

MAIN INSTALLATION YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT

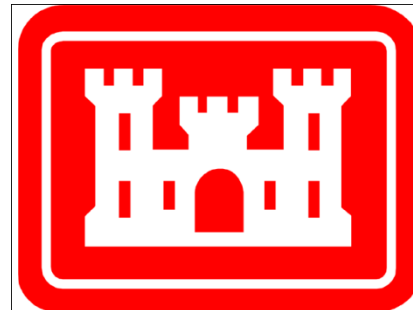
Defense Depot Memphis, Tennessee



Department of the Army



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**USACE Contract No. W90FYQ-09-D-0005
Task Order No. DS01**

**Revision 0
April 2014**

**MAIN INSTALLATION
YEAR THREE ENHANCED BIOREMEDIATION
TREATMENT REPORT**

Defense Depot Memphis, Tennessee

Prepared for:

U.S. Army Corps of Engineers, Tulsa District
Contract No. W90FYQ-09-D-0005
Task Order No. DS01

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LIST OF ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
cDCE	cis-1,2-dichloroethene
ceq/mL	cellular equivalents per milliliter
CF	chloroform
CT	carbon tetrachloride
CVOC	chlorinated volatile organic compound
DBCP	1,2-dibromo-3-chloropropane
DDMT	Defense Depot Memphis, Tennessee
DHc	dehalococcoides ethogenes
DO	dissolved oxygen
DQE	data quality evaluation
DQO	data quality objective
e ² M	engineering-environmental Management, Inc.
EBT	enhanced bioremediation treatment
ft	feet/foot
ft/ft	feet per foot
gpm	gallons per minute
IAQ	Intermediate Aquifer
IBC	intermediate bulk containers
IDW	investigation-derived waste
IRACR	Interim Remedial Action Completion Report
IW	Injection Well
JRW	JRW Bioremediation, LLC
LCS	laboratory control sample
LTM	Long-Term Monitoring
LUC	land use control
MACTEC	MACTEC Engineering and Consulting, Inc.
MAQ	Memphis Aquifer
MCL	Maximum Contaminant Level
MEK	2-butanone
MFA	metabolic fatty acid
µg/L	micrograms per liter

LIST OF ACRONYMS AND ABBREVIATIONS

(Continued)

mg/L	milligrams per liter
MI	Main Installation
mL	milliliter
MS/MSD	matrix spike/matrix spike duplicate
msl	mean sea level
MTBE	methyl tert-butyl ether
MW	monitoring well
mV	milliVolts
NPT	National pipe thread
NTU	nephelometric turbidity unit
OPS	operating properly and successfully
ORP	oxygen reduction potential
PCE	tetrachloroethene
PCR	polymerase chain reaction
PMW	performance monitoring well
ppm	parts per million
psi	pounds per square inch
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
QC	Quality Control
RA	Remedial Action
RAO	Remedial Action Objective
RA SAP	Remedial Action Sampling and Analysis Plan
RAWP	Remedial Action Work Plan
RD	Remedial Design
RL	reporting limit
ROD	Record of Decision
RPD	relative percent difference
SCHD	Shelby County Health Department
SU	standard unit
TA	treatment area

LIST OF ACRONYMS AND ABBREVIATIONS

(Continued)

TCE	trichloroethene
TDEC	Tennessee Department of Environment and Conservation
TEA	terminal electron acceptor
TOC	total organic carbon
US	United States
USACE	United States Army Corp of Engineers
USEPA	United States Environmental Protection Agency
TTA	target treatment area
VC	vinyl chloride
vcrA	vinyl chloride reductase
VOC	volatile organic compound
%	percent

1.0 INTRODUCTION

HDR has prepared this Year Three Enhanced Bioremediation Treatment (EBT) Report for the Main Installation (MI) at Defense Depot Memphis, Tennessee (DDMT) under Contract W90FYQ-09-D-0005, Task Order DS01 to the United States Army Corps of Engineers (USACE), Tulsa District.

1.1 SITE LOCATION AND DESCRIPTION

Defense Depot Memphis, Tennessee is located in southeastern Memphis, Shelby County, Tennessee approximately 5 miles east of the Mississippi River and 2 miles north of Memphis International Airport (Figure 1). DDMT originated as a military facility in the early 1940s; it received, warehoused, and distributed supplies common to all United States (US) military services and some civil agencies located primarily in the southeastern US, Puerto Rico, and Panama. Stocked items included food; clothing; petroleum products; construction materials; and industrial, medical, and general supplies. In 1995, DDMT was placed on the list of the Department of Defense facilities to be closed under Base Realignment and Closure. Storage and distribution of material continued until the facility closed in September 1997.

The property covers approximately 632 acres and includes the MI and Dunn Field. The MI covers approximately 567 acres and had open storage areas, warehouses, military family housing, and outdoor recreational areas. Dunn Field, which is located across Dunn Avenue from the north-northwest portion of the MI, covers approximately 65 acres and had mineral storage and waste disposal areas.

In 1992, DDMT was added to the National Priorities List (57 Federal Register 47180 No. 199). Responsibility for environmental restoration at DDMT transferred from the Defense Logistics Agency to the Department of the Army in December 2010. The regulatory oversight agencies are US Environmental Protection Agency (USEPA) Region 4 and the Tennessee Department of Environment and Conservation (TDEC). DDMT's USEPA Identification Number is TN4210020570.

1.2 GEOLOGY AND HYDROGEOLOGY

The geologic units of interest at DDMT are (from youngest to oldest): loess, including surface soil; fluvial deposits; Jackson formation/Upper Claiborne group; and Memphis Sand.

The loess consists of wind-blown and deposited brown to reddish-brown, low-plasticity clayey silt to silty clay. The loess deposits are about 20 to 30 feet (ft) thick and are continuous throughout the DDMT area.

The fluvial (terrace) deposits consist of two general layers. The upper layer is a silty, sandy clay that transitions to a clayey sand and ranges from about 10 to 40 ft thick. The lower layer is composed of interlayered sand, sandy gravel, and gravelly sand, and has an average thickness of approximately 40 ft. The uppermost aquifer is the unconfined fluvial aquifer, which consists of saturated sands and gravelly sands in the lower portion of the fluvial deposits. Recharge to this unit is mainly from rainfall infiltration; discharge is to underlying units or laterally into adjacent stream channels. The saturated thickness ranges from 0 ft (dry) to approximately 60 ft, and is controlled by the uppermost clay configuration in the Jackson formation/Upper Claiborne group. The groundwater in the fluvial aquifer is not a drinking water source for area residents.

The intermediate aquifer (IAQ) is locally developed in Jackson Formation/Upper Claiborne group deposits, which contain laterally extensive, thick clay deposits. The uppermost clay unit appears to be continuous, except for a large gap or 'window' in the northwestern MI. There are other possible gaps in the clay off-site, west and northwest of Dunn Field. Where present, these gaps create connections to the underlying IAQ from the fluvial deposits.

The Memphis Sand primarily consists of thick-bedded, white to brown or gray, very fine-grained to gravelly, partly argillaceous and micaceous sand. The Memphis Sand ranges from 500 to 890 ft in thickness and begins at a depth below ground surface (bgs) of approximately 120 to 300 ft. The top of the Memphis Sand was identified at approximately 280 ft bgs (elevation of 15 ft above mean sea level [msl]) in monitoring well (MW)-254 and MW-255 near the northwest corner of the MI. The Memphis aquifer (MAQ) is confined by overlying clays and silts in the Cook Mountain formation (part of the Jackson/Upper Claiborne group) and contains groundwater under strong artesian (confined) conditions regionally. The City of Memphis obtains the majority of its drinking water from this unit. The Allen Well Field, which is operated by Memphis Light, Gas and Water, is located approximately 2 miles west of Dunn Field.

Groundwater elevations in the fluvial aquifer at the MI range from a high of approximately 240 ft msl in the northeast to a low of approximately 195 ft msl in the central area. Groundwater flow converges on a low point in the central MI and then diverges to the south or to the north toward the 'window'. Water level elevations in the IAQ, away from areas of recharge from the fluvial aquifer, and in the MAQ are approximately 160 ft msl.

1.3 REMEDIAL ACTION

Remedial action objectives (RAOs) for the MI were established in the *Main Installation Record of Decision, Revision 2* (MI ROD) (CH2M HILL, 2001). The groundwater RAOs are:

- to prevent ingestion of water contaminated with volatile organic compounds (VOCs) in excess of maximum contaminant levels (MCLs) from potential future onsite wells;
- to restore groundwater to concentrations at or less than MCLs; and
- to prevent migration horizontally and vertically offsite of groundwater contaminants in excess of MCLs.

The selected remedy for groundwater is:

- enhanced bioremediation of chlorinated volatile organic compounds (CVOCs) in the most contaminated part of the groundwater plume;
- long-term monitoring (LTM) to document changes in plume concentrations and to detect potential plume migration to off-site areas or into deeper aquifers; and
- deed restrictions and site controls to prevent production/consumptive use of groundwater, and drilling into deeper aquifers on the MI.

The *Main Installation Final Remedial Design, Revision 1* (MI RD) (CH2M HILL, 2004) used concentrations of 100 micrograms per liter (µg/L) for tetrachloroethene (PCE) and trichloroethene (TCE) to delineate two treatment areas. EBT system construction included installation of 49 injection wells (IWs) and 30 performance monitoring wells (PMWs) in the two target treatment areas (TTA-1 and TTA-2) in 2006. Injections of sodium lactate solution and performance monitoring were performed from September 2006 through March 2009. The untreated areas were left to degrade under natural attenuation.

LTM has been performed since 2004 in accordance with the MI LTM Plan in Appendix B of the MI RD. Land use controls (LUCs) have been implemented through deed and lease restrictions, zoning regulations, a Notice of Land Use Restrictions recorded in January 2005, and annual inspections since 2005.

Although EBT did not achieve the RAO of reducing concentrations below MCLs, CVOC concentrations for parent compounds were reduced over 80 percent (%) in wells with high baseline concentrations. Injections were halted based on the significant reduction in concentrations in the EBT areas, the lack of significant source areas in soil and the presence of similar low-level PCE concentrations in other groundwater plumes downgradient of the treatment areas (TAs). The *Main Installation Interim Remedial*

Action Completion Report, Revision 1 (MI IRACR) (HDR|e²M, 2010), including an Operating Properly and Successfully (OPS) determination, was submitted to the USEPA Region 4 and the TDEC in February 2010. The OPS determination and the IRACR were approved by USEPA in March 2010.

EBT components were planned to be removed following a period of monitoring after the last injection in February 2009. However, system removal and well abandonment were not performed because of rebound in CVOC concentrations observed in LTM samples. New baseline groundwater samples collected from the treatment areas (TTA-1 and TTA-2) in December 2011 confirmed rebound in CVOC concentrations ([Section 3.4.1](#)).

Additional action was determined necessary to improve progress toward groundwater RAOs, and EBT is being performed in areas where individual CVOC concentrations of parent compounds PCE, TCE and carbon tetrachloride (CT) exceed 100 µg/L: TTA-1, TTA-2, the West-Central plume and the Building 835 plume. The *Remedial Action Work Plan Addendum, Main Installation* (MI RAWP Addendum) (HDR 2012a) describing procedures for additional EBT was approved by USEPA and TDEC in January 2013. Quarterly injections of sodium lactate and performance monitoring were begun in November 2012. The EBT injection and performance monitoring wells are listed on [Table 1](#) and the locations are shown on [Figure 2](#).

The number of performance monitoring wells was reduced from the initial EBT activities and overall progress toward RAOs will be evaluated through LTM. In 2013, MI LTM included 99 wells classified as Background (6), Boundary (7), Performance (62) and Sentinel (24). The sample frequency for two wells installed in 2013 will be determined after four semiannual sample events. The remaining 97 wells have the following sample frequency: biennial (15 wells), annual (30 wells) and semiannual (52 wells). The LTM well locations are shown on [Figure 3](#) and current results are described in *Annual Long-Term Monitoring Report-2013* (HDR, 2014a).

2.0 FIELD ACTIVITIES

The field activities described in this report are: updated baseline monitoring in December 2011; abandonment of selected IWs and PMWs in June 2012; quarterly lactate injections in November 2012 and in February, May and August 2013; and quarterly performance monitoring in February, May, August and November 2013. Field activities and laboratory analyses were performed in accordance with RAWP Addendum, the *Remedial Action Sampling and Analysis Plan, Revision 1* (RA SAP) (MACTEC, 2005) and the *Remedial Action Operations and Long Term Monitoring Quality Assurance Project Plan, Revision 0* (QAPP) (HDR, 2011a). The QAPP is consistent with the RA SAP but has not received final approval.

2.1 BASELINE MONITORING

Updated baseline monitoring of injection and performance monitoring wells followed by abandonment of selected wells was recommended in the *Work Plan for Partial Abandonment of Enhanced Bioremediation Treatment System* (HDR, 2011b). The work plan was approved by USEPA and TDEC in a conference call on 10 November 2011. The results were initially presented in *December 2011 Baseline Samples for the Enhanced Bioremediation Treatment System* (HDR, 2012b). The sampling activities and results are presented in this report for completeness and to incorporate data quality evaluation (DQE) ([Section 3.3.1](#)).

There were 49 IWs and 30 PMWs used for EBT. Six PMWs had been incorporated in LTM, but the remaining wells had not been sampled since March 2009. Updated baseline monitoring included water level measurements in 98 wells near TTA-1 and TTA-2 and sampling of 49 IWs and 24 PMWs. The monitoring event continued the sample event identification from initial EBT; the December 2011 event was EBT-10.

Groundwater levels were measured on 5 December 2011 using water level meters with electronic sensors and tapes graduated in 0.01-foot increments. Three wells were not accessible due to heavy rain. The water level measurements are shown on [Table 2](#).

Groundwater samples were collected from the designated wells on 5 to 14 December 2011 using low-flow purging methods. Dedicated Teflon® bladders and Teflon®-lined polyethylene tubing were used for each well. The pumping rate at each well was set such that the water levels would not decline more than 4 inches (0.1 meter).

Water quality parameters were measured at 5 to 10 minute intervals during purging using a flow-through cell with a YSI 6550. The YSI 6550 was calibrated each morning prior to sampling and, if abnormal readings were observed during the day, the instruments were recalibrated in the field. All measurements were recorded on the field sampling forms.

Purging continued at each well for up to two hours in order to meet the stabilization criteria: three successive readings within 0.1 for pH, 10 milliVolts (mVs) for oxygen reduction potential (ORP), 5% for specific conductance, 10% for dissolved oxygen (DO) and <20 nephelometric turbidity units (NTUs) for turbidity. Temperature was also measured and recorded but was not used as a stabilization parameter. Samples were collected when stabilization criteria were met or the field team leader approved the variance from the criteria. The final stabilization measurements are shown on [Table 3](#). The following samples were collected without meeting the stabilization criteria:

- Samples were collected from IW-21-02B and IW-21-05A with turbidity values of not recorded and 62 NTUs, respectively. During sampling of IW-21-02B, the turbidity meter malfunctioned and readings were not collected; the sample was visually clear. At well IW-21-05A the sampling team collected the sample when the turbidity reading stabilized as opposed to meeting the 20 NTU criterion.

Samples were sent to Microbac Laboratories in Marietta, Ohio for laboratory analysis. The samples were analyzed for VOCs by method 8260B.

2.2 WELL ABANDONMENT AND MODIFICATION

2.2.1 EBT Well Abandonment

Recommendations for abandonment of selected EBT wells were presented in the 2011 Baseline Samples memorandum. USEPA and TDEC provided comments on the recommended well abandonment via email on 29 March 2012. The comments were accepted and the designated wells were abandoned in June 2012.

The 11 PMWs and 20 IWs were abandoned by M&W Drilling, a licensed Tennessee well driller. An HDR field geologist observed the well abandonment. Shelby County Health Department (SCHD) issued Permit #12-069 for well abandonment on 31 May 2012; the permit is included in [Appendix A-1](#). Well abandonment was performed on 6 to 8 June 2012 in accordance with SCHD requirements. A well abandonment summary is provided on [Table 4](#) and well locations are shown for TTA-1 on [Figure 4](#) and for TTA-2 on [Figure 5](#).

Total well depths were measured at each well to confirm that obstructions did not interfere with placement of the tremie pipe and grout. No obstructions were found and the measured depths were within +/- 0.2 ft of the recorded depths.

One-half gallon of bleach was poured into each well as a disinfectant, and bentonite chips were added to seal the screened section and to limit waste water. The wells were then filled with grout (Portland type II cement with 5% bentonite) from the bottom up using a tremie pipe. After the grout had time to settle, additional grout was added to completely fill the well casing.

IW well vault covers were removed and a cage of reinforcing steel was placed in each vault; the vaults were then filled with concrete from a mixer truck. PMW manhole covers were removed and the manhole was filled with concrete mixed on-site.

2.2.2 EBT Well Modifications

Modifications were made to 13 2-inch IWs to improve access and connections during injections. The modification required replacement of the well pad and manhole, and addition of a female national pipe thread (NPT) threaded top to the PVC riser for use with a cam-lock connection. The modified wells were DR1-5/5A, DR1-6/6A, DR2-2, DR2-5, MW-21, MW-62, MW-203A/B, MW-213 and PMW101-02A/B.

The modifications were made by TriState Testing Services from 15 July to 1 August 2013. The repairs were made by area with removal of old pads and installation of replacement pads completed at adjacent wells before moving to the next area. The concrete pads were broken up using a jackhammer and the debris was placed in a roll-off and disposed as construction debris at South Shelby Landfill.

The PVC risers were cut and a PVC slip coupling, with a PVC female NPT 2-inch threaded coupling, was glued to the top of the riser. The replacement pads were 3 ft by 3 ft by 4 inches thick. Each pad was constructed using crack resistant concrete mix with four pieces of #3 rebar, 2.5 ft in length, laid in an overlapping square around the manhole near the mid-depth of the pad. Morrison Bros. Co. 519 9-inch diameter, powder coated, single bolt, water tight manholes were placed in the center of the pad and approximately 1-inch higher than the edge of the pad. The concrete was sloped from the manhole to the edge of the pad to allow water runoff. The well identification number was stamped on a brass tag affixed to the pad.

The wells were re-surveyed for location and elevation by Allen and Hoshall as repairs were completed. Horizontal and vertical coordinates are based on the North American Datum, 1927 used for all survey

data at DDMT. Horizontal coordinates are provided in the Tennessee State Plane coordinate system. The survey plats are provided in [Appendix A-2](#).

2.3 LACTATE INJECTIONS

2.3.1 Injection System

The EBT injection system consists of the lactate storage and transfer system, injection trailers, and injection wells. Building 265 at Memphis Depot Industrial Park was renovated in 2006 to include concrete curbing and a ramp for the lactate transfer area; the transfer system with drum pumps, flow meter, batch controller and piping; and a potable water line with backflow preventer, flow meter, batch controller and piping. Sodium lactate solution is received in intermediate bulk containers (IBCs), which contain approximately 260 gallons; the solution and potable water are pumped through a metered system into the 500-gallon tank on the injection trailer to meet the desired concentration. The transfer system components (drum pump, flow meter and batch controller) were tested by HDR staff in 2012 and minor repairs were made.

Injections are made using trailers constructed by INTEX Environmental Group in July 2006. The trailer components include: 500-gallon polyethylene storage tank with top-mounted ports for sodium lactate and potable water, a mixer and an air vent, and a discharge port on the bottom of the tank; manually operated, electrically powered mixer; transfer pump rated at 20 gallons per minute (gpm) at 50 pounds per square inch (psi); gas-powered generator to power the mixer and transfer pump; 50-ft flexible Teflon discharge hose with cam-lock fitting compatible with injection wellheads; and pressure gauge and flow meter. An INTEX field engineer made necessary repairs to the trailers in January 2012.

Following abandonment of the selected IWs and PMWs in June 2012, there are 30 4-inch IWs. To expand the TAs, 15 2-inch monitoring wells previously used as PMWs or LTM wells are also used for injections. In addition, 13 2-inch monitoring wells are used as PMWs. The IWs and PMWs currently used for EBT are listed on [Table 1](#); the 4-inch wells include “IW” in the well identification. The well locations are shown for TTA-1 on [Figure 4](#), TTA-2 on [Figure 5](#), West-Central plume on [Figure 6](#) and Building 835 plume on [Figure 7](#).

2.3.2 Sodium Lactate Solution

During the initial round of EBT, a 60% sodium lactate concentrate was mixed with potable water to create the injection solution; table sugar and a cellulose mixture were added to increase the microbial population. The sodium lactate concentration in the injected solution varied from 2% to 17%. The sodium

lactate concentrate was purchased from JRW Bioremediation, LLC (JRW) under the name WILCLEAR®. JRW has since developed and tested a sodium lactate product with a proprietary nutrient blend under the name WILCLEAR PLUS®. The new product was reported to have improved efficiency in enhancing reductive dechlorination and was selected for use.

During the November 2012 injection event, WILCLEAR PLUS® was used in the 4-inch IWs and tested in four 2-inch IWs to determine if its higher viscosity and solids content could pass the 0.010-inch screens; the 4-inch well screens have 0.040-inch screens and were not expected to have a problem. The injection solution in the remaining 2-inch IWs was WILCLEAR® with 1 pound of sugar and 2 pounds of cellulose mixture in each 500-gallon tank. WILCLEAR PLUS® contains 61% fermentable material compared to 48% fermentable material in WILCLEAR®.

The injection solution in November 2012 was equivalent to 15% sodium lactate (25% sodium lactate concentrate [60%]) with 125 gallons of WILCLEAR® or 100 gallons of WILCLEAR PLUS® in each 500 gallon tank of injection solution. Each IW received 250 gallons of injection solution. During later injections, the mass of sodium lactate injected at each well was modified through changes to injection volume and/or solution concentration. Initially, the mass was selected through review of pre-injection ORP measurements as described in the MI RAWP Addendum; the mass injected in the previous quarter was increased in wells with an ORP greater than -100 and decreased in wells with an ORP less than -250. During later events, concentrations of total organic carbon (TOC) and parent CVOCs (PCE, TCE and CT) from the previous sample event were also considered.

2.3.3 Quarterly Injections

The initial round of injections for additional EBT was made in November 2012 and injections were made quarterly thereafter. The injection events were numbered sequentially with the initial EBT injections; the November 2012 event was I-45.

Each injection event includes the following activities:

- Clear access to injection and performance monitoring well locations.
- Measure water quality and collect groundwater samples at all injection and performance monitoring wells (except for I-45).
- Prepare sodium lactate injection fluid in the trailer-mounted, 500-gallon storage tank.
- Inject sodium lactate at designated wells.

- Rinse injection trailer components to prevent biological growth between injection events.

Sodium lactate concentrate is pumped to the trailer-mounted 500-gallon storage tank from bulk containers in the Building 265 transfer area. Digital batch controllers are used to deliver the proper volumes of concentrate and water to the storage tank. A tank-mounted mixer blends the tank contents during travel to the injection well.

The trailer-mounted tank is towed to each IW and the sodium lactate solution is pumped into the injection well using a flexible hose. Flow rates and pressures are monitored to ensure hose pressures do not exceed 35 psi and a blow-off valve at the IW prevents the well from being over pressurized. Injection volume at each well are monitored using a trailer-mounted totalizer.

The equipment and facility were cleaned after each injection event was completed. An Alconox/water solution was used to clean the containment area used while filling the trailer-mounted tank and to flush the tanks and injection equipment (pump and hoses). The trailers were power-washed to remove spilled lactate concentrate. The waste water was discharged in the grassed area outside the shop.

2.3.3.1 I-45, November 2012

Sodium lactate concentrate was delivered on 5 November and transferred to the storage bay of the field office. The shipment consisted of 14 IBCs of WILCLEAR PLUS® and 8 IBCs of WILCLEAR®, sufficient for two injection events. Injections were made at the designated wells on 6 to 11 November. The equipment and facility were cleaned on 12 November.

The initial injection solution was planned as 15% sodium lactate (25% sodium lactate concentrate [60%]) with 125 gallons of WILCLEAR® or 100 gallons of WILCLEAR PLUS® in each 500-gallon tank of injection solution. Slightly more concentrate was used for each tank to limit handling the IBCs; each WILCLEAR® IBC was used for two 500-gallon tanks (approximately 130 gallons per tank) and each WILCLEAR PLUS® IBC was used for two and one-half 500-gallon tanks (approximately 105 gallons per tank).

Each IW was planned to receive 250 gallons of injection solution. All 4-inch IWs received WILCLEAR PLUS®. Four 2-inch IWs (DR1-5/5A at TTA-1S and MW-62 and MW-213 at Building 835) received WILCLEAR PLUS® as a test; the eleven remaining 2-inch IWs received WILCLEAR®. The injection at each well is summarized on [Table 5](#).

Injections were to be made from north-to-south and upgradient-to-downgradient as specified in the MI RAWP Addendum. However, the WILCLEAR PLUS® was much more viscous than expected and could not be pumped with the existing transfer equipment. The 2-inch IWs receiving WILCLEAR® were injected first. Nine of the eleven 2-inch IWs received the target volume of 250 gallons. Well DR2-2 took only 128 gallons with the remainder injected in IW92-01. Well MW-113 took only 25 gallons with the remainder injected in IW92-07.

Following discussions with the vendor, it was determined that the WILCLEAR PLUS® was not properly diluted, and thus contained more fermentable material than intended. The more viscous material was pumped directly to the trailer-mounted tank using a Powerhorse 2-inch semi-trash pump, which took additional time and resulted in more frequent spills. The target volume was injected in all 4-inch IWs and three of the four 2-inch IWs (DR1-5A, MW-62 and MW213). Well DR1-5 took only 184 gallons of the solution; the remainder was injected in DR1-5A. Based on success in injecting the WILCLEAR PLUS® solution in the four 2-inch IWs, WILCLEAR PLUS ® was selected for use in all IWs with the remaining WILCLEAR® concentrate used over time.

2.3.3.2 I-46, February 2013

Additional sodium lactate concentrate was delivered on 5 February and transferred to the storage bay of the field office. The shipment consisted of 14 IBCs of WILCLEAR PLUS®, including 6 IBCs to replace lactate concentrate delivered in November 2012 that was not properly diluted. The remaining WILCLEAR PLUS® from the previous delivery and the empty IBCs were returned to the vendor. Injections were made at the designated wells on 12 to 15 February. The equipment and facility were cleaned on 16 February.

The injection solution concentration and volume for each IW were reviewed based on the ORP data collected 5 to 11 February during field measurements for the EBT-11 sample event. The target injection volume was kept at 250 gallons for all wells. The solution concentrations were kept at 15% in 6 IWs, increased to 18% in 12 IWs and to 21% in 23 IWs, and reduced to 12% in 4 IWs. The injection at each well is summarized on [Table 6](#).

Injections were grouped in IW pairs receiving the same percentage of sodium lactate. The injections were generally made north-to-south and upgradient-to-downgradient per the MI RAWP Addendum; some adjustments were made because the IW pairs to be injected from each tank were selected based on solution concentration as well as location.

The WILCLEAR PLUS® created foam during mixing which slightly reduced the volume in each tank available for injection. In most cases, the target volume was injected in the initial well and the second well received a reduced volume. The injected volume ranged from 213 to 254 gallons in 33 IWs with an average of 242 gallons per well. In addition, six IWs received injection volumes of 14 to 191 gallons because the wells filled and would not accept the target volume. The remaining volume was injected in the other IW injected from that tank; those wells received 275 to 471 gallons. The average volume injected in these 12 wells was 241 gallons. The total volume injected into the aquifer was 97% of the planned amount and mixing within the aquifer is expected to distribute the carbon source material sufficiently.

JRW Bioremediation's technical director was consulted regarding foaming during mixing. He suggested the foam was due to the high concentration of WILCLEAR PLUS® in the solution and that the concentration be reduced. However, foaming was not observed during mixing solutions or injections in November 2012. In addition, foaming was observed at all solution concentrations from 12 to 21%. Foaming was reduced when the water was added to the tank first followed by the lactate concentrate. Several tank loads were limited to 250 gallons of solution for injection at a single IW.

JRW also suggested that water be injected after the solution in order to force the solution from the well, which should increase the effect of the carbon source in the aquifer and lessen the potential for biofouling in the well. All injection wells that received WILCLEAR PLUS® had 100 gallons of water injected.

2.3.3.3 I-47, May 2013

Additional sodium lactate concentrate was delivered on 7 May and transferred to the storage bay of the field office. The shipment consisted of 14 IBCs of WILCLEAR PLUS®. Injections were made at the designated wells on 14 to 20 May. The equipment and facility were cleaned on 21 May.

The injection solution concentration for each IW was reviewed based on comparison of the ORP measurements from February and May 2013 and review of the TOC and CVOC analytical results for February 2013. The target volume of injection solution was 350 to 500 gallons per well and varied based on the volume of sodium lactate concentrate while trying to maintain lactate concentrations of 10% or less. The volume of lactate concentrate for May ranged from 30 to 60 gallons of WILCLEAR PLUS® and 75 to 87.5 gallons of WILCLEAR; lactate concentrations were 6 to 11%.

WILCLEAR PLUS® was used in TTA-1 and TTA-2, and WILCLEAR® was used in the Building 835 and West-Central areas. A small amount (130 milliliter [mL]) of BioGreen (aloe vera) was added to each

tank of solution to reduce foaming. A cellulose mixture with sodium bicarbonate was added to the injection solution for TTA-1N IWs to test whether the additive would increase pH toward 7 standard units (SU). Injections were sequential by individual well and were made north-to-south and upgradient-to-downgradient per the MI RAWP Addendum.

The injections were made with individual tank loads for each IW. The injection at each well is summarized on [Table 7](#). The target injection volumes were met at all but two IWs, DR2-2 and MW-113 which took only 26 gallons and 18 gallons respectively. The remaining volume was injected in IW92-01 for DR2-2 and in IW92-08 for MW-113.

The addition of aloe vera to each tank of injection solution was successful in significantly reducing foaming during the tank mixing. Only minor foaming was observed and the injection volumes were not affected. After the sodium lactate injections, all IWs had 100 gallons of water injected, except DR2-2 and MW-113, which only accepted 10 gallons of water.

2.3.3.4 I-48, August 2013

Injections were made at the designated wells on 20 to 27 August. The equipment and facility were cleaned on 28 August.

PMW and IW locations were switched in TTA-1N and TTA-2 for I-48. In TTA-1N, PMW21-01 replaced PMW21-04 as an IW. PMW21-01 was the upgradient well on the north side of TTA-1N and had shown little to no effect from EBT injections; PMW21-04 was a downgradient location. In TTA-2, PMW92-03 replaced MW-113 as an IW. Target volumes had not been met in two IWs at TTA-2 during I-45, I-46 and I-47; DR2-2 had taken 14 to 128 gallons and MW-113 had taken 17 to 25 gallons. DR2-2 was the furthest upgradient well and did not have a suitable alternative.

The injection solution concentration for each IW was reviewed based on comparison of the ORP measurements from May and August 2013 and review of the TOC and CVOC analytical results for May 2013. The target volume of injection solution was 350 to 500 gallons per well and varied based on the volume of sodium lactate concentrate while trying to maintain lactate concentrations of 10% or less. The volume of lactate concentrate for May ranged from 30 to 80 gallons per well, and the lactate concentrations were 6 to 12%.

WILCLEAR PLUS® was used in all IWs, but TTA-1 IWs received a mixture containing approximately two-thirds WILCLEAR PLUS® and one-third WILCLEAR® until the remaining 450 gallons of

WILCLEAR® was used. A small amount (130 mLs) of BioGreen (aloe vera) was added to each tank of injection solution to reduce foaming. Well injections were made north-to-south and upgradient-to-downgradient, per the MI RAWP Addendum. However, the injection sequence for TTA1-S varied from the listing in the Addendum; injections were made at DR1-5/5A and then from DR1-6/6A moving south to north in order to inject upgradient wells first.

The injections were made with individual tank loads for each IW. The injection at each well is summarized on [Table 8](#). The target injection volumes were met at all IWs, except DR2-2 which took only 26 gallons. The remaining volume was injected in IW92-01. Only minor foaming was observed and the injection volumes were not affected. After the EBT injections, all IWs had 100 gallons of water injected, except DR2-2 which only accepted 10 gallons of water.

2.4 PERFORMANCE MONITORING

Performance monitoring is conducted to evaluate success in expanding anaerobic conditions and decreasing CVOC concentrations through reductive dechlorination. Quarterly monitoring is performed at the 45 IWs and 13 PMWs prior to injections and includes water level measurements, field water quality measurements and groundwater sampling for laboratory analyses. Field water quality parameters are DO, ORP, pH, temperature, and conductivity. Laboratory analyses are made for VOCs, TOC, metabolic fatty acids (MFAs) and dissolved gases.

The initial performance monitoring for additional EBT was conducted in February 2013, prior to the I-46 lactate injections. The performance monitoring events continued the sample event identification from the initial EBT; the February 2013 event was EBT-11.

Water levels measurements were made prior to each sample event using water level meters with an electronic sensor and tape graduated in 0.01-ft increments. The water level measurements are shown on [Table 9](#).

At most locations, groundwater samples were collected by low-flow purging methods using bladder pumps, with dedicated Teflon® bladders and Teflon®-lined polyethylene tubing for each well. The pump was positioned near the mid-point of the saturated screen interval in each well and the pumping rate was adjusted to limit water level decline to 4 inches (0.1 meter). Samples were collected with a Teflon® bailer in wells with a thin saturated zone or slow recharge.

Water quality parameters were measured at 5 to 10 minute intervals during purging using a flow-through cell with a YSI 6550 and HACH 2100P turbidity meter. The wells sampled with a bailer had stabilization parameters collected using the same instrumentation; a sampling cup was filled from the bailer and a set of stabilization parameters were collected for every well volume. The units were calibrated each morning prior to sampling, and if abnormal readings were observed during the day, the instruments were recalibrated in the field. All measurements were recorded on the field sampling forms.

Purging continued at each well for up to two hours in order to meet the stabilization criteria: three successive readings within 0.1 for pH, 10 mVs for ORP, 5% for specific conductance, 10% for DO and <20 NTUs for turbidity. Temperature was also measured and recorded but was not used as a stabilization parameter. Samples were collected when stabilization criteria were met or the field team leader approved the variance from the criteria.

After the wells were purged and prior to sampling, field colorimetric tests were used to provide a more accurate DO level. Two test ranges were used. The high level kit (1 milligram per liter [mg/L] to 12 mg/L) employs the indigo carmine method; the reduced form of indigo carmine reacts with DO to form a blue product. The low level DO kit (0 mg/L to 1 mg/L) employs the Rhodazine D Method; the Rhodazine D compound in reduced form reacts with DO to form a bright pink reaction product. If the high range test result was 2 mg/L or less, the low range test was also run. The injection solution and associated biological activity resulted in very dark water in many IWs, which prevented use of the colorimetric tests at those locations.

The groundwater samples were sent to Microbac Laboratories in Marietta, Ohio for laboratory analysis. The samples were analyzed for VOCs by method 8260B, TOC by method SW9060, dissolved gases by method RSK-175, and MFAs by method ASTM D-1522.

In addition to the chemical analyses, microbial analyses were performed to confirm the presence of *Dehalococcoides ethogenes* (DHc) and to quantify the cellular equivalents present; the confirmation and quantitation were separate analyses. If DHc was present in a sample, secondary analyses were performed to confirm whether the DHc community includes the vinyl chloride reductase (*vcrA*) gene and then to quantify the *vcrA* component. Microbial analyses were performed on groundwater samples collected in the second quarterly sample events (EBT-12). Samples were collected from 14 wells selected based on the EBT-11 analytical results. A second round of microbial analyses during EBT-14 was cancelled due to negative results in the initial samples. The samples were analyzed by Microbac Laboratories in Knoxville, Tennessee.

The activities during each sampling event are summarized in the following sections.

2.4.1 EBT-11, February 2013

Groundwater levels were measured at all EBT wells on 5 February 2013; the measurements are shown on [Table 9](#).

Groundwater samples were collected from the 58 EBT wells on 5 to 11 February 2013. Samples were collected from 55 wells using low-flow purging; three monitoring wells (MW-62, MW-212 and MW-213) were sampled with a Teflon® bailer. The final stabilization measurements are shown on [Table 10](#).

Twenty-seven samples from IWs were not considered to meet the stabilization criteria because the water was dark to black and in some locations opaque; these samples are shown on [Table 10](#) with no measurements for “Dissolved Oxygen (Field Test)”. Turbidity measurements ranged from high positive to high negative values; suspended solids were not noticeable in the samples. The measurements were discussed with staff at Lamotte, the turbidity meter manufacturer, who stated the meter readings are based on a light beam passing through the sample and are not valid for highly colored water. The high negative values were stated to have no meaning and should be considered out of range. Based on the field observations and the discussions with Lamotte, wells were sampled after a half hour of purging if the water was dark and parameters other than turbidity were stable.

Samples at MW-62, MW-212 and MW-213 were collected after three well volumes were drawn from the well. Turbidity at MW-212 was 106 NTUs, above the stabilization criteria.

2.4.2 EBT-12, May 2013

Groundwater levels were measured in all EBT wells on 7 May; the measurements are shown on [Table 9](#).

Groundwater samples were collected from 57 of 58 EBT wells on 7 to 13 May 2013. Well IW92-03 was pumped dry during the initial purging and the water level did not recover sufficiently for sampling. Samples were collected from 54 wells using low-flow purging. Three monitoring wells (MW-62, MW-212 and MW-213) were sampled with a Teflon® bailer after three well volumes were drawn from the well. The final stabilization measurements are shown on [Table 11](#).

As observed during performance monitoring in February 2013, colorimetric DO measurements could not be made and turbidity measurement were out of range or did not stabilize at many wells because of the very dark purge water. Wells were sampled after a half hour of purging if the water was dark and

parameters other than turbidity were stable. Dark purge water was observed at the three wells sampled by bailer and the turbidity measurements were out of range.

Samples were also collected from 14 wells for microbial analyses to confirm the presence of DHc and to quantify the cellular equivalents present. Wells were selected to provide samples from all EBT areas and from wells with varying indication of reductive dechlorination. The selected wells were: TTA-1N (IW21-01A, IW21-03A, IW21-04B, PMW21-04); TTA-1S (IW101-03C, IW101-04C, IW101-07C, PMW101-04B); TTA-2 (IW92-02, IW92-07, DR2-5, PMW85-05); West-Central (MW-203A); and Building 835 (MW-62).

Samples for DHc analysis were collected in sterile 1-liter plastic, unpreserved containers and shipped the same day to Microbac Laboratories in Knoxville, Tennessee. The analytical method requires the samples be extracted within 48 hours of collection to minimize change in the microbial community. The DHc sample bottles were filled immediately after the sample containers for the chemical analyses were filled.

2.4.3 EBT-13, August 2013

Groundwater levels were measured in EBT wells on 13 August and re-measured at selected locations on 20 August. The final measurements are shown on [Table 9](#).

Groundwater samples were collected from the 58 EBT wells from 13 to 20 August 2013. Samples were collected from 53 wells using low-flow purging methods. Five wells were sampled with Teflon® bailers. Wells IW92-01 and IW92-03 were initially purged with a bladder pump on 14 August, but the water level could not be maintained. IW92-01 did not have sufficient water for sampling after purging and IW92-03 was pumped dry. The water level recovered very slowly at IW92-03, and the sample was collected on 19 August. IW92-01 was bailed dry on 19 August and sampled on 20 August. Three wells (MW-62, MW-212 and MW-213) were purged of three well volumes and sampled on the same day. The final stabilization measurements are shown on [Table 12](#).

Dark purge water due to the injection solution and associated biological activity prevented use of the colorimetric tests at 33 of 45 IWs and 3 of 13 MWs. Stabilization parameters could not be met at many wells because of the very dark purge water; these wells were sampled after a half hour of purging if parameters other than turbidity were stable. Dark purge water was observed at the five wells sampled by bailer and the turbidity measurements were out of range.

2.4.4 EBT-14, November 2013

Groundwater levels were measured in EBT wells on 5 November and re-measured at selected locations on 6 and 10 November; the final measurements are shown on [Table 9](#).

Groundwater samples were collected from the 58 EBT wells on 5 to 11 November 2013. Samples were collected from 53 wells using low-flow purging. Five wells were sampled with Teflon® bailers. Wells IW92-01 and IW92-03 were bailed dry on 5 November and sampled within 24 hours on 6 November. Wells MW-62, MW-212 and MW-213 were purged of three well volumes on 11 November and sampled on the same day. The final stabilization measurements are shown on [Table 13](#).

Dark purge water due to the injection solution and associated biological activity prevented use of the colorimetric tests at 35 of 45 IWs and 6 of 13 MWs. Stabilization parameters could not be met at many wells because of the very dark purge water; these wells were sampled after a half hour of purging if parameters other than turbidity were stable. Dark purge water was observed at the five wells sampled by bailer and the turbidity was out of range at four of the five wells.

2.5 WASTE DISPOSAL

The waste generated during Year Three EBT was classified as either non-investigative waste or investigation-derived waste (IDW). Non-investigative solid waste, such as packaging materials, personal protective equipment, disposable sampling supplies, and other inert refuse, was collected and placed in the dumpster adjacent to the field office for disposal at a municipal landfill. Non-investigative liquid waste consisted of water generated during cleanup of the injection equipment; it was discharged to grassed areas outside Building 265.

The IDW consisted of water from purging and sampling equipment decontamination. The water was collected in 5-gallon buckets with lids and added to the soil vapor extraction condensate storage tank on Dunn Field. When the storage tank nears capacity, the waste water is analyzed and, if concentration limits are met, discharged to the storm sewer per agreement with TDEC. The last discharge was made 25 April 2013.

3.0 SUMMARY OF MONITORING RESULTS

3.1 HYDROGEOLOGY

Water level measurements are shown on [Table 2](#) for the updated baseline event and on [Table 9](#) for the quarterly performance monitoring events, EBT-11 through EBT-14. The approximate groundwater flow gradient at each injection area was: TTA-1N, 0.003 feet/foot (ft/ft) to the northeast (IW21-02B to PMW21-04); TTA-1S, 0.002 ft/ft to the northeast (DR1-5A to PMW101-02A); TTA-2, 0.008 ft/ft to the southwest (IW85-06 to MW-85); West-Central, 0.003 ft/ft to the northeast (MW-203B to MW-197B); and Building 835, 0.004 ft/ft to the southeast (MW-62 to MW-212). Average groundwater velocity in the fluvial aquifer at the MI was estimated at 0.6 ft per day in the MI RD with similar gradients.

Groundwater elevation contours from the most recent LTM event are shown with the CVOC concentration isopleths on [Figures 8 to 60](#). The LTM contours are used because the measurements are more comprehensive and cover the entire MI.

3.2 FIELD MEASUREMENTS

Field measurements of secondary parameters were measured in all injection and performance monitoring wells prior to injections in each area, except that measurements were not made prior to I-45 in November 2012. The results are used to document the extent of anaerobic aquifer conditions within the EBT zones. The field measurements are listed for EBT-10, the updated baseline event, on [Table 3](#) and for the quarterly monitoring events, EBT-11 through EBT-14, on [Tables 10 through 13](#). The RAWP Addendum identified specific metrics for anaerobic aquifer conditions:

- pH: Sustained between 6 and 8 SU
- DQ: Sustained at concentrations less than 1 mg/L
- ORP: Sustained in the range of -50 mV to – 200 mV to promote conditions favorable for reductive dechlorination and less favorable for methanogenesis

3.2.1 pH Measurements

EBT wells were generally at the low end of the target pH range (6 to 8 SU). pH was slightly below 6 SU in some IWs and PMWs.

- For EBT-10, pH at all wells measured 5.7 to 7.0, except for two outliers (IW92-06 at 7.4 and IW101-06A at 8.8); the average pH was 6.3.

- For EBT-11, pH at IWs measured 5.6 to 7.0 and the average pH was 6.3; pH at PMWs measured 5.3 to 6.4 and the average pH was 5.9;
- For EBT-12, pH at IWs measured 5.6 to 7.2 and the average pH was 6.3; pH at PMWs measured 5.5 to 6.3, except for one outlier (PMW85-01 at 7.1), and the average pH was 6.2.
- For EBT-13, pH at IWs measured 5.8 to 7.1, except for one outlier (IW85-06 at 7.5), and the average pH was 6.5; pH at PMWs measured 5.6 to 6.6, except for one outlier (PMW85-01 at 7.6), and the average pH was 6.4.
- For EBT-14, pH at IWs measured 5.6 to 7.0 and the average pH was 6.4; pH at PMWs measured 5.6 to 6.4, except for one outlier (MW85 at 7.6), and the average pH was 6.2.

3.2.2 DO Measurements

Evaluation of DO measurements are based on the following correlations:

- 1) DO above 2 parts per million (ppm) indicates aerobic conditions,
- 2) DO of 0-2 ppm represents nitrate-reducing conditions, which is transitional between aerobic and anaerobic conditions; and
- 3) Absence of DO (0 ppm) indicates anaerobic conditions.

DO measurements from the flow-through meter were highly variable and are not considered useful for EBT-10 through EBT-13; the YSI meters were sent to the manufacturer for repair after EBT-13 and the meter readings were less variable and were similar to the colorimetric measurements in EBT-14. The colorimetric measurements could only be made at a limited number of IWs due to the dark color of the water purged from the wells. Results for the quarterly measurements are summarized below.

During EBT-11, colorimetric DO measurements were obtained at 18 of 45 IWs and at 12 of 13 PMWs. Measurements indicated aerobic conditions in 7 IWs and 5 PMWs, nitrate-reducing conditions in 11 IWs and 6 PMWs, and anaerobic conditions in 1 PMW.

During EBT-12, colorimetric DO measurements were obtained at 10 of 45 IWs and at 10 of 13 PMWs. Measurements indicated aerobic conditions in 4 IWs and 3 PMWs, nitrate-reducing conditions in 6 IWs and 7 PMWs, and anaerobic conditions in no IWs or PMWs.

During EBT-13, colorimetric DO measurements were obtained at 10 of 45 IWs and at 12 of 13 PMWs. Measurements indicated aerobic conditions in 2 IWs and 4 PMWs, nitrate-reducing conditions in 8 IWs and 7 PMWs, and anaerobic conditions in one PMW.

During EBT-14, colorimetric DO measurements were obtained at 10 of 45 IWs and at 7 of 13 PMWs. Colorimetric DO measurements indicated aerobic conditions in 8 IWs and 3 PMWs, nitrate-reducing conditions in 2 IWs and 4 PMWs, and anaerobic conditions in no IWs or PMWs. YSI DO measurements indicated aerobic conditions in 20 IWs and 6 PMWs, nitrate-reducing conditions in 25 IWs and 7 PMWs, and anaerobic conditions in no IWs or PMWs.

3.2.3 ORP Measurements

Evaluation of ORP measurements is based on the following correlations between the measurements and the dominant terminal electron acceptor (TEA) in a well (oxygen, nitrate, iron, sulfate and carbon dioxide [methanogenic]):

- 1) Aerobic conditions are represented by an ORP of 200 mV or higher.
- 2) Nitrate reduction is the dominant TEA process from 200 to -50 mV.
- 3) Iron reduction is the dominant TEA process from -50 to -220 mV.
- 4) Sulfate reduction is dominant between -220 and -240 mV.
- 5) Methanogenesis will occur below -240 mV.

During EBT-10, ORP measurements ranged from -343 to 205 mV, and averaged 49 mV. The measurements indicated aerobic conditions in 1 well, nitrate-reducing conditions in 58 wells, iron-reducing conditions in 13 wells, sulfate-reducing conditions in no wells, and methanogenic conditions in 1 well.

During EBT-11, ORP measurements at IWs ranged from -366 to 129 mV, and averaged -35 mV; PMWs ranged from -67.7 to 165 mV, and averaged 83. The measurements indicated aerobic conditions in no IWs or PMWs, nitrate-reducing conditions in 31 IWs and 12 PMWs, iron-reducing conditions in 11 IWs and 1 PMW, sulfate-reducing conditions in no IWs or PMWs, and methanogenic conditions in 3 IWs and no PMWs.

During EBT-12, ORP measurements at IWs ranged from -200 to 109 mV, and averaged -33 mV; PMWs ranged from -112 to 154 mV, and averaged 87. The measurements indicated aerobic conditions in no IWs or PMWs, nitrate-reducing conditions in 28 IWs and 12 PMWs, iron-reducing conditions in 17 IWs and 1 PMW, and sulfate-reducing or methanogenic conditions in no IWs or PMWs.

During EBT-13, ORP measurements at IWs ranged from -195 to 101 mV, and averaged -49 mV; PMWs ranged from -207 to 157 mV, and averaged 38 mV. The measurements indicated aerobic conditions in no

IWs or PMWs, nitrate-reducing conditions in 20 IWs and 11 PMWs, iron-reducing conditions in 25 IWs and 2 PMWs, and sulfate-reducing or methanogenic conditions in no IWs or PMWs.

During EBT-14, ORP measurements at IWs ranged from -170 to 47.9 mV, and averaged -79 mV; PMWs ranged from -210 to 171 mV, and averaged -10. The measurements indicated aerobic conditions in no IWs or PMWs, nitrate-reducing conditions in 11 IWs and 8 PMWs, iron-reducing conditions in 34 IWs and 5 PMWs, and sulfate-reducing or methanogenic conditions in no IWs or PMWs.

3.3 DATA QUALITY EVALUATION

Data collected during the updated baseline and quarterly events included in Year Three EBT were reviewed based on guidelines in the RA SAP and the QAPP. Data review was performed by an independent data validation contractor, Diane Short and Associates, Inc. The complete analytical results with DQE flags are presented for each sample event in [Appendix B](#).

Overall, the data from the EBT events met project DQOs and were determined to be sufficient to support the evaluation of RA. The complete DQE for Year Three EBT is provided in [Appendix C](#). The main findings from the DQE for the analyses are summarized separately below.

3.3.1 Baseline Analyses

Based on the review and the project data quality objectives (DQOs), the baseline results from sampling event EBT-10 are acceptable and usable. No data were rejected. The primary causes of the qualified data are described below.

- Eight non-detect results for 1,2-dibromo-3-chloropropane (DBCP) and 12 non-detect results for 2-butanone (MEK) were qualified as non-detect estimated “UJ” due to low responses in continuing calibration analyses.
- Ten detected results for methyl tert-butyl ether (MTBE) were qualified as estimated “J” due to high responses in second source standard analyses.
- Three MTBE results, two acetone results and one 1,2,3-trichloropropane results were qualified as estimated “J” due to recoveries above the control limits in the laboratory control samples (LCSs).
- Results for PCE in PMW101-05A-EBT-10, TCE in IW21-04A-EBT-10, acetone in IW101-03A-EBT-10 and cis-1,2-dichloroethene (cDCE) in IW21-04A-EBT-10 were qualified as estimated “J” due to low matrix spike recoveries.

- Any result reported below the reporting limit (RL) but above the method detection limit was flagged “J” and considered an estimated result (unless overridden by other quality control [QC] flags).

3.3.2 Geochemical Analyses

Based on the review and the project DQOs, the geochemical results from the four quarterly EBT sampling events are generally acceptable and usable. Two MFA results in the EBT-13 event were rejected; no other data were rejected. The primary causes of the qualified data are described below.

3.3.2.1 TOC Results

- Two results in EBT-11 and two results in EBT-12 were qualified “B” due to TOC detected in the method blank.
- TOC in IW92-07-EBT-12 and its field duplicate was qualified as estimated “J” due to a relative percent difference (RPD) above control limits.
- TOC results in four samples in EBT-12, 10 samples in EBT-13 and 16 samples in EBT-14 were qualified as estimated “J” due to pH values out of control limits that were not adjustable by the lab upon sample receipt.
- Two results in EBT-13 and three results in EBT-14 were qualified “B” due to TOC detected in the rinsate blanks.
- TOC in MW-85-EBT-14 was qualified as estimated “J” due to a continuing calibration result above control limits.
- Any result reported below the RL but above the method detection limit was flagged “J” and considered an estimated result (unless overridden by other QC flags).

3.3.2.2 Metabolic Fatty Acid (MFA) Results

- Results for MFAs were qualified as estimated “J” or non-detect estimated “UJ” due to an interfering peak at the beginning of the chromatogram that could possibly mask the analyte peak. This affected 49 results for pyruvic acid in EBT-11; 32 for pyruvic acid, 32 for lactic acid, three for propionic acid, one for acetic acid and one for butyric acid in EBT-12; 23 for lactic acid and 25 for pyruvic acid in EBT-13; and 37 for lactic acid, four for propionic acid and 38 for pyruvic acid in EBT-14.

- All results for 8 samples in EBT-13 and 13 samples in EBT-14 were qualified as estimated “J” or non-detect estimated “UJ” due to pH values out of control limits that were not adjustable by the lab upon sample receipt.
- Acetic acid and butyric acid results in IW101-03A-EBT-11 were qualified as estimated “J” due to high matrix spike recoveries.
- Acetic acid, butyric acid and propionic acid results in IW21-03B-EBT-11 and its associated field duplicate sample were qualified as estimated “J” due to field duplicate RPDs above the control limit.
- Fifty-nine results for 13 samples in EBT-12 were qualified as estimated “J” or non-detect estimated “UJ” because the samples were analyzed 1.5 to 4 days past the holding time.
- Acetic acid in MW-213-EBT-13 was qualified as estimated “B” due to acetic acid detected in the rinsate blank.
- Pyruvic acid in MW-197A-EBT-13 was qualified as non-detect “UJ” due to an MS recovery below control limits.
- Lactic acid and pyruvic acid results in IW101-05A-EBT-13 were rejected “R” due to 0% recovery in the matrix spike/matrix spike duplicate (MS/MSD).
- Any result reported below the RL but above the method detection limit was flagged “J” and considered an estimated result (unless overridden by other QC flags).

3.3.2.3 Dissolved Gases

- Methane results in PMW21-01-EBT-11 and methane and carbon dioxide results in PMW92-03-EBT-14 and their field duplicates were qualified as estimated “J” due to RPDs above control limits.
- Methane in IW92-01-EBT-11 and carbon dioxide in MW-197A-EBT-14 were qualified as estimated “J” due to an MS recovery above the control limits.
- Methane results for seven samples in EBT-12, seven samples in EBT-13 and five samples in EBT-14 were qualified “B” due to methane detected in the method blanks.
- One methane result in EBT-12 and one result in EBT-14 were qualified as estimated “J” because it was reported above the calibration range and a greater dilution was not analyzed.

- Any result reported below the RL but above the method detection limit was flagged “J” and considered an estimated result (unless overridden by other QC flags).

3.3.3 VOC Analyses

Based on the review and the project DQOs, the VOC results from the four quarterly EBT sampling events are acceptable and usable. No data were rejected. The causes of the qualified data are described below.

- Acetone results for eight samples in EBT-11, two samples in EBT-13 and nine samples in EBT-14 were qualified “B” due to acetone detected in the rinsate blanks.
- Bromomethane in IW85-06-EBT-13 was qualified as estimated “B” due to bromomethane detected in the method blank.
- One methylene chloride result, four 1,2-dichlorobenzene results and five 1,4-dichlorobenzene results for EBT-14 were qualified “B” due to the analyte detected in the method blank.
- Acetone in MW-213-EBT-12 was qualified “B” due to acetone detected in the trip blank.
- Methylene chloride results for four samples in EBT-13 and four samples in EBT-14 were qualified “B” due to methylene chloride detected in the trip blanks.
- Acetone results for 23 samples and MEK results for three samples in EBT-14 were qualified “B” due to the analyte detected in the trip blanks.
- All results for one sample in EBT-13 and nine samples in EBT-14 were qualified “J” or “UJ” because the samples were analyzed one to four days past the holding time.
- Acetone in PMW101-07B-EBT-12 was qualified as estimated “J” because the dilution analysis to report acetone was analyzed two days past the holding time.
- cDCE in PMW21-02-EBT-12 was qualified as estimated “J” due to an MS recovery above the control limits.
- 1,2,3-Trichloropropane and CT in PMW85-05-EBT-12 were qualified as estimated “J” due to MS recoveries below the control limits.
- Twelve bromomethane results, six bromoform results and two 1,2,3-trichloropropane results in EBT-12 were qualified as non-detect estimated “UJ” due to continuing calibration responses below the control limits.

- Eighty-two results in EBT-14 were qualified as estimated “J” or non-detect estimated “UJ” due to continuing calibration responses below the control limits.
- Naphthalene results for six samples in EBT-13 were qualified as estimated “J” due to continuing calibration responses above the control limits.
- Six results for 1,2,3-trichlorobenzene in EBT-13 were qualified as non-detect estimated “UJ” due to a low LCS recovery.
- The result for MEK in IW101-05A-EBT-13 was qualified as estimated “J” due to high MS/MSD recoveries.
- The result for 1,2,3-trichlorobenzene in MW-197A-EBT-13 was qualified as non-detect estimated “UJ” due to a low MS recovery.
- Six results for acetone in EBT-14 were qualified as estimated “J” due to a high LCS recovery.
- Any result reported below the RL but above the method detection limit was flagged “J” and considered an estimated result (unless overridden by other QC flags).

3.3.4 Summary

Due to the difficult matrix of these samples as a result of the sodium lactate injections, many analyses required several dilutions in order to optimize results. Samples were properly preserved in the field, as sample bottles arrived from the laboratory with preservatives already added. However, the pH upon receipt or analysis at the lab was often outside the control limits of $\text{pH} < 2$, and these sample results have been estimated.

3.4 ANALYTICAL RESULTS

The complete analytical results for the updated baseline samples (EBT-10) and the four quarterly performance monitoring sample events (EBT-11 to EBT-14) are provided in [Appendix B](#). The laboratory RL was raised for many samples collected in the quarterly events due to the organic content in the water; the RLs were increased by a factor of 2 to 50 depending on the dilutions required to meet QC criteria.

3.4.1 Baseline Analytical Results

The analytical results for the 73 groundwater samples collected in the December 2011 updated baseline event, EBT-10, are shown on [Tables 14 to 16](#), which lists the analytical results for the primary CVOCs

and for all other VOCs detected above the RL in one or more samples. A summary of analytical results for the primary CVOCs by area is provided on [Table 17](#).

Isoconcentration maps were prepared using these baseline sample results with October 2011 LTM results for wells near TTA-1 and TTA-2. The reported concentrations and isopleths for PCE and TCE at TTA-1 are shown on [Figures 8 and 9](#) and for PCE, TCE and CT at TTA-2 on [Figures 10, 11 and 12](#).

Analytical results for PCE and TCE from the August-September 2006 pre-EBT baseline samples, the March 2009 samples (after final EBT injections in February 2009) and the December 2011 samples are shown on [Table 18](#). CT was not detected above the RL in TTA-1, and those results are shown for TTA-2 only. Four wells in TTA-2 (IW-85-05, IW85-06, PMW-85-04 and PMW85-05) were installed in February 2007 and results from the initial March 2007 samples are shown. The 2011 results for the six PMWs included in LTM are from the October LTM event. Concentrations above 100 µg/L, the concentration used to select EBT treatment areas, are in bold type. The percentage change in concentration from August 2006 to December 2011 is shown for those wells with initial or final concentrations above 5 µg/L.

The updated baseline samples confirmed rebound in concentrations of parent compounds, with increasing concentrations of PCE in all areas, TCE in TTA-1S and CT in TTA-2. Concentrations were at pre-EBT baseline levels throughout TTA-1N and approximately one-third of pre-EBT baseline levels in TTA-1S and TTA-2.

3.4.2 Geochemical Analytical Results

Quarterly monitoring of geochemical parameters was performed to evaluate the success of EBT in creating conditions favorable for reductive dechlorination in the aquifer. The geochemical analytical results for the Year Three quarterly events are shown by treatment area on [Tables 19 to 22](#); geochemical analyses were not performed for the updated baseline event. The MFA analyses for TTA-2 well PMW85-05 were not performed for EBT-11 because the sample container broke during shipment. A sample was not collected at IW92-03 during EBT-12 because the well was pumped dry and the water level did not recover sufficiently for sampling.

The mean concentrations for TOC, MFAs and dissolved gases in injection wells and monitoring wells in each treatment area are shown on [Table 23](#). The mean values were determined from the reported concentrations, with non-detects excluded. A mean value was not determined if only one sample in the group had a concentration above detection limits, except at Building 835 where only one PMW is sampled.

The amount of carbon in the aquifer is indicated by results of TOC and MFA analyses; the TOC concentration is generally similar to the total MFA concentration. Many IWs, particularly in TTA-1N and TTA-2, had high concentrations in February 2013 (EBT-11) following initial injection of sodium lactate concentrate, which was reported by the vendor to have been diluted less than planned. At other IWs, TOC and MFA concentrations increased over time as injections continued. In addition, TOC concentrations at IWs within each injection area, or even a well cluster, varied by orders of magnitude indicating local variation in soil conditions and groundwater flow.

The concentrations of TOC and MFAs were significantly higher in injection wells than in monitoring wells in all areas, indicating slow dispersion of sodium lactate from the injection points. The concentrations were also higher in the original injection areas, TTA-1 and TTA-2, than in the new areas, West-Central and Building 835.

Carbon dioxide was not included in the analysis of dissolved gases during EBT-11 in February 2013, but the increasing concentrations in later quarterly events indicate increased biological activity resulting from the injections. Ethene and ethane were detected in only a few wells and at low concentrations. Methane concentrations increased initially and appeared to stabilize near 10,000 µg/L in IWs with lower concentrations at PMWs depending on their distance from the IWs; as with TOC, methane concentrations were higher in the original injection areas.

3.4.3 VOC Analytical Results

Summary tables for each sampling event list the analytical results for the primary CVOCs and other VOCs detected above the RL in one or more samples. The MCLs are also shown on the summary tables.

3.4.3.1 EBT-11 Results

Samples were collected from the 45 IWs and 13 PMWs in February 2013 for EBT-11. Analytical results for the primary CVOCs and other VOCs detected above the RLs are shown by TA on [Tables 24 to 27](#). The laboratory RL was raised for 23 IW samples with 4 samples increased by a factor of 5 (5X), 11 samples by 10X, 5 samples by 20X and 3 samples by 50X.

The analytical results for the primary CVOCs are summarized for IWs and PMWs in each area on [Table 28](#). The reported concentrations of PCE, TCE, cDCE and CT (TTA-2 only) are shown by area in [Figures 13 to 24](#); the figures include results from October 2012 LTM samples.

Other VOCs detected most frequently and at the highest concentrations were acetone and MEK. Acetone was detected in 36 wells at 3.05 to 1860 µg/L. MEK was detected in 31 wells at 3 to 2560 µg/L. These two VOCs were detected in 35 IWs and one PMW, PMW85-01.

3.4.3.2 EBT-12 Results

Samples were collected from 44 IWs and 13 PMWs in May 2013 for EBT-12. A sample could not be collected from IW92-03; the well was pumped dry and did not recover sufficiently for sampling. Analytical results for the primary CVOCs and other VOCs detected above the RLs are shown by treatment area on [Tables 29 to 32](#). The laboratory RL was raised for 31 IW samples and 1 PMW sample with 13 samples increased by a factor of 5 (5X), 15 samples by 10X, 3 samples by 20X and 1 sample by 50X.

The analytical results for the primary CVOCs are summarized for IWs and PMWs in each area on [Table 33](#). The reported concentrations of PCE, TCE, cDCE and CT (TTA-2 only) are shown by area in [Figures 25 to 36](#); the figures include results from April 2013 LTM samples.

Other VOCs detected most frequently and at the highest concentrations were acetone and MEK. Acetone was detected in 42 wells at 4.8 to 7,790 µg/L. MEK was detected in 37 wells at 6.0 to 20,800 µg/L. These two VOCs were detected in 40 IWs and two PMWs, PMW85-01 and PMW101-07B.

3.4.3.3 EBT-13 Results

Samples were collected from the 45 IWs and 13 PMWs in August 2013 for EBT-11. Analytical results for the primary CVOCs and other VOCs detected above the RLs are shown by TA on [Tables 34 to 37](#). The laboratory RL was raised for 31 IW samples and 2 PMW samples with 1 sample increased by a factor of 2 (2X), 19 samples by 5X, 7 samples by 10X, 3 samples by 20X, 2 samples by 25X and 1 sample by 50X.

The analytical results for the primary CVOCs are summarized for IWs and PMWs in each area on [Table 38](#). The reported concentrations of PCE, TCE, cDCE and CT (TTA-2 only) are shown by area in [Figures 37 to 48](#); the figures include results from April 2013 LTM samples.

Other VOCs detected most frequently and at the highest concentrations were acetone and MEK. Acetone was detected in 41 wells at 4 to 1,700 µg/L, and MEK was detected in 42 wells at 11 to 15,200 µg/L. These two VOCs were detected in 40 IWs and two PMWs, MW-85 and PMW85-01.

3.4.3.4 EBT-14 Results

Samples were collected from the 45 IWs and 13 PMWs in November 2013 for EBT-14. Analytical results for the primary CVOCs and other VOCs detected above the RLs are shown by TA on [Tables 39 to 42](#). The laboratory RL was raised for 30 IW samples and 2 PMW samples with 3 samples increased by a factor of 2 (2X), 14 samples by 5X, 12 samples by 10X, 2 samples by 20X and 1 sample by 50X.

The analytical results for the primary CVOCs are summarized for IWs and PMWs in each area on [Table 43](#). The reported concentrations of PCE, TCE, cDCE and CT (TTA-2 only) are shown for each area in [Figures 49 to 60](#); the figures include results from October 2013 LTM samples.

Other VOCs detected most frequently and at the highest concentrations were acetone and MEK. Acetone was detected in 48 wells at 2.8 to 5,650 µg/L, and MEK was detected in 47 wells at 4.1 to 8,640 µg/L. These two VOCs were detected in 43 IWs and 5 PMWs.

3.4.4 Microbial Analytical Results

Samples were collected from 14 wells during EBT-12 in May 2013 for microbial analyses to confirm the presence of DHc and to quantify the cellular equivalents present. The analytical reports for the microbial analyses are provided in [Appendix D](#). The initial screening for DHc was negative in all 14 samples.

Samples were initially analyzed using a laboratory-specific Polymerase Chain Reaction (PCR) analysis (#60106.1) to identify the presence or absence of DHc in the sample. Samples with positive results would then be screened for DHc containing the *vcrA* gene. Quantitative PCR analysis (#60112.1) would then be performed on selected samples with positive results to determine the number of cellular equivalents (ceq) of both DHc and DHc-*vcrA*. Since the initial screening was negative in all samples, the follow-on analyses were not performed.

The laboratory had to treat the samples as an oil/sludge because they would not filter properly as water. Multiple stage filters were used with the residual from each combined. At least 100 mL was collected from each sample, which provided the target detection limit for the PCR analysis, if the DHc was within 1 cellular equivalents per milliliter (ceq/mL) which is the cutoff for the RL. The laboratory spiked several samples to rule out matrix interference since the samples were difficult to prepare. All the spiked samples were properly identified.

3.5 TREND ANALYSIS

3.5.1 CVOC Concentration Trends

A comparison of PCE, TCE, and cDCE concentrations in the updated baseline and Year Three sample events for each treatment area are shown on [Tables 44 to 47](#). CT and chloroform (CF) are also shown for TTA-2 on [Table 46](#). The percentage change in parent CVOC (PCE, TCE and CT) concentrations from EBT-10 in December 2011 to EBT-14 in November 2013 is shown on the tables; the percentage change was only calculated for EBT-10 results above the MCL. One-half the RL was used for non-detect results in EBT-14.

PCE and TCE concentrations decreased in almost all IWs and in many PMWs in the five EBT areas. CT concentrations decreased in all IWs and all but one PMW in TTA-2. The results are summarized for each area below.

- At TTA-1N, PCE and TCE concentrations decreased at all IWs. PCE concentrations decreased -89% to -100% with an average of -96% and TCE concentrations decreased by -74% to -99% with an average of -88%. The results were mixed at the PMWs; PCE and TCE concentrations increased at PMW21-02 and decreased at PMW21-04, which was used as an IW until August 2013.
- At TTA-1S, PCE and TCE concentrations decreased at all IWs and PMWs. At IWs, PCE concentrations decreased -12% to -98% with an average of -80% and TCE concentrations decreased by -84% to -99% with an average of -94%. At PMWs, PCE concentrations decreased -18% to -89% with an average of -46% and TCE concentrations decreased by -6% at the only PMW which exceeded the MCL.
- At TTA-2, PCE, TCE and CT concentrations decreased at all IWs, except PCE at IW92-08, and at all PMWs, except PMW85-05. The increased PCE at IW92-08 is due to a low initial concentration and an elevated RL for the non-detect in EBT-14; the percentage decreases at other wells were also impacted by elevated RLs. At IWs, PCE concentrations decreased -70% to -97% with an average of -87%, excluding IW92-08; TCE concentrations decreased by -24% to -96% with an average of -56%; and CT concentrations decreased by -80% to -99% with an average of -85%. At PMWs, PCE concentrations decreased -90% to -96% at three PMWs and increased 24% at one; TCE concentrations decreased -83% to -93% at three PMWs and increased 11% at one; and CT concentrations decreased -92% to -98% at three PMWs and decreased -3% at one.

- At the West-Central area, PCE concentrations decreased an average of -90% at the two IWs and -40% at the two PMWs, while TCE concentrations decreased -74% at the one IW exceeding the MCL and increased 7% at the one PMW exceeding the MCL.
- At the Building 835 area, TCE concentrations decreased -85% at the one IW exceeding the MCL and decreased -43% at the one PMW.

3.5.2 MCL Exceedance

CVOC concentrations at all EBT wells are listed for EBT-10 through EBT-14 in Appendix E, [Tables E-1 to E-5](#). The tables list the wells in descending order for the primary CVOC concentrations with results above the MCL shown in bold type. The number of wells exceeding MCLs for one or more CVOCs and the number exceeding MCLs for individual CVOCs are listed below by sample event.

Event	Total No. of Wells	PCE 5 µg/L	TCE 5 µg/L	cDCE 70 µg/L	VC 2 µg/L	CT 5 µg/L	CF 80 µg/L
EBT-10	55	51	31	7	1	8	0
EBT-11	45	34	19	12	0	4	0
EBT-12	38	21	13	16	2	3	0
EBT-13	34	25	16	14	1	3	0
EBT-14	30	18	9	13	3	1	0

From EBT-10 to EBT-14, the total number of wells exceeding MCLs decreased by -45% and the number exceeding MCLs for parent CVOCs (PCE, TCE and CT) each decreased by over -60%.

EBT wells with CVOC concentrations above the MCL in November 2013 (EBT-14) are shown on [Table 48](#). The 30 EBT wells with concentrations above the MCL for one or more of these CVOCs are shown in order of decreasing concentration; only concentrations above the MCL are shown. The maximum concentrations for each CVOC were PCE at 149 µg/L and TCE 52.5 µg/L in PMW21-02, cDCE at 211 µg/L and VC at 3.09 µg/L in IW101-07C, and CT at 75.3 µg/L in PMW85-05. Parent CVOCs (PCE, TCE and CT) were reported at concentrations above 50 µg/L in one IW (DR1-6) and three PMWs (PMW21-02, PMW21-04 and PMW85-05).

3.5.3 Reductive Dechlorination

Historical analytical results for the primary CVOCs in the EBT wells are provided in [Appendix F](#). Mass balance charts for primary CVOCs in the EBT wells are provided in [Appendix G](#); the charts show results from August 2006, the initial baseline samples prior to start of EBT.

The mass balance charts were reviewed for decreasing concentrations of PCE, TCE and CT with increasing concentrations of cDCE, VC and CF as indications of reductive dechlorination. All IWs were considered positive for reductive dechlorination, although the change in concentrations was less in a few wells, IW101-02B, IW101-05B and DR1-6 in TTA-1S and MW-213 in the Building 835 area. Reductive dechlorination was observed in PMW21-04 when it was used as an IW, but PCE concentrations increased after injections were shifted to PMW21-01 in August 2013. Reductive dechlorination was not observed in five of the remaining twelve PMWs: PMW21-02, PMW101-07B, PMW85-05, MW-197A and MW-212.

The presence of carbon mass, as indicated by TOC concentration, had good correlation with observed reductive dechlorination. The four IWs with less change in parent CVOC concentrations had lower TOC concentrations in November 2013: 5.1 mg/L in IW101-02B, 13.9 mg/L in IW101-05B, 13.5 mg/L in DR1-6 and 419 mg/L in MW-213; reductive dechlorination at MW-213 is likely also affected by the very thin saturated thickness (< 1 ft) in that area. The other IWs had TOC concentrations of 45 to 22,600 mg/L and averaged 4,700 mg/L. IW101-07A, which had no CVOC concentrations above the MCL and TOC at 3.4 mg/L, was not included. The five PMWs with no observed reductive dechlorination had TOC at 1.1 to 2.7 mg/L; the remaining eight PMWs had TOC at 2.5 to 2720 mg/L.

Sodium lactate injections were shifted from PMW21-04 to PMW21-01 in August 2013 and significant changes were seen in the August and November 2013 analytical results. At PMW21-01, TOC increased from 2 to 210 mg/L, PCE decreased from 279 to 2.2 µg/L. TCE decreased from 56 to 0.8 µg/L and cDCE increased from 9.6 to 93 µg/L. At PMW21-04, TOC decreased from 444 to 65 mg/L, PCE increased from 25 to 115 µg/L, TCE increased from 8.7 to 28.5 µg/L and cDCE increased from 78 to 136 µg/L. The increased cDCE concentration at PMW21-04 indicates continuing effects of the injections, but the increased PCE and TCE indicate potential for rebound if residual CVOCs remain.

The charts also show the impact of the initial EBT from 2006 to 2009 and subsequent rebound in some wells. Differences due to screen depth were also observed in some paired wells. The shallower West-Central wells, MW-197B and MW-203B, both show decreasing PCE concentrations and increasing cDCE concentrations prior to the end of the initial injections in 2009. In the deeper wells, MW-203A showed no impact until the current injections began, while MW-197A had decreasing PCE concentrations but no cDCE until the current injections.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The selected remedy in the MI ROD included EBT in the most contaminated areas with the assumption that untreated parts of the groundwater plume would degrade under natural attenuation. The MI RD used concentrations of 100 µg/L for PCE and TCE to delineate two treatment areas and EBT was implemented from August 2006 to February 2009.

Rebound in CVOC concentrations was observed in LTM, and EBT was re-started in November 2012 to address the rebound and to improve progress toward RAOs, which require restoration of groundwater to concentrations at or less than MCLs and prevention of contaminant migration offsite at concentrations above MCLs. Additional EBT was implemented through sodium lactate injections utilizing 45 IWs in five areas with CVOC concentrations above 100 µg/L; performance monitoring was conducted using the IWs and 13 PMWs. Overall success of groundwater remediation will be determined through LTM.

The following sections summarize the success of additional EBT in creating anaerobic conditions in the treatment areas and reducing CVOC concentrations, review the schedule for meeting RAOs and provide recommendations for further action.

4.1 PERFORMANCE EVALUATION

The evaluation of EBT performance is based on the ‘operating properly and successfully’ criteria in the RAWP Addendum: injection of sodium lactate solution, distribution of carbon mass throughout the treatment area, maintenance of anaerobic conditions and decrease in CVOC concentrations to MCLs.

The injections were successfully made as summarized in [Tables 5 to 8](#). In each event, one to six IWs did not take the target volumes, but the remaining solution was injected in a nearby well. Problems with loss of solution volume through foaming and transfer of sodium lactate concentrate were successfully addressed.

Distribution of carbon mass is indicated by results of TOC and MFA analyses. Concentrations generally increased over time as injections continued. However, TOC concentrations at IWs within injection areas varied significantly indicating local variation in soil conditions and groundwater flow, and concentrations were significantly higher at IWs than in PMWs, due at least partly to the low groundwater velocity (roughly 0.6 feet per day). TOC concentrations are correlated to reductive dechlorination and were used with ORP and CVOC concentrations to adjust the carbon mass injected.

ORP was used as the primary measure of anaerobic condition; the target range was -50 mV to -200 mV within the iron reduction range. Field ORP measurements indicated aquifer conditions improved from EBT-11 with nitrate-reducing conditions in 43 wells, iron-reducing conditions in 12 wells and methanogenic conditions in 3 wells to EBT-14 with nitrate-reducing conditions in 19 wells and iron-reducing conditions in 39 wells.

Acetone and MEK were the non-halogenated VOCs detected most frequently and at the highest concentrations. Their accumulation can occur as fermentation products of higher metabolic acids like lactic acid under highly anaerobic and slightly reduced pH conditions; both VOCs are readily degradable and can be utilized to promote reductive dechlorination. The presence of acetone and MEK may also be due to the substrate being too concentrated in the immediate area or due to the lack of a TEA where concentrations of parent CVOCs (PCE, TCE and CT) are low. CVOc concentrations were used to select injection mass and water injections were used to force the lactate from the IWs into the aquifer.

The reduction in CVOc concentrations is the most important determinant of EBT success at the MI and was reviewed in several ways.

- CVOc concentrations from EBT-10, the updated baseline, and EBT-14 in November 2013 were compared for all EBT-10 samples that exceeded the MCL. PCE concentrations decreased at 39 of 40 IWs with an average of -83% for the 40 wells and at 9 of 11 PMWs with an average of -45% for the 11 wells; the increase at the one IW (IW92-08) appears to be due to an elevated RL. TCE concentrations decreased at 22 of 22 IWs with an average of -82% and at 6 of 9 PMWs with an average of -31% for the 9 wells. CT concentrations decreased at 4 of 4 IWs with an average of -85% and at 4 of 4 PMWs with an average of -73%.
- The number of EBT wells with concentrations above the MCL decreased from 55 in EBT-10 to 30 wells in EBT-14. The number of wells exceeding MCLs for parent CVOcs decreased from 51 to 18 for PCE, from 31 to 9 for TCE and from 8 to 1 for CT; there was a corresponding but lesser increase in wells exceeding MCLs for daughter CVOcs, with an increase from 7 to 13 for cDCE and from 1 to 3 for vinyl chloride (VC).
- The maximum concentrations for parent CVOcs decreased from 280 µg/L to 149 µg/L for PCE, from 166 µg/L to 52.5 µg/L for TCE and from 167 µg/L to 75.3 µg/L for CT. The number of wells with higher concentrations (>50 µg/L) of parent compounds also decreased from 19 at EBT-10 to 4 at EBT-14.

Review of mass balance charts indicated reductive dechlorination was occurring at all IWs and at 8 of 13 PMWs. There was good correlation with TOC concentrations above 50 mg/L and rebound was observed when injections were shifted from one location.

DHC bacteria, which are the only known organisms able to completely degrade PCE and TCE, were not detected in microbial analyses of groundwater samples from EBT wells. While cDCE and VC have been detected at sustained high concentrations in a few LTM wells near EBT areas, the mass balance charts show cDCE concentrations decreasing in EBT wells a few quarters after parent CVOCs are depleted. Maximum VC concentrations at EBT wells were 1.48 µg/L to 8 µg/L in the four quarterly sample events.

4.2 PROJECT SCHEDULE

The ROD estimated that 10 years would be required for the selected remedy to meet RAOs and the current schedule includes completion of LTM in 2015, compliance monitoring in 2016 and RA completion for the MI and submittal of the remedial action completion report in 2017. The *Third Five-Year Review, Revision 1* (HDR, 2012c) included an action item for re-evaluation of the schedule for meeting MCLs on the MI in this report.

Although significant progress in reducing CVOC concentrations in the treatment areas was made in Year Three of EBT, it is not likely that contaminant concentrations will be reduced to MCLs throughout the MI by December 2015. If similar progress is made in Year Four, parent CVOCs should be reduced to MCLs in the IWs but it is not clear that cDCE and VC concentrations will be reduced to MCLs or that MCLs will be met in all PMWs.

While contaminant source areas were not identified in previous investigations, contaminant rebound after the initial EBT indicates residual contamination remains in the aquifer or vadose zone and some period of monitoring will be necessary after active groundwater treatment is completed. In addition, the 2013 LTM report noted there are 29 LTM wells in the fluvial aquifer that exceeded MCLs and are not affected by current EBT injections, and potential upgradient impacts to groundwater need to be defined in some areas. There are also IAQ wells exceeding MCLs for PCE and TCE; these concentrations are expected to be reduced over time by EBT in the fluvial aquifer. MI LTM wells that exceeded MCLs in the most recent annual samples collected October 2013 are listed on [Table 49](#).

The *2014 Site Management Plan, Revision 1* (SMP) (HDR, 2014b) stated the following issues should be considered in reviewing the schedule to meet RAOs on the MI: 1) determination of CVOC concentrations or locations in the fluvial aquifer that require active treatment versus natural attenuation, 2) the need for

RA in the IAQ, 3) the continued use of EBT versus other RAs and 4) potential impacts from off-site locations. The re-evaluation will be performed in 2014 and will be based on the findings from the 2013 LTM report and this EBT report.

4.3 RECOMMENDATIONS

Year Three EBT was successful in making progress toward RAOs and no changes to current procedures are recommended. EBT was shown to be effective in reducing CVOC concentrations where injections increase TOC concentrations above 50 mg/L.

Additional delineation of contaminant extent was recommended in the 2013 LTM report and expansion of the treatment areas and bioaugmentation should be considered along with alternative technologies.

5.0 REFERENCES

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TABLES

TABLE 1
EBT WELL DATA SUMMARY
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well	Area	Type	Northing (ft)	Easting (ft)	Top of Casing (ft, msl)	Ground Elevation (ft, msl)	Riser Length (ft)	Screen Length (ft)	Total Well Depth (ft, btoc)
IW21-01A	TTA-1N	IW	276504.77	800599.88	294.34	294.99	98.7	10	108.7
IW21-01B	TTA-1N	IW	276500.95	800605.89	294.61	294.85	89.9	10	99.9
IW21-02A	TTA-1N	IW	276464.81	800594.24	294.62	295.25	100.2	10	110.2
IW21-02B	TTA-1N	IW	276462.20	800598.51	294.65	295.12	91.7	10	101.7
IW21-03A	TTA-1N	IW	276551.96	800698.20	292.81	293.23	99.7	10	109.7
IW21-03B	TTA-1N	IW	276549.21	800705.08	292.50	293.12	89.8	10	99.8
IW21-04A	TTA-1N	IW	276518.82	800711.10	292.69	293.20	99.9	10	109.9
IW21-04B	TTA-1N	IW	276515.66	800715.39	292.79	293.30	89.7	10	99.7
MW-21 ²	TTA-1N	IW	276473.36	800602.47	295.00	295.30	92.1	15	107.1
PMW21-01 ^{1,2}	TTA-1N	IW	276533.14	800600.14	294.76	295.00	88.4	20	108.4
PMW21-02	TTA-1N	PMW	276574.64	800701.00	292.98	293.19	91.3	20	111.3
PMW21-04 ¹	TTA-1N	PMW	276601.83	800771.56	291.87	292.20	89.0	20	109.0
IW101-02A	TTA-1S	IW	276198.80	801107.92	291.12	291.60	124.0	15	139.0
IW101-02B	TTA-1S	IW	276200.62	801111.95	291.14	291.72	110.1	15	125.1
IW101-02C	TTA-1S	IW	276203.32	801116.22	291.53	291.74	93.7	15	108.7
IW101-03A	TTA-1S	IW	276164.62	801104.58	291.94	292.36	125.2	15	140.2
IW101-03B	TTA-1S	IW	276161.58	801106.45	291.91	292.51	109.4	15	124.4
IW101-03C	TTA-1S	IW	276158.05	801108.62	292.04	292.54	93.6	15	108.6
IW101-04A	TTA-1S	IW	276249.13	801142.39	291.72	292.18	123.4	15	138.4
IW101-04B	TTA-1S	IW	276252.94	801142.79	291.59	292.08	107.0	15	122.0
IW101-04C	TTA-1S	IW	276257.10	801143.03	291.47	292.05	92.3	15	107.3
IW101-05A	TTA-1S	IW	276214.93	801126.64	291.52	292.12	121.4	15	136.4
IW101-05B	TTA-1S	IW	276218.44	801125.04	291.41	292.06	107.8	15	122.8
IW101-05C	TTA-1S	IW	276221.88	801122.88	291.27	291.89	92.2	15	107.2
IW101-07A	TTA-1S	IW	276125.77	801099.90	292.83	293.13	123.0	15	138.0
IW101-07B	TTA-1S	IW	276123.62	801102.61	292.81	293.15	106.6	15	121.6
IW101-07C	TTA-1S	IW	276121.28	801105.60	292.78	293.08	93.3	15	108.3
DR1-5 ²	TTA-1S	IW	276080.00	800828.43	294.46	294.86	124.7	20	144.7
DR1-5A ²	TTA-1S	IW	276087.00	800835.01	294.51	294.87	90.0	20	110.0
DR1-6 ²	TTA-1S	IW	276043.88	801103.40	293.17	293.50	114.4	20	134.4
DR1-6A ²	TTA-1S	IW	276035.02	801103.61	293.28	293.58	90.9	20	110.9
PMW101-02A ²	TTA-1S	IW	276281.93	801144.78	292.00	292.29	117.7	20	137.7
PMW101-02B ²	TTA-1S	IW	276286.33	801145.41	291.98	292.24	97.8	20	117.8
PMW101-04A	TTA-1S	PMW	276299.41	801182.12	291.07	291.43	117.9	20	137.9
PMW101-04B	TTA-1S	PMW	276296.40	801186.86	291.47	291.75	98.6	20	118.6
PMW101-07A	TTA-1S	PMW	276143.43	801171.78	292.20	292.52	117.9	20	137.9
PMW101-07B	TTA-1S	PMW	276141.84	801176.74	292.36	292.70	98.0	20	118.0
IW85-05	TTA-2	IW	276815.58	806162.75	304.73	305.30	92.4	10	102.4
IW85-06	TTA-2	IW	276779.47	806183.37	304.81	305.45	95.5	10	105.5
IW92-01	TTA-2	IW	276769.42	806506.97	304.51	304.88	80.4	10	90.4
IW92-02	TTA-2	IW	276719.57	806513.90	304.05	304.87	79.5	10	89.5
IW92-03	TTA-2	IW	276669.17	806511.19	304.20	304.72	83.5	10	93.5
IW92-07	TTA-2	IW	276725.81	806366.98	303.78	304.31	87.8	10	97.8
IW92-08	TTA-2	IW	276784.63	806289.19	304.55	304.93	85.3	10	95.3
DR2-2 ²	TTA-2	IW	276770.85	806658.86	304.30	304.67	78.4	15	93.4

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DR2-5 ²	TTA-2	IW	276830.98	806180.40	305.41	305.72	84.5	15	99.5
PMW92-03 ¹	TTA-2	IW	276678.91	806438.66	303.91	304.17	92.5	10	102.5
MW-113 ¹	TTA-2	PMW	276685.34	806279.10	304.81	304.92	96.0	10	106.0
PMW85-01	TTA-2	PMW	276802.18	806146.13	305.08	305.39	93.2	10	103.2
PMW85-05	TTA-2	PMW	276752.08	806222.46	305.12	305.32	93.2	10	103.2
MW-85	TTA-2	PMW	276704.14	806064.51	304.13	304.50	95.9	15	110.9
MW-62 ²	B-835	IW	278289.65	801857.92	293.71	293.90	86.1	10	96.1
MW-213 ²	B-835	IW	278427.08	801669.11	294.22	294.20	77.3	15	92.3
MW-212	B-835	PMW	278028.36	802225.40	295.34	295.68	85.3	15	100.3
MW-203A ²	W-C	IW	276841.76	801740.43	290.70	290.80	142.9	20	162.9
MW-203B ²	W-C	IW	276821.40	801741.59	290.87	291.10	93.0	20	113.0
MW-197A	W-C	PMW	276975.42	802042.30	291.26	291.54	161.7	15	176.7
MW-197B	W-C	PMW	276973.14	802036.92	291.03	291.43	93.8	15	108.8

Notes:

- 1) PMW21-04 and MW-113 changed to PMWs, PMW21-01 and PMW92-03 to IWs in August 2013.
- 2) Wells re-surveyed after wellhead modifications in July 2013

btoc: below top of casing

ft: feet

msl: mean sea level

TABLE 2
WATER LEVEL MEASUREMENTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well ID	Top of Casing Elevation (ft, msl)	Top of Screen Elevation (ft, msl)	Depth to Water (ft, btoc) 5-Dec-11	Groundwater Elevation (ft, msl)
IW101-01A	290.76	291.29	86.39	204.37
IW101-01B	290.70	291.34	86.36	204.34
IW101-01C	290.66	291.52	86.40	204.26
IW101-02A	291.12	291.60	86.64	204.48
IW101-02B	291.14	291.72	86.70	204.44
IW101-02C	291.53	291.74	87.19	204.34
IW101-03A	291.94	292.36	87.43	204.51
IW101-03B	291.91	292.51	87.40	204.51
IW101-03C	292.04	292.54	87.50	204.54
IW101-04A	291.72	292.18	87.26	204.46
IW101-04B	291.59	292.08	87.30	204.29
IW101-04C	291.47	292.05	87.22	204.25
IW101-05A	291.52	292.12	87.18	204.34
IW101-05B	291.41	292.06	87.04	204.37
IW101-05C	291.27	291.89	86.92	204.35
IW101-06A	292.16	292.76	87.68	204.48
IW101-06B	292.19	292.85	87.63	204.56
IW101-06C	292.18	292.74	87.70	204.48
IW101-07A	292.83	293.13	88.20	204.63
IW101-07B	292.81	293.15	84.09	208.72
IW101-07C	292.78	293.08	88.15	204.63
IW101-08A	292.28	292.83	87.65	204.63
IW101-08B	292.20	292.92	87.82	204.38
IW101-08C	292.73	293.07	88.29	204.44
IW101-09A	292.59	292.94	88.07	204.52
IW101-09B	292.51	292.85	87.96	204.55
IW101-09C	292.59	292.99	87.97	204.62
IW21-01A	294.34	294.99	88.79	205.55
IW21-01B	294.61	294.85	88.95	205.66
IW21-02A	294.62	295.25	88.97	205.65
IW21-02B	294.65	295.12	88.91	205.74
IW21-03A	292.81	293.23	87.72	205.09
IW21-03B	292.50	293.12	87.39	205.11
IW21-04A	292.69	293.20	-	-
IW21-04B	292.79	293.30	87.70	205.09
IW21-05A	291.78	292.16	86.96	204.82
IW21-05B	291.82	292.26	87.01	204.81
IW85-01	304.79	305.15	93.10	211.69
IW85-02	304.93	305.33	93.72	211.21
IW85-05	304.73	305.30	94.31	210.42
IW85-06	304.81	305.45	95.39	209.42
IW92-01	304.51	304.88	84.65	219.86
IW92-02	304.05	304.87	82.84	221.21
IW92-03	304.20	304.72	90.97	213.23
IW92-04	303.80	304.40	91.26	212.54
IW92-05	303.99	304.28	89.23	214.76
IW92-06	304.07	304.34	84.89	219.18
IW92-07	303.78	304.31	91.89	211.89
IW92-08	304.55	304.93	92.49	212.06
PMW101-01A	290.78	291.17	86.43	204.35
PMW101-01B	290.86	291.20	86.60	204.26
PMW101-02A	291.47	291.87	87.25	204.22

TABLE 2
WATER LEVEL MEASUREMENTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well ID	Top of Casing Elevation (ft, msl)	Top of Screen Elevation (ft, msl)	Depth to Water (ft, btoc) 5-Dec-11	Groundwater Elevation (ft, msl)
PMW101-02B	291.60	291.83	87.47	204.13
PMW101-03A	291.61	291.99	87.55	204.06
PMW101-03B	291.55	291.82	87.50	204.05
PMW101-04A	291.07	291.43	86.95	204.12
PMW101-04B	291.47	291.75	87.45	204.02
PMW101-05A	291.43	291.84	87.22	204.21
PMW101-05B	291.68	292.11	87.52	204.16
PMW101-06A	292.13	292.72	87.79	204.34
PMW101-06B	292.17	292.40	87.83	204.34
PMW101-07A	292.20	292.52	87.82	204.38
PMW101-07B	292.36	292.70	88.00	204.36
PMW101-08A	293.01	293.30	88.51	204.50
PMW101-08B	293.03	293.47	88.49	204.54
PMW21-01	294.73	295.12	88.86	205.87
PMW21-02	292.98	293.19	87.83	205.15
PMW21-03	292.11	292.72	87.03	205.08
PMW21-04	291.87	292.20	87.11	204.76
PMW21-05	288.53	288.92	85.16	203.37
PMW85-01	305.08	305.39	95.40	209.68
PMW85-04	305.18	305.33	95.81	209.37
PMW85-05	305.12	305.32	94.70	210.42
PMW92-01	304.23	304.52	92.92	211.31
PMW92-02	304.17	304.35	93.11	211.06
PMW92-03	303.91	304.17	92.24	211.67
PMW92-04	303.93	304.08	92.96	210.97
PMW92-05	304.07	304.31	92.23	211.84
PMW92-06	304.65	304.97	93.36	211.29
DR1-1	293.09	171.42	88.19	204.90
DR1-1A	293.13	203.79	88.11	205.02
DR1-2	290.08	192.28	86.25	203.83
DR1-3	290.93	181.26	-	-
DR1-4	292.78	186.50	88.43	204.35
DR1-5	294.50	169.28	-	-
DR1-5A	294.61	204.88	89.46	205.15
DR1-6	292.98	177.14	88.11	204.87
DR1-6A	293.14	202.32	88.22	204.92
DR1-7	289.15	180.86	86.59	202.56
DR1-8	290.02	197.37	85.44	204.58
DR2-2	304.37	225.37	80.63	223.74
DR2-3	303.44	210.44	94.12	209.32
DR2-4	303.47	215.47	92.16	211.31
MW-26	303.69	206.09	96.54	207.15
MW-85	304.13	208.23	96.05	208.08
MW-96	289.02	213.52	79.46	209.56
MW-100B	291.06	183.56	86.21	204.85
MW-219	294.90	197.16	88.81	206.09

Notes:

btoc: below top of casing

ft: feet

msl: mean sea level

TABLE 3
FINAL FIELD MEASUREMENTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well ID	Date	Time Sampled	Sample Depth (ft, btoc)	Depth to Water (ft, btoc)	Purge Rate (mL/min)	Volume Purged (Liters)	pH	Temp (°C)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	Turbidity (NTUs)
IW21-01A	12/8/2011	09:29	102.0	89.2	140	10.3	6.1	14.9	0.296	1.5	37.0	2.3
IW21-01B	12/8/2011	13:45	94.0	89.3	100	11.5	6.2	17.7	0.382	2.1	116.6	2.7
IW21-02A	12/8/2011	15:29	105.0	89.2	172	5.9	6.0	16.6	0.274	2.3	146.7	0.8
IW21-02B	12/8/2011	16:29	95.0	89.4	80	4.0	6.0	11.3	0.295	3.4	99.0	NR
IW21-03A	12/9/2011	08:54	104.0	87.9	130	6.4	6.1	15.7	1.210	2.4	151.0	5.1
IW21-03B	12/9/2011	10:46	96.0	87.7	140	9.3	6.4	17.4	1.237	1.4	-54.7	1.5
IW21-04A	12/9/2011	13:19	90.5	87.9	140	11.5	6.1	16.7	1.101	1.2	87.7	4.3
IW21-04B	12/9/2011	14:51	94.0	87.9	160	6.7	6.2	17.1	1.137	1.4	8.3	4.4
IW21-05A	12/10/2011	9:05	106.0	87.5	140	8.9	7.0	14.5	1.162	7.5	109.2	62.1
IW21-05B	12/10/2011	10:42	95.0	87.5	140	6.4	6.1	15.8	1.239	2.8	99.5	6.5
IW101-01A	12/6/2011	10:30	129.0	86.5	150	24.2	6.3	17.8	0.394	1.5	115.2	5.4
IW101-01B	12/6/2011	12:03	120.0	86.5	120	7.0	6.3	16.6	0.392	5.5	171.0	0.1
IW101-01C	12/6/2011	12:46	99.0	86.5	230	4.3	6.2	17.1	0.378	4.7	155.4	1.2
IW101-02A	12/6/2011	16:14	131.0	86.7	240	6.3	6.3	15.7	0.386	3.3	175.9	1.8
IW101-02B	12/6/2011	14:47	117.0	86.8	140	7.2	6.2	18.0	0.358	5.9	174.6	5.4
IW101-02C	12/7/2011	09:01	100.0	87.3	200	5.9	6.1	16.7	0.353	3.5	204.5	0.0
IW101-03A	12/7/2011	11:02	133.0	87.6	175	6.7	6.4	14.7	0.428	1.9	141.3	5.4
IW101-03B	12/7/2011	12:20	117.0	87.6	150	5.7	6.0	16.2	0.304	6.1	169.7	5.7
IW101-03C	12/8/2011	13:46	101.0	87.7	200	3.7	6.1	17.6	0.167	5.5	99.8	16.3
IW101-04A	12/7/2011	15:16	131.0	87.5	150	5.1	6.4	7.0	0.449	2.3	118.0	7.0
IW101-04B	12/8/2011	16:05	115.0	87.5	120	4.8	6.4	17.7	0.363	1.7	-7.7	0.0
IW101-04C	12/8/2011	14:51	99.0	87.4	200	4.9	6.4	18.7	0.241	1.8	51.3	16.2
IW101-05A	12/9/2011	10:18	129.0	87.4	110	5.4	6.2	17.0	0.356	4.9	130.0	1.3
IW101-05B	12/9/2011	11:11	115.0	87.3	160	5.7	6.1	18.0	0.326	5.7	128.8	5.7
IW101-05C	12/9/2011	9:02	98.0	87.1	110	4.5	6.2	17.6	0.340	3.6	147.6	2.2
IW101-06A	12/9/2011	14:11	131.0	87.8	120	8.2	8.8	17.3	0.570	1.6	-2.8	5.3
IW101-06B	12/9/2011	15:08	101.0	87.9	110	5.3	5.9	17.9	0.233	6.4	102.5	5.5
IW101-06C	12/10/2011	8:36	101.0	88.1	140	3.6	6.1	16.2	0.205	4.0	116.7	5.4
IW101-07A	12/10/2011	12:07	131.0	88.7	100	4.3	6.4	17.2	0.284	8.0	124.4	2.5
IW101-07B	12/10/2011	15:04	113.0	89.6	120	5.1	7.0	17.3	0.334	6.4	82.9	8.1
IW101-07C	12/11/2011	09:16	100.0	88.5	60	4.5	6.0	16.4	0.170	1.8	129.2	3.7
IW101-08A	12/10/2011	12:15	131.0	88.1	120	5.4	6.3	15.0	1.404	7.4	100.8	8.5

TABLE 3
FINAL FIELD MEASUREMENTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well ID	Date	Time Sampled	Sample Depth (ft, btoc)	Depth to Water (ft, btoc)	Purge Rate (mL/min)	Volume Purged (Liters)	pH	Temp (°C)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	Turbidity (NTUs)
IW101-08B	12/11/2011	10:25	115.0	88.1	120	4.1	6.0	18.1	0.225	7.3	175.0	10.2
IW101-08C	12/11/2011	11:46	99.0	88.5	150	6.1	5.9	17.0	0.171	3.1	124.1	6.2
IW101-09A	12/11/2011	14:31	132.0	88.2	110	3.9	6.2	17.9	0.544	7.3	134.1	1.5
IW101-09B	12/12/2011	9:30	116.0	88.1	240	4.4	6.2	17.2	0.188	5.6	130.6	2.6
IW101-09C	12/12/2011	10:41	101.0	88.1	200	7.3	6.4	18.7	0.232	1.3	-68.9	18.5
IW85-01	12/14/2011	12:01	96.0	92.1	120	6.4	6.4	21.2	0.557	1.8	-53.6	3.9
IW85-02	12/14/2011	10:31	98.0	93.6	100	6.4	6.9	20.7	1.224	2.0	-66.3	6.3
IW85-05	12/14/2011	14:31	101.0	94.1	110	4.6	6.3	22.1	0.298	4.6	66.6	-0.1
IW85-06	12/14/2011	13:18	103.0	94.7	120	4.4	6.5	22.2	0.632	1.9	-66.4	1.9
IW92-01	12/12/2011	12:36	89.0	84.6	80	4.1	5.9	19.4	0.151	3.4	74.4	12.5
IW92-02	12/12/2011	13:57	90.0	81.8	76	3.6	5.9	18.1	0.178	2.2	106.7	9.0
IW92-03	12/12/2011	16:01	92.0	90.9	60	4.5	6.2	16.5	0.194	2.5	-111.4	18.8
IW92-04	12/13/2011	09:27	92.0	91.3	110	3.5	6.7	16.2	0.627	1.5	-84.3	9.5
IW92-05	12/13/2011	11:50	92.0	90.0	50	2.7	6.4	27.2	38.910	0.0	-343.0	91.9
IW92-06	12/13/2011	16:44	93.0	90.9	80	4.6	7.4	17.4	4.878	3.5	-7.3	46.6
IW92-07	12/13/2011	16:23	95.0	91.8	120	5.4	6.9	20.2	1.036	3.5	-86.3	9.5
IW92-08	12/14/2011	08:31	95.0	92.4	100	3.2	6.4	19.0	0.481	2.1	-40.1	7.8
PMW21-01	12/6/2011	9:02	100.9	89.1	220	4.0	6.0	15.3	0.978	0.7	55.7	0.9
PMW21-02	12/6/2011	9:54	102.1	88.1	80	3.3	6.0	14.6	0.908	0.7	20.2	0.0
PMW21-04	12/6/2011	10:46	100.2	87.3	120	3.6	6.1	15.6	0.970	0.7	-16.8	8.4
PMW101-01A	12/6/2011	15:09	129.6	86.5	160	3.6	6.3	16.5	1.112	0.4	-46.5	0.0
PMW101-01B	12/6/2011	14:12	108.9	86.7	100	4.0	6.1	16.9	1.024	2.2	51.1	7.7
PMW101-02A	12/6/2011	13:06	128.0	87.5	140	3.5	6.1	16.2	1.014	0.3	-30.2	0.3
PMW101-02B	12/6/2011	11:56	108.3	87.7	120	5.2	6.2	16.2	0.831	0.9	-16.1	8.7
PMW101-03A	12/8/2011	14:43	130.1	87.8	120	3.2	6.4	17.6	1.600	4.8	-67.5	4.4
PMW101-03B	12/8/2011	15:42	110.1	87.7	100	4.0	6.4	16.7	1.734	0.4	-102.9	0.0
PMW101-05A	12/7/2011	11:47	115.7	87.4	120	14.4	6.0	16.4	1.376	0.5	64.6	1.5
PMW101-05B	12/7/2011	13:47	98.2	87.7	140	4.8	6.2	16.2	1.216	0.9	-30.2	7.4
PMW101-06A	12/9/2011	11:20	130.8	88.0	94	3.8	6.1	17.4	0.340	3.5	100.9	17.7
PMW101-06B	12/9/2011	10:20	110.2	88.1	80	3.5	6.0	15.7	0.272	2.4	106.4	10.1
PMW101-07A	12/9/2011	13:46	128.7	88.0	120	3.7	6.2	18.2	0.430	1.9	81.7	2.2
PMW101-07B	12/9/2011	12:50	108.7	88.2	120	4.9	6.0	18.5	0.196	7.8	144.4	2.9

TABLE 3
 FINAL FIELD MEASUREMENTS, EBT-10
 YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
 Main Installation - Defense Depot Memphis, Tennessee

Well ID	Date	Time Sampled	Sample Depth (ft, btoc)	Depth to Water (ft, btoc)	Purge Rate (mL/min)	Volume Purged (Liters)	pH	Temp (°C)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	Turbidity (NTUs)
PMW101-08A	12/9/2011	15:32	108.9	88.7	160	4.5	6.2	18.3	0.508	2.5	22.7	9.2
PMW101-08B	12/10/2011	09:50	108.9	89.0	260	8.3	6.0	16.1	0.132	2.2	130.6	2.3
PMW85-01	12/12/2011	15:36	100.7	95.4	120	4.0	6.0	20.4	0.239	1.9	56.5	2.9
PMW85-04	12/13/2011	13:49	100.0	95.8	100	4.2	6.6	22.1	0.314	1.2	-70.9	7.9
PMW85-05	12/13/2011	15:06	101.0	94.8	100	4.1	5.7	21.2	0.176	1.6	64.8	2.3
PMW92-01	12/12/2011	09:10	99.0	92.8	120	6.0	6.4	18.8	0.694	1.8	-71.4	11.1
PMW92-02	12/12/2011	10:21	100.7	93.1	100	3.4	6.7	19.6	0.532	1.3	-120.3	0.9
PMW92-04	12/12/2011	13:00	98.5	93.0	120	3.4	6.1	20.8	0.257	1.5	-16.6	9.1
PMW92-05	12/12/2011	14:34	96.7	92.4	100	3.8	5.9	21.0	0.179	1.7	-41.9	13.1

Notes:

°C : degrees Celsius

btoc: below top of casing

ft: feet

mg/L : milligrams per liter

mL/min: milliliters per minute

mS/cm : milliSiemens per centimeter

mV :millivolts

NR: not recorded

NTU: nephelometric turbidity unit

TABLE 4
WELL ABANDONMENT SUMMARY
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well	Northing	Easting	Ground Elevation (ft, msl)	Date Abandoned	Well Diameter (inches)	Total Depth (ft, btoc)
IW101-01A	276256.7	801113.2	291.3	6/6/2012	4	137.6
IW101-01B	276253.7	801115.2	291.3	6/6/2012	4	122.7
IW101-01C	276250.1	801117.9	291.5	6/6/2012	4	107.7
IW101-06A	276161.3	801127.0	292.8	6/6/2012	4	139.2
IW101-06B	276157.4	801129.8	292.9	6/6/2012	4	124.2
IW101-06C	276153.0	801133.1	292.7	6/6/2012	4	109.7
IW101-08A	276128.3	801121.5	292.8	6/6/2012	4	140.7
IW101-08B	276125.7	801124.7	292.9	6/6/2012	4	123.4
IW101-08C	276122.9	801128.6	293.1	6/6/2012	4	108.3
IW101-09A	276081.9	801109.6	292.9	6/6/2012	4	140.4
IW101-09B	276076.8	801109.0	292.9	6/6/2012	4	125.3
IW101-09C	276073.0	801108.5	293.0	6/6/2012	4	110.3
IW21-05A	276574.9	800775.8	292.2	6/6/2012	4	111.2
IW21-05B	276579.9	800772.7	292.3	6/6/2012	4	100.4
IW85-01	276831.3	806201.3	305.2	6/6/2012	4	98.6
IW85-02	276797.4	806222.5	305.3	6/6/2012	4	101.6
IW85-04	276779.3	806187.6	305.5	6/6/2012	4	81.7
IW92-04	276681.9	806489.6	304.4	6/6/2012	4	93.9
IW92-05	276707.0	806449.3	304.3	6/6/2012	4	93.8
IW92-06	276723.9	806409.1	304.3	6/6/2012	4	94.7
PMW101-01A	276273.2	801114.5	291.2	6/6/2012	2	141.2
PMW101-01B	276269.1	801119.3	291.2	6/6/2012	2	118.4
PMW101-05A	276252.7	801184.9	291.8	6/6/2012	2	125.2
PMW101-05B	276250.1	801189.8	292.1	6/6/2012	2	105.3
PMW101-08A	276070.3	801119.0	293.3	6/6/2012	2	140.0
PMW101-08B	276065.1	801121.3	293.5	6/6/2012	2	118.5
PMW85-04	276763.5	806168.7	305.3	6/6/2012	2	101.9
PMW92-01	276635.3	806499.8	304.5	6/6/2012	2	102.9
PMW92-04	276690.6	806399.3	304.1	6/6/2012	2	101.4
PMW92-05	276730.2	806346.4	304.3	6/6/2012	2	98.6
PMW92-06	276766.9	806270.7	305.0	6/6/2012	2	102.0

Notes:

btoc: below top of casing

ft: feet

msl: mean sea level

TABLE 5
INJECTION SUMMARY, I-45
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Area	Well ID	Area	Injection Material	Percent Sodium Lactate	Date Injected	Start Time	End Time	Average Flow Rate (gpm)	Volume Injected (gallons)
TTA-1N	IW21-01A	TTA-1N	W+	15	11/7/2012	16:07	16:26	14.1	268
	IW21-01B	TTA-1N	W+	15	11/7/2012	15:47	16:05	13.9	250
	IW21-02A	TTA-1N	W+	15	11/8/2012	9:49	10:11	12.1	267
	IW21-02B	TTA-1N	W+	16	11/8/2012	9:27	9:48	11.9	250
	IW21-03A	TTA-1N	W+	15	11/8/2012	11:00	11:11	24.3	267
	IW21-03B	TTA-1N	W+	15	11/8/2012	10:46	11:00	17.9	250
	IW21-04A	TTA-1N	W+	15	11/8/2012	14:34	15:07	7.6	250
	IW21-04B	TTA-1N	W+	15	11/8/2012	13:53	14:33	6.3	250
	MW-21	TTA-1N	W	15	11/6/2012	9:39	10:00	11.9	250
	PMW21-04	TTA-1N	W	15	11/6/2012	10:17	10:31	19.4	271
TTA-1S	IW101-02A	TTA-1S	W+	15	11/9/2012	14:55	15:08	19.2	250
	IW101-02B	TTA-1S	W+	15	11/9/2012	15:09	15:22	18.9	245
	IW101-02C	TTA-1S	W+	15	11/9/2012	15:45	16:14	9.3	270
	IW101-03A	TTA-1S	W+	15	11/9/2012	16:21	16:50	9.8	285
	IW101-03B	TTA-1S	W+	15	11/10/2012	7:45	7:59	17.9	250
	IW101-03C	TTA-1S	W+	15	11/10/2012	7:59	8:12	17.7	230
	IW101-04A	TTA-1S	W+	15	11/9/2012	9:42	10:30	5.2	250
	IW101-04B	TTA-1S	W+	15	11/9/2012	10:30	11:02	8.0	255
	IW101-04C	TTA-1S	W+	15	11/9/2012	12:13	12:25	20.8	250
	IW101-05A	TTA-1S	W+	15	11/9/2012	12:29	12:41	22.4	269
	IW101-05B	TTA-1S	W+	15	11/9/2012	13:21	13:44	10.9	250
	IW101-05C	TTA-1S	W+	15	11/9/2012	13:44	14:08	10.8	259
	IW101-07A	TTA-1S	W+	15	11/10/2012	8:37	9:10	7.6	250
	IW101-07B	TTA-1S	W+	15	11/10/2012	9:11	9:52	6.3	257
	IW101-07C	TTA-1S	W+	15	11/10/2012	10:16	10:29	19.2	250
	DR1-5	TTA-1S	W+	15	11/9/2012	7:56	8:56	3.1	184
	DR1-5A ¹	TTA-1S	W+	15	11/9/2012	7:37	7:49	26.3	316
	DR1-6	TTA-1S	W	15	11/6/2012	14:47	15:04	14.4	245
	DR1-6A	TTA-1S	W	15	11/6/2012	14:27	14:44	14.7	250
	PMW101-02A	TTA-1S	W	15	11/6/2012	13:21	13:31	25.0	250
	PMW101-02B	TTA-1S	W	15	11/6/2012	12:28	13:07	6.4	250

TABLE 5
INJECTION SUMMARY, I-45
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Area	Well ID	Area	Injection Material	Percent Sodium Lactate	Date Injected	Start Time	End Time	Average Flow Rate (gpm)	Volume Injected (gallons)
TTA-2	DR2-2	TTA-2	W	15	11/7/2012	7:36	8:36	2.1	128
	DR2-5	TTA-2	W	15	11/7/2012	9:00	11:00	2.1	250
	IW85-05	TTA-2	W+	15	11/10/2012	15:15	16:45	1.1	100
	IW85-05 ²	TTA-2	W+	15	11/11/2012	13:19	13:27	19.6	157
	IW85-06	TTA-2	W+	15	11/11/2012	9:39	11:20	0.8	75
	IW85-06 ²	TTA-2	W+	15	11/11/2012	13:04	13:17	13.5	175
	IW92-01 ³	TTA-2	W	15	11/7/2012	11:08	11:16	15.3	122
	IW92-01	TTA-2	W+	15	11/10/2012	10:42	10:59	14.5	247
	IW92-02	TTA-2	W+	15	11/10/2012	12:00	12:53	4.7	250
	IW92-03	TTA-2	W+	15	11/10/2012	13:05	14:45	2.6	260
	IW92-07	TTA-2	W+	15	11/10/2012	13:56	14:12	15.6	250
	IW92-07 ⁴	TTA-2	W	15	11/11/2012	11:30	11:44	16.1	225
	IW92-08	TTA-2	W+	15	11/10/2012	14:15	14:28	18.8	244
	MW-113	TTA-2	W	15	11/11/2012	9:22	11:22	0.2	25
W-C	MW-203A	W-C	W	15	11/7/2012	12:42	14:25	2.4	250
	MW-203B	W-C	W	15	11/7/2012	14:36	14:47	22.7	250
B-835	MW-213	Bldg 835	W+	15	11/11/2012	8:18	8:31	19.3	251
	MW-62	Bldg 835	W+	15	11/11/2012	7:58	8:11	19.2	250

Notes:

- 1): Includes remainder from DR1-5
- 2): Remainder injected after pump failed
- 3): Remainder from DR2-2
- 4): Remainder from MW-113

gpm: gallons per minute

W-C: West-Central

W: WILCLEAR®

W+: WILCLEAR PLUS®

TABLE 6
INJECTION SUMMARY, 1-46
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Area	Tank ID	Well ID	Oxidation Reduction Potential	Injection Material	Percent Sodium Lactate	Date Injected	Start Time	End Time	Time Injecting (minutes)	Average Flow Rate (gpm)	Volume Injected (gallons)	Water Injection Date
TTA-1N	T-1	IW21-01A	-33.8	W+	18	2/12/2013	8:06	8:16	10	25.1	251	2/13/2013
		IW21-02A	-87.4	W+	18	2/12/2013	8:22	8:34	12	17.7	213	2/13/2013
	T-2	IW21-01B	-106.4	W+	15	2/12/2013	9:12	9:25	13	19.2	250	2/13/2013
		IW21-02B	-190.7	W+	15	2/12/2013	9:28	9:38	10	22.1	221	2/13/2013
	T-3	IW21-03A	-1.8	W+	18	2/12/2013	10:34	10:48	14	17.9	250	2/13/2013
		IW21-04B	-54.2	W+	18	2/12/2013	10:50	11:02	12	18.7	224	2/13/2013
	T-4	IW21-03B	-214.7	W+	12	2/12/2013	11:47	11:58	11	22.7	250	2/13/2013
		IW21-04A	-366.3	W+	12	2/12/2013	12:00	12:11	11	21.6	237	2/13/2013
	T-5	MW-21	48.0	W+	21	2/12/2013	12:50	13:02	12	20.8	250	2/13/2013
		PMW21-04	14.1	W+	21	2/12/2013	13:18	13:44	26	8.8	230	2/13/2013
TTA-1S	T-6	IW101-02A	27.6	W+	21	2/12/2013	13:58	14:09	11	23.1	254	2/14/2013
	T-7	IW101-02B	122.8	W+	21	2/12/2013	14:39	14:53	14	18.0	251	2/14/2013
	T-8	IW101-02C	22.4	W+	21	2/13/2013	8:22	8:31	9	27.8	250	2/15/2013
		IW101-03A	23.1	W+	21	2/13/2013	8:35	8:44	9	25.9	234	2/15/2013
	T-9	IW101-03B	32.5	W+	21	2/13/2013	9:22	9:36	14	17.9	250	2/15/2013
		IW101-03C	12.5	W+	21	2/13/2013	9:38	9:52	14	15.9	223	2/15/2013
	T-10	IW101-04A	34.1	W+	21	2/13/2013	10:18	10:27	9	27.9	252	2/15/2013
	T-11	IW101-04B	18.4	W+	21	2/13/2013	10:51	11:04	13	19.3	250	2/16/2013
	T-12	IW101-05A	43.2	W+	21	2/13/2013	13:43	13:52	9	27.3	246	2/14/2013
	T-13	IW101-05B	111.7	W+	21	2/13/2013	14:20	14:32	12	20.0	240	2/14/2013
	T-14	IW101-05C	8.0	W+	21	2/14/2013	8:48	8:58	10	25.1	251	2/14/2013
		IW101-07A	123.6	W+	21	2/14/2013	9:00	9:10	10	24.1	242	2/14/2013
	T-15	IW101-04C	-43.7	W+	18	2/14/2013	9:53	10:06	13	19.2	250	2/16/2013
		IW101-07C	-60.2	W+	18	2/14/2013	10:09	10:21	12	18.9	227	2/16/2013
	T-16	IW101-07B	12.6	W+	21	2/14/2013	10:40	10:49	9	26.4	238	2/16/2013
	T-17	DR1-5 ⁷	-46.6	W+	18	2/14/2013	11:54	12:28	22	8.7	191	2/16/2013
		DR1-5A ¹	-57.9	W+	18	2/14/2013	12:40	12:57	17	16.2	275	2/16/2013
	T-18	DR1-6A	37.2	W+	21	2/14/2013	13:29	13:49	20	12.5	250	2/16/2013
		DR1-6	69.8	W+	21	2/14/2013	14:01	14:23	22	10.2	225	2/16/2013
	T-19	PMW101-02A ^{2,7}	-26.7	W+	18	2/14/2013	14:52	16:17	33	10.5	346	2/16/2013
		PMW101-02B	-17.5	W+	18	2/14/2013	15:24	15:59	35	3.9	138	2/16/2013

TABLE 6
INJECTION SUMMARY, 1-46
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Area	Tank ID	Well ID	Oxidation Reduction Potential	Injection Material	Percent Sodium Lactate	Date Injected	Start Time	End Time	Time Injecting (minutes)	Average Flow Rate (gpm)	Volume Injected (gallons)	Water Injection Date
TTA-2	T-22	DR2-2 ⁷	11.4	W+	21	2/15/2013	10:01	10:14	3	4.7	14	2/16/2013
		IW92-01 ⁴	129.3	W+	21	2/15/2013	10:22	10:54	32	14.7	471	2/16/2013
	T-23	IW92-02	-192.9	W	15	2/15/2013	10:45	10:58	13	19.2	250	NI
		IW92-03	-137.6	W	15	2/15/2013	11:07	11:19	12	19.9	239	NI
	T-24	DR2-5 ⁷	-41.0	W	21	2/15/2013	11:58	12:18	9	5.5	49	NI
		IW92-08 ⁵	11.4	W	21	2/15/2013	12:23	12:50	27	16.4	444	NI
	T-25	IW85-06	-257.9	W	12	2/15/2013	12:34	12:44	10	25.0	250	NI
		IW92-07	-300.7	W	12	2/15/2013	12:56	13:07	11	21.1	232	NI
	T-26	MW-113 ⁷	-110.6	W	15	2/15/2013	13:41	13:46	1	16.7	17	NI
		IW85-05 ⁶	-152.5	W	15	2/15/2013	13:51	14:18	27	17.3	468	NI
W-C	T-20	MW-203A	-35.7	W+	21	2/14/2013	16:55	17:10	15	4.7	71	2/16/2013
		MW-203B ³	100.7	W+	21	2/14/2013	17:12	17:45	33	12.3	407	2/16/2013
B-835	T-21	MW-62	-33.6	W+	18	2/15/2013	8:24	9:15	51	4.9	252	2/16/2013
		MW-213	-18.0	W+	18	2/15/2013	9:26	9:35	9	27.3	246	2/16/2013

Notes:

- 1): Includes remainder from DR1-5
- 2): Includes remainder from PMW-101B
- 3): Remainder from MW-203A
- 4): Remainder from DR2-2
- 5): Remainder from DR2-5
- 6): Remainder from MW-113
- 7): Total pumping time less than start to end interval; pump shut down to let fluid level in well drop.

gpm: gallons per minute

W-C: West-Central

W: WILCLEAR[®]

W+: WILCLEAR PLUS[®]

NI: Water not injected after WilClear injections

TABLE 7
INJECTION SUMMARY, I-47
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Area	Tank ID	Well ID	Oxidation Reduction Potential	Injection Material	Percent Sodium Lactate	W/W+ Volume (gallons)	Water Volume (gallons)	Target Volume (gallons)	Date Injected	Start Time	End Time	Time Injecting (minutes)	Average Flow Rate (gpm)	Volume Injected (gallons)	Water Injection Date ³
TTA-1N	T-1	IW21-01A	-93.0	W+	9%	50	350	400	5/14/2013	9:03	9:22	19	21.1	400	5/15/2013
	T-2	IW21-01B	-13.4	W+	9%	50	350	400	5/14/2013	7:54	8:10	16	25.0	400	5/15/2013
	T-5	IW21-02A	4.8	W+	8%	40	360	400	5/14/2013	12:32	12:47	15	26.7	400	5/15/2013
	T-4	IW21-02B	-41.9	W+	8%	40	360	400	5/14/2013	11:20	11:42	22	18.2	400	5/15/2013
	T-8	IW21-03A	-0.5	W+	9%	50	350	400	5/15/2013	8:20	8:46	26	15.4	400	5/16/2013
	T-6	IW21-03B	-94.1	W+	6%	30	320	350	5/14/2013	13:27	13:50	23	15.2	350	5/16/2013
	T-9	IW21-04A	-172.9	W+	6%	30	320	350	5/15/2013	9:13	9:27	14	25.0	350	5/16/2013
	T-7	IW21-04B	-103.3	W+	9%	50	350	400	5/14/2013	14:39	14:59	20	20.0	400	5/16/2013
	T-3	MW-21	62.0	W+	10%	60	390	450	5/14/2013	10:20	10:45	25	17.4	450	5/16/2013
	T-10	PMW21-04	-16.0	W+	10%	60	390	450	5/15/2013	10:30	11:01	31	14.5	450	5/18/2013
TTA-1S	T-23	IW101-02A	33.2	W+	10%	60	390	450	5/17/2013	7:24	7:50	26	17.3	450	5/18/2013
	T-22	IW101-02B	76.0	W+	10%	60	390	450	5/16/2013	16:00	16:27	27	16.7	450	5/18/2013
	T-21	IW101-02C	-100.8	W+	10%	60	390	450	5/16/2013	15:08	15:26	18	25.0	450	5/18/2013
	T-26	IW101-03A	66.7	W+	10%	60	390	450	5/17/2013	10:00	10:21	21	21.4	450	5/18/2013
	T-25	IW101-03B	-21.2	W+	10%	60	390	450	5/17/2013	9:05	9:35	30	15.0	450	5/18/2013
	T-24	IW101-03C	-27.3	W+	10%	60	390	450	5/17/2013	8:10	8:30	20	22.5	450	5/18/2013
	T-17	IW101-04A	-157.1	W+	10%	60	390	450	5/16/2013	11:42	12:04	22	20.5	450	5/18/2013
	T-16	IW101-04B	-30.2	W+	10%	60	390	450	5/16/2013	10:44	11:10	26	17.3	450	5/18/2013
	T-15	IW101-04C	-136.3	W+	10%	60	390	450	5/16/2013	9:50	10:13	23	19.6	450	5/18/2013
	T-20	IW101-05A	28.2	W+	10%	60	390	450	5/16/2013	14:15	14:40	25	18.0	450	5/18/2013
	T-19	IW101-05B	100.0	W+	10%	60	390	450	5/16/2013	13:30	13:47	17	26.5	450	5/18/2013
	T-18	IW101-05C	-61.2	W+	10%	60	390	450	5/16/2013	12:34	13:02	28	16.1	450	5/18/2013
	T-29	IW101-07A	109.2	W+	10%	60	390	450	5/17/2013	13:04	13:32	28	16.0	450	5/18/2013
	T-28	IW101-07B	52.1	W+	10%	60	390	450	5/17/2013	12:00	12:30	30	15.0	450	5/18/2013
	T-27	IW101-07C	-70.0	W+	10%	60	390	450	5/17/2013	10:55	11:21	26	17.3	450	5/18/2013
	T-11	DR1-5	27.2	W+	10%	60	390	450	5/15/2013	11:50	12:36	46	9.8	450	5/18/2013
	T-12	DR1-5A	-54.1	W+	10%	60	390	450	5/15/2013	14:00	14:28	28	16.1	450	5/18/2013
	T-30	DR1-6	39.2	W+	10%	60	390	450	5/17/2013	14:10	14:50	40	11.3	450	5/18/2013
	T-31	DR1-6A	40.5	W+	10%	60	390	450	5/17/2013	15:30	15:55	25	18.0	450	5/18/2013
	T-14	PMW101-02A	-96.7	W+	10%	60	390	450	5/16/2013	7:40	7:57	17	26.5	450	5/18/2013
	T-13	PMW101-02B	-10.4	W+	10%	60	390	450	5/15/2013	15:10	15:35	25	18.0	450	5/18/2013

TABLE 7
INJECTION SUMMARY, I-47
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Area	Tank ID	Well ID	Oxidation Reduction Potential	Injection Material	Percent Sodium Lactate	W/W+ Volume (gallons)	Water Volume (gallons)	Target Volume (gallons)	Date Injected	Start Time	End Time	Time Injecting (minutes)	Average Flow Rate (gpm)	Volume Injected (gallons)	Water Injection Date ³
TTA-2	T-41	IW85-05	-56.6	W+	8%	40	360	400	5/19/2013	15:40	16:04	24	16.7	400	5/20/2013
	T-42	IW85-06	-199.4	W+	6%	30	320	350	5/20/2013	7:10	7:44	34	10.3	350	5/20/2013
	T-36	IW92-01	60.8	W+	10%	60	390	450	5/19/2013	11:30	12:20	50	9.0	450	5/21/2013
	T-37	IW92-02	-42.7	W+	8%	40	360	400	5/19/2013	12:20	13:00	40	8.8	350	5/20/2013
	T-38	IW92-03	-137.7	W+	6%	30	320	350	5/19/2013	13:20	13:45	25	14.0	350	5/20/2013
	T-39	IW92-07	-199.5	W+	6%	30	320	350	5/19/2013	13:56	14:26	30	11.7	350	5/20/2013
	T-40	IW92-08	42.8	W+	10%	60	390	450	5/19/2013	15:00	15:30	30	15.0	450	5/20/2013
	T-43 ¹	DR2-2	-5.9	W+	10%	60	390	450	5/20/2013	8:10	8:23	13	2.0	26	5/21/2013
		IW92-01	-	-	-	-	-	-	5/20/2013	-	-	-	-	424	-
	T-44	DR2-5	-7.7	W+	10%	60	390	450	5/20/2013	9:15	10:00	45	10.0	450	5/21/2013
	T-45 ²	MW-113	-171.9	W+	9%	50	350	400	5/20/2013	10:20	10:41	21	0.9	18	5/21/2013
		IW92-08	-	-	-	-	-	-	5/20/2013	-	-	-	-	382	-
W-C	T-33	MW-203A	-127.9	W	9%	75	425	500	5/18/2013	15:04	15:43	39	12.8	500	5/20/2013
	T-32	MW-203B	8.4	W	11%	87.5	412.5	500	5/18/2013	14:00	14:25	25	20.0	500	5/20/2013
B-835	T-35	MW-62	4.1	W	11%	87.5	412.5	500	5/18/2013	10:48	11:20	32	15.6	500	5/20/2013
	T-34	MW-213	23.4	W	11%	87.5	412.5	500	5/18/2013	16:34	16:50	16	31.3	500	5/20/2013

Notes:

- 1) The target volume could not be injected in DR2-2; the remaining volume was injected in IW92-01.
- 2) The target volume could not be injected in MW-113; the remaining volume was injected in IW92-01 and IW92-08.
- 3) Only 10 gallons of water could be injected in DR2-2 and MW-113; all other injection wells received 100 gallons.

gpm: gallons per minute

W-C: West-Central

W: WILCLEAR®

W+: WILCLEAR PLUS®

TABLE 8
INJECTION SUMMARY, I-48
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Area	Tank ID	Well ID	Oxidation Reduction Potential	Injection Material	Percent Sodium Lactate	W/W+ Volume (gallons)	Water Volume (gallons)	Target Volume (gallons)	Date Injected	Start Time	End Time	Time Injecting (minutes)	Average Flow Rate (gpm)	Volume Injected (gallons)	Water Injection Date ²
TTA-1N	T-1	IW21-01A	-95.8	W+	9%	50	350	400	8/20/2013	15:20	15:45	25	16.0	400	8/22/2013
	T-2	IW21-01B	-69.3	W+	10%	60	390	450	8/21/2013	7:50	8:50	60	7.5	450	8/22/2013
	T-3	IW21-02A	6.9	W+	10%	60	390	450	8/21/2013	9:35	9:46	25	18.0	450	8/22/2013
	T-4	IW21-02B	-38.8	W+	8%	40	360	400	8/21/2013	10:39	10:57	18	22.2	400	8/22/2013
	T-5	IW21-03A	-55.2	W+	10%	60	390	450	8/21/2013	11:00	12:15	25	18.0	450	8/22/2013
	T-6	IW21-03B	-67.1	W+	9%	50	350	400	8/21/2013	14:50	15:10	20	20.0	400	8/23/2013
	T-7	IW21-04A	-106.2	W+	6%	30	320	350	8/21/2013	15:38	15:59	21	16.7	350	8/23/2013
	T-10	IW21-04B	-152.4	W+	9%	50	350	400	8/22/2013	13:10	13:30	20	20.0	400	8/23/2013
	T-9	MW-21	5.6	W+	11%	70	430	500	8/22/2013	10:40	11:00	20	25.0	500	8/23/2013
	T-8	PMW21-01	79.6	W+	11%	70	430	500	8/22/2013	8:55	9:20	25	20.0	500	8/23/2013
TTA-1S	T-21	IW101-02A	-51.0	W+	11%	70	430	500	8/24/2013	8:53	9:20	27	18.5	500	8/25/2013
	T-22	IW101-02B	89.2	W+	11%	70	430	500	8/24/2013	9:47	10:08	21	23.8	500	8/25/2013
	T-23	IW101-02C	-121.9	W+	10%	60	390	450	8/24/2013	10:50	11:12	22	20.5	450	8/25/2013
	T-20	IW101-03A	1.5	W+	11%	70	430	500	8/23/2013	16:25	16:52	27	18.5	500	8/24/2013
	T-19	IW101-03B	-47.6	W+	11%	70	430	500	8/23/2013	15:25	15:45	20	25.0	500	8/24/2013
	T-18	IW101-03C	-54.5	W+	11%	70	430	500	8/23/2013	13:34	13:55	21	23.8	500	8/24/2013
	T-27	IW101-04A	-80.5	W+	10%	60	390	450	8/24/2013	16:05	16:29	24	18.8	450	8/25/2013
	T-28	IW101-04B	0.3	W+	11%	70	430	500	8/25/2013	11:40	12:07	27	18.5	500	8/25/2013
	T-29	IW101-04C	-19.4	W+	11%	70	430	500	8/25/2013	12:37	12:58	21	23.8	500	8/24/2013
	T-24	IW101-05A	-17.9	W+	11%	70	430	500	8/24/2013	13:29	13:50	21	23.8	500	8/25/2013
	T-25	IW101-05B	73.0	W+	11%	70	430	500	8/24/2013	14:25	14:53	28	17.9	500	8/25/2013
	T-26	IW101-05C	-74.9	W+	11%	70	430	500	8/24/2013	15:15	15:35	20	25.0	500	8/25/2013
	T-17	IW101-07A	96.7	W+	11%	70	430	500	8/23/2013	13:32	14:00	28	17.9	500	8/24/2013
	T-16	IW101-07B	-61.5	W+	11%	70	430	500	8/23/2013	10:58	11:20	22	22.7	500	8/24/2013
	T-15	IW101-07C	-65.9	W+	11%	70	430	500	8/23/2013	9:50	10:17	27	18.5	500	8/24/2013
	T-11	DR1-5	93.5	W+	11%	70	430	500	8/22/2013	14:10	14:30	20	25.0	500	8/25/2013
	T-12	DR1-5A	-23.6	W+	11%	70	430	500	8/22/2013	15:10	15:40	30	16.7	500	8/25/2013
	T-13	DR1-6	-18.0	W+	11%	70	430	500	8/22/2013	16:15	16:35	20	25.0	500	8/25/2013
	T-14	DR1-6A	-53.2	W+	11%	70	430	500	8/23/2013	8:45	9:07	22	22.7	500	8/25/2013
	T-30	PMW101-02A	-151.8	W+	10%	60	390	450	8/24/2013	13:35	14:00	25	18.0	450	8/25/2013
	T-31	PMW101-02B	-45.7	W+	11%	70	430	500	8/24/2013	14:46	15:10	24	20.8	500	8/25/2013

TABLE 8
INJECTION SUMMARY, I-48
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Area	Tank ID	Well ID	Oxidation Reduction Potential	Injection Material	Percent Sodium Lactate	W/W+ Volume (gallons)	Water Volume (gallons)	Target Volume (gallons)	Date Injected	Start Time	End Time	Time Injecting (minutes)	Average Flow Rate (gpm)	Volume Injected (gallons)	Water Injection Date ²
TTA-2	T-43	IW85-05	-145.8	W+	9%	50	350	400	8/27/2013	10:57	11:16	19	21.1	400	8/27/2013
	T-44	IW85-06	-138.6	W+	8%	40	360	400	8/27/2013	11:58	13:35	97	4.1	400	8/27/2013
	T-36	IW92-01	-5.6	W+	10%	60	390	450	8/26/2013	12:42	13:30	48	9.4	450	8/27/2013
	T-37	IW92-02	-195.3	W+	8%	40	360	400	8/26/2013	14:21	15:20	59	6.8	400	8/27/2013
	T-38	IW92-03	-107.8	W+	8%	40	360	400	8/26/2013	15:20	15:46	26	15.4	400	8/27/2013
	T-40	IW92-07	-155.3	W+	8%	40	360	400	8/27/2013	7:24	8:10	46	8.7	400	8/27/2013
	T-39	IW92-08	-106.7	W+	10%	60	390	450	8/26/2013	16:22	16:53	31	14.5	450	8/27/2013
	T-45 ¹	DR2-2	-98.5	W+	10%	60	390	450	8/27/2013	13:10	13:40	30	0.9	26	8/27/2013
		IW92-01	-	-	-	-	-	-	8/27/2013	-	-	-	-	424	-
	T-42	DR2-5	4.1	W+	11%	70	430	500	8/27/2013	9:40	10:25	45	11.1	500	8/27/2013
	T-41	PMW92-03	10.0	W+	11%	70	430	500	8/27/2013	8:28	9:38	70	7.1	500	8/27/2013
W-C	T-33	MW-203A	18.2	W+	10%	60	390	450	8/26/2013	8:56	9:52	32	14.1	450	8/27/2013
	T-32	MW-203B	101.2	W+	12%	80	420	500	8/26/2013	8:05	8:30	25	20.0	500	8/27/2013
B-835	T-35	MW-62	-67.0	W+	11%	70	430	500	8/26/2013	12:48	13:12	24	20.8	500	8/27/2013
	T-34	MW-213	-59.6	W+	11%	70	430	500	8/26/2013	10:18	10:47	29	17.2	500	8/27/2013

Notes:

- 1) The target volume could not be injected in DR2-2; the remaining volume was injected in IW92-01.
- 2) Only 10 gallons of water could be injected in DR2-2; all other injection wells received 100 gallons.

gpm: gallons per minute
W-C: West-Central
W: WILCLEAR®
W+: WILCLEAR PLUS®

TABLE 9
WATER LEVEL MEASUREMENTS, YEAR THREE
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well ID	Top of Casing Elevation (ft, msl)	New Top of Casing Elevation (ft, msl)	Top of Screen Depth (ft, btoc)	Depth to Water 5-Feb-13 (ft, btoc)	Groundwater Elevation (ft, msl)	Depth to Water 7-May-13 (ft, btoc)	Groundwater Elevation (ft, msl)	Depth to Water 13-Aug-13 (ft, btoc)	Groundwater Elevation (ft, msl)	Depth to Water 5-Nov-13 (ft, btoc)	Groundwater Elevation (ft, msl)
TTA-1N											
IW21-01A	294.34	294.34	99.4	89.00	205.34	89.18	205.16	88.75	205.59	88.88	205.46
IW21-01B	294.61	294.61	90.1	89.03	205.58	89.64	204.97	88.96	205.65	89.40	205.21
IW21-02A	294.62	294.62	100.8	89.70	204.92	89.84	204.78	89.05	205.57	89.14	205.48
IW21-02B	294.65	294.65	92.2	89.47	205.18	89.45	205.20	89.06	205.59	89.12	205.53
IW21-03A	292.81	292.81	100.1	88.23	204.58	87.93	204.88	87.62	205.19	87.70	205.11
IW21-03B	292.50	292.50	90.4	88.02	204.48	87.62	204.88	87.33	205.17	87.40	205.10
IW21-04A	292.69	292.69	100.4	88.25	204.44	88.18	204.51	87.60	205.09	87.64	205.05
IW21-04B	292.79	292.79	90.2	87.95	204.84	88.01	204.78	87.71	205.08	87.74	205.05
MW-21	295.00	295.00	92.3	89.30	205.70	89.52	205.48	89.08	205.92	89.09	205.91
PMW21-01	294.73	294.76	88.8	89.06	205.67	89.21	205.52	88.83	205.93	88.66	206.10
PMW21-02	292.98	292.98	91.5	88.20	204.78	88.20	204.78	87.88	205.10	87.95	205.03
PMW21-04	291.87	291.87	89.3	87.32	204.55	87.36	204.51	87.04	204.83	87.18	204.69
TTA-1S											
IW101-02A	291.12	291.12	124.5	86.64	204.48	85.99	205.13	86.52	204.60	86.79	204.33
IW101-02B	291.14	291.14	110.6	86.90	204.24	86.98	204.16	86.68	204.46	86.75	204.39
IW101-02C	291.53	291.53	93.9	87.38	204.15	87.38	204.15	87.19	204.34	87.20	204.33
IW101-03A	291.94	291.94	125.6	87.62	204.32	87.61	204.33	87.40	204.54	87.46	204.48
IW101-03B	291.91	291.91	110.0	87.59	204.32	85.51	206.40	87.42	204.49	88.02	204.46
IW101-03C	292.04	292.04	94.1	87.71	204.33	87.72	204.32	87.40	204.64	87.50	204.54
IW101-04A	291.72	291.72	123.9	87.52	204.20	88.03	203.69	87.33	204.39	87.42	204.30
IW101-04B	291.59	291.59	107.5	87.29	204.30	87.71	203.88	87.22	204.37	87.45	204.14
IW101-04C	291.47	291.47	92.8	87.48	203.99	87.44	204.03	87.30	204.17	87.38	204.09
IW101-05A	291.52	291.52	122.0	87.39	204.13	87.79	203.73	87.20	204.32	87.34	204.18
IW101-05B	291.41	291.41	108.4	87.24	204.17	87.26	204.15	87.05	204.36	87.14	204.27
IW101-05C	291.27	291.27	92.8	87.24	204.03	87.25	204.02	86.92	204.35	87.02	204.25
IW101-07A	292.83	292.83	123.3	88.54	204.29	88.59	204.24	88.26	204.57	88.32	204.51
IW101-07B	292.81	292.81	106.9	88.52	204.29	88.09	204.72	88.24	204.57	88.24	204.57
IW101-07C	292.78	292.78	93.6	88.52	204.26	88.44	204.34	88.26	204.52	88.25	204.53
DR1-5	294.50	294.46	125.1	89.90	204.60	89.58	204.92	89.34	205.12	89.38	205.08
DR1-5A	294.61	294.51	90.4	89.76	204.85	89.78	204.83	89.29	205.22	89.35	205.16
DR1-6	292.98	293.17	114.7	88.38	204.60	88.34	204.64	88.18	204.99	88.22	204.95
DR1-6A	293.14	293.28	91.1	88.47	204.67	88.48	204.66	88.27	205.01	88.42	204.86
PMW101-02A	291.47	292.00	117.5	87.53	203.94	87.11	204.36	86.30	205.70	87.43	204.57
PMW101-02B ¹	291.60	291.98	97.7	90.30	201.30	87.79	203.81	87.50	204.48	87.54	204.44

TABLE 9
WATER LEVEL MEASUREMENTS, YEAR THREE
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well ID	Top of Casing Elevation (ft, msl)	New Top of Casing Elevation (ft, msl)	Top of Screen Depth (ft, btoc)	Depth to Water (ft, btoc)	Groundwater Elevation 5-Feb-13 (ft, msl)	Depth to Water (ft, btoc)	Groundwater Elevation 7-May-13 (ft, msl)	Depth to Water (ft, btoc)	Groundwater Elevation 13-Aug-13 (ft, msl)	Depth to Water (ft, btoc)	Groundwater Elevation 5-Nov-13 (ft, msl)
PMW101-04A	291.07	291.07	118.3	87.17	203.90	87.21	203.86	86.94	204.13	86.98	204.09
PMW101-04B	291.47	291.47	98.8	87.70	203.77	86.74	204.73	87.50	203.97	87.52	203.95
PMW101-07A	292.20	292.20	118.2	88.11	204.09	88.10	204.10	87.83	204.37	87.85	204.35
PMW101-07B	292.36	292.36	98.3	88.38	203.98	88.28	204.08	87.99	204.37	88.04	204.32
TTA-2											
IW85-05	304.73	304.73	93.0	94.50	210.23	94.33	210.40	94.22	210.51	94.48	210.25
IW85-06	304.81	304.81	96.1	95.49	209.32	95.86	208.95	96.30	208.51	96.49	208.32
IW92-01	304.51	304.51	80.7	83.44	221.07	84.50	220.01	87.67	216.84	87.41	217.10
IW92-02	304.05	304.05	80.3	81.68	222.37	79.59	224.46	85.70	218.35	88.00	216.05
IW92-03	304.20	304.20	84.0	90.12	214.08	92.67	211.53	90.86	213.34	91.02	213.18
IW92-07	303.78	303.78	88.3	92.21	211.57	92.12	211.66	91.68	212.10	91.70	212.08
IW92-08	304.55	304.55	85.7	92.60	211.95	92.64	211.91	92.19	212.36	92.30	212.25
DR2-2	304.37	304.30	78.6	77.81	226.56	78.82	225.55	79.14	225.16	82.45	221.85
DR2-5	305.44	305.41	84.6	94.50	210.94	94.45	210.99	93.89	211.52	93.79	211.62
MW-85	304.13	304.13	96.3	96.40	207.73	96.40	207.73	96.18	207.95	96.20	207.93
MW-113	304.81	304.81	96.1	97.21	207.60	96.06	208.75	96.02	208.79	96.41	208.40
PMW85-01	305.08	305.08	93.5	95.73	209.35	95.80	209.28	95.55	209.53	95.63	209.45
PMW85-05	305.12	305.12	93.4	94.88	210.24	94.88	210.24	94.60	210.52	94.68	210.44
PMW92-03	303.91	303.91	92.7	92.71	211.20	92.73	211.18	92.45	211.46	92.68	211.23
West Central											
MW-197A	291.26	291.26	162.0	90.54	200.72	90.52	200.74	90.36	200.90	90.60	200.66
MW-197B	291.03	291.03	94.2	90.45	200.58	90.44	200.59	90.45	200.58	90.51	200.52
MW-203A	290.59	290.70	142.9	89.55	201.04	89.90	200.69	89.15	201.55	89.08	201.62
MW-203B	290.51	290.87	92.8	89.10	201.41	89.12	201.39	88.94	201.93	88.80	202.07
Bldg 835											
MW-62	293.65	293.71	86.5	91.36	202.29	91.29	202.36	91.20	202.51	91.25	202.46
MW-212	295.34	295.34	85.7	94.98	200.36	94.84	200.50	94.79	200.55	94.87	200.47
MW-213	293.83	294.22	77.2	91.26	202.57	91.15	202.68	91.04	203.18	91.02	203.20

Notes:

btoc: below top of casing

ft: feet

msl: mean sea level

TABLE 10
FINAL FIELD MEASUREMENTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Well ID	Date	Time Sampled	Sample Depth (ft, btoc)	Depth to Water (ft, btoc)	Purge Rate (mL/min)	Volume Purged (Liters)	pH	Temp (°C)	Specific Conductivity (mS/cm)	Dissolved Oxygen (YSI) (mg/L)	Dissolved Oxygen (Field Test) (mg/L)	Oxidation Reduction Potential (mV)	Turbidity (NTUs)
TTA-1N	IW IW21-01A	2/5/2013	13:56	102.0	89.1	130	5.9	6.2	18.6	2.72	12.5	1.0	-33.8	0.9
	IW IW21-01B	2/5/2013	15:43	94.0	89.2	210	6.4	6.4	17.5	6.63	9.1	NM	-106.4	0.0
	IW IW21-02A	2/6/2013	09:19	105.0	90.5	190	10.6	6.0	15.7	27.87	0.4	NM	-87.4	OR
	IW IW21-02B	2/6/2013	11:04	95.0	89.7	170	9.7	6.4	16.7	27.70	-0.1	NM	-190.7	2304
	IW IW21-03A	2/6/2013	16:30	104.0	87.9	120	6.0	5.9	16.9	0.38	16.3	2.0	-1.8	4.5
	IW IW21-03B	2/7/2013	08:50	96.0	87.8	205	9.2	7.0	17.3	17.71	-0.3	NM	-214.7	768
	IW IW21-04A	2/6/2013	13:47	90.5	88.5	160	7.7	6.8	17.6	25.31	-0.3	NM	-366.3	1075
	IW IW21-04B	2/6/2013	15:19	94.0	88.1	230	7.7	6.2	17.1	6.46	2.3	NM	-54.2	OR
	IW MW-21	2/7/2013	11:03	99.2	89.4	157	5.2	5.8	18.0	0.31	16.7	2.0	48.0	4.2
	IW PMW21-04	2/7/2013	14:00	100.2	87.2	180	6.0	5.9	18.8	0.33	19.3	1.0	14.1	6.8
	MW PMW21-01	2/5/2013	14:20	100.9	89.2	280	4.8	5.9	18.1	32.20	7.5	4.0	125.6	3.5
	MW PMW21-02	2/7/2013	12:20	102.1	88.1	200	6.5	5.8	18.3	0.26	22.0	3.0	99.0	1.6
TTA-1S	IW IW101-02A	2/8/2013	9:59	131.0	87.5	128	3.2	6.3	15.2	0.45	12.5	3.0	27.6	10.4
	IW IW101-02B	2/8/2013	11:03	117.0	87.2	200	8.8	6.2	17.2	0.36	11.9	3.0	122.8	-0.3
	IW IW101-02C	2/8/2013	13:25	100.0	87.7	156	6.9	6.3	16.8	4.01	1.2	NM	22.4	-0.7
	IW IW101-03A	2/7/2013	15:22	133.0	87.5	150	4.5	6.2	19.3	0.99	13.9	NM	23.1	6.4
	IW IW101-03B	2/7/2013	16:46	117.0	87.5	130	5.3	5.8	18.8	1.09	13.9	NM	32.5	7.1
	IW IW101-03C	2/8/2013	09:10	101.0	87.9	155	7.4	6.5	15.9	2.76	2.8	NM	12.5	0.4
	IW IW101-04A	2/9/2013	08:34	131.0	87.9	176	11.8	6.1	16.4	3.82	0.9	NM	34.1	0.6
	IW IW101-04B	2/9/2012	09:35	115.0	87.9	168	7.1	6.5	17.3	0.75	9.4	NM	18.4	6.5
	IW IW101-04C	2/9/2013	10:55	99.0	87.8	200	12.6	6.8	17.8	5.72	0.5	NM	-43.7	OR
	IW IW101-05A	2/8/2013	14:18	129.0	87.7	150	3.9	6.3	17.0	1.05	5.0	NM	43.2	6.6
	IW IW101-05B	2/8/2013	15:36	115.0	87.5	144	6.8	6.2	16.8	0.38	10.2	4.0	111.7	-0.3
	IW IW101-05C	2/8/2013	16:24	98.0	87.7	136	4.6	6.5	16.1	0.99	3.4	NM	8.0	10.5
	IW IW101-07A	2/7/2013	11:09	131.0	88.5	60	11.2	6.2	18.7	0.36	15.5	4.0	123.6	1.4
	IW IW101-07B	2/7/2013	13:20	113.0	88.4	110	4.8	6.6	19.0	0.27	9.0	4.0	12.6	16.7
	IW IW101-07C	2/7/2013	14:20	100.0	88.4	190	5.1	6.6	19.8	2.06	5.0	NM	-60.2	0.3
	IW DR1-5	2/6/2013	9:27	136.3	90.2	340	33.9	6.1	18.3	2.01	19.9	NM	-46.6	0.4
	IW DR1-5A	2/6/2013	10:33	102.3	89.9	480	13.0	6.0	18.8	0.39	8.0	NM	-57.9	10.0
	IW DR1-6	2/6/2013	11:59	126.6	88.5	420	20.0	5.9	19.2	0.42	9.6	4.0	69.8	3.1
	IW DR1-6A	2/6/2013	13:36	102.8	88.6	200	6.6	5.6	19.9	0.16	6.0	1.0	37.2	5.9
	IW PMW101-02A	2/6/2013	16:20	128.0	87.6	120	6.0	5.9	19.0	0.50	11.0	1.0	-26.7	3.4
	IW PMW101-02B	2/6/2013	15:03	108.3	87.8	180	8.4	5.8	18.8	0.36	8.4	1.0	-17.5	3.6
	MW PMW101-04A	2/7/2013	16:02	128.8	87.0	184	5.0	6.4	19.0	0.43	23.8	0.0	-67.7	1.5
	MW PMW101-04B	2/7/2013	14:54	109.5	87.6	163	5.3	5.8	19.7	0.27	19.8	1.0	97.2	1.9
	MW PMW101-07A	2/7/2013	09:45	128.7	88.0	164	7.8	6.2	18.5	0.44	14.7	1.0	-26.3	2.5
	MW PMW101-07B	2/7/2013	8:25	108.7	88.2	220	6.6	5.7	18.3	0.18	18.7	8.0	162.3	4.0

TABLE 10
FINAL FIELD MEASUREMENTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Well ID	Date	Time Sampled	Sample Depth (ft, btoc)	Depth to Water (ft, btoc)	Purge Rate (mL/min)	Volume Purged (Liters)	pH	Temp (°C)	Specific Conductivity (mS/cm)	Dissolved Oxygen (YSI) (mg/L)	Dissolved Oxygen (Field Test) (mg/L)	Oxidation Reduction Potential (mV)	Turbidity (NTUs)
TTA-2	IW IW85-05	2/11/2013	11:14	101.0	94.4	80	3.1	6.6	41.1	8.46	0.0	NM	-152.5	OR
	IW IW85-06	2/10/2013	08:04	103.0	95.6	100	5.4	6.7	18.6	18.34	-1.3	NM	-257.9	OR
	IW IW92-01	2/9/2013	13:10	89.0	83.2	88	3.3	6.0	17.2	0.23	12.4	3.0	129.3	5.4
	IW IW92-02	2/9/2013	15:32	90.0	82.6	74	8.3	6.8	17.3	24.09	5.9	NM	-192.9	OR
	IW IW92-03	2/9/2013	15:59	92.0	90.0	53	2.1	5.6	14.8	33.91	-7.0	NM	-137.6	OR
	IW IW92-07	2/10/2013	08:14	95.0	92.2	80	4.4	6.8	17.4	44.37	-1.2	NM	-300.7	-1.1
	IW IW92-08	2/11/2013	09:35	95.0	92.6	55	3.0	6.6	16.6	0.97	7.9	NM	11.4	4.5
	IW DR2-2	2/9/2013	13:27	88.6	77.9	86	5.2	5.6	17.0	0.24	6.3	1.0	11.4	9.3
	IW DR2-5	2/9/2013	14:38	98.6	94.5	154	3.4	5.9	20.5	0.43	16.1	0.8	-41.0	6.5
	IW MW-113	2/9/2013	16:40	103.2	96.0	91	10.9	6.2	17.9	4.30	-4.6	NM	-110.6	3.4
	MW MW-85	2/8/2013	14:15	105.1	96.7	185	5.8	5.6	19.2	0.18	4.4	3.0	164.9	4.9
	MW PMW85-01	2/9/2013	10:05	100.7	95.9	100	8.0	6.1	18.3	0.44	18.6	0.6	-10.3	3.6
	MW PMW85-05	2/9/2013	08:02	101.0	95.0	100	3.0	5.3	17.0	0.16	13.7	<1	123.0	5.6
	MW PMW92-03	2/9/2013	11:12	98.6	92.9	175	3.5	6.1	19.7	0.24	7.7	1.0	30.1	5.0
W-C	IW MW-203A	2/8/2013	11:00	150.5	89.9	360	14.8	6.1	16.8	8.43	-0.5	1.0	-35.7	16.2
	IW MW-203B	2/8/2013	8:35	100.3	89.5	65	3.0	6.0	12.9	0.30	7.3	2.0	100.7	3.1
	MW MW-197A	2/8/2013	11:51	170.4	89.9	360	15.9	5.9	17.3	0.32	2.9	2.0	135.5	6.1
	MW MW-197B	2/8/2013	12:30	102.6	90.8	271	6.0	5.9	17.0	0.32	2.1	1.0	132.0	2.5
B-835	IW MW-62	2/11/2013	14:37	Bailer	91.4	-	9.0	6.3	17.9	0.99	9.1	NM	-33.6	11.4
	IW MW-213	2/11/2013	13:45	Bailer	91.3	-	1.5	6.2	18.7	0.22	12.6	NM	-18.0	18.7
	MW MW-212	2/11/2013	15:44	Bailer	95.1	-	13.5	5.9	18.1	0.10	9.6	4.0	113.2	106

Notes:

°C : degrees Celsius

btoc: below top of casing

ft: feet

mg/L : milligrams per liter

mL/min: milliliters per minute

mS/cm : milliSiemens per centimeter

mV :millivolts

NM: not measured

NR: not recorded

NTU: nephelometric turbidity unit

OR: out of range

TABLE 11
FINAL FIELD MEASUREMENTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Well ID	Date	Time Sampled	Sample Depth (ft, btoc)	Depth to Water (ft, btoc)	Purge Rate (mL/min)	Volume Purged (Liters)	pH	Temp (°C)	Specific Conductivity (mS/cm)	Dissolved Oxygen (YSI) (mg/L)	Dissolved Oxygen (Field Test) (mg/L)	Oxygen Reduction Potential (mV)	Turbidity (NTUs)
TTA-1N	IW IW21-01A	5/7/2013	16:17	102.0	89.1	83	10.0	6.3	23.0	3.45	1.3	NM	-93	OR
	IW IW21-01B	5/10/2013	14:48	94.0	87.3	120	8.4	6.2	19.8	1.43	4.4	NM	-13	1.0
	IW IW21-02A	5/10/2013	12:27	105.0	89.1	64	5.1	5.8	20.4	1.75	2.6	NM	5	OR
	IW IW21-02B	5/10/2013	10:10	95.0	89.2	150	17.9	5.9	18.7	5.17	0.8	NM	-42	OR
	IW IW21-03A	5/8/2013	9:09	104.0	88.0	120	6.6	5.9	20.0	1.06	1.2	NM	-1	6.9
	IW IW21-03B	5/11/2013	12:03	96.0	87.6	148	5.9	6.5	20.0	2.60	4.2	NM	-94	OR
	IW IW21-04A	5/11/2013	14:01	90.5	87.6	143	11.4	6.5	20.3	17.95	0.0	NM	-173	OR
	IW IW21-04B	5/8/2013	11:04	94.0	87.8	149	6.7	6.5	20.1	5.23	1.2	NM	-103	OR
	IW MW-21	5/10/2013	14:04	99.2	89.4	111	5.0	5.6	19.2	0.24	1.5	NM	62	7.4
	IW PMW21-04	5/8/2013	14:00	100.2	87.4	100	3.5	6.1	21.1	1.04	0.6	NM	-16	11.9
	MW PMW21-01	5/11/2013	8:53	100.9	89.2	133	5.3	5.8	17.9	0.32	1.5	1.0	126	2.8
	MW PMW21-02	5/11/2013	10:02	102.1	88.2	128	3.2	5.8	19.5	0.29	4.3	3.0	134	4.8
TTA-1S	IW IW101-02A	5/12/2013	15:06	131.0	86.9	133	8.0	6.4	22.0	1.61	7.7	NM	33	29.6
	IW IW101-02B	5/12/2013	13:30	117.0	87.1	154	5.4	5.9	20.3	0.40	4.7	4.0	76	3.0
	IW IW101-02C	5/12/2013	12:06	100.0	87.6	100	5.0	6.4	21.2	4.48	12.2	NM	-101	3.0
	IW IW101-03A	5/12/2013	11:51	133.0	87.9	82	5.3	6.2	21.4	1.33	0.7	NM	67	14.3
	IW IW101-03B	5/12/2013	9:44	117.0	87.9	96	4.3	6.5	21.7	2.02	0.4	NM	-21	17.6
	IW IW101-03C	5/9/2013	11:24	101.0	87.6	120	4.8	6.6	21.3	5.47	0.3	NM	-27	5.1
	IW IW101-04A	5/13/2013	9:39	131.0	88.0	111	7.2	6.5	19.7	22.12	4.3	NM	-157	OR
	IW IW101-04B	5/13/2013	11:17	115.0	87.3	150	6.0	6.4	19.9	4.60	20.5	NM	-30	0.3
	IW IW101-04C	5/9/2013	9:14	99.0	87.6	146	6.6	7.0	19.9	7.06	0.2	NM	-136	5.9
	IW IW101-05A	5/13/2013	9:12	129.0	87.7	123	8.6	6.7	20.6	3.31	0.6	NM	28	OR
	IW IW101-05B	5/13/2013	10:52	115.0	87.4	100	5.0	6.1	20.2	0.42	2.4	1.0	100	6.4
	IW IW101-05C	5/13/2013	11:49	98.0	87.4	187	5.6	6.8	20.5	4.23	0.0	NM	-61	6.8
	IW IW101-07A	5/12/2013	14:32	131.0	86.9	114	4.0	6.1	22.0	0.38	7.2	6.0	109	0.8
	IW IW101-07B	5/12/2013	13:21	113.0	87.9	189	10.0	5.9	20.4	4.33	0.1	NM	52	OR
	IW IW101-07C	5/9/2013	13:10	100.0	88.3	158	7.9	6.4	21.6	6.46	0.4	NM	-70	OR
	IW DR1-5	5/12/2013	10:12	136.3	89.9	194	13.6	5.7	19.4	0.51	1.9	5.0	27	20.0
	IW DR1-5A	5/11/2013	15:52	102.3	90.5	157	4.7	6.0	21.6	0.28	0.9	0.6	-54	7.1
	IW DR1-6	5/12/2013	15:32	126.6	88.4	277	8.3	6.2	19.8	0.52	6.2	3.0	39	9.2
	IW DR1-6A	5/12/2013	16:34	102.8	88.6	236	10.6	5.9	21.7	0.60	1.3	NM	41	9.0
	IW PMW101-02A	5/13/2013	14:28	128.0	85.7	88	10.5	6.2	21.5	2.90	13.8	NM	-97	OR
	IW PMW101-02B	5/13/2013	16:49	108.3	87.8	154	7.7	6.4	21.4	0.86	2.7	NM	-10	15.1
	MW PMW101-04A	5/13/2013	15:09	128.8	87.2	214	7.5	6.3	19.9	0.46	0.8	NM	-19	6.9
	MW PMW101-04B	5/8/2013	16:19	109.5	87.7	120	4.2	5.7	22.6	0.30	0.9	2.0	100	8.4
	MW PMW101-07A	5/13/2013	14:09	128.7	88.2	143	5.7	6.2	20.7	0.47	1.6	0.6	27	0.5
	MW PMW101-07B	5/13/2013	12:58	108.7	88.4	171	7.7	5.8	20.0	0.19	5.2	5.0	138	0.6

TABLE 11
FINAL FIELD MEASUREMENTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Well ID	Date	Time Sampled	Sample Depth (ft, btoc)	Depth to Water (ft, btoc)	Purge Rate (mL/min)	Volume Purged (Liters)	pH	Temp (°C)	Specific Conductivity (mS/cm)	Dissolved Oxygen (YSI) (mg/L)	Dissolved Oxygen (Field Test) (mg/L)	Oxygen Reduction Potential (mV)	Turbidity (NTUs)
TTA-2	IW IW85-05	5/8/2013	11:08	101.0	94.3	128	3.2	6.6	23.2	8.84	0.4	NM	-57	OR
	IW IW85-06	5/9/2013	8:30	103.0	95.9	93	3.7	7.2	22.7	25.49	0.0	NM	-199	OR
	IW IW92-01	5/11/2013	9:05	89.0	84.5	100	4.0	5.9	21.4	0.85	1.3	2.0	61	13.6
	IW IW92-02	5/7/2013	14:42	90.0	79.6	144	6.9	6.3	22.2	5.20	0.0	NM	-43	OR
	IW IW92-03 ¹	5/10/2013	14:05	92.0	TOP	56	4.8	6.2	22.7	50.15	1.8	NM	-138	OR
	IW IW92-07	5/8/2013	9:05	95.0	92.0	142	7.4	6.7	21.9	42.80	0.0	NM	-200	OR
	IW IW92-08	5/9/2013	10:32	95.0	92.5	88	4.4	6.0	23.6	2.48	0.2	1.5	43	4.8
	IW DR2-2	5/10/2013	16:25	88.6	78.3	85	9.8	5.9	22.1	2.26	0.1	NM	-6	6.6
	IW DR2-5	5/8/2013	13:57	98.6	94.5	98	5.4	6.1	25.1	0.44	1.7	0.5	-8	2.6
	IW MW-113	5/10/2013	8:08	103.2	97.3	124	3.1	7.0	21.8	20.46	0.0	NM	-172	OR
	MW MW-85	5/10/2013	12:02	105.1	96.4	105	4.2	6.0	23.2	0.47	1.1	1.0	115	18.7
	MW PMW85-01	5/10/2013	10:20	100.7	95.7	102	10.2	7.1	22.2	4.45	0.0	0.3	-112	8.7
	MW PMW85-05	5/8/2013	15:28	101.0	95.8	144	5.2	5.5	24.1	0.19	0.4	0.8	154	3.4
	MW PMW92-03	5/9/2013	13:31	98.6	92.7	112	11.4	6.3	24.3	0.31	0.2	0.8	28	0.9
W-C	IW MW-203A	5/9/2013	15:41	150.5	89.8	55	3.3	6.2	23.2	14.26	0.0	NM	-128	OR
	IW MW-203B	5/11/2013	10:54	100.3	89.1	112	7.3	6.0	19.9	0.75	0.7	0.3	8	6.9
	MW MW-197A	5/11/2013	13:43	170.4	90.5	93	4.2	5.9	18.8	0.35	7.2	3.0	145	3.1
	MW MW-197B	5/11/2013	15:57	102.6	90.4	131	8.5	6.0	19.2	0.36	1.0	NM	151	14.5
B-835	IW MW-62	5/9/2013	16:43	Bailer	91.3	NR	12.3	6.0	19.5	0.61	1.7	NM	4	OR
	IW MW-213	5/11/2013	12:17	Bailer	91.2	NR	1.6	6.5	20.2	0.91	4.0	NM	23	OR
	MW MW-212	5/11/2013	11:37	Bailer	94.8	NR	15.1	5.7	18.8	0.16	11.2	NM	147	OR

Notes:

1) IW92-03 was purged dry and did not recover sufficiently for sampling.

°C : degrees Celsius

btoc: below top of casing

ft: feet

mg/L : milligrams per liter

mL/min: milliliters per minute

mS/cm : milliSiemens per centimeter

mV :millivolts

NM: not measured

NR: not recorded

NTU: nephelometric turbidity unit

OR: out of range

TABLE 12
FINAL FIELD MEASUREMENTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

					Sample	Depth to	Purge	Volume			Specific	Dissolved	Dissolved	Oxygen	
	Well ID	Date	Time	Depth	Water	Rate	Purged	pH	Temp	Conductivity	Oxygen	Oxygen	Oxygen	Reduction	Turbidity
			Sampled	(ft, btoc)	(ft, btoc)	(mL/min)	(Liters)		(°C)	(mS/cm)	(YSI)	(Field Test)	(mg/L)	Potential	(NTUs)
TTA-1N	IW	IW21-01A	8/18/2013	1010	102.0	89.2	228	14.8	6.9	20.0	3.13	0.4	NM	-96	4.1
	IW	IW21-01B	8/18/2013	1111	94.0	89.0	189	6.6	6.8	19.8	1.38	1.5	1.0	-69	9.9
	IW	IW21-02A	8/17/2013	0911	105.0	89.2	70	4.2	6.4	21.1	1.07	18.2	NM	7	6.0
	IW	IW21-02B	8/17/2013	1040	95.0	89.4	116	5.8	6.7	21.3	1.61	14.9	NM	-39	0.8
	IW	IW21-03A	8/19/2013	1215	104.0	87.8	131	4.6	6.0	22.4	0.83	3.2	0.8	-55	8.9
	IW	IW21-03B	8/19/2013	1345	96.0	87.6	194	6.8	6.3	20.6	1.32	3.9	NM	-67	6.3
	IW	IW21-04A	8/19/2013	0912	90.5	88.8	133	8.0	6.8	21.1	8.73	0.2	NM	-106	OR
	IW	IW21-04B	8/19/2013	1049	94.0	88.3	186	6.5	6.9	20.5	5.27	0.4	NM	-152	OR
	IW	MW-21	8/17/2013	1220	99.2	89.2	92	4.6	6.1	21.2	0.54	10.4	0.6	6	12.1
	IW-MW	PMW21-04	8/17/2013	1613	100.2	87.3	170	6.3	6.3	20.5	1.48	0.5	NM	-8	11.8
	MW-IW	PMW21-01	8/17/2013	1555	100.9	88.9	234	8.2	5.9	19.8	0.28	8.1	3.0	80	4.9
	MW	PMW21-02	8/18/2013	1229	102.1	88.0	174	7.8	6.0	20.2	0.28	4.2	4.0	24	3.4
TTA-1S	IW	IW101-02A	8/15/2013	0921	131.0	86.7	155	6.8	6.2	21.2	0.52	1.8	1.5	-51	2.3
	IW	IW101-02B	8/15/2013	1104	117.0	86.8	130	6.9	6.1	22.5	0.41	2.3	1.0	89	0.6
	IW	IW101-02C	8/15/2013	1216	100.0	87.5	133	6.1	6.4	22.3	6.77	0.9	NM	-122	1.5
	IW	IW101-03A	8/16/2013	0915	133.0	87.4	80	4.7	6.2	23.3	1.60	23.5	5.0	2	11.2
	IW	IW101-03B	8/16/2013	1120	117.0	87.4	85	6.4	6.2	23.6	3.55	14.5	NM	-48	4.6
	IW	IW101-03C	8/16/2013	1254	101.0	87.6	133	6.0	6.3	22.8	7.19	5.9	NM	-55	OR
	IW	IW101-04A	8/18/2013	0954	131.0	87.5	151	8.9	6.9	21.4	7.06	0.0	NM	-81	OR
	IW	IW101-04B	8/18/2013	1119	115.0	87.8	127	7.0	6.6	22.4	2.31	0.3	NM	0	8.3
	IW	IW101-04C	8/18/2013	1259	99.0	87.5	157	10.2	6.7	21.4	9.76	0.3	NM	-19	OR
	IW	IW101-05A	8/17/2013	1249	129.0	87.4	108	9.5	6.4	22.6	2.71	0.5	NM	-18	6.4
	IW	IW101-05B	8/17/2013	1030	115.0	87.1	232	6.5	6.0	23.4	0.40	2.5	NM	73	1.6
	IW	IW101-05C	8/17/2013	0904	98.0	87.2	131	7.7	6.6	22.0	5.67	1.4	NM	-75	1.6
	IW	IW101-07A	8/16/2013	0843	131.0	88.3	130	4.8	6.1	22.3	0.38	5.0	4.5	97	6.0
	IW	IW101-07B	8/16/2013	1012	113.0	88.9	170	9.7	6.2	21.9	5.20	0.9	NM	-62	OR
	IW	IW101-07C	8/16/2013	1143	100.0	89.4	192	9.8	6.3	22.2	8.77	2.3	NM	-66	OR
	IW	DR1-5	8/20/2013	0855	136.3	87.7	122	6.1	5.8	22.5	2.37	0.0	NM	94	9.0
	IW	DR1-5A	8/20/2013	0849	102.3	89.5	193	10.6	6.0	22.5	0.45	1.6	NM	-24	OR
	IW	DR1-6	8/16/2013	1535	126.6	88.2	184	9.0	6.1	21.9	0.56	0.7	1.0	-18	7.4
	IW	DR1-6A	8/16/2013	1417	102.8	88.8	247	13.1	6.2	21.8	2.77	0.7	NM	-53	3.1
	IW	PMW101-02A	8/16/2013	1509	128.0	87.5	82	4.0	6.3	24.6	5.38	6.6	NM	-152	OR
	IW	PMW101-02B	8/16/2013	1630	108.3	87.8	89	5.4	6.8	23.4	3.13	7.3	NM	-46	2.7
	MW	PMW101-04A	8/15/2013	1701	128.8	86.9	96	4.3	6.2	21.8	0.46	3.6	0.0	19	8.4
	MW	PMW101-04B	8/15/2013	1501	109.5	87.5	109	3.8	5.7	22.4	0.28	1.4	1.0	143	3.5
	MW	PMW101-07A	8/15/2013	1459	128.7	87.9	148	4.9	6.1	22.8	0.46	1.9	1.0	25	0.6
	MW	PMW101-07B	8/15/2013	1602	108.7	88.0	176	6.5	5.8	21.7	0.20	6.9	4.5	6	0.3

TABLE 12
FINAL FIELD MEASUREMENTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

		Well ID	Date	Time Sampled	Sample	Depth to	Purge	Volume	pH	Temp	Specific	Dissolved	Dissolved	Oxygen	Turbidity
					Depth	Water	Rate	Purged				Oxygen	Oxygen	Reduction	
					(ft, btoc)	(ft, btoc)	(mL/min)	(Liters)		(°C)	(mS/cm)	(YSI)	(Field Test)	Potential	(NTUS)
TTA-2	IW	IW85-05	8/14/2013	1104	101.0	95.5	93	5.1	7.1	25.9	6.90	0.2	NM	-146	OR
	IW	IW85-06	8/15/2013	0852	103.0	97.5	66	3.7	7.5	25.7	12.50	0.0	NM	-139	OR
	IW	IW92-01	8/20/2013	1008	Bailer	87.6	NM	8.5	6.4	20.7	6.15	3.9	NM	-6	OR
	IW	IW92-02	8/14/2013	1330	90.0	86.9	84	5.4	6.8	24.6	12.15	1.9	NM	-195	OR
	IW	IW92-03 ¹	8/19/2013	0802	Bailer	93.5	NM	10.1	6.6	26.3	16.04	2.3	NM	-108	OR
	IW	IW92-07	8/15/2013	1220	95.0	24.9	107	4.8	6.7	24.8	18.48	0.0	NM	-155	OR
	IW	IW92-08	8/15/2013	1043	95.0	93.4	80	4.4	7.0	25.4	10.29	0.0	NM	-107	OR
	IW	DR2-2	8/14/2013	1125	88.6	86.6	127	7.1	6.4	23.0	4.32	1.8	NM	-99	OR
	IW	DR2-5	8/14/2013	1355	98.6	95.2	70	5.8	6.0	26.7	1.43	0.8	1.0	4	12.2
	IW-MW	MW-113	8/13/2013	1608	103.2	99.8	87	4.3	6.4	27.2	10.19	0.4	NM	-153	OR
	MW-IW	PMW92-03	8/13/2013	1511	98.6	93.9	143	8.0	6.3	25.3	0.29	2.4	0.9	10	1.2
	MW	MW-85	8/14/2013	0853	105.1	96.2	85	4.0	6.6	23.5	0.89	1.0	0.6	-90	2.4
	MW	PMW85-01	8/13/2013	1412	100.7	97.1	143	8.7	7.6	26.9	5.15	0.4	0.8	-207	14.1
MW	PMW85-05	8/13/2013	1335	101.0	96.6	133	6.0	5.6	25.6	0.18	3.8	1.0	111	1.5	
W-C	IW	MW-203A	8/19/2013	1417	150.5	89.6	121	5.1	6.4	21.6	4.25	0.0	NM	18	12.3
	IW	MW-203B	8/19/2013	1307	100.3	89.0	129	11.5	6.2	20.6	0.41	0.8	0.9	101	8.5
	MW	MW-197A	8/19/2013	0936	170.4	90.6	127	6.2	6.1	19.3	0.34	2.8	3.0	127	3.5
	MW	MW-197B	8/19/2013	1050	102.6	90.5	159	4.5	6.1	20.2	0.37	0.9	1.0	157	2.5
B-835	IW	MW-62	8/20/2013	0938	Bailer	91.2	NM	16.0	6.9	20.0	1.79	1.1	NM	-67	OR
	IW	MW-213	8/20/2013	0957	Bailer	91.5	NM	0.7	6.9	24.0	2.19	6.2	NM	-60	OR
	MW	MW-212	8/20/2013	1032	Bailer	94.8	NM	8.2	5.6	20.4	0.15	9.2	NM	91	OR

Notes:

1) PMW21-04 and MW-113 changed from IWs to MWs; PMW21-01 and PMW92-03 received initial injections in August 2013, after field measurements and sampling.

°C : degrees Celsius

btoc: below top of casing

ft: feet

mg/L : milligrams per liter

mL/min: milliliters per minute

mS/cm : milliSiemens per centimeter

mV :millivolts

NM: not measured

NR: not recorded

NTU: nephelometric turbidity unit

OR: out of range

TABLE 13
FINAL FIELD MEASUREMENTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

		Well ID	Date	Time Sampled	Sample Depth (ft, btoc)	Depth to Water (ft, btoc)	Purge Rate (mL/min)	Volume Purged (Liters)	pH	Temp (°C)	Specific Conductivity (mS/cm)	Dissolved Oxygen (YSI) (mg/L)	Dissolved Oxygen (Field Test) (mg/L)	Oxygen Reduction Potential (mV)	Turbidity (NTUs)
TTA-1N	IW	IW21-01A	11/7/2013	1610	102.0	88.78	93.30	4.2	6.5	18.3	11.34	1.8	NM	-122.4	OR
	IW	IW21-01B	11/7/2013	1709	94.0	90.22	112.50	4.5	6.4	17.6	2.84	1.5	NM	-78.5	OR
	IW	IW21-02A	11/8/2013	0913	105.0	89.95	112.50	4.5	6.3	15.9	2.68	2.3	NM	-37.7	OR
	IW	IW21-02B	11/8/2013	1001	95.0	89.90	170.00	3.4	6.8	17.8	3.54	1.6	NM	-120.1	OR
	IW	IW21-03A	11/8/2013	1508	104.0	97.79	111.40	3.9	6.3	18.4	1.21	1.9	2	-95.6	2.4
	IW	IW21-03B	11/8/2013	1134	96.0	97.43	233.30	7.0	6.2	19.3	1.93	2.8	2	-61.5	10.2
	IW	IW21-04A	11/8/2013	1139	90.5	88.36	80.78	4.1	6.3	18.4	4.62	1.5	NM	-105	OR
	IW	IW21-04B	11/8/2013	1454	94.0	88.16	165.71	5.8	6.9	18.8	7.64	0.2	NM	-104.3	OR
	IW	MW-21	11/8/2013	0903	99.2	89.16	105.88	5.4	6.1	16.9	0.54	1.7	NM	-64.2	OR
	MW-IW	PMW21-01	11/7/2013	1523	100.9	88.98	155.26	5.9	6.0	18.1	0.79	3.7	NM	-97.3	3.2
	IW-MW	PMW21-04	11/8/2013	1015	100.2	87.76	116.67	4.9	6.4	18.9	0.94	1.7	NM	-112	14.6
	MW	PMW21-02	11/8/2013	1605	102.1	87.86	168.00	4.2	5.9	18.1	0.33	4.2	4	107.4	0.1
TTA-1S	IW	IW101-02A	11/9/2013	0921	131.0	86.54	85.10	4.0	6.7	18.0	2.01	2.5	NM	-52.4	11.6
	IW	IW101-02B	11/9/2013	1057	117.0	86.62	100.00	4.3	6.2	19.7	0.41	4.0	2.5	47.9	9.1
	IW	IW101-02C	11/9/2013	1209	100.0	87.32	76.92	3.0	6.6	19.8	8.73	0.1	NM	-155	0.0
	IW	IW101-03A	11/10/2013	1014	133.0	87.45	124.00	5.6	6.3	20.1	2.06	2.0	2	-48.7	10.5
	IW	IW101-03B	11/10/2013	1110	117.0	89.92	196.00	4.9	6.3	20.2	5.80	2.9	NM	-40.9	OR
	IW	IW101-03C	11/10/2013	1202	101.0	87.61	95.00	1.9	6.2	20.6	14.99	2.2	NM	-103.9	OR
	IW	IW101-04A	11/10/2013	1701	131.0	87.26	77.78	3.5	6.5	19.9	22.18	0.1	NM	-156.2	OR
	IW	IW101-04B	11/11/2013	0905	115.0	87.58	91.23	5.2	6.4	20.3	2.69	0.2	NM	-70.4	10.6
	IW	IW101-04C	11/11/2013	1014	99.0	87.29	88.50	3.5	6.4	20.7	9.99	0.1	NM	-103.9	OR
	IW	IW101-05A	11/10/2013	1000	129.0	87.28	76.92	4.0	6.3	20.5	10.37	0.4	NM	-84.4	3.0
	IW	IW101-05B	11/10/2013	1444	115.0	86.90	68.00	5.1	6.3	21.5	0.51	7.7	NM	46.1	14.2
	IW	IW101-05C	11/10/2013	1550	98.0	87.26	80.00	4.0	6.4	21.2	8.97	0.4	NM	-65.1	1.2
	IW	IW101-07A	11/9/2013	1658	131.0	88.14	100.00	4.0	6.1	19.8	0.39	4.1	4	43.1	0.2
	IW	IW101-07B	11/9/2013	1519	113.0	88.60	151.40	5.3	6.3	20.1	7.51	1.9	NM	-80.3	OR
	IW	IW101-07C	11/9/2013	1421	100.0	88.43	100.00	2.5	6.2	20.7	7.76	2.0	NM	-101.3	OR
	IW	DR1-5	11/9/2013	0959	136.3	89.40	100.00	5.0	5.7	18.8	2.11	1.7	NM	-56.8	8.8
	IW	DR1-5A	11/9/2013	0848	102.3	89.40	211.00	5.5	5.6	19.3	0.27	1.8	2	-25	8.9
	IW	DR1-6	11/9/2013	1049	126.6	88.13	185.00	6.5	6.1	19.4	0.49	0.9	1	-16.6	14.4
	IW	DR1-6A	11/9/2013	1120	102.8	88.48	165.00	3.3	6.1	19.8	1.81	1.0	1	-50.3	6.7
	IW	PMW101-02A	11/9/2013	1541	128.0	87.42	101.80	5.7	6.2	20.4	3.61	0.2	NM	-78.6	13.3
	IW	PMW101-02B	11/9/2013	1724	108.3	87.65	85.70	3.0	6.3	19.0	2.25	0.6	NM	-71.3	19.2
	MW	PMW101-04A	11/8/2013	1659	128.8	86.92	189.29	5.3	6.2	19.0	0.57	1.3	1	-68	15.4
	MW	PMW101-04B	11/8/2013	1540	109.5	87.40	51.30	1.5	5.9	19.7	0.35	2.3	NM	42.5	15.7
	MW	PMW101-07A	11/10/2013	1522	128.7	87.75	120.00	4.8	6.1	21.4	0.49	1.5	1	-23.4	2.3
	MW	PMW101-07B	11/10/2013	1553	108.7	87.92	167.00	3.5	5.7	20.0	0.20	6.0	6	127.9	3.1

TABLE 13
FINAL FIELD MEASUREMENTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

												Dissolved	Dissolved	Oxygen	
												Oxygen	Oxygen	Reduction	
												(YSI)	(Field Test)	Potential	Turbidity
												(mg/L)	(mg/L)	(mV)	(NTUs)
		Well ID	Date	Time	Sample	Depth to	Purge	Volume		Temp	Specific				
				Sampled	Depth	Water	Rate	Purged	pH	(°C)	Conductivity				
					(ft, btoc)	(ft, btoc)	(mL/min)	(Liters)			(mS/cm)				
TTA-2	IW	IW85-05	11/6/2013	1419	101.0	96.24	121.00	6.8	6.7	22.0	12.99	2.5	NM	-104.7	OR
	IW	IW85-06	11/7/2013	0905	103.0	97.45	116.67	3.5	7.0	21.0	14.29	2.8	NM	-38.1	OR
	IW	IW92-01	11/6/2013	1054	Bailer	87.41	NA	8.0	6.3	19.3	6.90	1.5	NM	-113	OR
	IW	IW92-02	11/7/2013	1219	90.0	89.05	97.78	4.4	6.5	20.2	4.73	2.4	NM	-23.5	OR
	IW	IW92-03	11/6/2013	1057	Bailer	92.33	NA	3.6	6.7	20.0	5.69	1.8	NM	-99.3	OR
	IW	IW92-07	11/7/2013	1056	95.0	92.60	97.67	4.2	6.5	20.8	10.18	2.2	NM	-121.7	OR
	IW	IW92-08	11/6/2013	1635	95.0	92.96	57.50	2.3	6.5	20.2	19.39	2.5	NM	-164.3	OR
	IW	DR2-2	11/6/2013	1639	88.6	85.08	140.00	3.5	6.5	19.9	10.36	3.5	NM	-103	OR
	IW	DR2-5	11/5/2013	1520	98.6	95.02	57.50	2.3	6.3	24.1	6.87	2.9	2	-37.5	OR
	MW-IW	PMW92-03	11/5/2013	1415	98.6	96.14	100.00	3.0	6.8	23.5	1.02	1.9	NM	-121.7	9.1
	IW-MW	MW-113	11/6/2013	0905	103.2	97.83	120.00	2.4	6.4	21.3	10.33	1.8	NM	-176.5	3.2
	MW	MW-85	11/5/2013	1522	105.1	97.00	90.77	3.5	7.6	23.7	11.07	3.8	NM	-188.8	12.2
	MW	PMW85-01	11/6/2013	1357	100.7	94.88	75.50	3.4	5.6	21.4	0.20	1.0	1	170.9	2.1
MW	PMW85-05	11/6/2013	0920	101.0	95.72	112.50	4.5	6.3	20.4	16.58	1.8	NM	-209.7	OR	
W-C	IW	MW-203A	11/7/2013	1208	150.5	90.80	232.00	5.8	6.6	18.4	11.18	2.0	NM	-169.9	OR
	IW	MW-203B	11/7/2013	0944	100.3	89.28	142.50	5.7	6.5	17.6	1.01	1.9	2	-151.3	13.4
	MW	MW-197A	11/7/2013	1359	170.4	90.65	185.71	3.9	6.2	18.3	0.43	3.6	3	18.33	2.9
	MW	MW-197B	11/7/2013	1316	102.6	90.61	133.00	4.0	6.3	18.4	0.47	1.5	1	68	1.9
B-835	IW	MW-62	11/11/2013	0919	Bailer	91.20	NA	10.0	6.4	17.0	0.54	4.7	NM	-78.9	11.8
	IW	MW-213	11/11/2013	0820	Bailer	91.00	NA	2.3	6.5	18.7	2.16	5.6	NM	-131.1	OR
	MW	MW-212	11/11/2013	1010	Bailer	94.81	NA	12.0	5.8	18.6	0.16	9.5	NM	109.6	114

Notes:

1) PMW21-04 and MW-113 changed from IWs to MWs; PMW21-01 and PMW92-03 received initial injections in August 2013, after field measurements and sampling.

°C : degrees Celsius

mV :millivolts

btoc: below top of casing

NM: not measured

ft: feet

NR: not recorded

mg/L : milligrams per liter

NTU: nephelometric turbidity unit

mL/min: milliliters per minute

OR: out of range

mS/cm : milliSiemens per centimeter

TABLE 14
VOC ANALYTICAL RESULTS SUMMARY, EBT-10 – TTA-1N
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A
	Lab ID		L11120348-01	L11120348-02	L11120348-03	L11120348-04	L11120348-20	L11120348-21	L11120348-22
	Date		12/8/2011	12/8/2011	12/8/2011	12/8/2011	12/9/2011	12/9/2011	12/9/2011
	Area		TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<1	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	80	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	70	10.6	11.5	3.08	2.15	7.09	51.2	48.8 J
Tetrachloroethene	µg/L	5	166	104	32.5	31.6	213	197	135
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<1	<1	0.554 J	0.837 J	<1
Trichloroethene	µg/L	5	27.1	16	3	3.06	45.9	68.5	33.3 J
Vinyl chloride	µg/L	2	<1	<1	<1	<1	<1	<1	<1
Additional VOCs									
1,2-Dichloroethane	µg/L	5	0.274 J	<0.5	1.63	1.08	<0.5	<0.5	0.26 J
Acetone	µg/L	-	<10	<10	3.23 J	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	-	70.9 J	66.3 J	<5	<5	33.7 J	43.8 J	95.1

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

TABLE 14
VOC ANALYTICAL RESULTS SUMMARY, EBT-10 – TTA-1N
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW21-04B	IW21-05A	IW21-05B	PMW21-04	PMW21-01	PMW21-02
	Lab ID		L11120348-25	L11120403-01	L11120403-02	L11120274-10	L11120274-08	L11120274-09
	Date		12/9/2011	12/10/2011	12/10/2011	12/6/2011	12/6/2011	12/6/2011
	Area		TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Primary CVOCs	Units	MCL						
Carbon tetrachloride	µg/L	5	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	80	<0.3	<0.3	<0.3	0.144 J	0.137 J	<0.3
cis-1,2-Dichloroethene	µg/L	70	101	3.79	20.3	55.5	15.6	4.2
Tetrachloroethene	µg/L	5	40.9	4.19	132	211	280	118
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<1	0.313 J	0.251 J	<1
Trichloroethene	µg/L	5	19	2.62	35.5	69.3	50.1	30.1
Vinyl chloride	µg/L	2	<1	<1	<1	<1	<1	<1
Additional VOCs								
1,2-Dichloroethane	µg/L	5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	µg/L	-	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	-	123 J	3.75 J	42.5	56.7	49.4	29.1

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

TABLE 15
VOC ANALYTICAL RESULTS SUMMARY, EBT-10 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW101-01A	IW101-01B	IW101-01C	IW101-02A	IW101-02B	IW101-02C	IW101-03A
	Lab ID		L11120274-01	L11120274-02	L11120274-03	L11120274-04	L11120274-05	L11120274-21	L11120274-22
	Date		12/6/2011	12/6/2011	12/6/2011	12/6/2011	12/6/2011	12/7/2011	12/7/2011
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<1	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	80	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	70	0.92 J	<1	<1	1.16	<1	0.302 J	0.415 J
Tetrachloroethene	µg/L	5	12.5	21.6	53.8	59.2	59.3	52	1.8
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	5	0.363 J	<1	<1	0.3 J	<1	0.706 J	<1
Vinyl chloride	µg/L	2	<1	<1	<1	<1	<1	<1	<1
Additional VOCs									
1,2-Dichloroethane	µg/L	5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	-	<1	<1	<1	<1	<1	<1	<1
Acetone	µg/L	-	<10	<10	<10	<10	<10	<10	32.3 J
MEK (2-Butanone)	µg/L	-	<10	<10	<10	<10	<10	<10 UJ	<10
Methyl t-butyl ether (MTBE)	µg/L	-	<5	<5	2.56 J	3.28 J	3.88 J	4.44 J	0.671 J

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE 15
VOC ANALYTICAL RESULTS SUMMARY, EBT-10 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW101-03B	IW101-03C	IW101-04A	IW101-04B	IW101-04C	IW101-05A	IW101-05B
	Lab ID		L11120274-25	L11120348-07	L11120274-26	L11120348-08	L11120348-09	L11120348-14	L11120348-15
	Date		12/7/2011	12/8/2011	12/7/2011	12/8/2011	12/8/2011	12/9/2011	12/9/2011
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<1	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	80	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	70	<1	3.41	10.4	0.931 J	59.2	0.432 J	<1
Tetrachloroethene	µg/L	5	30.6	21.7	26.4	44.4	16.7	55.9	59.9
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	5	0.464 J	39	1.86	1.57	31	<1	<1
Vinyl chloride	µg/L	2	<1	<1	<1	<1	<1	<1	<1
Additional VOCs									
1,2-Dichloroethane	µg/L	5	<0.5	<0.5	<0.5	<0.5	0.473 J	<0.5	<0.5
1,2-Dichloropropane	µg/L	-	<1	<1	<1	<1	0.731 J	<1	<1
Acetone	µg/L	-	<10	<10	2.81 J	<10	<10	<10	<10
MEK (2-Butanone)	µg/L	-	<10 UJ	<10	<10 UJ	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	-	5.99	1.24 J	1.01 J	1.2 J	1.19 J	2.33 J	3.16 J

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
UJ: Estimated, non-detect

TABLE 15
VOC ANALYTICAL RESULTS SUMMARY, EBT-10 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW101-05C	IW101-06A	IW101-06B	IW101-06C	IW101-07A	IW101-07B	IW101-07C
	Lab ID		L11120348-16	L11120348-17	L11120348-18	L11120403-03	L11120403-04	L11120403-05	L11120403-10
	Date		12/9/2011	12/9/2011	12/9/2011	12/10/2011	12/10/2011	12/10/2011	12/11/2011
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<1	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	80	<0.3	<0.3	0.133 J	<0.3	<0.3	<0.3	0.138 J
cis-1,2-Dichloroethene	µg/L	70	0.291 J	0.998 J	0.306 J	2.36	0.658 J	4.54	24.5
Tetrachloroethene	µg/L	5	58.6	0.35 J	17.8	18	8.4	19.6	40.8
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	5	1.35	<1	4.95	46.4	17	52.1	113
Vinyl chloride	µg/L	2	<1	<1	<1	<1	<1	<1	<1
Additional VOCs									
1,2-Dichloroethane	µg/L	5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.369 J
1,2-Dichloropropane	µg/L	-	<1	<1	<1	<1	<1	<1	0.595 J
Acetone	µg/L	-	<10	<10	<10	<10	<10	5.63 J	<10
MEK (2-Butanone)	µg/L	-	<10	<10	<10	<10	<10	3.06 J	<10
Methyl t-butyl ether (MTBE)	µg/L	-	4.12 J	<5	3.72 J	<5	0.703 J	<5	<5

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
UJ: Estimated, non-detect

TABLE 15
VOC ANALYTICAL RESULTS SUMMARY, EBT-10 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW101-08A	IW101-08B	IW101-08C	IW101-09A	IW101-09B	IW101-09C	PMW101-01A
	Lab ID		L11120403-06	L11120403-11	L11120403-12	L11120403-13	L11120403-15	L11120403-16	L11120274-11
	Date		12/10/2011	12/11/2011	12/11/2011	12/11/2011	12/12/2011	12/12/2011	12/6/2011
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<1	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	80	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	70	<1	1.8	4.46	<1	4.82	11.1	3.35
Tetrachloroethene	µg/L	5	0.493 J	12.1	16.8	<1	27.8	22.3	26.4
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	5	0.834 J	34.3	50.6	0.254 J	78.4	64.8	1.25
Vinyl chloride	µg/L	2	<1	<1	<1	<1	<1	56.6	<1
Additional VOCs									
1,2-Dichloroethane	µg/L	5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	-	<1	<1	<1	<1	<1	0.497 J	<1
Acetone	µg/L	-	<10	<10	<10	<10	<10	65.1	<10
MEK (2-Butanone)	µg/L	-	<10	<10	<10	<10	<10	129	<10 UJ
Methyl t-butyl ether (MTBE)	µg/L	-	<5	<5	<5	<5	<5	<5	0.592 J

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE 15
VOC ANALYTICAL RESULTS SUMMARY, EBT-10 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		PMW101-01B	PMW101-02A	PMW101-02B	PMW101-03A	PMW101-03B	PMW101-05A	PMW101-05B
	Lab ID		L11120274-12	L11120274-13	L11120274-14	L11120348-10	L11120348-11	L11120274-16	L11120274-19
	Date		12/6/2011	12/6/2011	12/6/2011	12/8/2011	12/8/2011	12/7/2011	12/7/2011
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<1	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	80	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.165 J
cis-1,2-Dichloroethene	µg/L	70	1.46	2.09	0.442 J	1.97	0.884 J	0.592 J	165
Tetrachloroethene	µg/L	5	45.4	45.4	25.5	36.5	40.4	64.9 J	16.6
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	5	0.777 J	0.558 J	1.86	1.59	1.46	<1	26.4
Vinyl chloride	µg/L	2	<1	<1	<1	<1	0.595 J	<1	<1
Additional VOCs									
1,2-Dichloroethane	µg/L	5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.02
1,2-Dichloropropane	µg/L	-	<1	<1	<1	<1	<1	<1	1.81
Acetone	µg/L	-	<10	<10	<10	<10	<10	<10	<10
MEK (2-Butanone)	µg/L	-	<10 UJ	<10 UJ	<10 UJ	<10	<10	<10 UJ	<10 UJ
Methyl t-butyl ether (MTBE)	µg/L	-	1.66 J	1.03 J	1.62 J	1.69 J	4.09 J	3.49 J	<5

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
UJ: Estimated, non-detect

TABLE 15
VOC ANALYTICAL RESULTS SUMMARY, EBT-10 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location Lab ID Date Area		PMW101-06A L11120348-26 12/9/2011 TTA-1S	PMW101-06B L11120348-27 12/9/2011 TTA-1S	PMW101-07A L11120348-28 12/9/2011 TTA-1S	PMW101-07B L11120348-29 12/9/2011 TTA-1S	PMW101-08A L11120348-30 12/9/2011 TTA-1S	PMW101-08B L11120403-07 12/10/2011 TTA-1S
Primary CVOCs	Units	MCL						
Carbon tetrachloride	µg/L	5	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	80	<0.3	<0.3	<0.3	<0.3	<0.3	0.205 J
cis-1,2-Dichloroethene	µg/L	70	<1	<1	<1	1.35	0.452 J	21
Tetrachloroethene	µg/L	5	2.32	16.6	0.361 J	14.2	15.7	41.7
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	5	<1	4.32	<1	28.9	0.386 J	127
Vinyl chloride	µg/L	2	<1	<1	<1	<1	<1	<1
Additional VOCs								
1,2-Dichloroethane	µg/L	5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	-	<1	<1	<1	<1	<1	0.386 J
Acetone	µg/L	-	<10	<10	<10	<10	<10	<10
MEK (2-Butanone)	µg/L	-	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	-	0.781 J	3.76 J	<5	<5	<5	<5

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
UJ: Estimated, non-detect

TABLE 16
VOC ANALYTICAL RESULTS SUMMARY, EBT-10 – TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-04	IW92-05
	Lab ID		L11120490-10	L11120490-11	L11120403-17	L11120403-18	L11120403-19	L11120490-01	L11120490-02
	Date		12/14/2011	12/14/2011	12/12/2011	12/12/2011	12/12/2011	12/13/2011	12/13/2011
	Area		TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	50.6	0.546 J	25.8	27.9	0.308 J	<1	<1
Chloroform	µg/L	80	21.2	0.24 J	7.46	9.53	0.442	<0.3	0.426
cis-1,2-Dichloroethene	µg/L	70	67.6	99.3	10.4	45.7	143	193	77.5
Tetrachloroethene	µg/L	5	32.8	1.45	189	191	21.2	<1	0.946 J
trans-1,2-Dichloroethene	µg/L	100	0.633 J	0.802 J	<1	<1	<1	0.254 J	0.734 J
Trichloroethene	µg/L	5	13.1	1.31	6.71	9.78	4.33	<1	0.363 J
Vinyl chloride	µg/L	2	<1	0.606 J	<1	<1	<1	<1	0.365 J
Additional VOCs									
1,2,3-Trichloropropane	µg/L	-	14.3	24.6	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.269 J
1,2-Dichloropropane	µg/L	-	0.476 J	6.59	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	-	0.21 J	6.17	<0.4	<0.4	<0.4	<0.4	<0.4
Acetone	µg/L	-	6.07 J	5.32 J	<10	<10	5.88 J	4.89 J	79 J
Carbon disulfide	µg/L	-	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	-	<0.5	0.344 J	<0.5	<0.5	<0.5	<0.5	<0.5
MEK (2-Butanone)	µg/L	-	<10	<10	<10	<10	4.2 J	4.92 J	4.79 J

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration

TABLE 16
VOC ANALYTICAL RESULTS SUMMARY, EBT-10 – TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW92-06	IW92-07	IW92-08	PMW92-01	PMW92-02	PMW92-04	PMW92-05
	Lab ID		L11120490-03	L11120490-04	L11120490-12	L11120403-23	L11120403-24	L11120403-25	L11120403-27
	Date		12/13/2011	12/13/2011	12/14/2011	12/12/2011	12/12/2011	12/12/2011	12/12/2011
	Area		TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<1	0.34 J	2.37	<1	<1	<1	19.6
Chloroform	µg/L	80	0.664	0.374	2.99	<0.3	<0.3	0.334	9.89
cis-1,2-Dichloroethene	µg/L	70	201	127	87.8	107	184	122	26.5
Tetrachloroethene	µg/L	5	0.335 J	3.17	8.86	1.43	<1	9.58	90.6
trans-1,2-Dichloroethene	µg/L	100	2.01	0.726 J	0.429 J	<1	<1	<1	<1
Trichloroethene	µg/L	5	<1	0.51 J	1.19	1.39	<1	14.5	8.9
Vinyl chloride	µg/L	2	0.462 J	0.493 J	0.302 J	<1	0.337 J	<1	<1
Additional VOCs									
1,2,3-Trichloropropane	µg/L	-	<1	<1	22 J	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	5	0.75	0.402 J	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	-	0.439 J	0.369 J	6.28	<1	<1	0.22 J	<1
1,3-Dichloropropane	µg/L	-	<0.4	<0.4	5.75	<0.4	<0.4	<0.4	<0.4
Acetone	µg/L	-	72.3	5.16 J	6.12 J	<10	<10	23.7	<10
Carbon disulfide	µg/L	-	<1	1.05	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	-	<0.5	<0.5	0.361 J	<0.5	<0.5	<0.5	<0.5
MEK (2-Butanone)	µg/L	-	47.5	<10	<10	<10	<10	<10	<10

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration

TABLE 16
VOC ANALYTICAL RESULTS SUMMARY, EBT-10 – TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW85-01	IW85-02	PMW85-01	PMW85-04	PMW85-05
	Lab ID		L11120490-08	L11120490-09	L11120403-22	L11120490-05	L11120490-06
	Date		12/14/2011	12/14/2011	12/12/2011	12/13/2011	12/13/2011
	Area		TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Primary CVOCs	Units	MCL					
Carbon tetrachloride	µg/L	5	4.47	1.05	102	<1	77.6
Chloroform	µg/L	80	5.32	0.739	42.5	0.218 J	34.8
cis-1,2-Dichloroethene	µg/L	70	125	84.1	37.3	83.8	81.9
Tetrachloroethene	µg/L	5	2.25	0.861 J	57.2	35.5	79.1
trans-1,2-Dichloroethene	µg/L	100	0.58 J	<1	<1	<1	0.464 J
Trichloroethene	µg/L	5	0.788 J	0.443 J	20.2	15.2	25.6
Vinyl chloride	µg/L	2	<1	0.325 J	<1	<1	<1
Additional VOCs							
1,2,3-Trichloropropane	µg/L	-	9.01	18.2	11.4	53.9	82.9
1,2-Dichloroethane	µg/L	5	<0.5	<0.5	<0.5	<0.5	0.48 J
1,2-Dichloropropane	µg/L	-	1.62	1.73	0.356 J	0.926 J	0.679 J
1,3-Dichloropropane	µg/L	-	2	2.41	<0.4	0.505	<0.4
Acetone	µg/L	-	12.9	9.66 J	<10	2.5 J	<10
Carbon disulfide	µg/L	-	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	-	0.145 J	0.281 J	0.191 J	0.524	0.301 J
MEK (2-Butanone)	µg/L	-	6.71 J	6.7 J	<10	<10	<10

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration

TABLE 17
SUMMARY FOR FREQUENTLY DETECTED CVOCS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PCE	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	213	4.19	9
	PMW	3	280	118	3
TTA-1S	IW	27	59.9	0.35	23
	PMW	14	64.9	0.361	12
TTA-2	IW	12	191	0.335	5
	PMW	7	90.6	1.43	5
West-Central	IW	0			
	PMW	0			
Bldg 835	IW	0			
	PMW	0			

TCE	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	68.5	2.62	7
	PMW	3	69.3	30.1	3
TTA-1S	IW	27	113	0.254	10
	PMW	14	127	0.386	3
TTA-2	IW	12	13.1	0.363	3
	PMW	7	25.6	1.39	5
West-Central	IW	0			
	PMW	0			
Bldg 835	IW	0			
	PMW	0			

cDCE	MCL				
	70 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	101	2.15	1
	PMW	3	55.5	4.2	0
TTA-1S	IW	27	59.2	0.291	0
	PMW	14	165	0.442	1
TTA-2	IW	12	204	10.4	9
	PMW	7	184	26.5	5
West-Central	IW	0			
	PMW	0			
Bldg 835	IW	0			
	PMW	0			

VC	MCL				
	2 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	<1	-	0
	PMW	3	<1	-	0
TTA-1S	IW	27	56.1	<1	1
	PMW	14	0.595	<1	0
TTA-2	IW	12	0.606	0.302	0
	PMW	7	0.337	<1	0
West-Central	IW	0			
	PMW	0			
Bldg 835	IW	0			
	PMW	0			

TABLE 17
SUMMARY FOR FREQUENTLY DETECTED CVOCS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

CT	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-2	IW	12	50.6	0.308	3
	PMW	7	102	0.5	3

CF	MCL				
	80 µg/L*	No. of Wells	Max	Min	Wells > MCL
TTA-2	IW	12	21.2	0.374	0
	PMW	7	42.5	0.218	0

Notes:

All concentrations in micrograms per liter (µg/L).

MCL: Maximum Contaminant Level

* MCL for total trihalomethanes shown for CF.

