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THE MEMPHIS DEPOT
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Part I of II

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ANNUAL OPERATIONS REPORT – 2008
DUNN FIELD GROUNDWATER INTERIM REMEDIAL ACTION – YEAR TEN

Defense Depot Memphis, Tennessee

Defense Logistics Agency

Solutions Today for a Sustainable Tomorrow

AFCEE

Air Force Center for Engineering and the Environment
Contract No. FA8903-04-D-8722
Task Order No. 0043

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LIST OF ACRONYMS AND ABBREVIATIONS

AFCEE	Air Force Center for Environmental Excellence
AS-SVE	air sparging-soil vapor extraction
bgs	below ground surface
BRAC	Base Realignment and Closure
BCT	BRAC Cleanup Team
cDCE	cis-1,2-Dichloroethene
CF	Chloroform
CT	Carbon tetrachloride
CVOCs	Chlorinated Volatile Organic Compounds
DCA	1,2-Dichloroethane
DCE	1,1-Dichloroethene
DDMT	Defense Depot Memphis, Tennessee
DLA	Defense Logistics Agency
DO	dissolved oxygen
DoD	Department of Defense
DQE	Data quality evaluation
DQO	Data quality objectives
e^2M	engineering-environmental management
EPA	Environmental Protection Agency
ET&D	Excavation, transportation and disposal
gpm	Gallons per minute
GWRS	Groundwater Recovery System
IAI	Intermediate Aquifer Investigation
IRA	Interim Remedial Action
LCS	Laboratory Calibration Standard
LTM	Long-term Monitoring
MACTEC	MACTEC Engineering and Consulting, Inc.
MCL	Maximum contaminant level
MDL	Method Detection Limit
MI	Main Installation
ml	milliliter
msl	mean seal level
MS/MSD	Matrix Spike/Matrix Spike Duplicate

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

MW	Monitoring Well
NTU	nephelometric turbidity units
O&M	Operation and maintenance
ORP	oxygen reduction potential
PCE	Tetrachloroethene
PDB	Passive diffusion bag
QA	Quality Assurance
QC	Quality control
RA SAP	Remedial Action Sampling and Analysis Plan
RAWP	Remedial Action Work Plan
RGs	remediation goals
RL	Reporting Limit
ROD	Record of Decision
RW	Recovery Well
SDG	Sample Data Group
SVE	Soil Vapor Extraction
SVOCs	Semi-volatile organic compounds
TC	Target Concentrations
TCA	1,1,2-Trichloethane
TCE	Trichloroethene
TeCA	1,1,2,2-Tetrachloroethane
tDCE	trans-1,2-Dichloroethene
TDEC	Tennessee Department of Environmental Conservation
TSVE	Thermal-enhanced Soil Vapor Extraction
µg/L	Micrograms per liter
VC	Vinyl Chloride
VOCs	Volatile organic compounds

1.0 INTRODUCTION

engineering-environmental Management, Inc (e^2M) has prepared this Annual Operations Report for the Groundwater Interim Remedial Action (IRA) under Contract FA8903-04-D-8722, Task Order 43 to the Air Force Center for Engineering and the Environment (AFCEE). This report summarizes the operations and maintenance activities for the groundwater recovery system and the results of system monitoring for 2008 (Year Ten) on Dunn Field at the Defense Depot Memphis, Tennessee (DDMT).

1.1 SITE DESCRIPTION AND BACKGROUND

DDMT, which originated as a military facility in the early 1940s, received, warehoused, and distributed supplies common to all U.S. military services and some civil agencies located primarily in the southeastern United States, 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 (DoD) facilities to be closed under Base Realignment and Closure (BRAC). Storage and distribution of material continued until the facility closed in September 1997.

DDMT is located in southeastern Memphis, Shelby County, Tennessee approximately five miles east of the Mississippi River and just northeast of Interstate 240. The property consists of approximately 642 acres and includes the Main Installation (MI) and Dunn Field. The MI contains approximately 578 acres with open storage areas, warehouses, military family housing, and outdoor recreational areas. Dunn Field contains approximately 64 acres and includes former mineral storage and waste disposal areas. Dunn Field is located across Dunn Avenue from the north-northwest portion of the MI. Figure 1-1 shows locations of the monitoring and recovery wells at Dunn Field.

In 1992, DDMT was added to the National Priorities List. The lead agency for environmental restoration activities at DDMT is the Defense Logistics Agency (DLA). The regulatory oversight agencies are the United States Environmental Protection Agency Region 4 (EPA) and the Tennessee Department of Environmental Conservation (TDEC). DDMT's EPA Identification Number is TN4210020570.

1.2 GEOLOGY AND HYDROGEOLOGY

The geologic units of interest at Dunn Field are (from youngest to oldest) loess, including surface soil; fluvial deposits; Jackson Formation/Upper Claiborne Group; and Memphis Sand.

The Quaternary-aged loess consists of wind-blown deposits, brown to reddish-brown, and low-plasticity clayey silt to silty clay. The loess deposits are about 20 to 30 feet thick and are continuous throughout the Dunn Field area.

The Quaternary, and possibly Pliocene-aged fluvial (terrace) deposits are composed of two general layers. The upper layer is a silty, sandy clay that transitions to a clayey sand and ranges from about 10 feet to 36 feet thick. The lower layer is composed of interlayered sand, sandy gravel, and gravelly sand, and has an average thickness of approximately 40 feet.

The late Eocene-aged Jackson Formation/Upper Claiborne Group consists of clays, silts, and sands. The upper clay unit appears to be continuous except in the southwestern area of Dunn Field. Offsite, to the west and northwest of Dunn Field, there are possible gaps in the clay. Where present, these gaps possibly create connections to the underlying intermediate aquifer from the fluvial deposits.

The Early to Middle Eocene-aged Memphis Sand is composed primarily of thick-bedded, white to brown or gray, very fine-grained to gravelly, partly argillaceous and micaceous sand. Lignitic clay beds constitute a small percentage of the total thickness. Regionally, the Memphis Sand ranges from 500 to 890 feet in thickness and is at a depth of approximately 120 to 300 feet below ground surface (bgs). The only monitoring well completed in the Memphis Sand at DDMT is MW-67. The top of the Memphis Sand was identified at a depth of 255 feet bgs (elevation of 21 feet above mean sea level [msl]).

Three aquifers of interest underlying Dunn Field correspond to the geologic units described previously. The uppermost aquifer is the unconfined fluvial aquifer consisting of saturated sands and gravelly sands in the lower portion of the fluvial deposits. Recharge is primarily from the infiltration of rainfall. Discharge is generally directed toward underlying units in hydraulic communication with the fluvial deposits or laterally into adjacent stream channels. The saturated thickness of the fluvial aquifer near Dunn Field ranges from 0 feet to 50 and is controlled by the configuration of the uppermost clay in the Jackson Formation/Upper Claiborne Group. Water level elevations range from approximately 258 feet msl northeast of Dunn Field (MW-65) to 203 feet msl southwest of Dunn Field (MW-19).

The intermediate aquifer is locally developed in deposits of the Jackson Formation/Upper Claiborne Group, which contain laterally extensive, thick deposits of clay. Water level elevations in the intermediate aquifer, away from areas of recharge from the fluvial aquifer, are approximately 160 to 170 feet msl.

The Memphis aquifer 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 is located approximately 2 miles west of Dunn Field. The Memphis aquifer is confined by overlying clays and silts in the Cook Mountain Formation (part of the Jackson/Upper Claiborne Group). This aquifer receives most of its recharge from an outcrop area several miles east of Memphis. Some recharge is derived from overlying or hydraulically communicating units. The top of the Memphis aquifer potentiometric surface at MW-67 is approximately 165 feet msl.

1.3 GROUNDWATER CONTAMINATION

Nine volatile organic compounds (VOCs) have been persistently detected in the fluvial aquifer during past sampling events: carbon tetrachloride (CT); chloroform (CF); 1,1-dichloroethene (DCE); cis-1,2-dichloroethene (cDCE); trans-1,2-dichloroethene (tDCE); 1,1,2-trichloroethane (TCA); trichloroethene (TCE); tetrachloroethene (PCE) and 1,1,1,2-tetrachloroethane (TeCA). Three primary VOC plumes underlie Dunn Field: a northern plume, a west-northwest (central) plume, and west-southwest (southern) plume. Mixing and intermingling of the plumes has occurred due to the active groundwater extraction system and natural groundwater flow; the plumes appear to merge west of Dunn Field.

The primary constituents in the northern plume are PCE, TCE, and DCE. There is an apparent offsite source(s) of these compounds northeast of Dunn Field; however, the disposal sites in the northwest corner of Dunn Field are also apparent source areas. The central plume contains high concentrations of TECA and TCE and also contains PCE, cDCE, tDCE, TCA, CT, and CF. The southern plume is principally composed of TECA, CT, TCA, and CF, although TCE, tDCE, PCE, and cDCE are also present. The central and southern plumes appear to result from disposal sites on Dunn Field.

1.4 SYSTEM DESCRIPTION

The IRA Record of Decision (ROD) for groundwater at Dunn Field was signed in April 1996 with the objectives of hydraulic containment to: (1) prevent further contaminant plume migration; and (2) reduce contaminant mass in groundwater. The final design for Phase 1 of this groundwater extraction system was completed in August 1997 and included the installation of seven groundwater extraction wells (RW-3 through RW-9), one pre-cast concrete building, an underground conveyance system, and flow measurement and control systems. The system was constructed from January 1998 through October 1998 and began operation in November 1998.

The Phase II design was completed in January 2000 and included four additional extraction wells and associated electrical, mechanical, and instrumentation/controls components. The Phase II system update was due to the detection of additional groundwater contamination in the southern portion of Dunn Field.

Installation of new recovery wells (RW-1, RW-1A, RW-1B and RW-2) south of recovery well RW-03 and construction of other components was completed by March 2001. The expanded system was in full operation in June 2001.

The Five Year Review for Dunn Field (CH2M HILL, 2003) concluded that over 300 pounds of VOCs had been removed by the IRA from 1998 to 2002. However, the extraction system did not adequately control groundwater flow and plume migration in the fluvial aquifer. Potentiometric surface maps indicated that groundwater was captured in the immediate vicinity of each recovery well, but the capture zones were not connected between wells, and portions of the groundwater plume were able to pass through the voids in the extraction well capture zones. An increase in chlorinated volatile organic compounds (CVOC) concentrations was observed in monitoring wells west of Dunn Field.

The IRA was found to be protective in the short term, because there is no current or planned use of the fluvial aquifer as a drinking water supply and local ordinances restrict installation of private wells. The Five Year Review stated that monitoring data from the IRA and the remedial investigation suggested that aquifer restoration could be accomplished effectively by other technologies rather than expanding the groundwater extraction system. Fully protective remedies for all media were selected in the *Dunn Field Record of Decision* (CH2M HILL, 2004). The *Second Five Year Review* (e^{2}M, 2008a) completed in January 2008 did not alter the findings relative to the protectiveness of the IRA.

Implementation of the selected remedies has begun: excavation, transportation, and offsite disposal (ET&D) of disposal sites was completed in March 2006; the fluvial soil vapor extraction (SVE) system began operation in July 2007; and the thermal-enhanced SVE (TSVE) system in the loess began operation in May 2008. TSVE operations were completed in December 2008 after soil sample results demonstrated attainment of remediation goals (RGs). Fluvial SVE operations are expected to continue until 2012.

1.5 SCOPE OF WORK

e^{2}M assumed the operation and maintenance (O&M) activities for the Groundwater IRA system in October 2006. The goals for O&M are to:

- Maintain system operations through regular field inspections, maintenance, and repairs; and
- Monitor system effectiveness through the measurement of water levels and the collection and analysis of system effluent samples and groundwater samples from monitoring wells and recovery wells.

The following sections briefly describe the field activities performed to support these objectives. During the performance of the O&M activities, e^2M reviewed the *Operations and Maintenance Manual for Instrumentation and Controls* (OHM Remediation Services, 1999) and the *Construction Report* (Jacobs Engineering Group, 2001) prepared following Phase II system construction.

The scope for the Groundwater IRA included the following activities:

- Weekly system inspections with repair or replacement of components, as required;
- Annual system calibration;
- Monthly discharge reports to document O&M activities, system status, and performance;
- Water levels measured weekly in recovery wells and semiannually in monitoring wells. Water level data from pressure transducers in recovery wells downloaded monthly;
- Semi-annual groundwater samples collected from monitoring wells using passive diffusion bag samplers (PDB) or low flow sampling procedures and from recovery well samples using wellhead sampling ports. Samples analyzed for VOCs; and
- Quarterly effluent samples analyzed for pH and VOCs with semi-annual effluent samples analyzed for semi-volatile organic compounds (SVOCs) and metals in accordance with the wastewater discharge agreement (Appendix A).

2.0 SYSTEM OPERATIONS ACTIVITIES

System O&M requirements were evaluated during weekly visits of the IRA system throughout 2008. Observations and system data were reported in monthly discharge reports, which are included in Appendix B.

2.1 RECOVERY WELL SHUTDOWNS

All recovery wells (RWs) are currently offline. Groundwater sample results from the April 2008 IRA semiannual monitoring event (e^2M, 2008b) demonstrated that the fluvial SVE operations were having a significant impact in reducing CVOC concentrations in groundwater. CVOC concentrations in recovery wells and monitoring wells at the north end of Dunn Field did not exceed 50 micrograms per liter (μg/L) for any single CVOC; this concentration limit is the objective for the Source Areas groundwater remedy, with further reduction to MCLs to be achieved by the Off Depot remedy. Operation of RW-5 through RW-9 was discontinued on 9 June 2008 following approval of the BRAC Cleanup Team (BCT).

CVOC concentrations in groundwater samples from the October 2008 semiannual monitoring event (e^2M, 2008c) decreased or remained at low levels. e^2M reviewed groundwater contours and concluded that groundwater with concentrations greater than 50 μg/L at a few locations in the south-central area of Dunn Field would pass through the active component of the Off Depot groundwater remedy, which is expected to be online in Fall 2009. The on-line RWs (RW-1, RW-1A, RW-1B, RW-2, RW-3, and RW-4) were shutdown on 23 January 2009 following approval from the BCT.

2.2 SYSTEM PERFORMANCE

The system performed well in 2008 with an average operational run time for all recovery wells of 98.3 percent. Issues with valving (RW-1), severe weather (RW-2 and RW-7) and a timer relay (RW-6) affected uptime in January 2008. A faulty pump affected uptime at RW-1A during May and June; the pump was replaced. Additional downtime in July at RW-2 was due to cleaning and re-wiring the pump. Percentage uptimes for individual wells through January 2009 are presented in the following table.

Recovery Well ID	January 2008 – January 2009 Operational Run Times (Percent)												
	Jan	Feb	March	April	May	June(1)	July	Aug	Sept	Oct	Nov	Dec	Jan(2)	Avg(3)
RW-1	86.8	99.9	100	99.7	100	100	100	100	100	100	100	100	74.2	99.0
RW-1A	100	100	100	99.7	60.3	55.1	100	100	100	100	100	100	74.2	93.5
RW-1B	100	100	100	99.7	100	100	100	100	100	100	100	100	74.2	99.9
RW-2	98.3	100	100	99.7	100	100	87.1	100	100	100	100	100	74.2	98.9
RW-3	100	100	100	99.7	100	100	100	100	100	100	100	100	74.2	99.9
RW-4	100	100	100	99.7	100	100	100	100	100	100	100	100	74.2	99.9
RW-5	100	100	100	99.7	100	28.3	0	0	0	0	0	0	0	99.9
RW-6	70.2	100	100	99.7	100	28.3	0	0	0	0	0	0	0	94.9
RW-7	91.1	100	100	92.2	94.9	28.3	0	0	0	0	0	0	0	96.4
RW-8	100	99.9	100	90.2	100	28.3	0	0	0	0	0	0	0	98.4
RW-9	100	100	100	99.7	100	28.3	0	0	0	0	0	0	0	99.9

(1) RW-5 through RW-9 were shutdown on 9 June 2008.
(2) RW-1 through RW-4 were shutdown on 23 January 2009.
(3) Average runtime for RW-1, RW-1A, RW-1B, RW-2, RW-3, and RW-4 is calculated through shutdown on 21 January 2009. Average runtime for RW-5, RW-6, RW-7, RW-8, and RW-9 is calculated through shutdown on 9 June 2008.

Approximately 18,062,602 gallons of groundwater from the IRA system was discharged to the sanitary sewer from 1 January 2008 through 31 January 2009. Individual RW totalizer data collected during weekly visits were used to calculate the groundwater recovery rates. The average monthly pumping rate for each recovery well is shown below.

Recovery Well ID	January 2008 – January 2009 Average Monthly Pumping Rate and Total Volume												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Average(1)
	gallons per minute (gpm)													
RW-1	0.2	1.5	0.2	0.2	0.1	0.2	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.34
RW-1A	1.6	1.7	1.5	1.4	1.3	1.5	1.5	1.6	1.1	1.0	1.0	1.0	0.9	1.32
RW-1B	2.0	1.5	1.7	1.7	1.8	2.1	2.3	2.5	2.5	2.5	2.4	2.6	2.7	2.18
RW-2	1.6	1.6	1.5	1.2	1.5	2.1	1.8	2.2	2.6	3.5	3.5	3.6	3.7	2.34
RW-3	1.9	1.8	1.8	1.5	1.2	1.0	0.9	1.0	2.9	3.9	3.9	2.4	2.6	2.06
RW-4	3.3	3.3	3.3	3.2	3.4	3.7	4.0	4.2	4.6	7.2	9.4	9.6	9.0	5.25
RW-5	1.2	1.2	1.3	1.3	1.4	1.8	0	0	0	0	0	0	0	1.37
RW-6	5.6	5.6	5.5	5.6	5.6	5.6	0	0	0	0	0	0	0	5.58
RW-7	5.3	5.3	5.3	5.6	5.0	5.3	0	0	0	0	0	0	0	5.30
RW-8	14.6	14.3	14.4	14.4	14.4	14.4	0	0	0	0	0	0	0	14.42
RW-9	19.9	19.9	19.8	19.8	19.8	19.8	0	0	0	0	0	0	0	19.83

(1) Average flow rate for RW-5 through RW-9 is calculated through shutdown on 9 June 2008. Average flow rates for RW-1 through RW-4 is calculated through shut down on 23 January 2009.

2.3 RECOVERY WELL MAINTENANCE

e^2M personnel inspected each recovery well and recorded system parameters (flowrates, water levels, totalizer readings) weekly. System parameters were also monitored remotely by downloads from the system datalogger. Regular maintenance activities include adjustments to system components to maintain flowrates and water levels at individual RWs and general maintenance of RW housings. System parameters were downloaded from the datalogger on a monthly basis and compared to manual readings. Due to the April 2008 shutdown of 5 of the 11 recovery wells, annual calibration of individual recovery well relays, totalizers, and pump controllers was not performed, individual components were calibrated on an as-needed basis (e.g., when manual readings and data from datalogger differed or when anomalous flowrates or water levels were observed). Maintenance activities in 2008 at individual recovery wells are described below.

- RW-1 was 99.0 percent operational for the reporting period. The ball valve was replaced in February.
- RW-1A was 93.5 percent operational for the reporting period. The pump was replaced in June. The level relay was calibrated in June.
- RW-1B was 99.9 percent operational for the year for the reporting period. In January 2008 debris was removed from the totalizer. The level relay was calibrated in June.
- RW-2 was 98.9 percent operational for the year. In July the flow rates declined in this well; the pump was cleaned and rewired, a new collar installed and, the flowmeter impeller was replaced.
- RW-3 was 99.9 percent operational for the year.
- RW-4 was 99.9 percent operational for the year.
- RW-5 was 99.9 percent operational for the year.
- RW-6 was 94.9 percent operational for the year. In January 2008 the timer relay was replaced.
- RW-7 was 96.4 percent operational for the year. In May the level relay was re-calibrated due to erratic operation.
- RW-8 was 98.4 percent operational for the year. The impeller in the totalizer was replaced in February. In April a bad electrical breaker was replaced.
- RW-9 was 99.9 percent operational for the year.

3.0 SYSTEM MONITORING ACTIVITIES

The system monitoring activities consist of water level measurements, sampling and analysis of groundwater samples from recovery wells and monitoring wells, and analysis of effluent samples from the recovery system discharge. The activities are performed in accordance with past practice and the *Remedial Action Sampling and Analysis Plan* (RA SAP) (MACTEC, 2005). The wells included in the monitoring program are listed on Table 3-1.

3.1 WATER LEVEL MEASUREMENTS

Water level measurements were collected to evaluate the capture zone of the recovery system and groundwater flow direction. Water level measurements were made in during two events in 2008; 10 April and 14 October. In each event, water levels were recorded in 133 monitoring wells, one piezometer, 11 recovery wells using a Solinst Model 101 water level meter with an electronic sensor and tape graduated in 0.01-foot increments. The water level measurements are shown on Table 3-2.

3.2 GROUNDWATER SAMPLING

3.2.1 Monitoring Wells

Groundwater samples were collected from monitoring wells to evaluate system effectiveness in restricting plume migration. Groundwater samples from monitoring wells were collected using passive diffusion bags (PDBs) from October 2001 through October 2007. Prior to that time, the samples are believed to have been collected using low-flow sampling methods. Due to 37 monitoring wells being added to the IRA sampling program in 2008, samples were collected using PDBs and low-flow sampling methods. Sampling was performed in general accordance with the *User's Guide for Polyethylene-based Passive Diffusion Bag Samplers to Obtain Volatile Organic Compound Concentrations in Wells* (U.S. Geological Survey, 2001) and the RA SAP. In 2008, 51 wells were selected for sampling with PDBs and 34 wells were selected for sampling with using low-flow sampling.

3.2.1.1 Passive Diffusion Bags

Upon removal from each monitoring well, a sample of water from the PDB was transferred to 40 milliliter vials preserved with hydrochloric acid. Following sample collection, a single, new PDB was filled with deionized water and were placed in each well in the middle of each well screen.

In the April 2008 sample event, a drop in water levels in the fluvial aquifer resulted in ten wells having midpoints of PDBs at or above the water table. In four wells with dual PDBs (MW-148, MW-150, MW-155 and MW-158A), the upper PDB was 0.3 to 2.4 feet above the water level. In six wells with single PDBs (MW-144, MW-147, MW-160, MW-161, MW-163 and MW-169), the PDB was 0.1 to 1.1 feet above the water level. Wells MW-144, MW-161 and MW- 163 were dry or had less than 1 foot of water based on the water level measurements. To limit this problem during future semiannual sampling events, e^2M began the practice of measuring water levels in all wells with PDBs approximately one month prior to sample collection and adjusting the PDB where necessary in order that the midpoint depth is 2 feet below the water level. If saturated thickness is less than 5 feet, samples will be collected by low-flow sampling.

3.2.1.2 Low Flow Sampling

Dedicated Teflon® bladders and Teflon®-lined polyethylene tubing were used for each well. Water quality parameters were measured at approximately 5 to 10 minute intervals during purging using a flow-through cell with either a Horiba U-22XD or an YSI 6500 Series. The units were calibrated daily prior to sampling. If necessary, 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 for oxygen reduction potential (ORP), 3 percent for specific conductance, 10 percent for dissolved oxygen (DO) and less than 20 nephelometric turbidity units (NTU) for turbidity. Temperatures 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. Upon completion of purging at each monitoring well, water samples were transferred to 40-milliliter vials preserved with hydrochloric acid.

3.2.1.3 April 2008

e^2M collected groundwater samples from 82 of 84 designated monitoring wells on 11 to 16 April 2008. Two monitoring wells (MW-10 and MW-233) were dry at the time of sampling.. The groundwater samples were sent to Microbac Laboratories for VOC analysis by EPA Method SW8260B.

A total of PDBs were retrieved from 51 wells on 11 to 14 April 2008. Two PDB samples were collected from 17 wells as shown on Table 3-1. The use of dual PDBs was discontinued following the April 2008 event as agreed at the April 2008 BCT meeting. PDB sample depths are shown on Table 3-3.

Groundwater samples were collected from 31of 33 monitoring wells on 11 to 16 April 2008 using bladder pumps and low-flow purging methods. MW-10 and MW-233 were dry at time of sampling. The final stabilization measurements for the April 2008 sampling event are shown in Table 3-4. The following samples were collected without meeting the stabilization criteria:

- Samples collected from MW-172, MW-231, MW-234, MW-235, and MW-238 had turbidity readings of 22.9 to 172 NTUs following purging for two hours.

3.2.1.4 October 2008

e^{2}M collected groundwater samples from 81 of 84 designated monitoring wells and on 17 to 22 October 2008. Two monitoring wells (MW-144 and MW- 233) were dry at the time of sampling and one monitoring well (MW-175) appears to have been damaged (melted) due to heat from the TSVE system. The groundwater samples were sent to Microbac Laboratories for VOC analysis by EPA Method SW8260B.

Samples were collected using PDBs in 50 of 51 designated wells on 17 to 22 October 2008. A sample was not collected from the PDB in MW-144 because the well was dry. PDB depths were checked during an inspection on 1 September 2008 to ensure that each PDB was placed near the center of the saturated portion of the well screen. Two PDBs were moved during the inspection; the PDB in MW-169 was moved down 1 foot and the PDB in MW-77 was lowered 6.8 feet. PDB sample depths are shown on Table 3-5.

Groundwater samples were collected from 31 of 33 monitoring wells on 17 to 22 October 2008 using bladder pumps and low-flow purging methods. MW-233 was dry at the time of sampling and MW-175 could not be sampled due to damage from TSVE heaters. The final stabilization measurements for the October 2008 are shown in Table 3-6. The following samples were collected without meeting the stabilization criteria:

- Sample collected from MW-235 had a turbidity reading of 21 NTUs following purging for two hours.

3.2.2 Recovery Wells

Groundwater samples were collected from recovery wells for comparison to monitoring well sample results and for evaluation of system effectiveness in reducing contaminant mass. Samples from recovery wells were collected on 10 April and 14 October 2008 and analyzed for VOCs by EPA Method 8260B.

Prior to sampling, the operating recovery well pumps were shut down to prevent the pumps from cycling. During sampling, each pump was restarted, allowed to run for a few minutes prior to sample collection and shut down after sampling. Samples were collected from the sample port on the recovery well heads. The valve was slowly opened and the extracted groundwater was allowed to slowly fill 40-ml vials preserved with hydrochloric acid. After sampling was completed, all recovery well pumps were re-started. The groundwater samples were sent to Microbac Laboratories for VOC analysis by EPA Method SW8260B.

3.3 EFFLUENT SAMPLING

Effluent samples were collected to comply with the discharge permit requirements and to estimate contaminant mass removal. Effluent samples were collected quarterly by field personnel on 9 January, 16 April, 7 July and 17 October 2008. A sample was also collected on 21 January prior to shutdown of the recovery wells on 23 January 2009. The effluent samples were collected from the groundwater extraction system at the discharge loop located adjacent to Person Avenue at the north property line of DDMT. The valve on the sample port was slowly opened and the system discharge allowed to slowly fill the required sample containers. All samples were submitted Microbac Laboratories for VOC analysis by EPA method SW8260B. The April and October effluent samples were also analyzed for SVOCs by EPA Method SW8270C; metals by EPA Method SW6010B; and pH by EPA Method 150.1.

3.4 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Field and laboratory quality control (QC) samples were collected during each sampling event. QC samples consisted of duplicates, and matrix spikes and matrix spike duplicates (MS/MSD). Trip blanks were included in coolers delivered from the laboratory. One duplicate was collected for approximately every 10 samples (10%) and 1 MS/MSD was collected for every 20 samples (5%). Laboratory QA/QC samples included surrogate spikes, method blanks, laboratory control samples, in addition to MS/MSD analysis. The sampling and analytical methods are described in the RA SAP (MACTEC, 2005).

Documentation was completed in the field to ensure that the samples collected, labels, chain-of-custody, and request for analysis were in agreement. Custody seals were placed on each cooler before shipment by common carrier. Samples were typically shipped the day collected for overnight delivery to the laboratory.

4.0 SUMMARY OF MONITORING RESULTS

Water level measurements and the groundwater and effluent sample analyses are discussed below.

4.1 WATER LEVEL MEASUREMENTS

Water level measurements collected on 10 April and 14 October 2008 are shown with resulting groundwater elevations on Table 3-2. Groundwater elevations in the fluvial aquifer are highest northeast of Dunn Field (MW-65: 258.1 ft msl in April and 250.67 msl in October 2008) and generally decrease to the southwest (MW-19: 203.6 ft msl in April and 203.3 ft msl in October 2008). The spatial variation in water levels in the fluvial aquifer monitoring wells is primarily due to the elevation of the underlying clay of the Jackson Formation/Upper Claiborne Group.

The groundwater elevations in the intermediate aquifer in April ranged from approximately 162.5 feet msl in MW-234 to 189.4 feet msl in MW-89, while in October the same wells had groundwater elevations of 155.63 feet msl and 187.9 feet msl, respectively. Groundwater elevation in MW-67, which is screened in the Memphis Sand, was 165.3 feet msl in April and 155.0 feet in October.

Groundwater levels in the fluvial aquifer wells were approximately one to three feet higher in October 2008 compared to measurements in April 2008. However, water levels are generally lower than levels recorded during the two events in 2007, apparently due to below average precipitation during 2007 and early 2008. Larger differences in 2008 water levels, as compared to levels in 200,7 were observed at fluvial screened wells located northeast (offsite) of Dunn Field. The presence of groundwater divide to the northeast of Dunn Field would cause a greater response to the weather conditions in this area. Water levels in wells screened in the intermediate and Memphis aquifers were lower in October 2008 than in April 2008, but generally higher than water levels recorded in 2007.

Groundwater elevation contour maps for the April and October 2008 water level measurements are shown on Figures 4-1 and 4-2, respectively. Groundwater flow is generally to the west in the area of the Groundwater IRA system. The maps show a trough in groundwater elevations approximately 1,000 feet west of Dunn Field, with flow apparently diverging to the north and south. The contour maps also show the effect of the April shut down of the northern RWs on Dunn Field.

4.2 ANALYTICAL RESULTS

Complete analytical results for groundwater samples from monitoring wells and recovery wells and for effluent samples collected during 2008 are presented in Appendix C. Positive results summaries for groundwater samples, including analytical results for all constituents detected above the reporting limit in one or more samples, are shown on Tables 4-1 (April 2008) and 4-2 (October 2008) for monitoring wells and on Tables 4-3 (April 2008) and 4-4 (October 2008) for recovery wells. Analytical results for IRA system effluent samples, with the applicable permit limits, are shown on Table 4-5.

4.2.1 Data Quality Evaluation

e[2]M performed a data quality evaluation (DQE) of the laboratory data packages for the samples collected in 2008 to qualify the data relative to the data quality objectives (DQOs) described in the RA SAP. Data qualifiers are shown on the analytical results tables. Any result reported below the reporting limit (RL) but above the method detection limit (MDL) was flagged "J" and considered an estimated result (unless overridden by other QC flags). A summary of the DQE for each event is provided in Appendix D.

4.2.1.1 April 2008 Monitoring Wells

A total of 99 groundwater samples were collected from 82 monitoring wells in April 2008 and analyzed for VOCs by EPA Method 8260. The data are usable with the following qualifications (refer to Tables 4-1 and C-1):

- All samples were analyzed initially within holding time. However, a number of samples were analyzed at a dilution out of holding time due to high concentrations. The affected analytes were qualified estimated J since the data could be biased slightly low due to compound degradation. As samples are kept in a volatile-specific cooler, it is not expected that there would be any significant impact.

- Contamination was observed in some method blanks. Whenever methylene chloride or acetone is detected in associated samples at a level less than 10x the method blank (corrected for dilution), the result is qualified as UB. Such results are usable as nondetects. The "B"- qualified data were reported at levels below the reporting limit and, therefore, should not adversely impact data quality.

- Surrogates were recovered high in two samples. In one sample (MW-158A-81.5-IS-4) detected results for 1,2,2-trichloroethane, CF, PCE, TCE, cDCE, tDCE were qualified J for possible high bias, however, this is right at the edge of the upper acceptable limit. In the other, no detections were observed so no qualifiers were warranted.

- Based on MS/MSD performance in the VOC analyses, low recoveries, both non-detects and detects in the parent sample are qualified as estimated J. For high recoveries, only detected results in the parent sample are so qualified, This includes DCE, CT, isopropylbenze, and TCE in sample MW-164-72.6-IS-4 (SDG L08040444).

- There was one target, carbon disulfide, out low in the LCS associated with the samples in SDG L08040517. These 8 samples (MW-43-165.5-IS-4, MW-44-69-IS-4, MW-67-267.5-IS-4, MW-130-69.5-IS-4, MW-156-62.0-IS-4, MW-161-80.0-IS-4, MW-165-89.9-IS-4, and MW-165-100.4-IS-4) were qualified as estimated J for this analyte.

4.2.1.2 October 2008 Monitoring Wells

A total of 81 groundwater samples were collected from 81 monitoring wells in October 2008 and analyzed for VOCs by EPA Method 8260. The data are usable with the following qualifications (refer to Tables 4-2 and C-2):

- Several analytes (bromomethane, chloromethane, methylene chloride) were observed in some method blanks and trip blanks. Whenever methylene chloride or acetone is detected in associated samples at a level less than 10x the method blank (corrected for dilution), the result is qualified as UB. Such results are usable as nondetects. The "B"- qualified data were reported at levels below the reporting limit or were not targets of interest and, therefore, should not adversely impact data quality.

- The possibility of some bias associated with calibration drift with respect to 1,2-dichloroethane (1,2-DCA) was indicated in one sample (MW-159-81.85-IS-5), and where the discrepancy in % D was observed, the associated sample detect was qualified estimated J.

- The surrogate 1,2-Dichloroethane-d4 was recovered high in one sample, MW-160-84.5-IS-5 (SDG L08100600). Detected results for 1,1.1,2-TECA, 1,1,2-TCA, carbon tetrachloride, chloroform, PCE, cis-DCE, and tDCE were qualified estimated J for possible high bias.

- For MS/MSD analyses, a number of targets are out of limits, but in some instances the parent sample is > 4x the spike level. In such cases, no qualifier is added because the spike is of the order of the normal variability of measurement and recovery calculations are not meaningful. In other cases the recoveries are elevated but there are no detections in the parent sample, hence no qualifiers. Where data could be biased low proportional to the spike recovery, targets are qualified estimated J. This includes cis-DCE in sample MW-158A-88.25-IS-5 and 1,1,2,2-TeCA in sample MW-156-67.75-IS-5 (SDG L08100600).

- Two targets were out high in LCS analyses for one sample, MW-15-IS-5 (SDG L08100573) 1,1,2-TCA and 1,2-DCA detects were qualified J in this sample. These indicate potential high lab bias.

4.2.1.3 April 2008 Recovery Wells

Groundwater samples were collected from all 11 recovery wells in April 2008 and analyzed for VOCs by EPA Method 8260. No qualifications are necessary for the April 2008 recovery well samples (refer to Tables 4-3 and C-3).

4.2.1.4 October 2008 Recovery Wells

Groundwater samples were collected from all 11 recovery wells in October 2008. Samples were analyzed for VOCs by EPA Method 8260. The October 2008 data are usable with the following qualifications samples (refer to Tables 4-4 and C-4):

- Based on MS/MSD performance in the VOC analyses, low recoveries, both non-detects and detects in the parent sample are qualified as estimated J. 1,1,2,2-tetrachloroethane was qualified J in one sample (RW-4-IS-5) (SDG L08100573).

4.2.1.5 Effluent Samples

Effluent samples were collected from the main discharge on 9 January, 16 April, 7 July, and 17 October 2008 and on 21 January 2009. All samples were analyzed for VOCs (EPA Method 8260). The April and October 2008 samples were also analyzed for total metals (EPA Method SW6010B), SVOCs (EPA Method 8270B) and pH (EPA Method E150.1). The data are usable with the following qualifications:

- No qualifications were warranted for the January 2008, July 2008 and January 2009 effluent samples.
- For the April 2008 effluent sample SVOC analyses:
  - bis(2-chloroethyoxy) methane was qualified as estimated J in the parent sample for low recovery, based on MS/MSD performance
  - Two analytes, 2-chloronaphthalene, and bis(2-chloroethoxy)methane, were out low in the LCS and were qualified as estimated J.
- For the October 2008 effluent sample, based on MS/MSD performance in the VOC analyses, low recoveries, both non-detects and detects in the parent sample are qualified as estimated J. 1,1,2,2-TeCA was qualified J in the effluent sample (SDG L08100573).

4.2.2 Groundwater

The review of groundwater analytical results focused on concentrations detected above the reporting limit for the nine CVOCs detected persistently at Dunn Field: CT, CF, DCE, tDCE, cDCE, TECA, PCE, TCA, and TCE. Vinyl chloride (VC), a significant CVOC degradation product, was also considered. The analytical results were compared to the maximum contaminant levels (MCLs) and groundwater target concentrations (TCs) from Table 2-21G of the *Dunn Field Record of Decision* (CH2M HILL, 2004). Historical results for these CVOCs in all the wells in the current sampling program are included in Appendix E. Total CVOC concentrations for the wells sampled in April and October 2008 are shown on Figures 4-3 and 4-4, respectively.

4.2.2.1 Monitoring Wells

A total of 99 groundwater samples were collected from 82 monitoring wells in April 2008 and analyzed for VOCs only. Table 4-1 lists the analytical results for all constituents detected above the RL in one or more samples. A total of 19 VOCs were detected above RLs in the April 2008 samples. A summary of analytical results for the primary CVOCs is provided on Tables 4-6.

Analytical results for the April 2008 samples from monitoring wells that had PDBs above the water level were compared to previous results and to the current results for the lower PDB, where present. The results for MW-150 (upper) and MW-144 are not considered valid based on differences with previous results. The results for the upper PDBs in other wells with dual PDBs (MW-148, MW-155 and MW-158) are consistent with trends from past results and the lower PDB, and are considered valid. The results in MW-169 are generally nondetect as in previous results. The results in the other wells with single PDBs (MW-147, MW-160, MW-161 and MW-163) were generally consistent with trends from past results but were sufficiently different to be considered questionable. As discussed above, water levels will be checked prior to future sample events.

A total of 81 groundwater samples were collected from 81 monitoring wells in October 2008 and analyzed for VOCs only. Table 4-2 lists the analytical results for all constituents detected above the RL in one or more samples. A total of 21 VOCs were detected above RLs in the October 2008 samples. A summary of analytical results for the primary CVOCs is provided on Table 4-7.

4.2.2.2 Recovery Wells

Groundwater samples were collected from all 11 recovery wells in April and October 2008. Tables 4-3 (April 2008) and 4-4 (October 2008) lists the analytical results for all constituents detected above the RL in one or more samples. A summary of analytical results for the primary CVOCs is provided on Tables 4-7 (April 2008) and 4-8 (October 2008).

4.2.3 Effluent

Effluent samples were collected from the main discharge on 9 January, 16 April, 7 July, and 17 October 2008 and on 21 January 2009. All samples were analyzed for VOCs; the April and October samples were also analyzed for total metals, SVOCs and pH. Table 4-5 lists the analytical results for all permitted constituents and others analytes detected above reporting limits and the permit discharge limits. All results were below permitted discharge limits.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 SYSTEM OPERATIONS

The IRA system operated as intended during 2008 with an average operational run time for all recovery wells of 98.3 percent. System repairs are summarized in Table 5-1.

The average system extraction/effluent discharge rate ranged from 57.7 gallons per minute (gpm) in February to 10.8 gpm in June. The decrease was due to the shutdown of the northern RWs in early June 2008. The total discharge from the IRA system in 2008 was approximately 18.96 million gallons, based on weekly recorded flow rates from individual wells. Approved one-time discharges from well installation/development and sampling activities, and from thermal SVE and fluvial SVE system condensate at DDMT totaled 894,831 additional gallons.

All effluent results were below the one-day maximum discharge level. Approximately 3.6 pounds of TCE and 12.7 pounds of total VOCs were removed from the fluvial aquifer during the reporting period, as calculated from effluent concentrations and system flow rates. This compares with 39.7 pounds of TCE and 87.4 pounds of total VOCs calculated as removed during 2007. The decrease in mass removal from the system between 2007 and 2008 is due to a decrease in both VOC concentrations and total system flow rates. Mass removal rates are based on quarterly effluent samples and flowrates as reported in the Monthly Operations Reports (Appendix B).

Figure 5-1 shows the TCE and total VOC concentrations measured at the effluent metering station since 1998. Reduction in the effluent CVOC concentrations coincided with the start up of the fluvial SVE system. CVOC concentrations remained low through samples collected in October 2008. The total CVOC concentration in the October 2008 sample is 15% of that reported in July 2007, prior to the start-up of the fluvial SVE system. Further declines were seen in the January 2009 quarterly samples. The higher CVOC concentrations in the July 2008 quarterly sample may have been due to higher contaminant flux from the loess to groundwater during TSVE operations (May through November 2008).

5.2 SYSTEM MONITORING

The completed TSVE and ongoing FSVE systems have resulted in a significant reduction in CVOC concentrations in groundwater, as seen in total CVOC plume maps for April 2007, October 2007, April 2008, and October 2008 shown in Figure 5-2. Time trend plots for individual recovery wells, monitoring wells on Dunn Field, and selected off-site monitoring wells are provided in Appendix F. The plots include

CVOCs detected above MCLs or TCs in current or previous samples. Where multiple sample results were available for a sampling event (i.e., for wells with multiple PDB samples), the higher result was plotted.

5.2.1 Recovery Wells

Time trend plots for recovery wells are included in Appendix F-1. CVOC concentrations in RW samples collected in 2008 continued to decrease or remained at low levels in all recovery wells, except RW-9. RW-9 is upgradient of most identified source areas of Dunn Field and the groundwater concentrations are representative of the plume migrating from off-site source(s) northeast of Dunn Field. Decreases in CVOC concentrations were observed in most of the recovery wells in the southern half of Dunn Field (RW-1, RW-1A, RW-1B, RW-2, and RW-3). At RW-4, TCE decreased from 55.4 μg/L in April to 28.8 μg/L, but TeCA increased from 19.4 μg/L in April to 52.5 μg/L. October 2008 CVOC concentration for individual constituents are below 50 μg/L in all recovery wells except chloroform (70.8 μg/L) in RW-2 and TeCA in RW-4.

e^2M recommended the shutdown of the northern RWs (RW-5 through RW-9) following the April 2008 sampling event (e^2M, 2008b); the wells were taken offline on 9 June 2008. Following the October 2008 event, the remaining five RWs (RW-1, RW-1A, RW-1B, RW-2, RW-3, and RW-4) were recommended for shut down (e^2M, 2008c); these wells were taken offline on 23 January 2009.

5.2.2 On-Site Monitoring Wells

Time trend plots for onsite monitoring wells are included in Appendix F-2. CVOC concentrations have remained at low levels in most on-site wells following large declines following the start of the Fluvial SVE system.

Four monitoring wells (MW-03, MW-07, MW-220 and MW-230) show the influence of the plume migrating on to Dunn Field from the northeast. No decrease in CVOC concentrations has been observed in MW-07 and MW-230; both wells are upgradient of the identified Source Areas in Dunn Field. Slight increases in CVOC concentrations have occurred in MW-03 and MW-220, located along the northern boundary of Dunn Field, following initial large decreases after start-up of the Fluvial SVE system.

An increase in CVOC concentrations was also observed. Chloroform and TCE concentrations increased slightly in the October 2008 sample from MW-227, located in loess treatment area 4; concentrations remain approximately an order of magnitude below concentrations in November 2007. The increase is probably due to higher contaminant flux from the loess during thermal SVE operations that was not captured by the Fluvial SVE system.

October 2008 CVOC concentration for individual constituents were below 50 µg/l in all monitoring wells on Dunn Field except PCE (63.9 µg/l) in MW-07; chloroform (134 µg/l) and TCE (61.8 µg/l) in MW-227; and PCE (100 µg/l) and TCE (98.4 µg/l) in MW-230. As noted above, CVOC concentrations in MW-07 and MW-230 are representative of the off-site northeast plume rather than source areas on Dunn Field.

5.2.3 Off-Site Monitoring Wells

Time trend plots for selected off-site monitoring wells are included in Appendix F-3. The concentrations vary considerable. However, the total CVOC concentrations in MW-70 near the center of the plume immediately west of Dunn Field decreased from 359 µg/l in April 2008 to 3.7 µg/l in the October 2008 sample.

5.2.4 Intermediate Aquifer Wells

IRA semiannual monitoring includes ten wells installed in the intermediate aquifer: one well on Dunn Field (MW-238) and nine wells west of Dunn Field (MW-37, MW-40, MW-43, MW-231, MW-232, MW-234, MW-237, MW-239, and MW-240). Several of these wells were installed as part of the 2007 Intermediate Aquifer Investigation (IAI) and were added to the IRA Monitoring program in 2008. Primary CVOCs were detected above RLs in three wells (MW-232, MW-237, and MW-240) in October 2008. The highest concentrations were reported in MW-232: cDCE at 22.4 µg/l (April 2008) and vinyl chloride at 13.2 µg/l (October 2008).

5.3 RECOMMENDATIONS

All of the IRA recovery wells have been shut down and mothballing or abandonment of the groundwater recovery system (GWRS) will be considered based on sample results from the April 2009 sampling event. The Off Depot Remedial Action Work Plan (RAWP) (e²M, 2009) was approved by EPA on 18 March 2009 and remedial action construction is planned to begin in April 2009. The RAWP includes performance monitoring in the area of the air sparging-soil vapor extraction (AS-SVE) system and long term monitoring over a broad area around Dunn Field. There is substantial overlap between wells in the three sampling programs (IRA, Off Depot performance monitoring and Off Depot LTM); all of the existing Off Depot performance monitoring wells are included in the IRA program, but 18 LTM wells are not included. The 18 LTM wells are: MW-4, MW-5, MW-13, MW-14, MW-51, MW-56, MW-65, MW-

75, MW-78, MW-87, MW-91, MW-128, MW-176, MW-182, MW-184, MW-185, MW-186 and MW-190.

c²M recommends that the 18 Off Depot LTM wells be included in the IRA sampling event and that sampling of 17 IRA wells west of the railroad tracks be delayed until the Off Depot baseline monitoring event in June and one IRA well be omitted from further sampling. Sample results from wells east of the railroad tracks will be useful in evaluating the IRA GWRS, but wells west of the railroad tracks are too far downgradient to be useful for that review.

The 18 IRA wells to be omitted from the April monitoring event are: MW-40, MW-54, MW-79, MW-148, MW-149, MW-150, MW-151, MW-152, MW-155, MW-158, MW-158A, MW-159, MW-160, MW-165, MW-165A, MW-166, MW-166A and MW-232. Well MW-40 is adjacent and screened at a similar depth to MW-169, which will be sampled during the April event. In addition, MW-40 will be abandoned as part of the Off Depot RA. The remaining wells will be sampled during the baseline event.

The well locations with proposed changes are shown on Figure 5-3.