TABLE 18
 BASELINE CVOC REVIEW
 YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
 Main Installation - Defense Depot Memphis, Tennessee

	PCE	PCE	PCE	Change		TCE	TCE	TCE	Change
	µg/L	µg/L	µg/L			µg/L	µg/L	µg/L	
Well	Aug-06	Mar-09	Dec-11		Well	Aug-06	Mar-09	Dec-11	
TTA-1N					TTA-1N				
IW21-01A	234	3.41	166	-29%	IW21-01A	55.7	2.26	27.1	-51%
IW21-01B	144	7.13	104	-28%	IW21-01B	30.1	4	16	-47%
IW21-02A	99.7	111	32.5	-67%	IW21-02A	17	17.8	3	-82%
IW21-02B	80.2	10.7	31.6	-61%	IW21-02B	14.8	1.76	3.06	-79%
IW21-03A	193	3.66	213	10%	IW21-03A	56.1	4.09	45.9	-18%
IW21-03B	49.4	0.3	197	299%	IW21-03B	23.4	1.32	68.5	193%
IW21-04A	276	8.75	135	-51%	IW21-04A	64.5	7.76	33.3	-48%
IW21-04B	286	0.383	40.9	-86%	IW21-04B	56.4	0.956	19	-66%
IW21-05A	83.6	<1	4.19	-95%	IW21-05A	30.8	0.464	2.62	-91%
IW21-05B	41.5	2.09	132	218%	IW21-05B	16.7	1.22	35.5	113%
PMW21-01	156	23.5	280	79%	PMW21-01	40.6	7.6	50.1	23%
PMW21-02	108	49.5	118	9%	PMW21-02	37.8	21.4	30.1	-20%
PMW21-03	185	18.7	55	-70%	PMW21-03	58	8.01	14.4	-75%
PMW21-04	199	13.5	211	6%	PMW21-04	87.7	5.52	69.3	-21%
PMW21-05	6.37	61.2	19.5	206%	PMW21-05	34.4	13	1.46	-96%
TTA-1S					TTA-1S				
IW101-01A	47.5	<1	12.5	-74%	IW101-01A	0.625	<1	0.363	
IW101-01B	71.8	0.256	21.6	-70%	IW101-01B	<1	<1	<1	
IW101-01C	228	8.38	53.8	-76%	IW101-01C	0.91	19.9	<1	
IW101-02A	232	10.4	59.2	-74%	IW101-02A	<1	3.05	0.3	
IW101-02B	221	18.4	59.3	-73%	IW101-02B	0.406	2.29	<1	
IW101-02C	190	1.06	52	-73%	IW101-02C	3.74	1.27	0.706	
IW101-03A	3.95	1.01	1.8		IW101-03A	<1	0.413	<1	
IW101-03B	89.9	16.1	30.6	-66%	IW101-03B	1.08	2.43	0.464	
IW101-03C	59	2.35	21.7	-63%	IW101-03C	78.5	11.4	39	-50%
IW101-04A	190	<1	26.4	-86%	IW101-04A	0.312	<1	1.86	
IW101-04B	182	0.328	44.4	-76%	IW101-04B	0.278	0.464	1.57	
IW101-04C	169	0.89	16.7	-90%	IW101-04C	29.7	2.85	31	4%
IW101-05A	63.1	5.19	55.9	-11%	IW101-05A	<1	1.28	<1	
IW101-05B	202	26.1	59.9	-70%	IW101-05B	0.319	4.72	<1	
IW101-05C	219	4.23	58.6	-73%	IW101-05C	3.44	8.82	1.35	
IW101-06A	6.84	1.05	0.35	-95%	IW101-06A	<1	0.502	<1	

TABLE 18
 BASELINE CVOC REVIEW
 YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
 Main Installation - Defense Depot Memphis, Tennessee

Well	PCE µg/L Aug-06	PCE µg/L Mar-09	PCE µg/L Dec-11	Change	Well	TCE µg/L Aug-06	TCE µg/L Mar-09	TCE µg/L Dec-11	Change
TTA-1S (cont'd)					TTA-1S (cont'd)				
IW101-06B	47	6.28	17.8	-62%	IW101-06B	64.7	4.17	4.95	-92%
IW101-06C	66.2	5.68	18	-73%	IW101-06C	204	33.4	46.4	-77%
IW101-07A	5.16	1.1	8.4	63%	IW101-07A	2.61	1.43	17	
IW101-07B	38	6	19.6	-48%	IW101-07B	138	23.5	52.1	-62%
IW101-07C	60.9	0.722	40.8	-33%	IW101-07C	207	1.94	113	-45%
IW101-08A	0.907	<1	0.493		IW101-08A	0.983	<1	0.834	
IW101-08B	17.5	0.765	12.1	-31%	IW101-08B	51	1.82	34.3	-33%
IW101-08C	66.6	0.827	16.8	-75%	IW101-08C	240	3.42	50.6	-79%
IW101-09A	0.572	0.45	<1		IW101-09A	0.321	0.328	0.254	
IW101-09B	45.8	0.395	27.8	-39%	IW101-09B	96	0.454	78.4	-18%
IW101-09C	101	1.04	22.3	-78%	IW101-09C	316	4.19	64.8	-79%
PMW101-01A	110	1.58	26.4	-76%	PMW101-01A	<1	<1	1.25	
PMW101-01B	158	5.47	45.4	-71%	PMW101-01B	1.19	1.41	0.777	
PMW101-02A	257	5.21	45.4	-82%	PMW101-02A	0.322	<1	0.558	
PMW101-02B	196	27	25.5	-87%	PMW101-02B	4.73	21	1.86	
PMW101-03A	100	0.885	36.5	-64%	PMW101-03A	<1	0.534	1.59	
PMW101-03B	144	10.4	40.4	-72%	PMW101-03B	2.41	3.31	1.46	
PMW101-04A	199	22.6	59.6	-70%	PMW101-04A	0.26	6.83	2.11	
PMW101-04B	90.4	22.4	31.2	-65%	PMW101-04B	23.2	2.39	3.23	-86%
PMW101-05A	194	3.8	64.9	-67%	PMW101-05A	<1	1.81	<1	
PMW101-05B	38.7	15.9	16.6	-57%	PMW101-05B	151	50	26.4	-83%
PMW101-06A	4.16	1.17	2.32		PMW101-06A	<1	0.607	<1	
PMW101-06B	23.3	<1	16.6	-29%	PMW101-06B	16.2	<1	4.32	-73%
PMW101-07A	0.562	0.39	0.361		PMW101-07A	0.782 J	<1	<1	
PMW101-07B	53.6	14.4	14.2	-74%	PMW101-07B	187	29.2	28.9	-85%
PMW101-08A	0.735	36.3	15.7		PMW101-08A	<1	9.43	0.386	
PMW101-08B	46.6	10.9	41.7	-11%	PMW101-08B	232	44.4	127	-45%

TABLE 18
 BASELINE CVOC REVIEW
 YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
 Main Installation - Defense Depot Memphis, Tennessee

Well	PCE µg/L	PCE µg/L	PCE µg/L	Change	Well	TCE µg/L	TCE µg/L	TCE µg/L	Change	Well	CT µg/L	CT µg/L	CT µg/L	Change
	Aug-06	Mar-09	Dec-11			Aug-06	Mar-09	Dec-11			Aug-06	Mar-09	Dec-11	
TTA-2					TTA-2					TTA-2				
IW85-01	79.2	4.84	2.25	-97%	IW85-01	26.3	1.79	0.788	-97%	IW85-01	168	<1	4.47	-97%
IW85-02	48.7	3.62	0.861	-98%	IW85-02	15.5	2.01	0.443	-97%	IW85-02	71.4	<1	1.05	-99%
IW85-05	76.4	1.87	32.8	-57%	IW85-05	25.1	0.824	13.1	-48%	IW85-05	199	<1	50.6	-75%
IW85-06	31	5.48	1.45	-95%	IW85-06	9.93	2.72	1.31	-87%	IW85-06	3.02	6.69	0.546	
IW92-01	160	0.264	189	18%	IW92-01	6.36	<1	6.71	6%	IW92-01	22.7	<1	25.8	14%
IW92-02	104	0.371	191	84%	IW92-02	4.01	<1	9.78	144%	IW92-02	13	<1	27.9	115%
IW92-03	184	<1	21.2	-88%	IW92-03	6.84	<1	4.33	-37%	IW92-03	30.5	<1	0.308	-99%
IW92-04	170	0.722	<1	-100%	IW92-04	6.16	<2	0.5	-92%	IW92-04	30	<2	<1	-98%
IW92-05	194	1.43	0.946	-100%	IW92-05	6.1	0.335	0.363	-94%	IW92-05	29.9	<1	<1	-98%
IW92-06	51.2	3.61	0.335	-99%	IW92-06	2.58	0.377	0.5		IW92-06	8.77	<1	<1	-94%
IW92-07	196	0.684	3.17	-98%	IW92-07	9.2	0.282	0.51	-94%	IW92-07	38.4	<1	0.34	-99%
IW92-08	156	1.79	8.86	-94%	IW92-08	26.9	<5	1.19	-96%	IW92-08	103	<5	2.37	-98%
PMW85-01	79.6	0.896	57.2	-28%	PMW85-01	26.1	<1	20.2	-23%	PMW85-01	222	<1	102	-54%
PMW85-04	79.5	1.3	35.5	-55%	PMW85-04	25.6	<1	15.2	-41%	PMW85-04	57.9	0.355	<1	-99%
PMW85-05	119	30.5	79.1	-34%	PMW85-05	37.9	14.8	25.6	-32%	PMW85-05	155	5.13	77.6	-50%
PMW92-01	73	<10	1.43	-98%	PMW92-01	2.87	<10	1.39		PMW92-01	8.92	<10	<1	-94%
PMW92-02	157	<1	<1	-100%	PMW92-02	5.81	<1	0.5	-91%	PMW92-02	19.8	<1	<1	-97%
PMW92-03	252	15.6	147	-42%	PMW92-03	11.5	5.99	15.1	31%	PMW92-03	58.1	<1	<1	-99%
PMW92-04	165	5.02	9.58	-94%	PMW92-04	7.8	0.916	14.5	86%	PMW92-04	33.1	<1	<1	-98%
PMW92-05	223	33.9	90.6	-59%	PMW92-05	17.1	7.02	8.9	-48%	PMW92-05	77.5	2.37	19.6	-75%
PMW92-06	179	3.88	135	-25%	PMW92-06	39.7	2.98	29.8	-25%	PMW92-06	182	<1	106	-42%

Notes:

µg/L

CT: carbon tetrachloride

PCE: tetrachloroethane

TCE: trichloroethene

TABLE 19
GEOCHEMICAL ANALYTICAL RESULTS, TTA-1N
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14		Well ID	IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A	IW21-04B	MW-21	PMW21-01	PMW21-02	PMW21-04
		Date	11/7/2013	11/7/2013	11/8/2013	11/8/2013	11/8/2013	11/8/2013	11/8/2013	11/8/2013	11/8/2013	11/7/2013	11/8/2013	11/8/2013
Analyte		Units												
Total Organic Carbon		mg/L	8200	1070	1080	680	143	426	2240 J	2470 J	162	210	2.28 B	65
Acetic Acid		mg/L	1610	83.9	144	148	83.1	285	846 J	1410 J	57.6	53.8	<1	14.6
Butyric Acid		mg/L	3040	379	529	23.1	5.83	90.8	1020 J	588 J	121	23.3	<1	3.23
Lactic Acid		mg/L	<50 UJ	<10	<10 UJ	<1 UJ	0.553 J	<1 UJ	<100 UJ	12.5 J	<1 UJ	<1 UJ	<1	<1 UJ
Propionic Acid		mg/L	1890	677	591	812	168	423	1000 J	1670 J	22.2	39	<10	6.19 J
Pyruvic Acid		mg/L	<5 UJ	<1	<1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ	<10 UJ	<1 UJ	<0.1 UJ	<0.1 UJ	<0.1	<0.1 UJ

EBT-13		Well ID	IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A	IW21-04B	MW-21	PMW21-01	PMW21-02	PMW21-04
		Date	8/18/2013	8/18/2013	8/17/2013	8/17/2013	8/19/2013	8/19/2013	8/19/2013	8/19/2013	8/17/2013	8/17/2013	8/18/2013	8/17/2013
Analyte		Units												
Total Organic Carbon		mg/L	502	114	189	244	134	199	4550	1240 J	120	1.96	1.58 B	444 J
Acetic Acid		mg/L	34.7	64.7	3.96	36.2	76.3	34.2	1200	243 J	84.1	<1	0.562 J	63.7 J
Butyric Acid		mg/L	6.41	2.5	6.34	10.3	21.7	5.73	1890	78.5 J	37.5	<1	<1	92.6 J
Lactic Acid		mg/L	3.44 J	0.82 J	2.37 J	4.54 J	0.903 J	2.25 J	<100 UJ	10.2 J	2.25 J	<1	<1	<1 UJ
Propionic Acid		mg/L	367	37.8	182	148	57.5	163	1800	984 J	36	<10	<10	201 J
Pyruvic Acid		mg/L	0.133 J	<0.1	<0.1 UJ	0.0597 J	<0.1 UJ	<0.1 UJ	<10 UJ	<0.1 UJ	<0.1 UJ	<0.1	<0.1	<0.1 UJ

EBT-12		Well ID	IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A	IW21-04B	MW-21	PMW21-01	PMW21-02	PMW21-04
		Date	5/7/2013	5/10/2013	5/10/2013	5/10/2013	5/8/2013	5/11/2013	5/11/2013	5/8/2013	5/10/2013	5/11/2013	5/11/2013	5/8/2013
Analyte		Units												
Total Organic Carbon		mg/L	6280	321	626	5220 J	205	422	23200	1470	28.3	0.944 J	2.48	172
Acetic Acid		mg/L	817	55.8	232	996	141	13.1 J	5010 J	1050	20.3	<1 UJ	<1 UJ	102
Butyric Acid		mg/L	888	11.3	246	1920	49.8	14.6 J	8360 J	230	2.82	<1 UJ	<1 UJ	3.89
Lactic Acid		mg/L	<1 UJ	0.826 J	<10 UJ	342 J	1.95 J	9.41 J	16.4 J	10.4 J	<1	<1 UJ	<1 UJ	1.86 J
Propionic Acid		mg/L	396	222	180 J	666	87.4	467 J	4150 J	794	11 J	<10 UJ	<10 UJ	134
Pyruvic Acid		mg/L	<0.1 UJ	<0.1 UJ	<1	0.755 J	<0.1 UJ	<1 UJ	<1 UJ	<0.1 UJ	<0.1	<0.1 UJ	<0.1 UJ	<0.1 UJ

EBT-11		Well ID	IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A	IW21-04B	MW-21	PMW21-01	PMW21-02	PMW21-04
		Date	2/5/2013	2/5/2013	2/6/2013	2/6/2013	2/6/2013	2/7/2013	2/6/2013	2/6/2013	2/7/2013	2/5/2013	2/7/2013	2/7/2013
Analyte		units												
Total Organic Carbon		mg/L	2150	8250	85700	123000	98.8 B	16900 J	78600	5010 B	32.7	1.91	2.4	29.1
Acetic Acid		mg/L	1590	1190	7200	5430	8.67	5430 J	<100	1800	10.6	<1	<1	1.86
Butyric Acid		mg/L	1420	4310	5760	30000	1.57	16500 J	43400	4150	7.77	<1	<1	<1
Lactic Acid		mg/L	<100	495	109000	113000	<1	<100	50500	<10	1.66	<1	<1	<1
Propionic Acid		mg/L	1060	1410	<10000	<1000	<10	7410 J	857 J	1900	19.7	<10	<10	<10
Pyruvic Acid		mg/L	<10 UJ	<10 UJ	<100 UJ	<10 UJ	<0.1 UJ	<10 UJ	790 J	<1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1

TABLE 19
GEOCHEMICAL ANALYTICAL RESULTS, TTA-1N
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14		Well ID	IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A	IW21-04B	MW-21	PMW21-01	PMW21-02	PMW21-04
Analyte		Date	11/7/2013	11/7/2013	11/8/2013	11/8/2013	11/8/2013	11/8/2013	11/8/2013	11/8/2013	11/8/2013	11/7/2013	11/8/2013	11/8/2013
		Units												
Carbon Dioxide		µg/L	480000	290000	220000	200000	240000	110000	340000	270000	65000	170000	120000	150000
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methane		µg/L	7400	7200	8900	7900	9000	7200	7800	4700	2000	9400	14	8900

EBT-13		Well ID	IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A	IW21-04B	MW-21	PMW21-01	PMW21-02	PMW21-04
Analyte		Date	8/18/2013	8/18/2013	8/17/2013	8/17/2013	8/19/2013	8/19/2013	8/19/2013	8/19/2013	8/17/2013	8/17/2013	8/18/2013	8/17/2013
		Units												
Carbon Dioxide		µg/L	300000	160000	220000	180000	240000	250000	390000	350000	120000	110000	96000	160000
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methane		µg/L	15000	7300	13000	11000	13000	15000	14000	14000	4600	8 B	8.5 B	15000

EBT-12		Well ID	IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A	IW21-04B	MW-21	PMW21-01	PMW21-02	PMW21-04
Analyte		Date	5/7/2013	5/10/2013	5/10/2013	5/10/2013	5/8/2013	5/11/2013	5/11/2013	5/8/2013	5/10/2013	5/11/2013	5/11/2013	5/8/2013
		Units												
Carbon Dioxide		µg/L	460000	220000	320000	430000	240000	210000 J	380000 J	210000	120000	120000	100000	160000
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methane		µg/L	12000	12000	9700	4100	15000	12000	7600	8400	620	3.9 JB	18	12000

EBT-11		Well ID	IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A	IW21-04B	MW-21	PMW21-01	PMW21-02	PMW21-04
Analyte		Date	2/5/2013	2/5/2013	2/6/2013	2/6/2013	2/6/2013	2/7/2013	2/6/2013	2/6/2013	2/7/2013	2/5/2013	2/7/2013	2/7/2013
		units												
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	1.95 J	<5	<5	<5	1.86 J	1.62 J	<5	<5	<5	<5	<5
Methane		µg/L	26000	12400	1450	332	12400	11000	5640	7160	344	87.8 J	47.5	5330

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE Flags:

B: Blank contamination

J: Estimated concentration

UJ: Estimated, non-detect

TABLE 20
GEOCHEMICAL ANALYTICAL RESULTS, TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14		Well ID	IW101-02A	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A	IW101-04B	IW101-04C	IW101-05A
Analyte		Date	11/9/2013	11/9/2013	11/9/2013	11/10/2013	11/10/2013	11/10/2013	11/10/2013	11/11/2013	11/11/2013	11/10/2013
		Units										
Total Organic Carbon	mg/L		329	5.11	4200	377	2320 J	4890 J	11800 J	458	4370 J	4110 J
Acetic Acid	mg/L		16.7	<1	1680	120	1040 J	2280 J	3820 J	32.6	2180 J	2140 J
Butyric Acid	mg/L		10.7	<1	2650	4.08	803 J	4120 J	7900 J	27.4	2810 J	2170 J
Lactic Acid	mg/L		5.41 J	<1	<100 UJ	3.29 J	8.81 J	<100 UJ	<100 UJ	4.37 J	<100 UJ	<100 UJ
Propionic Acid	mg/L		357	<10	1890 J	383	1390 J	3140 J	4170 J	277	2300 J	2660 J
Pyruvic Acid	mg/L		<0.1 UJ	<0.1	<10 UJ	0.0677 J	<1 UJ	<10 UJ	<10 UJ	<0.1 UJ	<10 UJ	<10 UJ

EBT-13		Well ID	IW101-02A	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A	IW101-04B	IW101-04C	IW101-05A
Analyte		Date	8/15/2013	8/15/2013	8/15/2013	8/16/2013	8/16/2013	8/16/2013	8/18/2013	8/18/2013	8/18/2013	8/17/2013
		Units										
Total Organic Carbon	mg/L		10.4	4.77	37.1	320	2010	4160	2110 J	250	3770 J	742
Acetic Acid	mg/L		5.76	<1	1230	64.6	555	1170	361 J	22.5	1470 J	175
Butyric Acid	mg/L		<1	<1	2020	12.5	979	2520	342 J	15.9	2510 J	249
Lactic Acid	mg/L		<1	<1	<100 UJ	2.35 J	<10 UJ	<100	<100 J	3.67 J	<100 J	<10 R
Propionic Acid	mg/L		<10	<10	1330	213	709	2050	1290 J	103	1620 J	530
Pyruvic Acid	mg/L		<0.1	<0.1	<10 UJ	<0.1 UJ	<1 UJ	<10	<10 J	<0.1 UJ	<10 J	<1 R

EBT-12		Well ID	IW101-02A	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A	IW101-04B	IW101-04C	IW101-05A
Analyte		Date	5/12/2013	5/12/2013	5/12/2013	5/12/2013	5/12/2013	5/9/2013	5/13/2013	5/13/2013	5/9/2013	5/13/2013
		Units										
Total Organic Carbon	mg/L		262	3.56	1250	219	359	1790 J	17500	1610	1890 J	680
Acetic Acid	mg/L		70.2	<1	1100 J	82.3	9.37	842	4190	1110	171 J	169 J
Butyric Acid	mg/L		8.06	<1	211 J	16.1	<1	396	8440	475	<10	<1 UJ
Lactic Acid	mg/L		0.631 J	<1 UJ	7.34 J	2.25	6.96	8.85 J	26.9 J	7.53 J	9.65 J	2.82 J
Propionic Acid	mg/L		172 J	<10	606 J	136	412	940	2430	997	1190	623 J
Pyruvic Acid	mg/L		0.0779 J	<0.1 UJ	0.0763 J	0.144 J	<0.1 UJ	<0.1 UJ	<1	0.238 J	<1	<0.1 UJ

EBT-11		Well ID	IW101-02A	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A	IW101-04B	IW101-04C	IW101-05A
Analyte		Date	2/8/2013	2/8/2013	2/8/2013	2/7/2013	2/7/2013	2/8/2013	2/9/2013	2/9/2013	2/9/2013	2/8/2013
		units										
Total Organic Carbon	mg/L		36.3	1.54	2470	161	495	1070	2020	82.5	12.2	388
Acetic Acid	mg/L		13.9	<1	425	17.3 J	124	457	802	29.8	1490	86.7
Butyric Acid	mg/L		<1	<1	1530	21.2 J	297	49.8	1290	<10	1070	126
Lactic Acid	mg/L		<1	<1	117	<10	7.29 J	11.6	85.3	<10	<100	8.77 J
Propionic Acid	mg/L		<10	<10	644	145	153	485	647	<100	1380	102
Pyruvic Acid	mg/L		<0.1 UJ	<0.1 UJ	<1 UJ	<1 UJ	<1 UJ	<1 UJ	<1 UJ	1.35 J	<10 UJ	<1 UJ

TABLE 20
GEOCHEMICAL ANALYTICAL RESULTS, TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14		Well ID	IW101-05B	IW101-05C	IW101-07A	IW101-07B	IW101-07C	DR1-5	DR1-5A	DR1-6	DR1-6A	PMW101-02A
Date			11/10/2013	11/10/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013
Analyte		Units										
Total Organic Carbon		mg/L	13.9	3660 J	3.38	3710 J	4190 J	766	45	13.5	666	1470 J
Acetic Acid		mg/L	6.5	1880 J	0.931 J	1880 J	1700 J	296	28.1	6.72	226	361 J
Butyric Acid		mg/L	<1	1600 J	<1	2680 J	3120 J	474	<1	1.58	467	741 J
Lactic Acid		mg/L	<1	<100 UJ	<1	<100 UJ	<100 UJ	<10 UJ	0.566 J	<1	<10	<5 UJ
Propionic Acid		mg/L	<10	2420 J	<10	2220 J	2090 J	171 J	12 J	<10	231	436 J
Pyruvic Acid		mg/L	<0.1	<10 UJ	<0.1	<10 UJ	<10 UJ	<1 UJ	<0.1	<0.1	<1	<0.5 UJ

EBT-13		Well ID	IW101-05B	IW101-05C	IW101-07A	IW101-07B	IW101-07C	DR1-5A	DR1-5	DR1-6A	DR1-6	PMW101-02A
Date			8/17/2013	8/17/2013	8/16/2013	8/16/2013	8/16/2013	8/20/2013	8/20/2013	8/16/2013	8/16/2013	8/16/2013
Analyte		Units										
Total Organic Carbon		mg/L	3.96	2460 J	5.86	2890 J	5350 J	76.2	966	1460	66.1	2720
Acetic Acid		mg/L	<1	561 J	1.86	1200	1710	<1	338	231	13.7	696
Butyric Acid		mg/L	<1	910 J	<1	2020	2800	0.697 J	621	749	7.1	1450
Lactic Acid		mg/L	<1	<10 UJ	<1	<100	<100	<1	<10 UJ	<10 UJ	0.822 J	<10
Propionic Acid		mg/L	<10	1050 J	<10	1140	1850	<10	229	535	21.3	607
Pyruvic Acid		mg/L	<0.1	<1 UJ	<0.1	<10	<10	<0.1	<1 UJ	<1 UJ	<0.1 UJ	<1

EBT-12		Well ID	IW101-05B	IW101-05C	IW101-07A	IW101-07B	IW101-07C	DR1-5	DR1-5A	DR1-6	DR1-6A	PMW101-02A
Date			5/13/2013	5/13/2013	5/12/2013	5/12/2013	5/9/2013	5/12/2013	5/11/2013	5/12/2013	5/12/2013	5/13/2013
Analyte		Units										
Total Organic Carbon		mg/L	2.77	593	1.54	2370	3610 J	64	32.6	20.4	254	921
Acetic Acid		mg/L	<1 UJ	5.77 J	<1	1280	1690	43	9.79 J	12.8	158	296
Butyric Acid		mg/L	<1 UJ	20.2 J	<1	1380	1080	22.9	<1 UJ	1.72	87.8	447
Lactic Acid		mg/L	<1 UJ	11.7 J	<1 UJ	5.95 J	10.9 J	<1	<1 UJ	<1 UJ	<1 UJ	1.3 J
Propionic Acid		mg/L	<10 UJ	660 J	<10	457	1070	17.6 J	12.5 J	<10	49.7	420
Pyruvic Acid		mg/L	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ	<1	<0.1	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ

EBT-11		Well ID	IW101-05B	IW101-05C	IW101-07A	IW101-07B	IW101-07C	DR1-5	DR1-5A	DR1-6	DR1-6A	PMW101-02A
Date			2/8/2013	2/8/2013	2/7/2013	2/7/2013	2/7/2013	2/6/2013	2/6/2013	2/6/2013	2/6/2013	2/6/2013
Analyte		units										
Total Organic Carbon		mg/L	1.81	206	58.7	8.99	421	1310	366	34.7	26	45.8
Acetic Acid		mg/L	<1	16.8	0.897 J	1.58	63.4	83.1	30.9	17.3	21.2	19
Butyric Acid		mg/L	<1	<10	2.45	<1	21	627	99.7	9.92	7.6	9.59
Lactic Acid		mg/L	<1	<10	1.77	<1	10.4	<10	<1	<1	<1	18.2
Propionic Acid		mg/L	<10	95.5 J	<10	<10	243	277	27.8	35	<10	35.7
Pyruvic Acid		mg/L	<0.1 UJ	<1 UJ	<0.1 UJ	<0.1 UJ	<1 UJ	0.866 J	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ

TABLE 20
GEOCHEMICAL ANALYTICAL RESULTS, TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14	Well ID	PMW101-02B	PMW101-04A	PMW101-04B	PMW101-07A	PMW101-07B
	Date	11/9/2013	11/8/2013	11/8/2013	11/10/2013	11/10/2013
Analyte	Units					
Total Organic Carbon	mg/L	821	5.86	2.5 B	4.01 J	1.12
Acetic Acid	mg/L	352	<1	<1	<1	<1
Butyric Acid	mg/L	368	<1	<1	<1	<1
Lactic Acid	mg/L	<10 UJ	<1	<1	<1	<1
Propionic Acid	mg/L	375	<10	<10	<10	<10
Pyruvic Acid	mg/L	<1 UJ	<0.1	<0.1	<0.1	<0.1

EBT-13	Well ID	PMW101-02B	PMW101-04A	PMW101-04B	PMW101-07A	PMW101-07B
	Date	8/16/2013	8/15/2013	8/15/2013	8/15/2013	8/15/2013
Analyte	Units					
Total Organic Carbon	mg/L	1450	3.75	2.73	2.82	1.32
Acetic Acid	mg/L	154	<1	<1	<1	<1
Butyric Acid	mg/L	828	0.811 J	<1	<1	<1
Lactic Acid	mg/L	<10 UJ	<1	<1 UJ	<1	<1
Propionic Acid	mg/L	558	<10	<10	<10	<10
Pyruvic Acid	mg/L	<1 UJ	<0.1	<0.1 UJ	<0.1	<0.1

EBT-12	Well ID	PMW101-02B	PMW101-04A	PMW101-04B	PMW101-07A	PMW101-07B
	Date	5/13/2013	5/13/2013	5/8/2013	5/13/2013	5/13/2013
Analyte	Units					
Total Organic Carbon	mg/L	128	1.56	1.14 B	1.78	0.607 JB
Acetic Acid	mg/L	4.7	<1 UJ	<1	<1 UJ	<1 UJ
Butyric Acid	mg/L	1.69	<1 UJ	<1	<1 UJ	<1 UJ
Lactic Acid	mg/L	1.69	<1 UJ	<1	<1 UJ	<1 UJ
Propionic Acid	mg/L	30	<10 UJ	<10	<10 UJ	<10 UJ
Pyruvic Acid	mg/L	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ

EBT-11	Well ID	PMW101-02B	PMW101-04A	PMW101-04B	PMW101-07A	PMW101-07B
	Date	2/6/2013	2/7/2013	2/7/2013	2/7/2013	2/7/2013
Analyte	units					
Total Organic Carbon	mg/L	4.41	9.76	4.35	2.49 J	<1
Acetic Acid	mg/L	<1	<1	<1	<1	<1
Butyric Acid	mg/L	<1	<1	<1	<1	<1
Lactic Acid	mg/L	<1	<1	<1	<1	<1
Propionic Acid	mg/L	<10	<10	<10	<10	<10
Pyruvic Acid	mg/L	<0.1 UJ	<0.1	<0.1 UJ	<0.1 UJ	<0.1 UJ

TABLE 20
GEOCHEMICAL ANALYTICAL RESULTS, TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14		Well ID	IW101-02A	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A	IW101-04B	IW101-04C	IW101-05A
Date			11/9/2013	11/9/2013	11/9/2013	11/10/2013	11/10/2013	11/10/2013	11/10/2013	11/11/2013	11/11/2013	11/10/2013
Analyte		Units										
Carbon Dioxide		µg/L	230000	120000	340000	260000	330000	490000	940000	330000	520000	590000
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	<5	1.3 J	<5	<5	1.9 J	<5	1.2 J
Methane		µg/L	12000	740	8200	9900	7600	5200	6700	16000	11000	9000
EBT-13		Well ID	IW101-02A	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A	IW101-04B	IW101-04C	IW101-05A
Date			8/15/2013	8/15/2013	8/15/2013	8/16/2013	8/16/2013	8/16/2013	8/18/2013	8/18/2013	8/18/2013	8/17/2013
Analyte		Units										
Carbon Dioxide		µg/L	110000	92000	350000	310000	460000	460000	520000	380000	410000	180000
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	<5	1.4 J	<5	1.4 J	1.1 J	<5	<5
Methane		µg/L	2900	4.4 JB	9300	9600	11000	8900	40000	19000	12000	18000
EBT-12		Well ID	IW101-02A	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A	IW101-04B	IW101-04C	IW101-05A
Date			5/12/2013	5/12/2013	5/12/2013	5/12/2013	5/12/2013	5/9/2013	5/13/2013	5/13/2013	5/9/2013	5/13/2013
Analyte		Units										
Carbon Dioxide		µg/L	210000	100000	200000	350000 F	260000 F	340000	1100000	330000 F	240000	250000 F
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methane		µg/L	13000	15	13000	15000	17000	15000 J	16000	11000	8400	12000
EBT-11		Well ID	IW101-02A	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A	IW101-04B	IW101-04C	IW101-05A
Date			2/8/2013	2/8/2013	2/8/2013	2/7/2013	2/7/2013	2/8/2013	2/9/2013	2/9/2013	2/9/2013	2/8/2013
Analyte		units										
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	1.02 J	1.74 J	<5	<5	<5	<5	<5
Methane		µg/L	8740	10	17800	18700	14800	19300	8580	6910	14900	23100

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE Flags:

B: Blank contamination

J: Estimated concentration

UJ: Estimated, non-detect

TABLE 20
GEOCHEMICAL ANALYTICAL RESULTS, TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14		Well ID	IW101-05B	IW101-05C	IW101-07A	IW101-07B	IW101-07C	DR1-5	DR1-5A	DR1-6	DR1-6A	PMW101-02A
		Date	11/10/2013	11/10/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013
Analyte		Units										
Carbon Dioxide		µg/L	140000	500000	130000	320000	410000	430000	250000	180000	310000	330000
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	1 J	1.5 J	<5	<5	<5	<5	<5
Methane		µg/L	1700	10000	3.4 JB	1300	5600	8600	9200	5100	7400	11000
EBT-13		Well ID	IW101-05B	IW101-05C	IW101-07A	IW101-07B	IW101-07C	DR1-5A	DR1-5	DR1-6A	DR1-6	PMW101-02A
		Date	8/17/2013	8/17/2013	8/16/2013	8/16/2013	8/16/2013	8/20/2013	8/20/2013	8/16/2013	8/16/2013	8/16/2013
Analyte		Units										
Carbon Dioxide		µg/L	110000	380000	76000	530000	610000	170000	1000000	360000	120000	500000
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	2 J	<5	<5	1 J	<5	<5	<5
Methane		µg/L	3.3 JB	13000	650	8200	11000	15000	18000	10000	10000	13000
EBT-12		Well ID	IW101-05B	IW101-05C	IW101-07A	IW101-07B	IW101-07C	DR1-5	DR1-5A	DR1-6	DR1-6A	PMW101-02A
		Date	5/13/2013	5/13/2013	5/12/2013	5/12/2013	5/9/2013	5/12/2013	5/11/2013	5/12/2013	5/12/2013	5/13/2013
Analyte		Units										
Carbon Dioxide		µg/L	86000	300000 F	95000	580000	380000	200000	76000	110000	170000	290000
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	1.3 F	<5	<5	<5	<5	<5	<5
Methane		µg/L	110	12000	3 F	11000	8100	3600	3600	5200	2800	10000
EBT-11		Well ID	IW101-05B	IW101-05C	IW101-07A	IW101-07B	IW101-07C	DR1-5	DR1-5A	DR1-6	DR1-6A	PMW101-02A
		Date	2/8/2013	2/8/2013	2/7/2013	2/7/2013	2/7/2013	2/6/2013	2/6/2013	2/6/2013	2/6/2013	2/6/2013
Analyte		units										
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	<5	1.32 J	<5	<5	<5	<5	<5
Methane		µg/L	30.4	21800	530	6860	16500	612	2730	59.5	1200	2180

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE Flags:

B: Blank contamination

J: Estimated concentration

UJ: Estimated, non-detect

TABLE 20
GEOCHEMICAL ANALYTICAL RESULTS, TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14		Well ID	PMW101-02B	PMW101-04A	PMW101-04B	PMW101-07A	PMW101-07B
		Date	11/9/2013	11/8/2013	11/8/2013	11/10/2013	11/10/2013
Analyte	Units						
Carbon Dioxide	µg/L		240000	190000	82000	130000	73000
Ethane	µg/L		<5	<5	<5	<5	<5
Ethene	µg/L		1.1 J	<5	<5	<5	<5
Methane	µg/L		4300	4300	8200	1500	3.2 JB

EBT-13		Well ID	PMW101-02B	PMW101-04A	PMW101-04B	PMW101-07A	PMW101-07B
		Date	8/16/2013	8/15/2013	8/15/2013	8/15/2013	8/15/2013
Analyte	Units						
Carbon Dioxide	µg/L		130000	170000	95000	84000	60000
Ethane	µg/L		<5	<5	<5	<5	<5
Ethene	µg/L		<5	<5	<5	<5	<5
Methane	µg/L		9300	1500	15000	470	9.3 B

EBT-12		Well ID	PMW101-02B	PMW101-04A	PMW101-04B	PMW101-07A	PMW101-07B
		Date	5/13/2013	5/13/2013	5/8/2013	5/13/2013	5/13/2013
Analyte	Units						
Carbon Dioxide	µg/L		160000	130000	95000	110000	74000
Ethane	µg/L		<5	<5	<5	<5	<5
Ethene	µg/L		<5	<5	<5	<5	<5
Methane	µg/L		7500	420	11000	2200	3.2 F

EBT-11		Well ID	PMW101-02B	PMW101-04A	PMW101-04B	PMW101-07A	PMW101-07B
		Date	2/6/2013	2/7/2013	2/7/2013	2/7/2013	2/7/2013
Analyte	units						
Ethane	µg/L		<5	<5	<5	<5	<5
Ethene	µg/L		<5	<5	<5	<5	<5
Methane	µg/L		4010	467	9920	3350	1.54 J

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE Flags:

B: Blank contamination

J: Estimated concentration

UJ: Estimated, non-detect

TABLE 21
GEOCHEMICAL ANALYTICAL RESULTS, TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14		Well ID	DR2-2	DR2-5	IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07	IW92-08	MW-85	MW-113
		Date	11/6/2013	11/5/2013	11/6/2013	11/7/2013	11/6/2013	11/7/2013	11/6/2013	11/7/2013	11/6/2013	11/6/2013	11/6/2013
Analyte		Units											
Total Organic Carbon	mg/L		8680	4980	10500	6930 J	4100	2280	8450	6980	22600 J	25.8 J	2720
Acetic Acid	mg/L		1920	1500	2220	1610 J	1150	96.3	1340	1030	5550	39.1	2150
Butyric Acid	mg/L		2320	1340	2600	1470 J	1210	450	2250	1950	4030	<1	1960
Lactic Acid	mg/L		58.4 J	<50 UJ	<100 UJ	<50 UJ	<50 UJ	<1 UJ	<50 UJ	<50 UJ	<100 UJ	1.18 J	<50 UJ
Propionic Acid	mg/L		2840	2220	4620	4790 J	1700	644	2920	3610	8700	<10	2150
Pyruvic Acid	mg/L		5.36 J	<5 UJ	<10 UJ	<5 UJ	<5 UJ	<0.1 UJ	<5 UJ	<5 UJ	<10 UJ	<0.1 UJ	<5 UJ

EBT-13		Well ID	DR2-2	DR2-5	IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07	IW92-08	MW-85	MW-113
		Date	8/14/2013	8/14/2013	8/14/2013	8/15/2013	8/20/2013	8/14/2013	8/19/2013	8/15/2013	8/15/2013	8/14/2013	8/13/2013
Analyte		Units											
Total Organic Carbon	mg/L		2510	689	1620	3100	3400 J	5990	11800 J	11700	4590	24.9	5940
Acetic Acid	mg/L		477	329	107	1820	1110 J	1300	2720 J	4730	1600	52	2320
Butyric Acid	mg/L		922	267	41.8 J	173	2050 J	2550	6180 J	7100	2880	0.578 J	2560
Lactic Acid	mg/L		<10 UJ	<1 UJ	149 J	<100 UJ	<100 UJ	<50	4190 J	<100 UJ	<100	<1	<50 UJ
Propionic Acid	mg/L		1400	463	2250	3830	1840 J	4460	5070 J	8770	4510	<10	2490
Pyruvic Acid	mg/L		<1 UJ	<0.1 UJ	<5 UJ	<10 UJ	<10 UJ	<5	<10 J	<10 UJ	<10	<0.1	<5 UJ

EBT-12		Well ID	DR2-2	DR2-5	IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07	IW92-08	MW-85	MW-113
		Date	5/10/2013	5/8/2013	5/8/2013	5/9/2013	5/11/2013	5/7/2013	-	5/8/2013	5/9/2013	5/10/2013	5/10/2013
Analyte		Units											
Total Organic Carbon	mg/L		1310	33.1	5030	35100	117	14500		104000 J	729	5.44	12100
Acetic Acid	mg/L		348	29.6	3220	4540	90.2	1030		1310	650	<1	2500
Butyric Acid	mg/L		794	7.42	1460	12200	1.54 J	1240		2680	165	<1	6190
Lactic Acid	mg/L		3.18 J	<1	1.5 J	6.64 J	2.63 J	11.2 J		93200	22.6	1.27 J	5840
Propionic Acid	mg/L		388	31	2620	6040	62.5	1410		2610	615	<10	6700
Pyruvic Acid	mg/L		<0.1	<0.1	<0.1	<1	<0.1 UJ	0.433 J		117	<0.1 UJ	<0.1 UJ	9.33

EBT-11		Well ID	DR2-2	DR2-5	IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07	IW92-08	MW-85	MW-113
		Date	2/9/2013	2/9/2013	2/11/2013	2/10/2013	2/9/2013	2/9/2013	2/9/2013	2/10/2013	2/11/2013	2/8/2013	2/8/2013
Analyte		units											
Total Organic Carbon	mg/L		17.7	16.7	13100	29600	7.93	75400	283000	140000	109	<1	1550
Acetic Acid	mg/L		11.1	42.9	11200	10300	3.17	7100	4970	1050	41.4	<1	514
Butyric Acid	mg/L		<1	38.9	17700	22900	2.22	37100	315	2260	7.97	<1	887
Lactic Acid	mg/L		<1	4.66	<100	<1000	<1	<1000	119000	290000	7.97	<1	400
Propionic Acid	mg/L		12	68.2	8470	9190 J	<10	11800	4860	<10000	39.4	<10	865
Pyruvic Acid	mg/L		<0.1 UJ	<0.1 UJ	<10 UJ	<100 UJ	<0.1 UJ	<100 UJ	<10 UJ	1020	<0.1 UJ	<0.1 UJ	0.957 J

TABLE 21
GEOCHEMICAL ANALYTICAL RESULTS, TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14		Well ID	PMW85-01	PMW85-05	PMW92-03
		Date	11/5/2013	11/6/2013	11/6/2013
Analyte	Units				
Total Organic Carbon	mg/L		1060 J	2.03	21100
Acetic Acid	mg/L		352	<1	3410
Butyric Acid	mg/L		63.2	<1	8360
Lactic Acid	mg/L		25.5 J	<1 UJ	<100 UJ
Propionic Acid	mg/L		505	<10	5770
Pyruvic Acid	mg/L		<0.1 UJ	<0.1 UJ	<10 UJ

EBT-13		Well ID	PMW85-01	PMW85-05	PMW92-03
		Date	8/13/2013	8/13/2013	8/13/2013
Analyte	Units				
Total Organic Carbon	mg/L		273	2.96	4.74
Acetic Acid	mg/L		96.5	<1	<1
Butyric Acid	mg/L		18.9	<1	<1
Lactic Acid	mg/L		7.47 J	<1	<1
Propionic Acid	mg/L		44.9 J	<10	<10
Pyruvic Acid	mg/L		<0.5 UJ	<0.1	<0.1

EBT-12		Well ID	PMW85-01	PMW85-05	PMW92-03
		Date	5/10/2013	5/8/2013	5/9/2013
Analyte	Units				
Total Organic Carbon	mg/L		720	0.917 J	0.822 J
Acetic Acid	mg/L		519	<1	<1
Butyric Acid	mg/L		17.6	<1	<1
Lactic Acid	mg/L		3.46 J	<1 UJ	<1
Propionic Acid	mg/L		1010	<10	<10
Pyruvic Acid	mg/L		0.0943 J	<0.1 UJ	<0.1 UJ

EBT-11		Well ID	PMW85-01	PMW85-05	PMW92-03
		Date	2/9/2013	2/9/2013	2/9/2013
Analyte	units				
Total Organic Carbon	mg/L		11.5	1.25	1.14
Acetic Acid	mg/L		9.38	--	<1
Butyric Acid	mg/L		0.964 J	--	<1
Lactic Acid	mg/L		0.911 J	--	<1
Propionic Acid	mg/L		<10	--	<10
Pyruvic Acid	mg/L		<0.1 UJ	--	<0.1

TABLE 21
GEOCHEMICAL ANALYTICAL RESULTS, TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14		Well ID	DR2-2	DR2-5	IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07	IW92-08	MW-85	MW-113
Date			11/6/2013	11/5/2013	11/6/2013	11/7/2013	11/6/2013	11/7/2013	11/6/2013	11/7/2013	11/6/2013	11/6/2013	11/6/2013
Units													
Carbon Dioxide		µg/L	1000000	660000	320000	270000	1300000	110000	760000	440000	460000	370000	1200000
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methane		µg/L	5700	3700	11000	6800	6800	1800	7300	6600	5100	3200	6200
EBT-13		Well ID	DR2-2	DR2-5	IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07	IW92-08	MW-85	MW-113
Date			8/14/2013	8/14/2013	8/14/2013	8/15/2013	8/20/2013	8/14/2013	8/19/2013	8/15/2013	8/15/2013	8/14/2013	8/13/2013
Units													
Carbon Dioxide		µg/L	420000	260000	220000	270000	450000	500000	520000	600000	410000	170000	730000
Ethane		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methane		µg/L	10000	4100	8800	6300	6500	8300	11000	5700	6600	1100	3900
EBT-12		Well ID	DR2-2	DR2-5	IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07	IW92-08	MW-85	MW-113
Date			5/10/2013	5/8/2013	5/8/2013	5/9/2013	5/11/2013	5/7/2013	-	5/8/2013	5/9/2013	5/10/2013	5/10/2013
Units													
Carbon Dioxide		µg/L	560000	97000	390000	150000	360000	460000		830000	170000	210000	570000
Ethane		µg/L	<5	<5	<5	<5	<5	<5		<5	<5	<5	<5
Ethene		µg/L	<5	<5	<5	<5	<5	<5		<5	<5	<5	<5
Methane		µg/L	8900	970	9500	2300	5000	5800		3000	2400	1600	6200
EBT-11		Well ID	DR2-2	DR2-5	IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07	IW92-08	MW-85	MW-113
Date			2/9/2013	2/9/2013	2/11/2013	2/10/2013	2/9/2013	2/9/2013	2/9/2013	2/10/2013	2/11/2013	2/8/2013	2/8/2013
units													
Ethane		µg/L	<5	<5	<50	<50	<5	<25	<5	<5	<5	<5	<5
Ethene		µg/L	<5	<5	<50	<50	<5	<25	<5	<5	<5	<5	<5
Methane		µg/L	63.6	257	2320	2970	9230 J	2080	682 J	4770	9530	281	2830

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE Flags:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE 21
GEOCHEMICAL ANALYTICAL RESULTS, TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14	Well ID	PMW85-01	PMW85-05	PMW92-03
	Date	11/5/2013	11/6/2013	11/6/2013
	Analyte	Units		
	Carbon Dioxide	µg/L	450000	140000 930000 J
	Ethane	µg/L	<5	<5
	Ethene	µg/L	<5	<5
	Methane	µg/L	10000	7100 3600

EBT-13	Well ID	PMW85-01	PMW85-05	PMW92-03
	Date	8/13/2013	8/13/2013	8/13/2013
	Analyte	Units		
	Carbon Dioxide	µg/L	180000	98000 80000
	Ethane	µg/L	<5	<5
	Ethene	µg/L	<5	<5
	Methane	µg/L	8900	5700 1700

EBT-12	Well ID	PMW85-01	PMW85-05	PMW92-03
	Date	5/10/2013	5/8/2013	5/9/2013
	Analyte	Units		
	Carbon Dioxide	µg/L	190000	100000 52000
	Ethane	µg/L	<5	<5
	Ethene	µg/L	<5	<5
	Methane	µg/L	13000	7000 530

EBT-11	Well ID	PMW85-01	PMW85-05 ¹	PMW92-03
	Date	2/9/2013	2/9/2013	2/9/2013
	Analyte	units		
	Ethane	µg/L	<5	<5
	Ethene	µg/L	<5	<5
	Methane	µg/L	10300	7280 867

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE Flags:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE 22
GEOCHEMICAL ANALYTICAL RESULTS, WEST-CENTRAL AND BUILDING 835
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14		Well ID	MW-197A	MW-197B	MW-203A	MW-203B	MW-62	MW-212	MW-213
		Date	11/7/2013	11/7/2013	11/7/2013	11/7/2013	11/11/2013	11/11/2013	11/11/2013
Analyte	Units								
Total Organic Carbon	mg/L	2.68	2.9	4940	172	171	1.07 B	419	
Acetic Acid	mg/L	0.559 J	<1	1330	107	133	<1	65.1	
Butyric Acid	mg/L	<1	0.548 J	2040	53.4	157	<1	28.5	
Lactic Acid	mg/L	<1	<1	<50 UJ	<1 UJ	<5 UJ	<1	30.4 J	
Propionic Acid	mg/L	<10	<10	1730	69.7	248	<10	330	
Pyruvic Acid	mg/L	<0.1	<0.1	<5 UJ	<0.1 UJ	<0.5 UJ	<0.1	0.103 J	

EBT-13		Well ID	MW-197A	MW-197B	MW-203A	MW-203B	MW-62	MW-212	MW-213
		Date	8/19/2013	8/19/2013	8/19/2013	8/19/2013	8/20/2013	8/20/2013	8/20/2013
Analyte	Units								
Total Organic Carbon	mg/L	2.39	2.31	637	13.5 J	101	1.62 B	458	
Acetic Acid	mg/L	<1	<1	56.3	0.874 J	20.6	15.8	0.848 J	
Butyric Acid	mg/L	<1	<1	<1	<1 J	14	4.29	<1	
Lactic Acid	mg/L	<1	<1	0.883 J	0.671 J	2.38 J	<1 UJ	<1	
Propionic Acid	mg/L	<10	<10	1140	<10 J	142	19	<10	
Pyruvic Acid	mg/L	<0.1 UJ	<0.1	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1	

EBT-12		Well ID	MW-197A	MW-197B	MW-203A	MW-203B	MW-62	MW-212	MW-213
		Date	5/11/2013	5/11/2013	5/9/2013	5/11/2013	5/9/2013	5/11/2013	5/11/2013
Analyte	Units								
Total Organic Carbon	mg/L	<1	<1	14500	167	1260	<1	180	
Acetic Acid	mg/L	<1	<1	2670	68.1	341	<1	50	
Butyric Acid	mg/L	<1	<1	7040	125	915	<1	47.5	
Lactic Acid	mg/L	<1 UJ	<1	24.5 J	<1 UJ	205	<1	<1 UJ	
Propionic Acid	mg/L	<10	<10	2050	58.6	319	<10	49.3	
Pyruvic Acid	mg/L	<0.1 UJ	<0.1	2.82 J	<0.1 UJ	0.616 J	<0.1	<0.1 UJ	

EBT-11		Well ID	MW-197A	MW-197B	MW-203A	MW-203B	MW-62	MW-212	MW-213
		Date	2/8/2013	2/8/2013	2/8/2013	2/8/2013	2/11/2013	2/11/2013	2/11/2013
Analyte	units								
Total Organic Carbon	mg/L	<1	0.986 J	4240	1.4	100	0.828 J	270	
Acetic Acid	mg/L	<1	<1	2120	<1	87.4	<1	34.9	
Butyric Acid	mg/L	<1	<1	1410	<1	92	<1	18.6	
Lactic Acid	mg/L	<1	<1	41.5	<1	43.5	5.43	300	
Propionic Acid	mg/L	<10	<10	4030	<10	85.7	<10	10.6	
Pyruvic Acid	mg/L	<0.1 UJ	<0.1	<1	<0.1 UJ	<0.1 UJ	<0.1 UJ	1.42 J	

TABLE 22
GEOCHEMICAL ANALYTICAL RESULTS, WEST-CENTRAL AND BUILDING 835
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

EBT-14	Well ID	MW-197A	MW-197B	MW-203A	MW-203B	MW-62	MW-212	MW-213
	Date	11/7/2013	11/7/2013	11/7/2013	11/7/2013	11/11/2013	11/11/2013	11/11/2013
	Analyte	Units						
Carbon Dioxide	µg/L	67000 J	87000	500000	100000	87000	89000	240000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	2.8 JB	100	13000	2300	8900	3.9 JB	8900
EBT-13	Well ID	MW-197A	MW-197B	MW-203A	MW-203B	MW-62	MW-212	MW-213
	Date	8/19/2013	8/19/2013	8/19/2013	8/19/2013	8/20/2013	8/20/2013	8/20/2013
	Analyte	Units						
Carbon Dioxide	µg/L	110000	92000	720000	90000	68000	46000	120000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	3.4 JB	53	13000	1900	6300	2.8 JB	7900
EBT-12	Well ID	MW-197A	MW-197B	MW-203A	MW-203B	MW-62	MW-212	MW-213
	Date	5/11/2013	5/11/2013	5/9/2013	5/11/2013	5/9/2013	5/11/2013	5/11/2013
	Analyte	Units						
Carbon Dioxide	µg/L	<500000	100000	400000	150000	110000	60000	73000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	1.1 J	<5	<5	<5	<5
Methane	µg/L	190 J	8.8 B	2400	1600	1700	3.4 JB	5000
EBT-11	Well ID	MW-197A	MW-197B	MW-203A	MW-203B	MW-62	MW-212	MW-213
	Date	2/8/2013	2/8/2013	2/8/2013	2/8/2013	2/11/2013	2/11/2013	2/11/2013
	Analyte	units						
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	2.04 J	<5	<5	<5	<5
Methane	µg/L	<5	17.6	587	144	8940	<5	1900

Notes:
µg/L: micrograms per liter
mg/L: milligrams per liter
RL: Reporting Limit
<: Not detected above RL

DQE Flags:
B: Blank contamination
J: Estimated concentration
UJ: Estimated, non-detect
JB: Estimated, blank contamination

TABLE 23
MEAN CONCENTRATIONS OF GEOCHEMICAL PARAMETERS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Area units	TTA-1N Injection Wells			
		EBT-11	EBT-12	EBT-13	EBT-14
Total Organic Carbon	mg/L	31977	3794	774	1668
Acetic Acid	mg/L	2271	844	184	472
Butyric Acid	mg/L	11728	1173	215	582
Lactic Acid	mg/L	54599	54.7	3.3	6.5
Propionic Acid	mg/L	2109	711	398	729
Pyruvic Acid	mg/L	-	-	0.1	ND
Carbon Dioxide	µg/L	NA	275000	237000	238500
Ethane	µg/L	ND	ND	ND	ND
Ethene	µg/L	1.8	ND	ND	ND
Methane	µg/L	8206	9342	12190	7150

Analyte	Area units	TTA-1N Performance Monitoring Wells			
		EBT-11	EBT-12	EBT-13	EBT-14
Total Organic Carbon	mg/L	2.2	1.7	1.8	33.6
Acetic Acid	mg/L	ND	ND	-	-
Butyric Acid	mg/L	ND	ND	ND	-
Lactic Acid	mg/L	ND	ND	ND	ND
Propionic Acid	mg/L	ND	ND	ND	-
Pyruvic Acid	mg/L	ND	ND	ND	ND
Carbon Dioxide	µg/L	NA	110000	103000	135000
Ethane	µg/L	ND	ND	ND	ND
Ethene	µg/L	ND	ND	ND	ND
Methane	µg/L	68	11	8.3	4457

Notes:

mg/L: milligrams per liter

µg/L: micrograms per liter

NA: not analyzed

ND: not detected in samples

- : mean not determined

TABLE 23
MEAN CONCENTRATIONS OF GEOCHEMICAL PARAMETERS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Area units	TTA-1S Injection Wells			
		EBT-11	EBT-12	EBT-13	EBT-14
Total Organic Carbon	mg/L	439	1598	1470	2296
Acetic Acid	mg/L	206	625	553	1002
Butyric Acid	mg/L	369	899	1061	1762
Lactic Acid	mg/L	32.5	7.5	2.3	4.5
Propionic Acid	mg/L	328	601	865	1442
Pyruvic Acid	mg/L	1.1	0.1	ND	-
Carbon Dioxide	µg/L	NA	271060	345620	351900
Ethane	µg/L	ND	ND	ND	ND
Ethene	µg/L	1.4	-	1.4	1.3
Methane	µg/L	9017	8778	11374	7169

Analyte	Area units	TTA-1S Performance Monitoring Wells			
		EBT-11	EBT-12	EBT-13	EBT-14
Total Organic Carbon	mg/L	5.5	1.3	2.7	3.4
Acetic Acid	mg/L	ND	ND	ND	ND
Butyric Acid	mg/L	ND	ND	-	ND
Lactic Acid	mg/L	ND	ND	ND	ND
Propionic Acid	mg/L	ND	ND	ND	ND
Pyruvic Acid	mg/L	ND	ND	ND	ND
Carbon Dioxide	µg/L	NA	102250	102250	118750
Ethane	µg/L	ND	ND	ND	ND
Ethene	µg/L	ND	ND	ND	ND
Methane	µg/L	3435	3406	4245	3501

Notes:

mg/L: milligrams per liter

µg/L: micrograms per liter

NA: not analyzed

ND: not detected in samples

- : mean not determined

TABLE 23
MEAN CONCENTRATIONS OF GEOCHEMICAL PARAMETERS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Area units	TTA-2 Injection Wells			
		EBT-11	EBT-12	EBT-13	EBT-14
Total Organic Carbon	mg/L	54280	19213	5134	9660
Acetic Acid	mg/L	3523	1524	1651	1983
Butyric Acid	mg/L	9023	2749	2472	2598
Lactic Acid	mg/L	81883	12386	2170	-
Propionic Acid	mg/L	4413	2275	3508	3781
Pyruvic Acid	mg/L	-	42.0	ND	-
Carbon Dioxide	µg/L	NA	398600	438000	625000
Ethane	µg/L	ND	ND	ND	ND
Ethene	µg/L	ND	ND	ND	ND
Methane	µg/L	3473	4897	7120	5840

Analyte	Area units	TTA-1N Performance Monitoring Wells			
		EBT-11	EBT-12	EBT-13	EBT-14
Total Organic Carbon	mg/L	4.6	182	76.4	952
Acetic Acid	mg/L	-	-	74.3	847
Butyric Acid	mg/L	-	-	9.7	1012
Lactic Acid	mg/L	-	2	-	13.3
Propionic Acid	mg/L	ND	-	-	1328
Pyruvic Acid	mg/L	ND	-	ND	ND
Carbon Dioxide	µg/L	NA	138000	132000	540000
Ethane	µg/L	ND	ND	ND	ND
Ethene	µg/L	ND	ND	ND	ND
Methane	µg/L	4682	5533	4350	6625

Notes:

mg/L: milligrams per liter

µg/L: micrograms per liter

NA: not analyzed

ND: not detected in samples

- : mean not determined

TABLE 23
MEAN CONCENTRATIONS OF GEOCHEMICAL PARAMETERS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Area units	West-Central Injection Wells			
		EBT-11	EBT-12	EBT-13	EBT-14
Total Organic Carbon	mg/L	2121	7334	325	2556
Acetic Acid	mg/L	-	1369	28.6	719
Butyric Acid	mg/L	-	3583	ND	1047
Lactic Acid	mg/L	-	-	0.8	ND
Propionic Acid	mg/L	-	1054	-	900
Pyruvic Acid	mg/L	ND	-	ND	ND
Carbon Dioxide	µg/L	NA	275000	405000	300000
Ethane	µg/L	ND	ND	ND	ND
Ethene	µg/L	-	ND	ND	ND
Methane	µg/L	366	2000	7450	7650

Analyte	Area units	West-Central Performance Monitoring Wells			
		EBT-11	EBT-12	EBT-13	EBT-14
Total Organic Carbon	mg/L	-	ND	2.4	2.8
Acetic Acid	mg/L	ND	ND	ND	-
Butyric Acid	mg/L	ND	ND	ND	-
Lactic Acid	mg/L	ND	ND	ND	ND
Propionic Acid	mg/L	ND	ND	ND	ND
Pyruvic Acid	mg/L	ND	ND	ND	ND
Carbon Dioxide	µg/L	NA	-	101000	77000
Ethane	µg/L	ND	ND	ND	ND
Ethene	µg/L	ND	ND	ND	ND
Methane	µg/L	-	99.4	28.2	51.4

Notes:

mg/L: milligrams per liter

µg/L: micrograms per liter

NA: not analyzed

ND: not detected in samples

- : mean not determined

TABLE 23
MEAN CONCENTRATIONS OF GEOCHEMICAL PARAMETERS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Area units	Building 835 Injection Wells			
		EBT-11	EBT-12	EBT-13	EBT-14
Total Organic Carbon	mg/L	185	720	280	295
Acetic Acid	mg/L	61.2	196	10.7	99.1
Butyric Acid	mg/L	55.3	481	-	92.8
Lactic Acid	mg/L	172	-	-	-
Propionic Acid	mg/L	48.2	184	-	289
Pyruvic Acid	mg/L	-	-	ND	-
Carbon Dioxide	µg/L	NA	91500	94000	163500
Ethane	µg/L	ND	ND	ND	ND
Ethene	µg/L	ND	ND	ND	ND
Methane	µg/L	5420	3350	7100	8900

Analyte	Area units	Building 835 Performance Monitoring Wells			
		EBT-11	EBT-12	EBT-13	EBT-14
Total Organic Carbon	mg/L	0.8	ND	1.6	1.1
Acetic Acid	mg/L	ND	ND	15.8	ND
Butyric Acid	mg/L	ND	ND	4.3	ND
Lactic Acid	mg/L	5.4	ND	ND	ND
Propionic Acid	mg/L	ND	ND	19.0	ND
Pyruvic Acid	mg/L	ND	ND	ND	ND
Carbon Dioxide	µg/L	NA	60000	46000	89000
Ethane	µg/L	ND	ND	ND	ND
Ethene	µg/L	ND	ND	ND	ND
Methane	µg/L	ND	3.4	2.8	3.9

Notes:

mg/L: milligrams per liter

µg/L: micrograms per liter

NA: not analyzed

ND: not detected in samples

- : mean not determined

TABLE 24
VOC ANALYTICAL RESULTS SUMMARY, EBT-11 – TTA-1N
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A
	Lab ID		L13020201-01	L13020201-02	L13020203-01	L13020203-02	L13020203-03	L13020289-01	L13020203-04
	Date		2/5/2013	2/5/2013	2/6/2013	2/6/2013	2/6/2013	2/7/2013	2/6/2013
	Area		TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<10	<5	<10	<10	<1	<20	<10
Chloroform	µg/L	80	<3	<1.5	<3	<3	<0.3	<6	<3
cis-1,2-Dichloroethene	µg/L	70	134	13.2	17.1	4.6 J	182	98.8	65.2
Tetrachloroethene	µg/L	5	<10	4.62 J	33.8	13.5	6.89	<20	6.98 J
trans-1,2-Dichloroethene	µg/L	100	<10	<5	<10	<10	0.749 J	<20	<10
Trichloroethene	µg/L	5	<10	1.51 J	2.96 J	<10	2.94	<20	2.53 J
Vinyl chloride	µg/L	2	<10	<5	<10	<10	0.497 J	<20	<10
Additional VOCs									
Acetone	µg/L	-	153	119	528	156 B	3.88 JB	853	81.2 JB
MEK (2-Butanone)	µg/L	-	276	117	217	63.9 J	4.85 J	895	71.8 J
Methyl t-butyl ether (MTBE)	µg/L	-	78.2	8.7 J	<50	<50	29.7	<100	16.7 J
Methylene chloride	µg/L	-	<10	<5	<10	<10	<1	14.6 J	<10

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
JB: Estimated-Blank Contamination

TABLE 24
VOC ANALYTICAL RESULTS SUMMARY, EBT-11 – TTA-1N
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW21-04B	MW-21	PMW21-04	PMW21-01	PMW21-02
	Lab ID		L13020203-05	L13020286-01	L13020286-03	L13020202-01	L13020286-02
	Date		2/6/2013	2/7/2013	2/7/2013	2/5/2013	2/7/2013
	Area		TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Primary CVOCs	Units	MCL					
Carbon tetrachloride	µg/L	5	<10	<1	<1	<1	<1
Chloroform	µg/L	80	<3	<0.3	<0.3	0.167 J	<0.3
cis-1,2-Dichloroethene	µg/L	70	28.8	4.35	125	15.3	4.5
Tetrachloroethene	µg/L	5	4.32 J	107	276	263	169
trans-1,2-Dichloroethene	µg/L	100	<10	<1	0.431 J	0.748 J	<1
Trichloroethene	µg/L	5	<10	6.83	59.3	51.2	44
Vinyl chloride	µg/L	2	<10	<1	<1	<1	<1
Additional VOCs							
Acetone	µg/L	-	206 B	<10	<10	<10	<10
MEK (2-Butanone)	µg/L	-	263	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	-	9.18 J	3.77 J	27.6	25.7	23.4
Methylene chloride	µg/L	-	<10	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

JB: Estimated-Blank Contamination

TABLE 25
VOC ANALYTICAL RESULTS SUMMARY, EBT-11 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW101-02A	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A
	Lab ID		L13020285-01	L13020285-02	L13020285-03	L13020289-02	L13020289-05	L13020285-04	L13020354-01
	Date		2/8/2013	2/8/2013	2/8/2013	2/7/2013	2/7/2013	2/8/2013	2/9/2013
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<1	<1	<20	<1	<5	<10	<10
Chloroform	µg/L	80	<0.3	<0.3	<6	<0.3	<1.5	<3	<3
cis-1,2-Dichloroethene	µg/L	70	11.1	<1	56.9	4.98	18.3	91.6	6.94 J
Tetrachloroethene	µg/L	5	30.8	56.2	<20	2.5	5.7	<10	6.17 J
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<20	<1	<5	<10	<10
Trichloroethene	µg/L	5	3.17	<1	<20	<1	2.89 J	<10	<10
Vinyl chloride	µg/L	2	<1	<1	<20	<1	<5	<10	<10
Additional VOCs									
1,2-Dichloropropane	µg/L	-	<1	<1	<20	<1	<5	<10	<10
Acetone	µg/L	-	4.96 J	<10	135 J	43.7	133 B	125	167
MEK (2-Butanone)	µg/L	-	6.28 J	<10	182 J	78	31.9 J	416	325
Methyl t-butyl ether (MTBE)	µg/L	-	6.18	6.45	<100	7.24	9.3 J	<50	<50
Methylene chloride	µg/L	-	<1	<1	<20	<1	<5	<10	<10
Toluene	µg/L	-	<1	<1	<20	7.5	<5	<10	<10

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

JB: Estimated-Blank Contamination

TABLE 25
VOC ANALYTICAL RESULTS SUMMARY, EBT-11 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW101-04B	IW101-04C	IW101-05A	IW101-05B	IW101-05C	IW101-07A	IW101-07B
	Lab ID		L13020354-02	L13020354-03	L13020285-05	L13020285-06	L13020285-07	L13020289-06	L13020289-07
	Date		2/9/2013	2/9/2013	2/8/2013	2/8/2013	2/8/2013	2/7/2013	2/7/2013
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<10	<20	<10	<1	<10	<1	<1
Chloroform	µg/L	80	<3	<6	<3	<0.3	<3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	70	14.7	44.9	14.8	1.54	41	1.26	54.5
Tetrachloroethene	µg/L	5	<10	<20	6.48 J	41.1	<10	1.48	2.01
trans-1,2-Dichloroethene	µg/L	100	<10	<20	<10	<1	<10	<1	<1
Trichloroethene	µg/L	5	<10	<20	<10	0.506 J	<10	2.68	5.58
Vinyl chloride	µg/L	2	<10	<20	<10	<1	<10	<1	<1
Additional VOCs									
1,2-Dichloropropane	µg/L	-	<10	<20	<10	<1	<10	<1	<1
Acetone	µg/L	-	27.6 J	280	65.5 J	<10	41.5 J	<10	3.52 JB
MEK (2-Butanone)	µg/L	-	27.1 J	728	58.6 J	<10	43.8 J	<10	3 J
Methyl t-butyl ether (MTBE)	µg/L	-	<50	<100	<50	2.64 J	<50	<5	<5
Methylene chloride	µg/L	-	<10	<20	2.99 J	<1	2.76 J	<1	<1
Toluene	µg/L	-	<10	<20	<10	<1	<10	<1	<1

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
JB: Estimated-Blank Contamination

TABLE 25
VOC ANALYTICAL RESULTS SUMMARY, EBT-11 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW101-07C	DR1-5	DR1-5A	DR1-6	DR1-6A	PMW101-02A	PMW101-02B
	Lab ID		L13020289-08	L13020204-01	L13020204-02	L13020204-03	L13020204-04	L13020204-05	L13020204-06
	Date		2/7/2013	2/6/2013	2/6/2013	2/6/2013	2/6/2013	2/6/2013	2/6/2013
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<10	<10	<10	<1	<1	<1	<1
Chloroform	µg/L	80	<3	<3	<3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	70	323	<10	<10	0.553 J	34.1	8.01	25.3
Tetrachloroethene	µg/L	5	<10	36.8	43.8	263	40.8	21.4	11.3
trans-1,2-Dichloroethene	µg/L	100	<10	<10	<10	<1	<1	<1	<1
Trichloroethene	µg/L	5	<10	<10	62.1	1.22	98	1.82	2.17
Vinyl chloride	µg/L	2	<10	<10	<10	<1	<1	<1	<1
Additional VOCs									
1,2-Dichloropropane	µg/L	-	<10	<10	<10	<1	0.356 J	<1	<1
Acetone	µg/L	-	76.4 JB	<100	38.1 J	3.6 J	3.05 J	<10	<10
MEK (2-Butanone)	µg/L	-	111	<100	<100	7.64 J	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	-	<50	24.7 J	<50	<5	<5	0.915 J	5.35
Methylene chloride	µg/L	-	<10	<10	<10	<1	0.26 J	<1	<1
Toluene	µg/L	-	<10	<10	<10	<1	<1	<1	<1

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
JB: Estimated-Blank Contamination

TABLE 25
VOC ANALYTICAL RESULTS SUMMARY, EBT-11 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location Lab ID Date Area Units	MCL	PMW101-04A L13020286-04 2/7/2013 TTA-1S	PMW101-04B L13020286-05 2/7/2013 TTA-1S	PMW101-07A L13020286-06 2/7/2013 TTA-1S	PMW101-07B L13020286-07 2/7/2013 TTA-1S
Primary CVOCs						
Carbon tetrachloride	µg/L	5	<1	<1	<1	<1
Chloroform	µg/L	80	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	70	1.03	<1	<1	1.68
Tetrachloroethene	µg/L	5	51.1	37.2	0.318 J	15.1
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<1	<1
Trichloroethene	µg/L	5	0.806 J	3.25	<1	32.7
Vinyl chloride	µg/L	2	<1	<1	<1	<1
Additional VOCs						
1,2-Dichloropropane	µg/L	-	<1	<1	<1	<1
Acetone	µg/L	-	<10	<10	<10	<10
MEK (2-Butanone)	µg/L	-	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	-	2.08 J	7.37	<5	<5
Methylene chloride	µg/L	-	<1	<1	<1	<1
Toluene	µg/L	-	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

JB: Estimated-Blank Contamination

TABLE 26
VOC ANALYTICAL RESULTS SUMMARY, EBT-11 – TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07	IW92-08
	Lab ID		L13020357-01	L13020341-01	L13020354-04	L13020354-07	L13020352-03	L13020340-01	L13020357-02
	Date		2/11/2013	2/10/2013	2/9/2013	2/9/2013	2/9/2013	2/10/2013	2/11/2013
	Area		TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<50	<10	<1	<20	<50	<20	<5
Chloroform	µg/L	80	<15	<3	1.96	<6	<15	<6	<1.5
cis-1,2-Dichloroethene	µg/L	70	50.4	28.4	117	28.8	42.9 J	28.6	119
Tetrachloroethene	µg/L	5	<50	<10	3.17	11.5 J	<50	<20	<5
trans-1,2-Dichloroethene	µg/L	100	<50	<10	<1	<20	<50	<20	<5
Trichloroethene	µg/L	5	<50	<10	1.88	<20	<50	<20	<5
Vinyl chloride	µg/L	2	<50	<10	<1	<20	<50	<20	<5
Additional VOCs									
1,2,3-Trichloropropane	µg/L	-	<50	<10	<1	<20	<50	<20	<5
1,2-Dichloropropane	µg/L	-	<50	<10	<1	<20	<50	<20	4.11 J
1,3-Dichloropropane	µg/L	-	<20	2.53 J	<0.4	<8	<20	<8	3.98
Acetone	µg/L	-	581	872	4.08 J	252	1860	610 B	54.4
MEK (2-Butanone)	µg/L	-	1200	2450	<10	270	634	399	101
Methylene chloride	µg/L	-	<50	<10	<1	<20	37.7 J	<20	<5

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

TABLE 26
VOC ANALYTICAL RESULTS SUMMARY, EBT-11 – TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		DR2-2	DR2-5	MW-113	MW-85	PMW85-01	PMW85-05	PMW92-03
	Lab ID		L13020352-01	L13020352-02	L13020288-02	L13020288-01	L13020352-04	L13020352-05	L13020352-06
	Date		2/9/2013	2/9/2013	2/8/2013	2/8/2013	2/9/2013	2/9/2013	2/9/2013
	Area		TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	2.34	69.6	15.6	102	0.322 J	47.7	<1
Chloroform	µg/L	80	1.95	45.7	7.25	28.1	0.685	24.5	<0.3
cis-1,2-Dichloroethene	µg/L	70	13.9	113	95	30.6	79.3	83.4	33
Tetrachloroethene	µg/L	5	33.3	33.7	54.7	58.5	1.03	75.7	154
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<5	<1	<1	<1	<1
Trichloroethene	µg/L	5	2.15	17.3	6.78	17.8	<1	22.5	11.6
Vinyl chloride	µg/L	2	<1	<1	<5	<1	0.364 J	<1	<1
Additional VOCs									
1,2,3-Trichloropropane	µg/L	-	<1	14.8	2.87 J	10.4	5.35	55.7	<1
1,2-Dichloropropane	µg/L	-	<1	0.364 J	<5	0.356 J	1.84	0.824 J	<1
1,3-Dichloropropane	µg/L	-	<0.4	<0.4	<2	<0.4	1.18	<0.4	<0.4
Acetone	µg/L	-	23.2	<10	30.8 J	<10	10.4	<10	<10
MEK (2-Butanone)	µg/L	-	<10	<10	55.8	<10	8.94 J	<10	<10
Methylene chloride	µg/L	-	0.273 J	<1	5.13	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

TABLE 27
VOC ANALYTICAL RESULTS SUMMARY, EBT-11 – WEST-CENTRAL AND BUILDING 835
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		MW-203A	MW-203B	MW-197A	MW-197B	MW-62	MW-213	MW-212
	Lab ID		L13020288-05	L13020288-06	L13020288-03	L13020288-04	L13020357-03	L13020357-05	L13020357-04
	Date		2/8/2013	2/8/2013	2/8/2013	2/8/2013	2/11/2013	2/11/2013	2/11/2013
	Area		West-Central	West-Central	West-Central	West-Central	Bldg 835	Bldg 835	Bldg 835
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<1	<1	<1	<1	<50	<5	<1
Chloroform	µg/L	80	<0.3	<0.3	0.138 J	<0.3	<15	<1.5	<0.3
cis-1,2-Dichloroethene	µg/L	70	8.36	3.57	0.771 J	3.83	37.5 J	<5	<1
Tetrachloroethene	µg/L	5	51	17.6	24.8	25	<50	<5	<1
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<1	<1	<50	<5	<1
Trichloroethene	µg/L	5	8.56	11.9	1.27	10.6	61.9	25	10.4
Vinyl chloride	µg/L	2	0.333 J	1.48	<1	1.05	<50	<5	<1
Additional VOCs									
Acetone	µg/L	-	292	<10	<10	<10	280 J	27 J	<10
MEK (2-Butanone)	µg/L	-	2560	<10	<10	<10	424 J	<50	<10
Methyl t-butyl ether (MTBE)	µg/L	-	<5	2.12 J	<5	1.77 J	<250	<25	<5

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

TABLE 28
SUMMARY FOR FREQUENTLY DETECTED CVOCS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PCE	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	276	4.3	6
	PMW	2	263	169	2
TTA-1S	IW	21	263	1.5	12
	PMW	4	51	0.3	3
TTA-2	IW	10	55	3.2	4
	PMW	4	154	1.0	3
West-Central	IW	2	51	18	2
	PMW	2	25	25	2
Bldg 835	IW	2	<50	<5	0
	PMW	1	<1	-	0

TCE	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	59	1.5	2
	PMW	2	51	44	2
TTA-1S	IW	21	98	0.5	3
	PMW	4	33	0.8	1
TTA-2	IW	10	17	1.9	2
	PMW	4	23	12	3
West-Central	IW	2	12	8.6	2
	PMW	2	11	1.3	1
Bldg 835	IW	2	62	25	2
	PMW	1	10	-	1

cDCE	MCL				
	70 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	182	4.4	4
	PMW	2	15	4.5	0
TTA-1S	IW	21	323	0.6	2
	PMW	4	1.7	<1	0
TTA-2	IW	10	119	14	4
	PMW	4	83	31	2
West-Central	IW	2	8.4	3.6	0
	PMW	2	3.8	0.8	0
Bldg 835	IW	2	38	<5	0
	PMW	1	<1	-	0

VC	MCL				
	2 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	0.497	<1	0
	PMW	2	<1	<1	0
TTA-1S	IW	21	<20	<1	0
	PMW	4	<1	<1	0
TTA-2	IW	10	<50	<1	0
	PMW	4	0.364	<1	0
West-Central	IW	2	1.48	0.333	0
	PMW	2	1.05	<1	0
Bldg 835	IW	2	<50	<5	0
	PMW	1	<1	-	0

TABLE 28
SUMMARY FOR FREQUENTLY DETECTED CVOCS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

CT	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-2	IW	10	70	2.3	2
	PMW	4	102	0.3	2

CF	MCL				
	80 µg/L*	No. of Wells	Max	Min	Wells > MCL
TTA-2	IW	10	46	2.0	0
	PMW	4	28	<0.3	0

Notes:

All concentrations in micrograms per liter (µg/L).

MCL: Maximum Contaminant Level

MCL for total trihalomethanes shown for CF.

TABLE 29
VOC ANALYTICAL RESULTS SUMMARY, EBT-12 – TTA-1N
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A
	Lab ID		L13050475-01	L13050705-01	L13050705-02	L13050705-03	L13050477-01	L13050805-01	L13050805-02
	Date		5/7/2013	5/10/2013	5/10/2013	5/10/2013	5/8/2013	5/11/2013	5/11/2013
	Area		TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<5	<5	<5	<5	<1	<20	<10
Chloroform	µg/L	80	<1.5	<1.5	<1.5	<1.5	<0.3	<6	<3
cis-1,2-Dichloroethene	µg/L	70	166	54.6	72.6	14.1	174	119	78.6
Tetrachloroethene	µg/L	5	1.48 J	<5	2.69 J	7.91	2.31	<20	<10
trans-1,2-Dichloroethene	µg/L	100	<5	<5	<5	<5	0.619 J	<20	<10
Trichloroethene	µg/L	5	2.09 J	<5	<5	<5	1.22	<20	<10
Vinyl chloride	µg/L	2	<5	<5	<5	<5	<1	<20	<10
Additional VOCs									
1,2,4-Trimethylbenzene	µg/L	-	43.1	27.7	70.2	142	3.63	<20	12.6
1,3,5-Trimethylbenzene	µg/L	-	17.2	12.1	19.3	34.1	1.09	<20	3.06 J
Acetone	µg/L	-	707	159	187	280	175	280	3500
Ethylbenzene	µg/L	-	<5	<5	<5	<5	5.04	<20	<10
MEK (2-Butanone)	µg/L	-	523	96.3	48 J	155	144	303	5890
Methyl t-butyl ether (MTBE)	µg/L	-	69.1	61.2	<25	<25	40.1	23.3 J	13.7 J
Methylene chloride	µg/L	-	<5	<5	<5	<5	<1	<20	<10
n-Propylbenzene	µg/L	-	5.49	4.24 J	8.99	17.9	0.587 J	<20	<10
o-Xylene	µg/L	-	6.45	<5	<5	<5	<1	<20	<10

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

TABLE 29
VOC ANALYTICAL RESULTS SUMMARY, EBT-12 – TTA-1N
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW21-04B	MW-21	PMW21-04	PMW21-01	PMW21-02
	Lab ID		L13050477-02	L13050705-04	L13050477-03	L13050805-03	L13050805-04
	Date		5/8/2013	5/10/2013	5/8/2013	5/11/2013	5/11/2013
	Area		TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Primary CVOCs	Units	MCL					
Carbon tetrachloride	µg/L	5	<10	<1	<1	<1	<1
Chloroform	µg/L	80	<3	<0.3	<0.3	0.179 J	<0.3
cis-1,2-Dichloroethene	µg/L	70	49.1	25.3	94.1	11.2	4.74 J
Tetrachloroethene	µg/L	5	<10	13.3	21.1	293	137
trans-1,2-Dichloroethene	µg/L	100	<10	<1	<1	0.554 J	<1
Trichloroethene	µg/L	5	2.66 J	4.43	5.37	61.6	47.5
Vinyl chloride	µg/L	2	<10	<1	<1	<1	<1
Additional VOCs							
1,2,4-Trimethylbenzene	µg/L	-	11.9	<1	0.784 J	<1	<1
1,3,5-Trimethylbenzene	µg/L	-	5.23 J	<1	0.261 J	<1	<1
Acetone	µg/L	-	1400	4.81 J	93.8	<10	<10
Ethylbenzene	µg/L	-	<10	<1	0.839 J	<1	<1
MEK (2-Butanone)	µg/L	-	1580	<10	114	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	-	8.33 J	5.52	12	35.1	29.7
Methylene chloride	µg/L	-	2.78 J	<1	<1	<1	<1
n-Propylbenzene	µg/L	-	1.52 J	<1	0.154 J	<1	<1
o-Xylene	µg/L	-	<10	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

TABLE 30
VOC ANALYTICAL RESULTS SUMMARY, EBT-12 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW101-02A	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A
	Lab ID		L13050800-02	L13050800-03	L13050800-04	L13050803-03	L13050803-04	L13050704-01	L13050802-01
	Date		5/12/2013	5/12/2013	5/12/2013	5/12/2013	5/12/2013	5/9/2013	5/13/2013
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<5	<1	<10	<10	<10	<5	<10
Chloroform	µg/L	80	<1.5	<0.3	<3	<3	<3	<1.5	<3
cis-1,2-Dichloroethene	µg/L	70	16.6	1.3	59.4	5.88 J	23.2	112	7.41 J
Tetrachloroethene	µg/L	5	9.8	51.4	<10	<10	<10	<5	<10
trans-1,2-Dichloroethene	µg/L	100	<5	<1	<10	<10	<10	<5	<10
Trichloroethene	µg/L	5	2.38 J	0.344 J	<10	<10	<10	<5	<10
Vinyl chloride	µg/L	2	<5	<1	<10	<10	<10	1.45 J	<10
Additional VOCs									
1,2,4-Trimethylbenzene	µg/L	-	<5	<1	<10	<10	<10	<5	3.09 J
1,2-Dichloroethane	µg/L	-	<2.5	<0.5	<5	<5	<5	<2.5	<5
1,2-Dichloropropane	µg/L	-	<5	<1	<10	<10	<10	<5	<10
Acetone	µg/L	-	190	<10	612	191	237	419	1790
MEK (2-Butanone)	µg/L	-	357	<10	488	176	450	1340	4650
Methyl t-butyl ether (MTBE)	µg/L	-	8.84 J	7.79	<50	10.8 J	7.29 J	<25	<50

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

TABLE 30
VOC ANALYTICAL RESULTS SUMMARY, EBT-12 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW101-04B	IW101-04C	IW101-05A	IW101-05B	IW101-05C	IW101-07A	IW101-07B
	Lab ID		L13050802-04	L13050704-02	L13050804-01	L13050804-02	L13050804-03	L13050803-05	L13050804-06
	Date		5/13/2013	5/9/2013	5/13/2013	5/13/2013	5/13/2013	5/12/2013	5/13/2013
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<10	<5	<10	<1	<10	<1	<10
Chloroform	µg/L	80	<3	<1.5	<3	<0.3	<3	<0.3	<3
cis-1,2-Dichloroethene	µg/L	70	14.8	27.2	13.8	4.51	56.6	1.42	104
Tetrachloroethene	µg/L	5	<10	<5	<10	33.7	<10	1.06	<10
trans-1,2-Dichloroethene	µg/L	100	<10	<5	<10	<1	<10	<1	<10
Trichloroethene	µg/L	5	<10	<5	<10	0.851 J	<10	1.94	<10
Vinyl chloride	µg/L	2	<10	<5	<10	<1	<10	<1	<10
Additional VOCs									
1,2,4-Trimethylbenzene	µg/L	-	<10	<5	<10	<1	<10	<1	<10
1,2-Dichloroethane	µg/L	-	<5	<2.5	<5	<0.5	<5	<0.5	<5
1,2-Dichloropropane	µg/L	-	<10	<5	<10	<1	<10	<1	<10
Acetone	µg/L	-	272	7790	507	<10	1040	<10	3270 J
MEK (2-Butanone)	µg/L	-	498	3160	1030	<10	1550	<10	841
Methyl t-butyl ether (MTBE)	µg/L	-	<50	<25	5.34 J	3.03 J	<50	0.515 J	<50

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

TABLE 30
VOC ANALYTICAL RESULTS SUMMARY, EBT-12 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW101-07C	DR1-5	DR1-5A	DR1-6	DR1-6A	PMW101-02A	PMW101-02B
	Lab ID		L13050704-03	L13050800-01	L13050805-07	L13050803-01	L13050803-02	L13050802-05	L13050802-06
	Date		5/9/2013	5/12/2013	5/11/2013	5/12/2013	5/12/2013	5/13/2013	5/13/2013
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<5	<5	<10	<1	<10	<10	<10
Chloroform	µg/L	80	<1.5	<1.5	<3	<0.3	<3	<3	<3
cis-1,2-Dichloroethene	µg/L	70	245	5.39	85.4	20	110	16	27.8
Tetrachloroethene	µg/L	5	<5	35.5	<10	126	<10	<10	<10
trans-1,2-Dichloroethene	µg/L	100	<5	<5	<10	<1	<10	<10	<10
Trichloroethene	µg/L	5	<5	<5	4.27 J	1.35	<10	<10	<10
Vinyl chloride	µg/L	2	1.81 J	<5	<10	<1	<10	<10	<10
Additional VOCs									
1,2,4-Trimethylbenzene	µg/L	-	<5	<5	<10	<1	<10	<10	<10
1,2-Dichloroethane	µg/L	-	1.44 J	<2.5	<5	<0.5	<5	<5	<5
1,2-Dichloropropane	µg/L	-	2.21 J	<5	<10	<1	<10	<10	<10
Acetone	µg/L	-	5220	125	94.4 J	9.07 J	75 J	206	42.9 J
MEK (2-Butanone)	µg/L	-	1180	33.9 J	<100	9.3 J	51.9 J	427	32.5 J
Methyl t-butyl ether (MTBE)	µg/L	-	<25	42.2	<50	<5	<50	<50	5.4 J

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

TABLE 30
VOC ANALYTICAL RESULTS SUMMARY, EBT-12 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location Lab ID Date Area Units	MCL	PMW101-04A L13050804-04 5/13/2013 TTA-1S	PMW101-04B L13050477-04 5/8/2013 TTA-1S	PMW101-07A L13050804-05 5/13/2013 TTA-1S	PMW101-07B L13050803-06 5/12/2013 TTA-1S
Primary CVOCs						
Carbon tetrachloride	µg/L	5	<1	<1	<1	<1
Chloroform	µg/L	80	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	70	2.29	2.46	<1	1.94
Tetrachloroethene	µg/L	5	45.6	33.7	<1	14.5
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<1	<1
Trichloroethene	µg/L	5	0.967 J	3.38	0.347 J	36
Vinyl chloride	µg/L	2	<1	<1	<1	<1
Additional VOCs						
1,2,4-Trimethylbenzene	µg/L	-	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	-	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	-	<1	<1	<1	<1
Acetone	µg/L	-	<10	<10	<10	<10
MEK (2-Butanone)	µg/L	-	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	-	2.89 J	10.2	<5	<5

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration

TABLE 31
VOC ANALYTICAL RESULTS SUMMARY, EBT-12 – TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07	IW92-08
	Lab ID		L13050476-02	L13050702-03	L13050801-01	L13050474-01		L13050476-03	L13050702-04
	Date		5/8/2013	5/9/2013	5/11/2013	5/7/2013	DRY	5/8/2013	5/9/2013
	Area		TTA-2	TTA-2	TTA-2	TTA-2		TTA-2	TTA-2
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<25	<10	<1	<5		<20	<1
Chloroform	µg/L	80	<7.5	<3	<0.3	<1.5		<6	<0.3
cis-1,2-Dichloroethene	µg/L	70	44.4	20.4	21.6	107		30.5	117
Tetrachloroethene	µg/L	5	<25	<10	<1	2.1 J		<20	0.773 J
trans-1,2-Dichloroethene	µg/L	100	<25	<10	<1	<5		<20	<1
Trichloroethene	µg/L	5	<25	<10	<1	<5		<20	<1
Vinyl chloride	µg/L	2	<25	<10	0.359 J	<5		<20	1.29
Additional VOCs									
1,2,3-Trichloropropane	µg/L	-	<25	<10	<1	<5		<20	10.6
1,2,4-Trimethylbenzene	µg/L	-	<25	<10	1.53	<5		<20	<1
1,2-Dichloroethane	µg/L	-	<12.5	<5	<0.5	<2.5		<10	0.559
1,2-Dichloropropane	µg/L	-	<25	<10	<1	<5		<20	4
1,3,5-Trimethylbenzene	µg/L	-	<25	<10	0.377 J	<5		<20	<1
1,3-Dichloropropane	µg/L	-	<10	<4	<0.4	<2		<8	2.6
Acetone	µg/L	-	358	798	259	301		123 J	286
Ethylbenzene	µg/L	-	<25	<10	<1	<5		<20	<1
MEK (2-Butanone)	µg/L	-	4610	20800	131	1060		<200	872
Methylene chloride	µg/L	-	<25	<10	<1	<5		<20	1.19
n-Propylbenzene	µg/L	-	<25	<10	0.227 J	<5		<20	<1

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration

TABLE 31
VOC ANALYTICAL RESULTS SUMMARY, EBT-12 – TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		DR2-2	DR2-5	MW-113	PMW85-01	PMW85-05	PMW92-03	MW-85
	Lab ID		L13050702-11	L13050476-01	L13050702-07	L13050702-08	L13050476-04	L13050702-05	L13050702-06
	Date		5/10/2013	5/8/2013	5/10/2013	5/10/2013	5/8/2013	5/9/2013	5/10/2013
	Area		TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<1	78.4	<5	<1	72.3 J	<1	45.8
Chloroform	µg/L	80	<0.3	40	3.12	<0.3	32.4	<0.3	13.8
cis-1,2-Dichloroethene	µg/L	70	44.9	118	169	55.1	85.1	36	52.4
Tetrachloroethene	µg/L	5	0.801 J	29.9	12.5	0.451 J	106	125	21
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<5	<1	<1	<1	<1
Trichloroethene	µg/L	5	<1	14	2.6 J	<1	31.7	12.1	5.76
Vinyl chloride	µg/L	2	0.38 J	<1	<5	1.89	<1	<1	<1
Additional VOCs									
1,2,3-Trichloropropane	µg/L	-	<1	16.2	<5	<1	46.5 J	<1	5.83
1,2,4-Trimethylbenzene	µg/L	-	1.09	<1	<5	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	-	<0.5	<0.5	<2.5	<0.5	0.466 J	<0.5	<0.5
1,2-Dichloropropane	µg/L	-	<1	0.561 J	<5	1.59	0.739 J	<1	0.307 J
1,3,5-Trimethylbenzene	µg/L	-	0.271 J	<1	<5	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	-	<0.4	<0.4	<2	2.03	<0.4	<0.4	<0.4
Acetone	µg/L	-	589	5.86 J	94.4	135	<10	<10	<10
Ethylbenzene	µg/L	-	0.513 J	<1	<5	<1	<1	<1	<1
MEK (2-Butanone)	µg/L	-	413	6.02 J	131	1990	<10	<10	<10
Methylene chloride	µg/L	-	0.553 J	<1	3.18 J	<1	<1	<1	<1
n-Propylbenzene	µg/L	-	0.169 J	<1	<5	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

TABLE 32
VOC ANALYTICAL RESULTS SUMMARY, EBT-12 – WEST-CENTRAL AND BUILDING 835
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		MW-203A	MW-203B	MW-197A	MW-197B	MW-62	MW-213	MW-212
	Lab ID		L13050702-01	L13050801-04	L13050801-02	L13050801-03	L13050702-02	L13050801-06	L13050801-05
	Date		5/9/2013	5/11/2013	5/11/2013	5/11/2013	5/9/2013	5/11/2013	5/11/2013
	Area		West-Central	West-Central	West-Central	West-Central	Bldg 835	Bldg 835	Bldg 835
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<20	<1	<1	<1	<5	<5	<1
Chloroform	µg/L	80	<6	<0.3	<0.3	<0.3	<1.5	<1.5	<0.3
cis-1,2-Dichloroethene	µg/L	70	24.8	16.6	0.738 J	3.81	34.8	4.05 J	<1
Tetrachloroethene	µg/L	5	19.8 J	3.1	21.6	21.1	<5	<5	<1
trans-1,2-Dichloroethene	µg/L	100	<20	<1	<1	<1	<5	<5	<1
Trichloroethene	µg/L	5	9 J	2.27	1.17	11.2	98.5	17.5	10.9
Vinyl chloride	µg/L	2	7.98 J	2.64	<1	1.31	<5	<5	<1
Additional VOCs									
Acetone	µg/L	-	961	79.5	<10	<10	132	125 B	<10
MEK (2-Butanone)	µg/L	-	1090	30.4	<10	<10	198	53.1	<10
Methyl t-butyl ether (MTBE)	µg/L	-	<100	2.51 J	<5	2.21 J	<25	<25	<5

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination

TABLE 33
SUMMARY FOR FREQUENTLY DETECTED CVOCS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PCE	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	21	1.5	3
	PMW	2	293	137	2
TTA-1S	IW	21	126	1.1	6
	PMW	4	46	34	2
TTA-2	IW	9	30	0.8	2
	PMW	4	125	0.5	3
West-Central	IW	2	20	3.1	1
	PMW	2	22	21	2
Bldg 835	IW	2	<5	-	0
	PMW	1	<1	-	0

TCE	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	5.4	1.2	1
	PMW	2	62	48	2
TTA-1S	IW	21	36	0.3	1
	PMW	4	3.4	0.3	0
TTA-2	IW	9	14	2.6	1
	PMW	4	32	5.8	3
West-Central	IW	2	9.0	2.3	1
	PMW	2	11	1.2	1
Bldg 835	IW	2	99	18	2
	PMW	1	11	-	1

cDCE	MCL				
	70 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	174	14	6
	PMW	2	11	4.7	0
TTA-1S	IW	21	245	1.3	4
	PMW	4	104	2.3	1
TTA-2	IW	9	169	20	4
	PMW	4	85	36	1
West-Central	IW	2	25	17	0
	PMW	2	3.8	0.7	0
Bldg 835	IW	2	35	4.1	0
	PMW	1	<1	-	0

VC	MCL				
	2 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	<20	<1	0
	PMW	2	<1	<1	0
TTA-1S	IW	21	1.8	1.5	0
	PMW	4	<10	<1	0
TTA-2	IW	9	1.3	0.36	0
	PMW	4	1.9	<1	0
West-Central	IW	2	8.0	2.6	2
	PMW	2	1.3	<1	0
Bldg 835	IW	2	<5	-	0
	PMW	1	<1	-	0

TABLE 33
SUMMARY FOR FREQUENTLY DETECTED CVOCS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

CT	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-2	IW	9	78	78	1
	PMW	4	72	46	2

CF	MCL				
	80 µg/L*	No. of Wells	Max	Min	Wells > MCL
TTA-2	IW	9	40	2.1	0
	PMW	4	32	14	0

Notes:

All concentrations in micrograms per liter (µg/L).

MCL: Maximum Contaminant Level

MCL for total trihalomethanes shown for CF.

TABLE 34
VOC ANALYTICAL RESULTS SUMMARY, EBT-13 – TTA-1N
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A
	Lab ID		L13081024-24	L13081024-25	L13081024-20	L13081024-21	L13081024-26	L13081024-27	L13081024-28
	Date		8/18/2013	8/18/2013	8/17/2013	8/17/2013	8/19/2013	8/19/2013	8/19/2013
	Area		TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<5	<1	<5	<5	<1 UJ	<1	<20
Chloroform	µg/L	80	<1.5	<0.3	<1.5	<1.5	<0.3 UJ	<0.3	<6
cis-1,2-Dichloroethene	µg/L	70	148	41.6	86.7	25.2	196 J	134	94.9
Tetrachloroethene	µg/L	5	6.35	<1	<5	<5	5.77 J	5.07	<20
trans-1,2-Dichloroethene	µg/L	100	<5	<1	<5	<5	1.04 J	0.747 J	<20
Trichloroethene	µg/L	5	3.35 J	<1	<5	<5	2.39 J	1.51	<20
Vinyl chloride	µg/L	2	<5	<1	<5	<5	<1 UJ	0.628 J	<20
Additional VOCs									
1,2,4-Trimethylbenzene	µg/L	-	7.42	1.42	1.72 J	3.91 J	0.615 J	0.893 J	<20
Acetone	µg/L	-	333	73.4	160	74.1	12 J	64.8	293
MEK (2-Butanone)	µg/L	-	567	86.9	112	88.1	42.2 J	163	1170
Methyl t-butyl ether (MTBE)	µg/L	-	60.1	37.2	<25	<25	43 J	24.1	<100
Methylene chloride	µg/L	-	<5	<1	1.7 JB	1.65 JB	<1 UJ	<1	<20

Notes:

µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:

J: Estimated concentration
B: Blank Contamination
UJ: Estimated-Non-Detect
JB: Estimated-Blank Contamination

TABLE 34
VOC ANALYTICAL RESULTS SUMMARY, EBT-13 – TTA-1N
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW21-04B	MW-21	PMW21-04	PMW21-01	PMW21-02
	Lab ID		L13081024-31	L13081024-22	L13081024-01	L13081024-23	L13081024-32
	Date		8/19/2013	8/17/2013	8/17/2013	8/17/2013	8/18/2013
	Area		TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Primary CVOCs	Units	MCL					
Carbon tetrachloride	µg/L	5	<10	<1	<5	<2	<1
Chloroform	µg/L	80	<3	<0.3	<1.5	<0.6	<0.3
cis-1,2-Dichloroethene	µg/L	70	55.6	25	77.6	9.62	5.18
Tetrachloroethene	µg/L	5	<10	19.1	25	279	143
trans-1,2-Dichloroethene	µg/L	100	<10	<1	<5	0.808 J	<1
Trichloroethene	µg/L	5	<10	2.96	8.67	55.5	54.3
Vinyl chloride	µg/L	2	<10	<1	<5	<2	<1
Additional VOCs							
1,2,4-Trimethylbenzene	µg/L	-	<10	<1	2.44 J	<2	<1
Acetone	µg/L	-	244	9.18	46.2	<20	<10
MEK (2-Butanone)	µg/L	-	930	11	139	<20	<10
Methyl t-butyl ether (MTBE)	µg/L	-	11.8 J	10.1	11.7 J	29.2	28.6
Methylene chloride	µg/L	-	<10	<1	<5	1.46 JB	<1

Notes:

µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:

J: Estimated concentration
B: Blank Contamination
UJ: Estimated-Non-Detect
JB: Estimated-Blank Contamination

TABLE 35
VOC ANALYTICAL RESULTS SUMMARY, EBT-13 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW101-02A	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A
	Lab ID		L13080921-09	L13080921-10	L13080921-13	L13080978-07	L13080978-11	L13080978-08	L13081024-02
	Date		8/15/2013	8/15/2013	8/15/2013	8/16/2013	8/16/2013	8/16/2013	8/18/2013
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<1	<1	<10	<5	<5	<5	<20
Chloroform	µg/L	80	<0.3	<0.3	<3	<1.5	<1.5	<1.5	<6
cis-1,2-Dichloroethene	µg/L	70	22.8	2.24	74.8	4.06 J	15.5	69.5	9.85 J
Tetrachloroethene	µg/L	5	11.2	48.3	<10	3.71 J	2.86 J	<5	<20
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<10	<5	<5	<5	<20
Trichloroethene	µg/L	5	2.3	0.706 J	<10	<5	<5	<5	<20
Vinyl chloride	µg/L	2	<1	<1	<10	<5	<5	<5	<20
Additional VOCs									
1,2,4-Trimethylbenzene	µg/L	-	<1	<1	3.32 J	1.31 J	5.89	3.1 J	<20
Acetone	µg/L	-	4.63 J	<10	547	67.8	106	205	263 B
MEK (2-Butanone)	µg/L	-	11.8	<10	1560	259	507	2110	2090
Methyl t-butyl ether (MTBE)	µg/L	-	8.26	8.32	<50	9.57 J	6.5 J	<25	<100
Methylene chloride	µg/L	-	<1	<1	<10	<5	<5	<5	<20
Toluene	µg/L	-	<1	<1	<10	149	<5	<5	<20

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

JB: Estimated-Blank Contamination

TABLE 35
VOC ANALYTICAL RESULTS SUMMARY, EBT-13 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW101-04B	IW101-04C	IW101-05A	IW101-05B	IW101-05C	IW101-07A	IW101-07B
	Lab ID		L13081024-14	L13081024-03	L13081024-15	L13081024-05	L13081024-17	L13080978-03	L13080978-04
	Date		8/18/2013	8/18/2013	8/17/2013	8/17/2013	8/17/2013	8/16/2013	8/16/2013
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<5	<10	<5	<1	<10	<1	<5
Chloroform	µg/L	80	<1.5	<3	<1.5	<0.3	<3	<0.3	<1.5
cis-1,2-Dichloroethene	µg/L	70	13.4	25.2	9.71	2.48	36	<1	52.9
Tetrachloroethene	µg/L	5	<5	<10	4.69 J	36	<10	0.375 J	4.17 J
trans-1,2-Dichloroethene	µg/L	100	<5	<10	<5	<1	<10	<1	<5
Trichloroethene	µg/L	5	<5	<10	<5	0.622 J	<10	0.487 J	10.9
Vinyl chloride	µg/L	2	<5	<10	<5	<1	<10	<1	<5
Additional VOCs									
1,2,4-Trimethylbenzene	µg/L	-	<5	2.74 J	1.49 J	<1	<10	<1	5.66
Acetone	µg/L	-	88.6	1700	38.7	<10	407	<10	370
MEK (2-Butanone)	µg/L	-	249	2380	234 J	<10	1780	<10	1160
Methyl t-butyl ether (MTBE)	µg/L	-	<25	<50	<25	3.23 J	<50	<5	<25
Methylene chloride	µg/L	-	2.31 J	5.29 J	<5	<1	3.55 JB	<1	<5
Toluene	µg/L	-	<5	<10	<5	<1	<10	<1	<5

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

JB: Estimated-Blank Contamination

TABLE 35
VOC ANALYTICAL RESULTS SUMMARY, EBT-13 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW101-07C	DR1-5	DR1-5A	DR1-6	DR1-6A	PMW101-02A	PMW101-02B
	Lab ID		L13080978-06	L13081060-01	L13081060-06	L13080978-01	L13080978-02	L13080978-09	L13080978-12
	Date		8/16/2013	8/20/2013	8/20/2013	8/16/2013	8/16/2013	8/16/2013	8/16/2013
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<10	<1	<1	<5	<5	<5	<5
Chloroform	µg/L	80	<3	<0.3	<0.3	<1.5	<1.5	<1.5	<1.5
cis-1,2-Dichloroethene	µg/L	70	145	12.9	91.8	13.6	86.8	11.9	32.9
Tetrachloroethene	µg/L	5	13.2	15	0.649 J	119	9.75	<5	1.25 J
trans-1,2-Dichloroethene	µg/L	100	<10	<1	<1	<5	<5	<5	<5
Trichloroethene	µg/L	5	10.5	0.996 J	1.01	2.89 J	26.4	<5	<5
Vinyl chloride	µg/L	2	<10	<1	0.479 J	<5	<5	<5	<5
Additional VOCs									
1,2,4-Trimethylbenzene	µg/L	-	6.76 J	1.07	1.04	<5	6.7	1.57 J	2.5 J
Acetone	µg/L	-	649	659	30.6	<50	56.6	115	244
MEK (2-Butanone)	µg/L	-	2060	431	11	15.9 J	155	589	180
Methyl t-butyl ether (MTBE)	µg/L	-	<50	40.6	0.706 J	<25	<25	2.55 J	5.41 J
Methylene chloride	µg/L	-	<10	<1	<1	<5	<5	<5	<5
Toluene	µg/L	-	<10	0.366 J	<1	<5	<5	<5	<5

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

JB: Estimated-Blank Contamination

TABLE 35
VOC ANALYTICAL RESULTS SUMMARY, EBT-13 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location Lab ID Date Area Units	MCL	PMW101-04A L13080921-01 8/15/2013 TTA-1S	PMW101-04B L13080921-08 8/15/2013 TTA-1S	PMW101-07A L13080921-11 8/15/2013 TTA-1S	PMW101-07B L13080921-12 8/15/2013 TTA-1S
Primary CVOCs						
Carbon tetrachloride	µg/L	5	<1	<1	<1	<1
Chloroform	µg/L	80	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	70	11.4	3.94	<1	1.4
Tetrachloroethene	µg/L	5	25.5	29.6	<1	12.7
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<1	<1
Trichloroethene	µg/L	5	1.13	3.47	0.272 J	32.4
Vinyl chloride	µg/L	2	<1	<1	<1	<1
Additional VOCs						
1,2,4-Trimethylbenzene	µg/L	-	<1	<1	<1	<1
Acetone	µg/L	-	<10	<10	<10	<10
MEK (2-Butanone)	µg/L	-	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	-	2.22 J	9.73	<5	<5
Methylene chloride	µg/L	-	<1	<1	<1	<1
Toluene	µg/L	-	<1	<1	<1	<1

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
JB: Estimated-Blank Contamination

TABLE 36
VOC ANALYTICAL RESULTS SUMMARY, EBT-13 – TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07	IW92-08
	Lab ID		L13080814-03	L13080921-02	L13081060-05	L13080814-06	L13081024-18	L13080921-03	L13080921-04
	Date		8/14/2013	8/15/2013	8/20/2013	8/14/2013	8/19/2013	8/15/2013	8/15/2013
	Area		TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<25	<25	<5	<50	<10	<5	<5
Chloroform	µg/L	80	<7.5	<7.5	<1.5	<15	<3	<1.5	<1.5
cis-1,2-Dichloroethene	µg/L	70	37.6	16.2 J	4.14 J	18.2 J	44.9	52.5	92.1
Tetrachloroethene	µg/L	5	<25	<25	<5	<50	<10	<5	<5
trans-1,2-Dichloroethene	µg/L	100	<25	<25	<5	<50	<10	<5	<5
Trichloroethene	µg/L	5	<25	<25	<5	<50	<10	<5	<5
Vinyl chloride	µg/L	2	<25	<25	<5	<50	<10	<5	<5
Additional VOCs									
1,2,3-Trichloropropane	µg/L	-	<25	<25	<5	<50	<10	<5	<5
1,2,4-Trimethylbenzene	µg/L	-	<25	<25	2.66 J	<50	8.44 J	3.22 J	3.6 J
Acetone	µg/L	-	281	540	837	1040	196	1420	1330
Carbon disulfide	µg/L	-	<25	<25	<5	<50	<10	<5	<5
MEK (2-Butanone)	µg/L	-	3740	6950	1850	10100	1820	15200	4050
Methylene chloride	µg/L	-	<25	<25	<5	<50	<10	<5	1.63 J

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination

TABLE 36
VOC ANALYTICAL RESULTS SUMMARY, EBT-13 – TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		DR2-2	DR2-5	MW-113	PMW85-01	PMW85-05	PMW92-03	MW-85
	Lab ID		L13080814-12	L13080814-01	L13080814-02	L13080814-05	L13080814-07	L13080814-13	L13080814-04
	Date		8/14/2013	8/14/2013	8/13/2013	8/13/2013	8/13/2013	8/13/2013	8/14/2013
	Area		TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<5	5.2	<20	<10	78.6	<1	9.69
Chloroform	µg/L	80	<1.5	48.3	<6	<3	32.3	<0.3	2.78
cis-1,2-Dichloroethene	µg/L	70	14.5	120	88.9	51.8	83.4	50.4	62.1
Tetrachloroethene	µg/L	5	2.61 J	44.9	12.6 J	<10	110	149	6.62
trans-1,2-Dichloroethene	µg/L	100	<5	<1	<20	<10	<1	<1	<1
Trichloroethene	µg/L	5	<5	21.8	5.09 J	<10	33.1	14.9	1.77
Vinyl chloride	µg/L	2	<5	<1	<20	<10	<1	1.61	<1
Additional VOCs									
1,2,3-Trichloropropane	µg/L	-	<5	15.8	<20	<10	54.2	<1	5.15
1,2,4-Trimethylbenzene	µg/L	-	1.84 J	2.25	<20	<10	<1	<1	<1
Acetone	µg/L	-	566	52.1	208	64.6	<10	<10	4.26 B
Carbon disulfide	µg/L	-	<5	0.603 J	<20	<10	<1	<1	<1
MEK (2-Butanone)	µg/L	-	1690	156	2420	59.6 J	<10	<10	56.7
Methylene chloride	µg/L	-	<5	2.14	<20	<10	<1	<1	<1

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

TABLE 37
VOC ANALYTICAL RESULTS SUMMARY, EBT-13 – WEST-CENTRAL AND BUILDING 835
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location		MW-203A	MW-203B	MW-197A	MW-197B	MW-62	MW-213	MW-212
	Lab ID		L13081024-09	L13081024-10	L13081024-06	L13081024-08	L13081060-02	L13081060-08	L13081060-07
	Date		8/19/2013	8/19/2013	8/19/2013	8/19/2013	8/20/2013	8/20/2013	8/20/2013
	Area		West-Central	West-Central	West-Central	West-Central	Bldg 835	Bldg 835	Bldg 835
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<5	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	80	<1.5	<0.3	<0.3	<0.3	0.351	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	70	12.1	12.7	0.79 J	6.12	51.8	11.5	<1
Tetrachloroethene	µg/L	5	4.41 J	13.9	21.7	19.1	0.382 J	<1	0.377 J
trans-1,2-Dichloroethene	µg/L	100	<5	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	5	<5	17.8	1.36	11.6	132	14	13.7
Vinyl chloride	µg/L	2	<5	2.66	<1	1.38	<1	0.327 J	<1
Additional VOCs									
Acetone	µg/L	-	65	<10	<10	<10	71.1	221	<10
Carbon disulfide	µg/L	-	<5	<1	<1	<1	<1	1.04	<1
MEK (2-Butanone)	µg/L	-	453	<10	<10	<10	213	606	<10
Methyl t-butyl ether (MTBE)	µg/L	-	<25	2.81 J	<5	2.11 J	<5	<5	<5
Methylene chloride	µg/L	-	2.58 J	<1	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

TABLE 38
SUMMARY FOR FREQUENTLY DETECTED CVOCS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PCE	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	25	5.1	5
	PMW	2	279	143	2
TTA-1S	IW	21	119	0.38	7
	PMW	4	29.6	12.7	3
TTA-2	IW	10	44.9	2.61	2
	PMW	4	149	6.6	3
West-Central	IW	2	13.9	4.4	1
	PMW	2	21.7	19.1	2
Bldg 835	IW	2	0.382	<0.3	0
	PMW	1	0.377	-	0

TCE	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	8.67	1.51	1
	PMW	2	55.5	54.3	2
TTA-1S	IW	21	26.4	0.487	3
	PMW	4	32.4	0.272	1
TTA-2	IW	10	21.8	5.1	2
	PMW	4	33.1	1.77	2
West-Central	IW	2	17.8	-	1
	PMW	2	11.6	1.36	1
Bldg 835	IW	2	132	14	2
	PMW	1	13.7	-	1

cDCE	MCL				
	70 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	196	25	6
	PMW	2	9.62	5.18	0
TTA-1S	IW	21	145	2.24	4
	PMW	4	11.4	1.4	0
TTA-2	IW	10	120	4.1	3
	PMW	4	83.4	50.4	1
West-Central	IW	2	12.7	12.1	0
	PMW	2	6.1	0.8	0
Bldg 835	IW	2	51.8	11.5	0
	PMW	1	<1	-	0

VC	MCL				
	2 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	0.628	<1	0
	PMW	2	<2	<1	0
TTA-1S	IW	21	0.479	<1	0
	PMW	4	<1	<1	0
TTA-2	IW	10	<25	<1	0
	PMW	4	1.61	<1	0
West-Central	IW	2	2.66	<5	1
	PMW	2	1.38	<1	0
Bldg 835	IW	2	0.327	<1	0
	PMW	1	<1	-	0

TABLE 38
SUMMARY FOR FREQUENTLY DETECTED CVOCS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

CT	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-2	IW	10	5.2	<5	1
	PMW	4	78.6	<1	2

CF	MCL				
	80 µg/L*	No. of Wells	Max	Min	Wells > MCL
TTA-2	IW	10	48.3	<1.5	0
	PMW	4	32.3	<0.3	0

Notes:

All concentrations in micrograms per liter (µg/L).

MCL: Maximum Contaminant Level

MCL for total trihalomethanes shown for CF.

Wells >MCLs does not include non-detect results with reporting limits above the MCL.

TABLE 39
VOC ANALYTICAL RESULTS SUMMARY, EBT-14 – TTA-1N
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Well ID		IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A
	Lab ID		L13110512-01	L13110512-02	L13110633-10	L13110633-11	L13110633-12	L13110633-13	L13110633-01
	Date		11/7/2013	11/7/2013	11/8/2013	11/8/2013	11/8/2013	11/8/2013	11/8/2013
	Area		TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<5	<1	<5	<5	<1	<1	<5
Chloroform	µg/L	80	<1.5	<0.3	<1.5	<1.5	<0.3	<0.3	<1.5
cis-1,2-Dichloroethene	µg/L	70	109	81.4	77.7	23	209	135	95.1
Tetrachloroethene	µg/L	5	9.93	11.3	1.87 J	2.77 J	1.21	0.526 J	2.37 J
trans-1,2-Dichloroethene	µg/L	100	<5	<1	<5	<5	1.13	0.877 J	<5
Trichloroethene	µg/L	5	6	4.23	<5	<5	0.652 J	<1	<5
Vinyl chloride	µg/L	2	<5	0.284 J	<5	<5	<1	<1	<5
Additional VOCs									
1,2,4-Trimethylbenzene	µg/L	-	11.8	7.46	6.24	2.14 J	0.33 J	0.64 J	2.56 J
1,2-Dichloroethane	µg/L	-	<2.5	<0.5	<2.5	<2.5	0.266 J	<0.5	<2.5
1,3,5-Trimethylbenzene	µg/L	-	3.26 J	2.21	1.94 J	<5	<1	<1	<5
Acetone	µg/L	-	467	143	150 B	93.9 B	29.4 B	107 B	145 B
Carbon disulfide	µg/L	-	<5	<1	<5	<5	0.732 J	0.536 J	<5
Ethylbenzene	µg/L	-	<5	<1	<5	<5	<1	<1	<5
MEK (2-Butanone)	µg/L	-	2330	324	283	371	188	312	696
Methyl t-butyl ether (MTBE)	µg/L	-	35.1	51.3	<25	<25	44.2	26.3	13.2 J
n-Propylbenzene	µg/L	-	1.1 J	1.03	0.844 J	<5	<1	<1	<5

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE Flags:
B: Blank contamination
J: Estimated concentration

TABLE 39
VOC ANALYTICAL RESULTS SUMMARY, EBT-14 – TTA-1N
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Well ID		IW21-04B	MW-21	PMW21-04	PMW21-01	PMW21-02
	Lab ID		L13110633-04	L13110633-05	L13110633-06	L13110511-06	L13110633-14
	Date		11/8/2013	11/8/2013	11/8/2013	11/7/2013	11/8/2013
	Area		TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Primary CVOCs	Units	MCL					
Carbon tetrachloride	µg/L	5	<5	<1	<1	<2	<1
Chloroform	µg/L	80	<1.5	<0.3	<0.3	<0.6	<0.3
cis-1,2-Dichloroethene	µg/L	70	90.8	12.8	136	93	5.66
Tetrachloroethene	µg/L	5	<5	2.89	115	2.19	149
trans-1,2-Dichloroethene	µg/L	100	<5	<1	0.607 J	0.53 J	<1
Trichloroethene	µg/L	5	<5	1.2	28.5	0.813 J	52.5
Vinyl chloride	µg/L	2	<5	<1	<1	<2	<1
Additional VOCs							
1,2,4-Trimethylbenzene	µg/L	-	1.79 J	0.253 J	1.34	<2	<1
1,2-Dichloroethane	µg/L	-	<2.5	<0.5	<0.5	<1	<0.5
1,3,5-Trimethylbenzene	µg/L	-	<5	<1	0.385 J	<2	<1
Acetone	µg/L	-	765 B	77.3 B	50 B	34.5 B	<10
Carbon disulfide	µg/L	-	<5	<1	<1	<2	<1
Ethylbenzene	µg/L	-	<5	3.06	0.883 J	0.736 J	<1
MEK (2-Butanone)	µg/L	-	3870 B	56.7	75.9	28.8	<10
Methyl t-butyl ether (MTBE)	µg/L	-	13.5 J	2.61 J	22.4	7.23 J	30.4
n-Propylbenzene	µg/L	-	<5	<1	0.231 J	<2	<1

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE Flags:

B: Blank contamination

J: Estimated concentration

TABLE 40
VOC ANALYTICAL RESULTS SUMMARY, EBT-14 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Well ID		IW101-02A	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A
	Lab ID		L13110792-09	L13110792-10	L13110792-13	L13110792-15	L13110792-21	L13110792-16	L13110792-22
	Date		11/9/2013	11/9/2013	11/9/2013	11/10/2013	11/10/2013	11/10/2013	11/10/2013
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<1 UJ	<1	<10 UJ	<1	<5 UJ	<10 UJ	<10 UJ
Chloroform	µg/L	80	<0.3 UJ	<0.3	<3 UJ	<0.3	<1.5 UJ	<3 UJ	<3 UJ
cis-1,2-Dichloroethene	µg/L	70	16 J	5.62	62.9 J	5.9	8.82 J	37.4 J	5.42 J
Tetrachloroethene	µg/L	5	14.2 J	44.1	<10 UJ	2.54	<5 UJ	<10 UJ	<10 UJ
trans-1,2-Dichloroethene	µg/L	100	<1 UJ	<1	<10 UJ	<1	<5 UJ	<10 UJ	<10 UJ
Trichloroethene	µg/L	5	0.908 J	1.36	<10 UJ	<1	<5 UJ	<10 UJ	<10 UJ
Vinyl chloride	µg/L	2	<1 UJ	<1	<10 UJ	<1	<5 UJ	<10 UJ	<10 UJ
Additional VOCs									
1,2,4-Trimethylbenzene	µg/L	-	0.396 J	<1	2.58 J	0.669 J	1.96 J	<10 UJ	6.35 J
1,2-Dichloroethane	µg/L	-	<0.5 UJ	<0.5	<5 UJ	<0.5	<2.5 UJ	<5 UJ	<5 UJ
1,2-Dichloropropane	µg/L	-	<1 UJ	<1	<10 UJ	<1	<5 UJ	<10 UJ	<10 UJ
1,3,5-Trimethylbenzene	µg/L	-	<1 UJ	<1	<10 UJ	<1	<5 UJ	<10 UJ	<10 UJ
Acetone	µg/L	-	280 JB	<10	675 JB	411 B	733 JB	5650 JB	1010 JB
Carbon disulfide	µg/L	-	0.579 J	<1	<10 UJ	0.812 J	<5 UJ	<10 UJ	<10 UJ
MEK (2-Butanone)	µg/L	-	388	<10	2780 J	728	1380 J	8640 J	4990 JB
Methyl t-butyl ether (MTBE)	µg/L	-	9.88 J	9.92	<50 UJ	11.7	3.65 J	<50 UJ	<50 UJ
n-Propylbenzene	µg/L	-	<1 UJ	<1	<10 UJ	<1	<5 UJ	<10 UJ	<10 UJ
Toluene	µg/L	-	<1 UJ	<1	<10 UJ	12.4	<5 UJ	<10 UJ	<10 UJ

Notes:

µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE Flags:

B: Blank contamination
J: Estimated concentration
UJ: Estimated, non-detect
JB: Estimated, blank contamination

TABLE 40
VOC ANALYTICAL RESULTS SUMMARY, EBT-14 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Well ID		IW101-04B	IW101-04C	IW101-05A	IW101-05B	IW101-05C	IW101-07A	IW101-07B
	Lab ID		L13110792-35	L13110792-33	L13110792-26	L13110792-24	L13110792-28	L13110792-05	L13110792-06
	Date		11/11/2013	11/11/2013	11/10/2013	11/10/2013	11/10/2013	11/9/2013	11/9/2013
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<5 UJ	<10	<5	<1	<10 UJ	<1	<5 UJ
Chloroform	µg/L	80	<1.5 UJ	<3	<1.5	<0.3	<3 UJ	<0.3	<1.5 UJ
cis-1,2-Dichloroethene	µg/L	70	11.9 J	18.3	15.7	11.5	24.4 J	<1	58.9 J
Tetrachloroethene	µg/L	5	<5 UJ	<10	1.41 J	17.5	<10 UJ	0.434 J	1.92 J
trans-1,2-Dichloroethene	µg/L	100	<5 UJ	<10	<5	<1	<10 UJ	<1	<5 UJ
Trichloroethene	µg/L	5	<5 UJ	<10	<5	1.13	<10 UJ	0.292 J	4.17 J
Vinyl chloride	µg/L	2	<5 UJ	<10	<5	<1	<10 UJ	<1	<5 UJ
Additional VOCs									
1,2,4-Trimethylbenzene	µg/L	-	3.35 J	8.23 J	9.63	<1	4.4 J	<1	25.7 J
1,2-Dichloroethane	µg/L	-	<2.5 UJ	<5	<2.5	<0.5	<5 UJ	<0.5	<2.5 UJ
1,2-Dichloropropane	µg/L	-	<5 UJ	<10	<5	<1	<10 UJ	<1	<5 UJ
1,3,5-Trimethylbenzene	µg/L	-	<5 UJ	<10	2.59 J	<1	<10 UJ	<1	7.42 J
Acetone	µg/L	-	94.1 JB	1260 B	580 JB	2.86 JB	653 JB	<10	522 J
Carbon disulfide	µg/L	-	<5 UJ	<10	<5	<1	<10 UJ	<1	<5 UJ
MEK (2-Butanone)	µg/L	-	211 J	3490	1670 B	4.09 JB	2340 J	<10	2040 J
Methyl t-butyl ether (MTBE)	µg/L	-	<25 UJ	<50	3.87 J	4 J	<50 UJ	<5	<25 UJ
n-Propylbenzene	µg/L	-	<5 UJ	<10	1.5 J	<1	<10 UJ	<1	3.64 J
Toluene	µg/L	-	<5 UJ	<10	<5	<1	<10 UJ	<1	<5 UJ

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE Flags:

B: Blank contamination

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated, blank contamination

TABLE 40
VOC ANALYTICAL RESULTS SUMMARY, EBT-14 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Well ID		IW101-07C	DR1-5	DR1-5A	DR1-6	DR1-6A	PMW101-02A	PMW101-02B
	Lab ID		L13110792-08	L13110792-01	L13110792-02	L13110792-03	L13110792-04	L13110792-11	L13110792-14
	Date		11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<10 UJ	<2	<1	<1	<1	<2	<1
Chloroform	µg/L	80	<3 UJ	<0.6	<0.3	<0.3	<0.3	<0.6	<0.3
cis-1,2-Dichloroethene	µg/L	70	211 J	11.6	26.5	8.42	132	8.62	37.5
Tetrachloroethene	µg/L	5	<10 UJ	10.2	0.848 J	148	1.49	2.15	1.58
trans-1,2-Dichloroethene	µg/L	100	<10 UJ	<2	<1	<1	<1	<2	<1
Trichloroethene	µg/L	5	<10 UJ	0.713 J	0.501 J	1.69	2.12	1.39 J	3.21
Vinyl chloride	µg/L	2	3.09 J	<2	<1	<1	0.398 J	<2	<1
Additional VOCs									
1,2,4-Trimethylbenzene	µg/L	-	34.2 J	0.865 J	29.3	1.4	22.4	2.03	4.95
1,2-Dichloroethane	µg/L	-	<5 UJ	<1	<0.5	<0.5	<0.5	<1	0.515
1,2-Dichloropropane	µg/L	-	<10 UJ	<2	<1	<1	0.388 J	<2	0.492 J
1,3,5-Trimethylbenzene	µg/L	-	8.59 J	<2	7.3	0.373 J	5.99	0.557 J	1.29
Acetone	µg/L	-	1220 J	345 B	49.6 B	8.98 JB	149 B	127 B	115 B
Carbon disulfide	µg/L	-	<10 UJ	<2	<1	<1	<1	<2	16.3
MEK (2-Butanone)	µg/L	-	2230 J	502	35.5	13.1	156	378	104
Methyl t-butyl ether (MTBE)	µg/L	-	<50 UJ	43.5	<5	<5	<5	2.25 J	2.96 J
n-Propylbenzene	µg/L	-	3.58 J	<2	4.21	0.228 J	3.09	0.312 J	0.731 J
Toluene	µg/L	-	<10 UJ	<2	<1	<1	<1	<2	<1

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE Flags:
B: Blank contamination
J: Estimated concentration
UJ: Estimated, non-detect
JB: Estimated, blank contamination

TABLE 40
VOC ANALYTICAL RESULTS SUMMARY, EBT-14 – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Well ID		PMW101-04A	PMW101-04B	PMW101-07A	PMW101-07B
	Lab ID		L13110633-07	L13110633-09	L13110792-17	L13110792-18
	Date		11/8/2013	11/8/2013	11/10/2013	11/10/2013
	Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S
Primary CVOCs	Units	MCL				
Carbon tetrachloride	µg/L	5	<1	<1	<1	<1
Chloroform	µg/L	80	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	70	20.4	8.17	<1	1.4
Tetrachloroethene	µg/L	5	6.35	22.1	<1	11.6
trans-1,2-Dichloroethene	µg/L	100	<1	<1	<1	<1
Trichloroethene	µg/L	5	0.927 J	2.02	0.265 J	27.1
Vinyl chloride	µg/L	2	<1	<1	<1	<1
Additional VOCs						
1,2,4-Trimethylbenzene	µg/L	-	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	-	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	-	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	-	<1	<1	<1	<1
Acetone	µg/L	-	2.8 JB	<10	<10	<10
Carbon disulfide	µg/L	-	<1	<1	<1	<1
MEK (2-Butanone)	µg/L	-	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	-	3 J	13.7	<5	0.558 J
n-Propylbenzene	µg/L	-	<1	<1	<1	<1
Toluene	µg/L	-	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE Flags:

B: Blank contamination

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated, blank contamination

TABLE 41
VOC ANALYTICAL RESULTS SUMMARY, EBT-14 – TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Well ID		IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07	IW92-08
	Lab ID		L13110487-03	L13110511-01	L13110486-06	L13110511-02	L13110487-04	L13110511-03	L13110487-01
	Date		11/6/2013	11/7/2013	11/6/2013	11/7/2013	11/6/2013	11/7/2013	11/6/2013
	Area		TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<20	<50	<10	<10	<10	<10	<20
Chloroform	µg/L	80	<6	<15	<3	<3	<3	<3	<6
cis-1,2-Dichloroethene	µg/L	70	19.8 J	<50	<10	15.1	34.2	42.6	56.2
Tetrachloroethene	µg/L	5	<20	<50	<10	<10	<10	<10	<20
trans-1,2-Dichloroethene	µg/L	100	<20	<50	<10	<10	<10	<10	<20
Trichloroethene	µg/L	5	<20	<50	<10	<10	<10	<10	<20
Vinyl chloride	µg/L	2	<20	<50	<10	<10	<10	<10	<20
Additional VOCs									
1,2,3-Trichloropropane	µg/L	-	<20	<50	<10	<10	<10	<10	<20
1,2,4-Trimethylbenzene	µg/L	-	8.58 J	14.9 J	44.4	3.37 J	12.5	6.78 J	<20
1,2-Dichloroethane	µg/L	-	<10	<25	<5	<5	<5	<5	<10
1,2-Dichloropropane	µg/L	-	<20	<50	<10	<10	<10	<10	<20
1,3,5-Trimethylbenzene	µg/L	-	<20	<50	11.8	<10	3.33 J	<10	<20
1,3-Dichloropropane	µg/L	-	<8	<20	<4	<4	<4	<4	<8
Acetone	µg/L	-	578 J	1580	547	536	475 J	813	1510
MEK (2-Butanone)	µg/L	-	3650	5330	1330	2710	2790	3210	2720
Methylene chloride	µg/L	-	<20	<50	<10	<10	<10	<10	<20
n-Propylbenzene	µg/L	-	<20	<50	6.74 J	<10	1.65 J	<10	<20
Toluene	µg/L	-	<20	<50	3.6 J	<10	<10	<10	<20

Notes:
µg/L: micrograms per liter
MCL: Maximum Contaminant Level
RL: Reporting Limit
<: Not detected above RL

DQE Flags:
B: Blank contamination
J: Estimated concentration

TABLE 41
VOC ANALYTICAL RESULTS SUMMARY, EBT-14 – TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Well ID		DR2-2	DR2-5	MW-113	PMW85-01	PMW85-05	PMW92-03	MW-85
	Lab ID		L13110486-05	L13110486-01	L13110486-03	L13110487-06	L13110486-02	L13110487-07	L13110487-05
	Date		11/6/2013	11/5/2013	11/6/2013	11/5/2013	11/6/2013	11/6/2013	11/6/2013
	Area		TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<10	<5	<10	<5	75.3	<5	1.32
Chloroform	µg/L	80	<3	8.52	<3	<1.5	34.3	<1.5	5.51
cis-1,2-Dichloroethene	µg/L	70	<10	53.4	88.1	22.6	66.1	54.4	63.3
Tetrachloroethene	µg/L	5	<10	4.73 J	11.3	<5	97.8	12.8	2.98
trans-1,2-Dichloroethene	µg/L	100	<10	<5	<10	<5	<1	<5	<1
Trichloroethene	µg/L	5	<10	1.47 J	3.09 J	<5	28.4	<5	0.744 J
Vinyl chloride	µg/L	2	<10	<5	<10	<5	<1	<5	<1
Additional VOCs									
1,2,3-Trichloropropane	µg/L	-	<10	9.34	<10	<5	51.2	<5	4.22
1,2,4-Trimethylbenzene	µg/L	-	21.4	15.3	<10	<5	<1	15.7	<1
1,2-Dichloroethane	µg/L	-	<5	<2.5	<5	<2.5	0.585	<2.5	<0.5
1,2-Dichloropropane	µg/L	-	<10	<5	<10	1.05 J	0.597 J	<5	1.07
1,3,5-Trimethylbenzene	µg/L	-	4.94 J	4.15 J	<10	<5	<1	4.02 J	<1
1,3-Dichloropropane	µg/L	-	<4	<2	<4	<2	<0.4	<2	0.669
Acetone	µg/L	-	748	179	220 B	925 J	<10	662 J	26 J
MEK (2-Butanone)	µg/L	-	2370	795	1570	1310	<10	330 J	36.1
Methylene chloride	µg/L	-	<10	6.72	<10	<5	<1	<5	<1
n-Propylbenzene	µg/L	-	2.45 J	2.24 J	<10	<5	<1	2.1 J	<1
Toluene	µg/L	-	<10	<5	<10	<5	<1	<5	<1

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE Flags:

B: Blank contamination

J: Estimated concentration

TABLE 42
VOC ANALYTICAL RESULTS SUMMARY, EBT-14 – WEST-CENTRAL AND BUILDING 835
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Well ID		MW-203A	MW-203B	MW-197A	MW-197B	MW-62	MW-213	MW-212
	Lab ID		L13110512-07	L13110512-08	L13110512-03	L13110512-06	L13110792-29	L13110792-31	L13110792-30
	Date		11/7/2013	11/7/2013	11/7/2013	11/7/2013	11/11/2013	11/11/2013	11/11/2013
	Area		West-Central	West-Central	West-Central	West-Central	Bldg 835	Bldg 835	Bldg 835
Primary CVOCs	Units	MCL							
Carbon tetrachloride	µg/L	5	<5	<1	<1	<1	<1	<5	<1
Chloroform	µg/L	80	<1.5	<0.3	<0.3	<0.3	0.287 J	<1.5	<0.3
cis-1,2-Dichloroethene	µg/L	70	13.4	11	0.736 J	8.41	106	4.79 J	<1
Tetrachloroethene	µg/L	5	7.94	3.4	20.9	16.4	<1	<5	<1
trans-1,2-Dichloroethene	µg/L	100	<5	<1	<1	<1	<1	<5	<1
Trichloroethene	µg/L	5	<5	2.27	1.26	10.1	24.1	13.7	9.35
Vinyl chloride	µg/L	2	<5	2.26	<1	2.06	<1	<5	<1
Additional VOCs									
1,2,4-Trimethylbenzene	µg/L	-	2.21 J	1.9	<1	<1	0.643 J	1.83 J	<1
1,3,5-Trimethylbenzene	µg/L	-	<5	0.551 J	<1	<1	<1	<5	<1
Acetone	µg/L	-	312	56.7	<10	<10	58.1 B	90.7 JB	<10 UJ
Carbon disulfide	µg/L	-	<5	0.694 J	<1	<1	<1	<5	<1
MEK (2-Butanone)	µg/L	-	1470	102	<10	<10	180	342 J	<10 UJ
Methyl t-butyl ether (MTBE)	µg/L	-	<25	2.04 J	<5	2.77 J	<5	<25	<5
n-Propylbenzene	µg/L	-	<5	0.328 J	<1	<1	<1	<5	<1

Notes:

µg/L: micrograms per liter

MCL: Maximum Contaminant Level

RL: Reporting Limit

<: Not detected above RL

DQE Flags:

B: Blank contamination

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated, blank contamination

TABLE 43
SUMMARY FOR FREQUENTLY DETECTED CVOCS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PCE	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	11.3	0.526	2
	PMW	2	149	115	2
TTA-1S	IW	21	148	0.434	5
	PMW	4	22.1	<1	3
TTA-2	IW	10	12.8	4.73	1
	PMW	4	97.8	2.98	2
West-Central	IW	2	7.94	3.4	1
	PMW	2	20.9	16.4	2
Bldg 835	IW	2	<5	<1	0
	PMW	1	<1	-	0

TCE	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	6	0.652	1
	PMW	2	52.5	28.5	2
TTA-1S	IW	21	4.17	0.292	0
	PMW	4	27.1	0.265	1
TTA-2	IW	10	1.47	-	0
	PMW	4	28.4	0.744	1
West-Central	IW	2	2.27	-	0
	PMW	2	10.1	1.26	1
Bldg 835	IW	2	24.1	13.7	2
	PMW	1	9.35	-	1

cDCE	MCL				
	70 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	209	12.8	8
	PMW	2	136	5.66	1
TTA-1S	IW	21	211	<1	2
	PMW	4	20.4	<1	0
TTA-2	IW	10	56.2	<10	0
	PMW	4	88.1	22.6	1
West-Central	IW	2	13.4	11	0
	PMW	2	8.41	0.736	0
Bldg 835	IW	2	106	4.8	1
	PMW	1	<1	-	0

VC	MCL				
	2 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-1N	IW	10	0.284	<1	0
	PMW	2	<1	<1	0
TTA-1S	IW	21	3.09	0.398	1
	PMW	4	<1	<1	0
TTA-2	IW	10	<20	<5	0
	PMW	4	<10	<1	0
West-Central	IW	2	2.26	<1	1
	PMW	2	2.06	<1	1
Bldg 835	IW	2	<5	<1	0
	PMW	1	<1	-	0

TABLE 43
SUMMARY FOR FREQUENTLY DETECTED CVOCS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

CT	MCL				
	5 µg/L	No. of Wells	Max	Min	Wells > MCL
TTA-2	IW	10	<50	<5	0
	PMW	4	75.3	1.32	1

CF	MCL				
	80 µg/L*	No. of Wells	Max	Min	Wells > MCL
TTA-2	IW	10	8.52	<1.5	0
	PMW	4	34.3	<1.5	0

Notes:

All concentrations in micrograms per liter (µg/L).

MCL: Maximum Contaminant Level

MCL for total trihalomethanes shown for CF.

Wells >MCLs does not include non-detect results with reporting limits above the MCL.

TABLE 44
CVOC CONCENTRATION TRENDS – TTA-1N
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Tetrachloroethene							
Well	Type	EBT-10 µg/L	EBT-11 µg/L	EBT-12 µg/L	EBT-13 µg/L	EBT-14 µg/L	Change %
IW21-01A	IW	166	<10	1.48	6.35	9.93	-94%
IW21-01B	IW	104	4.62	<5	<1	11.3	-89%
IW21-02A	IW	32.5	33.8	2.69	<5	1.87	-94%
IW21-02B	IW	31.6	13.5	7.91	<5	2.77	-91%
IW21-03A	IW	213	6.89	2.31	5.77	1.21	-99%
IW21-03B	IW	197	<20	<20	5.07	0.526	-100%
IW21-04A	IW	135	6.98	<10	<20	2.37	-98%
IW21-04B	IW	40.9	4.32	<10	<10	<5	-94%
MW-21	IW	80	107	13.3	19.1	2.89	-96%
PMW21-01	IW	280	263	293	279	2.19	-99%
PMW21-02	PMW	118	169	137	143	149	26%
PMW21-04	PMW	211	276	21.1	25	115	-45%

Trichloroethene							
Well	Type	EBT-10 µg/L	EBT-11 µg/L	EBT-12 µg/L	EBT-13 µg/L	EBT-14 µg/L	Change %
IW21-01A	IW	27.1	<10	2.09	3.35	6	-78%
IW21-01B	IW	16	1.51	<5	<1	4.23	-74%
IW21-02A	IW	3	2.96	<5	<5	<5	-
IW21-02B	IW	3.06	<10	<5	<5	<5	-
IW21-03A	IW	45.9	2.94	1.22	2.39	0.652	-99%
IW21-03B	IW	68.5	<20	<20	1.51	<1	-99%
IW21-04A	IW	33.3	2.53	<10	<20	<5	-92%
IW21-04B	IW	19	<10	2.66	<10	<5	-87%
MW-21	IW	5.3	6.83	4.43	2.96	1.2	-77%
PMW21-01	IW	50.1	51.2	61.6	55.5	0.813	-98%
PMW21-02	PMW	30.1	44	47.5	54.3	52.5	74%
PMW21-04	PMW	69.3	59.3	5.37	8.67	28.5	-59%

cis-1,2-Dichloroethene						
Well	Type	EBT-10 µg/L	EBT-11 µg/L	EBT-12 µg/L	EBT-13 µg/L	EBT-14 µg/L
IW21-01A	IW	10.6	134	166	148	109
IW21-01B	IW	11.5	13.2	54.6	41.6	81.4
IW21-02A	IW	3.08	17.1	72.6	86.7	77.7
IW21-02B	IW	2.15	4.6	14.1	25.2	23
IW21-03A	IW	7.09	182	174	196	209
IW21-03B	IW	51.2	98.8	119	134	135
IW21-04A	IW	48.8	65.2	78.6	94.9	95.1
IW21-04B	IW	101	28.8	49.1	55.6	90.8
MW-21	IW	2.27	4.35	25.3	25	12.8
PMW21-01	IW	15.6	15.3	11.2	9.62	93
PMW21-02	PMW	4.2	4.5	4.74	5.18	5.66
PMW21-04	PMW	55.5	125	94.1	77.6	136

Notes:

- 1) EBT-10 results for MW-21 are from October 2011 LTM.
- 2) % Change for EBT-10 to 14 calculated using 1/2 the reporting limit for non-detect results.
- 3) % Change not calculated for EBT-10 results below the MCL.
- 4) PMW21-01 changed from PMW to IW and PMW-21-04 from IW to PMW after EBT-13.

TABLE 45
CVOC CONCENTRATION TRENDS – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

		Tetrachloroethene					Change %
Well	Type	EBT-10 µg/L	EBT-11 µg/L	EBT-12 µg/L	EBT-13 µg/L	EBT-14 µg/L	
IW101-02A	IW	59.2	30.8	9.8	11.2	14.2	-76%
IW101-02B	IW	59.3	56.2	51.4	48.3	44.1	-26%
IW101-02C	IW	52	<20	<10	<10	<10	-90%
IW101-03A	IW	1.8	2.5	<10	3.71	2.54	-
IW101-03B	IW	30.6	5.7	<10	2.86	<5	-92%
IW101-03C	IW	21.7	<10	<5	<5	<10	-77%
IW101-04A	IW	26.4	6.17	<10	<20	<10	-81%
IW101-04B	IW	44.4	<10	<10	<5	<5	-94%
IW101-04C	IW	16.7	<20	<5	<10	<10	-70%
IW101-05A	IW	55.9	6.48	<10	4.69	1.41	-97%
IW101-05B	IW	59.9	41.1	33.7	36	17.5	-71%
IW101-05C	IW	58.6	<10	<10	<10	<10	-91%
IW101-07A	IW	8.4	1.48	1.06	0.375	0.434	-95%
IW101-07B	IW	19.6	2.01	<10	4.17	1.92	-90%
IW101-07C	IW	40.8	<10	<5	13.2	<10	-88%
DR1-5	IW	29	36.8	35.5	15	10.2	-65%
DR1-5A	IW	49.7	43.8	<10	0.649	0.848	-98%
DR1-6	IW	168	263	126	119	148	-12%
DR1-6A	IW	60.3	40.8	<10	9.75	1.49	-98%
PMW101-02A	IW	45.4	21.4	<10	<5	2.15	-95%
PMW101-02B	IW	25.5	11.3	<10	1.25	1.58	-94%
PMW101-04A	PMW	59.6	51.1	45.6	25.5	6.35	-89%
PMW101-04B	PMW	31.2	37.2	33.7	29.6	22.1	-29%
PMW101-07A	PMW	0.361	0.318	<1	<1	<1	-
PMW101-07B	PMW	14.2	15.1	14.5	12.7	11.6	-18%

		Trichloroethene					Change %
Well	Type	EBT-10 µg/L	EBT-11 µg/L	EBT-12 µg/L	EBT-13 µg/L	EBT-14 µg/L	
IW101-02A	IW	0.3	3.17	2.38	2.3	0.908	-
IW101-02B	IW	0.5	<1	0.344	0.706	1.36	-
IW101-02C	IW	0.706	<20	<10	<10	<10	-
IW101-03A	IW	0.5	<1	<10	<5	<1	-
IW101-03B	IW	0.464	2.89	<10	<5	<5	-
IW101-03C	IW	39	<10	<5	<5	<10	-87%
IW101-04A	IW	1.86	<10	<10	<20	<10	-
IW101-04B	IW	1.57	<10	<10	<5	<5	-
IW101-04C	IW	31	<20	<5	<10	<10	-84%
IW101-05A	IW	0.5	<10	<10	<5	<5	-
IW101-05B	IW	0.5	0.506	0.851	0.622	1.13	-
IW101-05C	IW	1.35	<10	<10	<10	<10	-
IW101-07A	IW	17	2.68	1.94	0.487	0.292	-98%
IW101-07B	IW	52.1	5.58	<10	10.9	4.17	-92%
IW101-07C	IW	113	<10	<5	10.5	<10	-96%
DR1-5	IW	<1	<10	<5	0.996	0.713	-
DR1-5A	IW	77.6	62.1	4.27	1.01	0.501	-99%
DR1-6	IW	1.28	1.22	1.35	2.89	1.69	-
DR1-6A	IW	166	98	<10	26.4	2.12	-99%
PMW101-02A	IW	0.558	1.82	<10	<5	1.39	-
PMW101-02B	IW	1.86	2.17	<10	<5	3.21	-
PMW101-04A	PMW	2.11	0.806	0.967	1.13	0.927	-
PMW101-04B	PMW	3.23	3.25	3.38	3.47	2.02	-
PMW101-07A	PMW	0.5	<1	0.347	0.272	0.265	-
PMW101-07B	PMW	28.9	32.7	36	32.4	27.1	-6%

TABLE 45
CVOC CONCENTRATION TRENDS – TTA-1S
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

		cis-1,2-Dichloroethene				
Well	Type	EBT-10	EBT-11	EBT-12	EBT-13	EBT-14
		µg/L	µg/L	µg/L	µg/L	µg/L
IW101-02A	IW	1.16	11.1	16.6	22.8	16
IW101-02B	IW	0.5	<1	1.3	2.24	5.62
IW101-02C	IW	0.302	56.9	59.4	74.8	62.9
IW101-03A	IW	0.415	4.98	5.88	4.06	5.9
IW101-03B	IW	0.5	18.3	23.2	15.5	8.82
IW101-03C	IW	3.41	91.6	112	69.5	37.4
IW101-04A	IW	10.4	6.94	7.41	9.85	5.42
IW101-04B	IW	0.931	14.7	14.8	13.4	11.9
IW101-04C	IW	59.2	44.9	27.2	25.2	18.3
IW101-05A	IW	0.432	14.8	13.8	9.71	15.7
IW101-05B	IW	0.5	1.54	4.51	2.48	11.5
IW101-05C	IW	0.291	41	56.6	36	24.4
IW101-07A	IW	0.658	1.26	1.42	<1	<1
IW101-07B	IW	4.54	54.5	104	52.9	58.9
IW101-07C	IW	24.5	323	245	145	211
DR1-5	IW	<1	<10	5.39	12.9	11.6
DR1-5A	IW	2.76	<10	85.4	91.8	26.5
DR1-6	IW	1.31	0.553	20	13.6	8.42
DR1-6A	IW	9.24	34.1	110	86.8	132
PMW101-02A	IW	2.09	8.01	16	11.9	8.62
PMW101-02B	IW	0.442	25.3	27.8	32.9	37.5
PMW101-04A	PMW	3.12	1.03	2.29	11.4	20.4
PMW101-04B	PMW	<1	<1	2.46	3.94	8.17
PMW101-07A	PMW	0.5	<1	<1	<1	<1
PMW101-07B	PMW	1.35	1.68	1.94	1.4	1.4

Notes:

- 1) EBT-10 results for DR-15/5A, DR1-6/6A and PMW101-04A/B are from October 2011 LTM.
- 2) % Change for EBT-10 to 14 calculated using 1/2 the reporting limit for non-detect results.
- 3) % Change not calculated for EBT-10 results below the MCL.

TABLE 46
CVOC CONCENTRATION TRENDS – TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Tetrachloroethene							
Well	Type	EBT-10 µg/L	EBT-11 µg/L	EBT-12 µg/L	EBT-13 µg/L	EBT-14 µg/L	Change %
IW85-05	IW	32.8	<50	<25	<25	<20	-70%
IW85-06	IW	1.45	<10	<10	<25	<50	-
IW92-01	IW	189	3.17	<1	<5	<10	-97%
IW92-02	IW	191	11.5	2.1	<50	<10	-97%
IW92-03	IW	21.2	<50		<10	<10	-76%
IW92-07	IW	3.17	<20	<20	<5	<10	-
IW92-08	IW	8.86	<5	0.773	<5	<20	13%
DR2-2	IW	35.9	33.3	0.801	2.61	<10	-86%
DR2-5	IW	86.5	33.7	29.9	44.9	4.73	-95%
PMW92-03	IW	147	154	125	149	12.8	-91%
MW-85	PMW	29.4	58.5	21	6.62	2.98	-90%
MW-113	PMW	189	54.7	12.5	12.6	11.3	-94%
PMW85-01	PMW	57.2	1.03	0.451	<10	<5	-96%
PMW85-05	PMW	79.1	75.7	106	110	97.8	24%

Trichloroethene							
		EBT-10	EBT-11	EBT-12	EBT-13	EBT-14	Change
	Type	µg/L	µg/L	µg/L	µg/L	µg/L	%
IW85-05	IW	13.1	<50	<25	<25	<20	-24%
IW85-06	IW	1.31	<10	<10	<25	<50	-
IW92-01	IW	6.71	1.88	<1	<5	<10	-25%
IW92-02	IW	9.78	<20	<5	<50	<10	-49%
IW92-03	IW	4.33	<50		<10	<10	-
IW92-07	IW	0.51	<20	<20	<5	<10	-
IW92-08	IW	1.19	<5	<1	<5	<20	-
DR2-2	IW	2.92	2.15	<1	<5	<10	-
DR2-5	IW	37.8	17.3	14	21.8	1.47	-96%
PMW92-03	IW	15.1	11.6	12.1	14.9	<5	-83%
MW-85	PMW	9.96	17.8	5.76	1.77	0.744	-93%
MW-113	PMW	18	6.78	2.6	5.09	3.09	-83%
PMW85-01	PMW	20.2	<1	<1	<10	<5	-88%
PMW85-05	PMW	25.6	23	31.7	33.1	28.4	11%

cis-1,2-Dichloroethene						
		EBT-10	EBT-11	EBT-12	EBT-13	EBT-14
	Type	µg/L	µg/L	µg/L	µg/L	µg/L
IW85-05	IW	67.6	50.4	44.4	37.6	19.8
IW85-06	IW	99.3	28.4	20.4	16.2	<50
IW92-01	IW	10.4	117	21.6	4.14	<10
IW92-02	IW	45.7	28.8	107	18.2	15.1
IW92-03	IW	143	42.9		44.9	34.2
IW92-07	IW	127	28.6	30.5	52.5	42.6
IW92-08	IW	87.8	119	117	92.1	56.2
DR2-2	IW	1.31	13.9	44.9	14.5	<10
DR2-5	IW	87.4	113	118	120	53.4
PMW92-03	IW	51.9	33	36	50.4	54.4
MW-85	PMW	21.2	30.6	52.4	62.1	63.3
MW-113	PMW	26.2	95	169	88.9	88.1
PMW85-01	PMW	37.3	79.3	55.1	51.8	22.6
PMW85-05	PMW	81.9	83.4	85.1	83.4	66.1

TABLE 46
CVOC CONCENTRATION TRENDS – TTA-2
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Carbon Tetrachloride							
		EBT-10	EBT-11	EBT-12	EBT-13	EBT-14	Change
	Type	µg/L	µg/L	µg/L	µg/L	µg/L	%
IW85-05	IW	50.6	<50	<25	<25	<20	-80%
IW85-06	IW	0.546	<10	<10	<25	<50	-
IW92-01	IW	25.8	<1	<1	<5	<10	-81%
IW92-02	IW	27.9	<20	<5	<50	<10	-82%
IW92-03	IW	0.308	<50		<10	<10	-
IW92-07	IW	0.34	<20	<20	<5	<10	-
IW92-08	IW	2.37	<5	<1	<5	<20	-
DR2-2	IW	4.37	2.34	<1	<5	<10	-
DR2-5	IW	167	69.6	78.4	5.2	<5	-99%
PMW92-03	IW	<1	<1	<1	<1	<5	-
MW-85	PMW	55.9	102	45.8	9.69	1.32	-98%
MW-113	PMW	65.8	15.6	<5	<20	<10	-92%
PMW85-01	PMW	102	0.322	<1	<10	<5	-98%
PMW85-05	PMW	77.6	47.7	72.3	78.6	75.3	-3%

Chloroform						
		EBT-10	EBT-11	EBT-12	EBT-13	EBT-14
	Type	µg/L	µg/L	µg/L	µg/L	µg/L
IW85-05	IW	21.2	<15	<7.5	<7.5	<6
IW85-06	IW	0.24	<3	<3	<7.5	<15
IW92-01	IW	7.46	1.96	<0.3	<1.5	<3
IW92-02	IW	9.53	<6	<1.5	<15	<3
IW92-03	IW	0.442	<15		<3	<3
IW92-07	IW	0.374	<6	<6	<1.5	<3
IW92-08	IW	2.99	<1.5	<0.3	<1.5	<6
DR2-2	IW	0.714	2.0	<0.3	<1.5	<3
DR2-5	IW	66.2	45.7	40	48.3	8.52
PMW92-03	IW	<0.3	<0.3	<0.3	<0.3	<1.5
MW-85	PMW	16.4	28.1	13.8	2.78	5.51
MW-113	PMW	16.2	7.25	3.12	<6	<3
PMW85-01	PMW	42.5	0.685	<0.3	<3	<1.5
PMW85-05	PMW	34.8	24.5	32.4	32.3	34.3

Notes:

- 1) EBT-10 results for DR2-2, DR2-5, MW-85, MW-113 and PMW92-03 are from October 2011 LTM.
- 2) % Change for EBT-10 to 14 calculated using 1/2 the reporting limit for non-detect results.
- 3) % Change not calculated for EBT-10 results below the MCL.
- 4) PMW92-03 changed from PMW to IW and MW-113 from IW to PMW after EBT-13.

TABLE 47
 CVOC CONCENTRATION TRENDS – WEST-CENTRAL AND BUILDING 835
 YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
 Main Installation - Defense Depot Memphis, Tennessee

Tetrachloroethene							
Well	Type	EBT-10 µg/L	EBT-11 µg/L	EBT-12 µg/L	EBT-13 µg/L	EBT-14 µg/L	Change %
<u>West-Central</u>							
MW-203A	IW	147	51	19.8	4.41	7.94	-95%
MW-203B	IW	23.2	17.6	3.1	13.9	3.4	-85%
MW-197A	PMW	32.2	24.8	21.6	21.7	20.9	-35%
MW-197B	PMW	29.7	25	21.1	19.1	16.4	-45%
<u>Bldg 835</u>							
MW-62	IW	0.504	<50	<5	0.382	<1	-
MW-213	IW	-	<5	<5	<1	<5	-
MW-212	PMW	<1	<1	<1	0.377	<1	-
Trichloroethene							
Well	Type	EBT-10 µg/L	EBT-11 µg/L	EBT-12 µg/L	EBT-13 µg/L	EBT-14 µg/L	Change %
<u>West-Central</u>							
MW-203A	IW	2.72	8.56	9	<5	<5	-
MW-203B	IW	8.72	11.9	2.27	17.8	2.27	-74%
MW-197A	PMW	1.51	1.27	1.17	1.36	1.26	-
MW-197B	PMW	9.4	10.6	11.2	11.6	10.1	7%
<u>Bldg 835</u>							
MW-62	IW	157	61.9	98.5	132	24.1	-85%
MW-213	IW	-	25	17.5	14	13.7	-
MW-212	PMW	16.5	10.4	10.9	13.7	9.35	-43%
cis-1,2-Dichloroethene							
Well	Type	EBT-10 µg/L	EBT-11 µg/L	EBT-12 µg/L	EBT-13 µg/L	EBT-14 µg/L	
<u>West-Central</u>							
MW-203A	IW	5.75	8.36	24.8	12.1	13.4	
MW-203B	IW	4.81	3.57	16.6	12.7	11	
MW-197A	PMW	1.26	0.771	0.738	0.79	0.736	
MW-197B	PMW	5.27	3.83	3.81	6.12	8.41	
<u>Bldg 835</u>							
MW-62	IW	<1	37.5	34.8	51.8	106	
MW-213	IW	-	<5	4.05	11.5	4.79	
MW-212	PMW	<1	<1	<1	<1	<1	

Notes:

- 1) EBT-10 results are from October 2011 LTM.
- 2) % Change for EBT-10 to 14 calculated using 1/2 the reporting limit for non-detect results.
- 3) % Change not calculated for EBT-10 results below the MCL.

TABLE 48
MCL EXCEEDANCES, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well	Date	Area	Analyte Units MCL Type	PCE µg/L 5	TCE µg/L 5	cDCE µg/L 70	VC µg/L 2	CT µg/L 5
IW101-07C	11/9/2013	TTA-1S	IW	-	-	211	3.09	-
IW21-03A	11/8/2013	TTA-1N	IW	-	-	209	-	-
PMW21-02	11/8/2013	TTA-1N	PMW	149	52.5	-	-	-
DR1-6	11/9/2013	TTA-1S	IW	148	-	-	-	-
PMW21-04	11/8/2013	TTA-1N	PMW	115	28.5	136	-	-
IW21-03B	11/8/2013	TTA-1N	IW	-	-	135	-	-
DR1-6A	11/9/2013	TTA-1S	IW	-	-	132	-	-
IW21-01A	11/7/2013	TTA-1N	IW	9.93	6	109	-	-
MW-62	11/11/2013	Bldg 835	IW	-	24.1	106	-	-
PMW85-05	11/6/2013	TTA-2	PMW	97.8	28.4	-	-	75.3
IW21-04A	11/8/2013	TTA-1N	IW	-	-	95.1	-	-
PMW21-01	11/7/2013	TTA-1N	IW	-	-	93	-	-
IW21-04B	11/8/2013	TTA-1N	IW	-	-	90.8	-	-
MW-113	11/6/2013	TTA-2	PMW	11.3	-	88.1	-	-
IW21-01B	11/7/2013	TTA-1N	IW	11.3	-	81.4	-	-
IW21-02A	11/8/2013	TTA-1N	IW	-	-	77.7	-	-
IW101-02B	11/9/2013	TTA-1S	IW	44.1	-	-	-	-
PMW101-04B	11/8/2013	TTA-1S	PMW	22.1	-	-	-	-
MW-197A	11/7/2013	W-C	PMW	20.9	-	-	-	-
IW101-05B	11/10/2013	TTA-1S	IW	17.5	-	-	-	-
MW-197B	11/7/2013	W-C	PMW	16.4	10.1	-	2.06	-
IW101-02A	11/9/2013	TTA-1S	IW	14.2	-	-	-	-
MW-213	11/11/2013	Bldg 835	IW	-	13.7	-	-	-
PMW92-03	11/6/2013	TTA-2	IW	12.8	-	-	-	-
PMW101-07B	11/10/2013	TTA-1S	PMW	11.6	27.1	-	-	-
DR1-5	11/9/2013	TTA-1S	IW	10.2	-	-	-	-
MW-212	11/11/2013	Bldg 835	PMW	-	9.35	-	-	-
MW-203A	11/7/2013	W-C	IW	7.94	-	-	-	-
PMW101-04A	11/8/2013	TTA-1S	PMW	6.35	-	-	-	-
MW-203B	11/7/2013	W-C	IW	-	-	-	2.26	-

Notes:

µg/L: micrograms per liter

TABLE 49
MCL EXCEEDANCES IN MAIN INSTALLATION LTM WELLS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well	Aquifer	Well Classification	Analyte Units MCL Area	PCE µg/L 5	TCE µg/L 5	cDCE µg/L 70	VC µg/L 2	CT µg/L 5	Within EBT Impact Area
MW-25A	Fluvial	Performance	-	5.83	-	-	-	-	No ²
MW-26	Fluvial	Performance	TTA-2	25	-	-	-	-	No ⁴
MW-39	Fluvial	Performance	W-C	-	11.6	-	-	-	Yes
MW-39A	Fluvial	Performance	W-C	29.5	7.05	-	-	-	Yes
MW-52	Fluvial	Performance	-	7.16	-	-	-	-	No ²
MW-64	Fluvial	Performance	TTA-2	18	28	-	-	-	No ⁵
MW-88	Fluvial	Performance	TTA-2	45.2	-	-	-	11	No ⁵
MW-92	Fluvial	Performance	TTA-2	79.7	10.8	-	5.28	-	Yes
MW-94A	Fluvial	Performance	W-C	32.8	10.4	-	-	-	No ⁴
MW-97	Fluvial	Performance	S-C	-	67.8	-	-	-	No ³
MW-98	Fluvial	Performance	W-C	40.5	-	-	-	-	No ⁵
MW-100B	Fluvial	Performance	TTA-1N	68.4	7.49	-	188	-	Yes
MW-103	Fluvial	Performance	N-C	-	10.6	-	-	-	No ³
MW-104	Fluvial	Performance	N-C	-	22	-	-	-	No ³
MW-142	Fluvial	Performance	B-835	-	5.77	-	-	-	No ⁵
MW-143	Fluvial	Performance	B-835	-	10	-	-	-	No ⁵
MW-199B	Fluvial	Performance	B-835	-	74.6	-	-	-	No ⁴
MW-200	Fluvial	Performance	W-C	7.75	6.17	-	-	-	Yes
MW-204A	Fluvial	Performance	W-C	38.6	-	-	-	-	No ⁵
MW-204B	Fluvial	Performance	W-C	13.9	-	-	-	-	No ⁵
MW-205A	Fluvial	Performance	W-C	26.4	6.81	-	-	-	Yes
MW-205B	Fluvial	Performance	W-C	23.5	8.86	-	-	-	Yes
MW-206A	Fluvial	Performance	W-C	19.9	7.26	-	-	-	Yes
MW-206B	Fluvial	Performance	W-C	20.8	5.53	-	-	-	Yes
MW-208B	Fluvial	Performance	W-C	22.2	12.7	-	-	-	Yes
MW-209B	Fluvial	Performance	B-835	-	28.8	-	-	-	No ⁵
MW-210B	Fluvial	Performance	W-C	-	6.93	-	-	-	No ⁴
MW-214A	Fluvial	Performance	N-C	6.6	-	-	-	-	No ³
MW-214B	Fluvial	Performance	N-C	6	-	-	-	-	No ³
MW-215A	Fluvial	Performance	-	6.93	-	-	-	-	No ²
MW-215B	Fluvial	Performance	-	6.24	-	-	-	-	No ²
MW-217	Fluvial	Performance	TTA-2	29.6	42.1	-	-	40.4	No ⁵
MW-218	Fluvial	Performance	TTA-2	18.9	40.3	-	-	8.75	No ⁵
MW-219	Fluvial	Boundary	Bndy	53.6	-	-	-	-	No ⁵
MW-258	Fluvial	Performance	N-C	32.2	85.8	-	-	-	No ³
MW-259	Fluvial	Performance	TTA-2	17	23.9	-	-	5.02	No ⁴
DR2-1	Fluvial	Performance	TTA-2	235	5.45	-	-	37.2	No ⁴
DR2-3	Fluvial	Performance	TTA-2	14	-	-	-	-	No ⁴
DR2-4	Fluvial	Performance	TTA-2	9.58	-	-	-	-	No ⁵
DR2-6	Fluvial	Performance	TTA-2	10.3	-	-	7.52	-	Yes
PMW21-03	Fluvial	Performance	TTA-1N	115	33.4	-	-	-	Yes
PMW21-05	Fluvial	Performance	TTA-1N	12.5	-	-	-	-	Yes
PMW92-02	Fluvial	Performance	TTA-2	-	-	149	-	-	Yes
PMW101-03A	Fluvial	Performance	TTA-1S	35	-	-	-	-	Yes
PMW101-03B	Fluvial	Performance	TTA-1S	42.4	-	-	-	-	Yes
PMW101-06B	Fluvial	Performance	TTA-1S	16	-	-	-	-	Yes
PZ-03	Fluvial	Performance	-	-	5.81	-	-	-	No ²
MW-90	Intermediate	Sentinel	-	21.5	5.19	-	-	-	

TABLE 49
MCL EXCEEDANCES IN MAIN INSTALLATION LTM WELLS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well	Aquifer	Well Classification	Analyte Units MCL Area	PCE µg/L 5	TCE µg/L 5	cDCE µg/L 70	VC µg/L 2	CT µg/L 5	Within EBT Impact Area
MW-107B	Fluvial/Inter.	Sentinel	-	25.1	-	-	-	-	
MW-107T	Fluvial/Inter.	Sentinel	-	18.3	-	-	-	-	
MW-108	Fluvial/Inter.	Sentinel	-	-	30.3	-	-	-	
MW-141	Intermediate	Sentinel	-	31.9	-	-	-	-	
MW-202B	Intermediate	Sentinel	-	25.5	-	-	-	-	
MW-207A	Fluvial	Sentinel	-	18.1	18.7	-	-	-	
MW-207B	Fluvial	Sentinel	-	12.5	-	-	-	-	
MW-210A	Intermediate	Sentinel	-	5.79	-	-	-	-	
MW-256	Intermediate	Sentinel	-	37.7	14	-	-	-	

Notes:

- 1) Results from October 2013 LTM samples.
- 2) Outside designated plume; no current EBT
- 3) No current EBT
- 4) Designated plume with EBT, impact during initial EBT but not currently
- 5) Designated plume with EBT but outside impact area

FIGURES



Figure 1

SITE LOCATION MAP

**YEAR THREE ENHANCED
BIOREMEDIATION TREATMENT
REPORT**

**DEFENSE DEPOT
MEMPHIS, TENNESSEE**

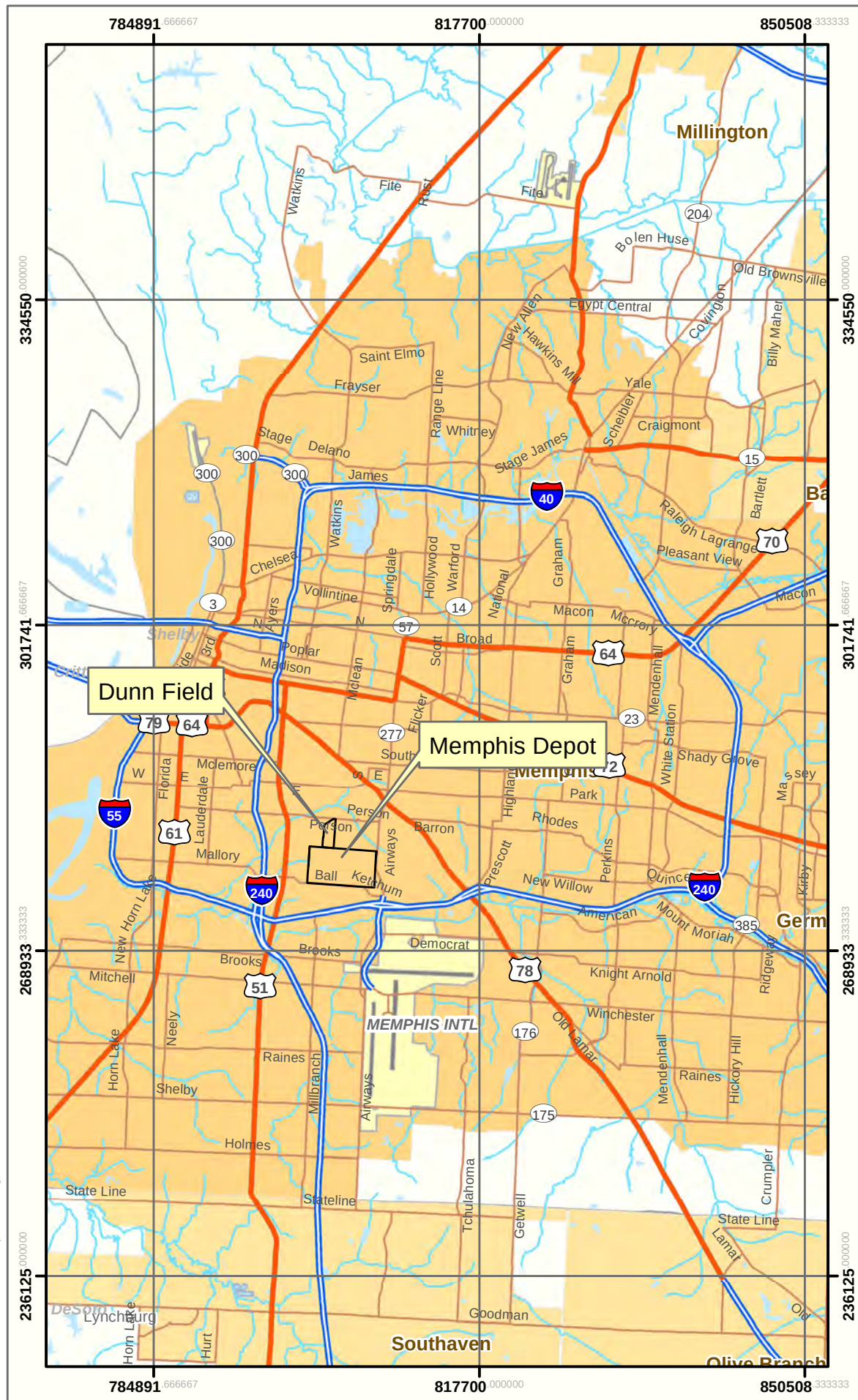
**Projection: NAD 1927 StatePlane Tennessee
Units: Feet**

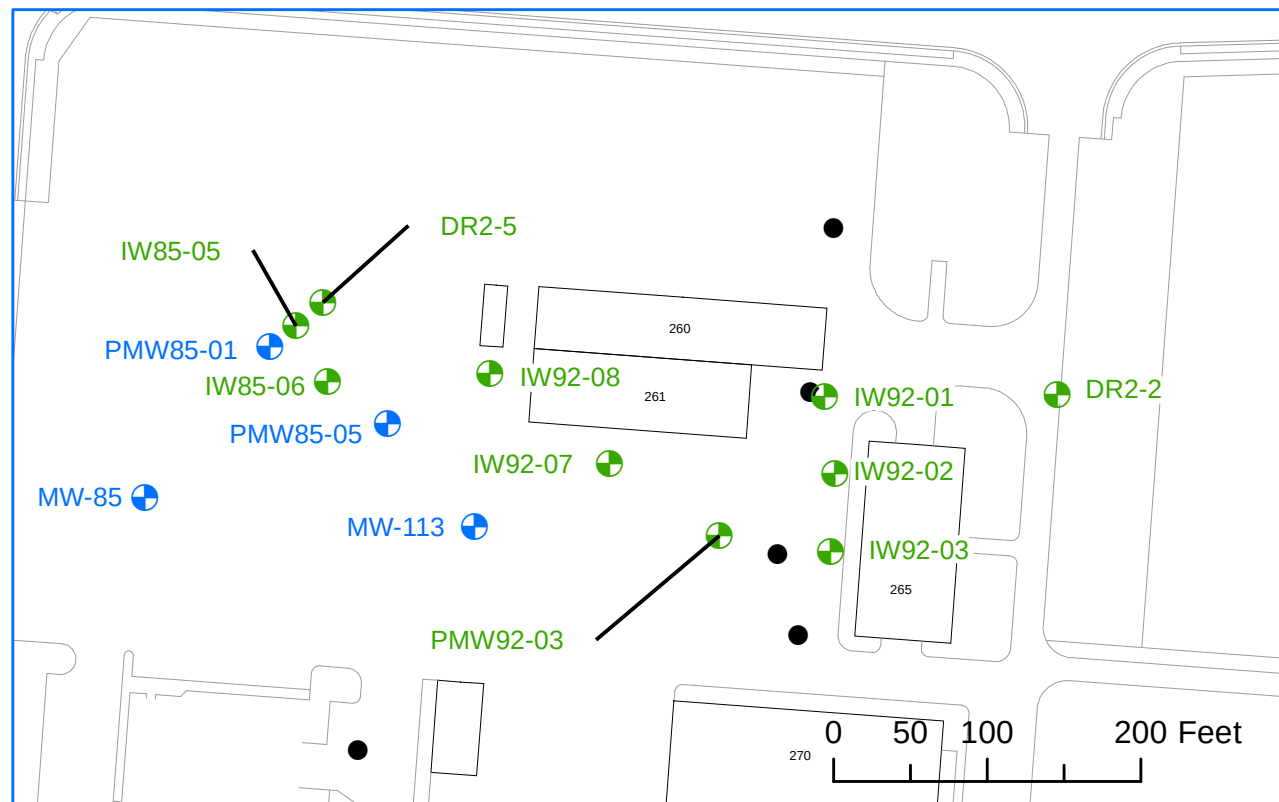
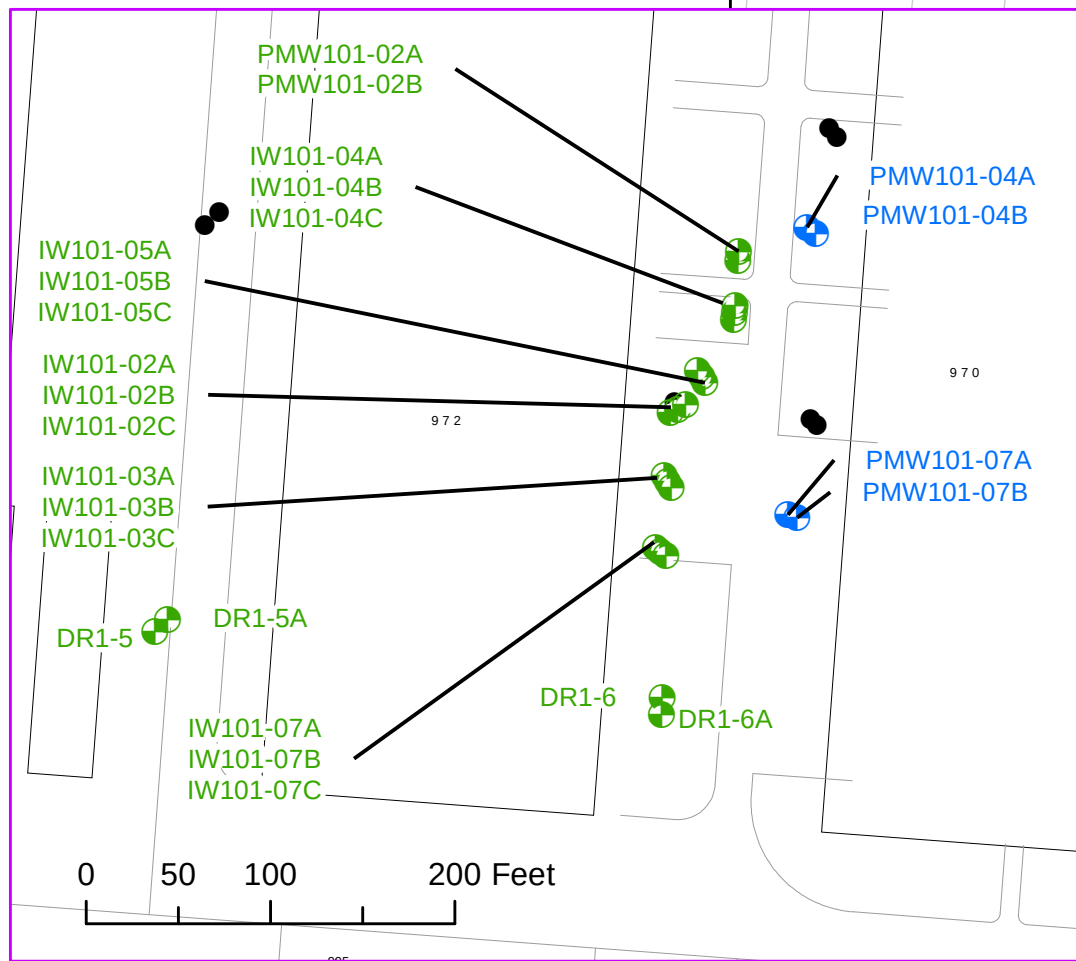
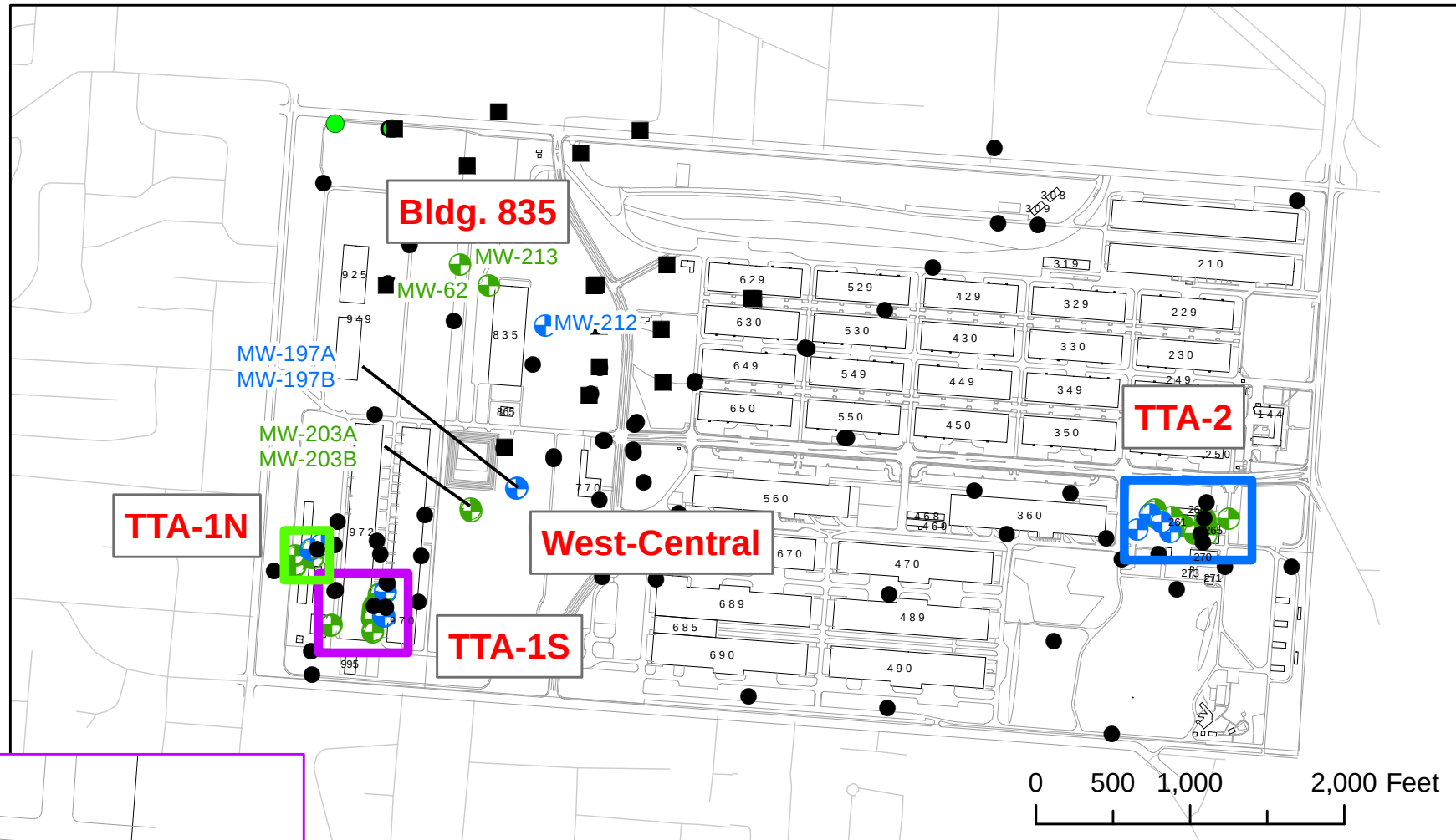
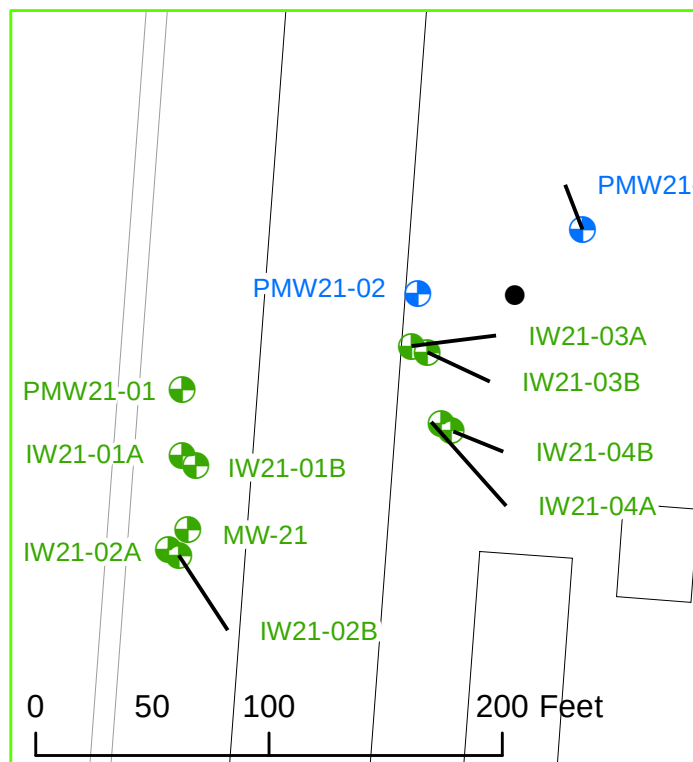
0 0.6 1.2 1.8 2.4 3 Miles

**Installation Location
Memphis, Tennessee**



**Date: March 2014
Edition: Rev 0**





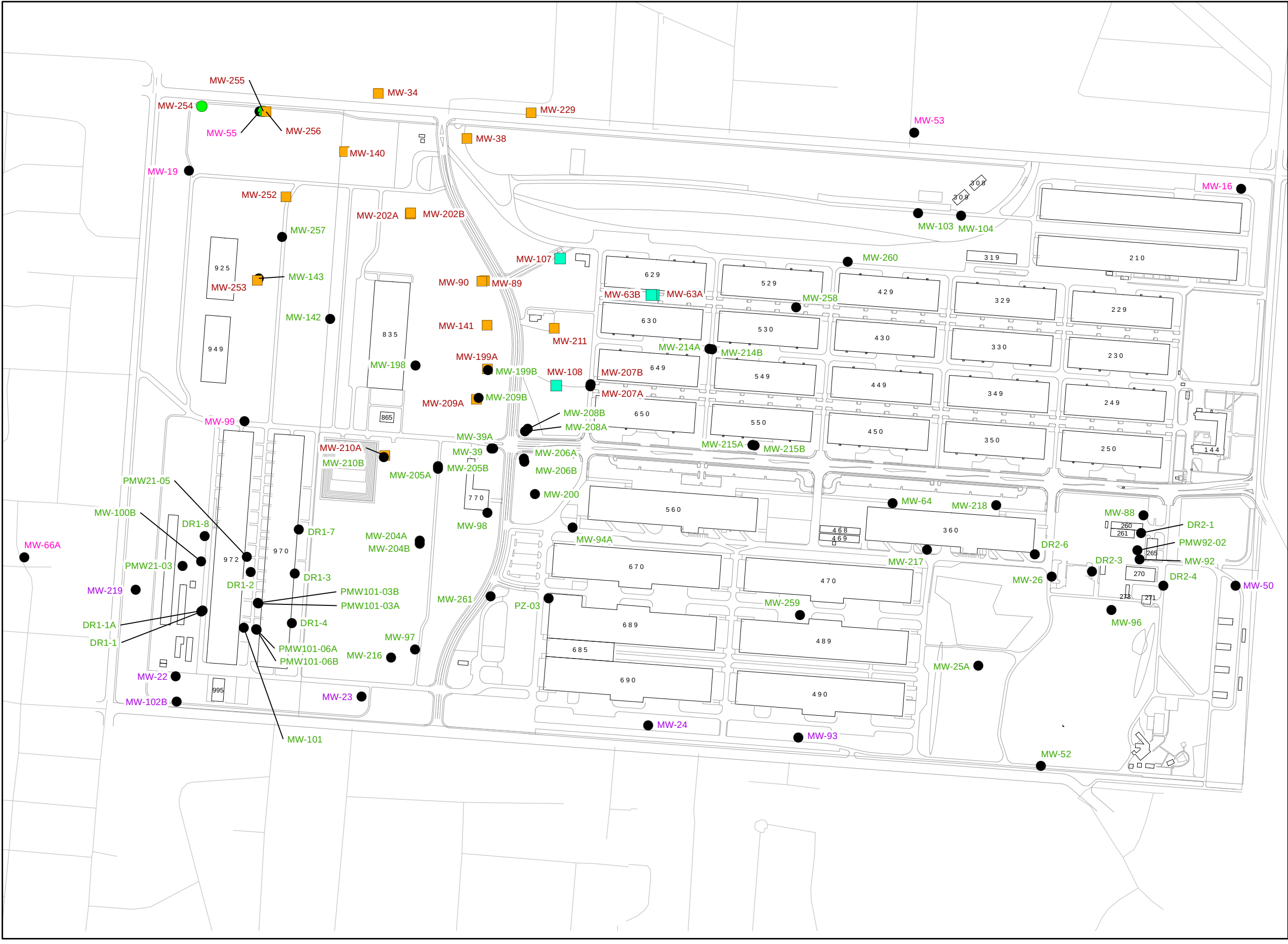


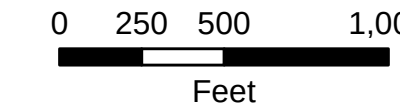
Figure 3
MAIN INSTALLATION LTM
WELLS

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
- Monitoring Well Screened in the Fluvial Aquifer
 - Monitoring Well Screened in the Intermediate Aquifer
 - Monitoring Well Screened in the Transition Zone
 - Monitoring Well Screened in the Memphis Aquifer

- Well Classification**
- MW-16 Background
 - MW-34 Sentinel
 - MW-88 Performance
 - MW-219 Boundary



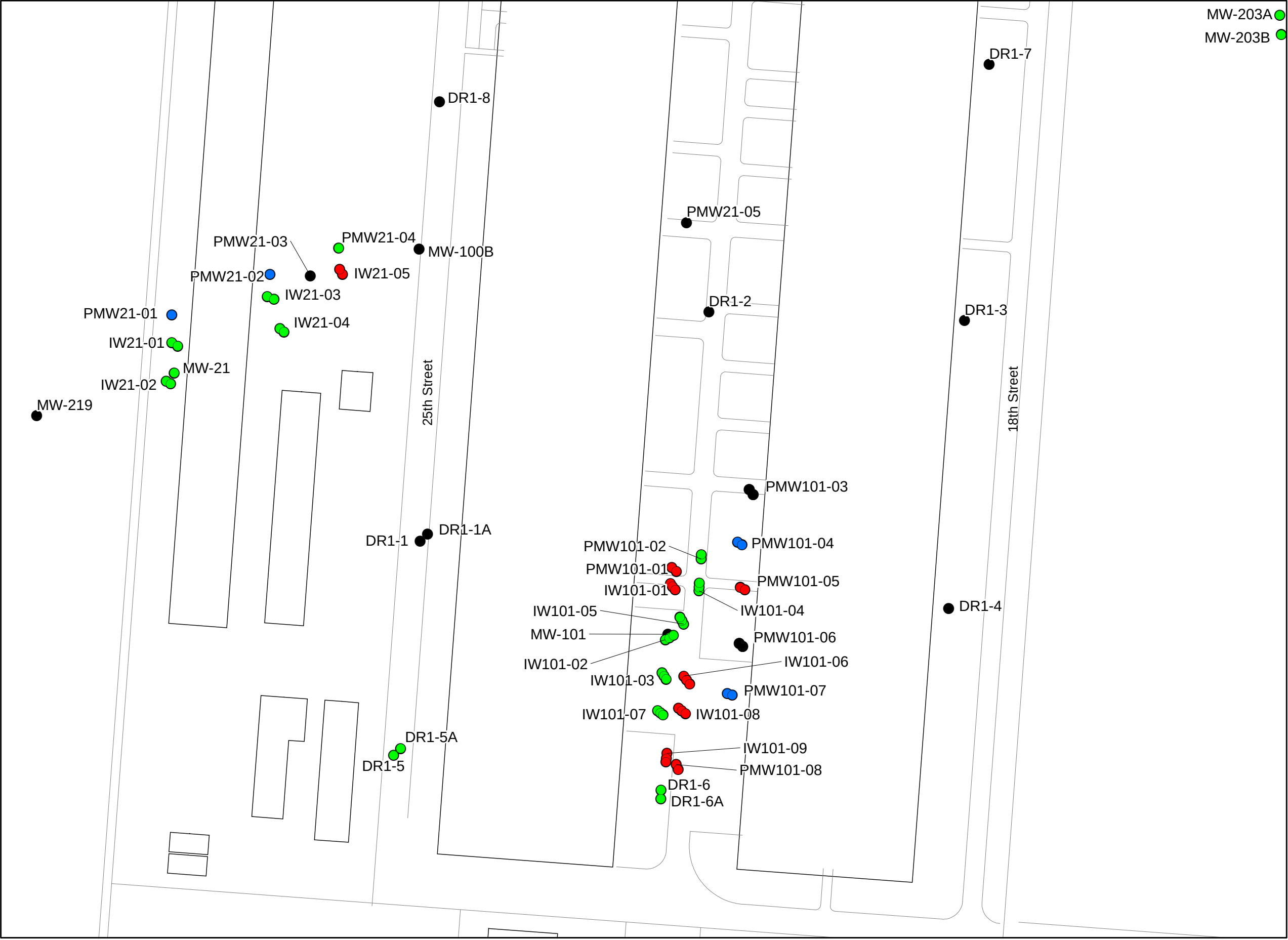


Figure 4

TTA-1 WELL LOCATIONS

YEAR THREE ENHANCED BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

- Injection
- Performance Monitor
- Long Term Monitoring
- Abandoned

0 25 50 100 150
Feet

Installation Location
Memphis, Tennessee

Date: March 2014
Edition: Rev 0

HDR

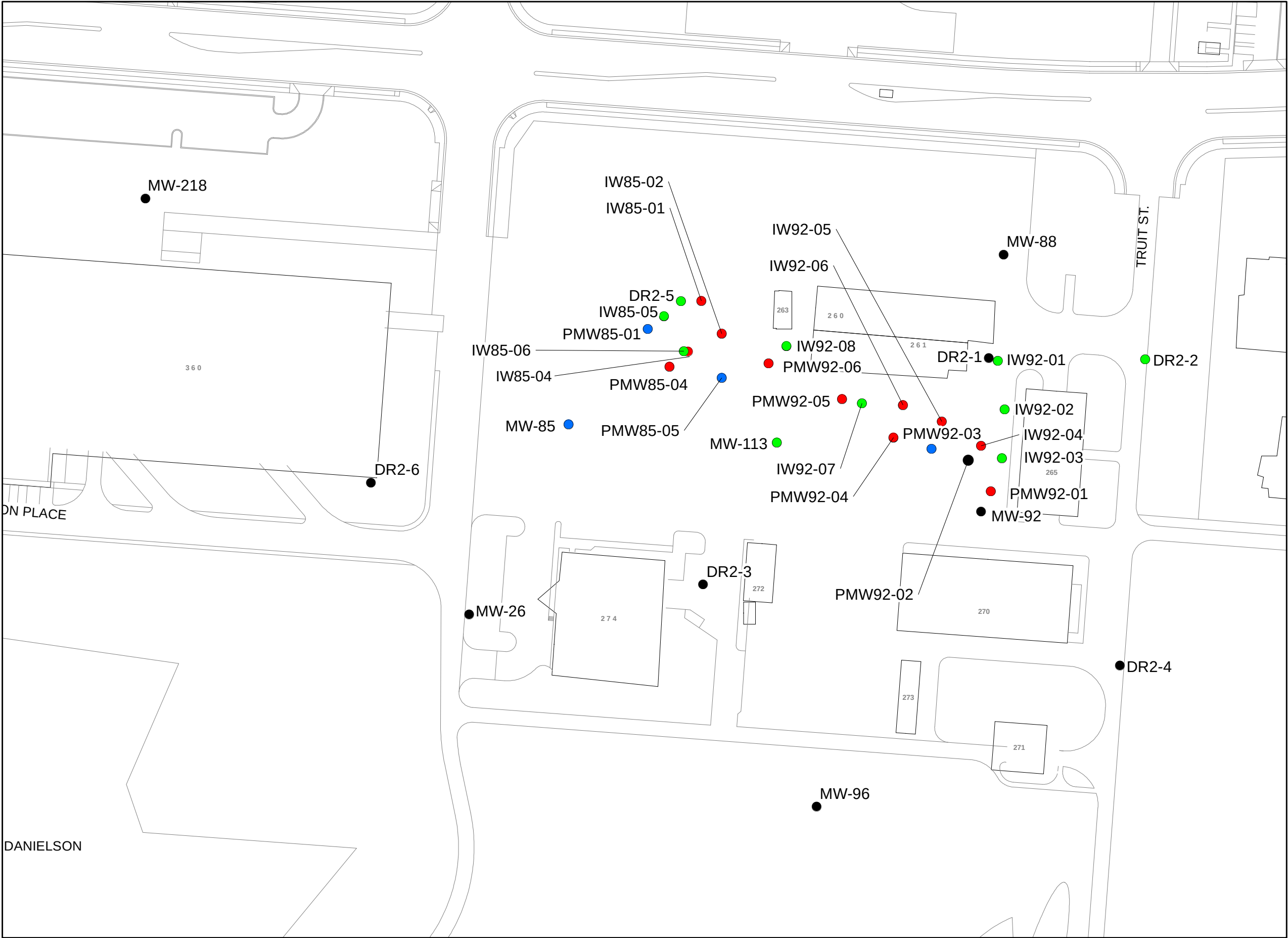


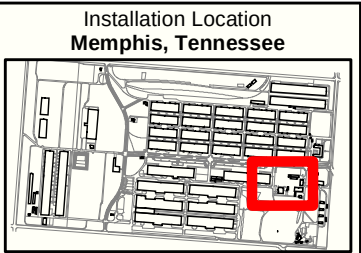
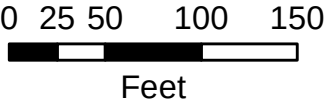
Figure 5

TTA-2 WELL LOCATIONS

YEAR THREE ENHANCED BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend
- Injection
 - Performance Monitor
 - Long Term Monitoring
 - Abandoned



Date: March 2014
Edition: Rev 0



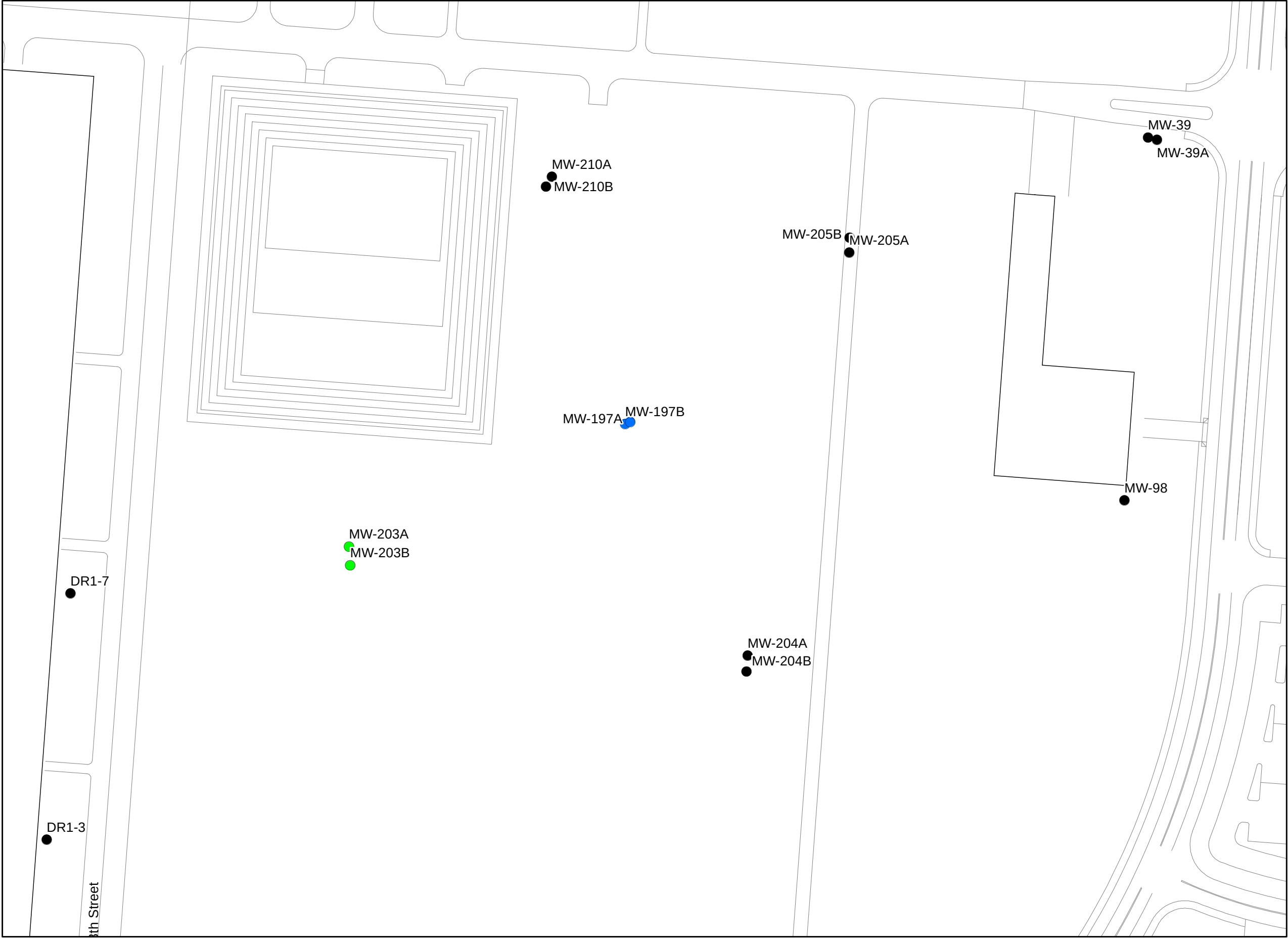


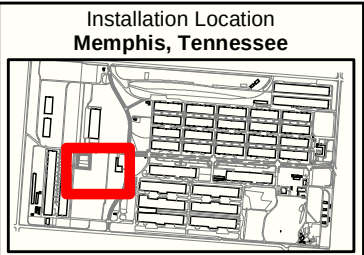
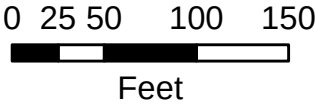
Figure 6

**WEST CENTRAL
WELL LOCATIONS**

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend
- Injection
 - Performance Monitor
 - Long Term Monitoring



Date: March 2014
Edition: Rev 0



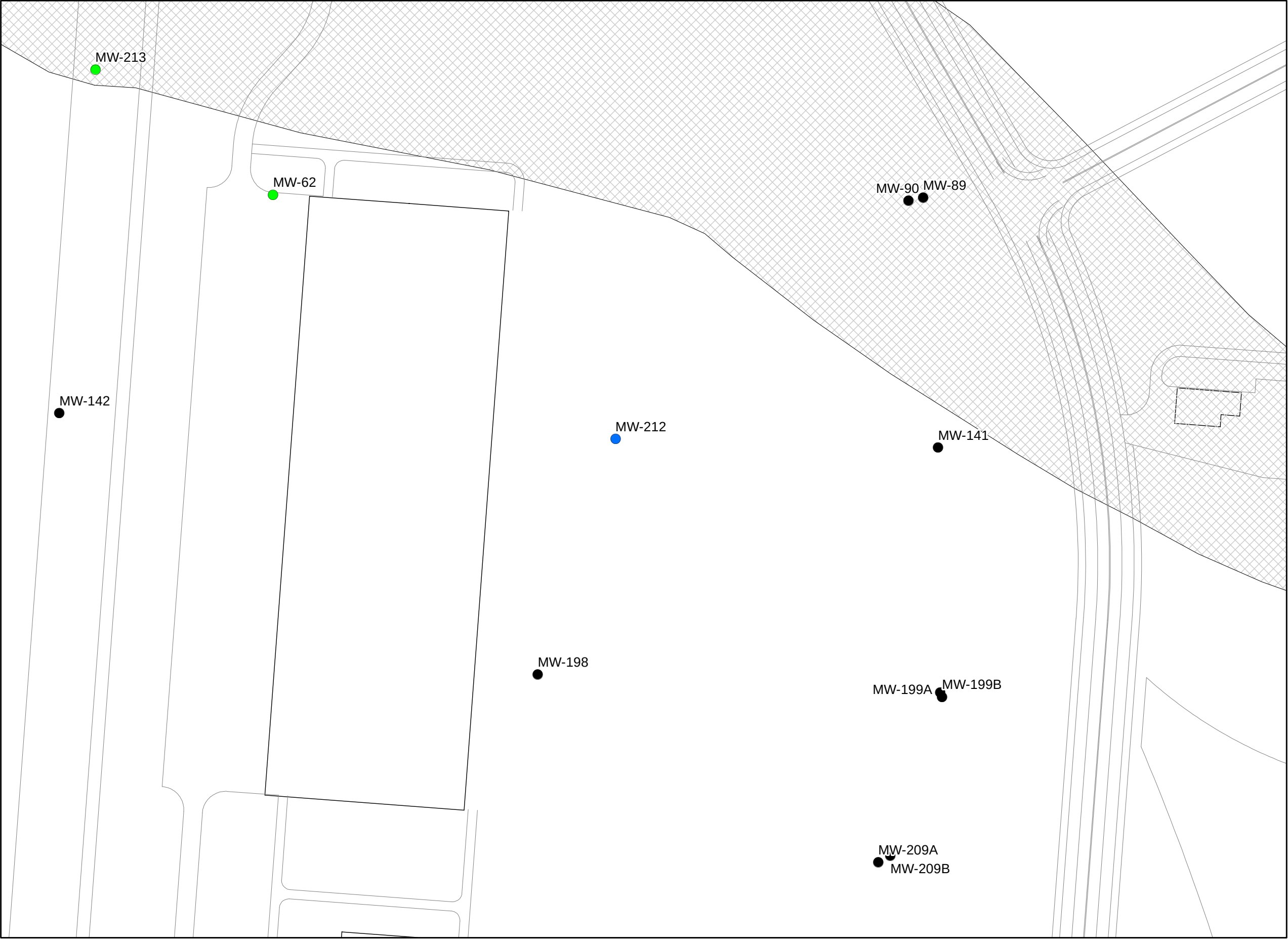


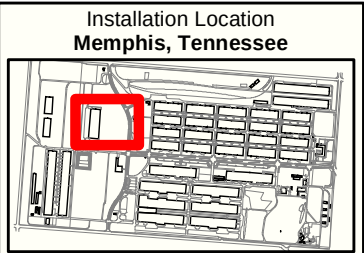
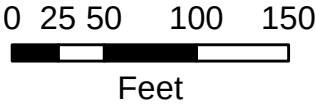
Figure 7

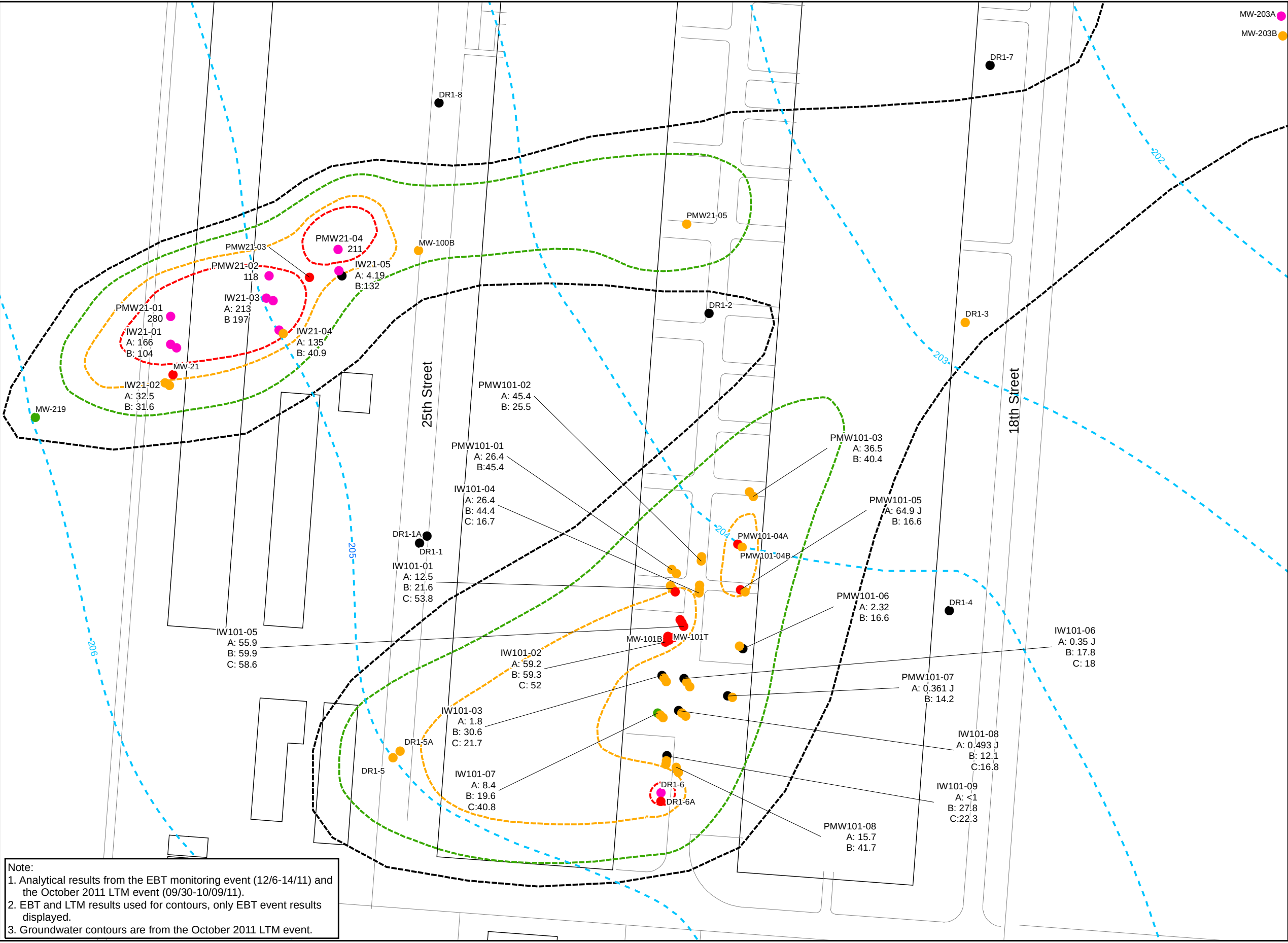
**BUILDING 835
WELL LOCATIONS**

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Injection
- Performance Monitoring
- Long Term Monitoring





Note:
1. Analytical results from the EBT monitoring event (12/6-14/11) and the October 2011 LTM event (09/30-10/09/11).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2011 LTM event.

Figure 8
TTA-1 PCE
CONCENTRATIONS,
DECEMBER 2011

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

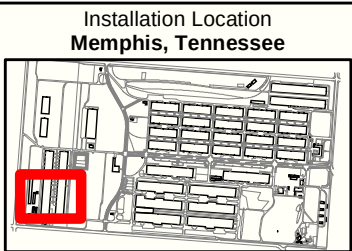
DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
- PCE Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300

- PCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100

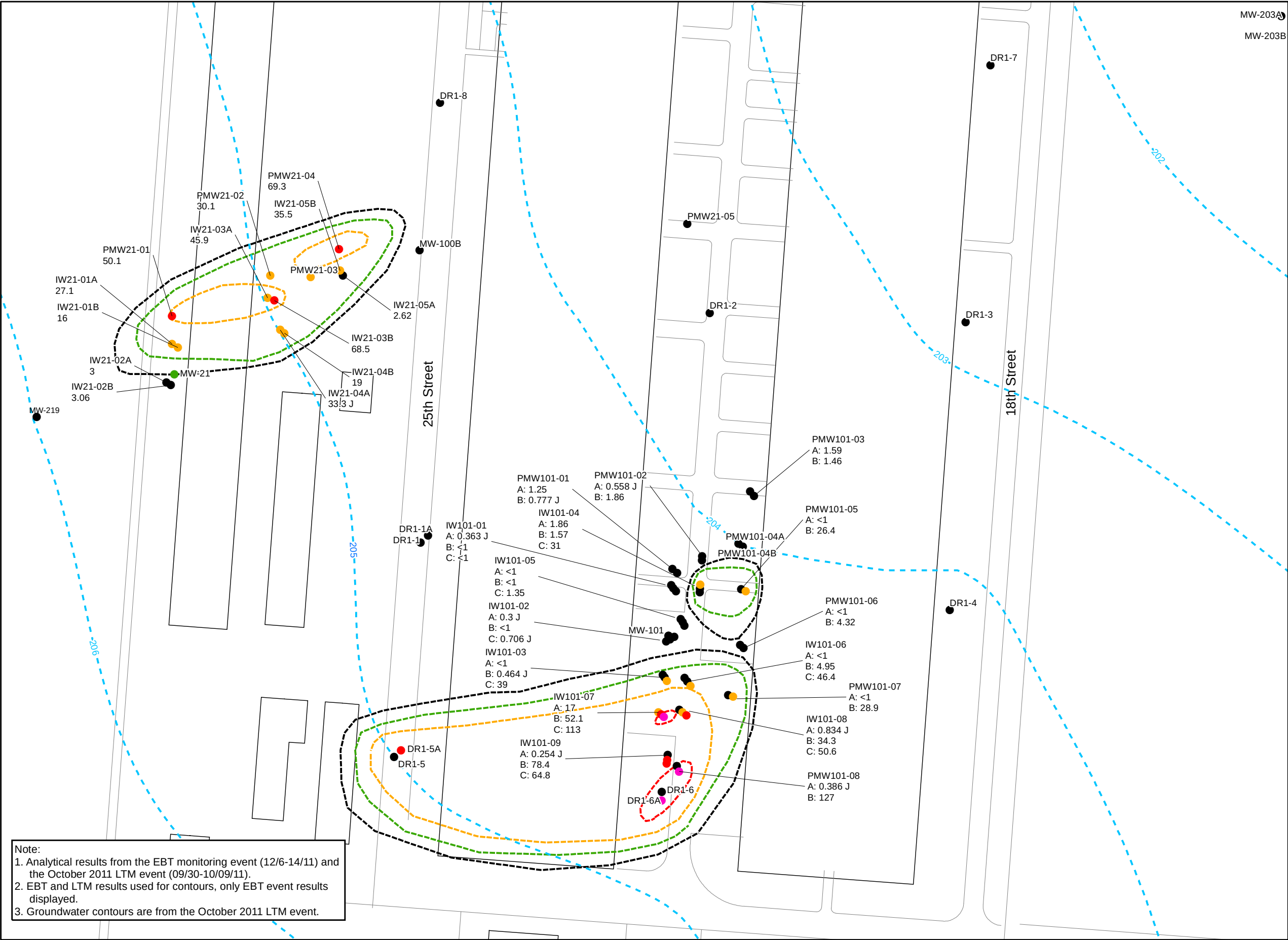
Potentiometric surface of the
Fluvial Aquifer 1-ft. contour

0 25 50 100 150
Feet



Date: March 2014
Edition: Rev 0

HDR



MW-203A
MW-203B



Figure 9

**TTA-1 TCE
CONCENTRATIONS,
DECEMBER 2011**

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

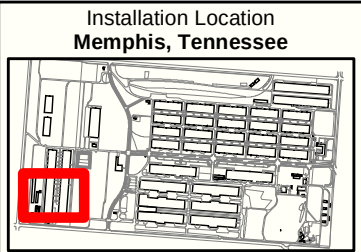
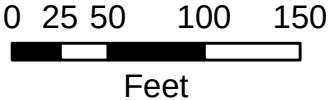
Legend
TCE Ranges
ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

TCE Isopleth
ug/L

- 5
- 10
- 50
- 100

— Potentiometric surface of the
Fluvial Aquifer 1-ft. contour



Date: March 2014
Edition: Rev 0



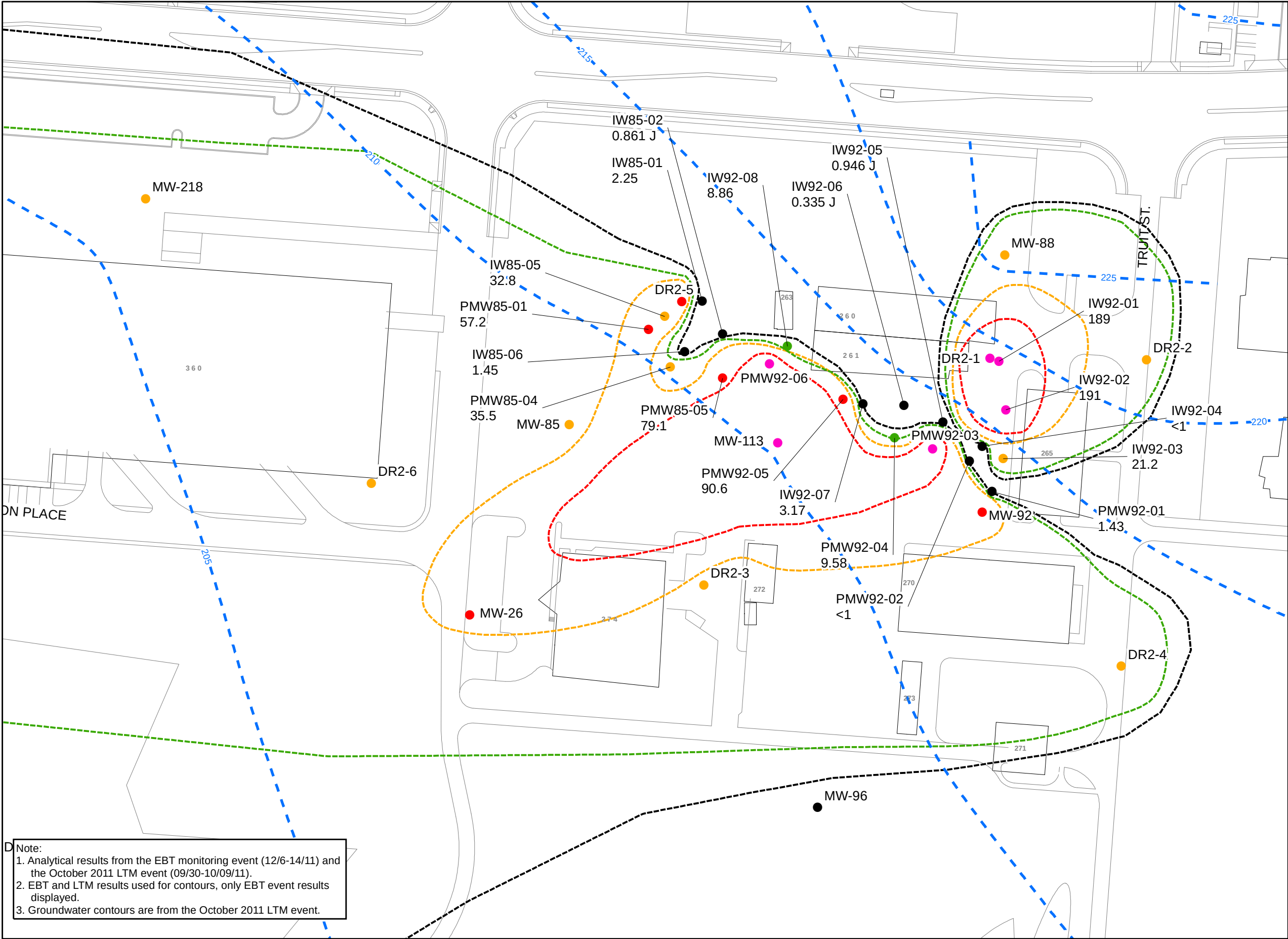


Figure 10

**TTA-2 PCE
CONCENTRATIONS,
DECEMBER 2011**

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

**PCE Ranges
ug/L**

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

**PCE Isopleth
ug/L**

- 5
- 10
- 50
- 100

Potentiometric surface of the
Fluvial Aquifer 5-ft. contour

0 25 50 100 150
Feet



Path: G:\DDMT\EBT\EBT-Y3report\GIS\Figure 11 - TCE TTA-2 Dec11.mxd

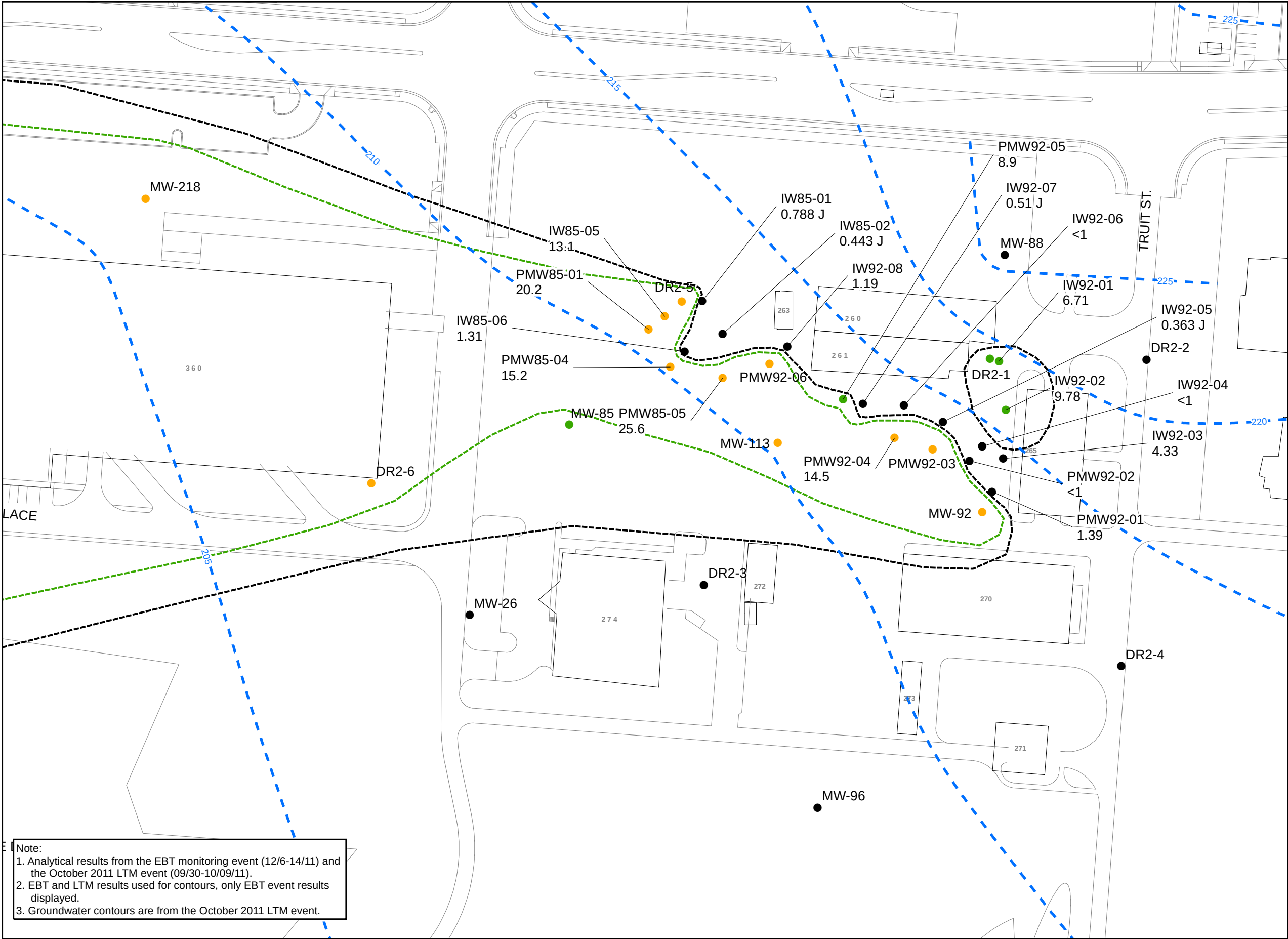


Figure 11

**TTA-2 TCE
CONCENTRATIONS,
DECEMBER 2011**

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

**TCE Ranges
ug/L**

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

**TCE Isopleth
ug/L**

- 5
- 10
- 50
- 100

Potentiometric surface of the
Fluvial Aquifer 5-ft. contour

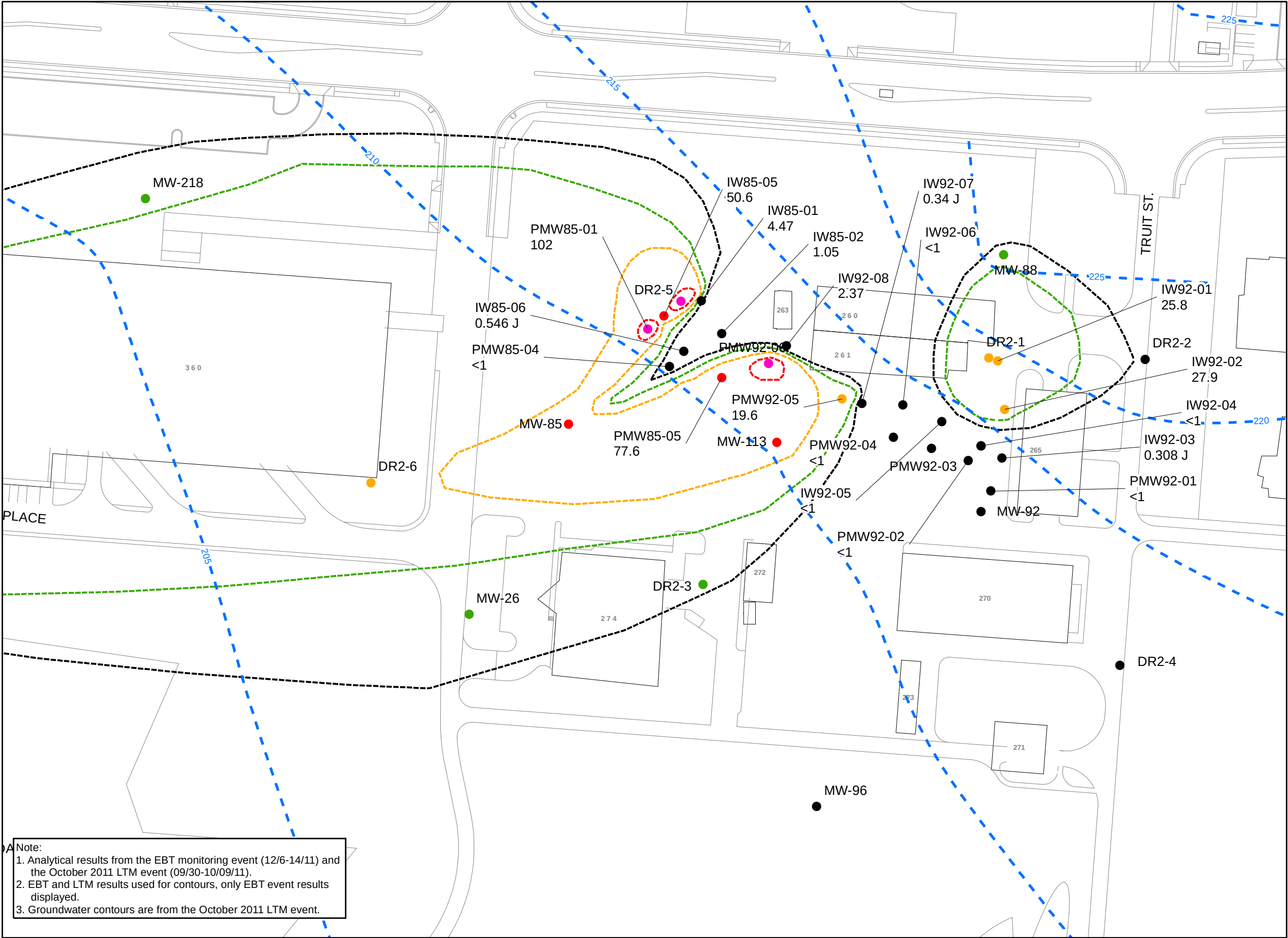
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Feet

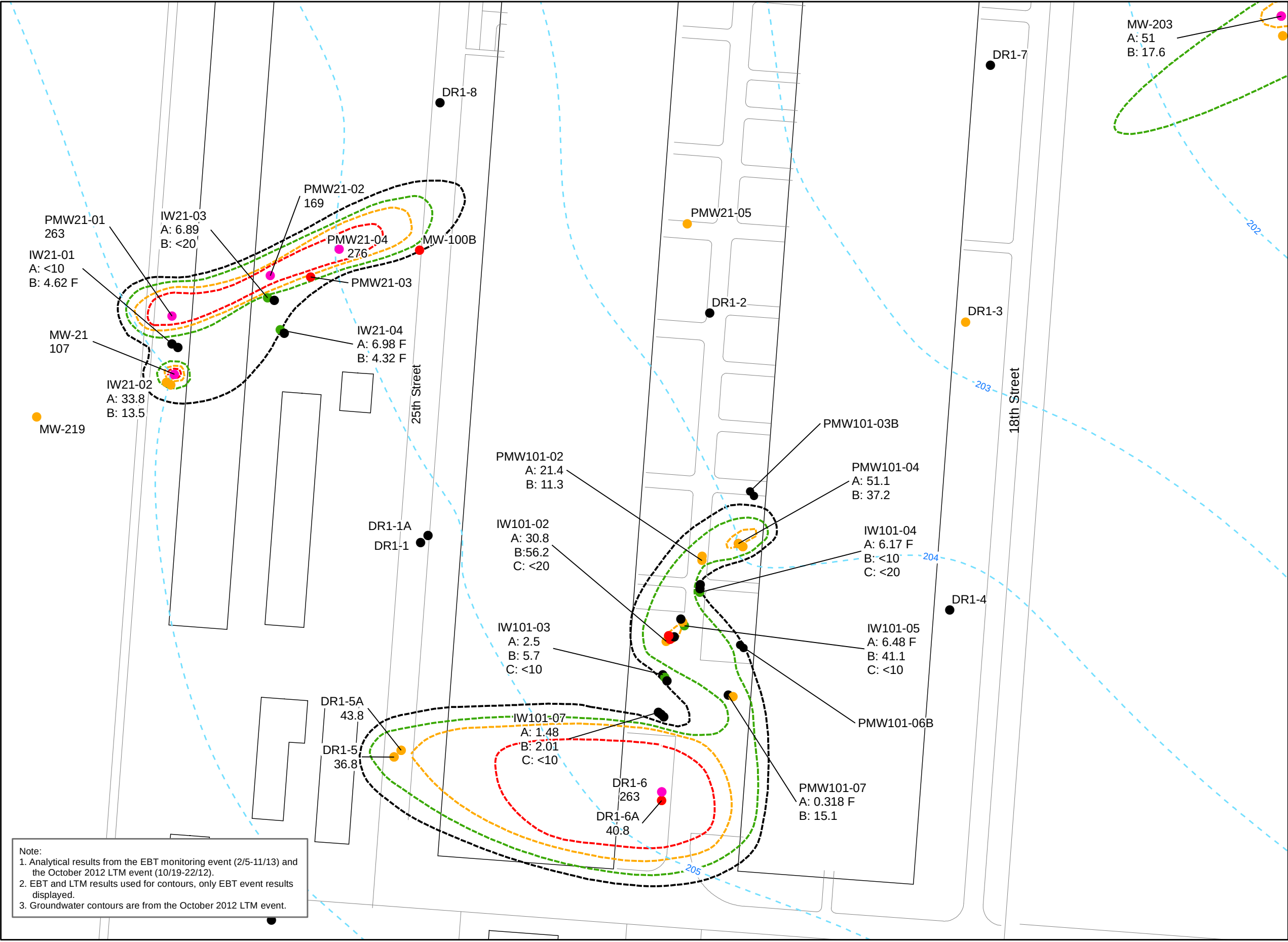
Installation Location
Memphis, Tennessee

HDR

Date: March 2014
Edition: Rev 0

Path: G:\DDMT\EBT\EBT-Y3report\GIS\Figure 12 - CT TTA-2 Dec11.mxd





Note:
1. Analytical results from the EBT monitoring event (2/5-11/13) and the October 2012 LTM event (10/19-22/12).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2012 LTM event.



Figure 13
TTA-1 PCE
CONCENTRATIONS,
FEBRUARY 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend
PCE Ranges
ug/L

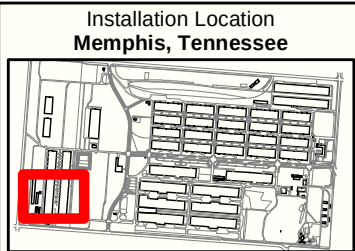
- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

PCE Isopleth
ug/L

- 5
- 10
- 50
- 100

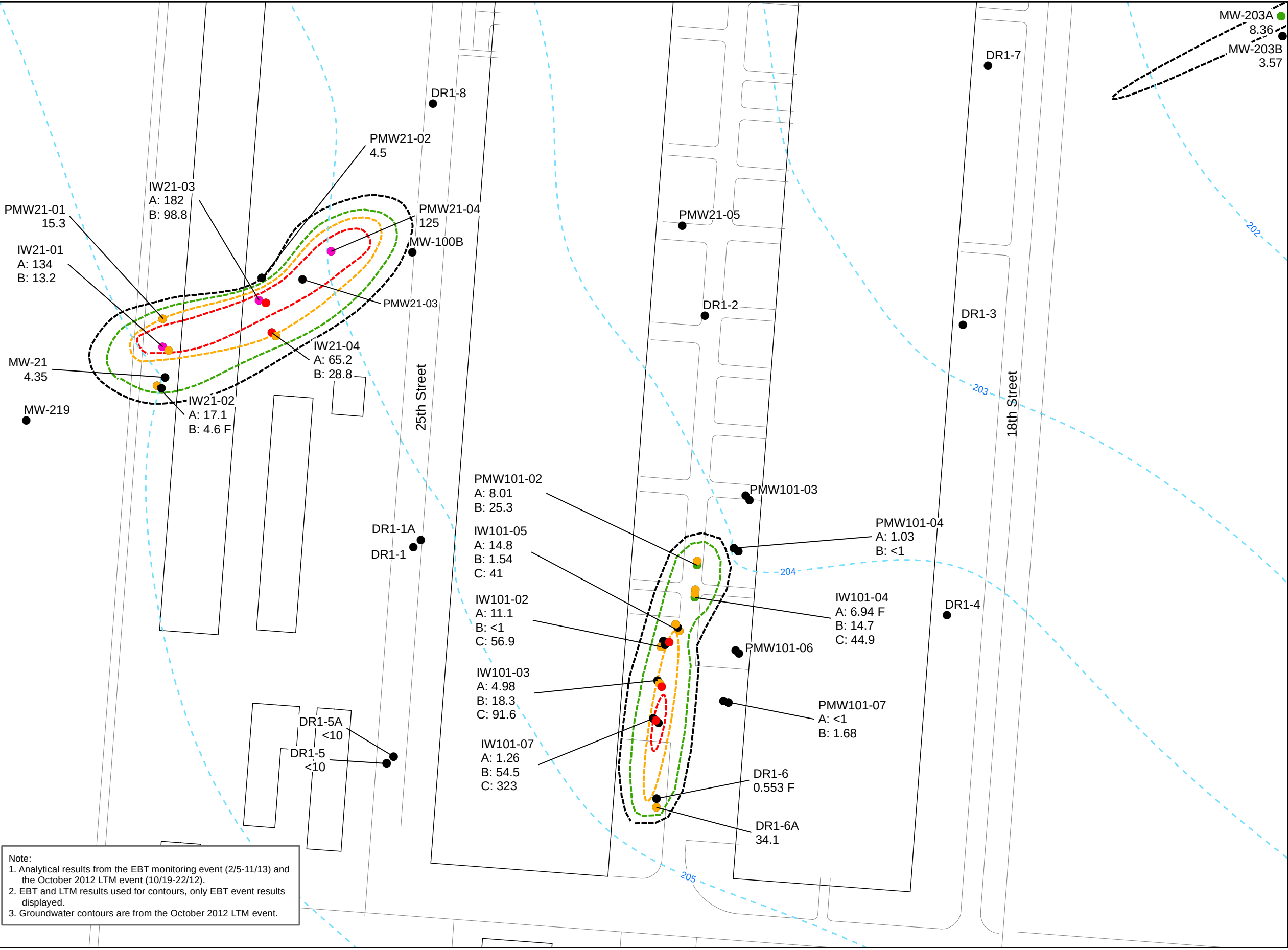
Potentiometric surface of the
Fluvial Aquifer 1-ft. contour

0 25 50 100 150
Feet



Date: March 2014
Edition: Rev 0

HDR



Note:
1. Analytical results from the EBT monitoring event (2/5-11/13) and the October 2012 LTM event (10/19-22/12).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2012 LTM event.

Figure 15
TTA-1 cDCE CONCENTRATIONS, FEBRUARY 2013
YEAR THREE ENHANCED BIOREMEDIATION REPORT
DEFENSE DEPOT MEMPHIS, TENNESSEE

Legend

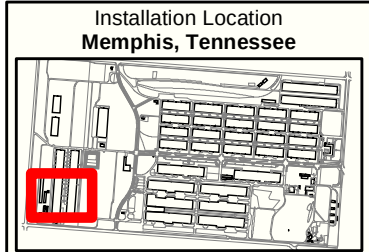
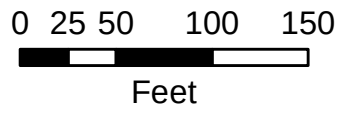
cDCE Ranges ug/L

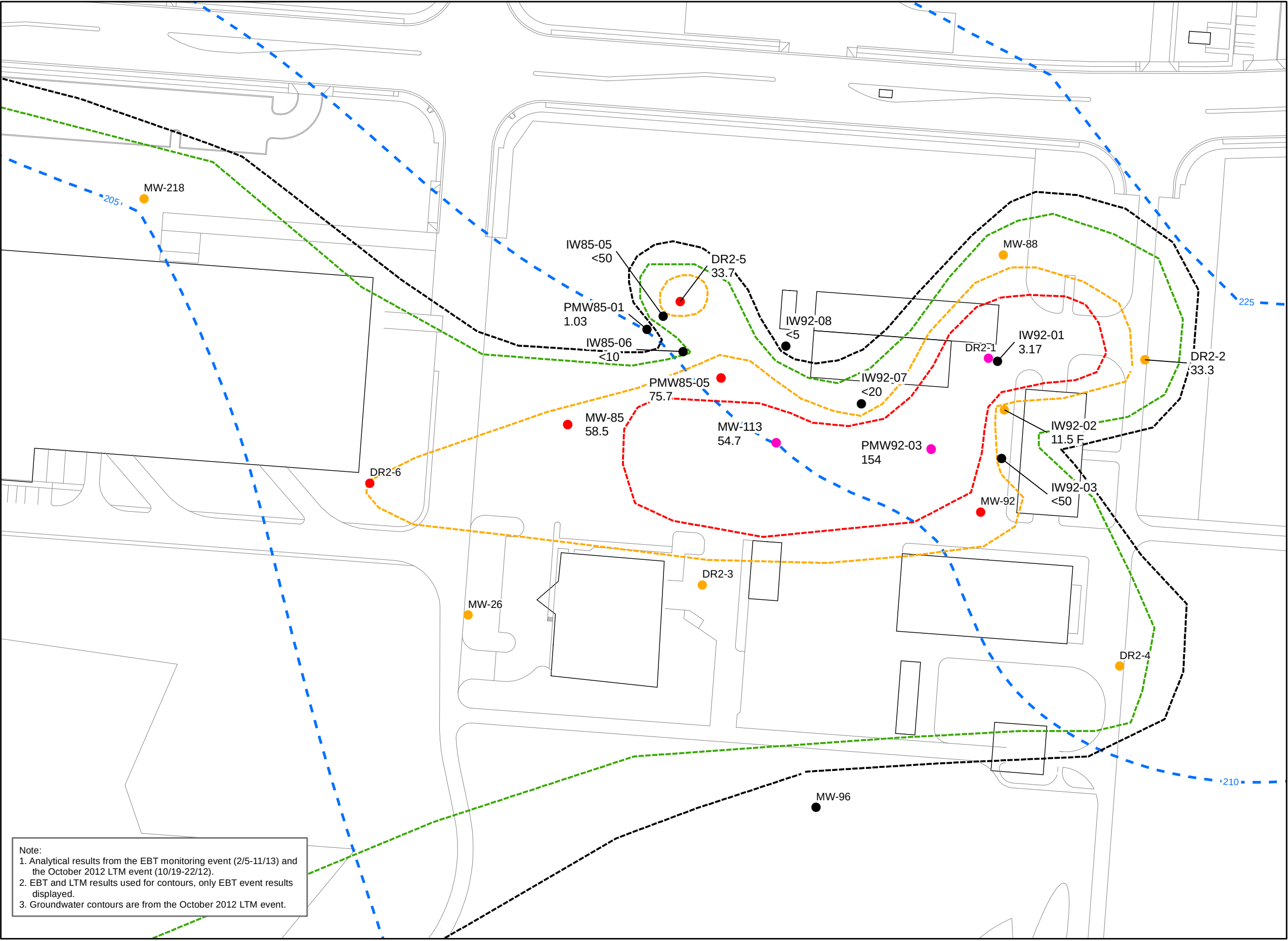
- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

cDCE Isopleth ug/L

- 5
- 10
- 50
- 100

Potentiometric surface of the Fluvial Aquifer 1-ft. contour





Note:
1. Analytical results from the EBT monitoring event (2/5-11/13) and the October 2012 LTM event (10/19-22/12).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2012 LTM event.



Figure 16
TTA-2 PCE
CONCENTRATIONS,
FEBRUARY 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
PCE Ranges
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300

- PCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 5-ft. contour

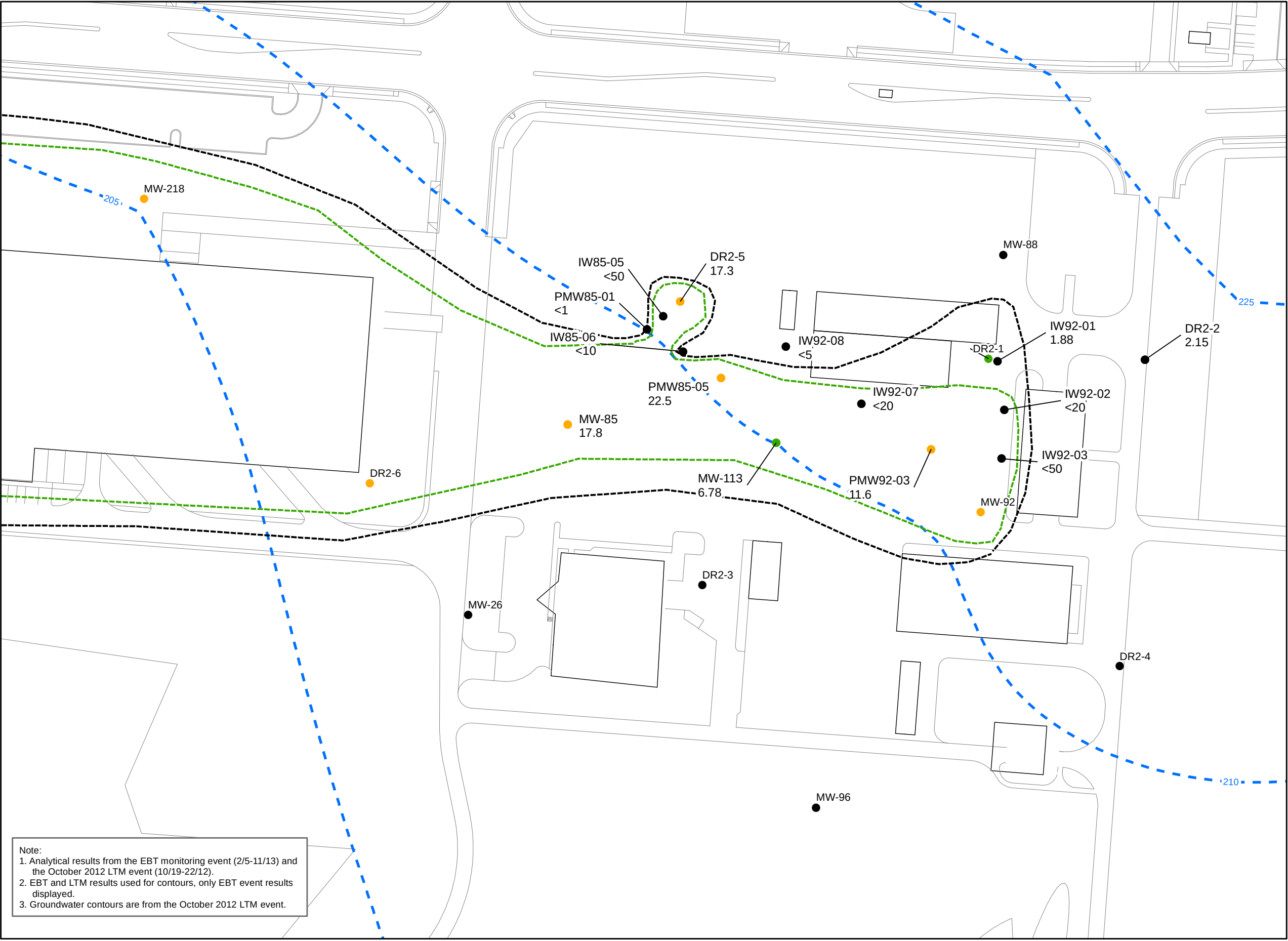
0 25 50 100 150
Feet



Date: March 2014
Edition: Rev 0



Path: G:\DDMT\EBT\EBT-Y3report\GIS\Figure 17 TTA2-TCE FEB13.mxd



Note:
1. Analytical results from the EBT monitoring event (2/5-11/13) and the October 2012 LTM event (10/19-22/12).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2012 LTM event.

Figure 17
TTA-2 TCE
CONCENTRATIONS,
FEBRUARY 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

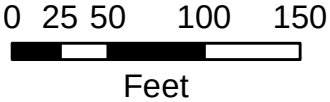
TCE Ranges
ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

TCE Isopleth
ug/L

- 5
- 10
- 50
- 100

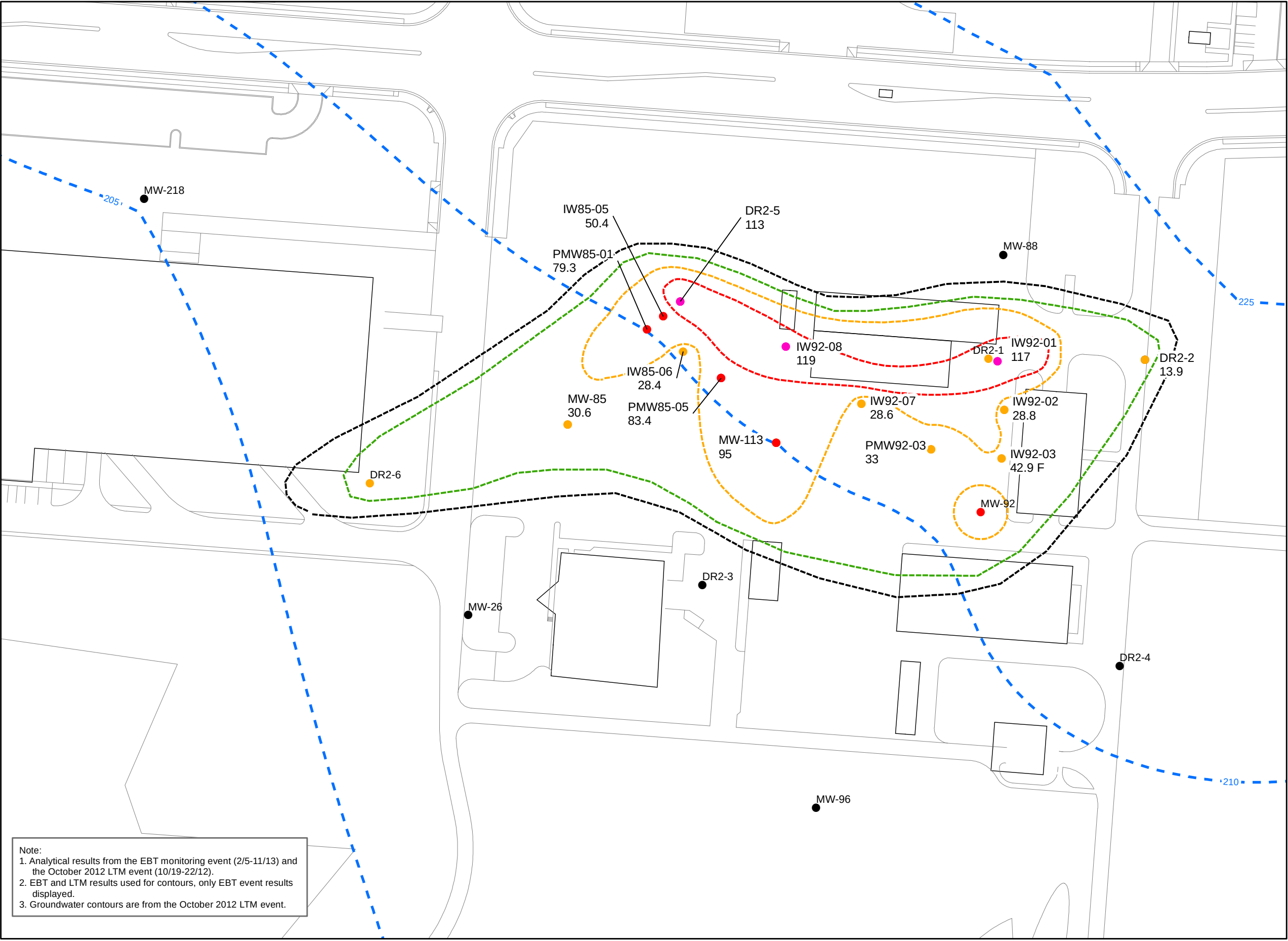
Potentiometric surface of the
Fluvial Aquifer 5-ft. contour



Installation Location
Memphis, Tennessee

HDR

Date: March 2014
Edition: Rev 0



Note:
1. Analytical results from the EBT monitoring event (2/5-11/13) and the October 2012 LTM event (10/19-22/12).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2012 LTM event.



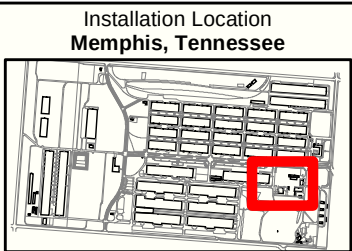
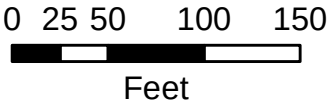
Figure 18
TTA-2 cDCE
CONCENTRATIONS,
FEBRUARY 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

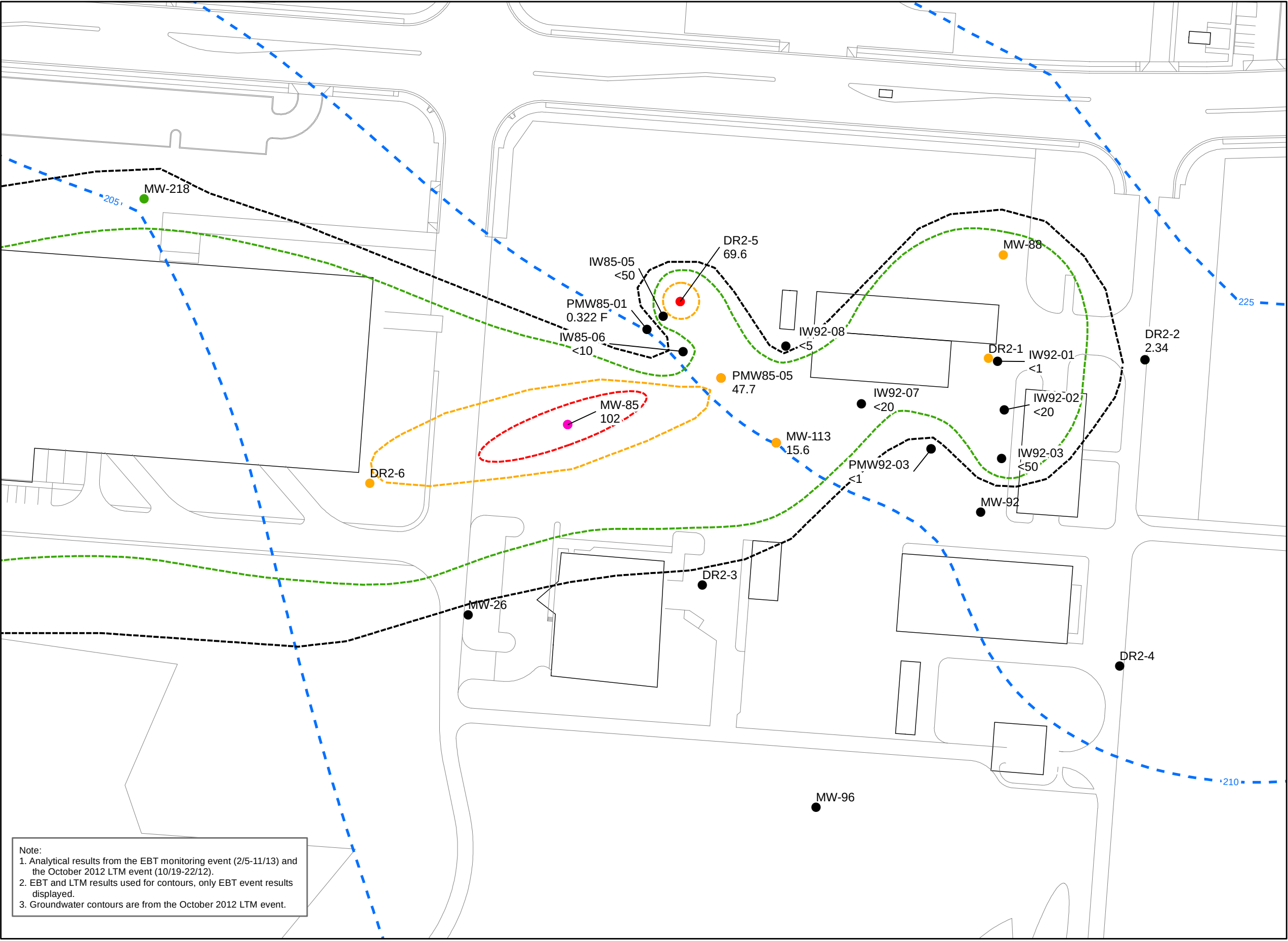
- Legend**
- cDCE Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300

- cDCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 5-ft. contour



Date: March 2014
Edition: Rev 0





Note:
1. Analytical results from the EBT monitoring event (2/5-11/13) and the October 2012 LTM event (10/19-22/12).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2012 LTM event.



Figure 19
TTA-2 CT
CONCENTRATIONS,
FEBRUARY 2013

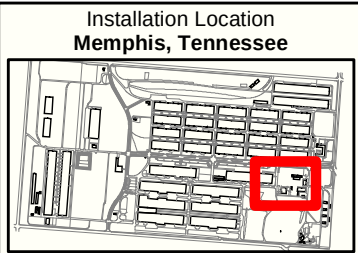
YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
- CT Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 200

- CT Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 5-ft. contour

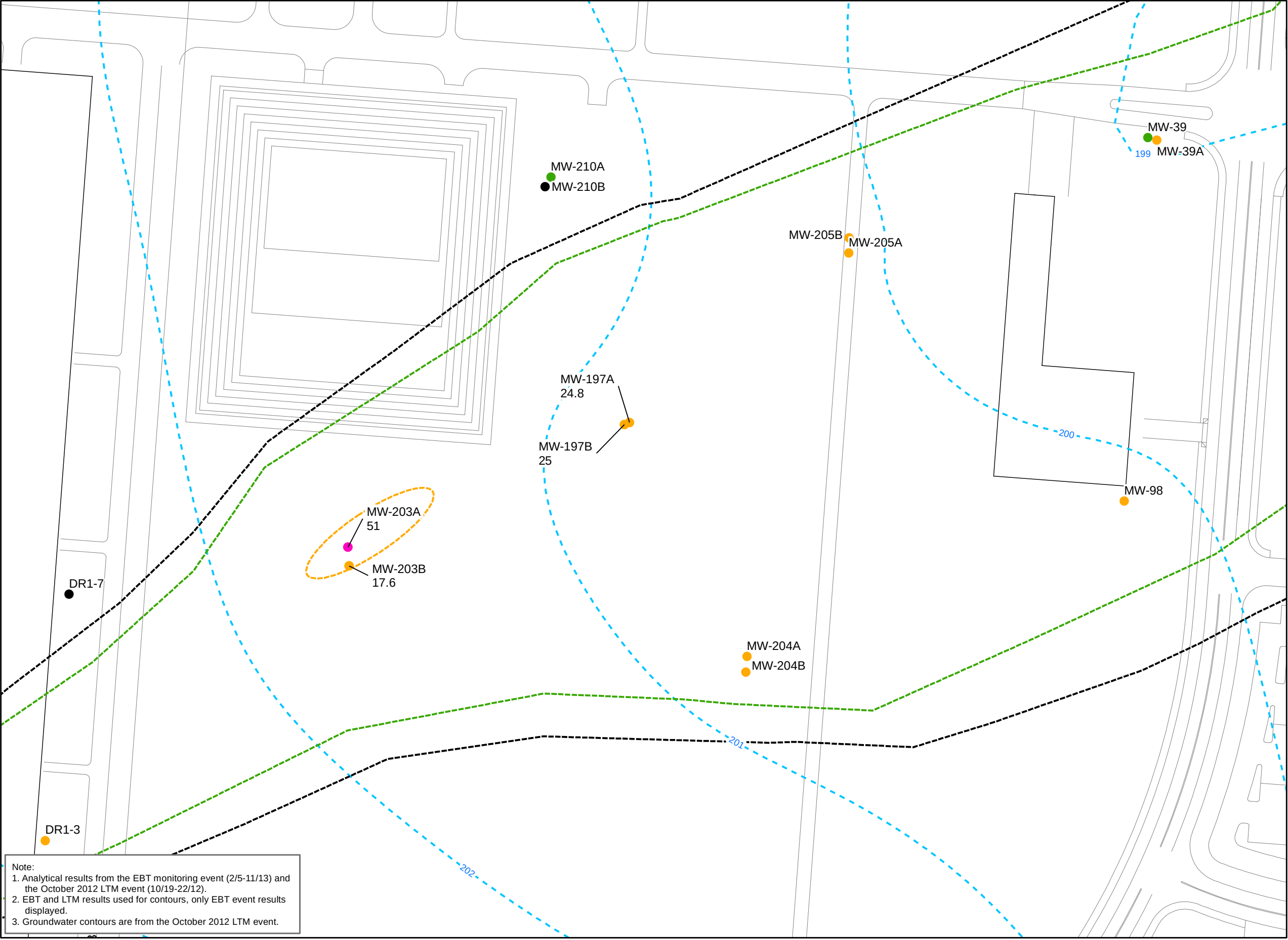
0 25 50 100 150
Feet



Date: March 2014
Edition: Rev 0



Path: G:\DDMT\EBT\EBT-Y3report\GIS\Figure 20 W-C PCE FEB13.mxd



Note:
1. Analytical results from the EBT monitoring event (2/5-11/13) and the October 2012 LTM event (10/19-22/12).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2012 LTM event.



Figure 20

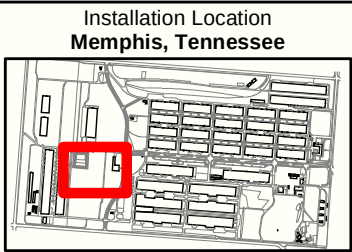
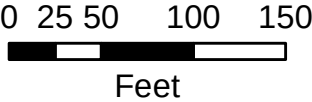
WEST-CENTRAL PCE
CONCENTRATIONS,
FEBRUARY 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

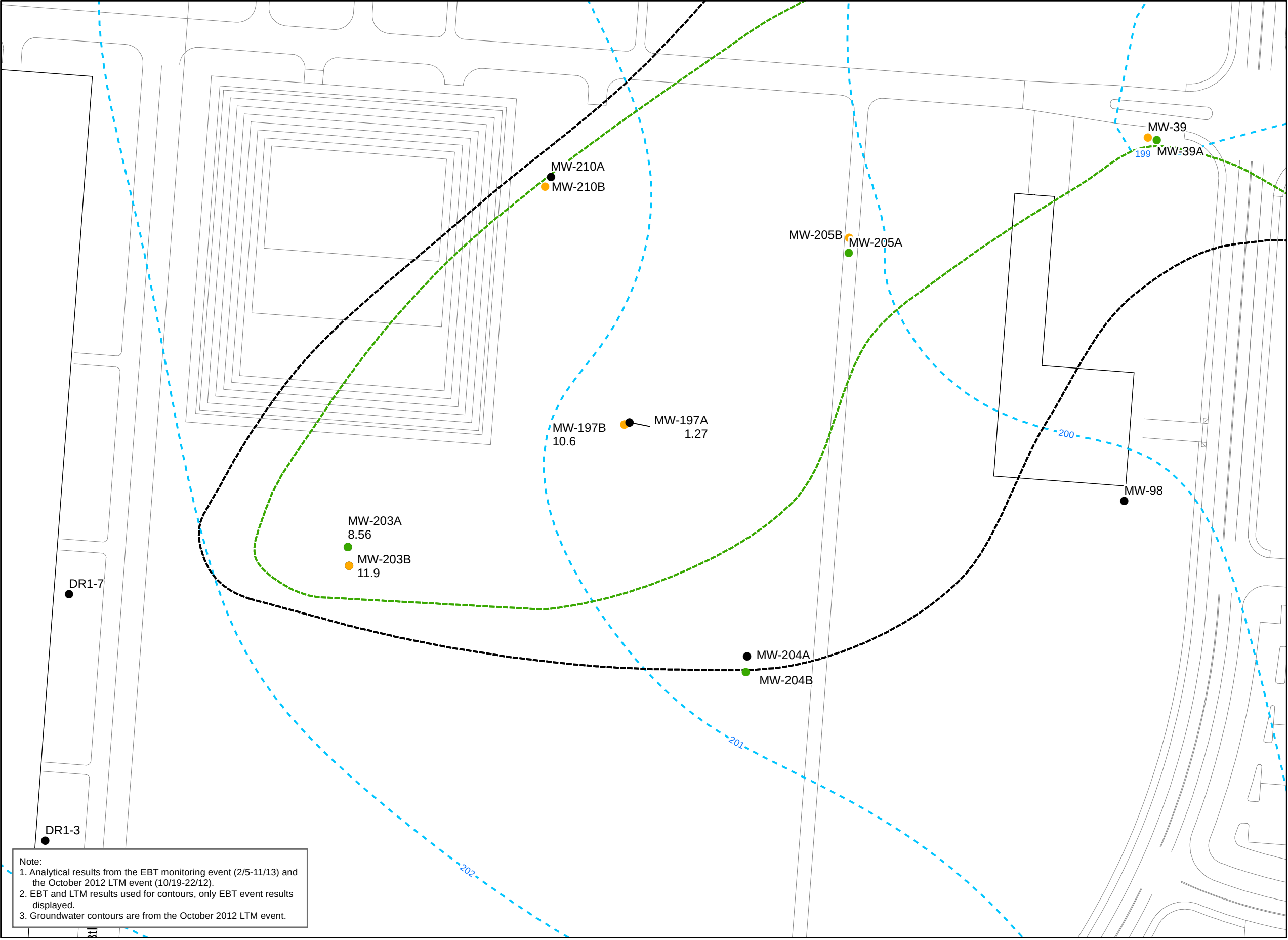
- Legend
- PCE Ranges
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300

- PCE Isopleth
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 1-ft. contour



Date: March 2014
Edition: Rev 0





Note:
1. Analytical results from the EBT monitoring event (2/5-11/13) and the October 2012 LTM event (10/19-22/12).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2012 LTM event.



Figure 21

**WEST- CENTRAL TCE
CONCENTRATIONS,
FEBRUARY 2013**

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

TCE Ranges

ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

TCE Isopleth

ug/L

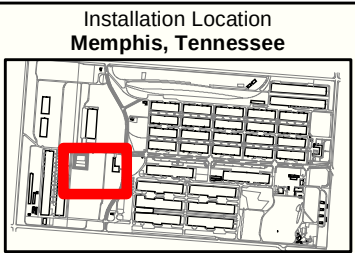
- 5
- 10
- 50
- 100

Potentiometric surface of the
Fluvial Aquifer 1-ft. contour

0 25 50 100 150



Feet



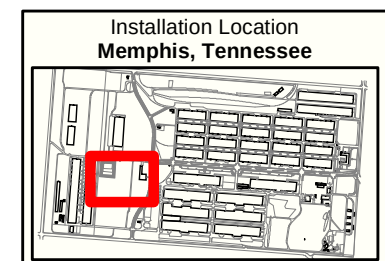
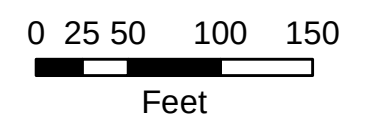
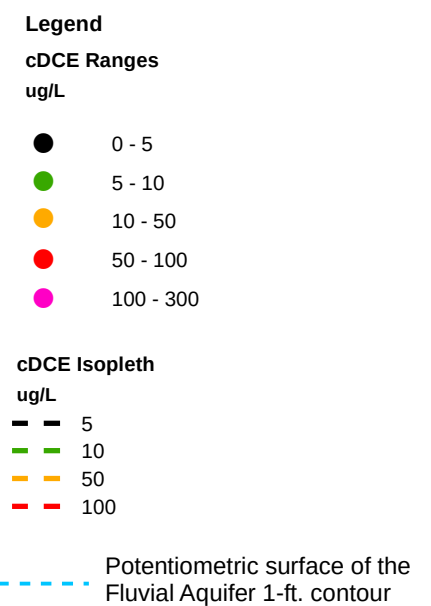
Date: March 2014
Edition: Rev 0

HDR

WEST-CENTRAL cDCE CONCENTRATIONS, FEBRUARY 2013

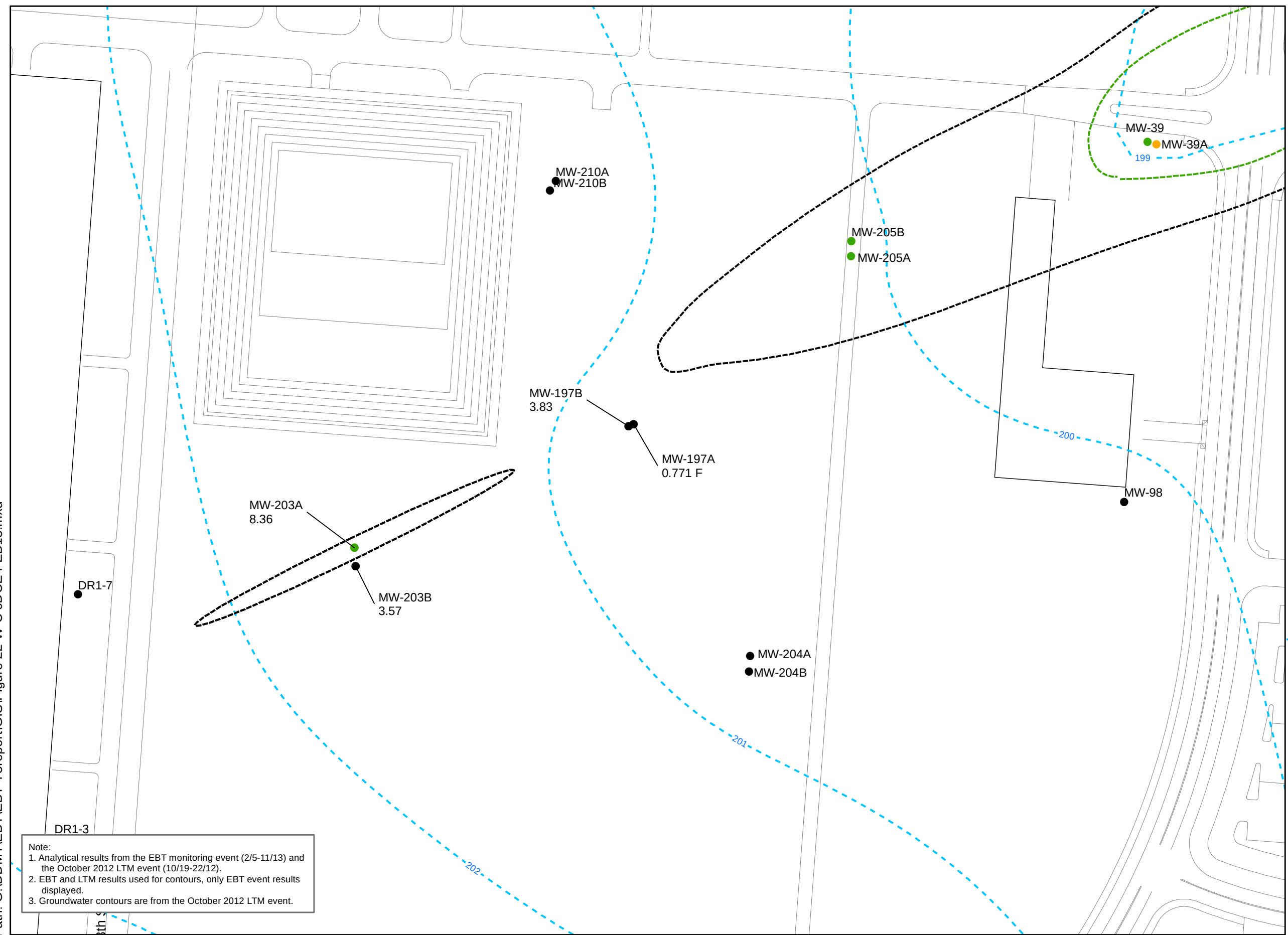
YEAR THREE ENHANCED
BIOREMEDIATION REPORT

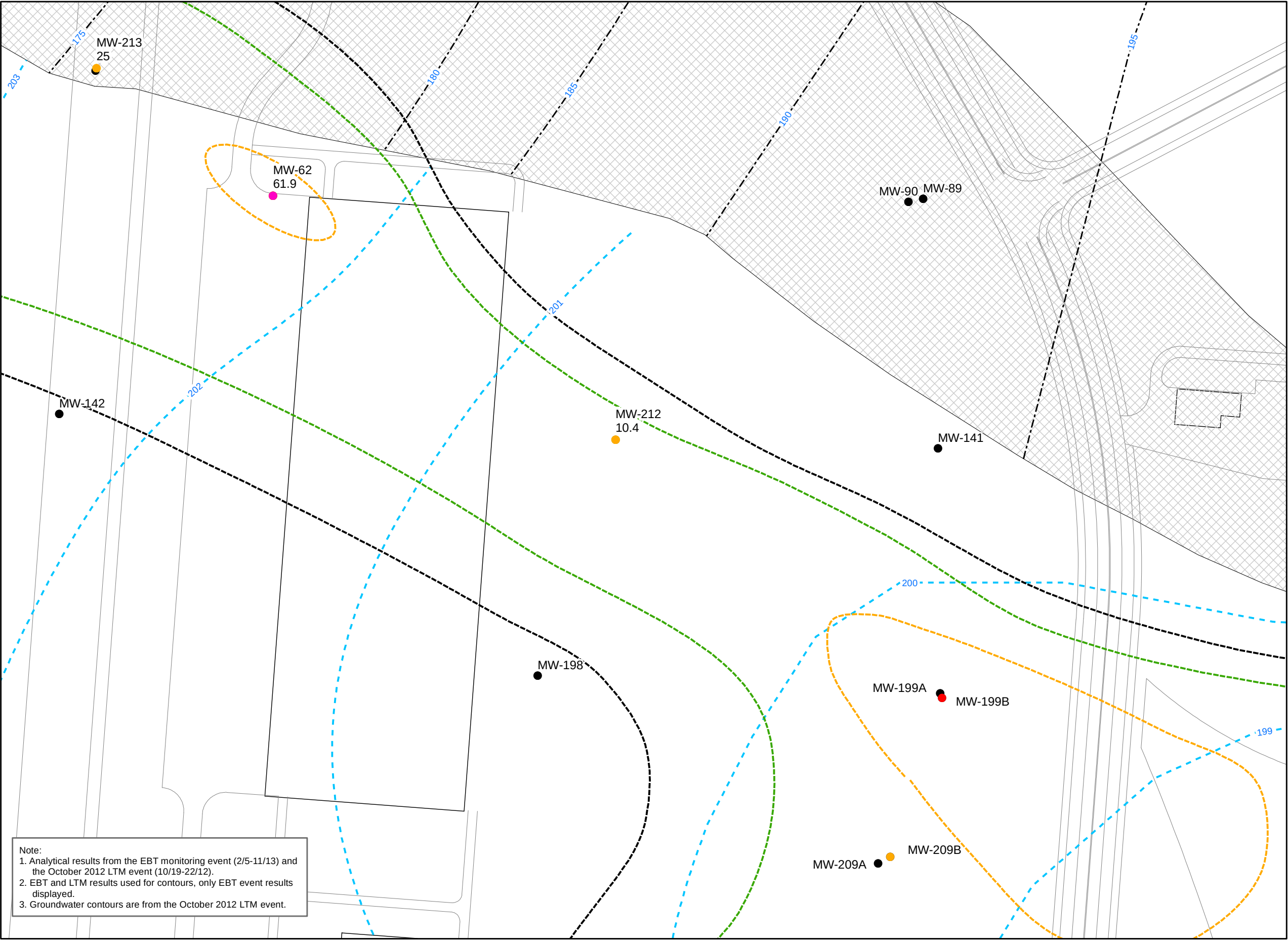
DEFENSE DEPOT
MEMPHIS, TENNESSEE



Date: March 2014
Edition: Rev 0

H&R





Note:
1. Analytical results from the EBT monitoring event (2/5-11/13) and the October 2012 LTM event (10/19-22/12).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2012 LTM event.



Figure 23
BUILDING 835 TCE CONCENTRATIONS, FEBRUARY 2013

YEAR THREE ENHANCED BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

TCE Ranges

ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

TCE Isopleth

ug/L

- 5
- 10
- 50
- 100

Potentiometric surface of the Fluvial Aquifer 1-ft. contour

Clay Elevation Exceeds Groundwater Elevation

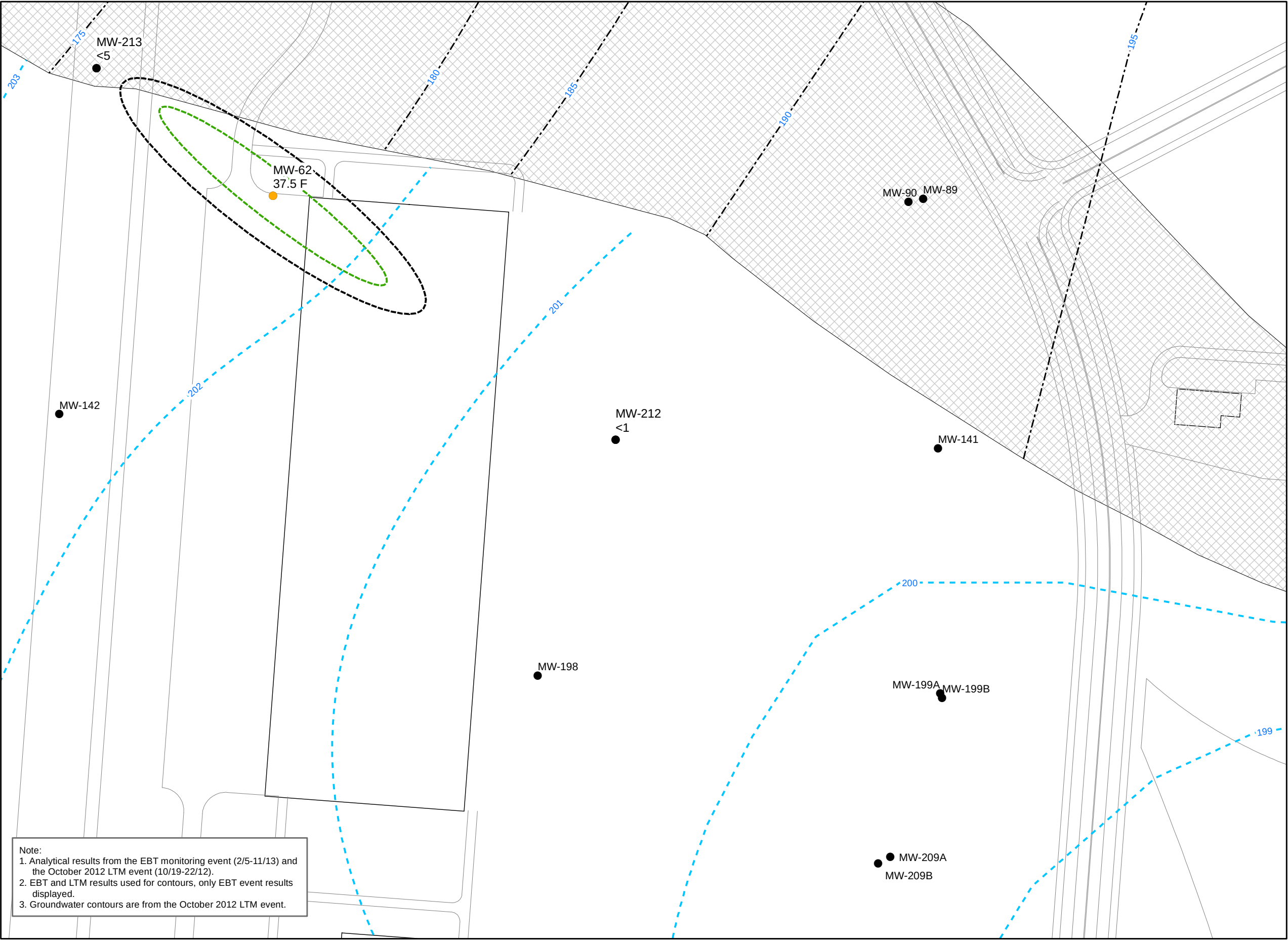
0 25 50 100 150

Feet



Date: March 2014
Edition: Rev 0

HDR



Note:
1. Analytical results from the EBT monitoring event (2/5-11/13) and the October 2012 LTM event (10/19-22/12).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2012 LTM event.



Figure 24
BUILDING 835 cDCE
CONCENTRATIONS,
FEBRUARY 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

cDCE Ranges
ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

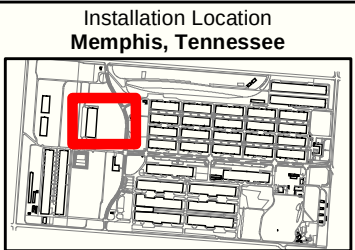
cDCE Isopleth
ug/L

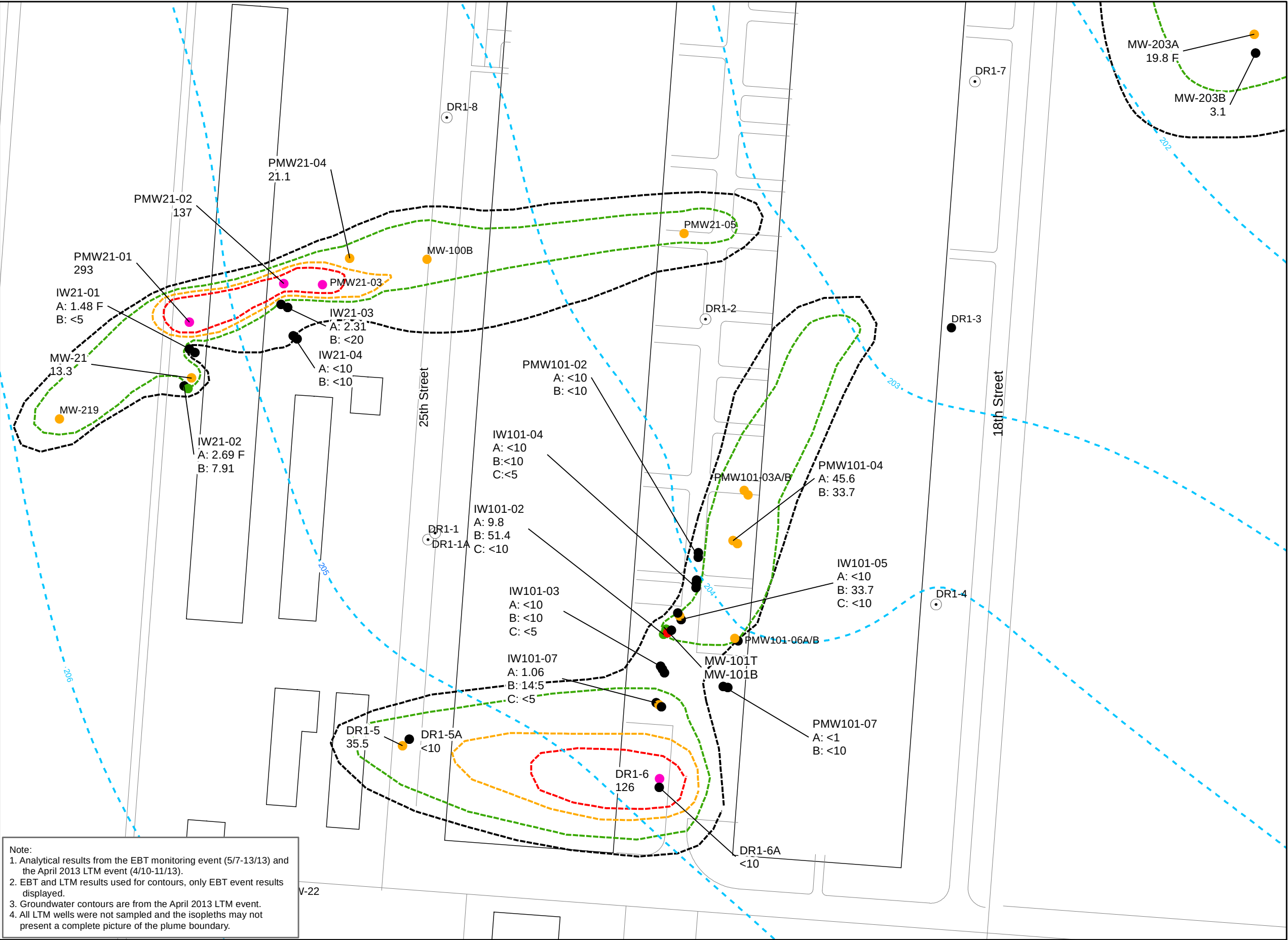
- 5
- 10
- 50
- 100

— Potentiometric surface of the
Fluvial Aquifer 1-ft. contour

Clay Elevation Exceeds Groundwater Elevation

0 25 50 100 150
Feet





Note:
1. Analytical results from the EBT monitoring event (5/7-13/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary.



Figure 25
TTA-1 PCE
CONCENTRATIONS,
MAY 2013

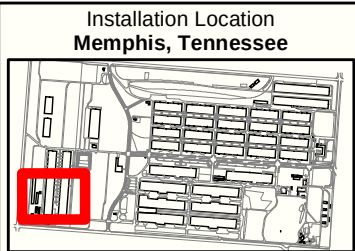
YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
- PCE Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300
 - Not Sampled

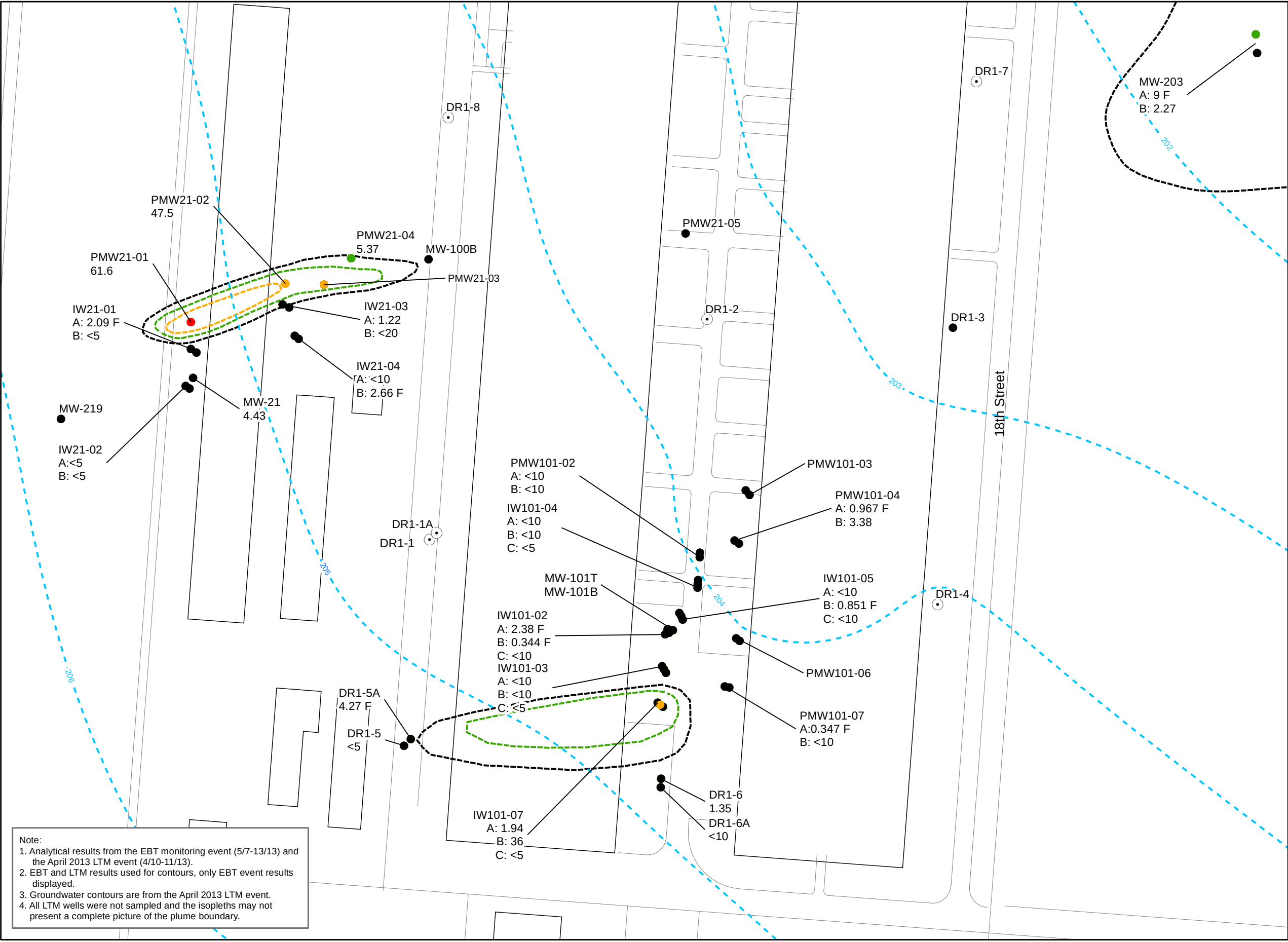
- PCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 1-ft. contour

0 25 50 100 150
Feet



Date: March 2014
Edition: Rev 0





Note:
1. Analytical results from the EBT monitoring event (5/7-13/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary.

Figure 26

TTA-1 TCE CONCENTRATIONS, MAY 2013

YEAR THREE ENHANCED BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

TCE Ranges ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300
- Not Sampled

TCE Isopleth ug/L

- 5
- 10
- 50
- 100

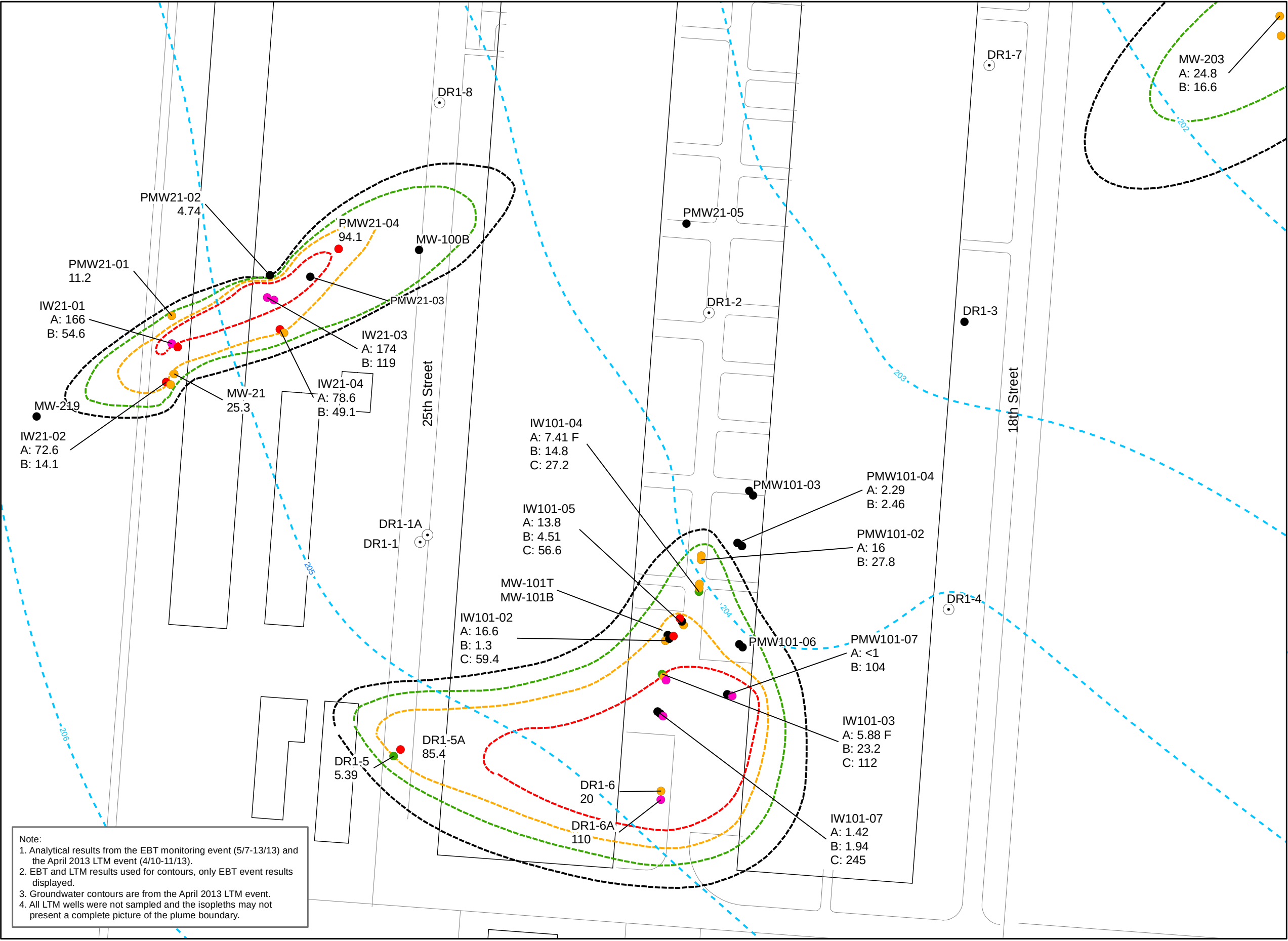
— Potentiometric surface of the Fluvial Aquifer 1-ft. contour

0 25 50 100 150

Feet

Installation Location
Memphis, Tennessee

Date: March 2014
Edition: Rev 0



Note:
1. Analytical results from the EBT monitoring event (5/7-13/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary.

Figure 27

TTA-1 cDCE CONCENTRATIONS, MAY 2013

YEAR THREE ENHANCED BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

cDCE Ranges ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300
- Not Sampled

cDCE Isopleth ug/L

- 5
- 10
- 50
- 100

Potentiometric surface of the Fluvial Aquifer 1-ft. contour

0 25 50 100 150

Feet

Installation Location
Memphis, Tennessee

Date: March 2014
Edition: Rev 0

Path: G:\DDMT\EBT\EBT-Y3report\GIS\Figure 28 TTA2-PCE MAY13.mxd

Note:
1. Analytical results from the EBT monitoring event (5/7-13/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary.

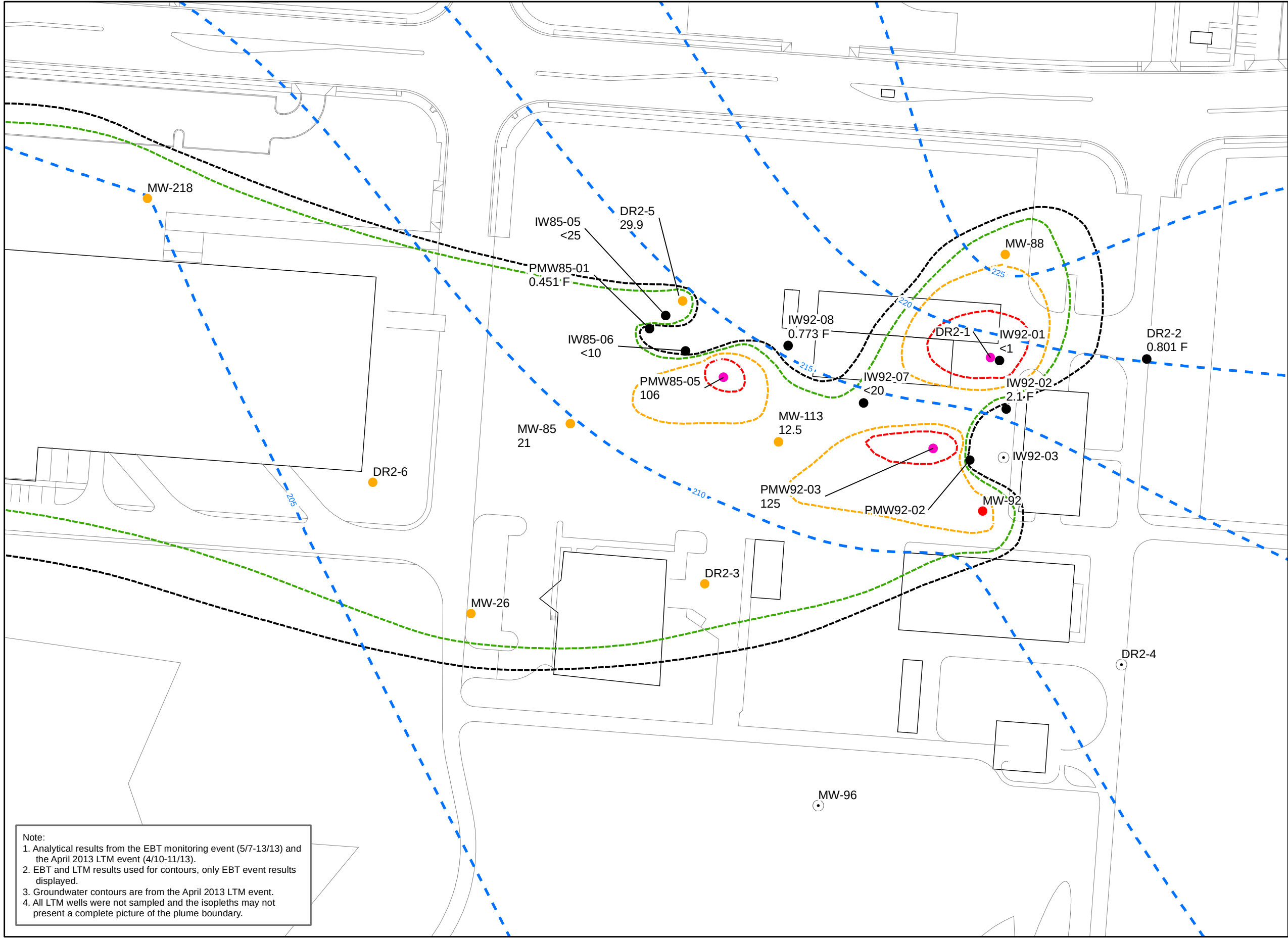


Figure 28
TTA-2 PCE
CONCENTRATIONS,
MAY 2013

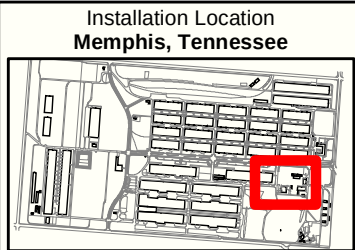
YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend
- PCE Ranges
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300
 - Not Sampled

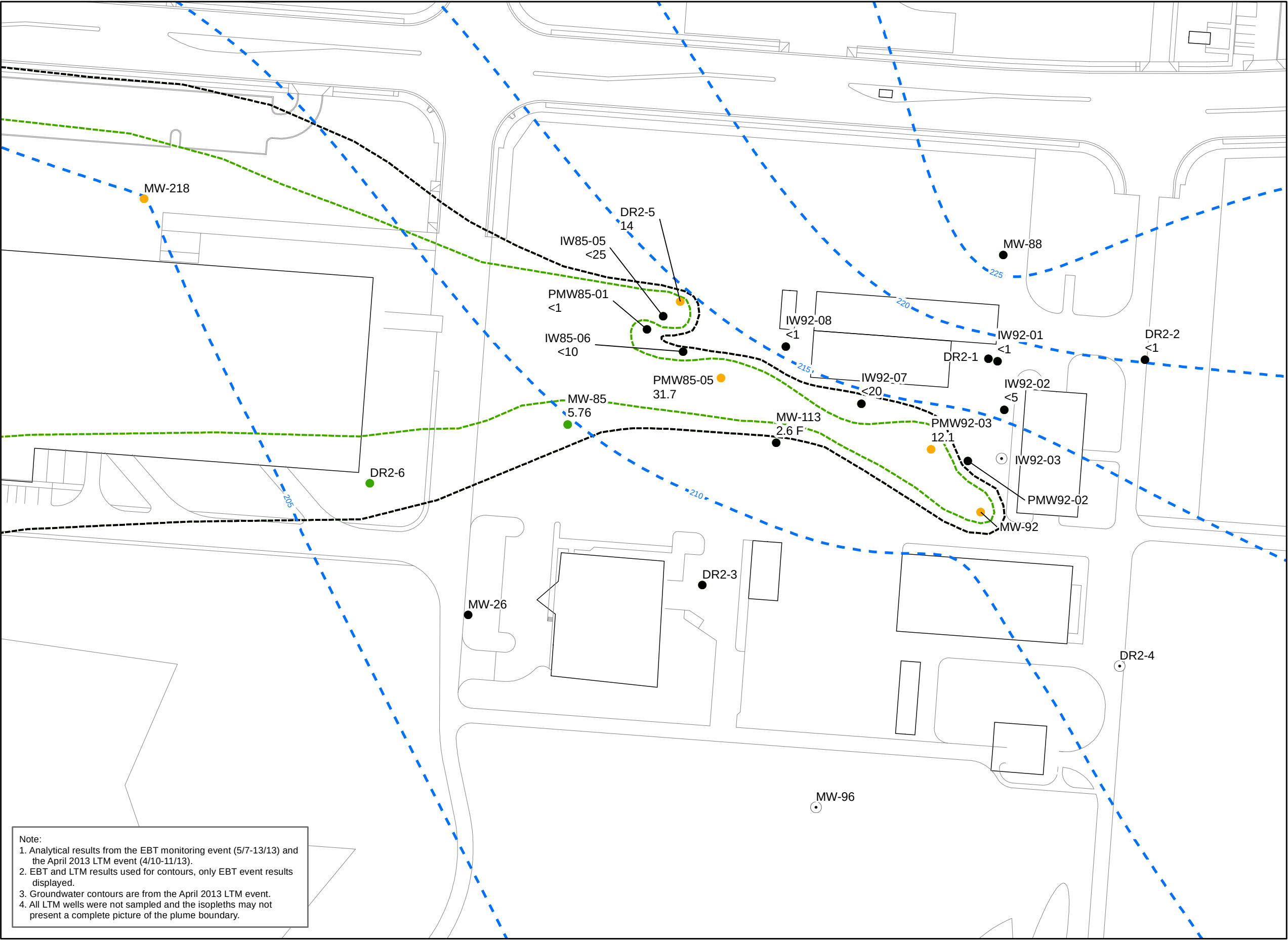
- PCE Isopleth
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 5-ft. contour

0 25 50 100 150
Feet



Date: March 2014
Edition: Rev 0

HDR



Note:
1. Analytical results from the EBT monitoring event (5/7-13/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary.



Figure 29
TTA-2 TCE
CONCENTRATIONS,
MAY 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
- TCE Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300
 - Not Sampled

- TCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100

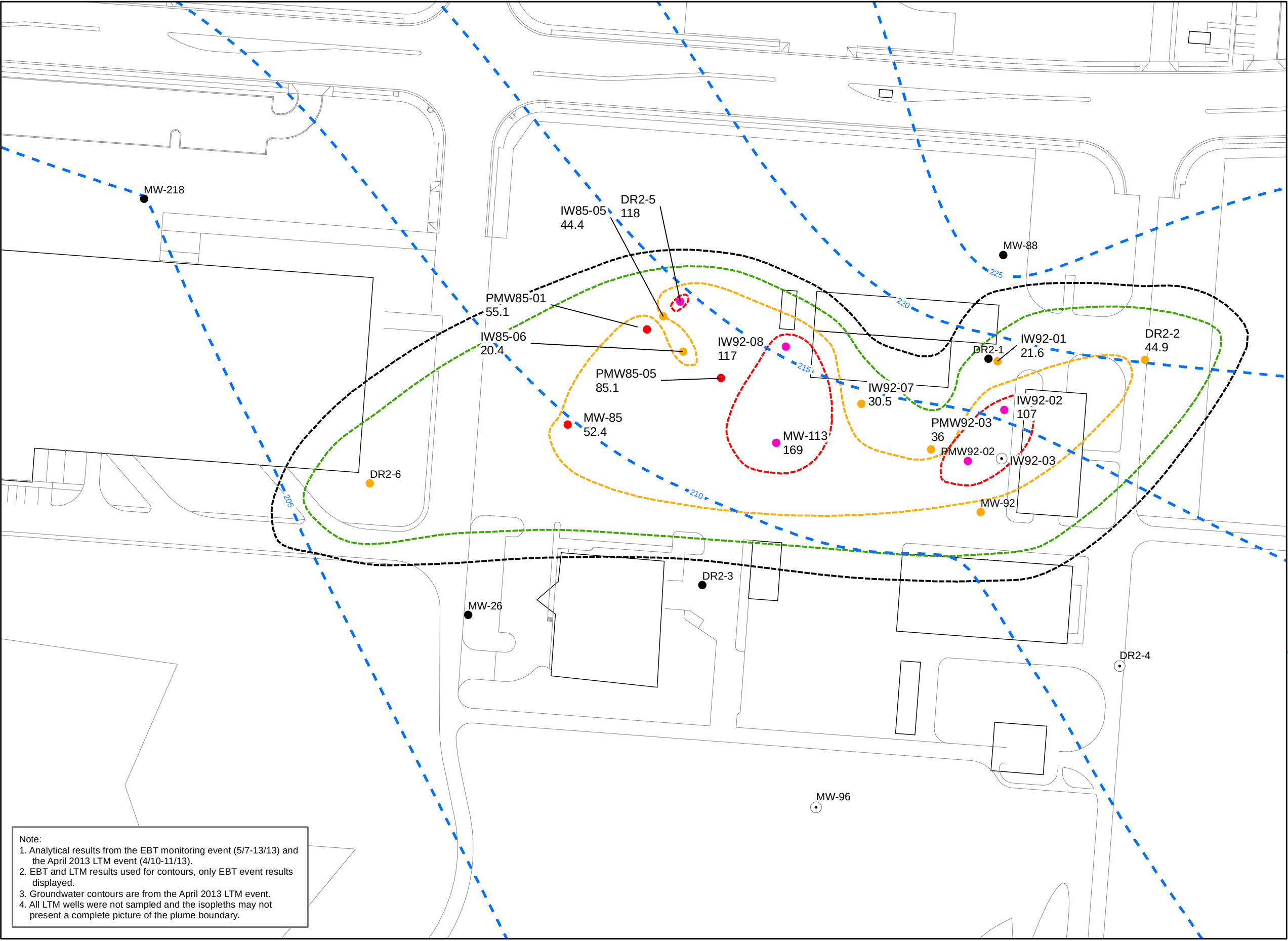
— Potentiometric surface of the
Fluvial Aquifer 5-ft. contour

0 25 50 100 150
Feet



Date: March 2014
Edition: Rev 0

HDR



Note:
1. Analytical results from the EBT monitoring event (5/7-13/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary.

Figure 30
TTA-2 cDCE
CONCENTRATIONS,
MAY 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

cDCE Ranges
ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300
- Not Sampled

cDCE Isopleth
ug/L

- 5
- 10
- 50
- 100

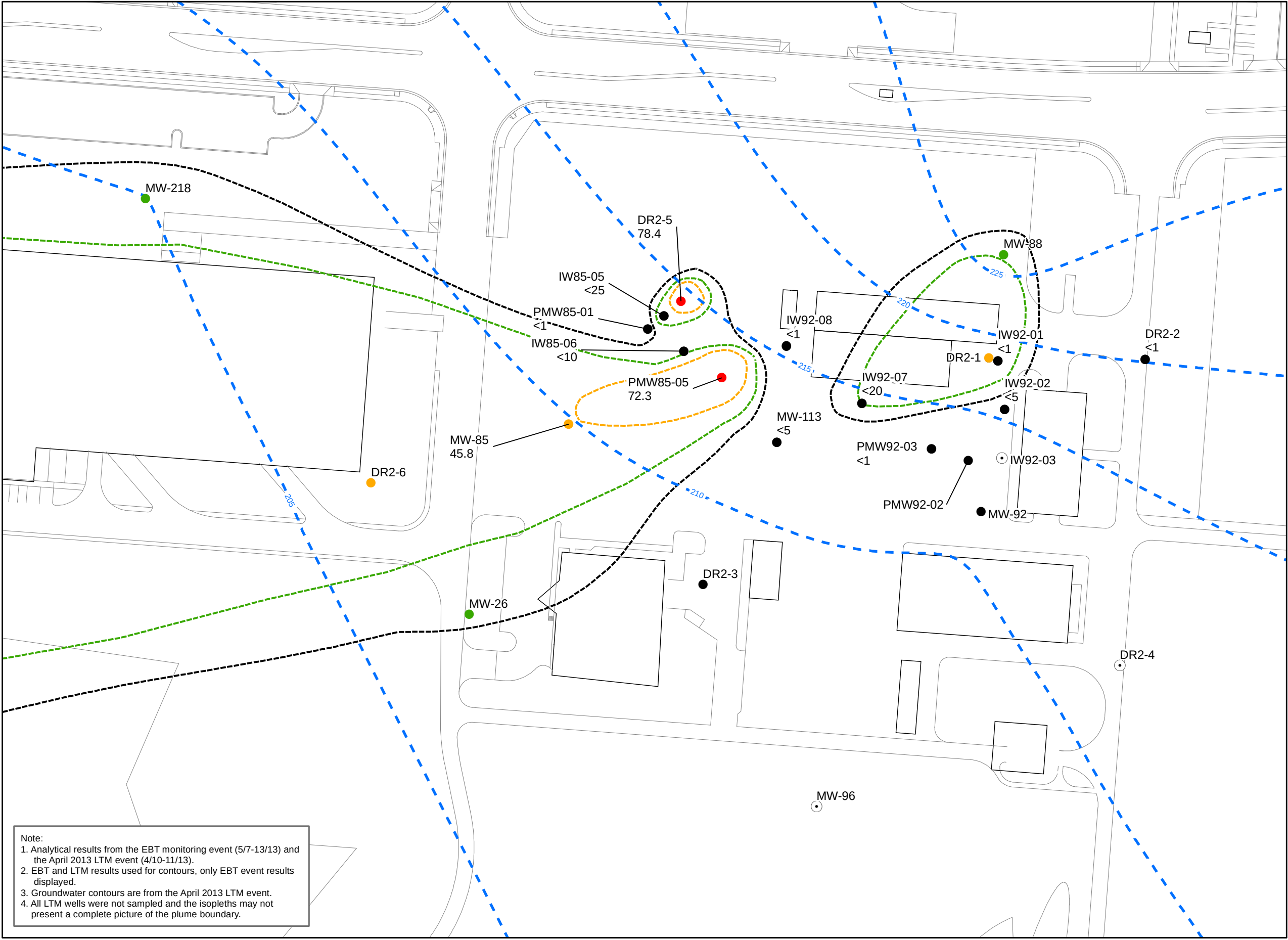
Potentiometric surface of the
Fluvial Aquifer 1-ft. contour

0 25 50 100 150
Feet

Installation Location
Memphis, Tennessee

Date: March 2014
Edition: Rev 0

Path: G:\DDMT\EBT\EBT-Y3report\GIS\Figure 31 TTA2-CT MAY13.mxd



Note:
1. Analytical results from the EBT monitoring event (5/7-13/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary.



Figure 31
TTA-2 CT
CONCENTRATIONS,
MAY 2013

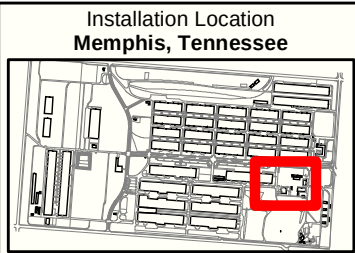
YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
- CT Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 200
 - Not Sampled

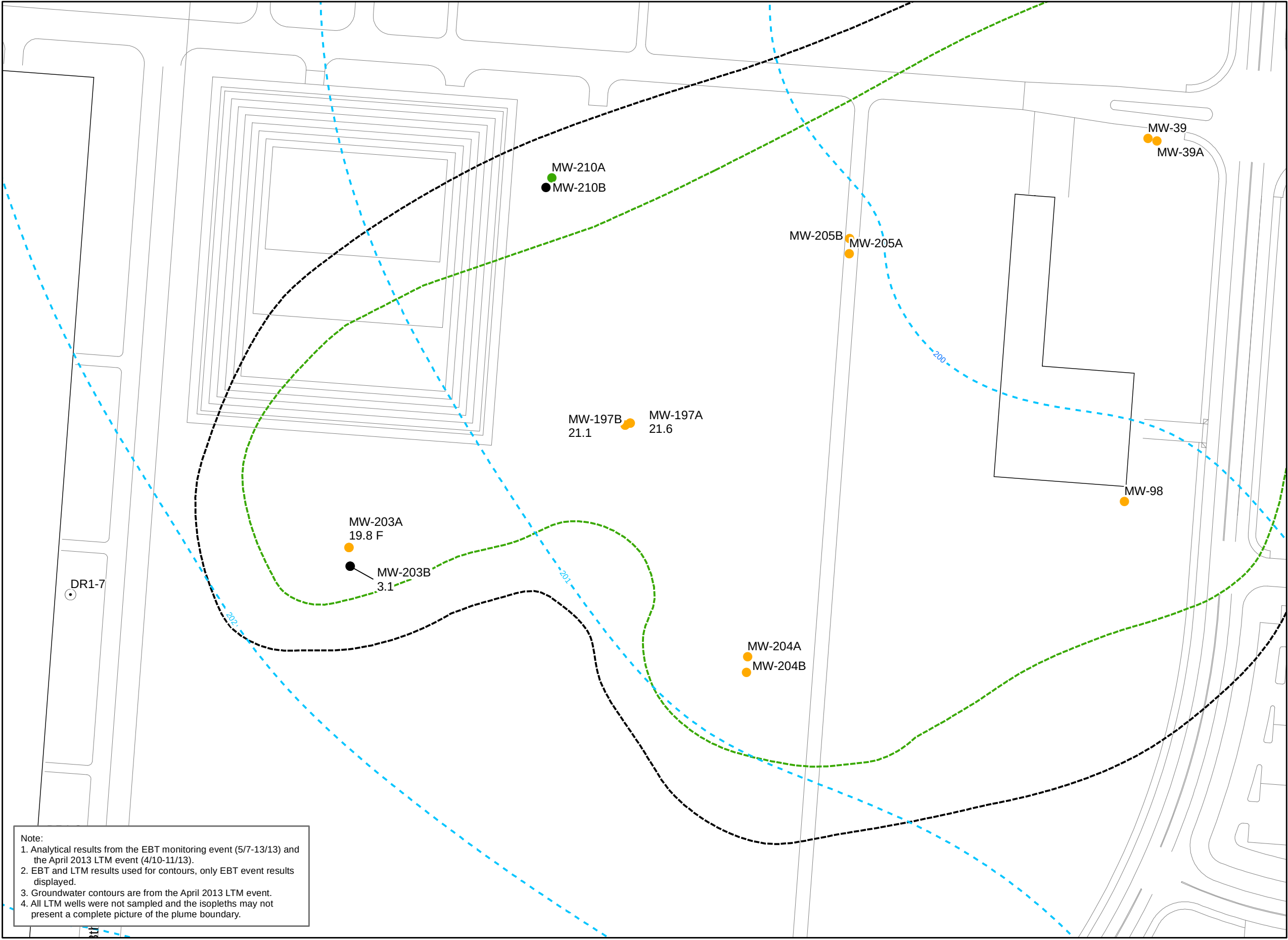
- CT Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 5-ft. contour

0 25 50 100 150
Feet



Date: March 2014
Edition: Rev 0

HDR



Note:
1. Analytical results from the EBT monitoring event (5/7-13/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary.

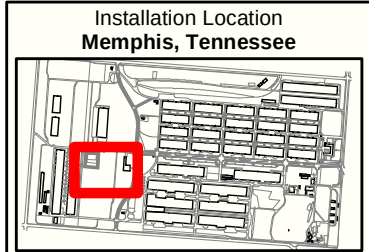
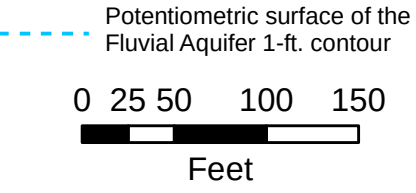


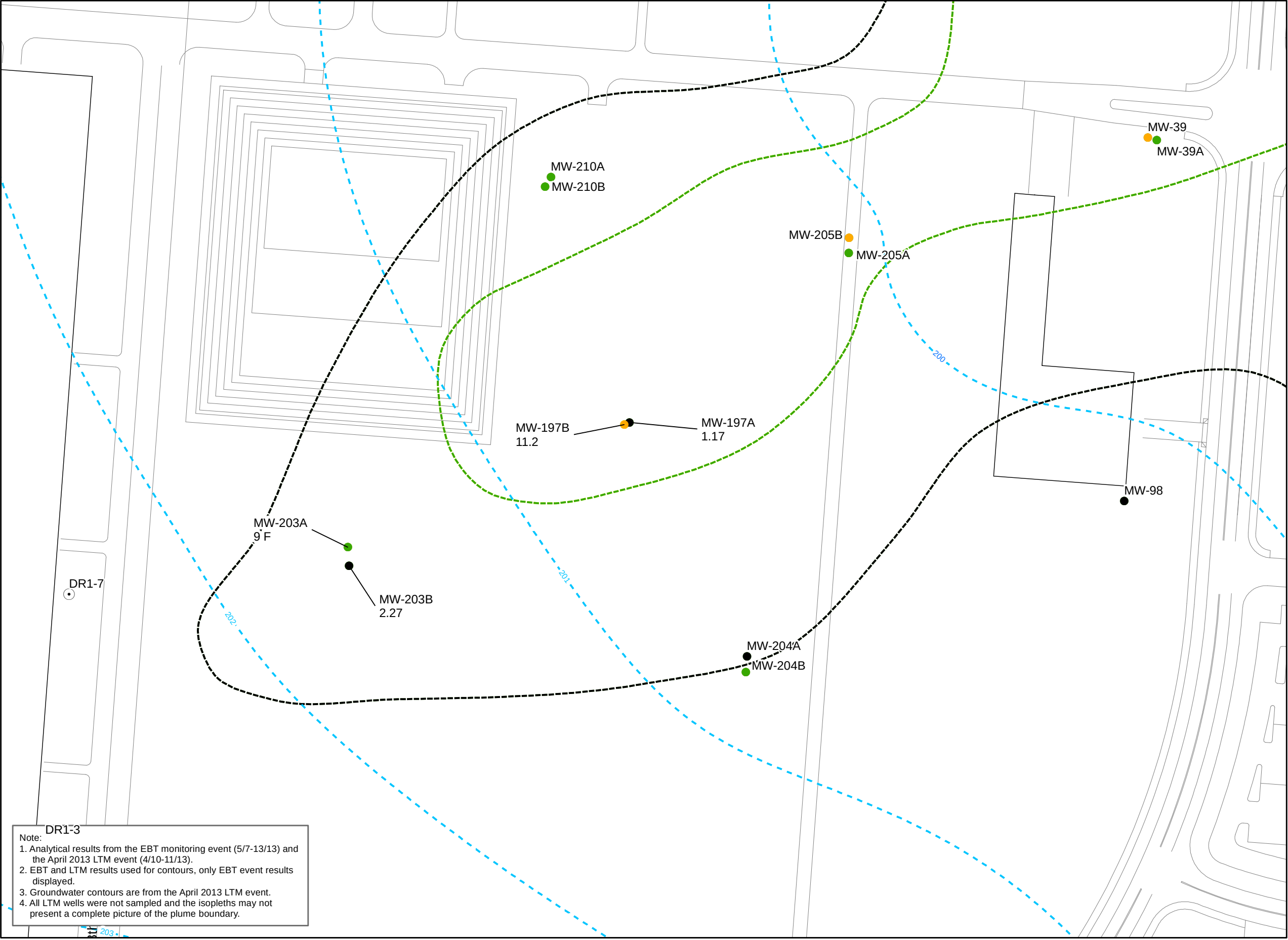
Figure 32
WEST-CENTRAL PCE
CONCENTRATIONS,
MAY 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
- PCE Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300
 - Not Sampled
- PCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100





Note:
1. Analytical results from the EBT monitoring event (5/7-13/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary.



Figure 33
WEST- CENTRAL TCE
CONCENTRATIONS,
MAY 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

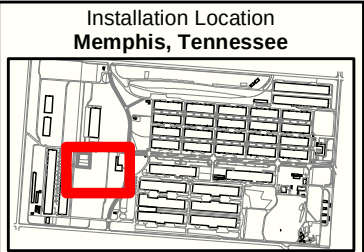
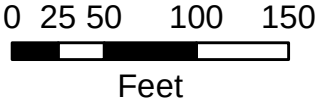
TCE Ranges
ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300
- Not Sampled

TCE Isopleth
ug/L

- 5
- 10
- 50
- 100

Potentiometric surface of the
Fluvial Aquifer 1-ft. contour



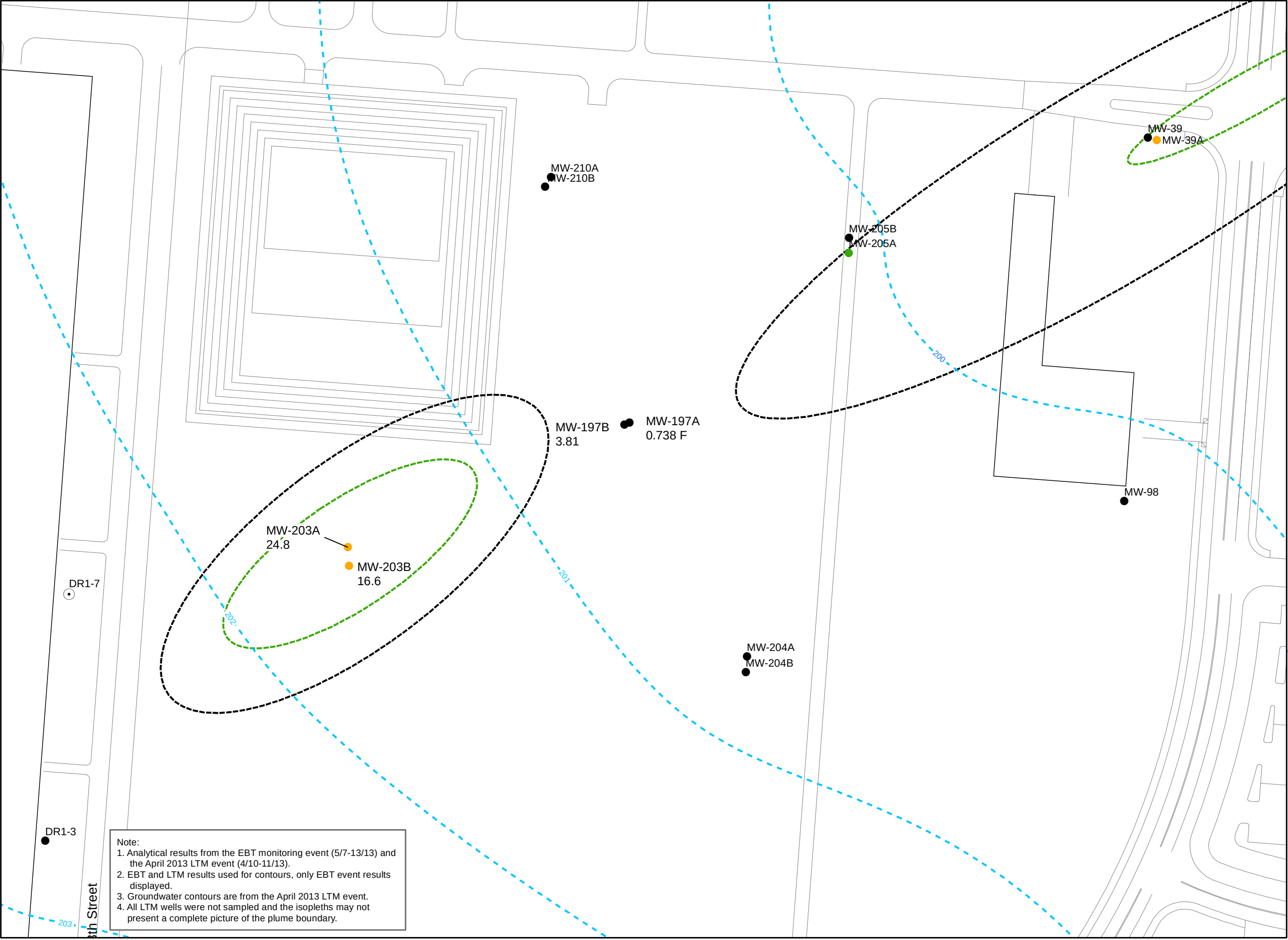


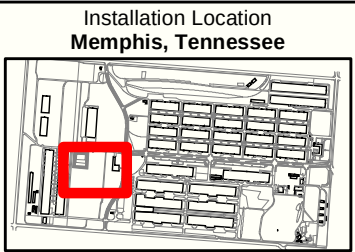
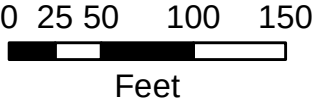
Figure 34

WEST-CENTRAL
CDCE CONCENTRATIONS,
MAY 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

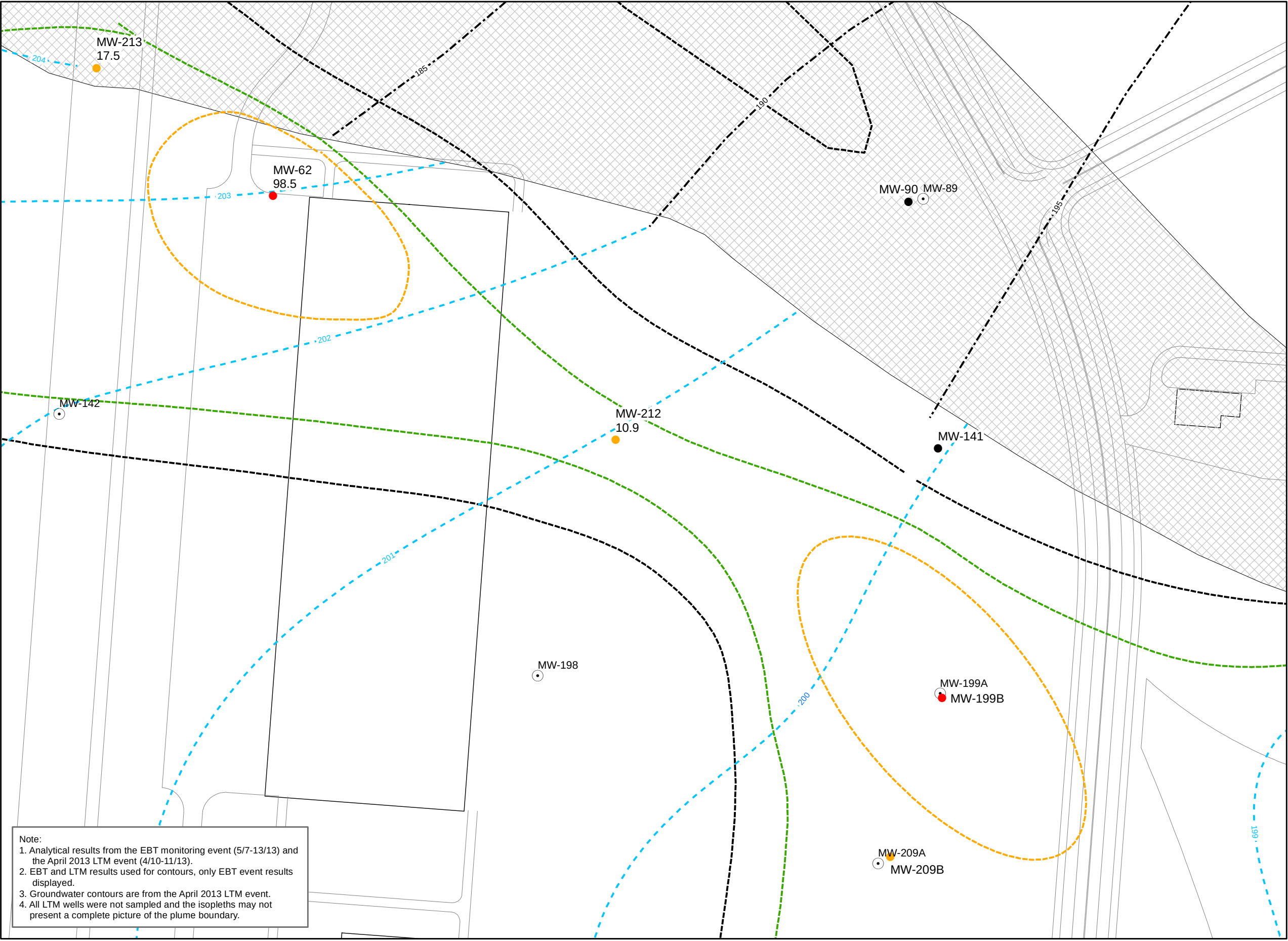
DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
- cDCE Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300
 - Not Sampled
- cDCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 1-ft. contour



Date: March 2014
Edition: Rev 0





Note:
1. Analytical results from the EBT monitoring event (5/7-13/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary.



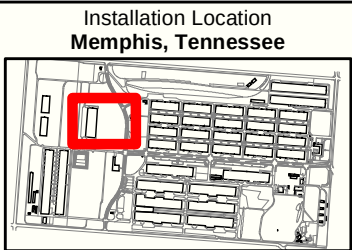
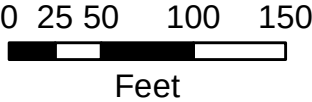
Figure 35
BUILDING 835 TCE
CONCENTRATIONS,
MAY 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

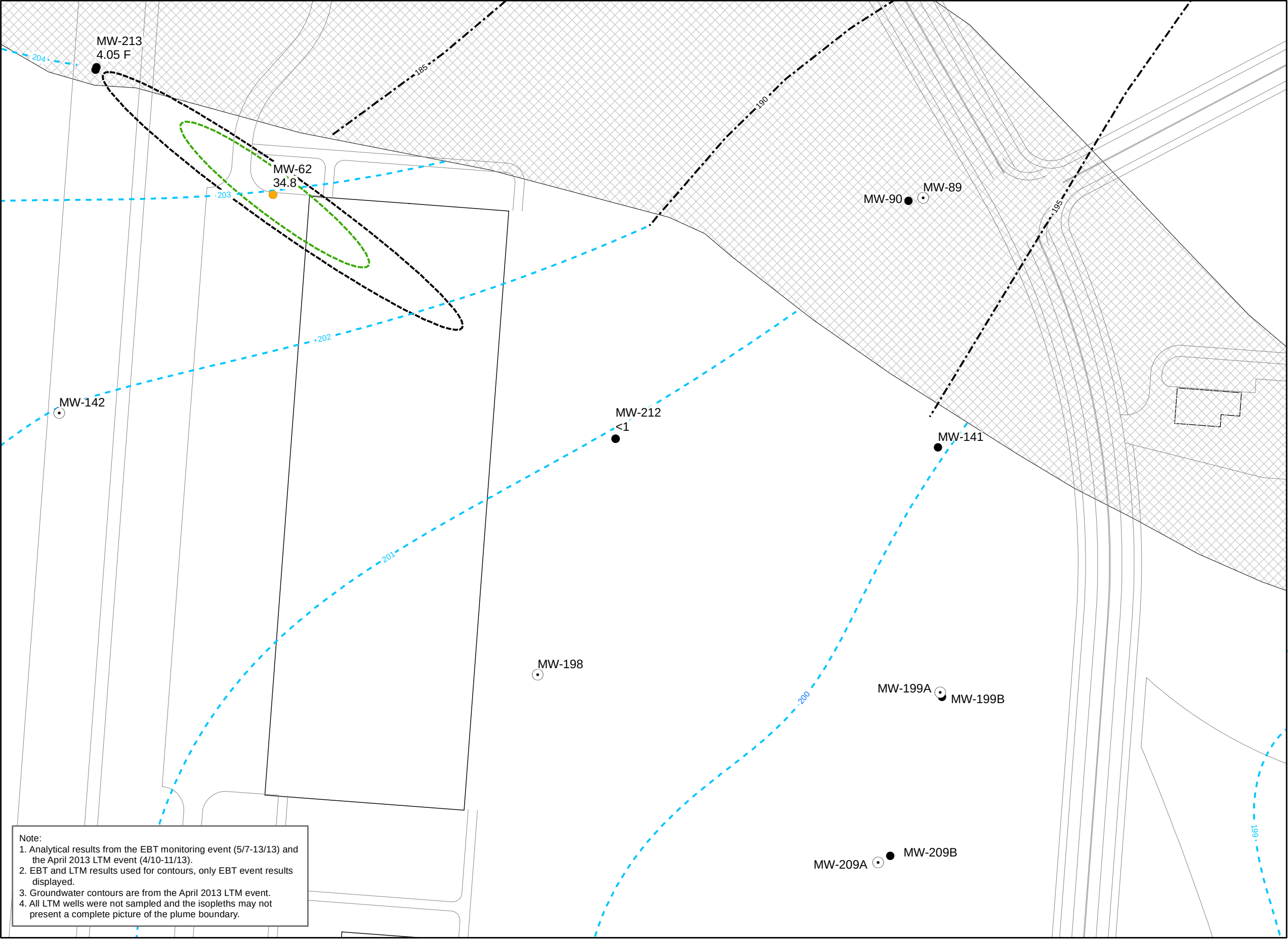
- Legend**
- TCE Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300
 - Not Sampled

- TCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 1-ft. contour
- ▨ Clay Elevation Exceeds Groundwater Elevation



Date: March 2014
Edition: Rev 0





Note:
1. Analytical results from the EBT monitoring event (5/7-13/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary.



Figure 36

**BUILDING 835 cDCE
CONCENTRATIONS,
MAY 2013**

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
- cDCE Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300
 - Not Sampled

- cDCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100

Potentiometric surface of the
Fluvial Aquifer 1-ft. contour

Clay Elevation Exceeds Groundwater Elevation

0 25 50 100 150



Feet



Date: March 2014
Edition: Rev 0



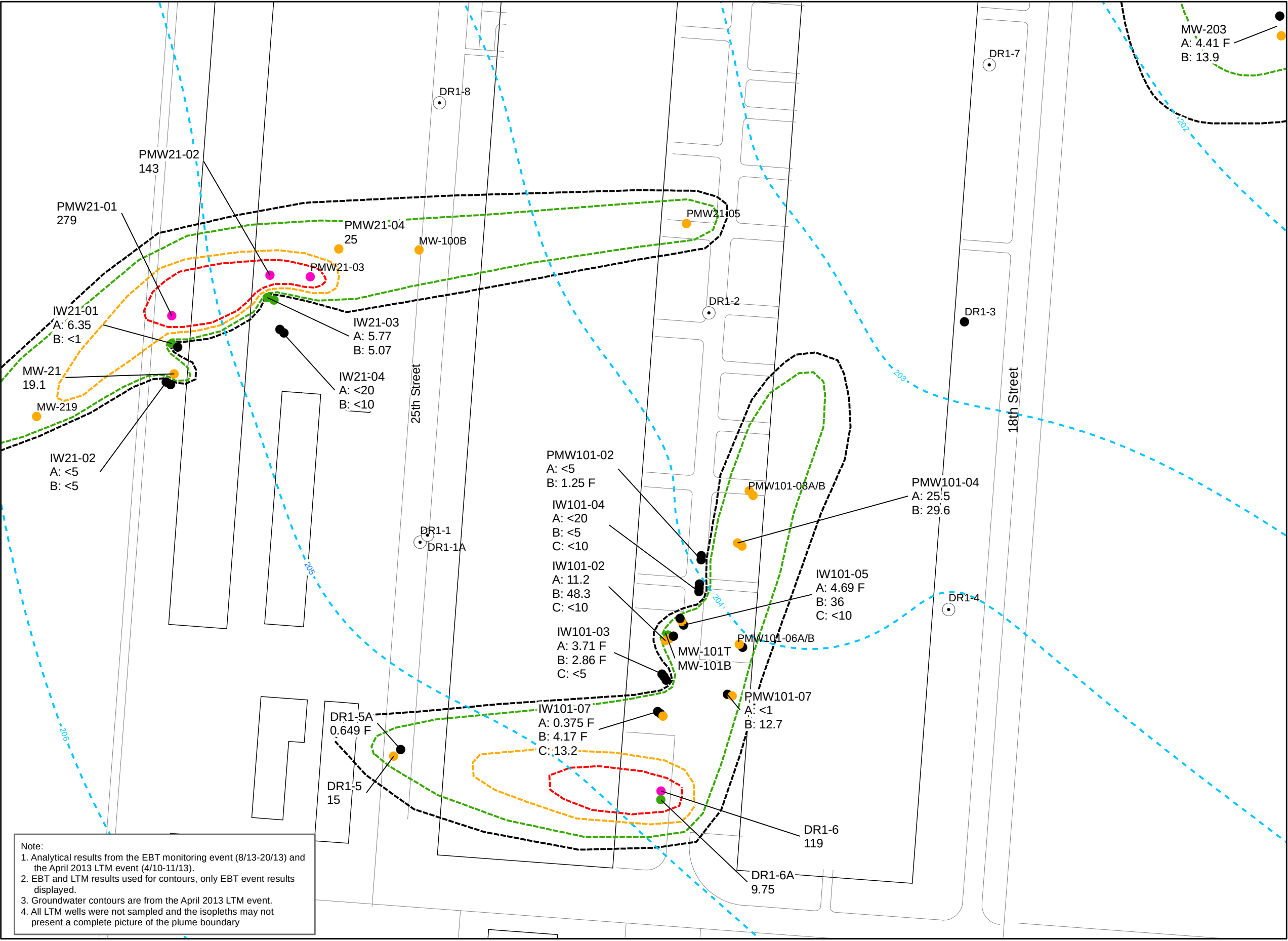


Figure 37

TTA-1 PCE
CONCENTRATIONS,
AUGUST 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

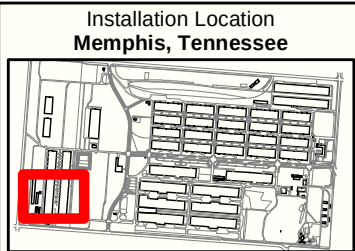
- Legend
- PCE Ranges
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300
 - Not Sampled

- PCE Isopleth
ug/L
- 5
 - 10
 - 50
 - 100

Potentiometric surface of the
Fluvial Aquifer 1-ft. contour

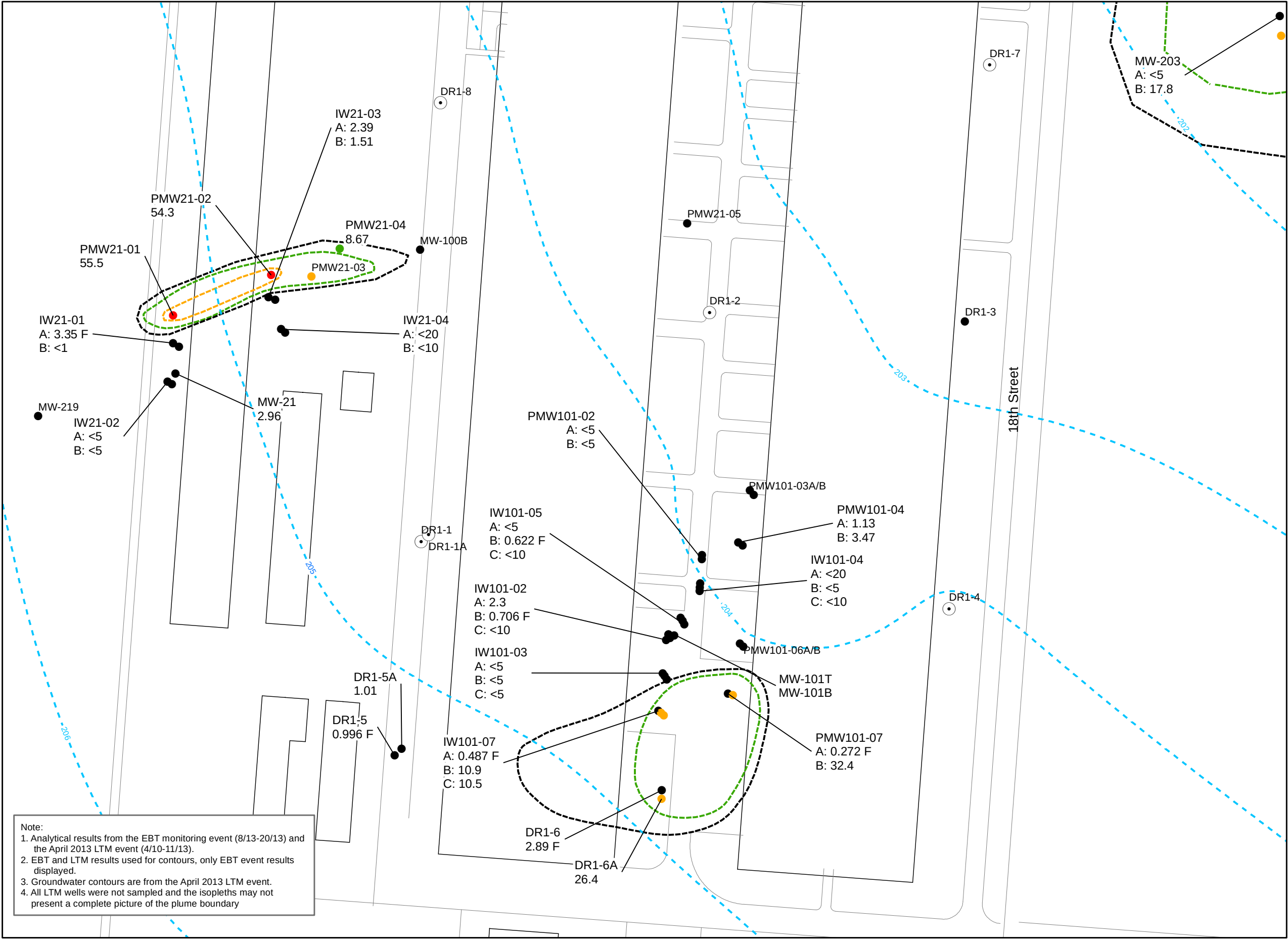
0 25 50 100 150

Feet



Date: March 2014
Edition: Rev 0

HDR



Note:
1. Analytical results from the EBT monitoring event (8/13-20/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary

Figure 38
TTA-1 TCE
CONCENTRATIONS,
AUGUST 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

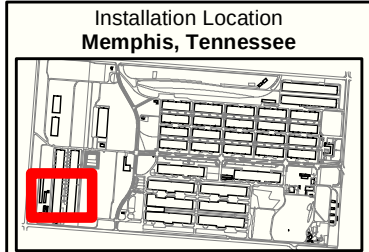
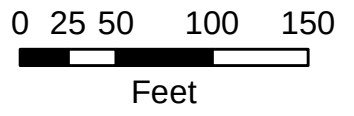
TCE Ranges ug/L

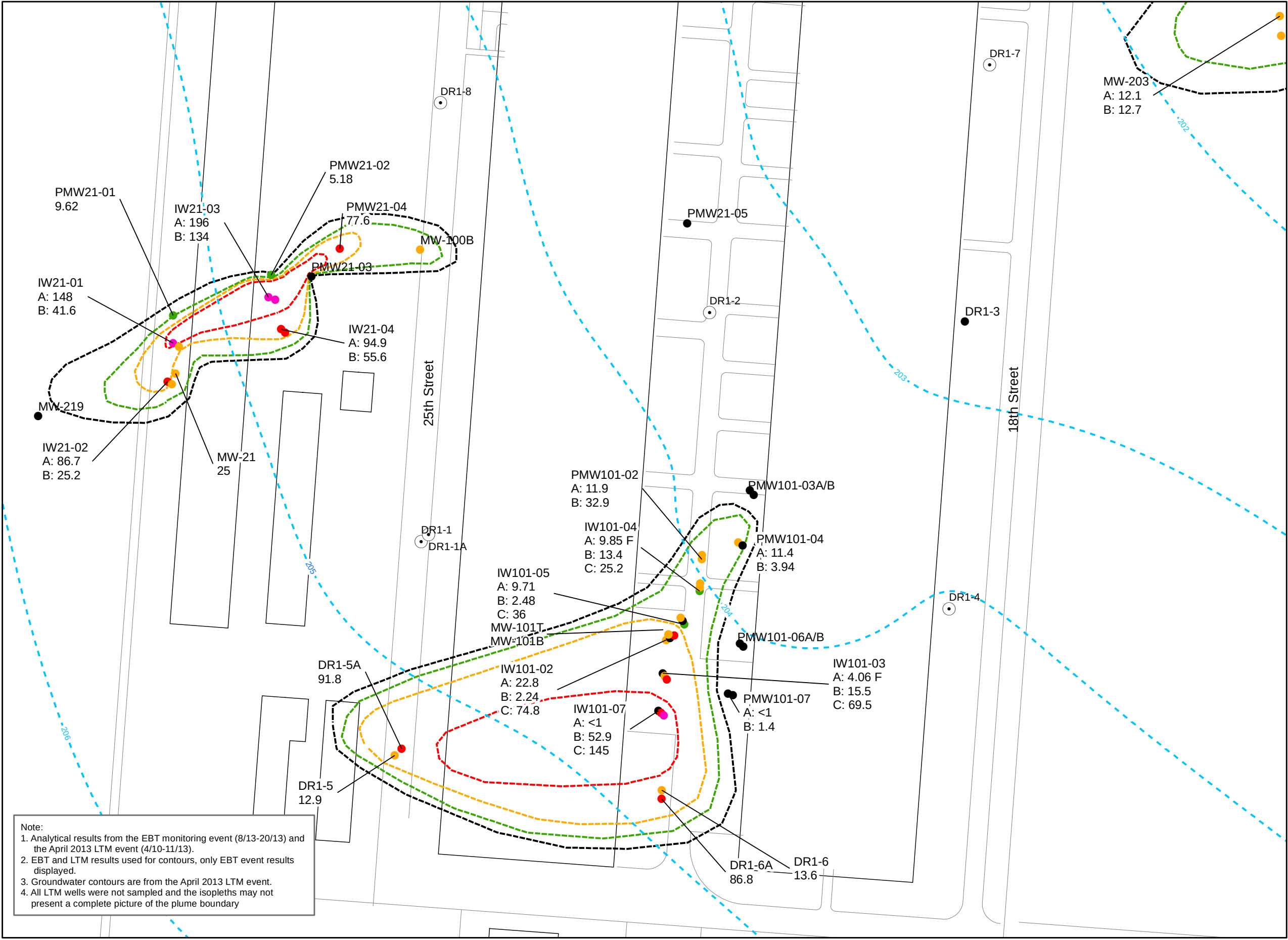
- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300
- Not Sampled

TCE Isopleth ug/L

- 5
- 10
- 50
- 100

Potentiometric surface of the Fluvial Aquifer 1-ft. contour





Note:
1. Analytical results from the EBT monitoring event (8/13-20/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary

Figure 39
TTA-1 cDCE
CONCENTRATIONS,
AUGUST 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

cDCE Ranges
ug/L

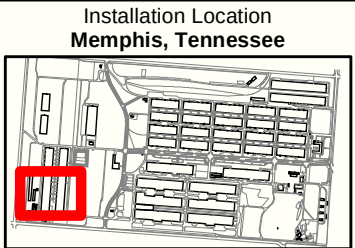
- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300
- Not Sampled

cDCE Isopleth
ug/L

- 5
- 10
- 50
- 100

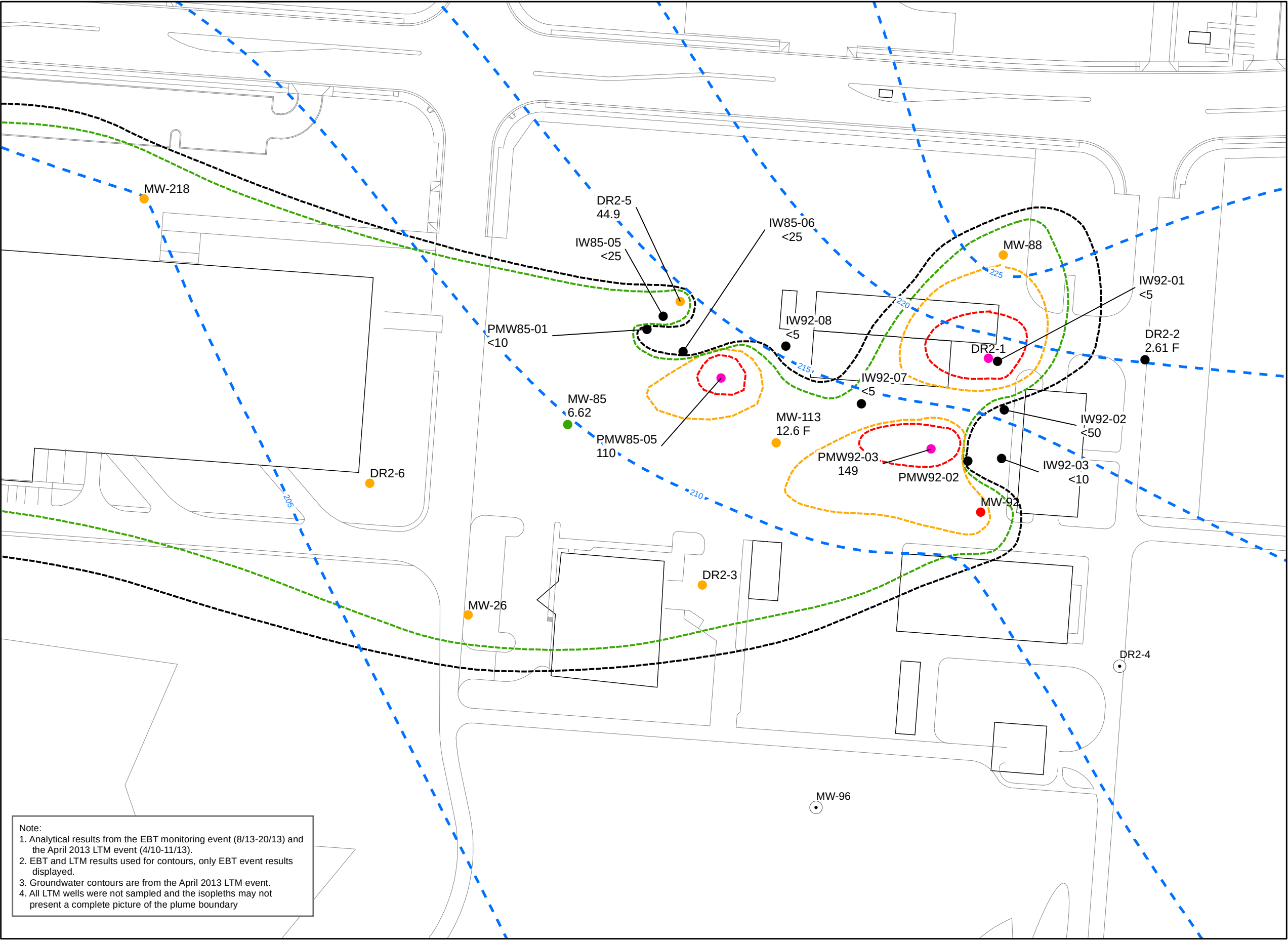
Potentiometric surface of the
Fluvial Aquifer 1-ft. contour

0 25 50 100 150
Feet



Date: March 2014
Edition: Rev 0





Note:
1. Analytical results from the EBT monitoring event (8/13-20/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary



Figure 40
TTA-2 PCE
CONCENTRATIONS,
AUGUST 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
- PCE Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300
 - Not Sampled

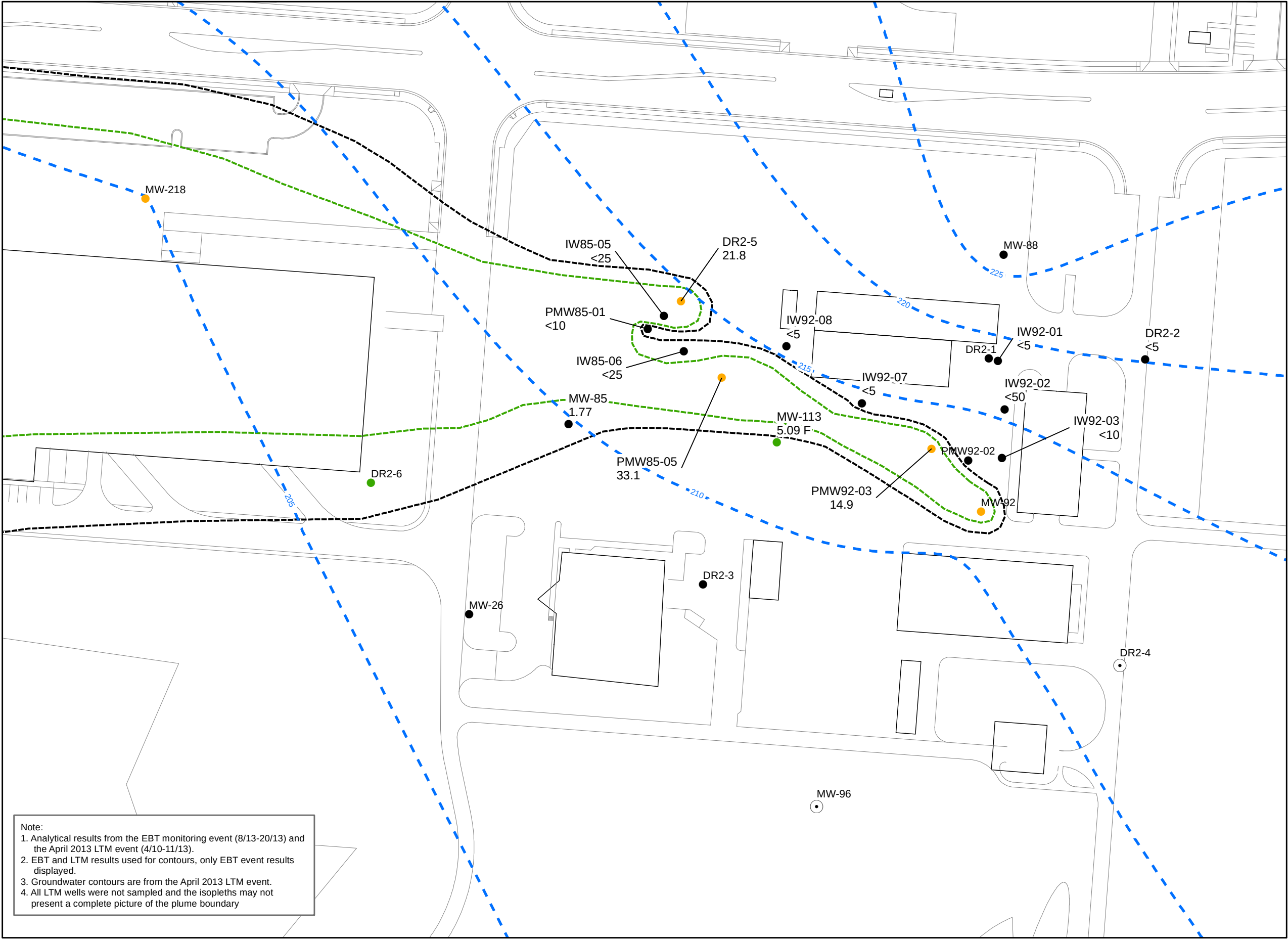
- PCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 5-ft. contour

0 25 50 100 150
Feet



Date: March 2014
Edition: Rev 0

HDR



Note:
1. Analytical results from the EBT monitoring event (8/13-20/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary



Figure 41
TTA-2 TCE
CONCENTRATIONS,
AUGUST 2013

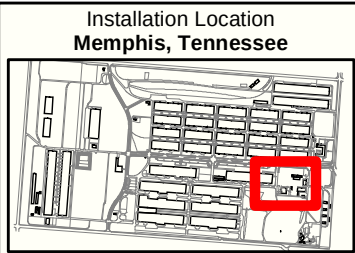
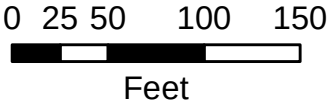
YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend
- TCE Ranges
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300
 - Not Sampled

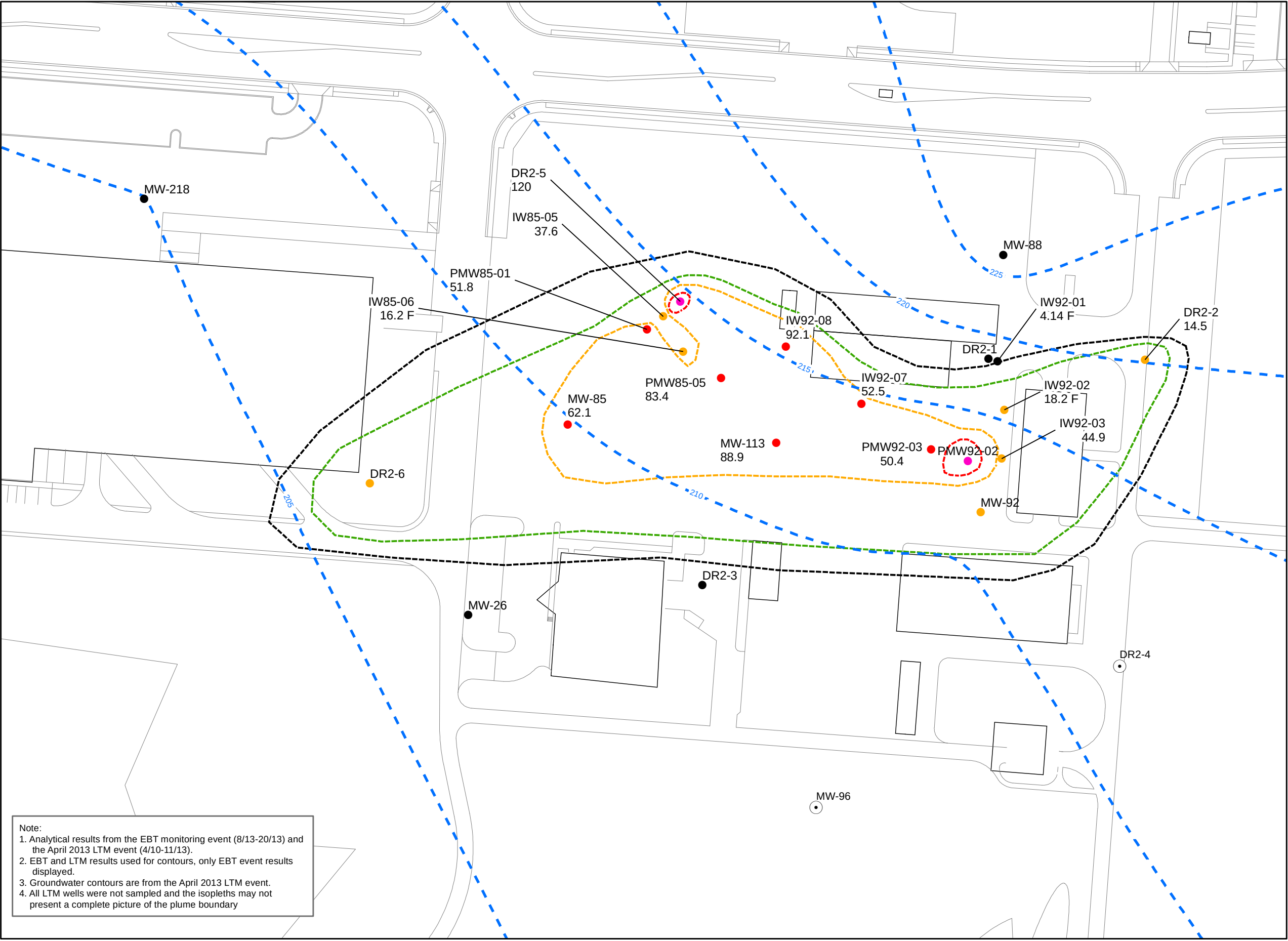
- TCE Isopleth
ug/L
- 5
 - 10
 - 50
 - 100

— Potentiometric surface of the
Fluvial Aquifer 5-ft. contour



Date: March 2014
Edition: Rev 0





Note:
1. Analytical results from the EBT monitoring event (8/13-20/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary

Figure 42
TTA-2 cDCE
CONCENTRATIONS,
AUGUST 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

cDCE Ranges
ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300
- Not Sampled

cDCE Isopleth
ug/L

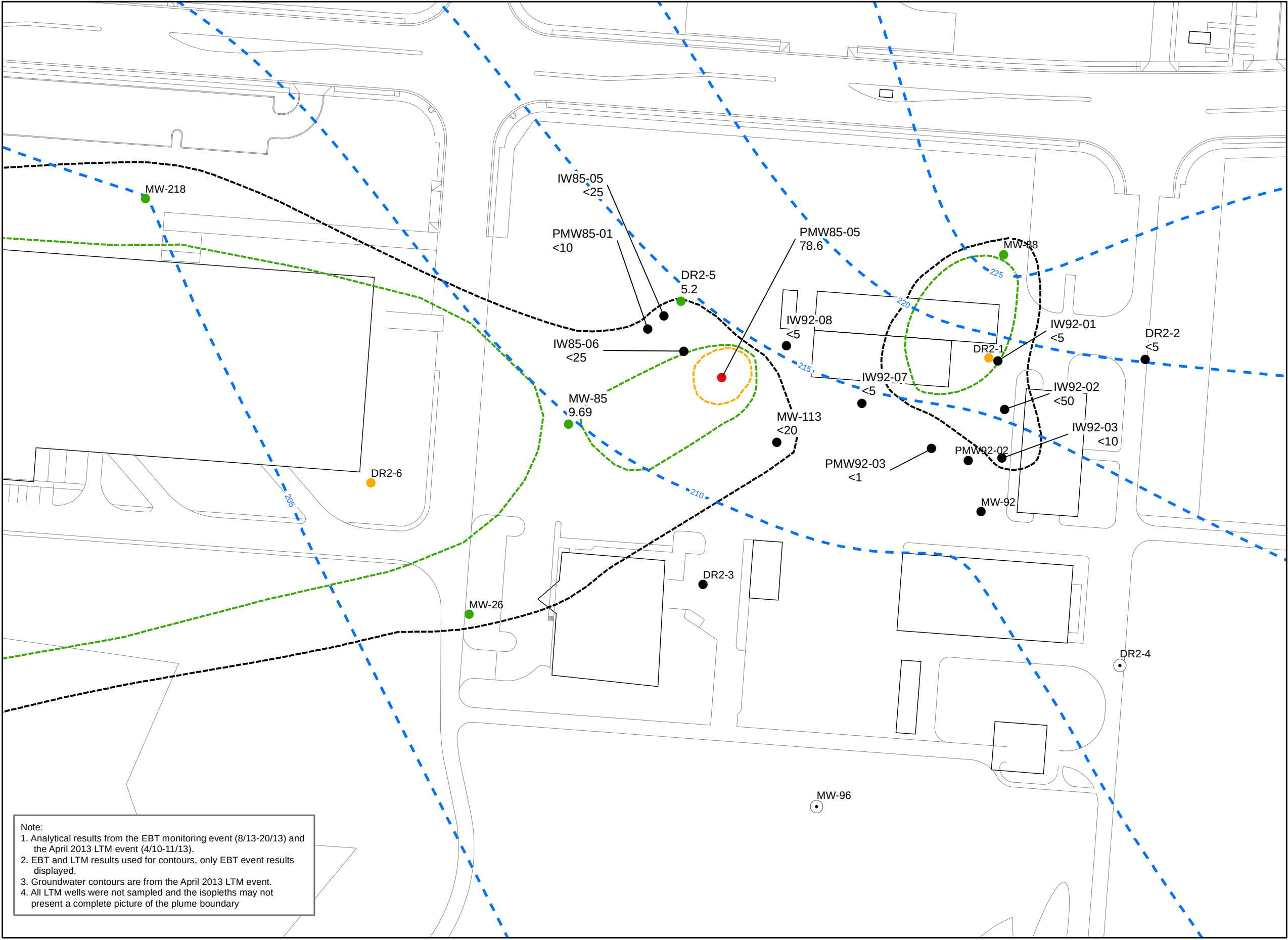
- 5
- 10
- 50
- 100

Potentiometric surface of the
Fluvial Aquifer 5-ft. contour

0 25 50 100 150
Feet

Installation Location
Memphis, Tennessee

Date: March 2014
Edition: Rev 0



Note:
1. Analytical results from the EBT monitoring event (8/13-20/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary



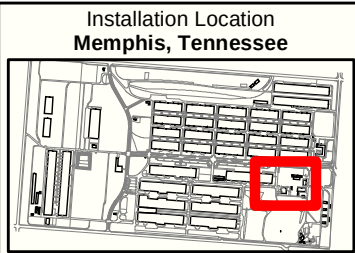
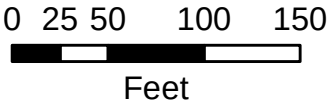
Figure 43
TTA-2 CT
CONCENTRATIONS,
AUGUST 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
- CT Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 200
 - Not Sampled

- CT Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 5-ft. contour



Date: March 2014
Edition: Rev 0



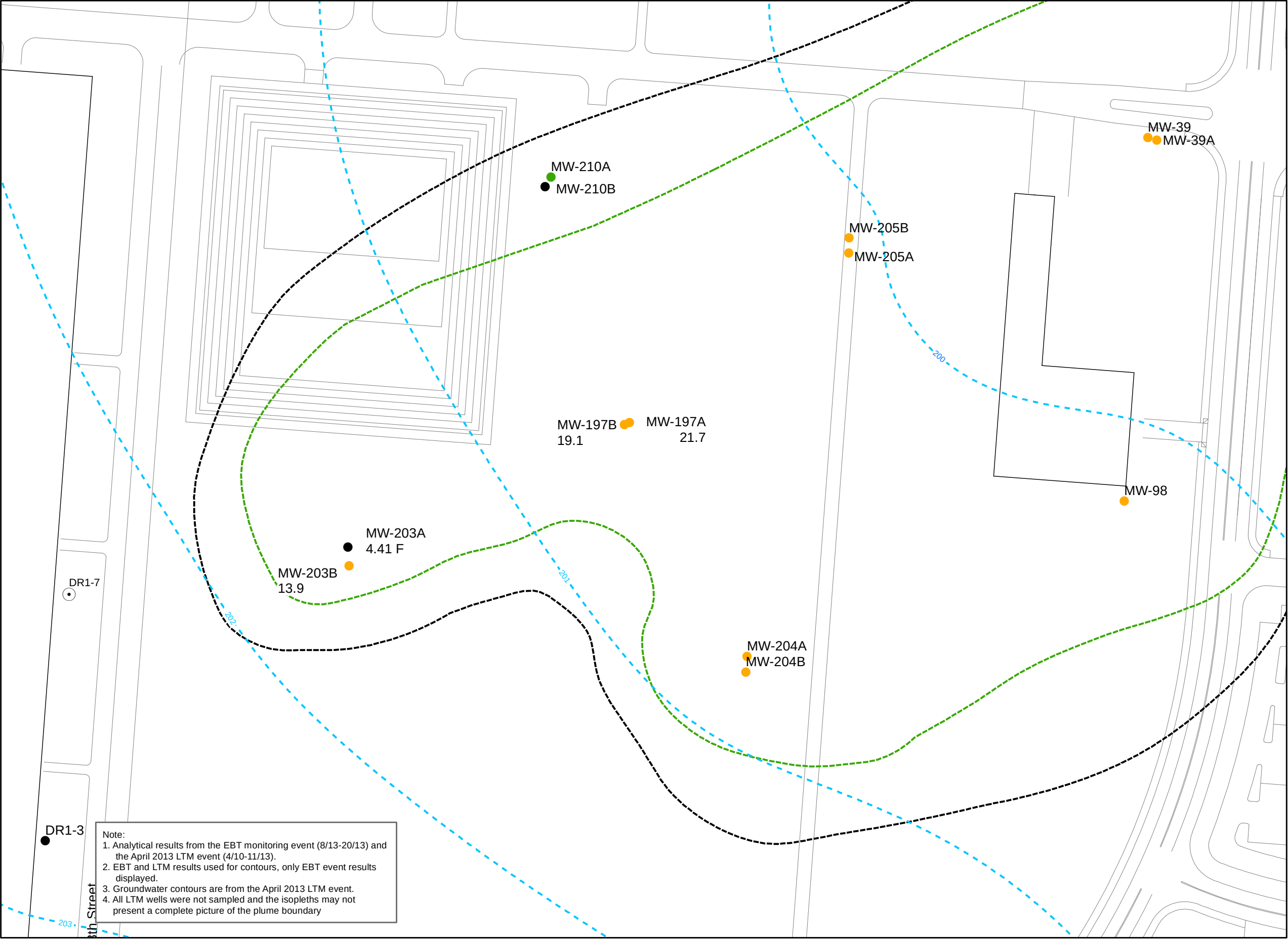


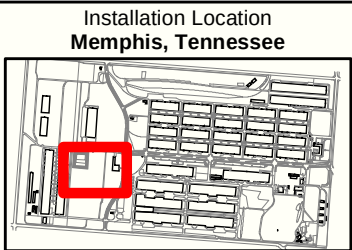
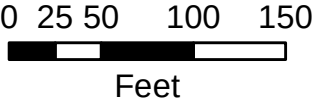
Figure 44
WEST-CENTRAL PCE
CONCENTRATIONS,
AUGUST 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

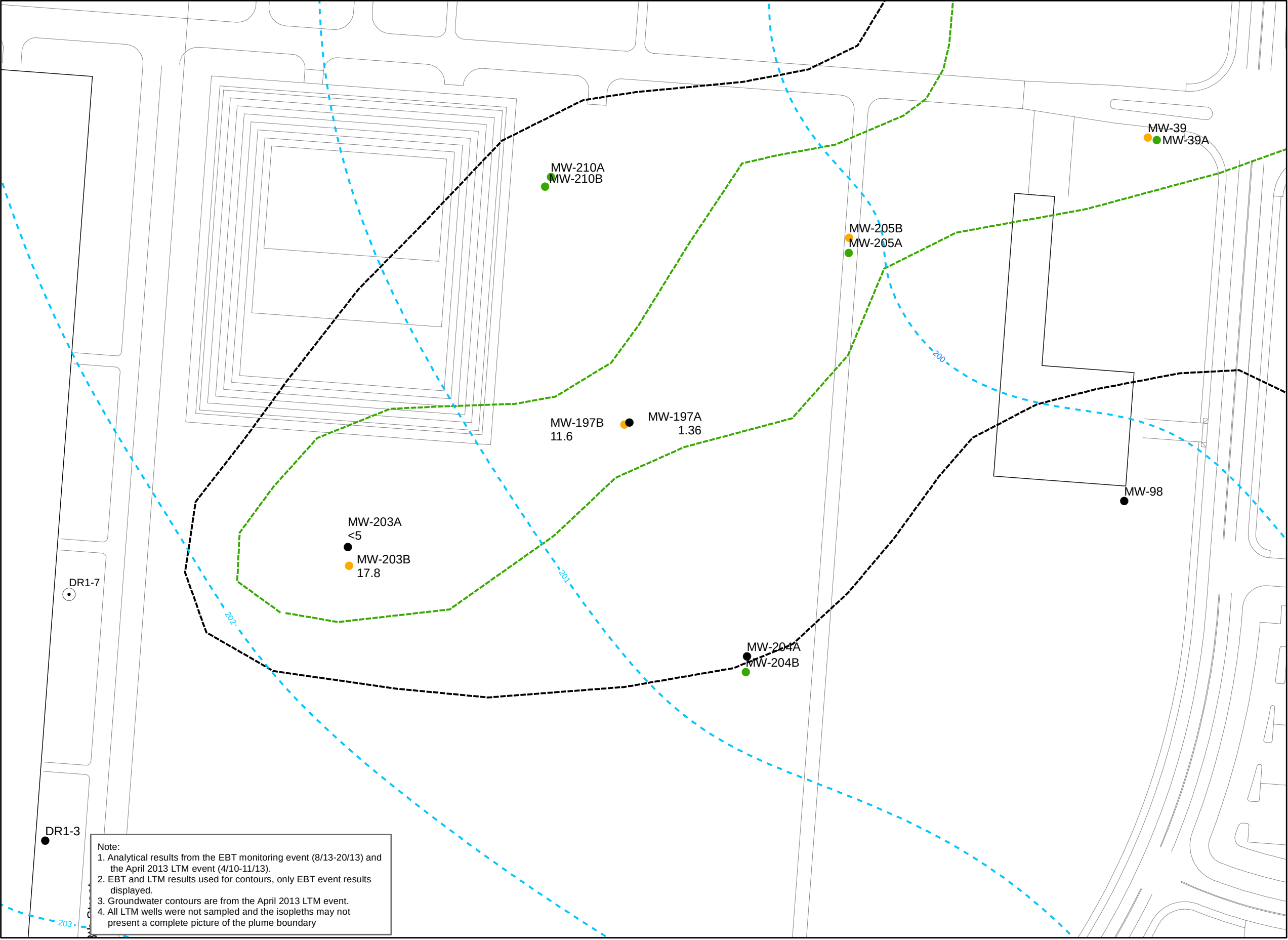
- Legend**
- PCE Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300
 - Not Sampled

- PCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 1-ft. contour



Date: March 2014
Edition: Rev 0





Note:
1. Analytical results from the EBT monitoring event (8/13-20/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary



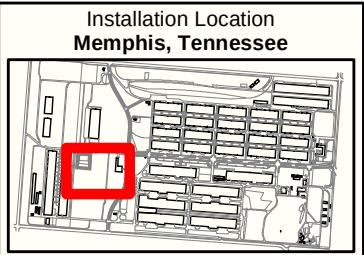
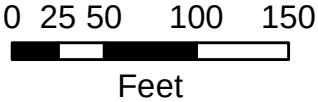
Figure 45
WEST- CENTRAL TCE
CONCENTRATIONS,
AUGUST 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
- TCE Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300
 - Not Sampled
- TCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100

— Potentiometric surface of the
Fluvial Aquifer 1-ft. contour



Date: March 2014
Edition: Rev 0



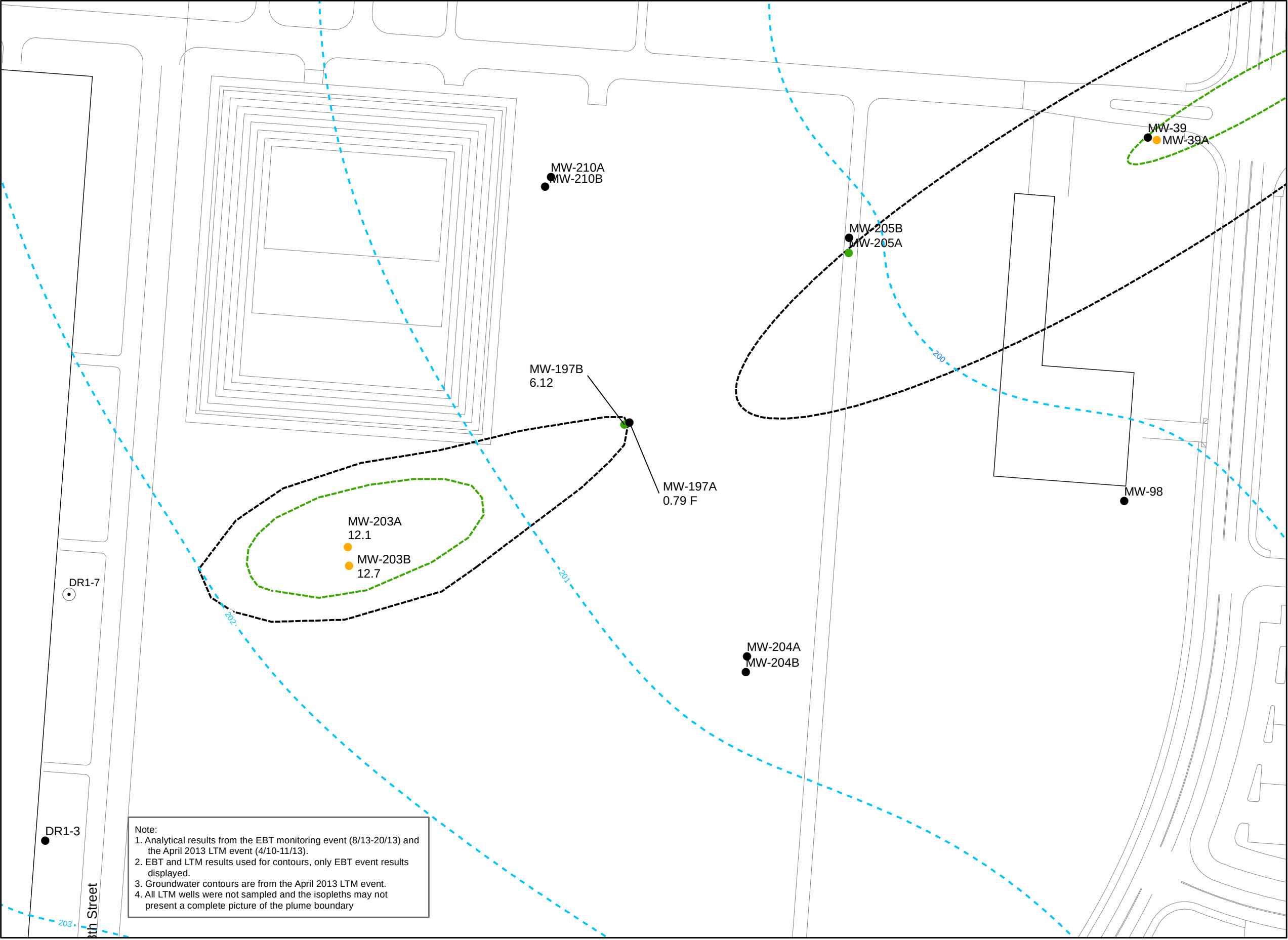


Figure 46

**WEST-CENTRAL cDCE
CONCENTRATIONS,
AUGUST 2013**

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

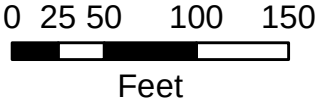
**cDCE Ranges
ug/L**

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300
- Not Sampled

**cDCE Isopleth
ug/L**

- 5
- 10
- 50
- 100

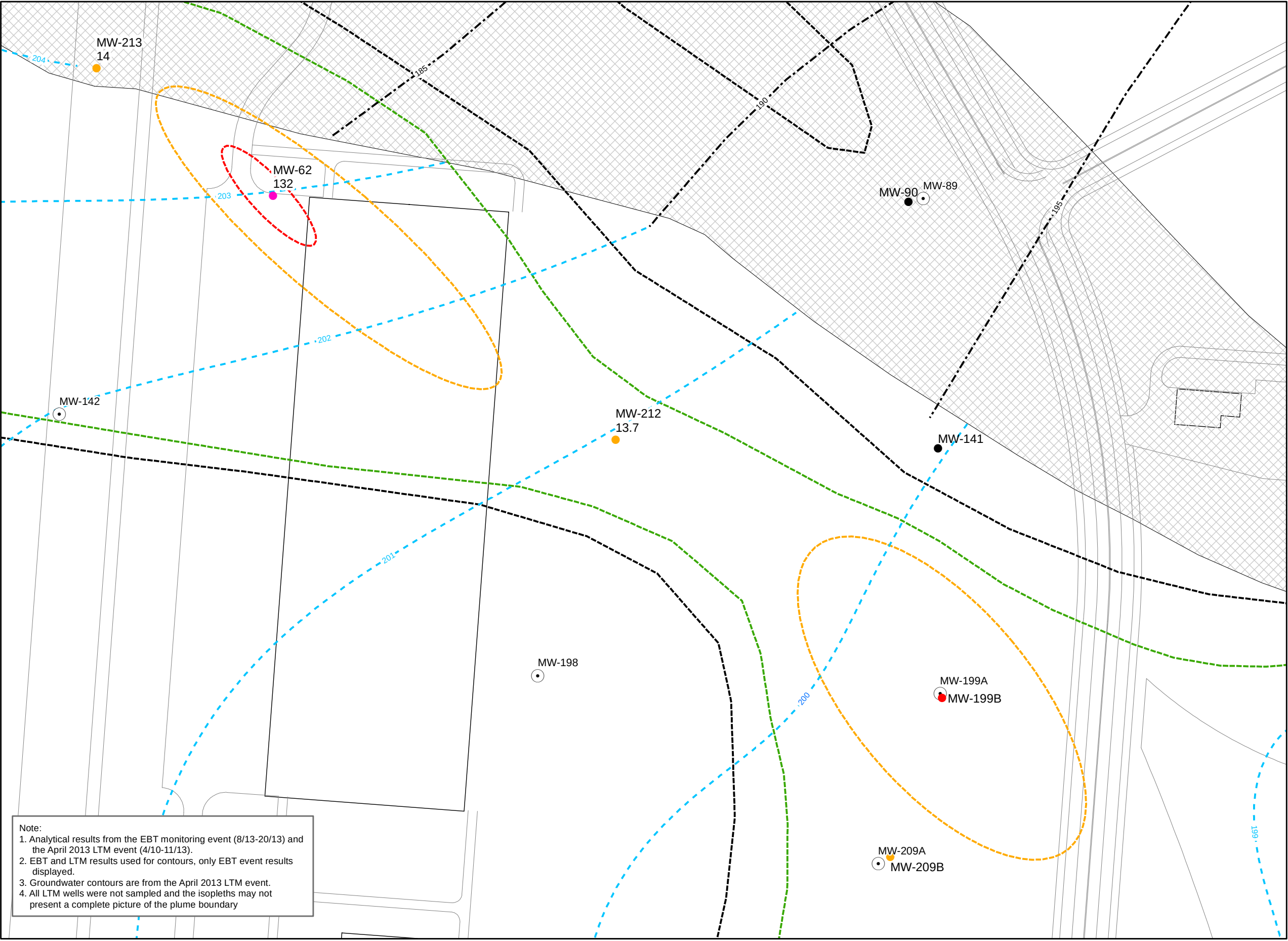
— Potentiometric surface of the
Fluvial Aquifer 1-ft. contour



Installation Location
Memphis, Tennessee

HDR

Date: March 2014
Edition: Rev 0



Note:
1. Analytical results from the EBT monitoring event (8/13-20/13) and the April 2013 LTM event (4/10-11/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the April 2013 LTM event.
4. All LTM wells were not sampled and the isopleths may not present a complete picture of the plume boundary



Figure 47
BUILDING 835 TCE
CONCENTRATIONS,
AUGUST 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

TCE Ranges
ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300
- Not Sampled

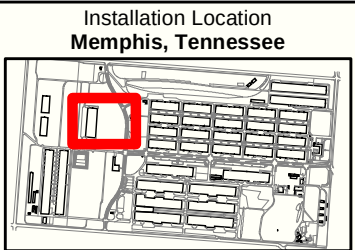
TCE Isopleth
ug/L

- 5
- 10
- 50
- 100

--- Potentiometric surface of the
Fluvial Aquifer 1-ft. contour

Clay Elevation Exceeds Groundwater Elevation

0 25 50 100 150
Feet



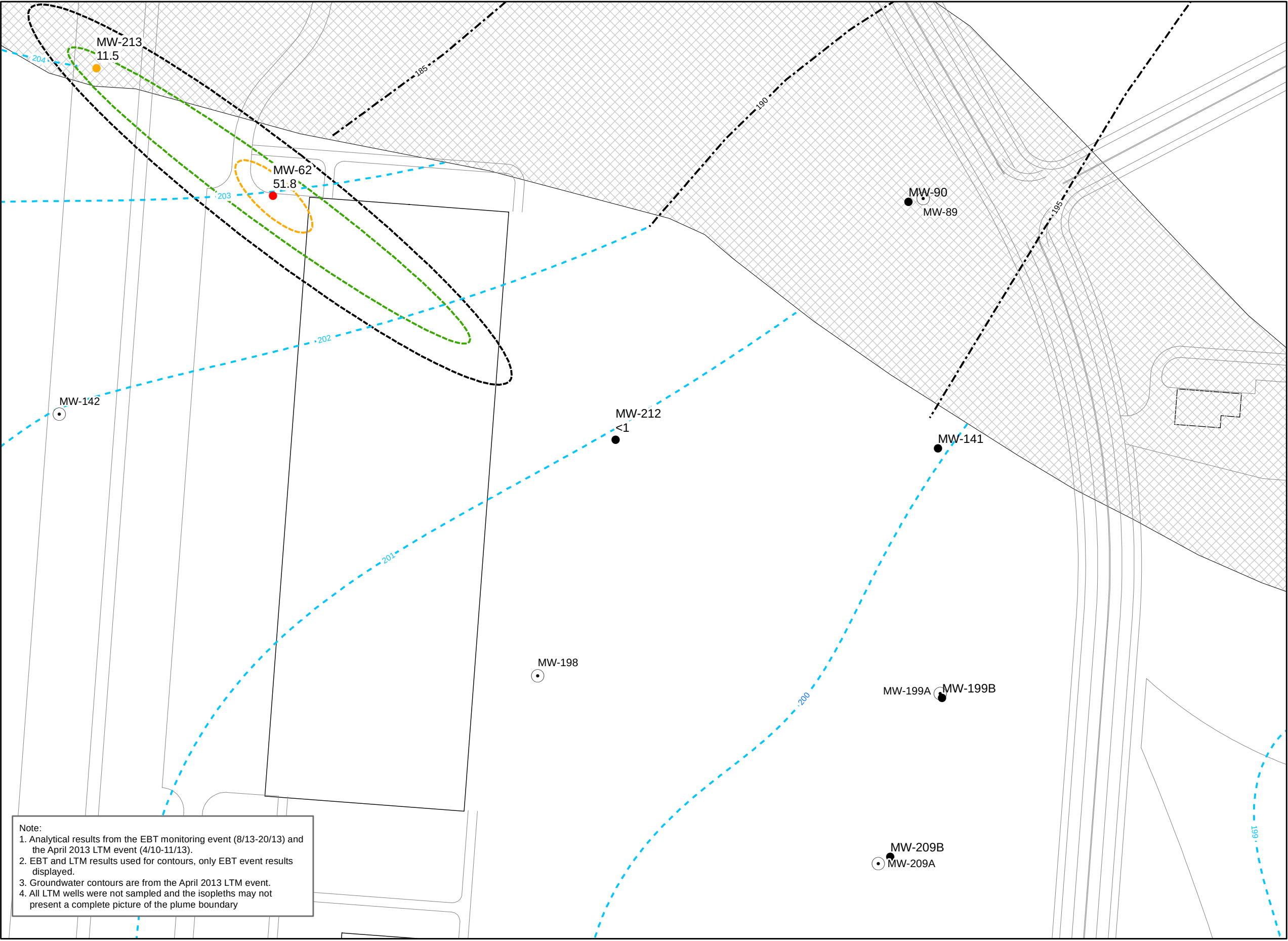


Figure 48

**BUILDING 835 cDCE
CONCENTRATIONS,
AUGUST 2013**

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

cDCE Ranges
ug/L

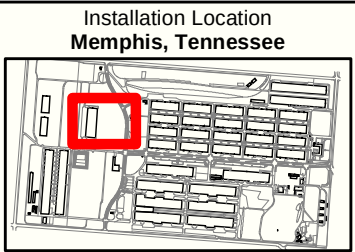
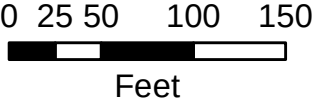
- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300
- Not Sampled

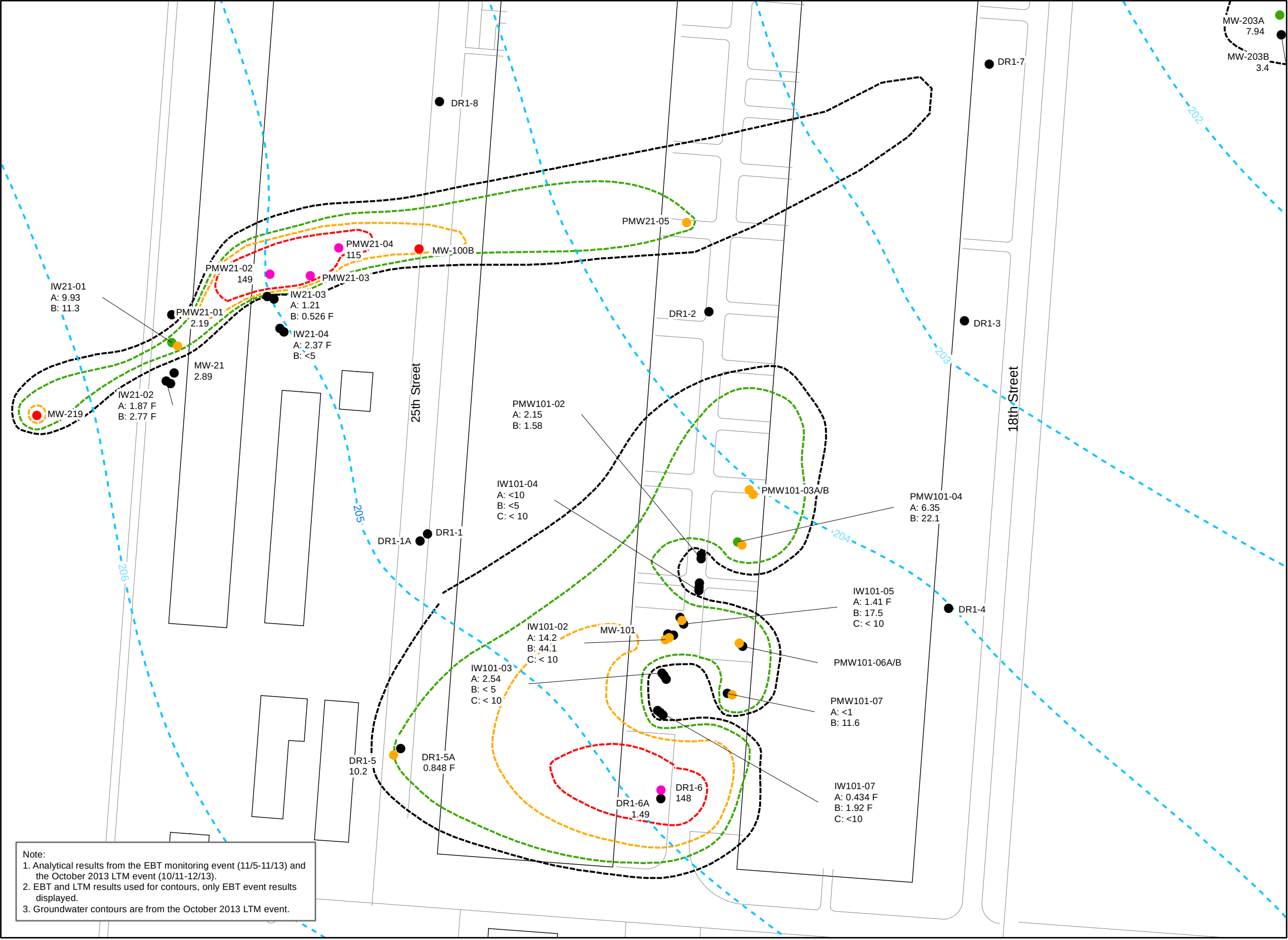
cDCE Isopleth
ug/L

- 5
- 10
- 50
- 100

--- Potentiometric surface of the
Fluvial Aquifer 1-ft. contour

▨ Clay Elevation Exceeds Groundwater Elevation





Note:
1. Analytical results from the EBT monitoring event (11/5-11/13) and the October 2013 LTM event (10/11-12/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2013 LTM event.

Figure 49
TTA-1 PCE CONCENTRATIONS, NOVEMBER 2013
YEAR THREE ENHANCED BIOREMEDIATION REPORT
DEFENSE DEPOT MEMPHIS, TENNESSEE

Legend

PCE Ranges ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

PCE Isopleth ug/L

- 5
- 10
- 50
- 100

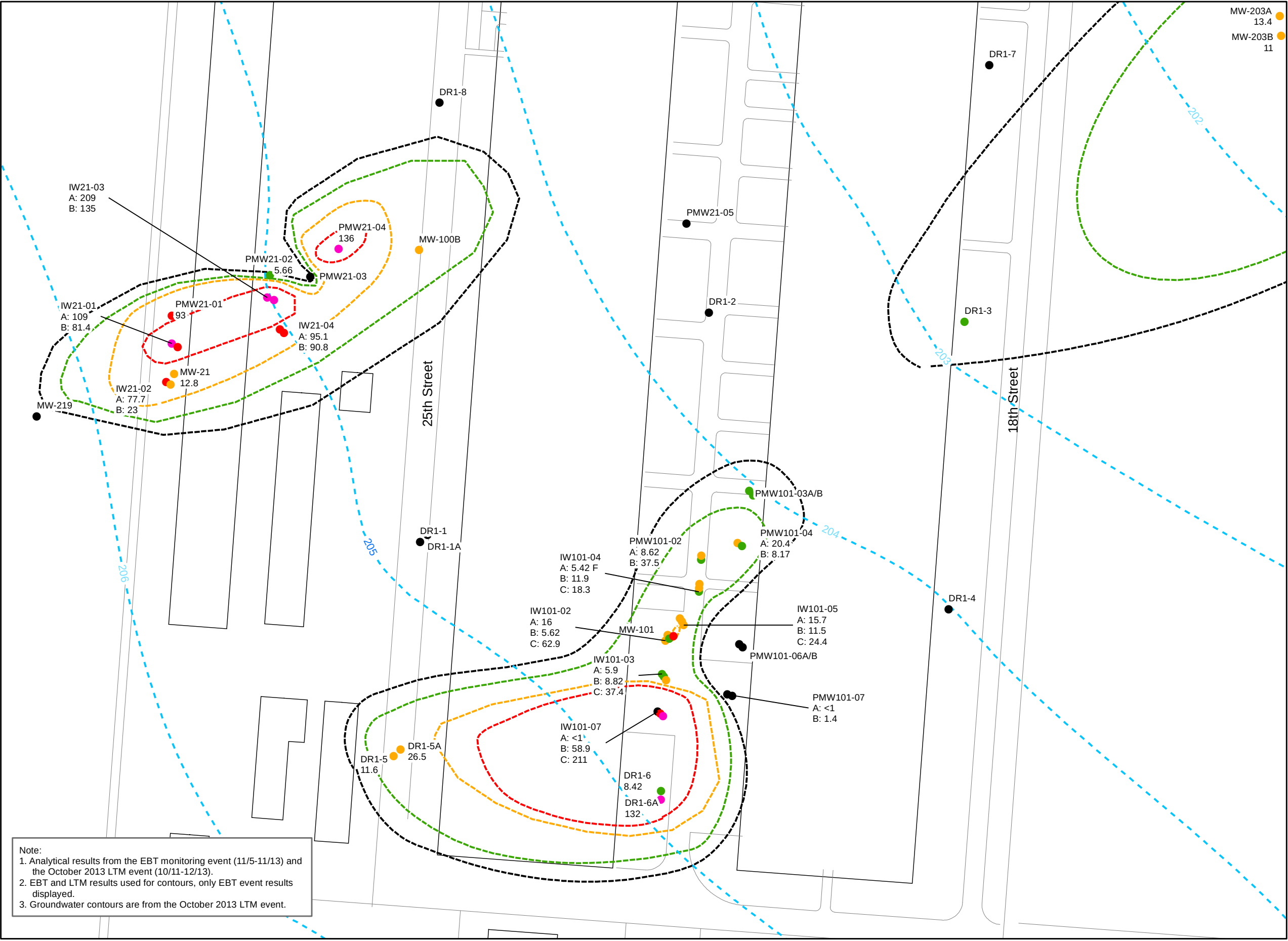
Potentiometric surface of the Fluvial Aquifer 1-ft. contour

0 25 50 100 150
Feet

Installation Location
Memphis, Tennessee

Date: March 2014
Edition: Rev 0

HDR



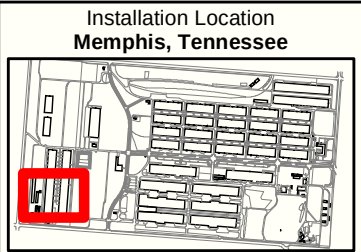
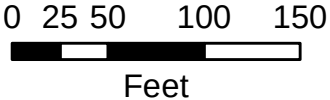
TTA-1 cDCE CONCENTRATIONS, NOVEMBER 2013

YEAR THREE ENHANCED BIOREMEDIATION REPORT

DEFENSE DEPOT MEMPHIS, TENNESSEE

- Legend**
- cDCE Ranges ug/L**
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300

- cDCE Isopleth ug/L**
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the Fluvial Aquifer 1-ft. contour



Date: March 2014
Edition: Rev 0



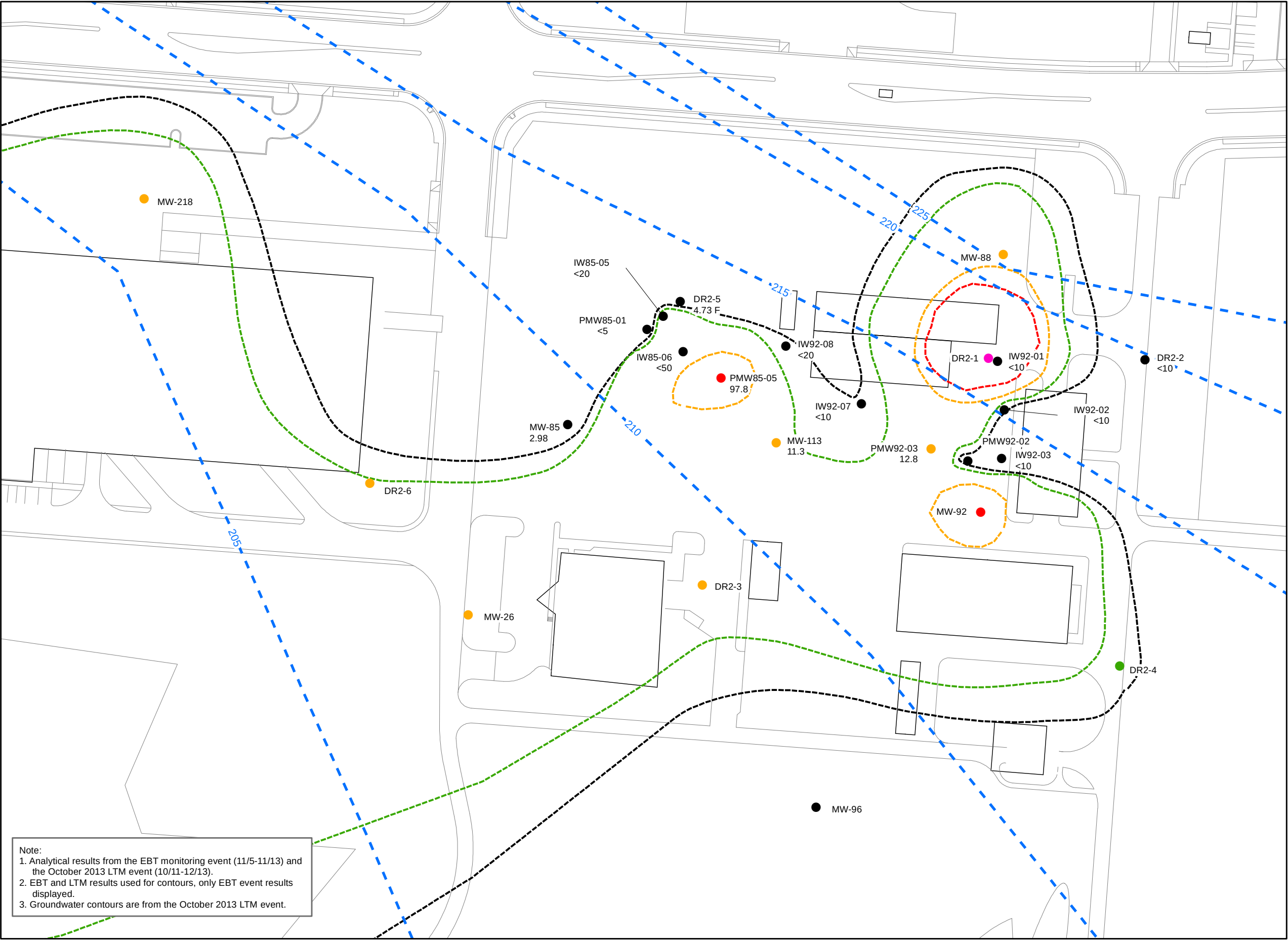


Figure 52

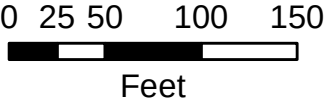
TTA-2 PCE
CONCENTRATIONS,
NOVEMBER 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

- Legend**
- PCE Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300

- PCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 5-ft. contour



Date: March 2014
Edition: Rev 0





**TTA-2 TCE
CONCENTRATIONS,
NOVEMBER 2013**

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

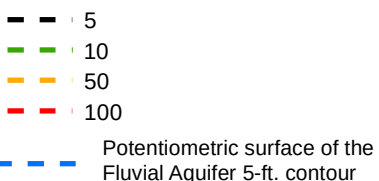
DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

**TCE Ranges
ug/L**



TCE Isopleth
ug/L



Feet

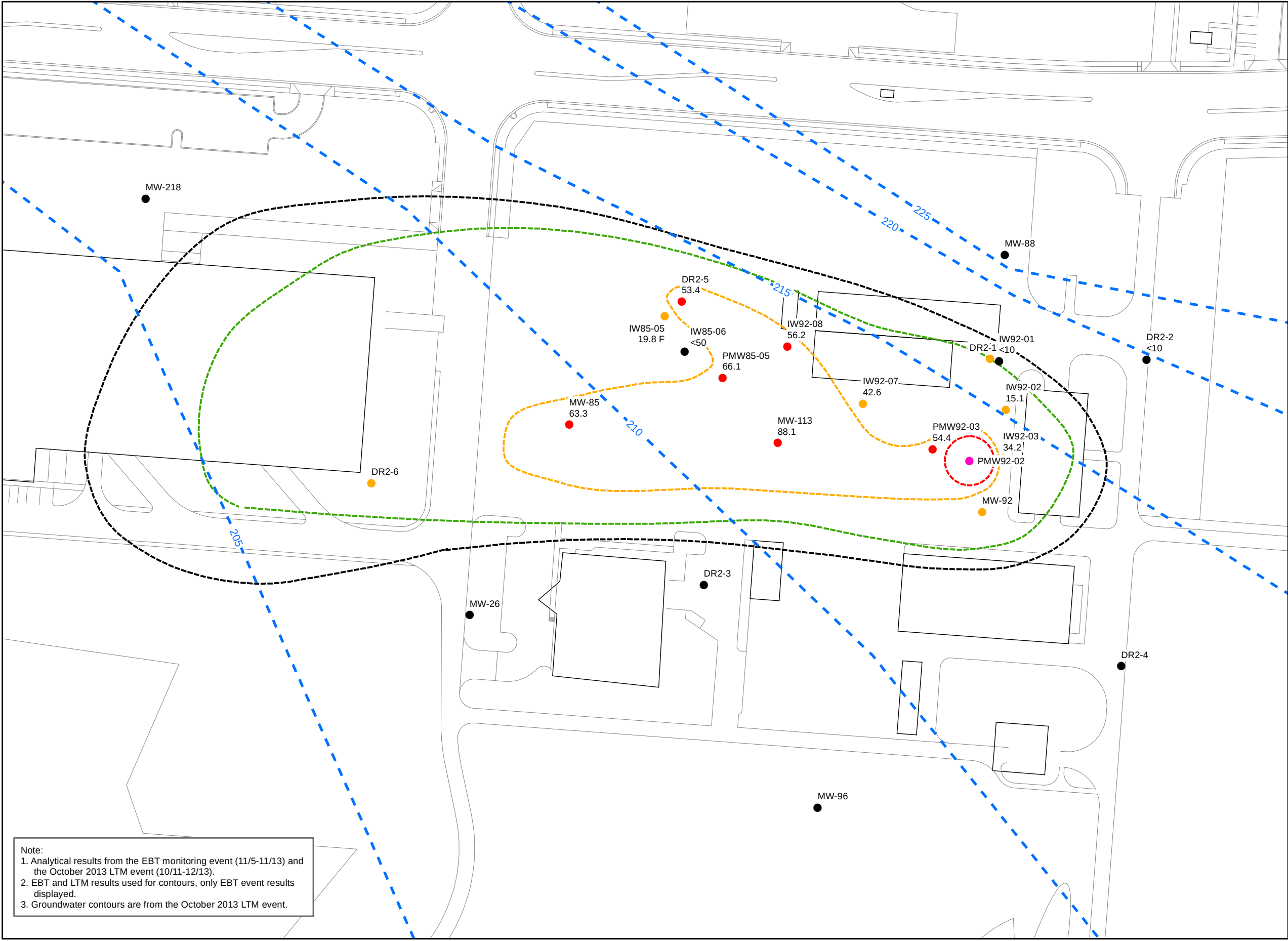


HDR

Note:

1. Analytical results from the EBT monitoring event (11/5-11/13) and the October 2013 LTM event (10/11-12/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2013 LTM event.

Path: G:\DDMT\EBT-Y3report\GIS\Figure 53 TTA2-TCE NOV13.mxd



Note:
1. Analytical results from the EBT monitoring event (11/5-11/13) and the October 2013 LTM event (10/11-12/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2013 LTM event.



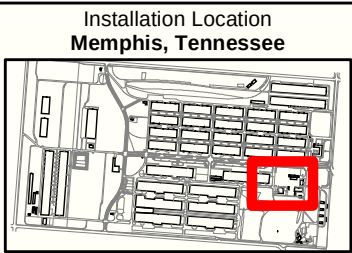
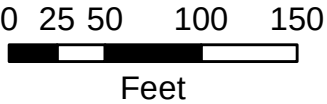
Figure 54
TTA-2 cDCE
CONCENTRATIONS,
NOVEMBER 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

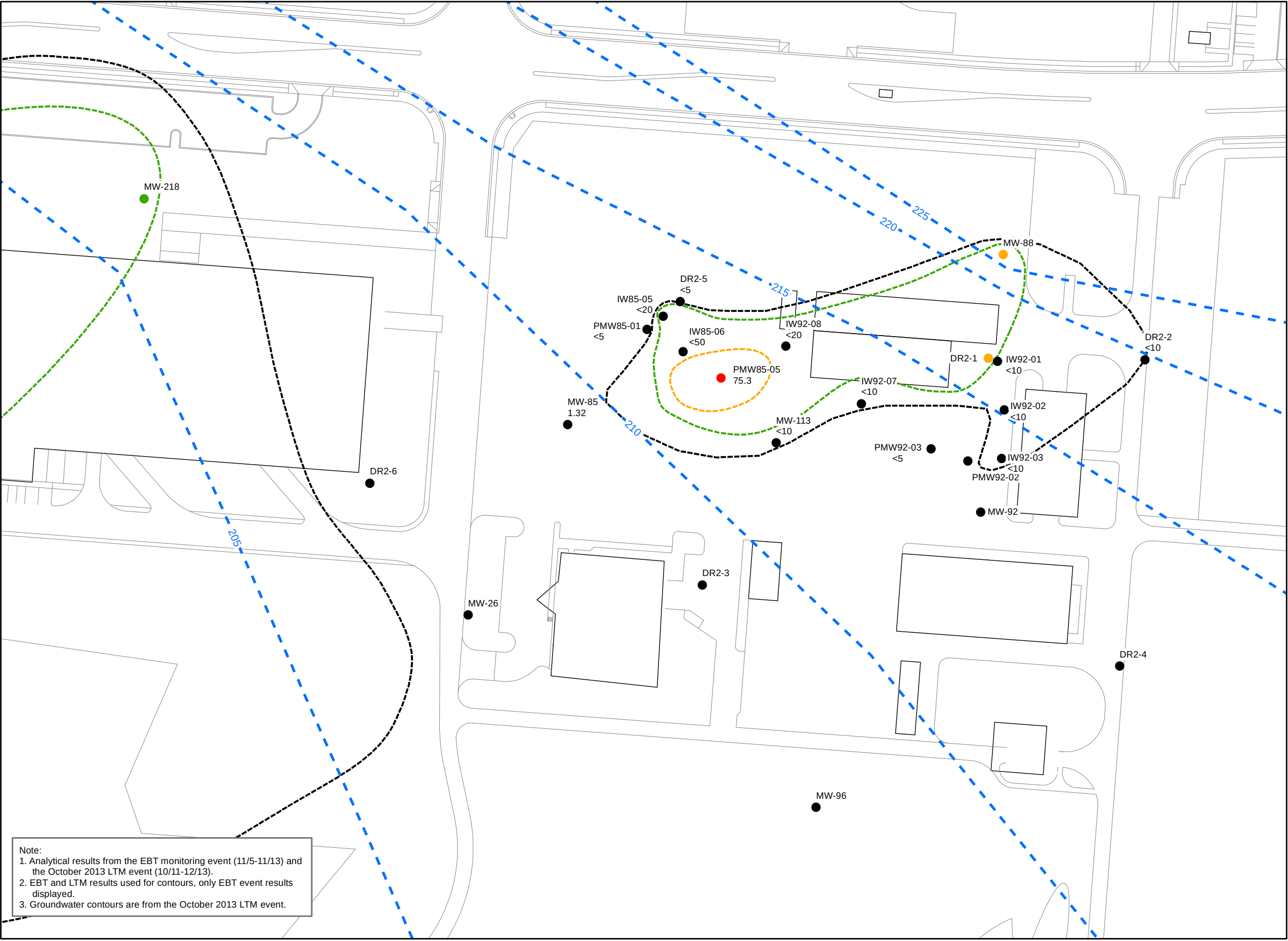
- Legend**
- cDCE Ranges**
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300

- cDCE Isopleth**
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 5-ft. contour



Date: March 2014
Edition: Rev 0





Note:
1. Analytical results from the EBT monitoring event (11/5-11/13) and the October 2013 LTM event (10/11-12/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2013 LTM event.



Figure 55

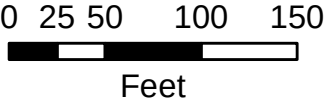
TTA-2 CT
CONCENTRATIONS,
NOVEMBER 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

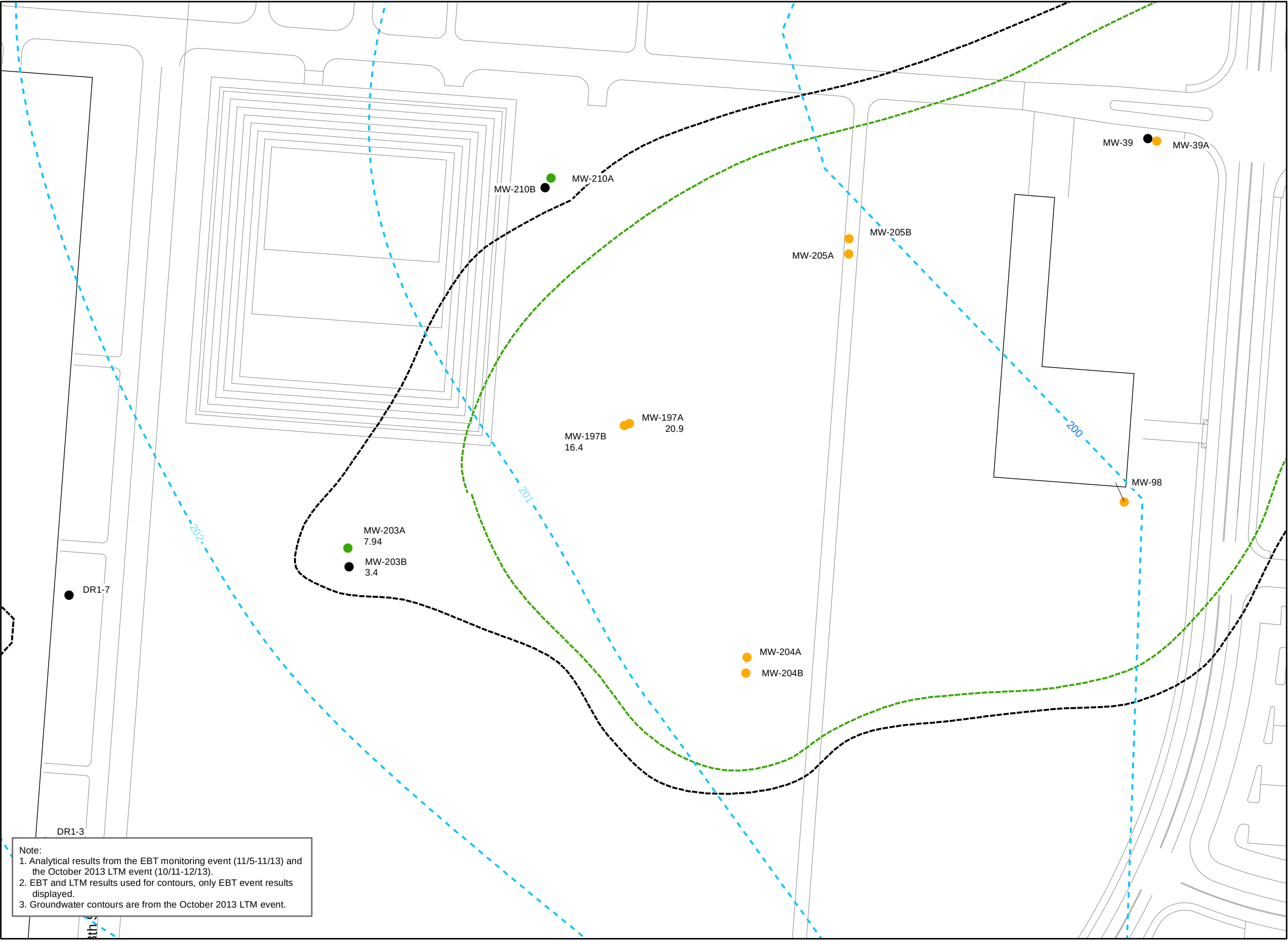
- Legend
- CT Ranges
ug/L
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 200

- CT Isopleth
ug/L
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the
Fluvial Aquifer 5-ft. contour



Date: March 2014
Edition: Rev 0





Note:
1. Analytical results from the EBT monitoring event (11/5-11/13) and the October 2013 LTM event (10/11-12/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2013 LTM event.



Figure 56

**WEST-CENTRAL PCE
CONCENTRATIONS,
NOVEMBER 2013**

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

PCE Ranges

ug/L

- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

PCE Isopleth

ug/L

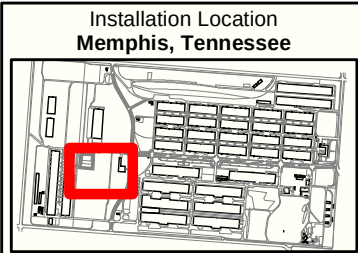
- 5
- 10
- 50
- 100

Potentiometric surface of the
Fluvial Aquifer 1-ft. contour

0 25 50 100 150

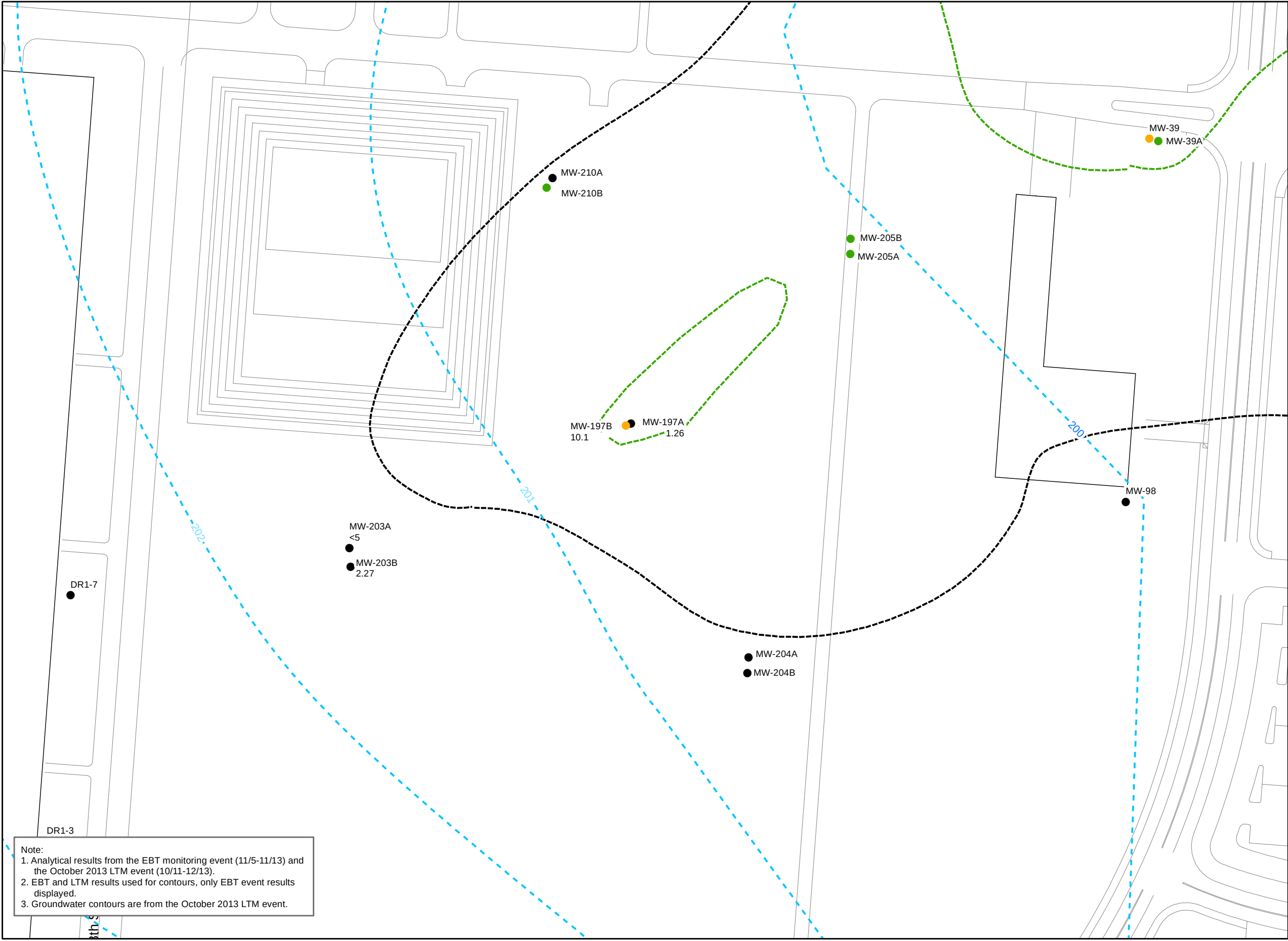


Feet



Date: March 2014
Edition: Rev 0





Note:
1. Analytical results from the EBT monitoring event (11/5-11/13) and the October 2013 LTM event (10/11-12/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2013 LTM event.



Figure 57
WEST- CENTRAL TCE
CONCENTRATIONS,
NOVEMBER 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

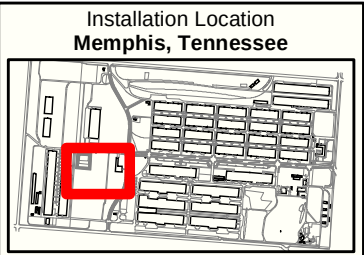
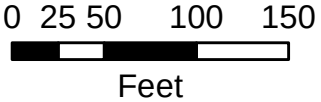
TCE Ranges
ug/L

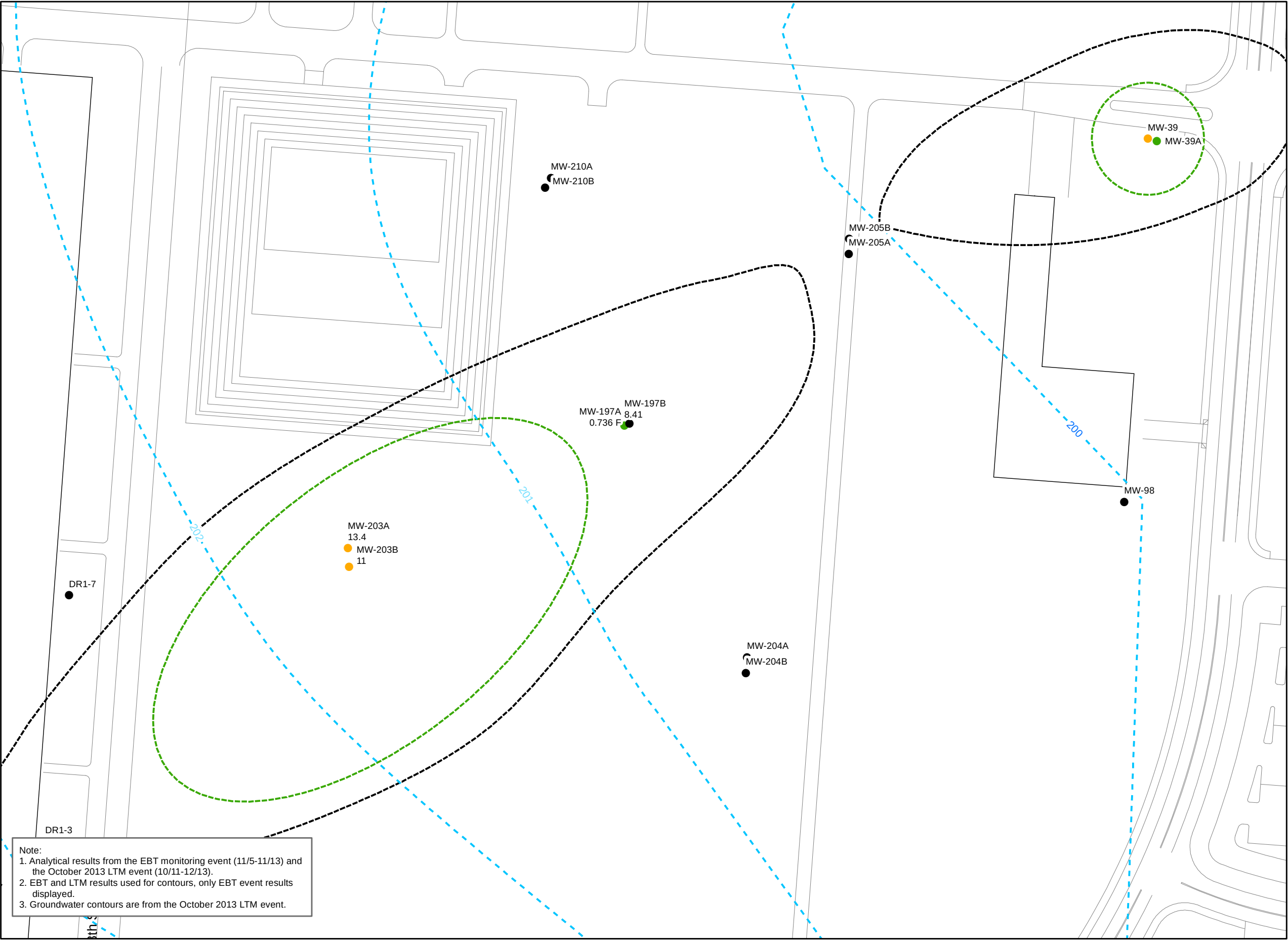
- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

TCE Isopleth
ug/L

- 5
- 10
- 50
- 100

— Potentiometric surface of the
Fluvial Aquifer 1-ft. contour





Note:
1. Analytical results from the EBT monitoring event (11/5-11/13) and the October 2013 LTM event (10/11-12/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2013 LTM event.



Figure 58

**WEST-CENTRAL cDCE
CONCENTRATIONS,
NOVEMBER 2013**

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

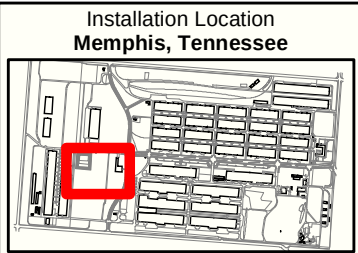
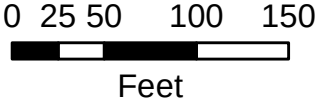
cDCE Ranges
ug/L

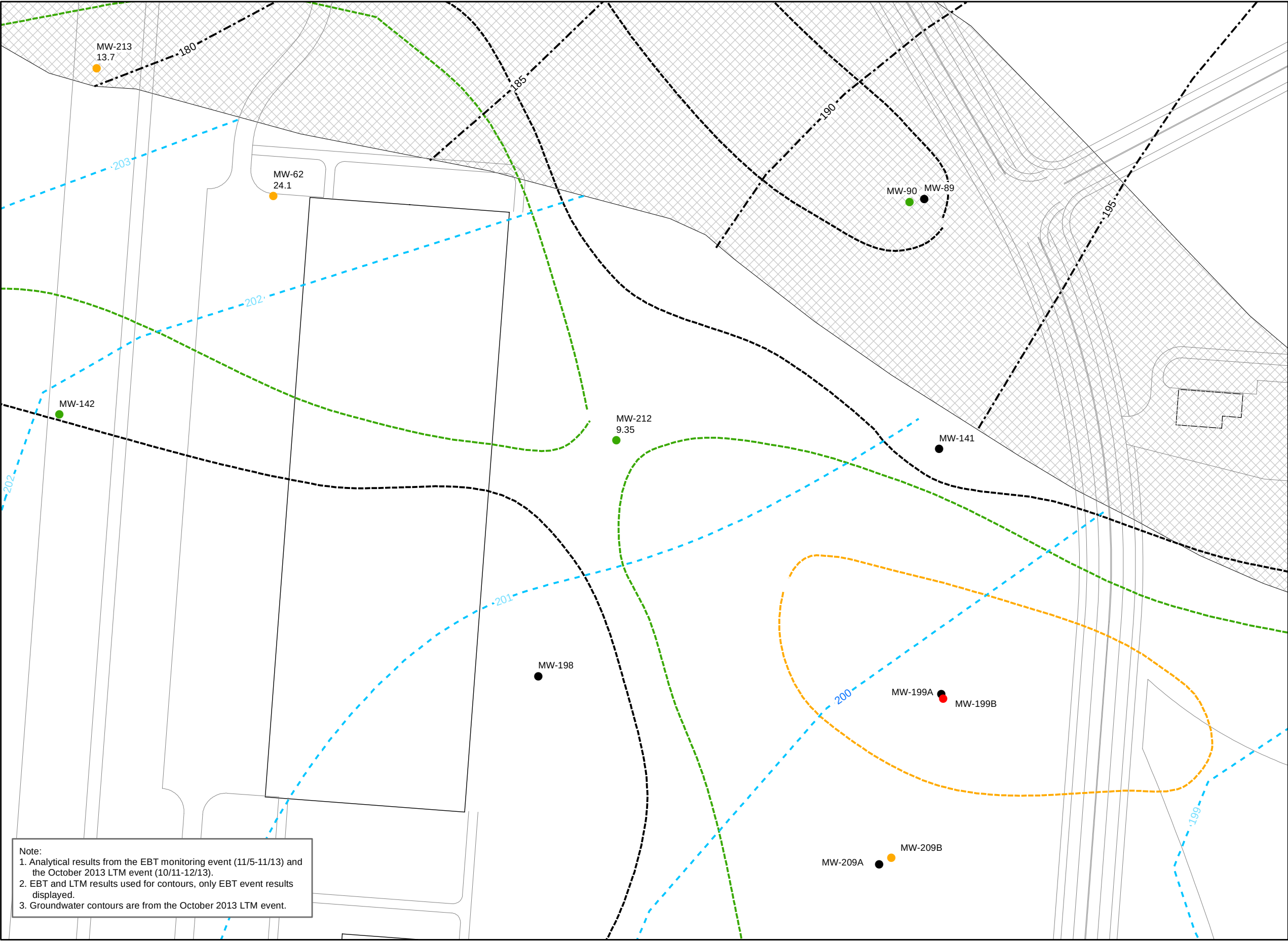
- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

cDCE Isopleth
ug/L

- 5
- 10
- 50
- 100

Potentiometric surface of the
Fluvial Aquifer 1-ft. contour





Note:
1. Analytical results from the EBT monitoring event (11/5-11/13) and the October 2013 LTM event (10/11-12/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2013 LTM event.



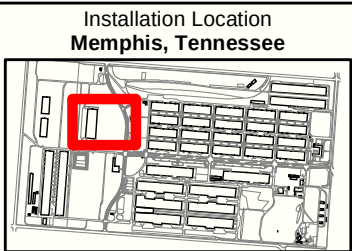
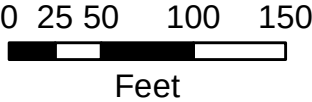
Figure 59
BUILDING 835 TCE CONCENTRATIONS, NOVEMBER 2013

YEAR THREE ENHANCED BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

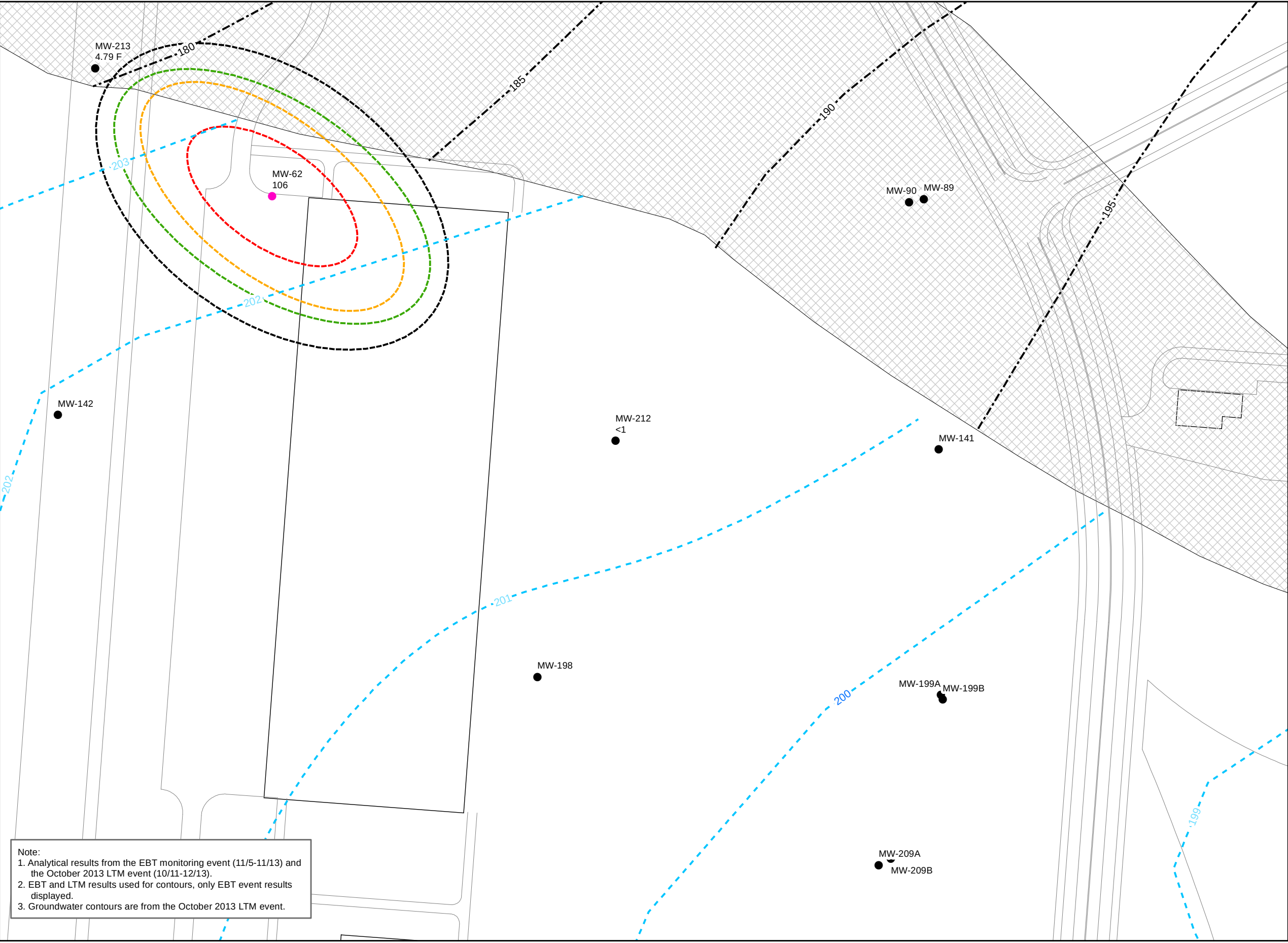
- Legend**
- TCE Ranges ug/L**
- 0 - 5
 - 5 - 10
 - 10 - 50
 - 50 - 100
 - 100 - 300

- TCE Isopleth ug/L**
- 5
 - 10
 - 50
 - 100
- Potentiometric surface of the Fluvial Aquifer
- Clay Fluvial Aquifer



Date: March 2014
Edition: Rev 0





Note:
1. Analytical results from the EBT monitoring event (11/5-11/13) and the October 2013 LTM event (10/11-12/13).
2. EBT and LTM results used for contours, only EBT event results displayed.
3. Groundwater contours are from the October 2013 LTM event.

Figure 60
BUILDING 835 cDCE
CONCENTRATIONS,
NOVEMBER 2013

YEAR THREE ENHANCED
BIOREMEDIATION REPORT

DEFENSE DEPOT
MEMPHIS, TENNESSEE

Legend

cDCE Ranges
ug/L

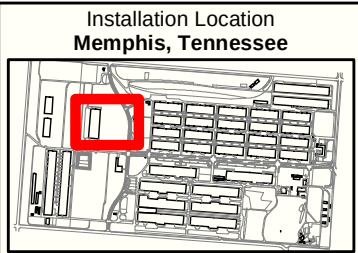
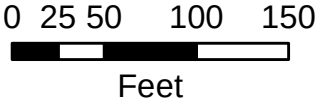
- 0 - 5
- 5 - 10
- 10 - 50
- 50 - 100
- 100 - 300

cDCE Isopleth
ug/L

- 5
- 10
- 50
- 100

— Potentiometric surface of the
Fluvial Aquifer 1-ft. contour

Clay Elevation Exceeds Groundwater Elevation



APPENDIX A

WELL ABANDONMENT PERMITS AND SURVEY PLATS



Mark H. Luttrell, Jr.
Mayor
Shelby County

SHELBY COUNTY HEALTH DEPARTMENT

YVONNE S. MADLOCK
DIRECTOR

HELEN MARROW, M. D.
HEALTH OFFICER



Public Health
Prevent. Promote. Protect.

May 31, 2012

HDR Inc.

Attention: Brad Sperry
2241 Truitt Street
Memphis, TN 38114

RE: EMERGENCY FILL AND ABANDONMENT: 1701 Dunn (Parcel ID # 060092 00029)
(Department of the Army IW101-01A-C,IW101-06A-C,IW101-081-C,IW101-09A-C,IW21-05 A,B,
PMW101-01 A,B, PMW101-05 A, B, PMW101-08A,B) **Permit # 12-069**

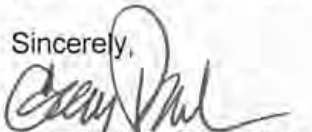
Dear Mr. Sperry:

This letter is to inform you that a construction permit has been issued to your selected well contractor, approving the fill and abandonment of the above referenced well. We appreciate the cooperation you have given the Health Department during the application review process. Complying with the following requires your further cooperation:

1. The Health Department is to be notified when the work is scheduled so that we can witness the procedures.
2. The Health Department is to be notified if the well driller violates any of the conditions for which the permit was issued.
3. The Health Department is to be notified for prior approval of any changes in plans for filling the well, or in the well contractor initially selected to do the work.
4. Inspection Fee Required? Yes ☐ No ☒ Amount
5. Permit Application Fee Yes ☒ No ☐ Amount \$50.00

If you have any questions or need additional information, please contact Mr. Greg Parker at (901) 222-9599.

Sincerely,


Greg Parker, Supervisor
Water Quality Branch

BD: GP: bfd

Mission

To promote, protect and improve the health and environment of all Shelby County residents.

814 Jefferson Street ♦ Memphis, Tennessee 38105
(901) 222-9599



SHELBY COUNTY HEALTH DEPARTMENT
WATER QUALITY CONTROL
FILL AND ABANDONMENT CONSTRUCTION PERMIT



Public Health
Prevent. Promote. Protect.

WELL DRILLING COMPANY M & W Drilling, LLC

ADDRESS 8321 Oak Ridge HWY Knoxville, TN 37931

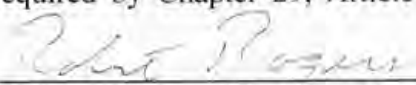
DATE ISSUED 5/30/2012 EXPIRATION DATE 8/28/2012 PERMIT # 12-069

DESCRIPTION OF WORK – Fill and Abandonment of Monitoring Well(s) at: 1701 Dunn (Parcel ID # 060092 00029) Emergency Permit Owner HDR Inc. (Department of the Army IW101-01A-C, IW101-06A-C, IW101-081-C, IW101-09A-C, IW21-05 A, B, PMW101-01 A, B, PMW101-05 A, B, PMW101-08A, B)

This permit is issued based on signed commitment by the driller and the owner of the well to fully comply with the requirements set forth in the approved application or as directed by the Shelby County Health Department. Deviation from the approved application or any conditions set forth by the Health Department shall void this permit.

CONDITIONS:

1. The abandoned well shall be sealed only by a licensed well contractor.
2. All procedures used in sealing the well shall be witnessed by a representative of the Shelby County Health department.
3. All water lines to the well are to be disconnected.
4. The well is to be dismantled in such a way that all working parts from inside the casing are removed.
5. Any obstructions found in the well are to be removed.
6. The empty casing is to be filled by one of two methods:
 - a. With a Portland Class A or quick setting cement in a ratio not over seven (7) gallons of water per ninety-four (94) pounds of cement.
 - b. A coarse-grained high solids non-drilling mud grade bentonite slurry such as Baroid Benseal, American Colloid or equal. The bentonite grout shall be mixed in accordance with the manufacturer's recommendations.
7. The grout shall be pumped from the bottom of the well upward through a tremmie pipe in one continuous operation in order to avoid separation or dilution of the seal material. A return shall be seen at the top as the same consistency as the material that is pumped into the well.
8. Chlorine shall be added at the beginning and during the sealing process.
9. The well must be sealed within thirty days of receipt of this permit.
10. The Health Department shall be notified before procedures are to begin in sealing the well. This includes all dismantling procedures and lowering the pipe used for grouting.
11. Abandoned wells on this site shall be sealed as required by Chapter 29, Article III, Water Quality Control of the Code of Shelby County, Tennessee.


Robert Rogers, P.E., Technical Manager
POLLUTION CONTROL

No authority is granted by this permit to construct, operate or maintain any well in violation of any law, statute, code, ordinance, rule or regulation of Memphis and Shelby County, Tennessee.

NON -TRANSFERABLE

POST OR FILE AT CONSTRUCTION SITE

RP 6/4/12

12-069



Mark H. Luttrell, Jr.
Mayor
Shelby County

SHELBY COUNTY HEALTH DEPARTMENT

YVONNE S. MADLOCK
DIRECTOR

HELEN MARROW, M. D.
HEALTH OFFICER



Public Health
Prevent. Promote. Protect.

May 31, 2012

HDR Inc.

Attention: Brad Sperry

2241 Truitt Street

Memphis, TN 38114

RE: EMERGENCY FILL AND ABANDONMENT: 2245 Truitt (Parcel ID # 060092 00033)
(Department of the Army IW85-01, IW85-02, IW85-04, IW92-04, IW92-05, IW92-06, PMW85-04, PMW92-01, PMW92-04, PMW92-05, PMW92-06
Permit # 12-068

Dear Mr. Sperry:

This letter is to inform you that a construction permit has been issued to your selected well contractor, approving the fill and abandonment of the above referenced well. We appreciate the cooperation you have given the Health Department during the application review process. Complying with the following requires your further cooperation:

1. The Health Department is to be notified when the work is scheduled so that we can witness the procedures.
2. The Health Department is to be notified if the well driller violates any of the conditions for which the permit was issued.
3. The Health Department is to be notified for prior approval of any changes in plans for filling the well, or in the well contractor initially selected to do the work.
4. Inspection Fee Required? Yes ☐ No ☒ Amount
5. Permit Application Fee Yes ☒ No ☐ Amount \$50.00

If you have any questions or need additional information, please contact Mr. Greg Parker at (901) 222-9599.

Sincerely,

Greg Parker, Supervisor
Water Quality Branch

BD: GP: bfd

Mission

To promote, protect and improve the health and environment of all Shelby County residents.

814 Jefferson Street ♦ Memphis, Tennessee 38105
(901) 222-9599



SHELBY COUNTY HEALTH DEPARTMENT
WATER QUALITY CONTROL
FILL AND ABANDONMENT CONSTRUCTION PERMIT



Public Health
Prevent. Promote. Protect.

WELL DRILLING COMPANY M & W Drilling, LLC

ADDRESS 8321 Oak Ridge HWY Knoxville, TN 37931

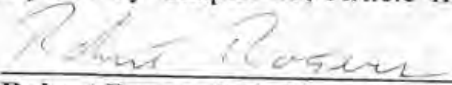
DATE ISSUED 5/30/2012 EXPIRATION DATE 8/28/2012 PERMIT # 12-068

DESCRIPTION OF WORK – Fill and Abandonment of Monitoring Well(s) at: 2245 Truitt (Parcel ID # 060092 00033) Emergency Permit Owner HDR Inc. (Department of the Army IW85-01, IW85-02, IW85-04, IW92-04, IW92-05, IW92-06, PMW85-04, PMW92-01, PMW92-04, PMW92-05, PMW92-06)

This permit is issued based on signed commitment by the driller and the owner of the well to fully comply with the requirements set forth in the approved application or as directed by the Shelby County Health Department. Deviation from the approved application or any conditions set forth by the Health Department shall void this permit.