6.0 REFERENCES

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TABLES

TABLE 3-1
WELL ACTIVITY SUMMARY
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Well	Aquifer Screened	April 2008		October 2008	
		Water Level Measurement	Groundwater Samples	Water Level Measurement	Groundwater Samples
MW-03	Fluvial	X	LF	X	LF
MW-04	Fluvial	X		X	
MW-05	Fluvial	X		Dry	
MW-06	Fluvial	X	LF	X	LF
MW-07	Fluvial	X	S	X	S
MW-08	Fluvial	X		X	
MW-10	Fluvial	X	NS	X	LF
MW-12	Fluvial	X		X	
MW-13	Fluvial	X		X	
MW-14	Fluvial	X		X	
MW-15	Fluvial	X	LF	X	LF
MW-19	Fluvial	X		X	
MW-28	Fluvial	X		X	
MW-29	Fluvial	X		X	
MW-30	Fluvial	X		X	
MW-31	Fluvial	X	M	X	S
MW-32	Fluvial	X	S	X	S
MW-33	Fluvial	X	S	X	S
MW-34	Intermediate	X		X	
MW-35	Fluvial	X		X	
MW-37	Intermediate	X	S	X	S
MW-38	Intermediate	X		X	
MW-40	Intermediate	X	S	X	S
MW-42	Fluvial	X		X	
MW-43	Intermediate	X	S	X	S
MW-44	Fluvial	X	S	X	S
MW-45	Fluvial	X		X	
MW-51	Fluvial	X		NM	
MW-53	Fluvial	X		X	
MW-54	Fluvial	X	S	X	S
MW-55	Fluvial	X		X	
MW-56	Fluvial	X		X	
MW-57	Fluvial	X	S	X	S
MW-58	Fluvial	X		X	
MW-59	Fluvial	X		X	
MW-60	Fluvial	X		X	
MW-61	Fluvial	X		X	
MW-62	Fluvial	X		X	
MW-65	Fluvial	X		X	
MW-67	Memphis	X	S	X	S
MW-68	Fluvial	X	S	X	S
MW-69	Fluvial	X	S	X	S
MW-70	Fluvial	X	M	X	S
MW-71	Fluvial	X	S	X	S
MW-74	Fluvial	X	LF	X	LF
MW-75	Fluvial	X		X	
MW-76	Fluvial	X	S	X	S
MW-77	Fluvial	X	S	X	S
MW-78	Fluvial	X		X	
MW-79	Fluvial	X	S	X	S
MW-80	Fluvial	X		X	
MW-87	Fluvial	X		X	
MW-89	Intermediate	X		X	
MW-90	Intermediate	X		X	
MW-91	Fluvial	X		X	

TABLE 3-1
WELL ACTIVITY SUMMARY
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Well	Aquifer Screened	April 2008		October 2008	
		Water Level Measurement	Groundwater Samples	Water Level Measurement	Groundwater Samples
MW-95	Fluvial	X		X	
MW-126	Fluvial	X		X	
MW-127	Fluvial	X		X	
MW-128	Fluvial	X		X	
MW-129	Fluvial	X		X	
MW-130	Fluvial	X	S	X	S
MW-132	Fluvial	X	LF	X	LF
MW-134	Fluvial	NM	LF	X	LF
MW-144	Fluvial	Dry	S	Dry	NS
MW-145	Fluvial	X	S	X	S
MW-147	Fluvial	X	S	X	S
MW-148	Fluvial	X	M	X	S
MW-149	Fluvial	X	M	X	S
MW-150	Fluvial	X	M	X	S
MW-151	Fluvial	X	M	X	S
MW-152	Fluvial	X	M	X	S
MW-153	Fluvial	X	S	X	S
MW-154	Fluvial	X	S	X	S
MW-155	Fluvial	X	M	X	S
MW-156	Fluvial	X	S	X	S
MW-157	Fluvial	X	S	X	S
MW-158	Fluvial	X	M	X	S
MW-158A	Fluvial	X	M	X	S
MW-159	Fluvial	X	M	X	S
MW-160	Fluvial	X	S	X	S
MW-161	Fluvial	X	S	X	S
MW-162	Fluvial	X	S	X	S
MW-163	Fluvial	X	S	X	S
MW-164	Fluvial	X	S	X	S
MW-165	Fluvial	X	M	X	S
MW-165A	Fluvial	X	M	X	S
MW-166	Fluvial	X	M	X	S
MW-166A	Fluvial	X	S	X	S
MW-167	Fluvial	X	S	X	S
MW-168	Fluvial	X	S	X	S
MW-168A	Fluvial	X	M	X	S
MW-169	Fluvial/Intermediate	X	S	X	S
MW-170	Fluvial	X	M	X	S
MW-171	Fluvial	X	S	X	S
MW-172	Fluvial	X	LF	X	LF
MW-174	Fluvial	X	LF	X	LF
MW-175	Fluvial	X	LF	X	NS
MW-176	Fluvial	X		NM	
MW-178	Fluvial	X	LF	X	LF
MW-179	Fluvial	X	LF	X	LF
MW-180	Fluvial	X	LF	X	LF
MW-182	Fluvial	X		X	
MW-183	Fluvial/Intermediate	X		X	
MW-184	Fluvial	X		X	
MW-185	Fluvial	X		X	
MW-186	Fluvial	X		X	
MW-187	Fluvial	X	LF	X	LF
MW-193	Fluvial	X		X	
MW-194	Fluvial	X		X	
MW-220	Fluvial	X	LF	X	LF

TABLE 3-1
WELL ACTIVITY SUMMARY
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Well	Aquifer Screened	April 2008		October 2008	
		Water Level Measurement	Groundwater Samples	Water Level Measurement	Groundwater Samples
MW-221	Fluvial	X	LF	X	LF
MW-222	Fluvial	X	LF	X	LF
MW-223	Fluvial	X	LF	X	LF
MW-224	Fluvial	X	LF	X	LF
MW-225	Fluvial	X	LF	X	LF
MW-226	Fluvial	X	LF	X	LF
MW-227	Fluvial	X	LF	X	LF
MW-228	Fluvial	X	LF	X	LF
MW-230	Fluvial	X	LF	X	LF
MW-231	Intermediate	X	LF	X	LF
MW-232	Intermediate	X	M	X	S
MW-233	Fluvial	Dry	NS	Dry	NS
MW-234	Intermediate	X	LF	X	LF
MW-235	Fluvial	X	LF	X	LF
MW-236	Fluvial	X	LF	X	LF
MW-237	Intermediate	X	LF	X	LF
MW-238	Intermediate	X	LF	X	LF
MW-239	Intermediate	X	LF	X	LF
MW-240	Intermediate	X	LF	X	LF
PZ-02	Fluvial	X		X	
RW-01	Fluvial	NM	G	X	G
RW-01A	Fluvial	NM	G	X	G
RW-01B	Fluvial	NM	G	X	G
RW-02	Fluvial	X	G	X	G
RW-03	Fluvial	X	G	X	G
RW-04	Fluvial	X	G	X	G
RW-05	Fluvial	X	G	X	G
RW-06	Fluvial	X	G	X	G
RW-07	Fluvial	X	G	X	G
RW-08	Fluvial	X	G	X	G
RW-09	Fluvial	X	G	X	G
MW-1 TDEC	Fluvial	X		X	
MW-2 TDEC	Fluvial	X		X	
MW-3 TDEC	Fluvial	X		X	
MW-4 TDEC	Fluvial	NM		X	

Notes:

X	Water level measured.
G	Grab sample collected from recovery well.
LF	Sample collected using low-flow purging methods.
M	Multiple samples; Permeable Diffusion Bag (PDB) samplers at top and bottom of saturated screened interval (two samples per well).
NM	Water level measurement planned but not made.
NS	Sample planned but not collected.
S	Single sample; one PDB sampler at mid-point of saturated screened intervals.

TABLE 3-2
WATER LEVEL MEASURMENTS
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
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Well ID	Aquifer	Top of Casing Elevation (ft, msl)	Top of Screen Elevation (ft, msl)	Depth to Water 10-Apr-2008 (ft, btoc)	Groundwater Elevation 10-Apr-2008 (ft, msl)	Depth to Water 14-Oct-2008 (ft, btoc)	Groundwater Elevation 14-Oct-2008 (ft, msl)
MW-03	Fluvial	292.35	226.85	72.10	220.25	67.19	225.16
MW-04	Fluvial	301.61	241.61	78.00	223.61	75.10	226.51
MW-05	Fluvial	304.64	244.64	79.04	225.60	Dry	--
MW-06	Fluvial	289.11	238.11	65.70	223.41	65.00	224.11
MW-07	Fluvial	295.10	228.10	69.75	225.35	66.81	228.29
MW-08	Fluvial	292.59	236.09	65.09	227.50	62.70	229.89
MW-10	Fluvial	288.79	230.19	66.45	222.34	62.25	226.54
MW-12	Fluvial	301.30	231.90	78.85	222.45	76.32	224.98
MW-13	Fluvial	300.01	234.01	75.87	224.14	73.75	226.26
MW-14	Fluvial	302.22	237.22	75.55	226.67	75.12	227.10
MW-15	Fluvial	295.12	231.72	70.92	224.20	70.21	224.91
MW-19	Fluvial	290.57	207.47	87.00	203.57	87.28	203.29
MW-28	Fluvial	294.79	240.49	58.48	236.31	56.59	238.20
MW-29	Fluvial	273.22	239.02	41.33	231.89	39.59	233.63
MW-30	Fluvial	275.14	236.14	49.44	225.70	47.33	227.81
MW-31	Fluvial	290.37	226.27	73.31	217.06	70.46	219.91
MW-32	Fluvial	285.38	232.68	64.48	220.90	63.65	221.73
MW-33	Fluvial	280.71	236.11	57.29	223.42	56.73	223.98
MW-34	Intermediate	299.97	163.37	132.15	167.82	137.95	162.02
MW-35	Fluvial	300.46	230.86	79.43	221.03	76.98	223.48
MW-37	Intermediate	284.91	119.21	120.53	164.38	129.87	155.04
MW-38	Intermediate	307.45	167.55	130.00	177.45	132.40	175.05
MW-40	Intermediate	262.23	177.23	82.02	180.21	85.10	177.13
MW-42	Fluvial	274.83	225.83	57.19	217.64	56.62	218.21
MW-43	Intermediate	284.99	123.49	119.85	165.14	127.64	157.35
MW-44	Fluvial	269.07	205.07	57.25	211.82	56.74	212.33
MW-45	Fluvial	293.22	235.22	56.35	236.87	55.80	237.42
MW-51 (1)	Fluvial	275.23	220.23	43.25	231.98	--	--
MW-53	Fluvial	306.38	233.88	73.92	232.46	73.54	232.84
MW-54	Fluvial	295.35	210.85	83.15	212.20	82.33	213.02
MW-55	Fluvial	292.08	228.08	70.55	221.53	70.69	221.39
MW-56	Fluvial	293.60	234.60	68.30	225.30	67.79	225.81
MW-57	Fluvial	290.77	230.77	65.15	225.62	64.55	226.22
MW-58	Fluvial	290.51	233.51	64.50	226.01	63.95	226.56
MW-59	Fluvial	300.13	227.63	77.38	222.75	74.16	225.97
MW-60	Fluvial	296.86	224.36	74.00	222.86	70.59	226.27
MW-61	Fluvial	294.04	225.54	69.70	224.34	67.13	226.91
MW-62	Fluvial	293.65	207.65	93.93	199.72	94.43	199.22
MW-65	Fluvial	263.22	222.42	5.10	258.12	12.55	250.67
MW-67	Memphis	278.21	18.21	112.90	165.31	123.24	154.97
MW-68	Fluvial	291.69	219.19	70.95	220.74	67.09	224.60
MW-69	Fluvial	307.02	224.94	85.71	221.31	82.55	224.47
MW-70	Fluvial	304.99	224.18	83.04	221.95	80.78	224.21

TABLE 3-2
WATER LEVEL MEASURMENTS
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DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

				Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation
		Top of Casing Elevation	Top of Screen Elevation	10-Apr-2008		14-Oct-2008	
Well ID	Aquifer	(ft, msl)	(ft, msl)	(ft, btoc)	(ft, msl)	(ft, btoc)	(ft, msl)
MW-71	Fluvial	294.40	228.90	71.57	222.83	70.97	223.43
MW-74	Fluvial	303.68	233.68	81.36	222.32	79.22	224.46
MW-75	Fluvial	303.61	232.61	81.51	222.10	78.93	224.68
MW-76	Fluvial	302.71	229.71	87.00	215.71	84.88	217.83
MW-77	Fluvial	304.42	236.42	83.81	220.61	81.66	222.76
MW-78	Fluvial	275.00	230.50	50.55	224.45	48.38	226.62
MW-79	Fluvial	285.03	202.53	73.57	211.46	72.84	212.19
MW-80	Fluvial	273.81	220.81	62.18	211.63	61.48	212.33
MW-87	Fluvial	294.93	231.93	72.12	222.81	71.37	223.56
MW-89	Intermediate	303.98	156.98	114.59	189.39	116.13	187.85
MW-90	Intermediate	304.19	189.19	115.00	189.19	116.38	187.81
MW-91	Fluvial	291.99	236.99	68.65	223.34	68.02	223 97
MW-95	Fluvial	259.23	219.43	29.15	230.08	28.40	230.83
MW-126	Fluvial	252.22	236.22	13.50	238.72	19.50	232.72
MW-127	Fluvial	268.71	208.71	60.20	208.51	59.90	208.81
MW-128	Fluvial	284.14	229.39	42.53	241.61	42.85	241.29
MW-129	Fluvial	293.01	228.01	58.50	234.51	57.11	235.90
MW-130	Fluvial	293.20	233.70	57.82	235.38	56.35	236.85
MW-132	Fluvial	300.73	227.23	78.25	222.48	76.17	224.56
MW-134[(2)]	Fluvial	300.81	225.81	--	--	75.90	224.91
MW-144	Fluvial	291.60	235.10	Dry	--	75.43	216.17
MW-145	Fluvial	284.72	204.72	72.74	211.98	71.10	213.62
MW-147	Fluvial	289.72	229.72	74.12	215.60	71.66	218.06
MW-148	Fluvial	294.71	224.71	81.31	213.40	79.99	214.72
MW-149	Fluvial	287.18	205.78	75.14	212.04	74.46	212.72
MW-150	Fluvial	296.81	225.61	84.32	212.49	83 44	213.37
MW-151	Fluvial	284.27	207.27	72.35	211.92	71.61	212.66
MW-152	Fluvial	289.59	198.59	77.83	211.76	77.13	212.46
MW-153	Fluvial	279.17	203.17	67.55	211.62	66.84	212.33
MW-154	Fluvial	273.81	220.81	58.41	215.40	58.68	215.13
MW-155	Fluvial	291.65	214.65	79.38	212.27	78.59	213.06
MW-156	Fluvial	269.15	213.71	58.60	210.55	58.08	211.07
MW-157	Fluvial	286.78	229.78	73.55	213.23	72.58	214.20
MW-158	Fluvial	294.07	203.06	82.24	211.83	81.54	212.53
MW-158A	Fluvial	293.95	216 03	82.14	211.81	81.43	212.52
MW-159	Fluvial	286.33	205.89	74.44	211.89	73.68	212.65
MW-160	Fluvial	294.00	228.13	81.45	212.55	80.55	213.45
MW-161	Fluvial	296.40	234.60	80.70	215.70	78 93	217.47
MW-162	Fluvial	299.70	233.39	84.34	215.36	82.57	217.13
MW-163	Fluvial	290.63	234.42	76.36	214.27	75.02	215.61
MW-164	Fluvial	287.48	231.86	72.07	215.41	70.89	216.59
MW-165	Fluvial	287.06	198.43	75.35	211.71	74.61	212.45
MW-165A	Fluvial	287.26	215.96	75.50	211.76	74.84	212.42

TABLE 3-2
WATER LEVEL MEASURMENTS
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Well ID	Aquifer	Top of Casing Elevation (ft, msl)	Top of Screen Elevation (ft, msl)	10-Apr-2008 Depth to Water (ft, btoc)	10-Apr-2008 Groundwater Elevation (ft, msl)	14-Oct-2008 Depth to Water (ft, btoc)	14-Oct-2008 Groundwater Elevation (ft, msl)
MW-166	Fluvial	283.44	199.59	71.53	211.91	70.85	212.59
MW-166A	Fluvial	283.45	215.15	71.54	211.91	70.86	212.59
MW-167	Fluvial	284.82	214.68	73.50	211.32	72.64	212.18
MW-168	Fluvial	283.95	177.75	72.23	211.72	71.51	212.44
MW-168A	Fluvial	283.20	204.42	71.50	211.70	70.78	212.42
MW-169	Intermediate	261.90	194.12	82.84	179.06	85.40	176.50
MW-170	Fluvial	273.75	214.14	60.70	213.05	59.91	213.84
MW-171	Fluvial	270.69	217.72	58.20	212.49	57.44	213.25
MW-172	Fluvial	300.28	232.28	74.43	225.85	73.85	226.43
MW-174	Fluvial	296.56	229.56	71.81	224.75	71.14	225.42
MW-175	Fluvial	291.63	224.13	74.31	217.32	66.46	225.17
MW-176[3]	Fluvial	299.68	223.68	76.48	223.20	--	--
MW-178	Fluvial	300.26	224.26	76.94	223.32	74.84	225.42
MW-179	Fluvial	301.16	224.16	78.32	222.84	75.95	225.21
MW-180	Fluvial	296.14	224.14	74.79	221.35	70.78	225.36
MW-182	Fluvial	275.40	213.40	63.70	211.70	64.18	211.22
MW-183	mediate	275.59	114.59	111.25	164.34	120.24	155.35
MW-184	Fluvial	283.12	225.12	67.39	215.73	66.71	216.41
MW-185	Fluvial	256.71	171.71	77.60	179.11	79.12	177.59
MW-186	Fluvial	256.31	108.31	81.05	175.26	86.67	169.64
MW-187	Fluvial	302.74	226.74	76.94	225.80	76.44	226.30
MW-193	Fluvial	293.28	222.28	78.63	214.65	77.12	216.16
MW-194	Fluvial	293.26	219.26	77.43	215.83	75.79	217.47
MW-220	Fluvial	293.29	228.35	71.59	221.70	67.44	225.85
MW-221	Fluvial	301.52	228.40	80.11	221.41	76.38	225.14
MW-222	Fluvial	303.82	229.64	79.83	223.99	77.85	225.97
MW-223	Fluvial	303.00	229.13	80.07	222.93	77.97	225.03
MW-224	Fluvial	304.13	230.42	80.95	223.18	78.79	225.34
MW-225	Fluvial	304.52	229.54	81.85	222.67	80.14	224.38
MW-226	Fluvial	303.19	228.97	79.96	223.23	77.91	225.28
MW-227	Fluvial	299.70	236.06	74.54	225.16	73.82	225.88
MW-228	Fluvial	301.65	237.56	76.17	225.48	75.50	226.15
MW-230	Fluvial	286.57	227.32	57.72	228.85	55.64	230.93
MW-231	Intermediate	289.18	121.43	124.70	164.48	132.91	156.27
MW-232	Intermediate	285.18	135.13	121.46	163.76	127.68	157.50
MW-233	Fluvial	289.53	231.88	Dry	-	Dry	-
MW-234	Intermediate	291.50	124.91	129.05	162.45	135.87	155.63
MW-235	Fluvial	264.00	213.41	56.88	207.12	56.51	207.49
MW-236	Fluvial	261.38	236.73	11.08	250.30	19.45	241.93
MW-237	Intermediate	289.18	122.73	124.80	164.38	132.41	156.77
MW-238	Intermediate	300.45	119.90	135.76	164.69	145.60	154.85
MW-239	Intermediate	288.44	122.97	124.58	163.86	135.57	152.87
MW-240	Intermediate	259.28	172.71	78.51	180.77	80.04	179.24

TABLE 3-2
WATER LEVEL MEASURMENTS
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

				Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation
		Top of Casing Elevation	Top of Screen Elevation	10-Apr-2008		14-Oct-2008	
Well ID	Aquifer	(ft, msl)	(ft, msl)	(ft, btoc)	(ft, msl)	(ft, btoc)	(ft, msl)
PZ-02	Fluvial	284.39	240.39	42.32	242.07	42.74	241.65
RW-01[4]	Fluvial	295.71	229.57	--	--	72.70	223.01
RW-01[4]	Fluvial	295.42	228.43	--	--	71.42	224.00
RW-01B[4]	Fluvial	289.17	227.48	--	--	59.55	229.62
RW-02	Fluvial	289.92	225.93	70.35	219.57	70.25	219.67
RW-03	Fluvial	299.34	231.40	77.16	222.18	77.60	221.74
RW-04	Fluvial	305.11	230.48	84.37	220.74	82.50	222.61
RW-05	Fluvial	307.13	226.09	88.29	218.84	82.60	224.53
RW-06	Fluvial	304.56	227.94	84.71	219.85	79.80	224.76
RW-07	Fluvial	297.44	228.33	78.47	218.97	72.60	224.84
RW-08	Fluvial	292.99	222.84	75.41	217.58	68.05	224.94
RW-09	Fluvial	290.67	225.98	72.02	218.65	64.22	226.45
MW-1-TDEC	Fluvial	275.83		28.58	247.25	30.79	245.04
MW-2-TDEC	Fluvial	272.13		26.69	245.44	28.25	243.88
MW-3-TDEC	Fluvial	265.28		9.02	256.26	15.19	250.09
TDEC[5]	Fluvial	263.81		--	--	15.96	247.85

Notes:

ft, msl feet mean sea level
ft, btoc feet below top of casing
-- Not Measured

(1) MW-51 was covered by debris and not accessible during October 2008 event.
(2) Well pad underwater during April 2008 event; water level not measured.
(3) Water level not measured during October 2008 monitoring event due to field oversight.
(4) Water level below top of pump motor during April 2008 event. Water level not measured.
(5) MW-4-TDEC was covered by debris and not accessible during April 2008 event.

TABLE 3-3
PDB SAMPLE INTERVALS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Monitoring Well	Date Collected	Measured Well Depth (ft bgs)	Depth to Water (feet btoc)	Sample Depth Interval - 1 (feet btoc)	Sample Depth Interval - 2 (feet btoc)
MW-07	4/14/2008	73.18	69.75	71.6	NI
MW-31	4/11/2008	83.28	73.31	74.3	79.7
MW-32	4/11/2008	68.08	64.48	66.6	NI
MW-33	4/14/2008	62.70	57.29	58.4	NI
MW-37	4/14/2008	184.68	120.53	175.9	NI
MW-40	4/11/2008	95.53	82.02	90.7	NI
MW-43	4/11/2008	171.71	119.85	168.0	NI
MW-44	4/11/2008	74.36	57.25	68 6	NI
MW-54	4/11/2008	97.18	83.15	89.5	NI
MW-57	4/14/2008	70.21	65.15	67.2	NI
MW-67	4/11/2008	>200	112.90	270.3	NI
MW-68	4/14/2008	81.56	70.95	77.5	NI
MW-69	4/14/2008	95.58	85.71	89.8	NI
MW-70	4/14/2008	93.73	83.04	87.6	92.1
MW-71	4/14/2008	78.10	71.57	73.5	NI
MW-76	4/14/2008	93.98	87.00	88.2	NI
MW-77	4/14/2008	89.18	83.81	84.9	NI
MW-79	4/11/2008	104.78	73.57	92.0	NI
MW-130	4/11/2008	81.02	57.82	69.5	NI
MW-144[(1)]	4/11/2008	76.28	Dry	75.3	NI
MW-145	4/14/2008	96.66	72.74	86.5	NI
MW-147	4/11/2008	77.91	74.12	73.7	NI
MW-148	4/11/2008	87 87	81.31	80.0	85.5
MW-149	4/11/2008	99.96	75.14	83.6	95.5
MW-150	4/11/2008	91.57	84.32	83.2	90.5
MW-151	4/14/2008	96.69	73.35	78.5	94.5
MW-152	4/11/2008	108.82	77.83	92.9	107.9
MW-153	4/14/2008	96.03	67.55	87.1	NI
MW-154	4/14/2008	66.84	58.14	60.7	NI
MW-155	4/11/2008	95.07	79.38	77.0	93.5
MW-156	4/11/2008	69.41	58.60	63.7	NI
MW-157	4/14/2008	77.11	73.55	74.8	NI
MW-158	4/11/2008	106.60	82.24	93.1	104.1
MW-158A	4/11/2008	93.28	82.14	81.5	91.4
MW-159	4/11/2008	99.31	74.44	81.1	91.1
MW-160	4/11/2008	85.77	81.45	80.8	NI
MW-161	4/11/2008	81.39	80.70	81.6	NI
MW-162	4/14/2008	86.69	84.34	85.3	NI
MW-163	4/14/2008	76.77	76.36	76.3	NI
MW-164	4/14/2008	75.28	72.07	72.6	NI
MW-165	4/11/2008	103.01	75.35	91.3	101.8
MW-165A	4/11/2008	86.40	75.50	76.5	84.7
MW-166	4/11/2008	100.05	71.53	87.3	97.8
MW-166A	4/11/2008	83.29	71.54	75.3	NI
MW-167	4/11/2008	82.68	73.50	75.8	NI
MW-168	4/11/2008	120.50	72.23	113.7	NI
MW-168A	4/11/2008	88.22	71.50	76.4	86.9
MW-169	4/11/2008	88.15	82.84	81.8	NI
MW-170	4/11/2008	79.78	60.70	61.9	78.1
MW-171	4/11/2008	68.32	58.20	60.8	NI
MW-232	4/11/2008	170.55	121.46	151.5	165.7

Notes:
NI Not installed
bgs Below ground surface
btoc Below top of casing
(1) Well dry; however sample collected from PDB.

TABLE 3-4
FINAL MONITORING WELL STABILIZATION MEASUREMENTS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Well ID	Sample Date	Method	Time	Sample Pump Depth (ft, btoc)	Water Depth (ft, btoc)	Purge Rate (ml/min)	Volume Purged (Liters)	pH	Temp (°C)	Specific Conductivity (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTUs)
MW-3	4/16/2008	low flow	9:00	73.2	71.9	220	5.3	6.4	16.7	0.529	3.2	226	2.9
MW-6	4/15/2008	low flow	10:45	68.8	65.8	280	4.6	5.8	17.3	0.900	4.9	231	6.9
MW-10	4/15/2008	Dry	-	-	-	-	-	-	-	-	-	-	-
MW-15	4/15/2008	low flow	12:00	77.0	71.0	240	8.1	6.0	17.5	0.727	6.9	231	12.1
MW-74	4/15/2008	low flow	14:35	85.0	81.4	240	17.4	5.9	18.3	0.445	2.3	247	18.4
MW-132	4/15/2008	low flow	16:15	84.0	78.3	265	14.6	6.1	18.2	0.414	3.1	81	4.8
MW-134	4/16/2008	low flow	12:10	84.0	78.2	200	13.1	6.1	18.2	0.392	3.6	217	14.3
MW-172	4/14/2008	low flow	14:50	76.1	74.6	120	12.8	6.0	16.8	0.181	7.3	168	34.1
MW-174	4/15/2008	low flow	8:55	75.0	71.9	110	6.0	6.0	18.1	0.216	5.3	141	17.5
MW-175	4/14/2008	low flow	16:10	76.0	67.6	100	4.0	6.0	15.8	0.197	7.4	169	4.0
MW-178	4/15/2008	low flow	9:30	83.0	77.2	260	11.4	6.0	16.4	0.302	5.9	214	15.4
MW-179	4/15/2008	low flow	11:58	82.0	78.5	280	14.1	5.4	17.5	0.252	20.7	118	20.0
MW-180	4/16/2008	low flow	10:30	78.6	74.8	220	8.9	6.3	17.9	0.459	3.8	207	0.8
MW-187	4/16/2008	low flow	8:28	83.6	77.3	290	11.6	5.8	18.1	0.178	12.4	164	18.4
MW-220	4/15/2008	low flow	15:40	77.6	71.8	80	3.5	6.4	19.2	0.422	1.6	70	6.5
MW-221	4/16/2008	low flow	9:45	85.0	80.2	140	4.7	5.9	17.3	0.249	8.4	164	4.7
MW-222	4/15/2008	low flow	13:55	80.7	80.9	200	13.9	6.7	18.3	0.251	0.9	-74	0.0
MW-223	4/15/2008	low flow	10:30	88.0	80.2	100	6.8	6.2	16.5	0.280	4.5	135	16.9
MW-224	4/16/2008	low flow	8:30	84.0	80.9	160	5.6	6.3	15.5	0.301	9.9	162	13.6
MW-225	4/16/2008	low flow	11:55	85.0	81.6	120	12.3	6.1	19.1	0.241	1.9	96	16.5
MW-226	4/15/2008	low flow	11:55	84.0	80.0	110	5.5	6.4	17.8	0.246	1.6	117	17.6
MW-227	4/16/2008	low flow	8:26	76.0	74.6	260	5.1	5.9	18.3	0.466	5.4	125	0.5
MW-228	4/16/2008	low flow	10:14	77.0	76.2	200	3.9	5.9	19.4	0.199	6.6	150	16.5
MW-230	4/15/2008	low flow	16:22	82.5	55.6	360	21.7	5.3	17.3	0.298	9.0	138	17.9
MW-231	4/14/2008	low flow	15:09	185.3	124.3	200	24.0	8.7	16.6	0.140	4.9	-42	172.0
MW-233	4/14/2008	Dry	-	-	-	-	-	-	-	-	-	-	-
MW-234	4/14/2008	low flow	12:07	172.0	125.6	180	22.0	6.3	15.8	0.291	4.0	-60	43.8
MW-235	4/15/2008	low flow	14:34	59.0	56.5	160	18.9	5.5	16.9	0.389	9.4	36	81.2
MW-236	4/14/2008	low flow	8:57	30.0	9.7	192	9.6	6.6	17.7	0.457	8.6	110	20.0
MW-237	4/11/2008	low flow	13:45	171.9	124.1	220	15.0	6.5	18.6	0.312	3.6	14	19.4
MW-238	4/15/2008	low flow	9:59	186.0	235.2	180	21.5	6.4	17.3	0.687	12.6	-54	22.9
MW-239	4/11/2008	low flow	11:48	170.9	124.5	200	16.0	10.4	18.3	0.250	3.1	-116	12.4
MW-240	4/11/2008	low flow	15:18	91.4	78.4	360	18.9	6.9	19.4	0.751	1.2	65	18.7

Notes:

°C	degrees Celsius	NTU	Nephelometric Turbidity Units
ft, btoc	feet below top of casing	-	Data not recorded
ml/min	milliliters per minute	ORP	Oxidation Reduction Potential
mS/cm	milliSiemens per centimeter	mg/L	milligrams per liter
mV	millivolts		

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TABLE 3-5
PDB SAMPLE INTERVALS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Monitoring Well	Date Collected	Measured Well Depth	Depth to Water	Sample Depth
Monitoring Well	Date Collected	(ft bgs)	(feet btoc)	(feet btoc)
MW-07	10/17/2008	75.75	66.81	75.14
MW-31	10/17/2008	83.28	70.34	76.95
MW-32	10/17/2008	68 08	63.70	66.84
MW-33	10/17/2008	62.70	56.77	59.15
MW-37	10/17/2008	184.68	129.32	173.25
MW-40	10/20/2008	95.53	85.19	90.75
MW-43	10/20/2008	171.71	127.01	167.25
MW-44	10/20/2008	74.36	56.65	69.75
MW-54	10/20/2008	97.18	82.32	90.25
MW-57	10/17/2008	70.21	64.61	68.32
MW-67	10/20/2008	275.0	121.74	268.25
MW-68	10/17/2008	81.56	67.00	78.25
MW-69	10/17/2008	95.58	72.69	89.64
MW-70	10/17/2008	93.73	72.78	87.67
MW-71	10/17/2008	78.10	71.01	74.28
MW-76	10/17/2008	93.98	82.74	90.75
MW-77	10/17/2008	89.18	81.66	85.55
MW-79	10/20/2008	104.78	72.59	93.25
MW-130	10/20/2008	81.02	56.50	70.25
MW-144	10/17/2008	76.28	Dry	NS
MW-145	10/20/2008	96.66	72.10	90.75
MW-147	10/17/2008	80.49	71.51	79.35
MW-148	10/17/2008	87.87	79.82	86.35
MW-149	10/20/2008	99.96	74.46	92.15
MW-150	10/20/2008	91.57	83.35	88.51
MW-151	10/20/2008	96.69	71.60	87.75
MW-152	10/20/2008	108.82	77.09	101.75
MW-153	10/20/2008	96.03	66.76	86.75
MW-154	10/20/2008	66.84	58.60	61.45
MW-155	10/20/2008	95.07	78.60	88.94
MW-156	10/20/2008	69.41	58.01	67.75
MW-157	10/17/2008	77.11	72.52	75.95
MW-158	10/20/2008	106.60	81.48	99.25
MW-158A	10/20/2008	93.28	81.39	88.25
MW-159	10/20/2008	99.31	73.65	81.85
MW-160	10/20/2008	85.77	80.54	84.35
MW-161	10/17/2008	83.97	78.85	83.47
MW-162	10/17/2008	86.69	82.45	86.08
MW-163	10/17/2008	76.73	74.98	76.10
MW-164	10/17/2008	75.28	70.84	74.59
MW-165	10/20/2008	103.01	74.53	96.88
MW-165A	10/20/2008	86.40	74.80	81.65
MW-166	10/20/2008	100.05	70.84	92.10
MW-166A	10/20/2008	83.29	70.87	78.17
MW-167	10/20/2008	82.68	72.57	80.07
MW-168	10/20/2008	120.50	71.45	114.45
MW-168A	10/20/2008	88.22	70.70	82.03
MW-169	10/20/2008	88.15	85.34	87.06
MW-170	10/20/2008	79.78	59.82	70.91
MW-171	10/20/2008	68.32	57.35	63.75
MW-232	10/21/2008	170.55	128.70	161.25

Notes:

bgs Below ground surface
btoc Below top of casing
NS Well not sampled

TABLE 3-6
FINAL MONITORING WELL STABILIZATION MEASUREMENTS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Well ID	Sample Date	Method	Time	Sample Pump Depth (ft, btoc)	Water Depth (ft, btoc)	Purge Rate (ml/min)	Volume Purged (Liters)	pH	Temp (°C)	Specific Conductivity (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTUs)
MW-3	10/21/2008	low flow	10:55	73.2	67.50	300	7.0	6.1	19.0	0.361	3.1	186	6.7
MW-6	10/17/2008	low flow	9:15	68.8	65.04	210	11.2	5.5	16.5	2.620	7.4	263	0.0
MW-10	10/21/2008	low flow	15:15	73.4	62.55	100	6.1	6.7	27.9	0.330	2.4	72	4.0
MW-15	10/16/2008	low flow	13:16	77.0	70.29	150	4.6	6.1	16.3	0.392	11.3	253	1.3
MW-74	10/21/2008	low flow	8.53	85.0	79.50	220	7.3	5.9	21.1	0.247	6.0	206	0.0
MW-132	10/20/2008	low flow	11:20	84.0	76.35	160	5.0	5.9	31.2	0.294	4.2	172	12.7
MW-134	10/20/2008	low flow	12:30	84.0	74.70	160	4.8	5.9	20.6	0.290	2.8	180	0.0
MW-172	10/16/2008	low flow	9:42	76.1	73.93	110	11.0	5.9	21.4	0.209	11.8	257	14.0
MW-174	10/16/2008	low flow	14:32	75.0	71.21	200	10.9	5.9	19.3	0.204	9.0	266	19.7
MW-175(1)	10/17/2008	low flow	9:55	76.0	-	-	-	-	-	-	-	-	-
MW-178	10/20/2008	low flow	16.15	83.0	74.86	140	6.1	6.1	38 9	0.333	5.2	196	17.6
MW-179	10/20/2008	low flow	14:10	82.0	76.01	160	11.2	5.9	20.5	0.275	2.7	217	18.7
MW-180	10/21/2008	low flow	13:27	78.6	70.81	260	6 5	5.8	20.4	0.240	2.8	215	1.2
MW-187	10/16/2008	low flow	11:35	83.6	76.54	130	13.7	5.9	21.4	0.206	9.6	271	17.1
MW-220	10/21/2008	low flow	12:30	77.6	67.49	280	14.0	6.0	35.6	0.341	1.3	185	0.0
MW-221	10/21/2008	low flow	10:05	85.0	76.40	200	7.5	5.9	35.9	0.408	3.0	157	5.1
MW-222	10/20/2008	low flow	10:20	80.7	78.64	130	4.9	6.5	36.6	0.790	0.0	-61	1.3
MW-223	10/17/2008	low flow	13:30	88.0	77.83	160	6.0	6.0	30.2	0.259	5.5	227	9.4
MW-224	10/20/2008	low flow	15:15	84.0	78.79	140	7.2	6.0	40.2	0.304	0.7	198	17.9
MW-225	10/17/2008	low flow	15.43	85.0	79.59	200	15.2	6.0	38.4	0.274	1.5	119	19.0
MW-226	10/20/2008	low flow	9:15	84.0	78.30	160	10.3	6.0	34.9	0.266	4.1	196	9.9
MW-227	10/17/2008	low flow	10:48	76.0	73.86	180	4.6	5.8	35.4	0.441	8.4	226	0 0
MW-228	10/17/2008	low flow	11:45	77.0	75.53	110	4.9	5.8	35.3	0.191	8.4	224	0.0
MW-230	10/22/2008	low flow	8:50	82.5	55.62	200	10.6	5.9	17.8	0.305	9.7	228	15.9
MW-231	10/22/2008	low flow	10:37	185.3	132.90	360	11.0	8.3	17.6	0.501	5.0	-73	20.0
MW-233	10/21/2008	Dry	-	-	-	-	-	-	-	-	-	-	-
MW-234	10/22/2008	low flow	9:37	172.0	133.82	300	7.3	7.5	17.5	0.353	5.9	-22	1.5
MW-235	10/22/2008	low flow	12:40	59.0	56.19	100	15.2	5.8	17.6	0.267	2.3	260	21.0
MW-236	10/22/2008	low flow	10:10	30.0	22.91	120	4 8	6.8	20.5	0.397	3.0	204	11.2
MW-237	10/22/2008	low flow	8:37	171.9	132.60	260	9.1	6.9	17.4	0.338	6.2	197	4.6
MW-238	10/22/2008	low flow	14:47	186.0	147.69	176	21.1	7.8	27.8	0.423	3.0	30	9.5
MW-239	10/21/2008	low flow	15:45	170.9	129.80	160	13.2	13.2	19.2	0.299	10.2	26	2.4
MW-240	10/21/2008	low flow	16:35	91.4	80.02	175	7.6	6.7	20.1	0.662	0.5	174	14.9

Notes:

(1) Unable to insert pump in well. Well possibly damaged by thermal SVE operations.

°C degrees Celsius — NTU Nephelometric Turbidity Units

ft, btoc feet below top of casing — - Data not recorded

ml/min milliliters per minute — ORP Oxidation Reduction Potential

mS/cm milliSiemens per centimeter — mg/L milligrams per liter

mV millivolts

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TABLE 4-1
POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-3 / L08040517-22 / 4/16/2008	MW-6 / L08040486-06 / 4/15/2008	MW-07-68.9 / L08040444-01 / 4/14/2008	MW-15 / L08040486-07 / 4/15/2008	MW-31-71.6 / L08040409-29 / 4/11/2008	MW-31-71.6 DUP / L08040409-36 / 4/11/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	**8.89**	<0.5	**2.15**	<0.5	0.446 J
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	**1.02**	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	**1.54**	<1	**24.8**	<1	**14.3**	**17.4**
Carbon tetrachloride (CT)	ug/L	5	3	<1	**3.78**	<1	**16**	0.368 J	0.539 J
Chloroform (CF)	ug/L	80	12	0.147 J	**84.7**	0.273 J	**106**	**0.802**	**1.19**
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	**36.2**	<1	**5.99**	**2.87**	**5.67**
Tetrachloroethene (PCE)	ug/L	5	2.5	**2.71**	**1.07**	**56.2**	**7.19**	0.891 J	**1.12**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	**1.45**	<1	**2.02**	**1.51**	**2.14**
Trichloroethene (TCE)	ug/L	5	5	**2.04**	**32.5**	**29.4**	**104**	**10.5**	**16.1**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				6.44	170	111	244	31.2	44.6
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	0.613 J	<1	**4.38**	**5.92**
1,1-Dichloroethane	ug/L	--	--	<1	<1	**1.2**	<1	**1.96**	**2.61**
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	0.357 J	**1.05**	<0.5	<0.5
Acetone	ug/L	--	--	<10	<10	3.41 B	<10	<10	<10
Bromomethane	ug/L	--	--	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	--	--	<1	<1	<1	<1	<1	<1
Toluene	ug/L	1000	--	<1	<1	<1	<1	<1	<1

Notes:

a Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G

µg/L micrograms per liter

-- Not listed

Results detected at or above reporting limits shown in bold

DQE Flags:

J Estimated result based on QC data or reported below RL

B Estimated result possibly biased high or false positive based on blank data

< Analyte not detected above RL

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TABLE 4-1
POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	Maximum Contaminant Levels[a]	Target Concentration	MW-31-77.1 L08040409-30 4/11/2008	MW-32-65.6 L08040409-31 4/11/2008	MW-33-58 L08040444-11 4/14/2008	MW-37-173.2 L08040444-02 4/14/2008	MW-40-90 L08040409-39 4/11/2008	MW-43-165.5 L08040409-41 4/11/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	<0.5	<0.5 J	<0.5	<0.5	<0.5
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1 J	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	**7.17**	<1	<1 J	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1 J	<1	<1	<1
Chloroform (CF)	ug/L	80	12	0.169 J	**4.07**	<0.3 J	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	0.332 J	0.263 J	<1 J	<1	<1	<1
Tetrachloroethene (PCE)	ug/L	5	2.5	0.916 J	<1	<1 J	<1	<1	<1
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1 J	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	**3.21**	**2.47**	<1 J	<1	<1	<1
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1 J	<1	<1	<1
Total Primary CVOCs				11.8	6.80	0	0	0	0
1,1,1-Trichloroethane	ug/L	200	--	0.856 J	<1	<1 J	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1 J	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5 J	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	<10	<10	<10 J	2.97 B	4.94 B	9.66 B
Bromomethane	ug/L	--	--	<1	<1	<1 J	<1	<1	0.611 B
Carbon disulfide	ug/L	--	--	<1.	<1	<1 J	<1	<1	<1 J
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5 J	<0.5	0.145 J	<0.5
Methylene chloride	ug/L	--	--	<1	<1	<1 J	<1	<1	<1
Toluene	ug/L	1000	--	<1	<1	<1 J	<1	<1	<1

Notes:

a Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G
µg/L micrograms per liter
-- Not listed
Results detected at or above reporting limits shown in bold

DQE Flags:

J Estimated result based on QC data or reported below RL
B Estimated result possibly biased high or false positive based on blank data
< Analyte not detected above RL

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TABLE 4-1
POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-44-69 / L08040409-42 / 4/11/2008	MW-44-69 DUP / L08040409-35 / 4/11/2008	MW-54-89.5 / L08040409-03 / 4/11/2008	MW-57-66.6 / L08040444-03 / 4/14/2008	MW-67-267.5 / L08040409-43 / 4/11/2008	MW-68-77.5 / L08040444-04 / 4/14/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	<0.5	**171**	<0.5	<0.5	0.24 B
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	0.885 J	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	0.823 J	**1.28**	**6.76**	**11.1**	<1	<1
Chloroform (CF)	ug/L	80	12	**0.567**	**0.586**	**3.85**	**3.32**	<0.3	<0.3
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	<1	**17.4**	<1	<1	<1
Tetrachloroethene (PCE)	ug/L	5	2.5	<1	<1	**3.88**	**3.03**	<1	<1
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	**4.42**	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	0.599 J	**1.14**	**348**	**19.4**	<1	0.36 J
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				1.99	3.01	556	36.9	0	1
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	<10	<10	5.16 B	6.58 B	5.95 B	<10
Bromomethane	ug/L	--	--	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1 J	<1	<1	<1	<1 J	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	--	--	<1	<1	<1	<1	<1	<1
Toluene	ug/L	1000	--	<1	<1	<1	<1	<1	<1

Notes:

[a] Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G
µg/L micrograms per liter
-- Not listed
Results detected at or above reporting limits shown in bold

DQE Flags:
J Estimated result based on QC data or reported below RL
B Estimated result possibly biased high or false positive based on blank data
< Analyte not detected above RL

982 43

TABLE 4-1
POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-69-88.2 L08040444-05 4/14/2008	MW-70-83.3 L08040444-06 4/14/2008	MW-70-88.8 L08040444-07 4/14/2008	MW-71-72.3 L08040444-13 4/14/2008	MW-74 L08040486-08 4/15/2008	MW-76-88.2 L08040444-14 4/14/2008	MW-77-84.9 L08040444-17 4/14/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	–	2.2	<0.5	**270**	**177**	**1.72**	**16.1**	**77**	**566**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<2	1.11 J	<1	<1	0.303 J	<20
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<2	1.71 J	<1	<1	<1	<20
Carbon tetrachloride (CT)	ug/L	5	3	<1	<2	<2.5	**7.66**	<1	<1	<20
Chloroform (CF)	ug/L	80	12	<0.3	<0.6	<0.75	**17.3**	0.163 J	**0.915**	<6
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	1.63 J	**14.2**	0.523 J	<1	**13.2**	7.13 J
Tetrachloroethene (PCE)	ug/L	5	2.5	0.658 J	1.53 J	0.984 J	0.715 J	0.473 J	**4.44**	<20
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<2	**4.74**	<1	<1	**3.59**	<20
Trichloroethene (TCE)	ug/L	5	5	<1	**86**	**60.4**	**9.37**	**7.19**	**336 J**	**309**
Vinyl chloride (VC)	ug/L	2	–	<1	<2	**13.5**	<1	<1	<1	<20
Total Primary CVOCs				1	359	274	37.3	23.9	435	882
1,1,1-Trichloroethane	ug/L	200	–	<1	<2	<2.5	<1	<1	<1	<20
1,1-Dichloroethane	ug/L	–	–	<1	<2	<2.5	<1	<1	<1	<20
1,2-Dichloroethane	ug/L	5	–	<0.5	<1	<1.25	<0.5	<0.5	<0.5	<10
Acetone	ug/L	–	–	<10	12.4 J	9.93 J	8.48 J	<10	6.54 J	<200
Bromomethane	ug/L	–	–	<1	<2	<2.5	<1	<1	<1	<20
Carbon disulfide	ug/L	–	–	<1	<2	<2.5	<1	<1	<1	<20
Chlorobenzene	ug/L	100	–	<0.5	<1	<1.25	<0.5	<0.5	<0.5	<10
Methylene chloride	ug/L	–	–	<1	<2	<2.5	<1	<1	<1	6.28 B
Toluene	ug/L	1000	–	<1	<2	<2.5	<1	<1	<1	<20

Notes:
a Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G
µg/L micrograms per liter
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982 44

TABLE 4-1
POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	Maximum Contaminant Levels[a]	Target Concentration	MW-79-92 L08040409-04 4/11/2008	MW-130-69.5 L08040409-44 4/11/2008	MW-132 L08040486-09 4/15/2008	MW-134 L08040517-24 4/16/2008	MW-144-74.9 L08040409-45 4/11/2008	MW-145-86.6 L08040444-08 4/14/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**30.4**	<0.5	**25.1**	**0.717**	**79.4**	<0.5 J
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	0.469 J	<1	0.461 J	<1 J
1,1-Dichloroethene (DCE)	ug/L	7	7	**10**	**73.4**	<1	<1	<1	<1 J
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	<1	<1 J
Chloroform (CF)	ug/L	80	12	<0.3	0.27 J	<0.3	<0.3	**1.77**	<0.3 J
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	0.789 J	0.388 J	<1	**2.31**	<1 J
Tetrachloroethene (PCE)	ug/L	5	2.5	0.917 J	**196**	0.649 J	0.488 J	<1	<1 J
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1	<1	<1	<1 J
Trichloroethene (TCE)	ug/L	5	5	**7.5**	**71**	**16.7**	**1.08**	**37.6**	<1 J
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1 J
Total Primary CVOCs				48.8	342	43.3	2.29	122	0
1,1,1-Trichloroethane	ug/L	200	--	<1	**1.86**	<1	<1	<1	<1 J
1,1-Dichloroethane	ug/L	--	--	0.2 J	**4.01**	<1	<1	<1	<1 J
1,2-Dichloroethane	ug/L	5	--	<0.5	**1**	<0.5	<0.5	<0.5	<0.5 J
Acetone	ug/L	--	--	<10	5.03 J	<10	<10	7.4 B	<10 J
Bromomethane	ug/L	--	--	<1	<1	<1	<1	<1	<1 J
Carbon disulfide	ug/L	--	--	<1	<1 J	<1	<1	<1	<1 J
Chlorobenzene	ug/L	100	--	<0.5	0.144 J	<0.5	<0.5	<0.5	<0.5 J
Methylene chloride	ug/L	--	--	<1	<1	<1	<1	<1	<1 J
Toluene	ug/L	1000	--	<1	<1	<1	<1	<1	<1 J

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POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-147-73.7 L08040409-05 4/11/2008	MW-148-80.0 L08040409-06 4/11/2008	MW-148-85.5 L08040409-07 4/11/2008	MW-149-83.6 L08040409-08 4/11/2008	MW-149-98.5 L08040409-09 4/11/2008	MW-150-83.2 L08040409-10 4/11/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	–	2.2	**22**	**21.2**	**6.92**	**1.53**	**4.1**	**174 J**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	0.252 J	<1	<1	<1	9.85 J
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	<1	<1	<1	<1 J
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	**5.26**	**6.7**	<1 J
Chloroform (CF)	ug/L	80	12	**0.509**	**1.16**	**0.582**	**14.2**	**29.6**	1.43 J
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	**6.15**	**21.7**	**7.33**	**1.12**	**2.43**	**3.59 J**
Tetrachloroethene (PCE)	ug/L	5	2.5	**7.92**	**3.59**	**1.96**	0.623 J	**1**	0.361 J
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	**1**	**2.74**	**2.1**	0.266 J	0.675 J	<1 J
Trichloroethene (TCE)	ug/L	5	5	**53.9**	**266**	**62.9**	**12.2**	**19.1**	**80.6 J**
Vinyl chloride (VC)	ug/L	2	–	<1	<1	<1	<1	<1	<1 J
Total Primary CVOCs				91.5	317	81.8	35.2	63.6	270
1,1,1-Trichloroethane	ug/L	200	–	<1	<1	<1	<1	<1	<1 J
1,1-Dichloroethane	ug/L	–	–	<1	<1	<1	<1	<1	<1 J
1,2-Dichloroethane	ug/L	5	–	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5 J
Acetone	ug/L	–	–	3.08 B	3.8 B	2.71 B	4.77 B	3.65 B	4.51 B
Bromomethane	ug/L	–	–	<1	<1	<1	<1	<1	<1 J
Carbon disulfide	ug/L	–	–	<1	<1	<1	<1	<1	<1 J
Chlorobenzene	ug/L	100	–	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5 J
Methylene chloride	ug/L	–	–	<1	<1	<1	<1	<1	<1 J
Toluene	ug/L	1000	–	<1	<1	<1	<1	<1	<1 J

Notes:

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POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-150-90.5 L08040409-11 4/11/2008	MW-150 90.5 DUP L08040409-02 4/11/2008	MW-151-78.5 L08040444-18 4/14/2008	MW-151-94.5 L08040444-19 4/14/2008	MW-152-107.9 L08040409-13 4/11/2008	MW-152-92.9 L08040409-12 4/11/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**1960**	**2020**	<0.5	0.468 J	**1.4**	**3.05**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	**15.2 J**	**23.1**	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<20	0.997 J	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	<20	<1	0.602 J	**4.77**	<1	<1
Chloroform (CF)	ug/L	80	12	**<6**	**1.9**	0.236 J	**15.5**	**0.573**	**0.601**
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	**37.3**	**57**	<1	**1.42**	**5.49**	**5.65**
Tetrachloroethene (PCE)	ug/L	5	2.5	**8.1 J**	11.8	<1	0.639	**8.53**	**5.5**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<20	4.38	<1	0.613 J	**1.76**	**2.42**
Trichloroethene (TCE)	ug/L	5	5	**1230**	**1220**	**1.32**	**20.1**	**61.7**	**72.7**
Vinyl chloride (VC)	ug/L	2	--	<20	0.708 J	<1	<1	<1	<1
Total Primary CVOCs				3251	3340	2.16	43.5	79.5	89.9
1,1,1-Trichloroethane	ug/L	200	--	<20	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<20	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<10	0.401 J	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	<200	2.92 B	<10	2.65 J	<10	<10
Bromomethane	ug/L	--	--	<20	<1	<1	0.705 B	<1	<1
Carbon disulfide	ug/L	--	--	<20	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<10	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	--	--	<20	<1	<1	<1	<1	<1
Toluene	ug/L	1000	--	<20	<1	<1	<1	<1	0.321 B