CONDITIONS:

1. The abandoned well shall be sealed only by a licensed well contractor.
2. All procedures used in sealing the well shall be witnessed by a representative of the Shelby County Health department.
3. All water lines to the well are to be disconnected.
4. The well is to be dismantled in such a way that all working parts from inside the casing are removed.
5. Any obstructions found in the well are to be removed.
6. The empty casing is to be filled by one of two methods:
 - a. With a Portland Class A or quick setting cement in a ratio not over seven (7) gallons of water per ninety-four (94) pounds of cement.
 - b. A course-grained high solids non-drilling mud grade bentonite slurry such as Baroid Benseal, American Colloid or equal. The bentonite grout shall be mixed in accordance with the manufacturer's recommendations.
7. The grout shall be pumped from the bottom of the well upward through a tremmie pipe in one continuous operation in order to avoid separation or dilution of the seal material. A return shall be seen at the top as the same consistency as the material that is pumped into the well.
8. Chlorine shall be added at the beginning and during the sealing process.
9. The well must be sealed within thirty days of receipt of this permit.
10. The Health Department shall be notified before procedures are to begin in sealing the well. This includes all dismantling procedures and lowering the pipe used for grouting.
11. Abandoned wells on this site shall be sealed as required by Chapter 29, Article III, Water Quality Control of the Code of Shelby County, Tennessee.


Robert Rogers, P.E., Technical Manager
POLLUTION CONTROL

No authority is granted by this permit to construct, operate or maintain any well in violation of any law, statute, code, ordinance, rule or regulation of Memphis and Shelby County, Tennessee.

NON -TRANSFERABLE

POST OR FILE AT CONSTRUCTION SITE

COP 6/4/12

DR1-5A (Center of Lid)
 N: 276087.00
 E: 800835.01
 Elev: 294.90'
 Top of Casing: 294.51'
 Adjacent Concrete: 294.91'
 Adjacent Asphalt: 294.87'

DR1-5 (Center of Lid)
 N: 276080.00
 E: 800828.43
 Elev: 294.91'
 Top of Casing: 294.46'
 Adjacent Concrete: 294.91'
 Adjacent Asphalt: 294.86'

DR1-6 (Center of Lid)
 N: 276043.88
 E: 801103.40
 Elev: 293.55'
 Top of Casing: 293.17'
 Adjacent Concrete: 293.55'
 Adjacent Asphalt: 293.50'

DR1-6A (Center of Lid)
 N: 276035.02
 E: 801103.61
 Elev: 293.55'
 Top of Casing: 293.28'
 Adjacent Concrete: 293.63'
 Adjacent Asphalt: 293.58'

Point Table

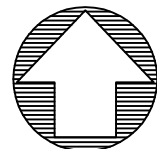
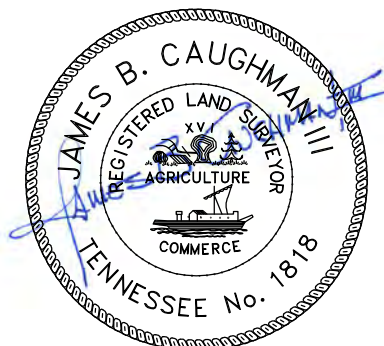
Point #	Northing	Easting	Top of Lid Elevation	Well ID
330	276080.00	800828.43	294.91'	DR1-5
340	276087.00	800835.01	294.90'	DR1-5A
350	276043.88	801103.40	293.55'	DR1-6
360	276035.02	801103.61	293.55'	DR1-6A

Site Location: at The Memphis Depot.

Elevations shown are dated:
 July 22, 2013.

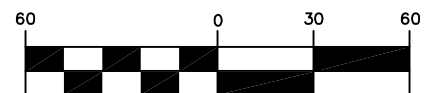
Survey data by: Allen&Hoshall, Inc.
 1661 International Drive, #100
 Memphis, TN 38120
 (901) 820-0820
 Date of Survey: 7-22-13
 Proj #: 77482
 Sheet 1 of 1

Monitoring Well Data



Grid North, NAD27

GRAPHIC SCALE



(IN FEET)

1 inch = 60 ft.

DR1-1A (Center of Lid)
 N: 276307.34
 E: 800863.06
 Elev: 293.50'
 Top of Casing: 293.00'
 Adjacent Concrete: 293.48'
 Adjacent Asphalt: 293.37'

DR1-1 (Center of Lid)
 N: 276300.34
 E: 800855.57
 Elev: 293.57'
 Top of Casing: 293.14'
 Adjacent Concrete: 293.56'
 Adjacent Asphalt: 293.42'

PMW101-02A (Center of Lid)
 N: 276281.93
 E: 801144.78
 Elev: 292.32'
 Top of Casing: 292.00'
 Adjacent Concrete: 292.32'
 Adjacent Asphalt: 292.29'

PMW101-02B (Center of Lid)
 N: 276286.33
 E: 801145.41
 Elev: 292.26'
 Top of Casing: 291.98'
 Adjacent Concrete: 292.25'
 Adjacent Asphalt: 292.24'

MW-101T (Center of Lid)
 N: 276204.09
 E: 801110.27
 Elev: 292.02'
 Top of Casing: 291.74'
 Adjacent Concrete: 292.02'
 Adjacent Asphalt: 291.98'

Point Table

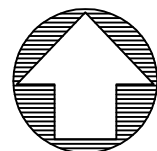
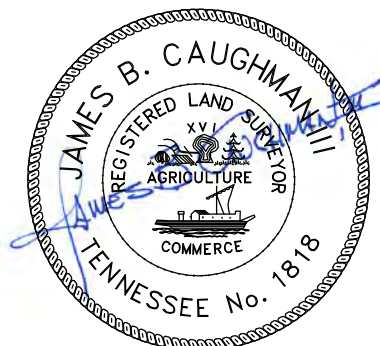
Point #	Northing	Easting	Top of Lid Elevation	Well ID
80	276204.09	801110.27	292.02'	MW-101T
370	276281.93	801144.78	292.32'	PMW101-02A
380	276286.33	801145.41	292.26'	PMW101-02B
1000	276300.34	800855.57	293.57'	DR1-1
1001	276307.34	800863.06	293.50'	DR1-1A

Site Location: at The Memphis Depot.

Elevations shown are dated:
 July 22, 2013.

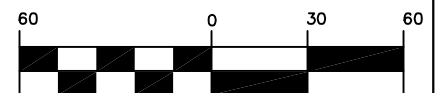
Survey data by: **Allen&Hoshall, Inc.**
 1661 International Drive, #100
 Memphis, TN 38120
 (901) 820-0820
 Date of Survey: 7-22-13
 Proj #: 77482
 Sheet 1 of 1

Monitoring Well Data



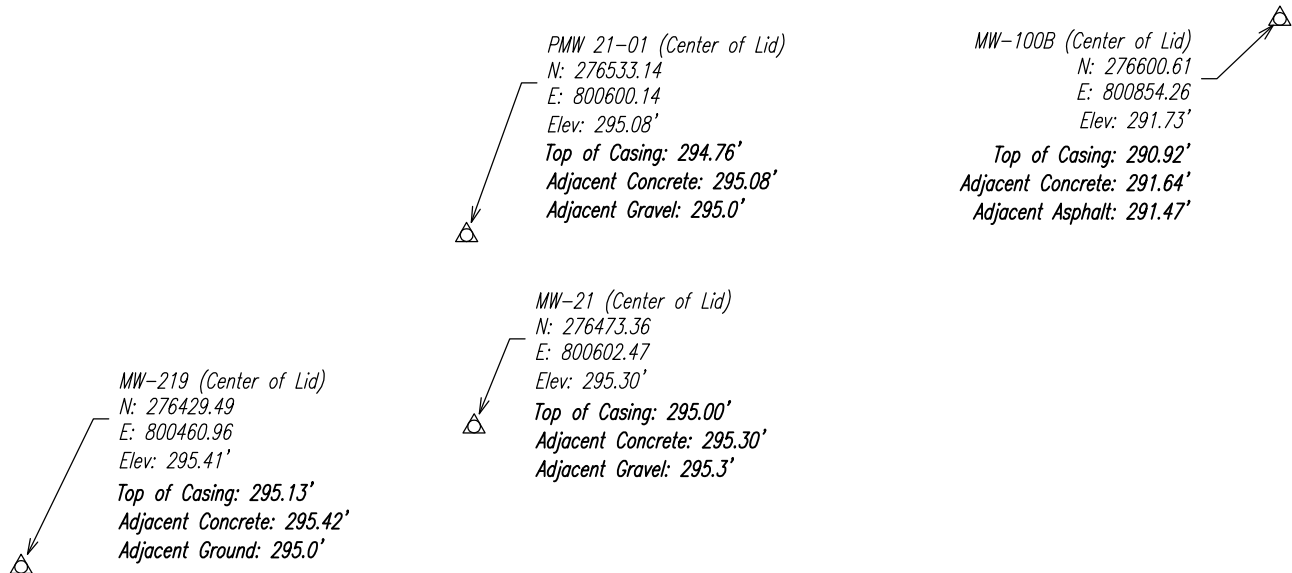
Grid North, NAD27

GRAPHIC SCALE



(IN FEET)

1 inch = 60 ft.



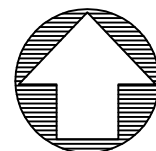
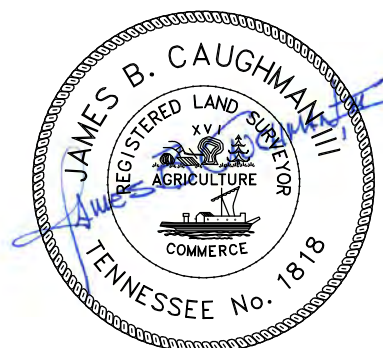
Point Table				
Point #	Northing	Easting	Top of Lid Elevation	Well ID
70	276600.61	800854.26	291.73'	MW-100B
180	276429.49	800460.96	295.41'	MW-219
320	276473.36	800602.47	295.30'	MW-21
344	276533.14	800600.14	295.08'	PMW 21-01

Site Location: at The Memphis Depot.

Elevations shown are dated:
 July 22, 2013.

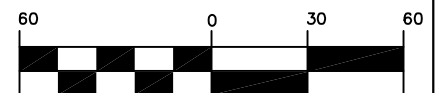
Survey data by: **Allen&Hoshall, Inc.**
 1661 International Drive, #100
 Memphis, TN 38120
 (901) 820-0820
 Date of Survey: 7-22-13
 Proj #: 77482
 Sheet 1 of 1

Monitoring Well Data



Grid North, NAD27

GRAPHIC SCALE



(IN FEET)

1 inch = 60 ft.

MW-203A (Center of Lid)
 N: 276841.76
 E: 801740.43
 Elev: 291.06'

Top of Casing: 290.70'
 Adjacent Concrete: 291.01'
 Adjacent Ground: 290.8'



MW-203B (Center of Lid)
 N: 276821.40
 E: 801741.59
 Elev: 291.22'
 Top of Casing: 290.87'
 Adjacent Concrete: 291.25'
 Adjacent Gravel: 291.1'

MW-204B (Center of Lid)
 N: 276707.81
 E: 802167.07
 Elev: 293.18'

Top of Casing: 292.71'
 Adjacent Concrete: 293.15'
 Adjacent Gravel: 293.0'



Point Table

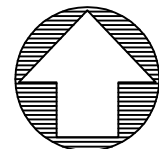
Point #	Northing	Easting	Top of Lid Elevation	Well ID
110	276707.81	802167.07	293.18'	MW-204B
390	276841.76	801740.43	291.06'	MW-203A
400	276821.40	801741.59	291.22'	MW-203B

Site Location: at The Memphis Depot.

Elevations shown are dated:
 July 22, 2013.

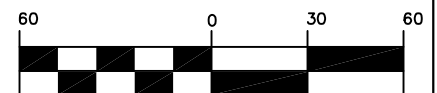
Survey data by: Allen&Hoshall, Inc.
 1661 International Drive, #100
 Memphis, TN 38120
 (901) 820-0820
 Date of Survey: 7-22-13
 Proj #: 77482
 Sheet 1 of 1

Monitoring Well Data



Grid North, NAD27

GRAPHIC SCALE



(IN FEET)

1 inch = 60 ft.


 MW-143 (Center of Lid)
 N: 278301.35
 E: 801201.48
 Elev: 291.06'
 Top of Casing: 290.66'
 Adjacent Concrete: 291.08'
 Adjacent Gravel: 290.9'


 MW-213 (Center of Lid)
 N: 278427.08
 E: 801669.11
 Elev: 294.58'
 Top of Casing: 294.22'
 Adjacent Concrete: 294.56'
 Adjacent Ground: 294.2'


 MW-62 (Center of Lid)
 N: 278289.65
 E: 801857.92
 Elev: 294.03'
 Top of Casing: 293.71'
 Adjacent Concrete: 294.01'
 Adjacent Ground: 293.9'

Point Table

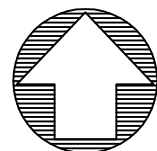
Point #	Northing	Easting	Top of Lid Elevation	Well ID
90	278301.35	801201.48	291.06'	MW-143
410	278289.65	801857.92	294.03'	MW-62
420	278427.08	801669.11	294.58'	MW-213

Site Location: at The Memphis Depot.

Elevations shown are dated:
July 22, 2013.

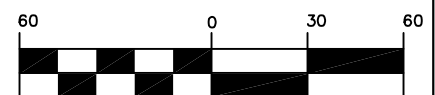
Survey data by: **Allen&Hoshall, Inc.**
 1661 International Drive, #100
 Memphis, TN 38120
 (901) 820-0820
 Date of Survey: 7-22-13
 Proj #: 77482
 Sheet 1 of 1

Monitoring Well Data



Grid North, NAD27

GRAPHIC SCALE



(IN FEET)

1 inch = 60 ft.

DR2-5 (Center of Lid)
 N: 276830.98
 E: 806180.40
 Elev: 305.83'
 Top of Casing: 305.41'
 Adjacent Concrete: 305.82'
 Adjacent Asphalt: 305.72'

DR2-2 (Center of Lid)
 N: 276770.85
 E: 806658.86
 Elev: 304.65'
 Top of Casing: 304.30'
 Adjacent Concrete: 304.66'
 Adjacent Asphalt: 304.67'

DR2-4 (Center of Lid)
 N: 276455.62
 E: 806633.07
 Elev: 303.98'
 Top of Casing: 303.55'
 Adjacent Concrete: 303.98'
 Adjacent Asphalt: 303.96'

Point Table

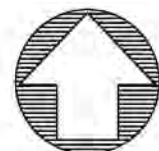
Point #	Northing	Easting	Top of Lid Elevation	Well ID
50	276455.62	806633.07	303.98'	DR2-4
430	276770.85	806658.86	304.65'	DR2-2
440	276830.98	806180.40	305.83'	DR2-5

Site Location: at The Memphis Depot.

Elevations shown are dated:
July 22, 2013.

Survey data by: Allen&Hoshall, Inc.
 1661 International Drive, #100
 Memphis, TN 38120
 (901) 820-0820
 Date of Survey: 7-22-13
 Proj #: 77482
 Sheet 1 of 1

Monitoring Well Data



Grid North, NAD27

GRAPHIC SCALE



(IN FEET)

1 inch = 60 ft.

APPENDIX B
LABORATORY ANALYTICAL RESULTS

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location LabID Date Area Units	IW101-01A L11120274-01 12/6/2011 TTA-1S	IW101-01B L11120274-02 12/6/2011 TTA-1S	IW101-01C L11120274-03 12/6/2011 TTA-1S	IW101-01A DUP2 L11120274-06 12/6/2011 TTA-1S	IW101-02A L11120274-04 12/6/2011 TTA-1S	IW101-02B L11120274-05 12/6/2011 TTA-1S
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	<10	<10	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	0.92 J	<1	<1	0.857 J	1.16	<1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	2.56 J	<5	3.28 J	3.88 J
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	12.5	21.6	53.8	12.7	59.2	59.3
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	0.363 J	<1	<1	0.308 J	0.3 J	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location LabID Date Area Units	IW101-02C L11120274-21 12/7/2011 TTA-1S	IW101-03A L11120274-22 12/7/2011 TTA-1S	IW101-03B L11120274-25 12/7/2011 TTA-1S	IW101-03C L11120348-07 12/8/2011 TTA-1S	IW101-04A L11120274-26 12/7/2011 TTA-1S	IW101-04B L11120348-08 12/8/2011 TTA-1S
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	<10	32.3 J	<10	<10	2.81 J	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	0.302 J	0.415 J	<1	3.41	10.4	0.931 J
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10 UJ	<10	<10 UJ	<10	<10 UJ	<10
Methyl t-butyl ether (MTBE)	µg/L	4.44 J	0.671 J	5.99	1.24 J	1.01 J	1.2 J
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	52	1.8	30.6	21.7	26.4	44.4
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	0.706 J	<1	0.464 J	39	1.86	1.57
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Location	IW101-04B DUP3	IW101-04C	IW101-05A	IW101-05B	IW101-05C	IW101-06A
LabID	L11120348-12	L11120348-09	L11120348-14	L11120348-15	L11120348-16	L11120348-17
Date	12/8/2011	12/8/2011	12/9/2011	12/9/2011	12/9/2011	12/9/2011
Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Units						
Analyte						
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	0.473 J	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	0.731 J	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	0.85 J	59.2	0.432 J	<1	0.998 J
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	1.14 J	1.19 J	2.33 J	3.16 J	<5
Methylene chloride	µg/L	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	42.6	16.7	55.9	59.9	0.35 J
Toluene	µg/L	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	1.41	31	<1	1.35	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location LabID Date Area Units	IW101-06B L11120348-18 12/9/2011 TTA-1S	IW101-06C L11120403-03 12/10/2011 TTA-1S	IW101-07A L11120403-04 12/10/2011 TTA-1S	IW101-07B L11120403-05 12/10/2011 TTA-1S	IW101-07C L11120403-10 12/11/2011 TTA-1S	IW101-07C DUP4 L11120403-14 12/11/2011 TTA-1S
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	0.221 J	0.255 J
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2 UJ	<2	<2	<2	<2 UJ
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	0.369 J	0.35 J
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	0.595 J	0.497 J
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	5.63 J	<10	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.133 J	<0.3	<0.3	<0.3	0.138 J	0.178 J
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	0.306 J	2.36	0.658 J	4.54	24.5	22.9
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	3.06 J	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	3.72 J	<5	0.703 J	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	17.8	18	8.4	19.6	40.8	38.2
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	4.95	46.4	17	52.1	113	117
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location LabID Date Area Units	IW101-08A L11120403-06 12/10/2011 TTA-1S	IW101-08B L11120403-11 12/11/2011 TTA-1S	IW101-08C L11120403-12 12/11/2011 TTA-1S	IW101-09A L11120403-13 12/11/2011 TTA-1S	IW101-09B L11120403-15 12/12/2011 TTA-1S	IW101-09C L11120403-16 12/12/2011 TTA-1S
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	0.27 J
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	0.76 J
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2 UJ	<2 UJ	<2 UJ	<2 UJ	<2 UJ
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	0.497 J
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	<10	<10	65.1
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	0.241 J
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	<1	1.8	4.46	<1	4.82	11.1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10	129
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	0.493 J	12.1	16.8	<1	27.8	22.3
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	0.834 J	34.3	50.6	0.254 J	78.4	64.8
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	56.6

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location LabID Date Area Units	PMW101-01A	PMW101-01A	PMW101-01B	PMW101-02A	PMW101-02B	PMW101-03A
		L11120274-11 12/6/2011 TTA-1S	L11120274-15 12/6/2011 TTA-1S	L11120274-12 12/6/2011 TTA-1S	L11120274-13 12/6/2011 TTA-1S	L11120274-14 12/6/2011 TTA-1S	L11120348-10 12/8/2011 TTA-1S
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	<10	<10	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	3.35	3.26	1.46	2.09	0.442 J	1.97
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10 UJ	<10 UJ	<10 UJ	<10 UJ	<10 UJ	<10
Methyl t-butyl ether (MTBE)	µg/L	0.592 J	<5	1.66 J	1.03 J	1.62 J	1.69 J
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	26.4	27.5	45.4	45.4	25.5	36.5
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	1.25	1.2	0.777 J	0.558 J	1.86	1.59
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	PMW101-03B	PMW101-05A	PMW101-05B	PMW101-06A	PMW101-06B	PMW101-07A
	LabID	L11120348-11	L11120274-16	L11120274-19	L11120348-26	L11120348-27	L11120348-28
	Date	12/8/2011	12/7/2011	12/7/2011	12/9/2011	12/9/2011	12/9/2011
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units						
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	0.374 J	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	1.02	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	1.81	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	<10	<10	<10
Benzene	µg/L	<0.4	<0.4	0.275 J	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	0.165 J	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	0.884 J	0.592 J	165	<1	<1	<1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10 UJ	<10 UJ	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	4.09 J	3.49 J	<5	0.781 J	3.76 J	<5
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	40.4	64.9 J	16.6	2.32	16.6	0.361 J
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	1.46	<1	26.4	<1	4.32	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	0.595 J	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location LabID Date Area Units	PMW101-07A	PMW101-07B	PMW101-08A	PMW101-08B	IW21-01A	IW21-01A DUP1
		L11120348-31 12/9/2011 TTA-1S	L11120348-29 12/9/2011 TTA-1S	L11120348-30 12/9/2011 TTA-1S	L11120403-07 12/10/2011 TTA-1S	L11120348-01 12/8/2011 TTA-1N	L11120348-05 12/8/2011 TTA-1N
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	0.235 J	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	0.274 J	0.306 J
1,2-Dichloropropane	µg/L	<1	<1	<1	0.386 J	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	<10	<10	<10
Benzene	µg/L	<0.4	<0.4	<0.4	0.148 J	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	0.205 J	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	<1	1.35	0.452 J	21	10.6	10.6
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5	70.9 J	71.1 J
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	0.337 J	14.2	15.7	41.7	166	168
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	28.9	0.386 J	127	27.1	27.8
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A
	LabID	L11120348-02	L11120348-03	L11120348-04	L11120348-20	L11120348-21	L11120348-22
	Date	12/8/2011	12/8/2011	12/8/2011	12/9/2011	12/9/2011	12/9/2011
	Area	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Analyte	Units						
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	1.63	1.08	<0.5	<0.5	0.26 J
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	<10	3.23 J	<10	<10	<10	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	11.5	3.08	2.15	7.09	51.2	48.8 J
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	66.3 J	<5	<5	33.7 J	43.8 J	95.1
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	104	32.5	31.6	213	197	135
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	0.554 J	0.837 J	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	16	3	3.06	45.9	68.5	33.3 J
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location LabID Date Area Units	IW21-04B L11120348-25 12/9/2011 TTA-1N	IW21-05A L11120403-01 12/10/2011 TTA-1N	IW21-05B L11120403-02 12/10/2011 TTA-1N	PMW21-01 L11120274-08 12/6/2011 TTA-1N	PMW21-02 L11120274-09 12/6/2011 TTA-1N	PMW21-04 L11120274-10 12/6/2011 TTA-1N
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2 UJ	<2 UJ	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	<10	<10	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	0.137 J	<0.3	0.144 J
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	101	3.79	20.3	15.6	4.2	55.5
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10 UJ	<10 UJ	<10 UJ
Methyl t-butyl ether (MTBE)	µg/L	123 J	3.75 J	42.5	49.4	29.1	56.7
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	40.9	4.19	132	280	118	211
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	0.251 J	<1	0.313 J
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	19	2.62	35.5	50.1	30.1	69.3
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location LabID Date Area Units	IW85-05 L11120490-10 12/14/2011 TTA-2	IW85-06 L11120490-11 12/14/2011 TTA-2	IW92-01 L11120403-17 12/12/2011 TTA-2	IW92-02 L11120403-18 12/12/2011 TTA-2	IW92-03 L11120403-19 12/12/2011 TTA-2	IW92-04 L11120490-01 12/13/2011 TTA-2
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	14.3	24.6	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	0.173 J	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	0.476 J	6.59	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	0.21 J	6.17	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	6.07 J	5.32 J	<10	<10	5.88 J	4.89 J
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	50.6	0.546 J	25.8	27.9	0.308 J	<1
Chlorobenzene	µg/L	<0.5	0.344 J	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	21.2	0.24 J	7.46	9.53	0.442 J	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	67.6	99.3	10.4	45.7	143	193
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	4.2 J	4.92 J
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	32.8	1.45	189	191	21.2	<1
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	0.633 J	0.802 J	<1	<1	<1	0.254 J
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	13.1	1.31	6.71	9.78	4.33	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	0.606 J	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location LabID Date Area Units	IW92-05 L11120490-02 12/13/2011 TTA-2	IW92-06 L11120490-03 12/13/2011 TTA-2	IW92-07 L11120490-04 12/13/2011 TTA-2	IW92-08 L11120490-12 12/14/2011 TTA-2	PMW92-01 L11120403-23 12/12/2011 TTA-2	PMW92-02 L11120403-24 12/12/2011 TTA-2
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	22 J	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	0.185 J	<1	<1
1,2-Dichloroethane	µg/L	0.269 J	0.75	0.402 J	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	0.439 J	0.369 J	6.28	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	5.75	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	2.65 J	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	79 J	72.3	5.16 J	6.12 J	<10	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	1.05	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	0.34 J	2.37	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	0.361 J	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.426	0.664	0.374	2.99	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	77.5	201	127	87.8	107	184
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	4.79 J	47.5	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	0.946 J	0.335 J	3.17	8.86	1.43	<1
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	0.734 J	2.01	0.726 J	0.429 J	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	0.363 J	<1	0.51 J	1.19	1.39	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	0.365 J	0.462 J	0.493 J	0.302 J	<1	0.337 J

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location LabID Date Area Units	PMW92-04	PMW92-05	IW85-01	IW85-01 DUP7	IW85-02	PMW85-01
		L11120403-25 12/12/2011 TTA-2	L11120403-27 12/12/2011 TTA-2	L11120490-08 12/14/2011 TTA-2	L11120490-13 12/14/2011 TTA-2	L11120490-09 12/14/2011 TTA-2	L11120403-22 12/12/2011 TTA-2
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	9.01	9.62 J	18.2	11.4
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	0.171 J	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	0.22 J	<1	1.62	1.81	1.73	0.356 J
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	2	2	2.41	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	23.7	<10	12.9	11.7 J	9.66 J	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	19.6	4.47	5.89	1.05	102
Chlorobenzene	µg/L	<0.5	<0.5	0.145 J	0.161 J	0.281 J	0.191 J
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.334	9.89	5.32	6.04	0.739	42.5
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	122	26.5	125	133	84.1	37.3
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	6.71 J	5.76 J	6.7 J	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<1	0.254 J	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	9.58	90.6	2.25	2.78	0.861 J	57.2
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	0.58 J	0.473 J	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	14.5	8.9	0.788 J	1.02	0.443 J	20.2
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	0.306 J	0.325 J	<1

Notes:
µg/L: micrograms per liter
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
UJ: Estimated, non-detect

TABLE B-1-1
VOC ANALYTICAL RESULTS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location LabID Date Area Units	PMW85-01 DUP8	PMW85-04	PMW85-05
		L11120403-26 12/12/2011 TTA-2	L11120490-05 12/13/2011 TTA-2	L11120490-06 12/13/2011 TTA-2
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1
1,2,3-Trichloropropane	µg/L	10.5	53.9	82.9
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	0.214 J	0.327 J
1,2-Dichloroethane	µg/L	<0.5	<0.5	0.48 J
1,2-Dichloropropane	µg/L	0.349 J	0.926 J	0.679 J
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	0.505	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1
Acetone	µg/L	<10	2.5 J	<10
Benzene	µg/L	<0.4	0.166 J	<0.4
Bromobenzene	µg/L	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1
Carbon tetrachloride	µg/L	103	<1	77.6
Chlorobenzene	µg/L	0.203 J	0.524	0.301 J
Chloroethane	µg/L	<1	<1	<1
Chloroform	µg/L	43.3	0.218 J	34.8
Chloromethane	µg/L	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	38.4	83.8	81.9
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1
Styrene	µg/L	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1
Tetrachloroethene	µg/L	58.8	35.5	79.1
Toluene	µg/L	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	0.464 J
trans-1,3-Dichloropropene	µg/L	<1	<1	<1
Trichloroethene	µg/L	20	15.2	25.6
Trichlorofluoromethane	µg/L	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-2
VOC ANALYTICAL RESULTS, TRIP AND RINSE BLANKS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Sample ID	TB-120611-EBT-10	TB-120711-EBT-10	TB-120811-EBT-10	TB-120911-EBT-10	TB-120511-EBT-10
Lab ID	L11120274-07	L11120274-20	L11120348-13	L11120348-19	L11120403-08
Date	12/6/2011	12/7/2011	12/8/2011	12/9/2011	12/10/2011
Sample Type	TB01	TB02	TB01	TB02	TB01
Analyte	Units				
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10 UJ	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-1-2
VOC ANALYTICAL RESULTS, TRIP AND RINSE BLANKS, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Sample ID Lab ID Date Sample Type Units	TB-121611-EBT-10 L11120403-09 12/11/2011 TB02	TB-121211-EBT-10 L11120403-21 12/12/2011 TB03	TB-121311-EBT-10 L11120490-07 12/13/2011 TB01	TB-121411-EBT-10 L11120490-15 12/14/2011 TB02	RB1-EBT-10 L11120348-06 12/8/2011 RB	RB2-EBT-10 L11120490-14 12/14/2011 RB
Analyte							
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	<10	<10	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-2-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location ID	IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-03B-DUP1
	Lab ID	L13020201-01	L13020201-02	L13020203-01	L13020203-02	L13020203-03	L13020289-01	L13020289-09
	Date	2/5/2013	2/5/2013	2/6/2013	2/6/2013	2/6/2013	2/7/2013	2/7/2013
	Area	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Analyte	Units							
Total Organic Carbon	mg/L	2150	8250	85700	123000	98.8 B	16900 J	28200 J
Acetic Acid	mg/L	1590	1190	7200	5430	8.67	5430 J	3030 J
Butyric Acid	mg/L	1420	4310	5760	30000	1.57	16500 J	10900 J
Lactic Acid	mg/L	<100	495	109000	113000	<1	<100	<100
Propionic Acid	mg/L	1060	1410	<10000	<1000	<10	7410 J	4120 J
Pyruvic Acid	mg/L	<10 UJ	<10 UJ	<100 UJ	<10 UJ	<0.1 UJ	<10 UJ	<10 UJ
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	1.95 J	<5	<5	<5	1.86 J	<5
Methane	µg/L	26000	12400	1450	332	12400	11000	9510

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

PMW85-05 : Bottle broke during shipment

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-2-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location ID	IW21-04A	IW21-04B	MW-21	PMW21-01	PMW21-02	PMW21-04	IW101-02A
	Lab ID	L13020203-04	L13020203-05	L13020286-01	L13020202-01	L13020286-02	L13020286-03	L13020285-01
	Date	2/6/2013	2/6/2013	2/7/2013	2/5/2013	2/7/2013	2/7/2013	2/8/2013
	Area	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	78600	5010 B	32.7	1.91	2.4	29.1	36.3
Acetic Acid	mg/L	<100	1800	10.6	<1	<1	1.86	13.9
Butyric Acid	mg/L	43400	4150	7.77	<1	<1	<1	<1
Lactic Acid	mg/L	50500	<10	1.66	<1	<1	<1	<1
Propionic Acid	mg/L	857 J	1900	19.7	<10	<10	<10	<10
Pyruvic Acid	mg/L	790 J	<1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1	<0.1 UJ
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	1.62 J	<5	<5	<5	<5	<5	<5
Methane	µg/L	5640	7160	344	87.8 J	47.5	5330	8740

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

PMW85-05 : Bottle broke during shipment

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-2-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location ID	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A	IW101-04B
	Lab ID	L13020285-02	L13020285-03	L13020289-02	L13020289-05	L13020285-04	L13020354-01	L13020354-02
	Date	2/8/2013	2/8/2013	2/7/2013	2/7/2013	2/8/2013	2/9/2013	2/9/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	1.54	2470	161	495	1070	2020	82.5
Acetic Acid	mg/L	<1	425	17.3 J	124	457	802	29.8
Butyric Acid	mg/L	<1	1530	21.2 J	297	49.8	1290	<10
Lactic Acid	mg/L	<1	117	<10	7.29 J	11.6	85.3	<10
Propionic Acid	mg/L	<10	644	145	153	485	647	<100
Pyruvic Acid	mg/L	<0.1 UJ	<1 UJ	<1 UJ	<1 UJ	<1 UJ	<1 UJ	1.35 J
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	1.02 J	1.74 J	<5	<5	<5
Methane	µg/L	10	17800	18700	14800	19300	8580	6910

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

PMW85-05 : Bottle broke during shipment

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-2-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location ID	IW101-04C	IW101-05A	IW101-05A-DUP2	IW101-05B	IW101-05C	IW101-07A	IW101-07B
	Lab ID	L13020354-03	L13020285-05	L13020285-08	L13020285-06	L13020285-07	L13020289-06	L13020289-07
	Date	2/9/2013	2/8/2013	2/8/2013	2/8/2013	2/8/2013	2/7/2013	2/7/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	12.2	388	276	1.81	206	58.7	8.99
Acetic Acid	mg/L	1490	86.7	89.4	<1	16.8	0.897 J	1.58
Butyric Acid	mg/L	1070	126	126	<1	<10	2.45	<1
Lactic Acid	mg/L	<100	8.77 J	<10	<1	<10	1.77	<1
Propionic Acid	mg/L	1380	102	101	<10	95.5 J	<10	<10
Pyruvic Acid	mg/L	<10 UJ	<1 UJ	<1 UJ	<0.1 UJ	<1 UJ	<0.1 UJ	<0.1 UJ
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	14900	23100	24600	30.4	21800	530	6860

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

PMW85-05 : Bottle broke during shipment

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-2-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location ID	IW101-07C	DR1-5	DR1-5A	DR1-6	DR1-6A	PMW101-02A	PMW101-02B
	Lab ID	L13020289-08	L13020204-01	L13020204-02	L13020204-03	L13020204-04	L13020204-05	L13020204-06
	Date	2/7/2013	2/6/2013	2/6/2013	2/6/2013	2/6/2013	2/6/2013	2/6/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	421	1310	366	34.7	26	45.8	4.41
Acetic Acid	mg/L	63.4	83.1	30.9	17.3	21.2	19	<1
Butyric Acid	mg/L	21	627	99.7	9.92	7.6	9.59	<1
Lactic Acid	mg/L	10.4	<10	<1	<1	<1	18.2	<1
Propionic Acid	mg/L	243	277	27.8	35	<10	35.7	<10
Pyruvic Acid	mg/L	<1 UJ	0.866 J	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	1.32 J	<5	<5	<5	<5	<5	<5
Methane	µg/L	16500	612	2730	59.5	1200	2180	4010

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

PMW85-05 : Bottle broke during shipment

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-2-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location ID	PMW101-04A	PMW101-04B	PMW101-04B-DUP3	PMW101-07A	PMW101-07B	DR2-2
	Lab ID	L13020286-04	L13020286-05	L13020286-08	L13020286-06	L13020286-07	L13020352-01
	Date	2/7/2013	2/7/2013	2/7/2013	2/7/2013	2/7/2013	2/9/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-2
Analyte	Units						
Total Organic Carbon	mg/L	9.76	4.35	1.34	2.49 J	<1	17.7
Acetic Acid	mg/L	<1	<1	<1	<1	<1	11.1
Butyric Acid	mg/L	<1	<1	<1	<1	<1	<1
Lactic Acid	mg/L	<1	<1	<1	<1	<1	<1
Propionic Acid	mg/L	<10	<10	<10	<10	<10	12
Pyruvic Acid	mg/L	<0.1	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ
Ethane	µg/L	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5
Methane	µg/L	467	9920	8320	3350	1.54 J	63.6

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

PMW85-05 : Bottle broke during shipment

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-2-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location ID	DR2-5	IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-03-DUP4
	Lab ID	L13020352-02	L13020357-01	L13020341-01	L13020354-04	L13020354-07	L13020352-03	L13020352-07
	Date	2/9/2013	2/11/2013	2/10/2013	2/9/2013	2/9/2013	2/9/2013	2/9/2013
	Area	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Analyte	Units							
Total Organic Carbon	mg/L	16.7	13100	29600	7.93	75400	283000	235000
Acetic Acid	mg/L	42.9	11200	10300	3.17	7100	4970	6090
Butyric Acid	mg/L	38.9	17700	22900	2.22	37100	315	420
Lactic Acid	mg/L	4.66	<100	<1000	<1	<1000	119000	155000
Propionic Acid	mg/L	68.2	8470	9190 J	<10	11800	4860	5850
Pyruvic Acid	mg/L	<0.1 UJ	<10 UJ	<100 UJ	<0.1 UJ	<100 UJ	<10 UJ	22.6 J
Ethane	µg/L	<5	<50	<50	<5	<25	<5	<5
Ethene	µg/L	<5	<50	<50	<5	<25	<5	<5
Methane	µg/L	257	2320	2970	9230 J	2080	682 J	451 J

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

PMW85-05 : Bottle broke during shipment

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-2-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location ID	IW92-07	IW92-08	MW-85	MW-113	PMW85-01	PMW85-05	PMW85-05-DUP5
	Lab ID	L13020340-01	L13020357-02	L13020288-01	L13020288-02	L13020352-04	L13020352-05	L13020352-08
	Date	2/10/2013	2/11/2013	2/8/2013	2/8/2013	2/9/2013	2/9/2013	2/9/2013
	Area	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Analyte	Units							
Total Organic Carbon	mg/L	140000	109	<1	1550	11.5	1.25	1.32
Acetic Acid	mg/L	1050	41.4	<1	514	9.38	--	<1
Butyric Acid	mg/L	2260	7.97	<1	887	0.964 J	--	<1
Lactic Acid	mg/L	290000	7.97	<1	400	0.911 J	--	<1
Propionic Acid	mg/L	<10000	39.4	<10	865	<10	--	<10
Pyruvic Acid	mg/L	1020	<0.1 UJ	<0.1 UJ	0.957 J	<0.1 UJ	--	<0.1 UJ
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	4770	9530	281	2830	10300	7280	2840

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

PMW85-05 : Bottle broke during shipment

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-2-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location ID	PMW92-03	MW-197A	MW-197B	MW-203A	MW-203A-DUP6	MW-203B	MW-62
	Lab ID	L13020352-06	L13020288-03	L13020288-04	L13020288-05	L13020288-07	L13020288-06	L13020357-03
	Date	2/9/2013	2/8/2013	2/8/2013	2/8/2013	2/8/2013	2/8/2013	2/11/2013
	Area	TTA-2	West-Central	West-Central	West-Central	West-Central	West-Central	Bldg 835
Analyte	Units							
Total Organic Carbon	mg/L	1.14	<1	0.986 J	4240	4050	1.4	100
Acetic Acid	mg/L	<1	<1	<1	2120	2180	<1	87.4
Butyric Acid	mg/L	<1	<1	<1	1410	1450	<1	92
Lactic Acid	mg/L	<1	<1	<1	41.5	43.1	<1	43.5
Propionic Acid	mg/L	<10	<10	<10	4030	4130	<10	85.7
Pyruvic Acid	mg/L	<0.1	<0.1 UJ	<0.1	<1	0.596 J	<0.1 UJ	<0.1 UJ
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	2.04 J	2.76 J	<5	<5
Methane	µg/L	867	<5	17.6	587	810	144	8940

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

PMW85-05 : Bottle broke during shipment

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-2-1
 GEOCHEMICAL ANALYTICAL RESULTS, EBT-11
 YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
 Main Installation - Defense Depot Memphis, Tennessee

	Location ID	MW-212	MW-213
	Lab ID	L13020357-04	L13020357-05
	Date	2/11/2013	2/11/2013
	Area	Bldg 835	Bldg 835
Analyte	Units		
Total Organic Carbon	mg/L	0.828 J	270
Acetic Acid	mg/L	<1	34.9
Butyric Acid	mg/L	<1	18.6
Lactic Acid	mg/L	5.43	300
Propionic Acid	mg/L	<10	10.6
Pyruvic Acid	mg/L	<0.1 UJ	1.42 J
Ethane	µg/L	<5	<5
Ethene	µg/L	<5	<5
Methane	µg/L	<5	1900

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

PMW85-05 : Bottle broke during shipment

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-2-2
VOC ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location ID Lab ID Date Area Units	DR1-5A	DR1-5	DR1-6A	DR1-6	IW101-02A	IW101-02B	IW101-02C
		L13020204-02	L13020204-01	L13020204-04	L13020204-03	L13020285-01	L13020285-02	L13020285-03
		2/6/2013	2/6/2013	2/6/2013	2/6/2013	2/8/2013	2/8/2013	2/8/2013
		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
		L13020204-02	L13020204-01	L13020204-04	L13020204-03	L13020285-01	L13020285-02	L13020285-03
1,1,1,2-Tetrachloroethane	µg/L	<5	<5	<0.5	<0.5	<0.5	<0.5	<10
1,1,1-Trichloroethane	µg/L	<10	<10	<1	<1	<1	<1	<20
1,1,2,2-Tetrachloroethane	µg/L	<5	<5	<0.5	<0.5	<0.5	<0.5	<10
1,1,2-Trichloroethane	µg/L	<10	<10	<1	<1	<1	<1	<20
1,1-Dichloroethane	µg/L	<10	<10	0.182 J	<1	<1	<1	<20
1,1-Dichloroethene	µg/L	<10	<10	<1	<1	<1	<1	<20
1,1-Dichloropropene	µg/L	<10	<10	<1	<1	<1	<1	<20
1,2,3-Trichlorobenzene	µg/L	<10	<10	<1	<1	<1	<1	<20
1,2,3-Trichloropropane	µg/L	<10	<10	<1	<1	<1	<1	<20
1,2,4-Trichlorobenzene	µg/L	<10	<10	<1	<1	<1	<1	<20
1,2,4-Trimethylbenzene	µg/L	<10	<10	<1	<1	<1	<1	<20
1,2-Dibromo-3-chloropropane	µg/L	<20	<20	<2	<2	<2	<2	<40
1,2-Dibromoethane	µg/L	<10	<10	<1	<1	<1	<1	<20
1,2-Dichlorobenzene	µg/L	<10	<10	<1	<1	<1	<1	<20
1,2-Dichloroethane	µg/L	<5	<5	<0.5	<0.5	<0.5	<0.5	<10
1,2-Dichloropropane	µg/L	<10	<10	0.356 J	<1	<1	<1	<20
1,3,5-Trimethylbenzene	µg/L	<10	<10	<1	<1	<1	<1	<20
1,3-Dichlorobenzene	µg/L	<10	<10	<1	<1	<1	<1	<20
1,3-Dichloropropane	µg/L	<4	<4	<0.4	<0.4	<0.4	<0.4	<8
1,4-Dichlorobenzene	µg/L	<5	<5	<0.5	<0.5	<0.5	<0.5	<10
1-Chlorohexane	µg/L	<10	<10	<1	<1	<1	<1	<20
2,2-Dichloropropane	µg/L	<10	<10	<1	<1	<1	<1	<20
2-Chlorotoluene	µg/L	<10	<10	<1	<1	<1	<1	<20
2-Hexanone	µg/L	<100	<100	<10	<10	<10	<10	<200
4-Chlorotoluene	µg/L	<10	<10	<1	<1	<1	<1	<20
Acetone	µg/L	38.1 J	<100	3.05 J	3.6 J	4.96 J	<10	135 J
Benzene	µg/L	<4	<4	0.155 J	<0.4	<0.4	<0.4	<8
Bromobenzene	µg/L	<10	<10	<1	<1	<1	<1	<20
Bromochloromethane	µg/L	<10	<10	<1	<1	<1	<1	<20
Bromodichloromethane	µg/L	<5	<5	<0.5	<0.5	<0.5	<0.5	<10
Bromoform	µg/L	<10	<10	<1	<1	<1	<1	<20
Bromomethane	µg/L	<10	<10	<1	<1	<1	<1	<20
Carbon disulfide	µg/L	<10	<10	<1	<1	<1	<1	<20
Carbon tetrachloride	µg/L	<10	<10	<1	<1	<1	<1	<20
Chlorobenzene	µg/L	<5	<5	<0.5	<0.5	<0.5	<0.5	<10
Chloroethane	µg/L	<10	<10	<1	<1	<1	<1	<20
Chloroform	µg/L	<3	<3	<0.3	<0.3	<0.3	<0.3	<6
Chloromethane	µg/L	<10	<10	<1	<1	<1	<1	<20
cis-1,2-Dichloroethene	µg/L	<10	<10	34.1	0.553 J	11.1	<1	56.9
cis-1,3-Dichloropropene	µg/L	<5	<5	<0.5	<0.5	<0.5	<0.5	<10
Dibromochloromethane	µg/L	<5	<5	<0.5	<0.5	<0.5	<0.5	<10
Dibromomethane	µg/L	<10	<10	<1	<1	<1	<1	<20
Dichlorodifluoromethane	µg/L	<10	<10	<1	<1	<1	<1	<20
Ethylbenzene	µg/L	<10	<10	<1	<1	<1	<1	<20
Hexachlorobutadiene	µg/L	<6	<6	<0.6	<0.6	<0.6	<0.6	<12
Isopropylbenzene	µg/L	<10	<10	<1	<1	<1	<1	<20
m-,p-Xylene	µg/L	<20	<20	<2	<2	<2	<2	<40
MEK (2-Butanone)	µg/L	<100	<100	<10	7.64 J	6.28 J	<10	182 J
Methyl t-butyl ether (MTBE)	µg/L	<50	24.7 J	<5	<5	6.18	6.45	<100
Methylene chloride	µg/L	<10	<10	0.26 J	<1	<1	<1	<20
MIBK (methyl isobutyl ketone)	µg/L	<100	<100	<10	<10	<10	<10	<200
Naphthalene	µg/L	<10	<10	<1	<1	<1	<1	<20
n-Butylbenzene	µg/L	<10	<10	<1	<1	<1	<1	<20
n-Propylbenzene	µg/L	<10	<10	<1	<1	<1	<1	<20
o-Xylene	µg/L	<10	<10	<1	<1	<1	<1	<20
p-Isopropyltoluene	µg/L	<10	<10	<1	<1	<1	<1	<20
sec-Butylbenzene	µg/L	<10	<10	<1	<1	<1	<1	<20
Styrene	µg/L	<10	<10	<1	<1	<1	<1	<20
tert-Butylbenzene	µg/L	<10	<10	<1	<1	<1	<1	<20
Tetrachloroethene	µg/L	43.8	36.8	40.8	263	30.8	56.2	<20
Toluene	µg/L	<10	<10	<1	<1	<1	<1	<20
trans-1,2-Dichloroethene	µg/L	<10	<10	<1	<1	<1	<1	<20
trans-1,3-Dichloropropene	µg/L	<10	<10	<1	<1	<1	<1	<20
Trichloroethene	µg/L	62.1	<10	98	1.22	3.17	<1	<20
Trichlorofluoromethane	µg/L	<10	<10	<1	<1	<1	<1	<20
Vinyl chloride	µg/L	<10	<10	<1	<1	<1	<1	<20

Notes:
µg/L: micrograms per liter
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
JB: Estimated-Blank Contamination

TABLE B-2-2
VOC ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location ID Lab ID Date Area Units	IW101-03A	IW101-03B	IW101-03C	IW101-04A	IW101-04B	IW101-04C	IW101-05A
		L13020289-02	L13020289-05	L13020285-04	L13020354-01	L13020354-02	L13020354-03	L13020285-05
		2/7/2013	2/7/2013	2/8/2013	2/9/2013	2/9/2013	2/9/2013	2/8/2013
		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
		L13020289-02	L13020289-05	L13020285-04	L13020354-01	L13020354-02	L13020354-03	L13020285-05
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<2.5	<5	<5	<5	<10	<5
1,1,1-Trichloroethane	µg/L	<1	<5	<10	<10	<10	<20	<10
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<2.5	<5	<5	<5	<10	<5
1,1,2-Trichloroethane	µg/L	<1	<5	<10	<10	<10	<20	<10
1,1-Dichloroethane	µg/L	<1	<5	<10	<10	<10	<20	<10
1,1-Dichloroethene	µg/L	<1	<5	<10	<10	<10	<20	<10
1,1-Dichloropropene	µg/L	<1	<5	<10	<10	<10	<20	<10
1,2,3-Trichlorobenzene	µg/L	<1	<5	<10	<10	<10	<20	<10
1,2,3-Trichloropropane	µg/L	<1	<5	<10	<10	<10	<20	<10
1,2,4-Trichlorobenzene	µg/L	<1	<5	<10	<10	<10	<20	<10
1,2,4-Trimethylbenzene	µg/L	<1	<5	<10	<10	<10	<20	<10
1,2-Dibromo-3-chloropropane	µg/L	<2	<10	<20	<20	<20	<40	<20
1,2-Dibromoethane	µg/L	<1	<5	<10	<10	<10	<20	<10
1,2-Dichlorobenzene	µg/L	<1	<5	<10	<10	<10	<20	<10
1,2-Dichloroethane	µg/L	<0.5	<2.5	<5	<5	<5	<10	<5
1,2-Dichloropropane	µg/L	<1	<5	<10	<10	<10	<20	<10
1,3,5-Trimethylbenzene	µg/L	<1	<5	<10	<10	<10	<20	<10
1,3-Dichlorobenzene	µg/L	<1	<5	<10	<10	<10	<20	<10
1,3-Dichloropropane	µg/L	<0.4	<2	<4	<4	<4	<8	<4
1,4-Dichlorobenzene	µg/L	<0.5	<2.5	<5	<5	<5	<10	<5
1-Chlorohexane	µg/L	<1	<5	<10	<10	<10	<20	<10
2,2-Dichloropropane	µg/L	<1	<5	<10	<10	<10	<20	<10
2-Chlorotoluene	µg/L	<1	<5	<10	<10	<10	<20	<10
2-Hexanone	µg/L	<10	<50	<100	<100	<100	<200	<100
4-Chlorotoluene	µg/L	<1	<5	<10	<10	<10	<20	<10
Acetone	µg/L	43.7	133 B	125	167	27.6 J	280	65.5 J
Benzene	µg/L	<0.4	<2	<4	<4	<4	<8	<4
Bromobenzene	µg/L	<1	<5	<10	<10	<10	<20	<10
Bromochloromethane	µg/L	<1	<5	<10	<10	<10	<20	<10
Bromodichloromethane	µg/L	<0.5	<2.5	<5	<5	<5	<10	<5
Bromoform	µg/L	<1	<5	<10	<10	<10	<20	<10
Bromomethane	µg/L	<1	<5	<10	<10	<10	<20	<10
Carbon disulfide	µg/L	<1	<5	<10	<10	<10	<20	<10
Carbon tetrachloride	µg/L	<1	<5	<10	<10	<10	<20	<10
Chlorobenzene	µg/L	<0.5	<2.5	<5	<5	<5	<10	<5
Chloroethane	µg/L	<1	<5	<10	<10	<10	<20	<10
Chloroform	µg/L	<0.3	<1.5	<3	<3	<3	<6	<3
Chloromethane	µg/L	<1	<5	<10	<10	<10	<20	<10
cis-1,2-Dichloroethene	µg/L	4.98	18.3	91.6	6.94 J	14.7	44.9	14.8
cis-1,3-Dichloropropene	µg/L	<0.5	<2.5	<5	<5	<5	<10	<5
Dibromochloromethane	µg/L	<0.5	<2.5	<5	<5	<5	<10	<5
Dibromomethane	µg/L	<1	<5	<10	<10	<10	<20	<10
Dichlorodifluoromethane	µg/L	<1	<5	<10	<10	<10	<20	<10
Ethylbenzene	µg/L	<1	<5	<10	<10	<10	<20	<10
Hexachlorobutadiene	µg/L	<0.6	<3	<6	<6	<6	<12	<6
Isopropylbenzene	µg/L	<1	<5	<10	<10	<10	<20	<10
m-,p-Xylene	µg/L	<2	<10	<20	<20	<20	<40	<20
MEK (2-Butanone)	µg/L	78	31.9 J	416	325	27.1 J	728	58.6 J
Methyl t-butyl ether (MTBE)	µg/L	7.24	9.3 J	<50	<50	<50	<100	<50
Methylene chloride	µg/L	<1	<5	<10	<10	<10	<20	2.99 J
MIBK (methyl isobutyl ketone)	µg/L	<10	<50	<100	<100	<100	<200	<100
Naphthalene	µg/L	<1	<5	<10	<10	<10	<20	<10
n-Butylbenzene	µg/L	<1	<5	<10	<10	<10	<20	<10
n-Propylbenzene	µg/L	<1	<5	<10	<10	<10	<20	<10
o-Xylene	µg/L	<1	<5	<10	<10	<10	<20	<10
p-Isopropyltoluene	µg/L	<1	<5	<10	<10	<10	<20	<10
sec-Butylbenzene	µg/L	<1	<5	<10	<10	<10	<20	<10
Styrene	µg/L	<1	<5	<10	<10	<10	<20	<10
tert-Butylbenzene	µg/L	<1	<5	<10	<10	<10	<20	<10
Tetrachloroethene	µg/L	2.5	5.7	<10	6.17 J	<10	<20	6.48 J
Toluene	µg/L	7.5	<5	<10	<10	<10	<20	<10
trans-1,2-Dichloroethene	µg/L	<1	<5	<10	<10	<10	<20	<10
trans-1,3-Dichloropropene	µg/L	<1	<5	<10	<10	<10	<20	<10
Trichloroethene	µg/L	<1	2.89 J	<10	<10	<10	<20	<10
Trichlorofluoromethane	µg/L	<1	<5	<10	<10	<10	<20	<10
Vinyl chloride	µg/L	<1	<5	<10	<10	<10	<20	<10

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

JB: Estimated-Blank Contamination

TABLE B-2-2
VOC ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Location ID	IW101-05A-DUP2	IW101-05B	IW101-05C	IW101-07A	IW101-07B	IW101-07C	PMW101-02A
Lab ID	L13020285-08	L13020285-06	L13020285-07	L13020289-06	L13020289-07	L13020289-08	L13020204-05
Date	2/8/2013	2/8/2013	2/8/2013	2/7/2013	2/7/2013	2/7/2013	2/6/2013
Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Units	L13020285-08	L13020285-06	L13020285-07	L13020289-06	L13020289-07	L13020289-08	L13020204-05
Analyte							
1,1,1,2-Tetrachloroethane	µg/L	<5	<0.5	<5	<0.5	<0.5	<5
1,1,1-Trichloroethane	µg/L	<10	<1	<10	<1	<1	<10
1,1,2,2-Tetrachloroethane	µg/L	<5	<0.5	<5	<0.5	<0.5	<5
1,1,2-Trichloroethane	µg/L	<10	<1	<10	<1	<1	<10
1,1-Dichloroethane	µg/L	<10	<1	<10	<1	<1	<10
1,1-Dichloroethene	µg/L	<10	<1	<10	<1	<1	<10
1,1-Dichloropropene	µg/L	<10	<1	<10	<1	<1	<10
1,2,3-Trichlorobenzene	µg/L	<10	<1	<10	<1	<1	<10
1,2,3-Trichloropropane	µg/L	<10	<1	<10	<1	<1	<10
1,2,4-Trichlorobenzene	µg/L	<10	<1	<10	<1	<1	<10
1,2,4-Trimethylbenzene	µg/L	<10	<1	<10	<1	<1	<10
1,2-Dibromo-3-chloropropane	µg/L	<20	<2	<20	<2	<2	<20
1,2-Dibromoethane	µg/L	<10	<1	<10	<1	<1	<10
1,2-Dichlorobenzene	µg/L	<10	<1	<10	<1	<1	<10
1,2-Dichloroethane	µg/L	<5	<0.5	<5	<0.5	<0.5	<5
1,2-Dichloropropane	µg/L	<10	<1	<10	<1	<1	<10
1,3,5-Trimethylbenzene	µg/L	<10	<1	<10	<1	<1	<10
1,3-Dichlorobenzene	µg/L	<10	<1	<10	<1	<1	<10
1,3-Dichloropropane	µg/L	<4	<0.4	<4	<0.4	<0.4	<4
1,4-Dichlorobenzene	µg/L	<5	<0.5	<5	<0.5	<0.5	<5
1-Chlorohexane	µg/L	<10	<1	<10	<1	<1	<10
2,2-Dichloropropane	µg/L	<10	<1	<10	<1	<1	<10
2-Chlorotoluene	µg/L	<10	<1	<10	<1	<1	<10
2-Hexanone	µg/L	<100	<10	<100	<10	<10	<100
4-Chlorotoluene	µg/L	<10	<1	<10	<1	<1	<10
Acetone	µg/L	67.7 J	<10	41.5 J	<10	3.52 JB	76.4 JB
Benzene	µg/L	<4	<0.4	<4	<0.4	<0.4	<4
Bromobenzene	µg/L	<10	<1	<10	<1	<1	<10
Bromochloromethane	µg/L	<10	<1	<10	<1	<1	<10
Bromodichloromethane	µg/L	<5	<0.5	<5	<0.5	<0.5	<5
Bromoform	µg/L	<10	<1	<10	<1	<1	<10
Bromomethane	µg/L	<10	<1	<10	<1	<1	<10
Carbon disulfide	µg/L	<10	<1	<10	<1	<1	<10
Carbon tetrachloride	µg/L	<10	<1	<10	<1	<1	<10
Chlorobenzene	µg/L	<5	<0.5	<5	<0.5	<0.5	<5
Chloroethane	µg/L	<10	<1	<10	<1	<1	<10
Chloroform	µg/L	<3	<0.3	<3	<0.3	<0.3	<3
Chloromethane	µg/L	<10	<1	<10	<1	<1	<10
cis-1,2-Dichloroethene	µg/L	14.8	1.54	41	1.26	54.5	323
cis-1,3-Dichloropropene	µg/L	<5	<0.5	<5	<0.5	<0.5	<5
Dibromochloromethane	µg/L	<5	<0.5	<5	<0.5	<0.5	<5
Dibromomethane	µg/L	<10	<1	<10	<1	<1	<10
Dichlorodifluoromethane	µg/L	<10	<1	<10	<1	<1	<10
Ethylbenzene	µg/L	<10	<1	<10	<1	<1	<10
Hexachlorobutadiene	µg/L	<6	<0.6	<6	<0.6	<0.6	<6
Isopropylbenzene	µg/L	<10	<1	<10	<1	<1	<10
m-,p-Xylene	µg/L	<20	<2	<20	<2	<2	<20
MEK (2-Butanone)	µg/L	58.5 J	<10	43.8 J	<10	3 J	111
Methyl t-butyl ether (MTBE)	µg/L	<50	2.64 J	<50	<5	<5	<50
Methylene chloride	µg/L	2.64 J	<1	2.76 J	<1	<1	<10
MIBK (methyl isobutyl ketone)	µg/L	<100	<10	<100	<10	<10	<100
Naphthalene	µg/L	<10	<1	<10	<1	<1	<10
n-Butylbenzene	µg/L	<10	<1	<10	<1	<1	<10
n-Propylbenzene	µg/L	<10	<1	<10	<1	<1	<10
o-Xylene	µg/L	<10	<1	<10	<1	<1	<10
p-Isopropyltoluene	µg/L	<10	<1	<10	<1	<1	<10
sec-Butylbenzene	µg/L	<10	<1	<10	<1	<1	<10
Styrene	µg/L	<10	<1	<10	<1	<1	<10
tert-Butylbenzene	µg/L	<10	<1	<10	<1	<1	<10
Tetrachloroethene	µg/L	9.34 J	41.1	<10	1.48	2.01	<10
Toluene	µg/L	<10	<1	<10	<1	<1	<10
trans-1,2-Dichloroethene	µg/L	<10	<1	<10	<1	<1	<10
trans-1,3-Dichloropropene	µg/L	<10	<1	<10	<1	<1	<10
Trichloroethene	µg/L	<10	0.506 J	<10	2.68	5.58	<10
Trichlorofluoromethane	µg/L	<10	<1	<10	<1	<1	<10
Vinyl chloride	µg/L	<10	<1	<10	<1	<1	<10

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

JB: Estimated-Blank Contamination

TABLE B-2-2
VOC ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location ID Lab ID Date Area Units	PMW101-02B	PMW101-04A	PMW101-04B	PMW101-04B-DUP3	PMW101-07A	PMW101-07B	IW21-01A
		L13020204-06	L13020286-04	L13020286-05	L13020286-08	L13020286-06	L13020286-07	L13020201-01
		2/6/2013	2/7/2013	2/7/2013	2/7/2013	2/7/2013	2/7/2013	2/5/2013
		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1N
		L13020204-06	L13020286-04	L13020286-05	L13020286-08	L13020286-06	L13020286-07	L13020201-01
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1	<10
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1	<10
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<1	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1	<10
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1	<10
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1	<10
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	<1	<10
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1	<10
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1	<10
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<2	<20
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1	<10
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1	<10
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1	<10
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1	<10
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1	<10
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1	<10
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1	<10
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1	<10
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10	<100
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1	<10
Acetone	µg/L	<10	<10	<10	<10	<10	<10	153
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1	<10
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1	<10
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1	<10
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1	<10
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1	<10
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1	<10
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1	<10
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<3
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1	<10
cis-1,2-Dichloroethene	µg/L	25.3	1.03	<1	0.268 J	<1	1.68	134
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1	<10
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1	<10
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1	<10
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1	<10
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2	<20
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10	<10	276
Methyl t-butyl ether (MTBE)	µg/L	5.35	2.08 J	7.37	6.95	<5	<5	78.2
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1	<10
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10	<100
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1	<10
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1	<10
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1	<10
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1	<10
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1	<10
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1	<10
Styrene	µg/L	<1	<1	<1	<1	<1	<1	<10
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1	<10
Tetrachloroethene	µg/L	11.3	51.1	37.2	35.1	0.318 J	15.1	<10
Toluene	µg/L	<1	<1	<1	<1	<1	<1	<10
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1	<10
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1	<10
Trichloroethene	µg/L	2.17	0.806 J	3.25	3.22	<1	32.7	<10
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1	<10
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1	<10

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

JB: Estimated-Blank Contamination

TABLE B-2-2
VOC ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location ID Lab ID Date Area Units	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-03B-DUP1	IW21-04A
		L13020201-02	L13020203-01	L13020203-02	L13020203-03	L13020289-01	L13020289-09	L13020203-04
		2/5/2013	2/6/2013	2/6/2013	2/6/2013	2/7/2013	2/7/2013	2/6/2013
		TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
		L13020201-02	L13020203-01	L13020203-02	L13020203-03	L13020289-01	L13020289-09	L13020203-04
1,1,1,2-Tetrachloroethane	µg/L	<2.5	<5	<5	<0.5	<10	<10	<5
1,1,1-Trichloroethane	µg/L	<5	<10	<10	<1	<20	<20	<10
1,1,2,2-Tetrachloroethane	µg/L	<2.5	<5	<5	<0.5	<10	<10	<5
1,1,2-Trichloroethane	µg/L	<5	<10	<10	<1	<20	<20	<10
1,1-Dichloroethane	µg/L	<5	<10	<10	<1	<20	<20	<10
1,1-Dichloroethene	µg/L	<5	<10	<10	<1	<20	<20	<10
1,1-Dichloropropene	µg/L	<5	<10	<10	<1	<20	<20	<10
1,2,3-Trichlorobenzene	µg/L	<5	<10	<10	<1	<20	<20	<10
1,2,3-Trichloropropane	µg/L	<5	<10	<10	<1	<20	<20	<10
1,2,4-Trichlorobenzene	µg/L	<5	<10	<10	<1	<20	<20	<10
1,2,4-Trimethylbenzene	µg/L	1.39 J	2.81 J	2.71 J	<1	<20	<20	<10
1,2-Dibromo-3-chloropropane	µg/L	<10	<20	<20	<2	<40	<40	<20
1,2-Dibromoethane	µg/L	<5	<10	<10	<1	<20	<20	<10
1,2-Dichlorobenzene	µg/L	<5	<10	<10	<1	<20	<20	<10
1,2-Dichloroethane	µg/L	<2.5	<5	<5	<0.5	<10	<10	<5
1,2-Dichloropropane	µg/L	<5	<10	<10	<1	<20	<20	<10
1,3,5-Trimethylbenzene	µg/L	<5	<10	<10	<1	<20	<20	<10
1,3-Dichlorobenzene	µg/L	<5	<10	<10	<1	<20	<20	<10
1,3-Dichloropropane	µg/L	<2	<4	<4	<0.4	<8	<8	<4
1,4-Dichlorobenzene	µg/L	<2.5	<5	<5	<0.5	<10	<10	<5
1-Chlorohexane	µg/L	<5	<10	<10	<1	<20	<20	<10
2,2-Dichloropropane	µg/L	<5	<10	<10	<1	<20	<20	<10
2-Chlorotoluene	µg/L	<5	<10	<10	<1	<20	<20	<10
2-Hexanone	µg/L	<50	<100	<100	<10	<200	<200	<100
4-Chlorotoluene	µg/L	<5	<10	<10	<1	<20	<20	<10
Acetone	µg/L	119	528	156 B	3.88 JB	853	910	81.2 JB
Benzene	µg/L	<2	<4	<4	<0.4	<8	<8	<4
Bromobenzene	µg/L	<5	<10	<10	<1	<20	<20	<10
Bromochloromethane	µg/L	<5	<10	<10	<1	<20	<20	<10
Bromodichloromethane	µg/L	<2.5	<5	<5	<0.5	<10	<10	<5
Bromoform	µg/L	<5	<10	<10	<1	<20	<20	<10
Bromomethane	µg/L	<5	<10	<10	<1	<20	<20	<10
Carbon disulfide	µg/L	<5	<10	<10	<1	<20	<20	<10
Carbon tetrachloride	µg/L	<5	<10	<10	<1	<20	<20	<10
Chlorobenzene	µg/L	<2.5	<5	<5	<0.5	<10	<10	<5
Chloroethane	µg/L	<5	<10	<10	<1	<20	<20	<10
Chloroform	µg/L	<1.5	<3	<3	<0.3	<6	<6	<3
Chloromethane	µg/L	<5	<10	<10	<1	<20	<20	<10
cis-1,2-Dichloroethene	µg/L	13.2	17.1	4.6 J	182	98.8	107	65.2
cis-1,3-Dichloropropene	µg/L	<2.5	<5	<5	<0.5	<10	<10	<5
Dibromochloromethane	µg/L	<2.5	<5	<5	<0.5	<10	<10	<5
Dibromomethane	µg/L	<5	<10	<10	<1	<20	<20	<10
Dichlorodifluoromethane	µg/L	<5	<10	<10	<1	<20	<20	<10
Ethylbenzene	µg/L	<5	<10	<10	<1	<20	<20	<10
Hexachlorobutadiene	µg/L	<3	<6	<6	<0.6	<12	<12	<6
Isopropylbenzene	µg/L	<5	<10	<10	<1	<20	<20	<10
m-,p-Xylene	µg/L	<10	<20	<20	<2	<40	<40	<20
MEK (2-Butanone)	µg/L	117	217	63.9 J	4.85 J	895	980	71.8 J
Methyl t-butyl ether (MTBE)	µg/L	8.7 J	<50	<50	29.7	<100	<100	16.7 J
Methylene chloride	µg/L	<5	<10	<10	<1	14.6 J	16.2 J	<10
MIBK (methyl isobutyl ketone)	µg/L	<50	<100	<100	<10	<200	<200	<100
Naphthalene	µg/L	<5	<10	<10	<1	<20	<20	<10
n-Butylbenzene	µg/L	<5	<10	<10	<1	<20	<20	<10
n-Propylbenzene	µg/L	<5	<10	<10	<1	<20	<20	<10
o-Xylene	µg/L	<5	<10	<10	<1	<20	<20	<10
p-Isopropyltoluene	µg/L	<5	<10	<10	<1	<20	<20	<10
sec-Butylbenzene	µg/L	<5	<10	<10	<1	<20	<20	<10
Styrene	µg/L	<5	<10	<10	<1	<20	<20	<10
tert-Butylbenzene	µg/L	<5	<10	<10	<1	<20	<20	<10
Tetrachloroethene	µg/L	4.62 J	33.8	13.5	6.89	<20	<20	6.98 J
Toluene	µg/L	<5	<10	<10	<1	<20	<20	<10
trans-1,2-Dichloroethene	µg/L	<5	<10	<10	0.749 J	<20	<20	<10
trans-1,3-Dichloropropene	µg/L	<5	<10	<10	<1	<20	<20	<10
Trichloroethene	µg/L	1.51 J	2.96 J	<10	2.94	<20	<20	2.53 J
Trichlorofluoromethane	µg/L	<5	<10	<10	<1	<20	<20	<10
Vinyl chloride	µg/L	<5	<10	<10	0.497 J	<20	<20	<10

Notes:
µg/L: micrograms per liter
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
JB: Estimated-Blank Contamination

TABLE B-2-2
VOC ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location ID Lab ID Date Area Units	IW21-04B	MW-21	PMW21-01	PMW21-02	PMW21-04	DR2-2	DR2-5
		L13020203-05	L13020286-01	L13020202-01	L13020286-02	L13020286-03	L13020352-01	L13020352-02
		2/6/2013	2/7/2013	2/5/2013	2/7/2013	2/7/2013	2/9/2013	2/9/2013
		TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-2	TTA-2
		L13020203-05	L13020286-01	L13020202-01	L13020286-02	L13020286-03	L13020352-01	L13020352-02
1,1,1,2-Tetrachloroethane	µg/L	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<10	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<10	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<10	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<10	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<10	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<10	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<10	<1	<1	<1	<1	<1	14.8
1,2,4-Trichlorobenzene	µg/L	<10	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<10	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<20	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<10	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<10	<1	<1	<1	<1	<1	0.213 J
1,2-Dichloroethane	µg/L	<5	0.495 J	<0.5	<0.5	<0.5	<0.5	0.265 J
1,2-Dichloropropane	µg/L	<10	<1	<1	<1	<1	<1	0.364 J
1,3,5-Trimethylbenzene	µg/L	<10	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<10	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<10	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<10	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<10	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<100	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<10	<1	<1	<1	<1	<1	<1
Acetone	µg/L	206 B	<10	<10	<10	<10	23.2	<10
Benzene	µg/L	<4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<10	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<10	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<10	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<10	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<10	<1	<1	<1	<1	<1	0.977 J
Carbon tetrachloride	µg/L	<10	<1	<1	<1	<1	2.34	69.6
Chlorobenzene	µg/L	<5	<0.5	<0.5	<0.5	<0.5	<0.5	0.331 J
Chloroethane	µg/L	<10	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<3	<0.3	0.167 J	<0.3	<0.3	1.95	45.7
Chloromethane	µg/L	<10	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	28.8	4.35	15.3	4.5	125	13.9	113
cis-1,3-Dichloropropene	µg/L	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<10	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<10	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<10	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<10	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<20	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	263	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	9.18 J	3.77 J	25.7	23.4	27.6	<5	<5
Methylene chloride	µg/L	<10	<1	<1	<1	<1	0.273 J	<1
MIBK (methyl isobutyl ketone)	µg/L	<100	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<10	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<10	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<10	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<10	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<10	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<10	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<10	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<10	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	4.32 J	107	263	169	276	33.3	33.7
Toluene	µg/L	<10	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<10	<1	0.748 J	<1	0.431 J	<1	<1
trans-1,3-Dichloropropene	µg/L	<10	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<10	6.83	51.2	44	59.3	2.15	17.3
Trichlorofluoromethane	µg/L	<10	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<10	<1	<1	<1	<1	<1	<1

Notes:
µg/L: micrograms per liter
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
JB: Estimated-Blank Contamination

TABLE B-2-2
VOC ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location ID Lab ID Date Area Units	IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-03-DUP4	IW92-07
		L13020357-01	L13020341-01	L13020354-04	L13020354-07	L13020352-03	L13020352-07	L13020340-01
		2/11/2013	2/10/2013	2/9/2013	2/9/2013	2/9/2013	2/9/2013	2/10/2013
		TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
		L13020357-01	L13020341-01	L13020354-04	L13020354-07	L13020352-03	L13020352-07	L13020340-01
1,1,1,2-Tetrachloroethane	µg/L	<25	<5	<0.5	<10	<25	<25	<10
1,1,1-Trichloroethane	µg/L	<50	<10	<1	<20	<50	<50	<20
1,1,2,2-Tetrachloroethane	µg/L	<25	<5	<0.5	<10	<25	<25	<10
1,1,2-Trichloroethane	µg/L	<50	<10	<1	<20	<50	<50	<20
1,1-Dichloroethane	µg/L	<50	<10	<1	<20	<50	<50	<20
1,1-Dichloroethene	µg/L	<50	<10	<1	<20	<50	<50	<20
1,1-Dichloropropene	µg/L	<50	<10	<1	<20	<50	<50	<20
1,2,3-Trichlorobenzene	µg/L	<50	<10	<1	<20	<50	<50	<20
1,2,3-Trichloropropane	µg/L	<50	<10	<1	<20	<50	<50	<20
1,2,4-Trichlorobenzene	µg/L	<50	<10	<1	<20	<50	<50	<20
1,2,4-Trimethylbenzene	µg/L	<50	<10	<1	<20	<50	<50	<20
1,2-Dibromo-3-chloropropane	µg/L	<100	<20	<2	<40	<100	<100	<40
1,2-Dibromoethane	µg/L	<50	<10	<1	<20	<50	<50	<20
1,2-Dichlorobenzene	µg/L	<50	<10	<1	<20	<50	<50	<20
1,2-Dichloroethane	µg/L	<25	<5	<0.5	<10	<25	<25	<10
1,2-Dichloropropane	µg/L	<50	<10	<1	<20	<50	<50	<20
1,3,5-Trimethylbenzene	µg/L	<50	<10	<1	<20	<50	<50	<20
1,3-Dichlorobenzene	µg/L	<50	<10	<1	<20	<50	<50	<20
1,3-Dichloropropane	µg/L	<20	2.53 J	<0.4	<8	<20	<20	<8
1,4-Dichlorobenzene	µg/L	<25	<5	<0.5	<10	<25	<25	<10
1-Chlorohexane	µg/L	<50	<10	<1	<20	<50	<50	<20
2,2-Dichloropropane	µg/L	<50	<10	<1	<20	<50	<50	<20
2-Chlorotoluene	µg/L	<50	<10	<1	<20	<50	<50	<20
2-Hexanone	µg/L	<500	<100	<10	<200	<500	<500	<200
4-Chlorotoluene	µg/L	<50	<10	<1	<20	<50	<50	<20
Acetone	µg/L	581	872	4.08 J	252	1860	1530	610 B
Benzene	µg/L	<20	<4	<0.4	<8	<20	<20	<8
Bromobenzene	µg/L	<50	<10	<1	<20	<50	<50	<20
Bromochloromethane	µg/L	<50	<10	<1	<20	<50	<50	<20
Bromodichloromethane	µg/L	<25	<5	<0.5	<10	<25	<25	<10
Bromoform	µg/L	<50	<10	<1	<20	<50	<50	<20
Bromomethane	µg/L	<50	<10	<1	<20	<50	<50	<20
Carbon disulfide	µg/L	<50	<10	<1	<20	<50	<50	<20
Carbon tetrachloride	µg/L	<50	<10	<1	<20	<50	<50	<20
Chlorobenzene	µg/L	<25	<5	<0.5	<10	<25	<25	<10
Chloroethane	µg/L	<50	<10	<1	<20	<50	<50	<20
Chloroform	µg/L	<15	<3	1.96	<6	<15	<15	<6
Chloromethane	µg/L	<50	<10	<1	<20	<50	<50	<20
cis-1,2-Dichloroethene	µg/L	50.4	28.4	117	28.8	42.9 J	30.9 J	28.6
cis-1,3-Dichloropropene	µg/L	<25	<5	<0.5	<10	<25	<25	<10
Dibromochloromethane	µg/L	<25	<5	<0.5	<10	<25	<25	<10
Dibromomethane	µg/L	<50	<10	<1	<20	<50	<50	<20
Dichlorodifluoromethane	µg/L	<50	<10	<1	<20	<50	<50	<20
Ethylbenzene	µg/L	<50	<10	<1	<20	<50	<50	<20
Hexachlorobutadiene	µg/L	<30	<6	<0.6	<12	<30	<30	<12
Isopropylbenzene	µg/L	<50	<10	<1	<20	<50	<50	<20
m-,p-Xylene	µg/L	<100	<20	<2	<40	<100	<100	<40
MEK (2-Butanone)	µg/L	1200	2450	<10	270	634	491 J	399
Methyl t-butyl ether (MTBE)	µg/L	<250	<50	<5	<100	<250	<250	<100
Methylene chloride	µg/L	<50	<10	<1	<20	37.7 J	<50	<20
MIBK (methyl isobutyl ketone)	µg/L	<500	<100	<10	<200	<500	<500	<200
Naphthalene	µg/L	<50	<10	<1	<20	<50	<50	<20
n-Butylbenzene	µg/L	<50	<10	<1	<20	<50	<50	<20
n-Propylbenzene	µg/L	<50	<10	<1	<20	<50	<50	<20
o-Xylene	µg/L	<50	<10	<1	<20	<50	<50	<20
p-Isopropyltoluene	µg/L	<50	<10	<1	<20	<50	<50	<20
sec-Butylbenzene	µg/L	<50	<10	<1	<20	<50	<50	<20
Styrene	µg/L	<50	<10	<1	<20	<50	<50	<20
tert-Butylbenzene	µg/L	<50	<10	<1	<20	<50	<50	<20
Tetrachloroethene	µg/L	<50	<10	3.17	11.5 J	<50	<50	<20
Toluene	µg/L	<50	<10	<1	<20	<50	<50	<20
trans-1,2-Dichloroethene	µg/L	<50	<10	<1	<20	<50	<50	<20
trans-1,3-Dichloropropene	µg/L	<50	<10	<1	<20	<50	<50	<20
Trichloroethene	µg/L	<50	<10	1.88	<20	<50	<50	<20
Trichlorofluoromethane	µg/L	<50	<10	<1	<20	<50	<50	<20
Vinyl chloride	µg/L	<50	<10	<1	<20	<50	<50	<20

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

JB: Estimated-Blank Contamination

TABLE B-2-2
VOC ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location ID Lab ID Date Area Units	IW92-08	MW-113	MW-85	PMW85-01	PMW85-05	PMW85-05-DUP5	PMW92-03
		L13020357-02	L13020288-02	L13020288-01	L13020352-04	L13020352-05	L13020352-08	L13020352-06
		2/11/2013	2/8/2013	2/8/2013	2/9/2013	2/9/2013	2/9/2013	2/9/2013
		TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
		L13020357-02	L13020288-02	L13020288-01	L13020352-04	L13020352-05	L13020352-08	L13020352-06
1,1,1,2-Tetrachloroethane	µg/L	<2.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<5	<5	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<2.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<5	<5	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<5	<5	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<5	<5	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<5	<5	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<5	<5	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<5	2.87 J	10.4	5.35	55.7	54.8	<1
1,2,4-Trichlorobenzene	µg/L	<5	<5	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<5	<5	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<10	<10	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<5	<5	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<5	<5	<1	<1	0.303 J	0.276 J	<1
1,2-Dichloroethane	µg/L	<2.5	<2.5	<0.5	<0.5	0.483 J	0.459 J	<0.5
1,2-Dichloropropane	µg/L	4.11 J	<5	0.356 J	1.84	0.824 J	0.856 J	<1
1,3,5-Trimethylbenzene	µg/L	<5	<5	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<5	<5	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	3.98	<2	<0.4	1.18	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<2.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<5	<5	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<5	<5	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<5	<5	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<50	<50	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<5	<5	<1	<1	<1	<1	<1
Acetone	µg/L	54.4	30.8 J	<10	10.4	<10	<10	<10
Benzene	µg/L	<2	<2	<0.4	<0.4	0.175 J	0.16 J	<0.4
Bromobenzene	µg/L	<5	<5	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<5	<5	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<2.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<5	<5	<1	<1	<1	<1	<1
Bromomethane	µg/L	<5	<5	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<5	<5	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<5	15.6	102	0.322 J	47.7	48.6	<1
Chlorobenzene	µg/L	<2.5	<2.5	0.188 J	0.173 J	0.317 J	0.321 J	<0.5
Chloroethane	µg/L	<5	<5	<1	<1	<1	<1	<1
Chloroform	µg/L	<1.5	7.25	28.1	0.685	24.5	25.4	<0.3
Chloromethane	µg/L	<5	<5	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	119	95	30.6	79.3	83.4	85	33
cis-1,3-Dichloropropene	µg/L	<2.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<2.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<5	<5	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<5	<5	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<5	<5	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<3	<3	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<5	<5	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<10	<10	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	101	55.8	<10	8.94 J	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<25	<25	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<5	5.13	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<50	<50	<10	<10	<10	<10	<10
Naphthalene	µg/L	<5	<5	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<5	<5	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<5	<5	<1	<1	<1	<1	<1
o-Xylene	µg/L	<5	<5	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<5	<5	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<5	<5	<1	<1	<1	<1	<1
Styrene	µg/L	<5	<5	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<5	<5	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<5	54.7	58.5	1.03	75.7	75.9	154
Toluene	µg/L	<5	<5	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<5	<5	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<5	<5	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<5	6.78	17.8	<1	22.5	22.8	11.6
Trichlorofluoromethane	µg/L	<5	<5	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<5	<5	<1	0.364 J	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

JB: Estimated-Blank Contamination

TABLE B-2-2
VOC ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location ID Lab ID Date Area Units	MW-197A	MW-197B	MW-203A	MW-203A-DUP6	MW-203B	MW-62	MW-212
		L13020288-03	L13020288-04	L13020288-05	L13020288-07	L13020288-06	L13020357-03	L13020357-04
		2/8/2013	2/8/2013	2/8/2013	2/8/2013	2/8/2013	2/11/2013	2/11/2013
		West-Central	West-Central	West-Central	West-Central	West-Central	Bldg 835	Bldg 835
		L13020288-03	L13020288-04	L13020288-05	L13020288-07	L13020288-06	L13020357-03	L13020357-04
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<25	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<50	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<25	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<50	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<50	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<50	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<50	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<50	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	<50	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<50	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<50	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<100	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<50	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<50	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<25	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<50	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<50	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<50	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<20	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<25	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<50	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<50	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<50	<1
2-Hexanone	µg/L	<10	<10	2.76 J	<10	<10	<500	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<50	<1
Acetone	µg/L	<10	<10	292	259	<10	280 J	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<20	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<50	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<50	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<25	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<50	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<50	<1
Carbon disulfide	µg/L	<1	<1	0.627 J	0.64 J	<1	<50	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<50	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<25	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<50	<1
Chloroform	µg/L	0.138 J	<0.3	<0.3	<0.3	<0.3	<15	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1	<50	<1
cis-1,2-Dichloroethene	µg/L	0.771 J	3.83	8.36	8.13 J	3.57	37.5 J	<1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<25	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<25	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<50	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<50	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<50	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<30	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<50	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<100	<2
MEK (2-Butanone)	µg/L	<10	<10	2560	2690	<10	424 J	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	1.77 J	<5	<5	2.12 J	<250	<5
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<50	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<500	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<50	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<50	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<50	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<50	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<50	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<50	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<50	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<50	<1
Tetrachloroethene	µg/L	24.8	25	51	50.5	17.6	<50	<1
Toluene	µg/L	<1	<1	<1	<1	<1	<50	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<50	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<50	<1
Trichloroethene	µg/L	1.27	10.6	8.56	8.36	11.9	61.9	10.4
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<50	<1
Vinyl chloride	µg/L	<1	1.05	0.333 J	0.315 J	1.48	<50	<1

Notes:
µg/L: micrograms per liter
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
JB: Estimated-Blank Contamination

TABLE B-2-2
VOC ANALYTICAL RESULTS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location ID	MW-213
	Lab ID	L13020357-05
	Date	2/11/2013
	Area	Bldg 835
	Units	L13020357-05
1,1,1,2-Tetrachloroethane	µg/L	<2.5
1,1,1-Trichloroethane	µg/L	<5
1,1,2,2-Tetrachloroethane	µg/L	<2.5
1,1,2-Trichloroethane	µg/L	<5
1,1-Dichloroethane	µg/L	<5
1,1-Dichloroethene	µg/L	<5
1,1-Dichloropropene	µg/L	<5
1,2,3-Trichlorobenzene	µg/L	<5
1,2,3-Trichloropropane	µg/L	<5
1,2,4-Trichlorobenzene	µg/L	<5
1,2,4-Trimethylbenzene	µg/L	<5
1,2-Dibromo-3-chloropropane	µg/L	<10
1,2-Dibromoethane	µg/L	<5
1,2-Dichlorobenzene	µg/L	<5
1,2-Dichloroethane	µg/L	<2.5
1,2-Dichloropropane	µg/L	<5
1,3,5-Trimethylbenzene	µg/L	<5
1,3-Dichlorobenzene	µg/L	<5
1,3-Dichloropropane	µg/L	<2
1,4-Dichlorobenzene	µg/L	<2.5
1-Chlorohexane	µg/L	<5
2,2-Dichloropropane	µg/L	<5
2-Chlorotoluene	µg/L	<5
2-Hexanone	µg/L	<50
4-Chlorotoluene	µg/L	<5
Acetone	µg/L	27 J
Benzene	µg/L	<2
Bromobenzene	µg/L	<5
Bromochloromethane	µg/L	<5
Bromodichloromethane	µg/L	<2.5
Bromoform	µg/L	<5
Bromomethane	µg/L	<5
Carbon disulfide	µg/L	<5
Carbon tetrachloride	µg/L	<5
Chlorobenzene	µg/L	<2.5
Chloroethane	µg/L	<5
Chloroform	µg/L	<1.5
Chloromethane	µg/L	<5
cis-1,2-Dichloroethene	µg/L	<5
cis-1,3-Dichloropropene	µg/L	<2.5
Dibromochloromethane	µg/L	<2.5
Dibromomethane	µg/L	<5
Dichlorodifluoromethane	µg/L	<5
Ethylbenzene	µg/L	<5
Hexachlorobutadiene	µg/L	<3
Isopropylbenzene	µg/L	<5
m-,p-Xylene	µg/L	<10
MEK (2-Butanone)	µg/L	<50
Methyl t-butyl ether (MTBE)	µg/L	<25
Methylene chloride	µg/L	<5
MIBK (methyl isobutyl ketone)	µg/L	<50
Naphthalene	µg/L	<5
n-Butylbenzene	µg/L	<5
n-Propylbenzene	µg/L	<5
o-Xylene	µg/L	<5
p-Isopropyltoluene	µg/L	<5
sec-Butylbenzene	µg/L	<5
Styrene	µg/L	<5
tert-Butylbenzene	µg/L	<5
Tetrachloroethene	µg/L	<5
Toluene	µg/L	<5
trans-1,2-Dichloroethene	µg/L	<5
trans-1,3-Dichloropropene	µg/L	<5
Trichloroethene	µg/L	25
Trichlorofluoromethane	µg/L	<5
Vinyl chloride	µg/L	<5

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

JB: Estimated-Blank Contamination

TABLE B-2-3
GEOCHEMICAL ANALYTICAL RESULTS, RINSE BLANKS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Sample ID	RB2-EBT-11	RB3-EBT-11	RB1-EBT-11
	Lab ID	L13020289-10	L13020340-02	L13020203-06
	Date	2/7/2013	2/10/2013	2/6/2013
Analyte	Units			
Total Organic Carbon	mg/L	<1	0.501 J	1.71
Acetic Acid	mg/L	<1	<1	<1
Butyric Acid	mg/L	<1	<1	<1
Lactic Acid	mg/L	<1	<1	<1
Propionic Acid	mg/L	<10	<10	<10
Pyruvic Acid	mg/L	<0.1	<0.1	<0.1
Ethane	µg/L	<5	<5	<5
Ethene	µg/L	<5	<5	<5
Methane	µg/L	<5	<5	<5

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-2-4
VOC ANALYTICAL RESULTS, TRIP AND RINSE BLANKS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Sample ID Lab ID Date Units	TB-020613-EBT-11 L13020203-07 2/6/2013	TB-020513-EBT-11 L13020203-08 2/6/2013	TB-020713-EBT-11 L13020286-09 2/7/2013	TB-020813-EBT-11 L13020288-08 2/8/2013	TB-021113-EBT-11 L13020354-08 2/9/2013
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	0.174 J	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-2-4
VOC ANALYTICAL RESULTS, TRIP AND RINSE BLANKS, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Sample ID Lab ID Date Units	TB-021213-EBT-11 L13020340-03 2/10/2013	TB-021313-EBT-11 L13020357-06 2/11/2013	RB1-EBT-11 L13020203-06 2/6/2013	RB2-EBT-11 L13020289-10 2/7/2013	RB3-EBT-11 L13020340-02 2/10/2013
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	3.84 J	3.51 J	5.26 J
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	0.259 J	<1	0.513 J
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	0.277 J	0.255 J	0.252 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

TABLE B-3-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03B	IW21-04A
	Lab ID	L13050475-01	L13050705-01	L13050705-02	L13050705-03	L13050477-01	L13050805-01	L13050805-02
	Date	5/7/2013	5/10/2013	5/10/2013	5/10/2013	5/8/2013	5/11/2013	5/11/2013
	Area	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Analyte	Units							
Total Organic Carbon	mg/L	6280	321	626	5220 J	205	422	23200
Acetic Acid	mg/L	817	55.8	232	996	141	13.1 J	5010 J
Butyric Acid	mg/L	888	11.3	246	1920	49.8	14.6 J	8360 J
Lactic Acid	mg/L	<1 UJ	0.826 J	<10 UJ	342 J	1.95 J	9.41 J	16.4 J
Propionic Acid	mg/L	396	222	180 J	666	87.4	467 J	4150 J
Pyruvic Acid	mg/L	<0.1 UJ	<0.1 UJ	<1	0.755 J	<0.1 UJ	<1 UJ	<1 UJ
Carbon Dioxide	µg/L	460000	220000	320000	430000	240000	210000 J	380000 J
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	12000	12000	9700	4100	15000	12000	7600

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-3-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW21-04B	IW21-04B-DUP1	MW-21	PMW21-01	PMW21-02	PMW21-04	IW101-02A
	Lab ID	L13050477-02	L13050477-05	L13050705-04	L13050805-03	L13050805-04	L13050477-03	L13050800-02
	Date	5/8/2013	5/8/2013	5/10/2013	5/11/2013	5/11/2013	5/8/2013	5/12/2013
	Area	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	1470	1470	28.3	0.944 J	2.48	172	262
Acetic Acid	mg/L	1050	1050	20.3	<1 UJ	<1 UJ	102	70.2
Butyric Acid	mg/L	230	227	2.82	<1 UJ	<1 UJ	3.89	8.06
Lactic Acid	mg/L	10.4 J	9.39 J	<1	<1 UJ	<1 UJ	1.86 J	0.631 J
Propionic Acid	mg/L	794	797	11 J	<10 UJ	<10 UJ	134	172 J
Pyruvic Acid	mg/L	<0.1 UJ	<0.1 UJ	<0.1	<0.1 UJ	<0.1 UJ	<0.1 UJ	0.0779 J
Carbon Dioxide	µg/L	210000	230000	120000	120000	100000	160000	210000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	8400	7900	620	3.9 JB	18	12000	13000

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-3-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03C	IW101-04A	IW101-04B
	Lab ID	L13050800-03	L13050800-04	L13050803-03	L13050803-04	L13050704-01	L13050802-01	L13050802-04
	Date	5/12/2013	5/12/2013	5/12/2013	5/12/2013	5/9/2013	5/13/2013	5/13/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	3.56	1250	219	359	1790 J	17500	1610
Acetic Acid	mg/L	<1	1100 J	82.3	9.37	842	4190	1110
Butyric Acid	mg/L	<1	211 J	16.1	<1	396	8440	475
Lactic Acid	mg/L	<1 UJ	7.34 J	2.25	6.96	8.85 J	26.9 J	7.53 J
Propionic Acid	mg/L	<10	606 J	136	412	940	2430	997
Pyruvic Acid	mg/L	<0.1 UJ	0.0763 J	0.144 J	<0.1 UJ	<0.1 UJ	<1	0.238 J
Carbon Dioxide	µg/L	100000	200000	350000 J	260000 J	340000	1100000	330000 J
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	15	13000	15000	17000	15000 J	16000	11000

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-3-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW101-04C	IW101-05A	IW101-05B	IW101-05C	IW101-07A	IW101-07A-DUP2	IW101-07B
	Lab ID	L13050704-02	L13050804-01	L13050804-02	L13050804-03	L13050803-05	L13050803-07	L13050803-06
	Date	5/9/2013	5/13/2013	5/13/2013	5/13/2013	5/12/2013	5/12/2013	5/12/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	1890 J	680	2.77	593	1.54	2.57	2370
Acetic Acid	mg/L	171 J	169 J	<1 UJ	5.77 J	<1	<1	1280
Butyric Acid	mg/L	<10	<1 UJ	<1 UJ	20.2 J	<1	<1	1380
Lactic Acid	mg/L	9.65 J	2.82 J	<1 UJ	11.7 J	<1 UJ	<1 UJ	5.95 J
Propionic Acid	mg/L	1190	623 J	<10 UJ	660 J	<10	<10	457
Pyruvic Acid	mg/L	<1	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ
Carbon Dioxide	µg/L	240000	250000 J	86000	300000 J	95000	110000	580000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	1.3 J
Methane	µg/L	8400	12000	110	12000	3 JB	3 JB	11000

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-3-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW101-07C	DR1-5	DR1-5A	DR1-6	DR1-6A	PMW101-02A	PMW101-02B
	Lab ID	L13050704-03	L13050800-01	L13050805-07	L13050803-01	L13050803-02	L13050802-05	L13050802-06
	Date	5/9/2013	5/12/2013	5/11/2013	5/12/2013	5/12/2013	5/13/2013	5/13/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	3610 J	64	32.6	20.4	254	921	128
Acetic Acid	mg/L	1690	43	9.79 J	12.8	158	296	4.7
Butyric Acid	mg/L	1080	22.9	<1 UJ	1.72	87.8	447	1.69
Lactic Acid	mg/L	10.9 J	<1	<1 UJ	<1 UJ	<1 UJ	1.3 J	1.69
Propionic Acid	mg/L	1070	17.6 J	12.5 J	<10	49.7	420	30
Pyruvic Acid	mg/L	<1	<0.1	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ
Carbon Dioxide	µg/L	380000	200000	76000	110000	170000	290000	160000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	8100	3600	3600	5200	2800	10000	7500

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-3-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	MW101-02B-DUF	PMW101-04A	PMW101-04B	PMW101-07A	PMW101-07B	DR2-2	DR2-5
	Lab ID	L13050802-07	L13050804-04	L13050477-04	L13050804-05	L13050804-06	L13050702-11	L13050476-01
	Date	5/13/2013	5/13/2013	5/8/2013	5/13/2013	5/13/2013	5/10/2013	5/8/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-2	TTA-2
Analyte	Units							
Total Organic Carbon	mg/L	134	1.56	1.14 B	1.78	0.607 JB	1310	33.1
Acetic Acid	mg/L	4.8	<1 UJ	<1	<1 UJ	<1 UJ	348	29.6
Butyric Acid	mg/L	1.59	<1 UJ	<1	<1 UJ	<1 UJ	794	7.42
Lactic Acid	mg/L	1.3	<1 UJ	<1	<1 UJ	<1 UJ	3.18 J	<1
Propionic Acid	mg/L	29.3	<10 UJ	<10	<10 UJ	<10 UJ	388	31
Pyruvic Acid	mg/L	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1	<0.1
Carbon Dioxide	µg/L	140000	130000	95000	110000	74000	560000	97000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	6800	420	11000	2200	3.2 JB	8900	970

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-3-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07	IW92-07-DUP4
	Lab ID	L13050476-02	L13050702-03	L13050801-01	L13050474-01	DRY	L13050476-03	L13050476-07
	Date	5/8/2013	5/9/2013	5/11/2013	5/7/2013		5/8/2013	5/8/2013
	Area	TTA-2	TTA-2	TTA-2	TTA-2		TTA-2	TTA-2
Analyte	Units							
Total Organic Carbon	mg/L	5030	35100	117	14500		104000 J	37000 J
Acetic Acid	mg/L	3220	4540	90.2	1030		1310	1310
Butyric Acid	mg/L	1460	12200	1.54 J	1240		2680	2670
Lactic Acid	mg/L	1.5 J	6.64 J	2.63 J	11.2 J		93200	92300
Propionic Acid	mg/L	2620	6040	62.5	1410		2610	2610
Pyruvic Acid	mg/L	<0.1	<1	<0.1 UJ	0.433 J		117	138
Carbon Dioxide	µg/L	390000	150000	360000	460000		830000	890000
Ethane	µg/L	<5	<5	<5	<5		<5	<5
Ethene	µg/L	<5	<5	<5	<5		<5	<5
Methane	µg/L	9500	2300	5000	5800		3000	3200

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-3-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW92-08	MW-85	MW-113	PMW85-01	PMW85-01-DUP5	PMW85-05	PMW92-03
	Lab ID	L13050702-04	L13050702-06	L13050702-07	L13050702-08	L13050702-09	L13050476-04	L13050702-05
	Date	5/9/2013	5/10/2013	5/10/2013	5/10/2013	5/10/2013	5/8/2013	5/9/2013
	Area	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Analyte	Units							
Total Organic Carbon	mg/L	729	5.44	12100	720	714	0.917 J	0.822 J
Acetic Acid	mg/L	650	<1	2500	519	487	<1	<1
Butyric Acid	mg/L	165	<1	6190	17.6	13 J	<1	<1
Lactic Acid	mg/L	22.6	1.27 J	5840	3.46 J	3.14 J	<1 UJ	<1
Propionic Acid	mg/L	615	<10	6700	1010	955	<10	<10
Pyruvic Acid	mg/L	<0.1 UJ	<0.1 UJ	9.33	0.0943 J	0.0654 J	<0.1 UJ	<0.1 UJ
Carbon Dioxide	µg/L	170000	210000	570000	190000	170000	100000	52000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	2400	1600	6200	13000	12000	7000	530

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-3-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	MW-197A	MW-197B	MW-197B-DUP6	MW-203A	MW-203B	MW-62	MW-212
	Lab ID	L13050801-02	L13050801-03	L13050801-07	L13050702-01	L13050801-04	L13050702-02	L13050801-05
	Date	5/11/2013	5/11/2013	5/11/2013	5/9/2013	5/11/2013	5/9/2013	5/11/2013
	Area	West-Central	West-Central	West-Central	West-Central	West-Central	Bldg 835	Bldg 835
Analyte	Units							
Total Organic Carbon	mg/L	<1	<1	1.43	14500	167	1260	<1
Acetic Acid	mg/L	<1	<1	<1	2670	68.1	341	<1
Butyric Acid	mg/L	<1	<1	<1	7040	125	915	<1
Lactic Acid	mg/L	<1 UJ	<1	<1	24.5 J	<1 UJ	205	<1
Propionic Acid	mg/L	<10	<10	<10	2050	58.6	319	<10
Pyruvic Acid	mg/L	<0.1 UJ	<0.1	<0.1	2.82 J	<0.1 UJ	0.616 J	<0.1
Carbon Dioxide	µg/L	<500000	100000	98000	400000	150000	110000	60000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	1.1 J	<5	<5	<5
Methane	µg/L	190 J	8.8 B	7.4 B	2400	1600	1700	3.4 JB

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-3-1
 GEOCHEMICAL ANALYTICAL RESULTS, EBT-12
 YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
 Main Installation - Defense Depot Memphis, Tennessee

	Location	MW-213
	Lab ID	L13050801-06
	Date	5/11/2013
	Area	Bldg 835
Analyte	Units	
Total Organic Carbon	mg/L	180
Acetic Acid	mg/L	50
Butyric Acid	mg/L	47.5
Lactic Acid	mg/L	<1 UJ
Propionic Acid	mg/L	49.3
Pyruvic Acid	mg/L	<0.1 UJ
Carbon Dioxide	µg/L	73000
Ethane	µg/L	<5
Ethene	µg/L	<5
Methane	µg/L	5000

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-3-2
VOC ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	DR1-5A	DR1-5	DR1-6A	DR1-6	IW101-02A	IW101-02B
		L13050805-07 5/11/2013 TTA-1S	L13050800-01 5/12/2013 TTA-1S	L13050803-02 5/12/2013 TTA-1S	L13050803-01 5/12/2013 TTA-1S	L13050800-02 5/12/2013 TTA-1S	L13050800-03 5/12/2013 TTA-1S
1,1,1,2-Tetrachloroethane	µg/L	<5	<2.5	<5	<0.5	<2.5	<0.5
1,1,1-Trichloroethane	µg/L	<10	<5	<10	<1	<5	<1
1,1,2,2-Tetrachloroethane	µg/L	<5	<2.5	<5	<0.5	<2.5	<0.5
1,1,2-Trichloroethane	µg/L	<10	<5	<10	<1	<5	<1
1,1-Dichloroethane	µg/L	<10	<5	<10	<1	<5	<1
1,1-Dichloroethene	µg/L	<10	<5	<10	<1	<5	<1
1,1-Dichloropropene	µg/L	<10	<5	<10	<1	<5	<1
1,2,3-Trichlorobenzene	µg/L	<10	<5	<10	<1	<5	<1
1,2,3-Trichloropropane	µg/L	<10	<5	<10	<1	<5	<1
1,2,4-Trichlorobenzene	µg/L	<10	<5	<10	<1	<5	<1
1,2,4-Trimethylbenzene	µg/L	<10	<5	<10	<1	<5	<1
1,2-Dibromo-3-chloropropane	µg/L	<20	<10	<20	<2	<10	<2
1,2-Dibromoethane	µg/L	<10	<5	<10	<1	<5	<1
1,2-Dichlorobenzene	µg/L	<10	<5	<10	<1	<5	<1
1,2-Dichloroethane	µg/L	<5	<2.5	<5	<0.5	<2.5	<0.5
1,2-Dichloropropane	µg/L	<10	<5	<10	<1	<5	<1
1,3,5-Trimethylbenzene	µg/L	<10	<5	<10	<1	<5	<1
1,3-Dichlorobenzene	µg/L	<10	<5	<10	<1	<5	<1
1,3-Dichloropropane	µg/L	<4	<2	<4	<0.4	<2	<0.4
1,4-Dichlorobenzene	µg/L	<5	<2.5	<5	<0.5	<2.5	<0.5
1-Chlorohexane	µg/L	<10	<5	<10	<1	<5	<1
2,2-Dichloropropane	µg/L	<10	<5	<10	<1	<5	<1
2-Chlorotoluene	µg/L	<10	<5	<10	<1	<5	<1
2-Hexanone	µg/L	<100	<50	<100	<10	<50	<10
4-Chlorotoluene	µg/L	<10	<5	<10	<1	<5	<1
Acetone	µg/L	94.4 J	125	75 J	9.07 J	190	<10
Benzene	µg/L	<4	<2	<4	<0.4	<2	<0.4
Bromobenzene	µg/L	<10	<5	<10	<1	<5	<1
Bromochloromethane	µg/L	<10	<5	<10	<1	<5	<1
Bromodichloromethane	µg/L	<5	<2.5	<5	<0.5	<2.5	<0.5
Bromoform	µg/L	<10	<5	<10	<1	<5	<1
Bromomethane	µg/L	<10	<5	<10	<1	<5	<1
Carbon disulfide	µg/L	<10	<5	<10	<1	<5	<1
Carbon tetrachloride	µg/L	<10	<5	<10	<1	<5	<1
Chlorobenzene	µg/L	<5	<2.5	<5	<0.5	<2.5	<0.5
Chloroethane	µg/L	<10	<5	<10	<1	<5	<1
Chloroform	µg/L	<3	<1.5	<3	<0.3	<1.5	<0.3
Chloromethane	µg/L	<10	<5	<10	<1	<5	<1
cis-1,2-Dichloroethene	µg/L	85.4	5.39	110	20	16.6	1.3
cis-1,3-Dichloropropene	µg/L	<5	<2.5	<5	<0.5	<2.5	<0.5
Dibromochloromethane	µg/L	<5	<2.5	<5	<0.5	<2.5	<0.5
Dibromomethane	µg/L	<10	<5	<10	<1	<5	<1
Dichlorodifluoromethane	µg/L	<10	<5	<10	<1	<5	<1
Ethylbenzene	µg/L	<10	<5	<10	<1	<5	<1
Hexachlorobutadiene	µg/L	<6	<3	<6	<0.6	<3	<0.6
Isopropylbenzene	µg/L	<10	<5	<10	<1	<5	<1
m-,p-Xylene	µg/L	<20	<10	<20	<2	<10	<2
MEK (2-Butanone)	µg/L	<100	33.9 J	51.9 J	9.3 J	357	<10
Methyl t-butyl ether (MTBE)	µg/L	<50	42.2	<50	<5	8.84 J	7.79
Methylene chloride	µg/L	<10	<5	<10	<1	<5	<1
MIBK (methyl isobutyl ketone)	µg/L	<100	<50	<100	<10	<50	<10
Naphthalene	µg/L	<10	<5	<10	<1	<5	<1
n-Butylbenzene	µg/L	<10	<5	<10	<1	<5	<1
n-Propylbenzene	µg/L	<10	<5	<10	<1	<5	<1
o-Xylene	µg/L	<10	<5	<10	<1	<5	<1
p-Isopropyltoluene	µg/L	<10	<5	<10	<1	<5	<1
sec-Butylbenzene	µg/L	<10	<5	<10	<1	<5	<1
Styrene	µg/L	<10	<5	<10	<1	<5	<1
tert-Butylbenzene	µg/L	<10	<5	<10	<1	<5	<1
Tetrachloroethene	µg/L	<10	35.5	<10	126	9.8	51.4
Toluene	µg/L	<10	<5	<10	<1	<5	<1
trans-1,2-Dichloroethene	µg/L	<10	<5	<10	<1	<5	<1
trans-1,3-Dichloropropene	µg/L	<10	<5	<10	<1	<5	<1
Trichloroethene	µg/L	4.27 J	<5	<10	1.35	2.38 J	0.344 J
Trichlorofluoromethane	µg/L	<10	<5	<10	<1	<5	<1
Vinyl chloride	µg/L	<10	<5	<10	<1	<5	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

TABLE B-3-2
VOC ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	IW101-02C L13050800-04 5/12/2013 TTA-1S	IW101-03A L13050803-03 5/12/2013 TTA-1S	IW101-03B L13050803-04 5/12/2013 TTA-1S	IW101-03C L13050704-01 5/9/2013 TTA-1S	IW101-04A L13050802-01 5/13/2013 TTA-1S	IW101-04B L13050802-04 5/13/2013 TTA-1S
1,1,1,2-Tetrachloroethane	µg/L	<5	<5	<5	<2.5	<5	<5
1,1,1-Trichloroethane	µg/L	<10	<10	<10	<5	<10	<10
1,1,2,2-Tetrachloroethane	µg/L	<5	<5	<5	<2.5	<5	<5
1,1,2-Trichloroethane	µg/L	<10	<10	<10	<5	<10	<10
1,1-Dichloroethane	µg/L	<10	<10	<10	<5	<10	<10
1,1-Dichloroethene	µg/L	<10	<10	<10	<5	<10	<10
1,1-Dichloropropene	µg/L	<10	<10	<10	<5	<10	<10
1,2,3-Trichlorobenzene	µg/L	<10	<10	<10	<5	<10	<10
1,2,3-Trichloropropane	µg/L	<10	<10	<10	<5	<10	<10
1,2,4-Trichlorobenzene	µg/L	<10	<10	<10	<5	<10	<10
1,2,4-Trimethylbenzene	µg/L	<10	<10	<10	<5	3.09 J	<10
1,2-Dibromo-3-chloropropane	µg/L	<20	<20	<20	<10	<20	<20
1,2-Dibromoethane	µg/L	<10	<10	<10	<5	<10	<10
1,2-Dichlorobenzene	µg/L	<10	<10	<10	<5	<10	<10
1,2-Dichloroethane	µg/L	<5	<5	<5	<2.5	<5	<5
1,2-Dichloropropane	µg/L	<10	<10	<10	<5	<10	<10
1,3,5-Trimethylbenzene	µg/L	<10	<10	<10	<5	<10	<10
1,3-Dichlorobenzene	µg/L	<10	<10	<10	<5	<10	<10
1,3-Dichloropropane	µg/L	<4	<4	<4	<2	<4	<4
1,4-Dichlorobenzene	µg/L	<5	<5	<5	<2.5	<5	<5
1-Chlorohexane	µg/L	<10	<10	<10	<5	<10	<10
2,2-Dichloropropane	µg/L	<10	<10	<10	<5	<10	<10
2-Chlorotoluene	µg/L	<10	<10	<10	<5	<10	<10
2-Hexanone	µg/L	<100	<100	<100	<50	58.9 J	<100
4-Chlorotoluene	µg/L	<10	<10	<10	<5	<10	<10
Acetone	µg/L	612	191	237	419	1790	272
Benzene	µg/L	<4	<4	<4	<2	<4	<4
Bromobenzene	µg/L	<10	<10	<10	<5	<10	<10
Bromochloromethane	µg/L	<10	<10	<10	<5	<10	<10
Bromodichloromethane	µg/L	<5	<5	<5	<2.5	<5	<5
Bromoform	µg/L	<10	<10	<10	<5 UJ	<10	<10
Bromomethane	µg/L	<10	<10	<10	<5	<10	<10
Carbon disulfide	µg/L	<10	<10	<10	<5	<10	<10
Carbon tetrachloride	µg/L	<10	<10	<10	<5	<10	<10
Chlorobenzene	µg/L	<5	<5	<5	<2.5	<5	<5
Chloroethane	µg/L	<10	<10	<10	<5	<10	<10
Chloroform	µg/L	<3	<3	<3	<1.5	<3	<3
Chloromethane	µg/L	<10	<10	<10	<5	<10	<10
cis-1,2-Dichloroethene	µg/L	59.4	5.88 J	23.2	112	7.41 J	14.8
cis-1,3-Dichloropropene	µg/L	<5	<5	<5	<2.5	<5	<5
Dibromochloromethane	µg/L	<5	<5	<5	<2.5	<5	<5
Dibromomethane	µg/L	<10	<10	<10	<5	<10	<10
Dichlorodifluoromethane	µg/L	<10	<10	<10	<5	<10	<10
Ethylbenzene	µg/L	<10	<10	<10	<5	<10	<10
Hexachlorobutadiene	µg/L	<6	<6	<6	<3	<6	<6
Isopropylbenzene	µg/L	<10	<10	<10	<5	<10	<10
m-,p-Xylene	µg/L	<20	<20	<20	<10	<20	<20
MEK (2-Butanone)	µg/L	488	176	450	1340	4650	498
Methyl t-butyl ether (MTBE)	µg/L	<50	10.8 J	7.29 J	<25	<50	<50
Methylene chloride	µg/L	<10	<10	<10	<5	<10	<10
MIBK (methyl isobutyl ketone)	µg/L	<100	<100	<100	<50	<100	<100
Naphthalene	µg/L	<10	<10	<10	<5	<10	<10
n-Butylbenzene	µg/L	<10	<10	<10	<5	<10	<10
n-Propylbenzene	µg/L	<10	<10	<10	<5	<10	<10
o-Xylene	µg/L	<10	<10	<10	<5	<10	<10
p-Isopropyltoluene	µg/L	<10	<10	<10	<5	<10	<10
sec-Butylbenzene	µg/L	<10	<10	<10	<5	<10	<10
Styrene	µg/L	<10	<10	<10	<5	<10	<10
tert-Butylbenzene	µg/L	<10	<10	<10	<5	<10	<10
Tetrachloroethene	µg/L	<10	<10	<10	<5	<10	<10
Toluene	µg/L	<10	6.36 J	<10	<5	<10	<10
trans-1,2-Dichloroethene	µg/L	<10	<10	<10	<5	<10	<10
trans-1,3-Dichloropropene	µg/L	<10	<10	<10	<5	<10	<10
Trichloroethene	µg/L	<10	<10	<10	<5	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<5	<10	<10
Vinyl chloride	µg/L	<10	<10	<10	1.45 J	<10	<10

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

TABLE B-3-2
VOC ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	IW101-04C L13050704-02 5/9/2013 TTA-1S	IW101-05A L13050804-01 5/13/2013 TTA-1S	IW101-05B L13050804-02 5/13/2013 TTA-1S	IW101-05C L13050804-03 5/13/2013 TTA-1S	IW101-07A L13050803-05 5/12/2013 TTA-1S	IW101-07A-DUP2 L13050803-07 5/12/2013 TTA-1S
1,1,1,2-Tetrachloroethane	µg/L	<2.5	<5	<0.5	<5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<5	<10	<1	<10	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<2.5	<5	<0.5	<5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<5	<10	<1	<10	<1	<1
1,1-Dichloroethane	µg/L	<5	<10	<1	<10	<1	<1
1,1-Dichloroethene	µg/L	<5	<10	<1	<10	<1	<1
1,1-Dichloropropene	µg/L	<5	<10	<1	<10	<1	<1
1,2,3-Trichlorobenzene	µg/L	<5	<10	<1	<10	<1	<1
1,2,3-Trichloropropane	µg/L	<5	<10	<1	<10	<1	<1
1,2,4-Trichlorobenzene	µg/L	<5	<10	<1	<10	<1	<1
1,2,4-Trimethylbenzene	µg/L	<5	<10	<1	<10	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<10	<20	<2	<20	<2	<2
1,2-Dibromoethane	µg/L	<5	<10	<1	<10	<1	<1
1,2-Dichlorobenzene	µg/L	<5	<10	<1	<10	<1	<1
1,2-Dichloroethane	µg/L	<2.5	<5	<0.5	<5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<5	<10	<1	<10	<1	<1
1,3,5-Trimethylbenzene	µg/L	<5	<10	<1	<10	<1	<1
1,3-Dichlorobenzene	µg/L	<5	<10	<1	<10	<1	<1
1,3-Dichloropropane	µg/L	<2	<4	<0.4	<4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<2.5	<5	<0.5	<5	<0.5	<0.5
1-Chlorohexane	µg/L	<5	<10	<1	<10	<1	<1
2,2-Dichloropropane	µg/L	<5	<10	<1	<10	<1	<1
2-Chlorotoluene	µg/L	<5	<10	<1	<10	<1	<1
2-Hexanone	µg/L	<50	<100	<10	<100	<10	<10
4-Chlorotoluene	µg/L	<5	<10	<1	<10	<1	<1
Acetone	µg/L	7790	507	<10	1040	<10	<10
Benzene	µg/L	<2	<4	<0.4	<4	<0.4	<0.4
Bromobenzene	µg/L	<5	<10	<1	<10	<1	<1
Bromochloromethane	µg/L	<5	<10	<1	<10	<1	<1
Bromodichloromethane	µg/L	<2.5	<5	<0.5	<5	<0.5	<0.5
Bromoform	µg/L	<5 UJ	<10	<1	<10	<1	<1
Bromomethane	µg/L	<5	<10	<1	<10	<1	<1
Carbon disulfide	µg/L	<5	<10	<1	<10	<1	<1
Carbon tetrachloride	µg/L	<5	<10	<1	<10	<1	<1
Chlorobenzene	µg/L	<2.5	<5	<0.5	<5	<0.5	<0.5
Chloroethane	µg/L	<5	<10	<1	<10	<1	<1
Chloroform	µg/L	<1.5	<3	<0.3	<3	<0.3	<0.3
Chloromethane	µg/L	<5	<10	<1	<10	<1	<1
cis-1,2-Dichloroethene	µg/L	27.2	13.8	4.51	56.6	1.42	1.22
cis-1,3-Dichloropropene	µg/L	<2.5	<5	<0.5	<5	<0.5	<0.5
Dibromochloromethane	µg/L	<2.5	<5	<0.5	<5	<0.5	<0.5
Dibromomethane	µg/L	<5	<10	<1	<10	<1	<1
Dichlorodifluoromethane	µg/L	<5	<10	<1	<10	<1	<1
Ethylbenzene	µg/L	<5	<10	<1	<10	<1	<1
Hexachlorobutadiene	µg/L	<3	<6	<0.6	<6	<0.6	<0.6
Isopropylbenzene	µg/L	<5	<10	<1	<10	<1	<1
m-,p-Xylene	µg/L	<10	<20	<2	<20	<2	<2
MEK (2-Butanone)	µg/L	3160	1030	<10	1550	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<25	5.34 J	3.03 J	<50	0.515 J	<5
Methylene chloride	µg/L	<5	<10	<1	<10	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<50	<100	<10	<100	<10	<10
Naphthalene	µg/L	<5	<10	<1	<10	<1	<1
n-Butylbenzene	µg/L	<5	<10	<1	<10	<1	<1
n-Propylbenzene	µg/L	<5	<10	<1	<10	<1	<1
o-Xylene	µg/L	<5	<10	<1	<10	<1	<1
p-Isopropyltoluene	µg/L	<5	<10	<1	<10	<1	<1
sec-Butylbenzene	µg/L	<5	<10	<1	<10	<1	<1
Styrene	µg/L	<5	<10	<1	<10	<1	<1
tert-Butylbenzene	µg/L	<5	<10	<1	<10	<1	<1
Tetrachloroethene	µg/L	<5	<10	33.7	<10	1.06	0.947 J
Toluene	µg/L	<5	<10	<1	<10	<1	<1
trans-1,2-Dichloroethene	µg/L	<5	<10	<1	<10	<1	<1
trans-1,3-Dichloropropene	µg/L	<5	<10	<1	<10	<1	<1
Trichloroethene	µg/L	<5	<10	0.851 J	<10	1.94	1.78
Trichlorofluoromethane	µg/L	<5	<10	<1	<10	<1	<1
Vinyl chloride	µg/L	<5	<10	<1	<10	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

TABLE B-3-2
VOC ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	IW101-07B L13050803-06 5/12/2013 TTA-1S	IW101-07C L13050704-03 5/9/2013 TTA-1S	PMW101-02A L13050802-05 5/13/2013 TTA-1S	PMW101-02B L13050802-06 5/13/2013 TTA-1S	PMW101-02B- L13050802-07 5/13/2013 TTA-1S	PMW101-04A L13050804-04 5/13/2013 TTA-1S
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<2.5	<5	<5	<5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<5	<10	<10	<10	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<2.5	<5	<5	<5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<5	<10	<10	<10	<1
1,1-Dichloroethane	µg/L	<1	<5	<10	<10	<10	<1
1,1-Dichloroethene	µg/L	<1	<5	<10	<10	<10	<1
1,1-Dichloropropene	µg/L	<1	<5	<10	<10	<10	<1
1,2,3-Trichlorobenzene	µg/L	<1	<5	<10	<10	<10	<1
1,2,3-Trichloropropane	µg/L	<1	<5	<10	<10	<10	<1
1,2,4-Trichlorobenzene	µg/L	<1	<5	<10	<10	<10	<1
1,2,4-Trimethylbenzene	µg/L	<1	<5	<10	<10	<10	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<10	<20	<20	<20	<2
1,2-Dibromoethane	µg/L	<1	<5	<10	<10	<10	<1
1,2-Dichlorobenzene	µg/L	<1	<5	<10	<10	<10	<1
1,2-Dichloroethane	µg/L	<0.5	1.44 J	<5	<5	<5	<0.5
1,2-Dichloropropane	µg/L	<1	2.21 J	<10	<10	<10	<1
1,3,5-Trimethylbenzene	µg/L	<1	<5	<10	<10	<10	<1
1,3-Dichlorobenzene	µg/L	<1	<5	<10	<10	<10	<1
1,3-Dichloropropane	µg/L	<0.4	<2	<4	<4	<4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<2.5	<5	<5	<5	<0.5
1-Chlorohexane	µg/L	<1	<5	<10	<10	<10	<1
2,2-Dichloropropane	µg/L	<1	<5	<10	<10	<10	<1
2-Chlorotoluene	µg/L	<1	<5	<10	<10	<10	<1
2-Hexanone	µg/L	<10	<50	<100	<100	<100	<10
4-Chlorotoluene	µg/L	<1	<5	<10	<10	<10	<1
Acetone	µg/L	<10	5220	206	42.9 J	43.3 J	<10
Benzene	µg/L	<0.4	<2	<4	<4	<4	<0.4
Bromobenzene	µg/L	<1	<5	<10	<10	<10	<1
Bromochloromethane	µg/L	<1	<5	<10	<10	<10	<1
Bromodichloromethane	µg/L	<0.5	<2.5	<5	<5	<5	<0.5
Bromoform	µg/L	<1	<5 UJ	<10	<10	<10	<1
Bromomethane	µg/L	<1	<5	<10	<10	<10	<1
Carbon disulfide	µg/L	<1	<5	<10	<10	<10	<1
Carbon tetrachloride	µg/L	<1	<5	<10	<10	<10	<1
Chlorobenzene	µg/L	<0.5	<2.5	<5	<5	<5	<0.5
Chloroethane	µg/L	<1	<5	<10	<10	<10	<1
Chloroform	µg/L	<0.3	<1.5	<3	<3	<3	<0.3
Chloromethane	µg/L	<1	<5	<10	<10	<10	<1
cis-1,2-Dichloroethene	µg/L	1.94	245	16	27.8	27.5	2.29
cis-1,3-Dichloropropene	µg/L	<0.5	<2.5	<5	<5	<5	<0.5
Dibromochloromethane	µg/L	<0.5	<2.5	<5	<5	<5	<0.5
Dibromomethane	µg/L	<1	<5	<10	<10	<10	<1
Dichlorodifluoromethane	µg/L	<1	<5	<10	<10	<10	<1
Ethylbenzene	µg/L	<1	<5	<10	<10	<10	<1
Hexachlorobutadiene	µg/L	<0.6	<3	<6	<6	<6	<0.6
Isopropylbenzene	µg/L	<1	<5	<10	<10	<10	<1
m-,p-Xylene	µg/L	<2	<10	<20	<20	<20	<2
MEK (2-Butanone)	µg/L	<10	1180	427	32.5 J	31.1	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<25	<50	5.4 J	5.44 J	2.89 J
Methylene chloride	µg/L	<1	<5	<10	<10	<10	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<50	<100	<100	<100	<10
Naphthalene	µg/L	<1	<5	<10	<10	<10	<1
n-Butylbenzene	µg/L	<1	<5	<10	<10	<10	<1
n-Propylbenzene	µg/L	<1	<5	<10	<10	<10	<1
o-Xylene	µg/L	<1	<5	<10	<10	<10	<1
p-Isopropyltoluene	µg/L	<1	<5	<10	<10	<10	<1
sec-Butylbenzene	µg/L	<1	<5	<10	<10	<10	<1
Styrene	µg/L	<1	<5	<10	<10	<10	<1
tert-Butylbenzene	µg/L	<1	<5	<10	<10	<10	<1
Tetrachloroethene	µg/L	14.5	<5	<10	<10	<10	45.6
Toluene	µg/L	<1	<5	<10	<10	<10	<1
trans-1,2-Dichloroethene	µg/L	<1	<5	<10	<10	<10	<1
trans-1,3-Dichloropropene	µg/L	<1	<5	<10	<10	<10	<1
Trichloroethene	µg/L	36	<5	<10	<10	<10	0.967 J
Trichlorofluoromethane	µg/L	<1	<5	<10	<10	<10	<1
Vinyl chloride	µg/L	<1	1.81 J	<10	<10	<10	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

TABLE B-3-2
VOC ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	PMW101-04B	PMW101-07A	PMW101-07B	IW21-01A	IW21-01B	IW21-02A
		L13050477-04 5/8/2013 TTA-1S	L13050804-05 5/13/2013 TTA-1S	L13050804-06 5/13/2013 TTA-1S	L13050475-01 5/7/2013 TTA-1N	L13050705-01 5/10/2013 TTA-1N	L13050705-02 5/10/2013 TTA-1N
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<5	<2.5	<2.5	<2.5
1,1,1-Trichloroethane	µg/L	<1	<1	<10	<5	<5	<5
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<5	<2.5	<2.5	<2.5
1,1,2-Trichloroethane	µg/L	<1	<1	<10	<5	<5	<5
1,1-Dichloroethane	µg/L	<1	<1	<10	<5	<5	<5
1,1-Dichloroethene	µg/L	<1	<1	<10	<5	<5	<5
1,1-Dichloropropene	µg/L	<1	<1	<10	<5	<5	<5
1,2,3-Trichlorobenzene	µg/L	<1	<1	<10	<5	<5	<5
1,2,3-Trichloropropane	µg/L	<1	<1	<10	<5	<5	<5
1,2,4-Trichlorobenzene	µg/L	<1	<1	<10	<5	<5	<5
1,2,4-Trimethylbenzene	µg/L	<1	<1	<10	43.1	27.7	70.2
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<20	<10	<10	<10
1,2-Dibromoethane	µg/L	<1	<1	<10	<5	<5	<5
1,2-Dichlorobenzene	µg/L	<1	<1	<10	<5	<5	<5
1,2-Dichloroethane	µg/L	<0.5	<0.5	<5	<2.5	<2.5	<2.5
1,2-Dichloropropane	µg/L	<1	<1	<10	<5	<5	<5
1,3,5-Trimethylbenzene	µg/L	<1	<1	<10	17.2	12.1	19.3
1,3-Dichlorobenzene	µg/L	<1	<1	<10	<5	<5	<5
1,3-Dichloropropane	µg/L	<0.4	<0.4	<4	<2	<2	<2
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<5	<2.5	<2.5	<2.5
1-Chlorohexane	µg/L	<1	<1	<10	<5	<5	<5
2,2-Dichloropropane	µg/L	<1	<1	<10	<5	<5	<5
2-Chlorotoluene	µg/L	<1	<1	<10	<5	<5	<5
2-Hexanone	µg/L	<10	<10	<100	<50	<50	<50
4-Chlorotoluene	µg/L	<1	<1	<10	<5	<5	<5
Acetone	µg/L	<10	<10	3270 J	707	159	187
Benzene	µg/L	<0.4	<0.4	<4	<2	<2	<2
Bromobenzene	µg/L	<1	<1	<10	<5	<5	<5
Bromochloromethane	µg/L	<1	<1	<10	<5	<5	<5
Bromodichloromethane	µg/L	<0.5	<0.5	<5	<2.5	<2.5	<2.5
Bromoform	µg/L	<1	<1	<10	<5	<5	<5
Bromomethane	µg/L	<1	<1	<10	<5	<5	<5
Carbon disulfide	µg/L	<1	<1	<10	<5	<5	<5
Carbon tetrachloride	µg/L	<1	<1	<10	<5	<5	<5
Chlorobenzene	µg/L	<0.5	<0.5	<5	<2.5	<2.5	<2.5
Chloroethane	µg/L	<1	<1	<10	<5	<5	<5
Chloroform	µg/L	<0.3	<0.3	<3	<1.5	<1.5	<1.5
Chloromethane	µg/L	<1	<1	<10	<5	<5	<5
cis-1,2-Dichloroethene	µg/L	2.46	<1	104	166	54.6	72.6
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<5	<2.5	<2.5	<2.5
Dibromochloromethane	µg/L	<0.5	<0.5	<5	<2.5	<2.5	<2.5
Dibromomethane	µg/L	<1	<1	<10	<5	<5	<5
Dichlorodifluoromethane	µg/L	<1	<1	<10	<5	<5	<5
Ethylbenzene	µg/L	<1	<1	<10	<5	<5	<5
Hexachlorobutadiene	µg/L	<0.6	<0.6	<6	<3	<3	<3
Isopropylbenzene	µg/L	<1	<1	<10	<5	<5	1.74 J
m-,p-Xylene	µg/L	<2	<2	<20	<10	<10	<10
MEK (2-Butanone)	µg/L	<10	<10	841	523	96.3	48 J
Methyl t-butyl ether (MTBE)	µg/L	10.2	<5	<50	69.1	61.2	<25
Methylene chloride	µg/L	<1	<1	<10	<5	<5	<5
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<100	<50	<50	<50
Naphthalene	µg/L	<1	<1	<10	<5	<5	<5
n-Butylbenzene	µg/L	<1	<1	<10	<5	1.65 J	1.97 J
n-Propylbenzene	µg/L	<1	<1	<10	5.49	4.24 J	8.99
o-Xylene	µg/L	<1	<1	<10	6.45	<5	<5
p-Isopropyltoluene	µg/L	<1	<1	<10	1.44 J	<5	<5
sec-Butylbenzene	µg/L	<1	<1	<10	<5	<5	<5
Styrene	µg/L	<1	<1	<10	<5	<5	<5
tert-Butylbenzene	µg/L	<1	<1	<10	<5	<5	<5
Tetrachloroethene	µg/L	33.7	<1	<10	1.48 J	<5	2.69 J
Toluene	µg/L	<1	<1	<10	<5	<5	<5
trans-1,2-Dichloroethene	µg/L	<1	<1	<10	<5	<5	<5
trans-1,3-Dichloropropene	µg/L	<1	<1	<10	<5	<5	<5
Trichloroethene	µg/L	3.38	0.347 J	<10	2.09 J	<5	<5
Trichlorofluoromethane	µg/L	<1	<1	<10	<5	<5	<5
Vinyl chloride	µg/L	<1	<1	<10	<5	<5	<5

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

TABLE B-3-2
VOC ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	IW21-02B L13050705-03 5/10/2013 TTA-1N	IW21-03A L13050477-01 5/8/2013 TTA-1N	IW21-03B L13050805-01 5/11/2013 TTA-1N	IW21-04A L13050805-02 5/11/2013 TTA-1N	IW21-04B L13050477-02 5/8/2013 TTA-1N	IW21-04B-DUP1 L13050477-05 5/8/2013 TTA-1N
1,1,1,2-Tetrachloroethane	µg/L	<2.5	<0.5	<10	<5	<5	<5
1,1,1-Trichloroethane	µg/L	<5	<1	<20	<10	<10	<10
1,1,2,2-Tetrachloroethane	µg/L	<2.5	<0.5	<10	<5	<5	<5
1,1,2-Trichloroethane	µg/L	<5	<1	<20	<10	<10	<10
1,1-Dichloroethane	µg/L	<5	<1	<20	<10	<10	<10
1,1-Dichloroethene	µg/L	<5	<1	<20	<10	<10	<10
1,1-Dichloropropene	µg/L	<5	<1	<20	<10	<10	<10
1,2,3-Trichlorobenzene	µg/L	<5	<1	<20	<10	<10	<10
1,2,3-Trichloropropane	µg/L	<5	<1	<20	<10	<10	<10
1,2,4-Trichlorobenzene	µg/L	<5	<1	<20	<10	<10	<10
1,2,4-Trimethylbenzene	µg/L	142	3.63	<20	12.6	11.9	11.2
1,2-Dibromo-3-chloropropane	µg/L	<10	<2	<40	<20	<20	<20
1,2-Dibromoethane	µg/L	<5	<1	<20	<10	<10	<10
1,2-Dichlorobenzene	µg/L	<5	<1	<20	<10	<10	<10
1,2-Dichloroethane	µg/L	<2.5	<0.5	<10	<5	<5	<5
1,2-Dichloropropane	µg/L	<5	<1	<20	<10	<10	<10
1,3,5-Trimethylbenzene	µg/L	34.1	1.09	<20	3.06 J	5.23 J	5.03 J
1,3-Dichlorobenzene	µg/L	<5	<1	<20	<10	<10	<10
1,3-Dichloropropane	µg/L	<2	<0.4	<8	<4	<4	<4
1,4-Dichlorobenzene	µg/L	<2.5	<0.5	<10	<5	<5	<5
1-Chlorohexane	µg/L	<5	<1	<20	<10	<10	<10
2,2-Dichloropropane	µg/L	<5	<1	<20	<10	<10	<10
2-Chlorotoluene	µg/L	<5	<1	<20	<10	<10	<10
2-Hexanone	µg/L	<50	<10	<200	<100	<100	<100
4-Chlorotoluene	µg/L	<5	<1	<20	<10	<10	<10
Acetone	µg/L	280	175	280	3500	1400	1380
Benzene	µg/L	<2	0.231 J	<8	<4	<4	<4
Bromobenzene	µg/L	<5	<1	<20	<10	<10	<10
Bromochloromethane	µg/L	<5	<1	<20	<10	<10	<10
Bromodichloromethane	µg/L	<2.5	<0.5	<10	<5	<5	<5
Bromoform	µg/L	<5	<1	<20	<10	<10	<10
Bromomethane	µg/L	<5	<1	<20 UJ	<10 UJ	<10	<10
Carbon disulfide	µg/L	<5	0.634 J	<20	<10	<10	<10
Carbon tetrachloride	µg/L	<5	<1	<20	<10	<10	<10
Chlorobenzene	µg/L	<2.5	<0.5	<10	<5	<5	<5
Chloroethane	µg/L	<5	<1	<20	<10	<10	<10
Chloroform	µg/L	<1.5	<0.3	<6	<3	<3	<3
Chloromethane	µg/L	<5	<1	<20	<10	<10	<10
cis-1,2-Dichloroethene	µg/L	14.1	174	119	78.6	49.1	48.4
cis-1,3-Dichloropropene	µg/L	<2.5	<0.5	<10	<5	<5	<5
Dibromochloromethane	µg/L	<2.5	<0.5	<10	<5	<5	<5
Dibromomethane	µg/L	<5	<1	<20	<10	<10	<10
Dichlorodifluoromethane	µg/L	<5	<1	<20	<10	<10	<10
Ethylbenzene	µg/L	<5	5.04	<20	<10	<10	<10
Hexachlorobutadiene	µg/L	<3	<0.6	<12	<6	<6	<6
Isopropylbenzene	µg/L	3.39 J	<1	<20	<10	<10	<10
m-,p-Xylene	µg/L	3.23 J	<2	<40	<20	<20	<20
MEK (2-Butanone)	µg/L	155	144	303	5890	1580	1560
Methyl t-butyl ether (MTBE)	µg/L	<25	40.1	23.3 J	13.7 J	8.33 J	8.63 J
Methylene chloride	µg/L	<5	<1	<20	<10	2.78 J	<10
MIBK (methyl isobutyl ketone)	µg/L	<50	<10	<200	<100	<100	<100
Naphthalene	µg/L	<5	<1	<20	<10	<10	<10
n-Butylbenzene	µg/L	3.68 J	<1	<20	<10	<10	<10
n-Propylbenzene	µg/L	17.9	0.587 J	<20	<10	1.52 J	<10
o-Xylene	µg/L	<5	<1	<20	<10	<10	<10
p-Isopropyltoluene	µg/L	<5	<1	<20	<10	<10	<10
sec-Butylbenzene	µg/L	1.93 J	<1	<20	<10	<10	<10
Styrene	µg/L	<5	<1	<20	<10	<10	<10
tert-Butylbenzene	µg/L	<5	<1	<20	<10	<10	<10
Tetrachloroethene	µg/L	7.91	2.31	<20	<10	<10	<10
Toluene	µg/L	<5	<1	<20	<10	<10	<10
trans-1,2-Dichloroethene	µg/L	<5	0.619 J	<20	<10	<10	<10
trans-1,3-Dichloropropene	µg/L	<5	<1	<20	<10	<10	<10
Trichloroethene	µg/L	<5	1.22	<20	<10	2.66 J	<10
Trichlorofluoromethane	µg/L	<5	<1	<20	<10	<10	<10
Vinyl chloride	µg/L	<5	<1	<20	<10	<10	<10

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

TABLE B-3-2
VOC ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	MW-21 L13050705-04 5/10/2013 TTA-1N	PMW21-01 L13050805-03 5/11/2013 TTA-1N	PMW21-02 L13050805-04 5/11/2013 TTA-1N	PMW21-04 L13050477-03 5/8/2013 TTA-1N	DR2-2 L13050702-11 5/10/2013 TTA-2	DR2-5 L13050476-01 5/8/2013 TTA-2
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	16.2
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	0.784 J	1.09	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	0.166 J
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	0.561 J
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	0.261 J	0.271 J	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	4.81 J	<10	<10	93.8	589	5.86 J
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1 UJ	<1
Bromomethane	µg/L	<1	<1 UJ	<1 UJ	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	0.541 J	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	78.4
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	0.249 J
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	0.179 J	<0.3	<0.3	<0.3	40
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	25.3	11.2	4.74 J	94.1	44.9	118
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	0.839 J	0.513 J	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	114	413	6.02 J
Methyl t-butyl ether (MTBE)	µg/L	5.52	35.1	29.7	12	<5	<5
Methylene chloride	µg/L	<1	<1	<1	<1	0.553 J	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	0.154 J	0.169 J	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	13.3	293	137	21.1	0.801 J	29.9
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	0.554 J	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	4.43	61.6	47.5	5.37	<1	14
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	0.38 J	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

TABLE B-3-2
VOC ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW85-05	IW85-06	IW92-01	IW92-02	IW92-03	IW92-07
	Lab ID	L13050476-02	L13050702-03	L13050801-01	L13050474-01		L13050476-03
	Date	5/8/2013	5/9/2013	5/11/2013	5/7/2013		5/8/2013
	Area	TTA-2	TTA-2	TTA-2	TTA-2		TTA-2
Analyte	Units						
1,1,1,2-Tetrachloroethane	µg/L	<12.5	<5	<0.5	<2.5		<10
1,1,1-Trichloroethane	µg/L	<25	<10	<1	<5		<20
1,1,2,2-Tetrachloroethane	µg/L	<12.5	<5	<0.5	<2.5		<10
1,1,2-Trichloroethane	µg/L	<25	<10	<1	<5		<20
1,1-Dichloroethane	µg/L	<25	<10	<1	<5		<20
1,1-Dichloroethene	µg/L	<25	<10	<1	<5		<20
1,1-Dichloropropene	µg/L	<25	<10	<1	<5		<20
1,2,3-Trichlorobenzene	µg/L	<25	<10	<1	<5		<20
1,2,3-Trichloropropane	µg/L	<25	<10	<1	<5		<20
1,2,4-Trichlorobenzene	µg/L	<25	<10	<1	<5		<20
1,2,4-Trimethylbenzene	µg/L	<25	<10	1.53	<5		<20
1,2-Dibromo-3-chloropropane	µg/L	<50	<20	<2	<10		<40
1,2-Dibromoethane	µg/L	<25	<10	<1	<5		<20
1,2-Dichlorobenzene	µg/L	<25	<10	<1	<5		<20
1,2-Dichloroethane	µg/L	<12.5	<5	<0.5	<2.5		<10
1,2-Dichloropropane	µg/L	<25	<10	<1	<5		<20
1,3,5-Trimethylbenzene	µg/L	<25	<10	0.377 J	<5		<20
1,3-Dichlorobenzene	µg/L	<25	<10	<1	<5		<20
1,3-Dichloropropane	µg/L	<10	<4	<0.4	<2		<8
1,4-Dichlorobenzene	µg/L	<12.5	<5	<0.5	<2.5		<10
1-Chlorohexane	µg/L	<25	<10	<1	<5		<20
2,2-Dichloropropane	µg/L	<25	<10	<1	<5		<20
2-Chlorotoluene	µg/L	<25	<10	<1	<5		<20
2-Hexanone	µg/L	<250	<100	<10	<50		<200
4-Chlorotoluene	µg/L	<25	<10	<1	<5		<20
Acetone	µg/L	358	798	259	301		123 J
Benzene	µg/L	<10	<4	<0.4	<2		<8
Bromobenzene	µg/L	<25	<10	<1	<5		<20
Bromochloromethane	µg/L	<25	<10	<1	<5		<20
Bromodichloromethane	µg/L	<12.5	<5	<0.5	<2.5		<10
Bromoform	µg/L	<25	<10	<1 UJ	<5		<20
Bromomethane	µg/L	<25	<10	<1	<5		<20
Carbon disulfide	µg/L	<25	<10	<1	<5		<20
Carbon tetrachloride	µg/L	<25	<10	<1	<5		<20
Chlorobenzene	µg/L	<12.5	<5	<0.5	<2.5		<10
Chloroethane	µg/L	<25	<10	<1	<5		<20
Chloroform	µg/L	<7.5	<3	<0.3	<1.5		<6
Chloromethane	µg/L	<25	<10	<1	<5		<20
cis-1,2-Dichloroethene	µg/L	44.4	20.4	21.6	107		30.5
cis-1,3-Dichloropropene	µg/L	<12.5	<5	<0.5	<2.5		<10
Dibromochloromethane	µg/L	<12.5	<5	<0.5	<2.5		<10
Dibromomethane	µg/L	<25	<10	<1	<5		<20
Dichlorodifluoromethane	µg/L	<25	<10	<1	<5		<20
Ethylbenzene	µg/L	<25	<10	<1	<5		<20
Hexachlorobutadiene	µg/L	<15	<6	<0.6	<3		<12
Isopropylbenzene	µg/L	<25	<10	<1	<5		<20
m-,p-Xylene	µg/L	<50	<20	<2	<10		<40
MEK (2-Butanone)	µg/L	4610	20800	131	1060		<200
Methyl t-butyl ether (MTBE)	µg/L	<125	<50	<5	<25		<100
Methylene chloride	µg/L	<25	<10	<1	<5		<20
MIBK (methyl isobutyl ketone)	µg/L	<250	<100	<10	<50		<200
Naphthalene	µg/L	<25	<10	<1	<5		<20
n-Butylbenzene	µg/L	<25	<10	<1	<5		<20
n-Propylbenzene	µg/L	<25	<10	0.227 J	<5		<20
o-Xylene	µg/L	<25	<10	<1	<5		<20
p-Isopropyltoluene	µg/L	<25	<10	<1	<5		<20
sec-Butylbenzene	µg/L	<25	<10	<1	<5		<20
Styrene	µg/L	<25	<10	<1	<5		<20
tert-Butylbenzene	µg/L	<25	<10	<1	<5		<20
Tetrachloroethene	µg/L	<25	<10	<1	2.1 J		<20
Toluene	µg/L	<25	<10	0.255 J	<5		<20
trans-1,2-Dichloroethene	µg/L	<25	<10	<1	<5		<20
trans-1,3-Dichloropropene	µg/L	<25	<10	<1	<5		<20
Trichloroethene	µg/L	<25	<10	<1	<5		<20
Trichlorofluoromethane	µg/L	<25	<10	<1	<5		<20
Vinyl chloride	µg/L	<25	<10	0.359 J	<5		<20

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

TABLE B-3-2
VOC ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW92-07-DUP4	IW92-08	MW-113	MW-85	PMW85-01	PMW85-01-DUP5
	Lab ID	L13050476-07	L13050702-04	L13050702-07	L13050702-06	L13050702-08	L13050702-09
	Date	5/8/2013	5/9/2013	5/10/2013	5/10/2013	5/10/2013	5/10/2013
Analyte	Area Units	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
1,1,1,2-Tetrachloroethane	µg/L	<10	<0.5	<2.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<20	<1	<5	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<10	<0.5	<2.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<20	<1	<5	<1	<1	<1
1,1-Dichloroethane	µg/L	<20	<1	<5	<1	<1	<1
1,1-Dichloroethene	µg/L	<20	<1	<5	<1	<1	<1
1,1-Dichloropropene	µg/L	<20	<1	<5	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<20	<1	<5	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<20	10.6	<5	5.83	<1	<1
1,2,4-Trichlorobenzene	µg/L	<20	<1	<5	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<20	<1	<5	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<40	<2	<10	<2	<2	<2
1,2-Dibromoethane	µg/L	<20	<1	<5	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<20	0.176 J	<5	<1	<1	<1
1,2-Dichloroethane	µg/L	<10	0.559	<2.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<20	4	<5	0.307 J	1.59	1.53
1,3,5-Trimethylbenzene	µg/L	<20	<1	<5	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<20	<1	<5	<1	<1	<1
1,3-Dichloropropane	µg/L	<8	2.6	<2	<0.4	2.03	2.05
1,4-Dichlorobenzene	µg/L	<10	<0.5	<2.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<20	<1	<5	<1	<1	<1
2,2-Dichloropropane	µg/L	<20	<1	<5	<1	<1	<1
2-Chlorotoluene	µg/L	<20	<1	<5	<1	<1	<1
2-Hexanone	µg/L	<200	5.78 J	<50	<10	<10	<10
4-Chlorotoluene	µg/L	<20	<1	<5	<1	<1	<1
Acetone	µg/L	98.5 J	286	94.4	<10	135	140
Benzene	µg/L	<8	<0.4	<2	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<20	<1	<5	<1	<1	<1
Bromochloromethane	µg/L	<20	<1	<5	<1	<1	<1
Bromodichloromethane	µg/L	<10	<0.5	<2.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<20	<1	<5 UJ	<1	<1 UJ	<1 UJ
Bromomethane	µg/L	<20	<1	<5	<1	<1	<1
Carbon disulfide	µg/L	<20	<1	<5	<1	<1	<1
Carbon tetrachloride	µg/L	<20	<1	<5	45.8	<1	<1
Chlorobenzene	µg/L	<10	0.158 J	<2.5	<0.5	0.192 J	0.194 J
Chloroethane	µg/L	<20	<1	<5	<1	<1	<1
Chloroform	µg/L	<6	<0.3	3.12	13.8	<0.3	<0.3
Chloromethane	µg/L	<20	<1	<5	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	29.3	117	169	52.4	55.1	52.6
cis-1,3-Dichloropropene	µg/L	<10	<0.5	<2.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<10	<0.5	<2.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<20	<1	<5	<1	<1	<1
Dichlorodifluoromethane	µg/L	<20	<1	<5	<1	<1	<1
Ethylbenzene	µg/L	<20	<1	<5	<1	<1	<1
Hexachlorobutadiene	µg/L	<12	<0.6	<3	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<20	<1	<5	<1	<1	<1
m-,p-Xylene	µg/L	<40	<2	<10	<2	<2	<2
MEK (2-Butanone)	µg/L	<200	872	131	<10	1990	1860
Methyl t-butyl ether (MTBE)	µg/L	<100	<5	<25	<5	<5	<5
Methylene chloride	µg/L	<20	1.19	3.18 J	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<200	<10	<50	<10	<10	<10
Naphthalene	µg/L	<20	<1	<5	<1	<1	<1
n-Butylbenzene	µg/L	<20	<1	<5	<1	<1	<1
n-Propylbenzene	µg/L	<20	<1	<5	<1	<1	<1
o-Xylene	µg/L	<20	<1	<5	<1	<1	<1
p-Isopropyltoluene	µg/L	<20	<1	<5	<1	<1	<1
sec-Butylbenzene	µg/L	<20	<1	<5	<1	<1	<1
Styrene	µg/L	<20	<1	<5	<1	<1	<1
tert-Butylbenzene	µg/L	<20	<1	<5	<1	<1	<1
Tetrachloroethene	µg/L	<20	0.773 J	12.5	21	0.451 J	0.382 J
Toluene	µg/L	<20	<1	<5	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<20	<1	<5	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<20	<1	<5	<1	<1	<1
Trichloroethene	µg/L	<20	<1	2.6 J	5.76	<1	<1
Trichlorofluoromethane	µg/L	<20	<1	<5	<1	<1	<1
Vinyl chloride	µg/L	<20	1.29	<5	<1	1.89	1.81

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

TABLE B-3-2
VOC ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	PMW85-05	PMW92-03	MW-197A	MW-197B	MW-197B-DUP6	MW-203A
		L13050476-04 5/8/2013 TTA-2	L13050702-05 5/9/2013 TTA-2	L13050801-02 5/11/2013 West-Central	L13050801-03 5/11/2013 West-Central	L13050801-07 5/11/2013 West-Central	L13050702-01 5/9/2013 West-Central
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<10
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<20
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<10
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<20
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<20
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<20
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<20
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<20
1,2,3-Trichloropropane	µg/L	46.5 J	<1	<1	<1	<1	<20 UJ
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<20
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<20
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<40
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<20
1,2-Dichlorobenzene	µg/L	0.321 J	<1	<1	<1	<1	<20
1,2-Dichloroethane	µg/L	0.466 J	<0.5	<0.5	<0.5	<0.5	<10
1,2-Dichloropropane	µg/L	0.739 J	<1	<1	<1	<1	<20
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<20
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<20
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<8
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<10
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<20
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<20
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<20
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<200
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<20
Acetone	µg/L	<10	<10	<10	<10	<10	961
Benzene	µg/L	0.184 J	<0.4	<0.4	<0.4	<0.4	<8
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<20
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<20
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<10
Bromoform	µg/L	<1	<1	<1 UJ	<1 UJ	<1 UJ	<20 UJ
Bromomethane	µg/L	<1	<1	<1	<1	<1	<20
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<20
Carbon tetrachloride	µg/L	72.3 J	<1	<1	<1	<1	<20
Chlorobenzene	µg/L	0.288 J	<0.5	<0.5	<0.5	<0.5	<10
Chloroethane	µg/L	<1	<1	<1	<1	<1	<20
Chloroform	µg/L	32.4	<0.3	<0.3	<0.3	<0.3	<6
Chloromethane	µg/L	<1	<1	<1	<1	<1	<20
cis-1,2-Dichloroethene	µg/L	85.1	36	0.738 J	3.81	3.88	24.8
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<10
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<10
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<20
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<20
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<20
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<12
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<20
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<40
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10	1090
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	2.21 J	2.07 J	<100
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<20
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<200
Naphthalene	µg/L	<1	<1	<1	<1	<1	<20
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<20
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<20
o-Xylene	µg/L	<1	<1	<1	<1	<1	<20
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<20
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<20
Styrene	µg/L	<1	<1	<1	<1	<1	<20
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<20
Tetrachloroethene	µg/L	106	125	21.6	21.1	21.2	19.8 J
Toluene	µg/L	<1	<1	<1	<1	<1	<20
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<20
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<20
Trichloroethene	µg/L	31.7	12.1	1.17	11.2	11.4	9 J
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<20
Vinyl chloride	µg/L	<1	<1	<1	1.31	1.36	7.98 J

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

TABLE B-3-2
VOC ANALYTICAL RESULTS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	MW-203B	MW-62	MW-212	MW-213
	Lab ID	L13050801-04	L13050702-02	L13050801-05	L13050801-06
	Date	5/11/2013	5/9/2013	5/11/2013	5/11/2013
	Area	West-Central	Bldg 835	Bldg 835	Bldg 835
Analyte	Units				
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<2.5	<0.5	<2.5
1,1,1-Trichloroethane	µg/L	<1	<5	<1	<5
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<2.5	<0.5	<2.5
1,1,2-Trichloroethane	µg/L	<1	<5	<1	<5
1,1-Dichloroethane	µg/L	<1	<5	<1	<5
1,1-Dichloroethene	µg/L	<1	<5	<1	<5
1,1-Dichloropropene	µg/L	<1	<5	<1	<5
1,2,3-Trichlorobenzene	µg/L	<1	<5	<1	<5
1,2,3-Trichloropropane	µg/L	<1	<5 UJ	<1	<5
1,2,4-Trichlorobenzene	µg/L	<1	<5	<1	<5
1,2,4-Trimethylbenzene	µg/L	<1	<5	<1	<5
1,2-Dibromo-3-chloropropane	µg/L	<2	<10	<2	<10
1,2-Dibromoethane	µg/L	<1	<5	<1	<5
1,2-Dichlorobenzene	µg/L	<1	<5	<1	<5
1,2-Dichloroethane	µg/L	<0.5	<2.5	<0.5	<2.5
1,2-Dichloropropane	µg/L	<1	<5	<1	<5
1,3,5-Trimethylbenzene	µg/L	<1	<5	<1	<5
1,3-Dichlorobenzene	µg/L	<1	<5	<1	<5
1,3-Dichloropropane	µg/L	<0.4	<2	<0.4	<2
1,4-Dichlorobenzene	µg/L	<0.5	<2.5	<0.5	<2.5
1-Chlorohexane	µg/L	<1	<5	<1	<5
2,2-Dichloropropane	µg/L	<1	<5	<1	<5
2-Chlorotoluene	µg/L	<1	<5	<1	<5
2-Hexanone	µg/L	<10	<50	<10	<50
4-Chlorotoluene	µg/L	<1	<5	<1	<5
Acetone	µg/L	79.5	132	<10	125 B
Benzene	µg/L	<0.4	<2	<0.4	<2
Bromobenzene	µg/L	<1	<5	<1	<5
Bromochloromethane	µg/L	<1	<5	<1	<5
Bromodichloromethane	µg/L	<0.5	<2.5	<0.5	<2.5
Bromoform	µg/L	<1 UJ	<5 UJ	<1 UJ	<5 UJ
Bromomethane	µg/L	<1	<5	<1	<5
Carbon disulfide	µg/L	<1	<5	<1	<5
Carbon tetrachloride	µg/L	<1	<5	<1	<5
Chlorobenzene	µg/L	<0.5	<2.5	<0.5	<2.5
Chloroethane	µg/L	<1	<5	<1	<5
Chloroform	µg/L	<0.3	<1.5	<0.3	<1.5
Chloromethane	µg/L	<1	<5	<1	<5
cis-1,2-Dichloroethene	µg/L	16.6	34.8	<1	4.05 J
cis-1,3-Dichloropropene	µg/L	<0.5	<2.5	<0.5	<2.5
Dibromochloromethane	µg/L	<0.5	<2.5	<0.5	<2.5
Dibromomethane	µg/L	<1	<5	<1	<5
Dichlorodifluoromethane	µg/L	<1	<5	<1	<5
Ethylbenzene	µg/L	<1	<5	<1	<5
Hexachlorobutadiene	µg/L	<0.6	<3	<0.6	<3
Isopropylbenzene	µg/L	<1	<5	<1	<5
m-,p-Xylene	µg/L	<2	<10	<2	<10
MEK (2-Butanone)	µg/L	30.4	198	<10	53.1
Methyl t-butyl ether (MTBE)	µg/L	2.51 J	<25	<5	<25
Methylene chloride	µg/L	<1	<5	<1	<5
MIBK (methyl isobutyl ketone)	µg/L	<10	<50	<10	<50
Naphthalene	µg/L	<1	<5	<1	<5
n-Butylbenzene	µg/L	<1	<5	<1	<5
n-Propylbenzene	µg/L	<1	<5	<1	<5
o-Xylene	µg/L	<1	<5	<1	<5
p-Isopropyltoluene	µg/L	<1	<5	<1	<5
sec-Butylbenzene	µg/L	<1	<5	<1	<5
Styrene	µg/L	<1	<5	<1	<5
tert-Butylbenzene	µg/L	<1	<5	<1	<5
Tetrachloroethene	µg/L	3.1	<5	<1	<5
Toluene	µg/L	<1	<5	<1	<5
trans-1,2-Dichloroethene	µg/L	<1	<5	<1	<5
trans-1,3-Dichloropropene	µg/L	<1	<5	<1	<5
Trichloroethene	µg/L	2.27	98.5	10.9	17.5
Trichlorofluoromethane	µg/L	<1	<5	<1	<5
Vinyl chloride	µg/L	2.64	<5	<1	<5

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

TABLE B-3-3
 GEOCHEMICAL ANALYTICAL RESULTS, RINSE BLANKS, EBT-12
 YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
 Main Installation - Defense Depot Memphis, Tennessee

	Sample ID	RB1-EBT-12	RB3-EBT-12	RB2-EBT-12
	Lab ID	L13050704-04	L13050801-08	L13050804-07
	Date	5/9/2013	5/11/2013	5/13/2013
Analyte	Units			
Total Organic Carbon	mg/L	0.57 JB	0.558 JB	0.641 JB
Acetic Acid	mg/L	<1	<1	<1 UJ
Butyric Acid	mg/L	<1	<1	<1 UJ
Lactic Acid	mg/L	<1	<1	<1 UJ
Propionic Acid	mg/L	<10	<10	<10 UJ
Pyruvic Acid	mg/L	<0.1	<0.1	<0.1 UJ
Carbon Dioxide	µg/L	<10000	<10000	<10000
Ethane	µg/L	<5	<5	<5
Ethene	µg/L	<5	<5	<5
Methane	µg/L	3.2 JB	3 JB	4.5 JB

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-3-4
VOC ANALYTICAL RESULTS, TRIP AND RINSE BLANKS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Sample ID Lab ID Date Units	TB-050813-EBT-12	TB-050913-EBT-12	TB-051313-EBT-12	TB-051013-EBT-12	TB-051413-EBT-12
		L13050474-02	L13050476-08	L13050702-10	L13050704-05	L13050801-09
		5/7/2013	5/8/2013	5/10/2013	5/9/2013	5/11/2013
		L13050474-02	L13050476-08	L13050702-10	L13050704-05	L13050801-09
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1 UJ
Bromomethane	µg/L	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1	<1	0.439 J
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1

Notes:
µg/L: micrograms per liter
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
UJ: Estimated-Non-Detect

TABLE B-3-4
VOC ANALYTICAL RESULTS, TRIP AND RINSE BLANKS, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Sample ID Lab ID Date Units	TB051513-EBT-12	TB-051613-EBT-12	RB1-EBT-12	RB3-EBT-12	RB2-EBT-12
		L13050803-08	L13050804-08	L13050704-04	L13050801-08	L13050804-07
		5/12/2013	5/13/2013	5/9/2013	5/11/2013	5/13/2013
		L13050803-08	L13050804-08	L13050704-04	L13050801-08	L13050804-07
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	0.422 J	0.279 J	0.225 J
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	7.21 J	4.89 J	3.63 J
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1 UJ	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1

Notes:
µg/L: micrograms per liter
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
UJ: Estimated-Non-Detect

TABLE B-4-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03A-DUP1	IW21-03B
	Lab ID	L13081024-24	L13081024-25	L13081024-20	L13081024-21	L13081024-26	L13081024-33	L13081024-27
	Date	8/18/2013	8/18/2013	8/17/2013	8/17/2013	8/19/2013	8/19/2013	8/19/2013
	Area	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Analyte	Units							
Total Organic Carbon	mg/L	502	114	189	244	134	130	199
Acetic Acid	mg/L	34.7	64.7	3.96	36.2	76.3	76.5	34.2
Butyric Acid	mg/L	6.41	2.5	6.34	10.3	21.7	21.1	5.73
Lactic Acid	mg/L	3.44 J	0.82 J	2.37 J	4.54 J	0.903 J	0.946 J	2.25 J
Propionic Acid	mg/L	367	37.8	182	148	57.5	57.1	163
Pyruvic Acid	mg/L	0.133 J	<0.1	<0.1 UJ	0.0597 J	<0.1 UJ	<0.1 UJ	<0.1 UJ
Carbon Dioxide	µg/L	300000	160000	220000	180000	240000	200000	250000
Ethane	ug/L	<5	<5	<5	<5	<5	<5	<5
Ethene	ug/L	<5	<5	<5	<5	<5	<5	<5
Methane	ug/L	15000	7300	13000	11000	13000	14000	15000

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-4-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW21-04A	IW21-04B	MW-21	PMW21-01	PMW21-02	PMW21-04	IW101-02A
	Lab ID	L13081024-28	L13081024-31	L13081024-22	L13081024-23	L13081024-32	L13081024-01	L13080921-09
	Date	8/19/2013	8/19/2013	8/17/2013	8/17/2013	8/18/2013	8/17/2013	8/15/2013
	Area	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	4550	1240 J	120	1.96	1.58 B	444 J	10.4
Acetic Acid	mg/L	1200	243 J	84.1	<1	0.562 J	63.7 J	5.76
Butyric Acid	mg/L	1890	78.5 J	37.5	<1	<1	92.6 J	<1
Lactic Acid	mg/L	<100 UJ	10.2 J	2.25 J	<1	<1	<1 UJ	<1
Propionic Acid	mg/L	1800	984 J	36	<10	<10	201 J	<10
Pyruvic Acid	mg/L	<10 UJ	<0.1 UJ	<0.1 UJ	<0.1	<0.1	<0.1 UJ	<0.1
Carbon Dioxide	µg/L	390000	350000	120000	110000	96000	160000	110000
Ethane	ug/L	<5	<5	<5	<5	<5	<5	<5
Ethene	ug/L	<5	<5	<5	<5	<5	<5	<5
Methane	ug/L	14000	14000	4600	8 B	8.5 B	15000	2700

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-4-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03B-DUP2	IW101-03C	IW101-04A
	Lab ID	L13080921-10	L13080921-13	L13080978-07	L13080978-11	L13080978-10	L13080978-08	L13081024-02
	Date	8/15/2013	8/15/2013	8/16/2013	8/16/2013	8/16/2013	8/16/2013	8/18/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	4.77	37.1	320	2010	1810 J	4160	2110 J
Acetic Acid	mg/L	<1	1230	64.6	555	628	1170	361 J
Butyric Acid	mg/L	<1	2020	12.5	979	1310	2520	342 J
Lactic Acid	mg/L	<1	<100 UJ	2.35 J	<10 UJ	<10 UJ	<100	<100 J
Propionic Acid	mg/L	<10	1330	213	709	798	2050	1290 J
Pyruvic Acid	mg/L	<0.1	<10 UJ	<0.1 UJ	<1 UJ	<1 UJ	<10	<10 J
Carbon Dioxide	µg/L	92000	350000	310000	460000	380000	460000	520000
Ethane	ug/L	<5	<5	<5	<5	<5	<5	<5
Ethene	ug/L	<5	<5	<5	1.4 J	<5	<5	1.4 J
Methane	ug/L	4.4 JB	9300	9600	11000	8400	8900	40000

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-4-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW101-04B	IW101-04C	IW101-05A	IW101-05B	IW101-05C	IW101-07A	IW101-07B
	Lab ID	L13081024-14	L13081024-03	L13081024-15	L13081024-05	L13081024-17	L13080978-03	L13080978-04
	Date	8/18/2013	8/18/2013	8/17/2013	8/17/2013	8/17/2013	8/16/2013	8/16/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	250	3770 J	742	3.96	2460 J	5.86	2890 J
Acetic Acid	mg/L	22.5	1470 J	175	<1	561 J	1.86	1200
Butyric Acid	mg/L	15.9	2510 J	249	<1	910 J	<1	2020
Lactic Acid	mg/L	3.67 J	<100 J	<10 R	<1	<10 UJ	<1	<100
Propionic Acid	mg/L	103	1620 J	530	<10	1050 J	<10	1140
Pyruvic Acid	mg/L	<0.1 UJ	<10 J	<1 R	<0.1	<1 UJ	<0.1	<10
Carbon Dioxide	µg/L	380000	410000	180000	110000	380000	76000	530000
Ethane	ug/L	<5	<5	<5	<5	<5	<5	<5
Ethene	ug/L	1.1 J	<5	<5	<5	<5	<5	2 J
Methane	ug/L	19000	12000	18000	3.3 JB	13000	650	8200

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-4-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW101-07C	DR1-5A	DR1-5	DR1-6A	DR1-6	PMW101-02A	PMW101-02B
	Lab ID	L13080978-06	L13081060-06	L13081060-01	L13080978-02	L13080978-01	L13080978-09	L13080978-12
	Date	8/16/2013	8/20/2013	8/20/2013	8/16/2013	8/16/2013	8/16/2013	8/16/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	5350 J	76.2	966	1460	66.1	2720	1450
Acetic Acid	mg/L	1710	<1	338	231	13.7	696	154
Butyric Acid	mg/L	2800	0.697 J	621	749	7.1	1450	828
Lactic Acid	mg/L	<100	<1	<10 UJ	<10 UJ	0.822 J	<10	<10 UJ
Propionic Acid	mg/L	1850	<10	229	535	21.3	607	558
Pyruvic Acid	mg/L	<10	<0.1	<1 UJ	<1 UJ	<0.1 UJ	<1	<1 UJ
Carbon Dioxide	µg/L	610000	170000	1000000	360000	120000	500000	130000
Ethane	ug/L	<5	<5	<5	<5	<5	<5	<5
Ethene	ug/L	<5	<5	1 J	<5	<5	<5	<5
Methane	ug/L	11000	15000	18000	10000	10000	13000	9300

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-4-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	PMW101-04A	PMW101-04B	PMW101-04B-DUP3	PMW101-07A	PMW101-07B	DR2-2
	Lab ID	L13080921-01	L13080921-08	L13080921-05	L13080921-11	L13080921-12	L13080814-12
	Date	8/15/2013	8/15/2013	8/15/2013	8/15/2013	8/15/2013	8/14/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-2
Analyte	Units						
Total Organic Carbon	mg/L	3.75	2.73	2.14	2.82	1.32	2510
Acetic Acid	mg/L	<1	<1	<1	<1	<1	477
Butyric Acid	mg/L	0.811 J	<1	<1	<1	<1	922
Lactic Acid	mg/L	<1	<1 UJ	<1	<1	<1	<10 UJ
Propionic Acid	mg/L	<10	<10	<10	<10	<10	1400
Pyruvic Acid	mg/L	<0.1	<0.1 UJ	<0.1	<0.1	<0.1	<1 UJ
Carbon Dioxide	µg/L	170000	95000	76000	84000	60000	420000
Ethane	ug/L	<5	<5	<5	<5	<5	<5
Ethene	ug/L	<5	<5	<5	<5	<5	<5
Methane	ug/L	1500	15000	13000	470	9.3 B	6800

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-4-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	DR2-5	IW85-05	IW85-06	IW85-06-DUP4	IW92-01	IW92-02	IW92-03
	Lab ID	L13080814-01	L13080814-03	L13080921-02	L13080921-06	L13081060-05	L13080814-06	L13081024-18
	Date	8/14/2013	8/14/2013	8/15/2013	8/15/2013	8/20/2013	8/14/2013	8/19/2013
	Area	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Analyte	Units							
Total Organic Carbon	mg/L	689	1620	3100	3830	3400 J	5990	11800 J
Acetic Acid	mg/L	329	107	1820	1550	1110 J	1300	2720 J
Butyric Acid	mg/L	267	41.8 J	173	109	2050 J	2550	6180 J
Lactic Acid	mg/L	<1 UJ	149 J	<100 UJ	19.3 J	<100 UJ	<50	4190 J
Propionic Acid	mg/L	463	2250	3830	3250	1840 J	4460	5070 J
Pyruvic Acid	mg/L	<0.1 UJ	<5 UJ	<10 UJ	<1 UJ	<10 UJ	<5	<10 J
Carbon Dioxide	µg/L	260000	220000	270000	300000	450000	500000	520000
Ethane	ug/L	<5	<5	<5	<5	<5	<5	<5
Ethene	ug/L	<5	<5	<5	<5	<5	<5	<5
Methane	ug/L	4100	6400	6300	5700	6500	8300	11000

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-4-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW92-07	IW92-08	MW-85	MW-113	PMW85-01	PMW85-05	PMW92-03
	Lab ID	L13080921-03	L13080921-04	L13080814-04	L13080814-02	L13080814-05	L13080814-07	L13080814-13
	Date	8/15/2013	8/15/2013	8/14/2013	8/13/2013	8/13/2013	8/13/2013	8/13/2013
	Area	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Analyte	Units							
Total Organic Carbon	mg/L	11700	4590	24.9	5940	273	2.96	4.74
Acetic Acid	mg/L	4730	1600	52	2320	96.5	<1	<1
Butyric Acid	mg/L	7100	2880	0.578 J	2560	18.9	<1	<1
Lactic Acid	mg/L	<100 UJ	<100	<1	<50 UJ	7.47 J	<1	<1
Propionic Acid	mg/L	8770	4510	<10	2490	44.9 J	<10	<10
Pyruvic Acid	mg/L	<10 UJ	<10	<0.1	<5 UJ	<0.5 UJ	<0.1	<0.1
Carbon Dioxide	µg/L	600000	410000	170000	730000	180000	98000	80000
Ethane	ug/L	<5	<5	<5	<5	<5	<5	<5
Ethene	ug/L	<5	<5	<5	<5	<5	<5	<5
Methane	ug/L	5700	6600	1100	3900	8900	5700	1700

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-4-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	PMW92-03-DUP5	MW-197A	MW-197B	MW-203A	MW-203B	MW-62	MW-212
	Lab ID	L13080814-08	L13081024-06	L13081024-08	L13081024-09	L13081024-10	L13081060-02	L13081060-07
	Date	8/13/2013	8/19/2013	8/19/2013	8/19/2013	8/19/2013	8/20/2013	8/20/2013
	Area	TTA-2	West-Central	West-Central	West-Central	West-Central	Bldg 835	Bldg 835
Analyte	Units							
Total Organic Carbon	mg/L	4.6	2.39	2.31	637	13.5 J	101	1.62 B
Acetic Acid	mg/L	<1	<1	<1	56.3	0.874 J	20.6	15.8
Butyric Acid	mg/L	<1	<1	<1	<1	<1 J	14	4.29
Lactic Acid	mg/L	<1	<1	<1	0.883 J	0.671 J	2.38 J	<1 UJ
Propionic Acid	mg/L	<10	<10	<10	1140	<10 J	142	19
Pyruvic Acid	mg/L	<0.1	<0.1 UJ	<0.1	<0.1 UJ	<0.1 UJ	<0.1 UJ	<0.1 UJ
Carbon Dioxide	µg/L	79000	110000	92000	720000	90000	68000	46000
Ethane	ug/L	<5	<5	<5	<5	<5	<5	<5
Ethene	ug/L	<5	<5	<5	<5	<5	<5	<5
Methane	ug/L	1700	3.4 JB	53	13000	1900	6300	2.8 JB

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-4-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	MW-212-DUP6	MW-213
	Lab ID	L13081060-09	L13081060-08
	Date	8/20/2013	8/20/2013
	Area	Bldg 835	Bldg 835
Analyte	Units		
Total Organic Carbon	mg/L	1.09 B	458
Acetic Acid	mg/L	0.802 J	0.848 J
Butyric Acid	mg/L	<1	<1
Lactic Acid	mg/L	<1	<1
Propionic Acid	mg/L	<10	<10
Pyruvic Acid	mg/L	<0.1	<0.1
Carbon Dioxide	µg/L	56000	120000
Ethane	ug/L	<5	<5
Ethene	ug/L	<5	<5
Methane	ug/L	2.9 JB	7900

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated- blank contamination

TABLE B-4-2
VOC ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	DR1-5A	DR1-5	DR1-6A	DR1-6	IW101-02A	IW101-02B
	Lab ID	L13081060-06	L13081060-01	L13080978-02	L13080978-01	L13080921-09	L13080921-10
	Date	8/20/2013	8/20/2013	8/16/2013	8/16/2013	8/15/2013	8/15/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units	L13081060-06	L13081060-01	L13080978-02	L13080978-01	L13080921-09	L13080921-10
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<5	<5	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<5	<5	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<5	<5	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<5	<5	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<5	<5	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1 J	<1 J	<5	<5	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<5	<5	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<5	<5	<1	<1
1,2,4-Trimethylbenzene	µg/L	1.04	1.07	6.7	<5	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<10	<10	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<5	<5	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<5	<5	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	0.302 J	<1	<5	<5	<1	<1
1,3,5-Trimethylbenzene	µg/L	0.293 J	0.317 J	1.93 J	<5	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<5	<5	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<2	<2	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<5	<5	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<5	<5	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<5	<5	<1	<1
2-Hexanone	µg/L	<10	<10	<50	<50	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<5	<5	<1	<1
Acetone	µg/L	30.6	659	56.6	<50	4.63 J	<10
Benzene	µg/L	<0.4	<0.4	<2	<2	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<5	<5	<1	<1
Bromochloromethane	µg/L	<1	<1	<5	<5	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<5	<5	<1	<1
Bromomethane	µg/L	<1	<1	<5	<5	<1	<1
Carbon disulfide	µg/L	<1	<1	<5	<5	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<5	<5	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<5	<5	<1	<1
Chloroform	µg/L	<0.3	<0.3	<1.5	<1.5	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<5	<5	<1	<1
cis-1,2-Dichloroethene	µg/L	91.8	12.9	86.8	13.6	22.8	2.24
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<5	<5	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<5	<5	<1	<1
Ethylbenzene	µg/L	<1	<1	<5	<5	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<3	<3	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<5	<5	<1	<1
m-,p-Xylene	µg/L	<2	<2	<10	<10	<2	<2
MEK (2-Butanone)	µg/L	11	431	155	15.9 J	11.8	<10
Methyl t-butyl ether (MTBE)	µg/L	0.706 J	40.6	<25	<25	8.26	8.32
Methylene chloride	µg/L	<1	<1	<5	<5	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<50	<50	<10	<10
Naphthalene	µg/L	<1	<1	<5	<5	<1	<1
n-Butylbenzene	µg/L	<1	<1	<5	<5	<1	<1
n-Propylbenzene	µg/L	0.158 J	0.215 J	0.979 J	<5	<1	<1
o-Xylene	µg/L	<1	<1	<5	<5	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<5	<5	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<5	<5	<1	<1
Styrene	µg/L	<1	<1	<5	<5	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<5	<5	<1	<1
Tetrachloroethene	µg/L	0.649 J	15	9.75	119	11.2	48.3
Toluene	µg/L	<1	0.366 J	<5	<5	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<5	<5	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<5	<5	<1	<1
Trichloroethene	µg/L	1.01	0.996 J	26.4	2.89 J	2.3	0.706 J
Trichlorofluoromethane	µg/L	<1	<1	<5	<5	<1	<1
Vinyl chloride	µg/L	0.479 J	<1	<5	<5	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-4-2
VOC ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW101-02C	IW101-03A	IW101-03B	IW101-03B-DUP2	IW101-03C	IW101-04A
Lab ID		L13080921-13	L13080978-07	L13080978-11	L13080978-10	L13080978-08	L13081024-02
Date		8/15/2013	8/16/2013	8/16/2013	8/16/2013	8/16/2013	8/18/2013
Area		TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units	L13080921-13	L13080978-07	L13080978-11	L13080978-10	L13080978-08	L13081024-02
1,1,1,2-Tetrachloroethane	µg/L	<5	<2.5	<2.5	<2.5	<2.5	<10
1,1,1-Trichloroethane	µg/L	<10	<5	<5	<5	<5	<20
1,1,2,2-Tetrachloroethane	µg/L	<5	<2.5	<2.5	<2.5	<2.5	<10
1,1,2-Trichloroethane	µg/L	<10	<5	<5	<5	<5	<20
1,1-Dichloroethane	µg/L	<10	<5	<5	<5	<5	<20
1,1-Dichloroethene	µg/L	<10	<5	<5	<5	<5	<20
1,1-Dichloropropene	µg/L	<10	<5	<5	<5	<5	<20
1,2,3-Trichlorobenzene	µg/L	<10	<5	<5	<5	<5	<20
1,2,3-Trichloropropane	µg/L	<10	<5	<5	<5	<5	<20
1,2,4-Trichlorobenzene	µg/L	<10	<5	<5	<5	<5	<20
1,2,4-Trimethylbenzene	µg/L	3.32 J	1.31 J	5.89	5.84	3.1 J	<20
1,2-Dibromo-3-chloropropane	µg/L	<20	<10	<10	<10	<10	<40
1,2-Dibromoethane	µg/L	<10	<5	<5	<5	<5	<20
1,2-Dichlorobenzene	µg/L	<10	<5	<5	<5	<5	<20
1,2-Dichloroethane	µg/L	<5	<2.5	<2.5	<2.5	<2.5	<10
1,2-Dichloropropane	µg/L	<10	<5	<5	<5	<5	<20
1,3,5-Trimethylbenzene	µg/L	<10	<5	1.46 J	1.98 J	<5	<20
1,3-Dichlorobenzene	µg/L	<10	<5	<5	<5	<5	<20
1,3-Dichloropropane	µg/L	<4	<2	<2	<2	<2	<8
1,4-Dichlorobenzene	µg/L	<5	<2.5	<2.5	<2.5	<2.5	<10
1-Chlorohexane	µg/L	<10	<5	<5	<5	<5	<20
2,2-Dichloropropane	µg/L	<10	<5	<5	<5	<5	<20
2-Chlorotoluene	µg/L	<10	<5	<5	<5	<5	<20
2-Hexanone	µg/L	<100	<50	<50	<50	<50	<200
4-Chlorotoluene	µg/L	<10	<5	<5	<5	<5	<20
Acetone	µg/L	547	67.8	106	117	205	263 B
Benzene	µg/L	<4	<2	<2	<2	<2	<8
Bromobenzene	µg/L	<10	<5	<5	<5	<5	<20
Bromochloromethane	µg/L	<10	<5	<5	<5	<5	<20
Bromodichloromethane	µg/L	<5	<2.5	<2.5	<2.5	<2.5	<10
Bromoform	µg/L	<10	<5	<5	<5	<5	<20
Bromomethane	µg/L	<10	<5	<5	<5	<5	<20
Carbon disulfide	µg/L	<10	<5	<5	<5	<5	<20
Carbon tetrachloride	µg/L	<10	<5	<5	<5	<5	<20
Chlorobenzene	µg/L	<5	<2.5	<2.5	<2.5	<2.5	<10
Chloroethane	µg/L	<10	<5	<5	<5	<5	<20
Chloroform	µg/L	<3	<1.5	<1.5	<1.5	<1.5	<6
Chloromethane	µg/L	<10	<5	<5	<5	<5	<20
cis-1,2-Dichloroethene	µg/L	74.8	4.06 J	15.5	15.3	69.5	9.85 J
cis-1,3-Dichloropropene	µg/L	<5	<2.5	<2.5	<2.5	<2.5	<10
Dibromochloromethane	µg/L	<5	<2.5	<2.5	<2.5	<2.5	<10
Dibromomethane	µg/L	<10	<5	<5	<5	<5	<20
Dichlorodifluoromethane	µg/L	<10	<5	<5	<5	<5	<20
Ethylbenzene	µg/L	<10	<5	<5	<5	<5	<20
Hexachlorobutadiene	µg/L	<6	<3	<3	<3	<3	<12
Isopropylbenzene	µg/L	<10	<5	<5	<5	<5	<20
m-,p-Xylene	µg/L	<20	<10	<10	<10	<10	<40
MEK (2-Butanone)	µg/L	1560	259	507	526	2110	2090
Methyl t-butyl ether (MTBE)	µg/L	<50	9.57 J	6.5 J	6.3 J	<25	<100
Methylene chloride	µg/L	<10	<5	<5	<5	<5	<20
MIBK (methyl isobutyl ketone)	µg/L	<100	<50	<50	<50	<50	<200
Naphthalene	µg/L	<10	<5	<5	<5	<5	<20
n-Butylbenzene	µg/L	<10	<5	<5	<5	<5	<20
n-Propylbenzene	µg/L	<10	<5	0.997 J	0.901 J	<5	<20
o-Xylene	µg/L	<10	<5	<5	<5	<5	<20
p-Isopropyltoluene	µg/L	<10	<5	<5	<5	<5	<20
sec-Butylbenzene	µg/L	<10	<5	<5	<5	<5	<20
Styrene	µg/L	<10	<5	<5	<5	<5	<20
tert-Butylbenzene	µg/L	<10	<5	<5	<5	<5	<20
Tetrachloroethene	µg/L	<10	3.71 J	2.86 J	3.12 J	<5	<20
Toluene	µg/L	<10	149	<5	<5	<5	<20
trans-1,2-Dichloroethene	µg/L	<10	<5	<5	<5	<5	<20
trans-1,3-Dichloropropene	µg/L	<10	<5	<5	<5	<5	<20
Trichloroethene	µg/L	<10	<5	<5	<5	<5	<20
Trichlorofluoromethane	µg/L	<10	<5	<5	<5	<5	<20
Vinyl chloride	µg/L	<10	<5	<5	<5	<5	<20

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-4-2
VOC ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location	IW101-04B	IW101-04C	IW101-05A	IW101-05B	IW101-05C	IW101-07A
	Lab ID	L13081024-14	L13081024-03	L13081024-15	L13081024-05	L13081024-17	L13080978-03
	Date	8/18/2013	8/18/2013	8/17/2013	8/17/2013	8/17/2013	8/16/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
	Units	L13081024-14	L13081024-03	L13081024-15	L13081024-05	L13081024-17	L13080978-03
1,1,1,2-Tetrachloroethane	µg/L	<2.5	<5	<2.5	<0.5	<5	<0.5
1,1,1-Trichloroethane	µg/L	<5	<10	<5	<1	<10	<1
1,1,2,2-Tetrachloroethane	µg/L	<2.5	<5	<2.5	<0.5	<5	<0.5
1,1,2-Trichloroethane	µg/L	<5	<10	<5	<1	<10	<1
1,1-Dichloroethane	µg/L	<5	<10	<5	<1	<10	<1
1,1-Dichloroethene	µg/L	<5	<10	<5	<1	<10	<1
1,1-Dichloropropene	µg/L	<5	<10	<5	<1	<10	<1
1,2,3-Trichlorobenzene	µg/L	<5	<10	<5	<1	<10	<1
1,2,3-Trichloropropane	µg/L	<5	<10	<5	<1	<10	<1
1,2,4-Trichlorobenzene	µg/L	<5	<10	<5	<1	<10	<1
1,2,4-Trimethylbenzene	µg/L	<5	2.74 J	1.49 J	<1	<10	<1
1,2-Dibromo-3-chloropropane	µg/L	<10	<20	<10	<2	<20	<2
1,2-Dibromoethane	µg/L	<5	<10	<5	<1	<10	<1
1,2-Dichlorobenzene	µg/L	<5	<10	<5	<1	<10	<1
1,2-Dichloroethane	µg/L	<2.5	<5	<2.5	<0.5	<5	<0.5
1,2-Dichloropropane	µg/L	<5	<10	<5	<1	<10	<1
1,3,5-Trimethylbenzene	µg/L	<5	<10	<5	<1	<10	<1
1,3-Dichlorobenzene	µg/L	<5	<10	<5	<1	<10	<1
1,3-Dichloropropane	µg/L	<2	<4	<2	<0.4	<4	<0.4
1,4-Dichlorobenzene	µg/L	<2.5	<5	<2.5	<0.5	<5	<0.5
1-Chlorohexane	µg/L	<5	<10	<5	<1	<10	<1
2,2-Dichloropropane	µg/L	<5	<10	<5	<1	<10	<1
2-Chlorotoluene	µg/L	<5	<10	<5	<1	<10	<1
2-Hexanone	µg/L	<50	<100	<50	<10	<100	<10
4-Chlorotoluene	µg/L	<5	<10	<5	<1	<10	<1
Acetone	µg/L	88.6	1700	38.7	<10	407	<10
Benzene	µg/L	<2	<4	<2	<0.4	<4	<0.4
Bromobenzene	µg/L	<5	<10	<5	<1	<10	<1
Bromochloromethane	µg/L	<5	<10	<5	<1	<10	<1
Bromodichloromethane	µg/L	<2.5	<5	<2.5	<0.5	<5	<0.5
Bromoform	µg/L	<5	<10	<5	<1	<10	<1
Bromomethane	µg/L	<5	<10	<5	<1	<10	<1
Carbon disulfide	µg/L	<5	<10	<5	<1	<10	<1
Carbon tetrachloride	µg/L	<5	<10	<5	<1	<10	<1
Chlorobenzene	µg/L	<2.5	<5	<2.5	<0.5	<5	<0.5
Chloroethane	µg/L	<5	<10	<5	<1	<10	<1
Chloroform	µg/L	<1.5	<3	<1.5	<0.3	<3	<0.3
Chloromethane	µg/L	<5	<10	<5	<1	<10	<1
cis-1,2-Dichloroethene	µg/L	13.4	25.2	9.71	2.48	36	<1
cis-1,3-Dichloropropene	µg/L	<2.5	<5	<2.5	<0.5	<5	<0.5
Dibromochloromethane	µg/L	<2.5	<5	<2.5	<0.5	<5	<0.5
Dibromomethane	µg/L	<5	<10	<5	<1	<10	<1
Dichlorodifluoromethane	µg/L	<5	<10	<5	<1	<10	<1
Ethylbenzene	µg/L	<5	<10	<5	<1	<10	<1
Hexachlorobutadiene	µg/L	<3	<6	<3	<0.6	<6	<0.6
Isopropylbenzene	µg/L	<5	<10	<5	<1	<10	<1
m-,p-Xylene	µg/L	<10	<20	<10	<2	<20	<2
MEK (2-Butanone)	µg/L	249	2380	234 J	<10	1780	<10
Methyl t-butyl ether (MTBE)	µg/L	<25	<50	<25	3.23 J	<50	<5
Methylene chloride	µg/L	2.31 J	5.29 J	<5	<1	3.55 JB	<1
MIBK (methyl isobutyl ketone)	µg/L	<50	<100	<50	<10	<100	<10
Naphthalene	µg/L	<5	<10	<5	<1	<10	<1
n-Butylbenzene	µg/L	<5	<10	<5	<1	<10	<1
n-Propylbenzene	µg/L	<5	<10	<5	<1	<10	<1
o-Xylene	µg/L	<5	<10	<5	<1	<10	<1
p-Isopropyltoluene	µg/L	<5	<10	<5	<1	<10	<1
sec-Butylbenzene	µg/L	<5	<10	<5	<1	<10	<1
Styrene	µg/L	<5	<10	<5	<1	<10	<1
tert-Butylbenzene	µg/L	<5	<10	<5	<1	<10	<1
Tetrachloroethene	µg/L	<5	<10	4.69 J	36	<10	0.375 J
Toluene	µg/L	<5	<10	<5	<1	<10	<1
trans-1,2-Dichloroethene	µg/L	<5	<10	<5	<1	<10	<1
trans-1,3-Dichloropropene	µg/L	<5	<10	<5	<1	<10	<1
Trichloroethene	µg/L	<5	<10	<5	0.622 J	<10	0.487 J
Trichlorofluoromethane	µg/L	<5	<10	<5	<1	<10	<1
Vinyl chloride	µg/L	<5	<10	<5	<1	<10	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-4-2
VOC ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW101-07B	IW101-07C	PMW101-02A	PMW101-02B	PMW101-04A	PMW101-04B
	Lab ID	L13080978-04	L13080978-06	L13080978-09	L13080978-12	L13080921-01	L13080921-08
	Date	8/16/2013	8/16/2013	8/16/2013	8/16/2013	8/15/2013	8/15/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units	L13080978-04	L13080978-06	L13080978-09	L13080978-12	L13080921-01	L13080921-08
1,1,1,2-Tetrachloroethane	µg/L	<2.5	<5	<2.5	<2.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<5	<10	<5	<5	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<2.5	<5	<2.5	<2.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<5	<10	<5	<5	<1	<1
1,1-Dichloroethane	µg/L	<5	<10	<5	<5	<1	<1
1,1-Dichloroethene	µg/L	<5	<10	<5	<5	<1	<1
1,1-Dichloropropene	µg/L	<5	<10	<5	<5	<1	<1
1,2,3-Trichlorobenzene	µg/L	<5	<10	<5	<5	<1	<1
1,2,3-Trichloropropane	µg/L	<5	<10	<5	<5	<1	<1
1,2,4-Trichlorobenzene	µg/L	<5	<10	<5	<5	<1	<1
1,2,4-Trimethylbenzene	µg/L	5.66	6.76 J	1.57 J	2.5 J	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<10	<20	<10	<10	<2	<2
1,2-Dibromoethane	µg/L	<5	<10	<5	<5	<1	<1
1,2-Dichlorobenzene	µg/L	<5	<10	<5	<5	<1	<1
1,2-Dichloroethane	µg/L	<2.5	<5	<2.5	<2.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<5	<10	<5	<5	<1	<1
1,3,5-Trimethylbenzene	µg/L	1.43 J	<10	<5	<5	<1	<1
1,3-Dichlorobenzene	µg/L	<5	<10	<5	<5	<1	<1
1,3-Dichloropropane	µg/L	<2	<4	<2	<2	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<2.5	<5	<2.5	<2.5	<0.5	<0.5
1-Chlorohexane	µg/L	<5	<10	<5	<5	<1	<1
2,2-Dichloropropane	µg/L	<5	<10	<5	<5	<1	<1
2-Chlorotoluene	µg/L	<5	<10	<5	<5	<1	<1
2-Hexanone	µg/L	<50	<100	<50	<50	<10	<10
4-Chlorotoluene	µg/L	<5	<10	<5	<5	<1	<1
Acetone	µg/L	370	649	115	244	<10	<10
Benzene	µg/L	<2	<4	<2	<2	<0.4	<0.4
Bromobenzene	µg/L	<5	<10	<5	<5	<1	<1
Bromochloromethane	µg/L	<5	<10	<5	<5	<1	<1
Bromodichloromethane	µg/L	<2.5	<5	<2.5	<2.5	<0.5	<0.5
Bromoform	µg/L	<5	<10	<5	<5	<1	<1
Bromomethane	µg/L	<5	<10	<5	<5	<1	<1
Carbon disulfide	µg/L	<5	<10	<5	<5	<1	<1
Carbon tetrachloride	µg/L	<5	<10	<5	<5	<1	<1
Chlorobenzene	µg/L	<2.5	<5	<2.5	<2.5	<0.5	<0.5
Chloroethane	µg/L	<5	<10	<5	<5	<1	<1
Chloroform	µg/L	<1.5	<3	<1.5	<1.5	<0.3	<0.3
Chloromethane	µg/L	<5	<10	<5	<5	<1	<1
cis-1,2-Dichloroethene	µg/L	52.9	145	11.9	32.9	11.4	3.94
cis-1,3-Dichloropropene	µg/L	<2.5	<5	<2.5	<2.5	<0.5	<0.5
Dibromochloromethane	µg/L	<2.5	<5	<2.5	<2.5	<0.5	<0.5
Dibromomethane	µg/L	<5	<10	<5	<5	<1	<1
Dichlorodifluoromethane	µg/L	<5	<10	<5	<5	<1	<1
Ethylbenzene	µg/L	<5	<10	<5	<5	<1	<1
Hexachlorobutadiene	µg/L	<3	<6	<3	<3	<0.6	<0.6
Isopropylbenzene	µg/L	<5	<10	<5	<5	<1	<1
m-,p-Xylene	µg/L	<10	<20	<10	<10	<2	<2
MEK (2-Butanone)	µg/L	1160	2060	589	180	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<25	<50	2.55 J	5.41 J	2.22 J	9.73
Methylene chloride	µg/L	<5	<10	<5	<5	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<50	<100	<50	<50	<10	<10
Naphthalene	µg/L	<5	<10	<5	<5	<1	<1
n-Butylbenzene	µg/L	<5	<10	<5	<5	<1	<1
n-Propylbenzene	µg/L	0.908 J	<10	<5	<5	<1	<1
o-Xylene	µg/L	<5	<10	<5	<5	<1	<1
p-Isopropyltoluene	µg/L	<5	<10	<5	<5	<1	<1
sec-Butylbenzene	µg/L	<5	<10	<5	<5	<1	<1
Styrene	µg/L	<5	<10	<5	<5	<1	<1
tert-Butylbenzene	µg/L	<5	<10	<5	<5	<1	<1
Tetrachloroethene	µg/L	4.17 J	13.2	<5	1.25 J	25.5	29.6
Toluene	µg/L	<5	<10	<5	<5	<1	<1
trans-1,2-Dichloroethene	µg/L	<5	<10	<5	<5	<1	<1
trans-1,3-Dichloropropene	µg/L	<5	<10	<5	<5	<1	<1
Trichloroethene	µg/L	10.9	10.5	<5	<5	1.13	3.47
Trichlorofluoromethane	µg/L	<5	<10	<5	<5	<1	<1
Vinyl chloride	µg/L	<5	<10	<5	<5	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-4-2
VOC ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	PMW101-04B-	PMW101-07A	PMW101-07B	IW21-01A	IW21-01B	IW21-02A
	Lab ID	L13080921-05	L13080921-11	L13080921-12	L13081024-24	L13081024-25	L13081024-20
	Date	8/15/2013	8/15/2013	8/15/2013	8/18/2013	8/18/2013	8/17/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1N	TTA-1N	TTA-1N
Analyte	Units	L13080921-05	L13080921-11	L13080921-12	L13081024-24	L13081024-25	L13081024-20
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<5	<1	<5
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<5	<1	<5
1,1-Dichloroethane	µg/L	<1	<1	<1	<5	<1	<5
1,1-Dichloroethene	µg/L	<1	<1	<1	<5	<1	<5
1,1-Dichloropropene	µg/L	<1	<1	<1	<5	<1	<5
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<5	<1	<5
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<5	<1	<5
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<5	<1	<5
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	7.42	1.42	1.72 J
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<10	<2	<10
1,2-Dibromoethane	µg/L	<1	<1	<1	<5	<1	<5
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<5	<1	<5
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<5	<1	<5
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	3.37 J	0.574 J	<5
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<5	<1	<5
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<2	<0.4	<2
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5
1-Chlorohexane	µg/L	<1	<1	<1	<5	<1	<5
2,2-Dichloropropane	µg/L	<1	<1	<1	<5	<1	<5
2-Chlorotoluene	µg/L	<1	<1	<1	<5	<1	<5
2-Hexanone	µg/L	<10	<10	<10	<50	<10	<50
4-Chlorotoluene	µg/L	<1	<1	<1	<5	<1	<5
Acetone	µg/L	<10	<10	<10	333	73.4	160
Benzene	µg/L	<0.4	<0.4	<0.4	<2	0.126 J	<2
Bromobenzene	µg/L	<1	<1	<1	<5	<1	<5
Bromochloromethane	µg/L	<1	<1	<1	<5	<1	<5
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5
Bromoform	µg/L	<1	<1	<1	<5	<1	<5
Bromomethane	µg/L	<1	<1	<1	<5	<1	<5
Carbon disulfide	µg/L	<1	<1	<1	<5	<1	<5
Carbon tetrachloride	µg/L	<1	<1	<1	<5	<1	<5
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5
Chloroethane	µg/L	<1	<1	<1	<5	<1	<5
Chloroform	µg/L	<0.3	<0.3	<0.3	<1.5	<0.3	<1.5
Chloromethane	µg/L	<1	<1	<1	<5	<1	<5
cis-1,2-Dichloroethene	µg/L	3.9	<1	1.4	148	41.6	86.7
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5
Dibromomethane	µg/L	<1	<1	<1	<5	<1	<5
Dichlorodifluoromethane	µg/L	<1	<1	<1	<5	<1	<5
Ethylbenzene	µg/L	<1	<1	<1	<5	<1	<5
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<3	<0.6	<3
Isopropylbenzene	µg/L	<1	<1	<1	<5	<1	<5
m-,p-Xylene	µg/L	<2	<2	<2	<10	<2	<10
MEK (2-Butanone)	µg/L	<10	<10	<10	567	86.9	112
Methyl t-butyl ether (MTBE)	µg/L	8.34	<5	<5	60.1	37.2	<25
Methylene chloride	µg/L	<1	<1	<1	<5	<1	1.7 JB
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<50	<10	<50
Naphthalene	µg/L	<1	<1	<1	1.28 J	0.247 J	1.46 J
n-Butylbenzene	µg/L	<1	<1	<1	<5	0.259 J	<5
n-Propylbenzene	µg/L	<1	<1	<1	0.836 J	0.265 J	<5
o-Xylene	µg/L	<1	<1	<1	<5	<1	<5
p-Isopropyltoluene	µg/L	<1	<1	<1	<5	<1	<5
sec-Butylbenzene	µg/L	<1	<1	<1	<5	<1	<5
Styrene	µg/L	<1	<1	<1	<5	<1	<5
tert-Butylbenzene	µg/L	<1	<1	<1	<5	<1	<5
Tetrachloroethene	µg/L	29.1	<1	12.7	6.35	<1	<5
Toluene	µg/L	<1	<1	<1	<5	<1	<5
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<5	<1	<5
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<5	<1	<5
Trichloroethene	µg/L	3.56	0.272 J	32.4	3.35 J	<1	<5
Trichlorofluoromethane	µg/L	<1	<1	<1	<5	<1	<5
Vinyl chloride	µg/L	<1	<1	<1	<5	<1	<5

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-4-2
VOC ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW21-02B	IW21-03A	IW21-03A-DUP1	IW21-03B	IW21-04A	IW21-04B
	Lab ID	L13081024-21	L13081024-26	L13081024-33	L13081024-27	L13081024-28	L13081024-31
	Date	8/17/2013	8/19/2013	8/19/2013	8/19/2013	8/19/2013	8/19/2013
	Area	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Analyte	Units	L13081024-21	L13081024-26	L13081024-33	L13081024-27	L13081024-28	L13081024-31
1,1,1,2-Tetrachloroethane	µg/L	<2.5	<0.5 UJ	<0.5	<0.5	<10	<5
1,1,1-Trichloroethane	µg/L	<5	<1 UJ	<1	<1	<20	<10
1,1,2,2-Tetrachloroethane	µg/L	<2.5	<0.5 UJ	<0.5	<0.5	<10	<5
1,1,2-Trichloroethane	µg/L	<5	<1 UJ	<1	<1	<20	<10
1,1-Dichloroethane	µg/L	<5	<1 UJ	<1	<1	<20	<10
1,1-Dichloroethene	µg/L	<5	<1 UJ	<1	<1	<20	<10
1,1-Dichloropropene	µg/L	<5	<1 UJ	<1	<1	<20	<10
1,2,3-Trichlorobenzene	µg/L	<5	<1 UJ	<1	<1	<20	<10
1,2,3-Trichloropropane	µg/L	<5	<1 UJ	<1	<1	<20	<10
1,2,4-Trichlorobenzene	µg/L	<5	<1 UJ	<1	<1	<20	<10
1,2,4-Trimethylbenzene	µg/L	3.91 J	0.615 J	0.409 J	0.893 J	<20	<10
1,2-Dibromo-3-chloropropane	µg/L	<10	<2 UJ	<2	<2	<40	<20
1,2-Dibromoethane	µg/L	<5	<1 UJ	<1	<1	<20	<10
1,2-Dichlorobenzene	µg/L	<5	<1 UJ	<1	<1	<20	<10
1,2-Dichloroethane	µg/L	<2.5	<0.5 UJ	<0.5	<0.5	<10	<5
1,2-Dichloropropane	µg/L	<5	<1 UJ	<1	<1	<20	<10
1,3,5-Trimethylbenzene	µg/L	<5	<1 UJ	<1	<1	<20	<10
1,3-Dichlorobenzene	µg/L	<5	<1 UJ	<1	<1	<20	<10
1,3-Dichloropropane	µg/L	<2	<0.4 UJ	<0.4	<0.4	<8	<4
1,4-Dichlorobenzene	µg/L	<2.5	<0.5 UJ	<0.5	<0.5	<10	<5
1-Chlorohexane	µg/L	<5	<1 UJ	<1	<1	<20	<10
2,2-Dichloropropane	µg/L	<5	<1 UJ	<1	<1	<20	<10
2-Chlorotoluene	µg/L	<5	<1 UJ	<1	<1	<20	<10
2-Hexanone	µg/L	<50	<10 UJ	<10	<10	<200	<100
4-Chlorotoluene	µg/L	<5	<1 UJ	<1	<1	<20	<10
Acetone	µg/L	74.1	12 J	22	64.8	293	244
Benzene	µg/L	<2	<0.4 UJ	<0.4	<0.4	<8	<4
Bromobenzene	µg/L	<5	<1 UJ	<1	<1	<20	<10
Bromochloromethane	µg/L	<5	<1 UJ	<1	<1	<20	<10
Bromodichloromethane	µg/L	<2.5	<0.5 UJ	<0.5	<0.5	<10	<5
Bromoform	µg/L	<5	<1 UJ	<1	<1	<20	<10
Bromomethane	µg/L	<5	<1 UJ	<1	<1	<20	<10
Carbon disulfide	µg/L	<5	<1 UJ	<1	<1	<20	<10
Carbon tetrachloride	µg/L	<5	<1 UJ	<1	<1	<20	<10
Chlorobenzene	µg/L	<2.5	<0.5 UJ	<0.5	<0.5	<10	<5
Chloroethane	µg/L	<5	<1 UJ	<1	<1	<20	<10
Chloroform	µg/L	<1.5	<0.3 UJ	<0.3	<0.3	<6	<3
Chloromethane	µg/L	<5	<1 UJ	<1	<1	<20	<10
cis-1,2-Dichloroethene	µg/L	25.2	196 J	217	134	94.9	55.6
cis-1,3-Dichloropropene	µg/L	<2.5	<0.5 UJ	<0.5	<0.5	<10	<5
Dibromochloromethane	µg/L	<2.5	<0.5 UJ	<0.5	<0.5	<10	<5
Dibromomethane	µg/L	<5	<1 UJ	<1	<1	<20	<10
Dichlorodifluoromethane	µg/L	<5	<1 UJ	<1	<1	<20	<10
Ethylbenzene	µg/L	<5	0.281 J	0.312 J	<1	<20	<10
Hexachlorobutadiene	µg/L	<3	<0.6 UJ	<0.6	<0.6	<12	<6
Isopropylbenzene	µg/L	<5	<1 UJ	<1	<1	<20	<10
m-,p-Xylene	µg/L	<10	<2 UJ	<2	<2	<40	<20
MEK (2-Butanone)	µg/L	88.1	42.2 J	38.7	163	1170	930
Methyl t-butyl ether (MTBE)	µg/L	<25	43 J	42.6	24.1	<100	11.8 J
Methylene chloride	µg/L	1.65 JB	<1 UJ	<1	<1	<20	<10
MIBK (methyl isobutyl ketone)	µg/L	<50	<10 UJ	<10	<10	<200	<100
Naphthalene	µg/L	1.43 J	<1 UJ	<1	<1	<20	<10
n-Butylbenzene	µg/L	<5	<1 UJ	<1	<1	<20	<10
n-Propylbenzene	µg/L	0.726 J	<1 UJ	<1	0.149 J	<20	<10
o-Xylene	µg/L	<5	<1 UJ	<1	<1	<20	<10
p-Isopropyltoluene	µg/L	<5	<1 UJ	<1	<1	<20	<10
sec-Butylbenzene	µg/L	<5	<1 UJ	<1	<1	<20	<10
Styrene	µg/L	<5	<1 UJ	<1	<1	<20	<10
tert-Butylbenzene	µg/L	<5	<1 UJ	<1	<1	<20	<10
Tetrachloroethene	µg/L	<5	5.77 J	3.76	5.07	<20	<10
Toluene	µg/L	<5	<1 UJ	<1	<1	<20	<10
trans-1,2-Dichloroethene	µg/L	<5	1.04 J	0.999 J	0.747 J	<20	<10
trans-1,3-Dichloropropene	µg/L	<5	<1 UJ	<1	<1	<20	<10
Trichloroethene	µg/L	<5	2.39 J	1.65	1.51	<20	<10
Trichlorofluoromethane	µg/L	<5	<1 UJ	<1	<1	<20	<10
Vinyl chloride	µg/L	<5	<1 UJ	0.259 J	0.628 J	<20	<10

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-4-2
VOC ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	MW-21	PMW21-01	PMW21-02	PMW21-04	DR2-2	DR2-5
	Lab ID	L13081024-22	L13081024-23	L13081024-32	L13081024-01	L13080814-12	L13080814-01
	Date	8/17/2013	8/17/2013	8/18/2013	8/17/2013	8/14/2013	8/14/2013
	Area	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-2	TTA-2
Analyte	Units	L13081024-22	L13081024-23	L13081024-32	L13081024-01	L13080814-12	L13080814-01
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<1	<0.5	<2.5	<2.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<2	<1	<5	<5	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<1	<0.5	<2.5	<2.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<2	<1	<5	<5	<1
1,1-Dichloroethane	µg/L	<1	<2	<1	<5	<5	<1
1,1-Dichloroethene	µg/L	<1	<2	<1	<5	<5	<1
1,1-Dichloropropene	µg/L	<1	<2	<1	<5	<5	<1
1,2,3-Trichlorobenzene	µg/L	<1	<2	<1	<5	<5	<1
1,2,3-Trichloropropane	µg/L	<1	<2	<1	<5	<5	15.8
1,2,4-Trichlorobenzene	µg/L	<1	<2	<1	<5	<5	<1
1,2,4-Trimethylbenzene	µg/L	<1	<2	<1	2.44 J	1.84 J	2.25
1,2-Dibromo-3-chloropropane	µg/L	<2	<4	<2	<10	<10	<2
1,2-Dibromoethane	µg/L	<1	<2	<1	<5	<5	<1
1,2-Dichlorobenzene	µg/L	<1	<2	<1	<5	<5	0.144 J
1,2-Dichloroethane	µg/L	<0.5	<1	<0.5	<2.5	<2.5	0.278 J
1,2-Dichloropropane	µg/L	<1	<2	<1	<5	<5	0.358 J
1,3,5-Trimethylbenzene	µg/L	<1	<2	<1	<5	<5	0.648 J
1,3-Dichlorobenzene	µg/L	<1	<2	<1	<5	<5	<1
1,3-Dichloropropane	µg/L	<0.4	<0.8	<0.4	<2	<2	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<1	<0.5	<2.5	<2.5	<0.5
1-Chlorohexane	µg/L	<1	<2	<1	<5	<5	<1
2,2-Dichloropropane	µg/L	<1	<2	<1	<5	<5	<1
2-Chlorotoluene	µg/L	<1	<2	<1	<5	<5	<1
2-Hexanone	µg/L	<10	<20	<10	<50	<50	<10
4-Chlorotoluene	µg/L	<1	<2	<1	<5	<5	<1
Acetone	µg/L	9.18	<20	<10	46.2	566	52.1
Benzene	µg/L	<0.4	<0.8	<0.4	<2	<2	0.167 J
Bromobenzene	µg/L	<1	<2	<1	<5	<5	<1
Bromochloromethane	µg/L	<1	<2	<1	<5	<5	<1
Bromodichloromethane	µg/L	<0.5	<1	<0.5	<2.5	<2.5	<0.5
Bromoform	µg/L	<1	<2	<1	<5	<5	<1
Bromomethane	µg/L	<1	<2	<1	<5	<5	<1
Carbon disulfide	µg/L	<1	<2	<1	<5	<5	0.603 J
Carbon tetrachloride	µg/L	<1	<2	<1	<5	<5	5.2
Chlorobenzene	µg/L	<0.5	<1	<0.5	<2.5	<2.5	0.251 J
Chloroethane	µg/L	<1	<2	<1	<5	<5	<1
Chloroform	µg/L	<0.3	<0.6	<0.3	<1.5	<1.5	48.3
Chloromethane	µg/L	<1	<2	<1	<5	<5	<1
cis-1,2-Dichloroethene	µg/L	25	9.62	5.18	77.6	14.5	120
cis-1,3-Dichloropropene	µg/L	<0.5	<1	<0.5	<2.5	<2.5	<0.5
Dibromochloromethane	µg/L	<0.5	<1	<0.5	<2.5	<2.5	<0.5
Dibromomethane	µg/L	<1	<2	<1	<5	<5	<1
Dichlorodifluoromethane	µg/L	<1	<2	<1	<5	<5	<1
Ethylbenzene	µg/L	<1	<2	<1	<5	<5	<1
Hexachlorobutadiene	µg/L	<0.6	<1.2	<0.6	<3	<3	<0.6
Isopropylbenzene	µg/L	<1	<2	<1	<5	<5	<1
m-,p-Xylene	µg/L	<2	<4	<2	<10	<10	<2
MEK (2-Butanone)	µg/L	11	<20	<10	139	1690	156
Methyl t-butyl ether (MTBE)	µg/L	10.1	29.2	28.6	11.7 J	<25	<5
Methylene chloride	µg/L	<1	1.46 JB	<1	<5	<5	2.14
MIBK (methyl isobutyl ketone)	µg/L	<10	<20	<10	<50	<50	<10
Naphthalene	µg/L	0.344 J	<2	<1	<5	<5	<1
n-Butylbenzene	µg/L	<1	<2	<1	<5	<5	<1
n-Propylbenzene	µg/L	<1	<2	<1	<5	<5	0.401 J
o-Xylene	µg/L	<1	<2	<1	<5	<5	<1
p-Isopropyltoluene	µg/L	<1	<2	<1	<5	<5	<1
sec-Butylbenzene	µg/L	<1	<2	<1	<5	<5	<1
Styrene	µg/L	<1	<2	<1	<5	<5	<1
tert-Butylbenzene	µg/L	<1	<2	<1	<5	<5	<1
Tetrachloroethene	µg/L	19.1	279	143	25	2.61 J	44.9
Toluene	µg/L	<1	<2	<1	<5	<5	<1
trans-1,2-Dichloroethene	µg/L	<1	0.808 J	<1	<5	<5	<1
trans-1,3-Dichloropropene	µg/L	<1	<2	<1	<5	<5	<1
Trichloroethene	µg/L	2.96	55.5	54.3	8.67	<5	21.8
Trichlorofluoromethane	µg/L	<1	<2	<1	<5	<5	<1
Vinyl chloride	µg/L	<1	<2	<1	<5	<5	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-4-2
VOC ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW85-05	IW85-06	IW85-06-DUP4	IW92-01	IW92-02	IW92-03
	Lab ID	L13080814-03	L13080921-02	L13080921-06	L13081060-05	L13080814-06	L13081024-18
	Date	8/14/2013	8/15/2013	8/15/2013	8/20/2013	8/14/2013	8/19/2013
	Area	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Analyte	Units	L13080814-03	L13080921-02	L13080921-06	L13081060-05	L13080814-06	L13081024-18
1,1,1,2-Tetrachloroethane	µg/L	<12.5	<12.5	<2.5	<2.5	<25	<5
1,1,1-Trichloroethane	µg/L	<25	<25	<5	<5	<50	<10
1,1,2,2-Tetrachloroethane	µg/L	<12.5	<12.5	<2.5	<2.5	<25	<5
1,1,2-Trichloroethane	µg/L	<25	<25	<5	<5	<50	<10
1,1-Dichloroethane	µg/L	<25	<25	<5	<5	<50	<10
1,1-Dichloroethene	µg/L	<25	<25	<5	<5	<50	<10
1,1-Dichloropropene	µg/L	<25	<25	<5	<5	<50	<10
1,2,3-Trichlorobenzene	µg/L	<25	<25	<5	<5 J	<50	<10
1,2,3-Trichloropropane	µg/L	<25	<25	<5	<5	<50	<10
1,2,4-Trichlorobenzene	µg/L	<25	<25	<5	<5	<50	<10
1,2,4-Trimethylbenzene	µg/L	<25	<25	<5	2.66 J	<50	8.44 J
1,2-Dibromo-3-chloropropane	µg/L	<50	<50	<10	<10	<100	<20
1,2-Dibromoethane	µg/L	<25	<25	<5	<5	<50	<10
1,2-Dichlorobenzene	µg/L	<25	19.6 J	<5	<5	<50	<10
1,2-Dichloroethane	µg/L	<12.5	<12.5	<2.5	<2.5	<25	<5
1,2-Dichloropropane	µg/L	<25	<25	<5	<5	<50	<10
1,3,5-Trimethylbenzene	µg/L	<25	<25	<5	<5	<50	<10
1,3-Dichlorobenzene	µg/L	<25	<25	<5	<5	<50	<10
1,3-Dichloropropane	µg/L	<10	<10	<2	<2	<20	<4
1,4-Dichlorobenzene	µg/L	<12.5	3.67 J	<2.5	<2.5	<25	<5
1-Chlorohexane	µg/L	<25	<25	<5	<5	<50	<10
2,2-Dichloropropane	µg/L	<25	<25	<5	<5	<50	<10
2-Chlorotoluene	µg/L	<25	<25	<5	<5	<50	<10
2-Hexanone	µg/L	<250	<250	12.8	<50	<500	<100
4-Chlorotoluene	µg/L	<25	<25	<5	<5	<50	<10
Acetone	µg/L	281	540	931	837	1040	196
Benzene	µg/L	<10	<10	<2	<2	<20	<4
Bromobenzene	µg/L	<25	<25	<5	<5	<50	<10
Bromochloromethane	µg/L	<25	<25	<5	<5	<50	<10
Bromodichloromethane	µg/L	<12.5	<12.5	<2.5	<2.5	<25	<5
Bromoform	µg/L	<25	<25	<5	<5	<50	<10
Bromomethane	µg/L	<25	17.5 JB	<5	<5	<50	<10
Carbon disulfide	µg/L	<25	<25	<5	<5	<50	<10
Carbon tetrachloride	µg/L	<25	<25	<5	<5	<50	<10
Chlorobenzene	µg/L	<12.5	<12.5	<2.5	<2.5	<25	<5
Chloroethane	µg/L	<25	<25	<5	<5	<50	<10
Chloroform	µg/L	<7.5	<7.5	<1.5	<1.5	<15	<3
Chloromethane	µg/L	<25	<25	<5	<5	<50	<10
cis-1,2-Dichloroethene	µg/L	37.6	16.2 J	16.8	4.14 J	18.2 J	44.9
cis-1,3-Dichloropropene	µg/L	<12.5	<12.5	<2.5	<2.5	<25	<5
Dibromochloromethane	µg/L	<12.5	<12.5	<2.5	<2.5	<25	<5
Dibromomethane	µg/L	<25	<25	<5	<5	<50	<10
Dichlorodifluoromethane	µg/L	<25	<25	<5	<5	<50	<10
Ethylbenzene	µg/L	<25	<25	<5	<5	<50	<10
Hexachlorobutadiene	µg/L	<15	<15	<3	<3	<30	<6
Isopropylbenzene	µg/L	<25	<25	<5	<5	<50	<10
m-,p-Xylene	µg/L	<50	<50	<10	<10	<100	<20
MEK (2-Butanone)	µg/L	3740	6950	9420	1850	10100	1820
Methyl t-butyl ether (MTBE)	µg/L	<125	<125	<25	<25	<250	<50
Methylene chloride	µg/L	<25	<25	<5	<5	<50	<10
MIBK (methyl isobutyl ketone)	µg/L	<250	<250	<50	<50	<500	<100
Naphthalene	µg/L	<25	<25	<5	<5	<50	2.36 J
n-Butylbenzene	µg/L	<25	<25	<5	<5	<50	<10
n-Propylbenzene	µg/L	<25	<25	<5	<5	<50	<10
o-Xylene	µg/L	<25	<25	<5	<5	<50	<10
p-Isopropyltoluene	µg/L	<25	<25	<5	<5	<50	<10
sec-Butylbenzene	µg/L	<25	<25	<5	<5	<50	<10
Styrene	µg/L	<25	<25	<5	<5	<50	<10
tert-Butylbenzene	µg/L	<25	<25	<5	<5	<50	<10
Tetrachloroethene	µg/L	<25	<25	<5	<5	<50	<10
Toluene	µg/L	<25	<25	<5	<5	<50	<10
trans-1,2-Dichloroethene	µg/L	<25	<25	<5	<5	<50	<10
trans-1,3-Dichloropropene	µg/L	<25	<25	<5	<5	<50	<10
Trichloroethene	µg/L	<25	<25	<5	<5	<50	<10
Trichlorofluoromethane	µg/L	<25	<25	<5	<5	<50	<10
Vinyl chloride	µg/L	<25	<25	2.57 J	<5	<50	<10

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-4-2
VOC ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW92-07	IW92-08	MW-113	MW-85	PMW85-01	PMW85-05
	Lab ID	L13080921-03	L13080921-04	L13080814-02	L13080814-04	L13080814-05	L13080814-07
	Date	8/15/2013	8/15/2013	8/13/2013	8/14/2013	8/13/2013	8/13/2013
	Area	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Analyte	Units	L13080921-03	L13080921-04	L13080814-02	L13080814-04	L13080814-05	L13080814-07
1,1,1,2-Tetrachloroethane	µg/L	<2.5	<2.5	<10	<0.5	<5	<0.5
1,1,1-Trichloroethane	µg/L	<5	<5	<20	<1	<10	<1
1,1,2,2-Tetrachloroethane	µg/L	<2.5	<2.5	<10	<0.5	<5	<0.5
1,1,2-Trichloroethane	µg/L	<5	<5	<20	<1	<10	<1
1,1-Dichloroethane	µg/L	<5	<5	<20	<1	<10	<1
1,1-Dichloroethene	µg/L	<5	<5	<20	<1	<10	<1
1,1-Dichloropropene	µg/L	<5	<5	<20	<1	<10	<1
1,2,3-Trichlorobenzene	µg/L	<5	<5	<20	<1	<10	<1
1,2,3-Trichloropropane	µg/L	<5	<5	<20	5.15	<10	54.2
1,2,4-Trichlorobenzene	µg/L	<5	<5	<20	<1	<10	<1
1,2,4-Trimethylbenzene	µg/L	3.22 J	3.6 J	<20	<1	<10	<1
1,2-Dibromo-3-chloropropane	µg/L	<10	<10	<40	<2	<20	<2
1,2-Dibromoethane	µg/L	<5	<5	<20	<1	<10	<1
1,2-Dichlorobenzene	µg/L	<5	<5	<20	<1	<10	0.222 J
1,2-Dichloroethane	µg/L	<2.5	<2.5	<10	<0.5	<5	0.491 J
1,2-Dichloropropane	µg/L	<5	<5	<20	0.391 J	<10	0.569 J
1,3,5-Trimethylbenzene	µg/L	<5	<5	<20	<1	<10	<1
1,3-Dichlorobenzene	µg/L	<5	<5	<20	<1	<10	<1
1,3-Dichloropropane	µg/L	<2	<2	<8	<0.4	2.42 J	<0.4
1,4-Dichlorobenzene	µg/L	<2.5	<2.5	<10	<0.5	<5	<0.5
1-Chlorohexane	µg/L	<5	<5	<20	<1	<10	<1
2,2-Dichloropropane	µg/L	<5	<5	<20	<1	<10	<1
2-Chlorotoluene	µg/L	<5	<5	<20	<1	<10	<1
2-Hexanone	µg/L	<50	<50	<200	<10	<100	<10
4-Chlorotoluene	µg/L	<5	<5	<20	<1	<10	<1
Acetone	µg/L	1420	1330	208	4.26 B	64.6	<10
Benzene	µg/L	<2	<2	<8	<0.4	<4	<0.4
Bromobenzene	µg/L	<5	<5	<20	<1	<10	<1
Bromochloromethane	µg/L	<5	<5	<20	<1	<10	<1
Bromodichloromethane	µg/L	<2.5	<2.5	<10	<0.5	<5	<0.5
Bromoform	µg/L	<5	<5	<20	<1	<10	<1
Bromomethane	µg/L	<5	<5	<20	<1	<10	<1
Carbon disulfide	µg/L	<5	<5	<20	<1	<10	<1
Carbon tetrachloride	µg/L	<5	<5	<20	9.69	<10	78.6
Chlorobenzene	µg/L	<2.5	<2.5	<10	<0.5	<5	0.228 J
Chloroethane	µg/L	<5	<5	<20	<1	<10	<1
Chloroform	µg/L	<1.5	<1.5	<6	2.78	<3	32.3
Chloromethane	µg/L	<5	<5	<20	<1	<10	<1
cis-1,2-Dichloroethene	µg/L	52.5	92.1	88.9	62.1	51.8	83.4
cis-1,3-Dichloropropene	µg/L	<2.5	<2.5	<10	<0.5	<5	<0.5
Dibromochloromethane	µg/L	<2.5	<2.5	<10	<0.5	<5	<0.5
Dibromomethane	µg/L	<5	<5	<20	<1	<10	<1
Dichlorodifluoromethane	µg/L	<5	<5	<20	<1	<10	<1
Ethylbenzene	µg/L	<5	<5	<20	<1	<10	<1
Hexachlorobutadiene	µg/L	<3	<3	<12	<0.6	<6	<0.6
Isopropylbenzene	µg/L	<5	<5	<20	<1	<10	<1
m-,p-Xylene	µg/L	<10	<10	<40	<2	<20	<2
MEK (2-Butanone)	µg/L	15200	4050	2420	56.7	59.6 J	<10
Methyl t-butyl ether (MTBE)	µg/L	<25	<25	<100	<5	<50	<5
Methylene chloride	µg/L	<5	1.63 J	<20	<1	<10	<1
MIBK (methyl isobutyl ketone)	µg/L	<50	<50	<200	<10	<100	<10
Naphthalene	µg/L	<5	<5	<20	<1	<10	<1
n-Butylbenzene	µg/L	<5	<5	<20	<1	<10	<1
n-Propylbenzene	µg/L	<5	<5	<20	<1	<10	<1
o-Xylene	µg/L	<5	<5	<20	<1	<10	<1
p-Isopropyltoluene	µg/L	<5	<5	<20	<1	<10	<1
sec-Butylbenzene	µg/L	<5	<5	<20	<1	<10	<1
Styrene	µg/L	<5	<5	<20	<1	<10	<1
tert-Butylbenzene	µg/L	<5	<5	<20	<1	<10	<1
Tetrachloroethene	µg/L	<5	<5	12.6 J	6.62	<10	110
Toluene	µg/L	<5	<5	<20	<1	<10	<1
trans-1,2-Dichloroethene	µg/L	<5	<5	<20	<1	<10	<1
trans-1,3-Dichloropropene	µg/L	<5	<5	<20	<1	<10	<1
Trichloroethene	µg/L	<5	<5	5.09 J	1.77	<10	33.1
Trichlorofluoromethane	µg/L	<5	<5	<20	<1	<10	<1
Vinyl chloride	µg/L	<5	<5	<20	<1	<10	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-4-2
VOC ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	PMW92-03	PMW92-03-DUP5	MW-197A	MW-197B	MW-203A	MW-203B
	Lab ID	L13080814-13	L13080814-08	L13081024-06	L13081024-08	L13081024-09	L13081024-10
	Date	8/13/2013	8/13/2013	8/19/2013	8/19/2013	8/19/2013	8/19/2013
	Area	TTA-2	TTA-2	West-Central	West-Central	West-Central	West-Central
Analyte	Units	L13080814-13	L13080814-08	L13081024-06	L13081024-08	L13081024-09	L13081024-10
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<5	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<5	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<5	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<5	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<5	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1 J	<1	<5	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<5	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<5	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<5	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<10	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<5	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<5	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<5	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<5	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<5	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<2	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<5	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<5	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<5	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<50	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<5	<1
Acetone	µg/L	<10	<10	<10	<10	65	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<2	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<5	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<5	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<5	<1
Bromomethane	µg/L	<1	<1	<1	<1	<5	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<5	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<5	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<5	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<1.5	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<5	<1
cis-1,2-Dichloroethene	µg/L	50.4	49.1	0.79 J	6.12	12.1	12.7
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<5	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<5	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<5	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<3	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<5	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<10	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	453	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	2.11 J	<25	2.81 J
Methylene chloride	µg/L	<1	<1	<1	<1	2.58 J	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<50	<10
Naphthalene	µg/L	<1	<1	<1	<1	<5	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<5	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<5	<1
o-Xylene	µg/L	<1	<1	<1	<1	<5	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<5	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<5	<1
Styrene	µg/L	<1	<1	<1	<1	<5	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<5	<1
Tetrachloroethene	µg/L	149	133	21.7	19.1	4.41 J	13.9
Toluene	µg/L	<1	<1	<1	<1	<5	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<5	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<5	<1
Trichloroethene	µg/L	14.9	13.8	1.36	11.6	<5	17.8
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<5	<1
Vinyl chloride	µg/L	1.61	1.56	<1	1.38	<5	2.66

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-4-2
VOC ANALYTICAL RESULTS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location	MW-62	MW-212	MW-212-DUP6	MW-213
	Lab ID	L13081060-02	L13081060-07	L13081060-09	L13081060-08
	Date	8/20/2013	8/20/2013	8/20/2013	8/20/2013
	Area	Bldg 835	Bldg 835	Bldg 835	Bldg 835
	Units	L13081060-02	L13081060-07	L13081060-09	L13081060-08
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	0.78 J	<1	<1	0.715 J
1,1-Dichloropropene	µg/L	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1 J	<1 J	<1 J	<1 J
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1
Acetone	µg/L	71.1	<10	<10	221
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	1.04
Carbon tetrachloride	µg/L	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1
Chloroform	µg/L	0.351	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	51.8	<1	<1	11.5
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	213	<10	<10	606
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1
Tetrachloroethene	µg/L	0.382 J	0.377 J	0.415 J	<1
Toluene	µg/L	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1
Trichloroethene	µg/L	132	13.7	13.7	14
Trichlorofluoromethane	µg/L	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	0.327 J

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-4-3
GEOCHEMICAL ANALYTICAL RESULTS, RINSE BLANKS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Sample ID	RB1-EBT-13	RB2-EBT-13	RB3-EBT-13
	Lab ID	L13080814-09	L13081024-34	L13081060-03
	Date	8/14/2013	8/18/2013	8/20/2013
Analyte	Units	L13080814-09	L13081024-34	L13081060-03
Total Organic Carbon	mg/L	0.647 J	0.709 J	1.07
Acetic Acid	mg/L	<1	<1	0.762 J
Butyric Acid	mg/L	<1	<1	<1
Lactic Acid	mg/L	<1	<1	<1
Propionic Acid	mg/L	<10	<10	<10
Pyruvic Acid	mg/L	<0.1	<0.1	<0.1
Carbon Dioxide	µg/L	<10000	<10000	<10000
Ethane	µg/L	<5	<5	<5
Ethene	µg/L	<5	<5	<5
Methane	µg/L	3.4 JB	3.2 JB	6

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

JB: Estimated- blank contamination

TABLE B-4-4
VOC ANALYTICAL RESULTS, TRIP AND RINSE BLANKS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Sample ID Lab ID Date Units	TB-081313-EBT-13	TB-081413-EBT-13	TB-081513-EBT-13	TB-081613-EBT-13	TB-081213-EBT-13
		L13080814-10	L13080814-11	L13080921-07	L13080978-05	L13081024-11
		8/13/2013	8/14/2013	8/15/2013	8/16/2013	8/17/2013
		L13080814-10	L13080814-11	L13080921-07	L13080978-05	L13081024-11
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1	0.252 J	0.28 J
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-4-4
VOC ANALYTICAL RESULTS, TRIP AND RINSE BLANKS, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Sample ID	TB-082213-EBT-13	TB-081913-EBT-13	TB-082013-EBT-13	RB1-EBT-13	RB2-EBT-13	RB3-EBT-13
	Lab ID	L13081024-13	L13081024-12	L13081060-04	L13080814-09	L13081024-34	L13081060-03
	Date	8/18/2013	8/19/2013	8/20/2013	8/14/2013	8/18/2013	8/20/2013
Analyte	Units	L13081024-13	L13081024-12	L13081060-04	L13080814-09	L13081024-34	L13081060-03
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1 J	<1	<1	<1 J
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1	<1
Acetone	µg/L	<10	<10	<10	3.24 J	4.48 J	2.57 J
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	µg/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-5-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A	IW21-03A-DUP1	IW21-03B
	Lab ID	L13110512-01	L13110512-02	L13110633-10	L13110633-11	L13110633-12	L13110633-15	L13110633-13
	Date	11/7/2013	11/7/2013	11/8/2013	11/8/2013	11/8/2013	11/8/2013	11/8/2013
	Area	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
Analyte	Units							
Total Organic Carbon	mg/L	8200	1070	1080	680	143	157	426
Acetic Acid	mg/L	1610	83.9	144	148	83.1	84.2	285
Butyric Acid	mg/L	3040	379	529	23.1	5.83	7.27	90.8
Lactic Acid	mg/L	<50 UJ	<10	<10 UJ	<1 UJ	0.553 J	<1	<1 UJ
Propionic Acid	mg/L	1890	677	591	812	168	168	423
Pyruvic Acid	mg/L	<5 UJ	<1	<1 UJ	<0.1 UJ	<0.1 UJ	<0.1	<0.1 UJ
Carbon Dioxide	µg/L	480000	290000	220000	200000	240000	130000	110000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	1.2 J	<5
Methane	µg/L	7400	7200	8900	7900	9000	12000	7200

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated, blank contamination

TABLE B-5-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW21-04A	IW21-04B	MW-21	PMW21-01	PMW21-02	PMW21-04	IW101-02A
	Lab ID	L13110633-01	L13110633-04	L13110633-05	L13110511-06	L13110633-14	L13110633-06	L13110792-09
	Date	11/8/2013	11/8/2013	11/8/2013	11/7/2013	11/8/2013	11/8/2013	11/9/2013
	Area	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	2240 J	2470 J	162	210	2.28 B	65	329
Acetic Acid	mg/L	846 J	1410 J	57.6	53.8	<1	14.6	16.7
Butyric Acid	mg/L	1020 J	588 J	121	23.3	<1	3.23	10.7
Lactic Acid	mg/L	<100 UJ	12.5 J	<1 UJ	<1 UJ	<1	<1 UJ	5.41 J
Propionic Acid	mg/L	1000 J	1670 J	22.2	39	<10	6.19 J	357
Pyruvic Acid	mg/L	<10 UJ	<1 UJ	<0.1 UJ	<0.1 UJ	<0.1	<0.1 UJ	<0.1 UJ
Carbon Dioxide	µg/L	340000	270000	65000	170000	120000	150000	230000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	7800	4700	2000	9400	14	8900	12000

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated, blank contamination

TABLE B-5-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW101-02B	IW101-02C	IW101-03A	IW101-03B	IW101-03B-DUP2	IW101-03C	IW101-04A
	Lab ID	L13110792-10	L13110792-13	L13110792-15	L13110792-21	L13110792-19	L13110792-16	L13110792-22
	Date	11/9/2013	11/9/2013	11/10/2013	11/10/2013	11/10/2013	11/10/2013	11/10/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	5.11	4200	377	2320 J	2030 J	4890 J	11800 J
Acetic Acid	mg/L	<1	1680	120	1040 J	1190 J	2280 J	3820 J
Butyric Acid	mg/L	<1	2650	4.08	803 J	853 J	4120 J	7900 J
Lactic Acid	mg/L	<1	<100 UJ	3.29 J	8.81 J	13 J	<100 UJ	<100 UJ
Propionic Acid	mg/L	<10	1890 J	383	1390 J	1620 J	3140 J	4170 J
Pyruvic Acid	mg/L	<0.1	<10 UJ	0.0677 J	<1 UJ	<1 UJ	<10 UJ	<10 UJ
Carbon Dioxide	µg/L	120000	340000	260000	330000	320000	490000	940000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	1.3 J	1.2 J	<5	<5
Methane	µg/L	740	8200	9900	7600	9100	5200	6700

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

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JB: Estimated, blank contamination

TABLE B-5-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW101-04B	IW101-04C	IW101-05A	IW101-05B	IW101-05C	IW101-07A	IW101-07B
	Lab ID	L13110792-35	L13110792-33	L13110792-26	L13110792-24	L13110792-28	L13110792-05	L13110792-06
	Date	11/11/2013	11/11/2013	11/10/2013	11/10/2013	11/10/2013	11/9/2013	11/9/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	458	4370 J	4110 J	13.9	3660 J	3.38	3710 J
Acetic Acid	mg/L	32.6	2180 J	2140 J	6.5	1880 J	0.931 J	1880 J
Butyric Acid	mg/L	27.4	2810 J	2170 J	<1	1600 J	<1	2680 J
Lactic Acid	mg/L	4.37 J	<100 UJ	<100 UJ	<1	<100 UJ	<1	<100 UJ
Propionic Acid	mg/L	277	2300 J	2660 J	<10	2420 J	<10	2220 J
Pyruvic Acid	mg/L	<0.1 UJ	<10 UJ	<10 UJ	<0.1	<10 UJ	<0.1	<10 UJ
Carbon Dioxide	µg/L	330000	520000	590000	140000	500000	130000	320000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	1.9 J	<5	1.2 J	<5	<5	<5	1 J
Methane	µg/L	16000	11000	9000	1700	10000	3.4 JB	1300

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

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JB: Estimated, blank contamination

TABLE B-5-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW101-07C	DR1-5	DR1-5A	DR1-6	DR1-6A	PMW101-02A	PMW101-02B
	Lab ID	L13110792-08	L13110792-01	L13110792-02	L13110792-03	L13110792-04	L13110792-11	L13110792-14
	Date	11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013	11/9/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
Analyte	Units							
Total Organic Carbon	mg/L	4190 J	766	45	13.5	666	1470 J	821
Acetic Acid	mg/L	1700 J	296	28.1	6.72	226	361 J	352
Butyric Acid	mg/L	3120 J	474	<1	1.58	467	741 J	368
Lactic Acid	mg/L	<100 UJ	<10 UJ	0.566 J	<1	<10	<5 UJ	<10 UJ
Propionic Acid	mg/L	2090 J	171 J	12 J	<10	231	436 J	375
Pyruvic Acid	mg/L	<10 UJ	<1 UJ	<0.1	<0.1	<1	<0.5 UJ	<1 UJ
Carbon Dioxide	µg/L	410000	430000	250000	180000	310000	330000	240000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	1.5 J	<5	<5	<5	<5	<5	1.1 J
Methane	µg/L	5600	8600	9200	5100	7400	11000	4300

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

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UJ: Estimated, non-detect

JB: Estimated, blank contamination

TABLE B-5-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	PMW101-04A	PMW101-04B	PMW101-04B-DUP3	PMW101-07A	PMW101-07B	DR2-2
	Lab ID	L13110633-07	L13110633-09	L13110633-08	L13110792-17	L13110792-18	L13110486-05
	Date	11/8/2013	11/8/2013	11/8/2013	11/10/2013	11/10/2013	11/6/2013
	Area	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-2
Analyte	Units						
Total Organic Carbon	mg/L	5.86	2.5 B	1.99	4.01 J	1.12	8680
Acetic Acid	mg/L	<1	<1	<1	<1	<1	1920
Butyric Acid	mg/L	<1	<1	<1	<1	<1	2320
Lactic Acid	mg/L	<1	<1	<1	<1	<1	58.4 J
Propionic Acid	mg/L	<10	<10	<10	<10	<10	2840
Pyruvic Acid	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	5.36 J
Carbon Dioxide	µg/L	190000	82000	69000	130000	73000	1000000
Ethane	µg/L	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5
Methane	µg/L	4300	8200	9800	1500	3.2 JB	5700

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

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JB: Estimated, blank contamination

TABLE B-5-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	DR2-5	IW85-05	IW85-06	IW85-06-DUP4	IW92-01	IW92-02	IW92-03
	Lab ID	L13110486-01	L13110487-03	L13110511-01	L13110511-04	L13110486-06	L13110511-02	L13110487-04
	Date	11/5/2013	11/6/2013	11/7/2013	11/7/2013	11/6/2013	11/7/2013	11/6/2013
	Area	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Analyte	Units							
Total Organic Carbon	mg/L	4980	10500	6930 J	7500	4100	2280	8450
Acetic Acid	mg/L	1500	2220	1610 J	1650	1150	96.3	1340
Butyric Acid	mg/L	1340	2600	1470 J	1510	1210	450	2250
Lactic Acid	mg/L	<50 UJ	<100 UJ	<50 UJ	<100 UJ	<50 UJ	<1 UJ	<50 UJ
Propionic Acid	mg/L	2220	4620	4790 J	4810	1700	644	2920
Pyruvic Acid	mg/L	<5 UJ	<10 UJ	<5 UJ	<10 UJ	<5 UJ	<0.1 UJ	<5 UJ
Carbon Dioxide	µg/L	660000	320000	270000	290000	1300000	110000	760000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	3700	11000	6800	8500	6800	1800	7300

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated, blank contamination

TABLE B-5-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW92-07	IW92-08	MW-85	MW-113	PMW85-01	PMW85-05	PMW92-03
	Lab ID	L13110511-03	L13110487-01	L13110487-05	L13110486-03	L13110487-06	L13110486-02	L13110487-07
	Date	11/7/2013	11/6/2013	11/6/2013	11/6/2013	11/5/2013	11/6/2013	11/6/2013
	Area	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2	TTA-2
Analyte	Units							
Total Organic Carbon	mg/L	6980	22600 J	25.8 J	2720	1060 J	2.03	21100
Acetic Acid	mg/L	1030	5550	39.1	2150	352	<1	3410
Butyric Acid	mg/L	1950	4030	<1	1960	63.2	<1	8360
Lactic Acid	mg/L	<50 UJ	<100 UJ	1.18 J	<50 UJ	25.5 J	<1 UJ	<100 UJ
Propionic Acid	mg/L	3610	8700	<10	2150	505	<10	5770
Pyruvic Acid	mg/L	<5 UJ	<10 UJ	<0.1 UJ	<5 UJ	<0.1 UJ	<0.1 UJ	<10 UJ
Carbon Dioxide	µg/L	440000	460000	370000	1200000	450000	140000	930000 J
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	6600	5100	3200	6200	10000	7100	3600

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated, blank contamination

TABLE B-5-1
GEOCHEMICAL ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	PMW92-03-DUP5	MW-197A	MW-197B	MW-203A	MW-203B	MW-62	MW-212
	Lab ID	L13110487-02	L13110512-03	L13110512-06	L13110512-07	L13110512-08	L13110792-29	L13110792-30
	Date	11/6/2013	11/7/2013	11/7/2013	11/7/2013	11/7/2013	11/11/2013	11/11/2013
	Area	TTA-2	West-Central	West-Central	West-Central	West-Central	Bldg 835	Bldg 835
Analyte	Units							
Total Organic Carbon	mg/L	15300 J	2.68	2.9	4940	172	171	1.07 B
Acetic Acid	mg/L	3600	0.559 J	<1	1330	107	133	<1
Butyric Acid	mg/L	8960	<1	0.548 J	2040	53.4	157	<1
Lactic Acid	mg/L	<100 UJ	<1	<1	<50 UJ	<1 UJ	<5 UJ	<1
Propionic Acid	mg/L	6070	<10	<10	1730	69.7	248	<10
Pyruvic Acid	mg/L	<10 UJ	<0.1	<0.1	<5 UJ	<0.1 UJ	<0.5 UJ	<0.1
Carbon Dioxide	µg/L	1500000 J	67000 J	87000	500000	100000	87000	89000
Ethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Ethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methane	µg/L	3400	2.8 JB	100	13000	2300	8900	3.9 JB

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

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DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated, blank contamination

TABLE B-5-1
 GEOCHEMICAL ANALYTICAL RESULTS, EBT-14
 YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
 Main Installation - Defense Depot Memphis, Tennessee

	Location	MW-212-DUP6	MW-213
	Lab ID	L13110792-32	L13110792-31
	Date	11/11/2013	11/11/2013
	Area	Bldg 835	Bldg 835
Analyte	Units		
Total Organic Carbon	mg/L	1.2 B	419
Acetic Acid	mg/L	<1	65.1
Butyric Acid	mg/L	0.569 J	28.5
Lactic Acid	mg/L	<1	30.4 J
Propionic Acid	mg/L	<10	330
Pyruvic Acid	mg/L	<0.1	0.103 J
Carbon Dioxide	µg/L	74000	240000
Ethane	µg/L	<5	<5
Ethene	µg/L	<5	<5
Methane	µg/L	3.2 JB	8900

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

UJ: Estimated, non-detect

JB: Estimated, blank contamination

TABLE B-5-2
VOC ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	DR1-5A	DR1-5	DR1-6A	DR1-6	IW101-02A	IW101-02B	IW101-02C	IW101-03A
		L13110792-02	L13110792-01	L13110792-04	L13110792-03	L13110792-09	L13110792-10	L13110792-13	L13110792-15
		11/9/2013 TTA-1S	11/9/2013 TTA-1S	11/9/2013 TTA-1S	11/9/2013 TTA-1S	11/9/2013 TTA-1S	11/9/2013 TTA-1S	11/9/2013 TTA-1S	11/10/2013 TTA-1S
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<1	<0.5	<0.5	<0.5 UJ	<0.5	<5 UJ	<0.5
1,1,1-Trichloroethane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<1	<0.5	<0.5	<0.5 UJ	<0.5	<5 UJ	<0.5
1,1,2-Trichloroethane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
1,1-Dichloroethane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
1,1-Dichloroethene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
1,1-Dichloropropene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
1,2,3-Trichlorobenzene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
1,2,3-Trichloropropane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
1,2,4-Trichlorobenzene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
1,2,4-Trimethylbenzene	µg/L	29.3	0.865 J	22.4	1.4	0.396 J	<1	2.58 J	0.669 J
1,2-Dibromo-3-chloropropane	µg/L	<2	<4	<2	<2	<2 UJ	<2	<20 UJ	<2
1,2-Dibromoethane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
1,2-Dichlorobenzene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
1,2-Dichloroethane	µg/L	<0.5	<1	<0.5	<0.5	<0.5 UJ	<0.5	<5 UJ	<0.5
1,2-Dichloropropane	µg/L	<1	<2	0.388 J	<1	<1 UJ	<1	<10 UJ	<1
1,3,5-Trimethylbenzene	µg/L	7.3	<2	5.99	0.373 J	<1 UJ	<1	<10 UJ	<1
1,3-Dichlorobenzene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
1,3-Dichloropropane	µg/L	<0.4	<0.8	<0.4	<0.4	<0.4 UJ	<0.4	<4 UJ	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<1	<0.5	<0.5	<0.5 UJ	<0.5	<5 UJ	<0.5
1-Chlorohexane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
2,2-Dichloropropane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
2-Chlorotoluene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
2-Hexanone	µg/L	<10	<20	<10	<10	<10 UJ	<10	<100 UJ	<10
4-Chlorotoluene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
Acetone	µg/L	49.6 B	345 B	149 B	8.98 JB	280 JB	<10	675 JB	411 B
Benzene	µg/L	<0.4	<0.8	<0.4	<0.4	<0.4 UJ	<0.4	<4 UJ	<0.4
Bromobenzene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
Bromochloromethane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
Bromodichloromethane	µg/L	<0.5	<1	<0.5	<0.5	<0.5 UJ	<0.5	<5 UJ	<0.5
Bromoform	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
Bromomethane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1 UJ
Carbon disulfide	µg/L	<1	<2	<1	<1	0.579 J	<1	<10 UJ	0.812 J
Carbon tetrachloride	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
Chlorobenzene	µg/L	<0.5	<1	<0.5	<0.5	<0.5 UJ	<0.5	<5 UJ	<0.5
Chloroethane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
Chloroform	µg/L	<0.3	<0.6	<0.3	<0.3	<0.3 UJ	<0.3	<3 UJ	<0.3
Chloromethane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
cis-1,2-Dichloroethene	µg/L	26.5	11.6	132	8.42	16 J	5.62	62.9 J	5.9
cis-1,3-Dichloropropene	µg/L	<0.5	<1	<0.5	<0.5	<0.5 UJ	<0.5	<5 UJ	<0.5
Dibromochloromethane	µg/L	<0.5	<1	<0.5	<0.5	<0.5 UJ	<0.5	<5 UJ	<0.5
Dibromomethane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
Dichlorodifluoromethane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
Ethylbenzene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
Hexachlorobutadiene	µg/L	<0.6	<1.2	<0.6	<0.6	<0.6 UJ	<0.6	<6 UJ	<0.6
Isopropylbenzene	µg/L	0.62 J	<2	0.501 J	<1	<1 UJ	<1	<10 UJ	<1
m,p-Xylene	µg/L	0.706 J	<4	<2	<2	<2 UJ	<2	<20 UJ	<2
MEK (2-Butanone)	µg/L	35.5	502	156	13.1	388	<10	2780 J	728
Methyl t-butyl ether (MTBE)	µg/L	<5	43.5	<5	<5	9.88 J	9.92	<50 UJ	11.7
Methylene chloride	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<20	<10	<10	<10 UJ	<10	<100 UJ	<10
Naphthalene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
n-Butylbenzene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
n-Propylbenzene	µg/L	4.21	<2	3.09	0.228 J	<1 UJ	<1	<10 UJ	<1
o-Xylene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
p-Isopropyltoluene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
sec-Butylbenzene	µg/L	0.318 J	<2	0.281 J	<1	<1 UJ	<1	<10 UJ	<1
Styrene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
tert-Butylbenzene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
Tetrachloroethene	µg/L	0.848 J	10.2	1.49	148	14.2 J	44.1	<10 UJ	2.54
Toluene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	12.4
trans-1,2-Dichloroethene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
trans-1,3-Dichloropropene	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
Trichloroethene	µg/L	0.501 J	0.713 J	2.12	1.69	0.908 J	1.36	<10 UJ	<1
Trichlorofluoromethane	µg/L	<1	<2	<1	<1	<1 UJ	<1	<10 UJ	<1
Vinyl chloride	µg/L	<1	<2	0.398 J	<1	<1 UJ	<1	<10 UJ	<1

Notes:
µg/L: micrograms per liter
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
UJ: Estimated-Non-Detect
JB: Estimated- blank contamination

TABLE B-5-2
VOC ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

	Location	IW101-03B	W101-03B-DUP2	IW101-03C	IW101-04A	IW101-04B	IW101-04C	IW101-05A	IW101-05B
	Lab ID	L13110792-21	L13110792-19	L13110792-16	L13110792-22	L13110792-35	L13110792-33	L13110792-26	L13110792-24
	Date	11/10/2013	11/10/2013	11/10/2013	11/10/2013	11/10/2013	11/10/2013	11/10/2013	11/10/2013
Analyte	Area Units	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S	TTA-1S
1,1,1,2-Tetrachloroethane	µg/L	<2.5 UJ	<5 UJ	<5 UJ	<5 UJ	<2.5 UJ	<5	<2.5	<0.5
1,1,1-Trichloroethane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
1,1,2,2-Tetrachloroethane	µg/L	<2.5 UJ	<5 UJ	<5 UJ	<5 UJ	<2.5 UJ	<5 UJ	<2.5 UJ	<0.5
1,1,2-Trichloroethane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
1,1-Dichloroethane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
1,1-Dichloroethene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
1,1-Dichloropropene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
1,2,3-Trichlorobenzene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10 UJ	<5 UJ	<1
1,2,3-Trichloropropane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10 UJ	<5 UJ	<1
1,2,4-Trichlorobenzene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10 UJ	<5 UJ	<1
1,2,4-Trimethylbenzene	µg/L	1.96 J	<10 UJ	<10 UJ	6.35 J	3.35 J	8.23 J	9.63	<1
1,2-Dibromo-3-chloropropane	µg/L	<10 UJ	<20 UJ	<20 UJ	<20 UJ	<10 UJ	<20 UJ	<10 UJ	<2
1,2-Dibromoethane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
1,2-Dichlorobenzene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	2.61 JB	4.68	2.17 B	<1
1,2-Dichloroethane	µg/L	<2.5 UJ	<5 UJ	<5 UJ	<5 UJ	<2.5 UJ	<5	<2.5	<0.5
1,2-Dichloropropane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
1,3,5-Trimethylbenzene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	2.59 J	<1
1,3-Dichlorobenzene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
1,3-Dichloropropane	µg/L	<2 UJ	<4 UJ	<4 UJ	<4 UJ	<2 UJ	<4	<2	<0.4
1,4-Dichlorobenzene	µg/L	<2.5 UJ	<5 UJ	<5 UJ	<5 UJ	1.81 JB	3.12 B	1.53 B	<0.5
1-Chlorohexane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
2,2-Dichloropropane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
2-Chlorotoluene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
2-Hexanone	µg/L	<50 UJ	<100 UJ	<100 UJ	<100 UJ	<50 UJ	<100 UJ	<50 UJ	<10
4-Chlorotoluene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
Acetone	µg/L	733 JB	703 JB	5650 JB	1010 JB	94.1 JB	1260 B	580 JB	2.86 JB
Benzene	µg/L	<2 UJ	<4 UJ	<4 UJ	<4 UJ	<2 UJ	<4	<2	<0.4
Bromobenzene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
Bromochloromethane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
Bromodichloromethane	µg/L	<2.5 UJ	<5 UJ	<5 UJ	<5 UJ	<2.5 UJ	<5	<2.5	<0.5
Bromoform	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10 UJ	<5 UJ	<1
Bromomethane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10 UJ	<5 UJ	<1 UJ
Carbon disulfide	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
Carbon tetrachloride	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
Chlorobenzene	µg/L	<2.5 UJ	<5 UJ	<5 UJ	<5 UJ	<2.5 UJ	<5	<2.5	<0.5
Chloroethane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
Chloroform	µg/L	<1.5 UJ	<3 UJ	<3 UJ	<3 UJ	<1.5 UJ	<3	<1.5	<0.3
Chloromethane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
cis-1,2-Dichloroethene	µg/L	8.82 J	8.67 J	37.4 J	5.42 J	11.9 J	18.3	15.7	11.5
cis-1,3-Dichloropropene	µg/L	<2.5 UJ	<5 UJ	<5 UJ	<5 UJ	<2.5 UJ	<5	<2.5	<0.5
Dibromochloromethane	µg/L	<2.5 UJ	<5 UJ	<5 UJ	<5 UJ	<2.5 UJ	<5	<2.5	<0.5
Dibromomethane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
Dichlorodifluoromethane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
Ethylbenzene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
Hexachlorobutadiene	µg/L	<3 UJ	<6 UJ	<6 UJ	<6 UJ	<3 UJ	<6	<3	<0.6
Isopropylbenzene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
m-,p-Xylene	µg/L	<10 UJ	<20 UJ	<20 UJ	<20 UJ	<10 UJ	<20	<10	<2
MEK (2-Butanone)	µg/L	1380 J	1560 J	8640 J	4990 JB	211 J	3490	1670 B	4.09 JB
Methyl t-butyl ether (MTBE)	µg/L	3.65 J	<50 UJ	<50 UJ	<50 UJ	<25 UJ	<50	3.87 J	4 J
Methylene chloride	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
MIBK (methyl isobutyl ketone)	µg/L	<50 UJ	<100 UJ	<100 UJ	<100 UJ	<50 UJ	<100 UJ	<50 UJ	<10
Naphthalene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10 UJ	<5 UJ	<1
n-Butylbenzene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
n-Propylbenzene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	1.5 J	<1
o-Xylene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
p-Isopropyltoluene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
sec-Butylbenzene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
Styrene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
tert-Butylbenzene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
Tetrachloroethene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	1.41 J	17.5
Toluene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
trans-1,2-Dichloroethene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
trans-1,3-Dichloropropene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
Trichloroethene	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	1.13
Trichlorofluoromethane	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1
Vinyl chloride	µg/L	<5 UJ	<10 UJ	<10 UJ	<10 UJ	<5 UJ	<10	<5	<1

Notes:
µg/L: micrograms per liter
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
UJ: Estimated-Non-Detect
JB: Estimated- blank contamination

TABLE B-5-2
VOC ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	IW101-05C L13110792-28 11/10/2013 TTA-1S	IW101-07A L13110792-05 11/9/2013 TTA-1S	IW101-07B L13110792-06 11/9/2013 TTA-1S	IW101-07C L13110792-08 11/9/2013 TTA-1S	PMW101-02A L13110792-11 11/9/2013 TTA-1S	PMW101-02B L13110792-14 11/9/2013 TTA-1S	PMW101-04A L13110633-07 11/9/2013 TTA-1S	PMW101-04B L13110633-09 11/8/2013 TTA-1S
1,1,1,2-Tetrachloroethane	µg/L	<5 UJ	<0.5	<2.5 UJ	<5 UJ	<1	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<5 UJ	<0.5	<2.5 UJ	<5 UJ	<1	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
1,1-Dichloroethane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
1,1-Dichloroethene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
1,1-Dichloropropene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1 UJ	<1 UJ
1,2,3-Trichloropropane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	4.4 J	<1	25.7 J	34.2 J	2.03	4.95	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<20 UJ	<2	<10 UJ	<20 UJ	<4	<2	<2	<2
1,2-Dibromoethane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
1,2-Dichloroethane	µg/L	<5 UJ	<0.5	<2.5 UJ	<5 UJ	<1	0.515	<0.5	<0.5
1,2-Dichloropropane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	0.492 J	<1	<1
1,3,5-Trimethylbenzene	µg/L	<10 UJ	<1	7.42 J	8.59 J	0.557 J	1.29	<1	<1
1,3-Dichlorobenzene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
1,3-Dichloropropane	µg/L	<4 UJ	<0.4	<2 UJ	<4 UJ	<0.8	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<5 UJ	<0.5	<2.5 UJ	<5 UJ	<1	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
2,2-Dichloropropane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
2-Chlorotoluene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
2-Hexanone	µg/L	<100 UJ	<10	<50 UJ	<100 UJ	<20	<10	<10	<10
4-Chlorotoluene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
Acetone	µg/L	653 JB	<10	522 J	1220 J	127 B	115 B	2.8 JB	<10
Benzene	µg/L	<4 UJ	<0.4	<2 UJ	<4 UJ	<0.8	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
Bromochloromethane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
Bromodichloromethane	µg/L	<5 UJ	<0.5	<2.5 UJ	<5 UJ	<1	<0.5	<0.5	<0.5
Bromoform	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
Bromomethane	µg/L	<10 J	<1	<5 UJ	<10 UJ	<2	<1 UJ	<1	<1
Carbon disulfide	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	16.3	<1	<1
Carbon tetrachloride	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
Chlorobenzene	µg/L	<5 UJ	<0.5	<2.5 UJ	<5 UJ	<1	<0.5	<0.5	<0.5
Chloroethane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
Chloroform	µg/L	<3 UJ	<0.3	<1.5 UJ	<3 UJ	<0.6	<0.3	<0.3	<0.3
Chloromethane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	24.4 J	<1	58.9 J	211 J	8.62	37.5	20.4	8.17
cis-1,3-Dichloropropene	µg/L	<5 UJ	<0.5	<2.5 UJ	<5 UJ	<1	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<5 UJ	<0.5	<2.5 UJ	<5 UJ	<1	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
Dichlorodifluoromethane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
Ethylbenzene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
Hexachlorobutadiene	µg/L	<6 UJ	<0.6	<3 UJ	<6 UJ	<1.2	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
m-,p-Xylene	µg/L	<20 UJ	<2	<10 UJ	<20 UJ	<4	<2	<2	<2
MEK (2-Butanone)	µg/L	2340 J	<10	2040 J	2230 J	378	104	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<50 UJ	<5	<25 UJ	<50 UJ	2.25 J	2.96 J	3 J	13.7
Methylene chloride	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<100 UJ	<10	<50 UJ	<100 UJ	<20	<10	<10	<10
Naphthalene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
n-Butylbenzene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
n-Propylbenzene	µg/L	<10 UJ	<1	3.64 J	3.58 J	0.312 J	0.731 J	<1	<1
o-Xylene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	0.323 J	<1	<1
p-Isopropyltoluene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
sec-Butylbenzene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
Styrene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
tert-Butylbenzene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
Tetrachloroethene	µg/L	<10 UJ	0.434 J	1.92 J	<10 UJ	2.15	1.58	6.35	22.1
Toluene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
Trichloroethene	µg/L	<10 UJ	0.292 J	4.17 J	<10 UJ	1.39 J	3.21	0.927 J	2.02
Trichlorofluoromethane	µg/L	<10 UJ	<1	<5 UJ	<10 UJ	<2	<1	<1	<1
Vinyl chloride	µg/L	<10 UJ	<1	<5 UJ	3.09 J	<2	<1	<1	<1

Notes:
µg/L: micrograms per liter
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
UJ: Estimated-Non-Detect
JB: Estimated- blank contamination

TABLE B-5-2
VOC ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	VW101-04B-DUF	PMW101-07A	PMW101-07B	IW21-01A	IW21-01B	IW21-02A	IW21-02B	IW21-03A
		L13110633-08	L13110792-17	L13110792-18	L13110512-01	L13110512-02	L13110633-10	L13110633-11	L13110633-12
		11/8/2013	11/10/2013	11/10/2013	11/7/2013	11/7/2013	11/8/2013	11/8/2013	11/8/2013
		TTA-1S	TTA-1S	TTA-1S	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5	<2.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5	<2.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
1,2,3-Trichlorobenzene	µg/L	<1 UJ	<1	<1	<5	<1	<5 UJ	<5 UJ	<1 UJ
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	11.8	7.46	6.24	2.14 J	0.33 J
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<10	<2	<10	<10	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5	<2.5	0.266 J
1,2-Dichloropropane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	3.26 J	2.21	1.94 J	<5	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<2	<0.4	<2	<2	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5	<2.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
2-Hexanone	µg/L	<10	<10	<10	<50	<10	<50	<50	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
Acetone	µg/L	<10	<10	<10	467	143	150 B	93.9 B	29.4 B
Benzene	µg/L	<0.4	<0.4	<0.4	<2	<0.4	<2	<2	<0.4
Bromobenzene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
Bromochloromethane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5	<2.5	<0.5
Bromoform	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
Bromomethane	µg/L	<1	<1 UJ	<1 UJ	<5	<1	<5	<5	<1
Carbon disulfide	µg/L	<1	<1	<1	<5	<1	<5	<5	0.732 J
Carbon tetrachloride	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5	<2.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<1.5	<0.3	<1.5	<1.5	<0.3
Chloromethane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
cis-1,2-Dichloroethene	µg/L	8.45	<1	1.4	109	81.4	77.7	23	209
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5	<2.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<2.5	<0.5	<2.5	<2.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
Ethylbenzene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<3	<0.6	<3	<3	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
m,p-Xylene	µg/L	<2	<2	<2	<10	<2	<10	<10	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	2330	324	283	371	188
Methyl t-butyl ether (MTBE)	µg/L	13.5	<5	0.558 J	35.1	51.3	<25	<25	44.2
Methylene chloride	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<50	<10	<50	<50	<10
Naphthalene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
n-Butylbenzene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
n-Propylbenzene	µg/L	<1	<1	<1	1.1 J	1.03	0.844 J	<5	<1
o-Xylene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<5	0.368 J	<5	<5	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
Styrene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
Tetrachloroethene	µg/L	22	<1	11.6	9.93	11.3	1.87 J	2.77 J	1.21
Toluene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<5	<1	<5	<5	1.13
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
Trichloroethene	µg/L	1.9	0.265 J	27.1	6	4.23	<5	<5	0.652 J
Trichlorofluoromethane	µg/L	<1	<1	<1	<5	<1	<5	<5	<1
Vinyl chloride	µg/L	<1	<1	<1	<5	0.284 J	<5	<5	<1

Notes:
µg/L: micrograms per liter
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
UJ: Estimated-Non-Detect
JB: Estimated- blank contamination

TABLE B-5-2
VOC ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location	IW21-03A-DUP1	IW21-03B	IW21-04A	IW21-04B	MW-21	PMW21-01	PMW21-02	PMW21-04
	Lab ID	L13110633-15	L13110633-13	L13110633-01	L13110633-04	L13110633-05	L13110511-06	L13110633-14	L13110633-06
	Date	11/8/2013	11/8/2013	11/8/2013	11/8/2013	11/8/2013	11/7/2013	11/8/2013	11/8/2013
	Area Units	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N	TTA-1N
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<1	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<1	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1 UJ	<5 UJ	<5 UJ	<1 UJ	<2	<1	<1 UJ
1,2,3-Trichloropropane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	0.64 J	2.56 J	1.79 J	0.253 J	<2	<1	1.34
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<10	<10	<2	<4	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<1	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<5	<5	<1	<2	<1	0.385 J
1,3-Dichlorobenzene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<2	<2	<0.4	<0.8	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<1	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
2-Hexanone	µg/L	<10	<10	<50	<50	<10	<20	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
Acetone	µg/L	33 B	107 B	145 B	765 B	77.3 B	34.5 B	<10	50 B
Benzene	µg/L	<0.4	<0.4	<2	<2	<0.4	<0.8	<0.4	0.209 J
Bromobenzene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
Bromochloromethane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<1	<0.5	<0.5
Bromoform	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
Bromomethane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
Carbon disulfide	µg/L	<1	0.536 J	<5	<5	<1	<2	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<1	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
Chloroform	µg/L	<0.3	<0.3	<1.5	<1.5	<0.3	<0.6	<0.3	<0.3
Chloromethane	µg/L	0.581 J	<1	<5	<5	<1	<2	<1	<1
cis-1,2-Dichloroethene	µg/L	236	135	95.1	90.8	12.8	93	5.66	136
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<1	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<2.5	<2.5	<0.5	<1	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
Ethylbenzene	µg/L	<1	<1	<5	<5	3.06	0.736 J	<1	0.883 J
Hexachlorobutadiene	µg/L	<0.6	<0.6	<3	<3	<0.6	<1.2	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
m-,p-Xylene	µg/L	<2	<2	<10	<10	<2	<4	<2	<2
MEK (2-Butanone)	µg/L	206	312	696	3870 B	56.7	28.8	<10	75.9
Methyl t-butyl ether (MTBE)	µg/L	50.7	26.3	13.2 J	13.5 J	2.61 J	7.23 J	30.4	22.4
Methylene chloride	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<50	<50	<10	<20	<10	<10
Naphthalene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
n-Butylbenzene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
n-Propylbenzene	µg/L	<1	<1	<5	<5	<1	<2	<1	0.231 J
o-Xylene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
Styrene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
Tetrachloroethene	µg/L	1.97	0.526 J	2.37 J	<5	2.89	2.19	149	115
Toluene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
trans-1,2-Dichloroethene	µg/L	1.17	0.877 J	<5	<5	<1	0.53 J	<1	0.607 J
trans-1,3-Dichloropropene	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
Trichloroethene	µg/L	0.783 J	<1	<5	<5	1.2	0.813 J	52.5	28.5
Trichlorofluoromethane	µg/L	<1	<1	<5	<5	<1	<2	<1	<1
Vinyl chloride	µg/L	0.265 J	<1	<5	<5	<1	<2	<1	<1

Notes:
µg/L: micrograms per liter
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
UJ: Estimated-Non-Detect
JB: Estimated- blank contamination

TABLE B-5-2
VOC ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	DR2-2	DR2-5	IW85-05	IW85-06	IW85-06-DUP4	IW92-01	IW92-02	IW92-03
		L13110486-05 11/6/2013 TTA-2	L13110486-01 11/5/2013 TTA-2	L13110487-03 11/6/2013 TTA-2	L13110511-01 11/7/2013 TTA-2	L13110511-04 11/7/2013 TTA-2	L13110486-06 11/6/2013 TTA-2	L13110511-02 11/7/2013 TTA-2	L13110487-04 11/6/2013 TTA-2
1,1,1,2-Tetrachloroethane	µg/L	<5	<2.5	<10	<25	<25	<5	<5	<5
1,1,1-Trichloroethane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
1,1,2,2-Tetrachloroethane	µg/L	<5	<2.5	<10	<25	<25	<5	<5	<5
1,1,2-Trichloroethane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
1,1-Dichloroethane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
1,1-Dichloroethene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
1,1-Dichloropropene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
1,2,3-Trichlorobenzene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
1,2,3-Trichloropropane	µg/L	<10	9.34	<20	<50	<50	<10	<10	<10
1,2,4-Trichlorobenzene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
1,2,4-Trimethylbenzene	µg/L	21.4	15.3	8.58 J	14.9 J	14.4 J	44.4	3.37 J	12.5
1,2-Dibromo-3-chloropropane	µg/L	<20	<10	<40	<100	<100	<20	<20	<20
1,2-Dibromoethane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
1,2-Dichlorobenzene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
1,2-Dichloroethane	µg/L	<5	<2.5	<10	<25	<25	<5	<5	<5
1,2-Dichloropropane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
1,3,5-Trimethylbenzene	µg/L	4.94 J	4.15 J	<20	<50	<50	11.8	<10	3.33 J
1,3-Dichlorobenzene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
1,3-Dichloropropane	µg/L	<4	<2	<8	<20	<20	<4	<4	<4
1,4-Dichlorobenzene	µg/L	<5	<2.5	<10	<25	<25	<5	<5	<5
1-Chlorohexane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
2,2-Dichloropropane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
2-Chlorotoluene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
2-Hexanone	µg/L	<100	<50	<200	<500	<500	<100	<100	<100
4-Chlorotoluene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Acetone	µg/L	748	179	578 J	1580	1510	547	536	475 J
Benzene	µg/L	<4	<2	<8	<20	<20	<4	<4	<4
Bromobenzene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Bromochloromethane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Bromodichloromethane	µg/L	<5	<2.5	<10	<25	<25	<5	<5	<5
Bromoform	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Bromomethane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Carbon disulfide	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Carbon tetrachloride	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Chlorobenzene	µg/L	<5	<2.5	<10	<25	<25	<5	<5	<5
Chloroethane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Chloroform	µg/L	<3	8.52	<6	<15	<15	<3	<3	<3
Chloromethane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
cis-1,2-Dichloroethene	µg/L	<10	53.4	19.8 J	<50	<50	<10	15.1	34.2
cis-1,3-Dichloropropene	µg/L	<5	<2.5	<10	<25	<25	<5	<5	<5
Dibromochloromethane	µg/L	<5	<2.5	<10	<25	<25	<5	<5	<5
Dibromomethane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Dichlorodifluoromethane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Ethylbenzene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Hexachlorobutadiene	µg/L	<6	<3	<12	<30	<30	<6	<6	<6
Isopropylbenzene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
m-,p-Xylene	µg/L	<20	<10	<40	<100	<100	<20	<20	<20
MEK (2-Butanone)	µg/L	2370	795	3650	5330	5200	1330	2710	2790
Methyl t-butyl ether (MTBE)	µg/L	<50	<25	<100	<250	<250	<50	<50	<50
Methylene chloride	µg/L	<10	6.72	<20	<50	<50	<10	<10	<10
MIBK (methyl isobutyl ketone)	µg/L	<100	<50	<200	<500	<500	<100	<100	<100
Naphthalene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
n-Butylbenzene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
n-Propylbenzene	µg/L	2.45 J	2.24 J	<20	<50	<50	6.74 J	<10	1.65 J
o-Xylene	µg/L	<10	1.27 J	<20	<50	<50	4.4 J	<10	<10
p-Isopropyltoluene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
sec-Butylbenzene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Styrene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
tert-Butylbenzene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Tetrachloroethene	µg/L	<10	4.73 J	<20	<50	<50	<10	<10	<10
Toluene	µg/L	<10	<5	<20	<50	<50	3.6 J	<10	<10
trans-1,2-Dichloroethene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
trans-1,3-Dichloropropene	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Trichloroethene	µg/L	<10	1.47 J	<20	<50	<50	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<5	<20	<50	<50	<10	<10	<10
Vinyl chloride	µg/L	<10	<5	<20	<50	<50	<10	<10	<10

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-5-2
VOC ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	IW92-07 L13110511-03 11/7/2013 TTA-2	IW92-08 L13110487-01 11/6/2013 TTA-2	MW-113 L13110486-03 11/6/2013 TTA-2	MW-85 L13110487-05 11/6/2013 TTA-2	PMW85-01 L13110487-06 11/5/2013 TTA-2	PMW85-05 L13110486-02 11/6/2013 TTA-2	PMW92-03 L13110487-07 11/6/2013 TTA-2	PMW92-03-DUP L13110487-02 11/6/2013 TTA-2
1,1,1,2-Tetrachloroethane	µg/L	<5	<10	<5	<0.5	<2.5	<0.5	<2.5	<5
1,1,1-Trichloroethane	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
1,1,2,2-Tetrachloroethane	µg/L	<5	<10	<5	<0.5	<2.5	<0.5	<2.5	<5
1,1,2-Trichloroethane	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
1,1-Dichloroethane	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
1,1-Dichloroethene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
1,1-Dichloropropene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
1,2,3-Trichlorobenzene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
1,2,3-Trichloropropane	µg/L	<10	<20	<10	4.22	<5	51.2	<5	<10
1,2,4-Trichlorobenzene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
1,2,4-Trimethylbenzene	µg/L	6.78 J	<20	<10	<1	<5	<1	15.7	16.9
1,2-Dibromo-3-chloropropane	µg/L	<20	<40	<20	<2	<10	<2	<10	<20
1,2-Dibromoethane	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
1,2-Dichlorobenzene	µg/L	<10	<20	<10	<1	<5	0.292 J	<5	<10
1,2-Dichloroethane	µg/L	<5	<10	<5	<0.5	<2.5	0.585	<2.5	<5
1,2-Dichloropropane	µg/L	<10	<20	<10	1.07	1.05 J	0.597 J	<5	<10
1,3,5-Trimethylbenzene	µg/L	<10	<20	<10	<1	<5	<1	4.02 J	4.81 J
1,3-Dichlorobenzene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
1,3-Dichloropropane	µg/L	<4	<8	<4	0.669	<2	<0.4	<2	<4
1,4-Dichlorobenzene	µg/L	<5	<10	<5	<0.5	<2.5	<0.5	<2.5	<5
1-Chlorohexane	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
2,2-Dichloropropane	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
2-Chlorotoluene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
2-Hexanone	µg/L	<100	<200	<100	<10	<50	<10	<50	<100
4-Chlorotoluene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Acetone	µg/L	813	1510	220 B	26 J	925 J	<10	662 J	472 J
Benzene	µg/L	<4	<8	<4	<0.4	<2	0.145 J	<2	<4
Bromobenzene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Bromochloromethane	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Bromodichloromethane	µg/L	<5	<10	<5	<0.5	<2.5	<0.5	<2.5	<5
Bromoform	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Bromomethane	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Carbon disulfide	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Carbon tetrachloride	µg/L	<10	<20	<10	1.32	<5	75.3	<5	<10
Chlorobenzene	µg/L	<5	<10	<5	0.13 J	<2.5	0.24 J	<2.5	<5
Chloroethane	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Chloroform	µg/L	<3	<6	<3	5.51	<1.5	34.3	<1.5	<3
Chloromethane	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
cis-1,2-Dichloroethene	µg/L	42.6	56.2	88.1	63.3	22.6	66.1	54.4	54.6
cis-1,3-Dichloropropene	µg/L	<5	<10	<5	<0.5	<2.5	<0.5	<2.5	<5
Dibromochloromethane	µg/L	<5	<10	<5	<0.5	<2.5	<0.5	<2.5	<5
Dibromomethane	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Dichlorodifluoromethane	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Ethylbenzene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Hexachlorobutadiene	µg/L	<6	<12	<6	<0.6	<3	<0.6	<3	<6
Isopropylbenzene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
m-,p-Xylene	µg/L	<20	<40	<20	<2	<10	<2	<10	<20
MEK (2-Butanone)	µg/L	3210	2720	1570	36.1	1310	<10	330 J	227 J
Methyl t-butyl ether (MTBE)	µg/L	<50	<100	<50	<5	<25	<5	<25	<50
Methylene chloride	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
MIBK (methyl isobutyl ketone)	µg/L	<100	<200	<100	<10	<50	<10	<50	<100
Naphthalene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
n-Butylbenzene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
n-Propylbenzene	µg/L	<10	<20	<10	<1	<5	<1	2.1 J	2.55 J
o-Xylene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
p-Isopropyltoluene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
sec-Butylbenzene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Styrene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
tert-Butylbenzene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Tetrachloroethene	µg/L	<10	<20	11.3	2.98	<5	97.8	12.8	13.5
Toluene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
trans-1,2-Dichloroethene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
trans-1,3-Dichloropropene	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Trichloroethene	µg/L	<10	<20	3.09 J	0.744 J	<5	28.4	<5	<10
Trichlorofluoromethane	µg/L	<10	<20	<10	<1	<5	<1	<5	<10
Vinyl chloride	µg/L	<10	<20	<10	<1	<5	<1	<5	<10

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-5-2
VOC ANALYTICAL RESULTS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Location Lab ID Date Area Units	MW-197A L13110512-03 11/7/2013 West-Central	MW-197B L13110512-06 11/7/2013 West-Central	MW-203A L13110512-07 11/7/2013 West-Central	MW-203B L13110512-08 11/7/2013 West-Central	MW-62 L13110792-29 11/11/2013 Bldg 835	MW-212 L13110792-30 11/11/2013 Bldg 835	MW-212-DUP6 L13110792-32 11/11/2013 Bldg 835	MW-213 L13110792-31 11/11/2013 Bldg 835
		West-Central	West-Central	West-Central	West-Central	Bldg 835	Bldg 835	Bldg 835	Bldg 835
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<2.5
1,1,1-Trichloroethane	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5 UJ	<0.5 UJ	<2.5 UJ
1,1,2-Trichloroethane	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
1,1-Dichloroethane	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
1,1-Dichloroethene	µg/L	<1	<1	<5	<1	0.919 J	<1	<1	<5
1,1-Dichloropropene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
1,2,3-Trichlorobenzene	µg/L	<1	<1	<5	<1	<1	<1 UJ	<1 UJ	<5 UJ
1,2,3-Trichloropropane	µg/L	<1	<1	<5	<1	<1	<1 UJ	<1 UJ	<5 UJ
1,2,4-Trichlorobenzene	µg/L	<1	<1	<5	<1	<1	0.291 J	0.283 J	<5 UJ
1,2,4-Trimethylbenzene	µg/L	<1	<1	2.21 J	1.9	0.643 J	<1	<1	1.83 J
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<10	<2	<2	<2 UJ	<2 UJ	<10 UJ
1,2-Dibromoethane	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
1,2-Dichlorobenzene	µg/L	<1	<1	<5	<1	<1	0.601 B	0.477 B	2.43 B
1,2-Dichloroethane	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<2.5
1,2-Dichloropropane	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
1,3,5-Trimethylbenzene	µg/L	<1	<1	<5	0.551 J	<1	<1	<1	<5
1,3-Dichlorobenzene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
1,3-Dichloropropane	µg/L	<0.4	<0.4	<2	<0.4	<0.4	<0.4	<0.4	<2
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	0.451 B	0.349 B	1.61 B
1-Chlorohexane	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
2,2-Dichloropropane	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
2-Chlorotoluene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
2-Hexanone	µg/L	<10	<10	<50	<10	<10	<10 UJ	<10 UJ	<50 UJ
4-Chlorotoluene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
Acetone	µg/L	<10	<10	312	56.7	58.1 B	<10 UJ	<10 UJ	90.7 JB
Benzene	µg/L	<0.4	<0.4	<2	<0.4	<0.4	<0.4	<0.4	<2
Bromobenzene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
Bromochloromethane	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
Bromodichloromethane	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<2.5
Bromoform	µg/L	<1	<1	<5	<1	<1	<1 UJ	<1 UJ	<5 UJ
Bromomethane	µg/L	<1	<1	<5	<1	<1 UJ	<1 UJ	<1 UJ	<5 UJ
Carbon disulfide	µg/L	<1	<1	<5	0.694 J	<1	<1	<1	<5
Carbon tetrachloride	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
Chlorobenzene	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<2.5
Chloroethane	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
Chloroform	µg/L	<0.3	<0.3	<1.5	<0.3	0.287 J	<0.3	<0.3	<1.5
Chloromethane	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
cis-1,2-Dichloroethene	µg/L	0.736 J	8.41	13.4	11	106	<1	<1	4.79 J
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<2.5
Dibromochloromethane	µg/L	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<2.5
Dibromomethane	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
Dichlorodifluoromethane	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
Ethylbenzene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
Hexachlorobutadiene	µg/L	<0.6	<0.6	<3	<0.6	<0.6	<0.6	<0.6	<3
Isopropylbenzene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
m,p-Xylene	µg/L	<2	<2	<10	<2	<2	<2	<2	<10
MEK (2-Butanone)	µg/L	<10	<10	1470	102	180	<10 UJ	<10 UJ	342 J
Methyl t-butyl ether (MTBE)	µg/L	<5	2.77 J	<25	2.04 J	<5	<5	<5	<25
Methylene chloride	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<50	<10	<10	<10 UJ	<10 UJ	<50 UJ
Naphthalene	µg/L	<1	<1	<5	<1	<1	<1 UJ	<1 UJ	<5 UJ
n-Butylbenzene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
n-Propylbenzene	µg/L	<1	<1	<5	0.328 J	<1	<1	<1	<5
o-Xylene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
p-Isopropyltoluene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
sec-Butylbenzene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
Styrene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
tert-Butylbenzene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
Tetrachloroethene	µg/L	20.9	16.4	7.94	3.4	<1	<1	<1	<5
Toluene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
trans-1,2-Dichloroethene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
trans-1,3-Dichloropropene	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
Trichloroethene	µg/L	1.26	10.1	<5	2.27	24.1	9.35	8.6	13.7
Trichlorofluoromethane	µg/L	<1	<1	<5	<1	<1	<1	<1	<5
Vinyl chloride	µg/L	<1	2.06	<5	2.26	<1	<1	<1	<5

Notes:
µg/L: micrograms per liter
RL: Reporting Limit
<: Not detected above RL

DQE FLAGS:
J: Estimated concentration
B: Blank Contamination
UJ: Estimated-Non-Detect
JB: Estimated- blank contamination

TABLE B-5-3
 GEOCHEMICAL ANALYTICAL RESULTS, RINSE BLANKS, EBT-14
 YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
 Main Installation - Defense Depot Memphis, Tennessee

	Sample ID	RB1-EBT-14	RB2-EBT-14	RB3-EBT-14
	Lab ID	L13110633-16	L13110792-07	L13110792-20
	Date	11/8/2013	11/9/2013	11/10/2013
Analyte	Units	L13110633-16	L13110792-07	L13110792-20
Total Organic Carbon	mg/L	0.668 J	0.643 J	0.684 J
Acetic Acid	mg/L	<1	<1	<1
Butyric Acid	mg/L	<1	<1	<1
Lactic Acid	mg/L	<1	<1	<1
Propionic Acid	mg/L	<10	<10	<10
Pyruvic Acid	mg/L	<0.1	<0.1	<0.1
Carbon Dioxide	µg/L	<10000	<10000	<10000
Ethane	µg/L	<5	<5	<5
Ethene	µg/L	<5	<5	<5
Methane	µg/L	2.9 JB	3.1 JB	3.2 JB

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

JB: Estimated- blank contamination

TABLE B-5-4
VOC ANALYTICAL RESULTS, TRIP AND RINSE BLANKS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Sample ID Lab ID Date Units	TB-110613-EBT-14	TB-111813-EBT-14	TB-111113-EBT-14	TB-111213-EBT-14	TB-111313-EBT-14
		L13110486-04	L13110511-05	L13110633-17	L13110792-12	L13110792-25
		11/6/2013	11/7/2013	11/8/2013	11/9/2013	11/10/2013
		L13110486-04	L13110511-05	L13110633-17	L13110792-12	L13110792-25
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-Dichloropropene	µg/L	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	µg/L	<1	<1	<1 UJ	<1	<1
1,2,3-Trichloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	µg/L	<2	<2	<2	<2	<2
1,2-Dibromoethane	µg/L	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	µg/L	<1	<1	<1	<1	<1
2,2-Dichloropropane	µg/L	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
2-Hexanone	µg/L	<10	<10	<10	<10	<10
4-Chlorotoluene	µg/L	<1	<1	<1	<1	<1
Acetone	µg/L	2.55 J	2.66 J	3.58 JB	<10	2.95 J
Benzene	µg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L	<1	<1	<1	<1	<1
Bromomethane	µg/L	<1	<1	<1	<1	<1 UJ
Carbon disulfide	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	µg/L	<1	0.703 J	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	<1	<1	<1	<1	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
m-,p-Xylene	µg/L	<2	<2	<2	<2	<2
MEK (2-Butanone)	µg/L	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<1	0.367 JB	0.386 J	0.47 J	0.555 J
MIBK (methyl isobutyl ketone)	µg/L	<10	<10	<10	<10	<10
Naphthalene	µg/L	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	<1	<1	<1	<1	<1
n-Propylbenzene	µg/L	<1	<1	<1	<1	<1
o-Xylene	µg/L	<1	<1	<1	<1	<1
p-Isopropyltoluene	µg/L	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Styrene	µg/L	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Trichlorofluoromethane	µg/L	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

TABLE B-5-4
VOC ANALYTICAL RESULTS, TRIP AND RINSE BLANKS, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Analyte	Sample ID	TB-111413-EBT-14	RB1-EBT-14	RB2-EBT-14	RB3-EBT-14
	Lab ID	L13110792-34	L13110633-16	L13110792-07	L13110792-20
	Date	11/11/2013	11/8/2013	11/9/2013	11/10/2013
Units		L13110792-34	L13110633-16	L13110792-07	L13110792-20
1,1,1,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5 UJ	<0.5
1,1,1-Trichloroethane	µg/L	<1	<1	<1 UJ	<1
1,1,2,2-Tetrachloroethane	µg/L	<0.5 UJ	<0.5	<0.5 UJ	<0.5
1,1,2-Trichloroethane	µg/L	<1	<1	<1 UJ	<1
1,1-Dichloroethane	µg/L	<1	<1	<1 UJ	<1
1,1-Dichloroethene	µg/L	<1	<1	<1 UJ	<1
1,1-Dichloropropene	µg/L	<1	<1	<1 UJ	<1
1,2,3-Trichlorobenzene	µg/L	<1 UJ	<1	<1 UJ	<1
1,2,3-Trichloropropane	µg/L	<1 UJ	<1	<1 UJ	<1
1,2,4-Trichlorobenzene	µg/L	0.296 J	<1	<1 UJ	<1
1,2,4-Trimethylbenzene	µg/L	<1	<1	<1 UJ	<1
1,2-Dibromo-3-chloropropane	µg/L	<2 UJ	<2	<2 UJ	<2
1,2-Dibromoethane	µg/L	<1	<1	<1 UJ	<1
1,2-Dichlorobenzene	µg/L	0.668 B	<1	<1 UJ	<1
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5 UJ	<0.5
1,2-Dichloropropane	µg/L	<1	<1	<1 UJ	<1
1,3,5-Trimethylbenzene	µg/L	<1	<1	<1 UJ	<1
1,3-Dichlorobenzene	µg/L	<1	<1	<1 UJ	<1
1,3-Dichloropropane	µg/L	<0.4	<0.4	<0.4 UJ	<0.4
1,4-Dichlorobenzene	µg/L	0.487 B	<0.5	<0.5 UJ	<0.5
1-Chlorohexane	µg/L	<1	<1	<1 UJ	<1
2,2-Dichloropropane	µg/L	<1	<1	<1 UJ	<1
2-Chlorotoluene	µg/L	<1	<1	<1 UJ	<1
2-Hexanone	µg/L	<10 UJ	<10	<10 UJ	<10
4-Chlorotoluene	µg/L	<1	<1	<1 UJ	<1
Acetone	µg/L	<10 UJ	37.2	34.3 J	33.1
Benzene	µg/L	<0.4	<0.4	<0.4 UJ	<0.4
Bromobenzene	µg/L	<1	<1	<1 UJ	<1
Bromochloromethane	µg/L	<1	<1	<1 UJ	<1
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5 UJ	<0.5
Bromoform	µg/L	<1 UJ	<1	<1 UJ	<1
Bromomethane	µg/L	<1 UJ	<1	<1 UJ	<1 UJ
Carbon disulfide	µg/L	<1	<1	<1 UJ	<1
Carbon tetrachloride	µg/L	<1	<1	<1 UJ	<1
Chlorobenzene	µg/L	<0.5	<0.5	<0.5 UJ	<0.5
Chloroethane	µg/L	<1	<1	<1 UJ	<1
Chloroform	µg/L	<0.3	<0.3	<0.3 UJ	<0.3
Chloromethane	µg/L	<1	<1	<1 UJ	<1
cis-1,2-Dichloroethene	µg/L	<1	<1	<1 UJ	<1
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5 UJ	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5 UJ	<0.5
Dibromomethane	µg/L	<1	<1	<1 UJ	<1
Dichlorodifluoromethane	µg/L	<1	<1	<1 UJ	<1
Ethylbenzene	µg/L	<1	<1	<1 UJ	<1
Hexachlorobutadiene	µg/L	<0.6	<0.6	<0.6 UJ	<0.6
Isopropylbenzene	µg/L	<1	<1	<1 UJ	<1
m-,p-Xylene	µg/L	<2	<2	<2 UJ	<2
MEK (2-Butanone)	µg/L	<10 UJ	2.88 J	<10 UJ	2.66 J
Methyl t-butyl ether (MTBE)	µg/L	<5	<5	<5 UJ	<5
Methylene chloride	µg/L	<1	0.464 J	0.426 J	0.446 J
MIBK (methyl isobutyl ketone)	µg/L	<10 UJ	<10	<10 UJ	<10
Naphthalene	µg/L	<1 UJ	0.471 J	0.373 J	0.517 J
n-Butylbenzene	µg/L	<1	<1	<1 UJ	<1
n-Propylbenzene	µg/L	<1	<1	<1 UJ	<1
o-Xylene	µg/L	<1	<1	<1 UJ	<1
p-Isopropyltoluene	µg/L	<1	<1	<1 UJ	<1
sec-Butylbenzene	µg/L	<1	<1	<1 UJ	<1
Styrene	µg/L	<1	<1	<1 UJ	<1
tert-Butylbenzene	µg/L	<1	<1	<1 UJ	<1
Tetrachloroethene	µg/L	<1	<1	<1 UJ	<1
Toluene	µg/L	<1	<1	<1 UJ	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1 UJ	<1
trans-1,3-Dichloropropene	µg/L	<1	<1	<1 UJ	<1
Trichloroethene	µg/L	<1	<1	<1 UJ	<1
Trichlorofluoromethane	µg/L	<1	<1	<1 UJ	<1
Vinyl chloride	µg/L	<1	<1	<1 UJ	<1

Notes:

µg/L: micrograms per liter

RL: Reporting Limit

<: Not detected above RL

DQE FLAGS:

J: Estimated concentration

B: Blank Contamination

UJ: Estimated-Non-Detect

JB: Estimated- blank contamination

APPENDIX C
DATA QUALITY EVALUATION

DATA QUALITY EVALUATION

EBT activities were conducted by HDR during five sample events in 2011 and 2013. For EBT-10 in December 2011, samples were collected and analyzed for VOCs only. For the quarterly events (EBT-11 in February 2013, EBT-12 in May 2013, EBT-13 in August 2013 and EBT-14 in November 2013), samples were collected and analyzed for volatile organic compounds (VOCs), total organic carbon (TOC), metabolic fatty acids (MFAs) and dissolved gases. For EBT-10, wells were selected for sampling in accordance with the *Work Plan for Partial Abandonment of the EBT System, Main Installation* (HDR, October 2011). For the quarterly events, wells were selected for sampling accordance with the *Remedial Action Work Plan Addendum, Main Installation* (HDR 2012a). Groundwater samples were submitted to Microbac Laboratories in Marietta, Ohio for analysis.

Field activities and laboratory analyses were performed in accordance with the *Remedial Action Sampling and Analysis Plan, Rev. 1* (RA SAP) (MACTEC 2005) and *Remedial Action Operations and Long Term Monitoring Quality Assurance Project Plan, Rev. 0* (QAPP) (HDR 2011c). The QAPP is consistent with the RA SAP but has not received final approval.

The data quality evaluation (DQE) process involves assessment of all field and laboratory procedures, including data validation, in accordance with the RA SAP/QAPP, completed by Diane Short and Associates, Inc (DSA). The data validation reports are included in this appendix. This assessment is designed to evaluate problems with the quality assurance (QA)/quality control (QC) associated with the laboratory data and potential impact to the data quality objectives (DQOs). The DQE findings are summarized in the following sections.

FIELD ACTIVITIES AND FIELD QUALITY CONTROL

The EBT field effort included the collection of groundwater samples from designated wells during the baseline event in December 2011 and the quarterly events in February, May, August and November 2013. The EBT well locations are shown on Figures 2 and 4 to 7 of the report.

Field QC samples were collected at selected wells to evaluate sampling technique and decontamination procedures. These samples included field duplicates, trip blanks and field equipment (rinsate) blanks. Additional samples were collected at selected locations for matrix spike/matrix spike duplicate (MS/MSD) analyses in the laboratory. Sample bottles met U.S. Environmental Protection Agency (USEPA) requirements for environmentally clean containers. Sample labels were pre-printed to facilitate sample tracking from the field through the laboratory. Documentation of the sampling was performed in the field to ensure that the samples collected, sample labels, chain-of-custody (COC) records, which were

generated electronically using a personal digital assistant (PDA) supplied by the laboratory, and request for analysis were consistent. Where necessary, additional COC forms were filled out manually. Custody seals were placed on each sample cooler prior to shipment by common carrier.

ANALYTICAL METHODS

The groundwater samples for EBT-10 were analyzed for Target Compound List (TCL) VOCs by method SW 8260B; the groundwater samples for EBT-11 to EBT-14 were analyzed for TOC by method 415.1, dissolved gases (methane, ethane, ethane and carbon dioxide) by method RSK-175, MFAs by Microbac Labs standard operating procedure (SOP) 830-MBA and TCL VOCs by method SW 8260B.

LABORATORY QUALITY CONTROL

The laboratory QC program, including sample handling, laboratory control, and reporting, is documented in the RA SAP. Sample handling includes documentation of sample receipt, placement in storage, lab personnel using the sample, and disposal. The laboratory control consists of instrument calibration and maintenance, laboratory control samples (LCS), method blanks and matrix spikes. Reporting of the laboratory control data was planned prior to the collection of the data, allowing the laboratory to place the appropriate information into the data package so that the DQE could be performed in a timely manner.

DQE SUMMARY

The objective of the DQE was to provide a review of the chemical data reports submitted by the laboratory and to assess the data in relation to the DQOs stated in the RA SAP/QAPP. The DQE consisted of review of laboratory QC data and field QC parameters, and flagging of the data as usable, usable with qualification, or unusable in accordance with the DQE standard operating procedures (SOPs) using the criteria stated in the RA SAP/QAPP for each analytical method performed. The following information was reviewed:

- Sample Integrity (Deliverables)
- Sample Completeness
- Sample Holding Times
- Laboratory Methods for Extraction and Analysis (Calibration, Internal Standards)
- Method Accuracy (bias) and Precision (Surrogates, MS/MSD, LCS Recoveries)
- Laboratory Performance Criteria (Blanks, Instrument Performance Checks)

Field QC parameters were evaluated through field duplicates, rinsate blanks, field documentation, and shipping criteria.

The DQE was summarized by use of flags that indicate to the reviewer that the data being considered has been qualified using the established criteria. Sample delivery group (SDG) narratives detailing the evaluation of the laboratory data by DSA are included as attachments in this Appendix. The SDGs and associated groundwater samples are listed on Table C-1.

The following sections provide summary discussions of the required data qualifications for each sampling event. A Level III DQE was performed and the data quality indicators (DQIs), expressed in terms of precision, accuracy, representativeness, comparability, completeness, and sensitivity, were assessed. This included the evaluation of sample integrity, holding times, trip blanks, rinsate blanks, method blanks, internal standards, surrogate recoveries, MS/MSD recoveries, LCSs, and field duplicate precision. The results of the DQI assessment are provided below.

Precision

Field duplicates were collected to assess sampling precision. They consisted of replicate grab samples collected concurrently with the associated field samples. Precision is best expressed in terms of relative percent difference (RPD). . Laboratory precision is discussed in more detail in the attached narratives.

TOC: Field precision goals were generally met for the field duplicate (FD) sample pairs collected during the four EBT sampling events. FD results were outside control limits for three sets of parent/FD samples. All associated data are qualified J or UJ and as such are valid

MFAs: Field precision goals were generally met for the FD sample pairs collected during the four EBT sampling events. Acetic acid, butyric acid and propionic acid results were outside control limits for one set of parent/FD samples. All associated data are qualified J or UJ and as such are valid.

Dissolved Gases: Field precision goals were generally met for the FD sample pairs collected during the four EBT sampling events. Methane was outside control limits for two sets of parent/FD samples and carbon dioxide was outside control limits for one set of parent/FD samples. All associated data are qualified J or UJ and as such are valid.

VOCs: Field precision goals were met for the FD sample pairs collected during the five EBT sampling events. All results were within control limits.

Accuracy

Accuracy or bias was measured through the analyses of LCSs and MS/MSDs. Sample specific accuracy is measured through surrogate recovery. Accuracy is expressed as percent recovery (%R). Further discussion of the LCS and MS/MSD recoveries is provided in the attached DQE narratives.

TOC: All LCS and MS/MSD recoveries were within control limits. Accuracy goals based upon LCS were met.

MFAs: All LCS recoveries were within control limits. MS/MSD recoveries for acetic acid and butyric acid in one sample were above control limits. The MS recovery of pyruvic acid in one sample was below control limits. The MS/MSD recoveries of pyruvic acid and lactic acid in one sample were zero. Accuracy goals based upon LCS were met. Although there were several MS/MSD recoveries outside control limits, except for the two rejected results, all associated data are qualified J or UJ and as such are valid.

Dissolved Gases: All LCS recoveries were within control limits. One MS recovery for methane and one MS recovery for carbon dioxide were above control limits. Although there were MS recoveries above control limits, all associated data are qualified J and as such are valid.

VOCs: Three MTBE results, eight acetone results and one 1,2,3-trichloropropane results were qualified as estimated "J" due to high LCS recoveries. Six results for 1,2,3-trichlorobenzene were qualified as non-detect estimated "UJ" due to a low LCS recovery. One result each for tetrachloroethene, trichloroethene, acetone, cis-1,2-dichloroethene and carbon tetrachloride and two results for 1,2,3-trichloropropane were qualified as estimated "J" due to low matrix spike recoveries. One result for cis-1,2-dichloroethene and one result for 2-butanone (MEK) were qualified as estimated "J" due to high matrix spike recoveries. Although there were LCS and MS recoveries above and below control limits, all associated data are qualified J and as such are valid.

Representativeness

Representativeness refers to the degree sample data accurately and precisely describes the population of samples at a sampling point or under certain environmental conditions. Samples that are not properly preserved or are analyzed beyond holding times may not be considered representative. Review of sampling procedures, laboratory preparation, analysis holding times, trip blank and rinsate blank analysis help in providing this assessment.

TOC, MFAs, dissolved gases and VOCs: Sampling procedures and locations followed the Work Plan and RA SAP/QAPP and were considered representative of the matrix collected. Laboratory preparation and analysis followed method guidelines.

Comparability

The selection of standardized methods and consistent laboratory practices facilitates the comparison of data between sampling events.

TOC: EBT data from the four sampling events are comparable to each other. Consistent methodology has been maintained throughout the EBT sampling events.

MFA: EBT data from the four sampling events are generally comparable to each other. Consistent methodology has been maintained throughout the EBT sampling events. The laboratory consistently noted matrix issues that made sample preparation and analysis difficult. A number of results for pyruvic acid and lactic acid, the earliest eluters, have been qualified as estimated “J” or non-detect estimated “UJ” due to the presence of a large interfering peak on the chromatogram that could mask response to these acids. As the purpose of the analysis for MFAs is to confirm distribution of the injected lactate mixture throughout the treatment area, the presence of the other MFAs also serve as indicators of the distribution of the lactate product.

Dissolved Gases: EBT data from the four sampling events are generally comparable to each other. Consistent methodology has been maintained throughout the EBT sampling events, although carbon dioxide was added as an analyte after the EBT-11 sampling event.

VOCs: EBT data from the four sampling events are comparable to each other. Consistent methodology has been maintained throughout the EBT sampling events.

Completeness

Completeness is determined for both field and analytical objectives. Field completeness is calculated from the number of samples proposed versus the actual number of samples collected. Analytical completeness is expressed in terms of usable data. The project completeness goal for DDMT is 90% as stated in the RA SAP/QAPP.

TOC: Data from the four EBT events in 2013 were 100% complete and therefore met the completeness DQO.

MFAs: Data from the four EBT events in 2013 were essentially 100% complete and therefore met the completeness DQO. One result for lactic acid and one result for pyruvic acid were rejected due to no recovery in the MS/MSD. A total of 231 samples were analyzed, so the completeness for these two analytes was 99.6%. Data from the other MFAs was 100% complete.

Dissolved Gases: Data from the four EBT events in 2013 were 100% complete and therefore met the completeness DQO.

VOCs: Data from the five EBT events in 2011-2013 were 100% complete and therefore met the completeness DQO.

Sensitivity

Analytical sensitivity is the concentration at which the measurement system can quantitate target analytes in the environmental matrices of concern. Analytical sensitivity is expressed in terms of the RL, which is provided by the respective laboratories as their reasonable and defensible quantitation limit for environmental samples above the method detection limit (MDL), which is established by each laboratory using pure water or clean matrix.

TOC: There are no screening levels listed in the QAPP. A number of samples required dilution due to high concentrations of TOC.

MFAs: There are no screening levels listed in the QAPP. A number of samples required dilution due to high concentrations of MFAs. Some non-detect results were reported from diluted analyses with raised RLs. In some of these samples with raised RLs, there were other analytes present in the sample at high concentrations. In some of the samples with raised RLs, the sample required dilution due to the matrix, resulting in samples reported as non-detect with all analytes having raised RLs.

Dissolved Gases: There are no screening levels listed in the QAPP. A number of samples required dilution due to high concentrations of dissolved gases. Some non-detect results were reported from diluted analyses with raised RLs, but generally there were other analytes present in the sample at high concentrations.

VOCs: The analytical method RLs and MDLs were compared to groundwater protection standards as listed in the RA SAP/QAPP and were determined to meet the overall project objectives. (The MDLs for six VOCs [1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,2-dichloroethane, bromodichloromethane, carbon tetrachloride, and dibromochloromethane] were above the standards; however, as noted in the QAPP, ... “MDLs for these VOC ... compounds are higher than their corresponding screening levels because current VOC ... analytical method technology can not achieve MDLs lower than those listed.”)

The following sections discuss only those deficiencies encountered during the evaluation that resulted in qualified and/or unusable data.

EBT-10 Baseline Event – December 2011

Groundwater samples were collected from 73 wells for the EBT-10 event in December 2011. A total of 100 water samples including 73 groundwater field samples and 27 QA/QC samples (field duplicates, MS/MSD, trip blanks and rinsate blanks) were collected.

VOCs: Samples were analyzed for TCL VOCs. The data are usable with qualifications as described below:

- Eight non-detect results for 1,2-dibromo-3-chloropropane (DBCP) and 12 non-detect results for 2-butanone (MEK) were qualified as non-detect estimated “UJ” due to low responses in continuing calibration analyses.
- Ten detected results for methyl tert-butyl ether (MTBE) were qualified as estimated “J” due to high responses in second source standard analyses.
- Three MTBE results, two acetone results and one 1,2,3-trichloropropane results were qualified as estimated “J” due to recoveries above the control limits in the laboratory control samples (LCSs).
- Results for tetrachloroethene in PMW101-05A-EBT-10, trichloroethene in IW21-04A-EBT-10, acetone in IW101-03A-EBT-10 and cis-1,2-dichloroethene in IW21-04A-EBT-10 were qualified as estimated “J” due to low matrix spike recoveries.
- A total of 145 results were qualified as estimated “J” because they were between the method detection limit (MDL) and reporting limit (RL).

EBT-11 Quarterly Event – February 2013

Groundwater samples were collected from 58 wells for the EBT-11 event in February 2013. A total of 80 water samples including 58 field samples and 22 QA/QC samples (field duplicates, MS/MSD, trip blanks and rinsate blanks) were collected.

TOC: Samples were analyzed for TOC. The data are usable with qualifications as described below:

- Two results were qualified “B” due to TOC detected in the method blank.
- Three samples were qualified as estimated “J” because they were between the MDL and RL.

- TOC results in IW21-03B-EBT-11, IW92-03-EBT-11 and their field duplicates were qualified as estimated “J” due to RPDs above control limits.

MFAs: Samples were analyzed for acetic acid, butyric acid, lactic acid, propionic acid and pyruvic acid.

The data are usable with qualifications as described below:

- Acetic acid and butyric acid results in IW101-03A-EBT-11 were qualified as estimated “J” due to high matrix spike recoveries.
- Acetic acid, butyric acid and propionic acid results in IW21-03B-EBT-11 and its associated field duplicate sample were qualified as estimated “J” due to field duplicate RPDs above the control limit.
- Forty-nine results for pyruvic acid were qualified as estimated “J” or non-detect estimated “UJ” due to an interfering peak at the beginning of the chromatogram that could possibly mask the pyruvic acid peak.
- Ten results (three for propionic acid, three for lactic acid, two for pyruvic acid, one for acetic acid and one for butyric acid) were qualified as estimated “J” because they were between the MDL and RL.

Dissolved Gases: Samples were analyzed for methane, ethane and ethene. The data are usable with qualifications as described below:

- Methane results in PMW21-01-EBT-11 and its field duplicate were qualified as estimated “J” due to an RPD above control limits.
- Seven ethane results and one methane result were qualified as estimated “J” because they were between the MDL and RL.
- Methane in IW92-01-EBT-11 was qualified as estimated “J” due to an MS recovery above the control limits.

VOCs: Samples were analyzed for TCL VOCs. The data are usable with qualifications as described below:

- Eight results for acetone were qualified “B” due to acetone detected in the rinsate blanks.
- A total of 99 results were qualified as estimated “J” because they were between the MDL and RL.

EBT-12 Quarterly Event – May 2013

Groundwater samples were collected from 57 wells for the EBT-12 event in May 2013. A total of 79 water samples were collected including 57 field samples and 22 QA/QC samples(field duplicates, MS/MSD, trip blanks and rinsate blanks).

TOC: Samples were analyzed for TOC. The data are usable with qualifications as described below:

- TOC in IW92-07-EBT-12 and its field duplicate was qualified as estimated “J” due to an RPD above control limits.
- TOC results in two samples were qualified “B” due to TOC detected in the method blanks.
- TOC results in four samples were qualified as estimated “J” due to pH values out of control limits that were not adjusted by the lab upon sample receipt.
- TOC results in four samples were qualified as estimated “J” because they were between the MDL and RL.

MFAs: Samples were analyzed for acetic acid, butyric acid, lactic acid, propionic acid and pyruvic acid. The data are usable with qualifications as described below:

- Fifty-nine results in 13 samples were qualified as estimated “J” or non-detect estimated “UJ” because the samples were analyzed 1.5 to four days past the holding time due to the need for dilution analyses.
- Sixty-nine results (32 for pyruvic acid, 32 for lactic acid, three for propionic acid, one for acetic acid and one for butyric acid) were qualified as estimated “J” or non-detect estimated “UJ” due to an interfering peak at the beginning of the chromatogram that could possibly mask the analyte peaks.
- Five results (three for lactic acid and two for pyruvic acid) were qualified as estimated “J” because they were between the MDL and RL.

Dissolved Gases: Samples were analyzed for methane, ethane, ethene and carbon dioxide. The data are usable with qualifications as described below:

- Seven methane results were qualified “B” due to methane detected in the method blanks.
- One methane result was qualified as estimated “J” because it was reported above the calibration range and a greater dilution was not analyzed.

- Two ethene results, seven methane results and nine carbon dioxide results were qualified as estimated “J” because they were between the MDL and RL.

VOCs: Samples were analyzed for TCL VOCs. The data are usable with qualifications as described below:

- Cis-1,2-dichloroethene in PMW21-02-EBT-12 was qualified as estimated “J” due to an MS recovery above the control limits.
- 1,2,3-Trichloropropane and carbon tetrachloride in PMW85-05-EBT-12 were qualified as estimated “J” due to MS recoveries below the control limits.
- Acetone in MW-213-EBT-12 was qualified as estimated “J” due to acetone detected in the trip blank.
- Acetone in PMW101-07B-EBT-12 was qualified as estimated “J” because the dilution analysis to report acetone was analyzed two days past the holding time.
- Twelve bromomethane results, six bromoform results and two 1,2,3-trichloropropane results were qualified as non-detect estimated “UJ” due to continuing calibration responses below the control limits.
- A total of 102 results were qualified as estimated “J” because they were between the MDL and RL.

EBT-13 Quarterly Event – August 2013

Groundwater samples were collected from 58 wells for the EBT-13 event in August 2013. A total of 81 water samples were collected including 58 field samples and 23 QA/QC samples (field duplicates, MS/MSD, trip blanks and rinsate blanks).

TOC: Samples were analyzed for TOC. The data are usable with qualifications as described below:

- TOC results in PMW21-02-EBT-13 and MW-212-EBT-13 were qualified “B” due to TOC detected in the rinsate blanks.
- TOC results in 10 samples were qualified as estimated “J” due to pH values out of control limits that were not adjustable by the lab upon sample receipt.

MFAs: Samples were analyzed for acetic acid, butyric acid, lactic acid, propionic acid and pyruvic acid. The data are usable with qualifications as described below:

- All 40 results in eight samples were qualified as estimated “J” due to pH values out of control limits that were not adjustable by the lab upon sample receipt.
- Acetic acid in MW-213-EBT-13 was qualified as estimated “J” due to acetic acid detected in the rinsate blank.
- Pyruvic acid in MW-197A-EBT-13 was qualified as non-detect “UJ” due to an MS recovery below control limits.
- Lactic acid and pyruvic acid results in IW101-05A-EBT-13 were rejected “R” due to 0% recovery in the MS/MSD.
- Forty-eight results (23 for lactic acid and 25 for pyruvic acid) were qualified as estimated “J” or non-detect estimated “UJ” due to an interfering peak at the beginning of the chromatogram that could possibly mask the analyte peaks.
- Fourteen results (three for acetic acid, four for butyric acid, five for lactic acid, one for propionic acid and one for pyruvic acid) were qualified as estimated “J” because they were between the MDL and RL.

Dissolved Gases: Samples were analyzed for methane, ethane, ethene and carbon dioxide. The data are usable with qualifications as described below:

- Methane results in seven samples were qualified “B” due to methane detected in the method blanks.
- Four methane results and five ethane results were qualified as estimated “J” because they were between the MDL and RL.

VOCs: Samples were analyzed for TCL VOCs. The data are usable with qualifications as described below:

- All results in IW21-03A-EBT-13 were qualified as estimated “J” or non-detect estimated “UJ” because the sample was analyzed four days past the holding time.
- Naphthalene results in six samples were qualified as estimated “J” due to continuing calibration responses above the control limits.
- Six results for 1,2,3-trichlorobenzene were qualified as non-detect estimated “UJ” due to a low LCS recovery.

- The result for 2-butanone (MEK) in IW101-05A-EBT-13 was qualified as estimated “J” due to high MS/MSD recoveries.
- The result for 1,2,3-trichlorobenzene in MW-197A-EBT-13 was qualified as non-detect estimated “UJ” due to a low MS recovery.
- Bromomethane in IW85-06-EBT-13 was qualified as estimated “J” due to bromomethane detected in the method blank.
- Acetone in IW85-06-EBT-13 and IW101-04A-EBT-13 was qualified as estimated “J” due to acetone detected in the rinsate blank.
- Methylene chloride in four samples was qualified as estimated “J” due to methylene chloride detected in the trip blanks.
- A total of 118 results were qualified as estimated “J” because they were between the MDL and RL.

EBT-14 Quarterly Event – November 2013

Groundwater samples were collected from 58 wells for the EBT-14 event in November 2013. A total of 79 water samples including 58 field samples and 21 QA/QC samples (field duplicates, MS/MSD, trip blanks and rinsate blanks) were collected.

TOC: Samples were analyzed for TOC. The data are usable with qualifications as described below:

- TOC results in 16 samples were qualified as estimated “J” due to pH values out of control limits that were not adjustable by the lab upon sample receipt.
- TOC results in three samples were qualified “B” due to TOC detected in the rinsate blank.
- TOC in MW-85-EBT-14 was qualified as estimated “J” due to a continuing calibration result above control limits.
- TOC results in PMW21-02-EBT-13 and MW-212-EBT-13 were qualified “B” due to TOC detected in the rinsate blanks.

MFAs: Samples were analyzed for acetic acid, butyric acid, lactic acid, propionic acid and pyruvic acid.. The data are usable with qualifications as described below:

- Seventy-nine results (37 for lactic acid, four for propionic acid and 38 for pyruvic acid) were qualified as estimated “J” or non-detect estimated “UJ” due to an interfering peak at the beginning of the chromatogram that could possibly mask the analyte peaks.
- All results in 13 samples were qualified as estimated “J” or non-detect estimated “UJ” due to pH values out of control limits that were not adjustable by the lab upon sample receipt.
- Eleven results (four for lactic acid, two for acetic acid, two for butyric acid, two for propionic acid and one for pyruvic acid) were qualified as estimated “J” because they were reported between the MDL and RL.

Dissolved Gases: Samples were analyzed for methane, ethane, ethene and carbon dioxide. The data are usable with qualifications as described below:

- The carbon dioxide result in MW-197A-EBT-14 was qualified as estimated “J” due to an MS recovery above the control limits.
- The results for methane and carbon dioxide results in PMW92-03-EBT-14 and its field duplicate sample were qualified as estimated “J” due to RPDs above the control limits.
- The methane result in PMW101-04B-EBT-14 was qualified as estimated “J” because it was reported above the calibration range and a greater dilution was not analyzed.
- Five methane results were qualified “B” due to methane detected in the method blanks.
- Twenty carbon dioxide results, three methane results and six ethene results were qualified as estimated “J” because they were between the MDL and RL.

VOCs: Samples were analyzed for TCL VOCs. The data are usable with qualifications as described below:

- Eighty-two results were qualified as estimated “J” or non-detect estimated “UJ” due to continuing calibration responses below the control limits.
- Six results for acetone were qualified as estimated “J” due to a high LCS recovery.
- Acetone in 23 samples and 2-butanone (MEK) in three samples were qualified “B” due to acetone or MEK detected in the trip blanks.
- Acetone in nine samples was qualified as estimated “B” due to acetone detected in the rinsate blanks.

- The result for 2-butanone (MEK) in IW21-04B-EBT-14 was qualified “B” due to MEK detected in the rinsate blank.
- Methylene chloride in four samples was qualified “B” due to methylene chloride detected in the trip blanks.
- One methylene chloride result, four 1,2-dichlorobenzene results and five 1,4-dichlorobenzene results were qualified “B” due to the analyte detected in the method blank.
- All results in nine samples were qualified “J” or “UJ” because the samples were analyzed one to four days past the holding time. These samples were analyzed within the holding time for properly preserved samples, but the pH for these samples were above 2, therefore the holding time for non-preserved samples was applied.
- A total of 137 results were qualified as estimated “J” because they were between the MDL and RL.

SUMMARY

Due to the difficult matrix of these samples as a result of the sodium lactate injections, MFA analyses and dissolved gases analyses generally required several dilutions in order to optimize results. Samples were properly preserved in the field, as sample bottles arrived from the laboratory with preservatives already added. However, the pH upon receipt or analysis at the lab for some samples was outside the control limits of $\text{pH} < 2$, and these sample results have been estimated.

TABLE C-1
SDG SUMMARY TABLE
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation Defense Depot Memphis, Tennessee

SDG	Groundwater Samples			Quality Control Samples
<u>EBT-10 Sampling Event - December 2011</u>				
L11120274	IW101-01A-EBT-10	IW101-03A-EBT-10	PMW101-01A-EBT-10	DUP2-EBT-10
	IW101-01B-EBT-10	IW101-03B-EBT-10	PMW101-01B-EBT-10	DUP5-EBT-10
	IW101-01C-EBT-10	IW101-04A-EBT-10	PMW101-02A-EBT-10	IW101-03A-EBT-10-MS
	IW101-02A-EBT-10	PMW21-01-EBT-10	PMW101-02B-EBT-10	IW101-03A-EBT-10-MSD
	IW101-02B-EBT-10	PMW21-02-EBT-10	PMW101-05A-EBT-10	PMW101-05A-EBT-10-MS
	IW101-02C-EBT-10	PMW21-04-EBT-10	PMW101-05B-EBT-10	PMW101-05A-EBT-10-MSD
				TB-120611-EBT-10 TB-120711-EBT-10
L11120348	IW21-01A-EBT-10	IW101-03C-EBT-10	PMW101-03A-EBT-10	DUP1-EBT-10
	IW21-01B-EBT-10	IW101-04B-EBT-10	PMW101-03B-EBT-10	DUP3-EBT-10
	IW21-02A-EBT-10	IW101-04C-EBT-10	PMW101-06A-EBT-10	DUP6-EBT-10
	IW21-02B-EBT-10	IW101-05A-EBT-10	PMW101-06B-EBT-10	IW21-04A-EBT-10-MS
	IW21-03A-EBT-10	IW101-05B-EBT-10	PMW101-07A-EBT-10	IW21-04A-EBT-10-MSD
	IW21-03B-EBT-10	IW101-05C-EBT-10	PMW101-07B-EBT-10	TB-120811-EBT-10
	IW21-04A-EBT-10	IW101-06A-EBT-10	PMW101-08A-EBT-10	TB-120911-EBT-10
	IW21-04B-EBT-10	IW101-06B-EBT-10	RB1-EBT-10	
L11120403	IW21-05A-EBT-10	IW101-07B-EBT-10	IW101-09C-EBT-10	DUP4-EBT-10
	IW21-05B-EBT-10	IW101-07C-EBT-10	PMW85-01-EBT-10	DUP8-EBT-10
	IW92-01-EBT-10	IW101-08A-EBT-10	PMW92-01-EBT-10	IW92-03-EBT-10-MS
	IW92-02-EBT-10	IW101-08B-EBT-10	PMW92-02-EBT-10	IW92-03-EBT-10-MSD
	IW92-03-EBT-10	IW101-08C-EBT-10	PMW92-04-EBT-10	TB-120511-EBT-10
	IW101-06C-EBT-10	IW101-09A-EBT-10	PMW92-05-EBT-10	TB-121211-EBT-10
	IW101-07A-EBT-10	IW101-09B-EBT-10	PMW101-08B-EBT-10	TB-121611-EBT-10
L11120490	IW85-01-EBT-10	IW92-04-EBT-10	IW92-07-EBT-10	DUP7-EBT-10
	IW85-02-EBT-10	IW92-04-EBT-10	IW92-08-EBT-10	TB-121311-EBT-10
	IW85-05-EBT-10	IW92-05-EBT-10	PMW85-04-EBT-10	TB-121411-EBT-10
	IW85-06-EBT-10	IW92-06-EBT-10	PMW85-05-EBT-10	RB2-EBT-10
<u>EBT-11 Sampling Event - February 2013</u>				
L13020201	IW21-01A-EBT-11	IW21-01B-EBT-11		
L13020202	PMW21-01-EBT-11			PMW21-01-EBT-11-MS PMW21-01-EBT-11-MSD
L13020203	IW21-02A-EBT-11	IW21-03A-EBT-11	IW21-04B-EBT-11	TB-020513-EBT-11
	IW21-02B-EBT-11	IW21-04A-EBT-11		TB-020613-EBT-11 RB1-EBT-11
L13020204	DR1-5-EBT-11	DR1-6-EBT-11	PMW101-02A-EBT-11	
	DR1-5A-EBT-11	DR1-6A-EBT-11	PMW101-02B-EBT-11	
L13020285	IW101-02A-EBT-11	IW101-02C-EBT-11	IW101-05A-EBT-11	DUP2-EBT-11
	IW101-02B-EBT-11	IW101-03C-EBT-11	IW101-05B-EBT-11 IW101-05C-EBT-11	
L13020286	MW-21-EBT-11	PMW21-04-EBT-11	PMW101-04B-EBT-11	DUP3-EBT-11
	PMW21-02-EBT-11	PMW101-04A-EBT-11	PMW101-07A-EBT-11 PMW101-07B-EBT-11	TB-020713-EBT-11
L13020288	MW-85-EBT-11	MW-197A-EBT-11	MW-203A-EBT-11	DUP6-EBT-11
	MW-113-EBT-11	MW-197B-EBT-11	MW-203B-EBT-11	TB-020813-EBT-11
L13020289	IW21-03B-EBT-11	IW101-03B-EBT-11	IW101-07B-EBT-11	DUP1-EBT-11
	IW101-03A-EBT-11	IW101-07A-EBT-11	IW101-07C-EBT-11	IW101-03A-EBT-11-MS IW101-03A-EBT-11-MSD RB2-EBT-11

TABLE C-1
SDG SUMMARY TABLE
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation Defense Depot Memphis, Tennessee

SDG	Groundwater Samples			Quality Control Samples
L13020340	IW92-07-EBT-11			TB-021213-EBT-11 RB3-EBT-11
L13020341	IW85-06-EBT-11			
L13020352	DR2-2-EBT-11 DR2-5-EBT-11	IW92-03-EBT-11 PMW85-01-EBT-11	PMW85-05-EBT-11 PMW92-03-EBT-11	DUP4-EBT-11 DUP5-EBT-11
L13020354	IW101-04A-EBT-11 IW101-04B-EBT-11	IW101-04C-EBT-11 IW92-01-EBT-11	IW92-02-EBT-11	IW92-01-EBT-11-MS IW92-01-EBT-11-MSD TB-021113-EBT-11
L13020357	IW85-05-EBT-11 IW92-08-EBT-11	MW-62-EBT-11 MW-212-EBT-11	MW-213-EBT-11	TB-021313-EBT-11
EBT-12 Sampling Event - May 2013				
L13050474	IW92-02-EBT-12			TB-050813-EBT-12
L13050475	IW21-01A-EBT-12			
L13050476	DR2-5-EBT-12 IW85-05-EBT-12	IW92-07-EBT-12	PMW85-05-EBT-12	DUP4-EBT-12 PMW85-05-EBT-12-MS PMW85-05-EBT-12-MSD TB-050913-EBT-12
L13050477	IW21-03A-EBT-12 IW21-04B-EBT-12	PMW21-04-EBT-12	PMW101-04B-EBT-12	DUP1-EBT-12
L13050702	DR2-2-EBT-12 IW85-06-EBT-12 IW92-08-EBT-12	MW-62-EBT-12 MW-85-EBT-12 MW-113-EBT-12	MW-203A-EBT-12 PMW85-01-EBT-12 PMW92-03-EBT-12	DUP5-EBT-12 TB-051313-EBT-12
L13050704	IW101-03C-EBT-12	IW101-04C-EBT-12	IW101-07C-EBT-12	TB-051013-EBT-12 RB1-EBT-12
L13050705	IW21-01B-EBT-12 IW21-02A-EBT-12	IW21-02B-EBT-12	MW-21-EBT-12	
L13050800	DR1-5-EBT-12 IW101-02A-EBT-12	IW101-02B-EBT-12	IW101-02C-EBT-12	
L13050801	IW92-01-EBT-12 MW-197A-EBT-12	MW-197B-EBT-12 MW-203B-EBT-12	MW-212-EBT-12 MW-213-EBT-12	DUP6-EBT-12 TB-051413-EBT-12 RB3-EBT-12
L13050802	IW101-04A-EBT-12	IW101-04B-EBT-12	PMW101-02A-EBT-12 PMW101-02B-EBT-12	DUP3-EBT-12 IW101-04A-EBT-12-MS IW101-04A-EBT-12-MSD
L13050803	DR1-6-EBT-12 DR1-6A-EBT-12	IW101-03A-EBT-12 IW101-03B-EBT-12	IW101-07A-EBT-12 IW101-07B-EBT-12	DUP2-EBT-12 TB051513-EBT-12
L13050804	IW101-05A-EBT-12 IW101-05B-EBT-12	IW101-05C-EBT-12 PMW101-04A-EBT-12	PMW101-07A-EBT-12 PMW101-07B-EBT-12	TB-051613-EBT-12 RB2-EBT-12
L13050805	DR1-5A-EBT-12 IW21-03B-EBT-12	IW21-04A-EBT-12 PMW21-01-EBT-12	PMW21-02-EBT-12	PMW21-02-EBT-12-MS PMW21-02-EBT-12-MSD

TABLE C-1
SDG SUMMARY TABLE
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation Defense Depot Memphis, Tennessee

SDG		Groundwater Samples		Quality Control Samples
EBT-13 Sampling Event - August 2013				
L13080814	DR2-2-EBT-13	IW92-02-EBT-13	PMW85-01-EBT-13	DUP5-EBT-13
	DR2-5-EBT-13	MW-85-EBT-13	PMW85-05-EBT-13	TB-081313-EBT-13
	IW85-05-EBT-13	MW-113-EBT-13	PMW92-03-EBT-13	TB-081413-EBT-13 RB1-EBT-13
L13080921	IW85-06-EBT-13	IW101-02A-EBT-13	PMW101-04A-EBT-13	DUP3-EBT-13
	IW92-07-EBT-13	IW101-02B-EBT-13	PMW101-04B-EBT-13	DUP4-EBT-13
	IW92-08-EBT-13	IW101-02C-EBT-13	PMW101-07A-EBT-13	TB-081513-EBT-13
			PMW101-07B-EBT-13	
L13080978	DR1-6-EBT-13	IW101-03B-EBT-13	IW101-07B-EBT-13	DUP2-EBT-13
	DR1-6A-EBT-13	IW101-03C-EBT-13	IW101-07C-EBT-13	TB-081613-EBT-13
	IW101-03A-EBT-13	IW101-07A-EBT-13	PMW101-02A-EBT-13 PMW101-02B-EBT-13	
L13081024	IW21-01A-EBT-13	IW92-03-EBT-13	PMW21-01-EBT-13	DUP1-EBT-13
	IW21-01B-EBT-13	IW101-04A-EBT-13	PMW21-02-EBT-13	IW21-04A-EBT-13-MS
	IW21-02A-EBT-13	IW101-04B-EBT-13	PMW21-04-EBT-13	IW21-04A-EBT-13-MSD
	IW21-02B-EBT-13	IW101-04C-EBT-13	MW-197A-EBT-13	IW101-05A-EBT13-MS
	IW21-03A-EBT-13	IW101-05A-EBT-13	MW-197B-EBT-13	IW101-05A-EBT-13-MSD
	IW21-03B-EBT-13	IW101-05B-EBT-13	MW-203A-EBT-13	MW-197A-EBT-13-MS
	IW21-04A-EBT-13	IW101-05C-EBT-13	MW-203B-EBT-13	MW-197A-EBT-13-MSD
	IW21-04B-EBT-13	MW-21-EBT-13		TB-081213-EBT-13 TB-081913-EBT-13 TB-082213-EBT-13 RB2-EBT-13
L13081060	DR1-5-EBT-13	IW92-01-EBT-13	MW-212-EBT-13	DUP6-EBT-13
	DR1-5A-EBT-13	MW-62-EBT-13	MW-213-EBT-13	TB-082013-EBT-13 RB3-EBT-13
EBT-14 Sampling Event - November 2013				
L13110486	DR2-2-EBT-14	IW92-01-EBT-14	PMW85-05-EBT-14	TB-110613-EBT-14
	DR2-5-EBT-14	MW-113-EBT-14		
L13110487	IW85-05-EBT-14	IW92-08-EBT-14	PMW85-01-EBT-14	DUP5-EBT-14
	IW92-03-EBT-14	MW-85-EBT-14	PMW92-03-EBT-14	
L13110511	IW85-06-EBT-14	IW92-02-EBT-14	IW92-07-EBT-14	DUP4-EBT-14
			PMW21-01-EBT-14	TB-111813-EBT-14
L13110512	IW21-01A-EBT-14	MW-197A-EBT-14	MW-203A-EBT-14	MW-197A-EBT-14-MS
	IW21-01B-EBT-14	MW-197B-EBT-14	MW-203B-EBT-14	MW-197A-EBT-14-MSD
L13110633	IW21-02A-EBT-14	IW21-04A-EBT-14	PMW21-04-EBT-14	DUP1-EBT-14
	IW21-02B-EBT-14	IW21-04B-EBT-14	PMW101-04A-EBT-14	DUP3-EBT-14
	IW21-3A-EBT-14	MW-21-EBT-14	PMW101-04B-EBT-14	IW21-04A-EBT-14-MS
	IW21-3B-EBT-14	PMW21-02-EBT-14		IW21-04A-EBT-14-MSD TB-111113-EBT-14 RB1-EBT-14
L13110792	DR1-5-EBT-14	IW101-03C-EBT-14	IW101-07C-EBT-14	DUP2-EBT-14
	DR1-5A-EBT-14	IW101-04A-EBT-14	MW-62-EBT-14	DUP6-EBT-14
	DR1-6-EBT-14	IW101-04B-EBT-14	MW-212-EBT-14	IW101-05A-EBT-14-MS
	DR1-6A-EBT-14	IW101-04C-EBT-14	MW-213-EBT-14	IW101-05A-EBT-14-MSD
	IW101-02A-EBT-14	IW101-05A-EBT-14	PMW101-02A-EBT-14	TB-111213-EBT-14
	IW101-02B-EBT-14	IW101-05B-EBT-14	PMW-101-02B-EBT-14	TB-111313-EBT-14
	IW101-02C-EBT-14	IW101-05C-EBT-14	PMW101-07A-EBT-14	TB-111413-EBT-14
	IW101-03A-EBT-14	IW101-07A-EBT-14	PMW101-07B-EBT-14	RB2-EBT-14
	IW101-03B-EBT-14	IW101-07B-EBT-14		RB3-EBT-14

DIANE SHORT & ASSOCIATES, INC. _____

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ORGANIC DATA QUALITY REVIEW REPORT

Volatile Organics by SW-846 Method 8260B (GC/MS)

SDG	L1112: 0274, 0348, 0403, 0490		
PROJECT	Memphis Defense Depot, EBT-10 Sampling for HDR, Denver		
LABORATORY	Microbac Laboratories, Inc., Marietta, OH		
SAMPLE MATRIX	Water	SAMPLING DATE	12/2011
NUMBER OF SAMPLES	100, including 8 field duplicate pairs, 9 trip blanks and 2 rinse blanks		
ANALYSES REQUESTED	SW-846 8260B (VOA by GC/MS)		
SAMPLE NUMBER	See result forms attached and associated EDD		

DATA REVIEWER: Diane Short

QA REVIEWER: Diane Short & Associates, Inc. INITIALS/DATE: DLS 01/09/2012

Telephone Logs included Yes____ No X

Contractual Violations Yes____ No X

The project QAPP (09/11), the EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 1999 and 2007, and the SW-846 Method 8260B have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review of these samples includes Level III validation of all chains of custody, calibrations and QC forms referencing the QC limits in the above documents.

I. DELIVERABLES

A. All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.

Yes ☒ No ☐

This report has been requested to include the following review: QC, hold times, sample integrity (Chains of Custody, sample login), and summary calibrations. Note that there are 17 QC sets (days of analysis per instrument) and 3 instruments for the 100 samples.

B. Chain of Custody documentation was complete and accurate.

Yes ☒ No ☐

No qualifiers have been added for Chain of Custody (COC) issues, and the Project Manager will update COC per the following notes to complete the project record.

The laboratory has signed and affixed a receipt label on all pages. The relinquishment date and time are part of the electronically-generated COC.

These are electronically generated Chain of Custody documents, and there is an electronic signature on each page unless noted. In addition, there are sample receipt acknowledgements from the laboratory. However, the hardcopy documents should be properly signed and dated by the laboratory on each page. The log in forms contain the courier identification and air bill number.

SDG 11120274: Only the 1st of 5 pages of the Chain of Custody documents were signed and dated by the laboratory.

SDG 11120403: Sample PMW92-05 is on the electronically generated COC. It is crossed out with a note that it has been put on a standard COC, which is also contained in the sample documentation.

C. Samples were received at the required temperature, preservation and intact with no bubbles.

Yes ☒ No ☐

EPA regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6 °C. The sample temperature conditions are fully compliant with applicable regulations.

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes ☒ No ☐

B. Holding Times

1. The contract holding times were met for all analyses [time of sample receipt to time of analysis (VOA) or time of extraction to time of analysis].

Yes ☒ No ☐

SDG 11120490: Sample 1, IW92-04-EBT10, was re-run due to potential carry over from a previous high sample. The sample was re-run 5 hours out of hold. As the samples are in sealed vials and kept in a regulated cooler, an outlier of less than a half day has not resulted in a qualifier.

2. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (14 days from time of sample collection to analysis or extraction).

Yes ☒ No ☐

III. INSTRUMENT CALIBRATION – GC/MS

A. Initial Calibration

1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of > 0.05 or > 0.01 for poor responding volatiles.

Yes ☒ No ☐ NA ☐

Method 8260: Per the Project Manager, the 2007 EPA CLP validation guidance has been applied to the common “poor responders.” Calibration response factors below 0.05 have been observed for Acetone and 2-

butanone. The validation guidance used for this project allows for a response of 0.01 for these compounds if spectral integrity can be verified at low concentrations. These spectra are not commonly provided and are not part of the deliverable for this data set. The laboratory has been tasked with providing to the client verification that the 0.01 RF is valid. If the spectral verification is available, data are not qualified for response factors greater than 0.01 and less than 0.05 for “poor responders.” No data have been qualified.

Most of the low-responding compounds are highly water-soluble and capable of hydrogen bonding with water. This decreases their purge efficiency and results in the relatively low response. The implication of this low purge efficiency is that a relatively low absolute recovery of such compounds is achieved in the purge step of the analysis. If this recovery is consistent, reasonable accuracy and precision can be achieved in a given matrix, which is indicated for the lab matrix by acceptable recoveries in LCS and calibration checks. However, this causes these targets to be more sensitive to matrix variations that impact purge efficiency (such as ionic strength or the presence of varying levels of soluble non-target organic material) than are the more hydrophobic compounds typically analyzed by this method, and as a result they are more likely to exhibit matrix bias.

2a. The relative standard deviation (RSD) for the five point calibration was within the 30% limit for the CCCs.
Yes ☒ No ☐ NA ☐

This is a method requirement and indicates that the analytical system is in control.

2b. The relative standard deviation (RSD) for the five point calibration was within the 30% limit for all other compounds, the average % RSD was < 15%, or a linear curve was used.

Yes ☒ No ☐ NA ☐

3. The 12 hour system Performance Check was performed as required in SW-846 and met the QC limits of 80 – 120%.

Yes ☐ No ☒ NA ☐

The following applies to the ICV for each initial calibration. Dichlorodifluoromethane (DCDFM) is slightly high is the ICVs for Instrument 11 on 12/9/11 and for Instrument 6 on 11/29/11. Methyl-tert-butyl ether (MTBE) is slightly high in the ICV for Instrument 8 for the 12/12/11 ICV. It is also high in the LCS's or CCV's for those instrument in some cases. The compound DCDFM is not detected in client samples and no qualification is required. Both compounds are also an EPA 'poor responders'. MTBE was detected and has been qualified even though it should be considered as a 'poor responder'. Data are qualified JC#, where # is the %R of the standard. Data could be biased slightly high.

Lab ID	Client ID	Compound	Result ug/L	Flag	RL	Qualifier
L11120348-14	IW101-05A-EBT-10	Methyl t-butyl ether (MTBE)	2.33	F	5	JC24.3
L11120348-15	IW101-05B-EBT-10	Methyl t-butyl ether (MTBE)	3.16	F	5	JC24.3
L11120348-16	IW101-05C-EBT-10	Methyl t-butyl ether (MTBE)	4.12	F	5	JC24.3
L11120348-18	IW101-06B-EBT-10	Methyl t-butyl ether (MTBE)	3.72	F	5	JC24.3
L11120348-20	IW21-03A-EBT-10	Methyl t-butyl ether (MTBE)	33.7		5	JC24.3
L11120348-21	IW21-03B-EBT-10	Methyl t-butyl ether (MTBE)	43.8		5	JC24.3
L11120348-25	IW21-04B-EBT-10	Methyl t-butyl ether (MTBE)	123		5	JC24.3
L11120348-26	PMW101-06A-EBT-10	Methyl t-butyl ether (MTBE)	0.781	F	5	JC24.3
L11120348-27	PMW101-06B-EBT-10	Methyl t-butyl ether (MTBE)	3.76	F	5	JC24.3
L11120274-22	IW101-03A-EBT-10	Methyl t-butyl ether (MTBE)	0.671	F	5	JC24

B. Continuing Calibrations

1. The midpoint standard was analyzed for each analysis at the required frequency, and the QC criterion of > 0.05 (> 0.01 for CLP 2001 VOA) was met.

Yes ☒ No ☐ NA ☐

2. The percent difference (% D) limits of $\pm 20\%$ were met. The 2007 NFG also allow for 40% D for the “poor responders.”

Yes ☐ No ☒ NA ☐

When there are no detections, no qualification is required unless the % D is biased low and so large as to indicate a significant probability of false negatives. Qualification is required for a % D biased high for detected compounds only. This requires that the RF is acceptable to verify the non-detect status, which is the case here. Data would be qualified “JC#”, where # is the % D. There could be variability to the data as there is variability to the response. No qualifiers have been required.

DCDFM is high in some of the CCALs for Instrument 6, low for 2-hexanone for Instrument 8 and low for 1,2-bromo-3-chloro propane for instrument 11. All are poor responders and no qualifier is required. All outliers were only slightly above the 20% limit.

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB (VOA) performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.

Yes ☒ No ☐ NA ☐

V. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria, and the Retention times were within the required windows.

Yes ☒ No ☐ NA ☐

VI. SURROGATE STANDARDS

Surrogate spikes were analyzed with every sample.

Yes ☒ No ☐

And met the recovery limits defined in the QAPP, which are the laboratory limits.

Yes ☒ No ☐

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.

Yes ☒ No ☐

The MS/MSDs include (all ending in EBT-10):

PMW101-05A, IW101-03, IW21-04A, IW92-03

This meets the recommendation of 1 per 20 field (not field QC or blank) samples. As this is an ongoing project an overall adherence to the 1:20 frequency is monitored by the Project Manager.

There was no MS/MSD reported for SDG 11120490. There was no sample designated and the laboratory notes insufficient volume to perform QC on a client sample. The lab notes they do not report non-client QC.

B. The MS and MSD percent recoveries were within the limits defined in the updated 2011 QAPP, which now references the laboratory limits.

Yes ☐ No ☒ NA ☐

The full target list has been spiked. For sample PMW101-05A-EBT-10, the result for tetrachloroethene (PCE) is near the 4x limit where the result is statistically greater than the recovery of the spike. PCE is 4

x the spike value in sample IW21-04A and no qualifier has been applied. In sample IW92-03, cis-1,2-dichloroethene is also 4 x the spike and no qualifier is applied.

Lab ID	Client ID	Compound	Result ug/L	Flag	RL	Qualifier
L11120348-22	IW21-04A-EBT-10	Trichloroethene	33.3		1	JMS65
L11120348-22	IW21-04A-EBT-10	cis-1,2-Dichloroethene	48.8		1	JMS65
L11120274-16	PMW101-05A-EBT-10	Tetrachloroethene	64.9		1	JMS22
L11120274-22	IW101-03A-EBT-10	Acetone	32.3		10	JMS0

Data are qualified JMS#, where # is the value of the spike. Data could be biased low proportional to the spike and the data for acetone are recommended to be used with caution as the bias is extremely low.

C. The MSD relative percent differences (RPD) were within the defined contract limits, which are 30%.
Yes ☒ No ☐ NA ☐

Qualifiers are added only when the MS or MSD recovery is also out of limits or the RPD exceeds 30%. Data are qualified "JD#", where # is the RPD. As the RPD increases, the matrix precision decreases. All RPD limits are met.

D. The MS/MSD were client samples.

Yes ☒ No ☐ NA ☐

Only client samples reported.

VIII. LABORATORY CONTROL SAMPLE

A. Laboratory Control Sample (LCS) was analyzed for every analysis performed and for every 20 samples.
Yes ☒ No ☐

Although not required of the method, an LCS and LCSD are routinely reported when there is not an MS/MSD reported in the data set. No LCSD has been reported for SDG 11120490.

B. The LCS percent recoveries were within the limits defined in the updated 2011 QAPP, which are the laboratory limits. If an LCS and LCSD are analyzed, both samples must have the same compounds out for data to be qualified.

Yes ☐ No ☒

The full target list has been spiked. When a high LCS recovery is associated with a non-detect in samples, no qualifier is added since the indicated bias is high. When the target is detected, data are qualified "JL#", where # is the recovery. Data could be biased high proportional to the LCS percent recovery. All results associated with low recoveries are qualified and data could be biased low. The laboratory uses the same control limits on all 3 instruments used for analysis even though the responses are different on each instrument. The control limits should be instrument specific.

Laboratory Control Sample Recovery			
Instrument	8	8	6
WG: 38:	4529	4801	5069
Date (2011)	12/13	12/15	12/19
Compound			
1,1,2,2-tetrachloroethane			129
1,2,3-Trichloropropane			127
Acetone			137
1,2-dibromomethane			122

Dichlorodifluoromethane			157
Methyl t-butyl ether (MTBE)	130	124	127

The table below shows data that were qualified for the LCS outliers .

Lab ID	Client ID	Compound	Result ug/L	Flag	RL	Qualifier
L11120490-02	IW92-05-EBT-10	Acetone	79		10	JL137
L11120490-12	IW92-08-EBT-10	1,2,3-Trichloropropane	22		1	JL127
L11120490-12	IW92-08-EBT-10	Acetone	6.12	F	10	JL137
L11120490-13	DUP7-EBT-10	1,2,3-Trichloropropane	9.62		1	JL127
L11120490-13	DUP7-EBT-10	Acetone	11.7		10	JL137
L11120348-01	IW21-01A-EBT-10	Methyl t-butyl ether (MTBE)	70.9		5	JL130
L11120348-02	IW21-01B-EBT-10	Methyl t-butyl ether (MTBE)	66.3		5	JL130
L11120348-05	DUP1-EBT-10	Methyl t-butyl ether (MTBE)	71.1		5	JL130
L11120403-04	IW101-07A-EBT-10	Methyl t-butyl ether (MTBE)	0.703	F	5	JL124

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.

Yes ☒ No ☐

B. No blank contamination was found in the Method Blank.

Yes ☒ No ☐

C. If Field Blanks were identified, no blank contamination was found.

Yes ☐ No ☒ NA ☐

The field blanks are RB1 and RB2-EBT-10. The samples were clean and no qualifiers have been applied. Nine Trip blanks were collected and all were non-detected. No qualifiers have been applied.

X. FIELD QC

If Field Duplicates were identified, they met guidance for VOA of RPD of < 30% for water or < 50% for soil. For values reported at < 5 × the reporting limit (RL), a difference of 2 × RL or 3.5 × RL for soil is used as guidance. This is referred to as the CRDL Rule. Data are not qualified for Field Duplicates as these are evaluated for the total project by the Project Manager.

Yes ☒ No ☐ NA ☐

All field precision limits were met for these samples.

IW21-01A-EBT-10	DUP1-EBT-10
IW101-01A-EBT-10	DUP2-EBT-10
IW101-04B-EBT-10	DUP3-EBT-10
IW101-07C-EBT-10	DUP4-EBT-10
PMW101-01A-EBT-10	DUP5-EBT-10
PMW101-07A-EBT-10	DUP6-EBT-10
IW85-01-EBT-10	DUP7-EBT-10
PMW85-01-EBT-10	DUP8-EBT-10

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and analytical systems.

Yes _____ No _____ NA ☒X_____

Not part of this review level.

B. The suggested EQLs for the sample matrices in this set were met.

Yes ☒X_____ No _____ NA _____

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for all detected compounds.

Yes _____ No _____ NA ☒X_____

Not part of this review level.

B. Quantitation was checked to determine the accuracy of calculations for representative compounds in each internal standards quantitation set.

Yes _____ No _____ NA ☒X_____

Not part of this review level.

XIII. TENTATIVELY IDENTIFIED COMPOUNDS

TICs were properly identified and met the library identification criteria.

Yes _____ No _____ NA ☒X_____

Not part of this review level.

XIV. OVERALL ASSESSMENT OF THE CASE

The laboratory has complied with the requested method. Data are fully usable after consideration of qualifiers. The following is noted:

Chain of Custody

No qualifiers have been added for Chain of Custody issues, and the Project Manager will update documentation per the notes in the text to complete the project record.

This report has been requested to include the following review: QC, hold times, sample integrity (Chains of Custody, sample login), and summary calibrations. Note that there are 17 QC sets (days of analysis per instrument) and 3 instruments for the 100 samples.

Sample Preservation

EPA regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6 °C. The sample temperature conditions are fully compliant with applicable regulations.

Holding Times

SDG 11120490: Sample 1, IW92-04-EBT10, was re-run due to potential carry over from a previous high sample. The sample was re-run 5 hours out of hold. As the samples are in sealed vials and kept in a regulated cooler, an outlier of less than a half day has not resulted in a qualifier.

Initial Calibrations

ICV

The following applies to the ICV for each initial calibration. Dichlorodifluoromethane (DCDFM) is slightly high in the ICVs for Instrument 11 on 12/9/11 and for Instrument 6 on 11/29/11. Methyl-tert-butyl ether (MTBE) is slightly high in the ICV for Instrument 8 for the 12/12/11 ICV. It is also high in the LCS's or CCV's for those instrument in some cases. The compound DCDFM is not detected in client samples and no qualification is required. Both compounds are also an EPA 'poor responders'. MTBE was detected and

has been qualified even though it should be considered as a ‘poor responder’. Data are qualified JC#, where # is the %R of the standard. Data could be biased slightly high.

Continuing Calibrations

See the body of this report. No data have been qualified as all %D recoveries are high and data are non-detect. No qualification is required for high bias when the response factor is acceptable to verify the non-detect as is the case here.

DCDFM is high in some of the CCALs for Instrument 6, low for 2-hexanone for Instrument 8 and low for 1,2-bromo-3-chloro propane for instrument 11. All are poor responders and no qualifier is required. All outliers were only slightly above the 20% limit.

Matrix Spikes

The MS/MSDs include (all ending in EBT-10):

PMW101-05A, IW101-03, IW21-04A, IW92-03

This meets the recommendation of 1 per 20 field (not field QC or blanks) samples. As this is an ongoing project an overall adherence to the 1:20 frequency is monitored by the Project Manager.

There was no MS/MSD reported for SDG 11120490. There was no sample designated and the laboratory notes insufficient volume to perform QC on a client sample. The lab notes they do not report non-client QC.

The full target list has been spiked. For sample PMW101-05A-EBT-10, the result for tetrachloroethene (PCE) is near the 4x limit where the result is statistically greater than the recovery of the spike. PCE is 4 x the spike value in sample IW21-04A and no qualifier has been applied. In sample IW92-03, cis-1,2-dichloroethene is also 4 x the spike and no qualifier is applied.

Laboratory Control Samples

The full target list has been spiked. When a high LCS recovery is associated with a non-detect in samples, no qualifier is added since the indicated bias is high. When the target is detected, data are qualified “JL#”, where # is the recovery. Data could be biased high proportional to the LCS percent recovery. The laboratory uses the same control limits on all 3 instruments used for analysis even though the responses are different on each instrument. The control limits should be instrument specific.

Field Blanks

The field blanks are RB1 and RB2-EBT-10. The sample was clean and no qualifiers have been applied. detection.

Nine Trip blanks were collected and all were non-detected. No qualifiers have been applied.

Field QC

All field precision limits were met for these samples.

IW21-01A-EBT-10	DUP1-EBT-10
IW101-01A-EBT-10	DUP2-EBT-10
IW101-04B-EBT-10	DUP3-EBT-10
IW101-07C-EBT-10	DUP4-EBT-10
PMW101-01A-EBT-10	DUP5-EBT-10
PMW101-07A-EBT-10	DUP6-EBT-10
IW85-01-EBT-10	DUP7-EBT-10
PMW85-01-EBT-10	DUP8-EBT-10

TABLE OF QUALIFIED DATA

Lab ID	Client ID	Compound	Result ug/L	Flag	RL	Qualifier
L11120490-02	IW92-05-EBT-10	Acetone	79		10	JL137
L11120490-12	IW92-08-EBT-10	1,2,3-Trichloropropane	22		1	JL127
L11120490-12	IW92-08-EBT-10	Acetone	6.12	F	10	JL137
L11120490-13	DUP7-EBT-10	1,2,3-Trichloropropane	9.62		1	JL127
L11120490-13	DUP7-EBT-10	Acetone	11.7		10	JL137
L11120348-01	IW21-01A-EBT-10	Methyl t-butyl ether (MTBE)	70.9		5	JL130
L11120348-02	IW21-01B-EBT-10	Methyl t-butyl ether (MTBE)	66.3		5	JL130
L11120348-05	DUP1-EBT-10	Methyl t-butyl ether (MTBE)	71.1		5	JL130
L11120348-14	IW101-05A-EBT-10	Methyl t-butyl ether (MTBE)	2.33	F	5	JC24.3
L11120348-15	IW101-05B-EBT-10	Methyl t-butyl ether (MTBE)	3.16	F	5	JC24.3
L11120348-16	IW101-05C-EBT-10	Methyl t-butyl ether (MTBE)	4.12	F	5	JC24.3
L11120348-18	IW101-06B-EBT-10	Methyl t-butyl ether (MTBE)	3.72	F	5	JC24.3
L11120348-20	IW21-03A-EBT-10	Methyl t-butyl ether (MTBE)	33.7		5	JC24.3
L11120348-21	IW21-03B-EBT-10	Methyl t-butyl ether (MTBE)	43.8		5	JC24.3
L11120348-22	IW21-04A-EBT-10	Trichloroethene	33.3		1	JMS65
L11120348-22	IW21-04A-EBT-10	cis-1,2-Dichloroethene	48.8		1	JMS65
L11120348-25	IW21-04B-EBT-10	Methyl t-butyl ether (MTBE)	123		5	JC24.3
L11120348-26	PMW101-06A-EBT-10	Methyl t-butyl ether (MTBE)	0.781	F	5	JC24.3
L11120348-27	PMW101-06B-EBT-10	Methyl t-butyl ether (MTBE)	3.76	F	5	JC24.3
L11120274-16	PMW101-05A-EBT-10	Tetrachloroethene	64.9		1	JMS22
L11120274-22	IW101-03A-EBT-10	Acetone	32.3		10	JMS0
L11120274-22	IW101-03A-EBT-10	Methyl t-butyl ether (MTBE)	0.671	F	5	JC24
L11120403-04	IW101-07A-EBT-10	Methyl t-butyl ether (MTBE)	0.703	F	5	JL124

Final Data Qualification and Usability Report

Project: Defense Depot Memphis, TN (DDMT)
Main Installation Enhanced Bioremediation
Treatment System
Sampling Event: EBT-10
Project / Task Number: 121842-006
Sample Data Package(s): L11120274, L11120348, L11120403, L11120490
Data Validation Performed by: Diane Short & Associates (DSA)
Final Data Qualification and Usability
Report Prepared by: Lynn K. Lutz, HDR Inc.

Data Validation Report Review and Comments

DSA noted that there were two analyses of IW92-04-EBT-10 but did not select which analysis should be reported. The initial analysis on 12/19/2011 had low detections of aromatics which the lab suspected might be carryover from a previous sample. The project sample was reanalyzed on 12/27/2011, approximately 5 hours past the 14 day holding time. The concentrations of one of the analytes of concern at the site, cis-1,2-dichloroethene, were 194 µg/L in the initial analysis and 193 µg/L in the reanalysis, suggesting little change in the concentration over the two weeks. The reanalysis has been used as the final reported results, with no qualifications based on holding time.

Except as discussed above, the data validation report was complete and acceptable.

Final Data Qualifiers

Trichloroethene and cis-1,2-dichloroethene recoveries in the MS/MSD analyses of IW21-04A-EBT-10 were below control limits and results in the parent sample have been qualified J where DSA had qualified as JMS65. Tetrachloroethene recovery in the MS/MSD analysis of PMW101-05A-EBT-10 was below control limits and the result in the parent sample has been qualified J where DSA had qualified JMS22. Acetone recovery in the MS/MSD analysis of IW101-03A-EBT-10 was below control limits and the result in the parent sample has been qualified J where DSA had qualified JMS0.

Final qualifiers for detected MTBE results with high ICV %D values were J where DSA had qualified as JC24 or JC24.3.

Final qualifiers for non-detected 2-hexanone results with CCV results outside control limits and with a lower response than in the initial calibration were not qualified where DSA had not qualified. The response in the CCV was higher than the response in the lowest-concentration calibration standard.

Final qualifiers for non-detected DBCP and 2-butanone results with CCV results outside control limits and with a lower response than in the initial calibration were UJ where DSA had not qualified. The response in the CCV was lower than the response in the lowest-concentration calibration standard. Qualified results are shown in the table below.

CCV	Analyte	%D	%D Control Limit	Sample ID	Sample Result, $\mu\text{g/L}$	Qualifier
HPMS11 12/16/2011 09:50	DBCP	-21.9%	20%	IW21-05A-EBT-10	U	UJ
				IW21-05B-EBT-10		
				IW101-06C-EBT-10		
				IW101-08B-EBT-10		
				IW101-08C-EBT-10		
				IW101-09A-EBT-10		
				IW101-09B-EBT-10		
				DUP4-EBT-10		
				IW101-09C-EBT-10		
HPMS8 12/12/2011 10:21	2-Butanone	-20.1%	20%	PMW21-01-EBT-10	U	UJ
				PMW21-02-EBT-10		
				PMW21-04-EBT-10		
				PMW101-01A-EBT-10		
				PMW101-01B-EBT-10		
				PMW101-02A-EBT-10		
				PMW101-02B-EBT-10		
				DUP5-EBT-10		
				PMW101-05A-EBT-10		
				PMW101-05B-EBT-10		
				TB-120711- EBT-10		
				IW101-02C-EBT-10		
				IW101-03B-EBT-10		
				IW101-04A-EBT-10		

Final qualifiers for detected MTBE, acetone and 1,2,3-trichloropropane results with high LCS recoveries were J where DSA had qualified as JL124, JL127, JL130 or JL137.

Final qualifiers were J where detected results were between the MDL and RL.

Data Usability

There were no rejected sample results. All results are usable as qualified.



18 January 2012

Lynn K. Lutz, HDR Inc.

Date

DIANE SHORT & ASSOCIATES, INC. _____

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dsa7cbc@eazy.net

ORGANIC DATA QUALITY REVIEW REPORT

GC REPORT FOR Metabolic Acids by HPLC; Ethane, Methane, Ethene, by EPA SOP RSK-175, TOC by SW-846 9060

SDG L13020:													
	201	202	203	204	285	286	288	289	340	341	352	354	357

PROJECT: Memphis Defense Depot, EBT-11 for HDR, Denver

LABORATORY: Microbac Laboratories, Inc., Marietta, OH

SAMPLE MATRIX: Water SAMPLING DATE (Month/Year): February 2013

NO. OF SAMPLES: 70 waters including 3 rinse blanks and 6 field duplicates

ANALYSES REQUESTED: Metabolic Acids by HPLC; EPA SOP RSK-175, SW-846 9060 (TOC)

SAMPLE NO.: Attached

DATA REVIEWER: Diane Short

QA REVIEWER: Diane Short & Associates, Inc., INITIALS/DATE: DLS 03/19/13

Telephone Logs included Yes____ No X

Contractual Violations Yes____ No X

The project QAPP (9/11), EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 2007 (SOP), the EPA SW 846 Methods for Evaluating Solid Waste, Physical/ Chemical Methods Third Edition, (SW-846), current updates, and the project-specific methods have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. The review has been tasked as Level III for review of all calibrations, holding times, and QC for all samples.

I. DELIVERABLES

All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.

Yes ☒ No ☐

This report has been requested to include the following review: Holding times and sample integrity (chains of custody, sample log in), Calibrations, Summary QC. There are 70 water samples including QC samples (duplicates and rinse blanks and excluding the volatile trip blanks) with 21 QC sets (days of analysis) for RSK, 17 QC for Metabolic Acid and 16 QC for TOC.

II. ANALYTICAL REPORT FORMS

The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes ☒ No ☐

III. HOLDING TIMES

A. The contract holding times were met for all analyses (Time of sample receipt to time of extraction and from extraction to analysis.)

Yes ☒ No ☐

See Section B. below. Per EPA guidance, for validation purposes we calculate the holding time to the nearest day in cases where the regulation or method specifies holding time units of days.

B. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (Time of sample collection to time of extraction and from extraction to analysis.)

Yes ☒ No ☐

Metabolic Acids: The reviewer has not been able to find 40 CFR or documented holding times for the metabolic acids. The holding time for an analogous HPLC method 8310 is 14 days for preserved water samples and the previous project QAPP holding time is 28 days.

RSK-175: When pH is adjusted, the holding time is 14 days per the method, and we have used this as the acceptable holding time. The laboratory has used 14 days for all RSK analytes. No data have been qualified per the updated holding times.

Method 9060: Holding time for preserved samples is 28 days. All samples are within this limit.

C. All chains of custody are complete with signatures and dates.

Yes ☒ No ☐

No qualifiers have been added for Chain of Custody (COC) issues, and the Project Manager will update COC per the following notes to complete the project record.

The laboratory has signed and affixed a receipt label on all pages. The relinquishment date and time are part of the electronically-generated COC and are present only on the last page of the COC. There is an electronic signature on the last page unless noted.

In addition, there are sample receipt acknowledgements from the laboratory. The log in forms contain the courier identification and air bill number.

D. Samples were received at the proper temperature and preservation.

Yes ☐ No ☒

The most current regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6° C.

Many of the report narratives and sample receipt documentation stated that several of the metabolic acid (MA) and TOC samples required pH adjustment upon arrival.

The Record of Sample Receipt notes the following

SDG L13020203: The pH was out for IW21-02A (all end in EBT-11), IW21-02B, IW21-04A, IW21-04B, RB1. No method is defined and the note is reported. The comment also says "These samples do not appear to be clean water. They are very dark and color and have a strong odor. Please proceed. SLM"

The Record of Sample Receipt notes the following

Sample IW21-04B – the MA lid was received cracked, but no sample was lost.

Sample RB1 – the MA lid was received cracked, and some of the sample was lost. Both lids were replaced and there was sufficient RB1 for analyses.

SDG L13020341, IW85-06-EBT-11; L13020340, IW92-07 ; L13020354, IW-92, IW101-04C ; L13020357, IW-85-05 ; L13020352, IW92-03 and DUP 4 and 2 samples in L13020289 are noted with pH out for MA and TOC. Only for the last SDG does the laboratory note that the pH was adjusted when samples arrived. The laboratory has been contacted in the past and verified that pH adjustment is part of the log-in process.

PW85-05 is noted as having a broken container for MA.

The need for pH adjustment is a common occurrence for samples at this site. The proper sample bottles have been issued and used. There is a buffering capacity to these matrices that results in slightly elevated pH. The pH is adjusted as soon as the samples reach the laboratory and the impact on the sample data is considered to be minimal. No qualifiers have been added.

IV. INSTRUMENT CALIBRATION (IC) AND CONTINUING CALIBRATION (CC) VERIFICATION

A. The HPLC and GC and TOC standards were analyzed at the required frequency.

Yes ☒ No ☐

B. The chromatographic resolution and separation criteria were met.

Yes ☐ No ☐ NA ☒

No data reported or required for this item.

C. The suggested columns were used and the EQLs were met.

Yes ☐ No ☐ NA ☒

No data reported or required for this item.

D. Calibration factors were met at 25% RSD for VFA and RSK or the regression curves were prepared with a correlation coefficient 'r' greater than 0.99, per SW-846, Method 8000B. The TOC ICV and CCV limits are 90- 110%.

Yes ☐ No ☒

MBA: In the Case Narrative, the laboratory has indicated that all initial calibrations have used linear regression, and that all acceptance criteria are met. The reported data verify the linear curve calculation. The % RSD is out of limits for propionic acid and pyruvic acid as noted below. There could be variability to the responses. The raw data have been provided for a representative package and the linearity of the curve used for quantitation is acceptable to verify reported results. The deviation for only the propionic acid is sufficient to recommend qualifying the variability. Response factors (RF) are not usually evaluated for this method, but the RF for pyruvic acid is only 0.007, which is quite low. The low recoveries of the matrix spikes could be an indication that the response is biased low. Per the acceptance of the linear curve, data have not been qualified and the low response has been noted to the project manager. The LCS data are acceptable to verify the quantitation from the curve.

The high % RSDs are noted for the report:

Propionic acid : ICAL 32.6 %RSD

Pyruvic acid 49.5 %RSD and RF of .007

Two SDGs were run under a different ICAL and are noted as

L13020204 :Propionic acid qualified as JC95.2 for very high %RSD; Pyruvic acid 49.5% RSD and 0.006 RF

L13020202: pyruvic acid 36.4 % RSD and RF 0.0066

Per review of the raw standards data for the Metabolic Acids, the response for pyruvic acid may be low, but the chromatography is acceptable even for the low standard. The linear curves are very tight and the % RSD is not apparent in the calibrations particularly for the propionic acid. Per communication with the HDR project manager, there are sufficient data to remove the qualifiers, except the one noted JC95.6

RSK-175: The initial calibrations are in control for ethane and ethene. The % RSD for methane is 39.6. The linear curve is acceptable per review of the raw data for the standards. All data as all SDGs are run under the same ICAL. For the RSK calibration, there was an interference peak right after the actual methane peak for the 1st standard on page 197. The area counts and result for that standard compared to the other standards shows that 1st standard is not accurate for methane. Methane is about 50% higher than it should be (reported at .836 should be around .640). The lab is advised to go back and recalculate the curve for methane. A recalculation will not change the reported results by a significant amount as most results are so high that they are not impacted by the error in the lowest standard. It will throw the curve off a bit, but not much. The method does allow for removing one point on the curve, which would bring the %RSD fully back into acceptance. As the curve without that value is well within limits, the methane qualifiers have been removed.

TOC: All calibrations were within limits. No summary data are provided and the raw data were accessed to review these data. The laboratory hand writes the %R values onto the run log.

E. Percent Difference (%D's) for Continuing Calibration Factors and retention times (RT) were within the 25% Limits.

Yes ☒ No ☐

MBA, RSK: All calibrations are in control.

TOC: All calibrations are in control as noted from the raw data review by bracketing all the client samples from the run log.

V. BLANKS

A. Laboratory blanks

1. Laboratory blanks were analyzed for every sample set and for each matrix type or once in every 20 samples, whichever is more frequent.

Yes ☒ No ☐

2. No blank contamination was found in the method blank.

Yes ☒ No ☐

MBA: All method blanks are in control.

RSK-175: All method blanks are in control.

TOC: All method blanks are in control. Note that a 10% review of the raw data indicates a calibration blank or background of about 0.15 mg/L TOC. No data are in that low a range and no data have been qualified.

3. Instrument blank analysis was performed following all samples that contained analytes at high concentrations.

Yes _____ No _____ NA ☒ _____

No data reported or required for this item.

B. Field Blanks

If field blanks were identified, no blank contamination was found.

Yes _____ No ☒ _____ NA _____

There are 3 field blanks for each method.

The table below summarizes the results.

Detected targets associated with a TOC field blank outlier are qualified as UFB#, where # is the field blank level corrected for sample dilution, when the result is less than 5x the corrected field blank level.

The rinse blank value itself is small at 1.71 mg/L, but it is multiplied by the dilution. In SDG L13020340, TOC was reported at 0.501 and all results even when corrected for dilution are > 5 x blank.

Lab ID	Client ID	Compound	Result mg/L	MDL	Dil'n	DVAL
L13020203-03	IW21-03A-EBT-11	Total Organic Carbon	98.8	25	50	UFB85.5
L13020203-05	IW21-04B-EBT-11	Total Organic Carbon	5010	50	100	UFB171

VI. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

A. Matrix spike (MS) and matrix duplicate or matrix spike duplicate (MSD) were analyzed for every analyses performed for every 20 samples or for every matrix whichever is more frequent.

Yes ☒ _____ No _____

There are 3 MS/MSDs for each method, which meets frequency requirements for non-QC samples.

PMW21-01, IW21-04A, IW92-01.

B. The MS and MSD percent recoveries (%R) were within the limits defined in the QAPP of 40 – 140% for soil and water for Method 8081/ 8082. Two compounds are allowed to be 30 -150%. Both the MS and the MSD %R are required to be out of limits for data to be qualified. No limits are defined in the QAPP for the RSK-175 or VFA methods and lab limits have been applied. For TOC, the EPA limits of 75-125% are used.

Yes _____ No ☒ _____

Metabolic acids: Data have been qualified JMS#, where # is the % R. Data could be biased extremely high in all cases except for the pyruvic acid zero recoveries, which are rejected as the parent sample in non-detect. Lactic acid was also extremely high, but it is non-detect and data are not qualified for high recovery.

RSK: The laboratory notes a missed spike for IW92-01, but it was properly spiked in the diluted sample and recoveries were acceptable.

Lab ID	Client ID	Compound	Result	units	Lab Flag	MDL	dil'n	DVAL
L13020202-01	PMW21-01-EBT-11	Pyruvic Acid		mg/L	U	0.05	1	RMS0
L13020289-02	IW101-03A-EBT-11	Acetic Acid	17.3	mg/L		5	10	JMS2450
L13020289-02	IW101-03A-EBT-11	Butyric Acid	21.2	mg/L		5	10	JMS2480
L13020289-02	IW101-03A-EBT-11	Pyruvic Acid		mg/L	U	0.5	10	RMS0
L13020354-04	IW92-01-EBT-11	Methane	2040	ug/L		25	25	JMS200
L13020354-04	IW92-01-EBT-11	Methane	9230	ug/L		20	20	JMS200

C. The MSD relative percent differences (RPD) were within the defined QAPP limits of < 50% RPD. None are acceptable if greater than 60% RPD. The TOC limit is 20% for waters.

Yes ☒ No ☐

D. The MS/MSDs were client samples.

Yes ☒ No ☐

No non-client samples were reported.

VII. LABORATORY CONTROL SAMPLE AND DUPLICATE (LCS/LCSD)

A. Laboratory Control Sample (LCS) and LCS duplicate were analyzed for every analyses performed and for every 20 samples or for every matrix whichever is more frequent.

Yes ☒ No ☐

B. The LCS percent recovery (%R) are within the limits defined by QAPP of 50 – 130% for soil and water for pesticides and PCBs. For RSK and VFA, the QAPP limit is the lab limits for both LCS and LCSD. Two compounds are allowed to be 30 -150%. If an LCS and LCDS are analyzed, both samples have to have outliers in order for data to be qualified. The TOC limit is 80 – 120%.

Yes ☒ No ☐

VIII. SURROGATE RECOVERY

A. The Surrogate spike was analyzed with every sample.

Yes ☐ No ☐ NA ☒

B. And met the recovery limits defined in the QAPP of 40 – 140%. If recovery limits were exceeded for both surrogates, the sample was re-extracted and re-analyzed.

Yes ☐ No ☐ NA ☒

IX. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria and the Retention times were within the required windows. Note: Internal standards are not required for GC analysis, but if they are used, SW-846 stipulates that they meet the same recovery requirements as those specified for GCMS methods.

Yes ☐ No ☐ NA ☒

X. FIELD QC

If Field duplicates were identified, they met guidance RPD of < 35% for water or < 50% for soils and gases. For values reported at < 5 x the reporting limit (RL), a difference of 2 x RL is used as guidance (4 x RL for soils). Data are not qualified for field duplicates as these are evaluated for the total project by the client.

Yes ☐ No ☒ NA ☐

A number of analytes are out of limits in field duplicates. Data have been qualified JD#, where # is the RPD in order to identify the outliers to the project manager. They can be removed once the precision is recorded. The metabolic acids are so highly diluted that only the highest dilution was used for the precision calculation. All dilutions have been qualified, however.

IW21-03B-EBT-11	DUP1-EBT-11
IW101-05A-EBT-11	DUP2-EBT-11
PMW101-04B-EBT-11	DUP3-EBT-11
IW92-03-EBT-11	DUP4-EBT-11

PMW85-05-EBT-11	DUP5-EBT-11
MW-203A-EBT-11	DUP6-EBT-11

Lab ID	Client ID	Compound	Result	units	Lab Flag	MDL	dil'n	DVAL
L13020289-01	IW21-03B-EBT-11	Butyric Acid	16500	mg/L		250	500	JFD41
L13020289-01	IW21-03B-EBT-11	Propionic Acid	6340	mg/L		2500	500	JFD42
L13020289-01	IW21-03B-EBT-11	Butyric Acid	19300	mg/L	J	50	100	JFD41
L13020289-01	IW21-03B-EBT-11	Propionic Acid	7410	mg/L		500	100	JFD42
L13020289-01	IW21-03B-EBT-11	Total Organic Carbon	16900	mg/L		1000	2000	JFD50
L13020289-09	DUP1-EBT-11	Butyric Acid	10700	mg/L	J	50	100	JFD41
L13020289-09	DUP1-EBT-11	Propionic Acid	4120	mg/L		500	100	JFD42
L13020289-09	DUP1-EBT-11	Butyric Acid	10900	mg/L		500	1000	JFD41
L13020289-09	DUP1-EBT-11	Propionic Acid		mg/L	U	5000	1000	JFD42
L13020289-09	DUP1-EBT-11	Total Organic Carbon	28200	mg/L		1000	2000	JFD50
L13020352-03	IW92-03-EBT-11	Methane	682	ug/L		1	1	JFD41
L13020352-07	DUP4-EBT-11	Methane	451	ug/L		1	1	JFD41
L13020289-01	IW21-03B-EBT-11	Acetic Acid	4710	mg/L		250	500	JFD41
L13020289-01	IW21-03B-EBT-11	Acetic Acid	5430	mg/L		50	100	JFD41
L13020289-09	DUP1-EBT-11	Acetic Acid	3030	mg/L		50	100	JFD41
L13020289-09	DUP1-EBT-11	Acetic Acid	3110	mg/L		500	1000	JFD41

XI. COMPOUND IDENTIFICATION

A. All raw data chromatograms and data system printouts were evaluated for all detected compounds and the identification is accurate.

Yes ____ No ____ NA X

This evaluation is not performed at this level of review.

B. Retention time limits or peak pattern identifications are met.

Yes ____ No ____ NA X

This evaluation is not performed at this level of review.

C. If two column or two detector confirmation was performed, the value of the confirmation was within 25%D of the quantitation value for results > 5 x RL. If the laboratory has flagged data 'COL' for %D > 40%, a JP qualifier has been added for low level results. For values below (5 x RL), the difference is not considered to impact the precision of the data.

Yes ____ No ____ NA X

Not part of this level of review. Dual columns are not required for these methods.

XII. COMPOUND QUANTITATION AND REPORTED CRQLS

A. Raw data examination verified that all sample results were correctly calculated.

Yes ____ No ____ NA X

This evaluation is not performed at this level of review.

B. The chromatograms and general system performance were acceptable for all instruments and analytical systems.

Yes _____ No _____ NA X _____

This evaluation is not performed at this level of review.

C. The suggested EQLs for the sample matrices in this set were met.

Yes X _____ No _____ NA _____

These samples are highly diluted, particularly for the metabolic acids. The project manager will determine if the project limits are met for the non-detected compounds.

XIII. OVERALL ASSESSMENT OF THE CASE

The method criteria have been met and the quality of the data, after consideration of qualifiers, is considered acceptable and usable as far as can be determined at this level of review.

The following is noted:

This report has been requested to include the following review: Holding times and sample integrity (chains of custody, sample log in), Calibrations, Summary QC. There are 70 water samples including QC samples (duplicates and rinse blanks, excluding the volatile count) with 21 QC sets (days of analysis) for RSK, 17 QC for Metabolic Acid and 16 QC for TOC.

Sample Condition:

Many of the report narratives and sample receipt documentation stated that several of the metabolic acid (MA) and TOC samples required pH adjustment upon arrival.

The Record of Sample Receipt notes the following

SDG L13020203: The pH was out for IW21-02A (all end in EBT-11), IW21-02B, IW21-04A, IW21-04B, RB1. No method is defined and the note is reported. The comment also says "These samples do not appear to be clean water. They are very dark and color and have a strong odor. Please proceed. SLM"

The Record of Sample Receipt notes the following

Sample IW21-04B – the MA lid was received cracked, but no sample was lost.

Sample RB1 – the MA lid was received cracked, and some of the sample was lost. Both lids were replaced and there was sufficient RB1 for analyses.

SDG L13020341, IW85-06-EBT-11; L13020340, IW92-07 ; L13020354, IW-92, IW101-04C ; L13020357, IW-85-05 ; L13020352, IW92-03 and DUP 4 and 2 samples in L13020289 are noted with pH out for MA and TOC. Only for the last SDG does the laboratory note that the pH was adjusted when samples arrived. The laboratory has been contacted in the past and verified that pH adjustment is part of the log-in process.

PW85-05 is noted as having a broken container for MA.

The need for pH adjustment is a common occurrence for samples at this site. The proper sample bottles have been issued and used. There is a buffering capacity to these matrices that results in slightly elevated pH. The pH is adjusted as soon as the samples reach the laboratory and the impact on the sample data is considered to be minimal. No qualifiers have been added.

Calibrations:

MBA: In the Case Narrative, the laboratory has indicated that all initial calibrations have used linear regression, and that all acceptance criteria are met. The reported data verify the linear curve calculation. The % RSD is out of limits for propionic acid and pyruvic acid as noted below. There could be variability to the responses. The raw data have been provided for a representative package and the linearity of the curve used for quantitation is acceptable to verify reported results. The deviation for only

the propionic acid is sufficient to recommend qualifying the variability. Response factors (RF) are not usually evaluated for this method, but the RF for pyruvic acid is only 0.007, which is quite low. The low recoveries of the matrix spikes could be an indication that the response is biased low. Per the acceptance of the linear curve, data have not been qualified and the low response has been noted to the project manager. The LCS data are acceptable to verify the quantitation from the curve.

The high % RSDs are noted for the report:

Propionic acid : ICAL 32.6 %RSD

Pyruvic acid 49.5 %RSD and RF of .007

Two SDGs were run under a different ICAL and are noted as

L13020204 :Propionic acid qualified as JC95.2 for very high %RSD; Pyruvic acid 49.5% RSD and 0.006 RF

L13020202: pyruvic acid 36.4 % RSD and RF 0.0066

Per review of the raw standards data for the Metabolic Acids, the response for pyruvic acid may be low, but the chromatography is acceptable even for the low standard. The linear curves are very tight and the % RSD is not apparent in the calibrations particularly for the propionic acid. Per communication with the HDR project manager, there are sufficient data to remove the qualifiers, except the one noted JC95.6

RSK-175: The initial calibrations are in control for ethane and ethene. The % RSD for methane is 39.6. The linear curve is acceptable per review of the raw data for the standards. All data as all SDGs are run under the same ICAL. For the RSK calibration, there was an interference peak right after the actual methane peak for the 1st standard on page 197. The area counts and result for that standard compared to the other standards shows that 1st standard is not accurate for methane. Methane is about 50% higher than it should be (reported at .836 should be around .640). The lab is advised to go back and recalculate the curve for methane. A recalculation will not change the reported results by a significant amount as most results are so high that they are not impacted by the error in the lowest standard. It will throw the curve off a bit, but not much. The method does allow for removing one point on the curve, which would bring the %RSD fully back into acceptance. As the curve without that value is well within limits, the methane qualifiers have been removed.

TOC: All calibrations were within limits. No summary data are provided and the raw data were accessed to review these data. The laboratory hand writes the %R values onto the run log.

Method Blanks

MBA: All method blanks are in control.

RSK-175: All method blanks are in control.

TOC: All method blanks are in control. Note that a 10% review of the raw data indicates a calibration blank or background of about 0.15 mg/L TOC. No data are in that low a range and no data have been qualified.

MS/MSD Recoveries:

There are 3 MS/MSDS for each method, which meets frequency requirements for non-QC samples. PMW21-01, IW21-04A, IW92-01.

B. The MS and MSD percent recoveries (%R) were within the limits defined in the QAPP of 40 – 140% for soil and water for Method 8081/ 8082. Two compounds are allowed to be 30 -150%. Both the MS and the MSD %R are required to be out of limits for data to be qualified. No limits are defined in the QAPP for the RSK-175 or VFA methods and lab limits have been applied.

Yes _____ No X

Metabolic acids: Data have been qualified JMS#, where # is the % R. Data could be biased extremely high in all cases except for the pyruvic acid zero recoveries, which are rejected as the parent sample in non-detect. Lactic acid was also extremely high, but it is non-detect and data are not qualified for high recovery.

RSK: The laboratory notes a missed spike for IW92-01, but it was properly spiked in the diluted sample and recoveries were acceptable.

Lab ID	Client ID	Compound	Result	units	Lab Flag	MDL	dil'n	DVAL
L13020202-01	PMW21-01-EBT-11	Pyruvic Acid		mg/L	U	0.05	1	RMS0
L13020289-02	IW101-03A-EBT-11	Acetic Acid	17.3	mg/L		5	10	JMS2450
L13020289-02	IW101-03A-EBT-11	Butyric Acid	21.2	mg/L		5	10	JMS2480
L13020289-02	IW101-03A-EBT-11	Pyruvic Acid		mg/L	U	0.5	10	RMS0
L13020354-04	IW92-01-EBT-11	Methane	2040	ug/L		25	25	JMS200
L13020354-04	IW92-01-EBT-11	Methane	9230	ug/L		20	20	JMS200

Field Blanks:

There are 3 field blanks for each method.

The table below summarizes the results.

Detected targets associated with a TOC field blank outlier are qualified as URB#, where # is the field blank level corrected for sample dilution, when the result is less than 5x the corrected field blank level.

The rinse blank value itself is small at 1.71 mg/L, but it is multiplied by the dilution. In SDG L13020340, TOC was reported at 0.501 and all results even when corrected for dilution are > 5 x blank.

Lab ID	Client ID	Compound	Result mg/L	MDL	Dil'n	DVAL
L13020203-03	IW21-03A-EBT-11	Total Organic Carbon	98.8	25	50	UFB85.5
L13020203-05	IW21-04B-EBT-11	Total Organic Carbon	5010	50	100	UFB171

Field Duplicates:

A number of analytes are out of limits in field duplicates. Data have been qualified JD#, where # is the RPD in order to identify the outliers to the project manager. They can be removed once the precision is recorded. The metabolic acids are so highly diluted that only the highest dilution was used for the precision calculation. All dilutions have been qualified, however.

IW21-03B-EBT-11	DUP1-EBT-11
IW101-05A-EBT-11	DUP2-EBT-11
PMW101-04B-EBT-11	DUP3-EBT-11
IW92-03-EBT-11	DUP4-EBT-11
PMW85-05-EBT-11	DUP5-EBT-11
MW-203A-EBT-11	DUP6-EBT-11

Lab ID	Client ID	Compound	Result	units	Lab Flag	MDL	dil'n	DVAL
L13020289-01	IW21-03B-EBT-11	Butyric Acid	16500	mg/L		250	500	JFD41
L13020289-01	IW21-03B-EBT-11	Propionic Acid	6340	mg/L		2500	500	JFD42

L13020289-01	IW21-03B-EBT-11	Butyric Acid	19300	mg/L	J	50	100	JFD41
L13020289-01	IW21-03B-EBT-11	Propionic Acid	7410	mg/L		500	100	JFD42
L13020289-01	IW21-03B-EBT-11	Total Organic Carbon	16900	mg/L		1000	2000	JFD50
L13020289-09	DUP1-EBT-11	Butyric Acid	10700	mg/L	J	50	100	JFD41
L13020289-09	DUP1-EBT-11	Propionic Acid	4120	mg/L		500	100	JFD42
L13020289-09	DUP1-EBT-11	Butyric Acid	10900	mg/L		500	1000	JFD41
L13020289-09	DUP1-EBT-11	Propionic Acid		mg/L	U	5000	1000	JFD42
L13020289-09	DUP1-EBT-11	Total Organic Carbon	28200	mg/L		1000	2000	JFD50
L13020352-03	IW92-03-EBT-11	Methane	682	ug/L		1	1	JFD41
L13020352-07	DUP4-EBT-11	Methane	451	ug/L		1	1	JFD41
L13020289-01	IW21-03B-EBT-11	Acetic Acid	4710	mg/L		250	500	JFD41
L13020289-01	IW21-03B-EBT-11	Acetic Acid	5430	mg/L		50	100	JFD41
L13020289-09	DUP1-EBT-11	Acetic Acid	3030	mg/L		50	100	JFD41
L13020289-09	DUP1-EBT-11	Acetic Acid	3110	mg/L		500	1000	JFD41

Reporting Limits

These samples are highly diluted, particularly for the metabolic acids. The project manager will determine if the project limits are met for the non-detected compounds.

TABLE OF QUALIFIED DATA

Lab ID	Client ID	Compound	Result	units	Lab Flag	MDL	dil'n	DVAL
L13020202-01	PMW21-01-EBT-11	Methane	87.8	ug/L		1	1	JD22.8
L13020202-01	PMW21-01-EBT-11	Pyruvic Acid		mg/L	U	0.05	1	RMS0
L13020203-03	IW21-03A-EBT-11	Total Organic Carbon	98.8	mg/L		25	50	UFB85.5
L13020203-05	IW21-04B-EBT-11	Total Organic Carbon	5010	mg/L		50	100	UFB171
L13020289-01	IW21-03B-EBT-11	Butyric Acid	16500	mg/L		250	500	JFD41
L13020289-01	IW21-03B-EBT-11	Propionic Acid	6340	mg/L		2500	500	JFD42
L13020289-01	IW21-03B-EBT-11	Butyric Acid	19300	mg/L	J	50	100	JFD41
L13020289-01	IW21-03B-EBT-11	Propionic Acid	7410	mg/L		500	100	JFD42
L13020289-01	IW21-03B-EBT-11	Total Organic Carbon	16900	mg/L		1000	2000	JFD50
L13020289-02	IW101-03A-EBT-11	Acetic Acid	17.3	mg/L		5	10	JMS2450
L13020289-02	IW101-03A-EBT-11	Butyric Acid	21.2	mg/L		5	10	JMS2480
L13020289-02	IW101-03A-EBT-11	Pyruvic Acid		mg/L	U	0.5	10	RMS0
L13020289-01	IW21-03B-EBT-11	Acetic Acid	4710	mg/L		250	500	JFD41
L13020289-01	IW21-03B-EBT-11	Acetic Acid	5430	mg/L		50	100	JFD41
L13020289-09	DUP1-EBT-11	Acetic Acid	3030	mg/L		50	100	JFD41
L13020289-09	DUP1-EBT-11	Acetic Acid	3110	mg/L		500	1000	JFD41
L13020289-09	DUP1-EBT-11	Butyric Acid	10700	mg/L	J	50	100	JFD41
L13020289-09	DUP1-EBT-11	Propionic Acid	4120	mg/L		500	100	JFD42
L13020289-09	DUP1-EBT-11	Butyric Acid	10900	mg/L		500	1000	JFD41
L13020289-09	DUP1-EBT-11	Propionic Acid		mg/L	U	5000	1000	JFD42
L13020289-09	DUP1-EBT-11	Total Organic Carbon	28200	mg/L		1000	2000	JFD50
L13020352-03	IW92-03-EBT-11	Methane	682	ug/L		1	1	JFD41

L13020352-07	DUP4-EBT-11	Methane	451	ug/L		1	1	JFD41
L13020354-04	IW92-01-EBT-11	Methane	2040	ug/L		25	25	JMS200
L13020354-04	IW92-01-EBT-11	Methane	9230	ug/L		20	20	JMS200
L13020204-02	DR1-5A-EBT-11	Propionic Acid	27.8	mg/L		5	1	JC95.2
L13020204-03	DR1-6-EBT-11	Propionic Acid	35	mg/L		5	1	JC95.2
L13020204-04	DR1-6A-EBT-11	Propionic Acid		mg/L	U	5	1	JC95.2
L13020204-05	PMW101-02A-EBT-11	Propionic Acid	35.7	mg/L		5	1	JC95.2
L13020204-06	PMW101-02B-EBT-11	Propionic Acid		mg/L	U	5	1	JC95.2

DIANE SHORT & ASSOCIATES, INC. _____

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ORGANIC DATA QUALITY REVIEW REPORT

Volatile Organics by SW-846 Method 8260B (GC/MS)

SDG L13020:													
201	202	203	204	285	286	288	289	340	341	352	354	357	

PROJECT	Memphis Defense Depot, EBT-11 Sampling for HDR, Denver		
LABORATORY	Microbac Laboratories, Inc., Marietta, OH		
SAMPLE MATRIX	Water	SAMPLING DATE	02/2013
NUMBER OF SAMPLES	77 water, including 6 field duplicate pairs, 9 trip blanks and 3 rinse blanks		
ANALYSES REQUESTED	SW-846 8260B (VOA by GC/MS)		
SAMPLE NUMBER	See result forms attached and associated EDD		

DATA REVIEWER: Diane Short

QA REVIEWER: Diane Short & Associates, Inc. INITIALS/DATE: DL 03/18/2013

Telephone Logs included Yes___ No X

Contractual Violations Yes___ No X

The project QAPP (09/11), the EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 1999 and 2007, and the SW-846 Method 8260B have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review of these samples includes Level III validation of all chains of custody, calibrations and QC forms referencing the QC limits in the above documents.

I. DELIVERABLES

A. All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.

Yes ☒ No ☐

This report has been requested to include the following review: QC, hold times, sample integrity (Chains of Custody, sample login), and summary calibrations. Note that there are 18 QC sets (days of analysis per instrument) and 3 instruments for the 77 samples. Note that some redundant QC has not been included in the count.

B. Chain of Custody documentation was complete and accurate.

Yes ☒ No ☐

No qualifiers have been added for Chain of Custody (COC) issues, and the Project Manager will update COC per the following notes to complete the project record.

The laboratory has signed and affixed a receipt label on all pages. The relinquishment date and time are part of the electronically-generated COC and are present only on the last page of the COC. There is an electronic signature on the last page unless noted.

In addition, there are sample receipt acknowledgements from the laboratory. The log in forms contain the courier identification and air bill number.

C. Samples were received at the required temperature, preservation and intact with no bubbles.

Yes ☐ No ☒

EPA regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6 °C. The sample temperature conditions are fully compliant with applicable regulations.

The Record of Sample Receipt notes the following

SDG L13020203: The pH was out for IW21-02A (all end in EBT-11), IW21-02B, IW21-04A, IW21-04B, RB1. It would not be expected that this would apply to VOA as pH is not generally measured during log-in. No method is defined and the note is reported. The comment also says "These samples do not appear to be clean water. They are very dark and color and have a strong odor. Please proceed. SLM"

'The TB-020613, 1 of 3 vials had headspace'. Sufficient volume was present to do the analysis as the sample is reported.

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes ☒ No ☐

B. Holding Times

1. The contract holding times were met for all analyses [time of sample receipt to time of analysis (VOA) or time of extraction to time of analysis].

Yes ☒ No ☐

2. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (14 days from time of sample collection to analysis or extraction).

Yes ☒ No ☐

III. INSTRUMENT CALIBRATION – GC/MS

A. Initial Calibration

1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of > 0.05 or > 0.01 for poor responding volatiles.

Yes ☒ No ☐ NA ☐

Method 8260: Per the Project Manager, the 2007 EPA CLP validation guidance has been applied to the common "poor responders." Calibration response factors were acceptable for Acetone and 2-butanone and other

poor responders. The validation guidance used for this project allows for a response of 0.01 for these compounds if spectral integrity can be verified at low concentrations. These spectra are not commonly provided and are not part of the deliverable for this data set. The laboratory has been tasked with providing to the client verification that the 0.01 RF is valid. If the spectral verification is available, data are not qualified for response factors greater than 0.01 and less than 0.05 for “poor responders.” No data have been qualified.

Most of the low-responding compounds are highly water-soluble and capable of hydrogen bonding with water. This decreases their purge efficiency and results in the relatively low response. The implication of this low purge efficiency is that a relatively low absolute recovery of such compounds is achieved in the purge step of the analysis. If this recovery is consistent, reasonable accuracy and precision can be achieved in a given matrix, which is indicated for the lab matrix by acceptable recoveries in LCS and calibration checks. However, this causes these targets to be more sensitive to matrix variations that impact purge efficiency (such as ionic strength or the presence of varying levels of soluble non-target organic material) than are the more hydrophobic compounds typically analyzed by this method, and as a result they are more likely to exhibit matrix bias.

2a. The relative standard deviation (RSD) for the five point calibration was within the 30% limit for the CCCs.
Yes ☒ No ☐ NA ☐

This is a method requirement and indicates that the analytical system is in control.

2b. The relative standard deviation (RSD) for the five point calibration was within the 30% limit for all other compounds, the average % RSD was < 15%, or a linear curve was used.

Yes ☒ No ☐ NA ☐

3. The 12 hour system Performance Check was performed as required in SW-846 and met the QC limits of 80 – 120%.

Yes ☐ No ☒ NA ☐

The following applies to the ICV for each initial calibration. Bromomethane is slightly high is the ICVs for Instrument 8 on 2/12/13. Other poor responders (pr) have also been noted as slightly high. The compounds are not detected in the samples and no qualifier is applied. See table below.

B. Continuing Calibrations

1. The midpoint standard was analyzed for each analysis at the required frequency, and the QC criterion of > 0.05 (> 0.01 for CLP 2001 VOA) was met.

Yes ☒ No ☐ NA ☐

2. The percent difference (% D) limits of $\pm 20\%$ were met. The 2007 NFG also allow for 40% D for the “poor responders (pr).”

Yes ☐ No ☒ NA ☐

When there are no detections, no qualification is required unless the % D is biased low and so large as to indicate a significant probability of false negatives. Qualification is required for a % D biased high for detected compounds only. This requires that the RF is acceptable to verify the non-detect status, which is the case here. Data would be qualified “JC#”, where # is the % D. There could be variability to the data as there is variability to the response. No qualifiers have been required.

Instrument						
MS 11	ICAL	ICV	CCAL			
	8-Feb		15-Feb	17-Feb	18-Feb	19-Feb
SDGs (L13020:) work group note in (x) as needed						

201, 341	X	pr	X			
289				pr's		
288, 340, 352, 354 (1155); 289, 352, 288 (1104)						a.m Bromomethane -23.8%; p.m. bromomethane -25.7%
MS8	12-Feb		17-Feb	19-Feb	18-Feb	20-Feb
202		Bromo methane -32.1%	pr's			
203, 285					pr's	
285					pr's	
352 (421410), 288(421157)						pr's and 1,1,2,2 tetrachloroethane -20.7
MS10	30-Jan		21-Feb	18-Feb	2/14, 15/2013	17-Feb
286,&289 (1012), 204		pr				pr's and Bromomethane 42%
286					X	
285, 204				X		
357			pr			

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB (VOA) performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.

Yes ☒ No ☐ NA ☐

V. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria, and the Retention times were within the required windows.

Yes ☒ No ☐ NA ☐

Note that the Internal Standards are quite a bit lower for Instrument 10, particularly for IS-1. All are still within acceptance limits.

VI. SURROGATE STANDARDS

Surrogate spikes were analyzed with every sample.

Yes ☒ No ☐

And met the recovery limits defined in the QAPP , which are the laboratory limits.

Yes ☒ No ☐

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.

Yes ☒ No ☐

The MS/MSDs include (all ending in EBT-11):

IW101-03A, PMW21-01, IW92-01,

This meets the recommendation of 1 per 20 field (not field QC or blank) samples. As this is an ongoing project an overall adherence to the 1:20 frequency is monitored by the Project Manager.

The lab notes they do not report non-client QC. In most, and not all cases, and LCS/LCSD is reported.

B. The MS and MSD percent recoveries were within the limits defined in the updated 2011 QAPP, which now references the laboratory limits.

Yes ☒ No ☐ NA ☐

The full target list has been spiked. For sample PMW21-01-EBT-11, the result for trichloroethene (TCE) is over the 4x limit, where the result is statistically greater than the recovery of the spike. PCE is 4 x the spike value in sample IW21-04A and no qualifier has been applied. In sample IW92-01, cis-1,2-dichloroethene is also 4 x the spike and no qualifier is applied.

C. The MSD relative percent differences (RPD) were within the defined contract limits, which are 30%.

Yes ☒ No ☐ NA ☐

D. The MS/MSD were client samples.

Yes ☒ No ☐ NA ☐

Only client samples reported.

VIII. LABORATORY CONTROL SAMPLE

A. Laboratory Control Sample (LCS) was analyzed for every analysis performed and for every 20 samples.

Yes ☒ No ☐

Although not required of the method, an LCS and LCSD are routinely reported when there is not an MS/MSD reported in the data set.

B. The LCS percent recoveries were within the limits defined in the updated 2011 QAPP, which are the laboratory limits. If an LCS and LCSD are analyzed, both samples must have the same compounds out for data to be qualified. The RPD is qualified only if the %R is also out.

Yes ☐ No ☒

The full target list has been spiked. When a high LCS recovery is associated with a non-detect in samples, no qualifier is added since the indicated bias is high. When the target is detected, data are qualified "JL#", where # is the recovery. Data could be biased high proportional to the LCS percent recovery. All results associated with low recoveries are qualified and data could be biased low. The laboratory uses the same control limits on all 3 instruments used for analysis even though the responses are different on each instrument. The control limits should be instrument specific. No data have been qualified.

Laboratory Control Sample Recovery			
Instrument	11	10	11
WG: 42:	0870	1110	0929
SDG 13020:	286	285	201, 341
Compound			
Sec-butylbenzene			74.1 (OK)/ 69.1 (low)
2-chlorotoluene			101/79.4 %R OK (RPD out at 24.4)
Dichlorodifluoromethane			159/149
Chloromethane	134/ 135	133/ 126	

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.

Yes ☒ No ☐

B. No blank contamination was found in the Method Blank.

Yes ☐ No ☒

SDG L13020201 reported method blank contamination of 1,2,3- and 1,2,4-trichlorobenzene and hexachlorobutadiene. These are not common laboratory contaminants and the source of the compounds is not specified in the narrative. The compounds are not reported in client samples, and no qualifier is applied. L13020288 does not report these compounds in the method blank, but the narrative notes that for sample 5 MW-203A-EBT-11 that the trichlorobenzenes are not reported due to suspected carryover.

C. If Field Blanks were identified, no blank contamination was found.

Yes ☐ No ☒ NA ☐

The field blanks are RB1, RB2 and RB3-EBT-11. The samples contained acetone, toluene and, in 2 of 3 cases, naphthalene. Only acetone has impacted reported data. Data are qualified UFB#, where # is the acetone result, dilution corrected for the associated sample.

Nine Trip blanks were collected and all were non-detected with the exception of one TB0201513 detection of 1,4 dichlorobenzene. The compound is not reported in the associated samples. No qualifiers have been applied.

Lab ID	Client ID	Compound	Result ug/L	Lab Flag	MDL	dilution	DVAL
L13020203-02	IW21-02B-EBT-11	Acetone	156		25	10	UFB38.4
L13020203-03	IW21-03A-EBT-11	Acetone	3.88	F	2.5	1	UFB3.84
L13020203-04	IW21-04A-EBT-11	Acetone	81.2	F	25	10	UFB38.4
L13020203-05	IW21-04B-EBT-11	Acetone	206		25	10	UFB38.4
L13020289-05	IW101-03B-EBT-11	Acetone	133		12.5	5	UFB17.6
L13020289-07	IW101-07B-EBT-11	Acetone	3.52	F	2.5	1	UFB3.51
L13020289-08	IW101-07C-EBT-11	Acetone	76.4	F	25	10	UFB35.1
L13020340-01	IW92-07-EBT-11	Acetone	610		50	20	UFB105.2

X. FIELD QC

If Field Duplicates were identified, they met guidance for VOA of RPD of < 30% for water or < 50% for soil. For values reported at < 5 × the reporting limit (RL), a difference of 2 × RL or 3.5 × RL for soil is used as guidance. This is referred to as the CRDL Rule. Data are not qualified for Field Duplicates as these are evaluated for the total project by the Project Manager.

Yes ☒ No ☐ NA ☐

All field precision limits were met for these samples. For The DUP6 pair, the sample was run at 2 dilutions. Both are in agreement at the specified dilution or are within the RL limit. At the higher dilutions for pairs like DUP 4, although the values seem high, the RL differences are met.

IW21-03B-EBT-11	DUP1-EBT-11
IW101-05A-EBT-11	DUP2-EBT-11
PMW101-04B-EBT-11	DUP3-EBT-11
IW92-03-EBT-11	DUP4-EBT-11
PMW85-05-EBT-11	DUP5-EBT-11
MW-203A-EBT-11	DUP6-EBT-11

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and analytical systems.

Yes _____ No _____ NA X
Not part of this review level.

B. The suggested EQLs for the sample matrices in this set were met.

Yes X No _____ NA _____

There are extremely high dilutions for many of the samples due to compounds over the calibration range of the instrument. There are also numerous samples noted as being diluted due to foaming of the sample during the purging step. The project manager will determine if the elevated reporting limits meet the project criteria. All dilutions have been reported.

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for all detected compounds.

Yes _____ No _____ NA X

Not part of this review level.

B. Quantitation was checked to determine the accuracy of calculations for representative compounds in each internal standards quantitation set.

Yes _____ No _____ NA X

Not part of this review level.

XIII. TENTATIVELY IDENTIFIED COMPOUNDS

TICs were properly identified and met the library identification criteria.

Yes _____ No _____ NA X

Not part of this review level.

XIV. OVERALL ASSESSMENT OF THE CASE

The laboratory has complied with the requested method. Data are fully usable after consideration of qualifiers. The following is noted:

Chain of Custody

No qualifiers have been added for Chain of Custody issues, and the Project Manager will update documentation per the notes in the text to complete the project record.

This report has been requested to include the following review: QC, hold times, sample integrity (Chains of Custody, sample login), and summary calibrations. Note that there are 18 QC sets (days of analysis per instrument) and 3 instruments for the 77 samples. Note that some redundant QC has not been included in the count.

No qualifiers have been added for Chain of Custody (COC) issues, and the Project Manager will update COC per the following notes to complete the project record.

The laboratory has signed and affixed a receipt label on all pages. The relinquishment date and time are part of the electronically-generated COC and are present only on the last page of the COC. There is an electronic signature on the last page unless noted.

In addition, there are sample receipt acknowledgements from the laboratory. The log in forms contain the courier identification and air bill number.

Sample Preservation

EPA regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6 °C. The sample temperature conditions are fully compliant with applicable regulations.

The Record of Sample Receipt notes the following

SDG L13020203: The pH was out for IW21-02A (all end in EBT-11), IW21-02B, IW21-04A, IW21-04B, RB1. It would not be expected that this would apply to VOA as pH is not generally measured during log-in. No

method is defined and the note is reported. The comment also says “These samples do not appear to be clean water. They are very dark and color and have a strong odor. Please proceed. SLM”
‘The TB-020613, 1 of 3 vials had headspace’. Sufficient volume was present to do the analysis as the sample is reported.

Initial Calibrations

Method 8260: Per the Project Manager, the 2007 EPA CLP validation guidance has been applied to the common “poor responders.” Calibration response factors were acceptable for Acetone and 2-butanone and other poor responders. The validation guidance used for this project allows for a response of 0.01 for these compounds if spectral integrity can be verified at low concentrations. These spectra are not commonly provided and are not part of the deliverable for this data set. The laboratory has been tasked with providing to the client verification that the 0.01 RF is valid. If the spectral verification is available, data are not qualified for response factors greater than 0.01 and less than 0.05 for “poor responders.” No data have been qualified.

Continuing Calibrations

The following applies to the ICV for each initial calibration. Bromomethane is slightly high is the ICVs for Instrument 8 on 2/12/13. Other poor responders (pr) have also been noted as slightly high. The compounds are not detected in the samples and no qualifier is applied. See table in the text. When there are no detections, no qualification is required unless the % D is biased low and so large as to indicate a significant probability of false negatives. Qualification is required for a % D biased high for detected compounds only. This requires that the RF is acceptable to verify the non-detect status, which is the case here. Data would be qualified “JC#”, where # is the % D. There could be variability to the data as there is variability to the response. No qualifiers have been required.

Internal Standards

Note that the Internal Standards are quite a bit lower for Instrument 10, particularly for IS-1. All are still within acceptance limits.

Matrix Spikes

The MS/MSDs include (all ending in EBT-11):

IW101-03A, PMW21-01, IW92-01,

This meets the recommendation of 1 per 20 field (not field QC or blank) samples. As this is an ongoing project an overall adherence to the 1:20 frequency is monitored by the Project Manager.

The lab notes they do not report non-client QC. In most, and not all cases, and LCS/LCSD is reported. The full target list has been spiked. For sample PMW21-01-EBT-11, the result for trichloroethene (TCE) is over the 4x limit, where the result is statistically greater than the recovery of the spike. PCE is 4 x the spike value in sample IW21-04A and no qualifier has been applied. In sample IW92-01, cis-1,2-dichloroethene is also 4 x the spike and no qualifier is applied.

Laboratory Control Samples

The full target list has been spiked. When a high LCS recovery is associated with a non-detect in samples, no qualifier is added since the indicated bias is high. When the target is detected, data are qualified “JL#”, where # is the recovery. Data could be biased high proportional to the LCS percent recovery. All results associated with low recoveries are qualified and data could be biased low. The laboratory uses the same control limits on all 3 instruments used for analysis even though the responses are different on each instrument. The control limits should be instrument specific. No data have been qualified.

Method Blanks

SDG L13020201 reported method blank contamination of 1,2,3- and 1,2,4-trichlorobenzene and hexachlorobutadiene. These are not common laboratory contaminants and the source of the compounds is not specified in the narrative. The compounds are not reported in client samples, and no qualifier is applied.

Field Blanks

The field blanks are RB1, RB2 and RB3-EBT-11. The samples contained acetone, toluene and, in 2 of 3 cases, naphthalene. Only acetone has impacted reported data. Data are qualified UFB#, where # is the acetone result, dilution corrected for the associated sample.

Nine Trip blanks were collected and all were non-detected with the exception of one TB0201513 detection of 1,4 dichlorobenzene. The compound is not reported in the associated samples. No qualifiers have been applied. See Table of Qualifiers at the end of the report.

Field QC

All field precision limits were met for these samples. For The DUP6 pair, the sample was run at 2 dilutions. Both are in agreement at the specified dilution or are within the RL limit. At the higher dilutions for pairs like DUP 4, although the values seem high, the RL differences are met.

IW21-03B-EBT-11	DUP1-EBT-11
IW101-05A-EBT-11	DUP2-EBT-11
PMW101-04B-EBT-11	DUP3-EBT-11
IW92-03-EBT-11	DUP4-EBT-11
PMW85-05-EBT-11	DUP5-EBT-11
MW-203A-EBT-11	DUP6-EBT-11

Reporting Limits

There are extremely high dilutions for many of the samples due to compounds over the calibration range of the instrument. There are also numerous samples noted as being diluted due to foaming of the sample during the purging step. The project manager will determine if the elevated reporting limits meet the project criteria. All dilutions have been reported.

TABLE OF QUALIFIED DATA

Lab ID	Client ID	Compound	Result ug/L	Lab Flag	MDL	dilution	DVAL
L13020203-02	IW21-02B-EBT-11	Acetone	156		25	10	UFB38.4
L13020203-03	IW21-03A-EBT-11	Acetone	3.88	F	2.5	1	UFB3.84
L13020203-04	IW21-04A-EBT-11	Acetone	81.2	F	25	10	UFB38.4
L13020203-05	IW21-04B-EBT-11	Acetone	206		25	10	UFB38.4
L13020289-05	IW101-03B-EBT-11	Acetone	133		12.5	5	UFB17.6
L13020289-07	IW101-07B-EBT-11	Acetone	3.52	F	2.5	1	UFB3.51
L13020289-08	IW101-07C-EBT-11	Acetone	76.4	F	25	10	UFB35.1
L13020340-01	IW92-07-EBT-11	Acetone	610		50	20	UFB105.2

Final Data Qualification and Usability Report

Project: Defense Depot Memphis, TN (DDMT)
Enhanced Bioremediation Treatment (EBT)
Sampling Event: EBT-11
Project / Task Number: 228-192672-002
Sample Data Package(s): L13020201, L13020202, L13020203, L13020204,
L13020285, L13020286, L13020288, L13020289,
L13020340, L13020341, L13020352, L13020354,
L13020357
Data Validation Performed by: Diane Short & Associates (DSA)
Final Data Qualification and Usability
Report Prepared by: Lynn K. Lutz, HDR Inc.

Data Validation Report Review and Comments

The data validator counted 70 samples including 3 rinse blanks and six field duplicates (77 VOC samples including trip blanks, rinse blanks and trip blanks), but the Project Chemist (PC) counted 67 samples. The validator received all applicable data packages, therefore the validation is considered complete.

VOCs:

The lab reported multiple results for some analytes in samples that required dilution; the PC has selected the results to report.

The validator noted that the sample receipt for SDG L13020203 stated that the pH was out for IW21-02A (all end in EBT-11), IW21-02B, IW21-04A, IW21-04B, and RB1, and that it would not be expected that this would apply to VOA as pH is not generally measured during log-in. The PC investigated further, as VOC pH values are not recorded upon receipt but are recorded on the instrument run logs; RB1 was at pH <2, but these other samples were run only at 10X dilution, and no pH was recorded. The laboratory stated that the pH strips could not be read, as the samples were dark and coated the strips. No qualification was applied to these sample results.

The validator discussed responses of poor responders and noted that the laboratory has been tasked with providing to the client verification that the RRFs below 0.05 are valid. The PC reviewed the initial calibrations and verified that there is sufficient response to allow the responses less than 0.05.

The validator noted that the narrative for sample MW-203A-EBT-11 states that the 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene are not reported due to suspected carryover. The PC investigated this issue and found that the narrative actually notes that these analytes are not reported in the 10X dilution analysis of this sample; the PC determined this is appropriate and not an issue, as only 2-butanone (MEK) is reported from the diluted analysis due to a concentration over the calibration curve in the undiluted analysis.

Metabolic Acids: The validator noted pyruvic acid had response factors of approximately 0.007, which is quite low. The validator also noted high %RSD values for pyruvic acid and propionic acid, but the lab used linear curves to quantitate results, and r values were 1.000. The PC reviewed the initial calibrations and verified that there is sufficient instrument response at the low concentration calibration standard, and qualification was not necessary.

The validator noted that two sets of MS/MSD results for pyruvic acid were non-detect and qualified the parent sample results as rejected. The PC examined the raw data for these samples and spikes and noted a large interfering peak eluting before pyruvic acid, and in the MS and MSD chromatograms there is a small peak on the tailing end of the interfering peak that corresponds to the retention time for pyruvic acid. The PC concluded that there is some recovery of this analyte that is overshadowed by the matrix interference. Parent sample results for pyruvic acid have been qualified as UJ, not R.

Examination of other sample chromatograms shows a similar interfering peak that might overshadow small amounts of pyruvic acid, therefore a number of pyruvic acid results have been qualified as non-detect estimated UJ or estimated J where the interfering peak was present. In some cases, a result (detected or non-detect) for pyruvic acid has been reported from a diluted analysis, in which the effect of the interfering peak is generally much less than in the undiluted analysis. In fact, in some samples, pyruvic acid was reported as non-detect from the undiluted analysis but was detected and reported in the diluted analysis, apparently because the matrix interference was lessened enough to see the pyruvic acid peak.

Dissolved Gases: The validator noted that due to a poor integration of the low concentration standard for methane, the lab should consider revising the curve, but that the sample results would not change significantly. The PC reviewed the applicable data and agrees; the lab was not asked to recalculate the curve and sample values.

The validator noted that recoveries in the MS/MSD analysis of IW92-01 were acceptable but methanol recoveries were above control limits as noted in the table that follows. The PC reviewed this and verified that methanol recoveries were above control limits.

TOC: No issues except as noted below for final qualifiers.

Final Data Qualifiers

VOCs: The final qualifier for some acetone results was B where DSA had qualified UFB38.4, UFB3.84, UFB17.6, UFB3.51, UFB35.1 or UFB105.2.

The final qualifier for some results was J where the lab had qualified as F.

Metabolic Acids: The final qualifier for some propionic acid results was “not qualified” where DSA had qualified as JC95.2.

The final qualifiers for one acetic acid result and one butyric acid result were J where DSA had qualified as JMS2450 and JMS2480 respectively.

The final qualifiers for some acetic acid, butyric acid and propionic acid results were J where DSA had qualified as JFD41 or JFD42.

The final qualifier for two pyruvic acid results was UJ where DSA had qualified as RMS0.

Some pyruvic acid results have been selected for reporting from the diluted analysis, and some pyruvic acid results reported from an analysis with a large interfering peak have been qualified as estimated J or non-detect estimated UJ.

The final qualifier for some results was J where the lab had qualified as F.

Dissolved Gases: The methanol concentrations in IW92-01 did not match between the 20X and 25X dilutions, and for this reason as well as high MS/MSD recoveries, the final qualifier was J where DSA had qualified as JM200. The higher result has been reported, which is not the result used to calculate the MS/MSD recoveries.

The final qualifier for two methane results was J where DSA had qualified as JFD41.

The final qualifier for one methane result was J where DSA had qualified as JD22.8.

The final qualifier for some results was J where the lab had qualified as F.

TOC: The final qualifier for two TOC results was B where DSA had qualified as UFB85.5 or UFB171.

The final qualifier for two TOC results was J where DSA had qualified as JFD50.

The final qualifier for some results was J where the lab had qualified as F.

Data Usability

VOCs: There were no rejected sample results. All results are usable as qualified.

Metabolic Acids: There were no rejected sample results. All results are usable as qualified, although qualitative results for pyruvic acid, the earliest eluter, should be used with caution, as this analyte is susceptible to matrix interference that may suppress results. As the purpose of the analysis for metabolic acids is to confirm distribution of the injected lactic acid throughout the treatment area, the concentrations of lactic acid are of much greater concern than the pyruvic acid concentrations.

Dissolved Gases: There were no rejected sample results. All results are usable as qualified.

TOC: There were no rejected sample results. All results are usable as qualified.



08 May 2013

Lynn K. Lutz, HDR Inc.

Date

DIANE SHORT & ASSOCIATES, INC. _____

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ORGANIC DATA QUALITY REVIEW REPORT

GC REPORT FOR Metabolic Acids by HPLC; Ethane, Methane, Ethene, by EPA SOP RSK-175, TOC by SW-846 9060

SDG:

L13050:	474	475	476	477	702	704	705
	800	801	802	803	804	805	

PROJECT: Memphis Defense Depot, EBT-12 for HDR, Denver

LABORATORY: Microbac Laboratories, Inc., Marietta, OH

SAMPLE MATRIX: Water SAMPLING DATE (Month/Year): May 2013

NO. OF SAMPLES: 72 waters including 3 rinse blanks and 6 field duplicates

ANALYSES REQUESTED: Metabolic Acids by HPLC; EPA SOP RSK-175, SW-846 9060 (TOC)

SAMPLE NO.: Attached

DATA REVIEWER: Diane Short

QA REVIEWER: Diane Short & Associates, Inc., INITIALS/DATE: DLS 06/27/13

Telephone Logs included Yes____ No X

Contractual Violations Yes____ No X

The project QAPP (9/11), EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 2007 (SOP), the EPA SW 846 Methods for Evaluating Solid Waste, Physical/ Chemical Methods Third Edition, (SW-846), current updates, and the project-specific methods have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. The review has been tasked as Level III for review of all calibrations, holding times, and QC for all samples.

I. DELIVERABLES

All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.

Yes ☒ No ☐

This report has been requested to include the following review: Holding times and sample integrity (chains of custody, sample log in), Calibrations, Summary QC. There are 72 water samples including QC samples (duplicates and rinse blanks) with 34 QC sets (days of analysis) for RSK, 13 QC for Metabolic Acid and 22 QC for TOC. A number of the QC samples and calibrations are redundant and applicable to more than one SDG. TOC has no summary forms and the calibrations and blanks were required to be reviewed from the raw data and using bracketing to determine client sample associations.

II. ANALYTICAL REPORT FORMS

The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes ☒ No ☐

III. HOLDING TIMES

A. The contract holding times were met for all analyses (Time of sample receipt to time of extraction and from extraction to analysis.)

Yes ☒ No ☐

See Section B. below. Per EPA guidance, for validation purposes we calculate the holding time to the nearest half day in cases where the regulation or method specifies holding time units of days.

B. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (Time of sample collection to time of extraction and from extraction to analysis.)

Yes ☐ No ☒

Metabolic Acids: The reviewer has not been able to find 40 CFR or documented holding times for the metabolic acids. The holding time for an analogous HPLC method 8310 is 14 days for preserved water samples and the project approved holding time is 28 days to analysis. For the noted outliers, the samples were prepared within the 28 day holding time and not analyzed within a 28 day holding time. Data are qualified JH#, where # is the rounded holding time. If the hold time overage is less than 12 hours, no qualifier has been applied. There could be a very slight low bias to the data.

RSK-175: When pH is adjusted, the holding time is 14 days per the method, and we have used this as the acceptable holding time. The laboratory has used 7 days for all RSK analytes; although it was 14 on some previous data sets. No data have been qualified per the updated holding times.

Method 9060: Holding time for preserved samples is 28 days. All samples are within this limit.

Sample ID	Client ID	Parameter	Result mg/L	Lab Flag	dil'n	MDL	DVAL
L13050800-02	IW101-02A-EBT-12	Acetic Acid	71.1		5	2.5	JH1
L13050800-02	IW101-02A-EBT-12	Butyric Acid	7.46		5	2.5	JH1
L13050800-02	IW101-02A-EBT-12	Lactic Acid		U	5	2.5	JH1
L13050800-02	IW101-02A-EBT-12	Propionic Acid	172		5	25	JH1
L13050800-02	IW101-02A-EBT-12	Pyruvic Acid		U	5	0.25	JH1
L13050800-04	IW101-02C-EBT-12	Acetic Acid	1100		20	10	JH1
L13050800-04	IW101-02C-EBT-12	Butyric Acid	211		20	10	JH1

L13050800-04	IW101-02C-EBT-12	Lactic Acid		U	20	10	JH1
L13050800-04	IW101-02C-EBT-12	Propionic Acid	606		20	100	JH1
L13050800-04	IW101-02C-EBT-12	Pyruvic Acid		U	20	1	JH1
L13050804-01	IW101-05A-EBT-12	All Metabolic Acids			1		JH1.5
L13050804-01	IW101-05A-EBT-12	All Metabolic Acids			10		JH1.5
L13050804-02	IW101-05B-EBT-12	All Metabolic Acids			1		JH1.5
L13050804-03	IW101-05C-EBT-12	All Metabolic Acids			10		JH1.5
L13050804-03	IW101-05C-EBT-12	All Metabolic Acids			1		JH1.5
L13050804-04	PMW101-04A-EBT-12	All Metabolic Acids			1		JH1.5
L13050804-05	PMW101-07A-EBT-12	All Metabolic Acids			1		JH1.5
L13050804-06	PMW101-07B-EBT-12	All Metabolic Acids			1		JH1.5
L13050804-07	RB2-EBT-12	All Metabolic Acids			1		JH1.5
L13050805-01	IW21-03B-EBT-12	All Metabolic Acids			10	5	JH4
L13050805-01	IW21-03B-EBT-12	All Metabolic Acids			1	0.5	JH3
L13050805-02	IW21-04A-EBT-12	All Metabolic Acids			100	50	JH3
L13050805-02	IW21-04A-EBT-12	All Metabolic Acids			10	5	JH3
L13050805-03	PMW21-01-EBT-12	All Metabolic Acids		U	1	0.5	JH3
L13050805-04	PMW21-02-EBT-12	All Metabolic Acids			1	0.5	JH3
L13050805-07	DR1-5A-EBT-12	All Metabolic Acids			1	0.5	JH3

C. All chains of custody are complete with signatures and dates.

Yes X No

No qualifiers have been added for Chain of Custody (COC) issues.

The laboratory has signed and affixed a receipt label on all pages. The relinquishment date and time are part of the electronically-generated COC. There is an electronic signature unless noted.

In addition, there are sample receipt acknowledgements from the laboratory. The log in forms contain the courier identification and air bill number.

D. Samples were received at the proper temperature and preservation.

Yes No X

The most current regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6° C.

For PMW101-04A, the RSK sample is noted as 'in VOA'. It appears a spare VOA vial was used for the analysis.

The need for pH adjustment is a common occurrence for samples at this site. The proper sample bottles have been issued and used. There is a buffering capacity to these matrices that results in slightly elevated pH. If the pH is adjusted as soon as the samples reach the laboratory, the impact on the sample data is considered to be minimal. For the 4 samples in the table below, the samples are noted as arriving at improper pH and the pH was not adjusted by the lab. Data have been qualified JP to indicate a possible bias to the data due to improper preservation.

Sample ID	Client ID	Parameter	Result	units	Lab Flag	dil'n	MDL	DVAL
L13050704-01	IW101-03C-EBT-12	Total Organic Carbon	1790	mg/L		100	50	JP
L13050704-02	IW101-04C-EBT-12	Total Organic Carbon	1890	mg/L		200	100	JP
L13050704-03	IW101-07C-EBT-12	Total Organic Carbon	3610	mg/L		100	50	JP
L13050705-03	IW21-02B-EBT-12	Total Organic Carbon	5220	mg/L		300	150	JP

IV. INSTRUMENT CALIBRATION (IC) AND CONTINUING CALIBRATION (CC) VERIFICATION

A. The HPLC and GC and TOC standards were analyzed at the required frequency.

Yes ☒ No ☐

B. The chromatographic resolution and separation criteria were met.

Yes ☐ No ☐ NA ☒

No data reported or required for this item.

C. The suggested columns were used and the EQLs were met.

Yes ☐ No ☐ NA ☒

No data reported or required for this item.

D. Calibration factors were met at 25% RSD for VFA and RSK or the regression curves were prepared with a correlation coefficient 'r' greater than 0.99, per SW-846, Method 8000B. The TOC ICV and CCV limits are 90- 110%.

Yes ☐ No ☒

MBA: In the Case Narrative, the laboratory has indicated that all initial calibrations have used linear regression, and that all acceptance criteria are met. The reported data verify the linear curve calculation. The % RSD is out of limits for propionic acid (33.2 %) and pyruvic acid (49.5%). As the linearity has been met, no data have been qualified. The variability to the responses is, however, noted. The deviation, particularly for pyruvic acid, could be sufficient to recommend qualifying the variability. Response factors (RF) are not usually evaluated for this method, but the RF average for pyruvic acid is only 0.005, which is quite low. The recoveries of the matrix spikes and LCS are acceptable and the calibration standard does include the lowest concentration. The EDD contains the lowest dilution to verify non-detects at the 0.1 mg/L limit. The project manager may determine further evaluation of the raw data is required to verify the pyruvic non-detects.

TOC: All calibrations were within limits and linear curves are provided. The ICAL curve is noted as being generated 8/6/2012. Daily calibrations were acceptable using this curve and the duration has not appeared to impact the accuracy. No summary data are provided and the raw data were accessed to review these data. The laboratory does not provide any %R values and the ICV, CCV were required to be manually evaluated from the standard concentrations.

E. Percent Difference (%D's) for Continuing Calibration Factors and retention times (RT) were within the 25% Limits .

Yes ☒ No ☐

MBA, RSK : All calibrations are in control.

TOC: All calibrations are in control as noted from the raw data review by bracketing all the client samples from the run log.

V. BLANKS

A. Laboratory blanks

1. Laboratory blanks were analyzed for every sample set and for each matrix type or once in every 20 samples, whichever is more frequent.

Yes ☒ No ☐

2. No blank contamination was found in the method blank.

Yes ☐ No ☒

MBA: All method blanks are in control.

RSK-175: Method blanks are reported for almost every QC set for Methane in the range of 3.2 to 3.6 ug/L. Data for methane have been qualified UMB#, where # is the associated blank value. Data are fully usable as non-detected values.

TOC: Method blanks and calibration blanks were reviewed at the raw data level along with the calibrations. This was required for all of the data. The review of the raw data indicates a calibration blank or background of about 0.15 mg/L TOC. Although the values are not reported for the method blanks below 0.5 mg/L, per the raw results, data have been qualified UMB# or UCB# as applicable.

Sample ID	Client ID	Parameter	Result	units	Lab Flag	MDL	DVAL
L13050477-04	PMW101-04B-EBT-12	Total Organic Carbon	1.14	mg/L		0.5	UMB.535
L13050704-04	RB1-EBT-12	Methane	3.2	ug/L	F	1	UMB3.3
L13050704-04	RB1-EBT-12	Total Organic Carbon	0.57	mg/L	F	0.5	UCB.161
L13050801-03	MW-197B-EBT-12	Methane	8.8	ug/L		1	UMB3.2
L13050801-05	MW-212-EBT-12	Methane	3.4	ug/L	F	1	UMB3.56
L13050801-07	DUP6-EBT-12	Methane	7.4	ug/L		1	UMB3.3
L13050801-08	RB3-EBT-12	Methane	3	ug/L	F	1	UMB3.3
L13050801-08	RB3-EBT-12	Total Organic Carbon	0.558	mg/L	F	0.5	UCB.122
L13050803-05	IW101-07A-EBT-12	Methane	3	ug/L	F	1	UMB3.56
L13050803-07	DUP2-EBT-12	Methane	3	ug/L	F	1	UMB3.25
L13050804-06	PMW101-07B-EBT-12	Total Organic Carbon	0.607	mg/L	F	0.5	UMB.153
L13050804-06	PMW101-07B-EBT-12	Methane	3.2	ug/L	F	1	UMB3.3
L13050804-07	RB2-EBT-12	Total Organic Carbon	0.641	mg/L	F	0.5	UMB.153
L13050804-07	RB2-EBT-12	Methane	4.5	ug/L	F	1	UMB3.2
L13050805-03	PMW21-01-EBT-12	Methane	3.9	ug/L	F	1	UMB3.25

3. Instrument blank analysis was performed following all samples that contained analytes at high concentrations.

Yes ☐ No ☐ NA ☒

No data reported or required for this item.

B. Field Blanks

If field blanks were identified, no blank contamination was found.

Yes ☒ No ☐ NA ☐

There are 3 field blanks for each method.

RSK – The methane detections in the rinse blanks were attributed to the method blank.

TOC- The detections in the rinse blanks were attributed to the method/ calibration blank.

VI. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

A. Matrix spike (MS) and matrix duplicate or matrix spike duplicate (MSD) were analyzed for every analyses performed for every 20 samples or for every matrix whichever is more frequent.

Yes ☒ No ☐

There are 3 MS/MSDs for each method, which meets frequency requirements for non-QC samples.

MS/MSDs are not reported for every SDG to verify the method frequency. As only client samples would be used for qualification, no further action is required.

PMW85-01, IW101-04A, PMW21-02

B. The MS and MSD percent recoveries (%R) were within the limits defined in the QAPP of 40 – 140% for soil and water for Method 8081/ 8082. Two compounds are allowed to be 30 -150%. Both the MS and the MSD %R are required to be out of limits for data to be qualified. No limits are defined in the QAPP for the RSK-175 or VFA methods and lab limits have been applied. For TOC, the EPA limits of 75-125% are used.

Yes ☐ No ☒

RSK: Methane is greater than 4 x spike in most cases and no qualifier is applied. Carbon dioxide is also over 4 x spike for IW101-04A and the RPD is 40%. Data are not qualified for the RPD alone.

Metabolic acids: Data for IW101-04A for lactic acid have been qualified RMS#, where # is the % R for the zero % recoveries, which are rejected as the parent sample in non-detect. The lab notes significant matrix interference. Without the raw data chromatograms, the extent of the interference cannot be determined. From the reported dilution, it appears that the spike was diluted out. The other acids were 4 x the spike. The rejection indicates that the compound cannot be detected given the dilution and interference.

Sample ID	Client ID	Parameter	Result	units	Lab Flag	dil'n	MDL	DVAL
L13050802-01	IW101-04A-EBT-12	Lactic Acid		mg/L	U	100	50	RMS0

C. The MSD relative percent differences (RPD) were within the defined QAPP limits of < 50% RPD. None are acceptable if greater than 60% RPD. The TOC limit is 20% for waters.

Yes ☒ No ☐

D. The MS/MSD were client samples.

Yes ☒ No ☐

No non client samples were reported.

VII. LABORATORY CONTROL SAMPLE AND DUPLICATE (LCS/LCSD)

A. Laboratory Control Sample (LCS) and LCS duplicate were analyzed for every analyses performed and for every 20 samples or for every matrix whichever is more frequent.

Yes ☒ No ☐

B. The LCS percent recovery (%R) are within the limits defined by QAPP of 50 – 130% for soil and water for pesticides and PCBs. For RSK and VFA, the QAPP limit is the lab limits for both LCS and LCSD. Two compounds are allowed to be 30 -150%. If an LCS and LCDS are analyzed, both samples have to have outliers in order for data to be qualified. The TOC limit is 80 – 120% R.

Yes ☒ No ☐

LCS/LCSD are run in several data sets. For WG430367, the RPD was out of the lab limits of 20 % RPD for ethene (21.2 %) and ethane (20.4%). As the %R's were within limits, not qualifier is applied.

VIII. SURROGATE RECOVERY

A. The Surrogate spike was analyzed with every sample.

Yes ☐ No ☐ NA ☒

B. And met the recovery limits defined in the QAPP of 40 – 140%. If recovery limits were exceeded for both surrogates, the sample was re-extracted and re-analyzed.

Yes ☐ No ☐ NA ☒

IX. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria and the Retention times were within the required windows. Note: Internal standards are not required for GC analysis, but if they are used, SW-846 stipulates that they meet the same recovery requirements as those specified for GCMS methods.

Yes ☐ No ☐ NA ☒

X. FIELD QC

If Field duplicates were identified, they met guidance RPD of < 35% for water or < 50% for soils and gases. For values reported at < 5 x the reporting limit (RL), a difference of 2 x RL is used as guidance (4 x RL for soils). Data are not qualified for field duplicates as these are evaluated for the total project by the client.

Yes ☐ No ☒ NA ☐

Field duplicate precision was acceptable for all but one parameter. Data for TOC have been qualified JD#, where # is the RPD in order to identify the outliers to the project manager. As the RPD increases, the precision decreases. They can be removed once the precision is recorded. Note that each sample is reported at a different dilution which could impact the results.

Parent	Duplicate	SDG
IW21-04B-EBT-12	DUP1	477
IW101-07A-EBT-12	DUP2	803
PMW101-02B-EBT-12	DUP3	802
IW92-07-EBT-12	DUP4	476
PMW85-01-EBT-12	DUP5	702
MW-197B-EBT-12	DUP6	801

Sample ID	Client ID	Parameter	Result	units	Lab Flag	dil'n	MDL	DVAL
L13050476-03	IW92-07-EBT-12	Total Organic Carbon	104000	mg/L		4000	2000	JFD122
L13050476-07	DUP4-EBT-12	Total Organic Carbon	37000	mg/L		1000	500	JFD122

XI. COMPOUND IDENTIFICATION

A. All raw data chromatograms and data system printouts were evaluated for all detected compounds and the identification is accurate.

Yes ☐ No ☐ NA ☒

This evaluation is not performed at this level of review.

B. Retention time limits or peak pattern identifications are met.

Yes _____ No _____ NA X

This evaluation is not performed at this level of review.

C. If two column or two detector confirmation was performed, the value of the confirmation was within 25%D of the quantitation value for results > 5 x RL. If the laboratory has flagged data 'COL' for %D > 40%, a JP qualifier has been added for low level results. For values below (5 x RL), the difference is not considered to impact the precision of the data.

Yes _____ No _____ NA X

Not part of this level of review. Dual columns are not required for these methods.

XII. COMPOUND QUANTITATION AND REPORTED CRQLS

A. Raw data examination verified that all sample results were correctly calculated.

Yes _____ No _____ NA X

This evaluation is not performed at this level of review.

B. The chromatograms and general system performance were acceptable for all instruments and analytical systems.

Yes _____ No _____ NA X

This evaluation is not performed at this level of review.

C. The suggested EQLs for the sample matrices in this set were met.

Yes X No _____ NA _____

These samples are highly diluted, particularly for the TOC and metabolic acids. The project manager will determine if the project limits are met for the non-detected compounds. The lowest dilution per parameter has been reported for the metabolic acids.

XIII. OVERALL ASSESSMENT OF THE CASE

The method criteria have been met and the quality of the data, after consideration of qualifiers, is considered acceptable and usable as far as can be determined at this level of review.

The following is noted:

This report has been requested to include the following review: Holding times and sample integrity (chains of custody, sample log in), Calibrations, Summary QC. There are 72 water samples including QC samples (duplicates and rinse blanks) with 34 QC sets (days of analysis) for RSK, 13 QC for Metabolic Acid and 22 QC for TOC. A number of the QC samples and calibrations are redundant and applicable to more than one SDG. TOC has no summary forms and the calibrations and blanks were required to be reviewed from the raw data and using bracketing to determine client sample associations.

Sample Condition

The most current regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6° C.

For PMW101-04A, the RSK sample is noted as 'in VOA'. It appears a spare VOA vial was used for the analysis.

The need for pH adjustment is a common occurrence for samples at this site. The proper sample bottles have been issued and used. There is a buffering capacity to these matrices that results in slightly elevated

pH. If the pH is adjusted as soon as the samples reach the laboratory, the impact on the sample data is considered to be minimal. For the 4 samples in the table below, the samples are noted as arriving at improper pH and the pH was not adjusted by the lab. Data have been qualified JP to indicate a possible bias to the data due to improper preservation.

Holding Times:

Metabolic Acids: The reviewer has not been able to find 40 CFR or documented holding times for the metabolic acids. The holding time for an analogous HPLC method 8310 is 14 days for preserved water samples and the project approved holding time is 28 days to analysis. For the noted outliers, the samples were prepared within the 28 day holding time and not analyzed within a 28 day holding time. Data are qualified JH#, where # is the rounded holding time. If the hold time overage is less than 12 hours, no qualifier has been applied. There could be a very slight low bias to the data.

RSK-175: When pH is adjusted, the holding time is 14 days per the method, and we have used this as the acceptable holding time. The laboratory has used 7 days for all RSK analytes; although it was 14 on some previous data sets. No data have been qualified per the updated holding times.

Method 9060: Holding time for preserved samples is 28 days. All samples are within this limit.

Calibrations:

MBA: In the Case Narrative, the laboratory has indicated that all initial calibrations have used linear regression, and that all acceptance criteria are met. The reported data verify the linear curve calculation. The % RSD is out of limits for propionic acid (33.2 %) and pyruvic acid (49.5%). As the linearity has been met, no data have been qualified. The variability to the responses is, however, noted. The deviation, particularly for pyruvic acid, could be sufficient to recommend qualifying the variability. Response factors (RF) are not usually evaluated for this method, but the RF average for pyruvic acid is only 0.005, which is quite low. The recoveries of the matrix spikes and LCS are acceptable and the calibration standard does include the lowest concentration. The EDD contains the lowest dilution to verify non-detects at the 0.1 mg/L limit. The project manager may determine further evaluation of the raw data is required to verify the pyruvic non-detects.

TOC: All calibrations were within limits and linear curves are provided. The ICAL curve is noted as being generated 8/6/2012. Daily calibrations were acceptable using this curve and the duration has not appeared to impact the accuracy. No summary data are provided and the raw data were accessed to review these data. The laboratory does not provide any %R values and the ICV, CCV were required to be manually evaluated from the standard concentrations.

Method Blanks

MBA: All method blanks are in control.

RSK-175: Method blanks are reported for almost every QC set for Methane in the range of 3.2 to 3.6 ug/L. Data for methane have been qualified UMB#, where # is the associated blank value. Data are fully usable as non-detected values.