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ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-153-87.1 L08040444-20 4/14/2008	MW-154-61.6 L08040444-21 4/14/2008	MW-155-77.0 L08040409-14 4/11/2008	MW-155-93.5 L08040409-15 4/11/2008	MW-156-62.0 L08040409-46 4/11/2008	MW-157-74.8 L08040444-22 4/14/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	<0.5	**3770**	**3540**	<0.5	**10.1**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	**53.8**	**43.2**	<1	<2
1,1-Dichloroethene (DCE)	ug/L	7	7	**6.37**	<1	<20	<25	<1	<2
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<20	<25	<1	<2
Chloroform (CF)	ug/L	80	12	<0.3	<0.3	<6	<7.5	<0.3	**9**
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	0.341 J	<1	**73.8**	**61.4**	<1	0.671 J
Tetrachloroethene (PCE)	ug/L	5	2.5	0.445 J	<1	10.2 J	8.34 J	<1	<2
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	9.93 J	7.82 J	<1	<2
Trichloroethene (TCE)	ug/L	5	5	0.469 J	<1	**1600**	**1510**	<1	**5.48**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<20	<25	<1	<2
Total Primary CVOCs				7.63	0	5518	5171	0	25.3
1,1,1-Trichloroethane	ug/L	200	--	**1.39**	<1	<20	<25	<1	<2
1,1-Dichloroethane	ug/L	--	--	0.596 J	<1	<20	<25	<1	<2
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<10	<12.5	<0.5	<1
Acetone	ug/L	--	--	<10	<10	<200	<250	4.95 B	8.87 J
Bromomethane	ug/L	--	--	0.59 B	0.573 B	<20	<25	<1	1.05 B
Carbon disulfide	ug/L	--	--	<1	<1	<20	<25	<1 J	<2
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<10	<12.5	<0.5	<1
Methylene chloride	ug/L	--	--	<1	<1	<20	<25	<1	<2
Toluene	ug/L	1000	--	<1	<1	<20	<25	<1	<2

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DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-157-74.8 DUP / L08040444-12 / 4/14/2008	MW-158-104.1 / L08040409-17 / 4/11/2008	MW-158-93.1 / L08040409-16 / 4/11/2008	MW-158A-81.5 / L08040409-18 / 4/11/2008	MW-158A-91.4 / L08040409-19 / 4/11/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**10.1**	**3.03**	**2.79**	**217**	**26.9**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	0.29 J	<1	<1	**7.88 J**	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	0.53 J	<1	<1	<1	<1
Chloroform (CF)	ug/L	80	12	**10.8**	0.288 J	0.251 J	0.373 J	**1.01**
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	0.741 J	**2.9**	**2.55**	**8.05 J**	**12.1**
Tetrachloroethene (PCE)	ug/L	5	2.5	<1	**4.98**	**4.74**	0.578 J	**10.7**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	**1.25**	**1.02**	0.938 J	**4.06**
Trichloroethene (TCE)	ug/L	5	5	**6.86**	**37.1**	**33.1**	**97.3 J**	**126**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1
Total Primary CVOCs				29.3	49.5	44.5	332	181
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	7.87 B	<10	3.98 B	3.16 B	2.52 B
Bromomethane	ug/L	--	--	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	--	--	<1	<1	<1	<1	<1
Toluene	ug/L	1000	--	<1	<1	<1	<1	<1

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DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-159-81.1 L08040409-20 4/11/2008	MW-159-81.1 DUP L08040409-01 4/11/2008	MW-159-97.1 L08040409-21 4/11/2008	MW-160-80.8 L08040409-22 4/11/2008	MW-161-80.0 L08040409-47 4/11/2008	MW-162-83.7 L08040444-23 4/14/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**312**	**361**	**290**	**3560**	**594**	**4160**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	**99.8**	**115**	**111**	2.97 J	<20	<50
1,1-Dichloroethene (DCE)	ug/L	7	7	<10	**4.38**	<10	<5	<20	<50
Carbon tetrachloride (CT)	ug/L	5	3	<10	<1	<10	<5	<20	<50
Chloroform (CF)	ug/L	80	12	<3	**1.33**	<3	**2.14**	3.65 J	<15
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	**1220**	**1350**	**1180**	**49.8**	15.7 J	23.9 J
Tetrachloroethene (PCE)	ug/L	5	2.5	5.26 J	**6.87**	6.28 J	**10.6**	<20	<50
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	**24.9**	**37**	**26.6**	**9.32**	5.59 J	<50
Trichloroethene (TCE)	ug/L	5	5	**1170**	**1250**	**1410**	**1130**	**342**	**792**
Vinyl chloride (VC)	ug/L	2	--	7.79 J	**7.14**	7.11 J	<5	<20	<50
Total Primary CVOCs				2840	3134	3031	4765	961	4976
1,1,1-Trichloroethane	ug/L	200	--	<10	<1	<10	<5	<20	<50
1,1-Dichloroethane	ug/L	--	--	<10	<1	<10	<5	<20	<50
1,2-Dichloroethane	ug/L	5	--	<5	**1.2**	<5	<2.5	<10	<25
Acetone	ug/L	--	--	<100	8.62 B	<100	<50	<200	<500
Bromomethane	ug/L	--	--	<10	<1	<10	<5	<20	<50
Carbon disulfide	ug/L	--	--	<10	<1	<10	<5	<20 J	<50
Chlorobenzene	ug/L	100	--	<5	<0.5	<5	0.926 J	<10	<25
Methylene chloride	ug/L	--	--	<10	<1	<10	**1.59 B**	**9.78 B**	**14.8 B**
Toluene	ug/L	1000	--	<10	<1	<10	<5	<20	<50

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982 50

TABLE 4-1
POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-163-74.9 / L08040444-24 / 4/14/2008	MW-164-72.6 / L08040444-25 / 4/14/2008	MW-165-100 / L08040409-49 / 4/11/2008	MW-165-89.9 / L08040409-48 / 4/11/2008	MW-165A-73.9 / L08040409-50 / 4/11/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**488**	**13.4**	**1.8**	**3.04**	<0.5
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	3.37 J	0.517 J	0.343 J	0.299 J	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<5	<1 J	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	<5	3.42 J	0.769 J	**9.32**	**1.14**
Chloroform (CF)	ug/L	80	12	**11.9**	**37.1**	**4.85**	**61.4**	**3.88**
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	**9.07**	**2.71**	**9.59**	**5.97**	**1.2**
Tetrachloroethene (PCE)	ug/L	5	2.5	<5	**0.894**	**1.25**	**1.64**	0.392 J
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	1.84 J	0.57 J	**1.99**	**1.6**	0.322 J
Trichloroethene (TCE)	ug/L	5	5	**80.3**	24.9 J	**128**	**87.1**	**32.6**
Vinyl chloride (VC)	ug/L	2	--	<5	<1	<1	<1	<1
Total Primary CVOCs				594	83.5	149	170	39.5
1,1,1-Trichloroethane	ug/L	200	--	<5	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<5	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<2.5	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	15.6 J	4.1 J	3.53 B	3.17 B	2.53 B
Bromomethane	ug/L	--	--	<5	0.547 B	<1	<1	<1
Carbon disulfide	ug/L	--	--	<5	<1	<1 J	<1 J	<1
Chlorobenzene	ug/L	100	--	<2.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	--	--	**1.56 B**	<1	<1	<1	<1
Toluene	ug/L	1000	--	<5	<1	<1	<1	<1

Notes:

a Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G

µg/L micrograms per liter

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TABLE 4-1
POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Well	Maximum	Target	MW-165A-73.9 DUP	MW-165A-84.5	MW-166-87.3	MW-166-97.8	MW-166A-75.3
	Lab ID	Contaminant	Concentration	L08040409-37	L08040409-56	L08040409-23	L08040409-24	L08040409-25
	Date	Levels[a]		4/11/2008	4/11/2008	4/11/2008	4/11/2008	4/11/2008
Volatile Organic Compounds - SW8260B	units							
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	**2.77**	**8.3**	**8.39**	**3.76**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	**1.25**	**11.3**	**6.43**	**8.3**	**4.44**
Chloroform (CF)	ug/L	80	12	**3.97**	**49.8**	**39.1**	**52.2**	**34.4**
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	**1.06**	**7.3**	**2.49**	**2.4**	**2.57**
Tetrachloroethene (PCE)	ug/L	5	2.5	0.267 J	**2.44**	**1.14**	**1.65**	**1.24**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	**1.4**	0.955 J	0.753 J	**1.16**
Trichloroethene (TCE)	ug/L	5	5	**31.1**	**103**	**24.8**	**25.7**	**69.9**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1
Total Primary CVOCs				37.6	178	83.2	99.4	117
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	<10	3.53 B	3.3 B	4.31 B	6.84 B
Bromomethane	ug/L	--	--	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	--	--	<1	<1	<1	<1	<1
Toluene	ug/L	1000	--	<1	<1	<1	<1	<1

Notes:

[a] Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G
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TABLE 4-1
POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	Maximum Contaminant Levels[a]	Target Concentration	MW-167-76.5 L08040409-57 4/11/2008	MW-167-76.5 DUP L08040409-34 4/11/2008	MW-168-113.9 L08040409-26 4/11/2008	MW-168A-76.4 L08040409-27 4/11/2008	MW-168A-86.9 L08040409-28 4/11/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	0.818 J	**13.6**	**6.01**
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	<1
Chloroform (CF)	ug/L	80	12	<0.3	<0.3	<0.3	**0.537**	0.188 J
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	<1	<1	<1	<1
Tetrachloroethene (PCE)	ug/L	5	2.5	<1	<1	<1	0.949 J	0.815 J
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	0.34 J	<1	**1.22**	**1.15**	**1.09**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1
Total Primary CVOCs				0.34	0	2.04	16.2	8.10
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	**6.83**	**2.05**
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	0.425 J	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	5.76 B	5.24 B	<10	<10	<10
Bromomethane	ug/L	--	--	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	--	--	<1	<1	<1	<1	<1
Toluene	ug/L	1000	--	<1	<1	0.317 B	<1	0.312 B

Notes:

[a] Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G
µg/L micrograms per liter
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TABLE 4-1
POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD, GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-169-81.8 L08040409-58 4/11/2008	MW-170-61.7 L08040409-59 4/11/2008	MW-170-77.7 L08040409-60 4/11/2008	MW-170-77.7 DUP L08040409-38 4/11/2008	MW-171-62.4 L08040409-61 4/11/2008	MW-172 L08040444-09 4/14/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	1.43	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	<1	<1
Chloroform (CF)	ug/L	80	12	<0.3	<0.3	<0.3	<0.3	<0.3	0.143 J
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	<1	<1	<1	<1	<1
Tetrachloroethene (PCE)	ug/L	5	2.5	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	<1	<1	<1	<1	<1	<1
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				0	1.43	0	0	0	0.14
1,1,1-Trichloroethane	ug/L	200	--	<1	0.27	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	0.913 J	<1	0.15 J	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	8.69 B	8.91 B	8.76 B	8.21 B	9.14 B	<10
Bromomethane	ug/L	--	--	<1	<1	<1	1.35 B	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1 J	<1	<1
Chlorobenzene	ug/L	100	--	**0.859**	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	--	--	<1	<1	<1	<1	<1	<1
Toluene	ug/L	1000	--	<1	<1	<1	<1	<1	<1

Notes:

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Target Concentration (TC) from Dunn Field ROD, Table 2-21G
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TABLE 4-1
POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	Maximum Contaminant Levels[a]	Target Concentration	MW-174 L08040486-11 4/15/2008	MW-175 L08040444-10 4/14/2008	MW-178 L08040486-10 4/15/2008	MW-179 L08040486-04 4/15/2008	MW-180 L08040517-25 4/16/2008	MW-187 L08040517-19 4/16/2008	MW-220 L08040486-12 4/15/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**0.7**	<0.5	<0.5	<0.5	**0.763**	<0.5	<0.5
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	<1	<1	<1	<1	**4.54**
Carbon tetrachloride (CT)	ug/L	5	3	<1	0.383 J	<1	<1	<1	<1	<1
Chloroform (CF)	ug/L	80	12	**0.666**	**0.489**	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene (PCE)	ug/L	5	2.5	0.297 J	0.317 J	0.726 J	**1.77**	<1	<1	**8.14**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1	<1	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	<1	0.874 J	<1	0.264 J	<1	<1	**4.61**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				1.66	2.06	0.73	2.03	0.76	0	17.3
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	<1	<1	<1	0.187 J
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	<10	<10	<10	<10	<10	<10	<10
Bromomethane	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/L	1000	--	<1	<1	<1	<1	<1	<1	<1

Notes:

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POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
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DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-221 L08040517-03 4/16/2008	MW-222 L08040486-13 4/15/2008	MW-223 L08040486-14 4/15/2008	MW-224 L08040517-04 4/16/2008	MW-225 L08040517-05 4/16/2008	MW-226 L08040486-15 4/15/2008	MW-227 L08040517-20 4/16/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	**12.7**	0.323 J	<0.5	**21.3**	<0.5	**28.1**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	**7.57**	<1	<1	0.544 J	<1	**1.02**
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	<1	<1	**4.02**
Chloroform (CF) •	ug/L	80	12	0.167 J	0.156 J	**0.439**	<0.3	0.275 J	0.155 J	**110**
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	**10.4**	<1	<1	1.71	<1	**6.33**
Tetrachloroethene (PCE)	ug/L	5	2.5	0.893 J	0.312 J	0.343 J	**1.33**	0.616 J	<1	**2.25**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	0.301 J	<1	<1	<1	<1	**1**
Trichloroethene (TCE)	ug/L	5	5	<1	**5.34**	**4.55**	<1	**39.6**	0.855 J	**40.8**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				1.06	37.1	5.66	1.33	64.0	1.01	196
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	0.341 J	<0.5	<0.5	<0.5	<0.5	**2.71**
Acetone	ug/L	--	--	<10	<10	<10	<10	<10	<10	<10
Bromomethane	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/L	1000	--	<1	<1	<1	<1	<1	<1	<1

Notes:

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POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	Maximum Contaminant Levels[a]	Target Concentration	MW-228 L08040517-21 4/16/2008	MW-230 L08040486-05 4/15/2008	MW-231 L08040444-33 4/14/2008	MW-232B L08040408-01 4/11/2008	MW-232 L08040409-55 4/11/2008	MW-234 L08040444-28 4/14/2008	MW-235 L08040486-01 4/15/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**0.509**	<0.5	<0.5	<0.5	<0.5	0.469 J	<0.5
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	0.736 J	0.763 J	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	**18.2**	<1	0.704 J	**1.27**	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	<1	<1	<1
Chloroform (CF)	ug/L	80	12	**0.387**	0.192 J	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	0.834 J	<1	**19**	**22.4**	<1	<1
Tetrachloroethene (PCE)	ug/L	5	2.5	<1	**76.1**	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1	0.311 J	0.426 J	<1	<1
Trichloroethene (TCE)	ug/L	5	5	<1	**74.6**	<1	0.384 J	0.39 J	<1	<1
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	0.611 J	0.593 J	<1	<1
Total Primary CVOCs				0.90	170	0	21.7	25.8	0.47	0
1,1,1-Trichloroethane	ug/L	200	--	<1	**1.33**	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	**1.43**	<1	0.187 J	0.176 J	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	0.455 J	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	<10	<10	<10	7.41 J	8.31 B	<10	<10
Bromomethane	ug/L	--	--	<1	<1	<1	<1	<1	0.724 B	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1	**2.99**	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/L	1000	--	<1	<1	<1	0.592 J	0.597 B	0.37 B	<1

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982 57

TABLE 4-1
POSITIVE RESULTS SUMMARY - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	Maximum Contaminant Levels[a]	Target Concentration	MW-236 L08040444-29 4/14/2008	MW-236 DUP L08040444-30 4/14/2008	MW-237 L08040409-51 4/11/2008	MW-238 L08040486-02 4/15/2008	MW-239 L08040409-52 4/11/2008	MW-240 L08040409-53 4/11/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	**2.2**	<1	0.76 J	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	<1	<1
Chloroform (CF)	ug/L	80	12	<0.3	<0.3	0.181 J	0.211 J	<0.3	<0.3
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	<1	<1	<1	<1	**1.43**
Tetrachloroethene (PCE)	ug/L	5	2.5	<1	<1	0.256 J	<1	<1	<1
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	<1	<1	<1	<1	<1	**2.13**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				0	0	2.64	0.21	0.76	3.56
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	0.266 J	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	<10	<10	<10	<10	**10.1 B**	<10
Bromomethane	ug/L	--	--	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	**17.5**	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	ug/L	--	--	<1	<1	<1	<1	<1	<1
Toluene	ug/L	1000	--	<1	<1	<1	<1	**17.6**	<1

Notes:

[a] Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G
µg/L micrograms per liter
-- Not listed
Results detected at or above reporting limits shown in bold

DQE Flags:

J Estimated result based on QC data or reported below RL
B Estimated result possibly biased high or false positive based on blank data
< Analyte not detected above RL

982 58

TABLE 4-2
POSITIVE RESULTS SUMMARY - MONITORING WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well ID / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-03 / L08100653-01 / 10/21/2008	MW-06 / L08100573-38 / 10/17/2008	MW-07 / L08100573-01 / 10/17/2008	MW-10 / L08100653-02 / 10/21/2008	MW-15 / L08100573-45 / 10/16/2008	MW-31 / L08100573-02 / 10/17/2008	MW-32 / L08100573-03 / 10/17/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**2.46**	**5.57**	<0.5	**1.01**	**4.61**	<0.5	<0.5
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	0.674 J	<1	<1	0.593 J	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	**17.3**	<1	**32.7**	<1	<1	**7.36**	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	0.793 J	<1	<1	**2.51**	<1	<1
Chloroform (CF)	ug/L	80	12	0.212 J	**21.2**	0.299 J	0.288 J	**29.9**	0.219 J	0.2 J
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	**15**	0.367 J	0.992 J	**2.54**	<1	**2.09**
Tetrachloroethene (PCE)	ug/L	5	2.5	**9.5**	<1	**63.9**	<1	**1.16**	**3.17**	<1
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	0.458 J	<1	0.432 J	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	**10.1**	**8.6**	**38.9**	**3.23**	**22.9**	**4.34**	**3.65**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				39.6	52.3	137	5.95	65.1	15.1	6.22
1,1,1,2-Tetrachloroethane	ug/L	--	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	200	--	0.335 J	<1	0.787 J	<1	<1	0.352 J	<1
1,1-Dichloroethane	ug/L	--	--	0.562 J	<1	**1.46**	<1	<1	0.253 J	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	0.385 J	<0.5	**0.837 J**	<0.5	0.276 J
1,4-Dichlorobenzene	ug/L	75	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.623 B**
Acetone	ug/L	--	--	**2.63**	<10	**15.3 B**	<10	<10	**11.9 B**	**15.3 B**
Benzene	ug/L	5	--	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromomethane	ug/L	--	--	<1	<1	<1	<1	**2.91 B**	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	0.847 J	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	100	--	<1	<1	<1	<1	<1	<1	<1

Notes:

a Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G
µg/L micrograms per liter
-- Not listed
Results detected at or above reporting limits shown in bold

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982 59

TABLE 4-2
POSITIVE RESULTS SUMMARY - MONITORING WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well ID / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-33 / L08100573-04 / 10/17/2008	MW-37 / L08100573-54 / 10/17/2008	MW-40 / L08100600-01 / 10/20/2008	MW-43 / L08100600-04 / 10/20/2008	MW-44 / L08100600-05 / 10/20/2008	MW-54 / L08100600-06 / 10/20/2008	MW-57 / L08100573-19 / 10/17/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	<0.5	<0.5	<0.5	<0.5	**53.9**	<0.5
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	<1	<1	0.621 J	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	0.708 J	**4.37**	**4.23**
Chloroform (CF)	ug/L	80	12	<0.3	<0.3	<0.3	<0.3	**0.366**	**9.78**	**15.9**
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	<1	<1	<1	<1	**15.7**	<1
Tetrachloroethene (PCE)	ug/L	5	2.5	<1	<1	<1	<1	<1	**2.46**	**1.82**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1	<1	<1	**3.13**	0.358 J
Trichloroethene (TCE)	ug/L	5	5	<1	<1	<1	<1	0.665 J	**350**	**30.4**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				0	0	0	0	1.74	440	52.7
1,1,1,2-Tetrachloroethane	ug/L	--	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	75	--	<0.5	<0.5	<0.5	0.149 B	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	3 B	**16.4 B**	**16 B**	**13.3 B**	**12.8 B**	5.34 B	4 B
Benzene	ug/L	5	--	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromomethane	ug/L	--	--	<1	<1	<1	**2.83 B**	**2.83 B**	**2.82 B**	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	**0.662**	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	100	--	<1	<1	<1	<1	<1	<1	<1

Notes:

a Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G

µg/L micrograms per liter

— Not listed

Results detected at or above reporting limits shown in bold

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982 60

TABLE 4-2
POSITIVE RESULTS SUMMARY - MONITORING WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Well ID	Maximum	Target	MW-67	MW-68	MW-69	MW-70	MW-71	MW-74	MW-76
	Lab ID	Contaminant	Concentration	L08100600-07	L08100573-20	L08100573-21	L08100573-22	L08100573-23	L08100653-09	L08100573-24
	Date	Levels[a]		10/20/2008	10/17/2008	10/17/2008	10/17/2008	10/17/2008	10/21/2008	10/17/2008
Volatile Organic Compounds - SW8260B	units									
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	0.251 J	<0.5	0.229 J	**0.883**	**5.32**	0.458 J	**9.41**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	0.727 J	<1	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	**5.94**	<1	<1
Chloroform (CF)	ug/L	80	12	<0.3	<0.3	0.147 J	<0.3	**27.2**	<0.3	0.167 J
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	<1	<1	<1	0.717 J	<1	0.406 J
Tetrachloroethene (PCE)	ug/L	5	2.5	<1	0.482 J	0.67 J	0.876 J	0.856 J	0.842 J	**1.35**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1	<1	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	0.292 J	0.573 J	0.88 J	**1.96**	**12.7**	0.458 J	**15**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				0.54	1.78	1.93	3.72	52.7	1.76	26.3
1,1,1,2-Tetrachloroethane	ug/L	--	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	75	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	**13.9 B**	**13.6 B**	**14.5 B**	**13.4 B**	<10	<10	3.68 B
Benzene	ug/L	5	--	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromomethane	ug/L	--	--	**2.79 B**	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	100	--	<1	<1	<1	<1	<1	<1	<1

Notes:

a Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G

μg/L micrograms per liter

-- Not listed

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982 61

TABLE 4-2
POSITIVE RESULTS SUMMARY - MONITORING WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Well ID	Maximum	Target	MW-77	MW-79	MW-130	MW-132	MW-134	MW-145	MW-147
	Lab ID	Contaminant	Concentration	L08100573-25	L08100600-08	L08100600-09	L08100600-40	L08100600-41	L08100600-10	L08100573-26
	Date	Levels[a]		10/17/2008	10/20/2008	10/20/2008	10/20/2008	10/20/2008	10/20/2008	10/17/2008
Volatile Organic Compounds - SW8260B	units									
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**2010**	<0.5	<0.5	0.277 J	<0.5	<0.5	0.373 J
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	**2.3**	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	**4.17**	**80.2**	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	<1	<1	<1
Chloroform (CF)	ug/L	80	12	**0.573**	0.127 J	0.296 J	<0.3	<0.3	<0.3	0.147 J
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	**13.2**	<1	0.799 J	<1	<1	<1	0.401 J
Tetrachloroethene (PCE)	ug/L	5	2.5	**4.62**	0.914 J	**140**	0.675 J	0.801 J	<1	**2.95**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	0.709 J	<1	<1	<1	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	**796**	0.948 J	**71.8**	<1	<1	<1	**3.1**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				2827	6.16	294	0.95	0.80	0	6.97
1,1,1,2-Tetrachloroethane	ug/L	--	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	**3.47**	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	**3.69**	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	**1.06**	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	75	--	<0.5	<0.5	0.156 B	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	<10	<10	7.05 B	<10	<10	**14 B**	2.97 B
Benzene	ug/L	5	--	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromomethane	ug/L	--	--	<1	**2.81 B**	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	100	--	<1	<1	<1	<1	<1	<1	<1

Notes:

a Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G
µg/L micrograms per liter
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982 62

TABLE 4-2
POSITIVE RESULTS SUMMARY - MONITORING WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Well ID	Maximum	Target	MW-148	MW-149	MW-150	MW-151	MW-152	MW-153	MW-154
	Lab ID	Contaminant	Concentration	L08100573-27	L08100600-11	L08100600-12	L08100600-13	L08100600-14	L08100600-15	L08100600-16
	Date	Levels[a]		10/17/2008	10/20/2008	10/20/2008	10/20/2008	10/20/2008	10/20/2008	10/20/2008
Volatile Organic Compounds - SW8260B	units									
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**9.66**	**1.71**	**1750**	<0.5	**11.7**	<0.5	<0.5
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	**12.4**	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	0.992 J	<1	0.758 J	**5.31**	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	**8.17**	<1	0.564 J	0.459 J	<1	<1
Chloroform (CF)	ug/L	80	12	**0.665**	**25.6**	**5**	**1.34**	**2.59**	<0.3	<0.3
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	**6.63**	**1.63**	**22.4**	<1	**40.2**	<1	<1
Tetrachloroethene (PCE)	ug/L	5	2.5	**2.42**	0.717 J	**5.22**	<1	**15.7**	0.272 J	<1
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	**1.73**	0.378 J	**1.28**	<1	**13.4**	<1	<1
Trichloroethene (TCE)	ug/L	5	5	**107**	**19.8**	**636**	**2.62**	**260**	<1	<1
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				128	58	2433	4.52	345	5.58	0
1,1,1,2-Tetrachloroethane	ug/L	--	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	<1	<1	**1.06**	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	<1	<1	0.363 J	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	75	--	0.149 B	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	5.64 B	**11.9 B**	4.63 B	<10	7.62 B	6.42 B	<10
Benzene	ug/L	5	--	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromomethane	ug/L	--	--	**2.85 B**	<1	**3.04 B**	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	100	--	<1	<1	<1	<1	<1	<1	<1

Notes:

[a] Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G
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982 63

TABLE 4-2
POSITIVE RESULTS SUMMARY - MONITORING WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Well ID	Maximum	Target	MW-155	MW-156	MW-157	MW-158	MW-158A	MW-159	MW-160
	Lab ID	Contaminant	Concentration	L08100600-17	L08100600-18	L08100573-28	L08100600-21	L08100600-22	L08100600-25	L08100600-26
	Date	Levels[a]		10/20/2008	10/20/2008	10/17/2008	10/20/2008	10/20/2008	10/20/2008	10/20/2008
Volatile Organic Compounds - SW8260B	units									
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**2040**	<0.5 J	**7.19**	**27.4**	**29.4**	**271**	**2340**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	**7.58**	<1	0.39 J	<1	<1	**92.8**	**3.84 J**
1,1-Dichloroethene (DCE)	ug/L	7	7	**1.04**	<1	<1	<1	**1.65**	**7.33**	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	**12**	<1	0.825 J	<1	0.388 J
Chloroform (CF)	ug/L	80	12	**1.17**	<0.3	**89.6**	**0.682**	**3.94**	**1.66**	**1.75 J**
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	**46.8**	<1	**3.29**	**7.79**	**54.4 J**	**959**	**40.6 J**
Tetrachloroethene (PCE)	ug/L	5	2.5	**10.4**	<1	**1.15**	**6.92**	**15**	**5.48**	**9.87 J**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	**3.58**	<1	0.589 J	**2.74**	**18**	**46.2**	**5.81 J**
Trichloroethene (TCE)	ug/L	5	5	**1210**	<1	**38.3**	**162**	**408**	**1320**	**1050**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	**17.7**	<1
Total Primary CVOCs				3321	0	153	208	531	2723	3452
1,1,1,2-Tetrachloroethane	ug/L	--	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.779 J**
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5	**1.34 J**	<0.5
1,4-Dichlorobenzene	ug/L	75	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	4.4 B	**15.8 B**	3.32 B	4.43 B	6.86 B	6.89 B	7.85 B
Benzene	ug/L	5	--	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromomethane	ug/L	--	--	<1	**2.87 B**	**2.81 B**	<1	**2.82 B**	**2.75 B**	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1	**2.2**	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	100	--	<1	<1	<1	<1	<1	<1	<1

Notes:

a Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G
µg/L micrograms per liter
-- Not listed
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DQE Flags:

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982 64

TABLE 4-2
POSITIVE RESULTS SUMMARY - MONITORING WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well ID / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-161 L08100573-29 10/17/2008	MW-162 L08100573-30 10/17/2008	MW-163 L08100573-31 10/17/2008	MW-164 L08100573-32 10/17/2008	MW-165 L08100600-27 10/20/2008	MW-165A L08100600-28 10/20/2008	MW-166 L08100600-29 10/20/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**2120**	**7140**	**1710**	**6.83**	**4.94**	**10.5**	**0.519**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	**6.61**	<50	**6.96**	0.403 J	0.491 J	0.496 J	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<50	<5	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	0.39 J	<50	<5	**4.43**	**4.59**	**10.8**	**5.38**
Chloroform (CF)	ug/L	80	12	**3.65**	<15	**7.67**	**32.2**	**34.3**	**82.7**	**14.1**
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	**27**	38.7 J	**29.9**	**2.91**	**9.28**	**10.2**	**1.2**
Tetrachloroethene (PCE)	ug/L	5	2.5	**6.79**	<50	<5	0.728 J	**1.3**	**2.32**	0.621 J
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	**2.91**	<50	3.81 J	0.41 J	**1.62**	**1.38**	0.354 J
Trichloroethene (TCE)	ug/L	5	5	**952**	**1610**	**615**	**27**	**94.1**	**112**	**15**
Vinyl chloride (VC)	ug/L	2	--	<1	<50	<5	<1	<1	<1	<1
Total Primary CVOCs				3119	8789	2373	74.9	151	230	37.2
1,1,1,2-Tetrachloroethane	ug/L	--	--	**0.93**	<25	<2.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	200	--	<1	<50	<5	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<50	<5	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<25	<2.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	75	--	<0.5	<25	<2.5	0.297 B	**0.572 B**	<0.5	<0.5
Acetone	ug/L	--	--	**17.3 B**	<500	21.1 B	5.65 B	**15.6 B**	5.54 B	4.76 B
Benzene	ug/L	5	--	<0.4	<20	<2	<0.4	<0.4	<0.4	<0.4
Bromomethane	ug/L	--	--	<1	<50	<5	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<50	<5	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<25	<2.5	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	100	--	<1	<50	<5	<1	<1	<1	<1

Notes:

[a] Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G
µg/L micrograms per liter
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982 65

TABLE 4-2
POSITIVE RESULTS SUMMARY - MONITORING WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well ID / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-166A / L08100600-30 / 10/20/2008	MW-167 / L08100600-33 / 10/20/2008	MW-168 / L08100600-34 / 10/20/2008	MW-168A / L08100600-35 / 10/20/2008	MW-169 / L08100600-36 / 10/20/2008	MW-170 / L08100600-37 / 10/20/2008	MW-171 / L08100600-38 / 10/20/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	0.149 J	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	0.711 J	**5.27**	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	**3.17**	<1	<1	<1	<1	<1	<1
Chloroform (CF)	ug/L	80	12	**14.5**	<0.3	<0.3	0.222 J	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	**1.82**	<1	<1	<1	<1	<1	<1
Tetrachloroethene (PCE)	ug/L	5	2.5	0.694 J	<1	<1	0.503 J	<1	<1	<1
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	0.75 J	<1	<1	<1	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	**62.7**	<1	0.392 J	<1	<1	<1	<1
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				83.8	0	1.10	6.00	0	0	0
1,1,1,2-Tetrachloroethane	ug/L	--	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	**1.73**	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	0.419 J	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	75	--	<0.5	0.429 B	<0.5	<0.5	0.494 B	<0.5	<0.5
Acetone	ug/L	--	--	6.62 B	**15.3 B**	<10	<10	**13.9 B**	**18.2 B**	**15 B**
Benzene	ug/L	5	--	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromomethane	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	0.471 J	<0.5	<0.5
Styrene	ug/L	100	--	<1	<1	<1	<1	<1	<1	<1

Notes:

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Target Concentration (TC) from Dunn Field ROD, Table 2-21G

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POSITIVE RESULTS SUMMARY - MONITORING WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Well ID / Lab ID / Date	Maximum Contaminant Levels[a]	Target Concentration	MW-172	MW-174	MW-178	MW-179	MW-180	MW-187	MW-220
	Lab ID			L08100573-49	L08100573-50	L08100600-42	L08100600-43	L08100653-10	L08100573-51	L08100653-11
	Date			10/16/2008	10/16/2008	10/20/2008	10/20/2008	10/21/2008	10/16/2008	10/21/2008
Volatile Organic Compounds - SW8260B	units									
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	**0.629**	<0.5	<0.5	<0.5	<0.5	0.267 J
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	<1	<1	**2.04**	<1	**44.3**
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	<1	<1	<1
Chloroform (CF)	ug/L	80	12	0.139 J	0.154 J	0.125 J	0.131 J	<0.3	0.183 J	0.217 J
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene (PCE)	ug/L	5	2.5	<1	<1	0.419 J	0.627 J	**1.88**	<1	**13.7**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1	<1	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	<1	<1	0.373 J	<1	**1.8**	<1	**15.2**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				0.14	0.78	0.92	0.76	5.72	0.18	74.1
1,1,1,2-Tetrachloroethane	ug/L	--	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	<1	<1	<1	0.491 J
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	<1	<1	<1	0.942 J
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.427 J
1,4-Dichlorobenzene	ug/L	75	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ug/L	--	--	<10	<10	2.95 B	<10	2.92 J	<10	<10
Benzene	ug/L	5	--	<0.4	<0.4	**3.22**	<0.4	<0.4	<0.4	<0.4
Bromomethane	ug/L	--	--	**2.89 B**	**2.82 B**	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	100	--	<1	<1	<1	<1	<1	<1	<1

Notes:

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DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Well ID	Maximum	Target	MW-221	MW-222	MW-223	MW-224	MW-225	MW-226	MW-227
	Lab ID	Contaminant	Concentration	L08100653-12	L08100600-44	L08100573-41	L08100600-45	L08100573-42	L08100600-46	L08100573-43
	Date	Levels[a]		10/21/2008	10/20/2008	10/17/2008	10/20/2008	10/17/2008	10/20/2008	10/17/2008
Volatile Organic Compounds - SW8260B	units									
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	0.329 J	**47.1**	**0.913**	<0.5	**22.8**	<0.5	**10.7**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	0.648 J	<1	<1	<1	<1	0.982 J
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	<1	<1	**7.26**
Chloroform (CF)	ug/L	80	12	<0.3	<0.3	0.249 J	<0.3	0.149 J	0.155 J	**134**
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	**4.51**	<1	<1	0.321 J	<1	**6.4**
Tetrachloroethene (PCE)	ug/L	5	2.5	<1	0.484 J	0.457 J	0.628 J	0.652 J	0.533 J	**2.7**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	0.376 J	<1	<1	<1	<1	**1.04**
Trichloroethene (TCE)	ug/L	5	5	0.501 J	**5.81**	**3.56**	<1	**8.66**	<1	**61.8**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				0.83	58.9	5.18	0.63	32.6	0.69	228
1,1,1,2-Tetrachloroethane	ug/L	--	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2.99**
1,4-Dichlorobenzene	ug/L	75	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.178 B
Acetone	ug/L	--	--	<10	**3.33 B**	<10	**3.01 B**	2.84 B	<10	<10
Benzene	ug/L	5	--	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromomethane	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	100	--	<1	<1	<1	<1	<1	<1	<1

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Volatile Organic Compounds - SW8260B	Well ID / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	MW-228 L08100573-44 10/17/2008	MW-230 L08100693-03 10/22/2008	MW-231 L08100693-08 10/22/2008	MW-232 L08100653-14 10/21/2008	MW-234 L08100693-09 10/22/2008	MW-235 L08100693-06 10/22/2008	MW-236 L08100693-07 10/22/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	**32.7**	<1	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	<1	<1	<1
Chloroform (CF)	ug/L	80	12	0.155 J	0.276 J	<0.3	<0.3	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	**1.27**	<1	<1	<1	<1	<1
Tetrachloroethene (PCE)	ug/L	5	2.5	<1	**100**	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1	<1	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	<1	**98.4**	<1	<1	<1	<1	<1
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	**13.2**	<1	<1	<1
Total Primary CVOCs				0.16	233	0	13.2	0	0	0
1,1,1,2-Tetrachloroethane	ug/L	--	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	200	--	<1	**1.65**	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	<1	**2.25**	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	**0.71**	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	75	--	<0.5	<0.5	<0.5	0.14 B	0.134 B	<0.5	<0.5
Acetone	ug/L	--	--	<10	<10	<10	3.77 J	<10	<10	<10
Benzene	ug/L	5	--	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromomethane	ug/L	--	--	<1	<1	**0.788 B**	<1	**0.609 B**	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	100	--	<1	<1	<1	**1.04**	<1	<1	<1

Notes:

a Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G

μg/L micrograms per liter

-- Not listed

Results detected at or above reporting limits shown in bold

DQE Flags:

J Estimated result based on QC data or reported below RL

B Estimated result possibly biased high or false positive based on blank data

< Analyte not detected above RL

982 69

TABLE 4-2
POSITIVE RESULTS SUMMARY - MONITORING WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Well ID	Maximum	Target	MW-237	MW-238	MW-239	MW-240
	Lab ID	Contaminant	Concentration	L08100693-10	L08100693-11	L08100653-15	L08100653-13
	Date	Levels[a]		10/22/2008	10/22/2008	10/21/2008	10/21/2008
Volatile Organic Compounds - SW8260B	units						
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	**2.02**	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1
Chloroform (CF)	ug/L	80	12	0.162 J	<0.3	<0.3	<0.3
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	<1	<1	**1.01**
Tetrachloroethene (PCE)	ug/L	5	2.5	0.261 J	<1	<1	<1
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	<1	<1	<1	**1.63**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1
Total Primary CVOCs				2.44	0	0	2.64
1,1,1,2-Tetrachloroethane	ug/L	--	--	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	200	--	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	--	--	0.237 J	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	75	--	0.14 B	0.192 B	0.378 B	<0.5
Acetone	ug/L	--	--	<10	<10	**21**	<10
Benzene	ug/L	5	--	<0.4	<0.4	<0.4	<0.4
Bromomethane	ug/L	--	--	<1	**0.5 B**	<1	<1
Carbon disulfide	ug/L	--	--	<1	<1	0.533 J	<1
Chlorobenzene	ug/L	100	--	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	100	--	<1	<1	<1	<1

Notes:

[a] Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G
µg/L micrograms per liter
-- Not listed
Results detected at or above reporting limits shown in bold

DQE Flags:

J Estimated result based on QC data or reported below RL
B Estimated result possibly biased high or false positive based on blank data
< Analyte not detected above RL

982 70

TABLE 4-3
POSITIVE RESULTS SUMMARY - RECOVERY WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	Maximum Contaminant Levels[a]	Target Concentration	RW-1 L08040517-06 4/16/2008	RW-1A L08040517-07 4/16/2008	RW-1B L08040517-08 4/16/2008	RW-2 L08040517-09 4/16/2008	RW-3 L08040517-10 4/16/2008	RW-4 L08040517-11 4/16/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**0.518**	**43.7**	**1.09**	**40.5**	**20.9**	**19.4**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	0.5 J	<1	**1.39**	0.717 J	0.287 J
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	**17.9**	**1.05**	**2.75**	**5.56**	0.961 J	0.799 J
Chloroform (CF)	ug/L	80	12	**81.9**	**27.8**	**78.3**	**107**	**1.82**	**0.796**
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	**2.02**	**1.01**	0.783 J	**18**	**5.49**	**1.13**
Tetrachloroethene (PCE)	ug/L	5	2.5	**4.07**	0.561 J	0.982 J	**1.9**	0.429 J	0.809 J
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	**1.05**	<1	<1	0.976 J	0.298 J	0.299 J
Trichloroethene (TCE)	ug/L	5	5	**53.9**	**10.6**	**18.1**	**43.5**	**10.7**	**55.4**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				161	85.9	102	219	41.3	78.9
1,2-Dichloroethane	ug/L	5	--	<0.5	**0.652**	<0.5	0.273 J	<0.5	<0.5

Notes:

a Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G

µg/L micrograms per liter

-- Not listed

Results detected at or above reporting limits shown in bold

DQE Flags:

J Estimated result based on QC data or reported below RL

B Estimated result possibly biased high or false positive based on blank data

< Analyte not detected above RL

982 71

982 72

TABLE 4-3
POSITIVE RESULTS SUMMARY - RECOVERY WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	RW-5 L08040517-01 4/16/2008	RW-6 L08040517-12 4/16/2008	RW-7 L08040517-02 4/16/2008	RW-8 L08040517-13 4/16/2008	RW-9 L08040517-14 4/16/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**14.4**	<0.5	**1.29**	**0.551**	**3.55**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	<1	**1.27**	**17.4**
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	<1
Chloroform (CF)	ug/L	80	12	0.133 J	0.239 J	0.143 J	<0.3	0.184 J
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	<1	<1	<1	<1
Tetrachloroethene (PCE)	ug/L	5	2.5	**2.36**	**4.4**	**1.33**	**1**	**19.1**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	**5.75**	**1.24**	**1.55**	0.919 J	**14**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1
Total Primary CVOCs				22.6	5.88	4.31	3.74	54.2
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:

a Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G

µg/L micrograms per liter

-- Not listed

Results detected at or above reporting limits shown in bold

DQE Flags:

J Estimated result based on QC data or reported below RL

B Estimated result possibly biased high or false positive based on blank data

< Analyte not detected above RL

982 73

TABLE 4-4
POSITIVE RESULTS SUMMARY - RECOVERY WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well ID / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	RW-1 L08100573-33 10/17/2008	RW-1A L08100573-34 10/17/2008	RW-1B L08100573-35 10/17/2008	RW-2 L08100573-36 10/17/2008	RW-3 L08100573-37 10/17/2008	RW-4 L08100573-05 10/17/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	<0.5	**14.3**	**3.41**	**17.5**	**1.7**	**52.5 J**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	0.299 J	<1	0.738 J	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	<1	<1	<1	<1
Carbon tetrachloride (CT)	ug/L	5	3	**11.8**	**1**	0.367 J	**3.08**	<1	<1
Chloroform (CF)	ug/L	80	12	**49.8**	**19.2**	**13.3**	**70.8**	**0.762**	0.287 J
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	**1.36**	**1.03**	<1	**7.69**	0.865 J	0.546 J
Tetrachloroethene (PCE)	ug/L	5	2.5	**2.35**	0.494 J	0.293 J	**1.28**	<1	0.616 J
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	0.735 J	<1	<1	0.529 J	<1	<1
Trichloroethene (TCE)	ug/L	5	5	**34**	**8.9**	**2.6**	**29.6**	**1.94**	**28.8**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1	<1
Total Primary CVOCs				100	45.9	20.0	131	5.27	82.7
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	5	--	<0.5	**0.693**	<0.5	0.26 J	<0.5	<0 5

Notes:

a Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G

µg/L micrograms per liter

-- Not listed

Results detected at or above reporting limits shown in bold

DQE Flags:

J Estimated result based on QC data or reported below RL

B Estimated result possibly biased high or false positive based on blank data

< Analyte not detected above RL

TABLE 4-4
POSITIVE RESULTS SUMMARY - RECOVERY WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well ID / Lab ID / Date / units	Maximum Contaminant Levels[a]	Target Concentration	RW-5 L08100573-08 10/17/2008	RW-6 L08100573-09 10/17/2008	RW-7 L08100573-10 10/17/2008	RW-8 L08100573-11 10/17/2008	RW-9 L08100573-12 10/17/2008
1,1,2,2-Tetrachloroethane (TeCA)	ug/L	--	2.2	**1.59**	<0.5	0.447 J	**2.06**	**1.2**
1,1,2-Trichloroethane (TCA)	ug/L	5	1.9	<1	<1	<1	<1	<1
1,1-Dichloroethene (DCE)	ug/L	7	7	<1	<1	<1	**18**	**25**
Carbon tetrachloride (CT)	ug/L	5	3	<1	<1	<1	<1	<1
Chloroform (CF)	ug/L	80	12	0.129 J	0.15 J	<0.3	0.193 J	0.223 J
cis-1,2-Dichloroethene (cDCE)	ug/L	70	35	<1	<1	<1	0.308 J	0.317 J
Tetrachloroethene (PCE)	ug/L	5	2.5	0.836 J	0.887 J	<1	**7.85**	**43.1**
trans-1,2-Dichloroethene (tDCE)	ug/L	100	50	<1	<1	<1	<1	<1
Trichloroethene (TCE)	ug/L	5	5	0.753 J	0.274 J	0.634 J	**10.2**	**30.2**
Vinyl chloride (VC)	ug/L	2	--	<1	<1	<1	<1	<1
Total Primary CVOCs				3.31	1.31	1.08	38.6	100
1,1-Dichloroethane	ug/L	--	--	<1	<1	<1	0.433 J	**1.06**
1,2-Dichloroethane	ug/L	5	--	<0.5	<0.5	<0.5	<0.5	0.391 J

Notes:

[a] Drinking Water Standards and Health Advisories (USEPA, 2004)
Target Concentration (TC) from Dunn Field ROD, Table 2-21G
μg/L micrograms per liter
-- Not listed
Results detected at or above reporting limits shown in bold

DQE Flags:
J Estimated result based on QC data or reported below RL
B Estimated result possibly biased high or false positive based on blank data
< Analyte not detected above RL

982 74

TABLE 4-5
EFFLUENT SAMPLE RESULTS
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Industrial Permit Discharge Limits						
Sample ID	Monthly Average	Instantaneous	Effluent	Effluent	Effluent	Effluent	Effluent
Date	Maximum Level	Daily Maximum	1/9/2008	4/16/2008	7/7/2008	10/17/2008	1/21/2009
pH - E150.1							
pH			NC	6.11	NC	6.26	NC
Volatile Organic Compounds - SW8260B µg/L							
1,1,1-Trichloroethane	10	20	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	500	1000	14.4	6.94	135	7.76 J	15.1
1,1,2-Trichloroethane	50	100	ND	ND	ND	ND	ND
1,1-Dichloroethane	NA	NA	ND	ND	ND	ND	ND
1,1-Dichloroethene	50	100	7.58	6.94	ND	12	ND
Acetone	2000	4000	ND	ND	ND	ND	ND
Carbon tetrachloride	20	40	1.08	ND	1.81	ND	ND
Chloroform	100	400	12.7	9.16	54.5	4.71	8.42
Chloromethane	10	20	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	80	100	2.89	1.27	6.11	0.822 J	1
Methylene chloride	10	20	ND	ND	ND	ND	ND
Tetrachloroethene	60	120	9.09	7.83	1.04	16.5	0.704 J
Toluene	20	40	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	50	100	ND	ND	1.02	ND	ND
Trichloroethene	400	800	26.1	13.3	32.1	18	11.1
Total Metals - SW6010B µg/L							
Aluminum	5000	10000	NS	ND	NS	ND	NS
Antimony	6	12	NS	ND	NS	ND	NS
Arsenic, Total	40	100	NS	ND	NS	ND	NS
Barium, Total	2000	4000	NS	98.7	NS	99.9	NS
Cadmium	10	20	NS	ND	NS	ND	NS
Calcium, Total	40,000	80,000	NS	19600	NS	23000	NS
Chromium	200	400	NS	ND	NS	ND	NS
Copper	600	1200	NS	ND	NS	ND	NS
Iron, Total	10,000	20,000	NS	ND	NS	382	NS
Lead, Total	150	300	NS	ND	NS	1.44	NS
Magnesium, Total	20000	40000	NS	10900	NS	12100	NS
Manganese, Total	50	100	NS	16.1	NS	78.2	NS
Mercury	1	2	NS	ND	NS	ND	NS
Nickel	100	300	NS	ND	NS	ND	NS
Potassium, Total	2000	4000	NS	773 J	NS	839 J	NS
Selenium, Total	50	100	NS	1.51	NS	0.984 J	NS
Sodium, Total	40000	80000	NS	20500	NS	24400	NS
Thallium	2	4	NS	ND	NS	ND	NS
Zinc, Total	300	1000	NS	33	NS	42.7	NS
Semi-volatile Organic Compounds - SW8270B µg/L							
Bis (2-ethylhexyl) Phthalate	35	70	NS	ND	NS	ND	NS
Di-n-butyl Phthalate	30	60	NS	ND	NS	ND	NS
Fluoranthene	10	20	NS	ND	NS	ND	NS
Naphthalene	10	20	NS	ND	NS	ND	NS
Phenanthrene	10	20	NS	ND	NS	ND	NS
Phenol	10	20	NS	ND	NS	ND	NS
Pyrene	10	20	NS	ND	NS	ND	NS

Notes:

µg/L micrograms per liter
ND Analyte not detected at or above RL
NC Not Collected
NA Discharge limit not established in agreement

DQE Flags:

J Estimated result based on QC data or reported below RL

TABLE 4-6
SUMMARY OF ANALYTICAL RESULTS - MONITORING WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Primary CVOCs	Maximum Contaminant Level (µg/L)	Target Concentration (µg/L)	Locations with Analyte Above RL	Maximum Concentration (µg/L)	Location of Maximum Concentration	Locations with Analyte Above MCL	Locations with Analyte Above TC
1,1,2,2-Tetrachloroethane (TeCA)	--	2.2	37	4,160	MW-162	--	31
1,1,2-Trichloroethane (TCA)	5	1.9	6	111	MW-159	4	4
1,1-Dichloroethene (DCE)	7	7	12	73.4	MW-130	6	6
Carbon tetrachloride (CT)	5	3	12	16	MW-15	8	12
Chloroform (CF)	80	12	30	110	MW-227	3	10
cis-1,2-Dichloroethene (cDCE)	70	35	29	1,220	MW-159	2	5
Tetrachloroethene (PCE)	5	2.5	25	196	MW-130	10	16
trans-1,2-Dichloroethene (tDCE)	100	50	18	26.6	MW-159	0	0
Trichloroethene (TCE)	5	5	51	1,600	MW-155	39	39
Vinyl chloride (VC)	2	--	1	13.5	MW-70	1	--