TOC: Method blanks and calibration blanks were reviewed at the raw data level along with the calibrations. This was required for all of the data. The review of the raw data indicates a calibration blank or background of about 0.15 mg/L TOC. Although the values are not reported for the method blanks below 0.5 mg/L, per the raw results, data have been qualified UMB# or UCB# as applicable.

MS/MSD Recoveries:

There are 3 MS/MSDS for each method, which meets frequency requirements for non-QC samples. MS/MSDs are not reported for every SDG to verify the method frequency. As only client samples would be used for qualification, no further action is required.

PMW85-01, IW101-04A, PMW21-02

RSK: Methane is greater than 4 x spike in most cases and no qualifier is applied. Carbon dioxide is also over 4 x spike for IW101-04A and the RPD is 40%. Data are not qualified for the RPD alone.

Metabolic acids: Data for IW101-04A for lactic acid have been qualified RMS#, where # is the % R for the zero % recoveries, which are rejected as the parent sample in non-detect. The lab notes significant matrix interference. Without the raw data chromatograms, the extent of the interference cannot be determined. From the reported dilution, it appears that the spike was diluted out. The other acids were 4 x the spike. The rejection indicates that the compound cannot be detected given the dilution and interference.

Laboratory Control Sample

LCS/LCSD samples are run in several data sets. For WG430367, the RPD was out of the lab limits of 20 % RPD for ethene (21.2 %) and ethane (20.4%). As the %R's were within limits, not qualifier is applied.

Field Blanks:

There are 3 field blanks for each method.

RSK – The methane detections in the rinse blanks were attributed to the method blank.

TOC- The detections in the rinse blanks were attributed to the method/ calibration blank.

Field Duplicates:

Field duplicate precision was acceptable for all but one parameter. Data for TOC have been qualified JD#, where # is the RPD in order to identify the outliers to the project manager. As the RPD increases, the precision decreases. They can be removed once the precision is recorded. Note that each sample is reported at a different dilution which could impact the results.

Parent	Duplicate	SDG
IW21-04B-EBT-12	DUP1	477
IW101-07A-EBT-12	DUP2	803
PMW101-02B-EBT-12	DUP3	802
IW92-07-EBT-12	DUP4	476
PMW85-01-EBT-12	DUP5	702
MW-197B-EBT-12	DUP6	801

Reporting Limits

These samples are highly diluted, particularly for the TOC and metabolic acids. The project manager will determine if the project limits are met for the non-detected compounds.

TABLE OF QUALIFIED DATA

Sample ID	Client ID	Parameter	Result mg/L*	Lab Flag	dil'n	MDL	DVAL
L13050476-03	IW92-07-EBT-12	Total Organic Carbon	104000		4000	2000	JFD122
L13050476-07	DUP4-EBT-12	Total Organic Carbon	37000		1000	500	JFD122
L13050477-04	PMW101-04B-EBT-12	Total Organic Carbon	1.14		1	0.5	UMB.535
L13050704-04	RB1-EBT-12	Methane	3.2	F	1	1	UMB3.3
L13050704-04	RB1-EBT-12	Total Organic Carbon	0.57	F	1	0.5	UCB.161
L13050704-01	IW101-03C-EBT-12	Total Organic Carbon	1790		100	50	JP
L13050704-02	IW101-04C-EBT-12	Total Organic Carbon	1890		200	100	JP
L13050704-03	IW101-07C-EBT-12	Total Organic Carbon	3610		100	50	JP
L13050705-03	IW21-02B-EBT-12	Total Organic Carbon	5220		300	150	JP
L13050800-02	IW101-02A-EBT-12	Acetic Acid	71.1		5	2.5	JH1
L13050800-02	IW101-02A-EBT-12	Butyric Acid	7.46		5	2.5	JH1
L13050800-02	IW101-02A-EBT-12	Lactic Acid		U	5	2.5	JH1
L13050800-02	IW101-02A-EBT-12	Propionic Acid	172		5	25	JH1
L13050800-02	IW101-02A-EBT-12	Pyruvic Acid		U	5	0.25	JH1
L13050800-04	IW101-02C-EBT-12	Acetic Acid	1100		20	10	JH1
L13050800-04	IW101-02C-EBT-12	Butyric Acid	211		20	10	JH1
L13050800-04	IW101-02C-EBT-12	Lactic Acid		U	20	10	JH1
L13050800-04	IW101-02C-EBT-12	Propionic Acid	606		20	100	JH1
L13050800-04	IW101-02C-EBT-12	Pyruvic Acid		U	20	1	JH1
L13050801-03	MW-197B-EBT-12	Methane	8.8		1	1	UMB3.2
L13050801-05	MW-212-EBT-12	Methane	3.4	F	1	1	UMB3.56
L13050801-07	DUP6-EBT-12	Methane	7.4		1	1	UMB3.3
L13050801-08	RB3-EBT-12	Methane	3	F	1	1	UMB3.3
L13050801-08	RB3-EBT-12	Total Organic Carbon	0.558	F	1	0.5	UCB.122
L13050802-01	IW101-04A-EBT-12	Lactic Acid		U	100	50	RMS0
L13050803-05	IW101-07A-EBT-12	Methane	3	F	1	1	UMB3.56
L13050803-07	DUP2-EBT-12	Methane	3	F	1	1	UMB3.25
L13050804-06	PMW101-07B-EBT-12	All VOA Compounds			50		JH2
L13050804-01	IW101-05A-EBT-12	All Metabolic Acids			1		JH1.5
L13050804-01	IW101-05A-EBT-12	All Metabolic Acids			10		JH1.5
L13050804-02	IW101-05B-EBT-12	All Metabolic Acids			1		JH1.5
L13050804-03	IW101-05C-EBT-12	All Metabolic Acids			10		JH1.5
L13050804-03	IW101-05C-EBT-12	All Metabolic Acids			1		JH1.5
L13050804-04	PMW101-04A-EBT-12	All Metabolic Acids			1		JH1.5
L13050804-05	PMW101-07A-EBT-12	All Metabolic Acids			1		JH1.5
L13050804-06	PMW101-07B-EBT-12	All Metabolic Acids			1		JH1.5
L13050804-07	RB2-EBT-12	All Metabolic Acids			1		JH1.5

L13050804-06	PMW101-07B-EBT-12	Total Organic Carbon	0.607	F	1	0.5	UMB.153
L13050804-06	PMW101-07B-EBT-12	Methane	3.2	F	1	1	UMB3.3
L13050804-07	RB2-EBT-12	Total Organic Carbon	0.641	F	1	0.5	UMB.153
L13050804-07	RB2-EBT-12	Methane	4.5	F	1	1	UMB3.2
L13050805-01	IW21-03B-EBT-12	All Metabolic Acids			10	5	JH4
L13050805-01	IW21-03B-EBT-12	All Metabolic Acids			1	0.5	JH3
L13050805-02	IW21-04A-EBT-12	All Metabolic Acids			100	50	JH3
L13050805-02	IW21-04A-EBT-12	All Metabolic Acids			10	5	JH3
L13050805-03	PMW21-01-EBT-12	Methane	3.9	F	1	1	UMB3.25
L13050805-03	PMW21-01-EBT-12	All Metabolic Acids		U	1	0.5	JH3
L13050805-04	PMW21-02-EBT-12	All Metabolic Acids			1	0.5	JH3
L13050805-07	DR1-5A-EBT-12	All Metabolic Acids			1	0.5	JH3

Units for methane are ug/L*

ORGANIC DATA QUALITY REVIEW REPORT

Volatile Organics by SW-846 Method 8260B (GC/MS)

SDG:

L13050:	474	475	476	477	702	704	705
	800	801	802	803	804	805	

PROJECT	Memphis Defense Depot, EBT-12 Sampling for HDR, Denver	
LABORATORY	Microbac Laboratories, Inc., Marietta, OH	
SAMPLE MATRIX	Water	SAMPLING DATE 05/2013
NUMBER OF SAMPLES	77 water, including 6 field duplicate pairs, 7 trip blanks and 3 rinse blanks	
ANALYSES REQUESTED	SW-846 8260B (VOA by GC/MS)	
SAMPLE NUMBER	See result forms attached and associated EDD	

DATA REVIEWER: Diane ShortQA REVIEWER: Diane Short & Associates, Inc. INITIALS/DATE: DL S 06/28/2013Telephone Logs included Yes____ No XContractual Violations Yes____ No X

The project QAPP (09/11), the EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 1999 and 2007, and the SW-846 Method 8260B have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review of these samples includes Level III validation of all chains of custody, calibrations and QC forms referencing the QC limits in the above documents.

I. DELIVERABLES

A. All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.

Yes ☒ No ☐

This report has been requested to include the following review: QC, hold times, sample integrity (Chains of Custody, sample login), and summary calibrations. Note that there are 27 QC sets (days of analysis per instrument) and 4 instruments for the 77 samples. Note there is some redundant QC and calibration.

B. Chain of Custody documentation was complete and accurate.

Yes ☒ No ☐

No qualifiers have been added for Chain of Custody (COC) issues, and the Project Manager will update COC per the following notes to complete the project record.

The laboratory has signed and affixed a receipt label on all pages. The relinquishment date and time are part of the electronically-generated COC except for SDG 13050702, which is a standard chain. There is an electronic signature on the last page unless noted.

In addition, there are sample receipt acknowledgements from the laboratory. The log in forms contain the courier identification and air bill number.

C. Samples were received at the required temperature, preservation and intact with no bubbles.

Yes ☐ No ☒

EPA regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6 °C. The sample temperature conditions are fully compliant with applicable regulations.

The laboratory does note that several samples were diluted due to foaming during the purging step. This was not evident in the vials received at log-in.

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes ☒ No ☐

B. Holding Times

1. The contract holding times were met for all analyses [time of sample receipt to time of analysis (VOA) or time of extraction to time of analysis].

Yes ☒ No ☐

2. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (14 days from time of sample collection to analysis or extraction).

Yes ☐ No ☒

One sample was analyzed 2 days over the holding time for the dilution. Data are qualified JH#, where # is the rounded holding time. If the hold time overage is less than 12 hours, no qualifier has been applied. There could be a very slight low bias to the data.

Sample ID	Client ID	Parameter	Result	units	dil'n	MDL	DVAL
L13050804-06	PMW101-07B-EBT-12	All VOA Compounds		ug/L	50		JH2

III. INSTRUMENT CALIBRATION – GC/MS

A. Initial Calibration

1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of > 0.05 or > 0.01 for poor responding volatiles.

Yes ☒ No ☐ NA ☐

Method 8260: Per the Project Manager, the 2007 EPA CLP validation guidance has been applied to the common “poor responders.” Calibration response factors were acceptable for Acetone and 2-butanone and other poor responders. The validation guidance used for this project allows for a response of 0.01 for these compounds if spectral integrity can be verified at low concentrations. These spectra are not commonly provided and are not part of the deliverable for this data set. The laboratory has been tasked with providing to the client verification that the 0.01 RF is valid. If the spectral verification is available, data are not qualified for response factors greater than 0.01 and less than 0.05 for “poor responders.” No data have been qualified.

Most of the low-responding compounds are highly water-soluble and capable of hydrogen bonding with water. This decreases their purge efficiency and results in the relatively low response. The implication of this low purge efficiency is that a relatively low absolute recovery of such compounds is achieved in the purge step of the analysis. If this recovery is consistent, reasonable accuracy and precision can be achieved in a given matrix, which is indicated for the lab matrix by acceptable recoveries in LCS and calibration checks. However, this causes these targets to be more sensitive to matrix variations that impact purge efficiency (such as ionic strength or the presence of varying levels of soluble non-target organic material) than are the more hydrophobic compounds typically analyzed by this method, and as a result they are more likely to exhibit matrix bias.

2a. The relative standard deviation (RSD) for the five point calibration was within the 30% limit for the CCCs.

Yes ☒ No ☐ NA ☐

This is a method requirement and indicates that the analytical system is in control.

2b. The relative standard deviation (RSD) for the five point calibration was within the 30% limit for all other compounds, the average % RSD was $< 15\%$, or a linear curve was used.

Yes ☒ No ☐ NA ☐

The laboratory only reports the % RSD if it is $< 15\%$. All other data are reported with the linear curve values.

3. The 12 hour system Performance Check was performed as required in SW-846 and met the QC limits of 80 – 120%.

Yes ☐ No ☒ NA ☐

Dichlorodifluoromethane is consistently high in the ICV for all instruments except for MS10. There are also some other poor responders that are out. Data have been qualified only from the daily calibrations. See table below.

B. Continuing Calibrations

1. The midpoint standard was analyzed for each analysis at the required frequency, and the QC criterion of > 0.05 (> 0.01 for CLP 2001 VOA) was met.

Yes ☒ No ☐ NA ☐

2. The percent difference (% D) limits of $\pm 20\%$ were met. The 2007 NFG also allow for 40% D for the “poor responders (pr).”

Yes ☐ No ☒ NA ☐

When there are no detections, no qualification is required unless the % D is biased low and so large as to indicate a significant probability of false negatives. Qualification is required for a % D biased high for detected compounds only. This requires that the RF is acceptable to verify the non-detect status, which is the case here. Data would be qualified “JC#”, where # is the % D. There could be variability to the data as there is variability to the response. No qualifiers have been required.

SDGs (L13050:) work group note in (x) as needed			
Instrument			
MS 11	ICAL	ICV	CCAL
	15-May	DFM 66% pr's	
476, 5/21 (431001)			pr's
702, 704, 802, 804 5/23 (431567)			pr's
702 5/22 (431243) a.m			pr's
same p.m			pr's, bromoform -22.2; 1,2,3-trichloropropane -20.5
702, 801 5/23 (431400)			Bromform -21. pr's
702, 704 5/22 (431380)			pr's, bromoform -22
800, 802, 803 5/25 (431720)			pr's; 1,1,2,2 and 1,1,1,2 tertachloroethane 21.5 and 20.5; styrene 29.2; t-1,3dichloropropene 20.4
MS 10	14-May	pr's w/in limits	
	ok		
802, 804 5/26 (431815)			ok
804 5/27 (431847)			ok
804 5/29 (432163 dil'ns)			ok
805 5/23 (431395)			Bromomethane -23.5
MS8	8-May	DFM 49 , pr's	
	ok		
476 5/21 (431036)			5 pr's ok
702, 704, 705 5/23 (431392)			DFM
702 5/24 (431574)			4 pr's
702 5/22 (431294)			4 pr's
MS 6	2-Apr	DFM	
474, 474 5/20 (430785)	ok		pr
476, 477 5/21 (430923)			pr

pr = acetone; Chloromethane; 2-butanone; MTBE, 1,2-dibromo-3-chloropropane; dichlorodifluoromethane (DFM); 4-methyl-2-pentanone; and / or 2-hexanone

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB (VOA) performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.

Yes X No NA

V. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria, and the Retention times were within the required windows.

Yes ☒ No ☐ NA ☐

VI. SURROGATE STANDARDS

Surrogate spikes were analyzed with every sample.

Yes ☒ No ☐

And met the recovery limits defined in the QAPP , which are the laboratory limits.

Yes ☒ No ☐

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.

Yes ☒ No ☐

The MS/MSDs include (all ending in EBT-12):

MS/MSDs are not reported for every SDG to verify the method frequency. As only client samples would be used for qualification, no further action is required.

PMW85-01, IW101-04A, PMW21-02

This meets the recommendation of 1 per 20 field (not field QC or blank) samples. As this is an ongoing project an overall adherence to the 1:20 frequency is monitored by the Project Manager.

The lab notes they do not report non-client QC. In most, and not all cases, and LCS/LCSD is reported.

B. The MS and MSD percent recoveries were within the limits defined in the updated 2011 QAPP, which now references the laboratory limits.

Yes ☐ No ☒ NA ☐

The full target list has been spiked. For sample PMW85-05-EBT-12, the result for tetrachloroethene (PCE) and cis-1,2-dichloroethane are over the 4x limit, where the result is statistically greater than the recovery of the spike. Chloroform (5.5/ 0 %R) is nearly 4 x the limit, but still under the limit and has been qualified. The bias could be quite low. The recovery for 1,2,3-trichloropropane is in for the MSD and just out of the 73% limit for the MS. Dichlorodifluoromethane (DFM) is high at 158 and 144%. The compound is non-detect. No qualifier has been applied.

Acetone is 4 x the spike value in sample IW101-04A.

For PMW21-02, twenty two (22) of the compounds in the MS were above the lab limits. All the MSD's were in control. As the %R's are high and all of the outlier compounds are non-detect with the exception of cis-1,2-dichloroethane, only that compound is qualified JMS#, where # is the %R. There could be a slight high bias to the data. PCE is over 4 x spike.

Sample ID	Client ID	Parameter	Result	units	Lab Flag	dil'n	MDL	DVAL
L13050476-04	PMW85-05-EBT-12	1,2,3-Trichloropropane	46.5	ug/L		1	0.5	JMS72.5
L13050476-04	PMW85-05-EBT-12	Carbon tetrachloride	72.3	ug/L		1	0.25	JMS0
L13050805-04	PMW21-02-EBT-12	cis-1,2-Dichloroethene	4.74	ug/L		1	0.25	JMS132

C. The MSD relative percent differences (RPD) were within the defined contract limits, which are 30%.

Yes ☐ No ☒ NA ☐

For the same sample noted above, there are 50 RPDs that exceed the lab limit of 20%. Data are not qualified for RPD alone. As there are so many outliers, it is suspected that there is a spiking error of some sort rather than matrix effects.

There are no chromatograms to review to determine the extent of interferences.

D. The MS/MSD were client samples.

Yes X No NA

Only client samples reported.

VIII. LABORATORY CONTROL SAMPLE

A. Laboratory Control Sample (LCS) was analyzed for every analysis performed and for every 20 samples.

Yes X No

Although not required of the method, an LCS and LCSD are often reported when there is not an MS/MSD reported in the data set.

B. The LCS percent recoveries were within the limits defined in the updated 2011 QAPP, which are the laboratory limits. If an LCS and LCSD are analyzed, both samples must have the same compounds out for data to be qualified. The RPD is qualified only if the %R is also out.

Yes No X

The full target list has been spiked. When a high LCS recovery is associated with a non-detect in samples, no qualifier is added since the indicated bias is high. When the target is detected, data are qualified "JL#", where # is the recovery. Data could be biased high proportional to the LCS percent recovery. All results associated with low recoveries are qualified and data could be biased low. The laboratory uses the same control limits on all 3 instruments used for analysis even though the responses are different on each instrument. The control limits should be instrument specific. No data have been qualified.

SDGs (L13050:) work group note in (x)	
Instrument	
MS 11	LCS
476, 5/21 (431001)	DFM155
702, 704, 802, 804 5/23 (431567)	OK
702 5/22 (431243) a.m	OK
same p.m	OK
702, 801 5/23 (431400)	ClMe 141/136; DFM 154/153
702, 704 5/22 (431380)	ClMe 139/134; DFM 162/ 153
800, 802, 803 5/25 (431720)	Acetone RPD 31.8; ClMe 135, DFM 160
MS 10	
802, 804 5/26 (431815)	2,2-Cl2propane RPD 24.2
804 5/27 (431847)	DFM 158
804 5/29 (432163 dil'ns)	DFM 163
805 5/23 (431395)	DFM 162
MS8	
476 5/21 (431036)	DFM 202/205
702, 704, 705 5/23 (431392)	ClMe141/ 139; DFM 215/224
702 5/24 (431574)	DFM 181

702 5/22 (431294)	DFM 192
MS 6	
474, 474 5/20 (430785)	DFM 155/145
476, 477 5/21 (430923)	OK

dichlorodifluoromethane (DFM), Chloromethane (ClMe)

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.

Yes ☒ No ☐

B. No blank contamination was found in the Method Blank.

Yes ☐ No ☒

Several method blanks contained 2-chlorotoluene and n-propylbenzene . One method blank contained vinyl chloride. None of these compounds was detected in client samples or detections were > 5 x blank. These are not common laboratory contaminants and the source is not noted in the narratives.

C. If Field Blanks were identified, no blank contamination was found.

Yes ☐ No ☒ NA ☐

The field blanks are RB1, RB2 and RB3-EBT-12. The 3 samples contained 1,4 dichlorobenzene and acetone. Only acetone has impacted reported data. Data are qualified UFB#, where # is the acetone result, dilution corrected for the associated sample.

Nine Trip blanks were collected and all were non-detected with the exception of the TB for the 5/11/13 collection with a detection of methylene chloride. The compound is not reported in the associated samples. No qualifiers have been applied.

Lab ID	Client ID	Compound	Result ug/L	Lab Flag	MDL	dilution	DVAL
L13050801-06	MW-213-EBT-12	Acetone	125		5	12.5	UFB24.5

X. FIELD QC

If Field Duplicates were identified, they met guidance for VOA of RPD of < 30% for water or < 50% for soil. For values reported at < 5 × the reporting limit (RL), a difference of 2 × RL or 3.5 × RL for soil is used as guidance. This is referred to as the CRDL Rule. Data are not qualified for Field Duplicates as these are evaluated for the total project by the Project Manager.

Yes ☒ No ☐ NA ☐

All field precision limits were met for these samples.

Parent	Duplicate	SDG 13050:
IW21-04B-EBT-12	DUP1	477
IW101-07A-EBT-12	DUP2	803
PMW101-02B-EBT-12	DUP3	802
IW92-07-EBT-12	DUP4	476
PMW85-01-EBT-12	DUP5	702
MW-197B-EBT-12	DUP6	801

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and analytical systems.

Yes _____ No _____ NA X

Not part of this review level.

B. The suggested EQLs for the sample matrices in this set were met.

Yes X No _____ NA _____

There are extremely high dilutions for many of the samples due to compounds over the calibration range of the instrument. There are also numerous samples noted as being diluted due to foaming of the sample during the purging step. The project manager will determine if the elevated reporting limits meet the project criteria. All dilutions have been reported.

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for all detected compounds.

Yes _____ No _____ NA X

Not part of this review level. The laboratory does note that for SDG L13050802, sample IW101-04A : 'The presence of naphthalene and 1,2,3-trichlorobenzene in the dilution of the sample may be attributed to carry-over contamination and data were not reported'. Samples 4 – 7 in this set were also noted as diluted due to foaming during the purge.

B. Quantitation was checked to determine the accuracy of calculations for representative compounds in each internal standards quantitation set.

Yes _____ No _____ NA X

Not part of this review level.

XIII. TENTATIVELY IDENTIFIED COMPOUNDS

TICs were properly identified and met the library identification criteria.

Yes _____ No _____ NA X

Not part of this review level.

XIV. OVERALL ASSESSMENT OF THE CASE

The laboratory has complied with the requested method. Data are fully usable after consideration of qualifiers. The following is noted:

This report has been requested to include the following review: QC, hold times, sample integrity (Chains of Custody, sample login), and summary calibrations. Note that there are 27 QC sets (days of analysis per instrument) and 4 instruments for the 77 samples. Note there is some redundant QC and calibration.

Sample Preservation

EPA regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6 °C. The sample temperature conditions are fully compliant with applicable regulations.

The laboratory does note that several samples were diluted due to foaming during the purging step. This was not evident in the vials received at log-in.

Holding Times

One sample, PMW101-07B-EBT-12, was analyzed 2 days over the holding time for the dilution. Data are qualified JH#, where # is the rounded holding time. If the hold time overage is less than 12 hours, no qualifier has been applied. There could be a very slight low bias to the data.

Initial Calibrations

Method 8260: Per the Project Manager, the 2007 EPA CLP validation guidance has been applied to the common “poor responders.” Calibration response factors were acceptable for Acetone and 2-butanone and other poor responders. The validation guidance used for this project allows for a response of 0.01 for these compounds if spectral integrity can be verified at low concentrations. These spectra are not commonly provided and are not part of the deliverable for this data set. The laboratory has been tasked with providing to the client verification that the 0.01 RF is valid. If the spectral verification is available, data are not qualified for response factors greater than 0.01 and less than 0.05 for “poor responders.” No data have been qualified.

Dichlorodifluoromethane is consistently high in the ICV for all instruments except for MS10. There are also some other poor responders that are out. Data have been qualified only from the daily calibrations. See table in the text.

Continuing Calibrations

When there are no detections, no qualification is required unless the % D is biased low and so large as to indicate a significant probability of false negatives. Qualification is required for a % D biased high for detected compounds only. This requires that the RF is acceptable to verify the non-detect status, which is the case here. Data would be qualified “JC#”, where # is the % D. There could be variability to the data as there is variability to the response. No qualifiers have been required. See a table in the text of the associated calibrations.

Matrix Spikes

The MS/MSDs include (all ending in EBT-12):

PMW85-01, IW101-04A, PMW21-02

This meets the recommendation of 1 per 20 field (not field QC or blank) samples. As this is an ongoing project an overall adherence to the 1:20 frequency is monitored by the Project Manager.

The lab notes they do not report non-client QC. In most, and not all cases, and LCS/LCSD is reported. The full target list has been spiked. For sample PMW85-05-EBT-12, the result for tetrachloroethene (PCE) and cis-1,2-dichloroethane are over the 4x limit, where the result is statistically greater than the recovery of the spike. Chloroform (5.5/ 0 %R) is nearly 4 x the limit, but still under the limit and has been qualified. The bias could be quite low. The recovery for 1,2,3-trichloropropane is in for the MSD and just out of the 73% limit for the MS. Dichlorodifluoromethane (DFM) is high at 158 and 144%. The compound is non-detect. No qualifier has been applied.

Acetone is 4 x the spike value in sample IW101-04A.

For PMW21-02, twenty two (22) of the compounds in the MS were above the lab limits. All the MSD's were in control. As the %R's are high and all of the outlier compounds are non-detect with the exception of cis-1,2-dichloroethane, only that compound is qualified JMS#, where # is the %R. There could be a slight high bias to the data. PCE is over 4 x spike.

For the same sample noted above, there are 50 RPDs that exceed the lab limit of 20%. Data are not qualified for RPD alone. As there are so many outliers, it is suspected that there is a spiking error of some sort rather than matrix effects. There are no chromatograms to review to determine the extent of interferences.

Laboratory Control Samples

The full target list has been spiked. When a high LCS recovery is associated with a non-detect in samples, no qualifier is added since the indicated bias is high. When the target is detected, data are qualified “JL#”, where # is the recovery. Data could be biased high proportional to the LCS percent recovery. All results associated with low recoveries are qualified and data could be biased low. The laboratory uses the same control limits on all 3 instruments used for analysis even though the responses are different on each instrument. The control limits should be instrument specific. No data have been qualified. Dichlorodifluoromethane (DFM), Chloromethane (ClMe) are high in several of the LCS's. The compounds are non-detect.

Method Blanks

Several method blanks contained 2-chlorotoluene and n-propylbenzene . One method blank contained vinyl chloride. None of these compounds was detected in client samples or detections were > 5 x blank. These are not common laboratory contaminants and the source is not noted in the narratives.

Field Blanks

The field blanks are RB1, RB2 and RB3-EBT-12. The 3 samples contained 1,4 dichlorobenzene and acetone. Only acetone has impacted reported data. Data are qualified UFB#, where # is the acetone result, dilution corrected for the associated sample.

Nine Trip blanks were collected and all were non-detected with the exception of the TB for the 5/11/13 collection with a detection of methylene chloride. The compound is not reported in the associated samples. No qualifiers have been applied.

Field QC

All field precision limits were met for these samples.

Parent	Duplicate	SDG 13050:
IW21-04B-EBT-12	DUP1	477
IW101-07A-EBT-12	DUP2	803
PMW101-02B-EBT-12	DUP3	802
IW92-07-EBT-12	DUP4	476
PMW85-01-EBT-12	DUP5	702
MW-197B-EBT-12	DUP6	801

Compound Identification

Not part of this review level. The laboratory does note that for SDG L13050802, sample IW101-04A : ‘The presence of naphthalene and 1,2,3-trichlorobenzene in the dilution of the sample may be attributed to carry-over contamination and data were not reported’. Samples 4 – 7 in this set were also noted as diluted due to foaming during the purge.

Reporting Limits

There are extremely high dilutions for many of the samples due to compounds over the calibration range of the instrument. There are also numerous samples noted as being diluted due to foaming of the sample during the purging step. The project manager will determine if the elevated reporting limits meet the project criteria. All dilutions have been reported.

TABLE OF QUALIFIED DATA

Sample ID	Client ID	Parameter	Result ug/L	Lab Flag	dil'n	MDL	DVAL
L13050476-04	PMW85-05-EBT-12	1,2,3-Trichloropropane	46.5		1	0.5	JMS72.5
L13050476-04	PMW85-05-EBT-12	Carbon tetrachloride	72.3		1	0.25	JMS0
L13050801-06	MW-213-EBT-12	Acetone	125		5	12.5	UFB24.5
L13050804-06	PMW101-07B-EBT-12	All VOA Compounds			50		JH2
L13050805-04	PMW21-02-EBT-12	cis-1,2-Dichloroethene	4.74		1	0.25	JMS132

Final Data Qualification and Usability Report

Project: Defense Depot Memphis, TN (DDMT)
Enhanced Bioremediation Treatment (EBT)
Sampling Event: EBT-12
Project / Task Number: 228-192672-002
Sample Data Package(s): L13050474, L13050475, L13050476, L13050477,
L13050702, L13050704, L13050705, L13050800,
L13050801, L13050802, L13050803, L13050804,
L13050805
Data Validation Performed by: Diane Short & Associates (DSA)
Final Data Qualification and Usability
Report Prepared by: Lynn K. Lutz, HDR Inc.

Data Validation Report Review and Comments

The data validation report is acceptable with comments as noted below.

VOCs:

The lab reported multiple results for some analytes in samples that required dilution; the Project Chemist selected which results to report.

The validator noted that the dilution of sample PMW101-07B-EBT-12 was analyzed two days past holding time and all sample results are qualified J. Only acetone was reported from this analysis and therefore only acetone is qualified for the holding time issue.

The validator discussed responses of poor responders and noted that the laboratory has been tasked with providing to the client verification that the RRFs below 0.05 are valid. The PC reviewed the initial calibrations and verified that there is sufficient response to allow the responses less than 0.05.

Metabolic Acids:

The validator noted pyruvic acid had response factors of approximately 0.005, which is quite low. The validator also noted high %RSD values for pyruvic acid and propionic acid, but the lab used linear curves to quantitate results, and r values were 1.000. The Project Chemist reviewed the initial calibrations and verified that there is sufficient instrument response at the low concentration calibration standard, and qualification was not necessary. However, the curve for propionic acid was biased slightly high, and low concentrations (less than two times the RL of 10 mg/L on the instrument) of propionic acid in the samples have been qualified as estimated (J).

Examination of other sample chromatograms shows a similar interfering peak that might overshadow small amounts of pyruvic acid and lactic acid, therefore a number of pyruvic acid and

lactic acid results have been qualified as non-detect estimated (UJ) or estimated (J) where the interfering peak was present.

Dissolved Gases:

No issues except as noted below for final qualifiers.

TOC:

No issues except as noted below for final qualifiers.

Final Data Qualifiers

VOCs:

Sample results were qualified J where the validator qualified JMS72.5, JMS0 or JMS132.

The validator noted a number of continuing calibration results outside control limits but did not apply qualifiers. The Project Chemist did apply qualifiers of UJ or J where applicable.

One acetone result was qualified B where the validator qualified UFB24.5.

The final qualifier for some results was J where the lab had qualified as F.

Metabolic Acids:

Sample results were qualified J where the validator qualified JH1, JH1.5, JH3 or JH4 for holding times.

The final qualifier for lactic acid in IW101-04A-EBT-12 was J where DSA had qualified as RMS0, where lactic acid was not recovered in the MS/MSD of this sample. The result is not rejected because there was a detection, therefore the result is estimated.

Some pyruvic acid and lactic acid results with a large interfering peak have been qualified as estimated (J) or non-detect estimated (UJ).

The final qualifier for some results was J where the lab had qualified as F.

Dissolved Gases:

The final qualifier for ten methane results was B where DSA had qualified as UMB3.2, UMB3.3, UMB3.56 or UMB3.25.

The final qualifier for one methane result was J where DSA had not qualified it, as the diluted analysis was above the calibration curve and there was apparently insufficient remaining sample to perform another analysis.

The final qualifier for some results was J where the lab had qualified as F.

TOC: Sample results were qualified J where the validator qualified JP for preservation issues.

The final qualifier for four TOC results was B where DSA had qualified as UMB.535, UCB.161, UCB.122 or UMB.153.

The final qualifier for two TOC results was J where DSA had qualified as JFD122.

The final qualifier for some results was J where the lab had qualified as F.

Data Usability

VOCs:

There were no rejected sample results. All results are usable as qualified.

Metabolic Acids:

There were no rejected sample results. All results are usable as qualified, although qualitative results for pyruvic acid and lactic acid, the earliest eluters, should be used with caution, as these analytes are susceptible to matrix interference that may suppress results.

Dissolved Gases:

There were no rejected sample results. All results are usable as qualified.

TOC:

There were no rejected sample results. All results are usable as qualified.



20 August 2013

Lynn K. Lutz, HDR Inc.

Date

DIANE SHORT & ASSOCIATES, INC. _____

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ORGANIC DATA QUALITY REVIEW REPORT

GC Report for Ethane, Methane, Ethene and Carbon Dioxide by EPA SOP RSK-175; Metabolic Acids by HPLC; TOC by SW-846 9060

SDG: L1308:	0814	0921	0978	1024	1060

PROJECT	Memphis Defense Depot, EBT-13 Sampling for HDR, Denver		
LABORATORY	Microbac Laboratories, Inc., Marietta, OH		
SAMPLE MATRIX	Water	SAMPLING DATE	08/2013
NUMBER OF SAMPLES	75 water, including 6 field duplicate pairs, 8 trip blanks and 3 rinse blanks		

ANALYSES REQUESTED: Metabolic Acids by HPLC; EPA SOP RSK-175, SW-846 9060 (TOC)

SAMPLE NO.: Attached

DATA REVIEWER: Diane Short

QA REVIEWER: Diane Short & Associates, Inc., INITIALS/DATE: DLS 12/02/13

Telephone Logs included Yes____ No X

Contractual Violations Yes____ No X

The project QAPP (9/11), EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 2007 (SOP), the EPA SW 846 Methods for Evaluating Solid Waste, Physical/ Chemical Methods Third Edition, (SW-846), current updates, and the project-specific methods have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. The review has been tasked as Level III for review of all calibrations, holding times, and QC for all samples.

I. DELIVERABLES

All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.

Yes ☒ No ☐

This report has been requested to include the following review: Holding times and sample integrity (chains of custody, sample log in), Calibrations, Summary QC. There are 75 water samples including QC samples (duplicates and rinse blanks) with 17 QC sets (days of analysis) for RSK, 11 QC for Metabolic Acid and 8 QC for TOC. A number of the QC samples and calibrations are redundant and applicable to more than one SDG. TOC has no summary forms and the calibrations and blanks were required to be reviewed from the raw data and using bracketing to determine client sample associations.

II. ANALYTICAL REPORT FORMS

The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes ☒ No ☐

III. HOLDING TIMES

A. The contract holding times were met for all analyses (Time of sample receipt to time of extraction and from extraction to analysis.)

Yes ☒ No ☐

See Section B. below. Per EPA guidance, for validation purposes we calculate the holding time to the nearest half day in cases where the regulation or method specifies holding time units of days.

B. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (Time of sample collection to time of extraction and from extraction to analysis.)

Yes ☒ No ☐

Metabolic Acids: The reviewer has not been able to find 40 CFR or documented holding times for the metabolic acids. The holding time for an analogous HPLC method 8310 is 14 days for preserved water samples and the project approved holding time is 28 days to analysis.

RSK-175: When pH is adjusted, the holding time is 14 days per the method, and we have used this as the acceptable holding time.

Method 9060: Holding time for preserved samples is 28 days. All samples are within this limit.

C. All chains of custody are complete with signatures and dates.

Yes ☒ No ☐

No qualifiers have been added for Chain of Custody (COC) issues.

The laboratory has signed and affixed a receipt label on all pages. The relinquishment date and time are part of the electronically-generated COC. There is an electronic signature unless noted.

In addition, there are sample receipt acknowledgements from the laboratory. The log in forms contain the courier identification and air bill number.

D. Samples were received at the proper temperature and preservation.

Yes ☐ No ☒

The most current regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6° C.

The need for pH adjustment is a common occurrence for samples at this site. The proper sample bottles have been issued and used. There is a buffering capacity to these matrices that results in slightly elevated pH. If the pH is adjusted as soon as the samples reach the laboratory, the impact on the sample data is

considered to be minimal. For the samples in the table below, the samples are noted as arriving at improper pH and the pH was not able to be fully adjusted by the lab per the narrative notes. Data have been qualified JP to indicate a possible bias to the data due to improper preservation.

Lab ID	Client ID	Compound	Result mg/L	Lab flag	dil'n	MDL	Qualifier
L13081024-01	PMW21-04-EBT-13	Acetic Acid	45.7		10	5	JP
L13081024-01	PMW21-04-EBT-13	Butyric Acid	67.3		10	5	JP
L13081024-01	PMW21-04-EBT-13	Lactic Acid		U	10	5	JP
L13081024-01	PMW21-04-EBT-13	Propionic Acid	201		10	50	JP
L13081024-01	PMW21-04-EBT-13	Pyruvic Acid		U	10	0.5	JP
L13081024-01	PMW21-04-EBT-13	Acetic Acid	63.7		1	0.5	JP
L13081024-01	PMW21-04-EBT-13	Butyric Acid	92.6		1	0.5	JP
L13081024-01	PMW21-04-EBT-13	Lactic Acid		U	1	0.5	JP
L13081024-01	PMW21-04-EBT-13	Propionic Acid	284	J	1	5	JP
L13081024-01	PMW21-04-EBT-13	Pyruvic Acid		U	1	0.05	JP
L13081024-01	PMW21-04-EBT-13	Total Organic Carbon	444		50	25	JP
L13081024-02	IW101-04A-EBT-13	Acetic Acid	361		100	50	JP
L13081024-02	IW101-04A-EBT-13	Butyric Acid	342		100	50	JP
L13081024-02	IW101-04A-EBT-13	Lactic Acid		U	100	50	JP
L13081024-02	IW101-04A-EBT-13	Propionic Acid	1290		100	500	JP
L13081024-02	IW101-04A-EBT-13	Pyruvic Acid		U	100	5	JP
L13081024-02	IW101-04A-EBT-13	Total Organic Carbon	2110		200	100	JP
L13081024-03	IW101-04C-EBT-13	Acetic Acid	1470		100	50	JP
L13081024-03	IW101-04C-EBT-13	Butyric Acid	2510		100	50	JP
L13081024-03	IW101-04C-EBT-13	Lactic Acid		U	100	50	JP
L13081024-03	IW101-04C-EBT-13	Propionic Acid	1620		100	500	JP
L13081024-03	IW101-04C-EBT-13	Pyruvic Acid		U	100	5	JP
L13081024-03	IW101-04C-EBT-13	Total Organic Carbon	3770		250	125	JP
L13081024-10	MW-203B-EBT-13	Acetic Acid	0.874	F	1	0.5	JP
L13081024-10	MW-203B-EBT-13	Butyric Acid		U	1	0.5	JP
L13081024-10	MW-203B-EBT-13	Lactic Acid	0.671	F	1	0.5	JP
L13081024-10	MW-203B-EBT-13	Propionic Acid		U	1	5	JP
L13081024-10	MW-203B-EBT-13	Pyruvic Acid		U	1	0.05	JP
L13081024-10	MW-203B-EBT-13	Total Organic Carbon	13.5		2	1	JP
L13081024-17	IW101-05C-EBT-13	Acetic Acid	561		10	5	JP
L13081024-17	IW101-05C-EBT-13	Butyric Acid	910		10	5	JP
L13081024-17	IW101-05C-EBT-13	Lactic Acid		U	10	5	JP
L13081024-17	IW101-05C-EBT-13	Propionic Acid	1100	J	10	50	JP
L13081024-17	IW101-05C-EBT-13	Pyruvic Acid		U	10	0.5	JP
L13081024-17	IW101-05C-EBT-13	Acetic Acid	540		20	10	JP
L13081024-17	IW101-05C-EBT-13	Butyric Acid	861		20	10	JP
L13081024-17	IW101-05C-EBT-13	Lactic Acid		U	20	10	JP
L13081024-17	IW101-05C-EBT-13	Propionic Acid	1050		20	100	JP
L13081024-17	IW101-05C-EBT-13	Pyruvic Acid		U	20	1	JP
L13081024-17	IW101-05C-EBT-13	Total Organic Carbon	2460		100	50	JP
L13081024-18	IW92-03-EBT-13	Acetic Acid	2720		100	50	JP
L13081024-18	IW92-03-EBT-13	Butyric Acid	6180		100	50	JP

L13081024-18	IW92-03-EBT-13	Lactic Acid	4190		100	50	JP
L13081024-18	IW92-03-EBT-13	Propionic Acid	5070		100	500	JP
L13081024-18	IW92-03-EBT-13	Pyruvic Acid		U	100	5	JP
L13081024-18	IW92-03-EBT-13	Total Organic Carbon	11800		500	250	JP
L13081024-31	IW21-04B-EBT-13	Acetic Acid	240	J	1	0.5	JP
L13081024-31	IW21-04B-EBT-13	Butyric Acid	78.5		1	0.5	JP
L13081024-31	IW21-04B-EBT-13	Lactic Acid	10.2		1	0.5	JP
L13081024-31	IW21-04B-EBT-13	Propionic Acid	975	J	1	5	JP
L13081024-31	IW21-04B-EBT-13	Pyruvic Acid		U	1	0.05	JP
L13081024-31	IW21-04B-EBT-13	Acetic Acid	243		10	5	JP
L13081024-31	IW21-04B-EBT-13	Butyric Acid	82		10	5	JP
L13081024-31	IW21-04B-EBT-13	Lactic Acid	56.9		10	5	JP
L13081024-31	IW21-04B-EBT-13	Propionic Acid	984		10	50	JP
L13081024-31	IW21-04B-EBT-13	Pyruvic Acid	5.7		10	0.5	JP
L13081024-31	IW21-04B-EBT-13	Total Organic Carbon	1240		100	50	JP
L13081060-05	IW92-01-EBT-13	Acetic Acid	1110		100	50	JP
L13081060-05	IW92-01-EBT-13	Butyric Acid	2050		100	50	JP
L13081060-05	IW92-01-EBT-13	Lactic Acid		U	100	50	JP
L13081060-05	IW92-01-EBT-13	Propionic Acid	1840		100	500	JP
L13081060-05	IW92-01-EBT-13	Pyruvic Acid		U	100	5	JP
L13081060-05	IW92-01-EBT-13	Total Organic Carbon	3400		100	50	JP
L13080978-04	IW101-07B-EBT-13	Total Organic Carbon	2890		100	50	JP
L13080978-06	IW101-07C-EBT-13	Total Organic Carbon	5350		150	75	JP
L13080978-10	DUP2-EBT-13	Total Organic Carbon	1810		100	50	JP

IV. INSTRUMENT CALIBRATION (IC) AND CONTINUING CALIBRATION (CC) VERIFICATION

A. The HPLC and GC and TOC standards were analyzed at the required frequency.

Yes ☒ No ☐

B. The chromatographic resolution and separation criteria were met.

Yes ☐ No ☐ NA ☒

No data reported or required for this item.

C. The suggested columns were used and the EQLs were met.

Yes ☐ No ☐ NA ☒

No data reported or required for this item.

D. Calibration factors were met at 25% RSD for VFA and RSK or the regression curves were prepared with a correlation coefficient 'r' greater than 0.99, per SW-846, Method 8000B. The TOC ICV and CCV limits are 90- 110%.

Yes ☐ No ☒

MBA: In the Case Narrative, the laboratory has indicated that all initial calibrations have used linear regression, and that all acceptance criteria are met. The reported data verify the linear curve calculation. The % RSD is out of limits for propionic acid (33.2 %) and pyruvic acid (49.5%). As the linearity has been met, no data have been qualified. The variability to the responses is, however, noted. The deviation, particularly for pyruvic acid, could be sufficient to recommend qualifying the variability.

Response factors (RF) are not usually evaluated for this method, but the RF average for pyruvic acid is only 0.005, which is quite low. The recoveries of the matrix spikes and LCS are acceptable and the calibration standard does include the lowest concentration. The EDD contains the lowest dilution to verify non-detects at the 0.1 mg/L limit. The RL for pyruvic acid is 1/10 that of the other compounds. The project manager may determine further evaluation of the raw data is required to verify the pyruvic non-detects.

TOC: All calibrations were within limits and linear curves are provided. The ICAL curve is noted as being generated 7/9/2013. Daily calibrations were acceptable using this curve and the duration has not appeared to impact the accuracy. No summary data are provided and the raw data were accessed to review these data. The laboratory does not provide any %R values and the ICV, CCV were required to be manually evaluated from the standard concentrations.

E. Percent Difference (%D's) for Continuing Calibration Factors and retention times (RT) were within the 25% Limits .

Yes ☒ No ☐

MBA, RSK : All calibrations are in control.

TOC: All calibrations are in control as noted from the raw data review by bracketing all the client samples from the run log.

V. BLANKS

A. Laboratory blanks

1. Laboratory blanks were analyzed for every sample set and for each matrix type or once in every 20 samples, whichever is more frequent.

Yes ☒ No ☐

2. No blank contamination was found in the method blank.

Yes ☐ No ☒

MBA: All method blanks are in control.

RSK-175: Method blanks are reported for almost every QC set for Methane. Data for methane have been qualified UMB#, where # is the associated blank value. Data are fully usable as non-detected values.

TOC: Method blanks acceptable.

Lab ID	Client ID	Compound	Result mg/L	Lab flag	dil'n	MDL	Qualifier
L13080814-09	RB1-EBT-13	Methane	3.4	F	1	1	UMB3.97
L13080921-10	IW101-02B-EBT-13	Methane	4.4	F	1	1	UMB3.97
L13080921-12	PMW101-07B-EBT-13	Methane	9.3		1	1	UMB3.97
L13081024-05	IW101-05B-EBT-13	Methane	3.3	F	1	1	UMB3.55
L13081024-06	MW-197A-EBT-13	Methane	3.4	F	1	1	UMB3.41
L13081024-23	PMW21-01-EBT-13	Methane	8		1	1	UMB3.37
L13081024-32	PMW21-02-EBT-13	Methane	8.5		1	1	UMB3.55
L13081024-34	RB2-EBT-13	Methane	3.2	F	1	1	UMB3.55
L13081060-07	MW-212-EBT-13	Methane	2.8	F	1	1	UMB3.37
L13081060-09	DUP6-EBT-13	Methane	2.9	F	1	1	UMB3.37

3. Instrument blank analysis was performed following all samples that contained analytes at high concentrations.

Yes _____ No _____ NA X

No data reported or required for this item.

B. Field Blanks

If field blanks were identified, no blank contamination was found.

Yes X No _____ NA _____

There are 3 field blanks for each method.

RSK – The methane detections in the rinse blanks were attributed to the method blank.

TOC and acetic acid were qualified UFB#, where # is the value of the blank. Data are fully usable as non-detected values.

Lab ID	Client ID	Compound	Result mg/L	Lab flag	dil'n	MDL	Qualifier
L13081024-32	PMW21-02-EBT-13	Total Organic Carbon	1.58		1	0.5	UFB.709
L13081060-07	MW-212-EBT-13	Total Organic Carbon	1.62		1	0.5	UFB1.07
L13081060-08	MW-213-EBT-13	Acetic Acid	0.848	F	1	0.5	UFB.762
L13081060-09	DUP6-EBT-13	Acetic Acid	0.802	F	1	0.5	UFB.762
L13081060-09	DUP6-EBT-13	Total Organic Carbon	1.09		1	0.5	UFB1.07

VI. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

A. Matrix spike (MS) and matrix duplicate or matrix spike duplicate (MSD) were analyzed for every analyses performed for every 20 samples or for every matrix whichever is more frequent.

Yes X No _____

There are 3 MS/MSDs for each method, which meets frequency requirements for non-QC samples.

MS/MSDs are not reported for every SDG to verify the method frequency. As only client samples would be used for qualification, no further action is required.

The MS/MSDs include (all ending in EBT-13): IW101-05A, MW-197A, IW21-04A

B. The MS and MSD percent recoveries (%R) were within the limits defined in the QAPP of 40 – 140% for soil and water for Method 8081/ 8082. Two compounds are allowed to be 30 -150%. Both the MS and the MSD %R are required to be out of limits for data to be qualified. No limits are defined in the QAPP for the RSK-175 or VFA methods and lab limits have been applied. For TOC, the EPA limits of 75-125% are used.

Yes _____ No X

RSK: Methane is greater than 4 x spike and carbon dioxide is also over 4 x spike except for sample MW-197A-EBT-13 (#6)

Metabolic acids: Data for IW101-05A (#15) for lactic and pyruvic acid have been qualified RMS#, where # is the % R for the zero % recoveries, which are rejected as the parent sample in non-detect. The other acids were 4 x the spike. The rejection is valid as the spike is above the RL at the 10 x dilution.

For MW-197A-EBT-13(#6), pyruvic is rejected in the non-diluted sample.

For IW21-04A-EBT-13 (#28), the spike is either diluted out or the sample result is > 4 x spike.

TOC- For IW21-04A-EBT-13 and IW101-05A-EBT-13, TOC is 4 x spike and no data are qualified.

Lab ID	Client ID	Compound	Result mg/L	Lab flag	dil'n	MDL	Qualifier
L13081024-06	MW-197A-EBT-13	Pyruvic Acid		U	1	0.05	RMS5.1
L13081024-15	IW101-05A-EBT-13	Lactic Acid		U	10	5	RMS0
L13081024-15	IW101-05A-EBT-13	Pyruvic Acid		U	10	0.5	RMS0D
L13081024-28	IW21-04A-EBT-13	Lactic Acid		U	100	50	Spike < MDL
L13081024-28	IW21-04A-EBT-13	Pyruvic Acid		U	100	5	Spike < MDL

C. The MSD relative percent differences (RPD) were within the defined QAPP limits of < 50% RPD. None are acceptable if greater than 60% RPD. The TOC limit is 20% for waters.

Yes _____ No ☒X_____

The RPD for pyruvic acid in IW101-05A-EBT-1 cannot be calculated as one recovery is zero and the other is 62%. The lack of precision is just denoted by an added 'D' code

D. The MS/MSD were client samples.

Yes ☒X_____ No _____

No non client samples were reported.

VII. LABORATORY CONTROL SAMPLE AND DUPLICATE (LCS/LCSD)

A. Laboratory Control Sample (LCS) and LCS duplicate were analyzed for every analyses performed and for every 20 samples or for every matrix whichever is more frequent.

Yes ☒X_____ No _____

B. The LCS percent recovery (%R) are within the limits defined by QAPP of 50 – 130% for soil and water for pesticides and PCBs. For RSK and VFA, the QAPP limit is the lab limits for both LCS and LCSD. Two compounds are allowed to be 30 -150%. If an LCS and LCDS are analyzed, both samples have to have outliers in order for data to be qualified. The TOC limit is 80 – 120% R.

Yes ☒X_____ No _____

LCS/LCSD pairs are run in several data sets. In SDG 13081060, there is an RPD of 25.1 for CO2. It is within lab limits and data are also not qualified for RPD alone when the spikes are acceptable.

VIII. SURROGATE RECOVERY

A. The Surrogate spike was analyzed with every sample.

Yes _____ No _____ NA ☒X_____

B. And met the recovery limits defined in the QAPP of 40 – 140%. If recovery limits were exceeded for both surrogates, the sample was re-extracted and re-analyzed.

Yes _____ No _____ NA ☒X_____

IX. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria and the Retention times were within the required windows. Note: Internal standards are not required for GC analysis, but if they are used, SW-846 stipulates that they meet the same recovery requirements as those specified for GCMS methods.

Yes _____ No _____ NA ☒X_____

X. FIELD QC

If Field duplicates were identified, they met guidance RPD of < 35% for water or < 50% for soils and gases. For values reported at < 5 x the reporting limit (RL), a difference of 2 x RL is used as guidance (4 x RL for soils). Data are not qualified for field duplicates as these are evaluated for the total project by the client. Yes _____ No X NA_____

The field duplicates were determined by proximity of collection dates and are noted below. The potential outlier field precision data for these samples with the variations noted below give the range of dilutions. An RPD has not been calculated given the number of reported results.

For the Dup 3 pair, there are multiple dilution results for RSK for methane and carbon dioxide. At each noted dilution, the precision was acceptable although there is a range of reported values. This is also true for the dilutions reported for the Dup4 pair.

Parent	Duplicate
IW21-03A-EBT-13	DUP1
IW101-03B-EBT-32	DUP2
PMW101-04B-EBT-13	DUP3
IW85-06-EBT-13	DUP4
PMW92-03-EBT-13	DUP5
MW-212-EBT-13	DUP6

DUP4-EBT-13	x100, Result mg/L	IW85-06-EBT-13	Comment
Acetic Acid	1550	1820	
Butyric Acid	133	173 (RL 100)	OK, RL
Lactic Acid		100U	
	x10		
Acetic Acid	1420		
Butyric Acid	109 (RL 10)		
Lactic Acid	19.3		

DUP2-EBT-13	Result mg/L	Dil'n	IW101-03B-EBT-13	Dil'n	Comment
Acetic Acid	728	10	628	10	
Butyric Acid	1310	100	1090	10	
Propionic Acid	936	1000	798 (RL 1000)	100	OK, RL
Acetic Acid			555	10	
Butyric Acid			979	10	
Propionic Acid			709	100	

DUP6-EBT-13	Result mg/L	MW212-EBT-13	Comment
Acetic Acid	0.802	15.8	
Butyric Acid	1U	0.29	OK, RL
Propionic Acid	10 U	19	OK, RL

XI. COMPOUND IDENTIFICATION

A. All raw data chromatograms and data system printouts were evaluated for all detected compounds and the identification is accurate.

Yes ☐ No ☐ NA ☒

This evaluation is not performed at this level of review.

B. Retention time limits or peak pattern identifications are met.

Yes ☐ No ☐ NA ☒

This evaluation is not performed at this level of review.

C. If two column or two detector confirmation was performed, the value of the confirmation was within 25%D of the quantitation value for results > 5 x RL. If the laboratory has flagged data 'COL' for %D > 40%, a JP qualifier has been added for low level results. For values below (5 x RL), the difference is not considered to impact the precision of the data.

Yes ☐ No ☐ NA ☒

Not part of this level of review. Dual columns are not required for these methods.

XII. COMPOUND QUANTITATION AND REPORTED CRQLS

A. Raw data examination verified that all sample results were correctly calculated.

Yes ☐ No ☐ NA ☒

This evaluation is not performed at this level of review.

B. The chromatograms and general system performance were acceptable for all instruments and analytical systems.

Yes ☐ No ☐ NA ☒

This evaluation is not performed at this level of review.

C. The suggested EQLs for the sample matrices in this set were met.

Yes ☒ No ☐ NA ☐

These samples are highly diluted, particularly for the TOC and metabolic acids. The project manager will determine if the project limits are met for the non-detected compounds. The lowest dilution per parameter has been reported for the metabolic acids.

XIII. OVERALL ASSESSMENT OF THE CASE

The method criteria have been met and the quality of the data, after consideration of qualifiers, is considered acceptable and usable as far as can be determined at this level of review.

The following is noted:

This report has been requested to include the following review: Holding times and sample integrity (chains of custody, sample log in), Calibrations, Summary QC. There are 75 water samples including QC samples (duplicates and rinse blanks) with 22 QC sets (days of analysis) for RSK, 11 QC for Metabolic Acid and 8 QC for TOC. A number of the QC samples and calibrations are redundant and applicable to more than one SDG. TOC has no summary forms and the calibrations and blanks were required to be reviewed from the raw data and using bracketing to determine client sample associations.

Sample Condition

HDebt13GC1213

The most current regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6° C.

The need for pH adjustment is a common occurrence for samples at this site. The proper sample bottles have been issued and used. There is a buffering capacity to these matrices that results in slightly elevated pH. If the pH is adjusted as soon as the samples reach the laboratory, the impact on the sample data is considered to be minimal. For the samples in the table below, the samples are noted as arriving at improper pH and the pH was not able to be fully adjusted by the lab per the narrative notes. Data have been qualified JP to indicate a possible bias to the data due to improper preservation.

Calibrations:

MBA: In the Case Narrative, the laboratory has indicated that all initial calibrations have used linear regression, and that all acceptance criteria are met. The reported data verify the linear curve calculation. The % RSD is out of limits for propionic acid (33.2 %) and pyruvic acid (49.5%). As the linearity has been met, no data have been qualified. The variability to the responses is, however, noted. The deviation, particularly for pyruvic acid, could be sufficient to recommend qualifying the variability. Response factors (RF) are not usually evaluated for this method, but the RF average for pyruvic acid is only 0.005, which is quite low. The recoveries of the matrix spikes and LCS are acceptable and the calibration standard does include the lowest concentration. The EDD contains the lowest dilution to verify non-detects at the 0.1 mg/L limit. The RL for pyruvic acid is 1/10 that of the other compounds. The project manager may determine further evaluation of the raw data is required to verify the pyruvic non-detects.

TOC: All calibrations were within limits and linear curves are provided. The ICAL curve is noted as being generated 7/9/2013. Daily calibrations were acceptable using this curve and the duration has not appeared to impact the accuracy. No summary data are provided and the raw data were accessed to review these data. The laboratory does not provide any %R values and the ICV, CCV were required to be manually evaluated from the standard concentrations.

Method Blanks

MBA: All method blanks are in control.

RSK-175: Method blanks are reported for almost every QC set for Methane. Data for methane have been qualified UMB#, where # is the associated blank value. Data are fully usable as non-detected values.

TOC: Method blanks acceptable.

MS/MSD Recoveries:

There are 3 MS/MSDs for each method, which meets frequency requirements for non-QC samples.

MS/MSDs are not reported for every SDG to verify the method frequency. As only client samples would be used for qualification, no further action is required.

The MS/MSDs include (all ending in EBT-13): IW101-05A, MW-197A, IW21-04A

RSK: Methane is greater than 4 x spike and carbon dioxide is also over 4 x spike except for sample MW-197A-EBT-13 (#6)

Metabolic acids: Data for IW101-05A (#15) for lactic and pyruvic acid have been qualified RMS#, where # is the % R for the zero % recoveries, which are rejected as the parent sample in non-detect. The other acids were 4 x the spike. The rejection is valid as the spike is above the RL at the 10 x dilution. For MW-197A-EBT-13(#6), pyruvic is rejected in the non-diluted sample.

For IW21-04A-EBT-13 (#28), the spike is either diluted out or the sample result is > 4 x spike.

TOC- For IW21-04A-EBT-13 and IW101-05A-EBT-13, TOC is 4 x spike and no data are qualified. The RPD for pyruvic acid in IW101-05A-EBT-1 cannot be calculated as one recovery is zero and the other is 62%. The lack of precision is just denoted by an added 'D' code

Field Blanks:

There are 3 field blanks for each method.

RSK – The methane detections in the rinse blanks were attributed to the method blank.

TOC and acetic acid were qualified UFB#, where # is the value of the blank. Data are fully usable as non-detected values.

Field Duplicates:

The field duplicates were determined by proximity of collection dates and are noted below. The potential outlier field precision data for these samples with the variations noted below give the range of dilutions. An RPD has not been calculated given the number of reported results.

For the Dup 3 pair, there are multiple dilution results for RSK for methane and carbon dioxide. At each noted dilution, the precision was acceptable although there is a range of reported values. This is also true for the dilutions reported for the Dup4 pair.

Parent	Duplicate
IW21-03A-EBT-13	DUP1
IW101-03B-EBT-32	DUP2
PMW101-04B-EBT-13	DUP3
IW85-06-EBT-13	DUP4
PMW92-03-EBT-13	DUP5
MW-212-EBT-13	DUP6

DUP4-EBT-13	x100, Result mg/L	IW85-06-EBT-13
Acetic Acid	1550	1820
Butyric Acid	133	173 (RL 100)
Lactic Acid		100U
	x10	
Acetic Acid	1420	
Butyric Acid	109 (RL 10)	
Lactic Acid	19.3	

DUP2-EBT-13	Result mg/L	Dil'n	IW101-03B-EBT-13	Dil'n
Acetic Acid	728	10	628	10
Butyric Acid	1310	100	1090	10
Propionic Acid	936	1000	798 (RL 1000)	100
Acetic Acid			555	10

Butyric Acid			979	10
Propionic Acid			709	100

DUP6-EBT-13	Result mg/L	MW212-EBT-13	Comment
Acetic Acid	0.802	15.8	
Butyric Acid	1U	0.29	OK, RL
Propionic Acid	10 U	19	OK, RL

Reporting Limits

These samples are highly diluted, particularly for the TOC and metabolic acids. The project manager will determine if the project limits are met for the non-detected compounds.

TABLE OF QUALIFIED DATA

Lab ID	client ID	Compound	*Result mg/L	Lab flag	dil'n	MDL	Qualifier
L13080814-09	RB1-EBT-13	Methane	3.4	F	1	1	UMB3.97
L13080921-10	IW101-02B-EBT-13	Methane	4.4	F	1	1	UMB3.97
L13080921-12	PMW101-07B-EBT-13	Methane	9.3		1	1	UMB3.97
L13081024-01	PMW21-04-EBT-13	Acetic Acid	45.7		10	5	JP
L13081024-01	PMW21-04-EBT-13	Butyric Acid	67.3		10	5	JP
L13081024-01	PMW21-04-EBT-13	Lactic Acid		U	10	5	JP
L13081024-01	PMW21-04-EBT-13	Propionic Acid	201		10	50	JP
L13081024-01	PMW21-04-EBT-13	Pyruvic Acid		U	10	0.5	JP
L13081024-01	PMW21-04-EBT-13	Acetic Acid	63.7		1	0.5	JP
L13081024-01	PMW21-04-EBT-13	Butyric Acid	92.6		1	0.5	JP
L13081024-01	PMW21-04-EBT-13	Lactic Acid		U	1	0.5	JP
L13081024-01	PMW21-04-EBT-13	Propionic Acid	284	J	1	5	JP
L13081024-01	PMW21-04-EBT-13	Pyruvic Acid		U	1	0.05	JP
L13081024-01	PMW21-04-EBT-13	Total Organic Carbon	444		50	25	JP
L13081024-02	IW101-04A-EBT-13	Acetic Acid	361		100	50	JP
L13081024-02	IW101-04A-EBT-13	Butyric Acid	342		100	50	JP
L13081024-02	IW101-04A-EBT-13	Lactic Acid		U	100	50	JP
L13081024-02	IW101-04A-EBT-13	Propionic Acid	1290		100	500	JP
L13081024-02	IW101-04A-EBT-13	Pyruvic Acid		U	100	5	JP
L13081024-02	IW101-04A-EBT-13	Total Organic Carbon	2110		200	100	JP
L13081024-03	IW101-04C-EBT-13	Acetic Acid	1470		100	50	JP
L13081024-03	IW101-04C-EBT-13	Butyric Acid	2510		100	50	JP
L13081024-03	IW101-04C-EBT-13	Lactic Acid		U	100	50	JP
L13081024-03	IW101-04C-EBT-13	Propionic Acid	1620		100	500	JP
L13081024-03	IW101-04C-EBT-13	Pyruvic Acid		U	100	5	JP
L13081024-03	IW101-04C-EBT-13	Total Organic Carbon	3770		250	125	JP
L13081024-05	IW101-05B-EBT-13	Methane	3.3	F	1	1	UMB3.55
L13081024-06	MW-197A-EBT-13	Pyruvic Acid		U	1	0.05	RMS5.1

L13081024-06	MW-197A-EBT-13	Methane	3.4	F	1	1	UMB3.41
L13081024-10	MW-203B-EBT-13	Acetic Acid	0.874	F	1	0.5	JP
L13081024-10	MW-203B-EBT-13	Butyric Acid		U	1	0.5	JP
L13081024-10	MW-203B-EBT-13	Lactic Acid	0.671	F	1	0.5	JP
L13081024-10	MW-203B-EBT-13	Propionic Acid		U	1	5	JP
L13081024-10	MW-203B-EBT-13	Pyruvic Acid		U	1	0.05	JP
L13081024-10	MW-203B-EBT-13	Total Organic Carbon	13.5		2	1	JP
L13081024-15	IW101-05A-EBT-13	Lactic Acid		U	10	5	RMS0
L13081024-15	IW101-05A-EBT-13	Pyruvic Acid		U	10	0.5	RMS0D
L13081024-17	IW101-05C-EBT-13	Acetic Acid	561		10	5	JP
L13081024-17	IW101-05C-EBT-13	Butyric Acid	910		10	5	JP
L13081024-17	IW101-05C-EBT-13	Lactic Acid		U	10	5	JP
L13081024-17	IW101-05C-EBT-13	Propionic Acid	1100	J	10	50	JP
L13081024-17	IW101-05C-EBT-13	Pyruvic Acid		U	10	0.5	JP
L13081024-17	IW101-05C-EBT-13	Acetic Acid	540		20	10	JP
L13081024-17	IW101-05C-EBT-13	Butyric Acid	861		20	10	JP
L13081024-17	IW101-05C-EBT-13	Lactic Acid		U	20	10	JP
L13081024-17	IW101-05C-EBT-13	Propionic Acid	1050		20	100	JP
L13081024-17	IW101-05C-EBT-13	Pyruvic Acid		U	20	1	JP
L13081024-17	IW101-05C-EBT-13	Total Organic Carbon	2460		100	50	JP
L13081024-18	IW92-03-EBT-13	Acetic Acid	2720		100	50	JP
L13081024-18	IW92-03-EBT-13	Butyric Acid	6180		100	50	JP
L13081024-18	IW92-03-EBT-13	Lactic Acid	4190		100	50	JP
L13081024-18	IW92-03-EBT-13	Propionic Acid	5070		100	500	JP
L13081024-18	IW92-03-EBT-13	Pyruvic Acid		U	100	5	JP
L13081024-18	IW92-03-EBT-13	Total Organic Carbon	11800		500	250	JP
L13081024-23	PMW21-01-EBT-13	Methane	8		1	1	UMB3.37
L13081024-31	IW21-04B-EBT-13	Acetic Acid	240	J	1	0.5	JP
L13081024-31	IW21-04B-EBT-13	Butyric Acid	78.5		1	0.5	JP
L13081024-31	IW21-04B-EBT-13	Lactic Acid	10.2		1	0.5	JP
L13081024-31	IW21-04B-EBT-13	Propionic Acid	975	J	1	5	JP
L13081024-31	IW21-04B-EBT-13	Pyruvic Acid		U	1	0.05	JP
L13081024-31	IW21-04B-EBT-13	Acetic Acid	243		10	5	JP
L13081024-31	IW21-04B-EBT-13	Butyric Acid	82		10	5	JP
L13081024-31	IW21-04B-EBT-13	Lactic Acid	56.9		10	5	JP
L13081024-31	IW21-04B-EBT-13	Propionic Acid	984		10	50	JP
L13081024-31	IW21-04B-EBT-13	Pyruvic Acid	5.7		10	0.5	JP
L13081024-31	IW21-04B-EBT-13	Total Organic Carbon	1240		100	50	JP
L13081024-32	PMW21-02-EBT-13	Methane	8.5		1	1	UMB3.55
L13081024-32	PMW21-02-EBT-13	Total Organic Carbon	1.58		1	0.5	UFB.709
L13081024-34	RB2-EBT-13	Methane	3.2	F	1	1	UMB3.55
L13081060-05	IW92-01-EBT-13	Acetic Acid	1110		100	50	JP
L13081060-05	IW92-01-EBT-13	Butyric Acid	2050		100	50	JP
L13081060-05	IW92-01-EBT-13	Lactic Acid		U	100	50	JP
L13081060-05	IW92-01-EBT-13	Propionic Acid	1840		100	500	JP
L13081060-05	IW92-01-EBT-13	Pyruvic Acid		U	100	5	JP
L13081060-05	IW92-01-EBT-13	Total Organic Carbon	3400		100	50	JP
L13081060-07	MW-212-EBT-13	Methane	2.8	F	1	1	UMB3.37

L13081060-07	MW-212-EBT-13	Total Organic Carbon	1.62		1	0.5	UFB1.07
L13081060-08	MW-213-EBT-13	Acetic Acid	0.848	F	1	0.5	UFB.762
L13081060-09	DUP6-EBT-13	Acetic Acid	0.802	F	1	0.5	UFB.762
L13081060-09	DUP6-EBT-13	Methane	2.9	F	1	1	UMB3.37
L13081060-09	DUP6-EBT-13	Total Organic Carbon	1.09		1	0.5	UFB1.07
L13080978-04	IW101-07B-EBT-13	Total Organic Carbon	2890		100	50	JP
L13080978-06	IW101-07C-EBT-13	Total Organic Carbon	5350		150	75	JP
L13080978-10	DUP2-EBT-13	Total Organic Carbon	1810		100	50	JP

Units for methane are ug/L*

ORGANIC DATA QUALITY REVIEW REPORT

Volatile Organics by SW-846 Method 8260B (GC/MS)

SDG: L1308:	0814	0921	0978	1024	1060

PROJECT	Memphis Defense Depot, EBT-13 Sampling for HDR, Denver				
LABORATORY	Microbac Laboratories, Inc., Marietta, OH				
SAMPLE MATRIX	Water			SAMPLING DATE	08/2013
NUMBER OF SAMPLES	75 water, including 6 field duplicate pairs, 8 trip blanks and 3 rinse blanks				
ANALYSES REQUESTED	SW-846 8260B (VOA by GC/MS)				
SAMPLE NUMBER	See result forms attached and associated EDD				

DATA REVIEWER: Diane ShortQA REVIEWER: Diane Short & Associates, Inc. INITIALS/DATE: DL 12/2/2013Telephone Logs included Yes____ No XContractual Violations Yes____ No X

The project QAPP (09/11), the EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 1999 and 2007, and the SW-846 Method 8260B have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review of these samples includes Level III validation of all chains of custody, calibrations and QC forms referencing the QC limits in the above documents.

I. DELIVERABLES

A. All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.

Yes ☒ No ☐

This report has been requested to include the following review: QC, hold times, sample integrity (Chains of Custody, sample login), and summary calibrations. Note that there are 17 QC sets (days of analysis per instrument) and 2 instruments for the 75 samples. Note there is some redundant QC and calibration.

B. Chain of Custody documentation was complete and accurate.

Yes ☒ No ☐

No qualifiers have been added for Chain of Custody (COC) issues, and the Project Manager will update COC per the following notes to complete the project record.

The laboratory has signed and affixed a receipt label on all pages. The relinquishment date and time are part of the electronically-generated COC.

In addition, there are sample receipt acknowledgements from the laboratory. The log in forms contain the courier identification and air bill number.

C. Samples were received at the required temperature, preservation and intact with no bubbles.

Yes ☐ No ☒

EPA regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6 °C. The sample temperature conditions are fully compliant with applicable regulations.

The log in notes pH outliers, but only for other methods.

One trip blank in SDG 13080814 arrived broken. Sufficient vials were left to perform the analyses.

In SDG 13080978, some samples were reported with bubbles, but sufficient vials were available for analysis.

Samples 1, 2, 4 and 7 were diluted due to foaming during purging.

In SDG 13081024, samples were diluted due to foaming for 1, 4, 15, 16 and 28.

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes ☒ No ☐

B. Holding Times

1. The contract holding times were met for all analyses [time of sample receipt to time of analysis (VOA) or time of extraction to time of analysis].

Yes ☒ No ☐

2. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (14 days from time of sample collection to analysis or extraction).

Yes ☐ No ☒

There were exceedences for several samples in SDG L13080978 but all were less than half a day and no qualifiers have been added. In SDG 13081024, sample 26, IW21-031, was run 3 days past holding time. All data for this sample are qualified JH3 to indicate a possible low bias.

III. INSTRUMENT CALIBRATION – GC/MS

A. Initial Calibration

1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of > 0.05 or > 0.01 for poor responding volatiles.

Yes ☒ No ☐ NA ☐

Method 8260: Per the Project Manager, the 2007 EPA CLP validation guidance has been applied to the common “poor responders.” Calibration response factors were acceptable for Acetone and 2-butanone and other

poor responders in almost all cases. The validation guidance used for this project allows for a response of 0.01 for these compounds if spectral integrity can be verified at low concentrations. These spectra are not commonly provided and are not part of the deliverable for this data set. The laboratory has been tasked with providing to the client verification that the 0.01 RF is valid. If the spectral verification is available, data are not qualified for response factors greater than 0.01 and less than 0.05 for “poor responders.” No data have been qualified. See table at the end of the report.

Most of the low-responding compounds are highly water-soluble and capable of hydrogen bonding with water. This decreases their purge efficiency and results in the relatively low response. The implication of this low purge efficiency is that a relatively low absolute recovery of such compounds is achieved in the purge step of the analysis. If this recovery is consistent, reasonable accuracy and precision can be achieved in a given matrix, which is indicated for the lab matrix by acceptable recoveries in LCS and calibration checks. However, this causes these targets to be more sensitive to matrix variations that impact purge efficiency (such as ionic strength or the presence of varying levels of soluble non-target organic material) than are the more hydrophobic compounds typically analyzed by this method, and as a result they are more likely to exhibit matrix bias.

2a. The relative standard deviation (RSD) for the five point calibration was within the 30% limit for the CCCs.
Yes ☒ No ☐ NA ☐

This is a method requirement and indicates that the analytical system is in control.

2b. The relative standard deviation (RSD) for the five point calibration was within the 30% limit for all other compounds, the average % RSD was < 15%, or a linear curve was used.

Yes ☒ No ☐ NA ☐

The laboratory only reports the % RSD if it is < 15%. All other data are reported with the linear curve values.

3. The 12 hour system Performance Check was performed as required in SW-846 and met the QC limits of 80 – 120%.

Yes ☐ No ☒ NA ☐

Dichlorodifluoromethane is consistently high in the ICV for Instrument 11. There are also some other poor responders that are out. Data have been qualified only from the daily calibrations. See table below.

B. Continuing Calibrations

1. The midpoint standard was analyzed for each analysis at the required frequency, and the QC criterion of > 0.05 (> 0.01 for CLP 2001 VOA) was met.

Yes ☒ No ☐ NA ☐

2. The percent difference (% D) limits of $\pm 20\%$ were met. The 2007 NFG also allow for 40% D for the “poor responders (pr).”

Yes ☐ No ☒ NA ☐

When there are no detections, no qualification is required unless the % D is biased low and so large as to indicate a significant probability of false negatives. Qualification is required for a % D biased high for detected compounds only. This requires that the RF is acceptable to verify the non-detect status, which is the case here. Data would be qualified “JC#”, where # is the % D. There could be variability to the data as there is variability to the response. No qualifiers have been required except for naphthalene. The bias could be very slightly high.

Lab ID	Client ID	Compound	Result ug/L	Lab flag	RL	dil'n	MDL	Qualifier
L13081024-18	IW92-03-EBT-13	Naphthalene	2.36	Q	10	10	2	JC21.7
L13081024-20	IW21-02A-EBT-13	Naphthalene	1.46	Q	5	5	1	JC21.7
L13081024-21	IW21-02B-EBT-13	Naphthalene	1.43	Q	5	5	1	JC21.7
L13081024-22	MW-21-EBT-13	Naphthalene	0.344	Q	1	1	0.2	JC21.7

L13081024-24	IW21-01A-EBT-13	Naphthalene	1.28	Q	5	5	1	JC21.7
L13081024-25	IW21-01B-EBT-13	Naphthalene	0.247	Q	1	1	0.2	JC21.7

pr = acetone; Chloromethane; 2-butanone; MTBE, 1,2-dibromo-3-chloropropane; dichlorodifluoromethane (DFM); 4-methyl-2-pentanone; and / or 2-hexanone

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB (VOA) performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.

Yes ☒ No ☐ NA ☐

V. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria, and the Retention times were within the required windows.

Yes ☒ No ☐ NA ☐

VI. SURROGATE STANDARDS

Surrogate spikes were analyzed with every sample.

Yes ☒ No ☐

And met the recovery limits defined in the QAPP , which are the laboratory limits.

Yes ☒ No ☐

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.

Yes ☒ No ☐

The MS/MSDs include (all ending in EBT-13): IW101-05A, MW-197A, IW21-04A

MS/MSDs are not reported for every SDG to verify the method frequency. As only client samples would be used for qualification, no further action is required.

This meets the recommendation of 1 per 20 field (not field QC or blank) samples. As this is an ongoing project an overall adherence to the 1:20 frequency is monitored by the Project Manager.

The lab notes they do not report non-client QC. In most, and not all cases, and LCS/LCSD is reported.

B. The MS and MSD percent recoveries were within the limits defined in the updated 2011 QAPP, which now references the laboratory limits.

Yes ☐ No ☒ NA ☐

The full target list has been spiked. For sample IW21-04A, bromomethane , chloromethane, dichlorodifluoromethane and styrene were recovered above the limits, but all client results are non-detect and no qualifier is applied. Data are qualified JMS#, where # is the %R. Data could be biased high or low in proportion to the recovery.

Lab ID	Client ID	Compound	Result ug/L	RL	dil'n	MDL	Qualifier
L13081024-06	MW-197A-EBT-13	1,2,3-Trichlorobenzene		1	1	0.15	JMS64
L13081024-15	IW101-05A-EBT-13	MEK (2-Butanone)	234	50	5	12.5	JMS169D22.9

C. The MSD relative percent differences (RPD) were within the defined contract limits, which are 30%.

Yes ☐ No ☒ NA ☐

For the same sample noted above, for MEK, the precision is out of limits as indicated by the D# added, where # is the RPD. As the RPD increases, precision decreases.

D. The MS/MSD were client samples.

Yes ☒ No ☐ NA ☐

Only client samples reported.

VIII. LABORATORY CONTROL SAMPLE

A. Laboratory Control Sample (LCS) was analyzed for every analysis performed and for every 20 samples.

Yes ☒ No ☐

Although not required of the method, an LCS and LCSD are often reported when there is not an MS/MSD reported in the data set.

B. The LCS percent recoveries were within the limits defined in the updated 2011 QAPP, which are the laboratory limits. If an LCS and LCSD are analyzed, both samples must have the same compounds out for data to be qualified. The RPD is qualified only if the %R is also out.

Yes ☐ No ☒

The full target list has been spiked. When a high LCS recovery is associated with a non-detect in samples, no qualifier is added since the indicated bias is high. When the target is detected, data are qualified "JL#", where # is the recovery. Data could be biased high proportional to the LCS percent recovery. All results associated with low recoveries are qualified and data could be biased low. The laboratory uses the same control limits on all instruments used for analysis even though the responses are different on each instrument. The control limits should be instrument specific. No data have been qualified except for 1,2,3-trichlorobenzene. Vinyl chloride, chloromethane, and dichlorodifluoromethane were recovered above the limits, but all client results are non-detect and no qualifier is applied. Data are qualified JL#, where # is the %R. Data could be biased low in proportion to the recovery. The RPD for an LCS/LCSD pair was also at 21.5 %RPD for acetone in WG 443283, but data are not qualified for RPD alone when the spikes are acceptable. See table at the end of the report.

Lab ID	Client ID	Compound	Result ug/L	Lab flag	RL	dil'n	MDL	Qualifier
L13081060-01	DR1-5-EBT-13	1,2,3-Trichlorobenzene		Q	1	1	0.15	JL64
L13081060-02	MW-62-EBT-13	1,2,3-Trichlorobenzene		Q	1	1	0.15	JL64
L13081060-03	RB3-EBT-13	1,2,3-Trichlorobenzene		Q	1	1	0.15	JL64
L13081060-04	TB-082013-EBT-13	1,2,3-Trichlorobenzene		Q	1	1	0.15	JL64
L13081060-05	IW92-01-EBT-13	1,2,3-Trichlorobenzene		Q	5	5	0.75	JL64
L13081060-06	DR1-5A-EBT-13	1,2,3-Trichlorobenzene		Q	1	1	0.15	JL64
L13081060-07	MW-212-EBT-13	1,2,3-Trichlorobenzene		Q	1	1	0.15	JL64
L13081060-08	MW-213-EBT-13	1,2,3-Trichlorobenzene		Q	1	1	0.15	JL64
L13081060-09	DUP6-EBT-13	1,2,3-Trichlorobenzene		Q	1	1	0.15	JL64

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.

Yes ☒ No ☐

B. No blank contamination was found in the Method Blank.

Yes ☐ No ☒

Several method blanks contained low level contaminants. Detected data that are < 5 x blank are qualified UMB#, where # is the blank(with appropriate dilution applied). These are not common laboratory contaminants and the source is not noted in the narratives.

Lab ID	Client ID	Compound	Result ug/L	Lab flag	RL	dil'n	MDL	Qualifier
L13080921-02	IW85-06-EBT-13	Bromomethane	17.5	F	25	25	12.5	UMB19.8
L13080978-08	IW101-03C-EBT-13	Benzene	10.7	F	20	50	6.25	UMB13.4
L13080978-08	IW101-03C-EBT-13	Bromomethane	40.9	Q	50	50	25	UMB32.9
L13080978-08	IW101-03C-EBT-13	Naphthalene	48.8	Q	50	50	10	UMB47.6

C. If Field Blanks were identified, no blank contamination was found.

Yes _____ No X NA _____

The field blanks are RB1, RB2 and RB3-EBT-13. The 3 samples contained acetone. Data are qualified UFB#, where # is the acetone result, dilution corrected for the associated sample.

Trip blanks were collected and all were non-detected with the exception of methylene chloride in the TB for the 8/13 and 8/16/13 dates. Qualifiers have been applied. Data are qualified UTB#, where # is the methylene chloride result, dilution corrected for the associated sample.

Lab ID	Client ID	Compound	Result ug/L	Lab flag	RL	dil'n	MDL	Qualifier
L13080814-04	MW-85-EBT-13	Acetone	4.26	Q	10	1	2.5	UFB3.24
L13081024-02	IW101-04A-EBT-13	Acetone	263	Q	200	20	50	UFB89.6
L13081024-17	IW101-05C-EBT-13	Methylene chloride	3.55	F	10	10	2.5	UTB2.8
L13081024-20	IW21-02A-EBT-13	Methylene chloride	1.7	F	5	5	1.25	UTB1.4
L13081024-21	IW21-02B-EBT-13	Methylene chloride	1.65	F	5	5	1.25	UTB1.4
L13081024-23	PMW21-01-EBT-13	Methylene chloride	1.46	F	2	2	0.5	UTB.56
L13081060-08	MW-213-EBT-13	Acetone	178		100	10	25	UFB25.7

X. FIELD QC

If Field Duplicates were identified, they met guidance for VOA of RPD of < 30% for water or < 50% for soil. For values reported at < 5 × the reporting limit (RL), a difference of 2 × RL or 3.5 × RL for soil is used as guidance. This is referred to as the CRDL Rule. Data are not qualified for Field Duplicates as these are evaluated for the total project by the Project Manager.

Yes _____ No X NA _____

The field duplicates were determined by proximity of collection dates and are noted below. All field precision limits were met for these samples with the variations noted below given the range of dilutions. For this same field pair, 1,2 and 1,4-dichlorobenzene and vinyl chloride were non-detect in one of the samples and reported in the other at < diluted RL.

Parent	Duplicate
IW21-03A-EBT-13	DUP1
IW101-03B-EBT-32	DUP2
PMW101-04B-EBT-13	DUP3
IW85-06-EBT-13	DUP4
PMW92-03-EBT-13	DUP5
MW-212-EBT-13	DUP6

IW85-06-EBT-13		DIL'N	DUP4-EBT-13	
Acetone	540	25	931	5

MEK (2-Butanone)	9140	25	8670	5
Acetone	524	100	608	100
MEK (2-Butanone)	6950	100	9420	100

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and analytical systems.

Yes _____ No _____ NA X

Not part of this review level.

B. The suggested EQLs for the sample matrices in this set were met.

Yes X No _____ NA _____

There are extremely high dilutions for many of the samples due to compounds over the calibration range of the instrument. The project manager will determine if the elevated reporting limits meet the project criteria. All dilutions have been reported.

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for all detected compounds.

Yes _____ No _____ NA X

B. Quantitation was checked to determine the accuracy of calculations for representative compounds in each internal standards quantitation set.

Yes _____ No _____ NA X

Not part of this review level.

XIII. TENTATIVELY IDENTIFIED COMPOUNDS

TICs were properly identified and met the library identification criteria.

Yes _____ No _____ NA X

Not part of this review level.

XIV. OVERALL ASSESSMENT OF THE CASE

The laboratory has complied with the requested method. Data are fully usable after consideration of qualifiers. The following is noted:

This report has been requested to include the following review: QC, hold times, sample integrity (Chains of Custody, sample login), and summary calibrations. Note that there are 27 QC sets (days of analysis per instrument) and 4 instruments for the 77 samples. Note there is some redundant QC and calibration.

Sample Preservation

EPA regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6 °C. The sample temperature conditions are fully compliant with applicable regulations.

The log in notes pH outliers, but only for other methods.

One trip blank in SDG 13080814 arrived broken. Sufficient vials were left to perform the analyses.

In SDG 13080978, some samples were reported with bubbles, but sufficient vials were available for analysis.

Samples 1, 2, 4 and 7 were diluted due to foaming during purging.

In SDG 13081024, samples were diluted due to foaming for 1, 4, 15, 16 and 28.

Holding Times

There were exceedences for several samples in SDG L13080978 but all were less than half a day and no qualifiers have been added. In SDG 13081024, sample 26, IW21-031, was run 3 days past holding time. All data for this sample are qualified JH3 to indicate a possible low bias.

Initial Calibrations

Method 8260: Per the Project Manager, the 2007 EPA CLP validation guidance has been applied to the common “poor responders.” Calibration response factors were acceptable for Acetone and 2-butanone and other poor responders. The validation guidance used for this project allows for a response of 0.01 for these compounds if spectral integrity can be verified at low concentrations. These spectra are not commonly provided and are not part of the deliverable for this data set. The laboratory has been tasked with providing to the client verification that the 0.01 RF is valid. If the spectral verification is available, data are not qualified for response factors greater than 0.01 and less than 0.05 for “poor responders.” No data have been qualified.

Dichlorodifluoromethane is consistently high in the ICV for all instrument MS11. There are also some other poor responders that are out. Data have been qualified only from the daily calibrations. See table in the text.

Continuing Calibrations

When there are no detections, no qualification is required unless the % D is biased low and so large as to indicate a significant probability of false negatives. Qualification is required for a % D biased high for detected compounds only. This requires that the RF is acceptable to verify the non-detect status, which is the case here. Data would be qualified “JC#”, where # is the % D. There could be variability to the data as there is variability to the response. See a table in the text of the associated calibrations.

No qualifiers have been required except for naphthalene. The bias could be very slightly high.

Matrix Spikes

The MS/MSDs include (all ending in EBT-13): IW101-05A, MW-197A, IW21-04A

MS/MSDs are not reported for every SDG to verify the method frequency. As only client samples would be used for qualification, no further action is required.

This meets the recommendation of 1 per 20 field (not field QC or blank) samples. As this is an ongoing project an overall adherence to the 1:20 frequency is monitored by the Project Manager.

The lab notes they do not report non-client QC. In most, and not all cases, and LCS/LCSD is reported. The full target list has been spiked. For sample IW21-04A, bromomethane, chloromethane, dichlorodifluoromethane and styrene were recovered above the limits, but all client results are non-detect and no qualifier is applied. Data are qualified JMS#, where # is the %R. Data could be biased high or low in proportion to the recovery.

For the same sample noted above, for MEK, the precision is out of limits as indicated by the D# added, where # is the RPD. As the RPD increases, precision decreases.

Laboratory Control Samples

The full target list has been spiked. When a high LCS recovery is associated with a non-detect in samples, no qualifier is added since the indicated bias is high. When the target is detected, data are qualified “JL#”, where # is the recovery. Data could be biased high proportional to the LCS percent recovery. All results associated with low recoveries are qualified and data could be biased low. The laboratory uses the same control limits on all instruments used for analysis even though the responses are different on each instrument. The control limits should be instrument specific. No data have been qualified except for 1,2,3-trichlorobenzene. Vinyl chloride, chloromethane, and dichlorodifluoromethane were recovered above the limits, but all client results are non-detect and no qualifier is applied. Data are qualified JL#, where # is the %R. Data could be biased low in proportion to the recovery. The RPD for an LCS/LCSD pair was also at 21.5 %RPD for acetone in WG 443283, but data are not qualified for RPD alone when the spikes are acceptable. See table at the end of the report.

Method Blanks

Several method blanks contained low level contaminants. Detected data that are < 5 x blank are qualified UMB#, where # is the blank(with appropriate dilution applied). These are not common laboratory contaminants and the source is not noted in the narratives.

Field Blanks

The field blanks are RB1, RB2 and RB3-EBT-13. The 3 samples contained acetone. Data are qualified UFB#, where # is the acetone result, dilution corrected for the associated sample.

Trip blanks were collected and all were non-detected with the exception of methylene chloride in the TB for the 8/13 and 8/16/13 dates. Qualifiers have been applied. Data are qualified UTB#, where # is the methylene chloride result, dilution corrected for the associated sample.

Field QC

The field duplicates were determined by proximity of collection dates and are noted below. All field precision limits were met for these samples with the variations noted below given the range of dilutions. For this same field pair, 1,2 and 1,4-dichlorobenzene and vinyl chloride were non-detect in one of the samples and reported in the other at < diluted RL.

Parent	Duplicate
IW21-03A-EBT-13	DUP1
IW101-03B-EBT-32	DUP2
PMW101-04B-EBT-13	DUP3
IW85-06-EBT-13	DUP4
PMW92-03-EBT-13	DUP5
MW-212-EBT-13	DUP6

IW85-06-EBT-13		DIL'N	DUP4-EBT-13	
Acetone	540	25	931	5
MEK (2-Butanone)	9140	25	8670	5
Acetone	524	100	608	100
MEK (2-Butanone)	6950	100	9420	100

Reporting Limits

There are extremely high dilutions for many of the samples due to compounds over the calibration range of the instrument. The project manager will determine if the elevated reporting limits meet the project criteria. All dilutions have been reported.

TABLE OF QUALIFIED DATA

Lab ID	client ID	Compound	Result ug/L	Lab flag	dil'n	MDL	Qualifier
L13080814-04	MW-85-EBT-13	Acetone	4.26	Q	1	2.5	UFB3.24
L13080921-02	IW85-06-EBT-13	Bromomethane	17.5	F	25	12.5	UMB19.8
L13081024-02	IW101-04A-EBT-13	Acetone	263	Q	20	50	UFB89.6

L13081024-06	MW-197A-EBT-13	1,2,3-Trichlorobenzene		Q	1	0.15	JMS64
L13081024-15	IW101-05A-EBT-13	MEK (2-Butanone)	234		5	12.5	JMS169D22.9
L13081024-17	IW101-05C-EBT-13	Methylene chloride	3.55	F	10	2.5	UTB2.8
L13081024-18	IW92-03-EBT-13	Naphthalene	2.36	Q	10	2	JC21.7
L13081024-20	IW21-02A-EBT-13	Methylene chloride	1.7	F	5	1.25	UTB1.4
L13081024-20	IW21-02A-EBT-13	Naphthalene	1.46	Q	5	1	JC21.7
L13081024-21	IW21-02B-EBT-13	Methylene chloride	1.65	F	5	1.25	UTB1.4
L13081024-21	IW21-02B-EBT-13	Naphthalene	1.43	Q	5	1	JC21.7
L13081024-22	MW-21-EBT-13	Naphthalene	0.344	Q	1	0.2	JC21.7
L13081024-23	PMW21-01-EBT-13	Methylene chloride	1.46	F	2	0.5	UTB.56
L13081024-24	IW21-01A-EBT-13	Naphthalene	1.28	Q	5	1	JC21.7
L13081024-25	IW21-01B-EBT-13	Naphthalene	0.247	Q	1	0.2	JC21.7
L13081060-01	DR1-5-EBT-13	1,2,3-Trichlorobenzene		Q	10	1.5	JL63.2
L13081060-01	DR1-5-EBT-13	1,2,3-Trichlorobenzene		Q	1	0.15	JL64
L13081060-02	MW-62-EBT-13	1,2,3-Trichlorobenzene		Q	1	0.15	JL64
L13081060-03	RB3-EBT-13	1,2,3-Trichlorobenzene		Q	1	0.15	JL64
L13081060-04	TB-082013-EBT-13	1,2,3-Trichlorobenzene		Q	1	0.15	JL64
L13081060-05	IW92-01-EBT-13	1,2,3-Trichlorobenzene		Q	5	0.75	JL64
L13081060-05	IW92-01-EBT-13	1,2,3-Trichlorobenzene		Q	25	3.75	JL63.2
L13081060-06	DR1-5A-EBT-13	1,2,3-Trichlorobenzene		Q	1	0.15	JL64
L13081060-07	MW-212-EBT-13	1,2,3-Trichlorobenzene		Q	1	0.15	JL64
L13081060-08	MW-213-EBT-13	1,2,3-Trichlorobenzene		Q	10	1.5	JL63.2
L13081060-08	MW-213-EBT-13	Acetone	178		10	25	UFB25.7
L13081060-08	MW-213-EBT-13	1,2,3-Trichlorobenzene		Q	1	0.15	JL64
L13081060-09	DUP6-EBT-13	1,2,3-Trichlorobenzene		Q	1	0.15	JL64
L13080978-08	IW101-03C-EBT-13	Benzene	10.7	F	50	6.25	UMB13.4
L13080978-08	IW101-03C-EBT-13	Bromomethane	40.9	Q	50	25	UMB32.9
L13080978-08	IW101-03C-EBT-13	Naphthalene	48.8	Q	50	10	UMB47.6
L13081024-26	IW21-03A-EBT-13	All VOA data					JH3

Final Data Qualification and Usability Report

Project: Defense Depot Memphis, TN (DDMT)
Enhanced Bioremediation Treatment (EBT)
Sampling Event: EBT-13
Project / Task Number: 228-192672-002
Sample Data Package(s): L13080814, L13080921, L13080978, L13081024,
L13081060
Data Validation Performed by: Diane Short & Associates (DSA)
Final Data Qualification and Usability
Report Prepared by: Lynn K. Lutz, HDR Inc.

Data Validation Report Review and Comments

The data validation report is acceptable with comments as noted below.

VOCs:

The lab reported multiple results for some analytes in samples that required dilution; the Project Chemist selected which results to report.

The validator discussed responses of poor responders and noted that the laboratory has been tasked with providing to the client verification that the RRFs below 0.05 are valid. The PC reviewed the initial calibrations and verified that there is sufficient response to allow the responses less than 0.05.

Metabolic Acids:

The validator noted pyruvic acid had response factors of approximately 0.005, which is quite low. The validator also noted high %RSD values for pyruvic acid and propionic acid, but the lab used linear curves to quantitate results, and r values were acceptable. The Project Chemist reviewed the initial calibrations and verified that there is sufficient instrument response at the low concentration calibration standard, and qualification was not necessary. However, the curve for propionic acid was biased slightly high, and low concentrations (less than two times the RL of 10 mg/L on the instrument) of propionic acid in the samples have been qualified as estimated (J).

Examination of other sample chromatograms shows a similar interfering peak that might overshadow small amounts of pyruvic acid and lactic acid, therefore a number of pyruvic acid and lactic acid results have been qualified as non-detect estimated (UJ) or estimated (J) where the interfering peak was present.

Dissolved Gases:

No issues except as noted below for final qualifiers.

TOC:

No issues except as noted below for final qualifiers.

Final Data Qualifiers

VOCs:

Final qualifiers for sample IW21-03A (mistyped as IW21-031 by the validator) were UJ or J where the validator had qualified JH3 for being analyzed past holding time.

Sample results for naphthalene were qualified J where the validator had qualified JC21.7 for high continuing calibration results.

The sample result for 1,2,3-trichlorobenzene was qualified J where the validator had qualified JMS64 for a low MS/MSD recovery. The sample result for 2-butanone (MEK) was qualified J where the validator had qualified JMS169D22.9 for high MS/MSD recoveries and a high RPD.

The sample result for 1,2,3-trichlorobenzene were qualified J where the validator had qualified JL64 for a low LCS recovery.

The final qualifier was B where the data validator had qualified UMB19.8 for method blank contamination. The results that the data validator had qualified UMB13.4, UMB32.9 or UMB47.6 were from diluted analyses that were not reported.

The final qualifier was B where the data validator had qualified UFB3.24 or UFB25.7 for field blank contamination. The result that the data validator had qualified UFB89.6 was from a diluted analysis that was not reported.

The final qualifier was B where the data validator had qualified UTB2.8, UTB1.4 or UTB.56 for trip blank contamination.

The final qualifier was J where the lab had qualified as F, estimated between the MDL and RL.

Metabolic Acids:

Sample results were qualified J where the validator qualified JP for preservation issues.

Sample results for acetic acid were qualified B where the validator qualified UFB.762 for field blank contamination.

The final qualifier for pyruvic acid in MW-197A-EBT-13 was UJ where DSA had qualified as RMS5.1, where the pyruvic acid recoveries were low in the MS/MSD of this sample. The result is not rejected because the chromatogram shows no inflection point that would account for

pyruvic acid in the parent sample, and the MS and MSD chromatograms show a definite spike for pyruvic acid.

The final qualifier for lactic acid and pyruvic acid in IW101-05A is R where DSA had qualified as RMS0 and RMS0D, where the recoveries in the MS and MSD were zero. There was some interference in the retention time zone for these analytes in the parent sample, and there were no appreciable peaks in the spiked analyses.

Some pyruvic acid and lactic acid results with a large interfering peak have been qualified as estimated (J) or non-detect estimated (UJ).

The final qualifier was J where the lab had qualified as F.

Dissolved Gases:

The final qualifier for ten methane results was B where DSA had qualified as UMB3.7, UMB3.41, UMB3.55 or UMB3.97 for method blank contamination.

The final qualifier was J where the lab had qualified as F.

TOC:

Sample results were qualified J where the validator qualified JP for preservation issues.

The final qualifier for four TOC results was B where DSA had qualified as UFB.79 or UFB1.07 for field blank contamination.

The final qualifier was J where the lab had qualified as F.

Data Usability

VOCs:

There were no rejected sample results. All results are usable as qualified.

Metabolic Acids:

Pyruvic acid and lactic acid in IW101-05A were rejected due to matrix spike recoveries of zero.

All other results are usable as qualified, although qualitative results for pyruvic acid and lactic acid, the earliest eluters, should be used with caution, as these analytes are susceptible to matrix interference that may suppress results.

Dissolved Gases:

There were no rejected sample results. All results are usable as qualified.

TOC:

There were no rejected sample results. All results are usable as qualified.



9 December 2013

Lynn K. Lutz, HDR Inc.

Date

DIANE SHORT & ASSOCIATES, INC. _____

1978 S. Garrison St. # 114
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ORGANIC DATA QUALITY REVIEW REPORT

GC REPORT FOR Metabolic Acids by HPLC; Ethane, Methane, Ethene, by EPA SOP RSK-175, TOC
by SW-846 9060

SDG:	<u>L13110: 486, 487, 511, 512, 633, 792</u>		
PROJECT	<u>Memphis Defense Depot, EBT-14 Sampling for HDR, Denver</u>		
LABORATORY	<u>Microbac Laboratories, Inc., Marietta, OH</u>		
SAMPLE MATRIX	<u>Water</u>	SAMPLING DATE	<u>11/2013</u>
NUMBER OF SAMPLES	<u>75 water, including 6 field duplicate pairs, and 3 rinse blanks</u>		

ANALYSES REQUESTED: Metabolic Acids by HPLC; EPA SOP RSK-175, SW-846 9060 (TOC)

SAMPLE NO.: Attached

DATA REVIEWER: Diane Short

QA REVIEWER: Diane Short & Associates, Inc., INITIALS/DATE: DLS 02/25/14

Telephone Logs included Yes___ No X

Contractual Violations Yes___ No X

The project QAPP (9/11), EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 2007 (SOP), the EPA SW 846 Methods for Evaluating Solid Waste, Physical/ Chemical Methods Third Edition, (SW-846), current updates, and the project-specific methods have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. The review has been tasked as Level III for review of all calibrations, holding times, and QC for all samples.

I. DELIVERABLES

All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.

Yes ☒ No ☐

This report has been requested to include the following review: Holding times and sample integrity (chains of custody, sample log in), Calibrations, Summary QC. There are 75 water samples including QC samples (duplicates and rinse blanks) with 18 QC sets (days of analysis) for RSK, 12 QC for Metabolic Acid and 16 QC for TOC. A number of the QC samples and initial calibrations are redundant and applicable to more than one SDG. TOC has no summary forms and the calibrations and blanks were required to be reviewed from the raw data and using bracketing to determine client sample associations.

II. ANALYTICAL REPORT FORMS

The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes ☒ No ☐

III. HOLDING TIMES

A. The contract holding times were met for all analyses (Time of sample receipt to time of extraction and from extraction to analysis.)

Yes ☒ No ☐

See Section B. below. Per EPA guidance, for validation purposes we calculate the holding time to the nearest half day in cases where the regulation or method specifies holding time units of days.

B. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (Time of sample collection to time of extraction and from extraction to analysis.)

Yes ☒ No ☐

Metabolic Acids: The reviewer has not been able to find 40 CFR or documented holding times for the metabolic acids. The holding time for an analogous HPLC method 8310 is 14 days for preserved water samples and the project approved holding time is 28 days to analysis.

RSK-175: When pH is adjusted, the holding time is 14 days per the method, and we have used this as the acceptable holding time. The laboratory limit is 7 days. There have been pH adjustments on many of the samples, and pH can only be taken at time of analysis for this method. All samples are within this limit with the exception of sample DR1-6A-EBT-14, which was 3 days over the holding time, but this was not one of the samples noted as having pH out for the samples for which pH could be measured. Therefore, no qualifier has been applied.

Method 9060: Holding time for preserved samples is 28 days.

C. All chains of custody are complete with signatures and dates.

Yes ☐ No ☒

No qualifiers have been added for Chain of Custody (COC) issues.

The laboratory has signed and affixed a receipt label on all pages. The relinquishment date and time are part of the electronically-generated COC. There is an electronic signature unless noted.

In addition, there are sample receipt acknowledgements from the laboratory. The log in forms contain the courier identification and air bill number.

Sample PW-85-05-ebt14 was on the COC and it was not received by the lab. The HDR project manager has verified that the sample was not collected.

D. Samples were received at the proper temperature and preservation.

Yes ☐ No ☒

The most current regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6° C.

The need for pH adjustment is a common occurrence for samples at this site. The proper sample bottles have been issued and used. There is a buffering capacity to these matrices that results in slightly elevated pH. If the pH is adjusted as soon as the samples reach the laboratory, the impact on the sample data is considered to be minimal. For the samples in the table below, the samples are noted as arriving at improper pH and the pH was not able to be fully adjusted by the lab per the narrative notes. Data have been qualified JP to indicate a possible bias to the data due to improper preservation. For SDG L13110792, all the Metabolic Acid and TOC data for the following samples could be impacted by pH outliers and data could be biased low.

L13110792 – 06, 08, 11, 6, 19, 22, 23, 26, 27, 28 and 33. One noted is a rinse blank, which would not be a sample that has buffer effects. Samples 17 and 21 are only out for TOC. As this is an extensive list, all qualifiers are only in the table at the end of the report.

Lab ID	Sample ID	Analyte	Result mg/L	MDL	Qualifier
L13110511-01	IW85-06-EBT-14	Acetic Acid	1610	25	JP
L13110511-01	IW85-06-EBT-14	Butyric Acid	1470	25	JP
L13110511-01	IW85-06-EBT-14	Lactic Acid		25	JP
L13110511-01	IW85-06-EBT-14	Propionic Acid	4790	250	JP
L13110511-01	IW85-06-EBT-14	Pyruvic Acid		2.5	JP
L13110511-01	IW85-06-EBT-14	Total Organic Carbon	6930	100	JP
L13110633-01	IW21-04A-EBT-14	Acetic Acid	846	50	JP
L13110633-01	IW21-04A-EBT-14	Butyric Acid	1020	50	JP
L13110633-01	IW21-04A-EBT-14	Lactic Acid		50	RMS0JP
L13110633-01	IW21-04A-EBT-14	Propionic Acid	1000	500	JP
L13110633-01	IW21-04A-EBT-14	Pyruvic Acid		5	RMS0JP
L13110633-01	IW21-04A-EBT-14	Total Organic Carbon	2240	50	JP
L13110633-04	IW21-04B-EBT-14	Acetic Acid	1410	50	JP
L13110633-04	IW21-04B-EBT-14	Butyric Acid	627	50	JP
L13110633-04	IW21-04B-EBT-14	Lactic Acid		50	JP
L13110633-04	IW21-04B-EBT-14	Propionic Acid	1670	500	JP
L13110633-04	IW21-04B-EBT-14	Pyruvic Acid		5	JP
L13110633-04	IW21-04B-EBT-14	Total Organic Carbon	2470	50	JP
L13110633-04	IW21-04B-EBT-14	Acetic Acid	1430	5	JP
L13110633-04	IW21-04B-EBT-14	Butyric Acid	588	5	JP
L13110633-04	IW21-04B-EBT-14	Lactic Acid	12.5	5	JP
L13110633-04	IW21-04B-EBT-14	Propionic Acid	1790	50	JP
L13110633-04	IW21-04B-EBT-14	Pyruvic Acid		0.5	JP
L13110487-01	IW92-08-EBT-14	Total Organic Carbon	22600	250	JP
L13110487-02	DUP5-EBT-14	Total Organic Carbon	15300	250	JP
L13110487-06	PMW85-01-EBT-14	Total Organic Carbon	1060	50	JP

IV. INSTRUMENT CALIBRATION (IC) AND CONTINUING CALIBRATION (CC) VERIFICATION

A. The HPLC and GC and TOC standards were analyzed at the required frequency.

Yes ☒ No ☐

B. The chromatographic resolution and separation criteria were met.

Yes ☐ No ☐ NA ☒

No data reported or required for this item.

C. The suggested columns were used and the EQLs were met.

Yes ☐ No ☐ NA ☒

No data reported or required for this item.

D. Calibration factors were met at 25% RSD for VFA and RSK or the regression curves were prepared with a correlation coefficient 'r' greater than 0.99, per SW-846, Method 8000B. The TOC ICV and CCV limits are 90- 110%.

Yes ☐ No ☒

MBA: In the Case Narrative, the laboratory has indicated that all initial calibrations have used linear regression, and that all acceptance criteria are met. The raw data for 11/6/2013 verify the linear curve calculation. The summary data, however, list % RSDs of 183 to 217 %. This does not correlate to the raw data curves as the points on the curve do verify a linear range. Response factors (RF) are not usually evaluated for this method, but the RF average for pyruvic acid in the past has been only 0.005. This is the RF that is reported for the CCV data, but the average RF in the summary ICAL is 0.1. This is a wide variation and the laboratory has been contacted to review the reported data. The RL for pyruvic acid is 1/10 that of the other compounds. Raw data review is not required nor provided, but the laboratory, in the past, has responded to comments regarding the low response saying that they do run an acceptable standard at the RL.

The laboratory has responded as follows:

"Our default ICAL/CCV/ICV forms include response factor results even in cases where an alternative curve fit is used for quantitation. These numbers should be disregarded as they are not used for instrument QC evaluation and have no bearing on sample results or data quality.

The level 4 client data includes copies of the curve plots with linear equations which may be used to validate the data.

It doesn't matter that there's a 20x difference between the average RF of the ICAL and the RF of the ICV/CCV as response factors were not used to produce these results. Everything meets the criteria set forth in our SOP using linear regression, the area counts of the ICAL midpoint, ICV and CCV are virtually identical, and the % Drift is well within limits."

RSK 175: The CCV associated with IW21-04A-EBT-14 was out of the lab limits of 15% (-15.3%), but within the project limits.

TOC: All calibrations were within limits and linear curves are provided. No summary data are provided and the raw data were accessed to review these data. The laboratory does not provide any %R values and the ICV, CCV were required to be manually evaluated from the standard concentrations.

E. Percent Difference (%D's) for Continuing Calibration Factors and retention times (RT) were within the 25% Limits (90 – 110 for TOC).

Yes ☒ No ☐

MBA: The recovery of the calibration standards are acceptable. As noted above, the RF for the daily calibrations is 0.005 for pyruvic acid which is a factor 20 x less sensitive than the RF average of the ICAL. All the metabolic acid RFs are at least a factor of 20 x less in not only the CCVs, but also in the

ICV run the same day as the ICAL. It is possible that the laboratory cannot achieve the sensitivity required to verify non-detects of low level data. See note above.

RSK : All calibrations are in control.

TOC: All calibrations are in control as noted from the raw data review by bracketing all the client samples from the run log except for one CCV was 115%. There could be a slight high bias.

Lab ID	Client ID	Analyte	result ug/L	MDL	Qualifier
L13110487-05	MW-85-EBT-14	Total Organic Carbon	25.8	2.5	JC115

V. BLANKS

A. Laboratory blanks

1. Laboratory blanks were analyzed for every sample set and for each matrix type or once in every 20 samples, whichever is more frequent.

Yes ☒ No ☐

2. No blank contamination was found in the method blank.

Yes ☐ No ☒

MBA: All method blanks are in control.

RSK-175: Method blanks are reported for almost every QC set for Methane. Data for methane have been qualified BMB#, where # is the associated blank value. Data are fully usable as non-detected values. In almost all cases, the methane result is greater than 5 x blank with the dilution factor applied.

TOC: Method blanks acceptable.

Lab ID	Client ID	Analyte	result ug/L	RL	Qualifier
L13110512-03	MW-197A-EBT-14	Methane	2.8	1	BMB3.17
L13110633-16	RB1-EBT-14	Methane	2.9	1	BMB3.53
L13110792-05	IW101-07A-EBT-14	Methane	3.4	5	BMB3.07
L13110792-07	RB2-EBT-14	Methane	3.1	5	BMB3.07
L13110792-18	PMW101-07B-EBT-14	Methane	3.2	5	BMB3.07
L13110792-20	RB3-EBT-14	Methane	3.2	5	BMB3.07
L13110792-30	MW-212-EBT-14	Methane	3.9	5	BMB3.07
L13110792-32	DUP6-EBT-14	Methane	3.2	5	BMB3.96

3. Instrument blank analysis was performed following all samples that contained analytes at high concentrations.

Yes ☐ No ☐ NA ☒

No data reported or required for this item.

B. Field Blanks

If field blanks were identified, no blank contamination was found.

Yes ☒ No ☐ NA ☐

There is one field blank for each method and most days of collection.

RSK – The methane detections in the rinse blanks were attributed to the method blank.

Metabolic Acids reported no detections.

TOC data are qualified BRB# or BFB, where # is the value of the blank. Data are fully usable as non-detected values.

Lab ID	Client ID	Analyte	result mg/L	MDL	Qualifier
L13110633-09	PMW101-04B-EBT-14	Total Organic Carbon	2.5	0.5	BRB.668
L13110633-14	PMW21-02-EBT-14	Total Organic Carbon	2.28	0.5	BRB.668
L13110792-30	MW-212-EBT-14	Total Organic Carbon	1.07	1	BFB.684
L13110792-32	DUP6-EBT-14	Total Organic Carbon	1.2	1	BFB.684

VI. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

A. Matrix spike (MS) and matrix duplicate or matrix spike duplicate (MSD) were analyzed for every analyses performed for every 20 samples or for every matrix whichever is more frequent.

Yes ☒ No ☐

There are 3 MS/MSDs for each method, which meets frequency requirements for non-QC samples.

MS/MSDs are not reported for every SDG to verify the method frequency. As only client samples would be used for qualification, no further action is required.

The MS/MSDs include (all ending in EBT-14): MW-197A, IW21-04A, IW101-05A

B. The MS and MSD percent recoveries (%R) were within the limits defined in the QAPP of 40 – 140% for soil and water for Method 8081/ 8082. Two compounds are allowed to be 30 -150%. Both the MS and the MSD %R are required to be out of limits for data to be qualified. No limits are defined in the QAPP for the RSK-175 or VFA methods and lab limits have been applied. For TOC, the EPA limits of 75-125% are used.

Yes ☐ No ☒

Metabolic acids: Data for IW21-04A and IW101-05A for lactic and pyruvic acid have been qualified RMS#, where # is the % R for the zero % recoveries, which are rejected as the parent sample in non-detect. The other acids were 4 x the spike. The sample is run at 100 x dilution although the spike is added after the dilution. There may be significant matrix effects for this sample.

RSK 175: For MW-197A-EBT-14, CO2 is qualified for high spike.

Lab ID	Client ID	Analyte	result ug/L	MDL	Qualifier
L13110512-03	MW-197A-EBT-14	Carbon Dioxide	67000	2500	JMS194
L13110633-01	IW21-04A-EBT-14	Lactic Acid		50	RMS0
L13110633-01	IW21-04A-EBT-14	Pyruvic Acid		5	RMS0
L13110792-26	IW101-05A-EBT-14	Lactic Acid		100	RMS0P
L13110792-26	IW101-05A-EBT-14	Pyruvic Acid		10	RMS0P

C. The MSD relative percent differences (RPD) were within the defined QAPP limits of < 50% RPD. None are acceptable if greater than 60% RPD. The TOC limit is 20% for waters.

Yes ☒ No ☐

D. The MS/MSD were client samples.

Yes ☒ No ☐

No non client samples were reported except for one RSK Qc sample.

VII. LABORATORY CONTROL SAMPLE AND DUPLICATE (LCS/LCSD)

A. Laboratory Control Sample (LCS) and LCS duplicate were analyzed for every analyses performed and for every 20 samples or for every matrix whichever is more frequent.

Yes ☒ No ☐

B. The LCS percent recovery (%R) are within the limits defined by QAPP of 50 – 130% for soil and water for pesticides and PCBs. For RSK and VFA, the QAPP limit is the lab limits for both LCS and LCSD. Two compounds are allowed to be 30 -150%. If an LCS and LCDS are analyzed, both samples have to have outliers in order for data to be qualified. The TOC limit is 80 – 120% R.

Yes ☒ No ☐

LCS/LCSD are run in several data sets.

VIII. SURROGATE RECOVERY

A. The Surrogate spike was analyzed with every sample.

Yes ☐ No ☐ NA ☒

B. And met the recovery limits defined in the QAPP of 40 – 140%. If recovery limits were exceeded for both surrogates, the sample was re-extracted and re-analyzed.

Yes ☐ No ☐ NA ☒

IX. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria and the Retention times were within the required windows. Note: Internal standards are not required for GC analysis, but if they are used, SW-846 stipulates that they meet the same recovery requirements as those specified for GCMS methods.

Yes ☐ No ☐ NA ☒

X. FIELD QC

If Field duplicates were identified, they met guidance RPD of < 35% for water or < 50% for soils and gases. For values reported at < 5 x the reporting limit (RL), a difference of 2 x RL is used as guidance (4 x RL for soils). Data are not qualified for field duplicates as these are evaluated for the total project by the client.

Yes ☐ No ☒ NA ☐

The field duplicates were determined by proximity of collection dates and verified by the project manager as noted below. The potential outlier field precision data for these samples with the variations noted below give the range of dilutions. An RPD has not been calculated given the number of reported results. For the DUP 2 pair, there are dilutions of 25x and 50x. The undiluted and dilutions agree for methane and CO2 at the same dilution although the reported results at the various dilutions are not always comparable.

The field duplicates were determined by proximity of collection dates and verified by the project manager are noted below. The potential outlier field precision data for these samples with the variations noted below give the range of dilutions. An RPD has not been calculated given the number of reported results. Precision for a similar dilution is comparable and the variation in values across dilutions may indicate the limits of the linear range of the instrument even when the data are not flagged 'E' by the laboratory.

Parent	Duplicate
IW21-03A-EBT-14	DUP1
IW101-3B-EBT-14	DUP2
PMW101-04B-EBT-14	DUP3
IW85-06-EBT-14	DUP4
PMW92-03-EBT-14	DUP5
MW212-04B-EBT-14	DUP6

DUP5-EBT-14	Result	dil'n	PMW92-03-EBT-14	result	dil'n
Carbon Dioxide	820000	1	Carbon Dioxide	650000	1
Methane	2300	1	Methane	3200	1
Carbon Dioxide	1500000	10	Carbon Dioxide	930000	20
Methane	3400	10	Methane	3600	20
DUP1-EBT-14			IW21-3A-EBT-1		
Carbon Dioxide	150000	25	Carbon Dioxide	150000	50
Methane	12000	25	Methane	9000	50
Carbon Dioxide	130000	10			
Methane	12000	10			
Carbon Dioxide	260000	1	Carbon Dioxide	240000	1
Ethene	1.2	1			
Methane	23000	1	Methane	21000	1
DUP3-EBT-14			PMW101-04B-EBT-14		
Carbon Dioxide	69000	1	Carbon Dioxide	82000	1
Methane	8700	1	Methane	12000	1
Methane	9800	50	Methane	8200	50

XI. COMPOUND IDENTIFICATION

A. All raw data chromatograms and data system printouts were evaluated for all detected compounds and the identification is accurate.

Yes ☐ No ☐ NA ☒

This evaluation is not performed at this level of review.

B. Retention time limits or peak pattern identifications are met.

Yes ☐ No ☐ NA ☒

This evaluation is not performed at this level of review.

C. If two column or two detector confirmation was performed, the value of the confirmation was within 25%D of the quantitation value for results > 5 x RL. If the laboratory has flagged data 'COL' for %D > 40%, a JP qualifier has been added for low level results. For values below (5 x RL), the difference is not considered to impact the precision of the data.

Yes ☐ No ☐ NA ☒

Not part of this level of review. Dual columns are not required for these methods.

XII. COMPOUND QUANTITATION AND REPORTED CRQLS

A. Raw data examination verified that all sample results were correctly calculated.

Yes ☐ No ☐ NA ☒

This evaluation is not performed at this level of review.

B. The chromatograms and general system performance were acceptable for all instruments and analytical systems.

Yes ☐ No ☐ NA ☒

This evaluation is not performed at this level of review.

C. The suggested EQLs for the sample matrices in this set were met.

Yes X No NA

These samples are highly diluted, particularly for the TOC and metabolic acids. The project manager will determine if the project limits are met for the non-detected compounds. The lowest dilution per parameter has been reported for the metabolic acids.

XIII. OVERALL ASSESSMENT OF THE CASE

The method criteria have been met and the quality of the data, after consideration of qualifiers, is considered acceptable and usable as far as can be determined at this level of review.

The following is noted:

This report has been requested to include the following review: Holding times and sample integrity (chains of custody, sample log in), Calibrations, Summary QC. There are 75 water samples including QC samples (duplicates and rinse blanks) with 18 QC sets (days of analysis) for RSK, 12 QC for Metabolic Acid and 16 QC for TOC. A number of the QC samples and initial calibrations are redundant and applicable to more than one SDG. TOC has no summary forms and the calibrations and blanks were required to be reviewed from the raw data and using bracketing to determine client sample associations.

Chain of Custody

Sample PW-85-05-ebt14 was on the COC and it was not received by the lab. The HDR project manager has verified that the sample was not collected.

Sample Condition

The most current regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6° C.

The need for pH adjustment is a common occurrence for samples at this site. The proper sample bottles have been issued and used. There is a buffering capacity to these matrices that results in slightly elevated pH. If the pH is adjusted as soon as the samples reach the laboratory, the impact on the sample data is considered to be minimal. For the samples in the table below, the samples are noted as arriving at improper pH and the pH was not able to be fully adjusted by the lab per the narrative notes. Data have been qualified JP to indicate a possible bias to the data due to improper preservation. For SDG L13110792, all the Metabolic Acid and TOC data for the following samples could be impacted by pH outliers and data could be biased low.

L13110792 – 06, 08, 11, 6, 19, 22, 23, 26, 27, 28 and 33. One noted is a rinse blank, which would not be a sample that has buffer effects. Samples 17 and 21 are only out for TOC. As this is an extensive list, all qualifiers are only in the table at the end of the report.

Calibrations:

RSK 175: The CCV associated with IW21-04A-EBT-14 was out of the lab limits of 15% (-15.3%), but within the project limits.

TOC: All calibrations are in control as noted from the raw data review by bracketing all the client samples from the run log except for one CCV was 115%.

MBA: In the Case Narrative, the laboratory has indicated that all initial calibrations have used linear regression, and that all acceptance criteria are met. The raw data for 11/6/2013 verify the linear curve calculation. The summary data, however, list % RSDs of 183 to 217 %. This does not correlate to the raw data curves as the points on the curve do verify a linear range. Response factors (RF) are not usually evaluated for this method, but the RF average for pyruvic acid in the past has been only 0.005.

This is the RF that is reported for the CCV data, but the average RF in the summary ICAL is 0.1. This is a wide variation and the laboratory has been contacted to review the reported data. The RL for pyruvic acid is 1/10 that of the other compounds. Raw data review is not required nor provided, but the laboratory, in the past, has responded to comments regarding the low response saying that they do run an acceptable standard at the RL.

The laboratory has responded as follows:

“Our default ICAL/CCV/ICV forms include response factor results even in cases where an alternative curve fit is used for quantitation. These numbers should be disregarded as they are not used for instrument QC evaluation and have no bearing on sample results or data quality.

The level 4 client data includes copies of the curve plots with linear equations which may be used to validate the data.

It doesn't matter that there's a 20x difference between the average RF of the ICAL and the RF of the ICV/CCV as response factors were not used to produce these results. Everything meets the criteria set forth in our SOP using linear regression, the area counts of the ICAL midpoint, ICV and CCV are virtually identical, and the % Drift is well within limits.”

MBA: The recovery of the calibration standards are acceptable. As noted above, the RF for the daily calibrations is 0.005 for pyruvic acid which is a factor 20 x less sensitive than the RF average of the ICAL. All the metabolic acid RFs are at least a factor of 20 x less in not only the CCVs, but also in the ICV run the same day as the ICAL. It is possible that the laboratory cannot achieve the sensitivity required to verify non-detects of low level data. See note above.

Method Blanks

MBA: All method blanks are in control.

RSK-175: Method blanks are reported for almost every QC set for Methane. Data for methane have been qualified BMB#, where # is the associated blank value. Data are fully usable as non-detected values.

TOC: Method blanks acceptable.

MS/MSD Recoveries:

The MS/MSDs include (all ending in EBT-14): MW-197A, IW21-04A, IW101-05A

Metabolic acids: Data for IW21-04A and IW101-05A for lactic and pyruvic acid have been qualified RMS#, where # is the % R for the zero % recoveries, which are rejected as the parent sample in non-detect. The other acids were 4 x the spike. The sample is run at 100 x dilution although the spike is added after the dilution. There may be significant matrix effects for this sample.

RSK 175: For MW-197A-EBT-14, CO2 is qualified for high spike.

Field Blanks:

There is one field blank for each method and for most days of collection.

RSK – The methane detections in the rinse blanks were attributed to the method blank.

The metabolic acids did not report detections.

TOC data are qualified BRB#, where # is the value of the blank. Data are fully usable as non-detected values.

Field Duplicates:

The field duplicates were determined by proximity of collection dates and verified by the project manager as noted below. The potential outlier field precision data for these samples with the variations noted below

give the range of dilutions. An RPD has not been calculated given the number of reported results. For the DUP 2 pair, there are dilutions of 25x and 50x. The undiluted and dilutions agree for methane and CO2 at the same dilution although the reported results at the various dilutions are not always comparable.

The field duplicates were determined by proximity of collection dates and verified by the project manager are noted below. The potential outlier field precision data for these samples with the variations noted below give the range of dilutions. An RPD has not been calculated given the number of reported results. Precision for a similar dilution is comparable and the variation in values across dilutions may indicate the limits of the linear range of the instrument even when the data are not flagged 'E' by the laboratory.

Parent	Duplicate
IW21-03A-EBT-14	DUP1
IW101-3B-EBT-14	DUP2
PMW101-04B-EBT-14	DUP3
IW85-06-EBT-14	DUP4
PMW92-03-EBT-14	DUP5
MW212-04B-EBT-14	DUP6

DUP5-EBT-14	Result ug/L	dil'n	PMW92-03-EBT-14	result	dil'n
Carbon Dioxide	820000	1	Carbon Dioxide	650000	1
Methane	2300	1	Methane	3200	1
Carbon Dioxide	1500000	10	Carbon Dioxide	930000	20
Methane	3400	10	Methane	3600	20
DUP1-EBT-14			IW21-3A-EBT-1		
Carbon Dioxide	150000	25	Carbon Dioxide	150000	50
Methane	12000	25	Methane	9000	50
Carbon Dioxide	130000	10			
Methane	12000	10			
Carbon Dioxide	260000	1	Carbon Dioxide	240000	1
Ethene	1.2	1			
Methane	23000	1	Methane	21000	1
DUP3-EBT-14			PMW101-04B-EBT-14		
Carbon Dioxide	69000	1	Carbon Dioxide	82000	1
Methane	8700	1	Methane	12000	1
Methane	9800	50	Methane	8200	50

Reporting Limits

These samples are highly diluted, particularly for the TOC and metabolic acids. The project manager will determine if the project limits are met for the non-detected compounds.

TABLE OF QUALIFIED DATA

Lab ID	Client ID	Analyte	result mg/L*	MDL	Qualifier
L13110487-05	MW-85-EBT-14	Total Organic Carbon	25.8	2.5	JC15
L13110512-03	MW-197A-EBT-14	Carbon Dioxide	67000	2500	JMS194
L13110512-03	MW-197A-EBT-14	Methane	2.8	1	BMB3.17
L13110633-01	IW21-04A-EBT-14	Lactic Acid		50	RMS0
L13110633-01	IW21-04A-EBT-14	Pyruvic Acid		5	RMS0
L13110633-01	IW21-04A-EBT-14	Carbon Dioxide	370000	2500	JC-15.3
L13110633-16	RB1-EBT-14	Methane	2.9	1	BMB3.53
L13110511-01	IW85-06-EBT-14	Acetic Acid	1610	25	JP
L13110511-01	IW85-06-EBT-14	Butyric Acid	1470	25	JP
L13110511-01	IW85-06-EBT-14	Lactic Acid		25	JP
L13110511-01	IW85-06-EBT-14	Propionic Acid	4790	250	JP
L13110511-01	IW85-06-EBT-14	Pyruvic Acid		2.5	JP
L13110511-01	IW85-06-EBT-14	Total Organic Carbon	6930	100	JP
L13110633-01	IW21-04A-EBT-14	Acetic Acid	846	50	JP
L13110633-01	IW21-04A-EBT-14	Butyric Acid	1020	50	JP
L13110633-01	IW21-04A-EBT-14	Lactic Acid		50	RMS0JP
L13110633-01	IW21-04A-EBT-14	Propionic Acid	1000	500	JP
L13110633-01	IW21-04A-EBT-14	Pyruvic Acid		5	RMS0JP
L13110633-01	IW21-04A-EBT-14	Total Organic Carbon	2240	50	JP
L13110633-04	IW21-04B-EBT-14	Acetic Acid	1410	50	JP
L13110633-04	IW21-04B-EBT-14	Butyric Acid	627	50	JP
L13110633-04	IW21-04B-EBT-14	Lactic Acid		50	JP
L13110633-04	IW21-04B-EBT-14	Propionic Acid	1670	500	JP
L13110633-04	IW21-04B-EBT-14	Pyruvic Acid		5	JP
L13110633-04	IW21-04B-EBT-14	Total Organic Carbon	2470	50	JP
L13110633-04	IW21-04B-EBT-14	Acetic Acid	1430	5	JP
L13110633-04	IW21-04B-EBT-14	Butyric Acid	588	5	JP
L13110633-04	IW21-04B-EBT-14	Lactic Acid	12.5	5	JP
L13110633-04	IW21-04B-EBT-14	Propionic Acid	1790	50	JP
L13110633-04	IW21-04B-EBT-14	Pyruvic Acid		0.5	JP
L13110487-01	IW92-08-EBT-14	Total Organic Carbon	22600	250	JP
L13110487-02	DUP5-EBT-14	Total Organic Carbon	15300	250	JP
L13110487-06	PMW85-01-EBT-14	Total Organic Carbon	1060	50	JP
L13110633-09	PMW101-04B-EBT-14	Total Organic Carbon	2.5	0.5	BRB.668
L13110633-14	PMW21-02-EBT-14	Total Organic Carbon	2.28	0.5	BRB.668
L13110792-05	IW101-07A-EBT-14	Methane	3.4	5	BMB3.07
L13110792-06	IW101-07B-EBT-14	Acetic Acid	1880	100	JP
L13110792-06	IW101-07B-EBT-14	Butyric Acid	2680	100	JP
L13110792-06	IW101-07B-EBT-14	Lactic Acid		100	JP
L13110792-06	IW101-07B-EBT-14	Propionic Acid	2220	1000	JP
L13110792-06	IW101-07B-EBT-14	Pyruvic Acid		10	JP
L13110792-06	IW101-07B-EBT-14	Total Organic Carbon	3710	100	JP
L13110792-07	RB2-EBT-14	Methane	3.1	5	BMB3.07
L13110792-08	IW101-07C-EBT-14	Total Organic Carbon	4190	150	JP
L13110792-08	IW101-07C-EBT-14	Acetic Acid	1700	100	JP
L13110792-08	IW101-07C-EBT-14	Butyric Acid	3120	100	JP

L13110792-08	IW101-07C-EBT-14	Lactic Acid		100	JP
L13110792-08	IW101-07C-EBT-14	Propionic Acid	2090	1000	JP
L13110792-08	IW101-07C-EBT-14	Pyruvic Acid		10	JP
L13110792-11	PMW101-02A-EBT-14	Acetic Acid	346	50	JP
L13110792-11	PMW101-02A-EBT-14	Butyric Acid	741	50	JP
L13110792-11	PMW101-02A-EBT-14	Lactic Acid		50	JP
L13110792-11	PMW101-02A-EBT-14	Propionic Acid	360	500	JP
L13110792-11	PMW101-02A-EBT-14	Pyruvic Acid		5	JP
L13110792-11	PMW101-02A-EBT-14	Acetic Acid	361	5	JP
L13110792-11	PMW101-02A-EBT-14	Butyric Acid	801	5	JP
L13110792-11	PMW101-02A-EBT-14	Lactic Acid		5	JP
L13110792-11	PMW101-02A-EBT-14	Propionic Acid	436	50	JP
L13110792-11	PMW101-02A-EBT-14	Pyruvic Acid		0.5	JP
L13110792-11	PMW101-02A-EBT-14	Total Organic Carbon	1470	100	JP
L13110792-16	IW101-03C-EBT-14	Acetic Acid	2280	100	JP
L13110792-16	IW101-03C-EBT-14	Butyric Acid	4120	100	JP
L13110792-16	IW101-03C-EBT-14	Lactic Acid		100	JP
L13110792-16	IW101-03C-EBT-14	Propionic Acid	3140	1000	JP
L13110792-16	IW101-03C-EBT-14	Pyruvic Acid		10	JP
L13110792-16	IW101-03C-EBT-14	Total Organic Carbon	4890	150	JP
L13110792-17	PMW101-07A-EBT-14	Total Organic Carbon	4.01	1	JP
L13110792-18	PMW101-07B-EBT-14	Methane	3.2	5	BMB3.07
L13110792-19	DUP2-EBT-14	Acetic Acid	1100	10	JP
L13110792-19	DUP2-EBT-14	Butyric Acid	853	10	JP
L13110792-19	DUP2-EBT-14	Lactic Acid	13	10	JP
L13110792-19	DUP2-EBT-14	Propionic Acid	1610	100	JP
L13110792-19	DUP2-EBT-14	Pyruvic Acid		1	JP
L13110792-19	DUP2-EBT-14	Total Organic Carbon	2030	50	JP
L13110792-19	DUP2-EBT-14	Acetic Acid	1190	100	JP
L13110792-19	DUP2-EBT-14	Butyric Acid	949	100	JP
L13110792-19	DUP2-EBT-14	Lactic Acid		100	JP
L13110792-19	DUP2-EBT-14	Propionic Acid	1620	1000	JP
L13110792-19	DUP2-EBT-14	Pyruvic Acid		10	JP
L13110792-20	RB3-EBT-14	Methane	3.2	5	BMB3.07
L13110792-21	IW101-03B-EBT-14	Acetic Acid	1050	10	JP
L13110792-21	IW101-03B-EBT-14	Butyric Acid	803	10	JP
L13110792-21	IW101-03B-EBT-14	Lactic Acid	8.81	10	JP
L13110792-21	IW101-03B-EBT-14	Propionic Acid	1530	100	JP
L13110792-21	IW101-03B-EBT-14	Pyruvic Acid		1	JP
L13110792-21	IW101-03B-EBT-14	Total Organic Carbon	2320	100	JP
L13110792-22	IW101-04A-EBT-14	Total Organic Carbon	11800	250	JP
L13110792-22	IW101-04A-EBT-14	Acetic Acid	3820	100	JP
L13110792-22	IW101-04A-EBT-14	Butyric Acid	7900	100	JP
L13110792-22	IW101-04A-EBT-14	Lactic Acid		100	JP
L13110792-22	IW101-04A-EBT-14	Propionic Acid	4170	1000	JP
L13110792-22	IW101-04A-EBT-14	Pyruvic Acid		10	JP
L13110792-26	IW101-05A-EBT-14	Total Organic Carbon	4110	200	JP
L13110792-26	IW101-05A-EBT-14	Acetic Acid	2140	100	JP

L13110792-26	IW101-05A-EBT-14	Butyric Acid	2170	100	JP
L13110792-26	IW101-05A-EBT-14	Lactic Acid		100	RMS0P
L13110792-26	IW101-05A-EBT-14	Propionic Acid	2660	1000	JP
L13110792-26	IW101-05A-EBT-14	Pyruvic Acid		10	RMS0P
L13110792-28	IW101-05C-EBT-14	Total Organic Carbon	3660	150	JP
L13110792-28	IW101-05C-EBT-14	Acetic Acid	1880	100	JP
L13110792-28	IW101-05C-EBT-14	Butyric Acid	1600	100	JP
L13110792-28	IW101-05C-EBT-14	Lactic Acid		100	JP
L13110792-28	IW101-05C-EBT-14	Propionic Acid	2420	1000	JP
L13110792-28	IW101-05C-EBT-14	Pyruvic Acid		10	JP
L13110792-30	MW-212-EBT-14	Methane	3.9	5	BMB3.07
L13110792-30	MW-212-EBT-14	Total Organic Carbon	1.07	1	BFB.684
L13110792-32	DUP6-EBT-14	Methane	3.2	5	BMB3.96
L13110792-32	DUP6-EBT-14	Total Organic Carbon	1.2	1	BFB.684
L13110792-33	IW101-04C-EBT-14	Total Organic Carbon	4370	150	JP
L13110792-33	IW101-04C-EBT-14	Acetic Acid	2180	100	JP
L13110792-33	IW101-04C-EBT-14	Butyric Acid	2810	100	JP
L13110792-33	IW101-04C-EBT-14	Lactic Acid		100	JP
L13110792-33	IW101-04C-EBT-14	Propionic Acid	2300	1000	JP
L13110792-33	IW101-04C-EBT-14	Pyruvic Acid		10	JP

Units for methane and CO2 are ug/L*

ORGANIC DATA QUALITY REVIEW REPORT

Volatile Organics by SW-846 Method 8260B (GC/MS)

SDG:	L13110: 486, 487, 511, 512, 633, 792	
PROJECT	Memphis Defense Depot, EBT-14 Sampling for HDR, Denver	
LABORATORY	Microbac Laboratories, Inc., Marietta, OH	
SAMPLE MATRIX	Water	SAMPLING DATE 11/2013
NUMBER OF SAMPLES	75 water, including 6 field duplicate pairs, 6 trip and 4 rinse blanks	
ANALYSES REQUESTED	SW-846 8260B (VOA by GC/MS)	
SAMPLE NUMBER	See result forms attached and associated EDD	

DATA REVIEWER: Diane ShortQA REVIEWER: Diane Short & Associates, Inc. INITIALS/DATE: DLs 02/25/2013Telephone Logs included Yes____ No XContractual Violations Yes____ No X

The project QAPP (09/11), the EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 1999 and 2007, and the SW-846 Method 8260B have been referenced by the reviewer to perform this data validation review. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the Project Manager. Per the Scope of Work, the review of these samples includes Level III validation of all chains of custody, calibrations and QC forms referencing the QC limits in the above documents.

I. DELIVERABLES

A. All deliverables were present as specified in the Statement of Work (SOW), SW-846, or in the project contract.

Yes ☒ No ☐

This report has been requested to include the following review: QC, hold times, sample integrity (Chains of Custody, sample login), and summary calibrations. Note that there are 17 QC sets (days of analysis per instrument) and 4 instruments for the 75 samples. Note there are some redundant initial calibrations and several QC sets are for a short list of compounds that were diluted.

B. Chain of Custody documentation was complete and accurate.

Yes ☐ No ☒

No qualifiers have been added for Chain of Custody (COC) issues, and the Project Manager will update COC per the following notes to complete the project record.

The laboratory has signed and affixed a receipt label on all pages. The relinquishment date and time are part of the electronically-generated COC.

In addition, there are sample receipt acknowledgements from the laboratory. The log in forms contain the courier identification and air bill number.

Sample PW-85-05-ebt14 was on the COC and it was not received by the lab. The HDR project manager has verified that the sample was not collected.

C. Samples were received at the required temperature, preservation and intact with no bubbles.

Yes ☐ No ☒

EPA regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6 °C. The sample temperature conditions are fully compliant with applicable regulations.

The log in notes pH outliers, but only for other methods except for SDG L11310792 which notes pH out for 7 samples. See the holding time section.

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes ☒ No ☐

B. Holding Times

1. The contract holding times were met for all analyses [time of sample receipt to time of analysis (VOA) or time of extraction to time of analysis].

Yes ☒ No ☐

2. The Clean Water Act (40 CFR 136) or method holding times were met for all analyses (14 days from time of sample collection to analysis or extraction).

Yes ☐ No ☒

The 14 day holding time is used for samples that have been acidified. Several samples were noted as being outside the pH 2 limit. These samples are considered to have a 7 day holding time. Data have been qualified JH#, where # is the days over the 7 day limit. There could be a slight low bias to the data. The full list of qualifiers is in the table at the end of the report. Samples noted with high pH are noted in the table below for L11310792.

Lab ID	Client ID	Analyte	Qualifier
L13110792-06	IW101-07B-EBT-14	All data for these samples	JH3
L13110792-07	RB2-EBT-14		JH3
L13110792-08	IW101-07C-EBT-14		JH3
L13110792-09	IW101-02A-EBT-14		JH3

L13110792-13	IW101-02C-EBT-14		JH3
L13110792-16	IW101-03C-EBT-14		JH2
L13110792-16	IW101-03C-EBT-14		JH4
L13110792-19	DUP2-EBT-14		JH2
L13110792-21	IW101-03B-EBT-14		JH2
L13110792-21	IW101-03B-EBT-14		JH4
L13110792-22	IW101-04A-EBT-14		JH2
L13110792-22	IW101-04A-EBT-14		JH4
L13110792-28	IW101-05C-EBT-14		JH1
L13110792-35	IW101-04B-EBT-14		JH2

III. INSTRUMENT CALIBRATION – GC/MS

A. Initial Calibration

1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of > 0.05 or > 0.01 for poor responding volatiles.

Yes ☒ No ☐ NA ☐

Method 8260: Per the Project Manager, the 2007 EPA CLP validation guidance has been applied to the common “poor responders.” Calibration response factors were slightly low for Acetone and 2-butanone and other poor responders on instrument 6. The validation guidance used for this project allows for a response of 0.01 for these compounds if spectral integrity can be verified at low concentrations. These spectra are not commonly provided and are not part of the deliverable for this data set. The laboratory has been tasked with providing to the client verification that the 0.01 RF is valid. If the spectral verification is available, data are not qualified for response factors greater than 0.01 and less than 0.05 for “poor responders.” No data have been qualified. See table at the end of the report.

Most of the low-responding compounds are highly water-soluble and capable of hydrogen bonding with water. This decreases their purge efficiency and results in the relatively low response. The implication of this low purge efficiency is that a relatively low absolute recovery of such compounds is achieved in the purge step of the analysis. If this recovery is consistent, reasonable accuracy and precision can be achieved in a given matrix, which is indicated for the lab matrix by acceptable recoveries in LCS and calibration checks. However, this causes these targets to be more sensitive to matrix variations that impact purge efficiency (such as ionic strength or the presence of varying levels of soluble non-target organic material) than are the more hydrophobic compounds typically analyzed by this method, and as a result they are more likely to exhibit matrix bias.

2a. The relative standard deviation (RSD) for the five point calibration was within the 30% limit for the CCCs.

Yes ☒ No ☐ NA ☐

This is a method requirement and indicates that the analytical system is in control.

2b. The relative standard deviation (RSD) for the five point calibration was within the 30% limit for all other compounds, the average % RSD was < 15%, or a linear curve was used.

Yes ☒ No ☐ NA ☐

The laboratory only reports the % RSD if it is < 15%. All other data are reported with the linear curve values.

3. The 12 hour system Performance Check was performed as required in SW-846 and met the QC limits of 80 – 120%.

Yes ☐ No ☒ NA ☐

Dichlorodifluoromethane is consistently high in the ICV for all Instrument. There are also some other poor responders that are out. Data have been qualified only from the daily calibrations and no data are qualified.

B. Continuing Calibrations

1. The midpoint standard was analyzed for each analysis at the required frequency, and the QC criterion of > 0.05 (> 0.01 for CLP 2001 VOA) was met.

Yes ☒ No ☐ NA ☐

2. The percent difference (% D) limits of $\pm 20\%$ were met. The 2007 NFG also allow for 40% D for the “poor responders (pr).”

Yes ☐ No ☒ NA ☐

When there are no detections, no qualification is required unless the % D is biased low and so large as to indicate a significant probability of false negatives. Qualification is required for a % D biased high for detected compounds only. This requires that the RF is acceptable to verify the non-detect status, which is the case here. Data would be qualified “JC#”, where # is the % D. There could be variability to the data as there is variability to the response. No qualifiers have been required as any outlier compounds were not detected and the response factors are acceptable to verify the non-detect with one exception in SDG L11310792. Note that there were 11 compounds over the %D limits for instrument 17 which was only used for dilutions for SDG L11310792. The ketone poor responders were all slightly out, but less than the 40% limit.

Lab ID	Client ID	Analyte	result ug/L	MDL	Qualifier
L13110792-30	MW-212-EBT-14	1,2,4-Trichlorobenzene	0.291	1	JC20.8
L13110792-32	DUP6-EBT-14	1,2,4-Trichlorobenzene	0.283	1	JC20.8
L13110792-34	TB-111413-EBT-14	1,2,4-Trichlorobenzene	0.296	1	JC20.8

pr = acetone; Chloromethane; 2-butanone; MTBE, 1,2-dibromo-3-chloropropane; dichlorodifluoromethane (DFM); 4-methyl-2-pentanone; and / or 2-hexanone

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB (VOA) performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.

Yes ☒ No ☐ NA ☐

V. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria, and the Retention times were within the required windows.

Yes ☒ No ☐ NA ☐

VI. SURROGATE STANDARDS

Surrogate spikes were analyzed with every sample.

Yes ☒ No ☐

And met the recovery limits defined in the QAPP , which are the laboratory limits.

Yes ☒ No ☐

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.

Yes ☒ No ☐

There are 3 MS/MSDs for each method, which meets frequency requirements for non-QC samples.

MS/MSDs are not reported for every SDG to verify the method frequency. As only client samples would be used for qualification, no further action is required.

The MS/MSDs include (all ending in EBT-14): MW-197A, IW21-04A, IW101-05A

This meets the recommendation of 1 per 20 field (not field QC or blank) samples. As this is an ongoing project an overall adherence to the 1:20 frequency is monitored by the Project Manager.

The lab notes they do not report non-client QC. In most, and not all cases, and LCS/LCSD is reported.

B. The MS and MSD percent recoveries were within the limits defined in the updated 2011 QAPP, which now references the laboratory limits.

Yes ☐ No ☒ NA ☐

The full target list has been spiked. For L13110633, sample IW21-04A, there were high recoveries for dichlorodifluoromethane and p-isopropyltoluene. All data are non-detect and no qualifier is required. 2-butanone was out, but the parent sample results was > 4 x the spike value. Data are qualified JMS#, where # is the %R. Data could be biased high or low in proportion to the recovery. No qualifiers have been applied.

C. The MSD relative percent differences (RPD) were within the defined contract limits, which are 30%.

Yes ☒ No ☐ NA ☐

For IW21-04A and MW-197A, acetone was within %R limits and the RPD is above the lab limits of 20% and within the project limits. For IW21-04A, 1,2-dibromo-3-chloropropane, 2-hexanone also reported the RPD is above the lab limits of 20% and within the project limits. As the RPD increases, precision decreases. No data are qualified.

D. The MS/MSD were client samples.

Yes ☒ No ☐ NA ☐

Only client samples reported.

VIII. LABORATORY CONTROL SAMPLE

A. Laboratory Control Sample (LCS) was analyzed for every analysis performed and for every 20 samples.

Yes ☒ No ☐

Although not required of the method, an LCS and LCSD are often reported when there is not an MS/MSD reported in the data set.

B. The LCS percent recoveries were within the limits defined in the updated 2011 QAPP, which are the laboratory limits. If an LCS and LCSD are analyzed, both samples must have the same compounds out for data to be qualified. The RPD is qualified only if the %R is also out.

Yes ☐ No ☒

The full target list has been spiked. When a high LCS recovery is associated with a non-detect in samples, no qualifier is added since the indicated bias is high. When the target is detected, data are qualified "JL#", where # is the recovery. Acetone data could be biased high proportional to the LCS percent recovery. Dichlorodifluoromethane is also high in another LCS and all data are non-detect and no qualification is required.

Lab ID	Client ID	Analyte	result ug/L	MDL	Qualifier
L13110487-03	IW85-05-EBT-14	Acetone	578	50	JL146
L13110487-04	IW92-03-EBT-14	Acetone	475	25	JL146
L13110487-05	MW-85-EBT-14	Acetone	26	2.5	JL146
L13110487-06	PMW85-01-EBT-14	Acetone	925	12.5	JL146
L13110487-07	PMW92-03-EBT-14	Acetone	662	12.5	JL146

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.

Yes ☒ No ☐

B. No blank contamination was found in the Method Blank.

Yes _____ No X

Several method blanks contained low level contaminants. Detected data that are < 5 x blank (10 x for common laboratory contaminants) are qualified BMB#, where # is the blank (with appropriate dilution applied).

Lab ID	Client ID	Analyte	result ug/L	MDL	Qualifier
L13110511-05	TB-111813-EBT-14	Methylene chloride	0.367	0.25	BMB.347
L13110792-26	IW101-05A-EBT-14	1,2-Dichlorobenzene	2.17	5	BMB.893
L13110792-26	IW101-05A-EBT-14	1,4-Dichlorobenzene	1.53	2.5	BMB.654
L13110792-30	MW-212-EBT-14	1,2-Dichlorobenzene	0.601	1	BMB.893
L13110792-30	MW-212-EBT-14	1,4-Dichlorobenzene	0.451	0.5	BMB.654
L13110792-31	MW-213-EBT-14	1,2-Dichlorobenzene	2.43	5	BMB.893
L13110792-31	MW-213-EBT-14	1,4-Dichlorobenzene	1.61	2.5	BMB.654
L13110792-32	DUP6-EBT-14	1,2-Dichlorobenzene	0.477	1	BMB.893
L13110792-32	DUP6-EBT-14	1,4-Dichlorobenzene	0.349	0.5	BMB.654
L13110792-33	IW101-04C-EBT-14	1,4-Dichlorobenzene	3.12	5	BMB.654
L13110792-34	TB-111413-EBT-14	1,2-Dichlorobenzene	0.668	1	BMB.893
L13110792-34	TB-111413-EBT-14	1,4-Dichlorobenzene	0.487	0.5	BMB.654
L13110792-35	IW101-04B-EBT-14	1,2-Dichlorobenzene	2.61	5	JH2BMB.893
L13110792-35	IW101-04B-EBT-14	1,4-Dichlorobenzene	1.81	2.5	JH2BMB.654

C. If Field Blanks were identified, no blank contamination was found.

Yes _____ No X NA _____

The field blanks is RB1, 2 and 3. The samples contained acetone at levels 10 times that of the trip blank as well as lower levels of 2-butanone, methylene chloride and naphthalene. Acetone and 2-butanone resulted in qualifiers of BRB#, where # is the blank corrected for dilution.

Trip blanks were collected and all were non-detected with the exception of acetone and/ or methylene chloride in the TB for the 11/ 7, 8, 9, 10/13(some of which are U from the rinse blank) dates. The 11/7/13 TB also reported chloromethane and the compound is not in any of the associated samples. Qualifiers have been applied.

Qualifiers have been applied. Data are qualified BTB#, where # is the acetone or 2-butanone, dilution corrected for the associated sample.

Lab ID	Client ID	Analyte	result ug/L	MDL	Qualifier
L13110486-03	MW-113-EBT-14	Acetone	220	25	BTB25.5
L13110511-02	IW92-02-EBT-14	Acetone	421	125	BTB133
L13110511-03	IW92-07-EBT-14	Acetone	624	125	BTB133
L13110511-06	PMW21-01-EBT-14	Acetone	34.5	5	BTB5.32
L13110633-01	IW21-04A-EBT-14	Acetone	145	12.5	BRB186
L13110633-04	IW21-04B-EBT-14	Acetone	765	12.5	BRB186
L13110633-04	IW21-04B-EBT-14	Acetone	738	250	BRB7320
L13110633-04	IW21-04B-EBT-14	MEK (2-Butanone)	3870	250	BRB288
L13110633-05	MW-21-EBT-14	Acetone	77.3	2.5	BRB37.2
L13110633-06	PMW21-04-EBT-14	Acetone	50	2.5	BRB37.2
L13110633-07	PMW101-04A-EBT-14	Acetone	2.8	2.5	BRB37.2
L13110633-10	IW21-02A-EBT-14	Acetone	150	12.5	BRB186
L13110633-11	IW21-02B-EBT-14	Acetone	93.9	12.5	BRB186
L13110633-12	IW21-3A-EBT-1	Acetone	29.4	2.5	BRB37.2
L13110633-13	IW21-3B-EBT-14	Acetone	107	2.5	BRB37.2

L13110633-13	IW21-3B-EBT-14	Acetone	67.4	25	BRB372
L13110633-15	DUP1-EBT-14	Acetone	33	2.5	BRB37.2
L13110633-17	TB-111113-EBT-14	Acetone	3.58	2.5	BRB37.2
L13110792-01	DR1-5-EBT-14	Acetone	345	20	BFB68.6
L13110792-02	DR1-5A-EBT-14	Acetone	49.6	10	BFB34.3
L13110792-03	DR1-6-EBT-14	Acetone	8.98	10	BFB34.3
L13110792-04	DR1-6A-EBT-14	Acetone	149	10	BFB34.3
L13110792-06	IW101-07B-EBT-14	Acetone	465	250	JH3BFB857.5
L13110792-06	IW101-07B-EBT-14	Acetone	522	50	JH3BFB172
L13110792-07	RB2-EBT-14	Acetone	34.3	10	JH3BFB34.3
L13110792-08	IW101-07C-EBT-14	Acetone	1220	100	JH3BFB343
L13110792-09	IW101-02A-EBT-14	Acetone	280	10	JH3BFB34.3
L13110792-09	IW101-02A-EBT-14	Acetone	251	50	JH3BFB172
L13110792-11	PMW101-02A-EBT-14	Acetone	127	20	BFB68.6
L13110792-13	IW101-02C-EBT-14	Acetone	675	100	JH3BFB343
L13110792-14	PMW-101-02B-EBT-14	Acetone	115	10	BFB34.3
L13110792-15	IW101-03A-EBT-14	Acetone	411	100	BFB333
L13110792-16	IW101-03C-EBT-14	Acetone	5650	2500	JH4BFB8275
L13110792-19	DUP2-EBT-14	Acetone	703	100	JH2BFB333
L13110792-21	IW101-03B-EBT-14	Acetone	733	50	JH2BFB165
L13110792-21	IW101-03B-EBT-14	Acetone	612	500	JH4BFB1655
L13110792-22	IW101-04A-EBT-14	Acetone	1010	100	JH2BFB333
L13110792-22	IW101-04A-EBT-14	Acetone	888	2500	JH4BFB8275
L13110792-22	IW101-04A-EBT-14	MEK (2-Butanone)	4990	2500	JH4BFB665
L13110792-24	IW101-05B-EBT-14	Acetone	2.86	10	BFB33.1
L13110792-24	IW101-05B-EBT-14	MEK (2-Butanone)	4.09	10	BFB2.66
L13110792-26	IW101-05A-EBT-14	Acetone	583	1000	BFB3333
L13110792-26	IW101-05A-EBT-14	MEK (2-Butanone)	1670	1000	BFB266
L13110792-26	IW101-05A-EBT-14	Acetone	580	50	BFB165
L13110792-28	IW101-05C-EBT-14	Acetone	653	100	JH1BFB333
L13110792-29	MW-62-EBT-14	Acetone	58.1	10	BFB33.1
L13110792-31	MW-213-EBT-14	Acetone	90.7	50	BFB165
L13110792-33	IW101-04C-EBT-14	Acetone	1210	100	BFB333
L13110792-33	IW101-04C-EBT-14	Acetone	1260	1000	BFB3333
L13110792-35	IW101-04B-EBT-14	Acetone	94.1	50	JH2BFB165

X. FIELD QC

If Field Duplicates were identified, they met guidance for VOA of RPD of < 30% for water or < 50% for soil. For values reported at < 5 × the reporting limit (RL), a difference of 2 × RL or 3.5 × RL for soil is used as guidance. This is referred to as the CRDL Rule. Data are not qualified for Field Duplicates as these are evaluated for the total project by the Project Manager.

Yes _____ No X NA _____

The field duplicates were determined by proximity of collection dates and verified by the project manager are noted below. The potential outlier field precision data for these samples with the variations noted below give the range of dilutions. An RPD has not been calculated given the number of reported results. Precision for a similar dilution is comparable and the variation in values across dilutions may indicate the limits of the linear range of the instrument even when the data are not flagged 'E' by the laboratory.

Parent	Duplicate

IW21-03A-EBT-14	DUP1
IW101-3B-EBT-14	DUP2
PMW101-04B-EBT-14	DUP3
IW85-06-EBT-14	DUP4
PMW92-03-EBT-14	DUP5
MW212-04B-EBT-14	DUP6

DUP5-EBT-14	Result	dil'n	PMW92-03-EBT-14	result	dil'n
Acetone	662	10	Acetone	472	5
MEK (2-Butanone)	330	10	MEK (2-Butanone)	227	5

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and analytical systems.

Yes _____ No _____ NA X

Not part of this review level.

B. The suggested EQLs for the sample matrices in this set were met.

Yes X No _____ NA _____

There are extremely high dilutions for many of the samples due to compounds over the calibration range of the instrument. The project manager will determine if the elevated reporting limits meet the project criteria. All dilutions have been reported.

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for all detected compounds.

Yes _____ No _____ NA X

B. Quantitation was checked to determine the accuracy of calculations for representative compounds in each internal standards quantitation set.

Yes _____ No _____ NA X

Not part of this review level.

XIII. TENTATIVELY IDENTIFIED COMPOUNDS

TICs were properly identified and met the library identification criteria.

Yes _____ No _____ NA X

Not part of this review level.

XIV. OVERALL ASSESSMENT OF THE CASE

The laboratory has complied with the requested method. Data are fully usable after consideration of qualifiers. The following is noted:

This report has been requested to include the following review: QC, hold times, sample integrity (Chains of Custody, sample login), and summary calibrations. Note that there are 17 QC sets (days of analysis per instrument) and 4 instruments for the 75 samples. Note there are some redundant initial calibrations and several QC sets are for a short list of compounds that were diluted.

Sample Preservation

EPA regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be equal to or less than 6 °C. The sample temperature conditions are fully compliant with applicable regulations.

The log in notes pH outliers, but only for other methods except for SDG L11310792 which notes pH out for 7 samples. See the holding time section.

Holding Times

The 14 day holding time is used for samples that have been acidified. Several samples were noted as being outside the pH 2 limit. These samples are considered to have a 7 day holding time. Data have been qualified JH#, where # is the days over the 7 day limit. There could be a slight low bias to the data. The full list of qualifiers is in the table at the end of the report. Samples noted with high pH are noted in the table below for L11310792.

Chain of Custody

Sample PW-85-05-ebt14 was on the COC and it was not received by the lab. The HDR project manager has verified that the sample was not collected.

Initial Calibrations

Method 8260: Per the Project Manager, the 2007 EPA CLP validation guidance has been applied to the common “poor responders.” Calibration response factors were slightly low for Acetone and 2-butanone and other poor responders on instrument 6. The validation guidance used for this project allows for a response of 0.01 for these compounds if spectral integrity can be verified at low concentrations. These spectra are not commonly provided and are not part of the deliverable for this data set. The laboratory has been tasked with providing to the client verification that the 0.01 RF is valid. If the spectral verification is available, data are not qualified for response factors greater than 0.01 and less than 0.05 for “poor responders.” No data have been qualified.

Dichlorodifluoromethane is consistently high in the ICV for all instrument s. There are also some other poor responders that are out. Data have been qualified only from the daily calibrations and no qualification has been required.

Continuing Calibrations

When there are no detections, no qualification is required unless the % D is biased low and so large as to indicate a significant probability of false negatives. Qualification is required for a % D biased high for detected compounds only. This requires that the RF is acceptable to verify the non-detect status, which is the case here. Data would be qualified “JC#”, where # is the % D. There could be variability to the data as there is variability to the response. No qualifiers have been required as any outlier compounds were not detected and the response factors are acceptable to verify the non-detect with one exception of 1,2,4-Trichlorobenzene in SDG L11310792. Note that there were 11 compounds over the %D limits for instrument 17 which was only used for dilutions for SDG L11310792. The ketone poor responders were all slightly out, but less than the 40% limit.

Matrix Spikes and Duplicates

The MS/MSDs include (all ending in EBT-14): MW-197A, IW21-04A, IW101-05A

MS/MSDs are not reported for every SDG to verify the method frequency. As only client samples would be used for qualification, no further action is required.

This meets the recommendation of 1 per 20 field (not field QC or blank) samples. As this is an ongoing project an overall adherence to the 1:20 frequency is monitored by the Project Manager.

The full target list has been spiked. For L13110633, sample IW21-04A , there were high recoveries for dichlorodifluoromethane and p-isopropyltoluene. All data are non-detect and no qualifier is required. 2 butanone was out, but the parent sample results was > 4 x the spike value. Data are qualified JMS#, where # is the %R. Data could be biased high or low in proportion to the recovery. No qualifiers have been applied.

For IW21-04A and MW-197A, acetone was within %R limits and the RPD is above the lab limits of 20% and within the project limits. For IW21-04A, 1,2 dibromo-3-chloropropane, 2-hexanone also reported the RPD is above the lab limits of 20% and within the project limits. As the RPD increases, precision decreases. No data are qualified.

Laboratory Control Samples

The full target list has been spiked. When a high LCS recovery is associated with a non-detect in samples, no qualifier is added since the indicated bias is high. When the target is detected, data are qualified "JL#", where # is the recovery. Acetone data could be biased high proportional to the LCS percent recovery.

Method Blanks

Several method blanks contained low level contaminants. Detected data that are < 5 x blank are qualified BMB#, where # is the blank (with appropriate dilution applied). These are common laboratory contaminants.

Field Blanks

The field blanks are RB1, 2 and 3. The samples contained acetone at levels 10 times that of the trip blank as well as lower levels of 2-butanone, methylene chloride and naphthalene. Acetone and 2-butanone resulted in qualifiers of BRB#, where # is the blank corrected for dilution.

Trip blanks were collected and all were non-detected with the exception of acetone and/or methylene chloride in the TB for the 11/7, 8, 9, 10/13 (some of which are U from the rinse blank) dates. The 11/7/13 TB also reported chloromethane and the compound is not in any of the associated samples. Qualifiers have been applied. Data are qualified BTB#, where # is the acetone or 2-butanone, dilution corrected for the associated sample.

Field QC

The field duplicates were determined by proximity of collection dates and verified by the project manager are noted below. The potential outlier field precision data for these samples with the variations noted below give the range of dilutions. An RPD has not been calculated given the number of reported results. Precision for a similar dilution is comparable and the variation in values across dilutions may indicate the limits of the linear range of the instrument even when the data are not flagged 'E' by the laboratory.

Parent	Duplicate
IW21-03A-EBT-14	DUP1
IW101-3B-EBT-14	DUP2
PMW101-04B-EBT-14	DUP3
IW85-06-EBT-14	DUP4
PMW92-03-EBT-14	DUP5
MW212-04B-EBT-14	DUP6

DUP5-EBT-14	Result	dil'n	PMW92-03-EBT-14	result	dil'n
Acetone	662	10	Acetone	472	5
MEK (2-Butanone)	330	10	MEK (2-Butanone)	227	5

Reporting Limits

There are extremely high dilutions for many of the samples due to compounds over the calibration range of the instrument. The project manager will determine if the elevated reporting limits meet the project criteria. All dilutions have been reported.

TABLE OF QUALIFIED DATA

Lab ID	Client ID	Analyte	result ug/L	MDL	Qualifier
L13110486-03	MW-113-EBT-14	Acetone	220	25	UTB25.5
L13110487-03	IW85-05-EBT-14	Acetone	578	50	JL146
L13110487-04	IW92-03-EBT-14	Acetone	475	25	JL146
L13110487-05	MW-85-EBT-14	Acetone	26	2.5	JL146
L13110487-06	PMW85-01-EBT-14	Acetone	925	12.5	JL146
L13110487-07	PMW92-03-EBT-14	Acetone	662	12.5	JL146
L13110511-02	IW92-02-EBT-14	Acetone	421	125	BTB133
L13110511-03	IW92-07-EBT-14	Acetone	624	125	BTB133
L13110511-05	TB-111813-EBT-14	Methylene chloride	0.367	0.25	BMB.347
L13110511-06	PMW21-01-EBT-14	Acetone	34.5	5	BTB5.32
L13110633-01	IW21-04A-EBT-14	Acetone	145	12.5	BRB186
L13110633-04	IW21-04B-EBT-14	Acetone	765	12.5	BRB186
L13110633-04	IW21-04B-EBT-14	Acetone	738	250	BRB7320
L13110633-04	IW21-04B-EBT-14	MEK (2-Butanone)	3870	250	BRB288
L13110633-05	MW-21-EBT-14	Acetone	77.3	2.5	BRB37.2
L13110633-06	PMW21-04-EBT-14	Acetone	50	2.5	BRB37.2
L13110633-07	PMW101-04A-EBT-14	Acetone	2.8	2.5	BRB37.2
L13110633-10	IW21-02A-EBT-14	Acetone	150	12.5	BRB186
L13110633-11	IW21-02B-EBT-14	Acetone	93.9	12.5	BRB186
L13110633-12	IW21-3A-EBT-1	Acetone	29.4	2.5	BRB37.2
L13110633-13	IW21-3B-EBT-14	Acetone	107	2.5	BRB37.2
L13110633-13	IW21-3B-EBT-14	Acetone	67.4	25	BRB372
L13110633-15	DUP1-EBT-14	Acetone	33	2.5	BRB37.2
L13110633-17	TB-111113-EBT-14	Acetone	3.58	2.5	BRB37.2
L13110792-01	DR1-5-EBT-14	Acetone	345	20	BFB68.6
L13110792-02	DR1-5A-EBT-14	Acetone	49.6	10	BFB34.3
L13110792-03	DR1-6-EBT-14	Acetone	8.98	10	BFB34.3
L13110792-04	DR1-6A-EBT-14	Acetone	149	10	BFB34.3
L13110792-06	IW101-07B-EBT-14	1,1,1,2-Tetrachloroethane		12.5	JH3
L13110792-06	IW101-07B-EBT-14	1,1,1-Trichloroethane		25	JH3
L13110792-06	IW101-07B-EBT-14	1,1,2,2-Tetrachloroethane		12.5	JH3
L13110792-06	IW101-07B-EBT-14	1,1,2-Trichloroethane		25	JH3
L13110792-06	IW101-07B-EBT-14	1,1-Dichloroethane		25	JH3
L13110792-06	IW101-07B-EBT-14	1,1-Dichloroethene		25	JH3
L13110792-06	IW101-07B-EBT-14	1,1-Dichloropropene		25	JH3
L13110792-06	IW101-07B-EBT-14	1,2,3-Trichlorobenzene		25	JH3
L13110792-06	IW101-07B-EBT-14	1,2,3-Trichloropropane		25	JH3
L13110792-06	IW101-07B-EBT-14	1,2,4-Trichlorobenzene		25	JH3
L13110792-06	IW101-07B-EBT-14	1,2,4-Trimethylbenzene	19.6	25	JH3
L13110792-06	IW101-07B-EBT-14	1,2-Dibromo-3-chloropropane		50	JH3
L13110792-06	IW101-07B-EBT-14	1,2-Dibromoethane		25	JH3
L13110792-06	IW101-07B-EBT-14	1,2-Dichlorobenzene		25	JH3
L13110792-06	IW101-07B-EBT-14	1,2-Dichloroethane		12.5	JH3
L13110792-06	IW101-07B-EBT-14	1,2-Dichloropropane		25	JH3

L13110792-06	IW101-07B-EBT-14	1,3,5-Trimethylbenzene		25	JH3
L13110792-06	IW101-07B-EBT-14	1,3-Dichlorobenzene		25	JH3
L13110792-06	IW101-07B-EBT-14	1,3-Dichloropropane		10	JH3
L13110792-06	IW101-07B-EBT-14	1,4-Dichlorobenzene		12.5	JH3
L13110792-06	IW101-07B-EBT-14	1-Chlorohexane		25	JH3
L13110792-06	IW101-07B-EBT-14	2,2-Dichloropropane		25	JH3
L13110792-06	IW101-07B-EBT-14	2-Chlorotoluene		25	JH3
L13110792-06	IW101-07B-EBT-14	2-Hexanone		250	JH3
L13110792-06	IW101-07B-EBT-14	4-Chlorotoluene		25	JH3
L13110792-06	IW101-07B-EBT-14	Acetone	465	250	JH3BFB857.5
L13110792-06	IW101-07B-EBT-14	Benzene		10	JH3
L13110792-06	IW101-07B-EBT-14	Bromobenzene		25	JH3
L13110792-06	IW101-07B-EBT-14	Bromochloromethane		25	JH3
L13110792-06	IW101-07B-EBT-14	Bromodichloromethane		12.5	JH3
L13110792-06	IW101-07B-EBT-14	Bromoform		25	JH3
L13110792-06	IW101-07B-EBT-14	Bromomethane		25	JH3
L13110792-06	IW101-07B-EBT-14	Carbon disulfide		25	JH3
L13110792-06	IW101-07B-EBT-14	Carbon tetrachloride		25	JH3
L13110792-06	IW101-07B-EBT-14	Chlorobenzene		12.5	JH3
L13110792-06	IW101-07B-EBT-14	Chloroethane		25	JH3
L13110792-06	IW101-07B-EBT-14	Chloroform		7.5	JH3
L13110792-06	IW101-07B-EBT-14	Chloromethane		25	JH3
L13110792-06	IW101-07B-EBT-14	Dibromochloromethane		12.5	JH3
L13110792-06	IW101-07B-EBT-14	Dibromomethane		25	JH3
L13110792-06	IW101-07B-EBT-14	Dichlorodifluoromethane		25	JH3
L13110792-06	IW101-07B-EBT-14	Ethylbenzene		25	JH3
L13110792-06	IW101-07B-EBT-14	Hexachlorobutadiene	9.02	15	JH3
L13110792-06	IW101-07B-EBT-14	Isopropylbenzene		25	JH3
L13110792-06	IW101-07B-EBT-14	MEK (2-Butanone)	2040	250	JH3
L13110792-06	IW101-07B-EBT-14	MIBK (methyl isobutyl ketone)		250	JH3
L13110792-06	IW101-07B-EBT-14	Methyl t-butyl ether (MTBE)		125	JH3
L13110792-06	IW101-07B-EBT-14	Methylene chloride		25	JH3
L13110792-06	IW101-07B-EBT-14	Naphthalene		25	JH3
L13110792-06	IW101-07B-EBT-14	Styrene		25	JH3
L13110792-06	IW101-07B-EBT-14	Tetrachloroethene		25	JH3
L13110792-06	IW101-07B-EBT-14	Toluene		25	JH3
L13110792-06	IW101-07B-EBT-14	Trichloroethene		25	JH3
L13110792-06	IW101-07B-EBT-14	Trichlorofluoromethane		25	JH3
L13110792-06	IW101-07B-EBT-14	Vinyl chloride		25	JH3
L13110792-06	IW101-07B-EBT-14	cis-1,2-Dichloroethene	51.4	25	JH3
L13110792-06	IW101-07B-EBT-14	cis-1,3-Dichloropropene		12.5	JH3
L13110792-06	IW101-07B-EBT-14	m-,p-Xylene		50	JH3
L13110792-06	IW101-07B-EBT-14	n-Butylbenzene		25	JH3
L13110792-06	IW101-07B-EBT-14	n-Propylbenzene	3.74	25	JH3
L13110792-06	IW101-07B-EBT-14	o-Xylene		25	JH3
L13110792-06	IW101-07B-EBT-14	p-Isopropyltoluene		25	JH3
L13110792-06	IW101-07B-EBT-14	sec-Butylbenzene		25	JH3
L13110792-06	IW101-07B-EBT-14	tert-Butylbenzene		25	JH3
L13110792-06	IW101-07B-EBT-14	trans-1,2-Dichloroethene		25	JH3

L13110792-06	IW101-07B-EBT-14	trans-1,3-Dichloropropene		25	JH3
L13110792-06	IW101-07B-EBT-14	1,1,1,2-Tetrachloroethane		2.5	JH3
L13110792-06	IW101-07B-EBT-14	1,1,1-Trichloroethane		5	JH3
L13110792-06	IW101-07B-EBT-14	1,1,2,2-Tetrachloroethane		2.5	JH3
L13110792-06	IW101-07B-EBT-14	1,1,2-Trichloroethane		5	JH3
L13110792-06	IW101-07B-EBT-14	1,1-Dichloroethane		5	JH3
L13110792-06	IW101-07B-EBT-14	1,1-Dichloroethene		5	JH3
L13110792-06	IW101-07B-EBT-14	1,1-Dichloropropene		5	JH3
L13110792-06	IW101-07B-EBT-14	1,2,3-Trichlorobenzene		5	JH3
L13110792-06	IW101-07B-EBT-14	1,2,3-Trichloropropane		5	JH3
L13110792-06	IW101-07B-EBT-14	1,2,4-Trichlorobenzene		5	JH3
L13110792-06	IW101-07B-EBT-14	1,2,4-Trimethylbenzene	25.7	5	JH3
L13110792-06	IW101-07B-EBT-14	1,2-Dibromo-3-chloropropane		10	JH3
L13110792-06	IW101-07B-EBT-14	1,2-Dibromoethane		5	JH3
L13110792-06	IW101-07B-EBT-14	1,2-Dichlorobenzene		5	JH3
L13110792-06	IW101-07B-EBT-14	1,2-Dichloroethane		2.5	JH3
L13110792-06	IW101-07B-EBT-14	1,2-Dichloropropane		5	JH3
L13110792-06	IW101-07B-EBT-14	1,3,5-Trimethylbenzene	7.42	5	JH3
L13110792-06	IW101-07B-EBT-14	1,3-Dichlorobenzene		5	JH3
L13110792-06	IW101-07B-EBT-14	1,3-Dichloropropane		2	JH3
L13110792-06	IW101-07B-EBT-14	1,4-Dichlorobenzene		2.5	JH3
L13110792-06	IW101-07B-EBT-14	1-Chlorohexane		5	JH3
L13110792-06	IW101-07B-EBT-14	2,2-Dichloropropane		5	JH3
L13110792-06	IW101-07B-EBT-14	2-Chlorotoluene		5	JH3
L13110792-06	IW101-07B-EBT-14	2-Hexanone		50	JH3
L13110792-06	IW101-07B-EBT-14	4-Chlorotoluene		5	JH3
L13110792-06	IW101-07B-EBT-14	Acetone	522	50	JH3BFB172
L13110792-06	IW101-07B-EBT-14	Benzene		2	JH3
L13110792-06	IW101-07B-EBT-14	Bromobenzene		5	JH3
L13110792-06	IW101-07B-EBT-14	Bromochloromethane		5	JH3
L13110792-06	IW101-07B-EBT-14	Bromodichloromethane		2.5	JH3
L13110792-06	IW101-07B-EBT-14	Bromoform		5	JH3
L13110792-06	IW101-07B-EBT-14	Bromomethane		5	JH3
L13110792-06	IW101-07B-EBT-14	Carbon disulfide		5	JH3
L13110792-06	IW101-07B-EBT-14	Carbon tetrachloride		5	JH3
L13110792-06	IW101-07B-EBT-14	Chlorobenzene		2.5	JH3
L13110792-06	IW101-07B-EBT-14	Chloroethane		5	JH3
L13110792-06	IW101-07B-EBT-14	Chloroform		1.5	JH3
L13110792-06	IW101-07B-EBT-14	Chloromethane		5	JH3
L13110792-06	IW101-07B-EBT-14	Dibromochloromethane		2.5	JH3
L13110792-06	IW101-07B-EBT-14	Dibromomethane		5	JH3
L13110792-06	IW101-07B-EBT-14	Dichlorodifluoromethane		5	JH3
L13110792-06	IW101-07B-EBT-14	Ethylbenzene		5	JH3
L13110792-06	IW101-07B-EBT-14	Hexachlorobutadiene		3	JH3
L13110792-06	IW101-07B-EBT-14	Isopropylbenzene		5	JH3
L13110792-06	IW101-07B-EBT-14	MEK (2-Butanone)	2340	50	JH3
L13110792-06	IW101-07B-EBT-14	MIBK (methyl isobutyl ketone)		50	JH3
L13110792-06	IW101-07B-EBT-14	Methyl t-butyl ether (MTBE)		25	JH3

L13110792-06	IW101-07B-EBT-14	Methylene chloride		5	JH3
L13110792-06	IW101-07B-EBT-14	Naphthalene		5	JH3
L13110792-06	IW101-07B-EBT-14	Styrene		5	JH3
L13110792-06	IW101-07B-EBT-14	Tetrachloroethene	1.92	5	JH3
L13110792-06	IW101-07B-EBT-14	Toluene		5	JH3
L13110792-06	IW101-07B-EBT-14	Trichloroethene	4.17	5	JH3
L13110792-06	IW101-07B-EBT-14	Trichlorofluoromethane		5	JH3
L13110792-06	IW101-07B-EBT-14	Vinyl chloride		5	JH3
L13110792-06	IW101-07B-EBT-14	cis-1,2-Dichloroethene	58.9	5	JH3
L13110792-06	IW101-07B-EBT-14	cis-1,3-Dichloropropene		2.5	JH3
L13110792-06	IW101-07B-EBT-14	m-,p-Xylene		10	JH3
L13110792-06	IW101-07B-EBT-14	n-Butylbenzene		5	JH3
L13110792-06	IW101-07B-EBT-14	n-Propylbenzene	3.64	5	JH3
L13110792-06	IW101-07B-EBT-14	o-Xylene		5	JH3
L13110792-06	IW101-07B-EBT-14	p-Isopropyltoluene		5	JH3
L13110792-06	IW101-07B-EBT-14	sec-Butylbenzene		5	JH3
L13110792-06	IW101-07B-EBT-14	tert-Butylbenzene		5	JH3
L13110792-06	IW101-07B-EBT-14	trans-1,2-Dichloroethene		5	JH3
L13110792-06	IW101-07B-EBT-14	trans-1,3-Dichloropropene		5	JH3
L13110792-07	RB2-EBT-14	1,1,1,2-Tetrachloroethane		0.5	JH3
L13110792-07	RB2-EBT-14	1,1,1-Trichloroethane		1	JH3
L13110792-07	RB2-EBT-14	1,1,2,2-Tetrachloroethane		0.5	JH3
L13110792-07	RB2-EBT-14	1,1,2-Trichloroethane		1	JH3
L13110792-07	RB2-EBT-14	1,1-Dichloroethane		1	JH3
L13110792-07	RB2-EBT-14	1,1-Dichloroethene		1	JH3
L13110792-07	RB2-EBT-14	1,1-Dichloropropene		1	JH3
L13110792-07	RB2-EBT-14	1,2,3-Trichlorobenzene		1	JH3
L13110792-07	RB2-EBT-14	1,2,3-Trichloropropane		1	JH3
L13110792-07	RB2-EBT-14	1,2,4-Trichlorobenzene		1	JH3
L13110792-07	RB2-EBT-14	1,2,4-Trimethylbenzene		1	JH3
L13110792-07	RB2-EBT-14	1,2-Dibromo-3-chloropropane		2	JH3
L13110792-07	RB2-EBT-14	1,2-Dibromoethane		1	JH3
L13110792-07	RB2-EBT-14	1,2-Dichlorobenzene		1	JH3
L13110792-07	RB2-EBT-14	1,2-Dichloroethane		0.5	JH3
L13110792-07	RB2-EBT-14	1,2-Dichloropropane		1	JH3
L13110792-07	RB2-EBT-14	1,3,5-Trimethylbenzene		1	JH3
L13110792-07	RB2-EBT-14	1,3-Dichlorobenzene		1	JH3
L13110792-07	RB2-EBT-14	1,3-Dichloropropane		0.4	JH3
L13110792-07	RB2-EBT-14	1,4-Dichlorobenzene		0.5	JH3
L13110792-07	RB2-EBT-14	1-Chlorohexane		1	JH3
L13110792-07	RB2-EBT-14	2,2-Dichloropropane		1	JH3
L13110792-07	RB2-EBT-14	2-Chlorotoluene		1	JH3
L13110792-07	RB2-EBT-14	2-Hexanone		10	JH3
L13110792-07	RB2-EBT-14	4-Chlorotoluene		1	JH3
L13110792-07	RB2-EBT-14	Acetone	34.3	10	JH3BFB34.3
L13110792-07	RB2-EBT-14	Benzene		0.4	JH3
L13110792-07	RB2-EBT-14	Bromobenzene		1	JH3
L13110792-07	RB2-EBT-14	Bromochloromethane		1	JH3
L13110792-07	RB2-EBT-14	Bromodichloromethane		0.5	JH3

L13110792-07	RB2-EBT-14	Bromoform		1	JH3
L13110792-07	RB2-EBT-14	Bromomethane		1	JH3
L13110792-07	RB2-EBT-14	Carbon disulfide		1	JH3
L13110792-07	RB2-EBT-14	Carbon tetrachloride		1	JH3
L13110792-07	RB2-EBT-14	Chlorobenzene		0.5	JH3
L13110792-07	RB2-EBT-14	Chloroethane		1	JH3
L13110792-07	RB2-EBT-14	Chloroform		0.3	JH3
L13110792-07	RB2-EBT-14	Chloromethane		1	JH3
L13110792-07	RB2-EBT-14	Dibromochloromethane		0.5	JH3
L13110792-07	RB2-EBT-14	Dibromomethane		1	JH3
L13110792-07	RB2-EBT-14	Dichlorodifluoromethane		1	JH3
L13110792-07	RB2-EBT-14	Ethylbenzene		1	JH3
L13110792-07	RB2-EBT-14	Hexachlorobutadiene		0.6	JH3
L13110792-07	RB2-EBT-14	Isopropylbenzene		1	JH3
L13110792-07	RB2-EBT-14	MEK (2-Butanone)		10	JH3
L13110792-07	RB2-EBT-14	MIBK (methyl isobutyl ketone)		10	JH3
L13110792-07	RB2-EBT-14	Methyl t-butyl ether (MTBE)		5	JH3
L13110792-07	RB2-EBT-14	Methylene chloride	0.426	1	JH3
L13110792-07	RB2-EBT-14	Naphthalene	0.373	1	JH3
L13110792-07	RB2-EBT-14	Styrene		1	JH3
L13110792-07	RB2-EBT-14	Tetrachloroethene		1	JH3
L13110792-07	RB2-EBT-14	Toluene		1	JH3
L13110792-07	RB2-EBT-14	Trichloroethene		1	JH3
L13110792-07	RB2-EBT-14	Trichlorofluoromethane		1	JH3
L13110792-07	RB2-EBT-14	Vinyl chloride		1	JH3
L13110792-07	RB2-EBT-14	cis-1,2-Dichloroethene		1	JH3
L13110792-07	RB2-EBT-14	cis-1,3-Dichloropropene		0.5	JH3
L13110792-07	RB2-EBT-14	m-,p-Xylene		2	JH3
L13110792-07	RB2-EBT-14	n-Butylbenzene		1	JH3
L13110792-07	RB2-EBT-14	n-Propylbenzene		1	JH3
L13110792-07	RB2-EBT-14	o-Xylene		1	JH3
L13110792-07	RB2-EBT-14	p-Isopropyltoluene		1	JH3
L13110792-07	RB2-EBT-14	sec-Butylbenzene		1	JH3
L13110792-07	RB2-EBT-14	tert-Butylbenzene		1	JH3
L13110792-07	RB2-EBT-14	trans-1,2-Dichloroethene		1	JH3
L13110792-07	RB2-EBT-14	trans-1,3-Dichloropropene		1	JH3
L13110792-08	IW101-07C-EBT-14	1,1,1,2-Tetrachloroethane		5	JH3
L13110792-08	IW101-07C-EBT-14	1,1,1-Trichloroethane		10	JH3
L13110792-08	IW101-07C-EBT-14	1,1,2,2-Tetrachloroethane		5	JH3
L13110792-08	IW101-07C-EBT-14	1,1,2-Trichloroethane		10	JH3
L13110792-08	IW101-07C-EBT-14	1,1-Dichloroethane		10	JH3
L13110792-08	IW101-07C-EBT-14	1,1-Dichloroethene		10	JH3
L13110792-08	IW101-07C-EBT-14	1,1-Dichloropropene		10	JH3
L13110792-08	IW101-07C-EBT-14	1,2,3-Trichlorobenzene		10	JH3
L13110792-08	IW101-07C-EBT-14	1,2,3-Trichloropropane		10	JH3
L13110792-08	IW101-07C-EBT-14	1,2,4-Trichlorobenzene		10	JH3
L13110792-08	IW101-07C-EBT-14	1,2,4-Trimethylbenzene	34.2	10	JH3
L13110792-08	IW101-07C-EBT-14	1,2-Dibromo-3-chloropropane		20	JH3

L13110792-08	IW101-07C-EBT-14	1,2-Dibromoethane		10	JH3
L13110792-08	IW101-07C-EBT-14	1,2-Dichlorobenzene		10	JH3
L13110792-08	IW101-07C-EBT-14	1,2-Dichloroethane		5	JH3
L13110792-08	IW101-07C-EBT-14	1,2-Dichloropropane		10	JH3
L13110792-08	IW101-07C-EBT-14	1,3,5-Trimethylbenzene	8.59	10	JH3
L13110792-08	IW101-07C-EBT-14	1,3-Dichlorobenzene		10	JH3
L13110792-08	IW101-07C-EBT-14	1,3-Dichloropropane		4	JH3
L13110792-08	IW101-07C-EBT-14	1,4-Dichlorobenzene		5	JH3
L13110792-08	IW101-07C-EBT-14	1-Chlorohexane		10	JH3
L13110792-08	IW101-07C-EBT-14	2,2-Dichloropropane		10	JH3
L13110792-08	IW101-07C-EBT-14	2-Chlorotoluene		10	JH3
L13110792-08	IW101-07C-EBT-14	2-Hexanone		100	JH3
L13110792-08	IW101-07C-EBT-14	4-Chlorotoluene		10	JH3
L13110792-08	IW101-07C-EBT-14	Acetone	1220	100	JH3BFB343
L13110792-08	IW101-07C-EBT-14	Benzene		4	JH3
L13110792-08	IW101-07C-EBT-14	Bromobenzene		10	JH3
L13110792-08	IW101-07C-EBT-14	Bromochloromethane		10	JH3
L13110792-08	IW101-07C-EBT-14	Bromodichloromethane		5	JH3
L13110792-08	IW101-07C-EBT-14	Bromoform		10	JH3
L13110792-08	IW101-07C-EBT-14	Bromomethane		10	JH3
L13110792-08	IW101-07C-EBT-14	Carbon disulfide		10	JH3
L13110792-08	IW101-07C-EBT-14	Carbon tetrachloride		10	JH3
L13110792-08	IW101-07C-EBT-14	Chlorobenzene		5	JH3
L13110792-08	IW101-07C-EBT-14	Chloroethane		10	JH3
L13110792-08	IW101-07C-EBT-14	Chloroform		3	JH3
L13110792-08	IW101-07C-EBT-14	Chloromethane		10	JH3
L13110792-08	IW101-07C-EBT-14	Dibromochloromethane		5	JH3
L13110792-08	IW101-07C-EBT-14	Dibromomethane		10	JH3
L13110792-08	IW101-07C-EBT-14	Dichlorodifluoromethane		10	JH3
L13110792-08	IW101-07C-EBT-14	Ethylbenzene		10	JH3
L13110792-08	IW101-07C-EBT-14	Hexachlorobutadiene		6	JH3
L13110792-08	IW101-07C-EBT-14	Isopropylbenzene		10	JH3
L13110792-08	IW101-07C-EBT-14	MEK (2-Butanone)	2230	100	JH3
L13110792-08	IW101-07C-EBT-14	MIBK (methyl isobutyl ketone)		100	JH3
L13110792-08	IW101-07C-EBT-14	Methyl t-butyl ether (MTBE)		50	JH3
L13110792-08	IW101-07C-EBT-14	Methylene chloride		10	JH3
L13110792-08	IW101-07C-EBT-14	Naphthalene		10	JH3
L13110792-08	IW101-07C-EBT-14	Styrene		10	JH3
L13110792-08	IW101-07C-EBT-14	Tetrachloroethene		10	JH3
L13110792-08	IW101-07C-EBT-14	Toluene		10	JH3
L13110792-08	IW101-07C-EBT-14	Trichloroethene		10	JH3
L13110792-08	IW101-07C-EBT-14	Trichlorofluoromethane		10	JH3
L13110792-08	IW101-07C-EBT-14	Vinyl chloride	3.09	10	JH3
L13110792-08	IW101-07C-EBT-14	cis-1,2-Dichloroethene	211	10	JH3
L13110792-08	IW101-07C-EBT-14	cis-1,3-Dichloropropene		5	JH3
L13110792-08	IW101-07C-EBT-14	m,p-Xylene		20	JH3
L13110792-08	IW101-07C-EBT-14	n-Butylbenzene		10	JH3
L13110792-08	IW101-07C-EBT-14	n-Propylbenzene	3.58	10	JH3
L13110792-08	IW101-07C-EBT-14	o-Xylene		10	JH3

L13110792-08	IW101-07C-EBT-14	p-Isopropyltoluene		10	JH3
L13110792-08	IW101-07C-EBT-14	sec-Butylbenzene		10	JH3
L13110792-08	IW101-07C-EBT-14	tert-Butylbenzene		10	JH3
L13110792-08	IW101-07C-EBT-14	trans-1,2-Dichloroethene		10	JH3
L13110792-08	IW101-07C-EBT-14	trans-1,3-Dichloropropene		10	JH3
L13110792-09	IW101-02A-EBT-14	1,1,1,2-Tetrachloroethane		0.5	JH3
L13110792-09	IW101-02A-EBT-14	1,1,1-Trichloroethane		1	JH3
L13110792-09	IW101-02A-EBT-14	1,1,2,2-Tetrachloroethane		0.5	JH3
L13110792-09	IW101-02A-EBT-14	1,1,2-Trichloroethane		1	JH3
L13110792-09	IW101-02A-EBT-14	1,1-Dichloroethane		1	JH3
L13110792-09	IW101-02A-EBT-14	1,1-Dichloroethene		1	JH3
L13110792-09	IW101-02A-EBT-14	1,1-Dichloropropene		1	JH3
L13110792-09	IW101-02A-EBT-14	1,2,3-Trichlorobenzene		1	JH3
L13110792-09	IW101-02A-EBT-14	1,2,3-Trichloropropane		1	JH3
L13110792-09	IW101-02A-EBT-14	1,2,4-Trichlorobenzene		1	JH3
L13110792-09	IW101-02A-EBT-14	1,2,4-Trimethylbenzene	0.396	1	JH3
L13110792-09	IW101-02A-EBT-14	1,2-Dibromo-3-chloropropane		2	JH3
L13110792-09	IW101-02A-EBT-14	1,2-Dibromoethane		1	JH3
L13110792-09	IW101-02A-EBT-14	1,2-Dichlorobenzene		1	JH3
L13110792-09	IW101-02A-EBT-14	1,2-Dichloroethane		0.5	JH3
L13110792-09	IW101-02A-EBT-14	1,2-Dichloropropane		1	JH3
L13110792-09	IW101-02A-EBT-14	1,3,5-Trimethylbenzene		1	JH3
L13110792-09	IW101-02A-EBT-14	1,3-Dichlorobenzene		1	JH3
L13110792-09	IW101-02A-EBT-14	1,3-Dichloropropane		0.4	JH3
L13110792-09	IW101-02A-EBT-14	1,4-Dichlorobenzene		0.5	JH3
L13110792-09	IW101-02A-EBT-14	1-Chlorohexane		1	JH3
L13110792-09	IW101-02A-EBT-14	2,2-Dichloropropane		1	JH3
L13110792-09	IW101-02A-EBT-14	2-Chlorotoluene		1	JH3
L13110792-09	IW101-02A-EBT-14	2-Hexanone		10	JH3
L13110792-09	IW101-02A-EBT-14	4-Chlorotoluene		1	JH3
L13110792-09	IW101-02A-EBT-14	Acetone	280	10	JH3BFB34.3
L13110792-09	IW101-02A-EBT-14	Benzene		0.4	JH3
L13110792-09	IW101-02A-EBT-14	Bromobenzene		1	JH3
L13110792-09	IW101-02A-EBT-14	Bromochloromethane		1	JH3
L13110792-09	IW101-02A-EBT-14	Bromodichloromethane		0.5	JH3
L13110792-09	IW101-02A-EBT-14	Bromoform		1	JH3
L13110792-09	IW101-02A-EBT-14	Bromomethane		1	JH3
L13110792-09	IW101-02A-EBT-14	Carbon disulfide	0.579	1	JH3
L13110792-09	IW101-02A-EBT-14	Carbon tetrachloride		1	JH3
L13110792-09	IW101-02A-EBT-14	Chlorobenzene		0.5	JH3
L13110792-09	IW101-02A-EBT-14	Chloroethane		1	JH3
L13110792-09	IW101-02A-EBT-14	Chloroform		0.3	JH3
L13110792-09	IW101-02A-EBT-14	Chloromethane		1	JH3
L13110792-09	IW101-02A-EBT-14	Dibromochloromethane		0.5	JH3
L13110792-09	IW101-02A-EBT-14	Dibromomethane		1	JH3
L13110792-09	IW101-02A-EBT-14	Dichlorodifluoromethane		1	JH3
L13110792-09	IW101-02A-EBT-14	Ethylbenzene		1	JH3
L13110792-09	IW101-02A-EBT-14	Hexachlorobutadiene		0.6	JH3
L13110792-09	IW101-02A-EBT-14	Isopropylbenzene		1	JH3

L13110792-09	IW101-02A-EBT-14	MEK (2-Butanone)	455	10	JH3
L13110792-09	IW101-02A-EBT-14	MIBK (methyl isobutyl ketone)		10	JH3
L13110792-09	IW101-02A-EBT-14	Methyl t-butyl ether (MTBE)	9.88	5	JH3
L13110792-09	IW101-02A-EBT-14	Methylene chloride		1	JH3
L13110792-09	IW101-02A-EBT-14	Naphthalene		1	JH3
L13110792-09	IW101-02A-EBT-14	Styrene		1	JH3
L13110792-09	IW101-02A-EBT-14	Tetrachloroethene	14.2	1	JH3
L13110792-09	IW101-02A-EBT-14	Toluene		1	JH3
L13110792-09	IW101-02A-EBT-14	Trichloroethene	0.908	1	JH3
L13110792-09	IW101-02A-EBT-14	Trichlorofluoromethane		1	JH3
L13110792-09	IW101-02A-EBT-14	Vinyl chloride		1	JH3
L13110792-09	IW101-02A-EBT-14	cis-1,2-Dichloroethene	16	1	JH3
L13110792-09	IW101-02A-EBT-14	cis-1,3-Dichloropropene		0.5	JH3
L13110792-09	IW101-02A-EBT-14	m-,p-Xylene		2	JH3
L13110792-09	IW101-02A-EBT-14	n-Butylbenzene		1	JH3
L13110792-09	IW101-02A-EBT-14	n-Propylbenzene		1	JH3
L13110792-09	IW101-02A-EBT-14	o-Xylene		1	JH3
L13110792-09	IW101-02A-EBT-14	p-Isopropyltoluene		1	JH3
L13110792-09	IW101-02A-EBT-14	sec-Butylbenzene		1	JH3
L13110792-09	IW101-02A-EBT-14	tert-Butylbenzene		1	JH3
L13110792-09	IW101-02A-EBT-14	trans-1,2-Dichloroethene		1	JH3
L13110792-09	IW101-02A-EBT-14	trans-1,3-Dichloropropene		1	JH3
L13110792-09	IW101-02A-EBT-14	1,1,1,2-Tetrachloroethane		2.5	JH3
L13110792-09	IW101-02A-EBT-14	1,1,1-Trichloroethane		5	JH3
L13110792-09	IW101-02A-EBT-14	1,1,2,2-Tetrachloroethane		2.5	JH3
L13110792-09	IW101-02A-EBT-14	1,1,2-Trichloroethane		5	JH3
L13110792-09	IW101-02A-EBT-14	1,1-Dichloroethane		5	JH3
L13110792-09	IW101-02A-EBT-14	1,1-Dichloroethene		5	JH3
L13110792-09	IW101-02A-EBT-14	1,1-Dichloropropene		5	JH3
L13110792-09	IW101-02A-EBT-14	1,2,3-Trichlorobenzene		5	JH3
L13110792-09	IW101-02A-EBT-14	1,2,3-Trichloropropane		5	JH3
L13110792-09	IW101-02A-EBT-14	1,2,4-Trichlorobenzene		5	JH3
L13110792-09	IW101-02A-EBT-14	1,2,4-Trimethylbenzene		5	JH3
L13110792-09	IW101-02A-EBT-14	1,2-Dibromo-3-chloropropane		10	JH3
L13110792-09	IW101-02A-EBT-14	1,2-Dibromoethane		5	JH3
L13110792-09	IW101-02A-EBT-14	1,2-Dichlorobenzene		5	JH3
L13110792-09	IW101-02A-EBT-14	1,2-Dichloroethane		2.5	JH3
L13110792-09	IW101-02A-EBT-14	1,2-Dichloropropane		5	JH3
L13110792-09	IW101-02A-EBT-14	1,3,5-Trimethylbenzene		5	JH3
L13110792-09	IW101-02A-EBT-14	1,3-Dichlorobenzene		5	JH3
L13110792-09	IW101-02A-EBT-14	1,3-Dichloropropane		2	JH3
L13110792-09	IW101-02A-EBT-14	1,4-Dichlorobenzene		2.5	JH3
L13110792-09	IW101-02A-EBT-14	1-Chlorohexane		5	JH3
L13110792-09	IW101-02A-EBT-14	2,2-Dichloropropane		5	JH3
L13110792-09	IW101-02A-EBT-14	2-Chlorotoluene		5	JH3
L13110792-09	IW101-02A-EBT-14	2-Hexanone		50	JH3
L13110792-09	IW101-02A-EBT-14	4-Chlorotoluene		5	JH3
L13110792-09	IW101-02A-EBT-14	Acetone	251	50	JH3BFB172

L13110792-09	IW101-02A-EBT-14	Benzene		2	JH3
L13110792-09	IW101-02A-EBT-14	Bromobenzene		5	JH3
L13110792-09	IW101-02A-EBT-14	Bromochloromethane		5	JH3
L13110792-09	IW101-02A-EBT-14	Bromodichloromethane		2.5	JH3
L13110792-09	IW101-02A-EBT-14	Bromoform		5	JH3
L13110792-09	IW101-02A-EBT-14	Bromomethane		5	JH3
L13110792-09	IW101-02A-EBT-14	Carbon disulfide		5	JH3
L13110792-09	IW101-02A-EBT-14	Carbon tetrachloride		5	JH3
L13110792-09	IW101-02A-EBT-14	Chlorobenzene		2.5	JH3
L13110792-09	IW101-02A-EBT-14	Chloroethane		5	JH3
L13110792-09	IW101-02A-EBT-14	Chloroform		1.5	JH3
L13110792-09	IW101-02A-EBT-14	Chloromethane		5	JH3
L13110792-09	IW101-02A-EBT-14	Dibromochloromethane		2.5	JH3
L13110792-09	IW101-02A-EBT-14	Dibromomethane		5	JH3
L13110792-09	IW101-02A-EBT-14	Dichlorodifluoromethane		5	JH3
L13110792-09	IW101-02A-EBT-14	Ethylbenzene		5	JH3
L13110792-09	IW101-02A-EBT-14	Hexachlorobutadiene		3	JH3
L13110792-09	IW101-02A-EBT-14	Isopropylbenzene		5	JH3
L13110792-09	IW101-02A-EBT-14	MEK (2-Butanone)	388	50	JH3
L13110792-09	IW101-02A-EBT-14	MIBK (methyl isobutyl ketone)		50	JH3
L13110792-09	IW101-02A-EBT-14	Methyl t-butyl ether (MTBE)	8.69	25	JH3
L13110792-09	IW101-02A-EBT-14	Methylene chloride		5	JH3
L13110792-09	IW101-02A-EBT-14	Naphthalene		5	JH3
L13110792-09	IW101-02A-EBT-14	Styrene		5	JH3
L13110792-09	IW101-02A-EBT-14	Tetrachloroethene	14.1	5	JH3
L13110792-09	IW101-02A-EBT-14	Toluene		5	JH3
L13110792-09	IW101-02A-EBT-14	Trichloroethene		5	JH3
L13110792-09	IW101-02A-EBT-14	Trichlorofluoromethane		5	JH3
L13110792-09	IW101-02A-EBT-14	Vinyl chloride		5	JH3
L13110792-09	IW101-02A-EBT-14	cis-1,2-Dichloroethene	14.4	5	JH3
L13110792-09	IW101-02A-EBT-14	cis-1,3-Dichloropropene		2.5	JH3
L13110792-09	IW101-02A-EBT-14	m-,p-Xylene		10	JH3
L13110792-09	IW101-02A-EBT-14	n-Butylbenzene		5	JH3
L13110792-09	IW101-02A-EBT-14	n-Propylbenzene		5	JH3
L13110792-09	IW101-02A-EBT-14	o-Xylene		5	JH3
L13110792-09	IW101-02A-EBT-14	p-Isopropyltoluene		5	JH3
L13110792-09	IW101-02A-EBT-14	sec-Butylbenzene		5	JH3
L13110792-09	IW101-02A-EBT-14	tert-Butylbenzene		5	JH3
L13110792-09	IW101-02A-EBT-14	trans-1,2-Dichloroethene		5	JH3
L13110792-09	IW101-02A-EBT-14	trans-1,3-Dichloropropene		5	JH3
L13110792-11	PMW101-02A-EBT-14	Acetone	127	20	BFB68.6
L13110792-13	IW101-02C-EBT-14	1,1,1,2-Tetrachloroethane		5	JH3
L13110792-13	IW101-02C-EBT-14	1,1,1-Trichloroethane		10	JH3
L13110792-13	IW101-02C-EBT-14	1,1,2,2-Tetrachloroethane		5	JH3
L13110792-13	IW101-02C-EBT-14	1,1,2-Trichloroethane		10	JH3
L13110792-13	IW101-02C-EBT-14	1,1-Dichloroethane		10	JH3
L13110792-13	IW101-02C-EBT-14	1,1-Dichloroethene		10	JH3
L13110792-13	IW101-02C-EBT-14	1,1-Dichloropropene		10	JH3
L13110792-13	IW101-02C-EBT-14	1,2,3-Trichlorobenzene		10	JH3

L13110792-13	IW101-02C-EBT-14	1,2,3-Trichloropropane		10	JH3
L13110792-13	IW101-02C-EBT-14	1,2,4-Trichlorobenzene		10	JH3
L13110792-13	IW101-02C-EBT-14	1,2,4-Trimethylbenzene	2.58	10	JH3
L13110792-13	IW101-02C-EBT-14	1,2-Dibromo-3-chloropropane		20	JH3
L13110792-13	IW101-02C-EBT-14	1,2-Dibromoethane		10	JH3
L13110792-13	IW101-02C-EBT-14	1,2-Dichlorobenzene		10	JH3
L13110792-13	IW101-02C-EBT-14	1,2-Dichloroethane		5	JH3
L13110792-13	IW101-02C-EBT-14	1,2-Dichloropropane		10	JH3
L13110792-13	IW101-02C-EBT-14	1,3,5-Trimethylbenzene		10	JH3
L13110792-13	IW101-02C-EBT-14	1,3-Dichlorobenzene		10	JH3
L13110792-13	IW101-02C-EBT-14	1,3-Dichloropropane		4	JH3
L13110792-13	IW101-02C-EBT-14	1,4-Dichlorobenzene		5	JH3
L13110792-13	IW101-02C-EBT-14	1-Chlorohexane		10	JH3
L13110792-13	IW101-02C-EBT-14	2,2-Dichloropropane		10	JH3
L13110792-13	IW101-02C-EBT-14	2-Chlorotoluene		10	JH3
L13110792-13	IW101-02C-EBT-14	2-Hexanone		100	JH3
L13110792-13	IW101-02C-EBT-14	4-Chlorotoluene		10	JH3
L13110792-13	IW101-02C-EBT-14	Acetone	675	100	JH3BFB343
L13110792-13	IW101-02C-EBT-14	Benzene		4	JH3
L13110792-13	IW101-02C-EBT-14	Bromobenzene		10	JH3
L13110792-13	IW101-02C-EBT-14	Bromochloromethane		10	JH3
L13110792-13	IW101-02C-EBT-14	Bromodichloromethane		5	JH3
L13110792-13	IW101-02C-EBT-14	Bromoform		10	JH3
L13110792-13	IW101-02C-EBT-14	Bromomethane		10	JH3
L13110792-13	IW101-02C-EBT-14	Carbon disulfide		10	JH3
L13110792-13	IW101-02C-EBT-14	Carbon tetrachloride		10	JH3
L13110792-13	IW101-02C-EBT-14	Chlorobenzene		5	JH3
L13110792-13	IW101-02C-EBT-14	Chloroethane		10	JH3
L13110792-13	IW101-02C-EBT-14	Chloroform		3	JH3
L13110792-13	IW101-02C-EBT-14	Chloromethane		10	JH3
L13110792-13	IW101-02C-EBT-14	Dibromochloromethane		5	JH3
L13110792-13	IW101-02C-EBT-14	Dibromomethane		10	JH3
L13110792-13	IW101-02C-EBT-14	Dichlorodifluoromethane		10	JH3
L13110792-13	IW101-02C-EBT-14	Ethylbenzene		10	JH3
L13110792-13	IW101-02C-EBT-14	Hexachlorobutadiene		6	JH3
L13110792-13	IW101-02C-EBT-14	Isopropylbenzene		10	JH3
L13110792-13	IW101-02C-EBT-14	MEK (2-Butanone)	2780	100	JH3
L13110792-13	IW101-02C-EBT-14	MIBK (methyl isobutyl ketone)		100	JH3
L13110792-13	IW101-02C-EBT-14	Methyl t-butyl ether (MTBE)		50	JH3
L13110792-13	IW101-02C-EBT-14	Methylene chloride		10	JH3
L13110792-13	IW101-02C-EBT-14	Naphthalene		10	JH3
L13110792-13	IW101-02C-EBT-14	Styrene		10	JH3
L13110792-13	IW101-02C-EBT-14	Tetrachloroethene		10	JH3
L13110792-13	IW101-02C-EBT-14	Toluene		10	JH3
L13110792-13	IW101-02C-EBT-14	Trichloroethene		10	JH3
L13110792-13	IW101-02C-EBT-14	Trichlorofluoromethane		10	JH3
L13110792-13	IW101-02C-EBT-14	Vinyl chloride		10	JH3
L13110792-13	IW101-02C-EBT-14	cis-1,2-Dichloroethene	62.9	10	JH3

L13110792-13	IW101-02C-EBT-14	cis-1,3-Dichloropropene		5	JH3
L13110792-13	IW101-02C-EBT-14	m-,p-Xylene		20	JH3
L13110792-13	IW101-02C-EBT-14	n-Butylbenzene		10	JH3
L13110792-13	IW101-02C-EBT-14	n-Propylbenzene		10	JH3
L13110792-13	IW101-02C-EBT-14	o-Xylene		10	JH3
L13110792-13	IW101-02C-EBT-14	p-Isopropyltoluene		10	JH3
L13110792-13	IW101-02C-EBT-14	sec-Butylbenzene		10	JH3
L13110792-13	IW101-02C-EBT-14	tert-Butylbenzene		10	JH3
L13110792-13	IW101-02C-EBT-14	trans-1,2-Dichloroethene		10	JH3
L13110792-13	IW101-02C-EBT-14	trans-1,3-Dichloropropene		10	JH3
L13110792-14	PMW-101-02B-EBT-14	Acetone	115	10	BFB34.3
L13110792-15	IW101-03A-EBT-14	Acetone	411	100	BFB333
L13110792-16	IW101-03C-EBT-14	1,1,1,2-Tetrachloroethane		5	JH2
L13110792-16	IW101-03C-EBT-14	1,1,1-Trichloroethane		10	JH2
L13110792-16	IW101-03C-EBT-14	1,1,2,2-Tetrachloroethane		5	JH2
L13110792-16	IW101-03C-EBT-14	1,1,2-Trichloroethane		10	JH2
L13110792-16	IW101-03C-EBT-14	1,1-Dichloroethane		10	JH2
L13110792-16	IW101-03C-EBT-14	1,1-Dichloroethene		10	JH2
L13110792-16	IW101-03C-EBT-14	1,1-Dichloropropene		10	JH2
L13110792-16	IW101-03C-EBT-14	1,2,3-Trichlorobenzene		10	JH2
L13110792-16	IW101-03C-EBT-14	1,2,3-Trichloropropane		10	JH2
L13110792-16	IW101-03C-EBT-14	1,2,4-Trichlorobenzene		10	JH2
L13110792-16	IW101-03C-EBT-14	1,2,4-Trimethylbenzene		10	JH2
L13110792-16	IW101-03C-EBT-14	1,2-Dibromo-3-chloropropane		20	JH2
L13110792-16	IW101-03C-EBT-14	1,2-Dibromoethane		10	JH2
L13110792-16	IW101-03C-EBT-14	1,2-Dichlorobenzene		10	JH2
L13110792-16	IW101-03C-EBT-14	1,2-Dichloroethane		5	JH2
L13110792-16	IW101-03C-EBT-14	1,2-Dichloropropane		10	JH2
L13110792-16	IW101-03C-EBT-14	1,3,5-Trimethylbenzene		10	JH2
L13110792-16	IW101-03C-EBT-14	1,3-Dichlorobenzene		10	JH2
L13110792-16	IW101-03C-EBT-14	1,3-Dichloropropane		4	JH2
L13110792-16	IW101-03C-EBT-14	1,4-Dichlorobenzene		5	JH2
L13110792-16	IW101-03C-EBT-14	1-Chlorohexane		10	JH2
L13110792-16	IW101-03C-EBT-14	2,2-Dichloropropane		10	JH2
L13110792-16	IW101-03C-EBT-14	2-Chlorotoluene		10	JH2
L13110792-16	IW101-03C-EBT-14	2-Hexanone		100	JH2
L13110792-16	IW101-03C-EBT-14	4-Chlorotoluene		10	JH2
L13110792-16	IW101-03C-EBT-14	Acetone	5500	100	JH2
L13110792-16	IW101-03C-EBT-14	Benzene		4	JH2
L13110792-16	IW101-03C-EBT-14	Bromobenzene		10	JH2
L13110792-16	IW101-03C-EBT-14	Bromochloromethane		10	JH2
L13110792-16	IW101-03C-EBT-14	Bromodichloromethane		5	JH2
L13110792-16	IW101-03C-EBT-14	Bromoform		10	JH2
L13110792-16	IW101-03C-EBT-14	Bromomethane		10	JH2
L13110792-16	IW101-03C-EBT-14	Carbon disulfide		10	JH2
L13110792-16	IW101-03C-EBT-14	Carbon tetrachloride		10	JH2
L13110792-16	IW101-03C-EBT-14	Chlorobenzene		5	JH2
L13110792-16	IW101-03C-EBT-14	Chloroethane		10	JH2

L13110792-16	IW101-03C-EBT-14	Chloroform		3	JH2
L13110792-16	IW101-03C-EBT-14	Chloromethane		10	JH2
L13110792-16	IW101-03C-EBT-14	Dibromochloromethane		5	JH2
L13110792-16	IW101-03C-EBT-14	Dibromomethane		10	JH2
L13110792-16	IW101-03C-EBT-14	Dichlorodifluoromethane		10	JH2
L13110792-16	IW101-03C-EBT-14	Ethylbenzene		10	JH2
L13110792-16	IW101-03C-EBT-14	Hexachlorobutadiene		6	JH2
L13110792-16	IW101-03C-EBT-14	Isopropylbenzene		10	JH2
L13110792-16	IW101-03C-EBT-14	MEK (2-Butanone)	8230	100	JH2
L13110792-16	IW101-03C-EBT-14	MIBK (methyl isobutyl ketone)		100	JH2
L13110792-16	IW101-03C-EBT-14	Methyl t-butyl ether (MTBE)		50	JH2
L13110792-16	IW101-03C-EBT-14	Methylene chloride		10	JH2
L13110792-16	IW101-03C-EBT-14	Naphthalene		10	JH2
L13110792-16	IW101-03C-EBT-14	Styrene		10	JH2
L13110792-16	IW101-03C-EBT-14	Tetrachloroethene		10	JH2
L13110792-16	IW101-03C-EBT-14	Toluene		10	JH2
L13110792-16	IW101-03C-EBT-14	Trichloroethene		10	JH2
L13110792-16	IW101-03C-EBT-14	Trichlorofluoromethane		10	JH2
L13110792-16	IW101-03C-EBT-14	Vinyl chloride		10	JH2
L13110792-16	IW101-03C-EBT-14	cis-1,2-Dichloroethene	37.4	10	JH2
L13110792-16	IW101-03C-EBT-14	cis-1,3-Dichloropropene		5	JH2
L13110792-16	IW101-03C-EBT-14	m-,p-Xylene		20	JH2
L13110792-16	IW101-03C-EBT-14	n-Butylbenzene		10	JH2
L13110792-16	IW101-03C-EBT-14	n-Propylbenzene		10	JH2
L13110792-16	IW101-03C-EBT-14	o-Xylene		10	JH2
L13110792-16	IW101-03C-EBT-14	p-Isopropyltoluene		10	JH2
L13110792-16	IW101-03C-EBT-14	sec-Butylbenzene		10	JH2
L13110792-16	IW101-03C-EBT-14	tert-Butylbenzene		10	JH2
L13110792-16	IW101-03C-EBT-14	trans-1,2-Dichloroethene		10	JH2
L13110792-16	IW101-03C-EBT-14	trans-1,3-Dichloropropene		10	JH2
L13110792-16	IW101-03C-EBT-14	1,1,1,2-Tetrachloroethane		125	JH4
L13110792-16	IW101-03C-EBT-14	1,1,1-Trichloroethane		250	JH4
L13110792-16	IW101-03C-EBT-14	1,1,2,2-Tetrachloroethane		125	JH4
L13110792-16	IW101-03C-EBT-14	1,1,2-Trichloroethane		250	JH4
L13110792-16	IW101-03C-EBT-14	1,1-Dichloroethane		250	JH4
L13110792-16	IW101-03C-EBT-14	1,1-Dichloroethene		250	JH4
L13110792-16	IW101-03C-EBT-14	1,1-Dichloropropene		250	JH4
L13110792-16	IW101-03C-EBT-14	1,2,3-Trichlorobenzene		250	JH4
L13110792-16	IW101-03C-EBT-14	1,2,3-Trichloropropane		250	JH4
L13110792-16	IW101-03C-EBT-14	1,2,4-Trichlorobenzene		250	JH4
L13110792-16	IW101-03C-EBT-14	1,2,4-Trimethylbenzene		250	JH4
L13110792-16	IW101-03C-EBT-14	1,2-Dibromo-3-chloropropane		500	JH4
L13110792-16	IW101-03C-EBT-14	1,2-Dibromoethane		250	JH4
L13110792-16	IW101-03C-EBT-14	1,2-Dichlorobenzene		250	JH4
L13110792-16	IW101-03C-EBT-14	1,2-Dichloroethane		125	JH4
L13110792-16	IW101-03C-EBT-14	1,2-Dichloropropane		250	JH4
L13110792-16	IW101-03C-EBT-14	1,3,5-Trimethylbenzene		250	JH4
L13110792-16	IW101-03C-EBT-14	1,3-Dichlorobenzene		250	JH4

L13110792-16	IW101-03C-EBT-14	1,3-Dichloropropane		100	JH4
L13110792-16	IW101-03C-EBT-14	1,4-Dichlorobenzene		125	JH4
L13110792-16	IW101-03C-EBT-14	1-Chlorohexane		250	JH4
L13110792-16	IW101-03C-EBT-14	2,2-Dichloropropane		250	JH4
L13110792-16	IW101-03C-EBT-14	2-Chlorotoluene		250	JH4
L13110792-16	IW101-03C-EBT-14	2-Hexanone		2500	JH4
L13110792-16	IW101-03C-EBT-14	4-Chlorotoluene		250	JH4
L13110792-16	IW101-03C-EBT-14	Acetone	5650	2500	JH4BFB8275
L13110792-16	IW101-03C-EBT-14	Benzene		100	JH4
L13110792-16	IW101-03C-EBT-14	Bromobenzene		250	JH4
L13110792-16	IW101-03C-EBT-14	Bromochloromethane		250	JH4
L13110792-16	IW101-03C-EBT-14	Bromodichloromethane		125	JH4
L13110792-16	IW101-03C-EBT-14	Bromoform		250	JH4
L13110792-16	IW101-03C-EBT-14	Bromomethane		250	JH4
L13110792-16	IW101-03C-EBT-14	Carbon disulfide		250	JH4
L13110792-16	IW101-03C-EBT-14	Carbon tetrachloride		250	JH4
L13110792-16	IW101-03C-EBT-14	Chlorobenzene		125	JH4
L13110792-16	IW101-03C-EBT-14	Chloroethane		250	JH4
L13110792-16	IW101-03C-EBT-14	Chloroform		75	JH4
L13110792-16	IW101-03C-EBT-14	Chloromethane		250	JH4
L13110792-16	IW101-03C-EBT-14	Dibromochloromethane		125	JH4
L13110792-16	IW101-03C-EBT-14	Dibromomethane		250	JH4
L13110792-16	IW101-03C-EBT-14	Dichlorodifluoromethane		250	JH4
L13110792-16	IW101-03C-EBT-14	Ethylbenzene		250	JH4
L13110792-16	IW101-03C-EBT-14	Hexachlorobutadiene	75.5	150	JH4
L13110792-16	IW101-03C-EBT-14	Isopropylbenzene		250	JH4
L13110792-16	IW101-03C-EBT-14	MEK (2-Butanone)	8640	2500	JH4
L13110792-16	IW101-03C-EBT-14	MIBK (methyl isobutyl ketone)		2500	JH4
L13110792-16	IW101-03C-EBT-14	Methyl t-butyl ether (MTBE)		1250	JH4
L13110792-16	IW101-03C-EBT-14	Methylene chloride		250	JH4
L13110792-16	IW101-03C-EBT-14	Naphthalene		250	JH4
L13110792-16	IW101-03C-EBT-14	Styrene		250	JH4
L13110792-16	IW101-03C-EBT-14	Tetrachloroethene		250	JH4
L13110792-16	IW101-03C-EBT-14	Toluene		250	JH4
L13110792-16	IW101-03C-EBT-14	Trichloroethene		250	JH4
L13110792-16	IW101-03C-EBT-14	Trichlorofluoromethane		250	JH4
L13110792-16	IW101-03C-EBT-14	Vinyl chloride		250	JH4
L13110792-16	IW101-03C-EBT-14	cis-1,2-Dichloroethene		250	JH4
L13110792-16	IW101-03C-EBT-14	cis-1,3-Dichloropropene		125	JH4
L13110792-16	IW101-03C-EBT-14	m,p-Xylene		500	JH4
L13110792-16	IW101-03C-EBT-14	n-Butylbenzene		250	JH4
L13110792-16	IW101-03C-EBT-14	n-Propylbenzene		250	JH4
L13110792-16	IW101-03C-EBT-14	o-Xylene		250	JH4
L13110792-16	IW101-03C-EBT-14	p-Isopropyltoluene		250	JH4
L13110792-16	IW101-03C-EBT-14	sec-Butylbenzene		250	JH4
L13110792-16	IW101-03C-EBT-14	tert-Butylbenzene		250	JH4
L13110792-16	IW101-03C-EBT-14	trans-1,2-Dichloroethene		250	JH4
L13110792-16	IW101-03C-EBT-14	trans-1,3-Dichloropropene		250	JH4
L13110792-19	DUP2-EBT-14	1,1,1,2-Tetrachloroethane		5	JH2

L13110792-19	DUP2-EBT-14	1,1,1-Trichloroethane		10	JH2
L13110792-19	DUP2-EBT-14	1,1,2,2-Tetrachloroethane		5	JH2
L13110792-19	DUP2-EBT-14	1,1,2-Trichloroethane		10	JH2
L13110792-19	DUP2-EBT-14	1,1-Dichloroethane		10	JH2
L13110792-19	DUP2-EBT-14	1,1-Dichloroethene		10	JH2
L13110792-19	DUP2-EBT-14	1,1-Dichloropropene		10	JH2
L13110792-19	DUP2-EBT-14	1,2,3-Trichlorobenzene		10	JH2
L13110792-19	DUP2-EBT-14	1,2,3-Trichloropropane		10	JH2
L13110792-19	DUP2-EBT-14	1,2,4-Trichlorobenzene		10	JH2
L13110792-19	DUP2-EBT-14	1,2,4-Trimethylbenzene		10	JH2
L13110792-19	DUP2-EBT-14	1,2-Dibromo-3-chloropropane		20	JH2
L13110792-19	DUP2-EBT-14	1,2-Dibromoethane		10	JH2
L13110792-19	DUP2-EBT-14	1,2-Dichlorobenzene		10	JH2
L13110792-19	DUP2-EBT-14	1,2-Dichloroethane		5	JH2
L13110792-19	DUP2-EBT-14	1,2-Dichloropropane		10	JH2
L13110792-19	DUP2-EBT-14	1,3,5-Trimethylbenzene		10	JH2
L13110792-19	DUP2-EBT-14	1,3-Dichlorobenzene		10	JH2
L13110792-19	DUP2-EBT-14	1,3-Dichloropropane		4	JH2
L13110792-19	DUP2-EBT-14	1,4-Dichlorobenzene		5	JH2
L13110792-19	DUP2-EBT-14	1-Chlorohexane		10	JH2
L13110792-19	DUP2-EBT-14	2,2-Dichloropropane		10	JH2
L13110792-19	DUP2-EBT-14	2-Chlorotoluene		10	JH2
L13110792-19	DUP2-EBT-14	2-Hexanone		100	JH2
L13110792-19	DUP2-EBT-14	4-Chlorotoluene		10	JH2
L13110792-19	DUP2-EBT-14	Acetone	703	100	JH2BFB333
L13110792-19	DUP2-EBT-14	Benzene		4	JH2
L13110792-19	DUP2-EBT-14	Bromobenzene		10	JH2
L13110792-19	DUP2-EBT-14	Bromochloromethane		10	JH2
L13110792-19	DUP2-EBT-14	Bromodichloromethane		5	JH2
L13110792-19	DUP2-EBT-14	Bromoform		10	JH2
L13110792-19	DUP2-EBT-14	Bromomethane		10	JH2
L13110792-19	DUP2-EBT-14	Carbon disulfide		10	JH2
L13110792-19	DUP2-EBT-14	Carbon tetrachloride		10	JH2
L13110792-19	DUP2-EBT-14	Chlorobenzene		5	JH2
L13110792-19	DUP2-EBT-14	Chloroethane		10	JH2
L13110792-19	DUP2-EBT-14	Chloroform		3	JH2
L13110792-19	DUP2-EBT-14	Chloromethane		10	JH2
L13110792-19	DUP2-EBT-14	Dibromochloromethane		5	JH2
L13110792-19	DUP2-EBT-14	Dibromomethane		10	JH2
L13110792-19	DUP2-EBT-14	Dichlorodifluoromethane		10	JH2
L13110792-19	DUP2-EBT-14	Ethylbenzene		10	JH2
L13110792-19	DUP2-EBT-14	Hexachlorobutadiene		6	JH2
L13110792-19	DUP2-EBT-14	Isopropylbenzene		10	JH2
L13110792-19	DUP2-EBT-14	MEK (2-Butanone)	1560	100	JH2
L13110792-19	DUP2-EBT-14	MIBK (methyl isobutyl ketone)		100	JH2
L13110792-19	DUP2-EBT-14	Methyl t-butyl ether (MTBE)		50	JH2
L13110792-19	DUP2-EBT-14	Methylene chloride		10	JH2
L13110792-19	DUP2-EBT-14	Naphthalene		10	JH2

L13110792-19	DUP2-EBT-14	Styrene		10	JH2
L13110792-19	DUP2-EBT-14	Tetrachloroethene		10	JH2
L13110792-19	DUP2-EBT-14	Toluene		10	JH2
L13110792-19	DUP2-EBT-14	Trichloroethene		10	JH2
L13110792-19	DUP2-EBT-14	Trichlorofluoromethane		10	JH2
L13110792-19	DUP2-EBT-14	Vinyl chloride		10	JH2
L13110792-19	DUP2-EBT-14	cis-1,2-Dichloroethene	8.67	10	JH2
L13110792-19	DUP2-EBT-14	cis-1,3-Dichloropropene		5	JH2
L13110792-19	DUP2-EBT-14	m,p-Xylene		20	JH2
L13110792-19	DUP2-EBT-14	n-Butylbenzene		10	JH2
L13110792-19	DUP2-EBT-14	n-Propylbenzene		10	JH2
L13110792-19	DUP2-EBT-14	o-Xylene		10	JH2
L13110792-19	DUP2-EBT-14	p-Isopropyltoluene		10	JH2
L13110792-19	DUP2-EBT-14	sec-Butylbenzene		10	JH2
L13110792-19	DUP2-EBT-14	tert-Butylbenzene		10	JH2
L13110792-19	DUP2-EBT-14	trans-1,2-Dichloroethene		10	JH2
L13110792-19	DUP2-EBT-14	trans-1,3-Dichloropropene		10	JH2
L13110792-21	IW101-03B-EBT-14	1,1,1,2-Tetrachloroethane		2.5	JH2
L13110792-21	IW101-03B-EBT-14	1,1,1-Trichloroethane		5	JH2
L13110792-21	IW101-03B-EBT-14	1,1,2,2-Tetrachloroethane		2.5	JH2
L13110792-21	IW101-03B-EBT-14	1,1,2-Trichloroethane		5	JH2
L13110792-21	IW101-03B-EBT-14	1,1-Dichloroethane		5	JH2
L13110792-21	IW101-03B-EBT-14	1,1-Dichloroethene		5	JH2
L13110792-21	IW101-03B-EBT-14	1,1-Dichloropropene		5	JH2
L13110792-21	IW101-03B-EBT-14	1,2,3-Trichlorobenzene		5	JH2
L13110792-21	IW101-03B-EBT-14	1,2,3-Trichloropropane		5	JH2
L13110792-21	IW101-03B-EBT-14	1,2,4-Trichlorobenzene		5	JH2
L13110792-21	IW101-03B-EBT-14	1,2,4-Trimethylbenzene	1.96	5	JH2
L13110792-21	IW101-03B-EBT-14	1,2-Dibromo-3-chloropropane		10	JH2
L13110792-21	IW101-03B-EBT-14	1,2-Dibromoethane		5	JH2
L13110792-21	IW101-03B-EBT-14	1,2-Dichlorobenzene		5	JH2
L13110792-21	IW101-03B-EBT-14	1,2-Dichloroethane		2.5	JH2
L13110792-21	IW101-03B-EBT-14	1,2-Dichloropropane		5	JH2
L13110792-21	IW101-03B-EBT-14	1,3,5-Trimethylbenzene		5	JH2
L13110792-21	IW101-03B-EBT-14	1,3-Dichlorobenzene		5	JH2
L13110792-21	IW101-03B-EBT-14	1,3-Dichloropropane		2	JH2
L13110792-21	IW101-03B-EBT-14	1,4-Dichlorobenzene		2.5	JH2
L13110792-21	IW101-03B-EBT-14	1-Chlorohexane		5	JH2
L13110792-21	IW101-03B-EBT-14	2,2-Dichloropropane		5	JH2
L13110792-21	IW101-03B-EBT-14	2-Chlorotoluene		5	JH2
L13110792-21	IW101-03B-EBT-14	2-Hexanone		50	JH2
L13110792-21	IW101-03B-EBT-14	4-Chlorotoluene		5	JH2
L13110792-21	IW101-03B-EBT-14	Acetone	733	50	JH2BFB165
L13110792-21	IW101-03B-EBT-14	Benzene		2	JH2
L13110792-21	IW101-03B-EBT-14	Bromobenzene		5	JH2
L13110792-21	IW101-03B-EBT-14	Bromochloromethane		5	JH2
L13110792-21	IW101-03B-EBT-14	Bromodichloromethane		2.5	JH2
L13110792-21	IW101-03B-EBT-14	Bromoform		5	JH2
L13110792-21	IW101-03B-EBT-14	Bromomethane		5	JH2

L13110792-21	IW101-03B-EBT-14	Carbon disulfide		5	JH2
L13110792-21	IW101-03B-EBT-14	Carbon tetrachloride		5	JH2
L13110792-21	IW101-03B-EBT-14	Chlorobenzene		2.5	JH2
L13110792-21	IW101-03B-EBT-14	Chloroethane		5	JH2
L13110792-21	IW101-03B-EBT-14	Chloroform		1.5	JH2
L13110792-21	IW101-03B-EBT-14	Chloromethane		5	JH2
L13110792-21	IW101-03B-EBT-14	Dibromochloromethane		2.5	JH2
L13110792-21	IW101-03B-EBT-14	Dibromomethane		5	JH2
L13110792-21	IW101-03B-EBT-14	Dichlorodifluoromethane		5	JH2
L13110792-21	IW101-03B-EBT-14	Ethylbenzene		5	JH2
L13110792-21	IW101-03B-EBT-14	Hexachlorobutadiene		3	JH2
L13110792-21	IW101-03B-EBT-14	Isopropylbenzene		5	JH2
L13110792-21	IW101-03B-EBT-14	MEK (2-Butanone)	1620	50	JH2
L13110792-21	IW101-03B-EBT-14	MIBK (methyl isobutyl ketone)		50	JH2
L13110792-21	IW101-03B-EBT-14	Methyl t-butyl ether (MTBE)	3.65	25	JH2
L13110792-21	IW101-03B-EBT-14	Methylene chloride		5	JH2
L13110792-21	IW101-03B-EBT-14	Naphthalene		5	JH2
L13110792-21	IW101-03B-EBT-14	Styrene		5	JH2
L13110792-21	IW101-03B-EBT-14	Tetrachloroethene		5	JH2
L13110792-21	IW101-03B-EBT-14	Toluene		5	JH2
L13110792-21	IW101-03B-EBT-14	Trichloroethene		5	JH2
L13110792-21	IW101-03B-EBT-14	Trichlorofluoromethane		5	JH2
L13110792-21	IW101-03B-EBT-14	Vinyl chloride		5	JH2
L13110792-21	IW101-03B-EBT-14	cis-1,2-Dichloroethene	8.82	5	JH2
L13110792-21	IW101-03B-EBT-14	cis-1,3-Dichloropropene		2.5	JH2
L13110792-21	IW101-03B-EBT-14	m,p-Xylene		10	JH2
L13110792-21	IW101-03B-EBT-14	n-Butylbenzene		5	JH2
L13110792-21	IW101-03B-EBT-14	n-Propylbenzene		5	JH2
L13110792-21	IW101-03B-EBT-14	o-Xylene		5	JH2
L13110792-21	IW101-03B-EBT-14	p-Isopropyltoluene		5	JH2
L13110792-21	IW101-03B-EBT-14	sec-Butylbenzene		5	JH2
L13110792-21	IW101-03B-EBT-14	tert-Butylbenzene		5	JH2
L13110792-21	IW101-03B-EBT-14	trans-1,2-Dichloroethene		5	JH2
L13110792-21	IW101-03B-EBT-14	trans-1,3-Dichloropropene		5	JH2
L13110792-21	IW101-03B-EBT-14	1,1,1,2-Tetrachloroethane		25	JH4
L13110792-21	IW101-03B-EBT-14	1,1,1-Trichloroethane		50	JH4
L13110792-21	IW101-03B-EBT-14	1,1,2,2-Tetrachloroethane		25	JH4
L13110792-21	IW101-03B-EBT-14	1,1,2-Trichloroethane		50	JH4
L13110792-21	IW101-03B-EBT-14	1,1-Dichloroethane		50	JH4
L13110792-21	IW101-03B-EBT-14	1,1-Dichloroethene		50	JH4
L13110792-21	IW101-03B-EBT-14	1,1-Dichloropropene		50	JH4
L13110792-21	IW101-03B-EBT-14	1,2,3-Trichlorobenzene		50	JH4
L13110792-21	IW101-03B-EBT-14	1,2,3-Trichloropropane		50	JH4
L13110792-21	IW101-03B-EBT-14	1,2,4-Trichlorobenzene		50	JH4
L13110792-21	IW101-03B-EBT-14	1,2,4-Trimethylbenzene		50	JH4
L13110792-21	IW101-03B-EBT-14	1,2-Dibromo-3-chloropropane		100	JH4
L13110792-21	IW101-03B-EBT-14	1,2-Dibromoethane		50	JH4
L13110792-21	IW101-03B-EBT-14	1,2-Dichlorobenzene		50	JH4

L13110792-21	IW101-03B-EBT-14	1,2-Dichloroethane		25	JH4
L13110792-21	IW101-03B-EBT-14	1,2-Dichloropropane		50	JH4
L13110792-21	IW101-03B-EBT-14	1,3,5-Trimethylbenzene		50	JH4
L13110792-21	IW101-03B-EBT-14	1,3-Dichlorobenzene		50	JH4
L13110792-21	IW101-03B-EBT-14	1,3-Dichloropropane		20	JH4
L13110792-21	IW101-03B-EBT-14	1,4-Dichlorobenzene		25	JH4
L13110792-21	IW101-03B-EBT-14	1-Chlorohexane		50	JH4
L13110792-21	IW101-03B-EBT-14	2,2-Dichloropropane		50	JH4
L13110792-21	IW101-03B-EBT-14	2-Chlorotoluene		50	JH4
L13110792-21	IW101-03B-EBT-14	2-Hexanone		500	JH4
L13110792-21	IW101-03B-EBT-14	4-Chlorotoluene		50	JH4
L13110792-21	IW101-03B-EBT-14	Acetone	612	500	JH4BFB1655
L13110792-21	IW101-03B-EBT-14	Benzene		20	JH4
L13110792-21	IW101-03B-EBT-14	Bromobenzene		50	JH4
L13110792-21	IW101-03B-EBT-14	Bromochloromethane		50	JH4
L13110792-21	IW101-03B-EBT-14	Bromodichloromethane		25	JH4
L13110792-21	IW101-03B-EBT-14	Bromoform		50	JH4
L13110792-21	IW101-03B-EBT-14	Bromomethane		50	JH4
L13110792-21	IW101-03B-EBT-14	Carbon disulfide		50	JH4
L13110792-21	IW101-03B-EBT-14	Carbon tetrachloride		50	JH4
L13110792-21	IW101-03B-EBT-14	Chlorobenzene		25	JH4
L13110792-21	IW101-03B-EBT-14	Chloroethane		50	JH4
L13110792-21	IW101-03B-EBT-14	Chloroform		15	JH4
L13110792-21	IW101-03B-EBT-14	Chloromethane		50	JH4
L13110792-21	IW101-03B-EBT-14	Dibromochloromethane		25	JH4
L13110792-21	IW101-03B-EBT-14	Dibromomethane		50	JH4
L13110792-21	IW101-03B-EBT-14	Dichlorodifluoromethane		50	JH4
L13110792-21	IW101-03B-EBT-14	Ethylbenzene		50	JH4
L13110792-21	IW101-03B-EBT-14	Hexachlorobutadiene	17.6	30	JH4
L13110792-21	IW101-03B-EBT-14	Isopropylbenzene		50	JH4
L13110792-21	IW101-03B-EBT-14	MEK (2-Butanone)	1380	500	JH4
L13110792-21	IW101-03B-EBT-14	MIBK (methyl isobutyl ketone)		500	JH4
L13110792-21	IW101-03B-EBT-14	Methyl t-butyl ether (MTBE)		250	JH4
L13110792-21	IW101-03B-EBT-14	Methylene chloride		50	JH4
L13110792-21	IW101-03B-EBT-14	Naphthalene		50	JH4
L13110792-21	IW101-03B-EBT-14	Styrene		50	JH4
L13110792-21	IW101-03B-EBT-14	Tetrachloroethene		50	JH4
L13110792-21	IW101-03B-EBT-14	Toluene		50	JH4
L13110792-21	IW101-03B-EBT-14	Trichloroethene		50	JH4
L13110792-21	IW101-03B-EBT-14	Trichlorofluoromethane		50	JH4
L13110792-21	IW101-03B-EBT-14	Vinyl chloride		50	JH4
L13110792-21	IW101-03B-EBT-14	cis-1,2-Dichloroethene		50	JH4
L13110792-21	IW101-03B-EBT-14	cis-1,3-Dichloropropene		25	JH4
L13110792-21	IW101-03B-EBT-14	m,p-Xylene		100	JH4
L13110792-21	IW101-03B-EBT-14	n-Butylbenzene		50	JH4
L13110792-21	IW101-03B-EBT-14	n-Propylbenzene		50	JH4
L13110792-21	IW101-03B-EBT-14	o-Xylene		50	JH4
L13110792-21	IW101-03B-EBT-14	p-Isopropyltoluene		50	JH4
L13110792-21	IW101-03B-EBT-14	sec-Butylbenzene		50	JH4

L13110792-21	IW101-03B-EBT-14	tert-Butylbenzene		50	JH4
L13110792-21	IW101-03B-EBT-14	trans-1,2-Dichloroethene		50	JH4
L13110792-21	IW101-03B-EBT-14	trans-1,3-Dichloropropene		50	JH4
L13110792-22	IW101-04A-EBT-14	1,1,1,2-Tetrachloroethane		5	JH2
L13110792-22	IW101-04A-EBT-14	1,1,1-Trichloroethane		10	JH2
L13110792-22	IW101-04A-EBT-14	1,1,2,2-Tetrachloroethane		5	JH2
L13110792-22	IW101-04A-EBT-14	1,1,2-Trichloroethane		10	JH2
L13110792-22	IW101-04A-EBT-14	1,1-Dichloroethane		10	JH2
L13110792-22	IW101-04A-EBT-14	1,1-Dichloroethene		10	JH2
L13110792-22	IW101-04A-EBT-14	1,1-Dichloropropene		10	JH2
L13110792-22	IW101-04A-EBT-14	1,2,3-Trichlorobenzene		10	JH2
L13110792-22	IW101-04A-EBT-14	1,2,3-Trichloropropane		10	JH2
L13110792-22	IW101-04A-EBT-14	1,2,4-Trichlorobenzene		10	JH2
L13110792-22	IW101-04A-EBT-14	1,2,4-Trimethylbenzene	6.35	10	JH2
L13110792-22	IW101-04A-EBT-14	1,2-Dibromo-3-chloropropane		20	JH2
L13110792-22	IW101-04A-EBT-14	1,2-Dibromoethane		10	JH2
L13110792-22	IW101-04A-EBT-14	1,2-Dichlorobenzene		10	JH2
L13110792-22	IW101-04A-EBT-14	1,2-Dichloroethane		5	JH2
L13110792-22	IW101-04A-EBT-14	1,2-Dichloropropane		10	JH2
L13110792-22	IW101-04A-EBT-14	1,3,5-Trimethylbenzene		10	JH2
L13110792-22	IW101-04A-EBT-14	1,3-Dichlorobenzene		10	JH2
L13110792-22	IW101-04A-EBT-14	1,3-Dichloropropane		4	JH2
L13110792-22	IW101-04A-EBT-14	1,4-Dichlorobenzene		5	JH2
L13110792-22	IW101-04A-EBT-14	1-Chlorohexane		10	JH2
L13110792-22	IW101-04A-EBT-14	2,2-Dichloropropane		10	JH2
L13110792-22	IW101-04A-EBT-14	2-Chlorotoluene		10	JH2
L13110792-22	IW101-04A-EBT-14	2-Hexanone		100	JH2
L13110792-22	IW101-04A-EBT-14	4-Chlorotoluene		10	JH2
L13110792-22	IW101-04A-EBT-14	Acetone	1010	100	JH2BFB333
L13110792-22	IW101-04A-EBT-14	Benzene		4	JH2
L13110792-22	IW101-04A-EBT-14	Bromobenzene		10	JH2
L13110792-22	IW101-04A-EBT-14	Bromochloromethane		10	JH2
L13110792-22	IW101-04A-EBT-14	Bromodichloromethane		5	JH2
L13110792-22	IW101-04A-EBT-14	Bromoform		10	JH2
L13110792-22	IW101-04A-EBT-14	Bromomethane		10	JH2
L13110792-22	IW101-04A-EBT-14	Carbon disulfide		10	JH2
L13110792-22	IW101-04A-EBT-14	Carbon tetrachloride		10	JH2
L13110792-22	IW101-04A-EBT-14	Chlorobenzene		5	JH2
L13110792-22	IW101-04A-EBT-14	Chloroethane		10	JH2
L13110792-22	IW101-04A-EBT-14	Chloroform		3	JH2
L13110792-22	IW101-04A-EBT-14	Chloromethane		10	JH2
L13110792-22	IW101-04A-EBT-14	Dibromochloromethane		5	JH2
L13110792-22	IW101-04A-EBT-14	Dibromomethane		10	JH2
L13110792-22	IW101-04A-EBT-14	Dichlorodifluoromethane		10	JH2
L13110792-22	IW101-04A-EBT-14	Ethylbenzene		10	JH2
L13110792-22	IW101-04A-EBT-14	Hexachlorobutadiene		6	JH2
L13110792-22	IW101-04A-EBT-14	Isopropylbenzene		10	JH2
L13110792-22	IW101-04A-EBT-14	MEK (2-Butanone)	5150	100	JH2
L13110792-22	IW101-04A-EBT-14	MIBK (methyl isobutyl		100	JH2

		ketone)			
L13110792-22	IW101-04A-EBT-14	Methyl t-butyl ether (MTBE)		50	JH2
L13110792-22	IW101-04A-EBT-14	Methylene chloride		10	JH2
L13110792-22	IW101-04A-EBT-14	Naphthalene		10	JH2
L13110792-22	IW101-04A-EBT-14	Styrene		10	JH2
L13110792-22	IW101-04A-EBT-14	Tetrachloroethene		10	JH2
L13110792-22	IW101-04A-EBT-14	Toluene		10	JH2
L13110792-22	IW101-04A-EBT-14	Trichloroethene		10	JH2
L13110792-22	IW101-04A-EBT-14	Trichlorofluoromethane		10	JH2
L13110792-22	IW101-04A-EBT-14	Vinyl chloride		10	JH2
L13110792-22	IW101-04A-EBT-14	cis-1,2-Dichloroethene	5.42	10	JH2
L13110792-22	IW101-04A-EBT-14	cis-1,3-Dichloropropene		5	JH2
L13110792-22	IW101-04A-EBT-14	m-,p-Xylene		20	JH2
L13110792-22	IW101-04A-EBT-14	n-Butylbenzene		10	JH2
L13110792-22	IW101-04A-EBT-14	n-Propylbenzene		10	JH2
L13110792-22	IW101-04A-EBT-14	o-Xylene		10	JH2
L13110792-22	IW101-04A-EBT-14	p-Isopropyltoluene		10	JH2
L13110792-22	IW101-04A-EBT-14	sec-Butylbenzene		10	JH2
L13110792-22	IW101-04A-EBT-14	tert-Butylbenzene		10	JH2
L13110792-22	IW101-04A-EBT-14	trans-1,2-Dichloroethene		10	JH2
L13110792-22	IW101-04A-EBT-14	trans-1,3-Dichloropropene		10	JH2
L13110792-22	IW101-04A-EBT-14	1,1,1,2-Tetrachloroethane		125	JH4
L13110792-22	IW101-04A-EBT-14	1,1,1-Trichloroethane		250	JH4
L13110792-22	IW101-04A-EBT-14	1,1,2,2-Tetrachloroethane		125	JH4
L13110792-22	IW101-04A-EBT-14	1,1,2-Trichloroethane		250	JH4
L13110792-22	IW101-04A-EBT-14	1,1-Dichloroethane		250	JH4
L13110792-22	IW101-04A-EBT-14	1,1-Dichloroethene		250	JH4
L13110792-22	IW101-04A-EBT-14	1,1-Dichloropropene		250	JH4
L13110792-22	IW101-04A-EBT-14	1,2,3-Trichlorobenzene		250	JH4
L13110792-22	IW101-04A-EBT-14	1,2,3-Trichloropropane		250	JH4
L13110792-22	IW101-04A-EBT-14	1,2,4-Trichlorobenzene		250	JH4
L13110792-22	IW101-04A-EBT-14	1,2,4-Trimethylbenzene		250	JH4
L13110792-22	IW101-04A-EBT-14	1,2-Dibromo-3-chloropropane		500	JH4
L13110792-22	IW101-04A-EBT-14	1,2-Dibromoethane		250	JH4
L13110792-22	IW101-04A-EBT-14	1,2-Dichlorobenzene		250	JH4
L13110792-22	IW101-04A-EBT-14	1,2-Dichloroethane		125	JH4
L13110792-22	IW101-04A-EBT-14	1,2-Dichloropropane		250	JH4
L13110792-22	IW101-04A-EBT-14	1,3,5-Trimethylbenzene		250	JH4
L13110792-22	IW101-04A-EBT-14	1,3-Dichlorobenzene		250	JH4
L13110792-22	IW101-04A-EBT-14	1,3-Dichloropropane		100	JH4
L13110792-22	IW101-04A-EBT-14	1,4-Dichlorobenzene		125	JH4
L13110792-22	IW101-04A-EBT-14	1-Chlorohexane		250	JH4
L13110792-22	IW101-04A-EBT-14	2,2-Dichloropropane		250	JH4
L13110792-22	IW101-04A-EBT-14	2-Chlorotoluene		250	JH4
L13110792-22	IW101-04A-EBT-14	2-Hexanone		2500	JH4
L13110792-22	IW101-04A-EBT-14	4-Chlorotoluene		250	JH4
L13110792-22	IW101-04A-EBT-14	Acetone	888	2500	JH4BFB8275
L13110792-22	IW101-04A-EBT-14	Benzene		100	JH4
L13110792-22	IW101-04A-EBT-14	Bromobenzene		250	JH4

L13110792-22	IW101-04A-EBT-14	Bromochloromethane		250	JH4
L13110792-22	IW101-04A-EBT-14	Bromodichloromethane		125	JH4
L13110792-22	IW101-04A-EBT-14	Bromoform		250	JH4
L13110792-22	IW101-04A-EBT-14	Bromomethane		250	JH4
L13110792-22	IW101-04A-EBT-14	Carbon disulfide		250	JH4
L13110792-22	IW101-04A-EBT-14	Carbon tetrachloride		250	JH4
L13110792-22	IW101-04A-EBT-14	Chlorobenzene		125	JH4
L13110792-22	IW101-04A-EBT-14	Chloroethane		250	JH4
L13110792-22	IW101-04A-EBT-14	Chloroform		75	JH4
L13110792-22	IW101-04A-EBT-14	Chloromethane		250	JH4
L13110792-22	IW101-04A-EBT-14	Dibromochloromethane		125	JH4
L13110792-22	IW101-04A-EBT-14	Dibromomethane		250	JH4
L13110792-22	IW101-04A-EBT-14	Dichlorodifluoromethane		250	JH4
L13110792-22	IW101-04A-EBT-14	Ethylbenzene		250	JH4
L13110792-22	IW101-04A-EBT-14	Hexachlorobutadiene		150	JH4
L13110792-22	IW101-04A-EBT-14	Isopropylbenzene		250	JH4
L13110792-22	IW101-04A-EBT-14	MEK (2-Butanone)	4990	2500	JH4BFB665
L13110792-22	IW101-04A-EBT-14	MIBK (methyl isobutyl ketone)		2500	JH4
L13110792-22	IW101-04A-EBT-14	Methyl t-butyl ether (MTBE)		1250	JH4
L13110792-22	IW101-04A-EBT-14	Methylene chloride		250	JH4
L13110792-22	IW101-04A-EBT-14	Naphthalene		250	JH4
L13110792-22	IW101-04A-EBT-14	Styrene		250	JH4
L13110792-22	IW101-04A-EBT-14	Tetrachloroethene		250	JH4
L13110792-22	IW101-04A-EBT-14	Toluene		250	JH4
L13110792-22	IW101-04A-EBT-14	Trichloroethene		250	JH4
L13110792-22	IW101-04A-EBT-14	Trichlorofluoromethane		250	JH4
L13110792-22	IW101-04A-EBT-14	Vinyl chloride		250	JH4
L13110792-22	IW101-04A-EBT-14	cis-1,2-Dichloroethene		250	JH4
L13110792-22	IW101-04A-EBT-14	cis-1,3-Dichloropropene		125	JH4
L13110792-22	IW101-04A-EBT-14	m,p-Xylene		500	JH4
L13110792-22	IW101-04A-EBT-14	n-Butylbenzene		250	JH4
L13110792-22	IW101-04A-EBT-14	n-Propylbenzene		250	JH4
L13110792-22	IW101-04A-EBT-14	o-Xylene		250	JH4
L13110792-22	IW101-04A-EBT-14	p-Isopropyltoluene		250	JH4
L13110792-22	IW101-04A-EBT-14	sec-Butylbenzene		250	JH4
L13110792-22	IW101-04A-EBT-14	tert-Butylbenzene		250	JH4
L13110792-22	IW101-04A-EBT-14	trans-1,2-Dichloroethene		250	JH4
L13110792-22	IW101-04A-EBT-14	trans-1,3-Dichloropropene		250	JH4
L13110792-24	IW101-05B-EBT-14	Acetone	2.86	10	BFB33.1
L13110792-24	IW101-05B-EBT-14	MEK (2-Butanone)	4.09	10	BFB2.66
L13110792-26	IW101-05A-EBT-14	Acetone	583	1000	BFB3333
L13110792-26	IW101-05A-EBT-14	MEK (2-Butanone)	1670	1000	BFB266
L13110792-26	IW101-05A-EBT-14	1,2-Dichlorobenzene	2.17	5	BMB.893
L13110792-26	IW101-05A-EBT-14	1,4-Dichlorobenzene	1.53	2.5	BMB.654
L13110792-26	IW101-05A-EBT-14	Acetone	580	50	BFB165
L13110792-28	IW101-05C-EBT-14	1,1,1,2-Tetrachloroethane		5	JH1
L13110792-28	IW101-05C-EBT-14	1,1,1-Trichloroethane		10	JH1
L13110792-28	IW101-05C-EBT-14	1,1,2,2-Tetrachloroethane		5	JH1
L13110792-28	IW101-05C-EBT-14	1,1,2-Trichloroethane		10	JH1

L13110792-28	IW101-05C-EBT-14	1,1-Dichloroethane		10	JH1
L13110792-28	IW101-05C-EBT-14	1,1-Dichloroethene		10	JH1
L13110792-28	IW101-05C-EBT-14	1,1-Dichloropropene		10	JH1
L13110792-28	IW101-05C-EBT-14	1,2,3-Trichlorobenzene		10	JH1
L13110792-28	IW101-05C-EBT-14	1,2,3-Trichloropropane		10	JH1
L13110792-28	IW101-05C-EBT-14	1,2,4-Trichlorobenzene		10	JH1
L13110792-28	IW101-05C-EBT-14	1,2,4-Trimethylbenzene	4.4	10	JH1
L13110792-28	IW101-05C-EBT-14	1,2-Dibromo-3-chloropropane		20	JH1
L13110792-28	IW101-05C-EBT-14	1,2-Dibromoethane		10	JH1
L13110792-28	IW101-05C-EBT-14	1,2-Dichlorobenzene		10	JH1
L13110792-28	IW101-05C-EBT-14	1,2-Dichloroethane		5	JH1
L13110792-28	IW101-05C-EBT-14	1,2-Dichloropropane		10	JH1
L13110792-28	IW101-05C-EBT-14	1,3,5-Trimethylbenzene		10	JH1
L13110792-28	IW101-05C-EBT-14	1,3-Dichlorobenzene		10	JH1
L13110792-28	IW101-05C-EBT-14	1,3-Dichloropropane		4	JH1
L13110792-28	IW101-05C-EBT-14	1,4-Dichlorobenzene		5	JH1
L13110792-28	IW101-05C-EBT-14	1-Chlorohexane		10	JH1
L13110792-28	IW101-05C-EBT-14	2,2-Dichloropropane		10	JH1
L13110792-28	IW101-05C-EBT-14	2-Chlorotoluene		10	JH1
L13110792-28	IW101-05C-EBT-14	2-Hexanone		100	JH1
L13110792-28	IW101-05C-EBT-14	4-Chlorotoluene		10	JH1
L13110792-28	IW101-05C-EBT-14	Acetone	653	100	JH1BFB333
L13110792-28	IW101-05C-EBT-14	Benzene		4	JH1
L13110792-28	IW101-05C-EBT-14	Bromobenzene		10	JH1
L13110792-28	IW101-05C-EBT-14	Bromochloromethane		10	JH1
L13110792-28	IW101-05C-EBT-14	Bromodichloromethane		5	JH1
L13110792-28	IW101-05C-EBT-14	Bromoform		10	JH1
L13110792-28	IW101-05C-EBT-14	Bromomethane		10	JH1
L13110792-28	IW101-05C-EBT-14	Carbon disulfide		10	JH1
L13110792-28	IW101-05C-EBT-14	Carbon tetrachloride		10	JH1
L13110792-28	IW101-05C-EBT-14	Chlorobenzene		5	JH1
L13110792-28	IW101-05C-EBT-14	Chloroethane		10	JH1
L13110792-28	IW101-05C-EBT-14	Chloroform		3	JH1
L13110792-28	IW101-05C-EBT-14	Chloromethane		10	JH1
L13110792-28	IW101-05C-EBT-14	Dibromochloromethane		5	JH1
L13110792-28	IW101-05C-EBT-14	Dibromomethane		10	JH1
L13110792-28	IW101-05C-EBT-14	Dichlorodifluoromethane		10	JH1
L13110792-28	IW101-05C-EBT-14	Ethylbenzene		10	JH1
L13110792-28	IW101-05C-EBT-14	Hexachlorobutadiene		6	JH1
L13110792-28	IW101-05C-EBT-14	Isopropylbenzene		10	JH1
L13110792-28	IW101-05C-EBT-14	MEK (2-Butanone)	2340	100	JH1
L13110792-28	IW101-05C-EBT-14	MIBK (methyl isobutyl ketone)		100	JH1
L13110792-28	IW101-05C-EBT-14	Methyl t-butyl ether (MTBE)		50	JH1
L13110792-28	IW101-05C-EBT-14	Methylene chloride		10	JH1
L13110792-28	IW101-05C-EBT-14	Naphthalene		10	JH1
L13110792-28	IW101-05C-EBT-14	Styrene		10	JH1
L13110792-28	IW101-05C-EBT-14	Tetrachloroethene		10	JH1
L13110792-28	IW101-05C-EBT-14	Toluene		10	JH1

L13110792-28	IW101-05C-EBT-14	Trichloroethene		10	JH1
L13110792-28	IW101-05C-EBT-14	Trichlorofluoromethane		10	JH1
L13110792-28	IW101-05C-EBT-14	Vinyl chloride		10	JH1
L13110792-28	IW101-05C-EBT-14	cis-1,2-Dichloroethene	24.4	10	JH1
L13110792-28	IW101-05C-EBT-14	cis-1,3-Dichloropropene		5	JH1
L13110792-28	IW101-05C-EBT-14	m-,p-Xylene		20	JH1
L13110792-28	IW101-05C-EBT-14	n-Butylbenzene		10	JH1
L13110792-28	IW101-05C-EBT-14	n-Propylbenzene		10	JH1
L13110792-28	IW101-05C-EBT-14	o-Xylene		10	JH1
L13110792-28	IW101-05C-EBT-14	p-Isopropyltoluene		10	JH1
L13110792-28	IW101-05C-EBT-14	sec-Butylbenzene		10	JH1
L13110792-28	IW101-05C-EBT-14	tert-Butylbenzene		10	JH1
L13110792-28	IW101-05C-EBT-14	trans-1,2-Dichloroethene		10	JH1
L13110792-28	IW101-05C-EBT-14	trans-1,3-Dichloropropene		10	JH1
L13110792-29	MW-62-EBT-14	Acetone	58.1	10	BFB33.1
L13110792-30	MW-212-EBT-14	1,2,4-Trichlorobenzene	0.291	1	JC20.8
L13110792-30	MW-212-EBT-14	1,2-Dichlorobenzene	0.601	1	BMB.893
L13110792-30	MW-212-EBT-14	1,4-Dichlorobenzene	0.451	0.5	BMB.654
L13110792-31	MW-213-EBT-14	1,2-Dichlorobenzene	2.43	5	BMB.893
L13110792-31	MW-213-EBT-14	1,4-Dichlorobenzene	1.61	2.5	BMB.654
L13110792-31	MW-213-EBT-14	Acetone	90.7	50	BFB165
L13110792-32	DUP6-EBT-14	1,2,4-Trichlorobenzene	0.283	1	JC20.8
L13110792-32	DUP6-EBT-14	1,2-Dichlorobenzene	0.477	1	BMB.893
L13110792-32	DUP6-EBT-14	1,4-Dichlorobenzene	0.349	0.5	BMB.654
L13110792-33	IW101-04C-EBT-14	1,4-Dichlorobenzene	3.12	5	BMB.654
L13110792-33	IW101-04C-EBT-14	Acetone	1210	100	BFB333
L13110792-33	IW101-04C-EBT-14	Acetone	1260	1000	BFB3333
L13110792-34	TB-111413-EBT-14	1,2,4-Trichlorobenzene	0.296	1	JC20.8
L13110792-34	TB-111413-EBT-14	1,2-Dichlorobenzene	0.668	1	BMB.893
L13110792-34	TB-111413-EBT-14	1,4-Dichlorobenzene	0.487	0.5	BMB.654
L13110792-35	IW101-04B-EBT-14	1,1,1,2-Tetrachloroethane		2.5	JH2
L13110792-35	IW101-04B-EBT-14	1,1,1-Trichloroethane		5	JH2
L13110792-35	IW101-04B-EBT-14	1,1,2,2-Tetrachloroethane		2.5	JH2
L13110792-35	IW101-04B-EBT-14	1,1,2-Trichloroethane		5	JH2
L13110792-35	IW101-04B-EBT-14	1,1-Dichloroethane		5	JH2
L13110792-35	IW101-04B-EBT-14	1,1-Dichloroethene		5	JH2
L13110792-35	IW101-04B-EBT-14	1,1-Dichloropropene		5	JH2
L13110792-35	IW101-04B-EBT-14	1,2,3-Trichlorobenzene		5	JH2
L13110792-35	IW101-04B-EBT-14	1,2,3-Trichloropropane		5	JH2
L13110792-35	IW101-04B-EBT-14	1,2,4-Trichlorobenzene		5	JH2
L13110792-35	IW101-04B-EBT-14	1,2,4-Trimethylbenzene	3.35	5	JH2
L13110792-35	IW101-04B-EBT-14	1,2-Dibromo-3-chloropropane		10	JH2
L13110792-35	IW101-04B-EBT-14	1,2-Dibromoethane		5	JH2
L13110792-35	IW101-04B-EBT-14	1,2-Dichlorobenzene	2.61	5	JH2BMB.893
L13110792-35	IW101-04B-EBT-14	1,2-Dichloroethane		2.5	JH2
L13110792-35	IW101-04B-EBT-14	1,2-Dichloropropane		5	JH2
L13110792-35	IW101-04B-EBT-14	1,3,5-Trimethylbenzene		5	JH2
L13110792-35	IW101-04B-EBT-14	1,3-Dichlorobenzene		5	JH2
L13110792-35	IW101-04B-EBT-14	1,3-Dichloropropane		2	JH2

L13110792-35	IW101-04B-EBT-14	1,4-Dichlorobenzene	1.81	2.5	JH2BMB.654
L13110792-35	IW101-04B-EBT-14	1-Chlorohexane		5	JH2
L13110792-35	IW101-04B-EBT-14	2,2-Dichloropropane		5	JH2
L13110792-35	IW101-04B-EBT-14	2-Chlorotoluene		5	JH2
L13110792-35	IW101-04B-EBT-14	2-Hexanone		50	JH2
L13110792-35	IW101-04B-EBT-14	4-Chlorotoluene		5	JH2
L13110792-35	IW101-04B-EBT-14	Acetone	94.1	50	JH2BFB165
L13110792-35	IW101-04B-EBT-14	Benzene		2	JH2
L13110792-35	IW101-04B-EBT-14	Bromobenzene		5	JH2
L13110792-35	IW101-04B-EBT-14	Bromochloromethane		5	JH2
L13110792-35	IW101-04B-EBT-14	Bromodichloromethane		2.5	JH2
L13110792-35	IW101-04B-EBT-14	Bromoform		5	JH2
L13110792-35	IW101-04B-EBT-14	Bromomethane		5	JH2
L13110792-35	IW101-04B-EBT-14	Carbon disulfide		5	JH2
L13110792-35	IW101-04B-EBT-14	Carbon tetrachloride		5	JH2
L13110792-35	IW101-04B-EBT-14	Chlorobenzene		2.5	JH2
L13110792-35	IW101-04B-EBT-14	Chloroethane		5	JH2
L13110792-35	IW101-04B-EBT-14	Chloroform		1.5	JH2
L13110792-35	IW101-04B-EBT-14	Chloromethane		5	JH2
L13110792-35	IW101-04B-EBT-14	Dibromochloromethane		2.5	JH2
L13110792-35	IW101-04B-EBT-14	Dibromomethane		5	JH2
L13110792-35	IW101-04B-EBT-14	Dichlorodifluoromethane		5	JH2
L13110792-35	IW101-04B-EBT-14	Ethylbenzene		5	JH2
L13110792-35	IW101-04B-EBT-14	Hexachlorobutadiene		3	JH2
L13110792-35	IW101-04B-EBT-14	Isopropylbenzene		5	JH2
L13110792-35	IW101-04B-EBT-14	MEK (2-Butanone)	211	50	JH2
L13110792-35	IW101-04B-EBT-14	MIBK (methyl isobutyl ketone)		50	JH2
L13110792-35	IW101-04B-EBT-14	Methyl t-butyl ether (MTBE)		25	JH2
L13110792-35	IW101-04B-EBT-14	Methylene chloride		5	JH2
L13110792-35	IW101-04B-EBT-14	Naphthalene		5	JH2
L13110792-35	IW101-04B-EBT-14	Styrene		5	JH2
L13110792-35	IW101-04B-EBT-14	Tetrachloroethene		5	JH2
L13110792-35	IW101-04B-EBT-14	Toluene		5	JH2
L13110792-35	IW101-04B-EBT-14	Trichloroethene		5	JH2
L13110792-35	IW101-04B-EBT-14	Trichlorofluoromethane		5	JH2
L13110792-35	IW101-04B-EBT-14	Vinyl chloride		5	JH2
L13110792-35	IW101-04B-EBT-14	cis-1,2-Dichloroethene	11.9	5	JH2
L13110792-35	IW101-04B-EBT-14	cis-1,3-Dichloropropene		2.5	JH2
L13110792-35	IW101-04B-EBT-14	m,p-Xylene		10	JH2
L13110792-35	IW101-04B-EBT-14	n-Butylbenzene		5	JH2
L13110792-35	IW101-04B-EBT-14	n-Propylbenzene		5	JH2
L13110792-35	IW101-04B-EBT-14	o-Xylene		5	JH2
L13110792-35	IW101-04B-EBT-14	p-Isopropyltoluene		5	JH2
L13110792-35	IW101-04B-EBT-14	sec-Butylbenzene		5	JH2
L13110792-35	IW101-04B-EBT-14	tert-Butylbenzene		5	JH2
L13110792-35	IW101-04B-EBT-14	trans-1,2-Dichloroethene		5	JH2
L13110792-35	IW101-04B-EBT-14	trans-1,3-Dichloropropene		5	JH2

Final Data Qualification and Usability Report

Project: Defense Depot Memphis, TN (DDMT)
Enhanced Bioremediation Treatment (EBT)
Sampling Event: EBT-14
Project / Task Number: 228-192672-002
Sample Data Package(s): L13110486, L13110487, L13110511, L13110512,
L13110633, L13110792
Data Validation Performed by: Diane Short & Associates (DSA)
Final Data Qualification and Usability
Report Prepared by: Lynn K. Lutz, HDR Inc.

Data Validation Report Review and Comments

The data validation report is acceptable with comments as noted below.

VOCs:

The lab reported multiple results for some analytes in samples that required dilution; the Project Chemist (PC) selected which results to report.

The validator discussed responses of poor responders and noted that the laboratory has been tasked with providing to the client verification that the RRFs below 0.05 are valid. The PC reviewed the initial calibrations and verified that there is sufficient response to allow the responses less than 0.05.

The validator did not qualify results based on low responses in the CCVs; the PC evaluated the %D values and qualified associated results as non-detect estimated "UJ" as follows, as both the project QAPP and the method require CCV results be within 20%D:

- bromomethane - workgroup # WG453197: %D = -21.0%
- 1,2-dibromo-3-chloropropane - workgroup # WG453325: %D = -20.7%
- 2-hexanone - workgroup # WG453325: %D = -28.6%
- acetone - workgroup # WG453325: %D = -32.5%
- 2-butanone (MEK) - workgroup # WG453325: %D = -30.9%
- 4-methyl-2-pentanone (MIBK) - workgroup # WG453325: %D = -24.1%
- 1,1,2,2-tetrachloroethane - workgroup # WG453325: %D = -20.4%
- bromoform - workgroup # WG453325: %D = -22.2%
- 1,2,3-trichlorobenzene - workgroup # WG453325: %D = -25.9%
- 1,2,4-trichlorobenzene - workgroup # WG453325: %D = -20.8%
- 1,2,3-trichloropropane - workgroup # WG453325: %D = -24.0%
- 1,2-dibromo-3-chloropropane - workgroup #WG453325 = -29.9%
- 2-hexanone - workgroup #WG453325 = -31.6%
- acetone - workgroup #WG453325 = -32.2%

- 2-butanone (MEK) - workgroup # WG453325: %D = -30.3%
- 4-methyl-2-pentanone (MIBK) - workgroup # WG453325: %D = -24.6%
- naphthalene - workgroup # WG453325: %D = -24.0%

Metabolic Acids:

The PC reviewed the initial calibrations and noted that as in previous events, the curve for propionic acid was biased slightly high, and low concentrations (less than two times the RL of 10 mg/L on the instrument) of propionic acid in the samples have been qualified as estimated (J).

Examination of other sample chromatograms shows a raised baseline or interfering peak that might overshadow small amounts of pyruvic acid and lactic acid, therefore a number of pyruvic acid and lactic acid results have been qualified as non-detect estimated (UJ) or estimated (J) where the interfering peak was present.

Dissolved Gases:

The validator noted that the lowest dilution per parameter has been reported for the metabolic acids. The PC has reviewed all sample data and selected which results to report when different dilutions were analyzed.

TOC:

No issues except as noted below for final qualifiers.

Final Data Qualifiers

VOCs:

The final qualifier for some 2-hexanone, 1,2-dibromo-3-chloropropane (DBCP), acetone, 2-butanone (MEK), 4-methyl-2-pentanone (MIBK), 1,1,2,2-tetrachloroethane, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2,3-trichloropropane, naphthalene, bromoform and bromomethane results was UJ where DSA had not qualified.

The final qualifier for five acetone results was J where the validator had qualified as JL164 for a high LCS recovery.

The final qualifier for one methylene chloride result, four 1,2-dichlorobenzene results and five 1,4-dichlorobenzene results was B where the data validator had qualified BMB# for method blank contamination.

The final qualifier for one MEK result was “not qualified” where the validator had qualified as BRB288 due to MEK in the rinsate blank; the sample concentration is greater than 10 times the blank and does not require qualification.

The final qualifier for 13 acetone results was B where the validator had qualified as BRB# due to acetone in the rinsate blank.

The final qualifier for 23 acetone results and three 2-butanone (MEK) results was B where the validator had qualified as BTB# or BFB# due to acetone or MEK in the trip blank.

The final qualifier for the acetone and 2-butanone (MEK) results in PMW92-03-EBT-14 and its field duplicate DUP5-EBT-14 was J where the validator had not qualified.

The final qualifier for all analytes in nine samples was “J” or “UJ” where the validator had qualified as JH# for samples analyzed one to four days past the holding time.

The final qualifier was J where the lab had qualified as F, estimated between the MDL and RL.

Metabolic Acids:

The final qualifier for all analytes in 13 samples was J or UJ where the validator qualified JP for preservation issues.

The final qualifier for lactic acid and pyruvic acid in IW21-04A-EBT-14 and IW101-05A-EBT-14 was “not qualified” where DSA had qualified as RMS0, where lactic acid and pyruvic acid had zero percent recoveries in the MS/MSD of this sample. DSA noted that the sample and MS/MSD were run at a dilution but the spike was added after the dilution; however, the PC’s conversation with the lab revealed that the spikes were correctly added before sample preparation and were therefore diluted out, therefore none of the MS/MSD results are considered actionable in this sample.

Some propionic acid results have been qualified as estimated (J) due to initial calibration results noted above.

Some pyruvic acid and lactic acid results with a large interfering peak have been qualified as estimated (J) or non-detect estimated (UJ).

The final qualifier was J where the lab had qualified as F.

Dissolved Gases:

The final qualifier for five methane results was B where DSA had qualified as BMB# for method blank contamination.

The final qualifier for one carbon dioxide result was J where DSA had qualified as JMS194 for a high MS/MSD recovery.

The final qualifier for methane and carbon dioxide results in two sets of parent and field duplicate samples was J where the validator had not qualified.

The final qualifier was J where the lab had qualified as F.

TOC:

Sixteen sample results were qualified J where the validator qualified JP for preservation issues.

The final qualifier for one TOC result was J where the validator qualified JC115 for a continuing calibration that was above control limits.

The final qualifier for three TOC results was B where the validator qualified as BRB.668 or BFB.684 for rinsate blank contamination.

The final qualifier was J where the lab had qualified as F.

Data Usability

VOCs:

There were no rejected sample results. All results are usable as qualified.

Metabolic Acids:

There were no rejected sample results. All results are usable as qualified.

Dissolved Gases:

There were no rejected sample results. All results are usable as qualified.

TOC:

There were no rejected sample results. All results are usable as qualified.



28 February 2014

Lynn K. Lutz, HDR Inc.

Date

APPENDIX D
MICROBIAL ANALYTICAL REPORT



Microbac Laboratories, Inc.

KNOXVILLE DIVISION

505 EAST BROADWAY AVE.

MARYVILLE, TN 37804

(865) 977-1200 FAX (865) 984-8616

<http://www.microbac.com>

E-Mail: knoxville@microbac.com

METHOD OVERVIEW – PCR ANALYSIS OF DEHALOCOCCOIDES

Dehalococcoides ethogenes is the only known organism that can efficiently reduce vinyl chloride. Standard microbiological analysis for this organism is very difficult due to its complex growth requirements that are not easily recreated in the laboratory environment. Detection of this organism is primarily done using the Polymerase Chain Reaction (PCR) which detects unique target sequences within the genome of Dehalococcoides ethogenes. Samples are filtered and then extracted within a 48 hour time frame to limit the amount of change to the microbial community and to ensure that the recovered template DNA is suitable for further analysis. PCR works by amplifying a specific gene fragment over several cycles giving a geometric amplification of the product which can then be discerned by gel electrophoresis or melt analysis. For quantitative PCR analysis (qPCR) the amplicons generated by the process are compared with a curve of known template concentrations to calculate the amount of target sequence in the original sample.



Microbac Laboratories, Inc.

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Tri-Cities Division

2109 W. Market Street Johnson City, TN 37064 423.926.6385

Nashville Division

2631 Grandview Avenue Nashville, TN 37211 615.242.1480

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CERTIFICATE OF ANALYSIS

Stephanie Mossburg
Microbac Ohio Valley
158 Starlite Drive
Marietta, OH 45750

Date Reported: 5/20/2013
Date Received: 5/8/2013
Cust #: R9027
PO#:

Workorder: 1308819 Project: HDR DHc

Analyte	Result	Units	Qualifier	Reporting Limit	Analyst	Analyzed	Method

IW92-02-EBT-12 Sampled: 05/07/2013 14:42

1308819-01 (Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

IW21-01A-EBT-12 Sampled: 05/07/2013 16:17

1308819-02 (Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

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CERTIFICATE OF ANALYSIS

Stephanie Mossburg
Microbac Ohio Valley
158 Starlite Drive
Marietta, OH 45750

Date Reported: 5/20/2013
Date Received: 5/8/2013
Cust #: R9027
PO#:

Workorder: 1308819 Project: HDR DHc

Certifications

Code	Description	Number	Expires
A2LA	ISO 17025 KNX food	3131.01	05/31/2013
EPA			
Nelac	State of Florida	E87966	06/30/2013
TN_DW	State of Tennessee	TN02017	04/30/2014
USDA	US Department of Agriculture		11/30/2013

Notes and Definitions

Z3 Negative
DET Analyte DETECTED
ND Analyte NOT DETECTED at or above the reporting limit
NR Not Reported
dry Sample results reported on a dry weight basis
RPD Relative Percent Difference

Microbac Laboratories, Inc.

ROBBY BROOKS, MOLECULAR MANAGER

Thank you for your business. For any feedback, please contact Ashley Morris, at ashley.morris@microbac.com. You may also contact Sean Hyde, Chief Operating Officer at sean.hyde@microbac.com or James Nokes, President, at james.nokes@microbac.com.

As regulatory limits change frequently, Microbac advises the recipient of this report to confirm such limits with the appropriate Federal, state, or local authorities before acting in reliance on the regulatory limits provided.

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MEMBER



CHAIN OF CUSTODY

Page 1 of 1

Microbac
MICROBAC LABORATORIES, INC.
KNOXVILLE DIVISION
505 EAST BROADWAY
MARYVILLE, TN 37804
PHONE: (865) 977-1200 FAX: (865) 984-8616

Project ID: 192672-002

Permit #:

If drinking water, State Reported?: ☐ Yes ☒ No

(1) Sample Matrix codes	
AR = Air	OL = Oil
DW = Dr. Water	PC = Paint Chip
FO = Food	SB = Swab
FT = Filter	SD = Soil/Solid
GW = Gr. Water	SL = Sludge
	SW = Storm Water
	WP = Wipe
	WW = Waste Water
	FB = Field Blank
	TB = Trip Blank

(2) Sample Type codes

G = Grab **C** = Composite

Report To: Tom Holmes
Address: P.O. Box 191253
Atlanta, GA 31119
Phone: 404-237-3982 Fax: _____
E-mail: ~~tom~~ tholmes.holmes@wdinc.com

Invoice To: Town Hobbies
Address: P.O. Box 191353
Atlanta, GA

P.O. #: 228 - 192672-002
Quote #:

[illegible][illegible]

Samples collected by [please print]: John, B. Spurr	PRIORITY ☐ Standard ☐ Same Day ☐ Next Day ☐ 2 Day ☐ 3 Day	(addl. fee) - (+200%) (+100%) (+50%) (+25%)	All rush priority orders require prior approval.	Relinquished By: 	Date: 5/7/13	Time: 1:00	Received By: Fedex	12030819
				Relinquished By: 	Date: 5/9/13	Time: 1:02	Received By: MINS	
				Relinquished By: 	Date:	Time:	Received By:	
				Relinquished By:	Date:	Time:	Received By:	

COOLER INSPECTION FORM # 10001.1

Client Name: Microbac OhioDate/Time Received: 5/8/13 1012Work Order: 1308819No. of Samples: 2Received By: MNBChecklist Completed By: / MNBCarrier: FedEx(☐) UPS(☒) Client(☐)Field Services(☒) Other(☐)

After-Hours Receipt?	Yes ☐	No ☒
Shipping container in good condition?	Yes ☒	No ☐ Not Present ☐
Custody seals intact on cooler?	Yes ☐	No ☐ Not Present ☒
Custody seals intact on samples?	Yes ☐	No ☐ Not Present ☒
Chain of custody present?	Yes ☒	No ☐
Chain of custody includes proper client information?	Yes ☒	No ☐
Chain of custody includes proper collection information and signatures?	Yes ☒	No ☐
Chain of custody includes dates and times of sample collection?	Yes ☒	No ☐
Chain of custody includes proper sample descriptions?	Yes ☒	No ☐
Chain of custody agrees with sample labels?	Yes ☒	No ☐
Chain of custody identifies proper sample matrix?	Yes ☒	No ☐
Chain of custody identifies proper number of samples?	Yes ☒	No ☐
Chain of custody includes required analysis?	Yes ☒	No ☐
Chain of custody signed when relinquished and received?	Yes ☒	No ☐
Samples are in proper containers/bottles?	Yes ☒	No ☐
Sample containers are intact?	Yes ☒	No ☐
Sufficient sample volume collected for requested analysis?	Yes ☒	No ☐
VOA vials for aqueous samples have zero headspace?	Yes ☐	No ☐ Not Present ☒
Samples received within holding times?	Yes ☒	No ☐
Samples received on ice?	Yes ☒	No ☐
Sample properly preserved?	Yes ☒	No ☐

If No, adjusted by? _____ Date/Time: _____

Remarks: _____

ANY "NO" EVALUATION REQUIRES CLIENT NOTIFICATION (excluding After-Hours Receipt).

Comments: _____



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Knoxville Division

505 E. Broadway Avenue Maryville, TN 37804 865.977.1200

Tri-Cities Division

2109 W. Market Street Johnson City, TN 37064 423.926.6385

Nashville Division

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CERTIFICATE OF ANALYSIS

Stephanie Mossburg
Microbac Ohio Valley
158 Starlite Drive
Marietta, OH 45750

Date Reported: 5/20/2013
Date Received: 5/9/2013
Cust #: R9027
PO#:

Workorder: 1308926 Project: HDR DHc

Analyte	Result	Units	Qualifier	Reporting Limit	Analyst	Analyzed	Method

DR2-5-EBT-12 Sampled: 05/08/2013 13:57

1308926-01 (Ground Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

PMW85-05-EBT-12 Sampled: 05/08/2013 15:28

1308926-02 (Ground Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

IW92-07-EBT-12 Sampled: 05/08/2013 09:05

1308926-03 (Ground Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

IW21-03A-EBT-12 Sampled: 05/08/2013 09:09

1308926-04 (Ground Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

IW21-04B-EBT-12 Sampled: 05/08/2013 11:04

1308926-05 (Ground Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

PMW21-04-EBT-12 Sampled: 05/08/2013 14:00

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CERTIFICATE OF ANALYSIS

Stephanie Mossburg
Microbac Ohio Valley
158 Starlite Drive
Marietta, OH 45750

Date Reported: 5/20/2013
Date Received: 5/9/2013
Cust #: R9027
PO#:

Workorder: 1308926 Project: HDR DHc

Analyte	Result	Units	Qualifier	Reporting Limit	Analyst	Analyzed	Method

PMW21-04-EBT-12 Sampled: 05/08/2013 14:00

1308926-06 (Ground Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

PMW101-04B-EBT-12 Sampled: 05/08/2013 16:19

1308926-07 (Ground Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

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CERTIFICATE OF ANALYSIS

Stephanie Mossburg
Microbac Ohio Valley
158 Starlite Drive
Marietta, OH 45750

Date Reported: 5/20/2013
Date Received: 5/9/2013
Cust #: R9027
PO#:

Workorder: 1308926 Project: HDR DHc

Certifications

Code	Description	Number	Expires
A2LA	ISO 17025 KNX food	3131.01	05/31/2013
EPA			
Nelac	State of Florida	E87966	06/30/2013
TN_DW	State of Tennessee	TN02017	04/30/2014
USDA	US Department of Agriculture		11/30/2013

Notes and Definitions

Z3	Negative
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Microbac Laboratories, Inc.

ROBBY BROOKS, MOLECULAR MANAGER

Thank you for your business. For any feedback, please contact Ashley Morris, at ashley.morris@microbac.com. You may also contact Sean Hyde, Chief Operating Officer at sean.hyde@microbac.com or James Nokes, President, at james.nokes@microbac.com.

As regulatory limits change frequently, Microbac advises the recipient of this report to confirm such limits with the appropriate Federal, state, or local authorities before acting in reliance on the regulatory limits provided.

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Page 1 of 1

MICROBAC LABORATORIES, INC.

KNOXVILLE DIVISION

505 EAST BROADWAY

MARYVILLE, TN 37804

PHONE: (865) 977-1200 FAX: (865) 984-8616

Project ID: 192672-003

Permit #:

If drinking water, State Reported?: ☐ Yes ☒ No

(1) Sample Matrix codes

AR = Air	OL = Oil	SW = Storm Water
DW = Dr. Water	PC = Paint Chip	WP = Wipe
FO = Food	SB = Swab	WW = Waste Water
FT = Filter	SD = Soil/Solid	FB = Field Blank
GW = Gr. Water	SL = Sludge	TB = Trip Blank

2) Sample Type codes

G = Grab **C = Composite**

Sample Identification	Sample Date	Sample Time
DR 2-5-EBT-12	5/8/13	1357
PMW 85-05-EBT-12	5/8/13	1528
IW 92-07-EBT-12	5/8/13	905.
IW 21-03A-EBT-12	5/8/13	909
IW 21-04B-EBT-12	5/8/13	1104
PMW 21-04-EBT-12	5/8/13	1400
PMW 101-04B-EBT-12	5/8/13	1619

Samples collected by (please print):	PRIORITY	(addl. fee)
	☐ Standard	-
	☐ Same Day	(+200%)
	☐ Next Day	(+100%)
	☐ 2 Day	(+50%)
	☐ 3 Day	(+25%)

All rush priority orders require prior approval.

Report To: Lynn Tutz
Address: 9563 South Kinross Ct., Suite 200
Englewood, CO 80112
Phone: 303-754-4266 Fax: _____
E-mail: lynn.tutz@hdrinc.com

[illegible][illegible]

Relinquished By: 	Date: 5/8/13	Time: 1700	Received By: Fedex
Relinquished By: Fedex	Date: 5/9	Time: 1000	Received By: MRS
Relinquished By:	Date:	Time:	Received By:

COOLER INSPECTION FORM # 10001.1

Client Name: Microbac Ohio Date/Time Received: 5/9/13 1000
Work Order: 710013 1308926 No. of Samples: 1
Received By: MNB Checklist Completed By: MNB
Carrier: FedEx(☒) UPS(☐) Client(☐) Field Services(☐) Other(☐)

After-Hours Receipt?	Yes ☐	No ☒
Shipping container in good condition?	Yes ☒	No ☐ Not Present ☐
Custody seals intact on cooler?	Yes ☐	No ☐ Not Present ☒
Custody seals intact on samples?	Yes ☐	No ☐ Not Present ☒
Chain of custody present?	Yes ☒	No ☐
Chain of custody includes proper client information?	Yes ☒	No ☐
Chain of custody includes proper collection information and signatures?	Yes ☒	No ☐
Chain of custody includes dates and times of sample collection?	Yes ☒	No ☐
Chain of custody includes proper sample descriptions?	Yes ☒	No ☐
Chain of custody agrees with sample labels?	Yes ☒	No ☐
Chain of custody identifies proper sample matrix?	Yes ☒	No ☐
Chain of custody identifies proper number of samples?	Yes ☒	No ☐
Chain of custody includes required analysis?	Yes ☒	No ☐
Chain of custody signed when relinquished and received?	Yes ☒	No ☐
Samples are in proper containers/bottles?	Yes ☒	No ☐
Sample containers are intact?	Yes ☒	No ☐
Sufficient sample volume collected for requested analysis?	Yes ☒	No ☐
VOA vials for aqueous samples have zero headspace?	Yes ☐	No ☐ Not Present ☒
Samples received within holding times?	Yes ☒	No ☐
Samples received on ice?	Yes ☒	No ☐
Sample properly preserved?	Yes ☒	No ☐

If No, adjusted by? _____ Date/Time: _____

Remarks: _____

ANY "NO" EVALUATION REQUIRES CLIENT NOTIFICATION (excluding After-Hours Receipt).

Comments: _____



Microbac Laboratories, Inc.

Knoxville Division

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CERTIFICATE OF ANALYSIS

Stephanie Mossburg
Microbac Ohio Valley
158 Starlite Drive
Marietta, OH 45750

Date Reported: 5/20/2013
Date Received: 5/10/2013
Cust #: R9027
PO#:

Workorder: 1308980 Project: HDR DHc

Analyte	Result	Units	Qualifier	Reporting Limit	Analyst	Analyzed	Method

IW101-04C-EBT-12 Sampled: 05/09/2013 09:14

1308980-01 (Ground Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

IW101-03C-EBT-12 Sampled: 05/09/2013 11:24

1308980-02 (Ground Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

IW101-07C-EBT-12 Sampled: 05/09/2013 13:10

1308980-03 (Ground Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

MW-203A-EBT-12 Sampled: 05/09/2013 15:41

1308980-04 (Ground Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

MW-62-EBT-12 Sampled: 05/09/2013 16:43

1308980-05 (Ground Water)

Molecular - PCR

Analyzed By: Microbac Knoxville Division

Dehalococcoides spp.	Negative	P/A	RWB	05/20/2013 13:01	PCR

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CERTIFICATE OF ANALYSIS

Stephanie Mossburg
Microbac Ohio Valley
158 Starlite Drive
Marietta, OH 45750

Date Reported: 5/20/2013
Date Received: 5/10/2013
Cust #: R9027
PO#:

Workorder: 1308980 Project: HDR DHc

Certifications

Code	Description	Number	Expires
A2LA	ISO 17025 KNX food	3131.01	05/31/2013
EPA			
Nelac	State of Florida	E87966	06/30/2013
TN_DW	State of Tennessee	TN02017	04/30/2014
USDA	US Department of Agriculture		11/30/2013

Notes and Definitions

Z3	Negative
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Microbac Laboratories, Inc.

ROBBY BROOKS, MOLECULAR MANAGER

Thank you for your business. For any feedback, please contact Ashley Morris, at ashley.morris@microbac.com. You may also contact Sean Hyde, Chief Operating Officer at sean.hyde@microbac.com or James Nokes, President, at james.nokes@microbac.com.

As regulatory limits change frequently, Microbac advises the recipient of this report to confirm such limits with the appropriate Federal, state, or local authorities before acting in reliance on the regulatory limits provided.

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Microbac
MICROBAC LABORATORIES, INC.
KNOXVILLE DIVISION
505 EAST BROADWAY
MARYVILLE, TN 37804
PHONE: (865) 977-1200 FAX: (865) 984-8616

Project ID: 192672-002

Permit #:

f drinking water, State Reported?: ☐ Yes ☒ No

1) Sample Matrix codes

AR = Air	OL = Oil	SW = Storm Water
DW = Dr. Water	PC = Paint Chip	WP = Wipe
FO = Food	SB = Swab	WW = Waste Water
FT = Filter	SD = Soil/Solid	FB = Field Blank
GW = Gr. Water	SL = Sludge	TB = Trip Blank

2) Sample Type codes

G = Grab **C** = Composite

Sample Identification	Sample Date	Sample Time
IW101-04C-EBT-12	5/9/13	914
IW101-03C-EBT-12	5/9/13	1124
IW101-07C-EBT-12	5/9/13	1310
MW-203A-EBT-12	5/9/13	1541
MW-62-EBT-12	5/9/13	1643

Samples collected by [please print]:	PRIORITY
	Standard ☐
	Same Day ☐
	Next Day ☐
	2 Day ☐
	3 Day ☐

Report To: Lynn Lutz
Address: 9563 South Kingston Ct., Suite 200
Englewood, CO 80112
Phone: 303-754-4266 Fax: _____
E-mail: Lynn.Lutz@advinc.com

[illegible]

Please Mark Testing Required Below (X)

FOR LAB CHECK-IN ONLY

Temp Rec'd: 5 °C

Prop. Preserved: Y N

Customer #:

Project:

Proj. Mgr:

Special instructions / notes:

1306900

Relinquished By:	Date:	Time:	Received By:
	5/9/13	1230	Fedex
Relinquished By:	Date:	Time:	Received By:
	5/10	1000	MNOB
Relinquished By:	Date:	Time:	Received By:
			



COOLER INSPECTION FORM # 10001.1

Client Name: Ohio Valley

Date/Time Received: 5/10/13 1000

Work Order: 130089400

No. of Samples: 5

Received By: MNB

Checklist Completed By: 1 DSA

Carrier: FedEx ☒ UPS ☐ Client ☐ Field Services ☐ Other ☐:

After-Hours Receipt?

Yes ☐ No ☒

Shipping container in good condition?

Yes ☒ No ☐ Not Present ☐

Custody seals intact on cooler?

Yes ☐ No ☐ Not Present ☒

Custody seals intact on samples?

Yes ☐ No ☐ Not Present ☒

Chain of custody present?

Yes ☒ No ☐

Chain of custody includes proper client information?

Yes ☒ No ☐

Chain of custody includes proper collection information and signatures?

Yes ☒ No ☐

Chain of custody includes dates and times of sample collection?

Yes ☒ No ☐

Chain of custody includes proper sample descriptions?

Yes ☒ No ☐

Chain of custody agrees with sample labels?

Yes ☒ No ☐

Chain of custody identifies proper sample matrix?

Yes ☒ No ☐

Chain of custody identifies proper number of samples?

Yes ☒ No ☐

Chain of custody includes required analysis?

Yes ☒ No ☐

Chain of custody signed when relinquished and received?

Yes ☒ No ☐

Samples are in proper containers/bottles?

Yes ☒ No ☐

Sample containers are intact?

Yes ☒ No ☐

Sufficient sample volume collected for requested analysis?

Yes ☒ No ☐

VOA vials for aqueous samples have zero headspace?

Yes ☐ No ☐ Not Present ☒

Samples received within holding times?

Yes ☒ No ☐

Samples received on ice?

Yes ☒ No ☐

Sample properly preserved?

Yes ☒ No ☐

If No, adjusted by: _____ Date/Time: _____

Remarks: _____

ANY "NO" EVALUATION REQUIRES CLIENT NOTIFICATION (excluding After-Hours Receipt).

Comments: _____

APPENDIX E
MCL EXCEEDANCES

TABLE E-1
MCL EXCEEDANCES, EBT-10
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well ID	Date	PCE µg/L 5	TCE µg/L 5	cDCE µg/L 70	VC µg/L 2	CT µg/L 5	CF µg/L 80
PMW21-01	12/6/2011	280	50.1	15.6	<1	<1	0.137
IW21-03A	12/9/2011	213	45.9	7.09	<1	<1	<0.3
PMW21-04	12/6/2011	211	69.3	55.5	<1	<1	0.144
IW21-03B	12/9/2011	197	68.5	51.2	<1	<1	<0.3
IW92-02	12/12/2011	191	9.78	45.7	<1	27.9	9.53
MW-113	10/3/2011	189	18	26.2	<1	65.8	16.2
IW92-01	12/12/2011	189	6.71	10.4	<1	25.8	7.46
DR1-6	10/4/2011	168	1.28	1.31	<1	<1	<0.3
DR2-5	10/2/2011	86.5	37.8	87.4	<1	167	66.2
DR1-6A	10/4/2011	60.3	166	9.24	<1	<1	0.248
IW21-01A	12/8/2011	166	27.1	10.6	<1	<1	<0.3
MW-62	10/8/2011	0.504	157	<1	<1	0.563	0.315
PMW92-03	10/3/2011	147	15.1	51.9	<1	<1	<0.3
MW-203A	10/5/2011	147	2.72	5.75	<1	<1	<0.3
IW92-03	12/12/2011	21.2	4.33	143	<1	0.308	0.442
IW21-04A	12/9/2011	135	33.3	48.8	<1	<1	<0.3
IW92-07	12/13/2011	3.17	0.51	127	0.493	0.34	0.374
PMW21-02	12/6/2011	118	30.1	4.2	<1	<1	<0.3
IW101-07C	12/11/2011	40.8	113	24.5	<1	<1	0.138
IW21-01B	12/8/2011	104	16	11.5	<1	<1	<0.3
PMW85-01	12/12/2011	57.2	20.2	37.3	<1	102	42.5
IW21-04B	12/9/2011	40.9	19	101	<1	<1	<0.3
IW85-06	12/14/2011	1.45	1.31	99.3	0.606	0.546	0.24
IW92-08	12/14/2011	8.86	1.19	87.8	0.302	2.37	2.99
PMW85-05	12/13/2011	79.1	25.6	81.9	<1	77.6	34.8
MW-21	10/6/2011	80	5.3	2.27	<1	<1	<0.3
DR1-5A	10/4/2011	49.7	77.6	2.76	<1	<1	0.191
IW101-05B	12/9/2011	59.9	<1	<1	<1	<1	<0.3
PMW101-04A	10/6/2011	59.6	2.11	3.12	<1	<1	<0.3
IW101-02B	12/6/2011	59.3	<1	<1	<1	<1	<0.3
IW101-02A	12/6/2011	59.2	0.3	1.16	<1	<1	<0.3
IW101-05C	12/9/2011	58.6	1.35	0.291	<1	<1	<0.3
MW-85	10/9/2011	29.4	9.96	21.2	<1	55.9	16.4
IW101-05A	12/9/2011	55.9	<1	0.432	<1	<1	<0.3
IW101-07B	12/10/2011	19.6	52.1	4.54	<1	<1	<0.3
IW101-02C	12/7/2011	52	0.706	0.302	<1	<1	<0.3
IW85-05	12/14/2011	32.8	13.1	67.6	<1	50.6	21.2
PMW101-02A	12/6/2011	45.4	0.558	2.09	<1	<1	<0.3
IW101-04B	12/8/2011	44.4	1.57	0.931	<1	<1	<0.3
DR2-2	10/2/2011	35.9	2.92	1.31	<1	4.37	0.714
IW21-02A	12/8/2011	32.5	3	3.08	<1	<1	<0.3
MW-197A	10/5/2011	32.2	1.51	1.26	<1	<1	0.126
IW21-02B	12/8/2011	31.6	3.06	2.15	<1	<1	<0.3
PMW101-04B	10/6/2011	31.2	3.23	<1	<1	<1	<0.3
IW101-04C	12/8/2011	16.7	31	59.2	<1	<1	<0.3
IW101-03B	12/7/2011	30.6	0.464	<1	<1	<1	<0.3
MW-197B	10/5/2011	29.7	9.4	5.27	1.86	<1	<0.3
DR1-5	10/4/2011	29	<1	<1	<1	<1	<0.3
PMW101-07B	12/9/2011	14.2	28.9	1.35	<1	<1	<0.3
IW101-04A	12/7/2011	26.4	1.86	10.4	<1	<1	<0.3
PMW101-02B	12/6/2011	25.5	1.86	0.442	<1	<1	<0.3
MW-203B	10/5/2011	23.2	8.72	4.81	2.74	<1	<0.3
IW101-03C	12/8/2011	21.7	39	3.41	<1	<1	<0.3
IW101-07A	12/10/2011	8.4	17	0.658	<1	<1	<0.3
MW-212	10/8/2011	<1	16.5	<1	<1	<1	<0.3
IW101-03A	12/7/2011	1.8	<1	0.415	<1	<1	<0.3
PMW101-07A	12/9/2011	0.361	<1	<1	<1	<1	<0.3

Note: MCL Exceedances shown in bold type.

TABLE E-2
MCL EXCEEDANCES, EBT-11
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well ID	Type	Date	PCE µg/L 5	TCE µg/L 5	cDCE µg/L 70	VC µg/L 2	CT µg/L 5	CF µg/L 80
IW101-07C	IW	2/7/2013	<10	<10	323	<10	<10	<3
PMW21-04	IW	2/7/2013	276	59.3	125	<1	<1	<0.3
PMW21-01	MW	2/5/2013	263	51.2	15.3	<1	<1	0.167
DR1-6	IW	2/6/2013	263	1.22	0.553	<1	<1	<0.3
IW21-03A	IW	2/6/2013	6.89	2.94	182	0.497	<1	<0.3
PMW21-02	MW	2/7/2013	169	44	4.5	<1	<1	<0.3
PMW92-03	MW	2/9/2013	154	11.6	33	<1	<1	<0.3
IW21-01A	IW	2/5/2013	<10	<10	134	<10	<10	<3
IW92-08	IW	2/11/2013	<5	<5	119	<5	<5	<1.5
IW92-01	IW	2/9/2013	3.17	1.88	117	<1	<1	1.96
DR2-5	IW	2/9/2013	33.7	17.3	113	<1	69.6	45.7
MW-21	IW	2/7/2013	107	6.83	4.4	<1	<1	<0.3
MW-85	MW	2/8/2013	58.5	17.8	30.6	<1	102	28.1
IW21-03B	IW	2/7/2013	<20	<20	98.8	<20	<20	<6
DR1-6A	IW	2/6/2013	40.8	98	34.1	<1	<1	<0.3
MW-113	IW	2/8/2013	54.7	6.78	95	<5	15.6	7.25
IW101-03C	IW	2/8/2013	<10	<10	91.6	<10	<10	<3
PMW85-05	MW	2/9/2013	75.7	23	83.4	<1	47.7	24.5
PMW85-01	MW	2/9/2013	1.03	<1	79.3	0.364	0.322	0.685
DR1-5A	IW	2/6/2013	43.8	62.1	<10	<10	<10	<3
MW-62	IW	2/11/2013	<50	61.9	37.5	<50	<50	<15
IW101-02B	IW	2/8/2013	56.2	<1	<1	<1	<1	<0.3
PMW101-04A	MW	2/7/2013	51.1	0.806	1.03	<1	<1	<0.3
MW-203A	IW	2/8/2013	51	8.56	8.36	0.333	<1	<0.3
IW101-05B	IW	2/8/2013	41.1	0.506	1.54	<1	<1	<0.3
PMW101-04B	MW	2/7/2013	37.2	3.25	<1	<1	<1	<0.3
DR1-5	IW	2/6/2013	36.8	<10	<10	<10	<10	<3
IW21-02A	IW	2/6/2013	33.8	2.96	17.1	<10	<10	<3
DR2-2	IW	2/9/2013	33.3	2.15	13.9	<1	2.34	2.0
PMW101-07B	MW	2/7/2013	15.1	32.7	1.68	<1	<1	<0.3
IW101-02A	IW	2/8/2013	30.8	3.17	11.1	<1	<1	<0.3
MW-197B	MW	2/8/2013	25	10.6	3.83	1.05	<1	<0.3
MW-213	IW	2/11/2013	<5	25	<5	<5	<5	<1.5
MW-197A	MW	2/8/2013	24.8	1.27	0.771	<1	<1	0.138
PMW101-02A	IW	2/6/2013	21.4	1.82	8.01	<1	<1	<0.3
MW-203B	IW	2/8/2013	17.6	11.9	3.57	1.48	<1	<0.3
IW21-02B	IW	2/6/2013	13.5	<10	4.6	<10	<10	<3
IW92-02	IW	2/9/2013	11.5	<20	28.8	<20	<20	<6
PMW101-02B	IW	2/6/2013	11.3	2.17	25.3	<1	<1	<0.3
MW-212	MW	2/11/2013	<1	10.4	<1	<1	<1	<0.3
IW21-04A	IW	2/6/2013	6.98	2.53	65.2	<10	<10	<3
IW101-05A	IW	2/8/2013	6.48	<10	14.8	<10	<10	<3
IW101-04A	IW	2/9/2013	6.17	<10	6.94	<10	<10	<3
IW101-03B	IW	2/7/2013	5.7	2.89	18.3	<5	<5	<1.5
IW101-07B	IW	2/7/2013	2.01	5.58	54.5	<1	<1	<0.3
IW85-05	IW	2/11/2013	<50	<50	50.4	<50	<50	<15
IW92-03	IW	2/9/2013	<50	<50	42.9	<50	<50	<15
IW101-02C	IW	2/8/2013	<20	<20	56.9	<20	<20	<6
IW101-04C	IW	2/9/2013	<20	<20	44.9	<20	<20	<6
IW92-07	IW	2/10/2013	<20	<20	28.6	<20	<20	<6
IW101-05C	IW	2/8/2013	<10	<10	41	<10	<10	<3
IW85-06	IW	2/10/2013	<10	<10	28.4	<10	<10	<3
IW101-04B	IW	2/9/2013	<10	<10	14.7	<10	<10	<3
IW21-01B	IW	2/5/2013	4.62	1.51	13.2	<5	<5	<1.5
IW21-04B	IW	2/6/2013	4.32	<10	28.8	<10	<10	<3
IW101-03A	IW	2/7/2013	2.5	<1	4.98	<1	<1	<0.3
IW101-07A	IW	2/7/2013	1.48	2.68	1.26	<1	<1	<0.3
PMW101-07A	MW	2/7/2013	0.318	<1	<1	<1	<1	<0.3

Note: MCL Exceedances shown in bold type.

TABLE E-3
MCL EXCEEDANCES, EBT-12
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well ID	Type	Date	PCE µg/L 5	TCE µg/L 5	cDCE µg/L 70	VC µg/L 2	CT µg/L 5	CF µg/L 80
PMW21-01	MW	5/11/2013	293	61.6	11.2	<1	<1	0.179
IW101-07C	IW	5/9/2013	<5	<5	245	1.81	<5	<1.5
IW21-03A	IW	5/8/2013	2.31	1.22	174	<1	<1	<0.3
MW-113	IW	5/10/2013	12.5	2.6	169	<5	<5	3.12
IW21-01A	IW	5/7/2013	1.48	2.09	166	<5	<5	<1.5
PMW21-02	MW	5/11/2013	137	47.5	4.74	<1	<1	<0.3
DR1-6	IW	5/12/2013	126	1.35	20	<1	<1	<0.3
PMW92-03	MW	5/9/2013	125	12.1	36	<1	<1	<0.3
IW21-03B	IW	5/11/2013	<20	<20	119	<20	<20	<6
DR2-5	IW	5/8/2013	29.9	14	118	<1	78.4	40
IW92-08	IW	5/9/2013	0.773	<1	117	1.29	<1	<0.3
IW101-03C	IW	5/9/2013	<5	<5	112	1.45	<5	<1.5
DR1-6A	IW	5/12/2013	<10	<10	110	<10	<10	<3
IW92-02	IW	5/7/2013	2.1	<5	107	<5	<5	<1.5
PMW85-05	MW	5/8/2013	106	31.7	85.1	<1	72.3	32.4
IW101-07B	MW	5/13/2013	<10	<10	104	<10	<10	<3
MW-62	IW	5/9/2013	<5	98.5	34.8	<5	<5	<1.5
PMW21-04	IW	5/8/2013	21.1	5.37	94.1	<1	<1	<0.3
DR1-5A	IW	5/11/2013	<10	4.27	85.4	<10	<10	<3
IW21-04A	IW	5/11/2013	<10	<10	78.6	<10	<10	<3
IW21-02A	IW	5/10/2013	2.69	<5	72.6	<5	<5	<1.5
IW101-02B	IW	5/12/2013	51.4	0.344	1.3	<1	<1	<0.3
MW-85	MW	5/10/2013	21	5.76	52.4	<1	45.8	13.8
PMW101-04A	MW	5/13/2013	45.6	0.967	2.29	<1	<1	<0.3
PMW101-07B	IW	5/12/2013	14.5	36	1.94	<1	<1	<0.3
DR1-5	IW	5/12/2013	35.5	<5	5.39	<5	<5	<1.5
IW101-05B	IW	5/13/2013	33.7	0.851	4.51	<1	<1	<0.3
PMW101-04B	MW	5/8/2013	33.7	3.38	2.46	<1	<1	<0.3
MW-197A	MW	5/11/2013	21.6	1.17	0.738	<1	<1	<0.3
MW-197B	MW	5/11/2013	21.1	11.2	3.81	1.31	<1	<0.3
MW-203A	IW	5/9/2013	19.8	9	24.8	7.98	<20	<6
MW-213	IW	5/11/2013	<5	17.5	4.05	<5	<5	<1.5
MW-21	IW	5/10/2013	13.3	4.43	25.3	<1	<1	<0.3
MW-212	MW	5/11/2013	<1	10.9	<1	<1	<1	<0.3
IW101-02A	IW	5/12/2013	9.8	2.38	16.6	<5	<5	<1.5
IW21-02B	IW	5/10/2013	7.91	<5	14.1	<5	<5	<1.5
MW-203B	IW	5/11/2013	3.1	2.27	16.6	2.64	<1	<0.3
PMW101-07A	MW	5/13/2013	<1	0.347	<1	<1	<1	<0.3
IW101-02C	IW	5/12/2013	<10	<10	59.4	<10	<10	<3
IW101-05C	IW	5/13/2013	<10	<10	56.6	<10	<10	<3
PMW85-01	MW	5/10/2013	0.451	<1	55.1	1.89	<1	<0.3
IW21-01B	IW	5/10/2013	<5	<5	54.6	<5	<5	<1.5
IW21-04B	IW	5/8/2013	<10	2.66	49.1	<10	<10	<3
DR2-2	IW	5/10/2013	0.801	<1	44.9	0.38	<1	<0.3
IW85-05	IW	5/8/2013	<25	<25	44.4	<25	<25	<7.5
IW92-07	IW	5/8/2013	<20	<20	30.5	<20	<20	<6
PMW101-02B	IW	5/13/2013	<10	<10	27.8	<10	<10	<3
IW101-04C	IW	5/9/2013	<5	<5	27.2	<5	<5	<1.5
IW101-03B	IW	5/12/2013	<10	<10	23.2	<10	<10	<3
IW92-01	IW	5/11/2013	<1	<1	21.6	0.359	<1	<0.3
IW85-06	IW	5/9/2013	<10	<10	20.4	<10	<10	<3
PMW101-02A	IW	5/13/2013	<10	<10	16	<10	<10	<3
IW101-04B	IW	5/13/2013	<10	<10	14.8	<10	<10	<3
IW101-05A	IW	5/13/2013	<10	<10	13.8	<10	<10	<3
IW101-04A	IW	5/13/2013	<10	<10	7.41	<10	<10	<3
IW101-03A	IW	5/12/2013	<10	<10	5.88	<10	<10	<3
IW101-07A	IW	5/12/2013	1.06	1.94	1.42	<1	<1	<0.3

Note: MCL Exceedances shown in bold type.

TABLE E-4
MCL EXCEEDANCES, EBT-13
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well ID	Date	Area	PCE µg/L 5	TCE µg/L 5	cDCE µg/L 70	VC µg/L 2	CT µg/L 5	CF µg/L 80
PMW21-01	8/17/2013	TTA-1N	279	55.5	9.62	<2	<2	<0.6
IW21-03A	8/19/2013	TTA-1N	5.77	2.39	196	<1	<1	<0.3
PMW92-03	8/13/2013	TTA-2	149	14.9	50.4	1.61	<1	<0.3
IW21-01A	8/18/2013	TTA-1N	6.35	3.35	148	<5	<5	<1.5
IW101-07C	8/16/2013	TTA-1S	13.2	10.5	145	<10	<10	<3
PMW21-02	8/18/2013	TTA-1N	143	54.3	5.18	<1	<1	<0.3
IW21-03B	8/19/2013	TTA-1N	5.07	1.51	134	0.628	<1	<0.3
MW-62	8/20/2013	Bldg 835	0.382	132	51.8	<1	<1	0.351
DR2-5	8/14/2013	TTA-2	44.9	21.8	120	<1	5.2	48.3
DR1-6	8/16/2013	TTA-1S	119	2.89	13.6	<5	<5	<1.5
PMW85-05	8/13/2013	TTA-2	110	33.1	83.4	<1	78.6	32.3
IW21-04A	8/19/2013	TTA-1N	<20	<20	94.9	<20	<20	<6
IW92-08	8/15/2013	TTA-2	<5	<5	92.1	<5	<5	<1.5
DR1-5A	8/20/2013	TTA-1S	0.649	1.01	91.8	0.479	<1	<0.3
MW-113	8/13/2013	TTA-2	12.6	5.09	88.9	<20	<20	<6
DR1-6A	8/16/2013	TTA-1S	9.75	26.4	86.8	<5	<5	<1.5
IW21-02A	8/17/2013	TTA-1N	<5	<5	86.7	<5	<5	<1.5
PMW21-04	8/17/2013	TTA-1N	25	8.67	77.6	<5	<5	<1.5
IW101-02C	8/15/2013	TTA-1S	<10	<10	74.8	<10	<10	<3
IW101-02B	8/15/2013	TTA-1S	48.3	0.706	2.24	<1	<1	<0.3
IW101-05B	8/17/2013	TTA-1S	36	0.622	2.48	<1	<1	<0.3
PMW101-07B	8/15/2013	TTA-1S	12.7	32.4	1.4	<1	<1	<0.3
PMW101-04B	8/15/2013	TTA-1S	29.6	3.47	3.94	<1	<1	<0.3
PMW101-04A	8/15/2013	TTA-1S	25.5	1.13	11.4	<1	<1	<0.3
MW-197A	8/19/2013	W-C	21.7	1.36	0.79	<1	<1	<0.3
MW-197B	8/19/2013	W-C	19.1	11.6	6.12	1.38	<1	<0.3
MW-21	8/17/2013	TTA-1N	19.1	2.96	25	<1	<1	<0.3
MW-203B	8/19/2013	W-C	13.9	17.8	12.7	2.66	<1	<0.3
DR1-5	8/20/2013	TTA-1S	15	0.996	12.9	<1	<1	<0.3
MW-213	8/20/2013	Bldg 835	<1	14	11.5	0.327	<1	<0.3
MW-212	8/20/2013	Bldg 835	0.377	13.7	<1	<1	<1	<0.3
IW101-02A	8/15/2013	TTA-1S	11.2	2.3	22.8	<1	<1	<0.3
IW101-07B	8/16/2013	TTA-1S	4.17	10.9	52.9	<5	<5	<1.5
MW-85	8/14/2013	TTA-2	6.62	1.77	62.1	<1	9.69	2.78
IW92-02	8/14/2013	TTA-2	<50	<50	18.2	<50	<50	<15
IW101-03C	8/16/2013	TTA-1S	<5	<5	69.5	<5	<5	<1.5
IW92-07	8/15/2013	TTA-2	<5	<5	52.5	<5	<5	<1.5
IW21-02B	8/17/2013	TTA-1N	<5	<5	25.2	<5	<5	<1.5
IW101-04B	8/18/2013	TTA-1S	<5	<5	13.4	<5	<5	<1.5
PMW101-02A	8/16/2013	TTA-1S	<5	<5	11.9	<5	<5	<1.5
IW92-01	8/20/2013	TTA-2	<5	<5	4.14	<5	<5	<1.5
IW85-05	8/14/2013	TTA-2	<25	<25	37.6	<25	<25	<7.5
IW85-06	8/15/2013	TTA-2	<25	<25	16.2	<25	<25	<7.5
IW101-04A	8/18/2013	TTA-1S	<20	<20	9.85	<20	<20	<6
IW21-04B	8/19/2013	TTA-1N	<10	<10	55.6	<10	<10	<3
PMW85-01	8/13/2013	TTA-2	<10	<10	51.8	<10	<10	<3
IW92-03	8/19/2013	TTA-2	<10	<10	44.9	<10	<10	<3
IW101-05C	8/17/2013	TTA-1S	<10	<10	36	<10	<10	<3
IW101-04C	8/18/2013	TTA-1S	<10	<10	25.2	<10	<10	<3
IW21-01B	8/18/2013	TTA-1N	<1	<1	41.6	<1	<1	<0.3
PMW101-07A	8/15/2013	TTA-1S	<1	0.272	<1	<1	<1	<0.3
IW101-05A	8/17/2013	TTA-1S	4.69	<5	9.71	<5	<5	<1.5
MW-203A	8/19/2013	W-C	4.41	<5	12.1	<5	<5	<1.5
IW101-03A	8/16/2013	TTA-1S	3.71	<5	4.06	<5	<5	<1.5
IW101-03B	8/16/2013	TTA-1S	2.86	<5	15.5	<5	<5	<1.5
DR2-2	8/14/2013	TTA-2	2.61	<5	14.5	<5	<5	<1.5
PMW101-02B	8/16/2013	TTA-1S	1.25	<5	32.9	<5	<5	<1.5
IW101-07A	8/16/2013	TTA-1S	0.375	0.487	<1	<1	<1	<0.3

Note: MCL Exceedances shown in bold type.

TABLE E-5
MCL EXCEEDANCES, EBT-14
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

Well ID	Date	Area	PCE µg/L 5	TCE µg/L 5	cDCE µg/L 70	VC µg/L 2	CT µg/L 5	CF µg/L 80
IW101-07C	11/9/2013	TTA-1S	<10	<10	211	3.09	<10	<3
IW21-03A	11/8/2013	TTA-1N	1.21	0.652	209	<1	<1	<0.3
PMW21-02	11/8/2013	TTA-1N	149	52.5	5.66	<1	<1	<0.3
DR1-6	11/9/2013	TTA-1S	148	1.69	8.42	<1	<1	<0.3
PMW21-04	11/8/2013	TTA-1N	115	28.5	136	<1	<1	<0.3
IW21-03B	11/8/2013	TTA-1N	0.526	<1	135	<1	<1	<0.3
DR1-6A	11/9/2013	TTA-1S	1.49	2.12	132	0.398	<1	<0.3
IW21-01A	11/7/2013	TTA-1N	9.93	6	109	<5	<5	<1.5
MW-62	11/11/2013	Bldg 835	<1	24.1	106	<1	<1	0.287
PMW85-05	11/6/2013	TTA-2	97.8	28.4	66.1	<1	75.3	34.3
IW21-04A	11/8/2013	TTA-1N	2.37	<5	95.1	<5	<5	<1.5
PMW21-01	11/7/2013	TTA-1N	2.19	0.813	93	<2 Q	<2	<0.6
IW21-04B	11/8/2013	TTA-1N	<5	<5	90.8	<5	<5	<1.5
MW-113	11/6/2013	TTA-2	11.3	3.09	88.1	<10	<10	<3
IW21-01B	11/7/2013	TTA-1N	11.3	4.23	81.4	0.284	<1	<0.3
IW21-02A	11/8/2013	TTA-1N	1.87	<5	77.7	<5	<5	<1.5
IW101-02B	11/9/2013	TTA-1S	44.1	1.36	5.62	<1	<1	<0.3
PMW101-04B	11/8/2013	TTA-1S	22.1	2.02	8.17	<1	<1	<0.3
MW-197A	11/7/2013	W-C	20.9	1.26	0.736	<1	<1	<0.3
IW101-05B	11/10/2013	TTA-1S	17.5	1.13	11.5	<1	<1	<0.3
MW-197B	11/7/2013	W-C	16.4	10.1	8.41	2.06	<1	<0.3
IW101-02A	11/9/2013	TTA-1S	14.2	0.908	16	<1	<1	<0.3
MW-213	11/11/2013	Bldg 835	<5	13.7	4.79	<5	<5	<1.5
PMW92-03	11/6/2013	TTA-2	12.8	<5	54.4	<5	<5	<1.5
PMW101-07B	11/10/2013	TTA-1S	11.6	27.1	1.4	<1	<1	<0.3
DR1-5	11/9/2013	TTA-1S	10.2	0.713	11.6	<2	<2	<0.6
MW-212	11/11/2013	Bldg 835	<1	9.35	<1	<1	<1	<0.3
MW-203A	11/7/2013	W-C	7.94	<5	13.4	<5	<5	<1.5
PMW101-04A	11/8/2013	TTA-1S	6.35	0.927	20.4	<1	<1	<0.3
MW-203B	11/7/2013	W-C	3.4	2.27	11	2.26	<1	<0.3
DR2-5	11/5/2013	TTA-2	4.73	1.47	53.4	<5	<5	8.52
MW-85	11/6/2013	TTA-2	2.98	0.744	63.3	<1	1.32	5.51
MW-21	11/8/2013	TTA-1N	2.89	1.2	12.8	<1	<1	<0.3
IW21-02B	11/8/2013	TTA-1N	2.77	<5	23	<5	<5	<1.5
IW101-03A	11/10/2013	TTA-1S	2.54	<1	5.9	<1	<1	<0.3
PMW101-02A	11/9/2013	TTA-1S	2.15	1.39	8.62	<2	<2	<0.6
IW101-07B	11/9/2013	TTA-1S	1.92	4.17	58.9	<5	<5	<1.5
PMW101-02B	11/9/2013	TTA-1S	1.58	3.21	37.5	<1	<1	<0.3
IW101-05A	11/10/2013	TTA-1S	1.41	<5	15.7	<5	<5	<1.5
DR1-5A	11/9/2013	TTA-1S	0.848	0.501	26.5	<1	<1	<0.3
IW101-07A	11/9/2013	TTA-1S	0.434	0.292	<1	<1	<1	<0.3
IW85-06	11/7/2013	TTA-2	<50	<50	<50	<50 Q	<50	<15
PMW85-01	11/5/2013	TTA-2	<5	<5	22.6	<5	<5	<1.5
IW101-04B	11/11/2013	TTA-1S	<5	<5	11.9	<5	<5	<1.5
IW101-03B	11/10/2013	TTA-1S	<5	<5	8.82	<5	<5	<1.5
IW92-08	11/6/2013	TTA-2	<20	<20	56.2	<20	<20	<6
IW85-05	11/6/2013	TTA-2	<20	<20	19.8	<20	<20	<6
DR2-2	11/6/2013	TTA-2	<10	<10	<10	<10	<10	<3
IW92-01	11/6/2013	TTA-2	<10	<10	<10	<10	<10	<3
IW101-02C	11/9/2013	TTA-1S	<10	<10	62.9	<10	<10	<3
IW92-07	11/7/2013	TTA-2	<10	<10	42.6	<10	<10	<3
IW101-03C	11/10/2013	TTA-1S	<10	<10	37.4	<10	<10	<3
IW92-03	11/6/2013	TTA-2	<10	<10	34.2	<10	<10	<3
IW101-05C	11/10/2013	TTA-1S	<10	<10	24.4	<10	<10	<3
IW101-04C	11/11/2013	TTA-1S	<10	<10	18.3	<10	<10	<3
IW92-02	11/7/2013	TTA-2	<10	<10	15.1	<10	<10	<3
IW101-04A	11/10/2013	TTA-1S	<10	<10	5.42	<10	<10	<3
PMW101-07A	11/10/2013	TTA-1S	<1	0.265	<1	<1	<1	<0.3

Note: MCL Exceedances shown in bold type.

APPENDIX F
HISTORICAL CVOC RESULTS

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-5

	Sample Name	DR1-5	DR1-5	DR1-5	DR1-5	DR1-5-LB-1	DR1-5-LS-3
	Sample Date	5/22/2004	11/12/2004	2/18/2005	5/19/2005	10/24/2006	4/16/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1 J	<1	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1	0.129	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	4.3	11	17	15	57	69.2
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020. SW8240,
SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-5

	Sample Name	DR1-5-LA-5	DR1-5	DR1-5	DR1-5	DR1-5	DR1-5
	Sample Date	10/1/2007	4/7/2008	10/9/2008	4/8/2009	10/5/2009	3/30/2010
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.148 J	0.165 J	0.181 J	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	0.295 J	<1	<1	<1
Tetrachloroethene	µg/L	69.9	95.8	69.2 J	53.2	37.3	22.2
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	4.28 J	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020. SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-5

	Sample Name	DR1-5	DR1-5	DR1-5	DR1-5	DR1-5	DR1-5
	Sample Date	10/5/2010	3/31/2011	10/4/2011	4/22/2012	10/20/2012	2/6/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<10
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<3
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<10
Tetrachloroethene	µg/L	18.3	18.2	29	29.3	38.6	36.8
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<10
Trichloroethene	µg/L	<1	<1	<1	<1	<1	<10
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<10

Notes:

VOC samples analyzed using methods SW8010/8020. SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-5

Analyte	Sample Name	DR1-5	DR1-5	DR1-5
	Sample Date	5/12/2013	8/20/2013	11/9/2013
UNIT				
Carbon tetrachloride	µg/L	<5	<1	<2
Chloroform	µg/L	<1.5	<0.3	<0.6
cis-1,2-Dichloroethene	µg/L	5.39	12.9	11.6
Tetrachloroethene	µg/L	35.5	15	10.2
trans-1,2-Dichloroethene	µg/L	<5	<1	<2
Trichloroethene	µg/L	<5	0.996 J	0.713
Vinyl chloride	µg/L	<5	<1	<2

Notes:

VOC samples analyzed using methods SW8010/8020. SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-5A

	Sample Name	DR1-5A	DR1-5A	DR1-5A	DR1-5A	DR1-5A	DR1-5A
	Sample Date	5/27/2004	11/12/2004	2/21/2005	5/19/2005	10/23/2006	4/13/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1.7	<5	<1	<1	<1	<1
Chloroform	µg/L	0.71 J	<5	0.4 B	0.29 B	0.306	0.274 J
cis-1,2-Dichloroethene	µg/L	1.7	5.2	4.6	4.1	3.46	3.19
Tetrachloroethene	µg/L	24	47	55	47	50.9	49.6
trans-1,2-Dichloroethene	µg/L	<1.7	<5	<1	<1	<1	<1
Trichloroethene	µg/L	47	110	110	100	98.1	84
Vinyl chloride	µg/L	<1.7	<5	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-5A

	Sample Name	DR1-5A	DR1-5A	DR1-5A	DR1-5A	DR1-5A	DR1-5A
	Sample Date	10/1/2007	4/8/2008	10/9/2008	4/8/2009	10/5/2009	3/30/2010
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.252 J	0.187 J	0.343 J	0.217 J	0.204 J	0.205 J
cis-1,2-Dichloroethene	µg/L	3.16	1.82	4.75 J	3.19	3.39	3.58
Tetrachloroethene	µg/L	46.8	34.9	59.7 J	56.3	54.9	59.4
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	78.6	58.7	114 J	95.7	92.8	96.6
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or

µg/L micrograms per liter

DQE FLAGS:

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-5A

	Sample Name	DR1-5A	DR1-5A	DR1-5A	DR1-5A	DR1-5A	DR1-5A
	Sample Date	10/5/2010	3/31/2011	10/4/2011	4/22/2012	10/20/2012	2/6/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<10
Chloroform	µg/L	0.197 J	0.197 J	0.191 J	<0.3	0.167 J	<3
cis-1,2-Dichloroethene	µg/L	3.88	2.9	2.76	2.26	2.41	<10
Tetrachloroethene	µg/L	70.4	50.4	49.7	46.7	49.7	43.8
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<10
Trichloroethene	µg/L	110	86.3	77.6	74.4	80.5	62.1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or

µg/L micrograms per liter

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-5A

Analyte	Sample Name	DR1-5A	DR1-5A	DR1-5A
	Sample Date	5/11/2013	8/20/2013	11/9/2013
	UNIT			
Carbon tetrachloride	µg/L	<10	<1	<1
Chloroform	µg/L	<3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	85.4	91.8	26.5
Tetrachloroethene	µg/L	<10	0.649 J	0.848
trans-1,2-Dichloroethene	µg/L	<10	<1	<1
Trichloroethene	µg/L	4.27 J	1.01	0.501
Vinyl chloride	µg/L	<10	0.479 J	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or

µg/L micrograms per liter

DQE FLAGS:

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- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-6

Analyte	Sample Name	DR1-6	DR1-6	DR1-6	DR1-6	DR1-6-LB-1	DR1-6-LS-3
	Sample Date	6/26/2004	11/10/2004	2/17/2005	5/18/2005	10/24/2006	4/13/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	3.3	6.2	4.1	3.8	1.59	1.91
Tetrachloroethene	µg/L	13	21	20	26	184	173
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	1.6	2.4	2.2	2.1	1.85	1.83
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.

SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-6

	Sample Name	DR1-6-LA-5	DR1-6	DR1-6	DR1-6	DR1-6	DR1-6
	Sample Date	10/1/2007	4/8/2008	10/7/2008	4/8/2009	10/6/2009	4/1/2010
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	1.42	1.09	1.38	1.31	1.49	1.37
Tetrachloroethene	µg/L	191 J	195	122	197	183	225
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	1.58	1.27	4.61	1.44	1.59	1.56
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-6

Analyte	Sample Name	DR1-6	DR1-6	DR1-6	DR1-6	DR1-6	DR1-6
	Sample Date	10/5/2010	4/1/2011	10/4/2011	4/22/2012	10/20/2012	2/6/2013
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	1.69	1.56	1.31	1.02	0.865 J	0.553
Tetrachloroethene	µg/L	239	193	168	161	186	263
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	1.89	1.7	1.28	1.16	1.49	1.22
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-6

Analyte	Sample Name	DR1-6	DR1-6	DR1-6
	Sample Date	5/12/2013	8/16/2013	11/9/2013
UNIT				
Carbon tetrachloride	µg/L	<1	<5	<1
Chloroform	µg/L	<0.3	<1.5	<0.3
cis-1,2-Dichloroethene	µg/L	20	13.6	8.42
Tetrachloroethene	µg/L	126	119	148
trans-1,2-Dichloroethene	µg/L	<1	<5	<1
Trichloroethene	µg/L	1.35	2.89 J	1.69
Vinyl chloride	µg/L	<1	<5	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-6A

	Sample Name	DR1-6A	DR1-6A	DR1-6A	DR1-6A	DR1-6A-LB-1	DR1-6A-LS-3
	Sample Date	6/26/2004	11/10/2004	2/17/2005	5/18/2005	10/24/2006	4/13/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<3.3	<1	<1	<1	<1
Chloroform	µg/L	<1	<3.3	0.17 J	<1	0.18	0.236 J
cis-1,2-Dichloroethene	µg/L	--	3J	4.1	3.5	4.81	5.98
Tetrachloroethene	µg/L	--	17	28	21	28.4	34.4
trans-1,2-Dichloroethene	µg/L	--	<3.3	<1	<1	<1	<1
Trichloroethene	µg/L	9.1	88	140	97	118	139
Vinyl chloride	µg/L	--	<3.3	<1	<2	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-6A

	Sample Name	DR1-6A-LA-5	DR1-6A	DR1-6A	DR1-6A	DR1-6A	DR1-6A
	Sample Date	10/1/2007	4/8/2008	10/7/2008	4/8/2009	10/6/2009	4/1/2010
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.183 J	0.215 J	0.238 J	0.214 J	0.245 J	0.193 J
cis-1,2-Dichloroethene	µg/L	4.24	2.99	3.81	4.33	4.89	4.05
Tetrachloroethene	µg/L	30.2	30.8	39.6	32.5	43	43.5
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	107	110	142	125	163	122
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-6A

	Sample Name	DR1-6A	DR1-6A	DR1-6A	DR1-6A	DR1-6A	DR1-6A
	Sample Date	10/5/2010	4/1/2011	10/4/2011	4/22/2012	10/20/2012	2/6/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.271 J	0.32	0.248 J	0.195 J	0.238 J	<0.3
cis-1,2-Dichloroethene	µg/L	5.08	7.83	9.24	7.71	8.58	34.1
Tetrachloroethene	µg/L	60.1	57.8	60.3	51.3	53.8	40.8
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	149	166	166	154	165	98
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR1-6A

Analyte	Sample Name	DR1-6A	DR1-6A	DR1-6A
	Sample Date	5/12/2013	8/16/2013	11/9/2013
	UNIT			
Carbon tetrachloride	µg/L	<10	<5	<1
Chloroform	µg/L	<3	<1.5	<0.3
cis-1,2-Dichloroethene	µg/L	110	86.8	132
Tetrachloroethene	µg/L	<10	9.75	1.49
trans-1,2-Dichloroethene	µg/L	<10	<5	<1
Trichloroethene	µg/L	<10	26.4	2.12
Vinyl chloride	µg/L	<10	<5	0.398

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR2-2

	Sample Name Sample Date	DR2-2 6/9/2004	DR2-2 11/13/2004	DR2-2 2/23/2005	DR2-2 5/19/2005	DR2-2-LB-1 10/3/2006	DR2-2-LS-3 4/13/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	1.8	5	4.2	4.7	4.19	6.78
Chloroform	µg/L	0.64 J	1.5	1.5	1.2 B	1.05	1.76
cis-1,2-Dichloroethene	µg/L	<1	2.7	2.5	2.4	1.9	3.47
Tetrachloroethene	µg/L	10	36	16	40	23.2	49.2
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	2.6	4.1	2.8	3.8	3.13	3.49
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR2-2

	Sample Name	DR2-2-LA-5	DR2-2	DR2-2	DR2-2	DR2-2	DR2-2
	Sample Date	10/1/2007	4/8/2008	10/9/2008	4/10/2009	10/11/2009	4/7/2010
Analyte	UNIT						
Carbon tetrachloride	µg/L	10.8	13.4	13.8	16.2	7.75	7.46
Chloroform	µg/L	2.86	3.65	3.87	4.23	1.91	1.44
cis-1,2-Dichloroethene	µg/L	5.7	7.04	6.86	7.39	4.79	3.3
Tetrachloroethene	µg/L	76.7	124	120	159	97.3	69.2
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	4.04	4.25	3.96	3.82	4.02	3.63
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR2-2

	Sample Name	DR2-2	DR2-2	DR2-2	DR2-2	DR2-2	DR2-2
	Sample Date	10/12/2010	4/3/2011	10/2/2011	4/20/2012	10/22/2012	2/9/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	4.87	4.56	4.37	4.96	5.28	2.34
Chloroform	µg/L	0.63	0.563	0.714	0.686	0.944	1.95
cis-1,2-Dichloroethene	µg/L	1.06	1.14	1.31	1.25	1.66	13.9
Tetrachloroethene	µg/L	25.6	38.9	35.9 J	34.5	41.6	33.3
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	2.45 B	3.27	2.92	2.89	2.92	2.15
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR2-2

Analyte	Sample Name	DR2-2	DR2-2	DR2-2
	Sample Date	5/10/2013	8/14/2013	11/6/2013
UNIT				
Carbon tetrachloride	µg/L	<1	<5	<10
Chloroform	µg/L	<0.3	<1.5	<3
cis-1,2-Dichloroethene	µg/L	44.9	14.5	<10
Tetrachloroethene	µg/L	0.801 J	2.61 J	<10
trans-1,2-Dichloroethene	µg/L	<1	<5	<10
Trichloroethene	µg/L	<1	<5	<10
Vinyl chloride	µg/L	0.38 J	<5	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR2-5

	Sample Name	DR2-5	DR2-5	DR2-5	DR2-5	DR2-5-BL	DR2-5-EBT-1
	Sample Date	6/23/2004	11/14/2004	2/23/2005	5/23/2005	8/31/2006	12/7/2006
Analyte	UNIT						
Carbon tetrachloride	µg/L	240	200	200	260	142	100
Chloroform	µg/L	82	68	64	79	46.7	35.8
cis-1,2-Dichloroethene	µg/L	44	39	41	35J	31	27.7
Tetrachloroethene	µg/L	88	71	75	88	54.2	45.3
trans-1,2-Dichloroethene	µg/L	<6.7	<5.7	<1	<1	0.506 J	0.287 J
Trichloroethene	µg/L	29	25	32	21J	18.3	15.4
Vinyl chloride	µg/L	<6.7	<5.7	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR2-5

	Sample Name	DR2-5-EBT-2	DR2-5-EBT-3	DR2-5-EBT-4	DR2-5-EBT-5	DR2-5	DR2-5
	Sample Date	3/13/2007	5/29/2007	9/13/2007	12/10/2007	3/12/2008	6/18/2008
Analyte	UNIT						
Carbon tetrachloride	µg/L	130	132 J	123	138	114	103
Chloroform	µg/L	43	37.6	42.2	43.6	40.9	37.2
cis-1,2-Dichloroethene	µg/L	32.9	25.9	30.5	33.7	32	29.2
Tetrachloroethene	µg/L	48.4	41.1	46.8	57.3	49.5	41.7
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	1.62
Trichloroethene	µg/L	18.5	14.4	16	18.9	17.5	13.7
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR2-5

Analyte	Sample Name	DR2-5	DR2-5	DR2-5	DR2-5	DR2-5	DR2-5
	Sample Date	12/17/2008	3/13/2009	10/10/2009	4/7/2010	10/13/2010	4/2/2011
UNIT							
Carbon tetrachloride	µg/L	112 J	206	94.4	217	25	175 J
Chloroform	µg/L	37.9	68.8	52	69.3	21.5	67
cis-1,2-Dichloroethene	µg/L	34.5	62	47.2	71.7	105	87.1
Tetrachloroethene	µg/L	48.9	114	47.7	98.7	21.1	68.3
trans-1,2-Dichloroethene	µg/L	1.07	<1	<1	<1	<1	<1
Trichloroethene	µg/L	17	35	20.7	33.2	12.1	32.3
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR2-5

	Sample Name	DR2-5	DR2-5	DR2-5	DR2-5	DR2-5	DR2-5
	Sample Date	10/2/2011	4/20/2012	10/19/2012	2/9/2013	5/8/2013	8/14/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	167	168	196	69.6	78.4	5.2
Chloroform	µg/L	66.2	52	56.1	45.7	40	48.3
cis-1,2-Dichloroethene	µg/L	87.4	65.1	72.8	113	118	120
Tetrachloroethene	µg/L	86.5	103	99.9	33.7	29.9	44.9
trans-1,2-Dichloroethene	µg/L	0.396 J	<1	0.271 J	<1	<1	<1
Trichloroethene	µg/L	37.8	38	38.2	17.3	14	21.8
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

DR2-5

Analyte	Sample Name	DR2-5
	Sample Date	11/5/2013
UNIT		
Carbon tetrachloride	µg/L	<5
Chloroform	µg/L	8.52
cis-1,2-Dichloroethene	µg/L	53.4
Tetrachloroethene	µg/L	4.73
trans-1,2-Dichloroethene	µg/L	<5
Trichloroethene	µg/L	1.47
Vinyl chloride	µg/L	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-01A

	Sample Name	IW21-01A	IW21-01A	IW21-01A	IW21-01A	IW21-01A	IW21-01A
	Sample Date	8/8/2006	12/11/2006	3/8/2007	6/5/2007	9/14/2007	12/17/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.231 J	<0.3	0.248 J	<0.3	0.161 J	<0.3
cis-1,2-Dichloroethene	µg/L	3.17	3.05	9.09	12.6	49.5	88.2
Tetrachloroethene	µg/L	234	197	111	41.5	88.6	30.9
trans-1,2-Dichloroethene	µg/L	0.463 J	0.462 J	0.537 J	<1	<1	0.254 J
Trichloroethene	µg/L	55.7	63.8	35.9	15.6	41.9	21.7
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-01A

	Sample Name	IW21-01A	IW21-01A	IW21-01A	IW21-01A	IW21-01A	IW21-01A
	Sample Date	3/17/2008	6/17/2008	12/15/2008	3/16/2009	12/8/2011	2/5/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<10
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<3
cis-1,2-Dichloroethene	µg/L	80.2	91.4	75.2	104	10.6	134
Tetrachloroethene	µg/L	20.7	21.7	4.52	3.41	166	<10
trans-1,2-Dichloroethene	µg/L	0.283 J	0.303 J	<1	0.388 J	<1	<10
Trichloroethene	µg/L	13.1	16.7	5.19	2.26	27.1	<10
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-01A

Analyte	Sample Name	IW21-01A	IW21-01A	IW21-01A
	Sample Date	5/7/2013	8/18/2013	11/7/2013
	UNIT			
Carbon tetrachloride	µg/L	<5	<5	<5
Chloroform	µg/L	<1.5	<1.5	<1.5
cis-1,2-Dichloroethene	µg/L	166	148	109
Tetrachloroethene	µg/L	1.48 J	6.35	9.93
trans-1,2-Dichloroethene	µg/L	<5	<5	<5
Trichloroethene	µg/L	2.09 J	3.35 J	6
Vinyl chloride	µg/L	<5	<5	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-01B

Analyte	Sample Name	IW21-01B	IW21-01B	IW21-01B	IW21-01B	IW21-01B	IW21-01B
	Sample Date	8/8/2006	12/11/2006	3/8/2007	6/5/2007	9/19/2007	12/17/2007
	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.158 J	0.192 J	0.141 J	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	1.99	2.42	0.917 J	64.8	109	59.3
Tetrachloroethene	µg/L	144	151	90.5	46.9	1.32	0.714 J
trans-1,2-Dichloroethene	µg/L	<1	0.526 J	0.716 J	0.932 J	0.45 J	0.307 J
Trichloroethene	µg/L	30.1	35.2	5.43	26.8	1.28	0.396 J
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-01B

Analyte	Sample Name	IW21-01B	IW21-01B	IW21-01B	IW21-01B	IW21-01B	IW21-01B
	Sample Date	3/17/2008	6/17/2008	12/15/2008	3/17/2009	12/8/2011	2/5/2013
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<5
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<1.5
cis-1,2-Dichloroethene	µg/L	9.37	35.2	63.7	40.8	11.5	13.2
Tetrachloroethene	µg/L	1.46	<1	5.72	7.13	104	4.62 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<5
Trichloroethene	µg/L	2.43	<1	2.89	4	16	1.51 J
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-01B

Analyte	Sample Name	IW21-01B	IW21-01B	IW21-01B
	Sample Date	5/10/2013	8/18/2013	11/7/2013
	UNIT			
Carbon tetrachloride	µg/L	<5	<1	<1
Chloroform	µg/L	<1.5	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	54.6	41.6	81.4
Tetrachloroethene	µg/L	<5	<1	11.3
trans-1,2-Dichloroethene	µg/L	<5	<1	<1
Trichloroethene	µg/L	<5	<1	4.23
Vinyl chloride	µg/L	<5	<1	0.284 J

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-02A

	Sample Name	IW21-02A	IW21-02A	IW21-02A	IW21-02A	IW21-02A	IW21-02A
	Sample Date	8/9/2006	12/11/2006	3/9/2007	6/6/2007	9/20/2007	12/17/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	0.127 J	0.145 J
cis-1,2-Dichloroethene	µg/L	1.78	1.45	1.37	1.32	2.05	6.68
Tetrachloroethene	µg/L	99.7	117 J	119	127	132	156
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	17	21.4	19.9	19.4	23.7	26
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-02A

	Sample Name	IW21-02A	IW21-02A	IW21-02A	IW21-02A	IW21-02A	IW21-02A
	Sample Date	3/17/2008	6/17/2008	12/15/2008	3/16/2009	12/8/2011	2/6/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<10
Chloroform	µg/L	0.129 J	0.169 J	<0.3	<0.3	<0.3	<3
cis-1,2-Dichloroethene	µg/L	14.3	15.8	24.1	38.6	3.08	17.1
Tetrachloroethene	µg/L	151	119	62.9	111	32.5	33.8
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<10
Trichloroethene	µg/L	23.2	21.6	13.9	17.8	3	2.96 J
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-02A

Analyte	Sample Name	IW21-02A	IW21-02A	IW21-02A
	Sample Date	5/10/2013	8/17/2013	11/8/2013
	UNIT			
Carbon tetrachloride	µg/L	<5	<5	<5
Chloroform	µg/L	<1.5	<1.5	<1.5
cis-1,2-Dichloroethene	µg/L	72.6	86.7	77.7
Tetrachloroethene	µg/L	2.69 J	<5	1.87 J
trans-1,2-Dichloroethene	µg/L	<5	<5	<5
Trichloroethene	µg/L	<5	<5	<5
Vinyl chloride	µg/L	<5	<5	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-02B

Analyte	Sample Name	IW21-02B	IW21-02B	IW21-02B	IW21-02B	IW21-02B	IW21-02B
	Sample Date	8/8/2006	12/11/2006	3/9/2007	6/6/2007	9/20/2007	12/17/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	0.99 J	0.888 J	0.787 J	0.799 J	14.2	38.6
Tetrachloroethene	µg/L	80.2	99.2	87.4 J	94.3	75.8 J	67.1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	14.8	16.3	11.6	11.2	12.8	6.64
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-02B

	Sample Name	IW21-02B	IW21-02B	IW21-02B	IW21-02B	IW21-02B	IW21-02B
	Sample Date	3/17/2008	6/18/2008	12/16/2008	3/16/2009	12/8/2011	2/6/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<5	<1	<1	<10
Chloroform	µg/L	<0.3	<0.3	<1.5	<0.3	<0.3	<3
cis-1,2-Dichloroethene	µg/L	49.8	82.8	2.37 J	4.41	2.15	4.6 J
Tetrachloroethene	µg/L	76.3	68	18.6	10.7	31.6	13.5
trans-1,2-Dichloroethene	µg/L	<1	1.65	<5	<1	<1	<10
Trichloroethene	µg/L	6.94	5.75	2.12 J	1.76	3.06	<10
Vinyl chloride	µg/L	<1	<1	<5	<1	<1	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-02B

Analyte	Sample Name	IW21-02B	IW21-02B	IW21-02B
	Sample Date	5/10/2013	8/17/2013	11/8/2013
	UNIT			
Carbon tetrachloride	µg/L	<5	<5	<5
Chloroform	µg/L	<1.5	<1.5	<1.5
cis-1,2-Dichloroethene	µg/L	14.1	25.2	23
Tetrachloroethene	µg/L	7.91	<5	2.77 J
trans-1,2-Dichloroethene	µg/L	<5	<5	<5
Trichloroethene	µg/L	<5	<5	<5
Vinyl chloride	µg/L	<5	<5	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-03A

Analyte	Sample Name	IW21-03A	IW21-03A	IW21-03A	IW21-03A	IW21-03A	IW21-03A
	Sample Date	8/9/2006	12/11/2006	3/8/2007	6/6/2007	9/20/2007	12/17/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	0.136 J	0.196 J	0.184 J	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	2.71	1.75	2.13	2.25	1.77	7.84
Tetrachloroethene	µg/L	193	158	167	189	79.4	89.4
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	56.1	50.9	47.7	52.4	31.3	29.6
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit
UJ Undetected, reporting limit is inaccurate or imprecise

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-03A

	Sample Name	IW21-03A	IW21-03A	IW21-03A	IW21-03A	IW21-03A	IW21-03A
	Sample Date	3/17/2008	6/18/2008	12/16/2008	3/16/2009	12/9/2011	2/6/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.144 J	0.156 J	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	9.52	31.6	96.8	134	7.09	182
Tetrachloroethene	µg/L	133	127	0.397 J	3.66	213	6.89
trans-1,2-Dichloroethene	µg/L	<1	1.53	0.585 J	0.624 J	0.554 J	0.749 J
Trichloroethene	µg/L	42.6	42.9	<1	4.09	45.9	2.94
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	0.497 J

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit
UJ Undetected, reporting limit is inaccurate or imprecise

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-03A

Analyte	Sample Name	IW21-03A	IW21-03A	IW21-03A
	Sample Date	5/8/2013	8/19/2013	11/8/2013
	UNIT			
Carbon tetrachloride	µg/L	<1	<1 UJ	<1
Chloroform	µg/L	<0.3	<0.3 UJ	<0.3
cis-1,2-Dichloroethene	µg/L	174	196 J	209
Tetrachloroethene	µg/L	2.31	5.77 J	1.21
trans-1,2-Dichloroethene	µg/L	0.619 J	1.04 J	1.13
Trichloroethene	µg/L	1.22	2.39 J	0.652 J
Vinyl chloride	µg/L	<1	<1 UJ	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit
UJ Undetected, reporting limit is inaccurate or imprecise

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-03B

Analyte	Sample Name	IW21-03B	IW21-03B	IW21-03B	IW21-03B	IW21-03B	IW21-03B
	Sample Date	8/9/2006	12/11/2006	3/8/2007	6/6/2007	9/20/2007	12/17/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	0.916 J	0.633 J	<1	2.34	3.1	13.5
Tetrachloroethene	µg/L	49.4 J	50.8	16.3	42.3	56.4	36.6
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	23.4	19.1	11.6	26.4	21	15.8
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-03B

	Sample Name	IW21-03B	IW21-03B	IW21-03B	IW21-03B	IW21-03B	IW21-03B
	Sample Date	3/17/2008	6/18/2008	12/16/2008	3/16/2009	12/9/2011	2/7/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<5	<1	<1	<20
Chloroform	µg/L	<0.3	<0.3	<1.5	<0.3	<0.3	<6
cis-1,2-Dichloroethene	µg/L	10.1	21.8	16.1	34	51.2	98.8
Tetrachloroethene	µg/L	31.4	24.2	<5	0.3 J	197	<20
trans-1,2-Dichloroethene	µg/L	<1	<1	<5	<1	0.837 J	<20
Trichloroethene	µg/L	19.6	13.8	<5	1.32	68.5	<20
Vinyl chloride	µg/L	<1	<1	<5	<1	<1	<20

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-03B

Analyte	Sample Name	IW21-03B	IW21-03B	IW21-03B
	Sample Date	5/11/2013	8/19/2013	11/8/2013
	UNIT			
Carbon tetrachloride	µg/L	<20	<1	<1
Chloroform	µg/L	<6	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	119	134	135
Tetrachloroethene	µg/L	<20	5.07	0.526 J
trans-1,2-Dichloroethene	µg/L	<20	0.747 J	0.877 J
Trichloroethene	µg/L	<20	1.51	<1
Vinyl chloride	µg/L	<20	0.628 J	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-04A

Analyte	Sample Name	IW21-04A	IW21-04A	IW21-04A	IW21-04A	IW21-04A	IW21-04A
	Sample Date	8/10/2006	12/11/2006	3/12/2007	6/6/2007	9/19/2007	12/14/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.275 J	<0.3	<0.3	0.143 J	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	4.13	70.3	68.8	17.9	87.1	37.3
Tetrachloroethene	µg/L	276	79	142	127	14.8	19.2
trans-1,2-Dichloroethene	µg/L	1.4	0.894 J	0.784 J	<1	0.274 J	<1
Trichloroethene	µg/L	64.5	28.8	46.1	38.1	7.54	9.47
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-04A

	Sample Name	IW21-04A	IW21-04A	IW21-04A	IW21-04A	IW21-04A	IW21-04A
	Sample Date	3/18/2008	6/18/2008	12/16/2008	3/17/2009	12/9/2011	2/6/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<5	<1	<1	<10
Chloroform	µg/L	<0.3	<0.3	<1.5	<0.3	<0.3	<3
cis-1,2-Dichloroethene	µg/L	62.2	72.6	65	70.8	48.8 J	65.2
Tetrachloroethene	µg/L	10.5	32.4	5.46	8.75	135	6.98 J
trans-1,2-Dichloroethene	µg/L	0.391 J	0.843 J	<5	<1	<1	<10
Trichloroethene	µg/L	5.77	14.4	3.89 J	7.76	33.3 J	2.53 J
Vinyl chloride	µg/L	<1	<1	<5	<1	<1	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-04A

Analyte	Sample Name	IW21-04A	IW21-04A	IW21-04A
	Sample Date	5/11/2013	8/19/2013	11/8/2013
	UNIT			
Carbon tetrachloride	µg/L	<10	<20	<5
Chloroform	µg/L	<3	<6	<1.5
cis-1,2-Dichloroethene	µg/L	78.6	94.9	95.1
Tetrachloroethene	µg/L	<10	<20	2.37 J
trans-1,2-Dichloroethene	µg/L	<10	<20	<5
Trichloroethene	µg/L	<10	<20	<5
Vinyl chloride	µg/L	<10	<20	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-04B

	Sample Name	IW21-04B	IW21-04B	IW21-04B	IW21-04B	IW21-04B	IW21-04B
	Sample Date	8/10/2006	12/12/2006	3/9/2007	6/6/2007	9/19/2007	12/17/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.28 J	0.221 J	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	3.57	12.8	30.8	26.1	74.4	5.41
Tetrachloroethene	µg/L	286	223	101	68	10.2	4.62
trans-1,2-Dichloroethene	µg/L	1.26	1.77	0.66 J	<1	<1	<1
Trichloroethene	µg/L	56.4	55.6	33.6	29	7.35	3.55
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-04B

	Sample Name	IW21-04B	IW21-04B	IW21-04B	IW21-04B	IW21-04B	IW21-04B
	Sample Date	3/18/2008	6/18/2008	12/16/2008	3/17/2009	12/9/2011	2/6/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<5	<1	<1	<10
Chloroform	µg/L	<0.3	<0.3	<1.5	<0.3	<0.3	<3
cis-1,2-Dichloroethene	µg/L	15.4	22	22	16.7	101	28.8
Tetrachloroethene	µg/L	1.49	2.41	<5	0.383 J	40.9	4.32 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<5	<1	<1	<10
Trichloroethene	µg/L	2.76	2.2	1.31 J	0.956 J	19	<10
Vinyl chloride	µg/L	<1	<1	<5	<1	<1	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW21-04B

Analyte	Sample Name	IW21-04B	IW21-04B	IW21-04B
	Sample Date	5/8/2013	8/19/2013	11/8/2013
	UNIT			
Carbon tetrachloride	µg/L	<10	<10	<5
Chloroform	µg/L	<3	<3	<1.5
cis-1,2-Dichloroethene	µg/L	49.1	55.6	90.8
Tetrachloroethene	µg/L	<10	<10	<5
trans-1,2-Dichloroethene	µg/L	<10	<10	<5
Trichloroethene	µg/L	2.66 J	<10	<5
Vinyl chloride	µg/L	<10	<10	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW85-05

	Sample Name	IW85-05	IW85-05	IW85-05	IW85-05	IW85-05	IW85-05
	Sample Date	3/14/2007	6/4/2007	9/14/2007	12/19/2007	3/19/2008	6/17/2008
Analyte	UNIT						
Carbon tetrachloride	µg/L	199	169	62.2	59.8	32.2	5.6
Chloroform	µg/L	67.7	82.4	73.5	87.4	143	36.4 J
cis-1,2-Dichloroethene	µg/L	27.1	15.3	40.5	36.3	54.3	105
Tetrachloroethene	µg/L	76.4	67.3	21.4	31.2	45	1.39
trans-1,2-Dichloroethene	µg/L	<1	0.315 J	<1	<1	<1	<1
Trichloroethene	µg/L	25.1	18.5	10.3	10.1	15.3	0.963 J
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW85-05

	Sample Name	IW85-05	IW85-05	IW85-05	IW85-05	IW85-05	IW85-05
	Sample Date	12/15/2008	3/13/2009	12/14/2011	2/11/2013	5/8/2013	8/14/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	50.6	<50	<25	<25
Chloroform	µg/L	37.8	3.94	21.2	<15	<7.5	<7.5
cis-1,2-Dichloroethene	µg/L	70.8	49	67.6	50.4	44.4	37.6
Tetrachloroethene	µg/L	8.34	1.87	32.8	<50	<25	<25
trans-1,2-Dichloroethene	µg/L	<1	<1	0.633 J	<50	<25	<25
Trichloroethene	µg/L	6.23	0.824 J	13.1	<50	<25	<25
Vinyl chloride	µg/L	<1	<1	<1	<50	<25	<25

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW85-05

Analyte	Sample Name	IW85-05
	Sample Date	11/6/2013
UNIT		
Carbon tetrachloride	µg/L	<20
Chloroform	µg/L	<6
cis-1,2-Dichloroethene	µg/L	19.8 J
Tetrachloroethene	µg/L	<20
trans-1,2-Dichloroethene	µg/L	<20
Trichloroethene	µg/L	<20
Vinyl chloride	µg/L	<20

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW85-06

	Sample Name	IW85-06	IW85-06	IW85-06	IW85-06	IW85-06	IW85-06
	Sample Date	3/14/2007	6/6/2007	9/13/2007	12/19/2007	3/19/2008	6/17/2008
Analyte	UNIT						
Carbon tetrachloride	µg/L	3.02	7.5	1.02	0.665 J	27	<1
Chloroform	µg/L	39.6	76.9	87.9	6.6	20.5	0.641 J
cis-1,2-Dichloroethene	µg/L	18.4	121	105	94.2	68.8	65.6
Tetrachloroethene	µg/L	31	1.98 B	2.35	2.7	16.1	0.925 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	9.93	1.67	2.16	0.709 J	6.41	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW85-06

	Sample Name	IW85-06	IW85-06	IW85-06	IW85-06	IW85-06	IW85-06
	Sample Date	12/12/2008	3/13/2009	12/14/2011	2/10/2013	5/9/2013	8/15/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	0.908 J	6.69	0.546 J	<10	<10	<25
Chloroform	µg/L	6.23	8.38	0.24 J	<3	<3	<7.5
cis-1,2-Dichloroethene	µg/L	36.7	37.8	99.3	28.4	20.4	16.2 J
Tetrachloroethene	µg/L	3.18	5.48	1.45	<10	<10	<25
trans-1,2-Dichloroethene	µg/L	<1	<1	0.802 J	<10	<10	<25
Trichloroethene	µg/L	2.07	2.72	1.31	<10	<10	<25
Vinyl chloride	µg/L	<1	<1	0.606 J	<10	<10	<25

Notes:

VOC samples analyzed using methods SW8010/8020,
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW85-06

Analyte	Sample Name	IW85-06
	Sample Date	11/7/2013
UNIT		
Carbon tetrachloride	µg/L	<50
Chloroform	µg/L	<15
cis-1,2-Dichloroethene	µg/L	<50
Tetrachloroethene	µg/L	<50
trans-1,2-Dichloroethene	µg/L	<50
Trichloroethene	µg/L	<50
Vinyl chloride	µg/L	<50

Notes:

VOC samples analyzed using methods SW8010/8020,
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-01

	Sample Name	IW92-01	IW92-01	IW92-01	IW92-01	IW92-01	IW92-01
	Sample Date	8/31/2006	12/12/2006	3/12/2007	6/1/2007	9/19/2007	12/13/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	22.7	23.6	18.8	8.67	6.33	1.28
Chloroform	µg/L	7.83	9.7	9.02	13.9	11	11.9
cis-1,2-Dichloroethene	µg/L	14.1	15.2	11.1	78.6	65.4	130
Tetrachloroethene	µg/L	160	228	170	71.4	42.9	29
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	0.297 J
Trichloroethene	µg/L	6.36	7.45	6.09	25	14	9.47
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-01

	Sample Name	IW92-01	IW92-01	IW92-01	IW92-01	IW92-01	IW92-01
	Sample Date	3/13/2008	6/9/2008	12/16/2008	3/11/2009	12/12/2011	2/9/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	0.808 J	<1	<5	<1	25.8	<1
Chloroform	µg/L	5.75	9.1	<1.5	<0.3	7.46	1.96
cis-1,2-Dichloroethene	µg/L	50.6	107	97	83.3	10.4	117
Tetrachloroethene	µg/L	7.5	3.24	<5	0.264 J	189	3.17
trans-1,2-Dichloroethene	µg/L	<1	<1	<5	<1	<1	<1
Trichloroethene	µg/L	2.75	2.25	<5	<1	6.71	1.88
Vinyl chloride	µg/L	<1	<1	<5	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-01

Analyte	Sample Name	IW92-01	IW92-01	IW92-01
	Sample Date	5/11/2013	8/20/2013	11/6/2013
	UNIT			
Carbon tetrachloride	µg/L	<1	<5	<10
Chloroform	µg/L	<0.3	<1.5	<3
cis-1,2-Dichloroethene	µg/L	21.6	4.14 J	<10
Tetrachloroethene	µg/L	<1	<5	<10
trans-1,2-Dichloroethene	µg/L	<1	<5	<10
Trichloroethene	µg/L	<1	<5	<10
Vinyl chloride	µg/L	0.359 J	<5	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-02

	Sample Name	IW92-02	IW92-02	IW92-02	IW92-02	IW92-02	IW92-02
	Sample Date	8/31/2006	12/12/2006	3/14/2007	6/7/2007	9/19/2007	12/14/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	13	38.7	4.37	9.79	3.17	0.295 J
Chloroform	µg/L	9.49	25.2	14.1	23	12.3	12.7
cis-1,2-Dichloroethene	µg/L	10.4	3.27	9.94	113	105	123
Tetrachloroethene	µg/L	104	228	54	90.5	13.4	3.18
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	4.01	4.68	6.58	14.2	4.55	0.872 J
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-02

	Sample Name	IW92-02	IW92-02	IW92-02	IW92-02	IW92-02	IW92-02
	Sample Date	3/14/2008	6/10/2008	12/16/2008	3/11/2009	12/12/2011	2/9/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	5.18	3.67	<5	<1	27.9	<20
Chloroform	µg/L	10.4	27.7	5.68	0.268 J	9.53	<6
cis-1,2-Dichloroethene	µg/L	37.6	90.5	139	126	45.7	28.8
Tetrachloroethene	µg/L	36.3	38.6	<5	0.371 J	191	11.5 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<5	<1	<1	<20
Trichloroethene	µg/L	2.73	8.63	<5	<1	9.78	<20
Vinyl chloride	µg/L	<1	<1	<5	0.672 J	<1	<20

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-02

Analyte	Sample Name	IW92-02	IW92-02	IW92-02
	Sample Date	5/7/2013	8/14/2013	11/7/2013
	UNIT			
Carbon tetrachloride	µg/L	<5	<50	<10
Chloroform	µg/L	<1.5	<15	<3
cis-1,2-Dichloroethene	µg/L	107	18.2 J	15.1
Tetrachloroethene	µg/L	2.1 J	<50	<10
trans-1,2-Dichloroethene	µg/L	<5	<50	<10
Trichloroethene	µg/L	<5	<50	<10
Vinyl chloride	µg/L	<5	<50	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-03

	Sample Name	IW92-03	IW92-03	IW92-03	IW92-03	IW92-03	IW92-03
	Sample Date	8/31/2006	12/12/2006	3/13/2007	6/6/2007	9/18/2007	12/14/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	30.5	5.27	8.72	1.8	<1	<1
Chloroform	µg/L	12.8	24.7	14.3	12.2	7.05	7.84
cis-1,2-Dichloroethene	µg/L	9.31	2.62	9.13	40.2	105	107
Tetrachloroethene	µg/L	184	173	181	146	9.74	7.48
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	6.84	4.19	5.91	14.4	3.21	1.94
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-03

	Sample Name	IW92-03	IW92-03	IW92-03	IW92-03	IW92-03	IW92-03
	Sample Date	3/14/2008	6/10/2008	12/15/2008	3/10/2009	12/12/2011	2/9/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	0.308 J	<50
Chloroform	µg/L	4.03	3.36	<0.3	<0.3	0.442	<15
cis-1,2-Dichloroethene	µg/L	53	63.9	147	50	143	42.9 J
Tetrachloroethene	µg/L	4.37	2.4	0.924 J	<1	21.2	<50
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<50
Trichloroethene	µg/L	1.36	1.56	<1	<1	4.33	<50
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<50

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-03

Analyte	Sample Name	IW92-03	IW92-03
	Sample Date	8/19/2013	11/6/2013
	UNIT		
Carbon tetrachloride	µg/L	<10	<10
Chloroform	µg/L	<3	<3
cis-1,2-Dichloroethene	µg/L	44.9	34.2
Tetrachloroethene	µg/L	<10	<10
trans-1,2-Dichloroethene	µg/L	<10	<10
Trichloroethene	µg/L	<10	<10
Vinyl chloride	µg/L	<10	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-07

Analyte	Sample Name	IW92-07	IW92-07	IW92-07	IW92-07	IW92-07	IW92-07
	Sample Date	9/1/2006	12/13/2006	3/14/2007	6/7/2007	9/14/2007	12/17/2007
UNIT							
Carbon tetrachloride	µg/L	38.4	39.9	25.7	15.5	10.5	3.82
Chloroform	µg/L	21	20.2	14.7	13.1	12.2	5.81
cis-1,2-Dichloroethene	µg/L	13.3	16.4	54.5	59.1	85	76.7
Tetrachloroethene	µg/L	196	213	118	87.8	51.4	20.1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	9.2	11.4	10.1	7.62	4.91	2.93
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-07

	Sample Name	IW92-07	IW92-07	IW92-07	IW92-07	IW92-07	IW92-07
	Sample Date	3/18/2008	6/13/2008	12/17/2008	3/9/2009	12/13/2011	2/10/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	2.46	0.812 J	<5	<1	0.34 J	<20
Chloroform	µg/L	7.65	5.88 J	3.27	<0.3	0.374	<6
cis-1,2-Dichloroethene	µg/L	104	67.5 J	52.3	32.9	127	28.6
Tetrachloroethene	µg/L	6.75	15.7 J	4.32 J	0.684 J	3.17	<20
trans-1,2-Dichloroethene	µg/L	0.439 J	<1 J	<5	<1	0.726 J	<20
Trichloroethene	µg/L	2.13	3.64 J	<5	0.282 J	0.51 J	<20
Vinyl chloride	µg/L	<1	<1 J	<5	<1	0.493 J	<20

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-07

Analyte	Sample Name	IW92-07	IW92-07	IW92-07
	Sample Date	5/8/2013	8/15/2013	11/7/2013
	UNIT			
Carbon tetrachloride	µg/L	<20	<5	<10
Chloroform	µg/L	<6	<1.5	<3
cis-1,2-Dichloroethene	µg/L	30.5	52.5	42.6
Tetrachloroethene	µg/L	<20	<5	<10
trans-1,2-Dichloroethene	µg/L	<20	<5	<10
Trichloroethene	µg/L	<20	<5	<10
Vinyl chloride	µg/L	<20	<5	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-08

Analyte	Sample Name	IW92-08	IW92-08	IW92-08	IW92-08	IW92-08	IW92-08
	Sample Date	9/5/2006	12/13/2006	3/13/2007	6/7/2007	9/17/2007	12/18/2007
UNIT							
Carbon tetrachloride	µg/L	103	50	8.21	5.44	0.376 J	<1
Chloroform	µg/L	68.9	108	97.2	89.7 J	15.3	26.4
cis-1,2-Dichloroethene	µg/L	57.9	38.3	142	192	43.9	134
Tetrachloroethene	µg/L	156	136	41.5	11.9	2.27	6.44
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	0.341 J
Trichloroethene	µg/L	26.9	18.9	22.4	6.31	0.775 J	3.62
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-08

	Sample Name	IW92-08	IW92-08	IW92-08	IW92-08	IW92-08	IW92-08
	Sample Date	3/19/2008	6/17/2008	12/17/2008	3/12/2009	12/14/2011	2/11/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	2.42	<1	<1	<5	2.37	<5
Chloroform	µg/L	33	11.4 J	7.22	0.987 J	2.99	<1.5
cis-1,2-Dichloroethene	µg/L	20.5	35.4	101	47.8	87.8	119
Tetrachloroethene	µg/L	13.3	8.95	3.03	1.79 J	8.86	<5
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<5	0.429 J	<5
Trichloroethene	µg/L	3.25	4.36	0.987 J	<5	1.19	<5
Vinyl chloride	µg/L	<1	<1	<1	<5	0.302 J	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW92-08

Analyte	Sample Name	IW92-08	IW92-08	IW92-08
	Sample Date	5/9/2013	8/15/2013	11/6/2013
UNIT				
Carbon tetrachloride	µg/L	<1	<5	<20
Chloroform	µg/L	<0.3	<1.5	<6
cis-1,2-Dichloroethene	µg/L	117	92.1	56.2
Tetrachloroethene	µg/L	0.773 J	<5	<20
trans-1,2-Dichloroethene	µg/L	<1	<5	<20
Trichloroethene	µg/L	<1	<5	<20
Vinyl chloride	µg/L	1.29	<5	<20

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-02A

	Sample Name	IW101-02A	IW101-02A	IW101-02A	IW101-02A	IW101-02A	IW101-02A
	Sample Date	8/22/2006	12/4/2006	3/5/2007	5/29/2007	9/11/2007	12/10/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1 J	<1	<1
Chloroform	µg/L	0.219 J	0.187 J	0.125 J	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	9.79	24.1	45	64.7
Tetrachloroethene	µg/L	232	189	176	88.1	40.7	11.4
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	0.288 J
Trichloroethene	µg/L	<1	<1	1.72	3.69	3.85	5.5
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-02A

	Sample Name	IW101-02A	IW101-02A	IW101-02A	IW101-02A	IW101-02A	IW101-02A
	Sample Date	3/10/2008	6/9/2008	12/8/2008	3/9/2009	12/6/2011	2/8/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	48.5	46.2	47.9	42.7	1.16	11.1
Tetrachloroethene	µg/L	1.44	24	4.9	10.4	59.2	30.8
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	0.866 J	5.59	2.79	3.05	0.3 J	3.17
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-02A

Analyte	Sample Name	IW101-02A	IW101-02A	IW101-02A
	Sample Date	5/12/2013	8/15/2013	11/9/2013
	UNIT			
Carbon tetrachloride	µg/L	<5	<1	<1
Chloroform	µg/L	<1.5	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	16.6	22.8	16
Tetrachloroethene	µg/L	9.8	11.2	14.2
trans-1,2-Dichloroethene	µg/L	<5	<1	<1
Trichloroethene	µg/L	2.38 J	2.3	0.908 J
Vinyl chloride	µg/L	<5	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-02B

	Sample Name	IW101-02B	IW101-02B	IW101-02B	IW101-02B	IW101-02B	IW101-02B
	Sample Date	8/23/2006	12/4/2006	3/5/2007	5/29/2007	9/12/2007	12/10/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1 J	<1	<1
Chloroform	µg/L	0.23 J	0.174 J	0.17 J	0.197 J	0.208 J	0.194 J
cis-1,2-Dichloroethene	µg/L	<1	<1	0.489 J	18	12.8	20.6
Tetrachloroethene	µg/L	221	174	195	103	127	102
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	0.406 J	<1	<1	4.03	1.56	4.01
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-02B

	Sample Name	IW101-02B	IW101-02B	IW101-02B	IW101-02B	IW101-02B	IW101-02B
	Sample Date	3/11/2008	6/10/2008	12/8/2008	3/10/2009	12/6/2011	2/8/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.156 J	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	12.6	13.2	39.5	44.2	<1	<1
Tetrachloroethene	µg/L	98.4	44	17.9	18.4	59.3	56.2
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	1.67	1.78	3.27	2.29	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-02B

Analyte	Sample Name	IW101-02B	IW101-02B	IW101-02B
	Sample Date	5/12/2013	8/15/2013	11/9/2013
	UNIT			
Carbon tetrachloride	µg/L	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	1.3	2.24	5.62
Tetrachloroethene	µg/L	51.4	48.3	44.1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1
Trichloroethene	µg/L	0.344 J	0.706 J	1.36
Vinyl chloride	µg/L	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-02C

	Sample Name	IW101-02C	IW101-02C	IW101-02C	IW101-02C	IW101-02C	IW101-02C
	Sample Date	8/23/2006	12/5/2006	3/6/2007	5/30/2007	9/12/2007	12/11/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.237 J	<0.3	<0.3	0.156 J	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	0.275 J	1.04	7.17	54.1 J	80.1	58.2
Tetrachloroethene	µg/L	190	168	157	82.3	56.3 J	49.9
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	3.74	20.5	18.5	13.8	9.18	12.3
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-02C

	Sample Name	IW101-02C	IW101-02C	IW101-02C	IW101-02C	IW101-02C	IW101-02C
	Sample Date	3/11/2008	6/10/2008	12/8/2008	3/10/2009	12/7/2011	2/8/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<20
Chloroform	µg/L	0.131 J	<0.3	<0.3	<0.3	<0.3	<6
cis-1,2-Dichloroethene	µg/L	53.3	52.9	92.5	145	0.302 J	56.9
Tetrachloroethene	µg/L	48.4	30.1	22	1.06	52	<20
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<20
Trichloroethene	µg/L	11.7	9.49	40.3	1.27	0.706 J	<20
Vinyl chloride	µg/L	<1	<1	<1	0.433 J	<1	<20

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-02C

Analyte	Sample Name	IW101-02C	IW101-02C	IW101-02C
	Sample Date	5/12/2013	8/15/2013	11/9/2013
	UNIT			
Carbon tetrachloride	µg/L	<10	<10	<10
Chloroform	µg/L	<3	<3	<3
cis-1,2-Dichloroethene	µg/L	59.4	74.8	62.9
Tetrachloroethene	µg/L	<10	<10	<10
trans-1,2-Dichloroethene	µg/L	<10	<10	<10
Trichloroethene	µg/L	<10	<10	<10
Vinyl chloride	µg/L	<10	<10	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-03A

	Sample Name	IW101-03A	IW101-03A	IW101-03A	IW101-03A	IW101-03A	IW101-03A
	Sample Date	8/23/2006	12/5/2006	3/6/2007	5/30/2007	9/12/2007	12/11/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1 J	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	2.69	6.91	13	16.6
Tetrachloroethene	µg/L	3.95	38.8	50.2	37.1	25.4 J	13.3
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	0.459 J	0.927 J	3.11	4.15
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-03A

	Sample Name	IW101-03A	IW101-03A	IW101-03A	IW101-03A	IW101-03A	IW101-03A
	Sample Date	3/11/2008	6/10/2008	12/10/2008	3/10/2009	12/7/2011	2/7/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	16.1	15.4	22.9	15.4	0.415 J	4.98
Tetrachloroethene	µg/L	17.8	14.2	0.86 J	1.01	1.8	2.5
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	4.26	4.19	0.468 J	0.413 J	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-03A

Analyte	Sample Name	IW101-03A	IW101-03A	IW101-03A
	Sample Date	5/12/2013	8/16/2013	11/10/2013
	UNIT			
Carbon tetrachloride	µg/L	<10	<5	<1
Chloroform	µg/L	<3	<1.5	<0.3
cis-1,2-Dichloroethene	µg/L	5.88 J	4.06 J	5.9
Tetrachloroethene	µg/L	<10	3.71 J	2.54
trans-1,2-Dichloroethene	µg/L	<10	<5	<1
Trichloroethene	µg/L	<10	<5	<1
Vinyl chloride	µg/L	<10	<5	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-03B

Analyte	Sample Name	IW101-03B	IW101-03B	IW101-03B	IW101-03B	IW101-03B	IW101-03B
	Sample Date	8/23/2006	12/5/2006	3/6/2007	6/1/2007	9/12/2007	12/11/2007
	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.29 J	0.19 J	<0.3	<0.3	0.162 J	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	2.95	0.784 J	3.45	0.828 J
Tetrachloroethene	µg/L	89.9	154	136	99.7	105 J	88.4
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	1.08	1.33	1.15	<1	0.934 J	0.609 J
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-03B

	Sample Name	IW101-03B	IW101-03B	IW101-03B	IW101-03B	IW101-03B	IW101-03B
	Sample Date	3/11/2008	6/11/2008	12/10/2008	3/10/2009	12/7/2011	2/7/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<5
Chloroform	µg/L	0.136 J	<0.3	<0.3	<0.3	<0.3	<1.5
cis-1,2-Dichloroethene	µg/L	2.24	53	41.4	28.2	<1	18.3
Tetrachloroethene	µg/L	86.2	17.6 J	9.26	16.1	30.6	5.7
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<5
Trichloroethene	µg/L	1.7	2.94	1.87	2.43	0.464 J	2.89 J
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-03B

Analyte	Sample Name	IW101-03B	IW101-03B	IW101-03B
	Sample Date	5/12/2013	8/16/2013	11/10/2013
	UNIT			
Carbon tetrachloride	µg/L	<10	<5	<5
Chloroform	µg/L	<3	<1.5	<1.5
cis-1,2-Dichloroethene	µg/L	23.2	15.5	8.82
Tetrachloroethene	µg/L	<10	2.86 J	<5
trans-1,2-Dichloroethene	µg/L	<10	<5	<5
Trichloroethene	µg/L	<10	<5	<5
Vinyl chloride	µg/L	<10	<5	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-03C

	Sample Name	IW101-03C	IW101-03C	IW101-03C	IW101-03C	IW101-03C	IW101-03C
	Sample Date	8/24/2006	12/5/2006	3/7/2007	6/1/2007	9/12/2007	12/12/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.257 J	0.329	0.255 J	0.173 B	0.202 J	0.133 J
cis-1,2-Dichloroethene	µg/L	3.03	21.6	63.1	30.7	37.9	63.6
Tetrachloroethene	µg/L	59	54.7 J	36.1	50.6	49.8 J	25.8
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	78.5	141 J	75.8	77.8	77.2	47.4
Vinyl chloride	µg/L	<1	< J	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-03C

	Sample Name	IW101-03C	IW101-03C	IW101-03C	IW101-03C	IW101-03C	IW101-03C
	Sample Date	3/11/2008	6/11/2008	12/10/2008	3/10/2009	12/8/2011	2/8/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<10
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<3
cis-1,2-Dichloroethene	µg/L	89.8	86.4	207	184	3.41	91.6
Tetrachloroethene	µg/L	15.3	17.5	11.2	2.35	21.7	<10
trans-1,2-Dichloroethene	µg/L	<1	<1	0.266 J	<1	<1	<10
Trichloroethene	µg/L	31.1	28.9	54	11.4	39	<10
Vinyl chloride	µg/L	<1	<1	<1	0.408 J	<1	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-03C

Analyte	Sample Name	IW101-03C	IW101-03C	IW101-03C
	Sample Date	5/9/2013	8/16/2013	11/10/2013
	UNIT			
Carbon tetrachloride	µg/L	<5	<5	<10
Chloroform	µg/L	<1.5	<1.5	<3
cis-1,2-Dichloroethene	µg/L	112	69.5	37.4
Tetrachloroethene	µg/L	<5	<5	<10
trans-1,2-Dichloroethene	µg/L	<5	<5	<10
Trichloroethene	µg/L	<5	<5	<10
Vinyl chloride	µg/L	1.45 J	<5	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-04A

	Sample Name	IW101-04A	IW101-04A	IW101-04A	IW101-04A	IW101-04A	IW101-04A
	Sample Date	8/24/2006	12/6/2006	3/8/2007	6/4/2007	9/12/2007	12/12/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.265 J	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	10.1	30	27	32
Tetrachloroethene	µg/L	190	123	67.9	4.21 B	0.632 J	0.39 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	0.312 J	0.462 J	1.99	2.06	<1	0.37 J
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-04A

	Sample Name	IW101-04A	IW101-04A	IW101-04A	IW101-04A	IW101-04A	IW101-04A
	Sample Date	3/12/2008	6/13/2008	12/15/2008	3/12/2009	12/7/2011	2/9/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<10
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<3
cis-1,2-Dichloroethene	µg/L	26.1	33.3	23.2	17.7	10.4	6.94 J
Tetrachloroethene	µg/L	0.293 J	0.54 J	<1	<1	26.4	6.17 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<10
Trichloroethene	µg/L	0.447 J	0.731 J	<1	<1	1.86	<10
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-04A

Analyte	Sample Name	IW101-04A	IW101-04A	IW101-04A
	Sample Date	5/13/2013	8/18/2013	11/10/2013
	UNIT			
Carbon tetrachloride	µg/L	<10	<20	<10
Chloroform	µg/L	<3	<6	<3
cis-1,2-Dichloroethene	µg/L	7.41 J	9.85 J	5.42 J
Tetrachloroethene	µg/L	<10	<20	<10
trans-1,2-Dichloroethene	µg/L	<10	<20	<10
Trichloroethene	µg/L	<10	<20	<10
Vinyl chloride	µg/L	<10	<20	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-04B

	Sample Name	IW101-04B	IW101-04B	IW101-04B	IW101-04B	IW101-04B	IW101-04B
	Sample Date	8/24/2006	12/6/2006	3/8/2007	6/4/2007	9/14/2007	12/12/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.239 J	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	94.3	82.8	70.9	53	46.5
Tetrachloroethene	µg/L	182	4.12	0.622 J	0.345 B	1.34	2.87
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	0.746 J	<1	<1
Trichloroethene	µg/L	0.278 J	1.46	<1	<1	0.658 J	2.04
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-04B

	Sample Name	IW101-04B	IW101-04B	IW101-04B	IW101-04B	IW101-04B	IW101-04B
	Sample Date	3/12/2008	6/13/2008	12/15/2008	3/12/2009	12/8/2011	2/9/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<10
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<3
cis-1,2-Dichloroethene	µg/L	42.3	44.5	45.2	35.5	0.931 J	14.7
Tetrachloroethene	µg/L	2.4	2.05	0.522 J	0.328 J	44.4	<10
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<10
Trichloroethene	µg/L	1.76	1.59	0.566 J	0.464 J	1.57	<10
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-04B

Analyte	Sample Name	IW101-04B	IW101-04B	IW101-04B
	Sample Date	5/13/2013	8/18/2013	11/11/2013
	UNIT			
Carbon tetrachloride	µg/L	<10	<5	<5
Chloroform	µg/L	<3	<1.5	<1.5
cis-1,2-Dichloroethene	µg/L	14.8	13.4	11.9
Tetrachloroethene	µg/L	<10	<5	<5
trans-1,2-Dichloroethene	µg/L	<10	<5	<5
Trichloroethene	µg/L	<10	<5	<5
Vinyl chloride	µg/L	<10	<5	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-04C

	Sample Name	IW101-04C	IW101-04C	IW101-04C	IW101-04C	IW101-04C	IW101-04C
	Sample Date	8/24/2006	12/6/2006	3/8/2007	6/4/2007	9/14/2007	12/12/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.502	0.376	0.331	0.269 J	0.409	0.152 J
cis-1,2-Dichloroethene	µg/L	1.62	39.8	182	190	259	232
Tetrachloroethene	µg/L	169	102	6.12	4.78 B	7.36	2.89
trans-1,2-Dichloroethene	µg/L	<1	<1	0.397 J	1.75	0.717 J	0.511 J
Trichloroethene	µg/L	29.7	113	15.9	18.9	33.3	13.3
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-04C

	Sample Name	IW101-04C	IW101-04C	IW101-04C	IW101-04C	IW101-04C	IW101-04C
	Sample Date	3/13/2008	6/13/2008	12/15/2008	3/12/2009	12/8/2011	2/9/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<2	<1	<1	<1	<1	<20
Chloroform	µg/L	<0.6	<0.3	<0.3	<0.3	<0.3	<6
cis-1,2-Dichloroethene	µg/L	227	192	108	103	59.2	44.9
Tetrachloroethene	µg/L	2.09	2.8	3.45	0.89 J	16.7	<20
trans-1,2-Dichloroethene	µg/L	<2	0.487 J	<1	<1	<1	<20
Trichloroethene	µg/L	8.22	12.4	13.4	2.85	31	<20
Vinyl chloride	µg/L	<2	<1	<1	0.435 J	<1	<20

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

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- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-04C

Analyte	Sample Name	IW101-04C	IW101-04C	IW101-04C
	Sample Date	5/9/2013	8/18/2013	11/11/2013
	UNIT			
Carbon tetrachloride	µg/L	<5	<10	<10
Chloroform	µg/L	<1.5	<3	<3
cis-1,2-Dichloroethene	µg/L	27.2	25.2	18.3
Tetrachloroethene	µg/L	<5	<10	<10
trans-1,2-Dichloroethene	µg/L	<5	<10	<10
Trichloroethene	µg/L	<5	<10	<10
Vinyl chloride	µg/L	<5	<10	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

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- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-05A

Analyte	Sample Name	IW101-05A	IW101-05A	IW101-05A	IW101-05A	IW101-05A	IW101-05A
	Sample Date	8/28/2006	12/6/2006	3/9/2007	6/5/2007	9/11/2007	12/10/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.219 J	0.164 J	0.133 J	0.182 J	0.17 J	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	21.1	30.1	26.7	39.7
Tetrachloroethene	µg/L	63.1	181	89.8	73.3	69.2	10.5
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	4.11	8.07	3.93	1.03
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-05A

	Sample Name	IW101-05A	IW101-05A	IW101-05A	IW101-05A	IW101-05A	IW101-05A
	Sample Date	3/13/2008	6/13/2008	12/12/2008	3/12/2009	12/9/2011	2/8/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<10
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<3
cis-1,2-Dichloroethene	µg/L	46.8	43	31.8	27.8	0.432 J	14.8
Tetrachloroethene	µg/L	8.93	10.1	7.41	5.19	55.9	6.48 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<10
Trichloroethene	µg/L	1.98	1.99	1.67	1.28	<1	<10
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-05A

Analyte	Sample Name	IW101-05A	IW101-05A	IW101-05A
	Sample Date	5/13/2013	8/17/2013	11/10/2013
	UNIT			
Carbon tetrachloride	µg/L	<10	<5	<5
Chloroform	µg/L	<3	<1.5	<1.5
cis-1,2-Dichloroethene	µg/L	13.8	9.71	15.7
Tetrachloroethene	µg/L	<10	4.69 J	1.41 J
trans-1,2-Dichloroethene	µg/L	<10	<5	<5
Trichloroethene	µg/L	<10	<5	<5
Vinyl chloride	µg/L	<10	<5	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-05B

Analyte	Sample Name	IW101-05B	IW101-05B	IW101-05B	IW101-05B	IW101-05B	IW101-05B
	Sample Date	8/28/2006	12/6/2006	3/9/2007	6/5/2007	9/12/2007	12/10/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	0.201 J	0.141 J	0.148 J	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	30.6	28.5	36.5	28.8
Tetrachloroethene	µg/L	202	181	89.7	95.1	66	76.9
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	0.319 J	<1	2.93	1.57	2.05	2.48
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-05B

	Sample Name	IW101-05B	IW101-05B	IW101-05B	IW101-05B	IW101-05B	IW101-05B
	Sample Date	3/13/2008	6/16/2008	12/12/2008	3/13/2009	12/9/2011	2/8/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.139 J	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	15.2	8.52	32.4	27	<1	1.54
Tetrachloroethene	µg/L	80.2	79.6	24.6	26.1	59.9	41.1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	1.89	1.58	6.76	4.72	<1	0.506 J
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-05B

Analyte	Sample Name	IW101-05B	IW101-05B	IW101-05B
	Sample Date	5/13/2013	8/17/2013	11/10/2013
	UNIT			
Carbon tetrachloride	µg/L	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	4.51	2.48	11.5
Tetrachloroethene	µg/L	33.7	36	17.5
trans-1,2-Dichloroethene	µg/L	<1	<1	<1
Trichloroethene	µg/L	0.851 J	0.622 J	1.13
Vinyl chloride	µg/L	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-05C

Analyte	Sample Name	IW101-05C	IW101-05C	IW101-05C	IW101-05C	IW101-05C	IW101-05C
	Sample Date	8/25/2006	12/6/2006	3/9/2007	6/5/2007	9/12/2007	12/10/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.294 J	<0.3	<0.3	<0.3	0.131 J	<0.3
cis-1,2-Dichloroethene	µg/L	0.284 J	0.399 J	74.3	85.6	64.8	70.7
Tetrachloroethene	µg/L	219	194	63	47.8	49.2	44
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	3.44	9.2	7.04	6.96	6.27	5.62
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-05C

	Sample Name	IW101-05C	IW101-05C	IW101-05C	IW101-05C	IW101-05C	IW101-05C
	Sample Date	3/13/2008	6/16/2008	12/15/2008	3/13/2009	12/9/2011	2/8/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<10
Chloroform	µg/L	0.13 J	<0.3	<0.3	<0.3	<0.3	<3
cis-1,2-Dichloroethene	µg/L	76.6	69.7	127	136	0.291 J	41
Tetrachloroethene	µg/L	27.2	27.6	15.2	4.23	58.6	<10
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<10
Trichloroethene	µg/L	5.14	5.46	31.3	8.82	1.35	<10
Vinyl chloride	µg/L	<1	<1	<1	0.491 J	<1	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-05C

Analyte	Sample Name	IW101-05C	IW101-05C	IW101-05C
	Sample Date	5/13/2013	8/17/2013	11/10/2013
	UNIT			
Carbon tetrachloride	µg/L	<10	<10	<10
Chloroform	µg/L	<3	<3	<3
cis-1,2-Dichloroethene	µg/L	56.6	36	24.4
Tetrachloroethene	µg/L	<10	<10	<10
trans-1,2-Dichloroethene	µg/L	<10	<10	<10
Trichloroethene	µg/L	<10	<10	<10
Vinyl chloride	µg/L	<10	<10	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-07A

	Sample Name	IW101-07A	IW101-07A	IW101-07A	IW101-07A	IW101-07A	IW101-07A
	Sample Date	8/28/2006	12/7/2006	3/7/2007	6/4/2007	9/13/2007	12/11/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	0.938 J	7.51	8.18	20.4	14.2
Tetrachloroethene	µg/L	5.16	22.2	15.7	5.78	6.87	8.59
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	2.61	31.1	13.5	2.37	7.43	10.9
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-07A

	Sample Name	IW101-07A	IW101-07A	IW101-07A	IW101-07A	IW101-07A	IW101-07A
	Sample Date	3/11/2008	6/11/2008	12/10/2008	3/11/2009	12/10/2011	2/7/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	21	25.5	30.3	32.7	0.658 J	1.26
Tetrachloroethene	µg/L	9.33	6.13	1.91	1.1	8.4	1.48
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	9.52	5.42	2.65	1.43	17	2.68
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-07A

Analyte	Sample Name	IW101-07A	IW101-07A	IW101-07A
	Sample Date	5/12/2013	8/16/2013	11/9/2013
	UNIT			
Carbon tetrachloride	µg/L	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	1.42	<1	<1
Tetrachloroethene	µg/L	1.06	0.375 J	0.434 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<1
Trichloroethene	µg/L	1.94	0.487 J	0.292 J
Vinyl chloride	µg/L	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-07B

Analyte	Sample Name	IW101-07B	IW101-07B	IW101-07B	IW101-07B	IW101-07B	IW101-07B
	Sample Date	8/29/2006	12/7/2006	3/7/2007	6/4/2007	9/13/2007	12/12/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.271 J	0.203 J	0.223 J	0.202 J	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	5.63	4.37	39.4	88	96.9	109
Tetrachloroethene	µg/L	38	38.2	24.6	8.88	3.3	2.11
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	138	140	81.8	28.4	9.15	6.97
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-07B

	Sample Name	IW101-07B	IW101-07B	IW101-07B	IW101-07B	IW101-07B	IW101-07B
	Sample Date	3/11/2008	6/11/2008	12/11/2008	3/11/2009	12/10/2011	2/7/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	119	111	176	155	4.54	54.5
Tetrachloroethene	µg/L	1.44	1.62	2.96	6	19.6	2.01
trans-1,2-Dichloroethene	µg/L	0.303 J	0.276 J	0.293 J	<1	<1	<1
Trichloroethene	µg/L	4.4	4.1	9.86	23.5	52.1	5.58
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-07B

Analyte	Sample Name	IW101-07B	IW101-07B	IW101-07B
	Sample Date	5/13/2013	8/16/2013	11/9/2013
	UNIT			
Carbon tetrachloride	µg/L	<10	<5	<5
Chloroform	µg/L	<3	<1.5	<1.5
cis-1,2-Dichloroethene	µg/L	104	52.9	58.9
Tetrachloroethene	µg/L	<10	4.17 J	1.92 J
trans-1,2-Dichloroethene	µg/L	<10	<5	<5
Trichloroethene	µg/L	<10	10.9	4.17 J
Vinyl chloride	µg/L	<10	<5	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-07C

	Sample Name	IW101-07C	IW101-07C	IW101-07C	IW101-07C	IW101-07C	IW101-07C
	Sample Date	8/29/2006	12/8/2006	3/7/2007	6/4/2007	9/13/2007	12/12/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.47	0.672	0.603	0.468	0.556	0.196 J
cis-1,2-Dichloroethene	µg/L	16.2	25.8	125	171 J	387	255
Tetrachloroethene	µg/L	60.9	102	65.7	38.9 J	13.4	24.2
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	0.542 J	0.594 J
Trichloroethene	µg/L	207	402	267	191 J	57	100
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-07C

	Sample Name	IW101-07C	IW101-07C	IW101-07C	IW101-07C	IW101-07C	IW101-07C
	Sample Date	3/12/2008	6/12/2008	12/11/2008	3/11/2009	12/11/2011	2/7/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<2	<1	<2	<1	<10
Chloroform	µg/L	<0.3	<0.6	<0.3	<0.6	0.138 J	<3
cis-1,2-Dichloroethene	µg/L	325	307	295	238	24.5	323
Tetrachloroethene	µg/L	1.98	<2	2.52	0.722 J	40.8	<10
trans-1,2-Dichloroethene	µg/L	0.8 J	1.58 J	0.31 J	<2	<1	<10
Trichloroethene	µg/L	7.29	2.58	5.85	1.94 J	113	<10
Vinyl chloride	µg/L	<1	<2	0.798	<2	<1	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

IW101-07C

Analyte	Sample Name	IW101-07C	IW101-07C	IW101-07C
	Sample Date	5/9/2013	8/16/2013	11/9/2013
	UNIT			
Carbon tetrachloride	µg/L	<5	<10	<10
Chloroform	µg/L	<1.5	<3	<3
cis-1,2-Dichloroethene	µg/L	245	145	211
Tetrachloroethene	µg/L	<5	13.2	<10
trans-1,2-Dichloroethene	µg/L	<5	<10	<10
Trichloroethene	µg/L	<5	10.5	<10
Vinyl chloride	µg/L	1.81 J	<10	3.09 J

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-21

	Sample Name	MW212	MW213	MW214	MW215	MW21NA	MW21-98-
	Sample Date	6/20/1997	9/27/1997	3/27/1998	10/19/1998	3/24/2000	103BL
Analyte	UNIT						3/20/2002
Carbon tetrachloride	µg/L	<10	<10	<10	<10	0.4 J	<1
Chloroform	µg/L	<10	<10	<10	<10	6	<1
cis-1,2-Dichloroethene	µg/L	--	--	--	--	1	1.9
Tetrachloroethene	µg/L	63	62	76	120	78	90
trans-1,2-Dichloroethene	µg/L	--	--	--	--	0.2 J	<1
Trichloroethene	µg/L	14	12	16	31	39	76
Vinyl chloride	µg/L	<10	<10	<10	<10	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020, SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-21

Analyte	Sample Name Sample Date UNIT	MW21-EBT- TS1-98.5- 103.5 7/8/2002	MW21-EBT- TS2-98.5- 103.5 7/29/2002	MW21-EBT- TS3-98.5- 103.5 9/3/2002	MW21-EBT- TS4-98.5- 103.5 10/7/2002	MW21-EBT- TS5-98.5- 103.5 11/11/2002	MW21-EBT- TS6-98.5- 103.5 12/16/2002
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	0.132 J	0.18 J	<1	0.171 J
cis-1,2-Dichloroethene	µg/L	1.7	1.27	1.02	1.63	1.32	1.22
Tetrachloroethene	µg/L	110	125	178	152	188	195
trans-1,2-Dichloroethene	µg/L	0.25 J	0.4 J	0.516 J	0.518 J	0.481 J	0.416 J
Trichloroethene	µg/L	66	53.6	38.1	49.2	37.6	38.3
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020,
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-21

Analyte	Sample Name Sample Date UNIT	MW21-EBT- TS7-98.5- 103.5 1/20/2003	MW21-EBT- TS8-98.5- 103.5 2/24/2003	MW21-EBT- TS9-98.5- 103.5 3/24/2003	MW21-EBT- TS10-98.5- 103.5 4/21/2003	MW21-EBT- TS11-98.5- 103.5 5/19/2003	MW21-EBT- TS12-98.5- 103.5 6/23/2003
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	0.14 J	<1	<1	<1
cis-1,2-Dichloroethene	µg/L	0.985 J	1.68	1.28	1.12	1.25	1.36
Tetrachloroethene	µg/L	194	200	190	171	172	159
trans-1,2-Dichloroethene	µg/L	0.403 J	0.331 J	0.342 J	0.304 J	<1	<1
Trichloroethene	µg/L	32.4	50.7	38.6	33.8	38.6	34
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020,
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-21

Analyte	Sample Name Sample Date UNIT	MW21-EBT- TS13-98.5- 103.5 7/21/2003	MW-21 3/31/2004	MW-21 11/12/2004	MW-21 2/21/2005	MW-21 5/19/2005	MW-21-BL 8/8/2006
Carbon tetrachloride	µg/L	<1	<2.5	<2.5	<1	<1	<1
Chloroform	µg/L	<1	<2.5	<2.5	<1	<1	<0.3
cis-1,2-Dichloroethene	µg/L	1.25	1.5 J	1.6 J	1.1	0.99 J	1.33
Tetrachloroethene	µg/L	120	75	71	61	53	106
trans-1,2-Dichloroethene	µg/L	<1	<2.5	<2.5	<1	<1	<1
Trichloroethene	µg/L	33.6	20	17	14	13	16.3
Vinyl chloride	µg/L	<1	<2.5	<2.5	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020, SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-21

	Sample Name	MW-21-EBT-1	MW-21-EBT-2	MW-21-EBT-3	MW-21-EBT-4	MW-21-EBT-5	MW-21
	Sample Date	12/6/2006	3/7/2007	6/4/2007	9/18/2007	12/18/2007	3/14/2008
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.129 J	0.126 J	<0.3	<0.3	0.137 J	0.184 J
cis-1,2-Dichloroethene	µg/L	1.17	1.66	1.53	1.95	2.12	1.83
Tetrachloroethene	µg/L	129	130 J	134	132	178	173
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	19.8	25	28.3	27.5	32.5	28.9
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020, SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-21

	Sample Name Sample Date	MW-21 6/16/2008	MW-21 12/11/2008	MW-21 3/13/2009	MW-21 10/5/2009	MW-21 3/30/2010	MW-21 10/6/2010
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.157 J	0.183 J	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	2.26	2.44	2.3	2.3	2.27	2.39
Tetrachloroethene	µg/L	154	192	179	187	146	83.5
trans-1,2-Dichloroethene	µg/L	0.252 J	0.274 J	<1	<1	<1	<1
Trichloroethene	µg/L	26.1	20.4	16.6	12.9	8.59	5.67
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020,
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-21

	Sample Name Sample Date	MW-21 4/1/2011	MW-21 10/6/2011	MW-21 4/21/2012	MW-21 10/20/2012	MW-21 2/7/2013	MW-21 5/10/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	2.75	2.27	2.57	3.64	4.35	25.3
Tetrachloroethene	µg/L	74	80	88	121	107	13.3
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	5.89	5.3	7	9.17	6.83	4.43
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020, SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-21

Analyte	Sample Name	MW-21	MW-21
	Sample Date	8/17/2013	11/8/2013
UNIT			
Carbon tetrachloride	µg/L	<1	<1
Chloroform	µg/L	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	25	12.8
Tetrachloroethene	µg/L	19.1	2.89
trans-1,2-Dichloroethene	µg/L	<1	<1
Trichloroethene	µg/L	2.96	1.2
Vinyl chloride	µg/L	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020, SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL

< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-62

	Sample Name Sample Date	MW625 10/26/1998	MW62NA 3/23/2000	MW62-94- 95BL 3/18/2002	MW62 2/4/2004	MW62 4/7/2004	MW-62 5/11/2004
Analyte	UNIT						
Carbon tetrachloride	µg/L	<10	<1	<1	1.38	1.19	<3.3
Chloroform	µg/L	<10	0.2 J	0.18 J	0.368 J	0.431 J	<3.3
cis-1,2-Dichloroethene	µg/L	--	<1	190	0.418 J	<1	<3.3
Tetrachloroethene	µg/L	<10	<1	<1	0.318 J	0.853	<3.3
trans-1,2-Dichloroethene	µg/L	--	<1	<1	<1	<1	<3.3
Trichloroethene	µg/L	37	32	6.5	134	183	100
Vinyl chloride	µg/L	<10	<1	28	1.27	<1	<3.3

Notes:

VOC samples analyzed using methods SW8010/8020,
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-62

	Sample Name Sample Date	MW-62 2/18/2005	MW-62 5/16/2005	MW-62-LB-1 10/4/2006	MW-62-LS-3 4/17/2007	MW-62-LA-5 10/3/2007	MW-62 4/9/2008
Analyte	UNIT						
Carbon tetrachloride	µg/L	0.56 J	0.84 J	0.279 J	0.703 J	0.744 J	0.525 J
Chloroform	µg/L	0.46 J	0.23 B	0.25 J	0.311	0.476	0.416
cis-1,2-Dichloroethene	µg/L	<1	1.3	0.26 J	1.16	0.33 J	<1
Tetrachloroethene	µg/L	1.1	0.34 J	<1	0.362 J	0.8 J	0.413 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	150	92	77.7 J	102	184	152
Vinyl chloride	µg/L	<1	1.2 J	<1	2.71	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020,
SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
B Estimated results possibly biased high or false positive based
on blank data
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-62

	Sample Name Sample Date	MW-62 10/14/2008	MW-62 4/10/2009	MW-62 10/10/2009	MW-62 4/7/2010	MW-62 10/14/2010	MW-62 4/3/2011
Analyte	UNIT						
Carbon tetrachloride	µg/L	0.634 J	0.369 J	<1	0.485 J	0.577 J	0.732 J
Chloroform	µg/L	0.394 J	0.361	0.154 J	0.296 J	0.291 J	0.356
cis-1,2-Dichloroethene	µg/L	<1	0.424 J	0.308 J	<1	<1	<1
Tetrachloroethene	µg/L	0.39 J	0.33 J	<1	0.474 J	0.447 J	0.584 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	157 J	169	59.2	178	119	153
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020, SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
B Estimated results possibly biased high or false positive based on blank data
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-62

	Sample Name	MW-62	MW-62	MW-62	MW-62	MW-62	MW-62
	Sample Date	10/8/2011	4/21/2012	10/22/2012	2/11/2013	5/9/2013	8/20/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	0.563 J	0.736 J	0.519 J	<50	<5	<1
Chloroform	µg/L	0.315	0.403	0.457	<15	<1.5	0.351
cis-1,2-Dichloroethene	µg/L	<1	0.88 J	3.76	37.5	34.8	51.8
Tetrachloroethene	µg/L	0.504 J	0.692 J	0.482 J	<50	<5	0.382 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<50	<5	<1
Trichloroethene	µg/L	157	185	163	61.9	98.5	132
Vinyl chloride	µg/L	<1	<1	1.2	<50	<5	<1

Notes:

VOC samples analyzed using methods SW8010/8020, SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
B Estimated results possibly biased high or false positive based on blank data
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-62

Analyte	Sample Name	MW-62
	Sample Date	11/11/2013
	UNIT	
Carbon tetrachloride	µg/L	<1
Chloroform	µg/L	0.287
cis-1,2-Dichloroethene	µg/L	106
Tetrachloroethene	µg/L	<1
trans-1,2-Dichloroethene	µg/L	<1
Trichloroethene	µg/L	24.1
Vinyl chloride	µg/L	<1

Notes:

VOC samples analyzed using methods SW8010/8020, SW8240, SW8260, SW8260A, SW8260B, or CV3990

-- not analyzed

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-85

	Sample Name	MW-85-1	MW-85-2	MW-85-3	MW-85-4	MW-85-5	MW-85-6
	Sample Date	11/30/2001	11/30/2001	11/30/2001	11/30/2001	11/30/2001	11/30/2001
Analyte	UNIT						
Carbon tetrachloride	µg/L	77	110	140	130	120	110
Chloroform	µg/L	27	61	66	67	63	64
cis-1,2-Dichloroethene	µg/L	10	25	30	30	28	28
Tetrachloroethene	µg/L	34	45	67	54	49	31
trans-1,2-Dichloroethene	µg/L	<1	0.49 J	0.74 J	0.62 J	0.96 J	0.58 J
Trichloroethene	µg/L	20	21	26	23	25	21
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020,
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-85

Analyte	Sample Name	MW-85	MW-85	MW-85	MW-85	MW-85-BL	MW-85-EBT-1
	Sample Date	4/2/2004	11/14/2004	2/22/2005	5/20/2005	8/30/2006	12/8/2006
UNIT							
Carbon tetrachloride	µg/L	110	120	110	110	188	179
Chloroform	µg/L	30	36	35	38	43.8	49.5
cis-1,2-Dichloroethene	µg/L	17	21	21	24	26.1	32.2
Tetrachloroethene	µg/L	46	57	51	48	74.8	73.4
trans-1,2-Dichloroethene	µg/L	<4	<3.3	<1	<1	<1	<1
Trichloroethene	µg/L	18	22	22	24	25.1	24.4
Vinyl chloride	µg/L	<4	<3.3	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020,
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-85

Analyte	Sample Name	MW-85-EBT-2	MW-85-EBT-3	MW-85-EBT-4	MW-85-EBT-5	MW-85	MW-85
	Sample Date	3/12/2007	5/29/2007	9/11/2007	12/10/2007	3/12/2008	6/16/2008
	UNIT						
Carbon tetrachloride	µg/L	123	106 J	75.1	34.3	22.5	47.2
Chloroform	µg/L	36.2	34.6	44.2	51.5	38.6	8.03
cis-1,2-Dichloroethene	µg/L	23.8	18.6	37.4	51	59.2	39.1
Tetrachloroethene	µg/L	58.6	37.8	32.5	21	14.4	22
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	20.3	15.5	14.3	9.15	7	10.4
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020,
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-85

	Sample Name	MW-85	MW-85	MW-85	MW-85	MW-85	MW-85
	Sample Date	12/17/2008	3/17/2009	10/12/2009	3/30/2010	10/14/2010	4/3/2011
Analyte	UNIT						
Carbon tetrachloride	µg/L	76.2	69.9	108	116 J	121	119
Chloroform	µg/L	9.84	8.51	10.4	14.9	27.1	27
cis-1,2-Dichloroethene	µg/L	7.45	7.29	1.3	1.69	9.47	17.3
Tetrachloroethene	µg/L	36.4	33.9	41	38.1	39.2	46.2
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	14.4	11.6	15.1	12.1	12.3	13.5
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020,
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-85

	Sample Name	MW-85	MW-85	MW-85	MW-85	MW-85	MW-85
	Sample Date	10/9/2011	4/21/2012	10/19/2012	2/8/2013	5/10/2013	8/14/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	55.9	110	112	102	45.8	9.69
Chloroform	µg/L	16.4	23.8	28.1	28.1	13.8	2.78
cis-1,2-Dichloroethene	µg/L	21.2	21.1	30.3	30.6	52.4	62.1
Tetrachloroethene	µg/L	29.4	44.3	51.5	58.5	21	6.62
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	9.96	14.4	17.4	17.8	5.76	1.77
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020,
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-85

Analyte	Sample Name	MW-85
	Sample Date	11/6/2013
UNIT		
Carbon tetrachloride	µg/L	1.32
Chloroform	µg/L	5.51
cis-1,2-Dichloroethene	µg/L	63.3
Tetrachloroethene	µg/L	2.98
trans-1,2-Dichloroethene	µg/L	<1
Trichloroethene	µg/L	0.744
Vinyl chloride	µg/L	<1

Notes:

VOC samples analyzed using methods SW8010/8020,
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-113

Analyte	Sample Name Sample Date UNIT	MW-113-EBT- B-99.5-104.5 5/20/2002	MW113-EBT- TS1-99.5- 104.5 7/8/2002	MW113-EBT- TS2-99.5- 104.5 7/29/2002	MW113-EBT- TS3-99.5- 104.5 9/3/2002	MW113-EBT- TS4-99.5- 104.5 10/7/2002	MW113-EBT- TS5-99.5- 104.5 11/11/2002
Carbon tetrachloride	µg/L	30	50	69.1	60.7	64.5	59
Chloroform	µg/L	76	79	98	90.6	83.2	78.2
cis-1,2-Dichloroethene	µg/L	44	48	55.5	59.9	92.4	77.3
Tetrachloroethene	µg/L	30	45	59.3	112	80.4	97
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	15	20	26.7	29.4	28	31.6
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-113

Analyte	Sample Name Sample Date UNIT	MW113-EBT- TS6-99.5- 104.5 12/16/2002	MW113-EBT- TS7-99.5- 104.5 1/20/2003	MW113-EBT- TS9-99.5- 104.5 3/24/2003	MW113-EBT- TS10-99.5- 104.5 4/21/2003	MW113-EBT- TS11-99.5- 104.5 5/19/2003	MW113-EBT- TS12-99.5- 104.5 6/23/2003
Carbon tetrachloride	µg/L	69.6 J	71.6	50.8	53.2 J	26	43.6 J
Chloroform	µg/L	87.6	93.8	70.8	81	84.4	89.8
cis-1,2-Dichloroethene	µg/L	83.4	94.1	69.7	71.2	71.6	93.9
Tetrachloroethene	µg/L	96.9	91.1	48.7	49.4	27.5	54.5
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	0.266 J	<1	<1
Trichloroethene	µg/L	32.7	30.4	23.3	21.1	15.3	19.7
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-113

Analyte	Sample Name Sample Date UNIT	MW113-EBT- TS13-99.5- 104.5 7/21/2003	MW113-EBT- TS14-99.5- 104.5 8/18/2003	MW-113 5/24/2004	MW-113 11/14/2004	MW-113 2/24/2005	MW-113 5/20/2005
Carbon tetrachloride	µg/L	38	42.7	20	44	49	47
Chloroform	µg/L	89.7	80.4	27	34	39	36
cis-1,2-Dichloroethene	µg/L	102 J	109	100	110	87	78
Tetrachloroethene	µg/L	56.1	63.6	64	100	130	130
trans-1,2-Dichloroethene	µg/L	<1	<1	<5	<5	<1	<1
Trichloroethene	µg/L	19.3	18.5	8.8	15	21	22
Vinyl chloride	µg/L	<1	<1	<5	<5	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-113

	Sample Name	MW-113-LB-1	MW-113-LS-3	MW-113	MW-113	MW-113	MW-113
	Sample Date	10/23/2006	4/16/2007	10/4/2007	4/7/2008	10/8/2008	4/9/2009
Analyte	UNIT						
Carbon tetrachloride	µg/L	75.6	89.1	96.9	75.1	110	101
Chloroform	µg/L	33.8	35.9	36.4	30.9	45.3	39
cis-1,2-Dichloroethene	µg/L	54.9	46.3	50.2	37.8	59.6	57.1
Tetrachloroethene	µg/L	182	163	151	170	156 J	192
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	0.354 J	<1	<1
Trichloroethene	µg/L	25.9	24.1	26	20.2	28.9	29.5
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-113

	Sample Name Sample Date UNIT	MW-113 10/10/2009	MW-113 3/30/2010	MW-113 10/14/2010	MW-113 4/3/2011	MW-113 10/3/2011	MW-113 4/21/2012
Analyte							
Carbon tetrachloride	µg/L	67.4	72.2	77.3	63.5	65.8	60.6
Chloroform	µg/L	29.5	26.5	24.3	16.9	16.2	13.4
cis-1,2-Dichloroethene	µg/L	49.5	37.1	29.7	25.1	26.2	22.2
Tetrachloroethene	µg/L	200	191	149	157	189	150
trans-1,2-Dichloroethene	µg/L	<1	<1	0.358 J	<1	<1	<1
Trichloroethene	µg/L	26.7	23.2	19.9	17.6	18	16.9
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-113

Analyte	Sample Name	MW-113	MW-113	MW-113	MW-113	MW-113
	Sample Date	10/22/2012	2/8/2013	5/10/2013	8/13/2013	11/6/2013
	UNIT					
Carbon tetrachloride	µg/L	65.6	15.6	<5	<20	<10
Chloroform	µg/L	16.4	7.25	3.12	<6	<3
cis-1,2-Dichloroethene	µg/L	28.6	95	169	88.9	88.1
Tetrachloroethene	µg/L	166	54.7	12.5	12.6 J	11.3
trans-1,2-Dichloroethene	µg/L	<1	<5	<5	<20	<10
Trichloroethene	µg/L	18.6	6.78	2.6 J	5.09 J	3.09
Vinyl chloride	µg/L	<1	<5	<5	<20	<10

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-197A

Analyte	Sample Name	MW-197A	MW-197A	MW-197A	MW-197A	MW-197A	MW-197A
	Sample Date	10/24/2006	1/24/2007	4/13/2007	7/9/2007	10/3/2007	4/8/2008
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.237 J	0.226 J	0.212 J	0.208 J	0.179 J	0.185 J
cis-1,2-Dichloroethene	µg/L	0.447 J	0.345 J	0.432 J	0.419 J	0.445 J	1.48
Tetrachloroethene	µg/L	130	125	114	103	87.3	82.8
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	2.04	2.04	2.28	2.31	2.42	2.42
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-197A

	Sample Name	MW-197A	MW-197A	MW-197A	MW-197A	MW-197A	MW-197A
	Sample Date	10/6/2008	4/6/2009	10/6/2009	4/2/2010	10/11/2010	4/2/2011
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.174 J	0.13 J	0.187 J	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	3.13	3.69	2.57	2.22	1.84	1.64
Tetrachloroethene	µg/L	54.8	42.1	33.8	34	35	32.8
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	2.4	2.09	2.04	1.81	1.72	1.51
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-197A

Analyte	Sample Name	MW-197A	MW-197A	MW-197A	MW-197A	MW-197A	MW-197A
	Sample Date	10/5/2011	4/20/2012	10/21/2012	2/8/2013	5/11/2013	8/19/2013
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.126 J	<0.3	0.139 J	0.138	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	1.26	0.926 J	0.798 J	0.771	0.738 J	0.79 J
Tetrachloroethene	µg/L	32.2 J	31	27.7	24.8	21.6	21.7
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	1.51	1.52	1.34	1.27	1.17	1.36
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-197A

Analyte	Sample Name	MW-197A
	Sample Date	11/7/2013
UNIT		
Carbon tetrachloride	µg/L	<1
Chloroform	µg/L	<0.3
cis-1,2-Dichloroethene	µg/L	0.736
Tetrachloroethene	µg/L	20.9
trans-1,2-Dichloroethene	µg/L	<1
Trichloroethene	µg/L	1.26
Vinyl chloride	µg/L	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-197B

Analyte	Sample Name Sample Date UNIT	MW-197B-LB- 1 10/2/2006	MW-197B-RW- 2 1/24/2007	MW-197B-LS- 3 4/13/2007	MW-197B-LQ- 4 7/9/2007	MW-197B-LA- 5 10/3/2007	MW-197B 4/8/2008
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	0.227 J	0.208 J	<0.3	0.166 J	<0.3
cis-1,2-Dichloroethene	µg/L	0.625 J	0.484 J	0.792 J	5.29	10.7	47.6
Tetrachloroethene	µg/L	179	166	138	134	105 J	38.6
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	8.51	8.76	9.11	10.2	10.3	9.01
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-197B

	Sample Name	MW-197B	MW-197B	MW-197B	MW-197B	MW-197B	MW-197B
	Sample Date	10/6/2008	4/6/2009	10/6/2009	4/2/2010	10/11/2010	4/2/2011
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	48.7	38.2	25.9	16.6	9.66	8.85
Tetrachloroethene	µg/L	16.7	20.2	24.1	26.8	34.1	31.5
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	9.77	12.6	12.3	10.9	10.2	10
Vinyl chloride	µg/L	<1	0.684 J	3.09	7.24	3.99 J	3.25 J

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-197B

	Sample Name	MW-197B	MW-197B	MW-197B	MW-197B	MW-197B	MW-197B
	Sample Date	10/5/2011	4/21/2012	10/21/2012	2/8/2013	5/11/2013	8/19/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	5.27	3.53	4.6	3.83	3.81	6.12
Tetrachloroethene	µg/L	29.7	28.5	27.1	25	21.1	19.1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	9.4	10.3	11	10.6	11.2	11.6
Vinyl chloride	µg/L	1.86	0.732 J	1.41	1.05	1.31	1.38

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-197B

Analyte	Sample Name	MW-197B
	Sample Date	11/7/2013
	UNIT	
Carbon tetrachloride	µg/L	<1
Chloroform	µg/L	<0.3
cis-1,2-Dichloroethene	µg/L	8.41
Tetrachloroethene	µg/L	16.4
trans-1,2-Dichloroethene	µg/L	<1
Trichloroethene	µg/L	10.1
Vinyl chloride	µg/L	2.06

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-203A

Analyte	Sample Name Sample Date UNIT	MW-203A 4/17/2007	MW-203A-LQ- 4 7/9/2007	MW-203A-LA- 5 10/3/2007	MW-203A-LQ- 6 1/8/2008	MW-203A 4/8/2008	MW-203A 10/6/2008
Carbon tetrachloride	µg/L	<1	<1 J	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	0.128 J	0.172 J	0.206 J	0.201 J
cis-1,2-Dichloroethene	µg/L	<1	<1	0.294 J	0.972 J	1.14	1.2
Tetrachloroethene	µg/L	62.6	69.1 J	86.8	108	144	143
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	1.27	1.46	1.69	1.93	2.03	2.11
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-203A

	Sample Name	MW-203A	MW-203A	MW-203A	MW-203A	MW-203A	MW-203A
	Sample Date	4/9/2009	10/6/2009	4/2/2010	10/9/2010	4/3/2011	10/5/2011
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.203 J	0.158 J	0.185 J	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	1.68	3.38	4.11	5.32	5.27	5.75
Tetrachloroethene	µg/L	170	149	162	143	147	147
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	2.23	2.34	2.43	2.55	2.8	2.72
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-203A

	Sample Name	MW-203A	MW-203A	MW-203A	MW-203A	MW-203A	MW-203A
	Sample Date	4/20/2012	10/21/2012	2/8/2013	5/9/2013	8/19/2013	11/7/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<20	<5	<5
Chloroform	µg/L	0.284 J	<0.3	<0.3	<6	<1.5	<1.5
cis-1,2-Dichloroethene	µg/L	5.78	8.54	8.36	24.8	12.1	13.4
Tetrachloroethene	µg/L	127	118	51	19.8 J	4.41 J	7.94
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<20	<5	<5
Trichloroethene	µg/L	2.78	2.89	8.56	9 J	<5	<5
Vinyl chloride	µg/L	<1	<1	0.333	7.98 J	<5	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-203B

Analyte	Sample Name Sample Date UNIT	MW-203B 4/27/2007	MW-203B-LQ- 4 7/9/2007	MW-203B-LA- 5 10/3/2007	MW-203B-LQ- 6 1/8/2008	MW-203B 4/8/2008	MW-203B 10/6/2008
Carbon tetrachloride	µg/L	<1 J	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	50.1	63.5	55	58.6	59.7	39.2
Tetrachloroethene	µg/L	38.4	21.1	13.9	9.39	10.8	19
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	8.97	7.68	7.92	6.31	6.25	11.3
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	0.358 J

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-203B

	Sample Name	MW-203B	MW-203B	MW-203B	MW-203B	MW-203B	MW-203B
	Sample Date	4/9/2009	10/6/2009	4/2/2010	10/11/2010	4/3/2011	10/5/2011
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	26.6	14.4	9.53	6.65	6.15	4.81
Tetrachloroethene	µg/L	21.1	24.8	31.8	31.9	30.6	23.2
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	9.15	9.16	6.74	6.76	7.64	8.72
Vinyl chloride	µg/L	7.12	5.14	5.51	5.11 J	3.01	2.74

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-203B

	Sample Name	MW-203B	MW-203B	MW-203B	MW-203B	MW-203B	MW-203B
	Sample Date	4/20/2012	10/21/2012	2/8/2013	5/11/2013	8/19/2013	11/7/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	4.39	1.59	3.57	16.6	12.7	11
Tetrachloroethene	µg/L	24.8	11.1	17.6	3.1	13.9	3.4
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	9.92	4.74	11.9	2.27	17.8	2.27
Vinyl chloride	µg/L	2.13	0.697 J	1.48	2.64	2.66	2.26

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-212

Analyte	Sample Name	MW-212	MW-212-LQ-4	MW-212-LA-5	MW-212-LQ-6	MW-212	MW-212
	Sample Date	4/27/2007	7/9/2007	10/3/2007	1/9/2008	4/8/2008	10/8/2008
UNIT							
Carbon tetrachloride	µg/L	0.257 J	0.479 J	0.568 J	0.635 J	0.519 J	<1
Chloroform	µg/L	0.289 J	0.135 J	0.13 J	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	0.516 J	<1	0.477 J	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	34.4	47.9	41.7	43.9	45.1	37.9 J
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-212

Analyte	Sample Name	MW-212	MW-212	MW-212	MW-212	MW-212	MW-212
	Sample Date	4/10/2009	10/10/2009	4/7/2010	10/15/2010	4/3/2011	10/8/2011
	UNIT						
Carbon tetrachloride	µg/L	0.29 J	0.271 J	0.277 J	0.323 J	0.319 J	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	0.407 J	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	38	38.4	31.5	23.8	20.1	16.5
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-212

Analyte	Sample Name	MW-212	MW-212	MW-212	MW-212	MW-212	MW-212
	Sample Date	4/22/2012	10/22/2012	2/11/2013	5/11/2013	8/20/2013	11/11/2013
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	0.377 J	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	12.2	13	10.4	10.9	13.7	9.35
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

MW-213

	Sample Name	MW-213	MW-213	MW-213	MW-213	MW-213	MW-213
	Sample Date	4/21/2012	10/22/2012	2/11/2013	5/11/2013	8/20/2013	11/11/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	0.661 J	0.553 J	<5	<5	<1	<5
Chloroform	µg/L	0.217 J	0.215 J	<1.5	<1.5	<0.3	<1.5
cis-1,2-Dichloroethene	µg/L	<1	<1	<5	4.05 J	11.5	4.79
Tetrachloroethene	µg/L	<1	<1	<5	<5	<1	<5
trans-1,2-Dichloroethene	µg/L	<1	<1	<5	<5	<1	<5
Trichloroethene	µg/L	44.6	34.2	25	17.5	14	13.7
Vinyl chloride	µg/L	<1	<1	<5	<5	0.327 J	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW21-01

Analyte	Sample Name	PMW21-01	PMW21-01	PMW21-01	PMW21-01	PMW21-01	PMW21-01
	Sample Date	8/9/2006	12/6/2006	3/7/2007	6/4/2007	9/18/2007	12/18/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.15 J	<0.3	0.127 J	0.152 J	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	1.96	2.27	2.06	2.19	2	2.17
Tetrachloroethene	µg/L	156	193	152	165	122	130
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	40.6	46.4	36.3	39.9	35.5	39.5
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW21-01

	Sample Name	PMW21-01	PMW21-01	PMW21-01	PMW21-01	PMW21-01	PMW21-01
	Sample Date	3/14/2008	6/16/2008	12/11/2008	3/12/2009	12/6/2011	PMW21-01 2/5/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.164 J	<0.3	<0.3	<0.3	0.137 J	0.167 J
cis-1,2-Dichloroethene	µg/L	2.55	1.86	1.78	1.32	15.6	15.3
Tetrachloroethene	µg/L	193	114	73.3	23.5	280	263
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	0.251 J	0.748 J
Trichloroethene	µg/L	54.2	32.2	23.9	7.6	50.1	51.2
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

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HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW21-01

Analyte	Sample Name	PMW21-01	PMW21-01	PMW21-01
	Sample Date	5/11/2013	8/17/2013	11/7/2013
UNIT				
Carbon tetrachloride	µg/L	<1	<2	<2
Chloroform	µg/L	0.179 J	<0.6	<0.6
cis-1,2-Dichloroethene	µg/L	11.2	9.62	93
Tetrachloroethene	µg/L	293	279	2.19
trans-1,2-Dichloroethene	µg/L	0.554 J	0.808 J	0.53 J
Trichloroethene	µg/L	61.6	55.5	0.813 J
Vinyl chloride	µg/L	<1	<2	<2

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW21-02

	Sample Name	PMW21-02	PMW21-02	PMW21-02	PMW21-02	PMW21-02	PMW21-02
	Sample Date	8/9/2006	12/6/2006	3/7/2007	6/4/2007	9/18/2007	12/18/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	0.144 J	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	1.51	0.825 J	0.823 J	0.739 J	0.782 J	0.626 J
Tetrachloroethene	µg/L	108	62.5	45.2	44.4	44.7	32.6
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	37.8	22	17.6	18.3	19.8	17
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW21-02

Analyte	Sample Name	PMW21-02	PMW21-02	PMW21-02	PMW21-02	PMW21-02	PMW21-02
	Sample Date	3/17/2008	6/16/2008	12/12/2008	3/12/2009	12/6/2011	PMW21-02 2/7/2013
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	0.478 J	0.251 J	1.03	0.891 J	4.2	4.5
Tetrachloroethene	µg/L	31.1	11.4	48.4	49.5	118	169
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	12.6	12.8	20.4	21.4	30.1	44
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW21-02

Analyte	Sample Name	PMW21-02	PMW21-02	PMW21-02
	Sample Date	5/11/2013	8/18/2013	11/8/2013
UNIT				
Carbon tetrachloride	µg/L	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	4.74 J	5.18	5.66
Tetrachloroethene	µg/L	137	143	149
trans-1,2-Dichloroethene	µg/L	<1	<1	<1
Trichloroethene	µg/L	47.5	54.3	52.5
Vinyl chloride	µg/L	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW21-04

Analyte	Sample Name	PMW21-04	PMW21-04	PMW21-04	PMW21-04	PMW21-04	PMW21-04
	Sample Date	8/9/2006	12/6/2006	3/7/2007	6/4/2007	9/18/2007	12/18/2007
UNIT							
Carbon tetrachloride	µg/L	<1	< J	<1	<1	<1	<1
Chloroform	µg/L	<0.3	0.199 J	0.157 J	0.141 J	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	2.94	2.47	2.46	2.08	2.22	1.83
Tetrachloroethene	µg/L	199	190	148	123	103	93.4
trans-1,2-Dichloroethene	µg/L	0.291 J	0.26 J	<1	<1	0.279 J	0.259 J
Trichloroethene	µg/L	87.7	84.5	64.3	60.2	50.7	49
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW21-04

Analyte	Sample Name	PMW21-04	PMW21-04	PMW21-04	PMW21-04	PMW21-04	PMW21-04
	Sample Date	3/17/2008	6/13/2008	12/12/2008	3/12/2009	12/6/2011	2/7/2013
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	0.131 J	<0.3	<0.3	0.144 J	<0.3
cis-1,2-Dichloroethene	µg/L	1.58	2.32	3.49	13.9	55.5	125
Tetrachloroethene	µg/L	93.9	90.9	16.2	13.5	211	276
trans-1,2-Dichloroethene	µg/L	<1	0.291 J	<1	<1	0.313 J	0.431 J
Trichloroethene	µg/L	47	55.5	5.8	5.52	69.3	59.3
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW21-04

Analyte	Sample Name	PMW21-04	PMW21-04	PMW21-04
	Sample Date	5/8/2013	8/17/2013	11/8/2013
UNIT				
Carbon tetrachloride	µg/L	<1	<5	<1
Chloroform	µg/L	<0.3	<1.5	<0.3
cis-1,2-Dichloroethene	µg/L	94.1	77.6	136
Tetrachloroethene	µg/L	21.1	25	115
trans-1,2-Dichloroethene	µg/L	<1	<5	0.607 J
Trichloroethene	µg/L	5.37	8.67	28.5
Vinyl chloride	µg/L	<1	<5	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW85-01

	Sample Name	PMW85-01	PMW85-01	PMW85-01	PMW85-01	PMW85-01	PMW85-01
	Sample Date	8/30/2006	12/8/2006	3/13/2007	6/1/2007	9/10/2007	12/10/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	222	199	161	171	102	72.9
Chloroform	µg/L	58.9	56.9	46.4	56.1	63.7	41
cis-1,2-Dichloroethene	µg/L	28.3	25.8	13.4	8.2	18	12.2
Tetrachloroethene	µg/L	79.6	76.6	51.2	57.2	45.3	30.7
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	26.1	23.7	18.1	12.5	12.7	10.1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW85-01

	Sample Name	PMW85-01	PMW85-01	PMW85-01	PMW85-01	PMW85-01	PMW85-01
	Sample Date	3/13/2008	6/18/2008	12/8/2008	3/13/2009	12/12/2011	2/9/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	24.5	57.3	0.942 J	<1	102	0.322 J
Chloroform	µg/L	36.3	29.9	78 J	0.455	42.5	0.685
cis-1,2-Dichloroethene	µg/L	79.3	18.3	29.8	50.4	37.3	79.3
Tetrachloroethene	µg/L	16.3	19.3	22.5	0.896 J	57.2	1.03
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	6.59	7.68	7.33	<1	20.2	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	0.364 J

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW85-01

Analyte	Sample Name	PMW85-01	PMW85-01	PMW85-01
	Sample Date	5/10/2013	8/13/2013	11/5/2013
	UNIT			
Carbon tetrachloride	µg/L	<1	<10	<5
Chloroform	µg/L	<0.3	<3	<1.5
cis-1,2-Dichloroethene	µg/L	55.1	51.8	22.6
Tetrachloroethene	µg/L	0.451 J	<10	<5
trans-1,2-Dichloroethene	µg/L	<1	<10	<5
Trichloroethene	µg/L	<1	<10	<5
Vinyl chloride	µg/L	1.89	<10	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW85-05

	Sample Name	PMW85-05	PMW85-05	PMW85-05	PMW85-05	PMW85-05	PMW85-05
	Sample Date	3/13/2007	5/31/2007	9/10/2007	12/11/2007	3/12/2008	6/18/2008
Analyte	UNIT						
Carbon tetrachloride	µg/L	155	157	152	158	154	143
Chloroform	µg/L	68.9	69	70.9	64.6	63.8	73.6
cis-1,2-Dichloroethene	µg/L	83.3	84.1	88.9	83.8	87.9	94.8
Tetrachloroethene	µg/L	119	119	116	127	138	126
trans-1,2-Dichloroethene	µg/L	0.333 J	1.93	0.489 J	1.74	0.438 J	<1
Trichloroethene	µg/L	37.9	36.5	35.4	39.3	38.7	34.5
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW85-05

	Sample Name	PMW85-05	PMW85-05	PMW85-05	PMW85-05	PMW85-05	PMW85-05
	Sample Date	12/8/2008	3/17/2009	12/13/2011	10/22/2012	2/9/2013	5/8/2013
Analyte	UNIT						
Carbon tetrachloride	µg/L	44.5 J	5.13	77.6	62.8	47.7	72.3 J
Chloroform	µg/L	98.7 J	86.4	34.8	30.1	24.5	32.4
cis-1,2-Dichloroethene	µg/L	127	166	81.9	101	83.4	85.1
Tetrachloroethene	µg/L	71	30.5	79.1	70.1	75.7	106
trans-1,2-Dichloroethene	µg/L	<1	<1	0.464 J	<1	<1	<1
Trichloroethene	µg/L	26.6	14.8	25.6	24	22.5	31.7
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW85-05

Analyte	Sample Name	PMW85-05	PMW85-05
	Sample Date	8/13/2013	11/6/2013
UNIT			
Carbon tetrachloride	µg/L	78.6	75.3
Chloroform	µg/L	32.3	34.3
cis-1,2-Dichloroethene	µg/L	83.4	66.1
Tetrachloroethene	µg/L	110	97.8
trans-1,2-Dichloroethene	µg/L	<1	<1
Trichloroethene	µg/L	33.1	28.4
Vinyl chloride	µg/L	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW92-03

	Sample Name	PMW92-03	PMW92-03	PMW92-03	PMW92-03	PMW92-03	PMW92-03
	Sample Date	8/30/2006	12/7/2006	3/8/2007	5/30/2007	9/12/2007	12/12/2007
Analyte	UNIT						
Carbon tetrachloride	µg/L	58.1	41.9	19.3	7.59	2.32	0.969 J
Chloroform	µg/L	19.2	18.9	27.4	31	25.7	3.12
cis-1,2-Dichloroethene	µg/L	19.9	21.3	70.7	166	182	159
Tetrachloroethene	µg/L	252	252	170	54.4	31.8	30.9
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	11.5	12	9.92	7.03	5.09	6.91
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW92-03

Analyte	Sample Name	PMW92-03	PMW92-03	PMW92-03	PMW92-03	PMW92-03	PMW92-03
	Sample Date	3/11/2008	6/11/2008	12/11/2008	3/16/2009	4/7/2010	10/4/2010
UNIT							
Carbon tetrachloride	µg/L	0.586 J	<1	<1	<1	<1	<1
Chloroform	µg/L	0.994	0.49	0.151 J	<0.3	<0.3	0.26 J
cis-1,2-Dichloroethene	µg/L	161	159	159	139	112	83
Tetrachloroethene	µg/L	30.8	27.1	33.3	15.6	66.6	104
trans-1,2-Dichloroethene	µg/L	<1	<1	0.339 J	<1	<1	<1
Trichloroethene	µg/L	4.66	8.79	12.7	5.99	18.2	19
Vinyl chloride	µg/L	0.262 J	<1	<1	<1	<1	0.528 J