Notes:
µg/L micrograms per liter
-- Not Listed
MCL Maximum Contaminant Level
RL Reporting Limit
TC Target Concentration

982 76

TABLE 4-7
SUMMARY OF ANALYTICAL RESULTS - MONITORING WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Primary CVOCs	Maximum Contaminant Level (µg/L)	Target Concentration (µg/L)	Locations with Analyte Above RL	Maximum Concentration (µg/L)	Location of Maximum Concentration	Locations with Analyte Above MCL	Locations with Analyte Above TC
1,1,2,2-Tetrachloroethane (TeCA)	--	2.2	31	7140	MW-162	--	25
1,1,2-Trichloroethane (TCA)	5	1.9	7	92.8	MW-159	5	7
1,1-Dichloroethene (DCE)	7	7	14	80.2	MW-130	7	7
Carbon tetrachloride (CT)	5	3	12	12	MW-157	6	11
Chloroform (CF)	80	12	26	134	MW-227	3	12
cis-1,2-Dichloroethene (cDCE)	70	35	26	959	MW-159	1	6
Tetrachloroethene (PCE)	5	2.5	26	140	MW-130	13	17
trans-1,2-Dichloroethene (tDCE)	100	50	13	46.2	MW-159	0	0
Trichloroethene (TCE)	5	5	42	1610	MW-162	33	33
Vinyl chloride (VC)	2	--	2	17.7	MW-159	2	--

Notes:
µg/L micrograms per liter
-- Not Listed
MCL Maximum Contaminant Level
RL Reporting Limit
TC Target Concentration

982 77

TABLE 4-8
SUMMARY OF ANALYTICAL RESULTS - RECOVERY WELLS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

VOC Analyte	Maximum Contaminant Level (µg/L)	Target Concentration (µg/L)	Locations with Analyte Above RL	Maximum Concentration (µg/L)	Location of Maximum Concentration	Locations with Analyte Above MCL	Locations with Analyte Above TC
1,1,2,2-Tetrachloroethane (TeCA)	--	2.2	10	44	RW-1A	--	6
1,1,2-Trichloroethane (TCA)	5	1.9	1	1.39	RW-2	0	0
1,1-Dichloroethene (DCE)	7	7	2	17.4	RW-9	1	1
1,2-Dichloroethane (DCA)	5	--	0	0 652	RW-1A	0	--
Carbon tetrachloride (CT)	5	3	4	17.9	RW-1	1	1
Chloroform (CF)	80	12	6	107	RW-2	4	4
cis-1,2-Dichloroethene (cDCE)	70	35	5	18	RW-2	0	0
Tetrachloroethene (PCE)	5	2.5	7	19.1	RW-9	1	3
trans-1,2-Dichloroethene (tDCE)	100	50	1	1.05	RW-1	0	0
Trichloroethene (TCE)	5	5	10	55.4	RW-4	7	7
Vinyl chloride (VC)	2	--	0	--	--	0	--

Notes:
µg/L micrograms per liter
-- Not Listed
MCL Maximum Contaminant Level
RL Reporting Limit
TC Target Concentration

982 78

TABLE 4-9
SUMMARY OF ANALYTICAL RESULTS - RECOVERY WELLS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

VOC Analyte	Maximum Contaminant Level (µg/L)	Target Concentration (µg/L)	Locations with Analyte Above RL	Maximum Concentration (µg/L)	Location of Maximum Concentration	Locations with Analyte Above MCL	Locations with Analyte Above TC
1,1,2,2-Tetrachloroethane (TeCA)	--	2.2	8	52.5 J	RW-4	--	4
1,1,2-Trichloroethane (TCA)	5	1.9	0	0.738 J	RW-2	0	0
1,1-Dichloroethene (DCE)	7	7	2	25	RW-9	2	2
Carbon tetrachloride (CT)	5	3	3	11.8	RW-1	1	2
Chloroform (CF)	80	12	5	70.8	RW-2	0	4
cis-1,2-Dichloroethene (cDCE)	70	35	3	7.69	RW-2	0	0
Tetrachloroethene (PCE)	5	2.5	4	43.1	RW-9	2	2
trans-1,2-Dichloroethene (tDCE)	100	50	0	0.735 J	RW-1	0	0
Trichloroethene (TCE)	5	5	8	34	RW-1	6	6
Vinyl chloride (VC)	2	--	0	--	--	0	--

Notes:
µg/L micrograms per liter
-- Not Listed
MCL Maximum Contaminant Level
RL Reporting Limit
TC Target Concentration

982 79

TABLE 5-1
SYSTEM REPAIRS, 2003 THROUGH 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

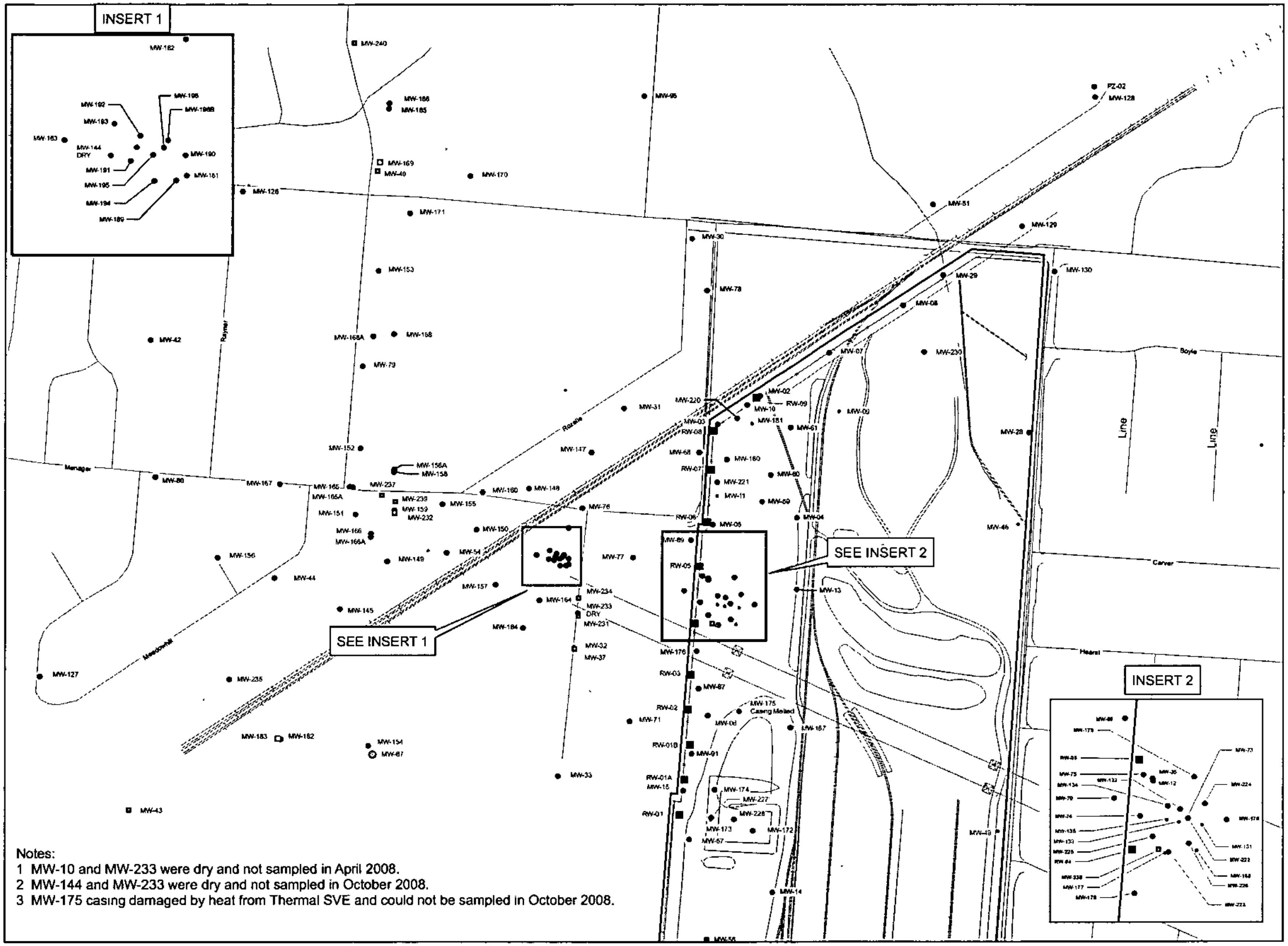
Recovery Well	Year	Percent Operational	REPAIRS/REPLACEMENT							
			Pump	Pump Leads[1]	Flowmeter	Flowmeter Actuator	Pressure Transducer	Level Relay	Flow Relay	Controller
RW-1	2003	67	1		1					
	2004	95			1					
	2005	100	1			1	1	1	1	
	2006	100								
	2007	95		1			1			
	2008	99[2]								
RW-1A	2003	100								
	2004	97								
	2005	100	1			1	1	1		
	2006	99			1					
	2007	91		1			1			
	2008	94[2]	1							
RW-1B	2003	100								
	2004	85								
	2005	52	1		1	1	1	1		
	2006	94	1							
	2007	95					1			
	2008	99[2]			1					
RW-2	2003	100								
	2004	83								
	2005	42	2		1		1	1		3
	2006	92			1			1		
	2007	97								
	2008	100[2]	1	1	1					
RW-3	2003	100								
	2004	98			1					2
	2005	100				1	1	1		
	2006	100			2					
	2007	99								
	2008	100[2]								
RW-4	2003	75								
	2004	78	1							2
	2005	87	1		2			1		
	2006	81			1					
	2007	93			1			1		
	2008	100[2]								
RW-5	2003	100			2					
	2004	95			1					
	2005	55	1		1	2	1	1		1
	2006	96	1		1					
	2007	94		2	1			1		
	2008	100[3]								

TABLE 5-1
SYSTEM REPAIRS, 2003 THROUGH 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Recovery Well	Year	Percent Operational	REPAIRS/REPLACEMENT Pump	Pump Leads[1]	Flowmeter	Flowmeter Actuator	Pressure Transducer	Level Relay	Flow Relay	Controller
RW-6	2003	100								
	2004	97								
	2005	100								
	2006	100								
	2007	97				1		1		
	2008	95[3]						1		
RW-7	2003	100								
	2004	92	1							
	2005	80	2		2	1				
	2006	84	2		1					
	2007	95					1	1		
	2008	96[3]			1			1		
RW-8	2003	100								
	2004	88	1							
	2005	100								
	2006	95	1		1					
	2007	97		1						
	2008	98[3]			1					
RW-9	2003	100	1							
	2004	98			1					
	2005	96	1		2					
	2006	100			1	1				
	2007	96						1		
	2008	100[3]								

Notes:
(1) Information on pump leads only tracked since 2007.
(2) Operational uptime calculated from January 2008 to January 21, 2009 shut down.
(3) Operational uptime calculated from January 2008 to June 5, 2008 shut down.

FIGURES



Notes:
1 MW-10 and MW-233 were dry and not sampled in April 2008.
2 MW-144 and MW-233 were dry and not sampled in October 2008.
3 MW-175 casing damaged by heat from Thermal SVE and could not be sampled in October 2008.

Figure 1-1

WELL LOCATION MAP

ANNUAL OPERATIONS REPORT - 2008

DUNN FIELD GROUNDWATER IRA YEAR TEN

DEFENSE DEPOT MEMPHIS, TENNESSEE

Legend
- Monitoring Well Screened in the Fluvial Aquifer
- Recovery 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
- MW-11 Abandoned
- MW-33 2008 Sample Location
- Dunn Field Boundary

0 150 300 450 60

Feet

Installation Location
Memphis, Tennessee

Date: March 2009
Edition: Rev 0

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982 83

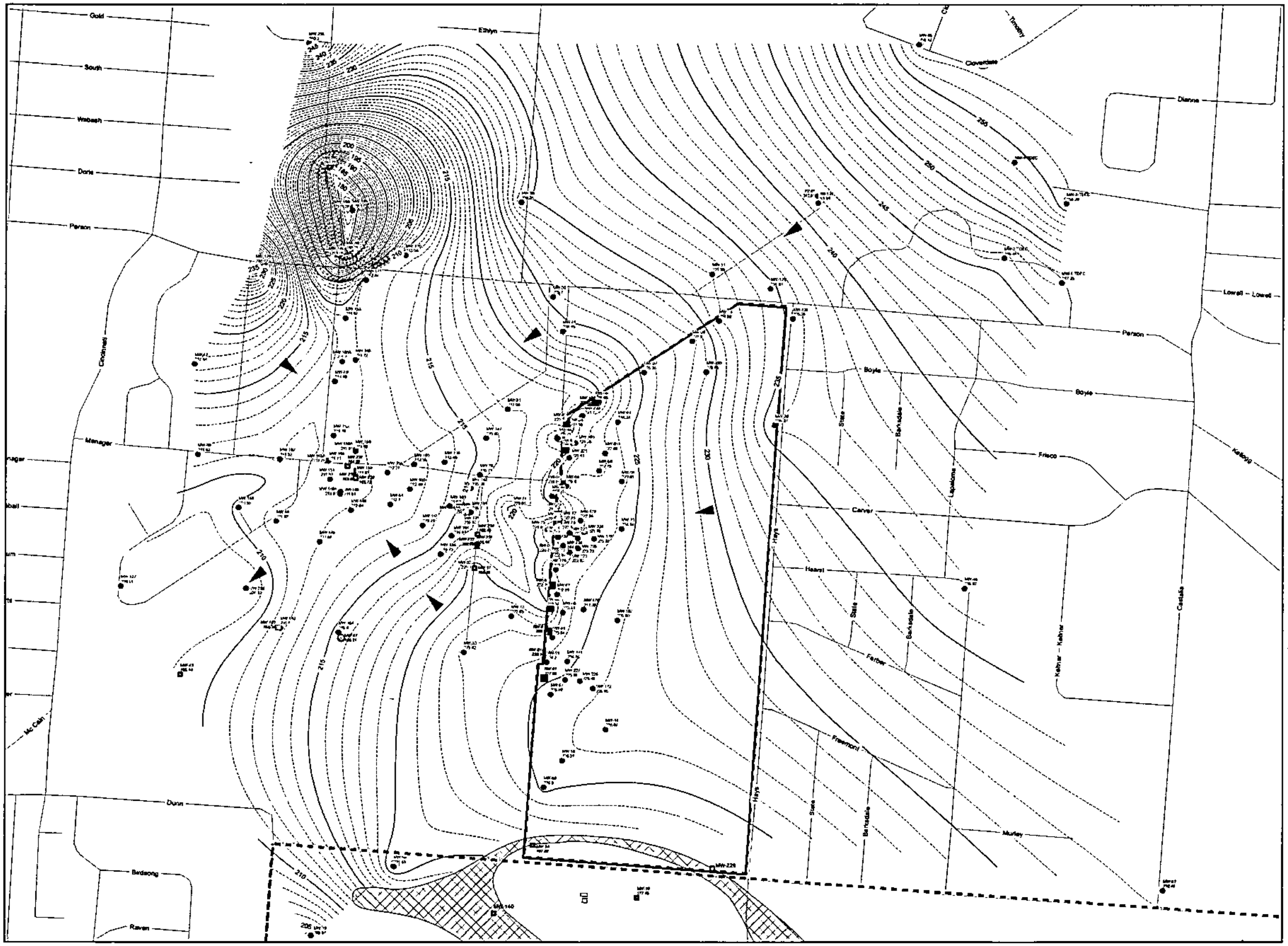

Figure 4-1

GROUNDWATER ELEVATION CONTOUR MAP
10 APRIL 2008

ANNUAL OPERATIONS REPORT - 2008

DUNN FIELD GROUNDWATER IRA YEAR TEN

DEFENSE DEPOT MEMPHIS, TENNESSEE

Legend

- Monitoring Well Screened in the Fluvial Aquifer
- Recovery 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
- Dunn Field Boundary
- ClayArea *Clay Elevation Exceeds Groundwater Elevatic*

MW-03 100.12 Blue non-italics: value used for groundwater contours

MW-237 100.15 Black Italics: value not used for groundwater contours (non-fluvial well or anomalous reading)

Groundwater Contours

- 1-ft Contour
- 5-ft Contour
- Groundwater Flow Direction

0 200 400 600 8(
Feet

Installation Location
Memphis, Tennessee

Date: February 2009
Edition: Rev 0

G:\3202\016\IRA\IS-5\GIS

982 84

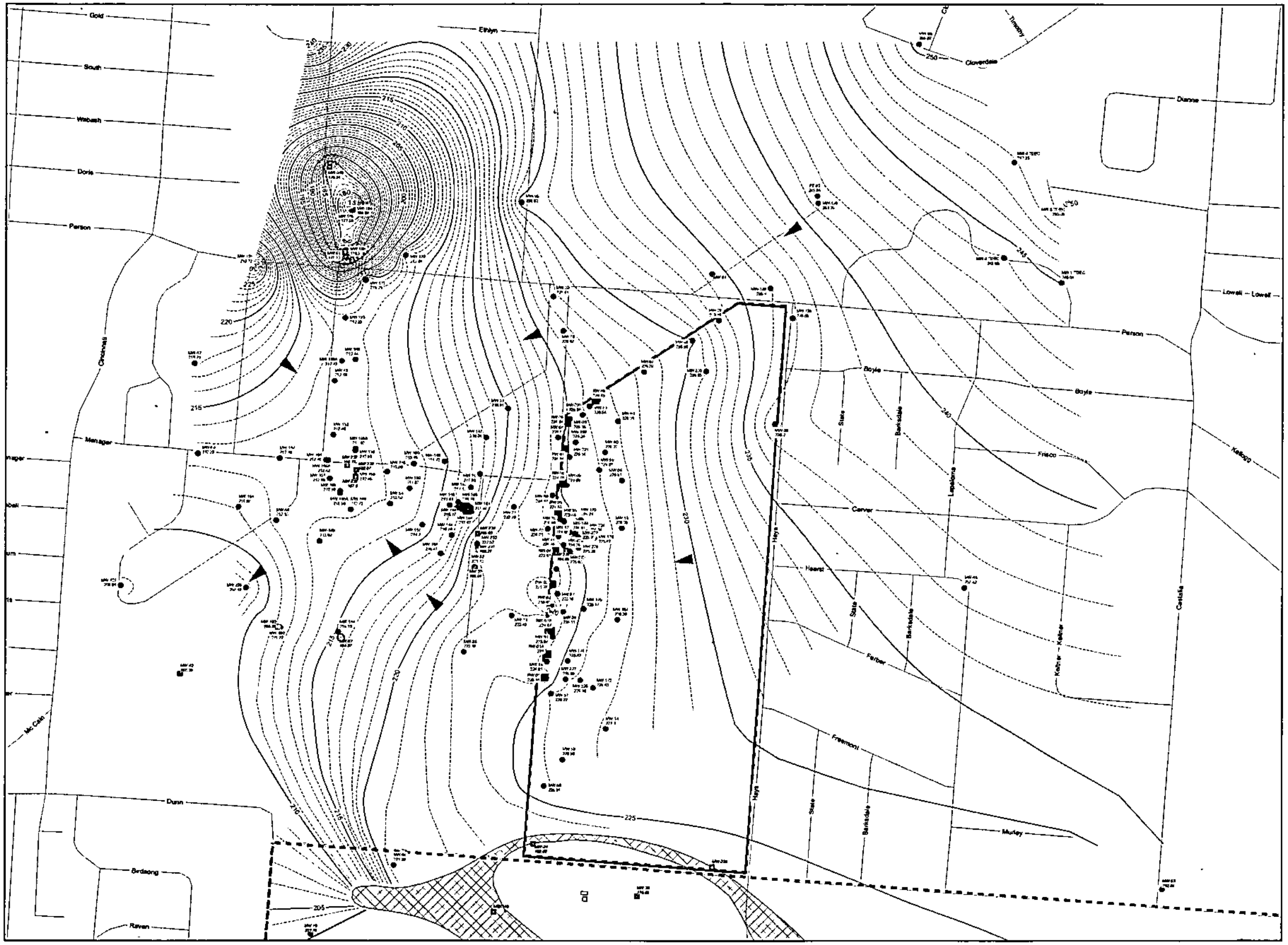

Figure 4-2

GROUNDWATER ELEVATION CONTOUR MAP 14 OCTOBER 2008

ANNUAL OPERATIONS REPORT - 2008

DUNN FIELD GROUNDWATER IRA YEAR TEN

DEFENSE DEPOT MEMPHIS, TENNESSEE

Legend

- Monitoring Well Screened in the Fluvial Aquifer
- Recovery 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
- Dunn Field Boundary
- ClayArea *Clay Elevation Exceeds Groundwater Elevatic*

MW-03 100.12 Blue non-italics: value used for groundwater contours

MW-237 100.15 Black italics: value not used for groundwater contours (non-fluvial well or anomalous reading)

Groundwater Contours

- 1-ft Contour
- 5-ft Contour
- Groundwater Flow Direction

0 200 400 600 8(

Feet

Installation Location
Memphis, Tennessee

Date: March 2009
Edition: Rev 0

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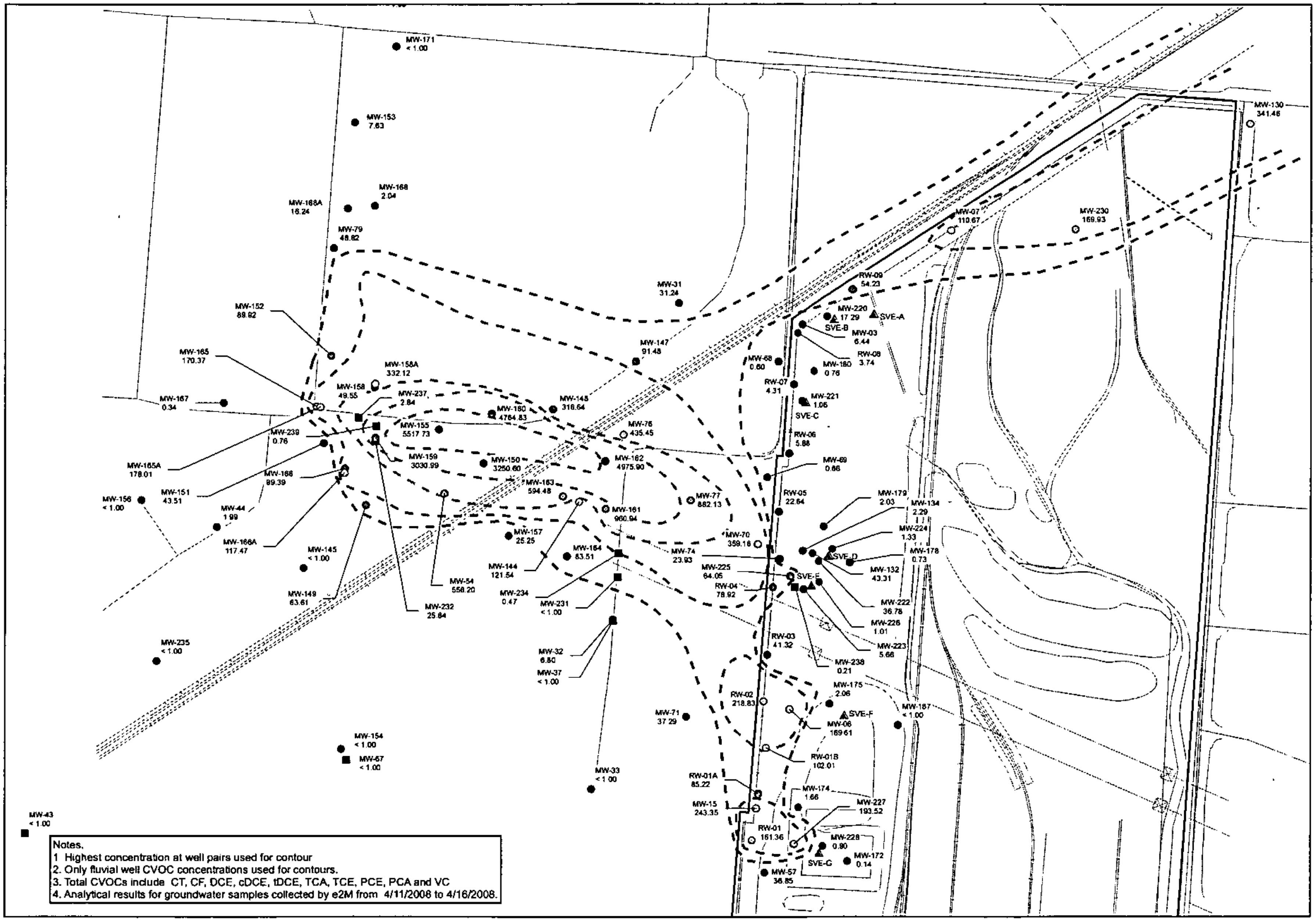
982 85



N
W E
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Figure 4-3

TOTAL CVOC CONCENTRATIONS, APRIL 2008

ANNUAL OPERATIONS REPORT - 2008

DUNN FIELD GROUNDWATER IRA YEAR TEN

DEFENSE DEPOT MEMPHIS, TENNESSEE

Legend

CVOCs Fluvial Wells

ug/L

- 0 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- 1001 - 5000
- 5001 - 10000

CVOCs Non-Fluvial Wells

ug/L

- 0 - 50

Total CVOC Isopleth (ug/L)

- 50
- 100
- 500
- 1000
- 5000

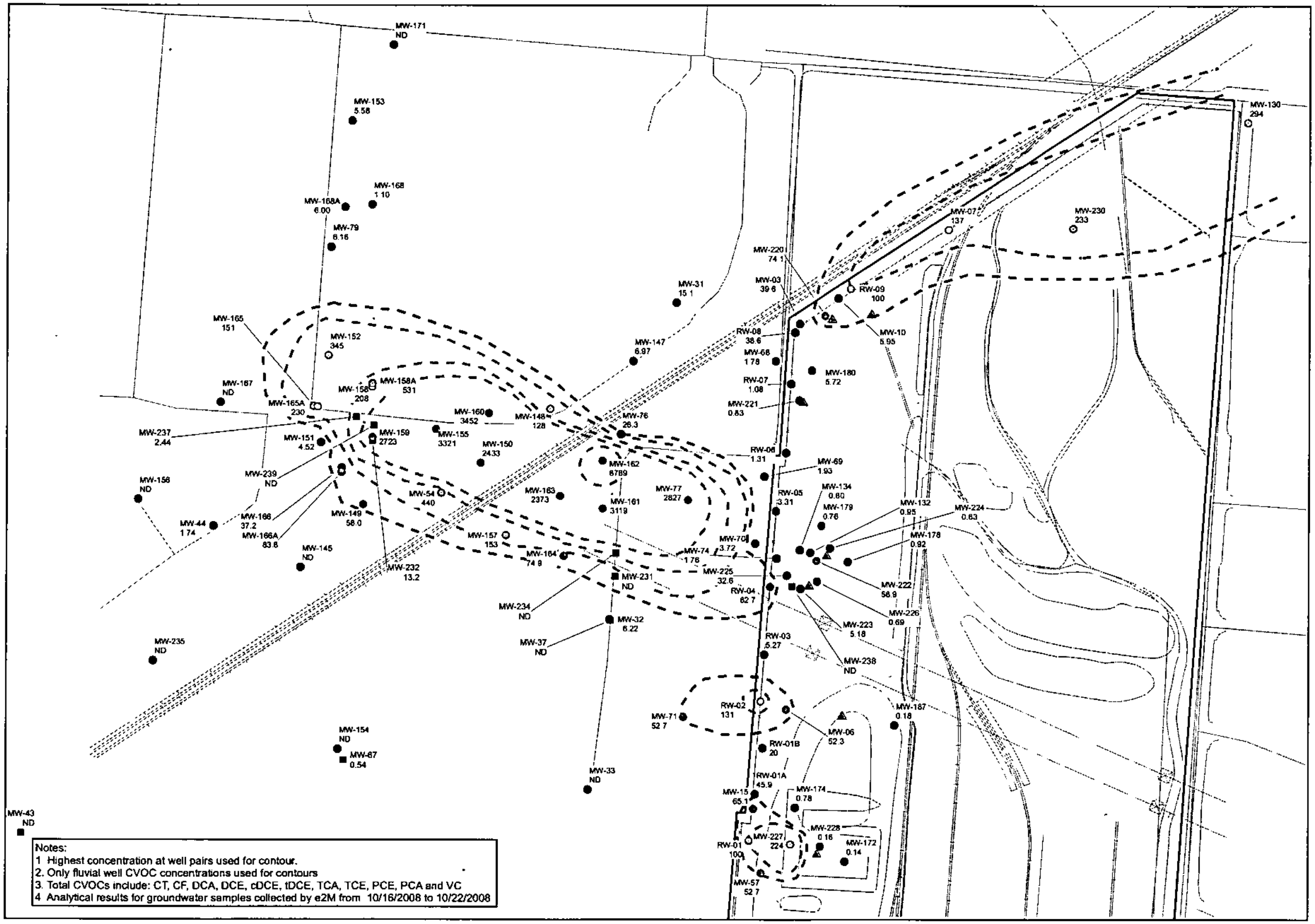
▲ SVE - Soil Vapor Extraction Point

0 50100 200 300 40
Feet

Installation Location
Memphis, Tennessee

Date: February 2009
Edition: Rev 0

982 86



N W E S

Figure 4-4

TOTAL CVOC CONCENTRATIONS, OCTOBER 2008

ANNUAL OPERATIONS REPORT - 2008

DUNN FIELD GROUNDWATER IRA YEAR TEN

DEFENSE DEPOT MEMPHIS, TENNESSEE

Legend

CVOCs Fluvial Wells

ug/L

- 0 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- 1001 - 5000
- 5001 - 10000

CVOCs Non-Fluvial Wells

ug/L

- 0 - 50

Total CVOC Isopleth (ug/L)

- 50
- 100
- 500
- 1000
- 5000

▲ SVE -Soil Vapor Extraction Point

0 50 100 200 300 400

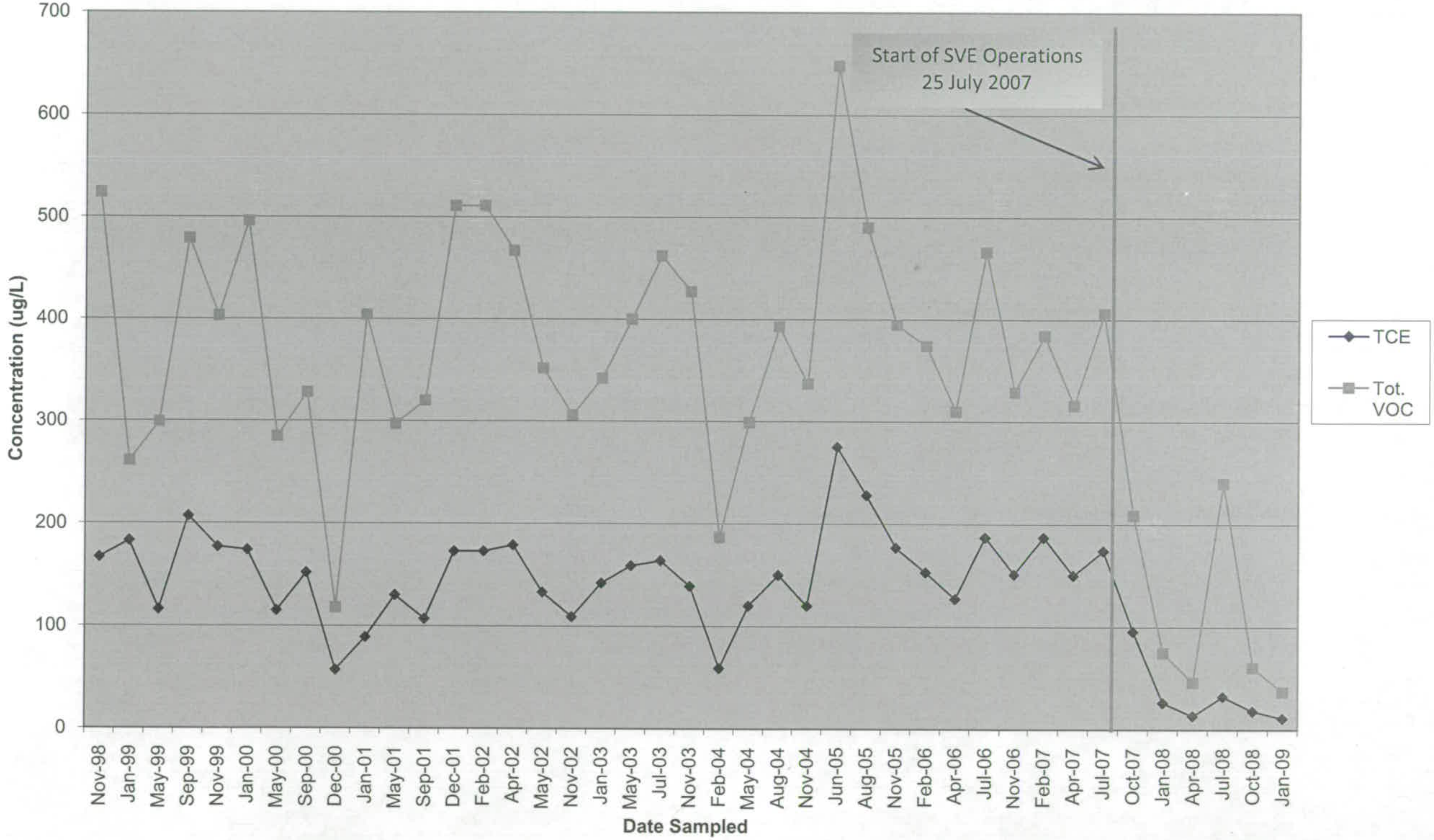
Feet

Installation Location
Memphis, Tennessee

Date February 2009
Edition: Rev 0

982 87

FIGURE 5-1
TCE AND TOTAL VOC CONCENTRATIONS IN EFFLUENT
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee



982 88

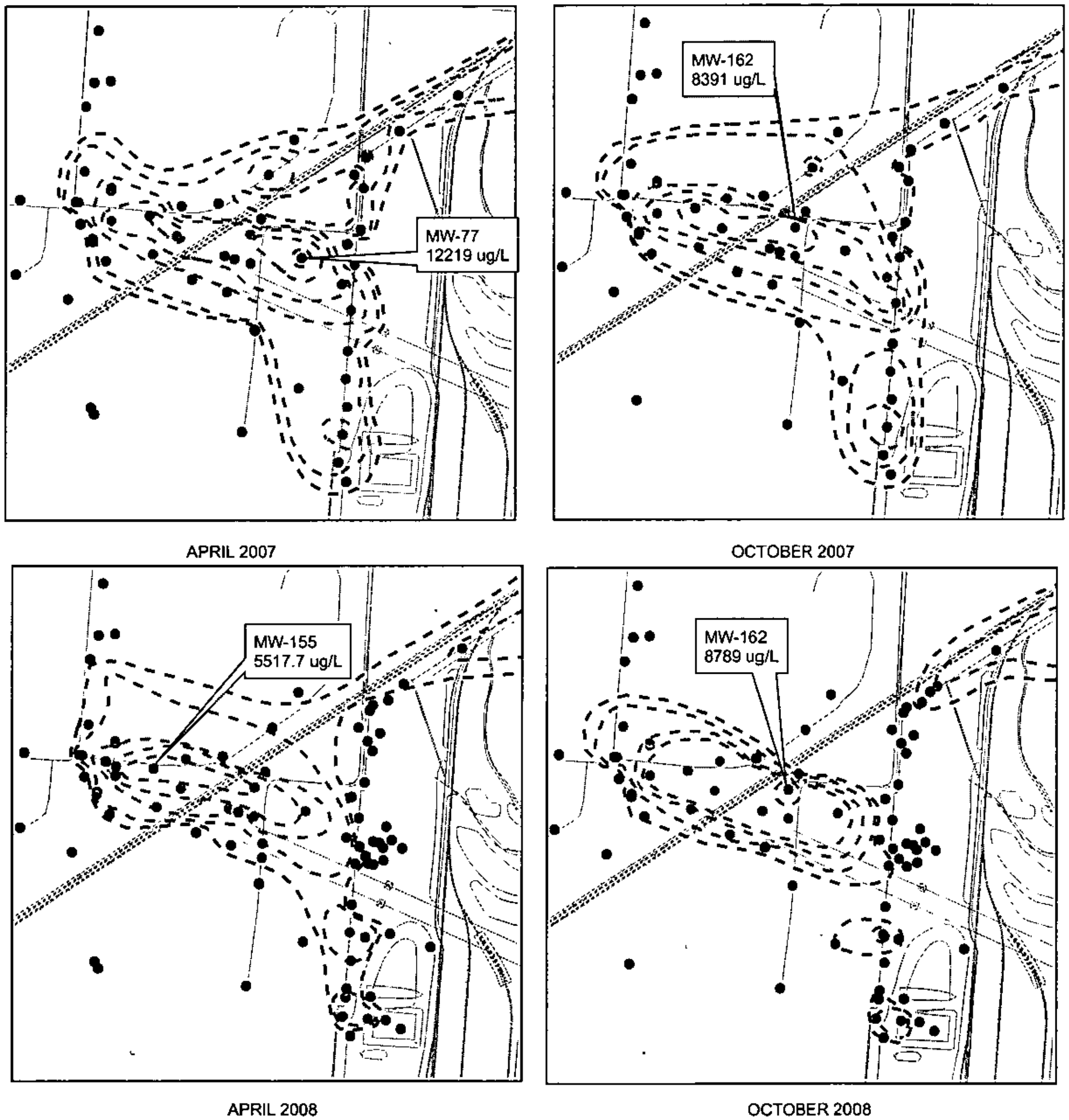


Figure 5-2

TOTAL CVOC CONCENTRATIONS, TIME TREND

ANNUAL OPERATIONS REPORT - 2008

DUNN FIELD GROUNDWATER IRA YEAR TEN

DEFENSE DEPOT MEMPHIS, TENNESSEE

Legend

Total CVOC Isopleth (ug/L)

- 50
- 100
- 500
- 1000
- 5000
- 10000

Total CVOC Ranges (ug/L)

- 0 - 100
- 101 - 500
- 501 - 1000
- 1001 - 5000
- 5001 - 10000
- 10001 - 50000

Notes.
1 Highest concentration at well pairs used for contour.
2 Total CVOCs include. CT, CF, DCA, DCE, cDCE, tDCE, TCA, TCE, PCE, PCA and VC
3 Highest Total CVOC labeled for each event.

0 200 400 600 800 1,000
Feet

982 89

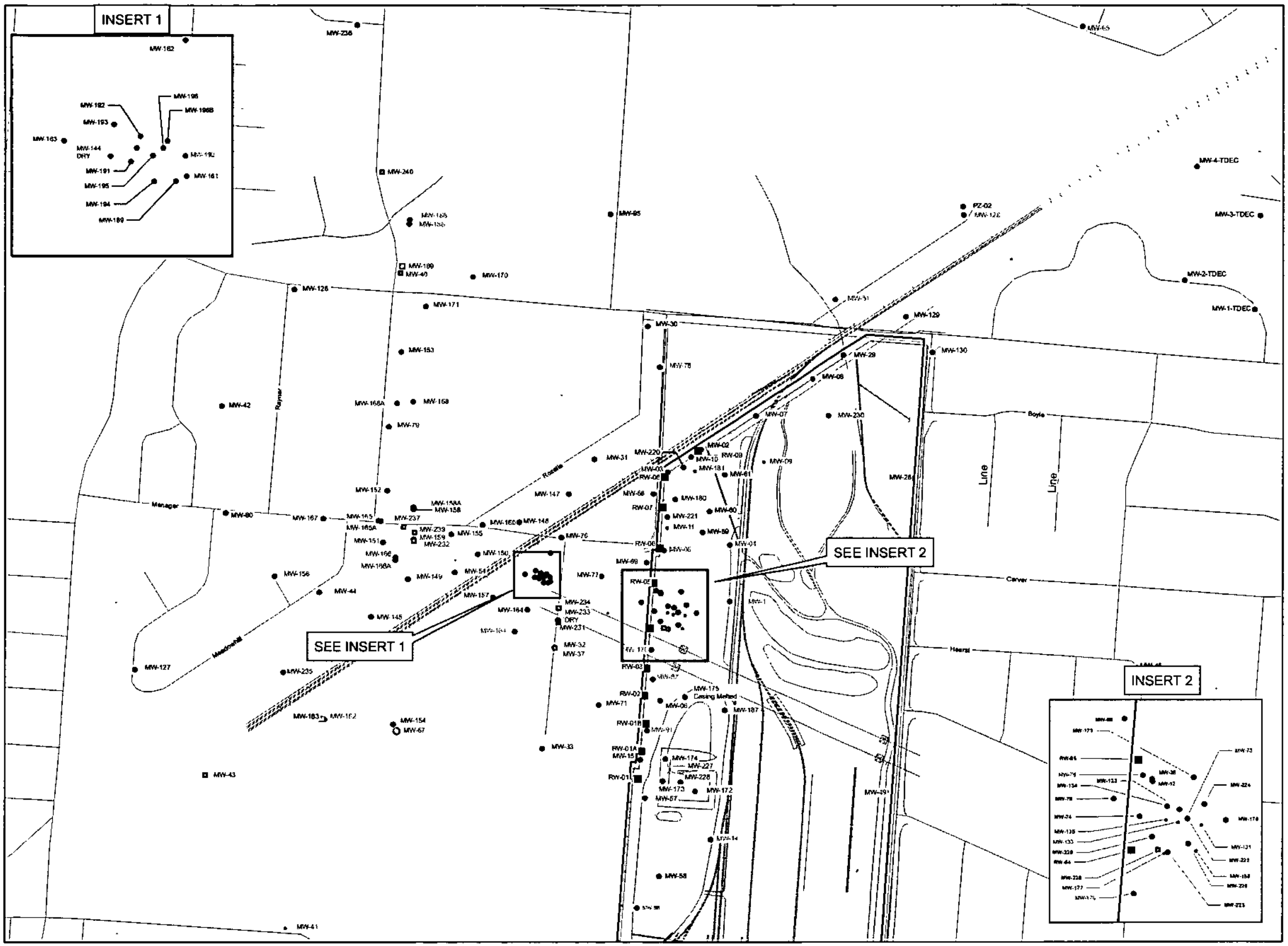
Figure 5-3

RECOMMENDED SAMPLE LOCATION MAP - 2009

ANNUAL OPERATIONS REPORT - 2008

DUNN FIELD GROUNDWATER IRA YEAR TEN

DEFENSE DEPOT MEMPHIS, TENNESSEE

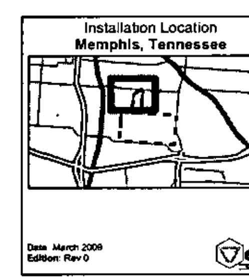


Legend

- Monitoring Well Screened in the Fluvial Aquifer
- Recovery 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
- MW-11 Abandoned
- MW-33 IRA Sample Location April 2009
- MW-1 LTM Well to be Added
- MW-40 IRA Well to be Omitted
- Dunn Field Boundary

0 150 300 450 600

Feet



Date: March 2009
Edition: Rev 0

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982 90

APPENDIX A

INDUSTRIAL WASTEWATER DISCHARGE PERMIT AGREEMENT NUMBER S-NN3-097

City of Memphis
TENNESSEE

DR. WILLIE W. HERENTON - Mayor
KEITH L. McGEE - Chief Administrative Officer
DIVISION OF PUBLIC WORKS
DWAN GILLIOM - Director
Maynard C. Stiles Wastewater Treatment Plant

Thursday, April 17, 2008

Mr. Michael Dobbs
Chief ES&OH Office
DES DDCEE (Memphis)
2241 Truitt Avenue
Memphis, Tennessee 38114

RE: Renewed Industrial Wastewater Discharge Agreement Permit # S-NN3-097
DES DDCEE (Memphis)@ 2241 Truitt Avenue, Memphis, Tennessee

Dear Mr. Dobbs:

Please find enclosed singed and approved copy the renewed Industrial Wastewater Discharge Agreement issued for DES DDCEE (Memphis) facility for your record keeping.

If you should have any questions, please feel free to contact me at (901) 576-4337.

Sincerely,

Akil Al-Chokhachi

Akil AL-Chokhachi
Environmental Engineer

982 93

ORIGINAL

S-NN3-097

DES-DDC-EE

City of Memphis

Division of Public Works

Industrial Wastewater Discharge Agreement

made by and between the

City of Memphis

and

D E S- D D C- E E (Memphis)

on

May 01, 2008

Approved by: ______________________

Dwan Gilliom, Director
Public Works

City Of Memphis
Industrial Wastewater Discharge Agreement

S-NN3-097
DES-DDC-EE

»»» Intent and Purpose «««

The City of Memphis in enacting the revised Sewer Use Ordinance deemed it necessary to identify certain significant contributors to the municipal sewer system and regulate the significant contributors on the discharge quantity and characteristics which would be permitted to be discharged into the municipal wastewater system. The basis for the values shown in the following sections are primarily to comply with the State of Tennessee and the Environmental Protection Agency regulations and to preserve the integrity of the publicly owned treatment works.

The agreement serves as a firm understanding between the user and the City for a specified period of time not to exceed five (5) years. The parameters which have been identified in this document reflect the best estimate of the user as to the characteristics of his discharge and will remain in effect until modified by amendments to the discharge agreement. The allowable levels for each parameter are determined by limitations imposed by the Sewer Use Ordinance and for compounds, not specifically limited by the Sewer Use Ordinance or EPA Categorical limitations, the best professional judgement of the City staff engineers and chemists. Primary in the determination is the protection of the integrity of the publicly owned treatment works. Accordingly, tables of guidance for criteria influent levels for specific incompatible wastes have been developed and are part of the Sewer Use Ordinance.

Willful failure of an industrial user to report significant changes in operations which affect wastewater constituents and characteristics can result in the revoking of his discharge agreement. If a public sewer becomes obstructed or damaged because of any substances improperly discharged into it, D E S- D D C- E E (Memphis) if responsible for such discharge shall be billed and shall pay for all the expenses incurred by the City in cleaning out, repairing, or rebuilding the sewer.

According to Section 33-173 of the Sewer Use Ordinance, violations of the Discharge Agreement and the Sewer Use Ordinance requirements may result in civil penalties up to ten thousand dollars ($10,000) for each day during which the acts or omission continues or occurs.

Any person who willfully or negligently violates any section of this Ordinance including, but not limited to the Federal Pretreatment Program Standards, Wastewater Discharge Agreement Permit Conditions may be subject to criminal penalties imposed by the State of Tennessee and/or the United States.

Each industrial user discharging compounds regulated by the pretreatment program or other programs identified by the Environmental Protection Agency (EPA) must also pretreat to the point as required by the EPA. In addition to this, the State of Tennessee has identified certain allowable levels for incompatibles entering a publicly owned treatment works. The pretreatment values set by the City are listed in Table 1 and Table 2, Section 33-104 of the Sewer Use Ordinance.

Wastewater discharge agreements are issued to a specific user for a specific operation. A wastewater discharge agreement shall not be reassigned or transferred or sold to a new owner, new user different premises, or a new or changed operation which will significantly affect wastewater characteristics, Section 33-85 of the Sewer Use Ordinance.

City Of Memphis
Industrial Wastewater Discharge
Agreement

S-NN3-097
DES-DDC-EE

» » » Intent and Purpose « « «

The industrial user shall comply with the record-keeping requirements outlined in the general pretreatment Standards in part 403.12 (o) of the Federal Regulations and Section 33-83(f) of the Sewer Use ordinance.

According to Section 33-110 of the Sewer Use Ordinance, the Industrial User shall notify the Control Authority immediately in the event of spill, bypass, upset and slug or accidental discharges, including any discharges that would violate a prohibition under Section 33-103; with procedures for the follow-up written notification within five days. When the Control Authority evaluate Industrial User for slug discharge control plan, if not required then, the the Industrial User shall submit a signed statement stating that there is no potential nor any need for developing such a plan. However, if required then the Control Authority will attach a copy of the plan to this Agreement. the plan to this Agreement.

Whereas, Chapter 33 of the Code of Ordinances of the City of Memphis requires that "dischargers to the municipal wastewater treatment facilities designated by the approving authority as requiring agreements shall not discharge to the system without said agreement"; and

Whereas, D E S- D D C- E E (Memphis) located at 2163 Airways Blvd, Bldg 144 desires to discharge to the Memphis sewer system; and

Whereas, D E S- D D C- E E (Memphis) agrees to comply with all requirements specified in Chapter 33 of the Code of Ordinances and any revision thereof.

Now therefore, D E S- D D C- E E (Memphis) is granted the right to discharge the wastewater of such characteristics and volume as described in this wastewater discharge permit into the City of Memphis sewer system from May 01, 2008 to April 30, 2013.

Signed by:

[signature]

City of Memphis

Authorized Industrial User Representative:

[signature]

D E S- D D C- E E (Memphis)

City Of Memphis
Industrial Wastewater Discharge Agreement

S	N	N	3	097
DES-DDC-EE				

Start Date	Expiration Date
May 01, 2008	April 30, 2013

A.1	Corporate Name	D E S- D D C- E E (Memphis)		
	Corporate Address	2241 Truitt Avenue		
		Memphis	TN	38114
A.2	Company Name	D E S- D D C- E E (Memphis)		
	Mailing Address	2241 Truitt Avenue		
		Memphis	TN	38114
A.3	Facility Name	D E S- D D C- E E (Memphis)		
	Facility Address	2241 Truitt Avenue		
		Memphis	TN	38114
A.4	Contact Official	Michael A. Dobbs		
	Title	Chief E S & O H Office		
	Phone	(717) 770-6950		
A.5	Signing Official	Michael A. Dobbs		
	Title	Chief E S & O H Office		
	Signee Address	D D C, Whs 1, Bay 3, 2001 Mission Dr.		
		New Cumberland	PA	17070-5000

A.6 I certify that the information contained in this industrial wastewater discharge agreement consisting of twenty two pages (and any appendices) is familiar to me and to the best of my knowledge and belief, such information is true, complete and correct.

Apr 12 2008

Authorized Industrial User Representative: Signature/Date

City Of Memphis
Industrial Wastewater Discharge Agreement

S-NN3-097
DES-DDC-EE

SECTION B - FACILITY OPERATIONAL CHARACTERISTICS

B.1 Description of manufacturing or service activities

The operation to be permitted is a ground water recovery system located in an open area, Dunn Field, adjacent to the northern perimeter of the DDMT main installation. The DDMT facility is currently being closed with the intent of transferring much of the facility to private ownership. Manufacturing of goods does not occur in the Dunn Field portion of the facility.

*Note: The ground water (GW) recovery and discharge system will operate on a continual basis once the system is completely operational. The federal government will operate and maintain the system.

B.2 Standard Industrial Classification(s)

a. 9711 b. c. d. e. f.

B.3 Weekly days of operation are 7 days/Week (GW)

B.4 The hours of operation and the number of employees per shift.

Shift	Times: Start	Times: Stop	Number of Employees: Weekday	Saturday	Sunday
Day	8:00 am	5:00 pm	1		
Evening					
Night					

B.5 Is production operation subject to seasonal variation? No

If so, complete the following:

a. Seasonal maximum wastewater discharged into the municipal sewer system is ______ gallons/day, during the months of ______

b. Seasonal minimum wastewater discharged into the municipal sewer system is ______ gallons/day, during the months of ______

City Of Memphis
Industrial Wastewater Discharge Agreement

S-NN3-097

DES-DDC-EE

B.6 Description of other operational schedule characteristics / scheduled shutdown

No operational variations are currently planned. The pumping rate may be altered based on the hydraulic capacity of the city sewer collection system, if required.

This discharge agreement application is for the following groundwater recovery system:

* One 40 - gpm wells
* One 50 - gpm wells
* Five 60 - gpm wells

This seven well groundwater recovery system will result in a total estimated discharge flow of 390 gpm (0.562 mgd) .

Requests for permits for additional wells beyond the seven identified may be submitted in the future, if required. The ground water design currently requires up to seventeen total wells to be installed in up to two phases.

B.7 Description of operational variables and frequency of occurrances which may result in unusual discharges

Fluctuations in the discharge of the system may occur due to changes in ground water conditions. The discharges described in Section B.6 are expected to be maximum discharges.

City Of Memphis Industrial Wastewater Discharge Agreement

S-NN3-097

DES-DDC-EE

B.8 Raw Materials

Type	Quantity	Units
N / A		

City Of Memphis
Industrial Wastewater Discharge Agreement

S-NN3-097

DES-DDC-EE

B.9 Catalysts, Intermediates

Type	Quantity	Units
N / A		

City Of Memphis
Industrial Wastewater Discharge Agreement

S-NN3-097
DES-DDC-EE

B.10 Principal Products

Type	Quantity	Units
No Manufacturing Activities		

City Of Memphis Industrial Wastewater Discharge Agreement

S-NN3-097
DES-DDC-EE

B.11 Byproducts and Waste Products

Type	Quantity	Units
None		

City Of Memphis
Industrial Wastewater Discharge Agreement

S-NN3-097

DES-DDC-EE

B.12 Components of Non-contact Cooling Water

Type	Quantity	Units
N / A		

City Of Memphis
Industrial Wastewater Discharge Agreement

S-NN3-097
DES-DDC-EE

B.13 The person (or position) on the plant site who shall be contacted for emergency situations during plant operating hours.

Name	Michael A. Dobbs
Title	Environmental Project Manager
Phone	(717) 770-6950

B.14 The person(s) who shall be contacted at any time during emergency situations.

Name	Phone
Michael A. Dobbs	(717) 770-6950

B.15 Description of spill prevention controls and counter measure plans / accidental and slug discharges to the process discharge or to the sanitary sewer system.

A spill of any material or contaminated stormwater run-off as a result of an excavation of hazardous materials or any wastewater other than recovered groundwater shall not be discharged into the sanitary sewer without a written approval from the City of Memphis.

City Of Memphis Industrial Wastewater Discharge Agreement

S-NN3-097
DES-DDC-EE

SECTION C - WATER USAGE CHARACTERISTICS

C.1 MLG&W Account number(s)

124708000

C.4 f. & C.5 a. - Recovered ground water only

C.2 MLG&W Billing address (if different from A.3)

C.3 Annual water usage by source:

From	Million Gallons Per Year
a. Public water supply	
b. Private well	
c. Surface stream	

C.4 Daily average water consumption:

In	Gallons Per Day
a. Process (industrial)	
b. Non-contact cooling	
c. Boiler Feed	
d. Product	
e. Domestic/Sanitary	
f. Other	561,600

C.5 Daily average water discharge:

To	Gallons Per Day
a. Wastewater sewer	561,600
b. Storm drain	
c. Waste hauler	
d. Evaporative loss	
e. Product	

City Of Memphis
Industrial Wastewater Discharge Agreement

S-NN3-097
DES-DDC-EE

SECTION D - WASTEWATER CHARACTERISTICS

PAGE 1 OF 2 Ground Water with a flow of 561,600 gallons / day

D.1 Analysis of wastewater discharged into the municipal sewer system

Parameter		Daily Average (Monthly Average) Maximum Level mg/l	Daily Average (Monthly Average) Maximum Level lbs/day	Instantaneous (One Day) Maximum Level mg/l	Instantaneous (One Day) Maximum Level lbs/day
Biochemical Oxygen Demand	(BOD_5)	250.000	1,170.936	400.000	1,873.498
Total Suspended Solids		300.000	1,405.123	500.000	2,341.872
Total Solids					
Oil & Grease (Hydrocarbons)					
Oil & Grease (Total)		10.000	46.837	10.000	46.837
Ammonia Nitrogen (NH_3N)					
Total Kjeldahl Nitrogen (TKN)					

		Pounds
Alkalinity	(Pounds of 100% sulfuric acid per day. See Attachment)	
Acidity	(Pounds of 100% sodium hydroxide per day. See Attachment)	

	Minimum	Maximum
Maximum Temperature (Degrees Fahrenheit)		
pH Range (Standard Units) (See Attachment)	5.5	10.0

D.2 Description of wastewater sampling location. Method of sample collection see attachment.

Sampling point is at the final discharge prior to the City Sanitary Sewer.

No Priority Pollutants or other substances listed in Appendix A are being discharged into the sanitary sewer.

Note: Blank = parameters not quantified.

City Of Memphis
Industrial Wastewater Discharge Agreement

S-NN3-097

DES-DDC-EE

D.3 Priority Pollutants and other substances that may be present in the wastewater discharge

(See Appendix A for complete listing.)

PAGE 1 OF 2 Ground Water with a flow of 561,600 gallons / day

Parameter	PPN	Class	Daily Average (Monthly Average) Maximum Level mg/l	lbs/day	Instantaneous (One Day) Maximum Level mg/l	lbs/day
1,1,1-trichloroethane	11	Volat	0.010	0.047	0.020	0.094
1,1,2,2-tetrachloroethane	15	Volat	0.500	2.342	1.000	4.684
1,1,2-trichloroethane	14	Volat	0.050	0.234	0.100	0.468
1,1-dichloroethane	13	Volat	0.010	0.047	0.020	0.094
1,1-dichloroethene		Volta	0.050	0.234	0.100	0.468
Acetone		Volat	2.000	9.367	4.000	18.735
Aluminum		Metal	5.000	23.419	10.000	46.837
Antimony	114	Metal	0.006	0.028	0.012	0.056
Arsenic	115	Metal	0.040	0.187	0.100	0.468
Barium		Metal	2.000	9.367	4.000	18.735
Bis (2-ethylhexyl) Phthalate	66	Semiv	0.035	0.164	0.070	0.328
Cadmium (total)	118	Metal	0.010	0.047	0.020	0.094
Calcium		Metal	40.000	187.350	80.000	374.700
Carbon Tetrachloride (tetrachlor-)	6	Volat	0.020	0.094	0.040	0.187
Chloroform (trichloromethane)	23	Volat	0.100	0.468	0.200	0.937
Chloromethane		Semiv	0.010	0.047	0.020	0.094
Chromium (total)	119	Metal	0.200	0.937	0.400	1.873
Cis-1,2-dichloroethene		Volat	0.080	0.375	0.100	0.468
Copper (total)	120	Metal	0.600	2.810	1.200	5.620
Di-n-butyl Phthalate	68	Semiv	0.030	0.141	0.060	0.281
Fluoranthene	39	Semiv	0.010	0.047	0.020	0.094
Iron		Metal	15.000	70.256	30.000	140.512
Lead (total)	122	Metal	0.150	0.703	0.300	1.405
Magnesium		Metal	20.000	93.675	40.000	187.350
Manganese		Metal	0.050	0.234	0.100	0.468

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D.3 Priority Pollutants and other substances that may be present in the wastewater discharge
(See Appendix A for complete listing.)

PAGE 2 OF 2 Ground Water with a flow of 561,600 gallons / day

Parameter	PPN	Class	Daily Average (Monthly Average) Maximum Level mg/l	lbs/day	Instantaneous (One Day) Maximum Level mg/l	lbs/day
Mercury	123	Metal	0.001	0.005	0.002	0.009
Methylene Chloride (dichlorometh-)	44	Volat	0.010	0.047	0.020	0.094
Naphthalene	55	Semiv	0.010	0.047	0.020	0.094
Nickel (total)	124	Metal	0.100	0.468	0.300	1.405
Phenanthrene	81	Semiv	0.010	0.047	0.020	0.094
* Phenol	65	Semiv	0.010	0.047	0.020	0.094
Potassium		Metal	2.000	9.367	4.000	18.735
Pyrene	84	Semiv	0.010	0.047	0.020	0.094
Selenium	125	Metal	0.050	0.234	0.100	0.468
Sodium		Metal	40.000	187.350	80.000	374.700
Tetrachloroethylene (perc- & Tet-)	85	Semiv	0.060	0.281	0.120	0.562
Thallium	127	Metal	0.002	0.009	0.004	0.019
Toluene	86	Volat	0.020	0.094	0.040	0.187
Trans-1,2-dichloroethene		Volat	0.050	0.234	0.100	0.468
Trichloroethylene (trichloroethe-)	87	Volat	0.400	1.873	0.800	3.747
Zinc (total)	128	Metal	0.300	1.405	1.000	4.684

* Revised Phenol Discharge limit
[illegible]
12/4/08

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SECTION D - WASTEWATER CHARACTERISTICS

PAGE 2 OF 2 Ground Water with a flow of 561,600 gallons / day

D.1 Analysis of wastewater discharged into the municipal sewer system

Parameter		Daily Average (Monthly Average) Maximum Level mg/l	lbs/day	Instantaneous (One Day) Maximum Level mg/l	lbs/day
Biochemical Oxygen Demand	(BOD_5)				
Total Suspended Solids					
Total Solids					
Oil & Grease (Hydrocarbons)					
Oil & Grease (Total)					
Ammonia Nitrogen (NH_3N)					
Total Kjeldahl Nitrogen (TKN)					

		Pounds
Alkalinity	(Pounds of 100% sulfuric acid per day. See Attachment)	
Acidity	(Pounds of 100% sodium hydroxide per day. See Attachment)	

	Minimum	Maximum
Maximum Temperature (Degrees Fahrenheit)		
pH Range (Standard Units) (See Attachment)		

D.2 Description of wastewater sampling location. Method of sample collection see attachment.

This page is inserted due to additional space required for priority pollutants (Page 13-2).

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D.4 The person or laboratory responsible for wastewater sampling and analysis

The name of the laboratory will be provided once a contract is in place, the groundwater recovery system (described in B . 6) is installed, and sampling begins.

D.5 Type and description of wastewater metering and sampling facilities

A continuous direct reading meter, flow totalizer, and sampling tap will be provided just prior to the discharge pipe leaving DDMT property.

D.6 Any batch wastewater discharges? No

If yes, describe type, volume, strength and time of discharges

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D.7 Is wastewater treated prior to discharge into the municipal sewer system? No

If yes, complete the following:

a. Description of unit processes used and wastewater quality before and after treatment

b. Description of production characteristics and any persistent or normal operational problems which may affect treatment system operations

c. Description of quality testing or process control methodology which shall ensure acceptable treatment levels

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SECTION E - SEWER FLOW PLAN, SITE PLAN AND PROCESS SCHEMATICS

E.1 The area of plant site in acres 64.11

E.2 Sewer flow plan or list of outlets, size and flow

PART 1 OF 3

The proposed layout of the groundwater recovery wells and piping system are shown on the figure provided in Attachment 2. Groundwater from the recovery wells will be combined into a common pipeline, conveyed and discharged (i.e., single discharge) into the sewer manhole located at Rozelle Street on the South side of Cane Creek (as shown on the Attachment 2 figure).

Initially, the groundwater discharge rates will be approximately 830 gpm. Each well will be brought on line by discharging flow from an 8-hour period into a holding tank. The groundwater in the holding tank will be analyzed to confirm concentrations are below the proposed discharge limits, prior to discharge to the sewer system.

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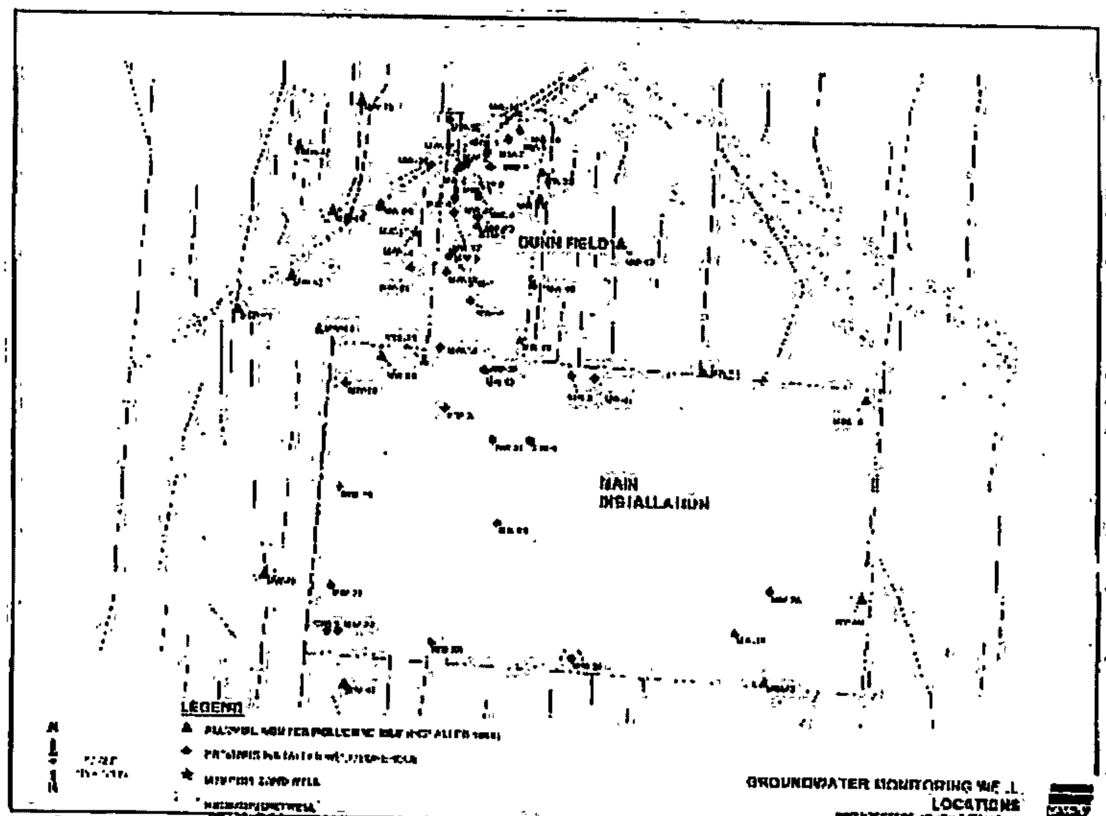
SECTION E - SEWER FLOW PLAN, SITE PLAN AND PROCESS SCHEMATICS

E.1 The area of plant site in acres 64.11

E.2 Sewer flow plan or list of outlets, size and flow

PART 2 OF 3

Sampling point is at the final discharge prior to the City Sanitary Sewer.



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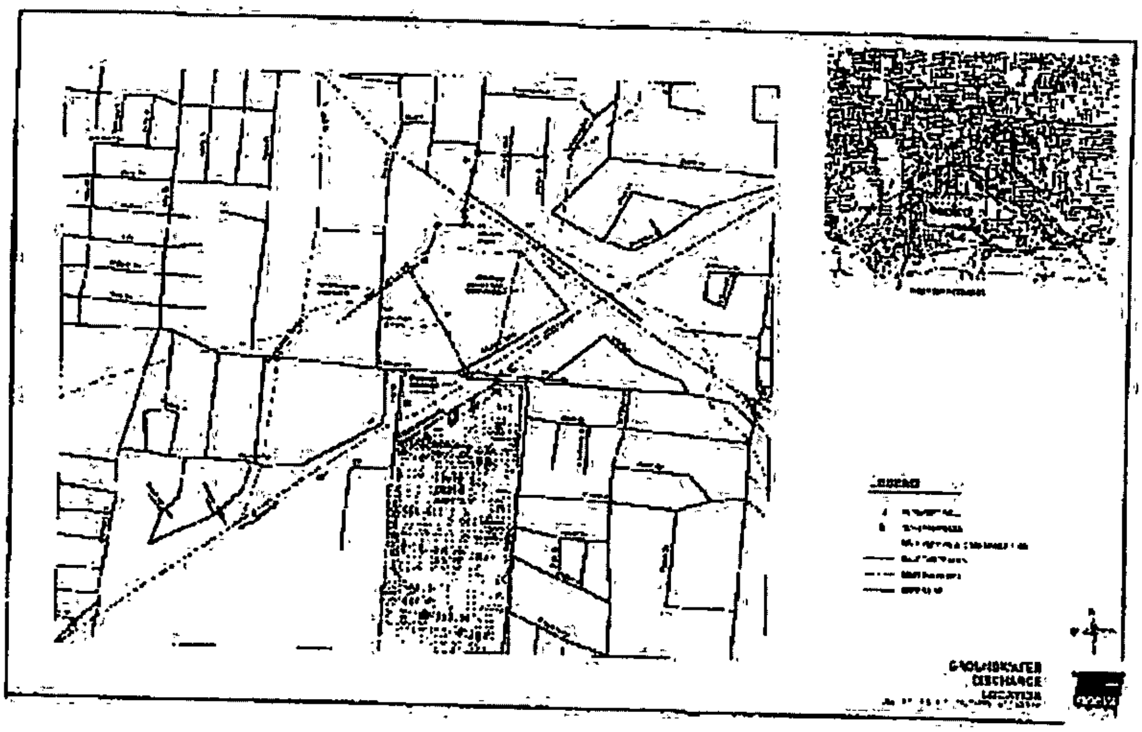
SECTION E - SEWER FLOW PLAN, SITE PLAN AND PROCESS SCHEMATICS

E.1 The area of plant site in acres | 64.11 |

E.2 Sewer flow plan or list of outlets, size and flow

PART 3 OF 3



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E.3 Plan indicating major structures and locations of hazardous materials and certain sewer appurtenances

PART 1 OF 1

See attached plan.

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E.4 Flow diagram of materials or processes

PART 1 OF 1

N/A

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E.5 Diagram and description of areas with quantified acreage where storm waters (run-off) are discharged into the municipal sewer system

Storm water total acreage 0.00

PART 1 OF 1

No storm water is being discharged into the sanitary sewer.

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SECTION F - SELF-MONITORING SCHEDULE PART 1 OF 1

F.1 The self monitoring requirements to be performed and/or reported to the City of Memphis.

All monitoring records should be kept on file for a minimum of 3 years.

According to Section 33-83 of the Sewer Use Ordinance, if sampling performed by an Industrial User indicates a violation, the User shall notify the Control Authority within 24 hours of becoming aware of the violation.. The User shall repeat the sampling and analysis and submit the results of the repeated analysis to the City within 30 days after becoming aware of the violation or sooner if so directed by the City Authorized representatives.

If any pollutant is monitored more frequently than required, using EPA approved methods, the results of this monitoring shall be included in the report.

A. SELF-MONITORING REQUIREMENT:

1) Continuous flow monitoring of the final discharge (Groundwater).

2) One (1) grab sample shall be collected semi-annually in May and November with analyses for:

pH
VOCs (SW846 Method 8240)
SVOCs (SW846 Method 8270)
TAL Metals (EPA 200 Series)

B. REPORTING REQUIREMENT:

1. Monthly reports include the total volume dishcarged be sent by the 10th of each month.

2. Semi-annual Reports detailing all analyses of samples collected shall be submitted in June & December.

The above reports shall be submitted to:
Mr. Akil AL-Chokhachi
City of Memphis
2303 North Second Street
Memphis, Tennessee 38127-7500

The Monthly volumes discharged shall be sent to :
Sewer Fee Billing Department
Room 622, City Hall
125 Mid-America Mall
Memphis, TN 38103

A spill of any material or contaminated stormwater run-off as a result of an excavation of hazardous materials or any wastewater other than recovered groundwater shall not be discharged into the sanitary sewer without a written approval from the City of Memphis.

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SECTION G - COMPLIANCE SCHEDULE PART 1 OF 1

G.1 The compliance schedule as required to meet categorical pretreatment standards and other requirements required by the City of Memphis pretreatment program.

None required

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SECTION H - HAZARDOUS MATERIALS PART 1 OF 1

H.1 All hazardous, toxic, noxious or malodorous materials used, produced or formed as by-product or waste.

NOT APPLICABLE FOR DDMT INSTALLATION

DUNN FIELD:

Historically, Dunn Field was used as a burial area on DDMT. The individual burial sites within Dunn Field have the following suspected buried contaminants:

- thiodiglycol
- arsenic
- chloroform
- ammonia hydroxide
- acetic acid
- ammonia salts
- metals
- orthotoluidine dihydrochloride
- VOCs .
- SVOCs
- methyl bromide
- nitric acid PAHs
- trichloroacetic acid
- sulphuric acid
- hydrochloric acid
- lead
- pesticides

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SECTION I - ATTACHMENTS PART 1 OF 1

I.1 Summary of Attachments

Appendix A, B, C, & D
Sewer Use Ordinance Table 1 & 2

Sara 312 Tier Two Emergency and Hazardous Chemical Inventory

APPENDIX B

2008 MONTHLY DISCHARGE REPORTS

January 2008 Monthly Discharge Report
Groundwater Recovery System
Dunn Field, Memphis Depot, Tennessee
e²M Project Number 3202-041-01-10

Groundwater Recovery System (GWRS) Operation - January 2008

Duration of System Operation: 1-Jan-08 31-Jan-08

Site visits During Month:

Site visits were performed by e²M on 4 January, 11 January and 18 January, 24 January, and 31 January 2008. Tasks included collection of flow rates, reviewing system operations, and performing system maintenance and repair.

System Operational Notes:

All recovery wells were continuously online during January 2008 with the exceptions noted below. A sample of the system effluent was collected on 8 January and analyzed for VOCs only. Also, an additional 17,627 gallons of water (stormwater from excavation activites) was discharged via the IRA system on 3 January after approval was granted by the City of Memphis.

System Maintenance and Repairs Summary:

On 11 January, debris was removed from the totalizer at RW-1B, adjustments were made to the valves at RW-5 to limit pump cycling, and the timer relay in RW-6 was replaced after that well was found to be offline. RW-2 and RW-7 were offline on 29-30 January apparently due to an electrical storm on the evening of 29 January, both wells restarted on their own RW-1 was out of operation intermittently on 17-18 and 30-31 January because the manual ball valve was loose and closing on its own; the valve will be replaced in early February

Alarm Summary:
No alarms noted.

Upcoming Activities
Weekly site visits to the groundwater recovery system for operations and maintenance are scheduled for February 2008.

January 2008 GWRS Discharge (gallons).	2,461,474
Approved One-Time Discharges (gallons)	17,627
January 2008 Effluent Discharge Volume (gallons):	**2,479,101**
January 2008 Average Discharge Flow Rate (GPM)	55.1
January 2008 Maximum Discharge Flow Rate (GPM)	57.8
January 2008 Minimum Discharge Flow Rate (GPM)	50 2

Explanations for deviations from 100% recovery well operation run times are provided in the above "System Maintenance Summary". On-site recordings were compiled to estimate each well's performance using recorded flow rates, totalized discharged volumes and low level cycling to yield the following recovery well operational run time percentages:

Well I.D.	Percent Uptime	Average Operating Flow Rate (GPM)	Total Flow (Gallons) - Based on Average Flow Rate During Operational Period
RW-1	86.8	0.2	7,815
RW-1A	100	1.6	71,448
RW-1B	100	2 0	87,661
RW-2*	98.3	1.6	68,033
RW-3	100	1 9	84,891
RW-4	100	3.3	149,379
RW-5*	100	1.2	54,879
RW-6	70.2	5.6	176,017
RW-7	91.1	5.3	215,458
RW-8	100	14.6	649,736
RW-9	100	19.9	889,392

* Pump cycling (non-continuous flow), therefore average fluorites for these wells were calculated from totalized flow readings for the month of January 2008

System Effluent Samples Collected:

The most recent effluent analytical results are from January 2008.

Mass removal is calculated based on daily flow rates and the most recent analytical data Cumulative amounts reflect contaminant removal since initial system startup.

Contaminant Mass Removal:

January 2008: 0.54 lbs TCE; 1.53 lbs Total VOCs

Cumulative: 366.27 lbs TCE; 907.05 lbs Total VOCs

Total System Effluent through 31 January 2008 (gallons): **297,208,741**

Prepared by: SLH 2/8/08 (revised: 02/27/08)
Checked by: TH 2/8/08

February 2008 Monthly Discharge Report
Groundwater Recovery System
Dunn Field, Memphis Depot, Tennessee
e^{2}M Project Number 3202-043-01-10

Groundwater Recovery System (GWRS) Operation - February 2008

Duration of System Operation: 1-Feb-08 29-Feb-08

Site visits During Month:

Site visits were performed by e^{2}M on 1 February, 7 February, 15 February, 21 February, and 28 February 2008. Tasks included collection of flow rates, reviewing system operations, and performing system maintenance and repair.

System Operational Notes:

All recovery wells were continuously online during February 2008 with the exceptions noted below. Also, an additional 43,310 gallons of water was discharged via the IRA system on 6 February after approval was granted by the City of Memphis. Approximately 41,096 gallons was storm water from RA activities and 2,014 gallons was condensate from the Fluvial SVE system.

System Maintenance and Repairs Summary:

As reported last month, the manual ball valve at RW-1 was closing on its own. The valve was replaced with a gate valve on 5 February. The impeller in the totalizer at RW-8 was replaced on 25 February. The non-functioning impeller did not affect the well's uptime. Each well was offline less than one hour for their respective repairs.

Alarm Summary:
No alarms noted.

Upcoming Activities
Weekly site visits to the groundwater recovery system for operations and maintenance are scheduled for March 2008.

February 2008 GWRS Discharge (gallons):	2,354,050
Approved One-Time Discharges (gallons)	43,110
February 2008 Effluent Discharge Volume (gallons):	**2,397,160**
February 2008 Average Discharge Flow Rate (GPM)	56.3
February 2008 Maximum Discharge Flow Rate (GPM)	56 8
February 2008 Minimum Discharge Flow Rate (GPM)	55.5

Explanations for deviations from 100% recovery well operation run times are provided in the above "System Maintenance Summary". On-site recordings were compiled to estimate each well's performance using recorded flow rates, totalized discharged volumes and low level cycling to yield the following recovery well operational run time percentages:

Well I.D.	Percent Uptime	Average Operating Flow Rate (GPM)	Total Flow (Gallons) - Based on Average Flow Rate During Operational Period
RW-1	99.9	1.5	63,442
RW-1A	100	1.7	71,545
RW-1B	100	1.5	64,598
RW-2*	100	1.6	64,777
RW-3	100	1.8	75,665
RW-4	100	3.3	135,774
RW-5*	100	1 2	52,194
RW-6	100	5.6	232,205
RW-7	100	5.3	220,647
RW-8	99 9	14 3	596,308
RW-9	100	19.9	833,047

* Pump cycling (non-continuous flow), therefore average flowrites for these wells were calculated from totalized flow readings for the month of February 2008

System Effluent Samples Collected:

The most recent effluent analytical results are from January 2008.

Mass removal is calculated based on daily flow rates and the most recent analytical data. Cumulative amounts reflect contaminant removal since initial system startup.

Contaminant Mass Removal:

February 2008: 0.51 lbs TCE; 1.47 lbs Total VOCs

Cumulative: 366.79 lbs TCE; 908.51 lbs Total VOCs

Total System Effluent through 29 February 2008 (gallons): **299,562,791**

Prepared by: SLH 3/7/08
Checked by: TH 3/7/08

March 2008 Monthly Discharge Report
Groundwater Recovery System
Dunn Field, Memphis Depot, Tennessee
e^2M Project Number 3202-043-01-10

Groundwater Recovery System (GWRS) Operation - March 2008

Duration of System Operation: 1-Mar-08 – 31-Mar-08

Site visits During Month:

Site visits were performed by e^2M on 6 March, 14 March, 20 March, and 28 March 2008 Tasks included collection of flow rates, reviewing system operations, and performing system maintenance and repair.

System Operational Notes:

All recovery wells were continuously online during March 2008.

System Maintenance and Repairs Summary:

Desiccants were replaced in each well box on 14 March.

Alarm Summary:
No alarms noted.

Upcoming Activities
Weekly site visits to the groundwater recovery system for operations and maintenance are scheduled for April 2008. Semi-annual samples will be collected from monitoring wells, recovery wells and effluent discharge. The groundwater samples from monitoring and recovery wells will be analyzed for VOCs. The effluent sample will also be analyzed for VOCs, SVOCs, metals and pH in accordance with the discharge permit.

March 2008 GWRS Discharge (gallons):	2,491,275
Approved One-Time Discharges (gallons)	0
March 2008 Effluent Discharge Volume (gallons):	**2,491,275**
March 2008 Average Discharge Flow Rate (GPM)	56.2
March 2008 Maximum Discharge Flow Rate (GPM)	57.3
March 2008 Minimum Discharge Flow Rate (GPM)	55.3

Explanations for deviations from 100% recovery well operation run times are provided in the above "System Maintenance Summary". On-site recordings were compiled to estimate each well's performance using recorded flow rates, totalized discharged volumes and low level cycling to yield the following recovery well operational run time percentages:

Well I.D.	Percent Uptime	Average Operating Flow Rate (GPM)	Total Flow (Gallons) - Based on Average Flow Rate During Operational Period
RW-1	100	0.2	8,623
RW-1A	100	1 5	65,631
RW-1B	100	1.7	76,427
RW-2*	100	1.5	66,324
RW-3	100	1.8	79,880
RW-4	100	3.3	145,520
RW-5*	100	1 3	57,162
RW-6	100	5.5	246,902
RW-7	100	5 3	235,820
RW-8	100	14.4	643,508
RW-9	100	19 8	884,660

* Pump cycling (non-continuous flow), therefore average fluorites for these wells were calculated from totalized flow readings for the month of March 2008

System Effluent Samples Collected: The most recent effluent analytical results are from January 2008.

Mass removal is calculated based on daily flow rates and the most recent analytical data. Cumulative amounts reflect contaminant removal since initial system startup.

Contaminant Mass Removal:

March 2008: 0.54 lbs TCE; 1.55 lbs Total VOCs

Cumulative: 367.33 lbs TCE; 910.07 lbs Total VOCs

Total System Effluent through 31 March 2008 (gallons): **302,054,066**

Prepared by: SLH 3/8/08
Checked by: TH 3/8/08

April 2008 Monthly Discharge Report
Groundwater Recovery System
Dunn Field, Memphis Depot, Tennessee
e^2M Project Number 3202-043-01-11

Groundwater Recovery System (GWRS) Operation - April 2008

Duration of System Operation: 1-Apr-08 – 30-Apr-08

Site visits During Month:

Site visits were performed by e^2M on 3 April, 10 April, 18 April, and 24 April 2008. Tasks included collection of flow rates, reviewing system operations, and performing system maintenance and repair.

System Operational Notes:

All recovery wells were continuously online during April 2008 with the exceptions noted below. Semiannual groundwater samples were collected from the monitoring wells, recovery wells and effluent discharge. All samples were analyzed for VOCs. The effluent sample was also analyzed for SVOCs, metals, and pH in accordance with the discharge permit. Also, approximately 17,000 gallons of water was discharged via the IRA system on 30 April after approval was granted by the City of Memphis.

System Maintenance and Repairs Summary:

RW-8 was discovered to be offline during the inspection on 3 April 2008. The cause was attributed to a bad electrical breaker. The breaker was replaced and RW-8 is now online. The discharge totalizer was discovered to be not functioning on 10 April; it has been sent to the manufacturer for diagnosis and repair. All recovery wells were offline for a two-hour period on 16 April for the semi-annual sampling event. RW-7 was found to be shutting down and restarting at random times near the end of the month. Diagnosis is scheduled to occur in early May.

Alarm Summary:

No alarms noted.

Upcoming Activities

Weekly site visits to the groundwater recovery system for operations and maintenance are scheduled for May 2008.

April 2008 GWRS Discharge (gallons):	2,491,275
Approved One-Time Discharges (gallons)	17,000
April 2008 Effluent Discharge Volume (gallons):	**2,508,275**
April 2008 Average Discharge Flow Rate (GPM)	56.2
April 2008 Maximum Discharge Flow Rate (GPM)	57.3
April 2008 Minimum Discharge Flow Rate (GPM)	55.3

Explanations for deviations from 100% recovery well operation run times are provided in the above "System Maintenance Summary". On-site recordings were compiled to estimate each well's performance using recorded flow rates, totalized discharged volumes and low level cycling to yield the following recovery well operational run time percentages:

Well I.D.	Percent Uptime	Average Operating Flow Rate (GPM)	Total Flow (Gallons) - Based on Average Flow Rate During Operational Period
RW-1	99 7	0.2	6,732
RW-1A	99 7	1.4	59,837
RW-1B	99.7	1.7	73,192
RW-2*	99.7	1.2	53,539
RW-3	99.7	1.5	66,023
RW-4	99 7	3.2	137,985
RW-5*	99.7	1.3	55,579
RW-6	99 7	5.6	239,402
RW-7	92.2	5 6	223,630
RW-8	90.2	14.4	560,301
RW-9	99.7	19.8	852,753

* Pump cycling (non-continuous flow), therefore average flowrites for these wells were calculated from totalized flow readings for the month of April 2008

System Effluent Samples Collected:

The most recent effluent analytical results are from April 2008.

Mass removal is calculated based on daily flow rates and the most recent analytical data. Cumulative amounts reflect contaminant removal since initial system startup.

Contaminant Mass Removal:

April 2008: 0.28 lbs TCE; 0.96 lbs Total VOCs

Cumulative: 367.60 lbs TCE; 911.03 lbs Total VOCs

Total System Effluent through 30 April 2008 (gallons): **304,382,089**

Prepared by: SLH 5/9/08

May 2008 Monthly Discharge Report
Groundwater Recovery System
Dunn Field, Memphis Depot, Tennessee
e^{2}M Project Number 3202-043-01-11

Groundwater Recovery System (GWRS) Operation - May 2008

Duration of System Operation: 1-May-08 31-May-08

Site visits During Month:

Site visits were performed by e^{2}M on 2 May, 8 May, 15 May, 22 May, and 30 May 2008. Tasks included collection of flow rates, reviewing system operations, and performing system maintenance and repair

System Operational Notes:

All recovery wells were continuously online during May 2008 with the exceptions noted below.

System Maintenance and Repairs Summary:

As reported last month, RW-7 was found to be shutting down and restarting at random times. The level relay was not functioning properly, was re-calibrated on 4 May 2008 and the well is operating properly. RW-1A was discovered to be offline on 21 May and was determined to need replacement. A new pump was ordered and will arrive the week of 2 June 2008.

Alarm Summary:

No alarms noted.

Upcoming Activities

Weekly site visits to the groundwater recovery system for operations and maintenance are scheduled for June 2008.

May 2008 GWRS Discharge (gallons):	2,455,466
Approved One-Time Discharges (gallons)	0
May 2008 Effluent Discharge Volume (gallons):	**2,455,466**
May 2008 Average Discharge Flow Rate (GPM)	55.0
May 2008 Maximum Discharge Flow Rate (GPM)	56.2
May 2008 Minimum Discharge Flow Rate (GPM)	50.6

Explanations for deviations from 100% recovery well operation run times are provided in the above "System Maintenance Summary". On-site recordings were compiled to estimate each well's performance using recorded flow rates, totalized discharged volumes and low level cycling to yield the following recovery well operational run time percentages:

Well I.D.	Percent Uptime	Average Operating Flow Rate (GPM)	Total Flow (Gallons) - Based on Average Flow Rate During Operational Period
RW-1	100	0.1	6,237
RW-1A	60.3	1.3	34,632
RW-1B	100	1 8	78,881
RW-2*	100	1.5	68,845
RW-3	100	1.2	55,112
RW-4	100	3.4	151,208
RW-5*	100	1.4	61,966
RW-6	100	5.6	249,882
RW-7	94 9	5.0	209,877
RW-8	100	19.8	882,338
RW-9	100	14.4	642,799

* Pump cycling (non-continuous flow), therefore average fluorites for these wells were calculated from totalized flow readings for the month of May 2008.

System Effluent Samples Collected:

The most recent effluent analytical results are from April 2008.

Mass removal is calculated based on daily flow rates and the most recent analytical data. Cumulative amounts reflect contaminant removal since initial system startup.

Contaminant Mass Removal:

May 2008: 0.27 lbs TCE; 0.95 lbs Total VOCs

Cumulative: 367.88 lbs TCE; 911.97 lbs Total VOCs

Total System Effluent through 31 May 2008 (gallons): **306,837,554**

Prepared by: SLH 06/09/08

June 2008 Monthly Discharge Report
Groundwater Recovery System
Dunn Field, Memphis Depot, Tennessee
e^{2}M Project Number 3202-043-01-11

Groundwater Recovery System (GWRS) Operation - June 2008

Duration of System Operation: 1-Jun-08 – 30-Jun-08

Site visits During Month:

Site visits were performed by e^{2}M on 5 June, 13 June, 19 June, and 26 June Tasks included collection of flow rates, reviewing system operations, and performing system maintenance and repair.

System Operational Notes:

RW-5 through RW-9 were shut down on 9 June due to low VOC concentrations from the April 2008 IRA sampling event and per e^{2}M recommendation. The offline wells will remain operational and checked bi-weekly. All other recovery wells were continuously online during June 2008 with the exceptions noted below. Also, an additional 63,451 gallons of water was discharged from thermal soil vapor extraction (T-SVE) remedial action activities Approval for discharge was granted by the City of Memphis on 7 September 2007.

System Maintenance and Repairs Summary:

The pump at RW-1A was replaced on 2 June. However, RW-1A was shutting off and restarting at random times throughout the month Troubleshooting activities did not reveal the cause. The pump is now operational and will continue to be monitored.

Alarm Summary:
No alarms noted.

Upcoming Activities
Weekly site visits to the groundwater recovery system for operations and maintenance are scheduled for June 2008.

June 2008 GWRS Discharge (gallons):	1,006,626
Approved One-Time Discharges (gallons)	63,451
June 2008 Effluent Discharge Volume (gallons):	**1,070,077**
June 2008 Average Discharge Flow Rate (GPM)	23.3
June 2008 Maximum Discharge Flow Rate (GPM)	57.2
June 2008 Minimum Discharge Flow Rate (GPM)	8 7

Explanations for deviations from 100% recovery well operation run times are provided in the above "System Maintenance Summary". On-site recordings were compiled to estimate each well's performance using recorded flow rates, totalized discharged volumes and low level cycling to yield the following recovery well operational run time percentages:

Well I.D.	Percent Uptime	Average Operating Flow Rate (GPM)	Total Flow (Gallons) - Based on Average Flow Rate During Operational Period
RW-1	100	0.2	10,017
RW-1A	55 1	1 5	35,412
RW-1B	100	2.1	89,747
RW-2	100	2 1	90,189
RW-3	100	1.0	44,401
RW-4	100	3.7	159,532
RW-5*	28 3	1.8	21,708
RW-6	28.3	5.6	68,735
RW-7	28 3	5.3	64,820
RW-8	28.3	14.4	176,393
RW-9	28 3	19 8	242,543

* Pump cycling (non-continuous flow), therefore average fluorites for these wells were calculated from totalized flow readings for the month of June 2008.

System Effluent Samples Collected:

The most recent effluent analytical results are from April 2008.

Mass removal is calculated based on daily flow rates and the most recent analytical data. Cumulative amounts reflect contaminant removal since initial system startup.

Contaminant Mass Removal:

June 2008: 0.17 lbs TCE; 0.54 lbs Total VOCs

Cumulative: 368.05 lbs TCE; 912.51 lbs Total VOCs

Total System Effluent through 30 June 2008 (gallons): **307,844,180**

Prepared by: SLH 07/07/08
Checked by: TCH 07/08/08

July 2008 Monthly Discharge Report
Groundwater Recovery System
Dunn Field, Memphis Depot, Tennessee
e^{2}M Project Number 3202-043-01-11

Groundwater Recovery System (GWRS) Operation - July 2008

Duration of System Operation: 1-Jul-08
31-Jul-08

Site visits During Month:

Site visits were performed by e^{2}M on 3 July, 11 July, 18 July, and 25 July Tasks included collection of flow rates, reviewing system operations, and performing system maintenance and repair.

System Operational Notes:

RW-5 through RW-9 remain offline per agreement from the BCT due to low concentrations from the April 2008 IRA sampling event. The offline wells will remain operational and checked bi-weekly. All other recovery wells were continuously online during July 2008 with the exceptions noted below. Also, an additional 78,544 gallons of water was discharged from thermal soil vapor extraction (T-SVE) remedial action activities. Approval for discharge was granted by the City of Memphis on 7 September 2007.

System Maintenance and Repairs Summary:

Flow rates at RW-2 were noted to have declined. During trouble shooting activities on 7/31, the pump was cleaned and rewired. Also, a new collar and flow meter impeller was installed. Flow rates are now near normal levels.

Alarm Summary:

No alarms noted.

Upcoming Activities

Weekly site visits to the groundwater recovery system for operations and maintenance are scheduled for August 2008.

July 2008 GWRS Discharge (gallons).	475,050
Approved One-Time Discharges (gallons)	78,544
July 2008 Effluent Discharge Volume (gallons):	**553,594**
July 2008 Average Discharge Flow Rate (GPM)	10 6
July 2008 Maximum Discharge Flow Rate (GPM)	11.2
July 2008 Minimum Discharge Flow Rate (GPM)	9.1

Explanations for deviations from 100% recovery well operation run times are provided in the above "System Maintenance Summary". On-site recordings were compiled to estimate each well's performance using recorded flow rates, totalized discharged volumes and low level cycling to yield the following recovery well operational run time percentages:

Well I.D.	Percent Uptime	Average Operating Flow Rate (GPM)	Total Flow (Gallons) - Based on Average Flow Rate During Operational Period
RW-1	100	0.3	14,182
RW-1A	100	1.5	69,124
RW-1B	100	2.3	104,334
RW-2	87.1	1 8	68,544
RW-3	100	0.9	42,056
RW-4	100	4.0	176,810
RW-5	0.0	0.0	0
RW-6	0.0	0.0	0
RW-7	0.0	0.0	0
RW-8	0.0	0.0	0
RW-9	0.0	0.0	0

System Effluent Samples Collected:

The most recent effluent analytical results are from July 2008.

Mass removal is calculated based on daily flow rates and the most recent analytical data Cumulative amounts reflect contaminant removal since initial system startup.

Contaminant Mass Removal:

July 2008: 0.20 lbs TCE; 0.95 lbs Total VOCs

Cumulative: 368.25 lbs TCE; 913.47 lbs Total VOCs

Total System Effluent through 31 July 2008 (gallons): **308,319,230**

Prepared by. SLH 08/08/08

August 2008 Monthly Discharge Report
Groundwater Recovery System
Dunn Field, Memphis Depot, Tennessee
e²M Project Number 3202-043-01-11

Groundwater Recovery System (GWRS) Operation - August 2008

Duration of System Operation: 1-Aug-08 / 31-Aug-08

Site visits During Month:

Site visits were performed by e²M on 1 August, 8 August, 15 August, 22 August, and 29 August. Tasks included collection of flow rates, reviewing system operations, and performing system maintenance and repair.

System Operational Notes:

RW-5 through RW-9 remain offline per agreement from the BCT due to low concentrations from the April 2008 IRA sampling event. The offline wells will remain operational and checked bi-weekly. All other recovery wells were continuously online during August 2008. Also, an additional 184,238 gallons of water was discharged from thermal soil vapor extraction (T-SVE) remedial action activities. Approval for discharge was granted by the City of Memphis on 7 September 2007

System Maintenance and Repairs Summary:

All wells were online without interruption in August 2008.

Alarm Summary:

No alarms noted.

Upcoming Activities

Weekly site visits to the groundwater recovery system for operations and maintenance are scheduled for September 2008 Also, all IRA monitoring wells with passive difissuion bags will be checked to ensure they are below the water level. This activity is part of pre-samping activites assoicated with the upcoming October semiannual event.

August 2008 GWRS Discharge (gallons):	526,467
Approved One-Time Discharges (gallons)	184,238
August 2008 Effluent Discharge Volume (gallons):	**710,705**
August 2008 Average Discharge Flow Rate (GPM)	11.8
August 2008 Maximum Discharge Flow Rate (GPM)	13.5
August 2008 Minimum Discharge Flow Rate (GPM)	11.3

Explanations for deviations from 100% recovery well operation run times are provided in the above "System Maintenance Summary". On-site recordings were compiled to estimate each well's performance using recorded flow rates, totalized discharged volumes and low level cycling to yield the following recovery well operational run time percentages:

Well I.D.	Percent Uptime	Average Operating Flow Rate (GPM)	Total Flow (Gallons) - Based on Average Flow Rate During Operational Period
RW-1	100	0.3	12,091
RW-1A	100	1.6	70,460
RW-1B	100	2.5	111,759
RW-2	100	2.2	99,299
RW-3	100	1.0	44,188
RW-4	100	4.2	188,669
RW-5	0 0	0.0	0
RW-6	0.0	0 0	0
RW-7	0.0	0.0	0
RW-8	0 0	0.0	0
RW-9	0.0	0.0	0

System Effluent Samples Collected: The most recent effluent analytical results are from July 2008.

Mass removal is calculated based on daily flow rates and the most recent analytical data. Cumulative amounts reflect contaminant removal since initial system startup.

Contaminant Mass Removal:

August 2008: 0.20 lbs TCE; 0.95 lbs Total VOCs

Cumulative: 368.47 lbs TCE; 914.52 lbs Total VOCs

Total System Effluent through 31 August 2008 (gallons): **308,845,697**

Prepared by: SLH 9/10/08

September 2008 Monthly Discharge Report
Groundwater Recovery System
Dunn Field, Memphis Depot, Tennessee
e^2M Project Number 3202-043-01-11

Groundwater Recovery System (GWRS) Operation - September 2008

Duration of System Operation: 1-Sep-08 – 30-Sep-08

Site visits During Month:

Site visits were performed by e^2M on 4 September, 12 September, 19 September, and 26 September. Tasks included collection of flow rates, reviewing system operations, and performing system maintenance and repair.

System Operational Notes:

RW-5 through RW-9 remain offline per agreement from the BCT due to low concentrations from the April 2008 IRA sampling event. The offline wells will remain operational and checked bi-weekly. All other recovery wells were continuously online during September 2008 Also, an additional 182,533 gallons of water was discharged from thermal soil vapor extraction (T-SVE) remedial action activities. Approval for discharge was granted by the City of Memphis on 7 September 2007.

System Maintenance and Repairs Summary:

All wells were online without interruption in September 2008

Alarm Summary:

No alarms noted.

Upcoming Activities

Weekly site visits to the groundwater recovery system for operations and maintenance are scheduled for October 2008.

September 2008 GWRS Discharge (gallons)	604,127
Approved One-Time Discharges (gallons)	182,533
September 2008 Effluent Discharge Volume (gallons):	**786,660**
September 2008 Average Discharge Flow Rate (GPM)	14.0
September 2008 Maximum Discharge Flow Rate (GPM)	15.7
September 2008 Minimum Discharge Flow Rate (GPM)	13.4

Explanations for deviations from 100% recovery well operation run times are provided in the above "System Maintenance Summary". On-site recordings were compiled to estimate each well's performance using recorded flow rates, totalized discharged volumes and low level cycling to yield the following recovery well operational run time percentages:

Well I.D.	Percent Uptime	Average Operating Flow Rate (GPM)	Total Flow (Gallons) - Based on Average Flow Rate During Operational Period
RW-1	100	0.3	11,797
RW-1A	100	1.1	49,328
RW-1B	100	2.5	109,385
RW-2	100	2.6	112,120
RW-3	100	2.9	124,163
RW-4	100	4.6	197,334
RW-5	0.0	0.0	0
RW-6	0 0	0.0	0
RW-7	0.0	0.0	0
RW-8	0 0	0.0	0
RW-9	0.0	0.0	0

System Effluent Samples Collected:

The most recent effluent analytical results are from July 2008

Mass removal is calculated based on daily flow rates and the most recent analytical data. Cumulative amounts reflect contaminant removal since initial system startup.