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW92-03

Analyte	Sample Name	PMW92-03	PMW92-03	PMW92-03	PMW92-03	PMW92-03	PMW92-03
	Sample Date	4/3/2011	10/3/2011	4/21/2012	10/22/2012	2/9/2013	5/9/2013
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	73.4 J	51.9	54.2	42.6	33	36
Tetrachloroethene	µg/L	136	147	112	145	154	125
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	21.1	15.1	18.9	15.2	11.6	12.1
Vinyl chloride	µg/L	0.286 J	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW92-03

Analyte	Sample Name	PMW92-03	PMW92-03
	Sample Date	8/13/2013	11/6/2013
	UNIT		
Carbon tetrachloride	µg/L	<1	<5
Chloroform	µg/L	<0.3	<1.5
cis-1,2-Dichloroethene	µg/L	50.4	54.4
Tetrachloroethene	µg/L	149	12.8
trans-1,2-Dichloroethene	µg/L	<1	<5
Trichloroethene	µg/L	14.9	<5
Vinyl chloride	µg/L	1.61	<5

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-02A

Analyte	Sample Name	PMW101-02A	PMW101-02A	PMW101-02A	PMW101-02A	PMW101-02A	PMW101-02A
	Sample Date	8/22/2006	12/4/2006	3/5/2007	5/29/2007	9/13/2007	12/14/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1 J	<1	<1
Chloroform	µg/L	0.267 J	0.224 J	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	6.72	51.2	70.4	58.7
Tetrachloroethene	µg/L	257	192	176	50.8	12.4	13.9
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	0.322 J	<1	3.22	6.43	1.47	1.34
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-02A

Analyte	Sample Name	PMW101-02A	PMW101-02A	PMW101-02A	PMW101-02A	PMW101-02A	PMW101-02A
	Sample Date	3/10/2008	6/10/2008	12/8/2008	3/9/2009	12/6/2011	2/6/2013
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	48	37.7	31.2	37.7	2.09	8.01
Tetrachloroethene	µg/L	20.3	24.5	24	5.21	45.4	21.4
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	3.92	5.97	2.28	<1	0.558 J	1.82
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-02A

Analyte	Sample Name	PMW101-02A	PMW101-02A	PMW101-02A
	Sample Date	5/13/2013	8/16/2013	11/9/2013
UNIT				
Carbon tetrachloride	µg/L	<10	<5	<2
Chloroform	µg/L	<3	<1.5	<0.6
cis-1,2-Dichloroethene	µg/L	16	11.9	8.62
Tetrachloroethene	µg/L	<10	<5	2.15
trans-1,2-Dichloroethene	µg/L	<10	<5	<2
Trichloroethene	µg/L	<10	<5	1.39 J
Vinyl chloride	µg/L	<10	<5	<2

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-02B

Analyte	Sample Name	PMW101-02B	PMW101-02B	PMW101-02B	PMW101-02B	PMW101-02B	PMW101-02B
	Sample Date	8/22/2006	12/4/2006	3/5/2007	5/29/2007	9/13/2007	12/14/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1 J	<1	<1
Chloroform	µg/L	0.202 J	0.233 J	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	0.326 J	<1	7.27	93.3	110	101
Tetrachloroethene	µg/L	196	191	151	15.3	0.613 J	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	0.326 J
Trichloroethene	µg/L	4.73	1.25	11.1	4.29	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-02B

Analyte	Sample Name	PMW101-02B	PMW101-02B	PMW101-02B	PMW101-02B	PMW101-02B	PMW101-02B
	Sample Date	3/10/2008	6/9/2008	12/8/2008	3/9/2009	12/6/2011	2/6/2013
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	87.7	96.1	55	35.2	0.442 J	25.3
Tetrachloroethene	µg/L	<1	<1	4.03	27	25.5	11.3
trans-1,2-Dichloroethene	µg/L	0.334 J	0.265 J	0.375 J	<1	<1	<1
Trichloroethene	µg/L	<1	0.698 J	5.41	21	1.86	2.17
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-02B

Analyte	Sample Name	PMW101-02B	PMW101-02B	PMW101-02B
	Sample Date	5/13/2013	8/16/2013	11/9/2013
UNIT				
Carbon tetrachloride	µg/L	<10	<5	<1
Chloroform	µg/L	<3	<1.5	<0.3
cis-1,2-Dichloroethene	µg/L	27.8	32.9	37.5
Tetrachloroethene	µg/L	<10	1.25 J	1.58
trans-1,2-Dichloroethene	µg/L	<10	<5	<1
Trichloroethene	µg/L	<10	<5	3.21
Vinyl chloride	µg/L	<10	<5	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-04A

Analyte	Sample Name	PMW101-04A	PMW101-04A	PMW101-04A	PMW101-04A	PMW101-04A	PMW101-04A
	Sample Date	8/22/2006	12/5/2006	3/6/2007	5/31/2007	9/17/2007	12/14/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1 J	<1	<1
Chloroform	µg/L	0.199 J	0.163 J	0.144 J	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	20.9	86.9	72.6
Tetrachloroethene	µg/L	199	176	177	138	12.2	5.89
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	0.26 J	<1	<1	1.2	1.31	0.294 J
Vinyl chloride	µg/L	<1	<1	<1	<1	0.277 J	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-04A

Analyte	Sample Name	PMW101-04A	PMW101-04A	PMW101-04A	PMW101-04A	PMW101-04A	PMW101-04A
	Sample Date	3/11/2008	6/11/2008	12/8/2008	3/10/2009	4/1/2010	10/14/2010
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	81.3	42.6	60.7	47	29	13.5 J
Tetrachloroethene	µg/L	5.7	4.64	13.9	22.6	33	44.6 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	0.559 J	1.65	2.65	6.83	6.93	7.89 J
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-04A

Analyte	Sample Name	PMW101-04A	PMW101-04A	PMW101-04A	PMW101-04A	PMW101-04A	PMW101-04A
	Sample Date	4/4/2011	10/6/2011	4/22/2012	10/22/2012	2/7/2013	5/13/2013
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	7.76	3.12	2.09	1.35	1.03	2.29
Tetrachloroethene	µg/L	57.3	59.6	53.4	46.9	51.1	45.6
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	6.1	2.11	1.44	0.977 J	0.806	0.967 J
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-04A

Analyte	Sample Name	PMW101-04A	PMW101-04A
	Sample Date	8/15/2013	11/8/2013
	UNIT		
Carbon tetrachloride	µg/L	<1	<1
Chloroform	µg/L	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	11.4	20.4
Tetrachloroethene	µg/L	25.5	6.35
trans-1,2-Dichloroethene	µg/L	<1	<1
Trichloroethene	µg/L	1.13	0.927
Vinyl chloride	µg/L	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-04B

Analyte	Sample Name	PMW101-04B	PMW101-04B	PMW101-04B	PMW101-04B	PMW101-04B	PMW101-04B
	Sample Date	8/29/2006	12/5/2006	3/6/2007	5/31/2007	9/17/2007	12/14/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1 J	<1	<1
Chloroform	µg/L	<0.3	0.172 J	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	0.971 J	0.394 J	18.8	86.3	72.1	48.1
Tetrachloroethene	µg/L	90.4	109	104	19.1	14.1	29.3
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	23.2	9.06	3.04	1.24	1.65	2.91
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-04B

Analyte	Sample Name	PMW101-04B	PMW101-04B	PMW101-04B	PMW101-04B	PMW101-04B	PMW101-04B
	Sample Date	3/11/2008	6/10/2008	12/10/2008	3/10/2009	4/1/2010	10/5/2010
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	69.3	52.2	26	37.2	0.708 J	<1
Tetrachloroethene	µg/L	5.33	12.8	37	22.4	35.7	28.7
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	1.6	4.85	5.02	2.39	3.87	3.09
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-04B

Analyte	Sample Name	PMW101-04B	PMW101-04B	PMW101-04B	PMW101-04B	PMW101-04B	PMW101-04B
	Sample Date	4/4/2011	10/6/2011	4/22/2012	10/19/2012	2/7/2013	5/8/2013
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	<1	0.281 J	<1	2.46
Tetrachloroethene	µg/L	26.1	31.2	30.9	28.5	37.2	33.7
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	2.79	3.23	3.82	5.6	3.25	3.38
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-04B

Analyte	Sample Name	PMW101-04B	PMW101-04B
	Sample Date	8/15/2013	11/8/2013
	UNIT		
Carbon tetrachloride	µg/L	<1	<1
Chloroform	µg/L	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	3.94	8.17
Tetrachloroethene	µg/L	29.6	22.1
trans-1,2-Dichloroethene	µg/L	<1	<1
Trichloroethene	µg/L	3.47	2.02
Vinyl chloride	µg/L	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-07A

Analyte	Sample Name	PMW101-07A	PMW101-07A	PMW101-07A	PMW101-07A	PMW101-07A	PMW101-07A
	Sample Date	8/25/2006	12/5/2006	3/6/2007	5/31/2007	9/18/2007	12/17/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1 J	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	0.263 J	<1	<1	0.432 J	0.488 J	0.42 J
Tetrachloroethene	µg/L	0.562 J	0.65 J	0.662 J	0.747 B	0.294 J	0.271 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	0.782 J	0.532 J	0.54 J	0.27 J	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-07A

Analyte	Sample Name	PMW101-07A	PMW101-07A	PMW101-07A	PMW101-07A	PMW101-07A	PMW101-07A
	Sample Date	3/13/2008	6/12/2008	12/10/2008	3/11/2009	12/9/2011	2/7/2013
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	0.261 J	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	0.435 J	0.327 J	0.527 J	0.39 J	0.361 J	0.318 J
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	0.502 J	0.296 J	<1	<1	<1	<1
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-07A

Analyte	Sample Name	PMW101-07A	PMW101-07A	PMW101-07A
	Sample Date	5/13/2013	8/15/2013	11/10/2013
	UNIT			
Carbon tetrachloride	µg/L	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1
Trichloroethene	µg/L	0.347 J	0.272 J	0.265 J
Vinyl chloride	µg/L	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

- J Estimated results based on QC data or reported below RL
- B Estimated results possibly biased high or false positive based on blank data
- < Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-07B

Analyte	Sample Name	PMW101-07B	PMW101-07B	PMW101-07B	PMW101-07B	PMW101-07B	PMW101-07B
	Sample Date	8/24/2006	12/5/2006	3/6/2007	5/31/2007	9/18/2007	12/18/2007
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1 J	<1	<1
Chloroform	µg/L	0.431	0.275 J	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	14.6	11.8	1.9	1.44	1.37	1.61
Tetrachloroethene	µg/L	53.6	46.4	24.3	21.4	22.8	21.6
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	187	154	47	37	40.1	46.3
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-07B

Analyte	Sample Name	PMW101-07B	PMW101-07B	PMW101-07B	PMW101-07B	PMW101-07B	PMW101-07B
	Sample Date	3/13/2008	6/12/2008	12/10/2008	3/11/2009	12/9/2011	2/7/2013
UNIT							
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	1.74	5.49	1.39	1.74	1.35	1.68
Tetrachloroethene	µg/L	20.6	14.9	13.3	14.4	14.2	15.1
trans-1,2-Dichloroethene	µg/L	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	43	34	24.5	29.2	28.9	32.7
Vinyl chloride	µg/L	<1	<1	<1	<1	<1	<1

Notes:

VOC samples analyzed using methods SW8010/8020.
SW8240, SW8260, SW8260A, SW8260B, or CV3990

µg/L micrograms per liter

DQE FLAGS:

J Estimated results based on QC data or reported below RL
< Not detected at sample reporting limit

HISTORICAL CVOC RESULTS
YEAR THREE ENHANCED BIOREMEDIATION TREATMENT REPORT
Main Installation - Defense Depot Memphis, Tennessee

PMW101-07B

Analyte	Sample Name	PMW101-07B	PMW101-07B	PMW101-07B
	Sample Date	5/12/2013	8/15/2013	11/10/2013
	UNIT			
Carbon tetrachloride	µg/L	<1	<1	<1
Chloroform	µg/L	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene	µg/L	1.94	1.4	1.4
Tetrachloroethene	µg/L	14.5	12.7	11.6
trans-1,2-Dichloroethene	µg/L	<1	<1	<1
Trichloroethene	µg/L	36	32.4	27.1
Vinyl chloride	µg/L	<1	<1	<1

Notes:

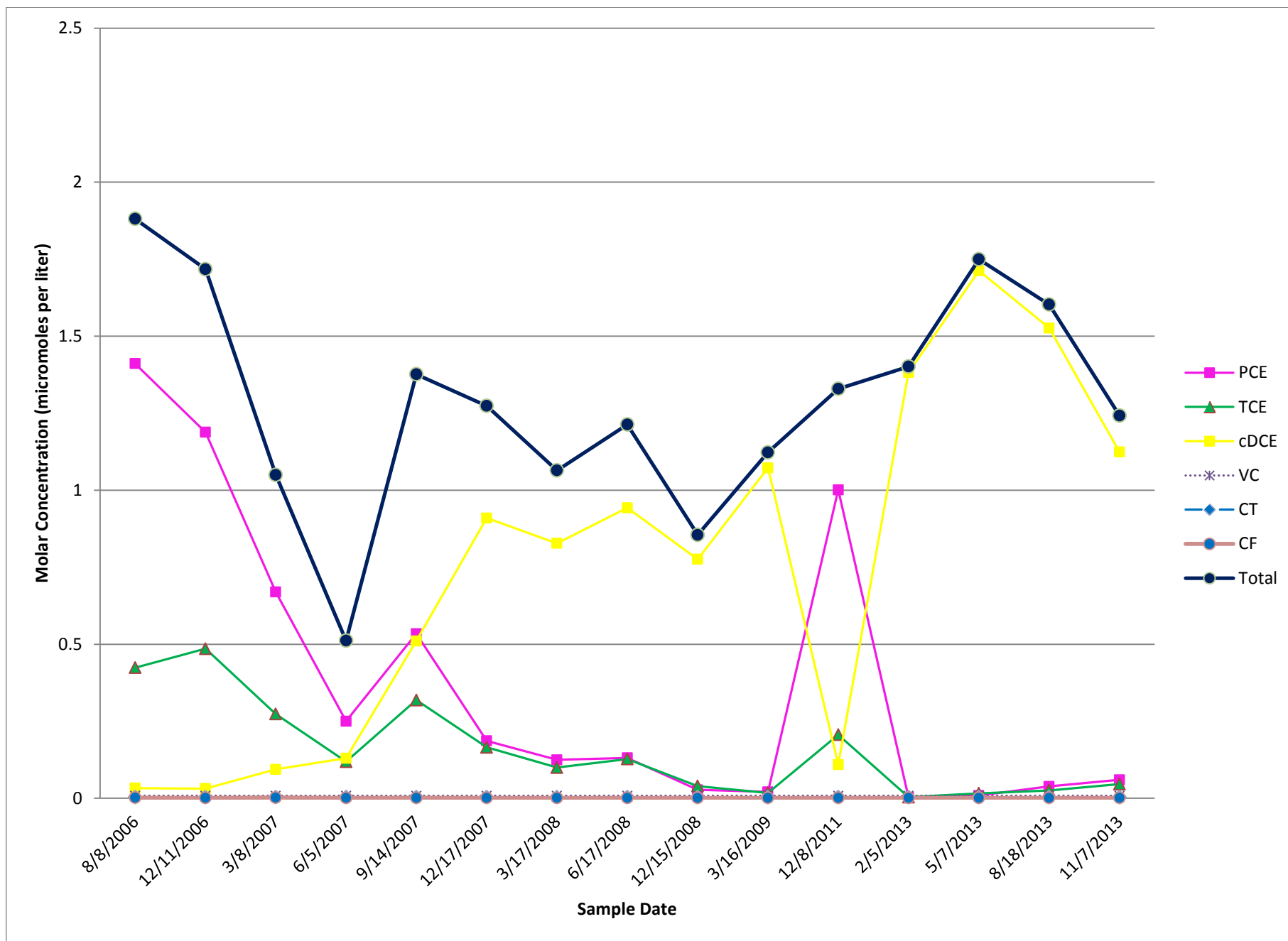
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SW8240, SW8260, SW8260A, SW8260B, or CV3990

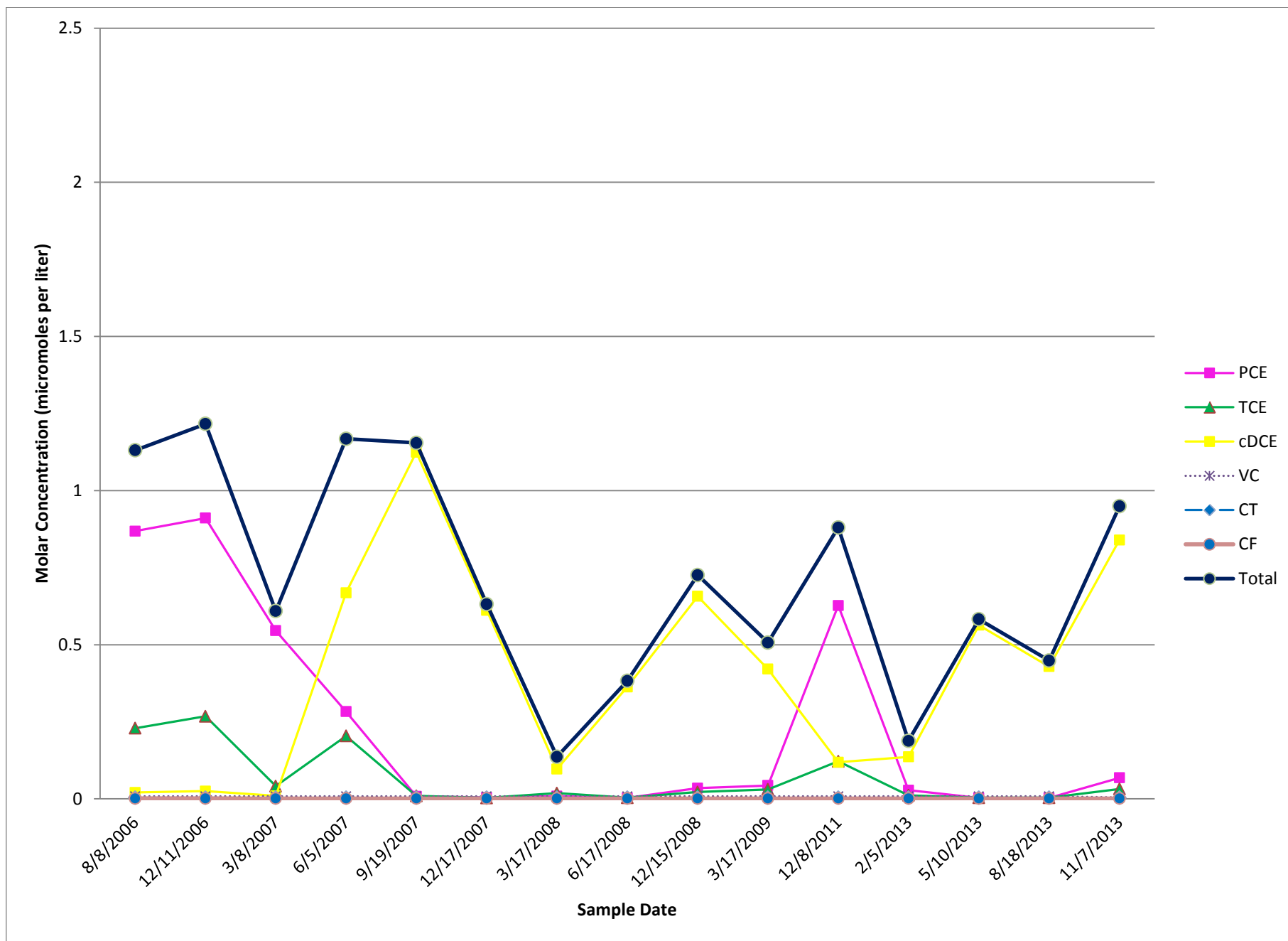
µg/L micrograms per liter

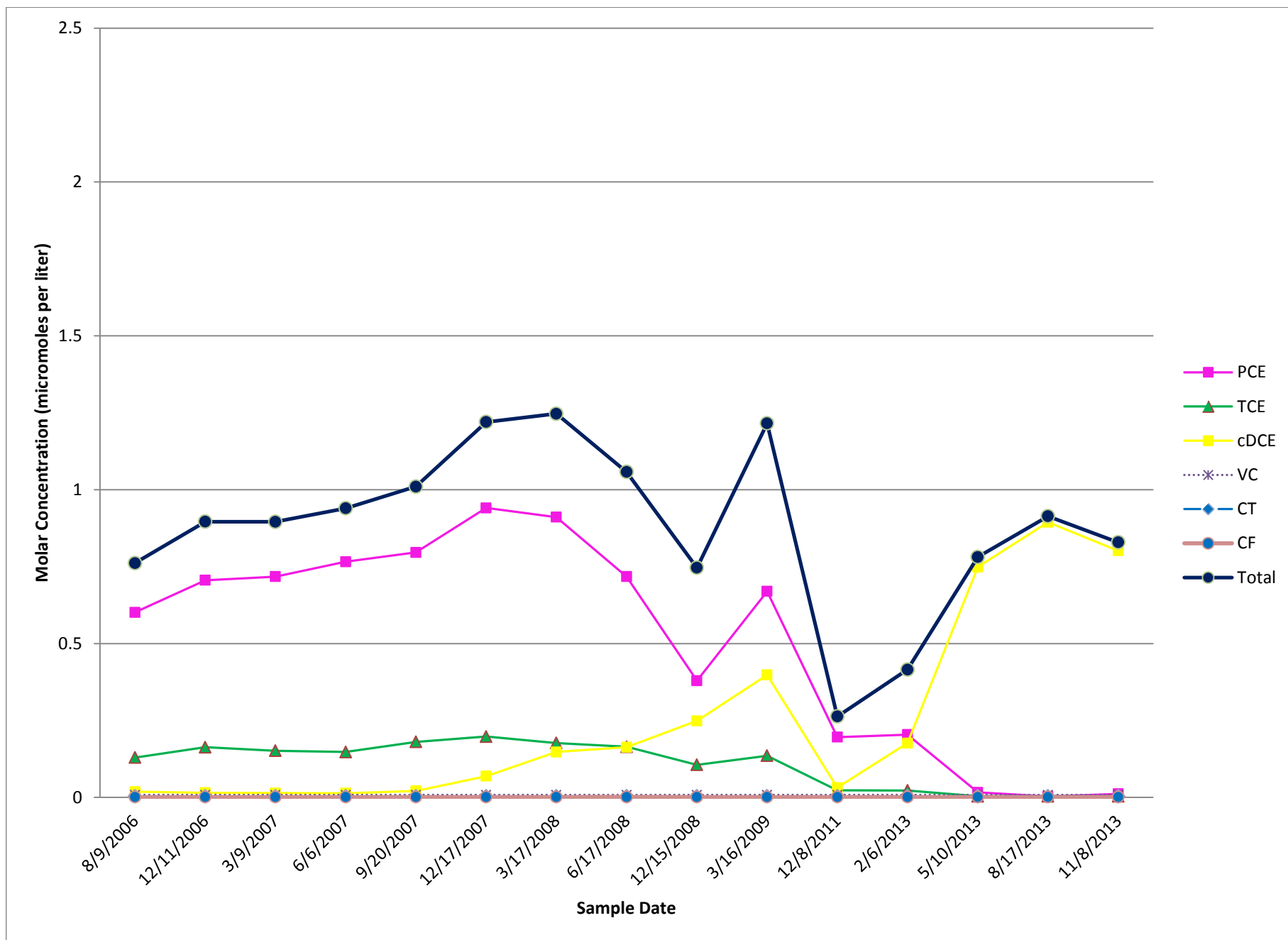
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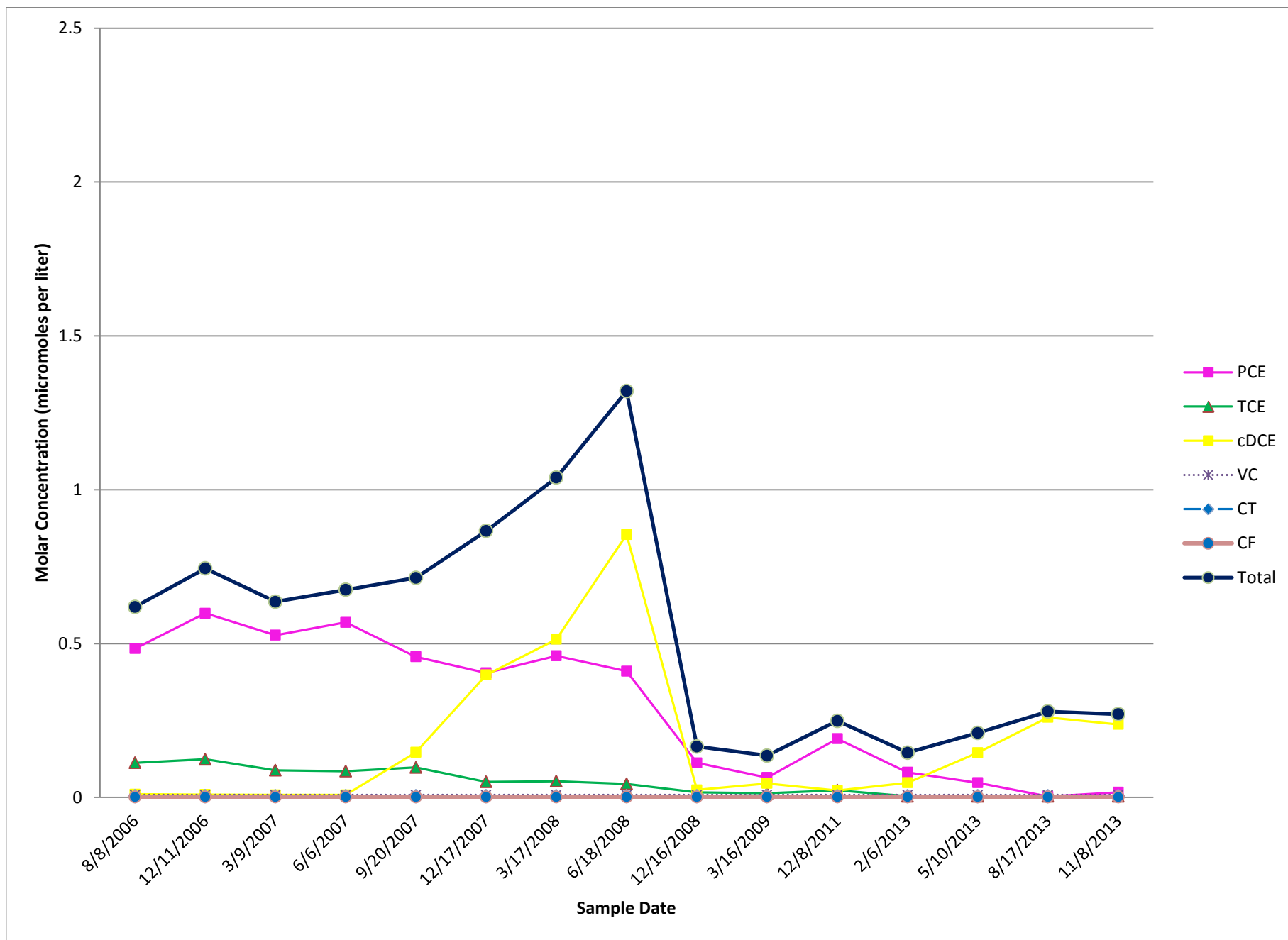
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< Not detected at sample reporting limit

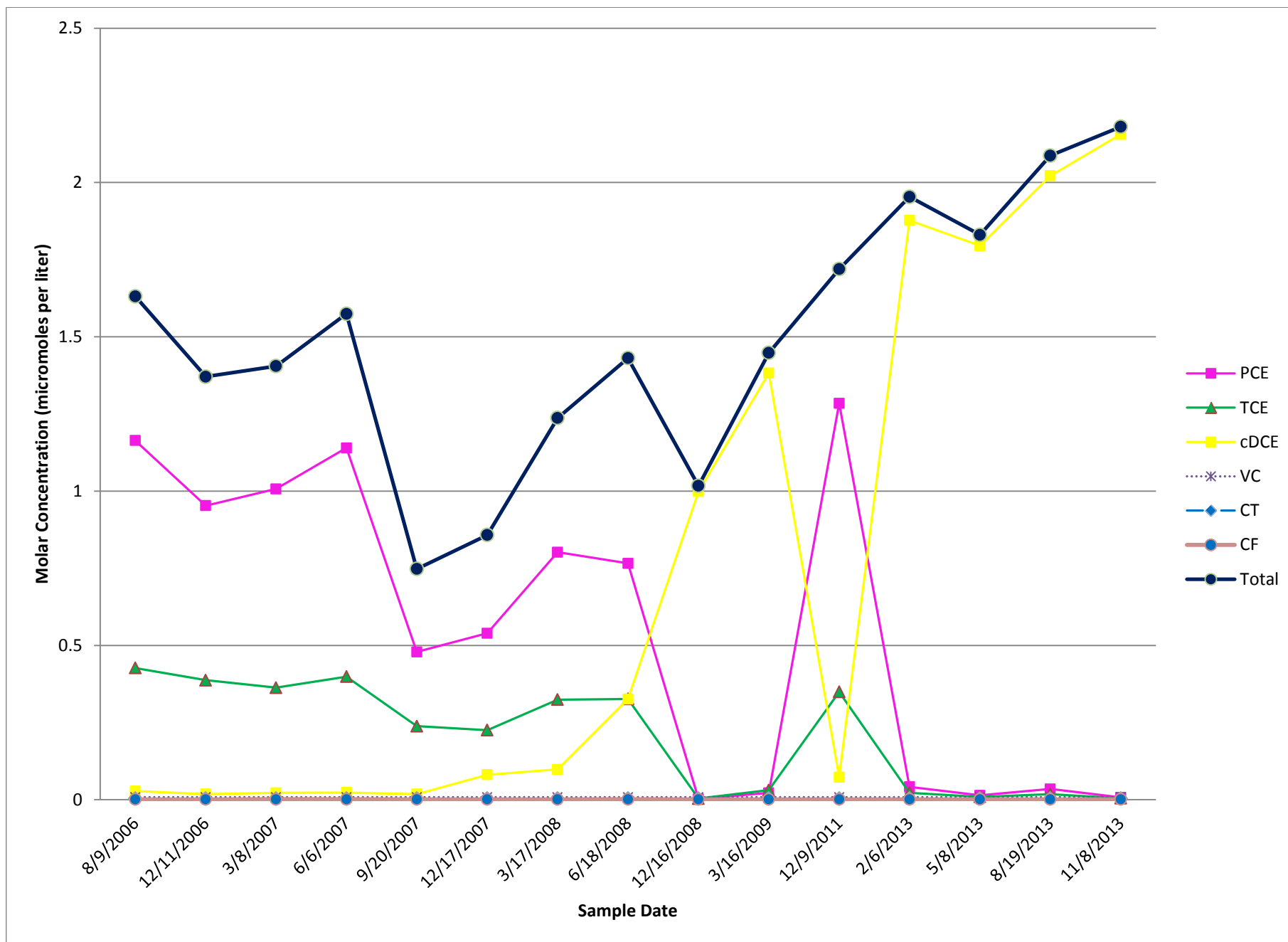
APPENDIX G
MASS BALANCE CHARTS

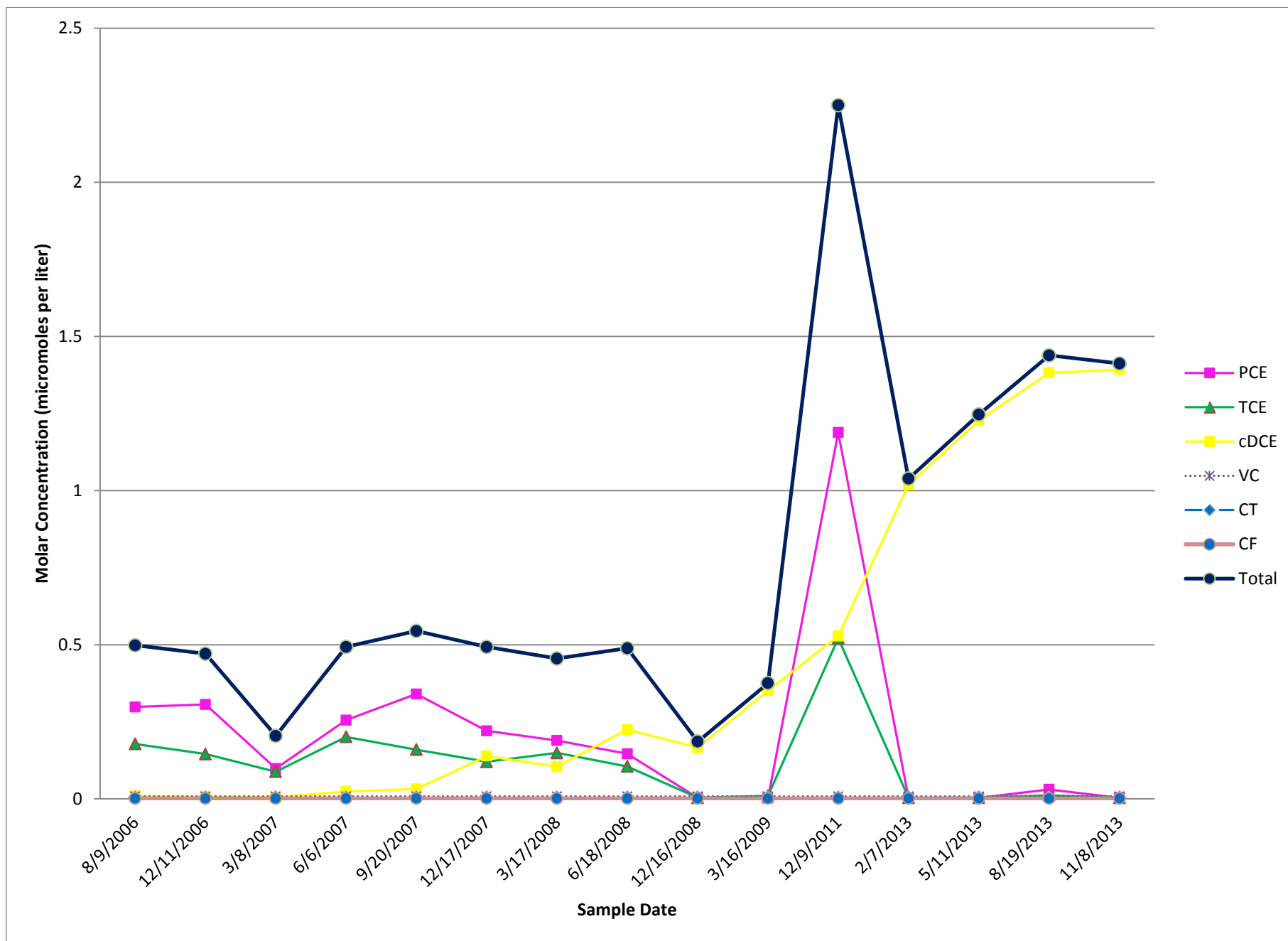


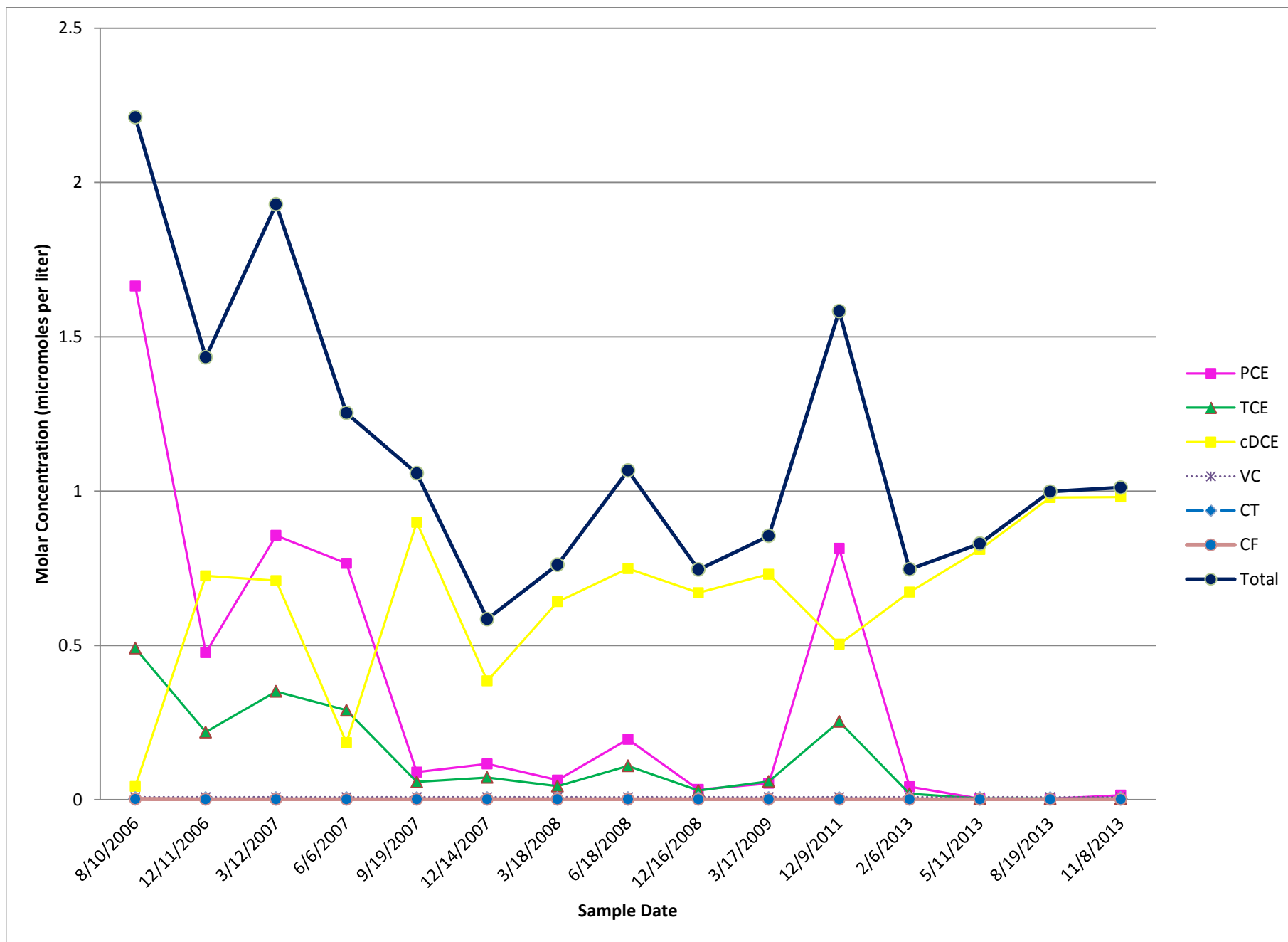


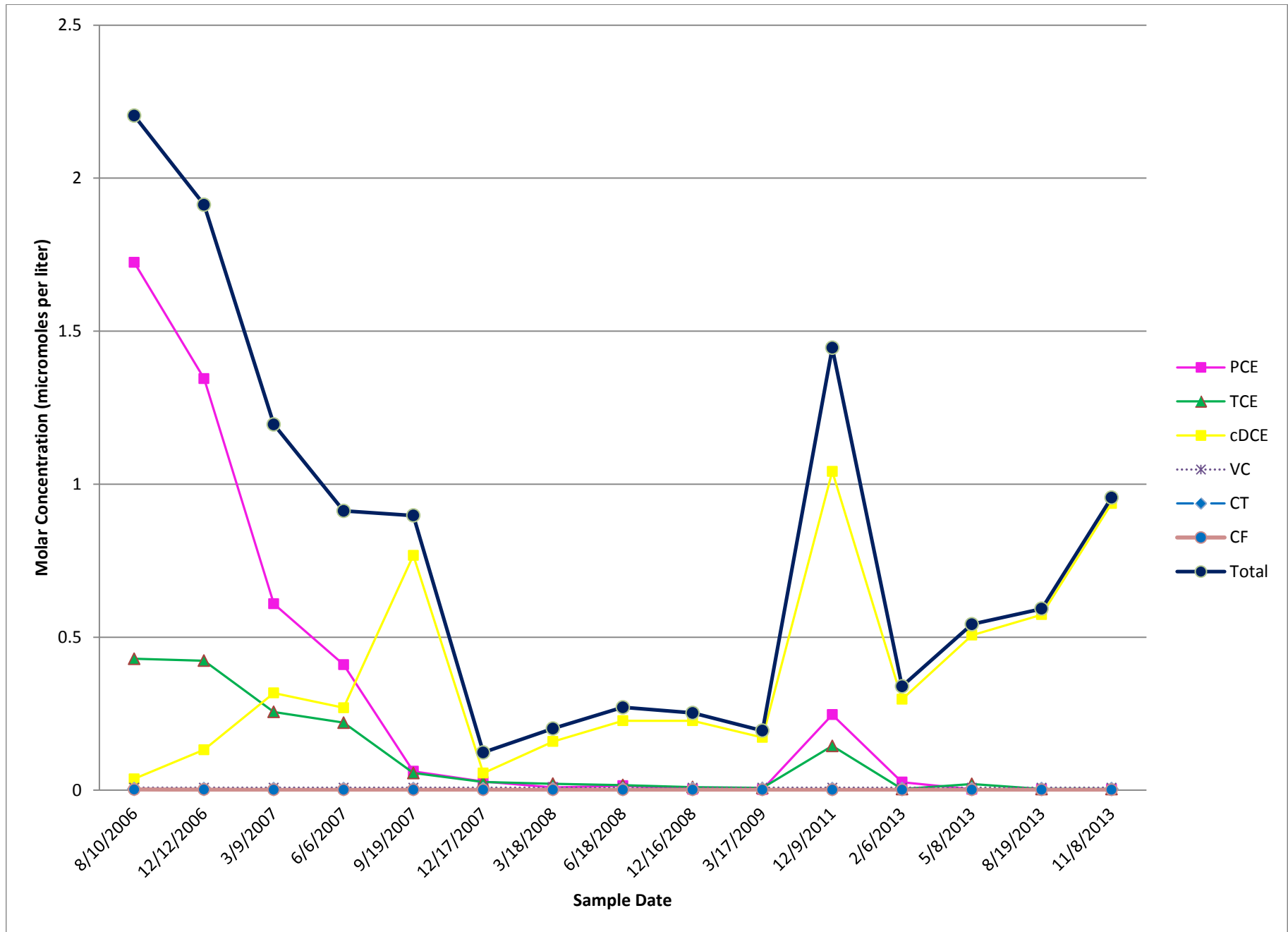


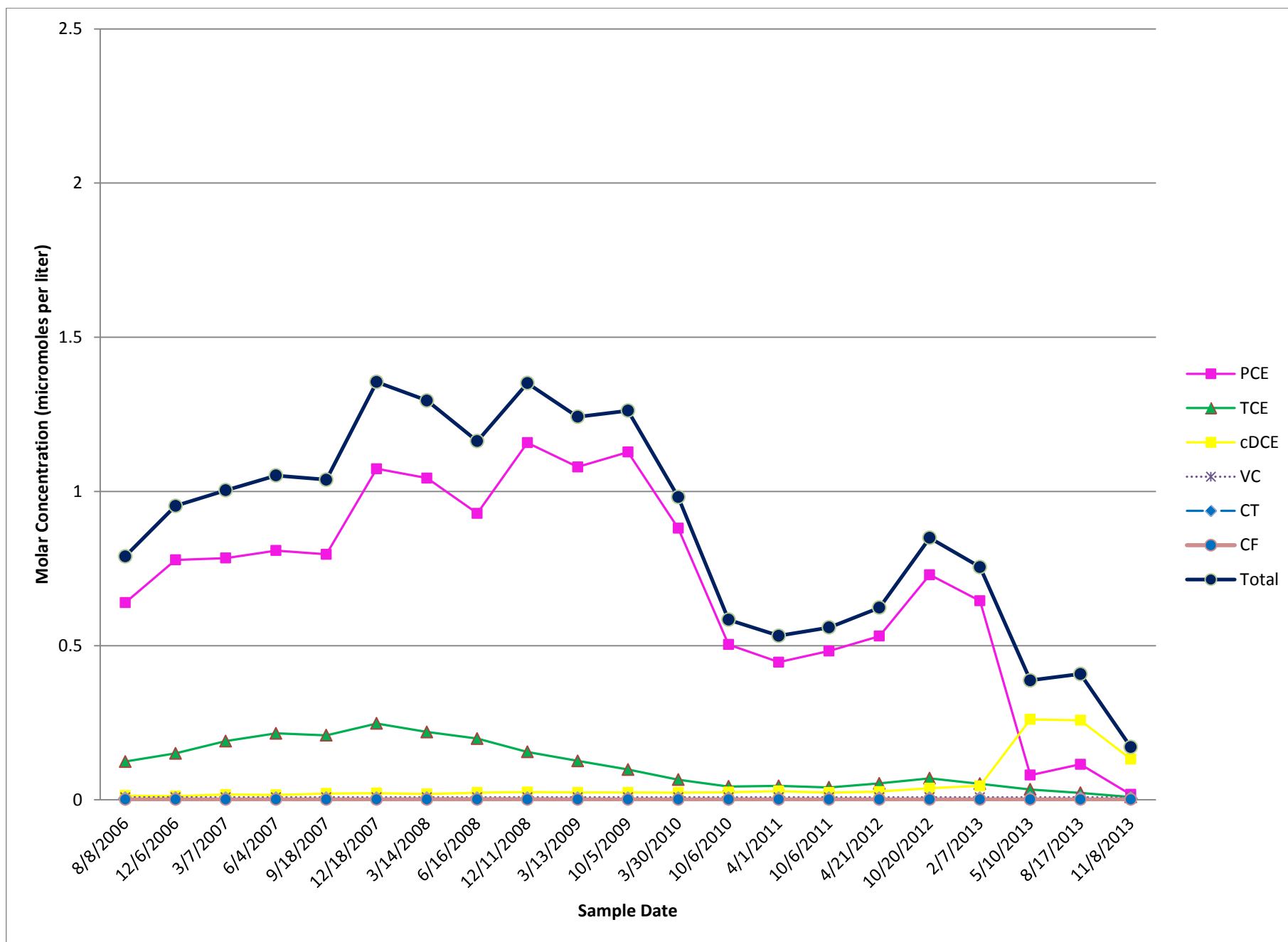




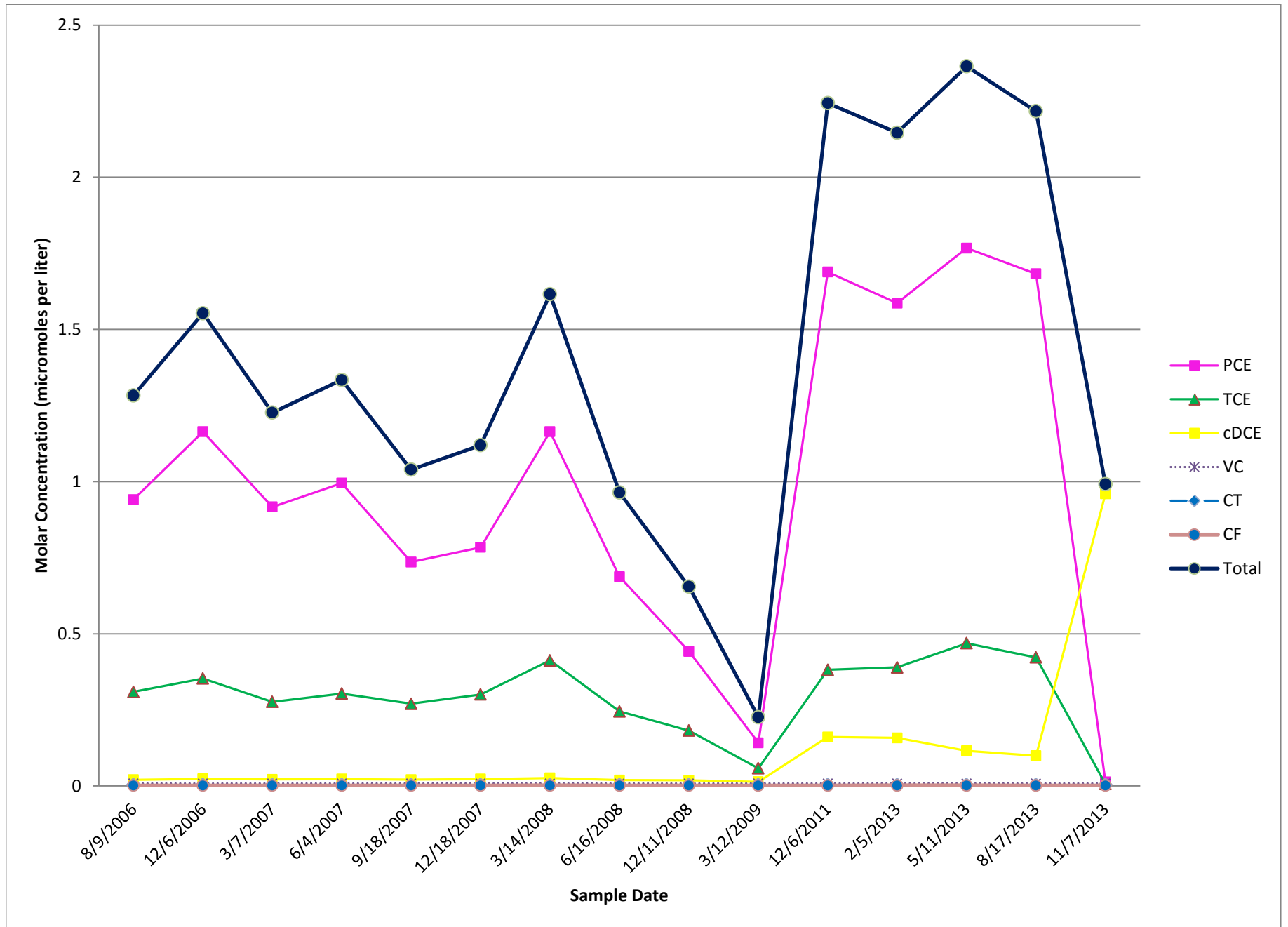




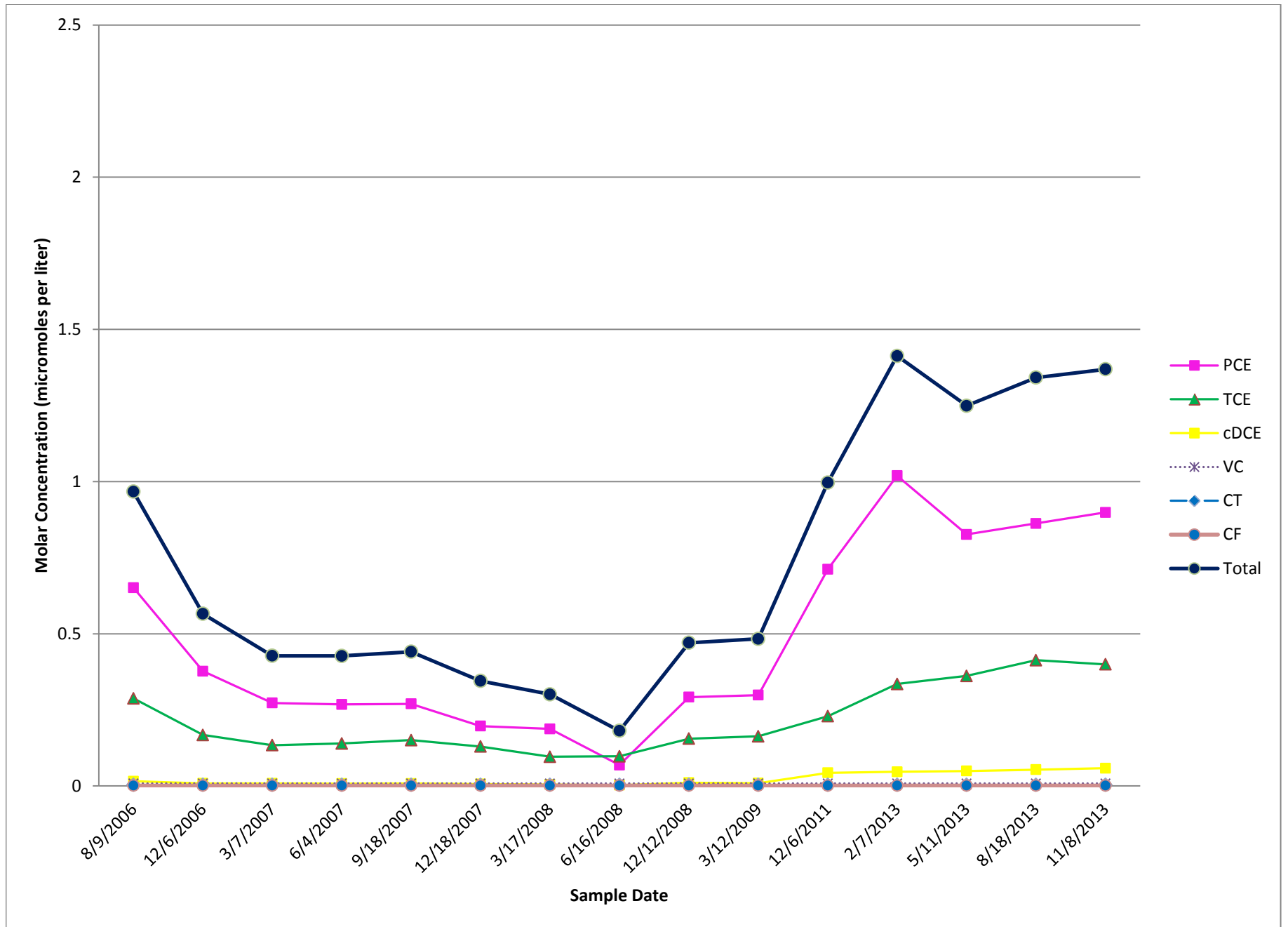




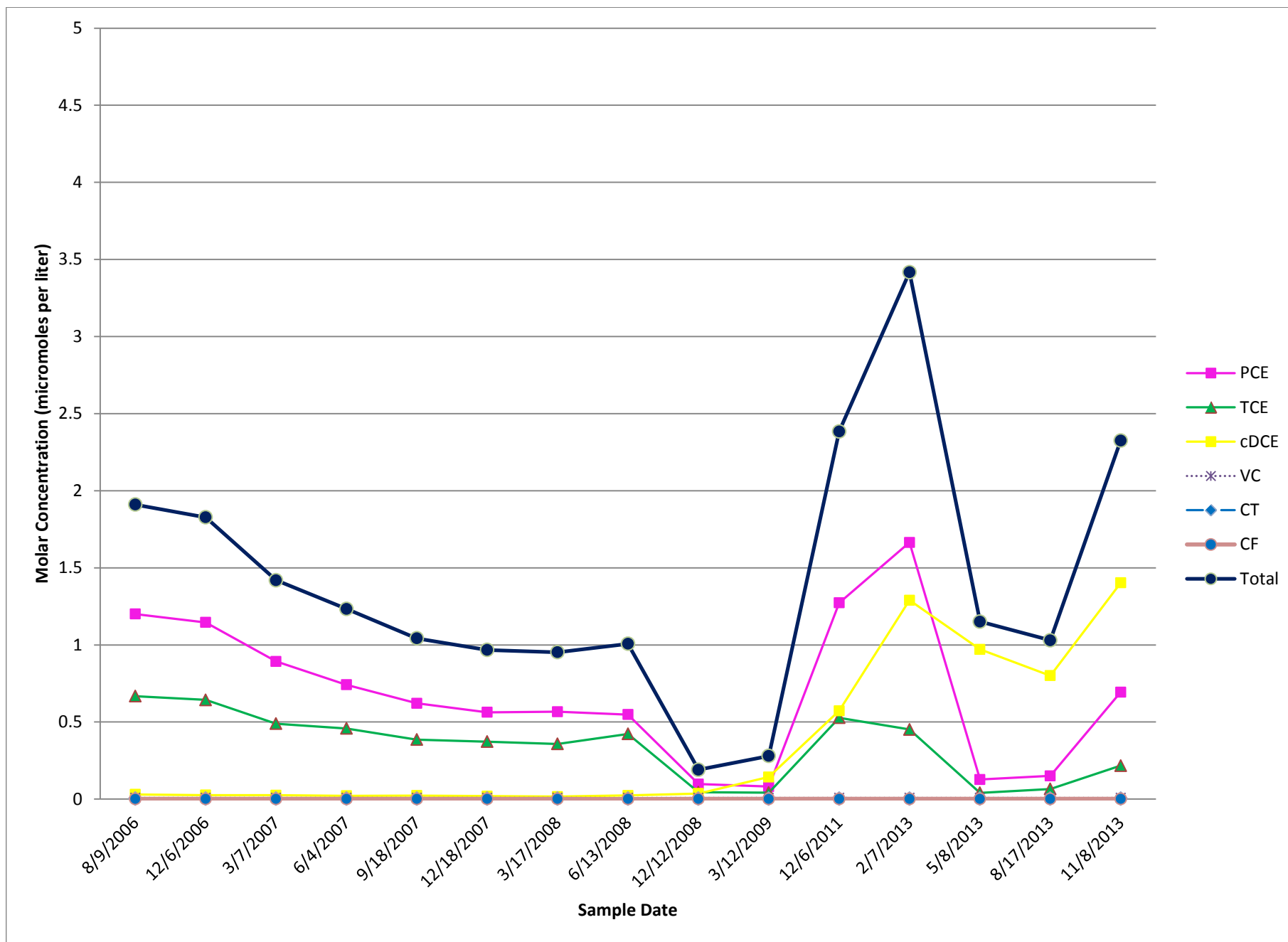
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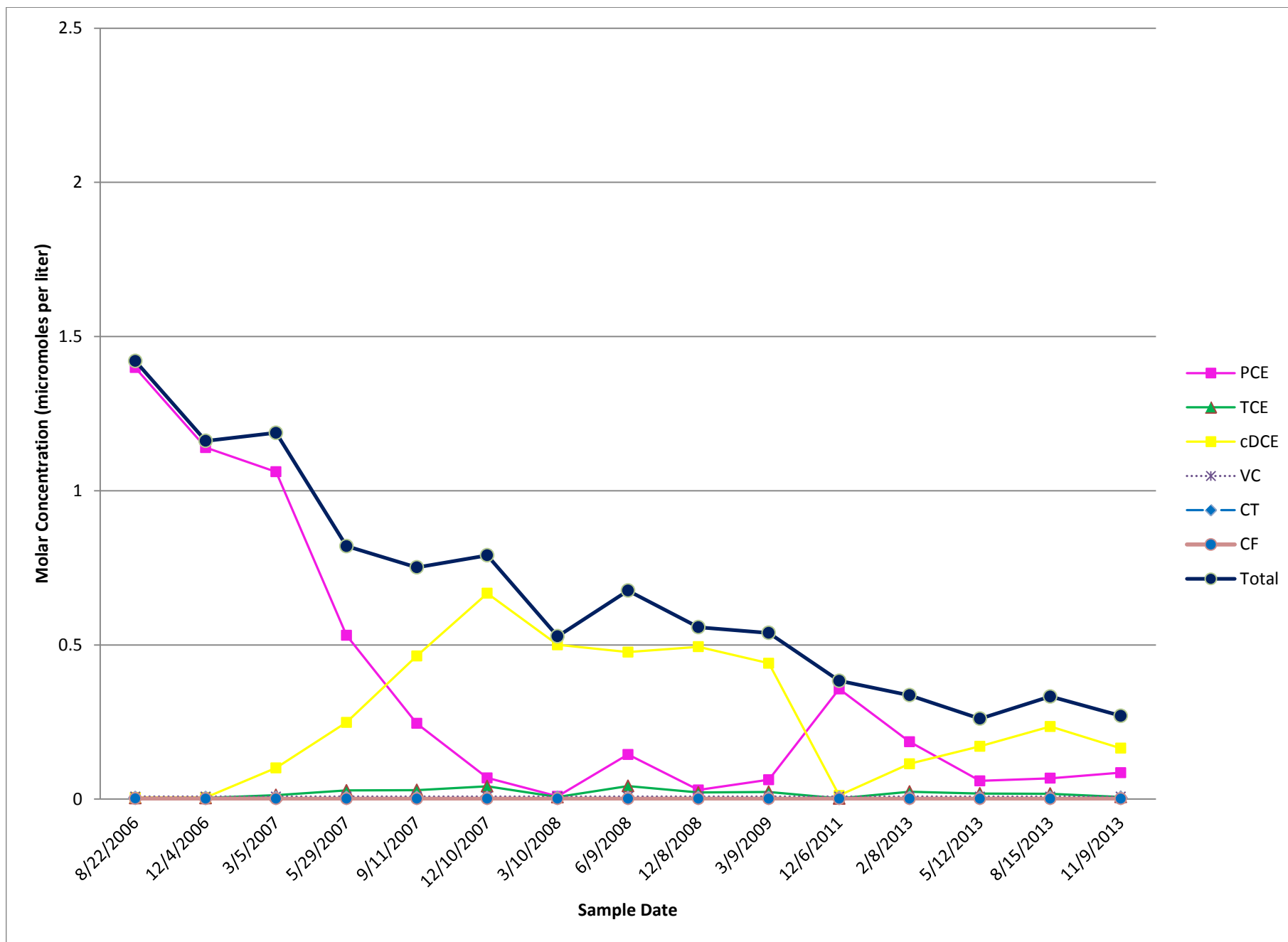


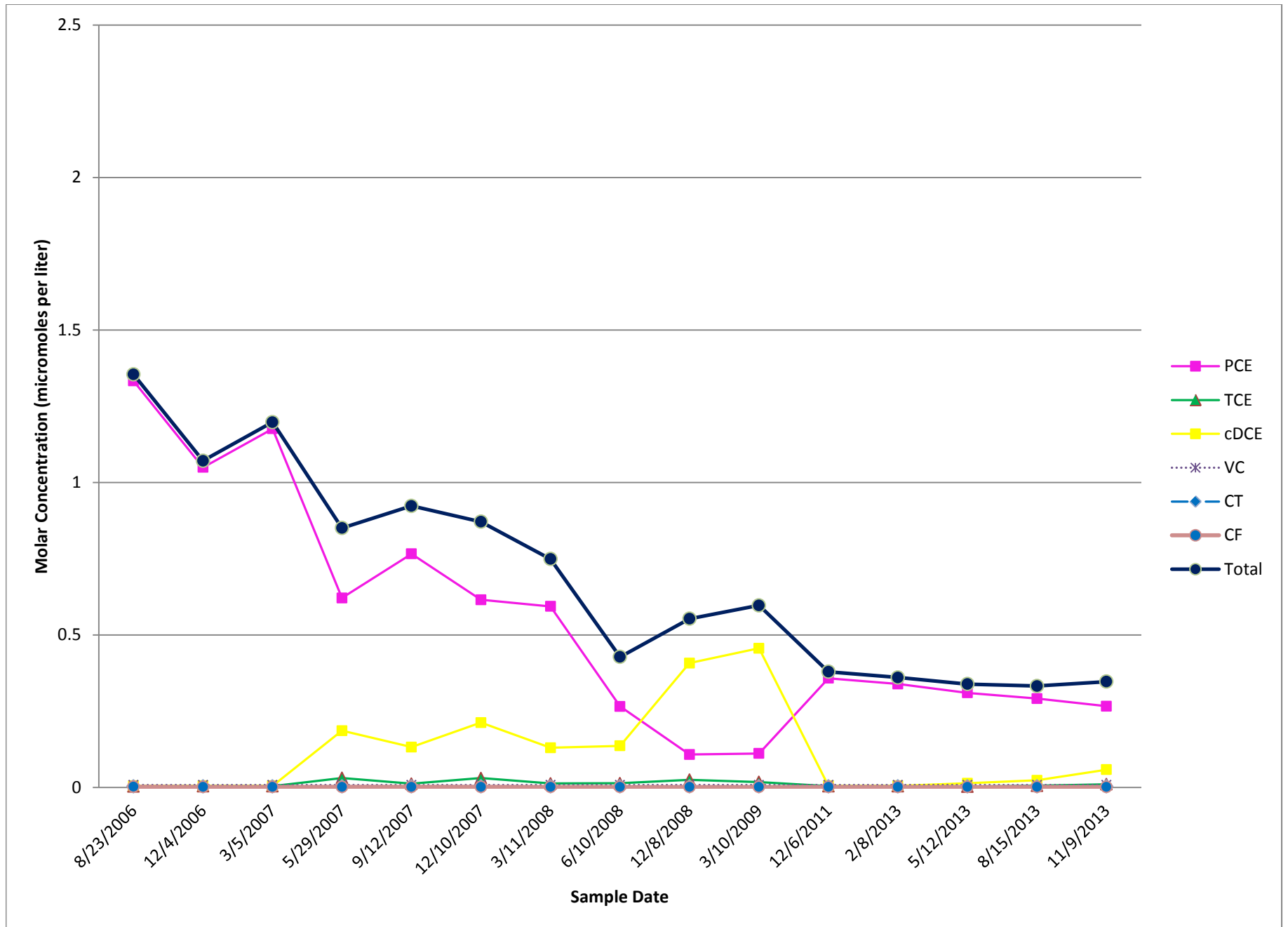
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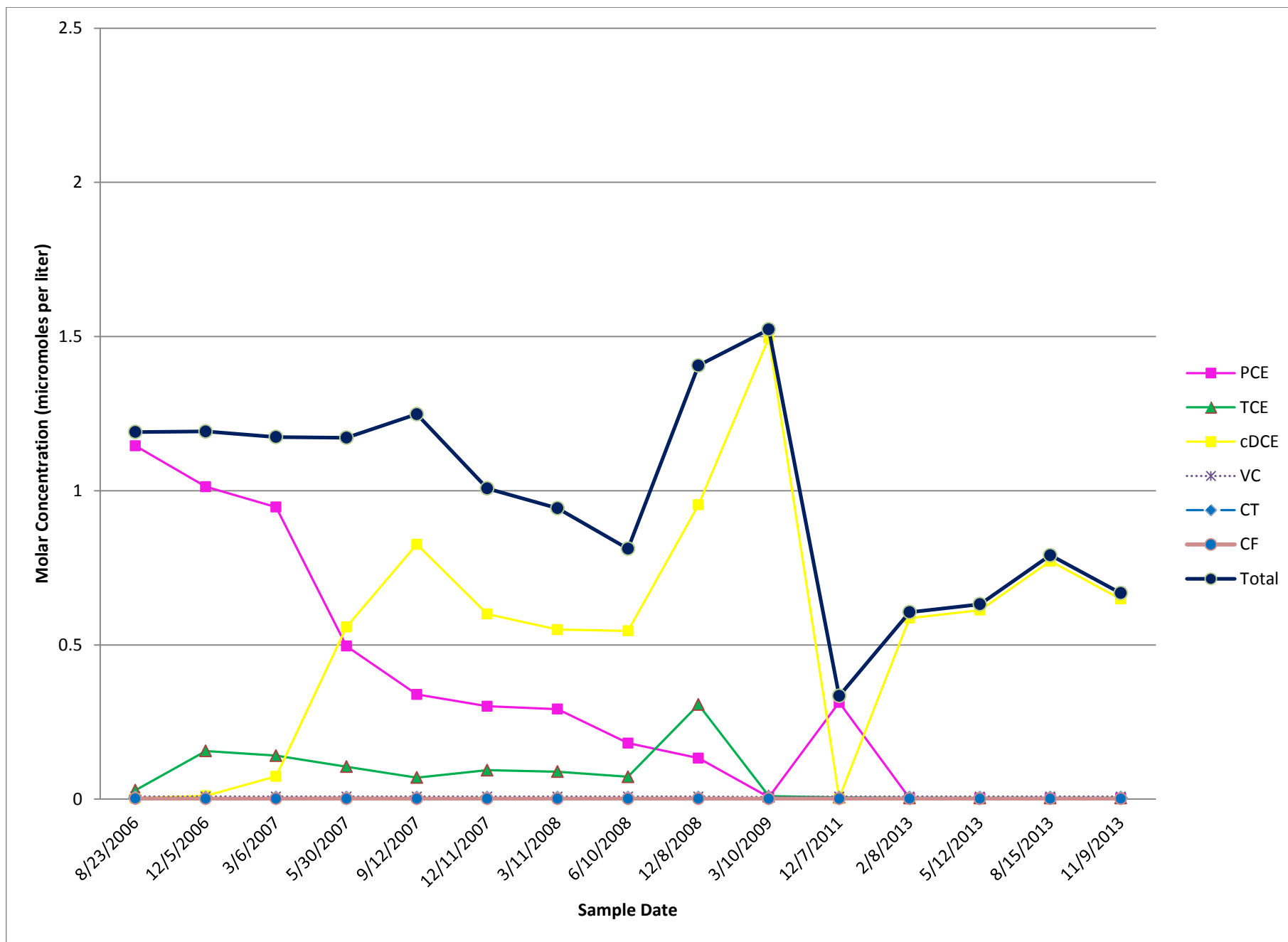


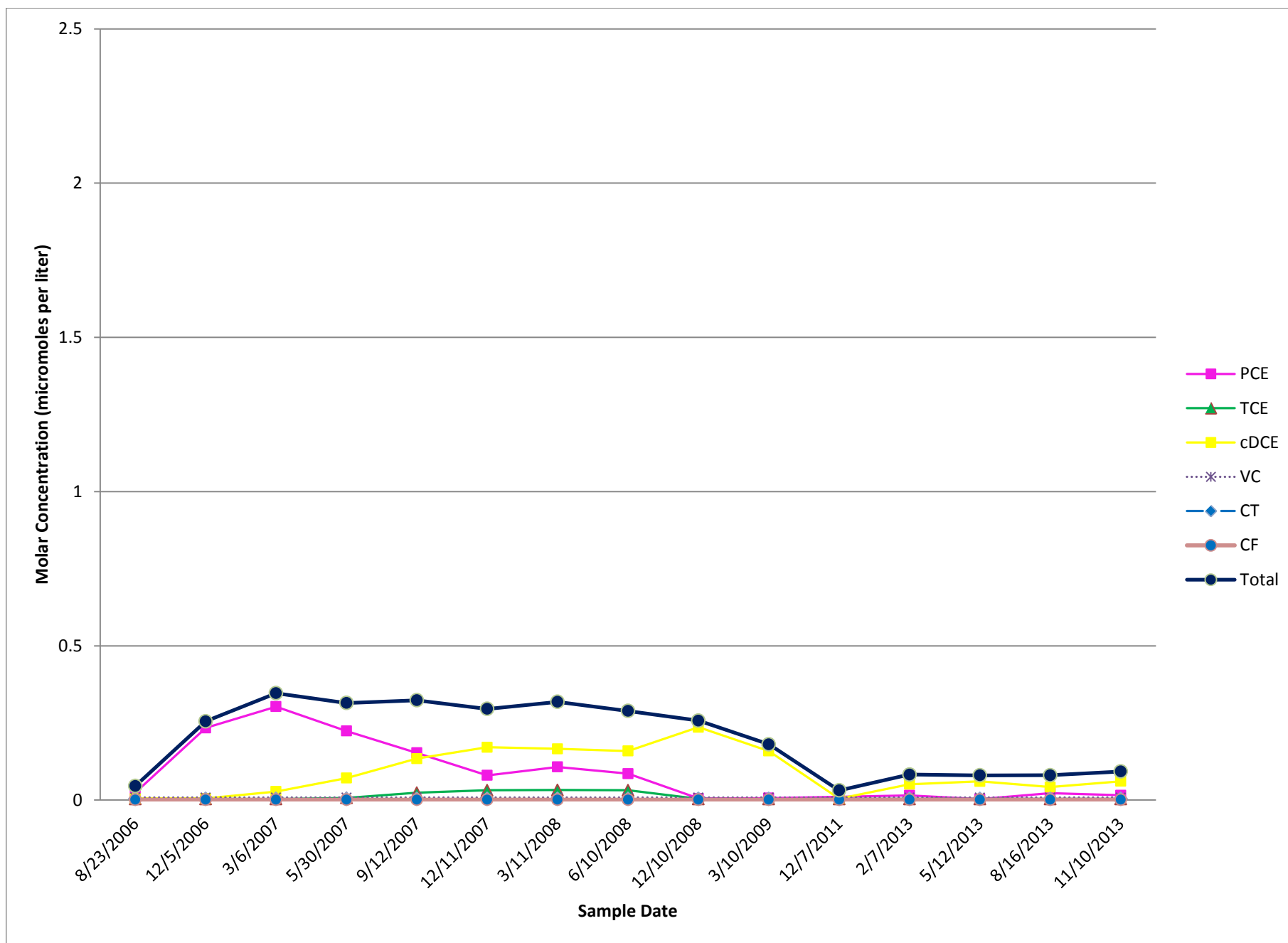
PMW21-04

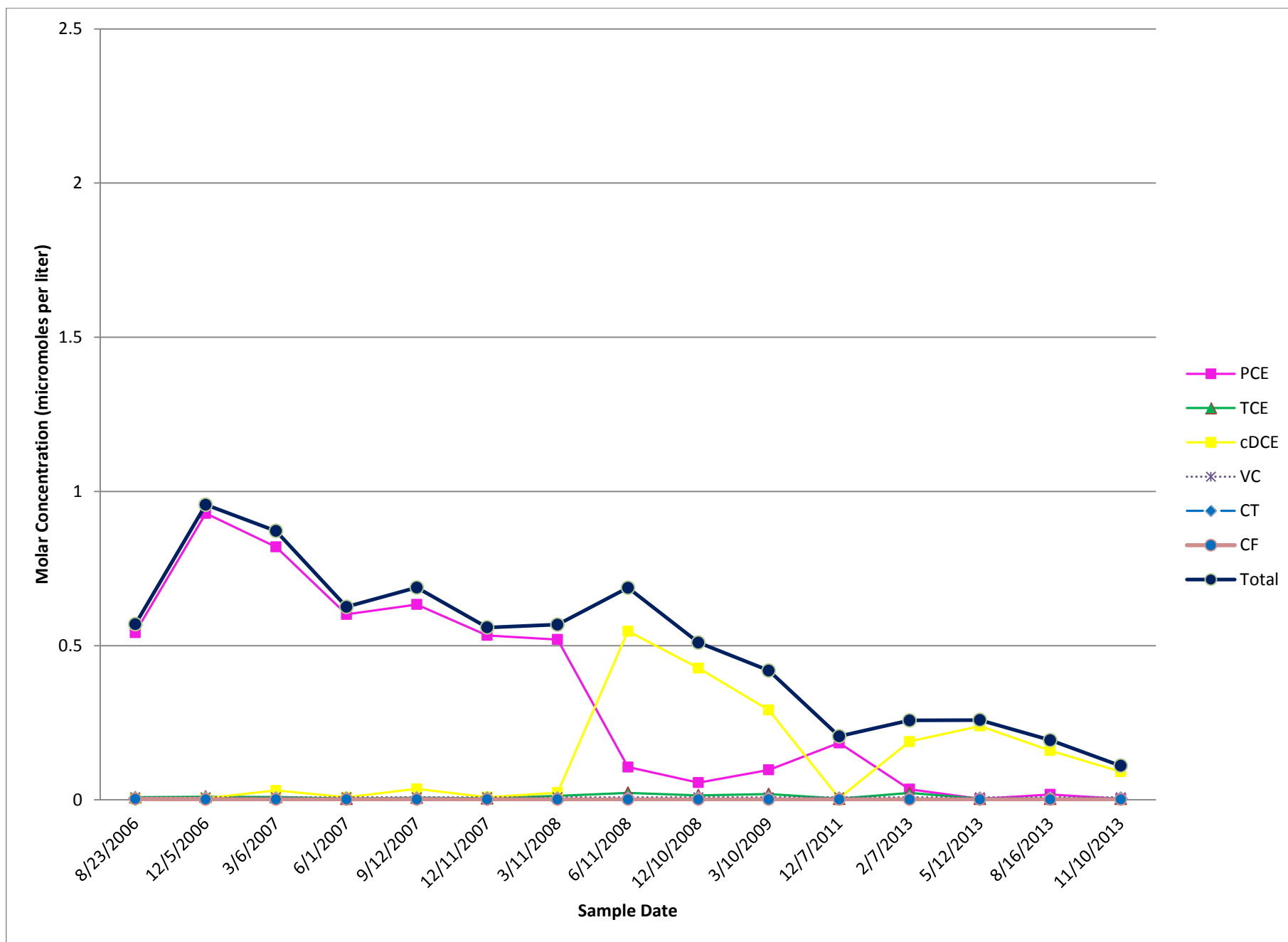




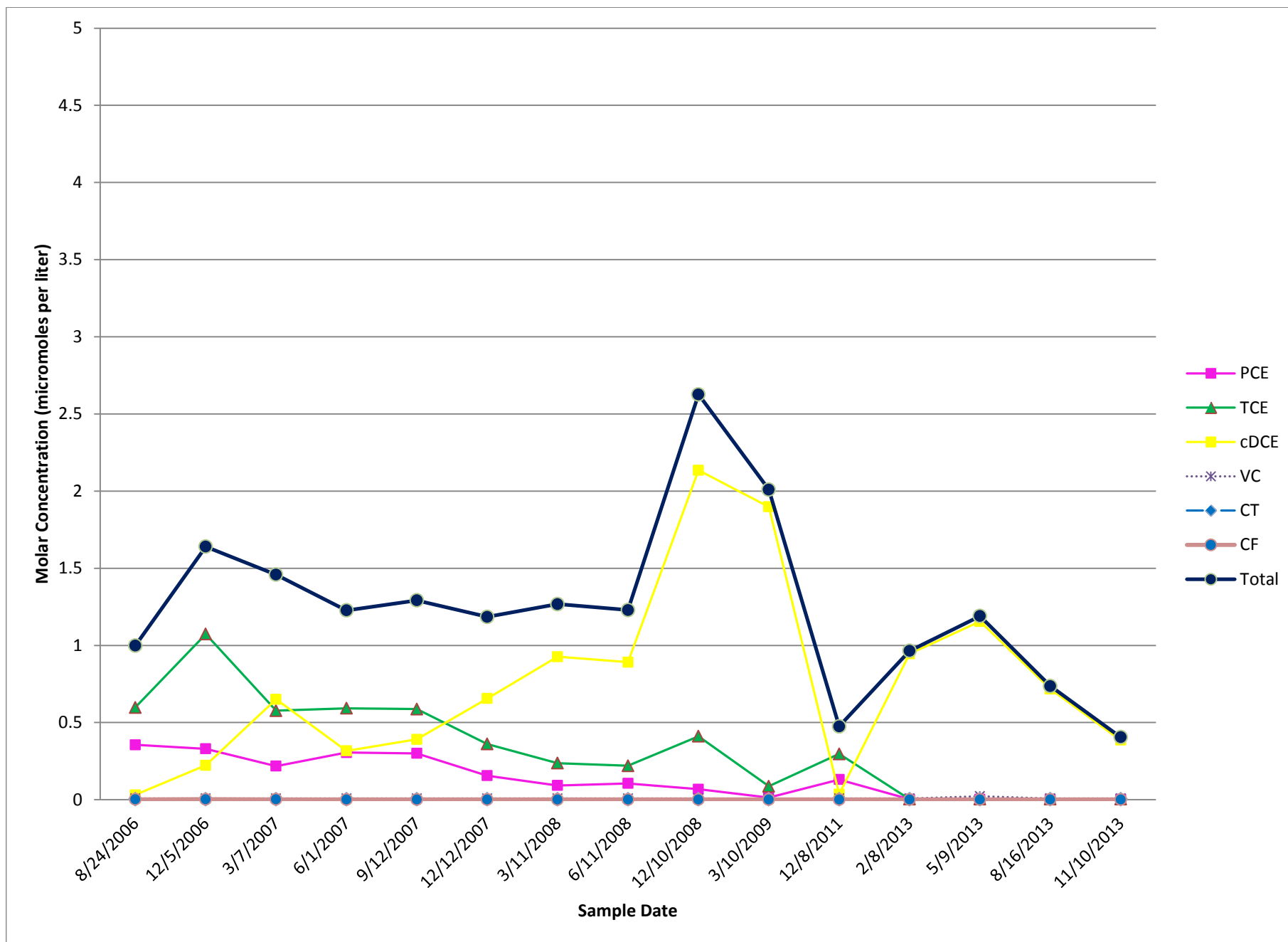


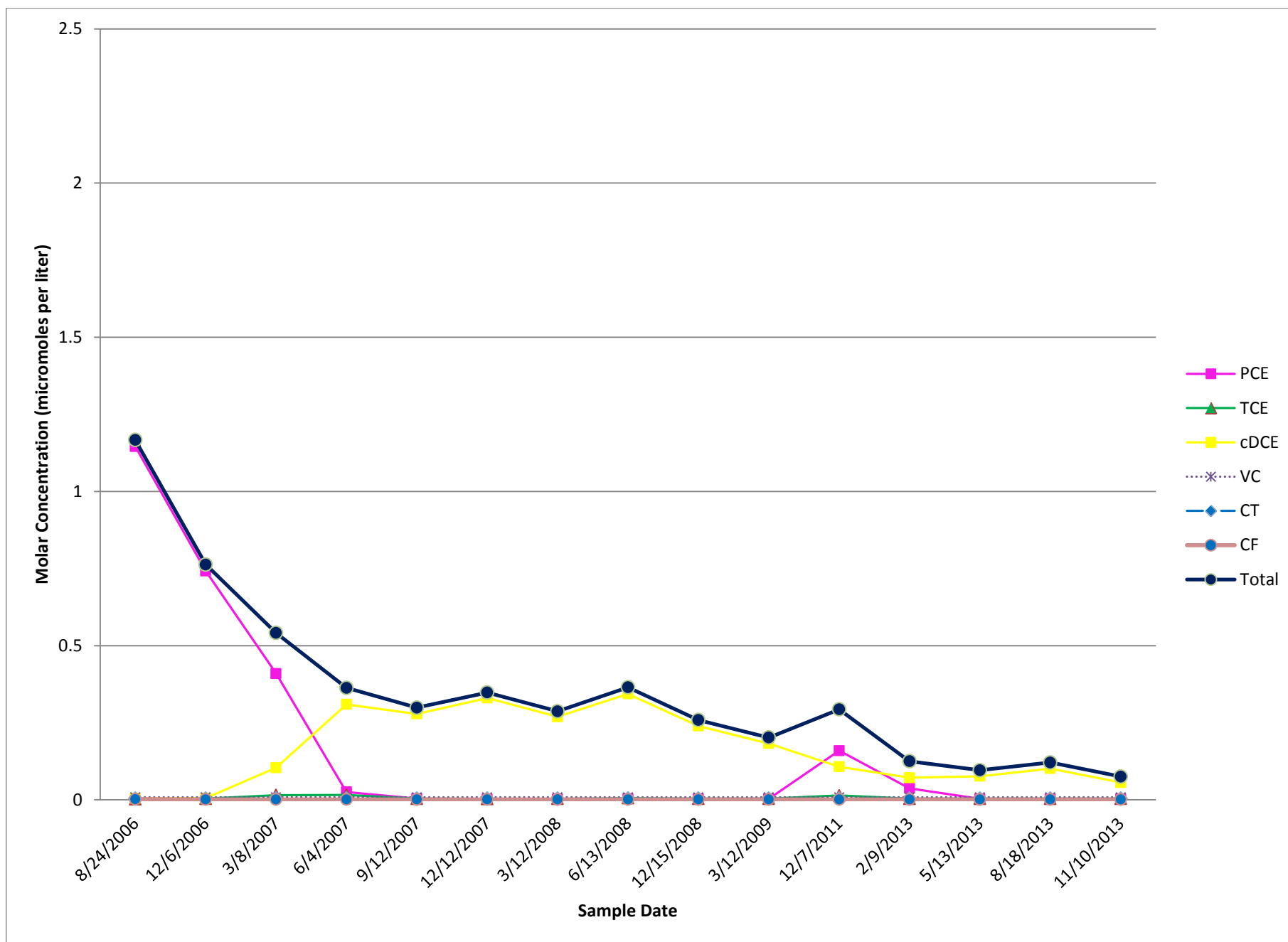


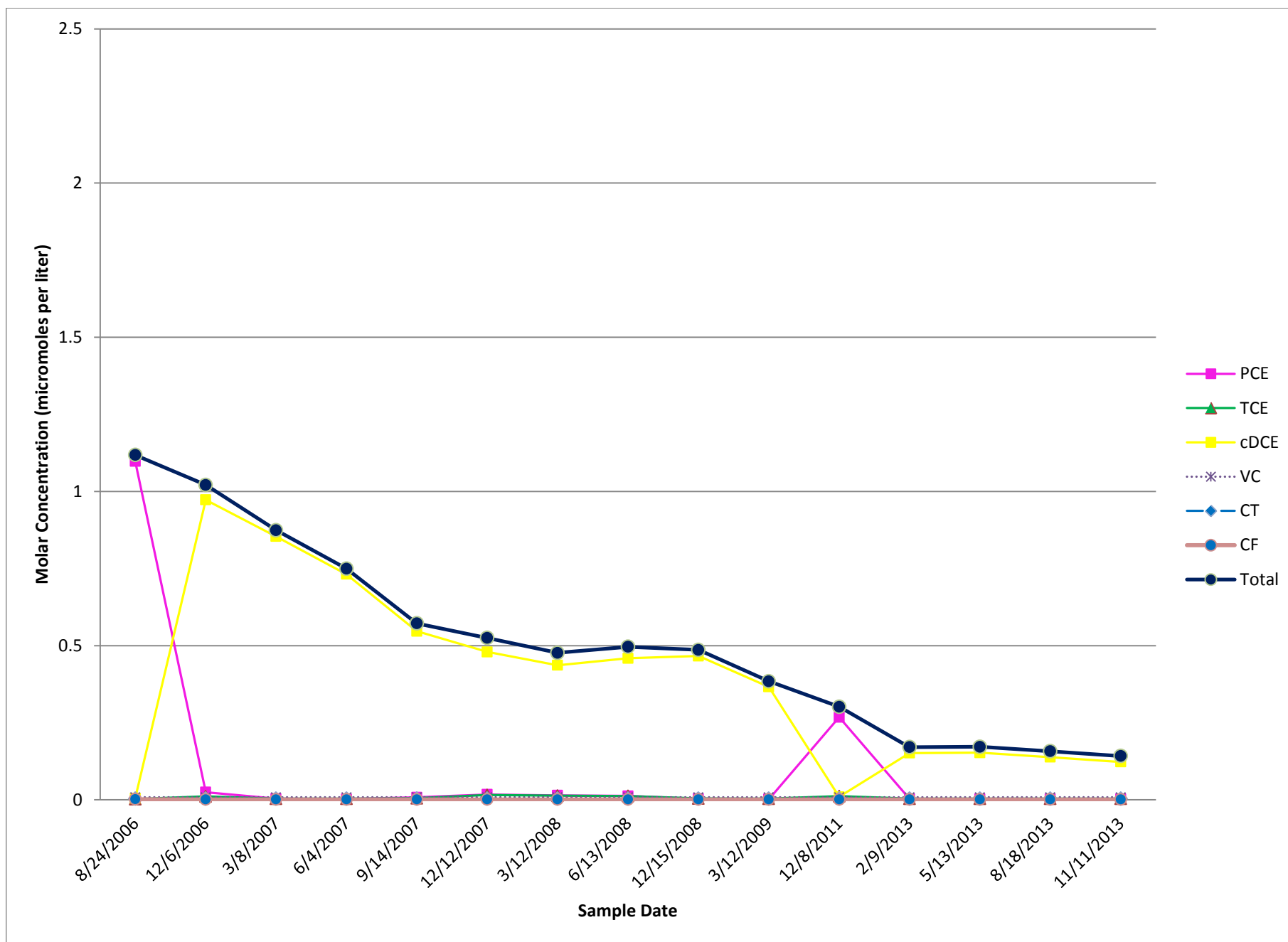


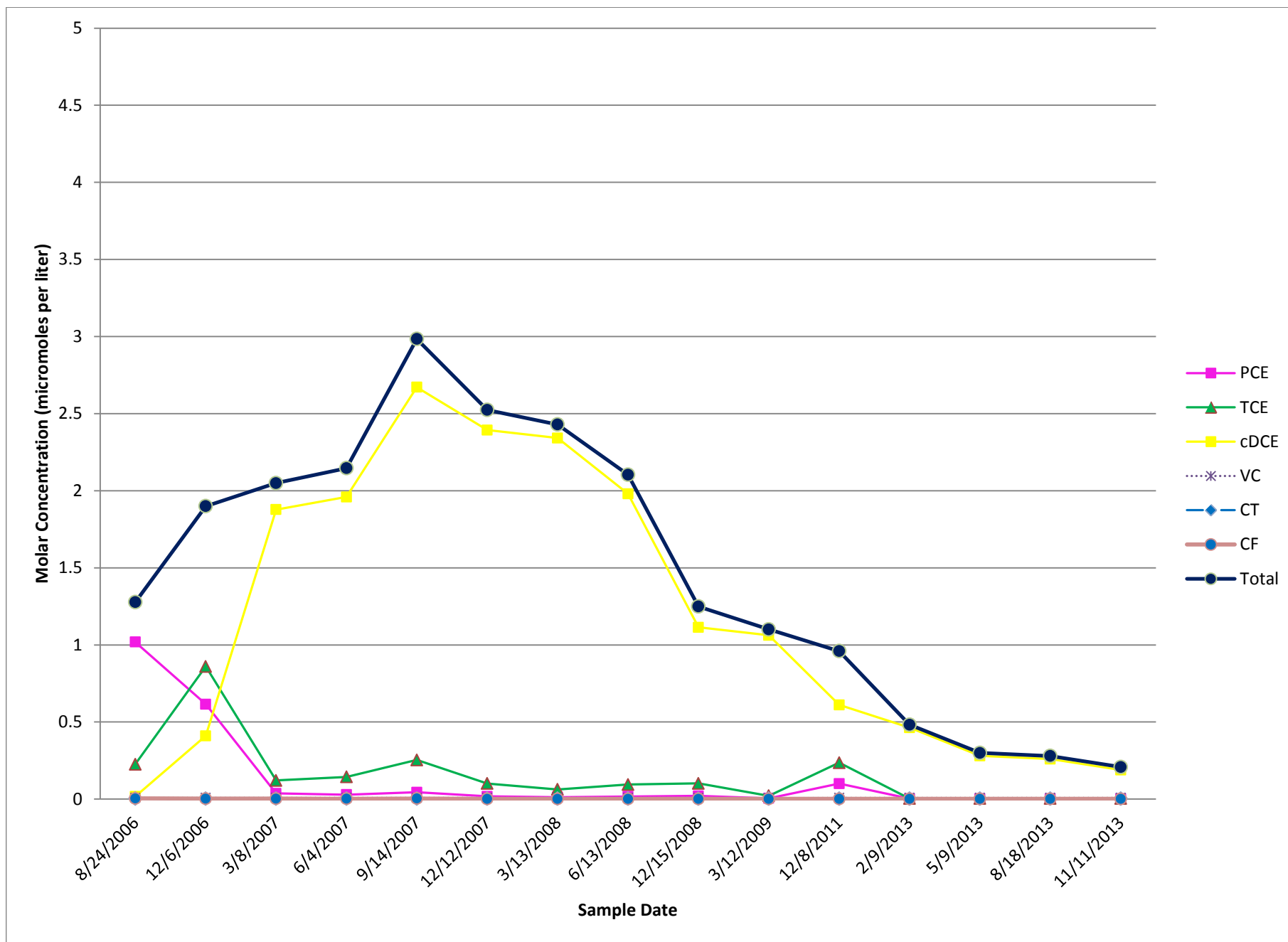


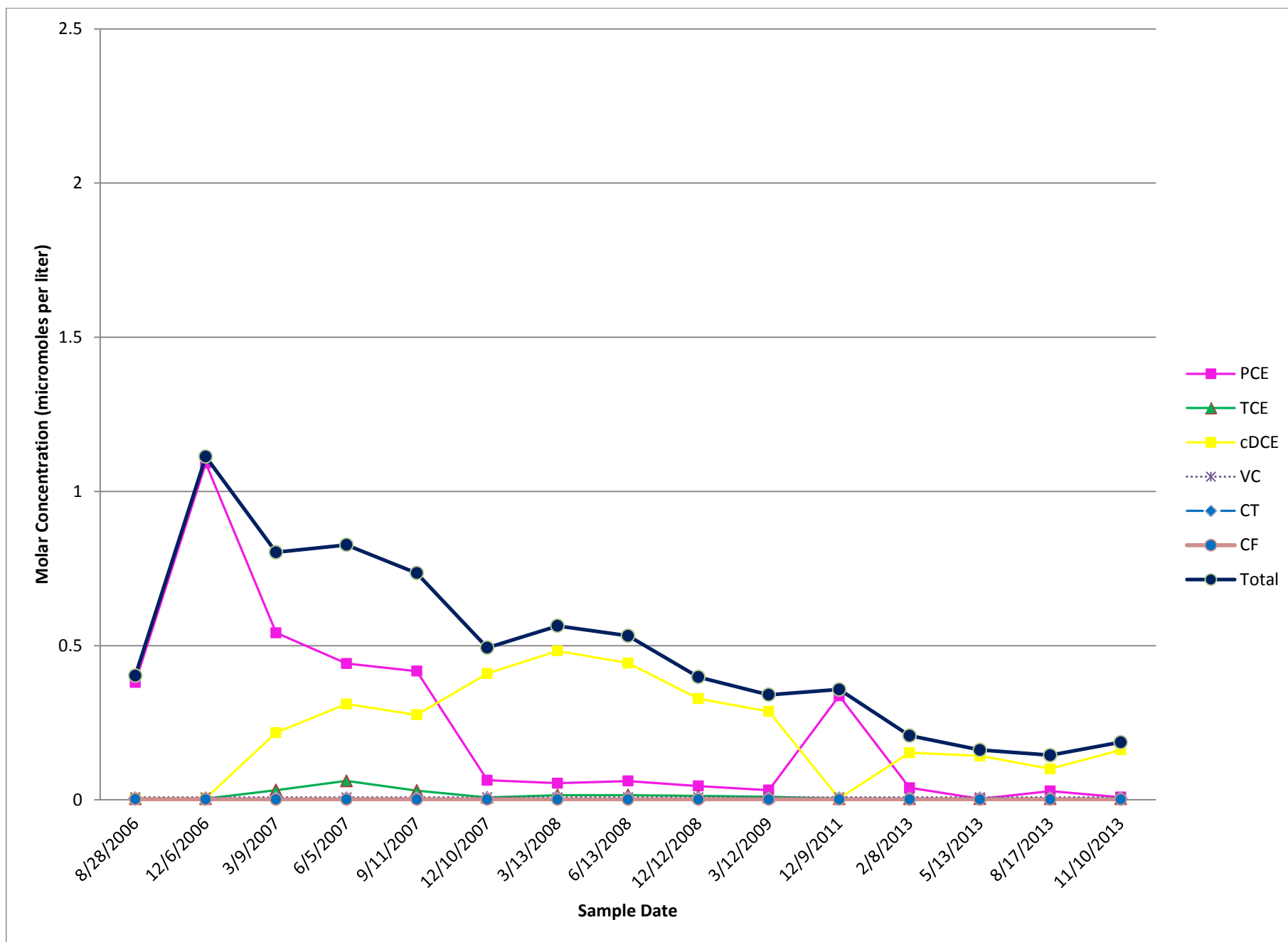
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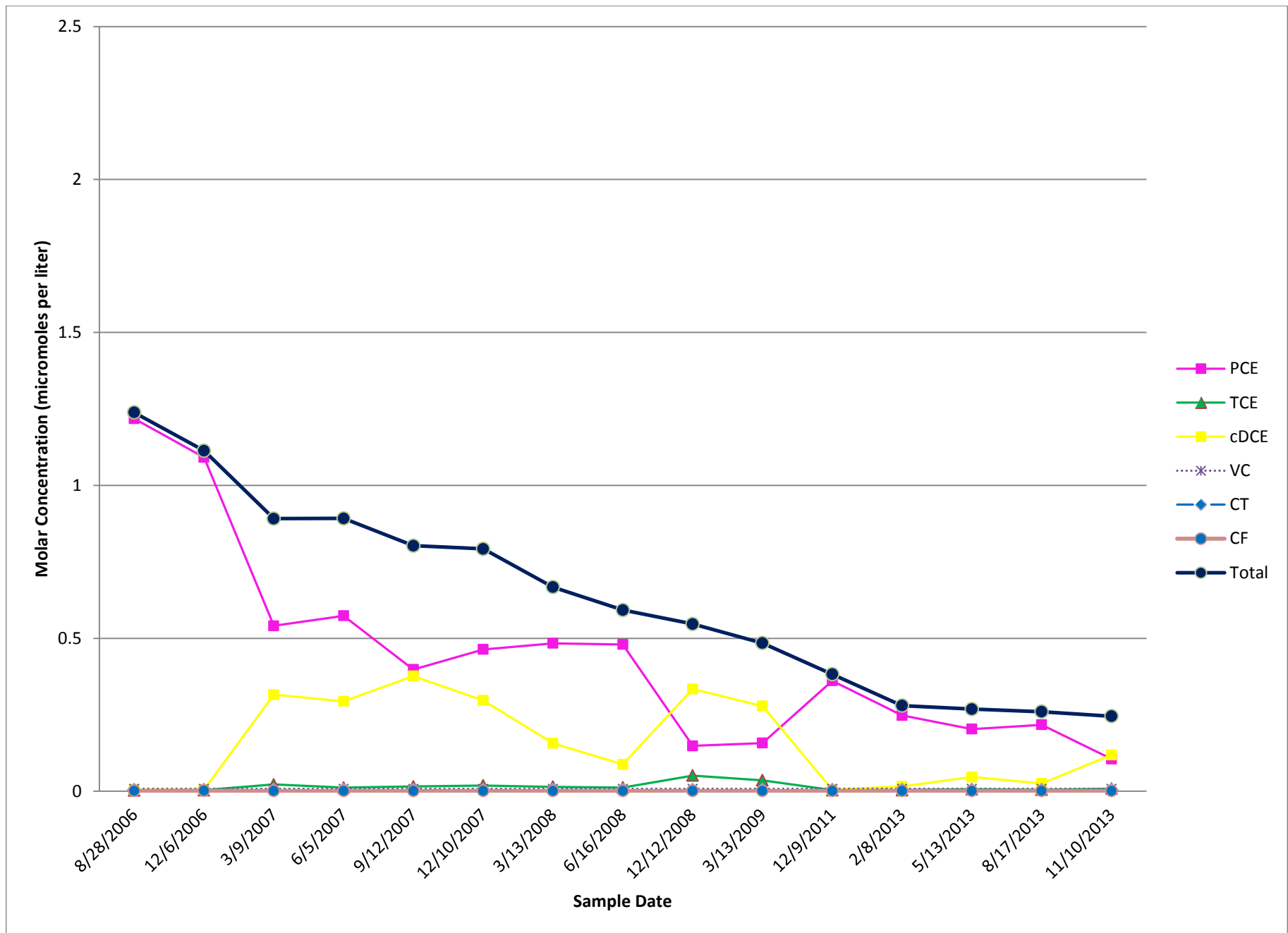




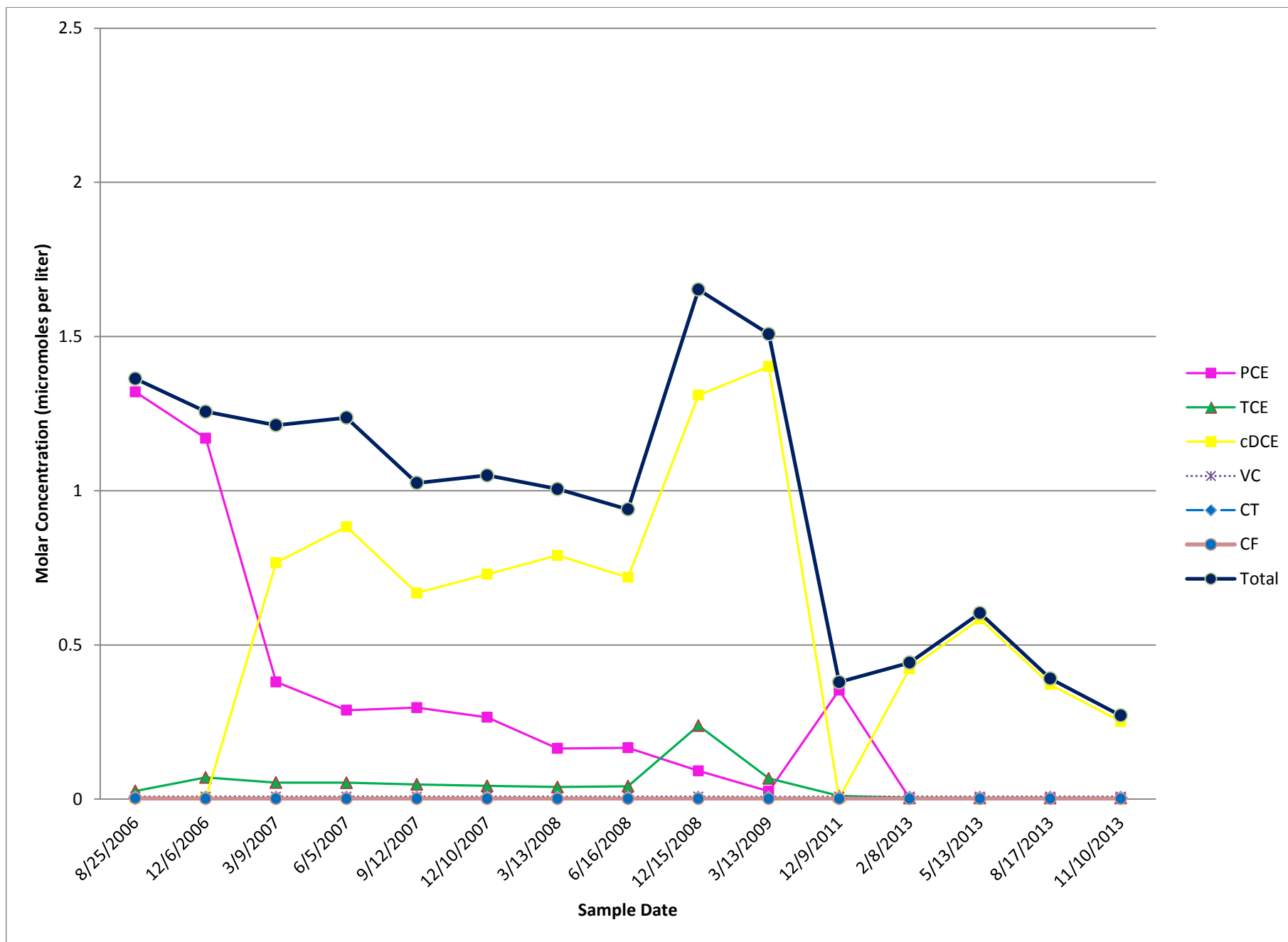




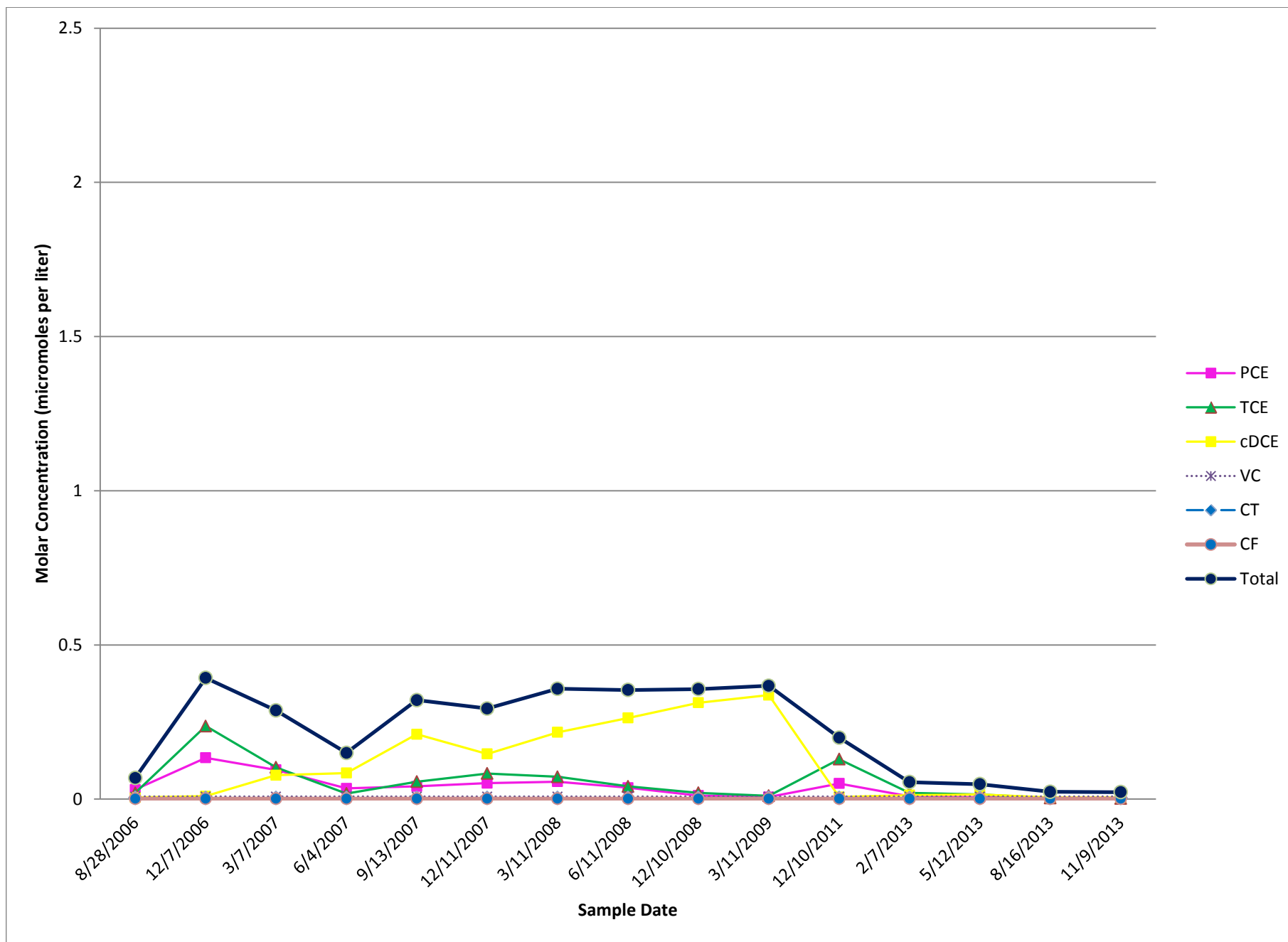




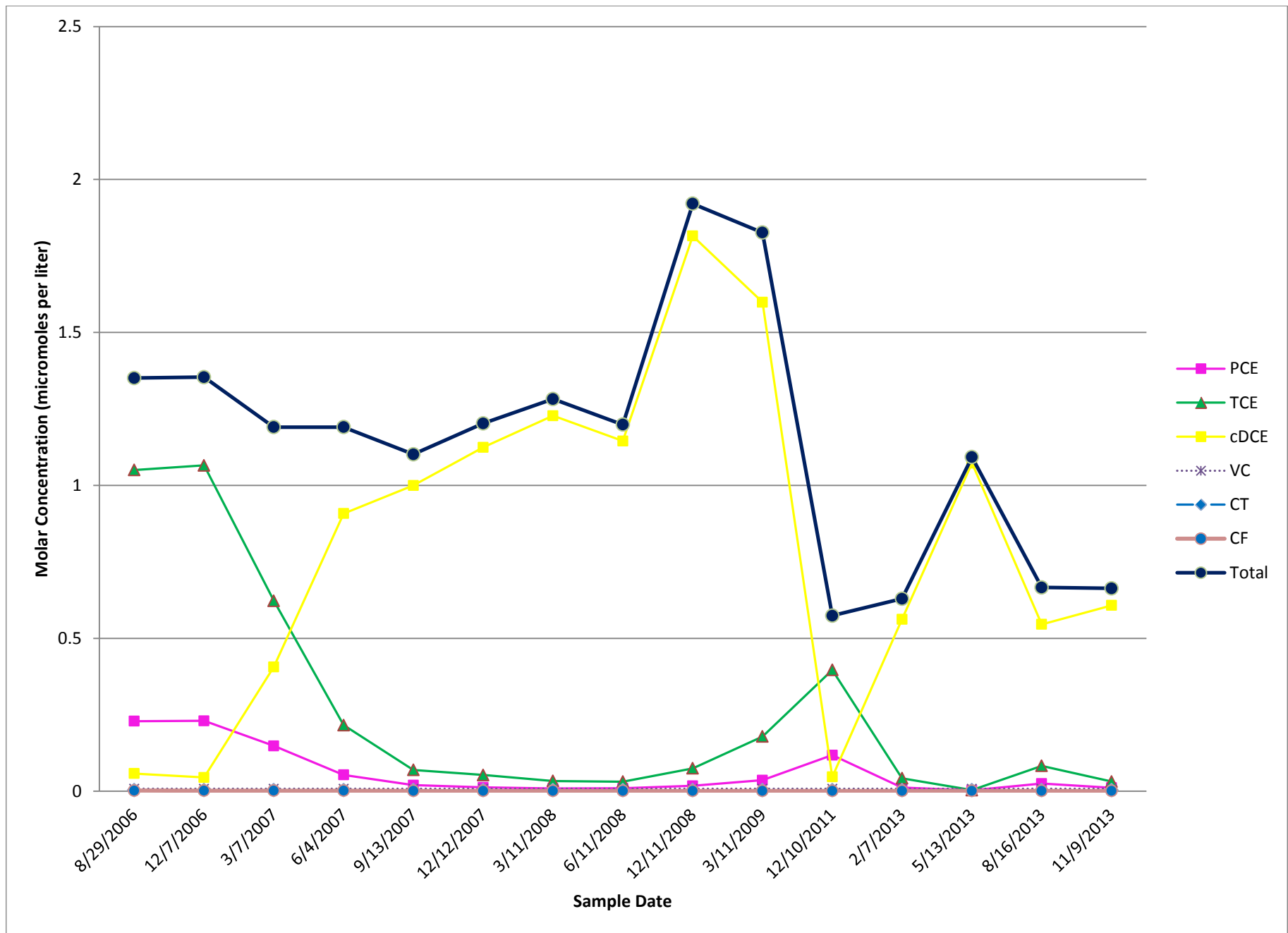
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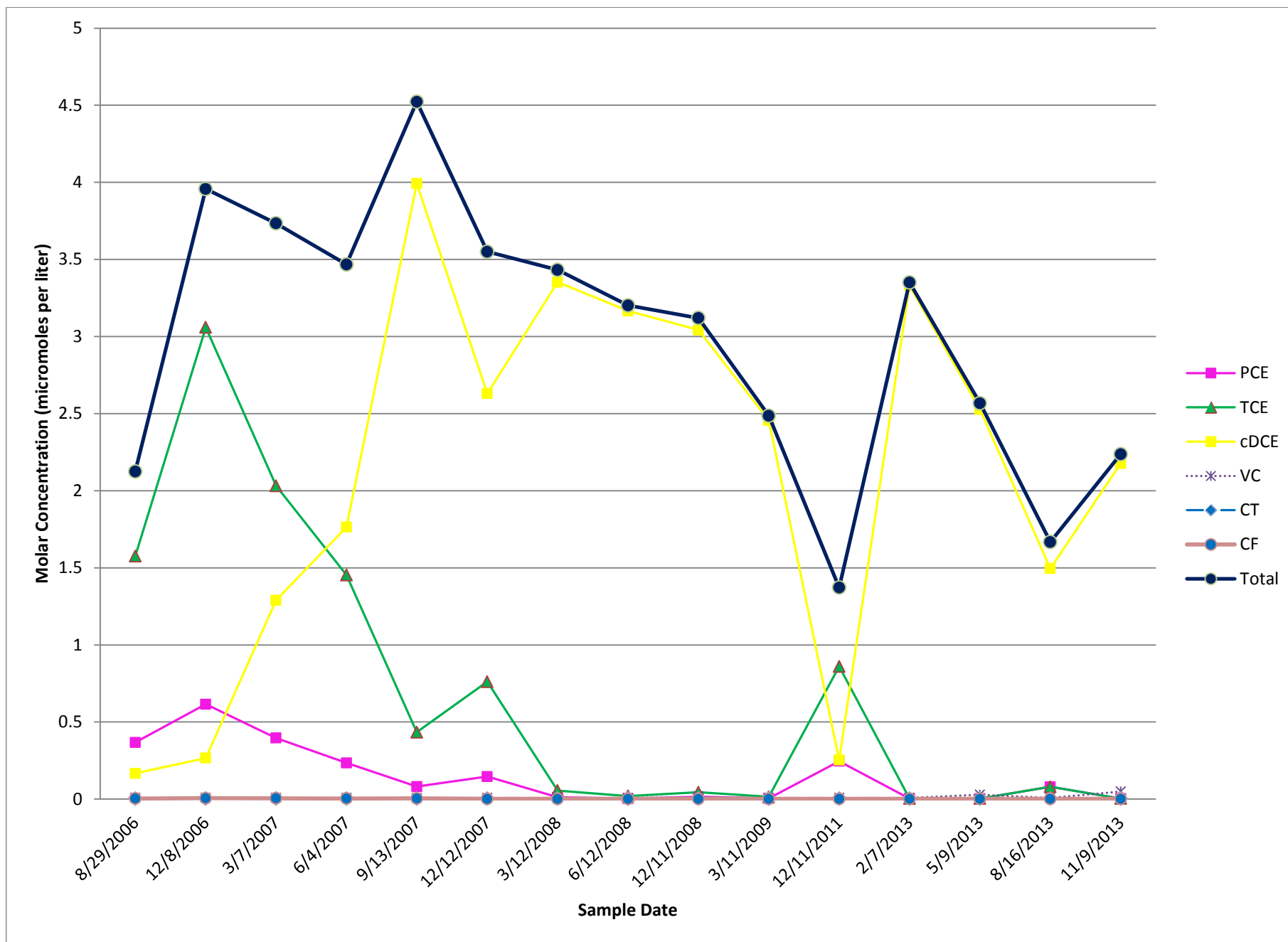
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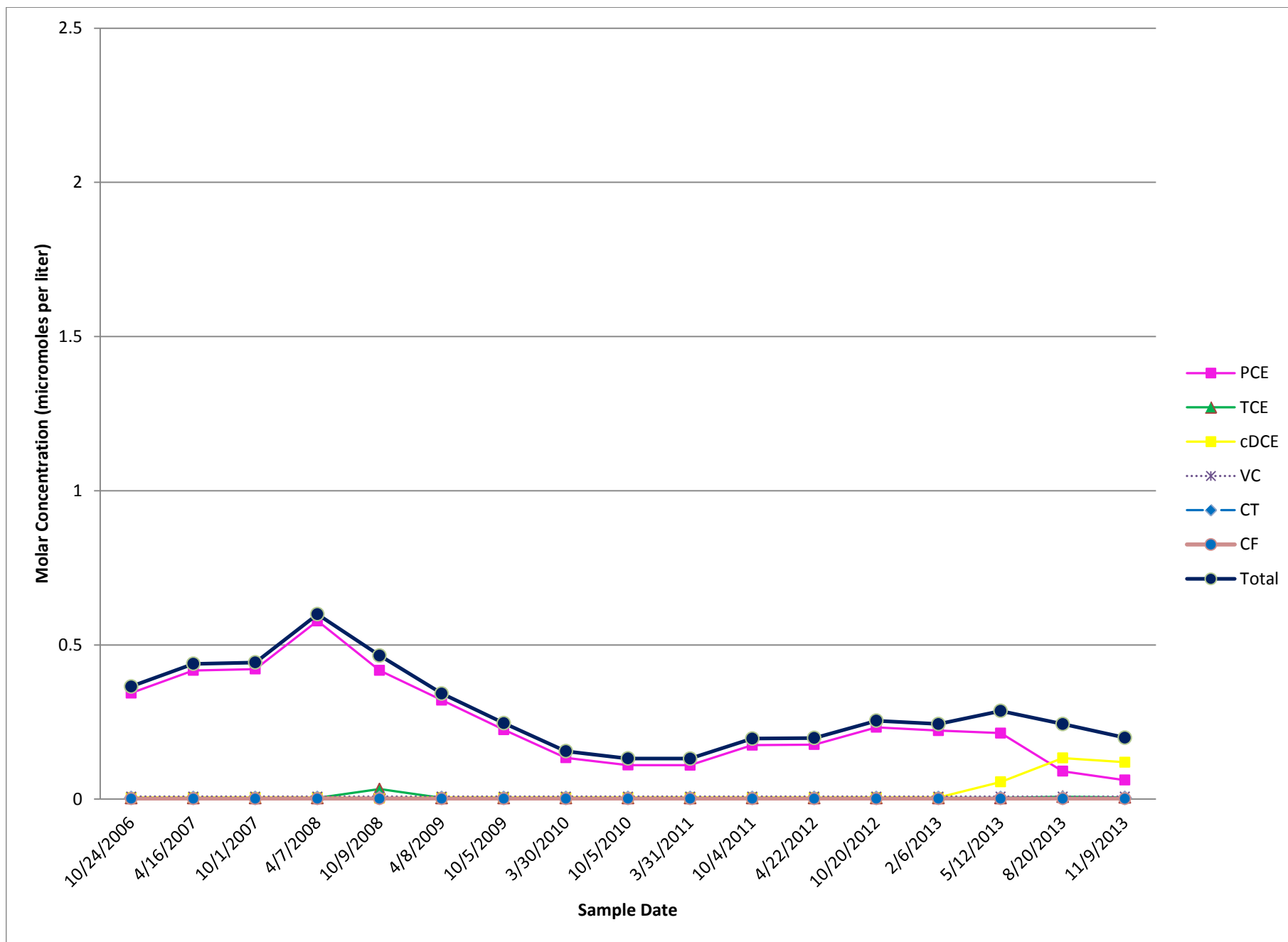


IW101-07B

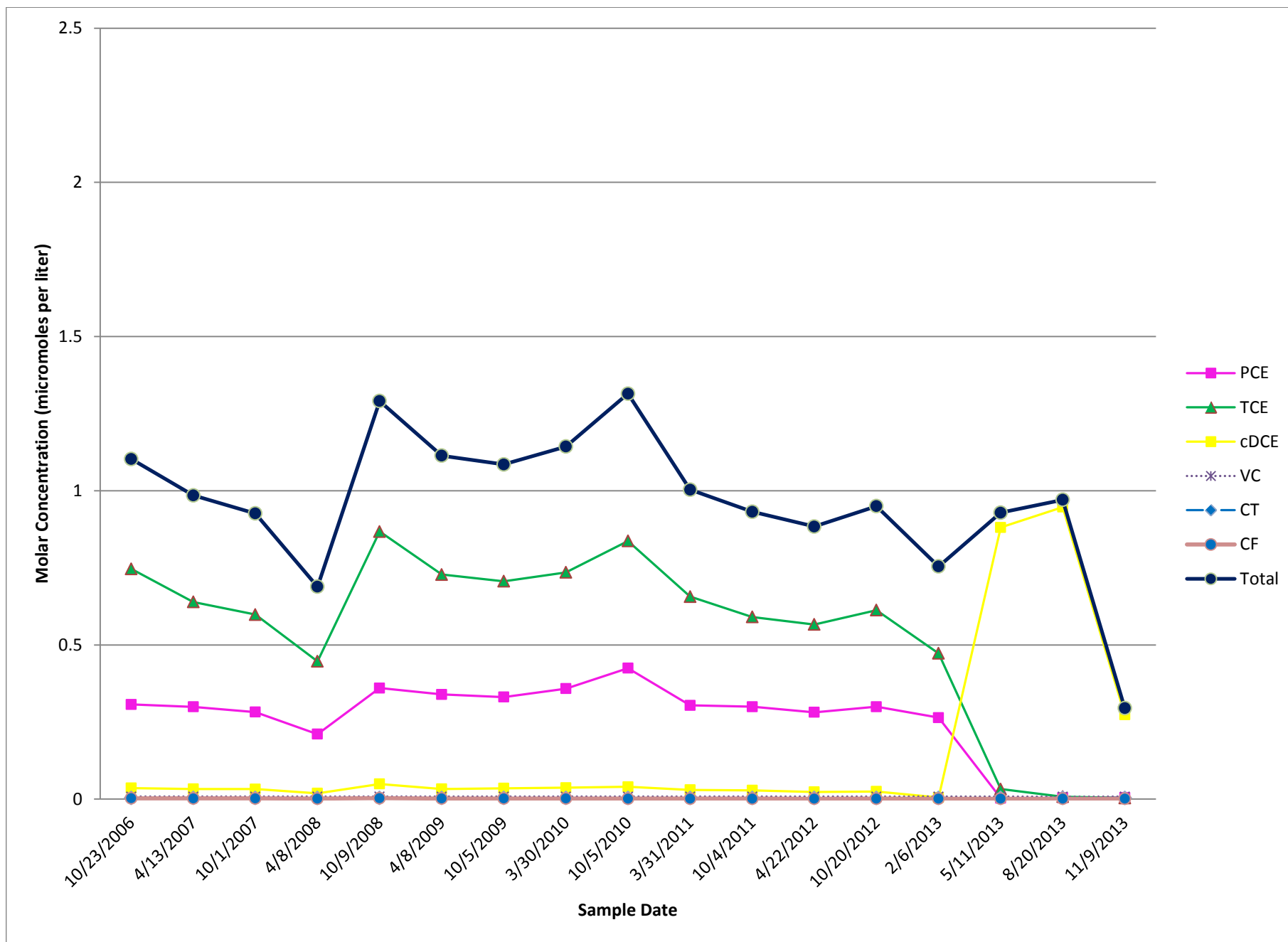


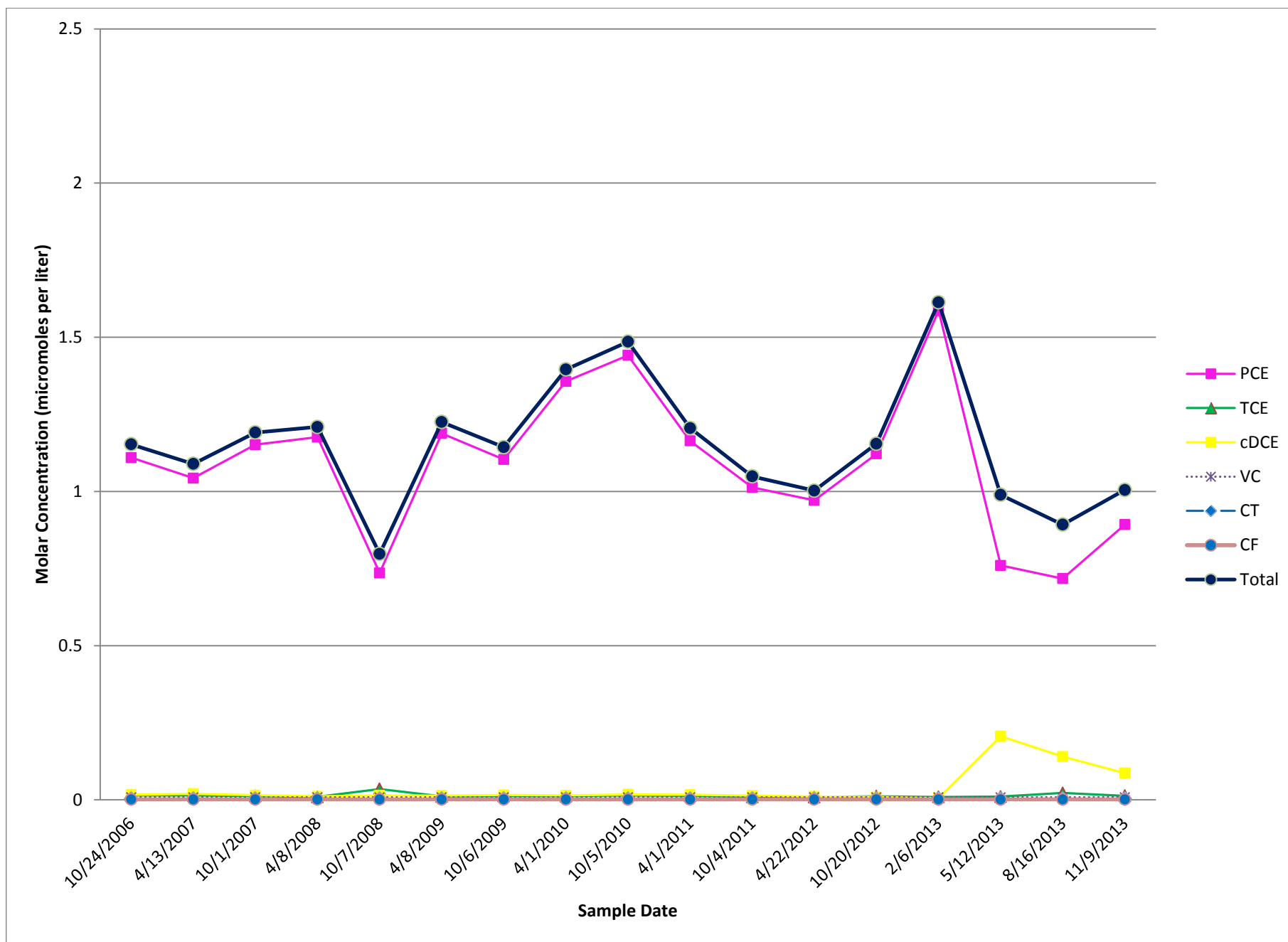
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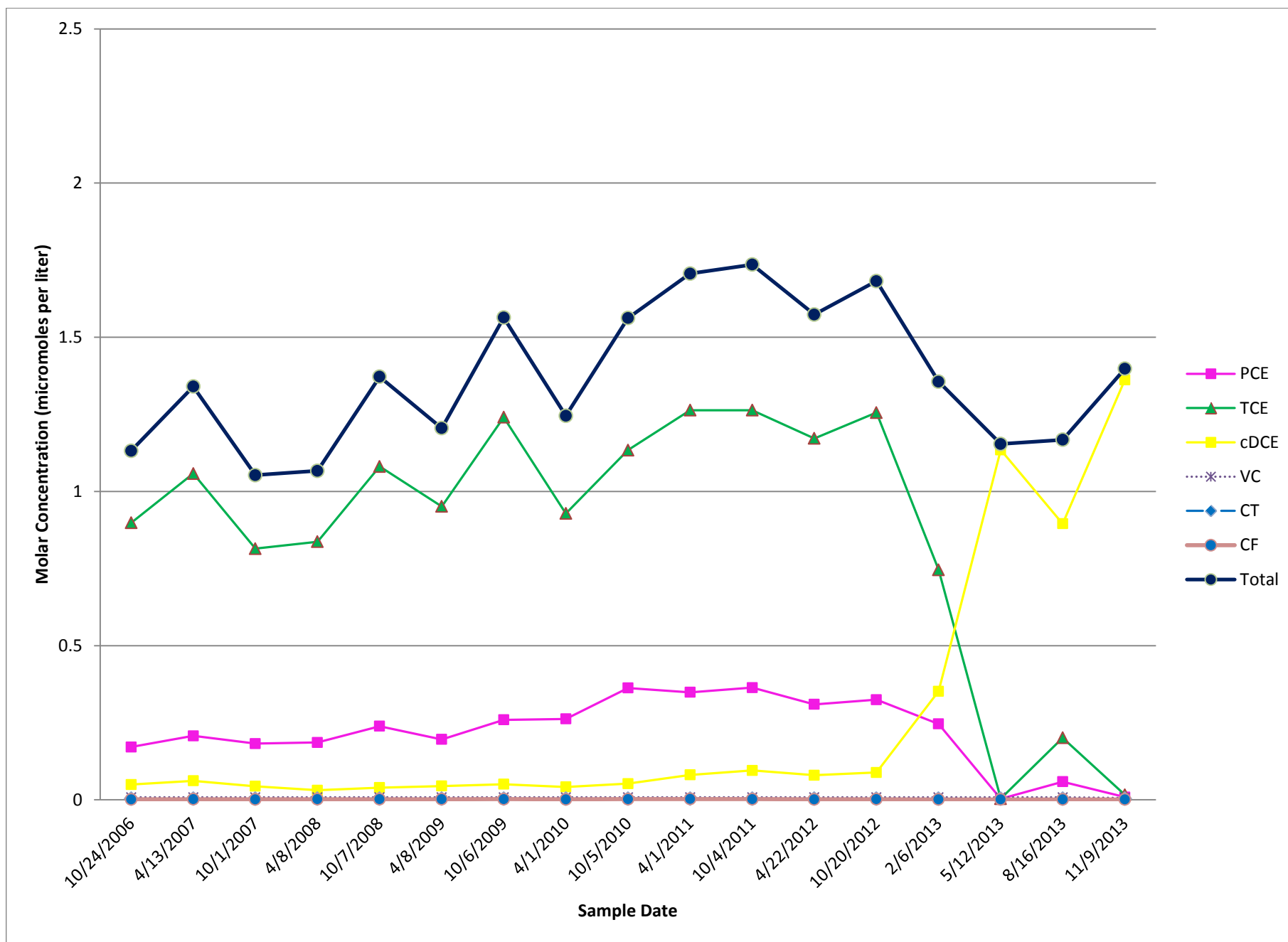




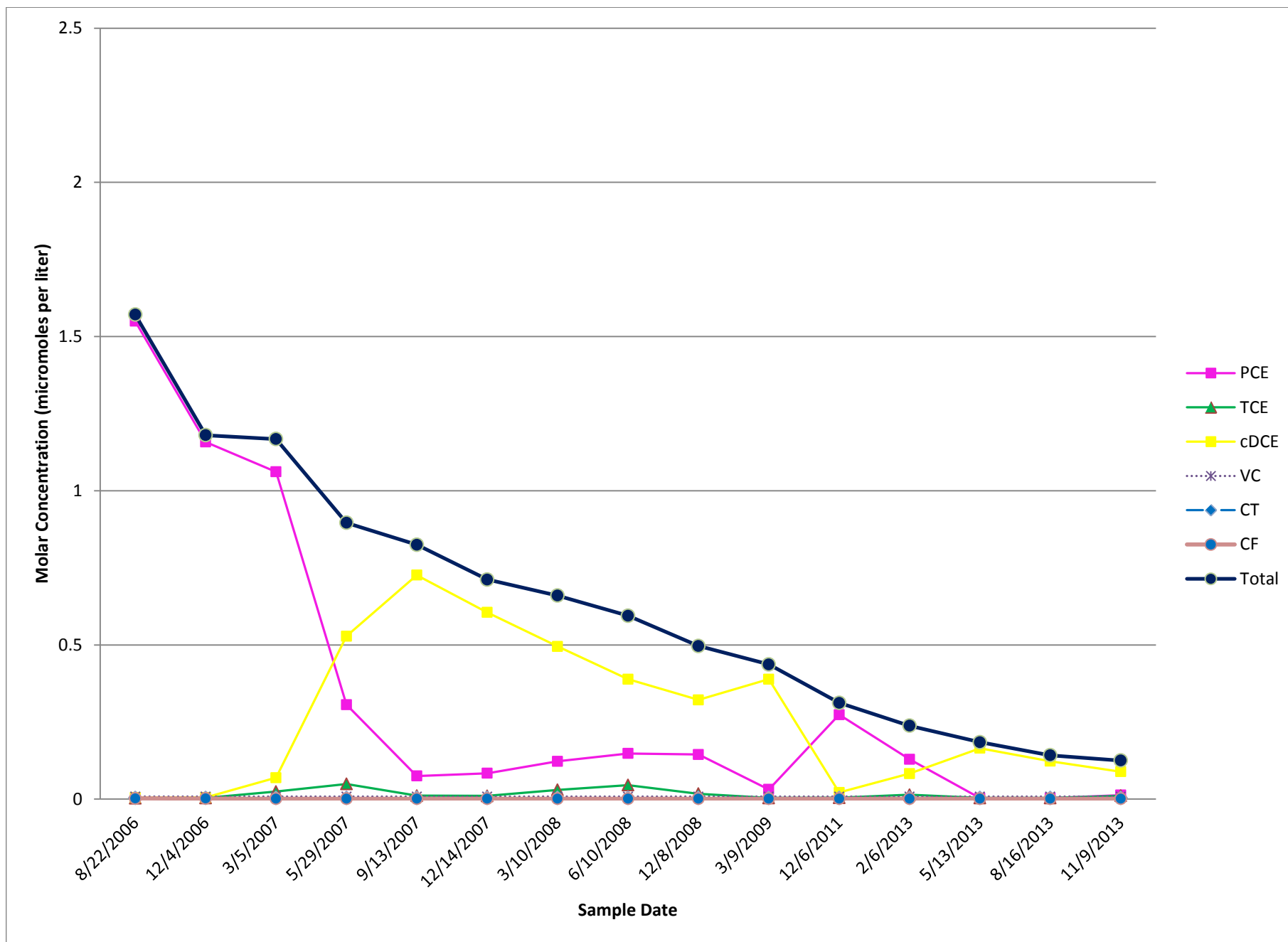
DR1-5A



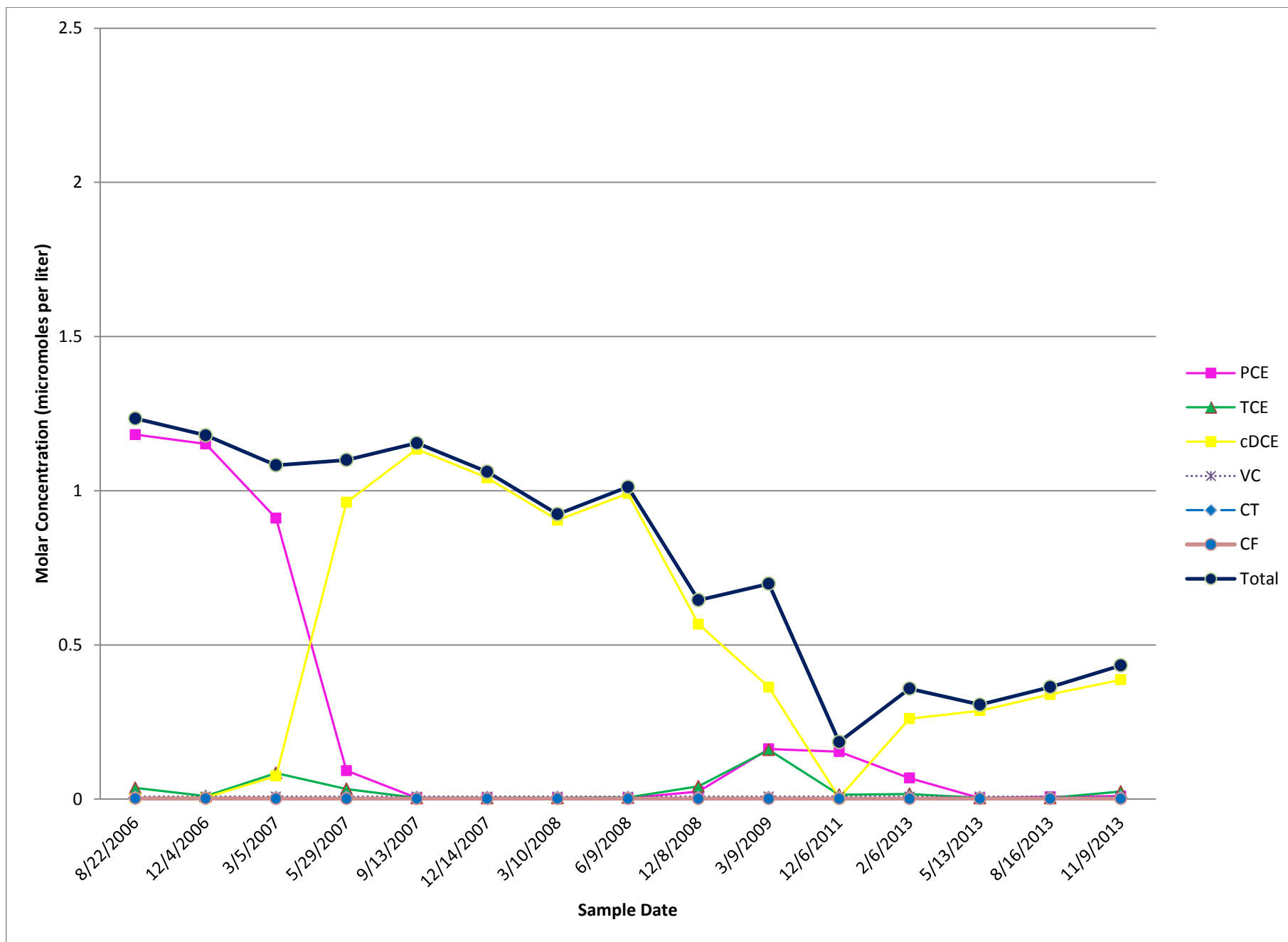




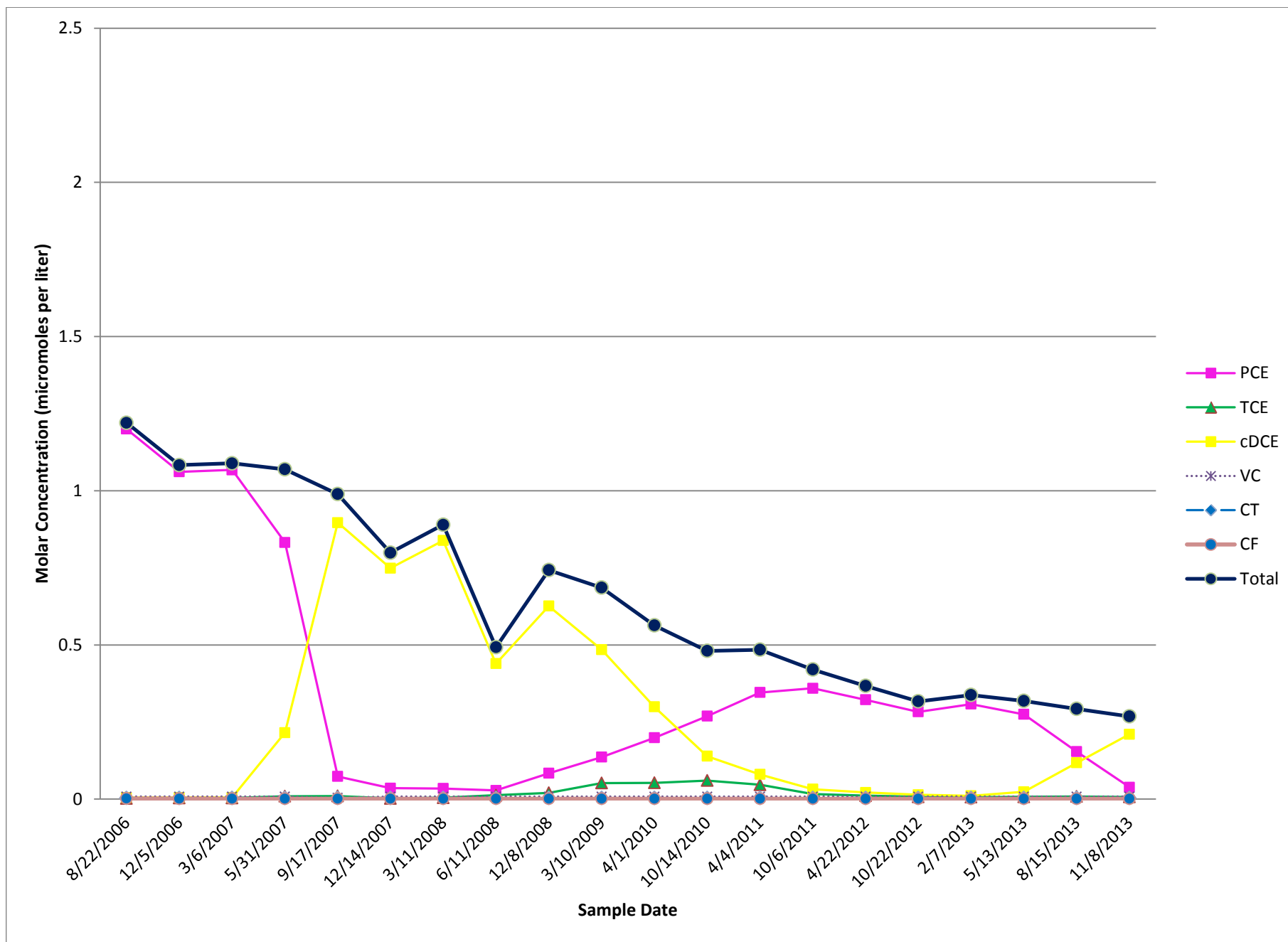
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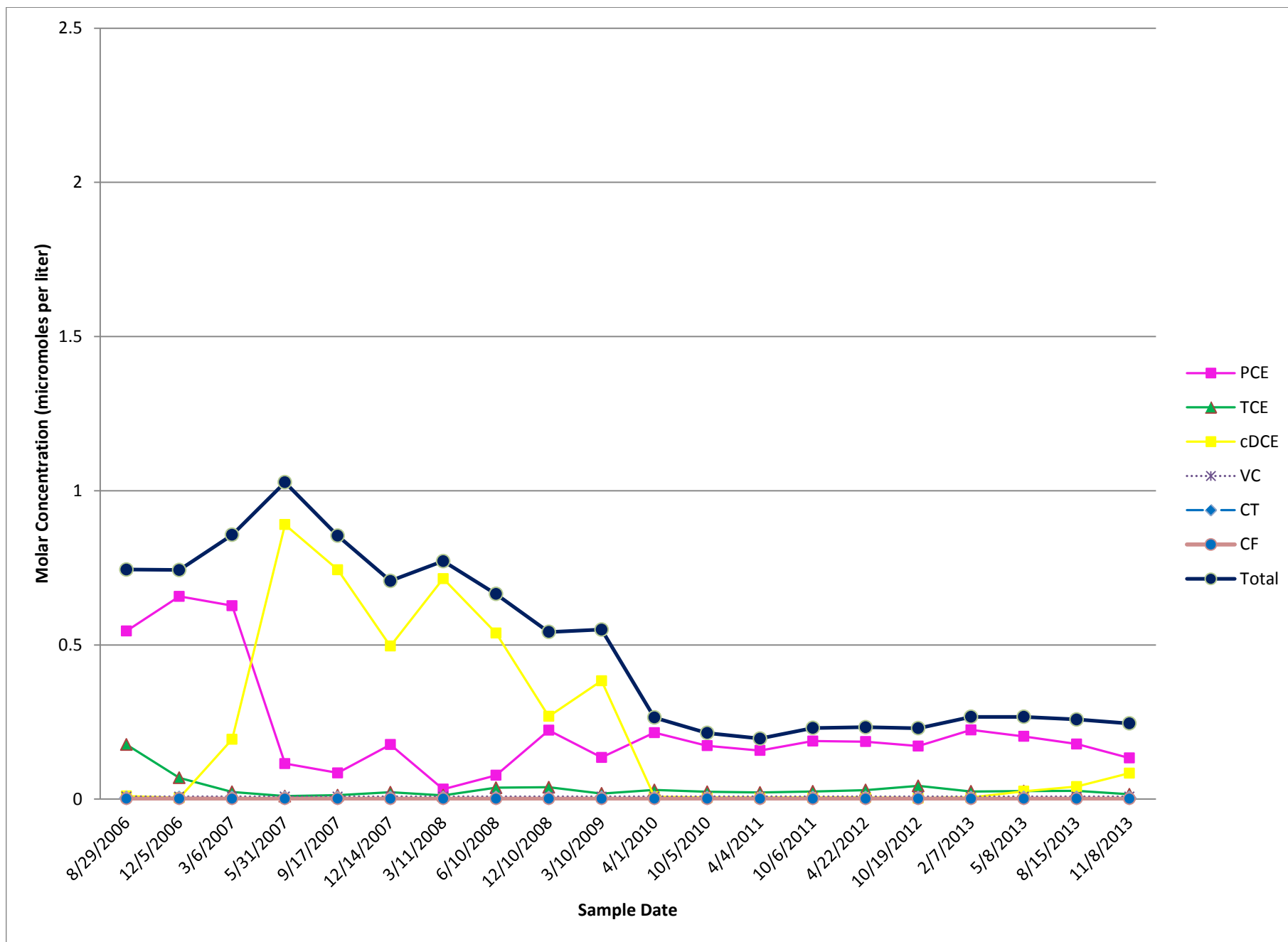
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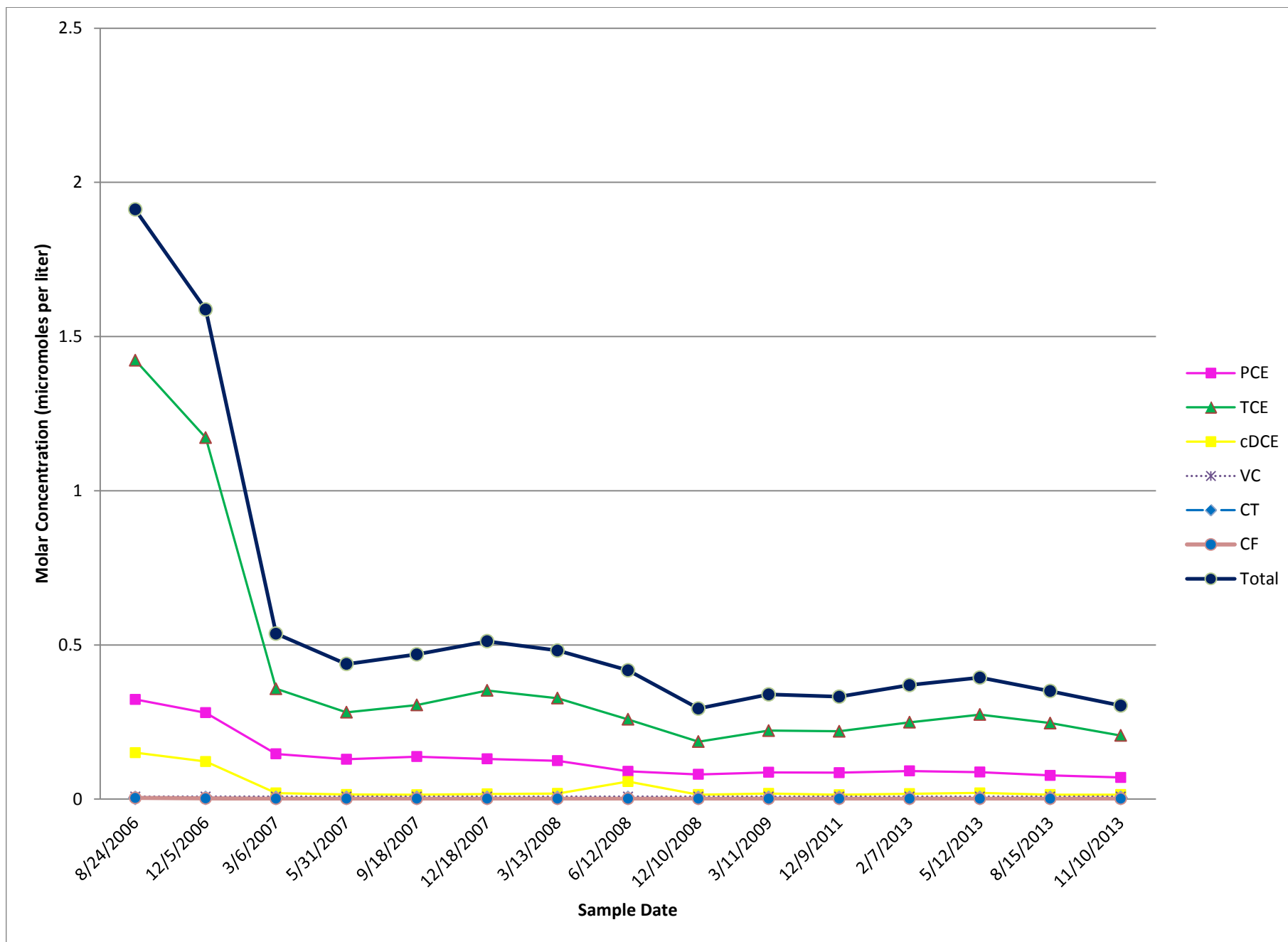
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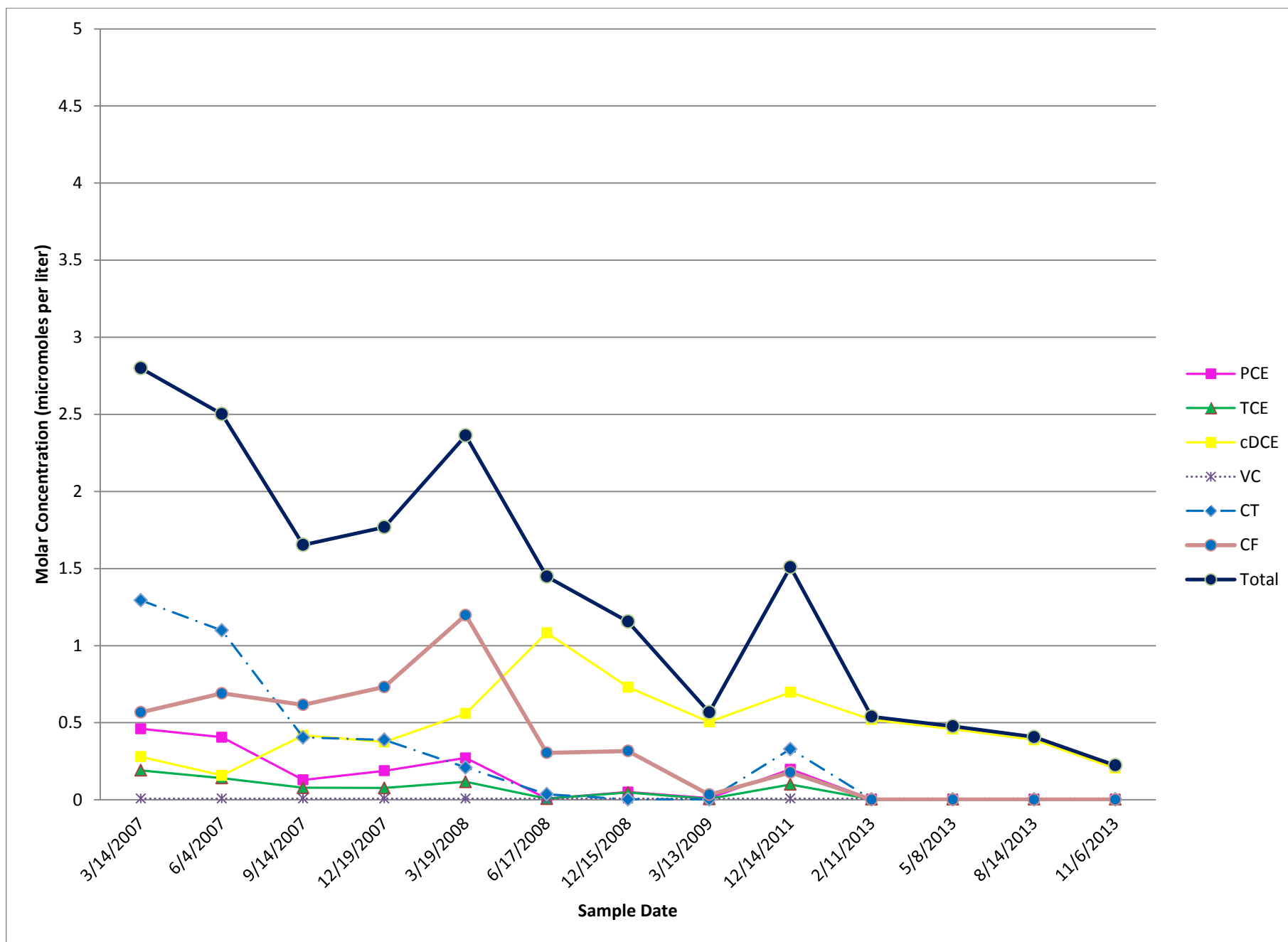


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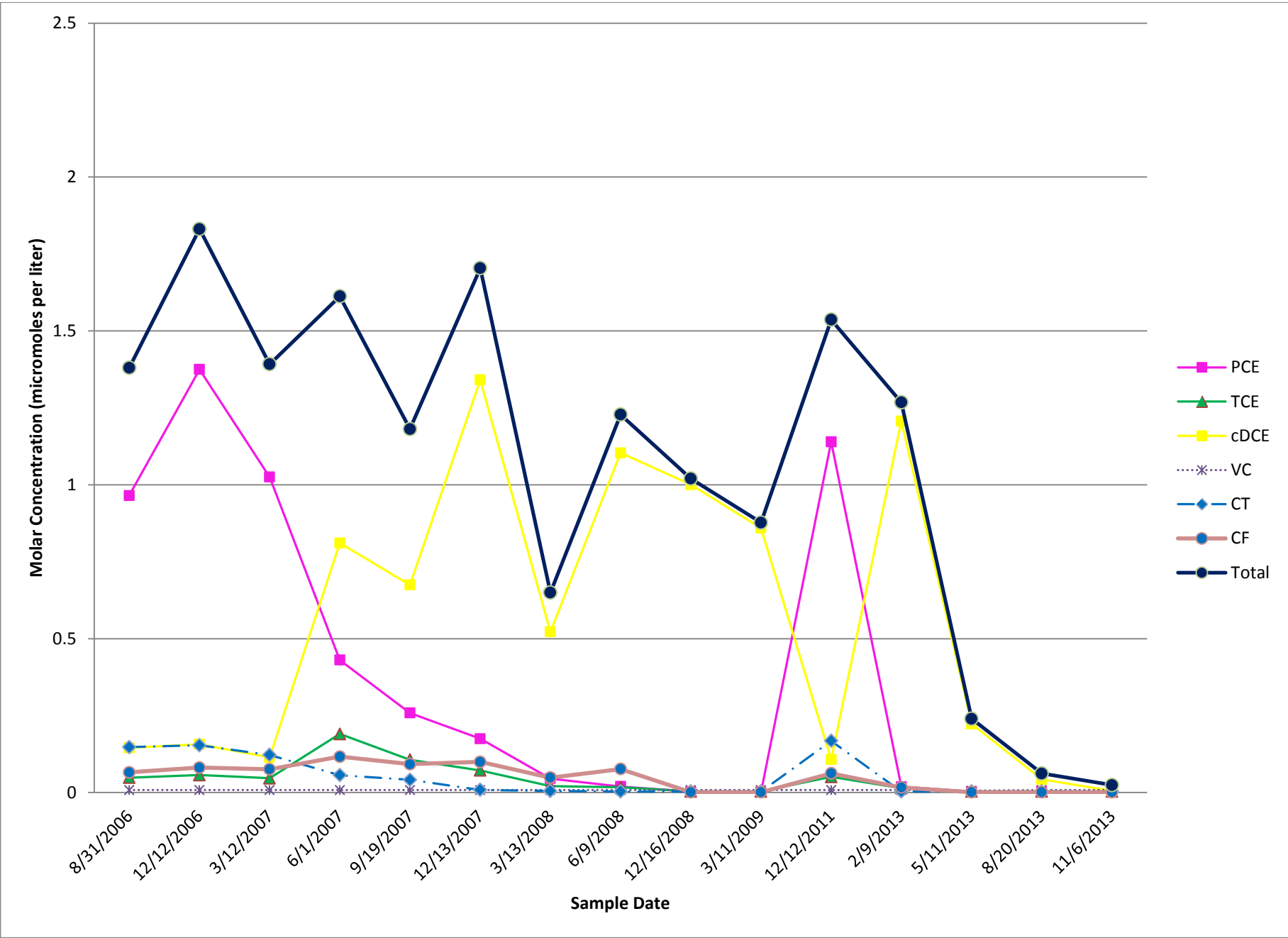


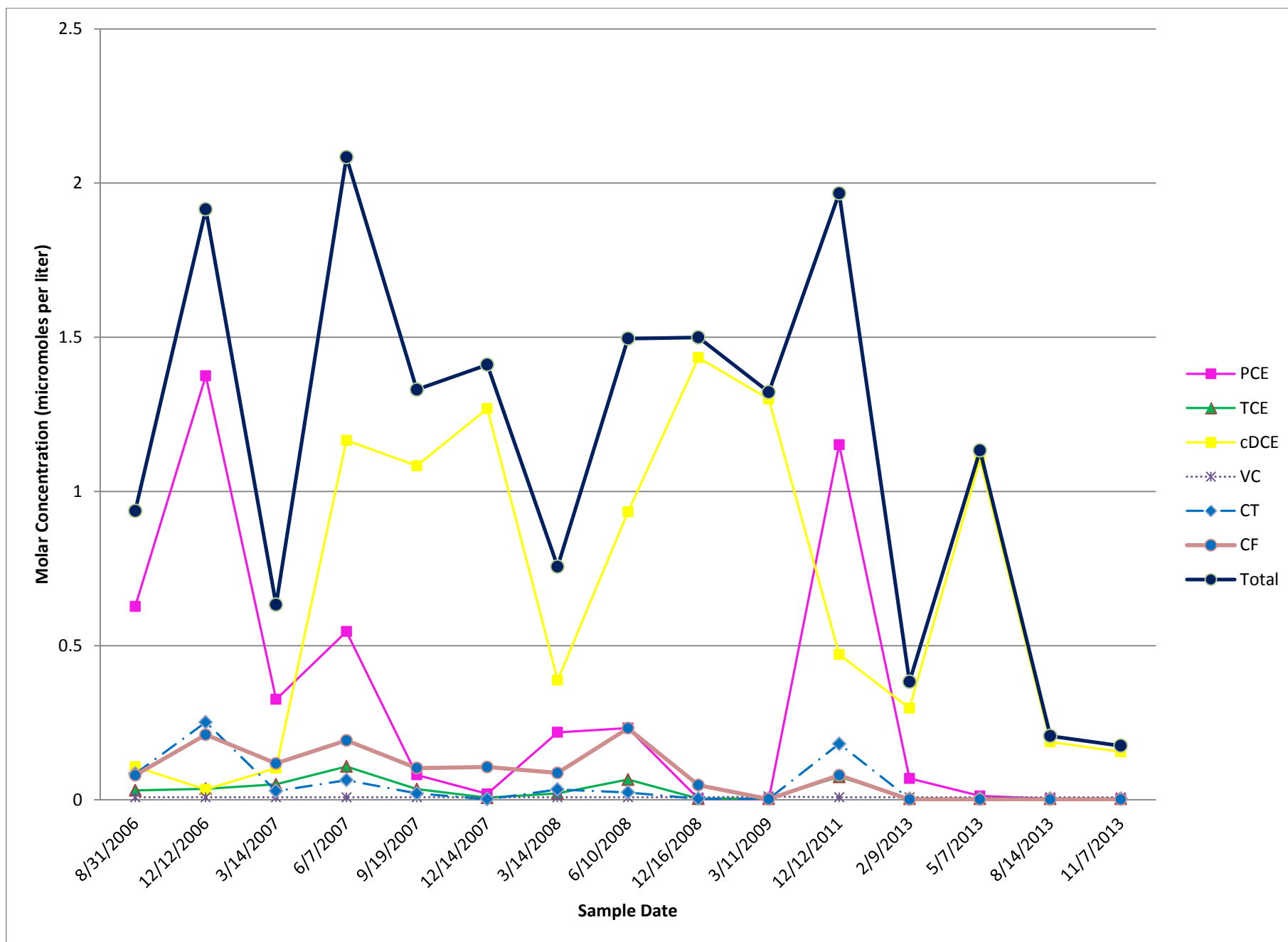
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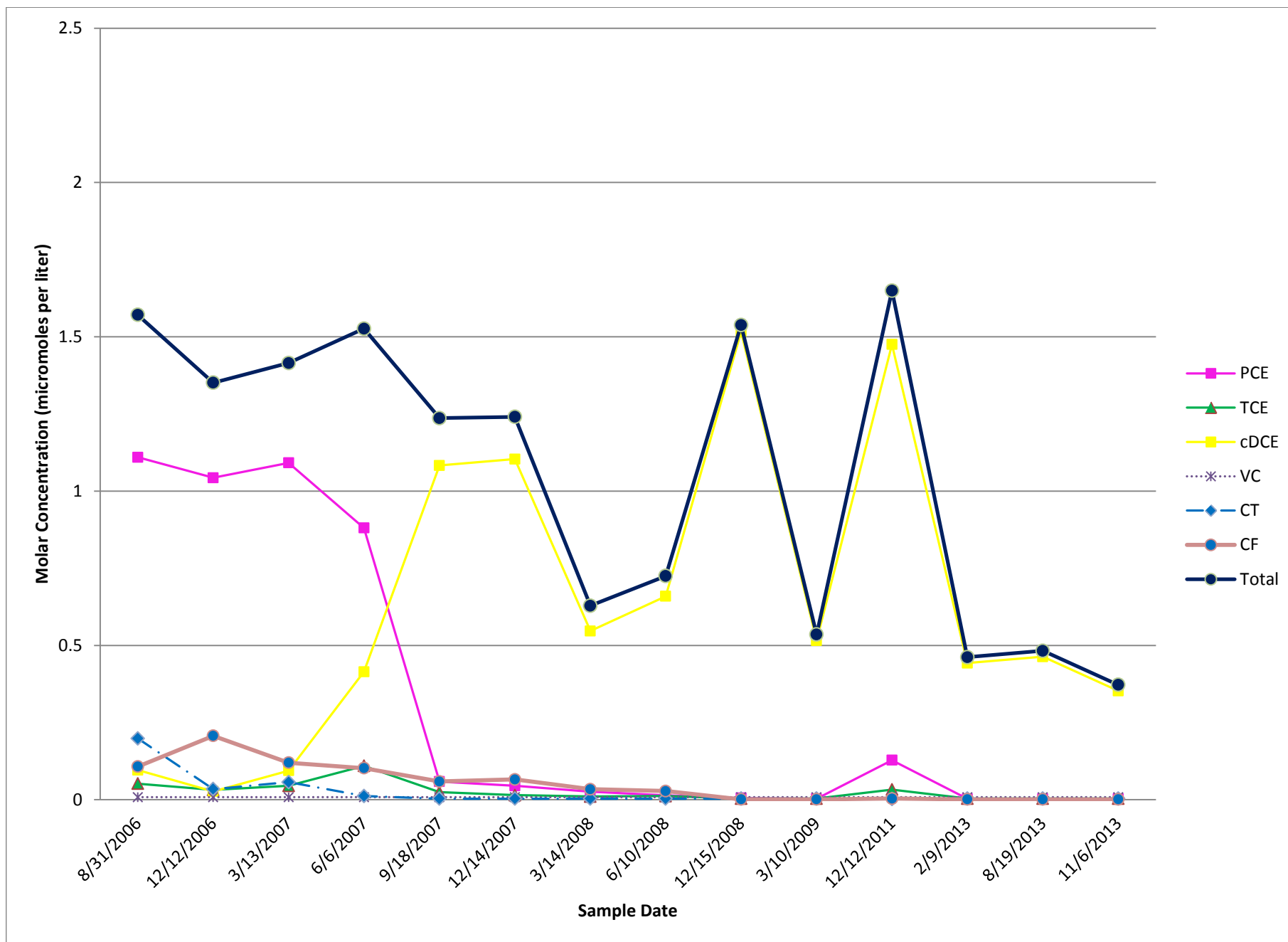


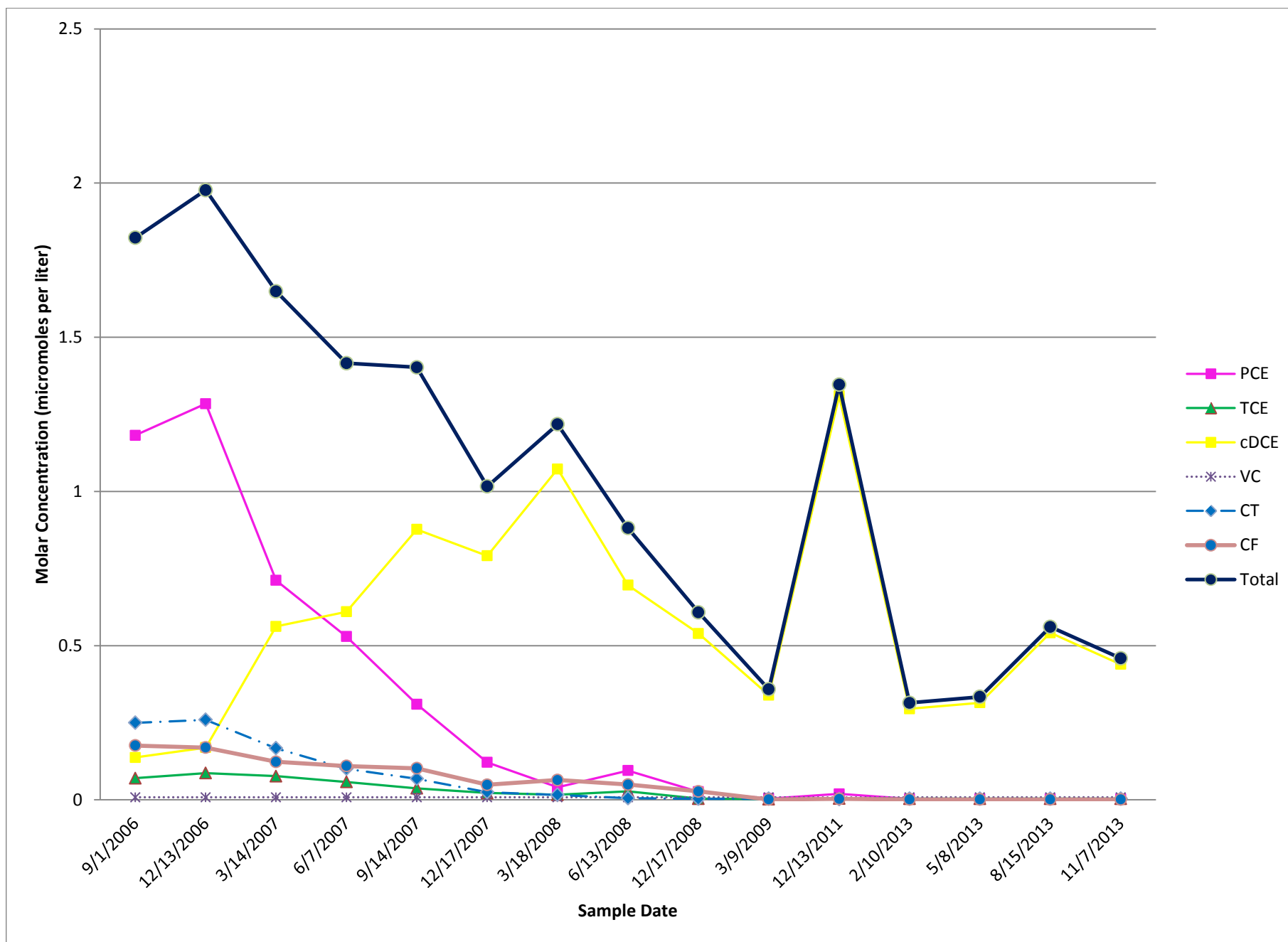


IW92-01

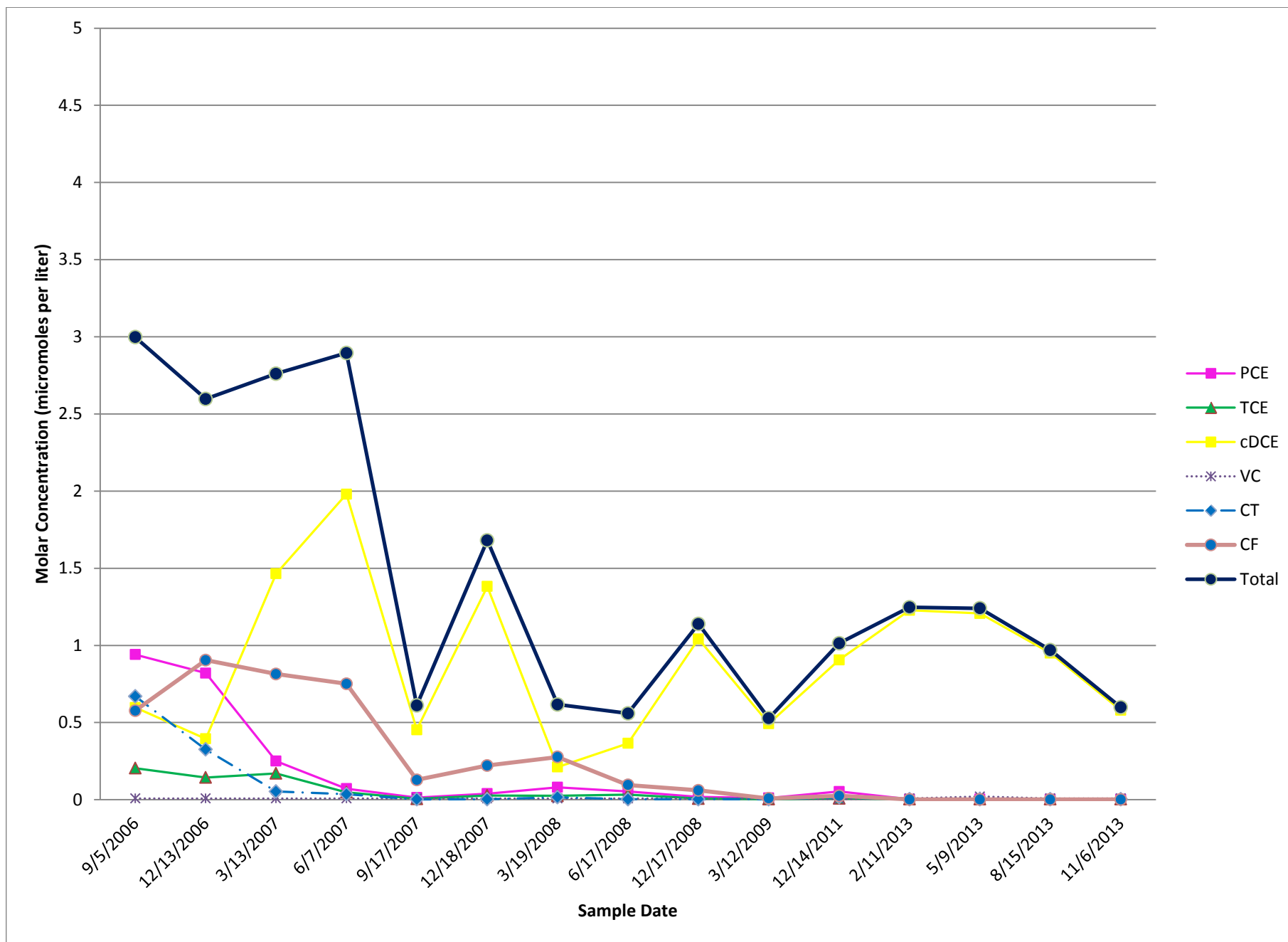


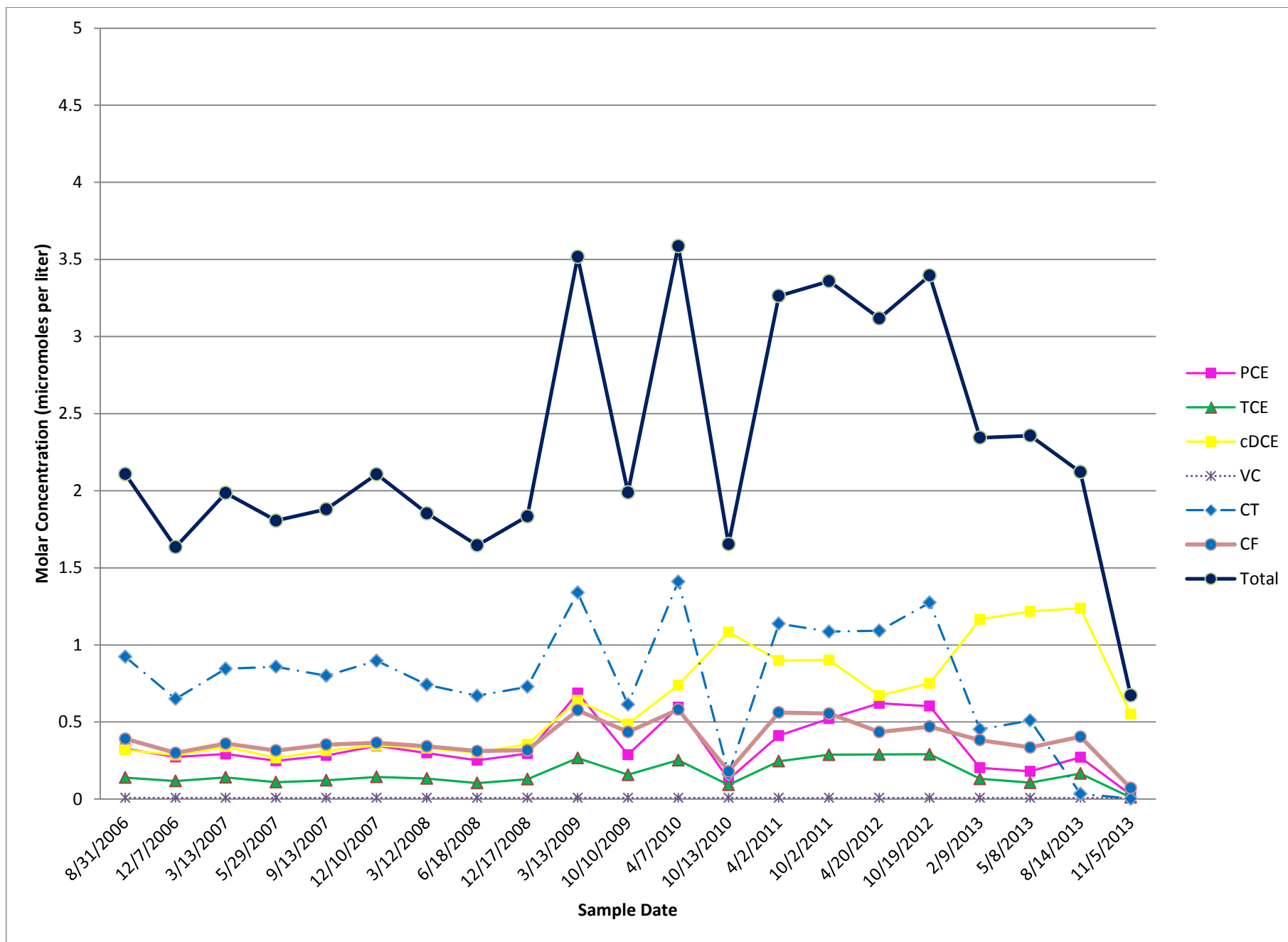




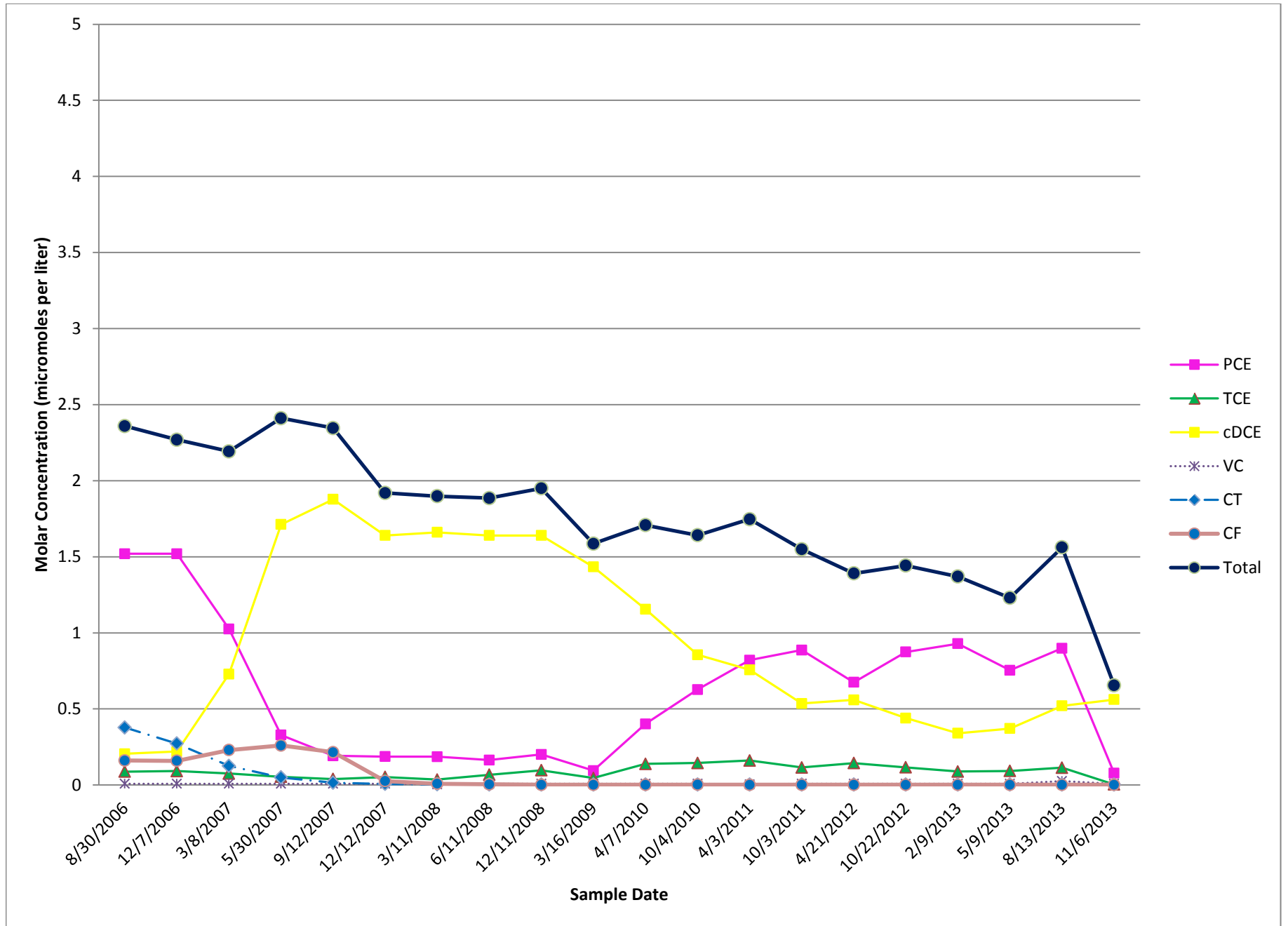


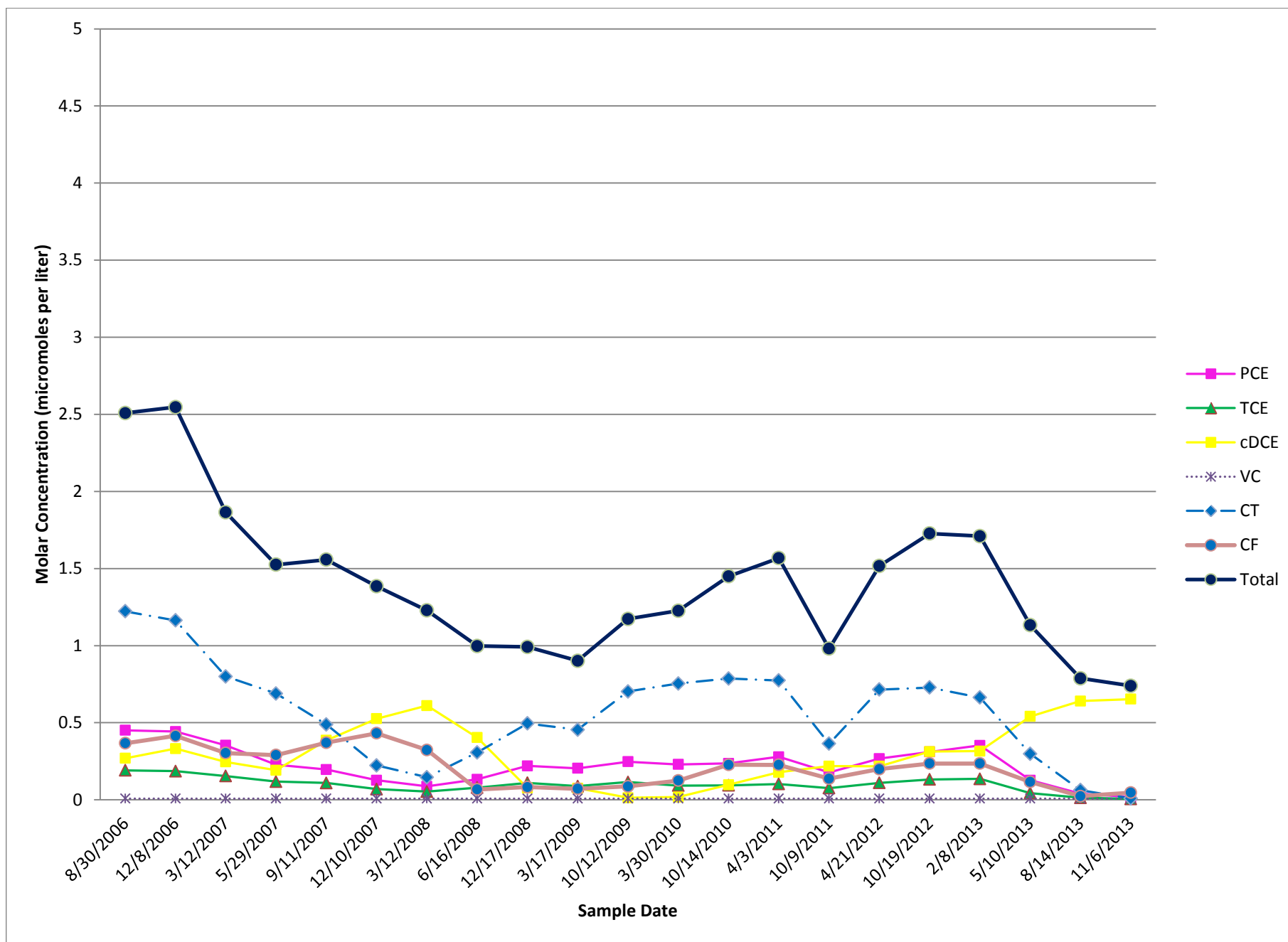
IW92-08



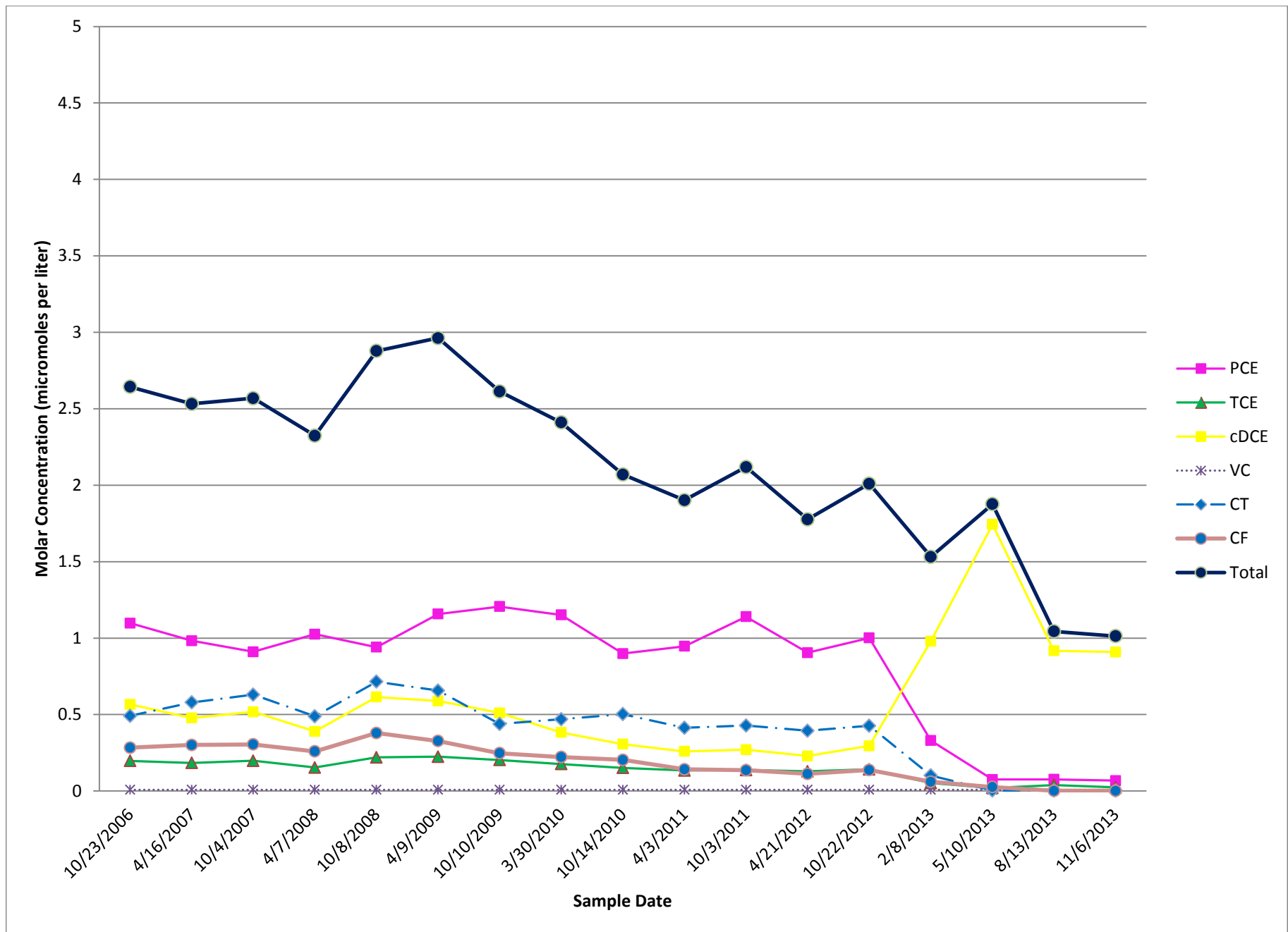


PMW92-03

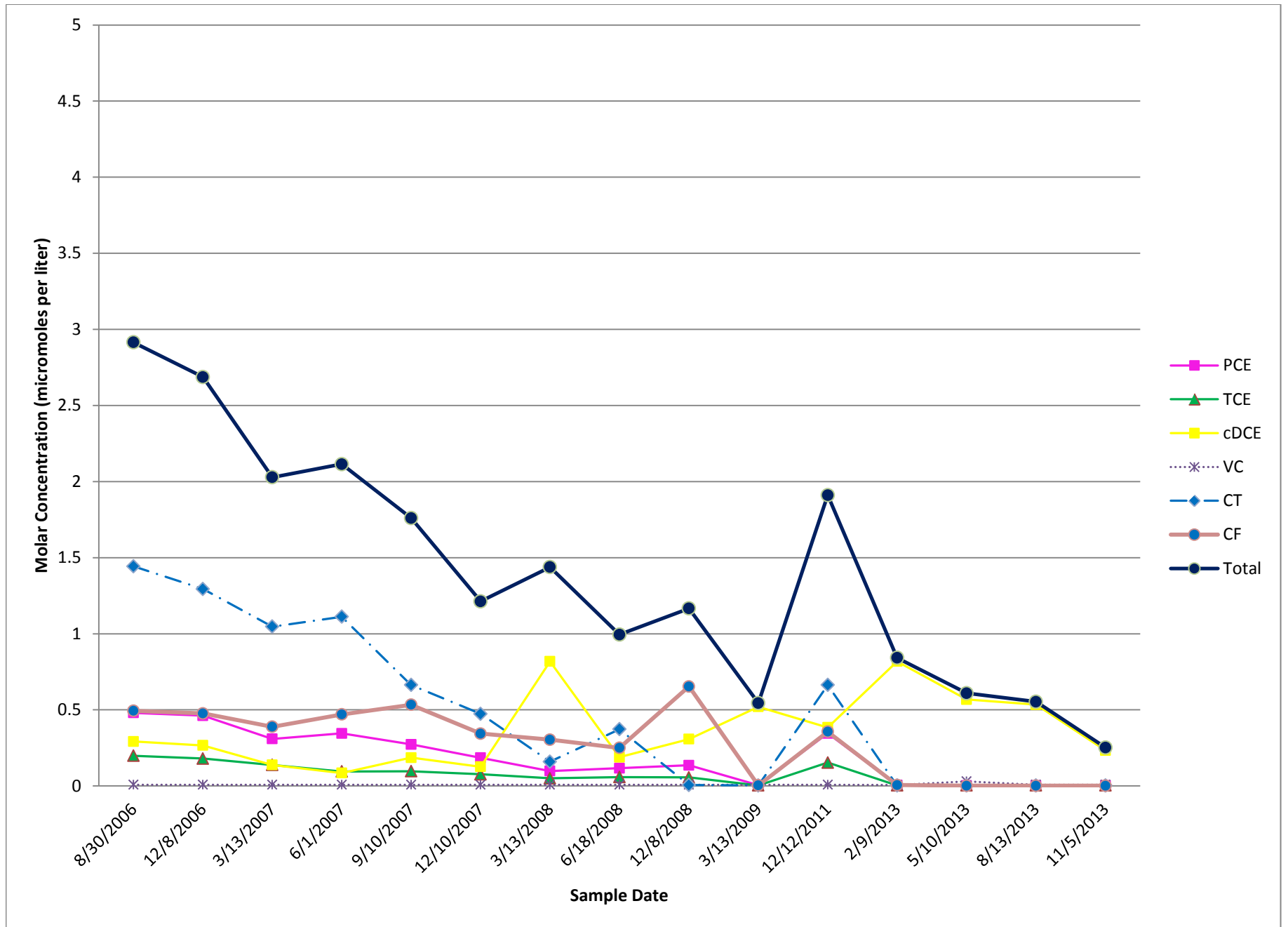




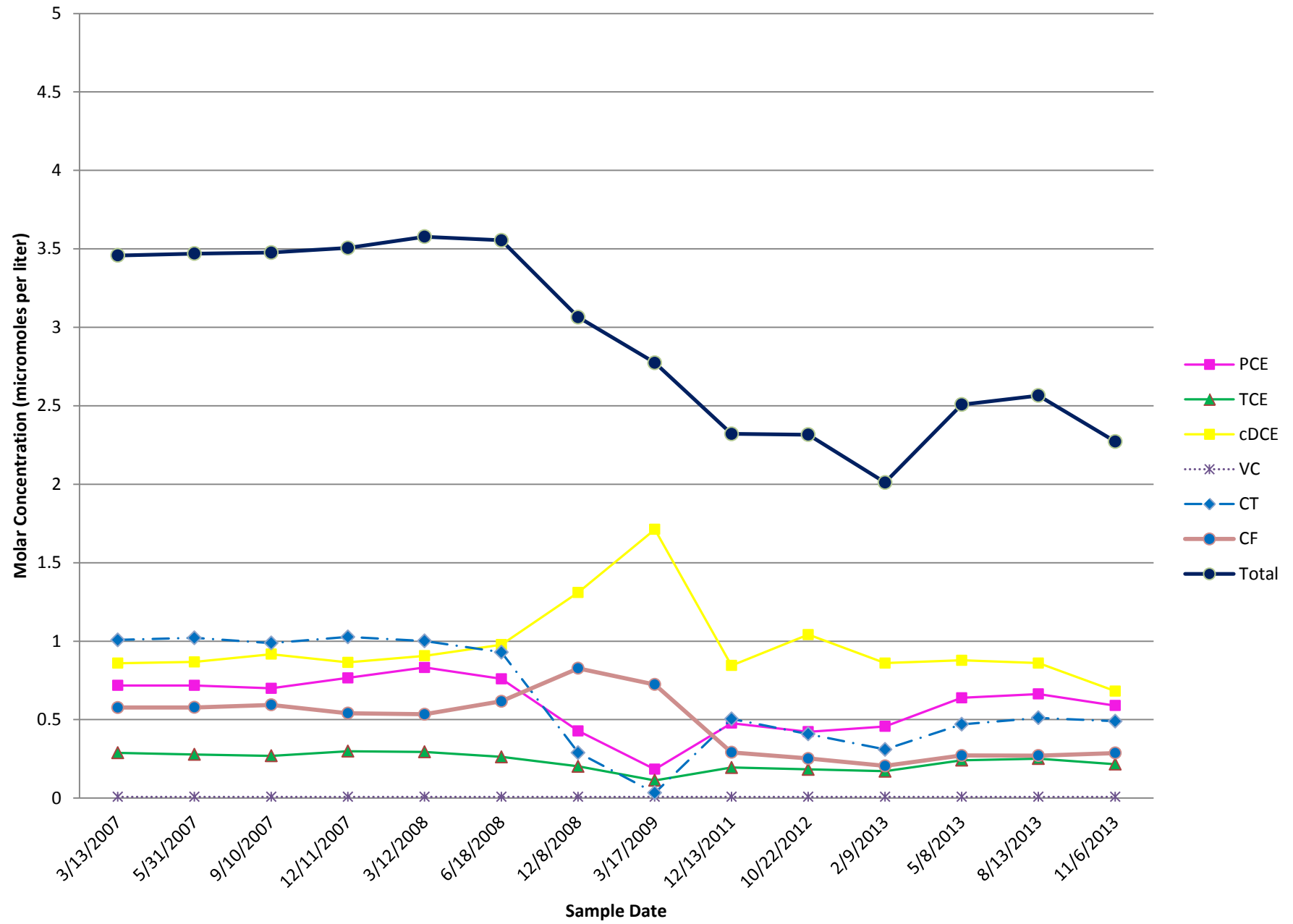
MW-113



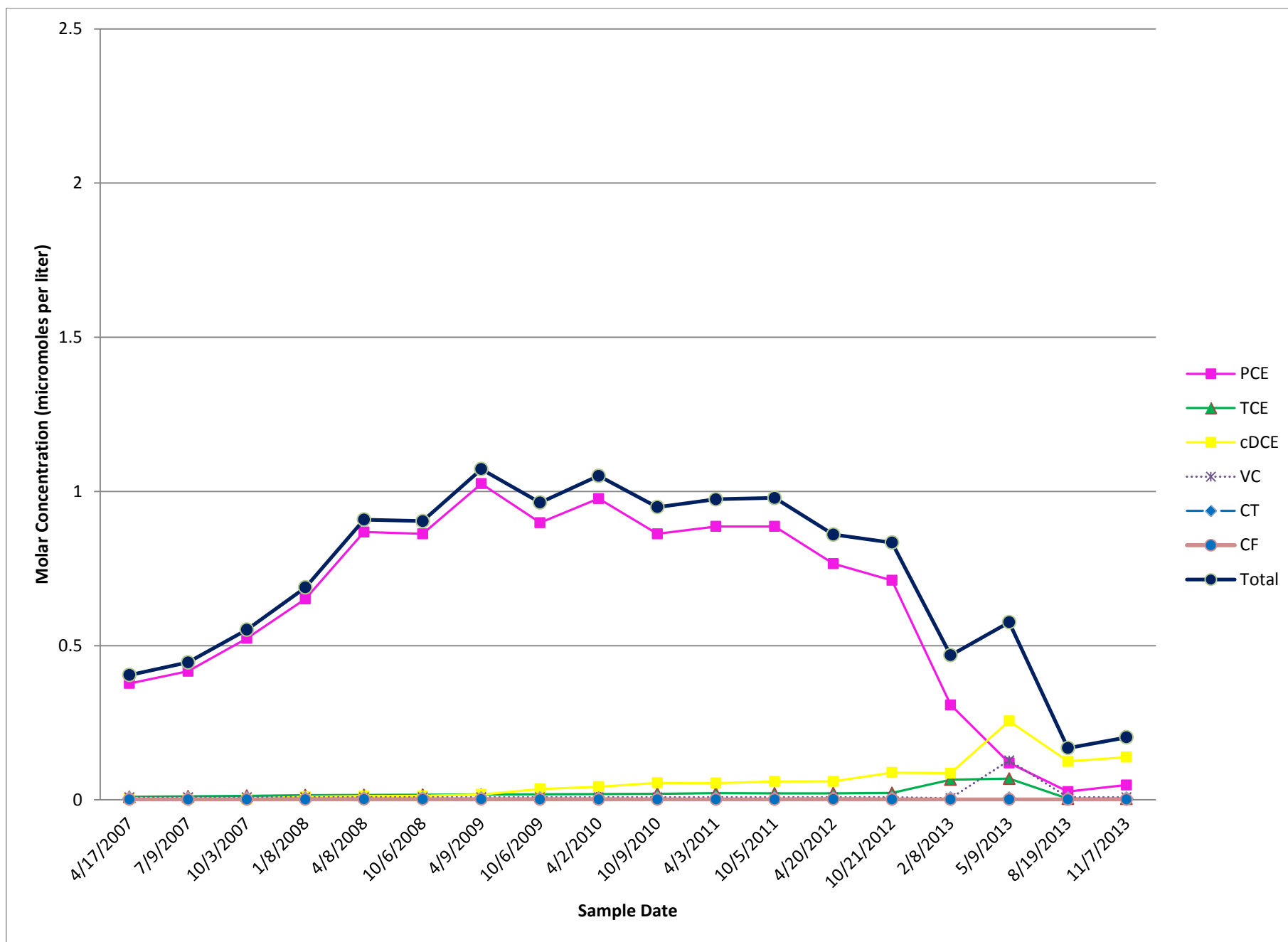
PMW85-01

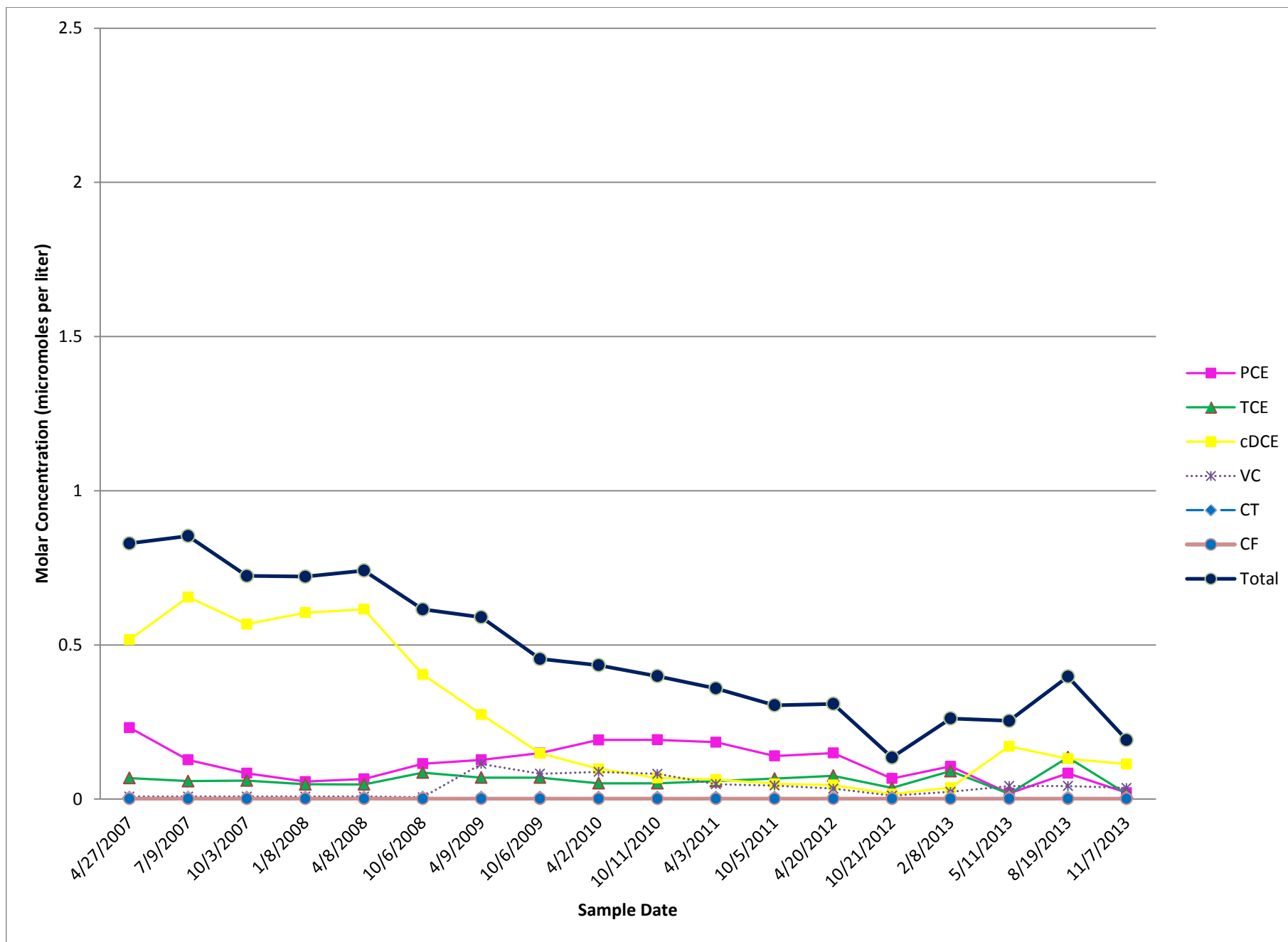


PMW85-05

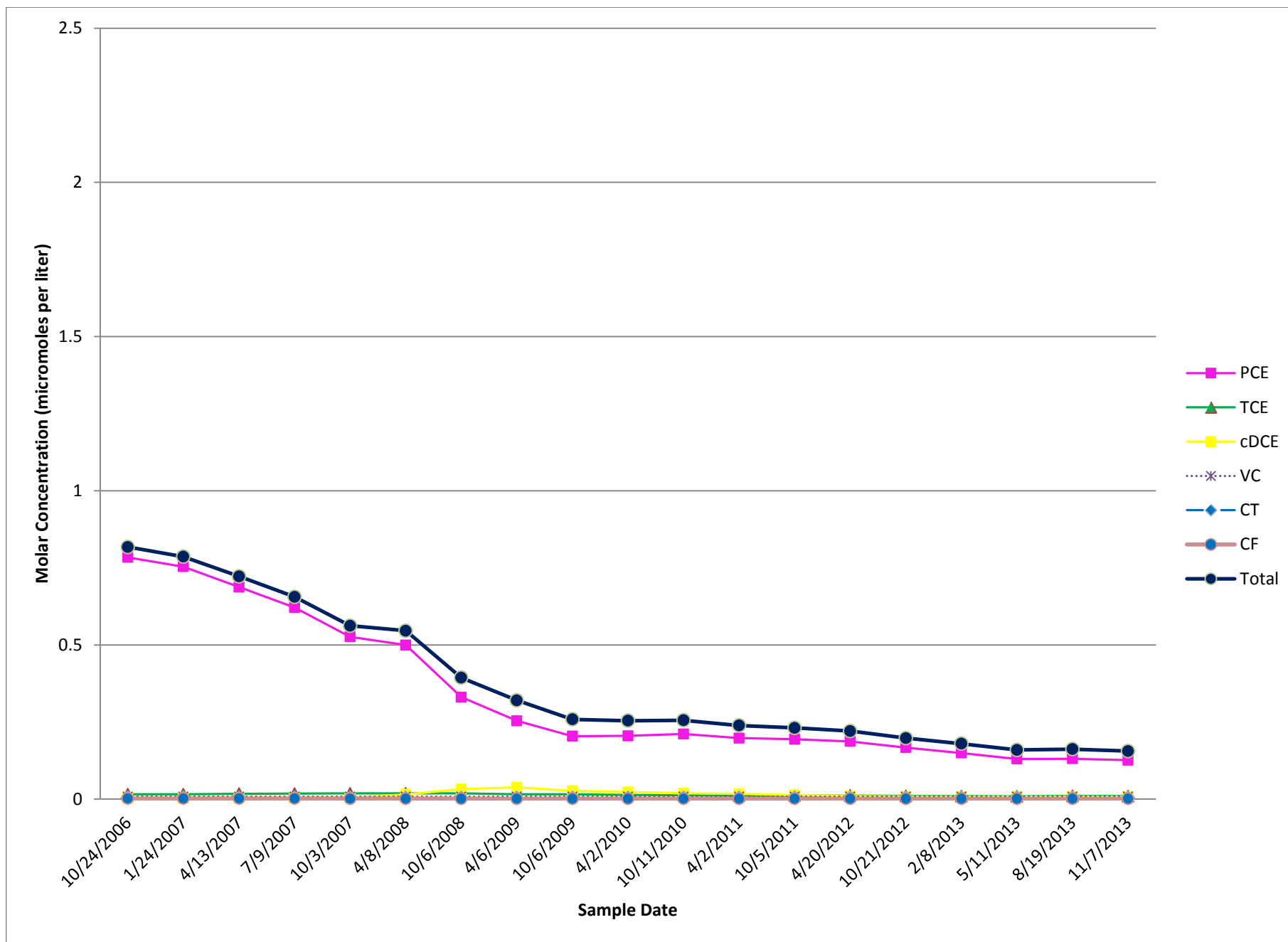


MW-203A

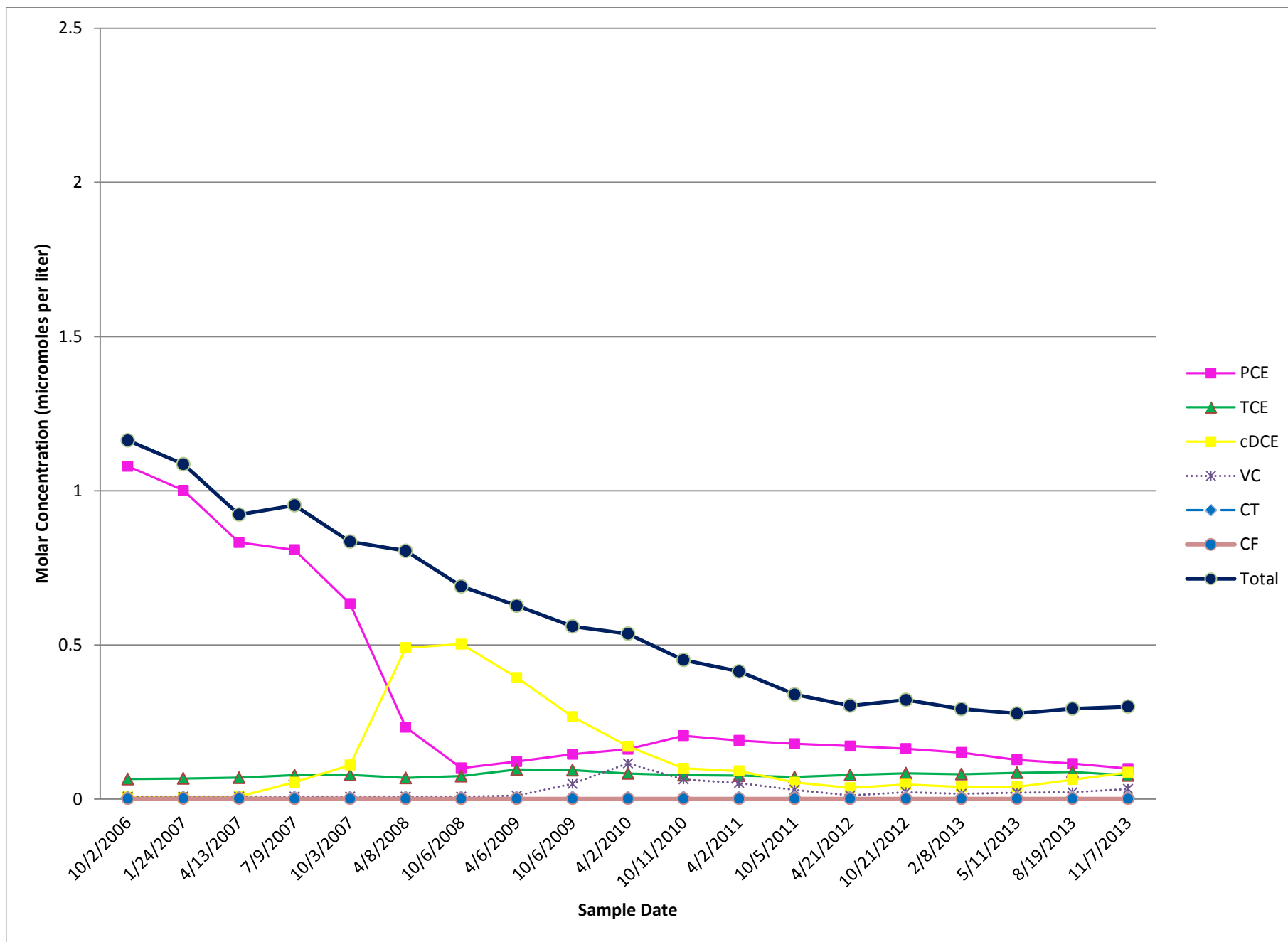


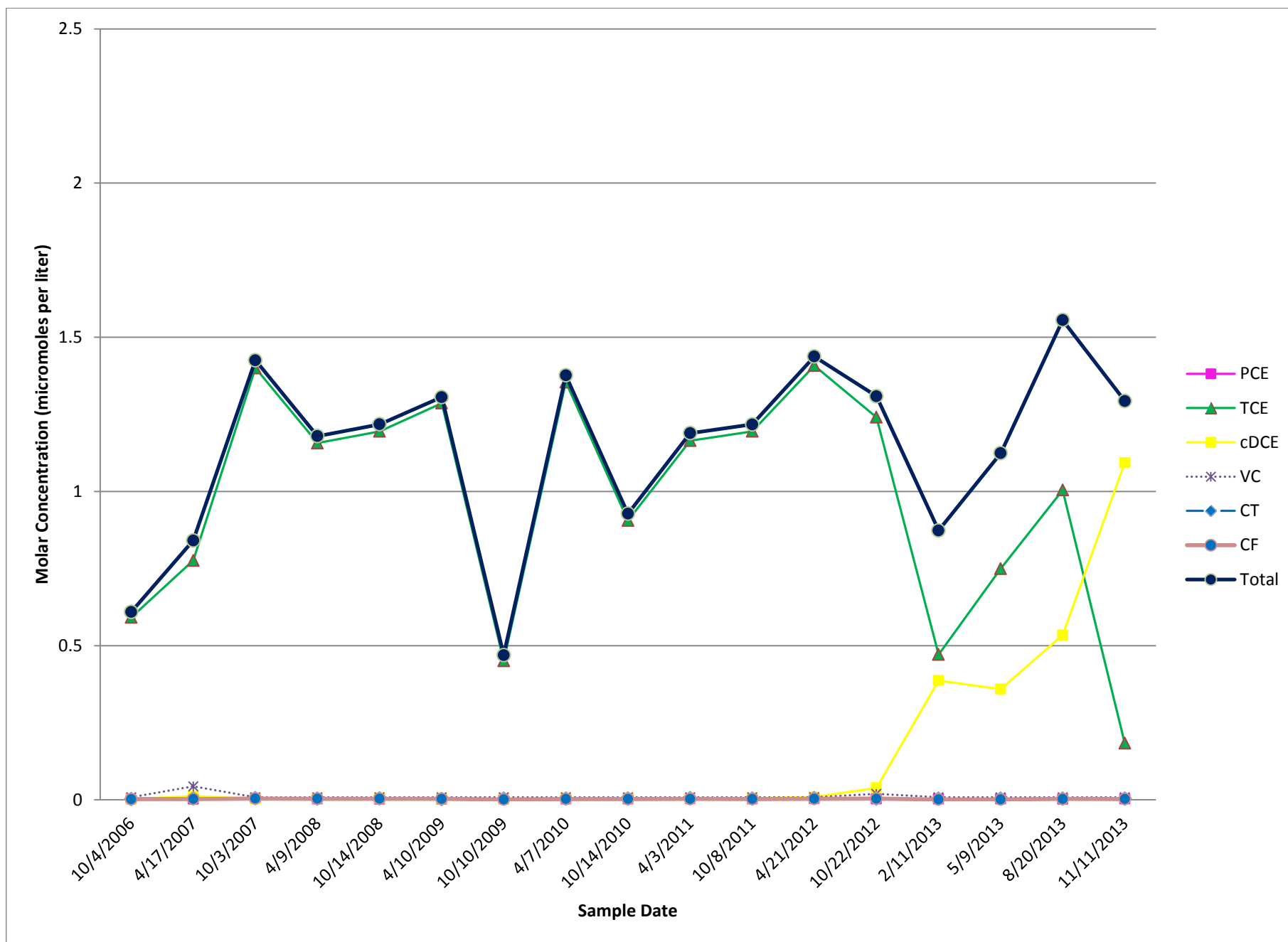


MW-197A



MW-197B





MW-213