Contaminant Mass Removal:

September 2008: 0.26 lbs TCE; 1.21 lbs Total VOCs

Cumulative: 368.73 lbs TCE; 915.73 lbs Total VOCs

Total System Effluent through 30 September 2008 (gallons): **309,449,824**

Prepared by: SLH 10/09/08

October 2008 Monthly Discharge Report
Groundwater Recovery System
Dunn Field, Memphis Depot, Tennessee
e²M Project Number 3202-043-01-11

Groundwater Recovery System (GWRS) Operation - October 2008

Duration of System Operation: 1-Oct-08 – 31-Oct-08

Site visits During Month:

Site visits were performed by e²M on 2 October, 10 October, 17 October, 23 October, and 31 October. Tasks included collection of flow rates, reviewing system operations, and performing system maintenance and repair. Semi-annual groundwater samples were collected from monitoring wells, recovery wells and effluent discharge. All samples were analyzed for VOCs. The effluent sample was also analyzed for SVOCs, metals, and pH in accordance with the discharge permit.

System Operational Notes:

RW-5 through RW-9 remain offline per agreement from the BCT due to low concentrations from the April 2008 IRA sampling event. The offline wells will remain operational and checked bi-weekly. All other recovery wells were continuously online during October 2008. Also, an additional 177,124 gallons of water was discharged from thermal soil vapor extraction (T-SVE) remedial action activities. Approval for discharge was granted by the City of Memphis on 7 October 2007.

System Maintenance and Repairs Summary:

All wells were online without interruption in October 2008.

Alarm Summary:
No alarms noted.

Upcoming Activities
Weekly site visits to the groundwater recovery system for operations and maintenance are scheduled for November 2008.

October 2008 GWRS Discharge (gallons):	815,978
Approved One-Time Discharges (gallons)	177,124
October 2008 Effluent Discharge Volume (gallons):	**993,102**
October 2008 Average Discharge Flow Rate (GPM)	18.3
October 2008 Maximum Discharge Flow Rate (GPM)	20 5
October 2008 Minimum Discharge Flow Rate (GPM)	15.7

Explanations for deviations from 100% recovery well operation run times are provided in the above "System Maintenance Summary". On-site recordings were compiled to estimate each well's performance using recorded flow rates, totalized discharged volumes and low level cycling to yield the following recovery well operational run time percentages:

Well I.D.	Percent Uptime	Average Operating Flow Rate (GPM)	Total Flow (Gallons) - Based on Average Flow Rate During Operational Period
RW-1	100	0 2	10,863
RW-1A	100	1.0	44,584
RW-1B	100	2.5	113,266
RW-2	100	3.5	154,726
RW-3	100	3.9	173,339
RW-4	100	7 2	319,200
RW-5	0 0	0.0	0
RW-6	0.0	0.0	0
RW-7	0.0	0.0	0
RW-8	0.0	0.0	0
RW-9	0.0	0.0	0

System Effluent Samples Collected:

The most recent effluent analytical results are from July 2008.

Mass removal is calculated based on daily flow rates and the most recent analytical data. Cumulative amounts reflect contaminant removal since initial system startup.

Contaminant Mass Removal:

October 2008: 0.35 lbs TCE; 1.64 lbs Total VOCs

Cumulative: 369.07 lbs TCE; 917.37 lbs Total VOCs

Total System Effluent through 31 October 2008 (gallons): **310,265,802**

Prepared by: SLH 11/09/08

November 2008 Monthly Discharge Report
Groundwater Recovery System
Dunn Field, Memphis Depot, Tennessee
e²M Project Number 3202-043-01-11

Groundwater Recovery System (GWRS) Operation - November 2008

Duration of System Operation: 1-Nov-08 – 30-Nov-08

Site visits During Month:

Site visits were performed by e²M on 7 November, 14 November, 21 November, and 26 November. Tasks included collection of flow rates, reviewing system operations, and performing system maintenance and repair.

System Operational Notes:

RW-5 through RW-9 remain offline per agreement from the BCT due to low concentrations from the April 2008 IRA sampling event. The offline wells will remain operational and checked bi-weekly All other recovery wells were continuously online during November 2008. Also, an additional 113,883 gallons of water was discharged from thermal soil vapor extraction (T-SVE) remedial action activities Approval for discharge was granted by the City of Memphis on 7 October 2007

System Maintenance and Repairs Summary:

All wells were online without interruption in November 2008.

Alarm Summary:

No alarms noted.

Upcoming Activities

Weekly site visits to the groundwater recovery system for operations and maintenance are scheduled for November 2008

November 2008 GWRS Discharge (gallons):	884,833
Approved One-Time Discharges (gallons)	113,883
November 2008 Effluent Discharge Volume (gallons):	**998,716**
November 2008 Average Discharge Flow Rate (GPM)	20.5
November 2008 Maximum Discharge Flow Rate (GPM)	20 8
November 2008 Minimum Discharge Flow Rate (GPM)	20 2

Explanations for deviations from 100% recovery well operation run times are provided in the above "System Maintenance Summary". On-site recordings were compiled to estimate each well's performance using recorded flow rates, totalized discharged volumes and low level cycling to yield the following recovery well operational run time percentages:

Well I.D.	Percent Uptime	Average Operating Flow Rate (GPM)	Total Flow (Gallons) - Based on Average Flow Rate During Operational Period
RW-1	100	0.3	12,862
RW-1A	100	1.0	42,974
RW-1B	100	2.4	105,527
RW-2	100	3.5	151,207
RW-3	100	3.9	168,020
RW-4	100	9.4	404,243
RW-5	0.0	0 0	0
RW-6	0 0	0.0	0
RW-7	0.0	0.0	0
RW-8	0 0	0.0	0
RW-9	0.0	0.0	0

System Effluent Samples Collected:

The most recent effluent analytical results are from Oct 2008.

Mass removal is calculated based on daily flow rates and the most recent analytical data. Cumulative amounts reflect contaminant removal since initial system startup.

Contaminant Mass Removal:

November 2008: 0.13 lbs TCE; 0.45 lbs Total VOCs

Cumulative: 369.21 lbs TCE; 917.82 lbs Total VOCs

Total System Effluent through 30 November 2008 (gallons): **311,150,635**

Prepared by: SLH 12/10/08

December 2008 Monthly Discharge Report
Groundwater Recovery System
Dunn Field, Memphis Depot, Tennessee
e²M Project Number 3202-043-01-11

Groundwater Recovery System (GWRS) Operation - December 2008

Duration of System Operation: 1-Dec-08 – 31-Dec-08

Site visits During Month:

Site visits were performed by e²M on 4 December, 12 December, 18 December, 23 December, and 31 December. Tasks included collection of flow rates, reviewing system operations, and performing system maintenance and repair.

System Operational Notes:

RW-5 through RW-9 remain offline per agreement from the BCT due to low concentrations from the April 2008 IRA sampling event. The offline wells will remain operational and checked bi-weekly. All other recovery wells were continuously online during December 2008. Also, an additional 6,624 gallons of water was discharged from thermal soil vapor extraction (T-SVE) remedial action activities. Approval for discharge was granted by the City of Memphis on 7 October 2007.

System Maintenance and Repairs Summary:

All wells were online without interruption in December 2008. On 31 December, a crack was discovered in the aboveground portion of the pipe used to discharge water to the City of Memphis POTW. New parts were obtained and the pipe repaired the same day.

Alarm Summary:

No alarms noted.

Upcoming Activities

Weekly site visits to the groundwater recovery system for operations and maintenance are scheduled for January 2009.

December 2008 GWRS Discharge (gallons):	864,958
Approved One-Time Discharges (gallons)	6,624
December 2008 Effluent Discharge Volume (gallons):	**871,582**
December 2008 Average Discharge Flow Rate (GPM)	19.4
December 2008 Maximum Discharge Flow Rate (GPM)	20.4
December 2008 Minimum Discharge Flow Rate (GPM)	18.6

Explanations for deviations from 100% recovery well operation run times are provided in the above "System Maintenance Summary". On-site recordings were compiled to estimate each well's performance using recorded flow rates, totalized discharged volumes and low level cycling to yield the following recovery well operational run time percentages.

Well I.D.	Percent Uptime	Average Operating Flow Rate (GPM)	Total Flow (Gallons) - Based on Average Flow Rate During Operational Period
RW-1	100	0.2	9,635
RW-1A	100	1.0	43,465
RW-1B	100	2.6	116,390
RW-2	100	3.6	161,422
RW-3	100	2.4	107,114
RW-4	100	9.6	426,931
RW-5	0 0	0.0	0
RW-6	0.0	0.0	0
RW-7	0.0	0.0	0
RW-8	0.0	0.0	0
RW-9	0.0	0.0	0

System Effluent Samples Collected:

The most recent effluent analytical results are from Oct 2008.

Mass removal is calculated based on daily flow rates and the most recent analytical data. Cumulative amounts reflect contaminant removal since initial system startup

Contaminant Mass Removal:

December 2008: 0.13 lbs TCE; 0.44 lbs Total VOCs

Cumulative: 369.34 lbs TCE; 918.25 lbs Total VOCs

Total System Effluent through 31 December 2008 (gallons): **312,015,593**

Prepared by: SLH 01/09/09

APPENDIX C

RESULTS OF LABORATORY ANALYSIS

APPENDIX C-1

MONITORING WELL ANALYTICAL RESULTS – VOCS – APRIL 2008

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	MW-3 / L08040517-22 / 4/16/2008	MW-6 / L08040486-06 / 4/15/2008	MW-07-68.9 / L08040444-01 / 4/14/2008	MW-15 / L08040486-07 / 4/15/2008	MW-31-71.6 / L08040409-29 / 4/11/2008	MW-31-77.1 / L08040409-30 / 4/11/2008	MW-32-65 6 / L08040409-31 / 4/11/2008
1,1,1,2-Tetrachloroethane	ug/L	<0 5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	0.613 J	<1	4.38	0.856 J	<1
1,1,2,2-Tetrachloroethane	ug/L	<0 5	8.89	<0 5	2.15	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	<1	1.02	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	1.2	<1	1.96	<1	<1
1,1-Dichloroethene	ug/L	1.54	<1	24.8	<1	14.3	7 17	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	0.357 J	1.05	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0 4	<0.4	<0.4	<0 4
1,4-Dichlorobenzene	ug/L	0.193 B	0 177 J	<0.5	0 239 J	<0 5	<0.5	<0 5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
Acetone	ug/L	<10	<10	3 41 B	<10	<10	<10	<10
Benzene	ug/L	<0.4	<0.4	<0 4	<0.4	<0.4	<0 4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0 5	<0.5	<0 5	<0 5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	3.78	<1	16	0.368 J	<1	<1
Chlorobenzene	ug/L	<0 5	<0.5	<0.5	<0.5	<0.5	<0.5	<0 5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	0.147 J	84 7	0 273 J	106	0.802	0.169 J	4.07
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	36 2	<1	5.99	2 87	0.332 J	0 263 J
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0 5	<0 5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0 5	<0.5	<0.5	<0 5	<0.5	<0 5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0 6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	2.71	1.07	56.2	7.19	0.891 J	0 916 J	<1
Toluene	ug/L	<1	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	1.45	<1	2.02	1.51	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	2.04	32.5	29 4	104	10.5	3.21	2.47
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-33-58 L08040444-11 4/14/2008	MW-37-173 2 L08040444-02 4/14/2008	MW-40-90 L08040409-39 4/11/2008	MW-43-165 5 L08040409-41 4/11/2008	MW-44-69 L08040409-42 4/11/2008	MW-54-89 5 L08040409-03 4/11/2008	MW-57-66 6 L08040444-03 4/14/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5 J	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0 5 J	<0.5	<0 5	<0.5	<0.5	171	<0.5
1,1,2-Trichloroethane	ug/L	<1 J	<1	<1	<1	<1	0.885 J	<1
1,1-Dichloroethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1 J	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2 J	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5 J	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1 J	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4 J	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5 J	<0 5	<0.5	<0 5	<0 5	<0.5	<0 5
1-Chlorohexane	ug/L	<1 J	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1 J	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10 J	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
Acetone	ug/L	<10 J	2 97 B	4 94 B	9.66 B	<10	5.16 B	6.58 B
Benzene	ug/L	<0.4 J	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5 J	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1 J	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1 J	<1	<1	0.611 B	<1	<1	<1
Carbon disulfide	ug/L	<1 J	<1	<1	<1 J	<1 J	<1	<1
Carbon tetrachloride	ug/L	<1 J	<1	<1	<1	0.823 J	6 76	11.1
Chlorobenzene	ug/L	<0.5 J	<0 5	0.145 J	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	<0 3 J	<0.3	<0 3	<0.3	0.567	3 85	3.32
Chloromethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1 J	<1	<1	<1	<1	17.4	<1
cis-1,3-Dichloropropene	ug/L	<0.5 J	<0.5	<0.5	<0.5	<0 5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5 J	<0.5	<0 5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6 J	<0 6	<0.6	<0.6	<0 6	<0.6	<0.6
Isopropylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2 J	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10 J	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5 J	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1 J	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10 J	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	<1 J	<1	<1	<1	<1	3.88	3.03
Toluene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1 J	<1	<1	<1	<1	4.42	<1
trans-1,3-Dichloropropene	ug/L	<1 J	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	<1 J	<1	<1	<1	0.599 J	348	19.4
Trichlorofluoromethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5 J	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1 J	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-67-267 5 L08040409-43 4/11/2008	MW-68-77 5 L08040444-04 4/14/2008	MW-69-88 2 L08040444-05 4/14/2008	MW-70-83 3 L08040444-06 4/14/2008	MW-70-88 8 L08040444-07 4/14/2008	MW-71-72 3 L08040444-13 4/14/2008	MW-74 L08040486-08 4/15/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0 5	<1	<1.25	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<2	<2.5	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5	0 24 B	<0.5	270	177	1 72	16.1
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<2	1.11 J	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<2	<2.5	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	<2	1.71 J	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<2	<2.5	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<4	<5	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<2	<2.5	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<2	<2 5	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0 5	<1	<1 25	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	0 524 J	<2.5	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<2	<2 5	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0 8	<1	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0 5	<0.5	<1	<1.25	<0.5	<0 5
1-Chlorohexane	ug/L	<1	<1	<1	<2	<2.5	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<2	<2.5	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<20	<25	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
Acetone	ug/L	5 95 B	<10	<10	12.4 J	9.93 J	8.48 J	<10
Benzene	ug/L	<0.4	<0.4	<0.4	<0.8	<1	<0.4	<0 4
Bromobenzene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<2	<2.5	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0 5	<1	<1 25	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<2	<2.5	<1	<1
Bromomethane	ug/L	<1	<1	<1	<2	<2.5	<1	<1
Carbon disulfide	ug/L	<1 J	<1	<1	<2	<2.5	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<2	<2 5	7.66	<1
Chlorobenzene	ug/L	<0.5	<0 5	<0.5	<1	<1.25	<0.5	<0 5
Chloroethane	ug/L	<1	<1	<1	<2	<2.5	<1	<1
Chloroform	ug/L	<0.3	<0.3	<0.3	<0.6	<0.75	17.3	0.163 J
Chloromethane	ug/L	<1	<1	<1	<2	<2.5	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	<1	<1	1.63 J	14.2	0.523 J	<1
cis-1,3-Dichloropropene	ug/L	<0 5	<0.5	<0.5	<1	<1.25	<0 5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<1	<1.25	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<2	<2.5	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<2	<2.5	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<1.2	<1.5	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<4	<5	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<20	<25	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<10	<12.5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<2	<2 5	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<20	<25	<10	<10
Naphthalene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
o-Xylene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
Styrene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
Tetrachloroethene	ug/L	<1	<1	0.658 J	1 53 J	0.984 J	0.715 J	0.473 J
Toluene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<2	4.74	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<2	<2.5	<1	<1
Trichloroethene	ug/L	<1	0.36 J	<1	86	60.4	9 37	7.19
Trichlorofluoromethane	ug/L	<1	<1	<1	<2	<2.5	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<10	<12.5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<2	13.5	<1	<1

Notes.
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	MW-76-88 2 / L08040444-14 / 4/14/2008	MW-77-84.9 / L08040444-17 / 4/14/2008	MW-79-92 / L08040409-04 / 4/11/2008	MW-130-69 5 / L08040409-44 / 4/11/2008	MW-132 / L08040486-09 / 4/15/2008	MW-134 / L08040517-24 / 4/16/2008	MW-144-74.9 / L08040409-45 / 4/11/2008
1,1,1,2-Tetrachloroethane	ug/L	<0 5	<10	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<20	<1	1.86	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	77	566	30 4	<0.5	25.1	0 717	79 4
1,1,2-Trichloroethane	ug/L	0.303 J	<20	<1	<1	0 469 J	<1	0.461 J
1,1-Dichloroethane	ug/L	<1	<20	0 2 J	4.01	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<20	10	73.4	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<20	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<20	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<20	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<20	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<20	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<40	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<20	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	0 142 B	<20	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<10	<0 5	1	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<20	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<20	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<20	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<8	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	0 204 B	<10	<0.5	<0.5	0.179 J	0.135 B	<0.5
1-Chlorohexane	ug/L	<1	<20	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<20	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<20	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<200	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<20	<1	<1	<1	<1	<1
Acetone	ug/L	6.54 J	<200	<10	5.03 J	<10	<10	7 4 B
Benzene	ug/L	<0 4	<8	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<20	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<20	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<10	<0 5	<0.5	<0.5	<0 5	<0.5
Bromoform	ug/L	<1	<20	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<20	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<20	<1	<1 J	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<20	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<10	<0 5	0.144 J	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<20	<1	<1	<1	<1	<1
Chloroform	ug/L	0.915	<6	<0.3	0.27 J	<0.3	<0 3	1.77
Chloromethane	ug/L	<1	<20	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	13 2	7.13 J	<1	0 789 J	0.388 J	<1	2.31
cis-1,3-Dichloropropene	ug/L	<0.5	<10	<0 5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0 5	<10	<0.5	<0 5	<0 5	<0.5	<0.5
Dibromomethane	ug/L	<1	<20	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<20	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<20	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<12	<0.6	<0 6	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<20	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<40	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<200	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<100	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	6.28 B	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<200	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<20	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<20	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<20	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<20	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<20	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<20	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<20	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<20	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	4.44	<20	0 917 J	196	0.649 J	0 488 J	<1
Toluene	ug/L	<1	<20	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	3.59	<20	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<20	<1	<1	<1	<1	<1
Trichloroethene	ug/L	336 J	309	7.5	71	16.7	1.08	37.6
Trichlorofluoromethane	ug/L	<1	<20	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<100	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<20	<1	<1	<1	<1	<1

Notes.
μg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank
J Analyte positively identified, but quantitation

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	MW-145-86 6 / L08040444-08 / 4/14/2008	MW-147-73.7 / L08040409-05 / 4/11/2008	MW-148-80 0 / L08040409-06 / 4/11/2008	MW-148-85 5 / L08040409-07 / 4/11/2008	MW-149-83 6 / L08040409-08 / 4/11/2008	MW-149-98.5 / L08040409-09 / 4/11/2008	MW-150-83 2 / L08040409-10 / 4/11/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5 J	<0.5	<0.5	<0.5	<0.5	<0.5	<0 5 J
1,1,1-Trichloroethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
1,1,2,2-Tetrachloroethane	ug/L	<0.5 J	22	21.2	6.92	1.53	4.1	174 J
1,1,2-Trichloroethane	ug/L	<1 J	<1	0.252 J	<1	<1	<1	9.85 J
1,1-Dichloroethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
1,1-Dichloroethene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
1,1-Dichloropropene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
1,2,3-Trichlorobenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
1,2,3-Trichloropropane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
1,2,4-Trichlorobenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
1,2,4-Trimethylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
1,2-Dibromo-3-chloropropane	ug/L	<2 J	<2	<2	<2	<2	<2	<2 J
1,2-Dibromoethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
1,2-Dichlorobenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
1,2-Dichloroethane	ug/L	<0.5 J	<0.5	<0.5	<0.5	<0 5	<0.5	<0.5 J
1,2-Dichloropropane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
1,3,5-Trimethylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
1,3-Dichlorobenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
1,3-Dichloropropane	ug/L	<0.4 J	<0.4	<0.4	<0 4	<0.4	<0.4	<0.4 J
1,4-Dichlorobenzene	ug/L	<0.5 J	<0.5	<0.5	<0 5	<0.5	<0.5	<0 5 J
1-Chlorohexane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
2,2-Dichloropropane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
2-Chlorotoluene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
2-Hexanone	ug/L	<10 J	<10	<10	<10	<10	<10	<10 J
4-Chlorotoluene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Acetone	ug/L	<10 J	3.08 B	3.8 B	2.71 B	4.77 B	3 65 B	4.51 B
Benzene	ug/L	<0.4 J	<0.4	<0 4	<0.4	<0.4	<0.4	<0 4 J
Bromobenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Bromochloromethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Bromodichloromethane	ug/L	<0.5 J	<0 5	<0.5	<0 5	<0.5	<0.5	<0.5 J
Bromoform	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Bromomethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Carbon disulfide	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Carbon tetrachloride	ug/L	<1 J	<1	<1	<1	5.26	6.7	<1 J
Chlorobenzene	ug/L	<0.5 J	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5 J
Chloroethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Chloroform	ug/L	<0.3 J	0.509	1 16	0 582	14.2	29.6	1.43 J
Chloromethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
cis-1,2-Dichloroethene	ug/L	<1 J	6 15	21.7	7.33	1.12	2 43	3.59 J
cis-1,3-Dichloropropene	ug/L	<0 5 J	<0 5	<0.5	<0.5	<0.5	<0 5	<0.5 J
Dibromochloromethane	ug/L	<0.5 J	<0 5	<0.5	<0.5	<0.5	<0 5	<0.5 J
Dibromomethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Dichlorodifluoromethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Ethylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Hexachlorobutadiene	ug/L	<0.6 J	<0.6	<0.6	<0.6	<0 6	<0.6	<0.6 J
Isopropylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
m-,p-Xylene	ug/L	<2 J	<2	<2	<2	<2	<2	<2 J
MEK (2-Butanone)	ug/L	<10 J	<10	<10	<10	<10	<10	<10 J
Methyl t-butyl ether (MTBE)	ug/L	<5 J	<5	<5	<5	<5	<5	<5 J
Methylene chloride	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
MIBK (methyl isobutyl ketone)	ug/L	<10 J	<10	<10	<10	<10	<10	<10 J
Naphthalene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
n-Butylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
n-Propylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
o-Xylene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
p-Isopropyltoluene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
sec-Butylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Styrene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
tert-Butylbenzene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Tetrachloroethene	ug/L	<1 J	7.92	3.59	1.96	0.623 J	1	0.361 J
Toluene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
trans-1,2-Dichloroethene	ug/L	<1 J	1	2.74	2.1	0.266 J	0.675 J	<1 J
trans-1,3-Dichloropropene	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Trichloroethene	ug/L	<1 J	53.9	266	62.9	12 2	19.1	80.6 J
Trichlorofluoromethane	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J
Vinyl acetate	ug/L	<5 J	<5	<5	<5	<5	<5	<5 J
Vinyl chloride	ug/L	<1 J	<1	<1	<1	<1	<1	<1 J

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Well	MW-150-90 5	MW-151-78.5	MW-151-94.5	MW-152-107 9	MW-152-92 9	MW-153-87.1	MW-154-61 6
	Lab ID	L08040409-11	L08040444-18	L08040444-19	L08040409-13	L08040409-12	L08040444-20	L08040444-21
	Date	4/11/2008	4/14/2008	4/14/2008	4/11/2008	4/11/2008	4/14/2008	4/14/2008
Volatile Organic Compounds - SW8260B	units							
1,1,1,2-Tetrachloroethane	ug/L	<10	<0.5	<0.5	<0 5	<0.5	<0.5	<0 5
1,1,1-Trichloroethane	ug/L	<20	<1	<1	<1	<1	1.39	<1
1,1,2,2-Tetrachloroethane	ug/L	1960	<0 5	0.468 J	1.4	3.05	<0 5	<0.5
1,1,2-Trichloroethane	ug/L	15 2 J	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<20	<1	<1	<1	<1	0.596 J	<1
1,1-Dichloroethene	ug/L	<20	<1	<1	<1	<1	6.37	<1
1,1-Dichloropropene	ug/L	<20	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<20	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<20	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<20	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<20	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<40	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<20	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<20	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<10	<0.5	<0.5	<0.5	<0 5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<20	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<20	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<20	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<8	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<10	<0.5	<0 5	<0.5	<0.5	<0 5	<0.5
1-Chlorohexane	ug/L	<20	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<20	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<20	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<200	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<20	<1	<1	<1	<1	<1	<1
Acetone	ug/L	<200	<10	2.65 J	<10	<10	<10	<10
Benzene	ug/L	<8	<0.4	<0.4	<0.4	<0.4	<0 4	<0.4
Bromobenzene	ug/L	<20	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<20	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<10	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5
Bromoform	ug/L	<20	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<20	<1	0.705 B	<1	<1	0.59 B	0.573 B
Carbon disulfide	ug/L	<20	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<20	0.602 J	4.77	<1	<1	<1	<1
Chlorobenzene	ug/L	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<20	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	<6	0.236 J	15.5	0.573	0.601	<0.3	<0.3
Chloromethane	ug/L	<20	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	37.3	<1	1.42	5.49	5.65	0.341 J	<1
cis-1,3-Dichloropropene	ug/L	<10	<0 5	<0.5	<0.5	<0.5	<0 5	<0.5
Dibromochloromethane	ug/L	<10	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<20	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<20	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<20	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<12	<0.6	<0.6	<0.6	<0.6	<0.6	<0 6
Isopropylbenzene	ug/L	<20	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<40	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<200	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<100	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<20	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<200	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<20	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<20	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<20	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<20	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<20	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<20	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<20	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<20	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	8.1 J	<1	0 639	8.53	5.5	0.445 J	<1
Toluene	ug/L	<20	<1	<1	<1	0.321 B	<1	<1
trans-1,2-Dichloroethene	ug/L	<20	<1	0.613 J	1.76	2.42	<1	<1
trans-1,3-Dichloropropene	ug/L	<20	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	1230	1 32	20.1	61.7	72 7	0.469 J	<1
Trichlorofluoromethane	ug/L	<20	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<100	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<20	<1	<1	<1	<1	<1	<1

Notes:

µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank
J Analyte positively identified, but quantitation

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MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	MW-155-77.0	MW-155-93.5	MW-156-62.0	MW-157-74.8	MW-158-104.1	MW-158-93.1	MW-158A-81.5
	Lab ID	L08040409-14	L08040409-15	L08040409-46	L08040444-22	L08040409-17	L08040409-16	L08040409-18
	Date	4/11/2008	4/11/2008	4/11/2008	4/14/2008	4/11/2008	4/11/2008	4/11/2008
	units							
1,1,1,2-Tetrachloroethane	ug/L	<10	<12.5	<0.5	<1	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<20	<25	<1	<2	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	3770	3540	<0.5	10.1	3.03	2.79	217
1,1,2-Trichloroethane	ug/L	53.8	43.2	<1	<2	<1	<1	7.88 J
1,1-Dichloroethane	ug/L	<20	<25	<1	<2	<1	<1	<1
1,1-Dichloroethene	ug/L	<20	<25	<1	<2	<1	<1	<1
1,1-Dichloropropene	ug/L	<20	<25	<1	<2	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<20	<25	<1	<2	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<20	<25	<1	<2	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<20	<25	<1	<2	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<20	<25	<1	<2	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<40	<50	<2	<4	<2	<2	<2
1,2-Dibromoethane	ug/L	<20	<25	<1	<2	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<20	<25	<1	<2	<1	<1	<1
1,2-Dichloroethane	ug/L	<10	<12.5	<0.5	<1	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<20	<25	<1	0.515 J	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<20	<25	<1	<2	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<20	<25	<1	<2	<1	<1	<1
1,3-Dichloropropane	ug/L	<8	<10	<0.4	<0.8	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<10	<12.5	<0.5	<1	<0.5	<0.5	<0.5
1-Chlorohexane	ug/L	<20	<25	<1	<2	<1	<1	<1
2,2-Dichloropropane	ug/L	<20	<25	<1	<2	<1	<1	<1
2-Chlorotoluene	ug/L	<20	<25	<1	<2	<1	<1	<1
2-Hexanone	ug/L	<200	<250	<10	<20	<10	<10	<10
4-Chlorotoluene	ug/L	<20	<25	<1	<2	<1	<1	<1
Acetone	ug/L	<200	<250	4.95 B	8.87 J	<10	3.98 B	3.16 B
Benzene	ug/L	<8	<10	<0.4	<0.8	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<20	<25	<1	<2	<1	<1	<1
Bromochloromethane	ug/L	<20	<25	<1	<2	<1	<1	<1
Bromodichloromethane	ug/L	<10	<12.5	<0.5	<1	<0.5	<0.5	<0.5
Bromoform	ug/L	<20	<25	<1	<2	<1	<1	<1
Bromomethane	ug/L	<20	<25	<1	1.05 B	<1	<1	<1
Carbon disulfide	ug/L	<20	<25	<1 J	<2	<1	<1	<1
Carbon tetrachloride	ug/L	<20	<25	<1	<2	<1	<1	<1
Chlorobenzene	ug/L	<10	<12.5	<0.5	<1	<0.5	<0.5	<0.5
Chloroethane	ug/L	<20	<25	<1	<2	<1	<1	<1
Chloroform	ug/L	<6	<7.5	<0.3	9	0.288 J	0.251 J	0.373 J
Chloromethane	ug/L	<20	<25	<1	<2	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	73.8	61.4	<1	0.671 J	2.9	2.55	8.05 J
cis-1,3-Dichloropropene	ug/L	<10	<12.5	<0.5	<1	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<10	<12.5	<0.5	<1	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<20	<25	<1	<2	<1	<1	<1
Dichlorodifluoromethane	ug/L	<20	<25	<1	<2	<1	<1	<1
Ethylbenzene	ug/L	<20	<25	<1	<2	<1	<1	<1
Hexachlorobutadiene	ug/L	<12	<15	<0.6	<1.2	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<20	<25	<1	<2	<1	<1	<1
m-,p-Xylene	ug/L	<40	<50	<2	<4	<2	<2	<2
MEK (2-Butanone)	ug/L	<200	<250	<10	<20	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<100	<125	<5	<10	<5	<5	<5
Methylene chloride	ug/L	<20	<25	<1	<2	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<200	<250	<10	<20	<10	<10	<10
Naphthalene	ug/L	<20	<25	<1	<2	<1	<1	<1
n-Butylbenzene	ug/L	<20	<25	<1	<2	<1	<1	<1
n-Propylbenzene	ug/L	<20	<25	<1	<2	<1	<1	<1
o-Xylene	ug/L	<20	<25	<1	<2	<1	<1	<1
p-Isopropyltoluene	ug/L	<20	<25	<1	<2	<1	<1	<1
sec-Butylbenzene	ug/L	<20	<25	<1	<2	<1	<1	<1
Styrene	ug/L	<20	<25	<1	<2	<1	<1	<1
tert-Butylbenzene	ug/L	<20	<25	<1	<2	<1	<1	<1
Tetrachloroethene	ug/L	10.2 J	8.34 J	<1	<2	4.98	4.74	0.578 J
Toluene	ug/L	<20	<25	<1	<2	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	9.93 J	7.82 J	<1	<2	1.25	1.02	0.938 J
trans-1,3-Dichloropropene	ug/L	<20	<25	<1	<2	<1	<1	<1
Trichloroethene	ug/L	1600	1510	<1	5.48	37.1	33.1	97.3 J
Trichlorofluoromethane	ug/L	<20	<25	<1	<2	<1	<1	<1
Vinyl acetate	ug/L	<100	<125	<5	<10	<5	<5	<5
Vinyl chloride	ug/L	<20	<25	<1	<2	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	MW-158A-91 4 / L08040409-19 / 4/11/2008	MW-159-81 1 / L08040409-20 / 4/11/2008	MW-159-97 1 / L08040409-21 / 4/11/2008	MW-160 IS4 Confirm / L08060542-01 / 6/18/2008	MW-160-80 8 / L08040409-22 / 4/11/2008	MW-161-80 0 / L08040409-47 / 4/11/2008	MW-162-83 7 / L08040444-23 / 4/14/2008
1,1,1,2-Tetrachloroethane	ug/L	<0 5	<5	<5	0 663	<2.5	<10	<25
1,1,1-Trichloroethane	ug/L	<1	<10	<10	<1	<5	<20	<50
1,1,2,2-Tetrachloroethane	ug/L	26 9	312	290	3090	3560	594	4160
1,1,2-Trichloroethane	ug/L	<1	99 8	111	2 69	2.97 J	<20	<50
1,1-Dichloroethane	ug/L	<1	<10	<10	<1	<5	<20	<50
1,1-Dichloroethene	ug/L	<1	<10	<10	<1	<5	<20	<50
1,1-Dichloropropene	ug/L	<1	<10	<10	<1	<5	<20	<50
1,2,3-Trichlorobenzene	ug/L	<1	<10	<10	<1	<5	<20	<50
1,2,3-Trichloropropane	ug/L	<1	<10	<10	<1	<5	<20	<50
1,2,4-Trichlorobenzene	ug/L	<1	<10	<10	<1	<5	<20	<50
1,2,4-Trimethylbenzene	ug/L	<1	<10	<10	<1	<5	<20	<50
1,2-Dibromo-3-chloropropane	ug/L	<2	<20	<20	<2	<10	<40	<100
1,2-Dibromoethane	ug/L	<1	<10	<10	<1	<5	<20	<50
1,2-Dichlorobenzene	ug/L	<1	<10	<10	<1	<5	<20	<50
1,2-Dichloroethane	ug/L	<0.5	<5	<5	<0.5	<2.5	<10	<25
1,2-Dichloropropane	ug/L	<1	<10	<10	<1	<5	<20	<50
1,3,5-Trimethylbenzene	ug/L	<1	<10	<10	<1	<5	<20	<50
1,3-Dichlorobenzene	ug/L	<1	<10	<10	<1	<5	<20	<50
1,3-Dichloropropane	ug/L	<0.4	<4	<4	<0.4	<2	<8	<20
1,4-Dichlorobenzene	ug/L	<0.5	<5	<5	0.149	<2 5	<10	<25
1-Chlorohexane	ug/L	<1	<10	<10	<1	<5	<20	<50
2,2-Dichloropropane	ug/L	<1	<10	<10	<1	<5	<20	<50
2-Chlorotoluene	ug/L	<1	<10	<10	<1	<5	<20	<50
2-Hexanone	ug/L	<10	<100	<100	<10	<50	<200	<500
4-Chlorotoluene	ug/L	<1	<10	<10	<1	<5	<20	<50
Acetone	ug/L	2.52 B	<100	<100	3 52	<50	<200	<500
Benzene	ug/L	<0.4	<4	<4	<0.4	<2	<8	<20
Bromobenzene	ug/L	<1	<10	<10	<1	<5	<20	<50
Bromochloromethane	ug/L	<1	<10	<10	<1	<5	<20	<50
Bromodichloromethane	ug/L	<0.5	<5	<5	<0.5	<2 5	<10	<25
Bromoform	ug/L	<1	<10	<10	<1	<5	<20	<50
Bromomethane	ug/L	<1	<10	<10	<1	<5	<20	<50
Carbon disulfide	ug/L	<1	<10	<10	<1	<5	<20 J	<50
Carbon tetrachloride	ug/L	<1	<10	<10	1.14	<5	<20	<50
Chlorobenzene	ug/L	<0.5	<5	<5	<0.5	0.926 J	<10	<25
Chloroethane	ug/L	<1	<10	<10	<1	<5	<20	<50
Chloroform	ug/L	1.01	<3	<3	1.62	2.14	3.65 J	<15
Chloromethane	ug/L	<1	<10	<10	<1	<5	<20	<50
cis-1,2-Dichloroethene	ug/L	12.1	1220	1180	40.9	49 8	15.7 J	23 9 J
cis-1,3-Dichloropropene	ug/L	<0.5	<5	<5	<0.5	<2.5	<10	<25
Dibromochloromethane	ug/L	<0.5	<5	<5	<0.5	<2 5	<10	<25
Dibromomethane	ug/L	<1	<10	<10	<1	<5	<20	<50
Dichlorodifluoromethane	ug/L	<1	<10	<10	<1	<5	<20	<50
Ethylbenzene	ug/L	<1	<10	<10	<1	<5	<20	<50
Hexachlorobutadiene	ug/L	<0.6	<6	<6	<0 6	<3	<12	<30
Isopropylbenzene	ug/L	<1	<10	<10	<1	<5	<20	<50
m-,p-Xylene	ug/L	<2	<20	<20	<2	<10	<40	<100
MEK (2-Butanone)	ug/L	<10	<100	<100	<10	<50	<200	<500
Methyl t-butyl ether (MTBE)	ug/L	<5	<50	<50	<5	<25	<100	<250
Methylene chloride	ug/L	<1	<10	<10	<1	1.59 B	9.78 B	14.8 B
MIBK (methyl isobutyl ketone)	ug/L	<10	<100	<100	<10	<50	<200	<500
Naphthalene	ug/L	<1	<10	<10	<1	<5	<20	<50
n-Butylbenzene	ug/L	<1	<10	<10	<1	<5	<20	<50
n-Propylbenzene	ug/L	<1	<10	<10	<1	<5	<20	<50
o-Xylene	ug/L	<1	<10	<10	<1	<5	<20	<50
p-Isopropyltoluene	ug/L	<1	<10	<10	<1	<5	<20	<50
sec-Butylbenzene	ug/L	<1	<10	<10	<1	<5	<20	<50
Styrene	ug/L	<1	<10	<10	<1	<5	<20	<50
tert-Butylbenzene	ug/L	<1	<10	<10	<1	<5	<20	<50
Tetrachloroethene	ug/L	10.7	5 26 J	6.28 J	9.43	10 6	<20	<50
Toluene	ug/L	<1	<10	<10	<1	<5	<20	<50
trans-1,2-Dichloroethene	ug/L	4.06	24 9	26.6	7.36	9.32	5.59 J	<50
trans-1,3-Dichloropropene	ug/L	<1	<10	<10	<1	<5	<20	<50
Trichloroethene	ug/L	126	1170	1410	1120	1130	342	792
Trichlorofluoromethane	ug/L	<1	<10	<10	<1	<5	<20	<50
Vinyl acetate	ug/L	<5	<50	<50	<5	<25	<100	<250
Vinyl chloride	ug/L	<1	7.79 J	7.11 J	<1	<5	<20	<50

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	MW-163-74 9 / L08040444-24 / 4/14/2008	MW-164-72 6 / L08040444-25 / 4/14/2008	MW-165-100 / L08040409-49 / 4/11/2008	MW-165-89.9 / L08040409-48 / 4/11/2008	MW-165A-73.9 / L08040409-50 / 4/11/2008	MW-165A-84 5 / L08040409-56 / 4/11/2008	MW-166-87 3 / L08040409-23 / 4/11/2008
1,1,1,2-Tetrachloroethane	ug/L	<2.5	<0.5	<0.5	<0.5	<0.5	<0 5	<0.5
1,1,1-Trichloroethane	ug/L	<5	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	488	13.4	1.8	3.04	<0 5	2.77	8.3
1,1,2-Trichloroethane	ug/L	3.37 J	0 517 J	0.343 J	0.299 J	<1	<1	<1
1,1-Dichloroethane	ug/L	<5	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<5	<1 J	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/L	<5	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<5	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<5	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<5	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<5	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<10	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<5	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<5	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<2 5	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<5	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<5	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<5	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<2	<0.4	<0.4	<0.4	<0.4	<0 4	<0 4
1,4-Dichlorobenzene	ug/L	<2.5	<0.5	<0.5	<0.5	<0.5	<0 5	<0.5
1-Chlorohexane	ug/L	<5	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<5	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<5	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<50	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<5	<1	<1	<1	<1	'<1	<1
Acetone	ug/L	15 6 J	4.1 J	3 53 B	3 17 B	2.53 B	3 53 B	3.3 B
Benzene	ug/L	<2	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<5	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<5	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<5	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<5	0.547 B	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<5	<1	<1 J	<1 J	<1	<1	<1
Carbon tetrachloride	ug/L	<5	3 42 J	0.769 J	9.32	1.14	11.3	6.43
Chlorobenzene	ug/L	<2 5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<5	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	11.9	37.1	4 85	61.4	3.88	49.8	39.1
Chloromethane	ug/L	<5	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	9.07	2.71	9.59	5.97	1.2	7.3	2.49
cis-1,3-Dichloropropene	ug/L	<2.5	<0.5	<0.5	<0.5	<0.5	<0 5	<0 5
Dibromochloromethane	ug/L	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0 5
Dibromomethane	ug/L	<5	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<5	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<5	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<3	<0.6	<0.6	<0.6	<0.6	<0.6	<0 6
Isopropylbenzene	ug/L	<5	<1 J	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<10	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<50	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<25	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	1.56 B	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<50	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<5	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<5	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<5	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<5	<1	0.659 J	0 614 J	<1	<1	<1
p-Isopropyltoluene	ug/L	<5	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<5	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<5	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<5	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	<5	0.894	1.25	1.64	0 392 J	2.44	1.14
Toluene	ug/L	<5	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	1.84 J	0 57 J	1.99	1.6	0.322 J	1.4	0.955 J
trans-1,3-Dichloropropene	ug/L	<5	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	80.3	24.9 J	128	87.1	32.6	103	24.8
Trichlorofluoromethane	ug/L	<5	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<25	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<5	<1	<1	<1	<1	<1	<1

Notes.
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank
J Analyte positively identified, but quantitation

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	MW-166-97 8 / L08040409-24 / 4/11/2008	MW-166A-75 3 / L08040409-25 / 4/11/2008	MW-167-76.5 / L08040409-57 / 4/11/2008	MW-168-113.9 / L08040409-26 / 4/11/2008	MW-168A-76 4 / L08040409-27 / 4/11/2008	MW-168A-86.9 / L08040409-28 / 4/11/2008	MW-169-81 8 / L08040409-58 / 4/11/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0 5	<0 5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	6 83	2 05	<1
1,1,2,2-Tetrachloroethane	ug/L	8 39	3.76	<0 5	<0 5	<0.5	<0 5	<0.5
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	0.425 J	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	0 818 J	13.6	6.01	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0 4	<0.4	<0.4	<0 4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0 5	0.156 B	<0.5	<0 5	<0.5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
Acetone	ug/L	4.31 B	6.84 B	5.76 B	<10	<10	<10	8.69 B
Benzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0 5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	8.3	4.44	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	<0 5	<0.5	<0.5	<0.5	<0 5	<0.5	0.859
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	52.2	34.4	<0.3	<0 3	0.537	0.188 J	<0.3
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	2.4	2.57	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5	<0 5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0 5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0 6	<0.6	<0.6	<0 6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	1 65	1 24	<1	<1	0.949 J	0.815 J	<1
Toluene	ug/L	<1	<1	<1	0.317 B	<1	0.312 B	<1
trans-1,2-Dichloroethene	ug/L	0 753 J	1.16	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	25.7	69.9	0.34 J	1.22	1 15	1.09	<1
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-170-61 7 L08040409-59 4/11/2008	MW-170-77.7 L08040409-60 4/11/2008	MW-171-62.4 L08040409-61 4/11/2008	MW-172 L08040444-09 4/14/2008	MW-174 L08040486-11 4/15/2008	MW-175 L08040444-10 4/14/2008	MW-178 L08040486-10 4/15/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0 5	<0 5	<0.5	<0.5	<0 5
1,1,1-Trichloroethane	ug/L	0.27	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	0 7	<0 5	<0.5
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	0.913 J	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	1.43	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0 5	<0.5	<0.5	<0.5	<0 5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0 4	<0 4	<0.4	<0.4	<0 4	<0 4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5	0 196 J
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
Acetone	ug/L	8 91 B	8.76 B	9.14 B	<10	<10	<10	<10
Benzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0 4	<0 4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<1	<1	0.383 J	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0 5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	<0.3	<0.3	<0.3	0 143 J	0.666	0.489	<0.3
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0 5	<0 5	<0.5	<0.5	<0 5	<0 5
Dibromochloromethane	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5	<0 5	<0 5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	<1	<1	<1	<1	0.297 J	0 317 J	0.726 J
Toluene	ug/L	<1	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	<1	<1	<1	<1	<1	0.874 J	<1
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Well	MW-179	MW-180	MW-187	MW-220	MW-221	MW-222	MW-223
	Lab ID	L08040486-04	L08040517-25	L08040517-19	L08040486-12	L08040517-03	L08040486-13	L08040486-14
	Date	4/15/2008	4/16/2008	4/16/2008	4/15/2008	4/16/2008	4/15/2008	4/15/2008
Volatile Organic Compounds - SW8260B	units							
1,1,1,2-Tetrachloroethane	ug/L	<0 5	<0.5	<0 5	<0.5	<0 5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5	0 763	<0.5	<0.5	<0 5	12.7	0.323 J
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1	7.57	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	0.187 J	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	4.54	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0 5	<0.5	<0 5	<0.5	<0.5	0.341 J	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0 4
1,4-Dichlorobenzene	ug/L	<0 5	0 163 B	<0 5	<0.5	<0.5	<0.5	<0 5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
Acetone	ug/L	<10	<10	<10	<10	<10	<10	<10
Benzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0 4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0 5	<0.5	<0 5	<0.5	<0.5	<0 5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<0 5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	<0 3	<0.3	<0 3	<0.3	0.167 J	0.156 J	0.439
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1	10.4	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0 5	<0 5	<0.5	<0 5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0 5	<0.5	<0.5	<0 5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0 6	<0.6	<0.6	<0 6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	1 77	<1	<1	8.14	0.893 J	0.312 J	0 343 J
Toluene	ug/L	<1	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1	0.301 J	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	0 264 J	<1	<1	4.61	<1	5.34	4.55
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1	<1

Notes:

µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-224 L08040517-04 4/16/2008	MW-225 L08040517-05 4/16/2008	MW-226 L08040486-15 4/15/2008	MW-227 L08040517-20 4/16/2008	MW-228 L08040517-21 4/16/2008	MW-230 L08040486-05 4/15/2008	MW-231 L08040444-33 4/14/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0 5	<0 5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	1.33	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5	21.3	<0.5	28 1	0.509	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	<1	0.544 J	<1	1 02	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1	1 43	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	<1	<1	18.2	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0 5	<0.5	<0.5	2.71	<0.5	0.455 J	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0 4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0 5	<0 5	<0 5	<0.5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
Acetone	ug/L	<10	<10	<10	<10	<10	<10	<10
Benzene	ug/L	<0.4	<0 4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0 5	<0 5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	4.02	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	<0.3	0.275 J	0.155 J	110	0.387	0.192 J	<0.3
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	1.71	<1	6.33	<1	0.834 J	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0 5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0 5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0 6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	1 33	0 616 J	<1	2.25	<1	76.1	<1
Toluene	ug/L	<1	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	<1	39.6	0.855 J	40.8	<1	74.6	<1
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-232B L08040408-01 4/11/2008	MW-232 L08040409-55 4/11/2008	MW-234 L08040444-28 4/14/2008	MW-235 L08040486-01 4/15/2008	MW-236 L08040444-29 4/14/2008	MW-237 L08040409-51 4/11/2008	MW-238 L08040486-02 4/15/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0 5	<0 5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5	<0.5	0.469 J	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	0.736 J	0 763 J	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	0.187 J	0.176 J	<1	<1	<1	0.266 J	<1
1,1-Dichloroethene	ug/L	0 704 J	1.27	<1	<1	<1	2.2	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Tnchlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0 5	<0.5	<0.5	<0 5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0.4	<0 4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	0.223 J	0.289 B	<0 5	<0.5	<0.5	<0 5	0.145 J
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
Acetone	ug/L	7.41 J	8.31 B	<10	<10	<10	<10	<10
Benzene	ug/L	<0.4	0 13 B	<0 4	<0.4	<0.4	<0 4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0 5	<0.5	<0 5	<0 5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	0.724 B	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	2.99	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	<0 5	<0.5	<0.5	<0.5	<0 5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	<0.3	<0.3	<0.3	<0.3	<0.3	0.181 J	0 211 J
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	19	22.4	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0 6	<0.6	<0.6	<0.6	<0 6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Styrene	ug/L	0.137 J	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	<1	<1	<1	<1	<1	0.256 J	<1
Toluene	ug/L	0 592 J	0.597 B	0.37 B	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	0 311 J	0.426 J	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	0 384 J	0.39 J	<1	<1	<1	<1	<1
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	0 611 J	0.593 J	<1	<1	<1	<1	<1

Notes.
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-1
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-239 L08040409-52 4/11/2008	MW-240 L08040409-53 4/11/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0 5
1,1,1-Trichloroethane	ug/L	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0 5	<0 5
1,1,2-Trichloroethane	ug/L	<1	<1
1,1-Dichloroethane	ug/L	<1	<1
1,1-Dichloroethene	ug/L	0.76 J	<1
1,1-Dichloropropene	ug/L	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2
1,2-Dibromoethane	ug/L	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0 4
1,4-Dichlorobenzene	ug/L	<0.5	<0 5
1-Chlorohexane	ug/L	<1	<1
2,2-Dichloropropane	ug/L	<1	<1
2-Chlorotoluene	ug/L	<1	<1
2-Hexanone	ug/L	<10	<10
4-Chlorotoluene	ug/L	<1	<1
Acetone	ug/L	10.1 B	<10
Benzene	ug/L	0.156 B	<0.4
Bromobenzene	ug/L	<1	<1
Bromochloromethane	ug/L	<1	<1
Bromodichloromethane	ug/L	<0.5	<0 5
Bromoform	ug/L	<1	<1
Bromomethane	ug/L	<1	<1
Carbon disulfide	ug/L	17 5	<1
Carbon tetrachloride	ug/L	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5
Chloroethane	ug/L	<1	<1
Chloroform	ug/L	<0.3	<0.3
Chloromethane	ug/L	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	1 43
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0 5
Dibromomethane	ug/L	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1
Ethylbenzene	ug/L	<1	<1
Hexachlorobutadiene	ug/L	<0 6	<0.6
Isopropylbenzene	ug/L	<1	<1
m-,p-Xylene	ug/L	<2	<2
MEK (2-Butanone)	ug/L	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5
Methylene chloride	ug/L	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10
Naphthalene	ug/L	<1	<1
n-Butylbenzene	ug/L	<1	<1
n-Propylbenzene	ug/L	<1	<1
o-Xylene	ug/L	<1	<1
p-Isopropyltoluene	ug/L	<1	<1
sec-Butylbenzene	ug/L	<1	<1
Styrene	ug/L	<1	<1
tert-Butylbenzene	ug/L	<1	<1
Tetrachloroethene	ug/L	<1	<1
Toluene	ug/L	17.6	<1
trans-1,2-Dichloroethene	ug/L	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1
Trichloroethene	ug/L	<1	2.13
Trichlorofluoromethane	ug/L	<1	<1
Vinyl acetate	ug/L	<5	<5
Vinyl chloride	ug/L	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

APPENDIX C-2

MONITORING WELL ANALYTICAL RESULTS – VOCS – OCTOBER 2008

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	MW-3 L08100653-01 10/21/2008	MW-6 L08100573-38 10/17/2008	MW-07 L08100573-01 10/17/2008	MW-10 L08100653-02 10/21/2008	MW-15 L08100573-45 10/16/2008	MW-31 L08100573-02 10/17/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0 5
1,1,1-Trichloroethane	ug/L	0.335 J	<1	0.787 J	<1	<1	0.352 J
1,1,2,2-Tetrachloroethane	ug/L	2.46	5.57	<0.5	1.01	4.61	<0.5
1,1,2-Trichloroethane	ug/L	<1	0 674 J	<1	<1	0.593 J	<1
1,1-Dichloroethane	ug/L	0.562 J	<1	1.46	<1	<1	0.253 J
1,1-Dichloroethene	ug/L	17.3	<1	32 7	<1	<1	7 36
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	0 228 J	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	0.385 J	<0.5	0 837 J	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0.4	<0 4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
Acetone	ug/L	2.63	<10	15.3 B	<10	<10	11.9 B
Benzene	ug/L	<0.4	<0.4	<0.4	<0 4	<0 4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	2.91 B	<1
Carbon disulfide	ug/L	<1	<1	<1	0.847 J	<1	<1
Carbon tetrachloride	ug/L	<1	0.793 J	<1	<1	2.51	<1
Chlorobenzene	ug/L	<0 5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	0.212 J	21.2	0.299 J	0.288 J	29.9	0.219 J
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	15	0.367 J	0.992 J	2.54	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0 5	<0.5	<0 5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0 6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	9.5	<1	63.9	<1	1.16	3.17
Toluene	ug/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	0.458 J	<1	0.432 J	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	10.1	8.6	38.9	3.23	22.9	4.34
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank
J Analyte positively identified, but quantitation

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-32 L08100573-03 10/17/2008	MW-33 L08100573-04 10/17/2008	MW-37 L08100573-54 10/17/2008	MW-40 L08100600-01 10/20/2008	MW-43 L08100600-04 10/20/2008	MW-44 L08100600-05 10/20/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0 5	<0 5	<0 5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0 5
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	0.276 J	<0.5	<0 5	<0 5	<0.5	<0 5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0 4	<0 4	<0 4	<0.4	<0 4	<0.4
1,4-Dichlorobenzene	ug/L	0.623 B	<0.5	<0.5	<0.5	0.149 B	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
Acetone	ug/L	15.3 B	3 B	16.4 B	16 B	13.3 B	12.8 B
Benzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0 5	<0 5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	2.83 B	2 83 B
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<1	<1	0 708 J
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	0.662	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	0.2 J	<0.3	<0.3	<0.3	<0.3	0.366
Chloromethane	ug/L	<1	0.368 J	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	2.09	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0 6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	<1	<1	<1	<1	<1	<1
Toluene	ug/L	0.321 B	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	3.65	<1	<1	<1	<1	0.665 J
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1

Notes:

µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

982 155

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-54 L08100600-06 10/20/2008	MW-57 L08100573-19 10/17/2008	MW-67 L08100600-07 10/20/2008	MW-68 L08100573-20 10/17/2008	MW-69 L08100573-21 10/17/2008	MW-70 L08100573-22 10/17/2008
1,1,1,2-Tetrachloroethane	ug/L	<0 5	<0.5	<0 5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	53.9	<0.5	0.251 J	<0 5	0.229 J	0.883
1,1,2-Trichloroethane	ug/L	0.621 J	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	0.727 J	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0 5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0.4	<0 4	<0.4
1,4-Dichlorobenzene	ug/L	<0 5	<0.5	<0.5	<0.5	<0 5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
Acetone	ug/L	5.34 B	4 B	13.9 B	13.6 B	14.5 B	13.4 B
Benzene	ug/L	<0.4	<0.4	<0.4	<0 4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0 5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	2.82 B	<1	2.79 B	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	4.37	4.23	<1	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	9.78	15.9	<0.3	<0.3	0.147 J	<0.3
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	15.7	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0 5	<0 5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0 5	<0 5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0 6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	2.46	1.82	<1	0.482 J	0 67 J	0.876 J
Toluene	ug/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	3 13	0.358 J	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	350	30.4	0.292 J	0.573 J	0.88 J	1.96
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-71 L08100573-23 10/17/2008	MW-74 L08100653-09 10/21/2008	MW-76 L08100573-24 10/17/2008	MW-77 L08100573-25 10/17/2008	MW-79 L08100600-08 10/20/2008	MW-130 L08100600-09 10/20/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0 5	<0 5
1,1,1-Tnchloroethane	ug/L	<1	<1	<1	<1	<1	3.47
1,1,2,2-Tetrachloroethane	ug/L	5.32	0.458 J	9.41	2010	<0.5	<0.5
1,1,2-Tnchloroethane	ug/L	<1	<1	<1	2.3	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1	3 69
1,1-Dichloroethene	ug/L	<1	<1	<1	<1	4.17	80.2
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Tnchlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	1.06
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Tnmethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0 4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	0.156 B
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
Acetone	ug/L	<10	<10	3.68 B	<10	<10	7.05 B
Benzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	0 216 J	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	0.653 J	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	2 81 B	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	5.94	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0 5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	27.2	<0.3	0.167 J	0 573	0.127 J	0.296 J
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	0.717 J	<1	0.406 J	13.2	<1	0.799 J
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0 5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0 5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0 6	<0 6	<0 6	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5
Methylene chlonde	ug/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	0.856 J	0.842 J	1 35	4.62	0.914 J	140
Toluene	ug/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	0.709 J	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	12.7	0.458 J	15	796	0 948 J	71.8
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5
Vinyl chlonde	ug/L	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found ın the associated blank.
J Analyte posıtively identified, but quantıtation

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-132 L08100600-39 10/20/2008	MW-134 L08100600-41 10/20/2008	MW-145 L08100600-10 10/20/2008	MW-147 L08100573-26 10/17/2008	MW-148 L08100573-27 10/17/2008	MW-149 L08100600-11 10/20/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0 5	<0.5	<0.5	<0.5	<0 5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	0.373 J	9 66	1.71
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0 5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0 4	<0 4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0 5	<0 5	0.149 B	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
Acetone	ug/L	<10	<10	14 B	2.97 B	5.64 B	11.9 B
Benzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0 5	<0 5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	2 85 B	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<1	<1	8 17
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	<0 3	<0.3	<0.3	0.147 J	0.665	25.6
Chloromethane	ug/L	<1	<1	<1	0 292 J	0.572 B	0.515 B
cis-1,2-Dichloroethene	ug/L	<1	<1	<1	0 401 J	6 63	1.63
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0 5	<0 5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0 5	<0 5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0 6	<0 6	<0.6	<0.6	<0 6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	0.619 J	0 801 J	<1	2.95	2.42	0.717 J
Toluene	ug/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	1.73	0 378 J
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	<1	<1	<1	3.1	107	19.8
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-150 L08100600-12 10/20/2008	MW-151 L08100600-13 10/20/2008	MW-152 L08100600-14 10/20/2008	MW-153 L08100600-15 10/20/2008	MW-154 L08100600-02 10/20/2008	MW-155 L08100600-17 10/20/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	1.06	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	1750	<0.5	11.7	<0.5	<0 5	2040
1,1,2-Trichloroethane	ug/L	12.4	<1	<1	<1	<1	7 58
1,1-Dichloroethane	ug/L	<1	<1	<1	0.363 J	<1	<1
1,1-Dichloroethene	ug/L	0.992 J	<1	0.758 J	5.31	<1	1 04
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0 4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0 5	<0.5	<0 5	<0.5	<0.5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
Acetone	ug/L	4 63 B	<10	7.62 B	6.42 B	<10	4.4 B
Benzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0 4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	0 648 J
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0 5	<0.5	<0 5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	0 897 J
Bromomethane	ug/L	3.04 B	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	0 564 J	0.459 J	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	5	1.34	2 59	<0.3	<0 3	1.17
Chloromethane	ug/L	0 288 B	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	22.4	<1	40.2	<1	<1	46.8
cis-1,3-Dichloropropene	ug/L	<0.5	<0 5	<0.5	<0 5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0 5	<0.5	<0 5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	5.22	<1	15.7	0.272 J	<1	10.4
Toluene	ug/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	1.28	<1	13.4	<1	<1	3.58
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	636	2.62	260	<1	<1	1210
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-156 L08100600-18 10/20/2008	MW-157 L08100573-28 10/17/2008	MW-158 L08100600-21 10/20/2008	MW-158A L08100600-22 10/20/2008	MW-159 L08100600-25 10/20/2008	MW-160 L08100600-26 10/20/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0 5	<0.5	<0.5	<0.5	0 779 J
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5 J	7.19	27.4	29.4	271	2340
1,1,2-Trichloroethane	ug/L	<1	0.39 J	<1	<1	92.8	3.84 J
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	1 65	7 33	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0 5	<0 5	<0.5	1.34 J	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0 4	<0.4	<0.4	<0 4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
Acetone	ug/L	15.8 B	3 32 B	4.43 B	6.86 B	6.89 B	7.85 B
Benzene	ug/L	<0 4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0 5	<0 5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	2.87 B	2.81 B	<1	2.82 B	2 75 B	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	2 2	<1
Carbon tetrachloride	ug/L	<1	12	<1	0.825 J	<1	0.388 J
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	<0.3	89 6	0.682	3.94	1 66	1.75 J
Chloromethane	ug/L	<1	0.518 B	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	3.29	7 79	54 4 J	959	40.6 J
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5	<0 5
Dibromochloromethane	ug/L	<0.5	<0 5	<0 5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0 6	<0 6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	<1	1.15	6.92	15	5 48	9.87 J
Toluene	ug/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	0 589 J	2 74	18	46.2	5.81 J
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	<1	38.3	162	408	1320	1050
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	17 7	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-161 L08100573-29 10/17/2008	MW-162 L08100573-30 10/17/2008	MW-163 L08100573-31 10/17/2008	MW-164 L08100573-32 10/17/2008	MW-165 L08100600-27 10/20/2008	MW-165A L08100600-28 10/20/2008
1,1,1,2-Tetrachloroethane	ug/L	0 93	<25	<2.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<50	<5	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	2120	7140	1710	6.83	4.94	10.5
1,1,2-Trichloroethane	ug/L	6.61	<50	6.96	0.403 J	0.491 J	0.496 J
1,1-Dichloroethane	ug/L	<1	<50	<5	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<50	<5	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<50	<5	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<50	<5	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<50	<5	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<50	<5	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<50	<5	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<100	<10	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<50	<5	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<50	<5	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<25	<2.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<50	<5	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<50	<5	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<50	<5	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<20	<2	<0 4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<25	<2 5	0.297 B	0.572 B	<0.5
1-Chlorohexane	ug/L	<1	<50	<5	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<50	<5	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<50	<5	<1	<1	<1
2-Hexanone	ug/L	<10	<500	<50	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<50	<5	<1	<1	<1
Acetone	ug/L	17 3 B	<500	21.1 B	5.65 B	15.6 B	5.54 B
Benzene	ug/L	<0.4	<20	<2	<0.4	<0 4	<0.4
Bromobenzene	ug/L	<1	<50	<5	<1	<1	<1
Bromochloromethane	ug/L	<1	<50	<5	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<25	<2.5	<0.5	<0 5	<0.5
Bromoform	ug/L	<1	<50	<5	<1	<1	<1
Bromomethane	ug/L	<1	<50	<5	<1	<1	<1
Carbon disulfide	ug/L	<1	<50	<5	<1	<1	<1
Carbon tetrachloride	ug/L	0.39 J	<50	<5	4.43	4.59	10.8
Chlorobenzene	ug/L	<0.5	<25	<2.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<50	<5	<1	<1	<1
Chloroform	ug/L	3 65	<15	7.67	32 2	34.3	82.7
Chloromethane	ug/L	<1	<50	<5	0 822 J	<1	<1
cis-1,2-Dichloroethene	ug/L	27	38.7 J	29.9	2.91	9.28	10.2
cis-1,3-Dichloropropene	ug/L	<0.5	<25	<2 5	<0 5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<25	<2.5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<50	<5	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<50	<5	<1	<1	<1
Ethylbenzene	ug/L	<1	<50	<5	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<30	<3	<0.6	<0.6	<0 6
Isopropylbenzene	ug/L	<1	<50	<5	<1	<1	<1
m-,p-Xylene	ug/L	<2	<100	<10	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<500	<50	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<250	<25	<5	<5	<5
Methylene chloride	ug/L	<1	<50	<5	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<500	<50	<10	<10	<10
Naphthalene	ug/L	<1	<50	<5	<1	<1	<1
n-Butylbenzene	ug/L	<1	<50	<5	<1	<1	<1
n-Propylbenzene	ug/L	<1	<50	<5	<1	<1	<1
o-Xylene	ug/L	<1	<50	<5	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<50	<5	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<50	<5	<1	<1	<1
Styrene	ug/L	<1	<50	<5	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<50	<5	<1	<1	<1
Tetrachloroethene	ug/L	6.79	<50	<5	0.728 J	1.3	2.32
Toluene	ug/L	<1	<50	<5	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	2.91	<50	3.81 J	0.41 J	1.62	1 38
trans-1,3-Dichloropropene	ug/L	<1	<50	<5	<1	<1	<1
Trichloroethene	ug/L	952	1610	615	27	94.1	112
Trichlorofluoromethane	ug/L	<1	<50	<5	<1	<1	<1
Vinyl acetate	ug/L	<5	<250	<25	<5	<5	<5
Vinyl chloride	ug/L	<1	<50	<5	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

982 161

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-166 L08100600-29 10/20/2008	MW-166A L08100600-30 10/20/2008	MW-167 L08100600-33 10/20/2008	MW-168 L08100600-34 10/20/2008	MW-168A L08100600-35 10/20/2008	MW-169 L08100600-36 10/20/2008
1,1,1,2-Tetrachloroethane	ug/L	<0 5	<0.5	<0 5	<0.5	<0 5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	1.73	<1
1,1,2,2-Tetrachloroethane	ug/L	0.519	0.149 J	<0.5	<0.5	<0 5	<0.5
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	0 419 J	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	0.711 J	5.27	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	0 163 J	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0 5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0 5	0.429 B	<0.5	<0.5	0.494 B
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
Acetone	ug/L	4.76 B	6.62 B	15.3 B	<10	<10	13.9 B
Benzene	ug/L	<0 4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	5 38	3.17	<1	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<0 5	<0.5	<0.5	<0 5	0.471 J
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	14.1	14.5	<0.3	<0.3	0.222 J	<0.3
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	1 2	1.82	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0 5	<0.5	<0 5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	0.289 J	<0.6	<0 6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	0.621 J	0.694 J	<1	<1	0 503 J	<1
Toluene	ug/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	0.354 J	0.75 J	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	15	62.7	<1	0.392 J	<1	<1
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-170 L08100600-37 10/20/2008	MW-171 L08100600-38 10/20/2008	MW-172 L08100573-49 10/16/2008	MW-174 L08100573-50 10/16/2008	MW-178 L08100600-42 10/20/2008	MW-179 L08100600-43 10/20/2008
1,1,1,2-Tetrachloroethane	ug/L	<0 5	<0.5	<0.5	<0.5	<0 5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0 5	<0.5	<0.5	0.629	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0 5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0.4	<0 4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0 5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
Acetone	ug/L	18.2 B	15 B	<10	<10	2.95 B	<10
Benzene	ug/L	<0 4	<0 4	<0 4	<0.4	3.22	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	2.89 B	2.82 B	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	<0 5	<0 5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	<0 3	<0 3	0.139 J	0.154 J	0.125 J	0.131 J
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0 6	<0 6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	<1	<1	<1	<1	0.419 J	0.627 J
Toluene	ug/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	<1	<1	<1	<1	0.373 J	<1
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-180 L08100653-10 10/21/2008	MW-187 L08100573-47 10/16/2008	MW-220 L08100653-11 10/21/2008	MW-221 L08100653-12 10/21/2008	MW-222 L08100600-44 10/20/2008	MW-223 L08100573-41 10/17/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	0 491 J	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5	<0.5	0.267 J	0.329 J	47.1	0.913
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	0 648 J	<1
1,1-Dichloroethane	ug/L	<1	<1	0.942 J	<1	<1	<1
1,1-Dichloroethene	ug/L	2.04	<1	44.3	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	0.427 J	<0.5	<0 5	<0 5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0 4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0 5	<0 5	<0 5	<0 5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
Acetone	ug/L	2.92 J	<10	<10	<10	3.33 B	<10
Benzene	ug/L	<0 4	<0 4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0 5	<0 5	<0 5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	2 88 B	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	<0 5	<0.5	<0.5	<0.5	<0.5	<0 5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	<0 3	0.214 J	0 217 J	<0.3	<0 3	0.249 J
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	4.51	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6	<0 6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	1.88	0.292 J	13.7	<1	0.484 J	0.457 J
Toluene	ug/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	0.376 J	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	1 8	<1	15 2	0.501 J	5.81	3.56
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1

Notes:

µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-224 L08100600-45 10/20/2008	MW-225 L08100573-39 10/17/2008	MW-226 L08100600-46 10/20/2008	MW-227 L08100573-43 10/17/2008	MW-228 L08100573-44 10/17/2008	MW-230 L08100693-03 10/22/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	1.65
1,1,2,2-Tetrachloroethane	ug/L	<0.5	22 4	<0.5	10.7	<0 5	<0.5
1,1,2-Trichloroethane	ug/L	<1	<1	<1	0.982 J	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1	2 25
1,1-Dichloroethene	ug/L	<1	<1	<1	<1	<1	32.7
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0 5	2.99	<0.5	0.71
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0 4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	0 178 B	<0.5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
Acetone	ug/L	3.01 B	<10	<10	<10	<10	<10
Benzene	ug/L	<0 4	<0.4	<0.4	<0.4	<0.4	<0 4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	7 26	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	<0.3	0.157 J	0 155 J	134	0.155 J	0 276 J
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	0.296 J	<1	6.4	<1	1.27
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0 6	<0 6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5
Methylene chlonde	ug/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	0.628 J	0.611 J	0.533 J	2.7	<1	100
Toluene	ug/L	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	1.04	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	<1	8.46	<1	61 8	<1	98 4
Tnchlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5
Vinyl chlonde	ug/L	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank
J Analyte positively identified, but quantitation

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-231 L08100693-08 10/22/2008	MW-232 L08100653-14 10/21/2008	MW-234 L08100693-09 10/22/2008	MW-235 L08100693-06 10/22/2008	MW-236 L08100693-01 10/22/2008	MW-237 L08100693-10 10/22/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1	0.237 J
1,1-Dichloroethene	ug/L	<1	<1	<1	<1	<1	2 02
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,3-Tnchloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2,4-Tnmethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0 4	<0 4	<0.4	<0 4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	0.14 B	0.134 B	<0 5	<0 5	0.14 B
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1
Acetone	ug/L	<10	3.77 J	<10	<10	<10	<10
Benzene	ug/L	<0 4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0 5	<0 5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	0.788 B	<1	0.609 B	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	<0.3	<0.3	<0.3	<0.3	<0.3	0.162 J
Chloromethane	ug/L	0 45 B	<1	0.555 B	0.265 B	0.438 B	<1
cis-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	<0 5	<0 5	<0 5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0 5	<0 5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6	<0 6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	1.04	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	<1	<1	<1	<1	<1	0.261 J
Toluene	ug/L	<1	0.623 J	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5
Vinyl chlonde	ug/L	<1	13 2	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-2
MONITORING WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-238 L08100693-11 10/22/2008	MW-239 L08100653-15 10/21/2008	MW-240 L08100653-05 10/21/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0 5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	0.192 B	0.378 B	<0 5
1-Chlorohexane	ug/L	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1
Acetone	ug/L	<10	21	<10
Benzene	ug/L	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1
Bromodichloromethane	ug/L	<0 5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1
Bromomethane	ug/L	0.5 B	<1	<1
Carbon disulfide	ug/L	<1	0.533 J	<1
Carbon tetrachloride	ug/L	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1
Chloroform	ug/L	<0.3	<0.3	<0.3
Chloromethane	ug/L	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	<1	1.35
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0 6	<0 6
Isopropylbenzene	ug/L	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1
Styrene	ug/L	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1
Tetrachloroethene	ug/L	<1	<1	<1
Toluene	ug/L	<1	0 641 J	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1
Trichloroethene	ug/L	<1	<1	1.85
Trichlorofluoromethane	ug/L	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank
J Analyte positively identified, but quantitation

APPENDIX C-3

RECOVERY WELL ANALYTICAL RESULTS – VOCS – APRIL 2008

TABLE C-3
RECOVERY WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Well	RW-1	RW-1A	RW-1B	RW-2	RW-3	RW-4	RW-5	RW-6
	Lab ID	L08040517-06	L08040517-07	L08040517-08	L08040517-09	L08040517-10	L08040517-11	L08040517-01	L08040517-12
	Date	4/16/2008	4/16/2008	4/16/2008	4/16/2008	4/16/2008	4/16/2008	4/16/2008	4/16/2008
Volatile Organic Compounds - SW8260B	units								
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	0.518	43.7	1.09	40.5	20.9	19.4	14.4	<0.5
1,1,2-Trichloroethane	ug/L	<1	0.5 J	<1	1.39	0.717 J	0.287 J	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	0.274 J	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	0.652	<0.5	0.273 J	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Acetone	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Benzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	17.9	1.05	2.75	5.56	0.961 J	0.799 J	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	81.9	27.8	78.3	107	1.82	0.796	0.133 J	0.239 J
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	2.02	1.01	0.783 J	18	5.49	1.13	<1	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	3.32 J	<10	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1	0.235 J	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	4.07	0.561 J	0.982 J	1.9	0.429 J	0.809 J	2.36	4.4
Toluene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	1.05	<1	<1	0.976 J	0.298 J	0.299 J	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	53.9	10.6	18.1	43.5	10.7	55.4	5.75	1.24
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-3
RECOVERY WELL SAMPLE ANALYTICAL RESULTS - VOCs - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	RW-7 L08040517-02 4/16/2008	RW-8 L08040517-13 4/16/2008	RW-9 L08040517-14 4/16/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0 5
1,1,1-Trichloroethane	ug/L	<1	<1	0.803 J
1,1,2,2-Tetrachloroethane	ug/L	1.29	0 551	3.55
1,1,2-Trichloroethane	ug/L	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	0.581 J
1,1-Dichloroethene	ug/L	<1	1.27	17.4
1,1-Dichloropropene	ug/L	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2
1,2-Dibromoethane.	ug/L	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1
Acetone	ug/L	<10	<10	<10
Benzene	ug/L	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0 5
Bromoform	ug/L	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1
Chlorobenzene	ug/L	<0 5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1
Chloroform	ug/L	0 143 J	<0 3	0.184 J
Chloromethane	ug/L	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	<0 5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0 6
Isopropylbenzene	ug/L	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1
Styrene	ug/L	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1
Tetrachloroethene	ug/L	1 33	1	19.1
Toluene	ug/L	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1
Trichloroethene	ug/L	1.55	0.919 J	14
Trichlorofluoromethane	ug/L	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1

Notes
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

APPENDIX C-4

RECOVERY WELL ANALYTICAL RESULTS – VOCS – OCTOBER 2008

TABLE C-4
RECOVERY WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	RW-1 / L08100573-33 / 10/17/2008	RW-1A / L08100573-34 / 10/17/2008	RW-1B / L08100573-35 / 10/17/2008	RW-01B DUP6 / L08100573-17 / 10/17/2008	RW-2 / L08100573-36 / 10/17/2008	RW-3 / L08100573-37 / 10/17/2008	RW-4 / L08100573-05 / 10/17/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5	14.3	3.41	2.66	17.5	1.7	52.5 J
1,1,2-Trichloroethane	ug/L	<1	0.299 J	<1	<1	0.738 J	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	0.693	<0.5	<0.5	0.26 J	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
Acetone	ug/L	<10	<10	<10	<10	<10	<10	<10
Benzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	11.8	1	0.367 J	0.289 J	3.08	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/L	49.8	19.2	13.3	12.2	70.8	0.762	0.287 J
Chloromethane	ug/L	<1	<1	<1	<1	<1	<1	0.289 J
cis-1,2-Dichloroethene	ug/L	1.36	1.03	<1	<1	7.69	0.865 J	0.546 J
cis-1,3-Dichloropropene	ug/L	<0,5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	2.35	0.494 J	0.293 J	0.312 J	1.28	<1	0.616 J
Toluene	ug/L	<1	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	0.735 J	<1	<1	<1	0.529 J	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/L	34	8.9	2.6	2.67	29.6	1.94	28.8
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1	<1	<1

Notes:

µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-4
RECOVERY WELL SAMPLE ANALYTICAL RESULTS - VOCs - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	RW-5 L08100573-08 10/17/2008	RW-6 L08100573-09 10/17/2008	RW-7 L08100573-10 10/17/2008	RW-8 L08100573-11 10/17/2008	RW-9 L08100573-12 10/17/2008
1,1,1,2-Tetrachloroethane	ug/L	<0 5	<0.5	<0 5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	0.336 J	0 584 J
1,1,2,2-Tetrachloroethane	ug/L	1.59	<0.5	0.447 J	2.06	1.2
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	0.433 J	1.06
1,1-Dichloroethene	ug/L	<1	<1	<1	18	25
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0 5	<0.5	<0 5	<0.5	0.391 J
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0 4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0 5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1
Acetone	ug/L	<10	<10	<10	<10	<10
Benzene	ug/L	<0 4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0 5	<0.5	<0 5
Chloroethane	ug/L	<1	<1	<1	<1	<1
Chloroform	ug/L	0.129 J	0.15 J	<0.3	0.193 J	0.223 J
Chloromethane	ug/L	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	<1	<1	0.308 J	0.317 J
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0 6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	0.836 J	0 887 J	<1	7 85	43.1
Toluene	ug/L	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1
Trichloroethene	ug/L	0.753 J	0.274 J	0.634 J	10.2	30.2
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1

Notes:

µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

APPENDIX C-5

IRA SYSTEM EFFLUENT SAMPLE ANALYTICAL RESULTS

TABLE C-5
IRA SYSTEM EFFLUENT SAMPLE ANALYTICAL RESULTS
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Sample ID / Date	Effluent 1/9/2008	Effluent 4/16/2008	Effluent 7/7/2008	Effluent 10/17/2008	Effluent 1/21/2009
pH - E150.1					
pH	NC	6.11	NC	6.26	NC
Volatile Organic Compounds - SW8260B µg/L					
1,1,1,2-Tetrachloroethane	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	<1	<1	<1	0.273 J	<1
1,1,2,2-Tetrachloroethane	14.4	6 94	135	7.76 J	15.1
1,1,2-Trichloroethane	0.317 J	<1	0.621 J	<1	<1
1,1-Dichloroethane	0.243 J	0.217 J	<1	0.451 J	<1
1,1-Dichloroethene	7.58	6.94	<1	12	<1
1,1-Dichloropropene	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2	<2
1,2-Dibromoethane	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	<1	<1	<1	<1	<1
1,2-Dichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	<1	<1	<1	<1	<1
1,3-Dichloropropane	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	<1	<1	<1	<1	<1
2,2-Dichloropropane	<1	<1	<1	<1	<1
2-Chlorotoluene	<1	<1	<1	<1	<1
2-Hexanone	<10	<10	<10	<10	<10
4-Chlorotoluene	<1	<1	<1	<1	<1
Acetone	<10	<10	8.07 J	<10	<10
Benzene	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	<1	<1	<1	<1	<1
Bromochloromethane	<1	<1	<1	<1	<1
Bromodichloromethane	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	<1	<1	<1	<1	<1
Bromomethane	<1	<1	<1	<1	<1
Carbon disulfide	<1	<1	<1	<1	<1
Carbon tetrachloride	1.08	0.524 J	1.81	<1	0.608 J
Chlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	<1	<1	<1	<1	<1
Chloroform	12.7	9.16	54.5	4.71	8.42
Chloromethane	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	2.89	1.27	6.11	0.822 J	1
cis-1,3-Dichloropropene	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	<1	<1	<1	<1	<1
Dichlorodifluoromethane	<1	<1	<1	<1	<1
Ethylbenzene	<1	<1	<1	<1	<1
Hexachlorobutadiene	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	<1	<1	<1	<1	<1
m-,p-Xylene	<2	<2	<2	<2	<2
MEK (2-Butanone)	<10	<10	<10	<10	<10

TABLE C-5
IRA SYSTEM EFFLUENT SAMPLE ANALYTICAL RESULTS
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Sample ID Date	Effluent 1/9/2008	Effluent 4/16/2008	Effluent 7/7/2008	Effluent 10/17/2008	Effluent 1/21/2009
Methyl t-butyl ether (MTBE)	<5	<5	<5	<5	<5
Methylene chloride	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	<10	<10	<10	<10	<10
Naphthalene	<1	<1	<1	<1	<1
n-Butylbenzene	<1	<1	<1	<1	<1
n-Propylbenzene	<1	<1	<1	<1	<1
o-Xylene	<1	<1	<1	<1	<1
p-Isopropyltoluene	<1	<1	<1	<1	<1
sec-Butylbenzene	<1	<1	<1	<1	<1
Styrene	<1	<1	<1	<1	<1
tert-Butylbenzene	<1	<1	<1	<1	<1
Tetrachloroethene	9.09	7.83	1.04	16.5	0.704 J
Toluene	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	0.301 J	<1	1.02	<1	<1
trans-1,3-Dichloropropene	<1	<1	<1	<1	<1
Trichloroethene	26.1	13.3	32.1	18	11.1
Trichlorofluoromethane	<1	<1	<1	<1	<1
Vinyl acetate	<5	<5	<5	<5	<5
Vinyl chloride	<1	<1	<1	<1	<1
<u>Semi-volatile Organic Compounds - SW8270B µg/L</u>					
1,2,4-Trichlorobenzene	NC	<11.1	NC	<10.5	NC
1,2-Dichlorobenzene	NC	<11.1	NC	<10.5	NC
1,3-Dichlorobenzene	NC	<11.1	NC	<10.5	NC
1,4-Dichlorobenzene	NC	<11.1	NC	<10.5	NC
2,4,5-Trichlorophenol	NC	<11.1	NC	<10.5	NC
2,4,6-Trichlorophenol	NC	<11.1	NC	<10.5	NC
2,4-Dichlorophenol	NC	<11.1	NC	<10.5	NC
2,4-Dimethylphenol	NC	<11.1	NC	<10.5	NC
2,4-Dinitrophenol	NC	<55.6	NC	<52.6	NC
2,4-Dinitrotoluene	NC	<11.1	NC	<10.5	NC
2,6-Dinitrotoluene	NC	<11.1	NC	<10.5	NC
2-Chloronaphthalene	NC	<11.1J	NC	<10.5	NC
2-Chlorophenol	NC	<11.1	NC	<10.5	NC
2-Methylnaphthalene	NC	<11.1	NC	<10.5	NC
2-Methylphenol	NC	<11.1	NC	<10.5	NC
2-Nitroaniline	NC	<55.6	NC	<52.6	NC
2-Nitrophenol	NC	<11.1	NC	<10.5	NC
3,3'-Dichlorobenzidine	NC	<22.2	NC	<21.1	NC
3-,4-Methylphenol	NC	<55.6	NC	<10.5	NC
3-Nitroaniline	NC	<55.6	NC	<52.6	NC
4,6-Dinitro-2-methylphenol	NC	<55.6	NC	<52.6	NC
4-Bromophenyl-phenylether	NC	<11.1	NC	<10.5	NC
4-Chloro-3-methylphenol	NC	<11.1	NC	<10.5	NC
4-Chloroaniline	NC	<22.2	NC	<10.5	NC
4-Chlorophenyl-phenyl ether	NC	<11.1	NC	<10.5	NC
4-Nitroaniline	NC	<55.6	NC	<52.6	NC
4-Nitrophenol	NC	<55.6	NC	<52.6	NC
Acenaphthene	NC	<11.1	NC	<10.5	NC
Acenaphthylene	NC	<11.1	NC	<10.5	NC
Anthracene	NC	<11.1	NC	<10.5	NC
Benzo(a)anthracene	NC	<11.1	NC	<10.5	NC

TABLE C-5
IRA SYSTEM EFFLUENT SAMPLE ANALYTICAL RESULTS
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Sample ID Date	Effluent 1/9/2008	Effluent 4/16/2008	Effluent 7/7/2008	Effluent 10/17/2008	Effluent 1/21/2009
Benzo(a)pyrene	NC	<11.1	NC	<10.5	NC
Benzo(b)fluoranthene	NC	<11.1	NC	<10.5	NC
Benzo(g,h,i)Perylene	NC	<11.1	NC	<10.5	NC
Benzo(k)fluoranthene	NC	<11.1	NC	<10.5	NC
Benzoic acid	NC	<55.6	NC	<52.6	NC
Benzyl alcohol	NC	<11.1	NC	<10.5	NC
Bis(2-Chloroethoxy)Methane	NC	<11.1J	NC	<10.5	NC
Bis(2-Chloroethyl)ether	NC	<11.1	NC	<10.5	NC
bis(2-Chloroisopropyl)ether	NC	<11.1	NC	<10.5	NC
bis(2-Ethylhexyl)phthalate	NC	<11.1	NC	<10.5	NC
Butylbenzylphthalate	NC	<11.1	NC	<10.5	NC
Chrysene	NC	<11.1	NC	<10.5	NC
Dibenzo(a,h)Anthracene	NC	<11.1	NC	<10.5	NC
Dibenzofuran	NC	<11.1	NC	<10.5	NC
Diethylphthalate	NC	<11.1	NC	<10.5	NC
Dimethylphthalate	NC	<11.1	NC	<10.5	NC
Di-N-Butylphthalate	NC	<11.1	NC	<10.5	NC
Di-n-octylphthalate	NC	<11.1	NC	<10.5	NC
Fluoranthene	NC	<11.1	NC	<10.5	NC
Fluorene	NC	<11.1	NC	<10.5	NC
Hexachlorobenzene	NC	<11.1	NC	<10.5	NC
Hexachlorobutadiene	NC	<11.1	NC	<10.5	NC
Hexachlorocyclopentadiene	NC	<11.1	NC	<10.5	NC
Hexachloroethane	NC	<11.1	NC	<10.5	NC
Indeno(1,2,3-cd)pyrene	NC	<11.1	NC	<10.5	NC
Isophorone	NC	<11.1	NC	<10.5	NC
Naphthalene	NC	<11.1	NC	<10.5	NC
Nitrobenzene	NC	<11.1	NC	<10.5	NC
N-Nitroso-di-n-propylamine	NC	<11.1	NC	<10.5	NC
N-Nitrosodiphenylamine	NC	<11.1	NC	<10.5	NC
Pentachlorophenol	NC	<55.6	NC	<52.6	NC
Phenanthrene	NC	<11.1	NC	<10.5	NC
Phenol	NC	<11.1J	NC	<10.5	NC
Pyrene	NC	<11.1	NC	<10.5	NC
<u>Total Metals - SW6010B µg/L</u>					
Aluminum, Total	NC	<100	NC	<100	NC
Arsenic, Total	NC	<10	NC	0.436 J	NC
Barium, Total	NC	98.7	NC	99.9	NC
Beryllium, Total	NC	<10	NC	<10	NC
Cadmium, Total	NC	<10	NC	<10	NC
Calcium, Total	NC	19600	NC	23000	NC
Chromium, Total	NC	<20	NC	<20	NC
Cobalt, Total	NC	<20	NC	<20	NC
Copper, Total	NC	<20	NC	<20	NC
Iron, Total	NC	<100	NC	382	NC
Lead, Total	NC	<5	NC	1.44	NC
Magnesium, Total	NC	10900	NC	12100	NC
Manganese, Total	NC	16.1	NC	78.2	NC
Nickel, Total	NC	<40	NC	<40	NC
Potassium, Total	NC	773 J	NC	839 J	NC
Silver, Total	NC	<10	NC	<10	NC

TABLE C-5
IRA SYSTEM EFFLUENT SAMPLE ANALYTICAL RESULTS
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Sample ID	Effluent	Effluent	Effluent	Effluent	Effluent
Date	1/9/2008	4/16/2008	7/7/2008	10/17/2008	1/21/2009
Sodium, Total	NC	20500	NC	24400	NC
Vanadium, Total	NC	<10	NC	<10	NC
Zinc, Total	NC	33	NC	42.7	NC
Antimony, Total	NC	<1	NC	<1	NC
Selenium, Total	NC	1.51	NC	0.984 J	NC
Thallium, Total	NC	<0.2	NC	<0.2	NC
Mercury	NC	<0.2	NC	<0.2	NC

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B The analyte was found in the associated blank, as well as in the sample.
J The analyte was positively identified, but the quantitation is an estimate.
NC Not Collected

APPENDIX C-6

MONITORING WELL QA ANALYTICAL RESULTS – VOCS – APRIL 2008

TABLE C-6
GROUNDWATER QA/QC SAMPLE ANALYTICAL RESULTS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Well	MW-31-71 6 DUP	MW-44-69 DUP	MW-150 90.5 DUP	MW-157-74.8 DUP	MW-159-81.1 DUP
	Lab ID	L08040409-36	L08040409-35	L08040409-02	L08040444-12	L08040409-01
	Date	4/11/2008	4/11/2008	4/11/2008	4/14/2008	4/11/2008
Volatile Organic Compounds - SW8260B	units					
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0 5	<0.5
1,1,1-Trichloroethane	ug/L	5.92	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	0.446 J	<0.5	2020	10.1	361
1,1,2-Trichloroethane	ug/L	<1	<1	23.1	0.29 J	115
1,1-Dichloroethane	ug/L	2.61	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	17.4	<1	0.997 J	<1	4 38
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	0.401 J	<0.5	1.2
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0 5	<0 5	<0.5	<0.5	<0 5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1
Acetone	ug/L	<10	<10	2.92 B	7.87 B	8.62 B
Benzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	0.539 J	1.28	<1	0.53 J	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1
Chloroform	ug/L	1.19	0.586	1.9	10.8	1.33
Chloromethane	ug/L	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	5.67	<1	57	0.741 J	1350
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	1.12	<1	11.8	<1	6.87
Toluene	ug/L	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	2.14	<1	4.38	<1	37
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1
Trichloroethene	ug/L	16 1	1.14	1220	6.86	1250
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	0 708 J	<1	7.14

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

TABLE C-6
GROUNDWATER QA/QC SAMPLE ANALYTICAL RESULTS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	MW-165A-73.9 DUP / L08040409-37 / 4/11/2008	MW-167-76.5 DUP / L08040409-34 / 4/11/2008	MW-170-77.7 DUP / L08040409-38 / 4/11/2008	MW-236 DUP / L08040444-30 / 4/14/2008	TB041108-IS-4 / L08040409-40 / 4/11/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	0.15 J	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	0.359 J	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	0.275 J	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	0.144 J	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	0.364 B	<1	0.313 B
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1
Acetone	ug/L	<10	5.24 B	8.21 B	<10	3.09 J
Benzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	0.894 J
Bromomethane	ug/L	<1	<1	1.35 B	<1	0.718 J
Carbon disulfide	ug/L	<1	<1	<1 J	<1	<1J
Carbon tetrachloride	ug/L	1.25	<1	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1
Chloroform	ug/L	3.97	<0.3	<0.3	<0.3	<0.3
Chloromethane	ug/L	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	1.06	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	0.698
Dibromomethane	ug/L	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	0.587 J	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	7.18
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	0.78 B	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	0.235 B	<1	<1
o-Xylene	ug/L	<1	<1	0.611 J	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	0.48 J	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	0.686 B	<1	0.649 J
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	0.267 J	<1	<1	<1	<1
Toluene	ug/L	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1
Trichloroethene	ug/L	31.1	<1	<1	<1	<1
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation

982 181

TABLE C-6
GROUNDWATER QA/QC SAMPLE ANALYTICAL RESULTS - APRIL 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

	Well	TB-041408-IS-4	TB-041508-IS-4	TB-041608-IS-4	RB1-IS-4	RB2-IS-4
	Lab ID	L08040409-40	L08040486-03	L08040517-23	L08040409-54	L08040444-32
	Date	4/14/2008	4/15/2008	4/16/2008	4/11/2008	4/14/2008
Volatile Organic Compounds - SW8260B	units					
1,1,1,2-Tetrachloroethane	ug/L	<0 5	<0.5	<0.5	<0.5	<0 5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0 5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0 5	<0.5	<0.5	<0 5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	0.308 J
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0 4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0 5	0.127 J	1 7	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1
Acetone	ug/L	4.47 B	2.59 B	<10	<10	<10
Benzene	ug/L	<0.4	<0.4	<0.4	0 288 J	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0 5	<0.5	<0 5
Bromoform	ug/L	<1	<1	1.36	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	0 645 B
Carbon disulfide	ug/L	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1
Chloroform	ug/L	<0.3	<0 3	<0.3	<0.3	<0 3
Chloromethane	ug/L	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	0.427 J	1.02	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	0.309 J	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0 6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5
Methylene chloride	ug/L	6.33	3 91	4.13	<1	1.57 B
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	<1	<1	<1	<1	<1
Toluene	ug/L	<1	<1	<1	0.74 J	0.365 J
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1
Trichloroethene	ug/L	<1	<1	<1	<1	<1
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1

Notes:

µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank
J Analyte positively identified, but quantitation

APPENDIX C-7

MONITORING WELL QA ANALYTICAL RESULTS – VOCS – OCTOBER 2008

TABLE C-7
GROUNDWATER QA/QC SAMPLE ANALYTICAL RESULTS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well Lab ID Date units	MW-03 DUP7 L08100653-06 10/21/2008	MW-32 DUP8 L08100573-18 10/17/2008	MW-74 DUP10 L08100653-07 10/21/2008	MW-132 DUP11 L08100600-40 10/20/2008	MW-154 DUP9 L08100600-16 10/20/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0 5	<0 5
1,1,1-Trichloroethane	ug/L	0.324 J	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	2.19	<0.5	0.49 J	0.277 J	<0.5
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	0 442 J	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	17 9	<1	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0 5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0 4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	<0 5	0.603 B	<0.5	<0.5	<0.5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1
Acetone	ug/L	3.01 J	14.8 B	<10	<10	<10
Benzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1
Bromomethane	ug/L	<1	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	<0 5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1
Chloroform	ug/L	0.187 J	0.206 J	<0 3	<0.3	<0.3
Chloromethane	ug/L	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	2.12	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0 5
Dibromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0 6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	9 13	<1	0 867 J	0.675 J	<1
Toluene	ug/L	<1	0.341 B	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1
Trichloroethene	ug/L	10.2	3.47	0 471 J	<1	<1
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation estimated.

TABLE C-7
GROUNDWATER QA/QC SAMPLE ANALYTICAL RESULTS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	MW-172 DUP1 / L08100573-46 / 10/16/2008	MW-187 DUP2 / L08100573-51 / 10/16/2008	MW-225 DUP3 / L08100573-42 / 10/17/2008	MW-236 DUP4 / L08100693-07 / 10/22/2008	MW-240 DUP5 / L08100653-13 / 10/21/2008
1,1,1,2-Tetrachloroethane	ug/L	<0 5	<0 5	<0 5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0.5	<0.5	22.8	<0.5	<0 5
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0.4	<0.4	<0.4	<0 4	<0.4
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0 5	<0 5
1-Chlorohexane	ug/L	<1	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1	<1
Acetone	ug/L	<10	<10	2.84 B	<10	<10
Benzene	ug/L	<0.4	<0 4	<0.4	<0 4	<0.4
Bromobenzene	ug/L	<1	<1	<1	<1	<1
Bromochlorbmethane	ug/L	<1	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1	<1
Bromomethane	ug/L	2.99 B	<1	<1	<1	<1
Carbon disulfide	ug/L	<1	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1	<1
Chloroform	ug/L	<0.3	0 183 J	0.149 J	<0.3	<0.3
Chloromethane	ug/L	<1	<1	<1	0.259 B	<1
cis-1,2-Dichloroethene	ug/L	<1	<1	0 321 J	<1	1.01
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0.5	<0 5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	<10	<10	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10	<10
Naphthalene	ug/L	<1	<1	<1	<1	<1
n-Butylbenzene	ug/L	<1	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1	<1
Tetrachloroethene	ug/L	<1	<1	0.652 J	<1	<1
Toluene	ug/L	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1
Trichloroethene	ug/L	<1	<1	8.66	<1	1.63
Trichlorofluoromethane	ug/L	<1	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank
J Analyte positively identified, but quantitation estimated.

TABLE C-7
GROUNDWATER QA/QC SAMPLE ANALYTICAL RESULTS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	TB-101608-IS-5 / L08100573-48 / 10/16/2008	TB2-101708-IS-5 / L08100573-52 / 10/17/2008	TB-101708-IS-5 / L08100573-40 / 10/17/2008	TB-101508-IS-5 / L08100600-03 / 10/20/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0 5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1
1,1-Dichloroethane	ug/L	<1	<1	<1	<1
1,1-Dichloroethene	ug/L	<1	<1	<1	<1
1,1-Dichloropropene	ug/L	<1	<1	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2	<2	<2
1,2-Dibromoethane	ug/L	<1	<1	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0 5
1,2-Dichloropropane	ug/L	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1
1,3-Dichloropropane	ug/L	<0 4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	ug/L	0 161 J	1.02	1.44	1.09
1-Chlorohexane	ug/L	<1	<1	<1	<1
2,2-Dichloropropane	ug/L	<1	<1	<1	<1
2-Chlorotoluene	ug/L	<1	<1	<1	<1
2-Hexanone	ug/L	<10	<10	<10	<10
4-Chlorotoluene	ug/L	<1	<1	<1	<1
Acetone	ug/L	<10	20.9	31.2	19.7
Benzene	ug/L	<0.4	0.166 J	0.166 J	0.164 J
Bromobenzene	ug/L	<1	<1	<1	<1
Bromochloromethane	ug/L	<1	<1	<1	<1
Bromodichloromethane	ug/L	<0.5	<0 5	<0.5	<0.5
Bromoform	ug/L	<1	<1	<1	<1
Bromomethane	ug/L	<1	0.65 J	2.84 B	3.3 B
Carbon disulfide	ug/L	<1	<1	<1	<1
Carbon tetrachloride	ug/L	<1	<1	<1	<1
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<1	<1	<1	<1
Chloroform	ug/L	<0.3	<0.3	<0 3	<0.3
Chloromethane	ug/L	<1	0.542	0 3 B	0.41 B
cis-1,2-Dichloroethene	ug/L	<1	<1	<1	<1
cis-1,3-Dichloropropene	ug/L	<0 5	<0.5	<0.5	<0.5
Dibromochloromethane	ug/L	<0 5	<0.5	<0.5	<0.5
Dibromomethane	ug/L	<1	<1	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1	<1	<1
Ethylbenzene	ug/L	<1	<1	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1	<1	<1
m-,p-Xylene	ug/L	<2	<2	<2	<2
MEK (2-Butanone)	ug/L	<10	5 59 J	4.81 J	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5	<5	<5
Methylene chloride	ug/L	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10	<10	<10
Naphthalene	ug/L	<1	0.317 J	0.277 J	0.424 J
n-Butylbenzene	ug/L	<1	<1	<1	<1
n-Propylbenzene	ug/L	<1	<1	<1	<1
o-Xylene	ug/L	<1	<1	<1	<1
p-Isopropyltoluene	ug/L	<1	<1	<1	<1
sec-Butylbenzene	ug/L	<1	<1	<1	<1
Styrene	ug/L	<1	<1	<1	<1
tert-Butylbenzene	ug/L	<1	<1	<1	<1
Tetrachloroethene	ug/L	<1	<1	<1	<1
Toluene	ug/L	<1	0.364 J	0.418 J	0.415 J
trans-1,2-Dichloroethene	ug/L	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1
Trichloroethene	ug/L	<1	<1	<1	<1
Trichlorofluoromethane	ug/L	<1	<1	<1	<1
Vinyl acetate	ug/L	<5	<5	<5	<5
Vinyl chloride	ug/L	<1	<1	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank.
J Analyte positively identified, but quantitation estimated.

TABLE C-7
GROUNDWATER QA/QC SAMPLE ANALYTICAL RESULTS - OCTOBER 2008
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Volatile Organic Compounds - SW8260B	Well / Lab ID / Date / units	TB101308-IS-5 / L08100653-08 / 10/21/2008	TB-101408 / L08100693-02 / 10/22/2008
1,1,1,2-Tetrachloroethane	ug/L	<0.5	<0 5
1,1,1-Trichloroethane	ug/L	<1	<1
1,1,2,2-Tetrachloroethane	ug/L	<0 5	<0.5
1,1,2-Trichloroethane	ug/L	<1	<1
1,1-Dichloroethane	ug/L	<1	<1
1,1-Dichloroethene	ug/L	<1	<1
1,1-Dichloropropene	ug/L	<1	<1
1,2,3-Trichlorobenzene	ug/L	<1	<1
1,2,3-Trichloropropane	ug/L	<1	<1
1,2,4-Trichlorobenzene	ug/L	<1	<1
1,2,4-Trimethylbenzene	ug/L	<1	<1
1,2-Dibromo-3-chloropropane	ug/L	<2	<2
1,2-Dibromoethane	ug/L	<1	<1
1,2-Dichlorobenzene	ug/L	<1	<1
1,2-Dichloroethane	ug/L	<0.5	<0.5
1,2-Dichloropropane	ug/L	<1	<1
1,3,5-Trimethylbenzene	ug/L	<1	<1
1,3-Dichlorobenzene	ug/L	<1	<1
1,3-Dichloropropane	ug/L	<0 4	<0.4
1,4-Dichlorobenzene	ug/L	0.149 J	<0.5
1-Chlorohexane	ug/L	<1	<1
2,2-Dichloropropane	ug/L	<1	<1
2-Chlorotoluene	ug/L	<1	<1
2-Hexanone	ug/L	<10	<10
4-Chlorotoluene	ug/L	<1	<1
Acetone	ug/L	<10	<10
Benzene	ug/L	<0.4	<0 4
Bromobenzene	ug/L	<1	<1
Bromochloromethane	ug/L	<1	<1
Bromodichloromethane	ug/L	<0.5	<0.5
Bromoform	ug/L	<1	<1
Bromomethane	ug/L	<1	<1
Carbon disulfide	ug/L	<1	<1
Carbon tetrachloride	ug/L	<1	<1
Chlorobenzene	ug/L	<0 5	<0.5
Chloroethane	ug/L	<1	<1
Chloroform	ug/L	<0.3	<0.3
Chloromethane	ug/L	<1	<1
cis-1,2-Dichloroethene	ug/L	<1	<1
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5
Dibromochloromethane	ug/L	<0.5	<0 5
Dibromomethane	ug/L	<1	<1
Dichlorodifluoromethane	ug/L	<1	<1
Ethylbenzene	ug/L	<1	<1
Hexachlorobutadiene	ug/L	<0.6	<0.6
Isopropylbenzene	ug/L	<1	<1
m-,p-Xylene	ug/L	<2	<2
MEK (2-Butanone)	ug/L	<10	<10
Methyl t-butyl ether (MTBE)	ug/L	<5	<5
Methylene chloride	ug/L	<1	<1
MIBK (methyl isobutyl ketone)	ug/L	<10	<10
Naphthalene	ug/L	<1	<1
n-Butylbenzene	ug/L	<1	<1
n-Propylbenzene	ug/L	<1	<1
o-Xylene	ug/L	<1	<1
p-Isopropyltoluene	ug/L	<1	<1
sec-Butylbenzene	ug/L	<1	<1
Styrene	ug/L	<1	<1
tert-Butylbenzene	ug/L	<1	<1
Tetrachloroethene	ug/L	<1	<1
Toluene	ug/L	<1	<1
trans-1,2-Dichloroethene	ug/L	<1	<1
trans-1,3-Dichloropropene	ug/L	<1	<1
Trichloroethene	ug/L	<1	<1
Trichlorofluoromethane	ug/L	<1	<1
Vinyl acetate	ug/L	<5	<5
Vinyl chloride	ug/L	<1	<1

Notes:
µg/L micrograms per liter
< Analyte not detected above RL
B Analyte was found in the associated blank
J Analyte positively identified, but quantitation estimated.

APPENDIX C-8

IRA SYSTEM EFFLUENT QUALITY CONTROL ANALYTICAL RESULTS – VOCS

TABLE C-8
IRA SYSTEM EFFLUENT QA/QC SAMPLE ANALYTICAL RESULTS
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Sample ID	Effluent-DUP	Effluent-DUP	Effluent-DUP	Effluent-DUP	Effluent-DUP
Date	1/9/2008	4/16/2008	7/7/2008	10/17/2008	1/21/2009
pH - E150.1					
pH		6.26		6.21	
Volatile Organic Compounds - SW8260B µg/L					
1,1,1,2-Tetrachloroethane	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	<1	<1	<1	0.31 J	<1
1,1,2,2-Tetrachloroethane	14	6.47	156	7.98	14.3
1,1,2-Trichloroethane	0.295 J	<1	0.663 J	<1	<1
1,1-Dichloroethane	0.239 J	<1	<1	0.468 J	<1
1,1-Dichloroethene	8.24	6.88	<1	12.7	<1
1,1-Dichloropropene	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2	<2
1,2-Dibromoethane	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	<1	<1	<1	<1	<1
1,2-Dichloroethane	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	<1	<1	<1	<1	<1
1,3-Dichloropropane	<0.4	<0.4	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	<0.5	<0.5	0.154 J	<0.5	<0.5
1-Chlorohexane	<1	<1	<1	<1	<1
2,2-Dichloropropane	<1	<1	<1	<1	<1
2-Chlorotoluene	<1	<1	<1	<1	<1
2-Hexanone	<10	<10	<10	<10	<10
4-Chlorotoluene	<1	<1	<1	<1	<1
Acetone	<10	<10	13.2	3.04 B	<10
Benzene	<0.4	<0.4	<0.4	<0.4	<0.4
Bromobenzene	<1	<1	<1	<1	<1
Bromochloromethane	<1	<1	<1	<1	<1
Bromodichloromethane	<0.5	<0.5	0.464 J	<0.5	<0.5
Bromoform	<1	<1	<1	<1	<1 Q
Bromomethane	<1	<1	<1	<1	<1
Carbon disulfide	<1	<1	<1	<1	<1 Q
Carbon tetrachloride	1.09	0.738 J	1.8	<1	1.09
Chlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	<1	<1	<1	<1	<1
Chloroform	12.2	8.91	62.2	5.02	11
Chloromethane	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	2.7	1.28	6.99	0.89 J	1.23
cis-1,3-Dichloropropene	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	<1	<1	<1	<1	<1
Dichlorodifluoromethane	<1	<1	<1	<1	<1
Ethylbenzene	<1	<1	<1	<1	<1
Hexachlorobutadiene	<0.6	<0.6	<0.6	<0.6	<0.6
Isopropylbenzene	<1	<1	<1	<1	<1
m-,p-Xylene	<2	<2	<2	<2	<2
MEK (2-Butanone)	<10	<10	<10	<10	<10

TABLE C-8
IRA SYSTEM EFFLUENT QA/QC SAMPLE ANALYTICAL RESULTS
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Sample ID	Effluent-DUP	Effluent-DUP	Effluent-DUP	Effluent-DUP	Effluent-DUP
Date	1/9/2008	4/16/2008	7/7/2008	10/17/2008	1/21/2009
Methyl t-butyl ether (MTBE)	<5	<5	<5	<5	<5
Methylene chloride	<1	<1	<1	<1	<1
MIBK (methyl isobutyl ketone)	<10	<10	<10	<10	<10
Naphthalene	<1	<1	<1	<1	<1
n-Butylbenzene	<1	<1	<1	<1	<1
n-Propylbenzene	<1	<1	<1	<1	<1
o-Xylene	<1	<1	<1	<1	<1
p-Isopropyltoluene	<1	<1	<1	<1	<1
sec-Butylbenzene	<1	<1	<1	<1	<1
Styrene	<1	<1	<1	<1	<1
tert-Butylbenzene	<1	<1	<1	<1	<1
Tetrachloroethene	9.29	7.54	1.14	16.4	0.779 F
Toluene	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	0.294 J	<1	1.06	<1	<1
trans-1,3-Dichloropropene	<1	<1	<1	<1	<1
Trichloroethene	25.8	13.3	33.3	18.7	13.1
Trichlorofluoromethane	<1	<1	<1	<1	<1
Vinyl acetate	<5	<5	<5	<5	<5 Q
Vinyl chloride	<1	<1	<1	<1	<1
Semi-volatile Organic Compounds - SW8270B µg/L					
1,2,4-Trichlorobenzene	NC	<11.2	NC	<10.8	NC
1,2-Dichlorobenzene	NC	<11.2	NC	<10.8	NC
1,3-Dichlorobenzene	NC	<11.2	NC	<10.8	NC
1,4-Dichlorobenzene	NC	<11.2	NC	<10.8	NC
2,4,5-Trichlorophenol	NC	<11.2	NC	<10.8	NC
2,4,6-Trichlorophenol	NC	<11.2	NC	<10.8	NC
2,4-Dichlorophenol	NC	<11.2	NC	<10.8	NC
2,4-Dimethylphenol	NC	<11.2	NC	<10.8	NC
2,4-Dinitrophenol	NC	<56.2	NC	<53.8	NC
2,4-Dinitrotoluene	NC	<11.2	NC	<10.8	NC
2,6-Dinitrotoluene	NC	<11.2	NC	<10.8	NC
2-Chloronaphthalene	NC	<11.2J	NC	<10.8	NC
2-Chlorophenol	NC	<11.2	NC	<10.8	NC
2-Methylnaphthalene	NC	<11.2	NC	<10.8	NC
2-Methylphenol	NC	<11.2	NC	<10.8	NC
2-Nitroaniline	NC	<56.2	NC	<53.8	NC
2-Nitrophenol	NC	<11.2	NC	<10.8	NC
3,3'-Dichlorobenzidine	NC	<22.5	NC	<21.5	NC
3-,4-Methylphenol	NC	<56.2	NC	<10.8	NC
3-Nitroaniline	NC	<56.2	NC	<53.8	NC
4,6-Dinitro-2-methylphenol	NC	<56.2	NC	<53.8	NC
4-Bromophenyl-phenylether	NC	<11.2	NC	<10.8	NC
4-Chloro-3-methylphenol	NC	<11.2	NC	<10.8	NC
4-Chloroaniline	NC	<22.5	NC	<10.8	NC
4-Chlorophenyl-phenyl ether	NC	<11.2	NC	<10.8	NC
4-Nitroaniline	NC	<56.2	NC	<53.8	NC
4-Nitrophenol	NC	<56.2	NC	<53.8	NC
Acenaphthene	NC	<11.2	NC	<10.8	NC
Acenaphthylene	NC	<11.2	NC	<10.8	NC
Anthracene	NC	<11.2	NC	<10.8	NC
Benzo(a)anthracene	NC	<11.2	NC	<10.8	NC
Benzo(a)pyrene	NC	<11.2	NC	<10.8	NC

TABLE C-8
IRA SYSTEM EFFLUENT QA/QC SAMPLE ANALYTICAL RESULTS
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Sample ID	Effluent-DUP	Effluent-DUP	Effluent-DUP	Effluent-DUP	Effluent-DUP
Date	1/9/2008	4/16/2008	7/7/2008	10/17/2008	1/21/2009
Benzo(b)fluoranthene	NC	<11.2	NC	<10.8	NC
Benzo(g,h,i)Perylene	NC	<11.2	NC	<10.8	NC
Benzo(k)fluoranthene	NC	<11.2	NC	<10.8	NC
Benzoic acid	NC	<56.2	NC	<53.8	NC
Benzyl alcohol	NC	<11.2	NC	<10.8	NC
Bis(2-Chloroethoxy)Methane	NC	<11.2J	NC	<10.8	NC
Bis(2-Chloroethyl)ether	NC	<11.2	NC	<10.8	NC
bis(2-Chloroisopropyl)ether	NC	<11.2	NC	<10.8	NC
bis(2-Ethylhexyl)phthalate	NC	<11.2	NC	<10.8	NC
Butylbenzylphthalate	NC	<11.2	NC	<10.8	NC
Chrysene	NC	<11.2	NC	<10.8	NC
Dibenzo(a,h)Anthracene	NC	<11.2	NC	<10.8	NC
Dibenzofuran	NC	<11.2	NC	<10.8	NC
Diethylphthalate	NC	<11.2	NC	<10.8	NC
Dimethylphthalate	NC	<11.2	NC	<10.8	NC
Di-N-Butylphthalate	NC	<11.2	NC	<10.8	NC
Di-n-octylphthalate	NC	<11.2	NC	<10.8	NC
Fluoranthene	NC	<11.2	NC	<10.8	NC
Fluorene	NC	<11.2	NC	<10.8	NC
Hexachlorobenzene	NC	<11.2	NC	<10.8	NC
Hexachlorobutadiene	NC	<11.2	NC	<10.8	NC
Hexachlorocyclopentadiene	NC	<11.2	NC	<10.8	NC
Hexachloroethane	NC	<11.2	NC	<10.8	NC
Indeno(1,2,3-cd)pyrene	NC	<11.2	NC	<10.8	NC
Isophorone	NC	<11.2	NC	<10.8	NC
Naphthalene	NC	<11.2	NC	<10.8	NC
Nitrobenzene	NC	<11.2	NC	<10.8	NC
N-Nitroso-di-n-propylamine	NC	<11.2	NC	<10.8	NC
N-Nitrosodiphenylamine	NC	<11.2	NC	<10.8	NC
Pentachlorophenol	NC	<56.2	NC	<53.8	NC
Phenanthrene	NC	<11.2	NC	<10.8	NC
Phenol	NC	<11.2J	NC	<10.8	NC
Pyrene	NC	<11.2	NC	<10.8	NC
Total Metals - SW6010B µg/L					
Aluminum, Total	NC	<100	NC	<100	NC
Arsenic, Total	NC	<10	NC	0.459 J	NC
Barium, Total	NC	98.6	NC	103	NC
Beryllium, Total	NC	<10	NC	<10	NC
Cadmium, Total	NC	<10	NC	<10	NC
Calcium, Total	NC	19700	NC	23000	NC
Chromium, Total	NC	<20	NC	<20	NC
Cobalt, Total	NC	<20	NC	<20	NC
Copper, Total	NC	<20	NC	<20	NC
Iron, Total	NC	<100	NC	387	NC
Lead, Total	NC	<5	NC	1.31	NC
Magnesium, Total	NC	10800	NC	11900	NC
Manganese, Total	NC	16.2	NC	79.7	NC
Nickel, Total	NC	<40	NC	<40	NC
Potassium, Total	NC	775 J	NC	815 J	NC
Silver, Total	NC	<10	NC	<10	NC
Sodium, Total	NC	20500	NC	24500	NC
Vanadium, Total	NC	<10	NC	<10	NC

TABLE C-8
IRA SYSTEM EFFLUENT QA/QC SAMPLE ANALYTICAL RESULTS
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

Sample ID	Effluent-DUP	Effluent-DUP	Effluent-DUP	Effluent-DUP	Effluent-DUP
Date	1/9/2008	4/16/2008	7/7/2008	10/17/2008	1/21/2009
Zinc, Total	NC	33.1	NC	42	NC
Antimony, Total	NC	<1	NC	<1	NC
Selenium, Total	NC	1.51	NC	0.877 J	NC
Thallium, Total	NC	<0.2	NC	<0.2	NC
Mercury	NC	<0.2	NC	<0.2	NC

Notes:

µg/L micrograms per liter
< Analyte not detected above RL
B The analyte was found in the associated blank, as well as in the sample.
J The analyte was positively identified, but the quantitation is an estimate.
NC Not Collected

APPENDIX D

DATA QUALITY EVALUATION

DATA QUALITY EVALUATION

System monitoring activities by engineering-environmental Management, Inc (e^2M) included sampling and analysis of groundwater samples from recovery wells and monitoring wells, and of effluent samples from the recovery system discharge. The activities were performed in accordance with past practice and the *Remedial Action Sampling and Analysis Plan* (RA SAP) (MACTEC, 2004). Semi-annual groundwater sampling of monitoring wells and recovery wells was conducted in April and October of 2008. Samples from monitoring wells were collected using either passive diffusion bags (PDBs) or low-flow sampling methods. Sampling was performed in general accordance with the *User's Guide for Polyethylene-based Passive Diffusion Bag Samplers to Obtain Volatile Organic Compound Concentrations in Wells* (U.S. Geological Survey, 2001) and the RA SAP. Effluent samples were collected from the main discharge at Dunn Field in January, April, July and October of 2008 and January of 2009. Samples were submitted to Microbac Laboratories, Inc. (Microbac), formerly Kemron Environmental Services, Inc. in Marietta, Ohio for analysis.

The data quality evaluation (DQE) process involves assessment of field and laboratory procedures, including the independent data validation completed by Diane Short and Associates, Inc (DSA) per the guidelines in the RA SAP. The data validation forms 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.

D.1 FIELD ACTIVITIES and FIELD QUALITY CONTROL

In April of 2008, 99 groundwater samples were collected from 83 monitoring wells using PDBs for 50 of the wells and a low-flow pump for the remainder. Sixteen of the wells sampled with PDBs had at two depth intervals. Samples were planned but not collected from two additional wells because they were dry (MW-10 and MW-233). In October of 2008, 81 groundwater samples were collected from 81 monitoring wells. Sampling was planned at three additional wells, but two were dry (MW-144 and MW-233) and one was inaccessible (MW-175). Groundwater samples were collected from all 11 recovery wells in both April and October.

Effluent samples were collected on 9 January, 16 April, 7 July , 17 October 2008, and 21 January 2009, respectively. The sample locations are presented in the Annual Report.

The field QC program for the collection of samples for the Dunn Field O&M included specific procedures for the collection of groundwater samples as described in the PDB User's Guide (USGS, 2001) and the RA SAP. Sample bottles met USEPA requirements for environmentally clean containers. Sample labels were pre-printed to facilitate sample tracking from the field through the laboratory to the final report.

Field QC samples were collected to evaluate sampling technique and decontamination procedures. These samples included field duplicates, matrix spike/matrix spike duplicates (MS/MSD), trip blanks, and field equipment blanks. Documentation of the sampling was performed in the field to ensure that the sample collected, labeling, chain-of-custody, and request for analysis were in agreement. Custody seals were placed on each cooler before pickup by the laboratory.

D.2 ANAL YTICAL METHODS

The groundwater samples collected from the monitoring wells and the recovery wells were analyzed for VOCs by method 8260B. The effluent samples collected during the semi-annual events were analyzed for target compound list (TCL) VOCs by method 8260B, TCL semi-VOCs (SVOCs) by method 8270C, target analyte list (TAL) metals by methods 6010B and 7470A, and pH by method 150.1. In January and July 2008 and January 2009, effluent samples were collected for VOC and pH analysis only.

D.3 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.

D.4 DATA QUALITY EVALUATION

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 data quality objectives stated in the RA SAP. 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 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 and Precision (Surrogates, Matrix Spike/Matrix Spike Duplicate, LCS Recoveries)
- Laboratory Performance Criteria (Blanks, Instrument Performance Checks)

Field QC parameters were evaluated through field duplicates, field 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 in this attachment. The SDGs and associated samples are listed on Table D-1. The following sections discuss only those deficiencies encountered during the evaluation that resulted in qualified and/or unusable data.

D.4.1 Data Quality Evaluation Summary

A DQE was completed on the data reported for the groundwater and effluent sampling events conducted at Dunn Field in January (effluent only), April, July (effluent only) and October 2008 and January 2009(effluent only). The following sections provide summary discussions of the required data qualifications for each event and analytical method for groundwater samples collected at DDMT. A Level III DQE was performed and the data quality indicators (DQIs) included sample integrity, holding times, trip blanks, field blanks, method blanks, internal standards, calibrations, surrogate recoveries, matrix spike/matrix spike duplicate (MS/MSD) recoveries, LCSs, and field duplicate precision. These DQIs are expressed in terms of precision, accuracy, representativeness, completeness, comparability, and sensitivity. The results of the DQE are summarized 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). All duplicate samples met precision goals. No analytes required qualification based on field precision.

Accuracy

Accuracy 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).

In the April event, there was one target (carbon disulfide) out low in the LCS associated with the samples reported. These are qualified as estimated J. In the October event, 1,2-dichloroethane (1,2-DCA) and 1,1,2-trichloroethane (1,1,2-TCA) were out high indicating a high bias. Qualifiers were added to one sample based on LCS.

Based on MS/MSD performance in the VOC analyses for the April and October events, low recoveries, both non-detects and detects in the parent sample are qualified as estimated J. Four targets in one sample in April and two targets in two samples, respectively in October were so qualified. Based on these results, data met accuracy goals.

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 field blank analysis help in providing this assessment.

Sampling procedures followed the work plan and were considered representative of the matrices collected. Laboratory preparation and analysis followed method guidelines. Trip blanks, field blanks, and some method blanks contained VOCs that resulted in the qualification of data as possible false positives or biased high values based on the blank data. This resulted in the "B" qualification of some of the chloroform and methylene chloride results in the water samples. The "B"-qualified data were reported at levels below MCLs and therefore should not adversely impact data quality.

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.

Total completeness for the O&M groundwater 2008 semi-annual sampling events was greater than 99.9 % which met the completeness DQO. The groundwater data and effluent data were usable with the qualifications discussed in the sections below and the attached DQE narratives.

<u>Comparability</u>

The selection of standardized methods aids in the comparison of past data to recent studies. Past investigation data are comparable to recent studies. Refer to the historical data presented in Appendix E.

<u>Sensitivity</u>

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 reporting (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. It varies among laboratories dependent upon their SOPs and expertise. The analytical method RLs and MDLs were compared to groundwater protection standards and were determined to meet the overall project objectives.

D.4.1.1 Semi-Annual Event – April 2008 and Effluent Sampling –January 2008

<u>Monitoring Well Samples</u> - During the April 2008 semi-annual sampling event, 99 groundwater samples were collected from 83 monitoring wells. Samples were analyzed for Target Compound List (TCL) VOCs only. The data are usable with qualifications as described below:

- All samples were analyzed initially within holding time. However, a number of samples were analyzed at a dilution out of holding time due to high concentrations. The affected analytes were qualified estimated J since the data could be biased slightly low due to compound degradation. As samples are kept in a volatile-specific cooler, it is not expected that there would be any significant impact.
- Contamination was observed in some method blanks. Whenever methylene chloride or acetone is detected in associated samples at a level less than 10x the method blank (corrected for dilution), the result is qualified as UB. Such results are usable as non-

detects. The "B"- qualified data were reported at levels below the reporting limit and, therefore, should not adversely impact data quality.

- Surrogates were recovered high in two samples. In one sample (MW-158A-81.5-IS-4) detected results for 1,2,2-trichloroethane(1,1,2-TCA), chloroform, tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-DCE) and trans-1,2-dichloroethene (tDCE) were qualified J for possible high bias, however, this is right at the edge of the upper acceptable limit. In the other, no detections were observed so no qualifiers were warranted.

- Based on MS/MSD performance in the VOC analyses, low recoveries, both non-detects and detects in the parent sample are qualified as estimated J. For high recoveries, only detected results in the parent sample are so qualified. This includes 1,1-DCE, carbon tetrachloride, isopropylbenzene, and TCE in sample MW-164-72.6-IS-4 (SDG L08040444).

- There was one target, carbon disulfide, out low in the LCS associated with the samples in SDG L08040517. These 8 samples (MW-43-165.5-IS-4, MW-44-69-IS-4, MW-67-267.5-IS-4, MW-130-69.5-IS-4, MW-156-62.0-IS-4, MW-161-80.0-IS-4, MW-165-89.9-IS-4, and MW-165-100.4-IS-4) were qualified as estimated J for this analyte.

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

Recovery Well Samples - Eleven groundwater samples were collected from 11 recovery wells in April 2008. Samples were analyzed for TCL VOCs only. The data are usable with the following qualifications:

- No qualifications were warranted for the April 2008 recovery well samples.

- Any result reported below RL but above MDL was flagged "J" and considered an estimated result (unless overridden by other QC flags).

Effluent Samples - Effluent discharge samples were collected in January and April. The January effluent sample was analyzed for TCL VOCs only. The April sample and duplicate were analyzed for TCL VOCs, TCL SVOCs TAL Metals and pH. The data are usable with the following qualifications:

- No qualifications were warranted for the January 2008 effluent sample.

- For the April effluent sample based on MS/MSD performance, bis(2-chloroethyoxy) methane in the SVOC analyses was qualified J in the parent sample for low recovery,

- There were 2 targets, 2-chloronaphthalene, and bis(2-chloroethoxy)methane out low in the LCS for SVOC analyses associated with the April effluent sample and were qualified as estimated J.

- Any result reported below RL but above MDL was flagged "J" and considered an estimated result (unless overridden by other QC flags).

D.4.1.2 Semi-Annual Event – October 2008 and Effluent Sampling-July 2008

Monitoring Well Samples - During the October 2008 semiannual sampling event, 81 groundwater samples were collected from 81 monitoring wells. Samples were analyzed for TCL VOCs only. The October 2008 data are usable with qualifications as described below:

- Several analytes (bromomethane, chloromethane, methylene chloride) were observed in some method blanks and trip blanks. Whenever methylene chloride or acetone is detected in associated samples at a level less than 10x the method blank (corrected for dilution), the result is qualified as UB. Such results are usable as nondetects. The "B"- qualified data were reported at levels below the reporting limit or were not targets of interest and, therefore, should not adversely impact data quality.

- The possibility of some bias associated with calibration drift with respect to 1,2-dichloroethane (1,2-DCA) was indicated in one sample (MW-159-81.85-IS-5), and where the discrepancy in % D was observed, the associated sample detect was qualified estimated J.

- The surrogate 1,2-Dichloroethane-d4 was recovered high in one sample, MW-160-84.5-IS-5 (SDG L08100600). Detected results for 1,1.1,2-TeCA, 1,1,2-TCA, carbon tetrachloride, chloroform, PCE, cis-DCE, and tDCE were qualified estimated J for possible high bias.

- For MS/MSD analyses, a number of targets are out of limits, but in some instances the parent sample is > 4x the spike level. In such cases, no qualifier is added because the spike is of the order of the normal variability of measurement and recovery calculations are not meaningful. In other cases the recoveries are elevated but there are no detections in the parent sample, hence no qualifiers. Where data could be biased low proportional to the spike recovery, targets are qualified estimated J. This includes cis-DCE in sample MW-158A-88.25-IS-5 and 1,1,2,2-TeCA in sample MW-156-67.75-IS-5 (SDG L08100600).

- Two targets were out high in LCS analyses for one sample, MW-15-IS-5 (SDG L08100573) 1,1,2-TCA and 1,2-DCA detects were qualified J in this sample. These indicate potential high lab bias.

- Any result reported below the RL but above the MDL was flagged "J" and considered an estimated result (unless overridden by other QC flags).

Recovery Well Samples - Eleven groundwater samples were collected from 11 recovery wells in October 2008. Samples were analyzed for TCL VOCs only. The October 2008 data are usable with the following qualifications:

- Based on MS/MSD performance in the VOC analyses, low recoveries, both non-detects and detects in the parent sample are qualified as estimated J. 1,1,2,2-TeCA was qualified J in one sample (RW-4-IS-5) (SDG L08100573).
- Any result reported below RL but above MDL was flagged "J" and considered an estimated result (unless overridden by other QC flags).

Effluent Samples – Effluent discharge samples were collected in July and October 2008. The July effluent sample was analyzed for TCL VOCs only. The October sample and duplicate were analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and pH. The effluent discharge data are usable with the following qualifications:

- No qualifications were warranted for the July 2008 effluent sample.
- Based on MS/MSD performance in the October VOC analyses, low recoveries, both non-detects and detects in the parent sample are qualified as estimated J. 1,1,2,2-TeCA was qualified J in the effluent sample (SDG L08100573).
- Any result reported below RL but above MDL was flagged "J" and considered an estimated result (unless overridden by other QC flags).

D.4.1.3 Effluent Sampling –January 2009

Effluent Sample – An effluent discharge sample was collected in January 2009. This effluent sample was analyzed for TCL VOCs only. The effluent discharge data are usable with the following qualifications:

- No qualifications were warranted for the January 2009 effluent sample.

D.5 SUMMARY

Data obtained in 2008 and 2009 (effluent only), from the monitoring wells, the recovery wells, and the effluent discharge samples at DDMT Dunn Field were determined to have met the DQOs and be sufficient and valid for remedial decisions regarding monitoring system effectiveness.

TABLE D-1
SDG SUMMARY TABLE
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

SDG	Groundwater and Effluent Samples			Quality Control Samples
Effluent Sampling January 2008 Event				Effluent-DUP
L08010208	Main Discharge			Effluent-MS/MSD
				Trip Blank
April 2008 Semi-Annual Event				
L08040408	MW-232B-IS-4			
L08040409	MW-54-89.5-IS-4	MW-159-81.1-IS-4	MW-144-74.9-IS-4	DUP1-IS-4
	MW-79-92-IS-4	MW-159-97.1-IS-4	MW-156-62.0-IS-4	DUP5-IS-4
	MW-147-73.7-IS-4	MW-160-80.8-IS-4	MW-161-80 0-IS-4	MW-32-65.6-IS-4-MS
	MW-148-80.0-IS-4	MW-166-87.3-IS-4	MW-165-89.9-IS-4	MW-32-65.6-IS-4-MSD
	MW-148-85.5-IS-4	MW-166-97.8-IS-4	MW-165-100.4-IS-	DUP2-IS-4
	MW-149-83.6-IS-4	MW-166A-75.3-IS-4	MW-165A-73.9-IS-4	DUP3-IS-4
	MW-149-98.5-IS-4	MW-168-113.9-IS-4	MW-237-IS-4	DUP4-IS-4
	MW-150-83.2-IS-4	MW-168A-76.4-IS-4	MW-239-IS-4	DUP7-IS-4
	MW-150-90.5-IS-4	MW-168A-86.9-IS-4	MW-240-IS-4	DUP8-IS-4
	MW-152-92.9-IS-4	MW-31-71.6-IS-4	MW-232-IS-4	TB041108-IS-4
	MW-152-107.9-IS-4	MW-31-77.1-IS-4	MW-165A-84.5-IS-4	RB1-IS-4
	MW-155-77.0-IS-4	MW-32-65.6-IS-4	MW-167-76.5-IS-4	
	MW-155-93.5-IS-4	MW-40-90-IS-4	MW-169-81.8-IS-4	
	MW-158-93.1-IS-4	MW-43-165.5-IS-4	MW-170-61.7-IS-4	
	MW-158-104.1-IS-4	MW-44-69-IS-4	MW-170-77.7-IS-4	
	MW-158A-81.5-IS-4	MW-67-267.5-IS-4	MW-171-62.4-IS-4	
	MW-158A-91.4-IS-4	MW-130-69.5-IS-4		
L08040444	MW-07-68.9-IS-4	MW-76-88.2-IS-4	MW-154-61.6-IS-4	DUP6-IS-4
	MW-33-58-IS-4	MW-77-84.9-IS-4	MW-157-74.8-IS-4	DUP9-IS-4
	MW-37-173.2-IS-4	MW-145-86.6-IS-4	MW-162-83.7-IS-4	TB-041408-IS-4
	MW-57-66.6-IS-4	MW-151-78.5-IS-4	MW-163-74.9-IS-4	RB2-IS-4
	MW-68-77.5-IS-4	MW-151-94.5-IS-4	MW-164-72.6-IS-4	MW-76-88.2-IS-4-MS
	MW-69-88.2-IS-4	MW-153-87.1-IS-4	MW-234-IS-4	MW-76-88.2-IS-4-MSD
	MW-70-83.3-IS-4	MW-172-IS-4	MW-236-IS-4	MW-164-72.6-IS-4-MS
	MW-70-88.8-IS-4	MW-175-IS-4	MW-231-IS-4	MW-164-72.6-IS-4-MSD
	MW-71-72.3-IS-4			
L08040486	MW-6-IS-4	MW-174-IS-4	MW-226-IS-4	TB-041508-IS-4
	MW-15-IS-4	MW-179-IS-4	MW-230-IS-4	
	MW-74-IS-4	MW-220-IS-4	MW-235-IS-4	
	MW-132-IS-4	MW-222-IS-4	MW-238-IS-4	
	MW-178-IS-4	MW-223-IS-4		
L08040517	RW-1-IS-4	RW-3-IS-4	RW-7-IS-4	Effluent-DUP
	RW-1A-IS-4	RW-4-IS-4	RW-8-IS-4	Effluent-MS/MSD
	RW-1B-IS-4	RW-5-IS-4	RW-9-IS-4	Trip Blank
	RW-2-IS-4	RW-6-IS-4	MAIN DISCHARGE-IS-4	
	MW-3-IS-4	MW-187-IS-4	MW-225-IS-4	
	MW-134-IS-4	MW-221-IS-4	MW-227-IS-4	
	MW-180-IS-4	MW-224-IS-4	MW-228-IS-4	

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TABLE D-1
SDG SUMMARY TABLE
ANNUAL OPERATIONS REPORT - 2008
DUNN FIELD GROUNDWATER IRA - YEAR TEN
Defense Depot Memphis, Tennessee

SDG	Groundwater and Effluent Samples			Quality Control Samples
Effluent Sampling July 2008 Event				Effluent-DUP
L0807159	Main Discharge			Effluent-MS/MSD
				Trip Blank
October 2008 Semi-Annual Event				
	MAIN DISCHARGE-IS-5	MW-6-IS-5	MW-147-77-IS-5	DUP1-IS-5
	RW-1-IS-5	MW-07-74.15-IS-5	MW-148-86.35-IS-5	DUP2-IS-5
	RW-1A-IS-5	MW-15-IS-5	MW-157-75.95-IS-5	DUP3-IS-5
	RW-1B-IS-5	MW-31-76.95-IS-5	MW-161-82-IS-5	DUP6-IS-5
	RW-2-IS-5	MW-32-66.84-IS-5	MW-162-86.08-IS-5	DUP8-IS-5
	RW-3-IS-5	MW-33-59.15-IS-5	MW-163-77.03-IS-5	MAIN DISCHARGE-IS-5-DUP
L08100573	RW-4-IS-5	MW-37-173-25-IS-5	MW-164-74.59-IS-5	RW-4-IS-5-MS
	RW-5-IS-5	MW-57-68.32-IS-5	MW-172-IS-5	RW-4-IS-5-MSD
	RW-6-IS-5	MW-68-78.25-IS-5	MW-174-IS-5	MAIN DISCHARGE-IS-5-MS
	RW-7-IS-5	MW-69-89.64-IS-5	MW-187-IS-5	MAIN DISCHARGE-IS-5-MSD
	RW-8-IS-5	MW-70-87.67-IS-5	MW-223-IS-5	TB-101708-IS-5
	RW-9-IS-5	MW-71-74.28-IS-5	MW-225-IS-5	TB2-101708-IS-5
		MW-76-90.75-IS-5	MW-227-IS-5	TB-101608-IS-5
		MW-77-78.75-IS-5	MW-228-IS-5	
	MW-40-90.75-IS-5	MW-154-61.45-IS-5	MW-168-114.45-IS-5	DUP9-IS-5
	MW-43-167.25-IS-5	MW-155-88.94-IS-5	MW-168A-82.03-IS-5	DUP11-IS-5
	MW-44-69.75-IS-5	MW-156-67.75-IS-5	MW-169-86.06-IS-5	MW-156-67.75-IS-5-MS
	MW-54-90.25-IS-5	MW-158-99.25-IS-5	MW-170-70.91-IS-5	MW-156-67.75-IS-5-MSD
	MW-67-268.25-IS-5	MW-158A-88.25-IS-5	MW-171-63.75-IS-5	MW-166A-78.17-IS-5-MS
	MW-79-93.25-IS-5	MW-159-81.85-IS-5	MW-132-IS-5	MW-166A-78.17-IS-5-MSD
L08100600	MW-130-70.25-IS-5	MW-160-84.35-IS-5	MW-134-IS-5	MW-158A-88.25-IS-5-MS
	MW-145-90.75-IS-5	MW-165-96.88-IS-5	MW-178-IS-5	MW-158A-88.25-IS-5-MSD
	MW-149-92.15-IS-5	MW-165A-81.65-IS-5	MW-179-IS-5	TB-101508-IS-5
	MW-150-88.51-IS-5	MW-166-92.1-IS-5	MW-222-IS-5	
	MW-151-87.75-IS-5	MW-166A-78.17-IS-5	MW-224-IS-5	
	MW-152-101.75-IS-5	MW-167-80.07-IS-5	MW-226-IS-5	
	MW-153-86.75-IS-5			
	MW-3-IS-5	MW-180-IS-5	MW-240-IS-5	DUP5-IS-5
	MW-10-IS-5	MW-220-IS-5	MW-232-IS-5	DUP7-IS-5
L08100653	MW-74-IS-5	MW-221-IS-5	MW-239-IS-5	DUP10-IS-5
				MW-10-IS-5/MS
				MW-10-IS-5/MSD
				TB101308-IS-5
	MW-230-IS-5	MW-235-IS-5	MW-237-IS-5	DUP4-IS-5
L08100693	MW-231-IS-5	MW-236-IS-5	MW-238-IS-5	MW-230-IS-5-MS
	MW-234-IS-5			MW-230-IS-5-MSD
				TB-101408
Effluent Sampling January 2009 Event				Effluent-DUP
L09010428	Main Discharge			Effluent-MS/MSD
				Trip Blank

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ORGANIC DATA QUALITY REVIEW REPORT
VOLATILE ORGANICS SW-846 METHOD 8260B/5030B

8260B/5030B
SDG: L08010208 (main discharge sample #24)

PROJECT: Memphis Defense Depot, Main Discharge

LABORATORY: Kemron Environmental Services, Marietta, OH

SAMPLE MATRIX: Water

SAMPLING DATE (Month/Year): January, 2008

NO. OF SAMPLES: 8260B/5030B (Waters) – 5 samples including 1 Trip Blank, MS/MSD, and Duplicate

ANALYSES REQUESTED: SW-846 8260B

SAMPLE NO.: See attached result forms and associated edd

DATA REVIEWER: Sammy Huntington and John Huntington (Gateway Enterprises)

QA REVIEWER: Diane Short and Associates Inc. INITIALS/DATE: ___________

Telephone Logs included Yes____ No _X__

Contractual Violations Yes____ No _X___

The EPA Contract Laboratory Program National Functional Guidelines for Organic Review (NFG), 2001/ 2007, and the SW-846 Method 8260B has 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 __X_ No _____

This is a Level III Report. Raw data are not reviewed, nor required.

B. Chain of Custody Documentation was complete and accurate.
Yes ______ No __X__

The project manager is informed of the following.

No samples have been qualified due to COC issues. Comments made in previous reports regarding the COCs used on this project still apply.

C. Samples were received at the required temperature, preservation and intact with no bubbles.
Yes __X___ No _____
SDG L0801078 had "NA" checked on the sample receiving checklist for the "correct preservatives used "item. SDG L08010208 checklist had this item checked as "yes."

SDG L0801078: The Sample Receipt form states that there were bubbles in 2 bottles of MW-210A, 1 bottle of MW210A, and 1 bottle of MW210A MSD. Since there are three containers per sample, the laboratory was able to analyze the ones without headspace.

All of the SDGs stated NA on the Sample Receiving Checklist to whether the samples were pH tested and of acceptable range. This is normal, since the laboratory cannot check the pH of VOA samples on receipt. Any such checks are normally conducted at the bench after the samples have been analyzed.

II. ANALYTICAL REPORT FORMS
A. The Analytical Report or Data Sheets are present and complete for all requested analyses.
Yes _X_ No ____

B. Holding Times
1. The contract holding times were met for all analyses (Time of sample receipt to time of analysis (VOA) or extraction and from extraction to analysis).
Yes __X___ No______
Assuming that all samples were properly preserved with HCl.

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, assuming acid preservation).
Yes _X__ No____
Assuming that all samples were properly preserved with HCl.

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 >0.01.
Yes __X__ No ____ NA____
Per the project manager, the 2001 EPA CLP validation guidance has been applied to the common "poor responders". Acetone, 2-butanone, and 4-methyl-2-pentanone are the compounds for which any calibration response factors below 0.05 have been observed. 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 these data sets. The laboratory has been tasked with providing to the client verification that the 0.01 RF is valid. Given the spectral verification is available, the data are not qualified for response >0.01 < 0.05. No data have been qualified.

2a.The relative standard deviation (RSD) for the five point calibration was within the 30% limit for the CCCs.
Yes __X__ 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 or a linear curve was used. Note the 2007 CLP guidance allows for 40% for the low responders.
Yes __X___ No _____ NA____

3. The 12 hour system Performance Check was performed as required in SW-846.
Yes _X__ No_____ NA____

B. Continuing Calibrations
1. The midpoint standard was analyzed for each analysis at the required frequency and the QC criteria of > 0.05 (.01 for CLP 2001) were met.
Yes __X___ No ____ NA____
The CCVs were analyzed at the proper frequency. The same compounds showed low responses in the continuing calibration as were observed in the initial calibrations. Qualifiers are not added for these outliers since none were below the lower limit of 0.01.

2. The percent difference (%D) limits of ± 25% were met (40% for poor responders, for closing CCV: 50% poor responders per 2007 NFG).
Yes ___ No __X__ NA___
There is one CCV in which vinyl acetate had a %D outside the 25% validation limit. Since the analyte is not detected in associated samples, no qualifiers are added.

SDG	CCV	Batch	Instrument#	Analyte	%RSD	RRF OUT	Qualifiers Added
L08010208	1/17/08 8:49	WG260850		Vinyl Acetate	28.1		None

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 __X___ No ____ NA____

VI. SURROGATE
Surrogate spikes were analyzed with every sample.
Yes _X___ No____

And met the recovery limits defined in the current contract, which are the current laboratory limits.
Yes ___X___ No ____

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix spike (MS) and matrix spike duplicates (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.

Yes __X__ No _____

There are 3 MS/MSDs which does meet the 1:20 ratio.

Method	SDG	Client Sample ID	Lab Sample ID
8260B\5030B	L08010208	MAIN DISHCARGE	21

B. The MS and MSD percent recoveries were within the limits defined in the contract, which are the current laboratory control chart limits.

Yes _X__ No _____NA___

C. The MSD relative percent differences (RPD) were within the defined contract limits.

Yes _X__ No ___NA____

D. The MS/MSD were client samples.

Yes _X_ No ____NA___

VIII. LABORATORY CONTROL SAMPLE

A. Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples.

Yes _X__ No ____

B. The LCS percent recoveries were within the limits defined in the contract (the MS limits are used as a reference or laboratory-specific limits for this matrix are defined).

Yes _____ No _X__

The full target list has been spiked. Only one target is out of limits in one LCS on the high side. It is not detected in associated samples and no qualifier has been added.

SDG	Lab Sample#	Batch	Targets Detected	LCS/LCSD/RPD	Qualifiers
L08010208		WG260850	4-chlorotoluene	129	None, ND

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.

Yes _X__ No___

B. No blank contamination was found in the Method Blank.

Yes__X____ No ___

C. If Field Blanks were identified, no blank contamination was found.

Yes _X_ No ____

There are two trip blanks, both in control.

X. FIELD QC

If Field duplicates were identified, they met guidance RPD of < 35% for water or < 50% for soils. 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 _X__ No ___ NA____

There is one field duplicate, shown in the table below and it is in control.

SDG	Sample ID	Field DUP	[illegible]
L08010208	Main Discharge	DUP-2	in control

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____

EQLs are typical for this method.

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 and no qualifiers have been added.

The following is noted:

Chain of Custody/Deliverables:

The project manager is informed of the following.

No samples have been qualified due to COC issues. Comments made in previous reports regarding the COCs used on this project still apply.

Sample Condition:

SDG L08010208 had "yes" checked on the sample receiving checklist for the "correct preservatives used "item.

All of the SDGs stated NA on the Sample Receiving Checklist to whether the samples were pH tested and of acceptable range. This is normal, since the laboratory cannot check the pH of VOA samples on receipt. Any such checks are normally conducted at the bench after the samples have been analyzed.

Continuing Calibrations:
There is one CCV in which vinyl acetate had a %D outside the 25% validation limit. Since the analyte is not detected in associated samples, no qualifiers are added.

Matrix Spikes:
There is one MS/MSD pair, this was in control.

LCS Recoveries:
The full target list has been spiked. Only one target is out of limits in one LCS on the high side. It is not detected in associated samples and no qualifier has been added.

Method Blanks:
Method blanks are in control.

Field Blanks:
There are two trip blanks, in control.

Field QC:
There was one field duplicate, shown in the table within the body of this report. It was in control.

ORGANIC DATA QUALITY REVIEW REPORT
VOLATILE ORGANICS SW-846 METHOD 8260B/5030B and Method 8270C

8260B/5030B
SDG: L08040517 (Main Discharge Sample #15), L08040409, L08040486, L08040444, L08040408

8270C
SDG: L08040517 (Main Discharge Sample #15)

PROJECT: Memphis Defense Depot Interim Remedial Action IRA-4 and Recovery Well, Main Discharge

LABORATORY: Microbac Laboratories (formerly Kemron Environmental Services), Marietta, OH

SAMPLE MATRIX: Water

SAMPLING DATE (Month/Year): April 2008

NO. OF SAMPLES: 8260B/5030B (Waters) – 59 samples including 1 trip blank and 1 rinse blank; Method 8270C: 2 waters

ANALYSES REQUESTED: SW-846 8260B, 8270C

SAMPLE NO.: See attached result forms and associated edd

DATA REVIEWER: Sammy Huntington and John Huntington (Gateway Enterprises)

QA REVIEWER: Diane Short and Associates Inc. INITIALS/DATE: ___________

Telephone Logs included Yes___ No X__

Contractual Violations Yes____ No X___

The EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 2001, and the SW-846 Method 8260B has 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 X___ No_____
This is a Level III Report.

B. Chain of Custody Documentation was complete and accurate.
Yes ______ No _X__
The project manager is informed of the following and the chain information is to be updated for the project file.

The chain of custody system used on this project is generated from an electronic sample tracking system. Previous reports have noted certain deficiencies. The main problems with the earlier versions of these appear to have been resolved. A few of the sample names are long and are still being truncated, but otherwise the record appears to be intact and the samples are still identifiable.

C. Samples were received at the required temperature, preservation and intact with no bubbles.
Yes _____ No __X___
The most recent regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be less than 6° C. The sample receipt conditions are fully compliant with applicable regulations.

SDG: L08040517 - IS-4-MS main discharge sample, 1 semi-volatile bottle was received broken. There appear to be sufficient sample bottles to perform all required analyses.

For some SDGs the Sample Receiving Checklist states "NA" for whether the correct preservatives were added to the water samples, if the pH was tested on preserved water samples and if the pH ranges acceptable and some SDGs have "Yes" checked.

pH cannot be checked for 8260B samples on receipt. This is done in the laboratory at run time. In this case samples are shown on the run logs as being pH <2, so they were properly preserved.

II. ANALYTICAL REPORT FORMS
A. The Analytical Report or Data Sheets are present and complete for all requested analyses.
Yes _X__ No ____

B. Holding Times
1. The contract holding times were met for all analyses (Time of sample receipt to time of analysis (VOA) or extraction and from extraction to analysis).
Yes ______ No __X___
All samples have at least one run within the specified holding time. See item 2 below.

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 __X__
Method 8270:
Method 8260:
All samples were analyzed initially within holding time. However, a number of samples were either analyzed at a dilution or analyzed at normal dilution out of hold. The samples affected are shown below, along with the qualifiers added to the run impacted. Qualifiers are JH#, where # is the number of days past the 14-day holding time at which analysis was performed. Data could be biased slightly low due to compound degradation. As samples are kept in a volatile-specific cooler, it is not expected that there would be any significant impact.

SDG	Sample ID	Dilution Factor	Qualifier
L08040409	MW-150-83.2-IS-4	1	JH4
L08040409	MW-150-83.2-IS-4	5	JH5
L08040444	MW-145-86.6-IS-4	1	JH4
L08040444	MW-33-58-IS-4	1	JH4
L08040444	MW-76-88.2-IS-4	5	JH9

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 (> 0.01 for the 2001 guidance).
Yes X No NA

Per the project manager, the 2001 EPA CLP validation guidance has been applied to the common "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 these data sets. The laboratory has been tasked with providing to the client verification that the 0.01 RF is valid. Given the spectral verification is available, the data are not qualified for response >0.01 < 0.05. No data have been qualified.

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. The matrix spike behavior of these compounds can be used to judge the impacts of matrix for this site.

2a.The relative standard deviation (RSD) for the five point calibration was within the 30% limit for the CCCs.
Yes X 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 or a linear curve was used.
Yes X No NA

3. The 12 hour system Performance Check was performed as required in SW-846.
Yes X No NA

B. Continuing Calibrations

1. The midpoint standard was analyzed for each analysis at the required frequency and the QC criteria of > 0.05 (>0.01 for the 2001 validation guidance) were met.
Yes X No NA
The CCVs were analyzed at the proper frequency. The same compounds showed response factors < 0.05 as did in the initial calibrations, but since all were above the 2001 validation limit of 0.01, no qualifiers have been added for this.

2. The percent difference (%D) limits of + 25% were met.
Yes______ No __X__ NA___
8260:
Vinyl acetate was out low in a number of CCVS. No qualifiers were added, since the target is not detected in associated samples. Under such circumstances, no qualifier is added unless the drift is so great to make a possibility of false negatives significant.
8270:
Benzoic acid was out low in one CCV. No qualifiers were added, since the target is not detected in associated samples. Under such circumstances, no qualifier is added unless the drift is so great to make a possibility of false negatives significant.

Method	SDG	CCV Date	Batch	Analyte	%D	Qualifiers Added
8260B	L08040409	4/24/08 12:10	WG269373	Vinyl Acetate	26.2	None, samples ND
		4/29/08 8:50	WG269770	Vinyl Acetate	71.0	None, samples ND
		4/30/08 7:16	WG269875	Vinyl Acetate	54.5	None, samples ND
		4/21/08 14:53	WG269021	Vinyl Acetate	28.9	None, samples ND
		4/23/08 7:11	WG269190	Vinyl Acetate	26.9	None, samples ND
		4/23/08 7:19	WG269192	Vinyl Acetate	30.1	None, samples ND
		4/22/08 18:49	WG269188	Vinyl Acetate	41.6	None, samples ND
		4/23/08 8:53	WG269210	Vinyl Acetate	41.8	None, samples ND
	L08040486	4/25/08 19:47	WG269536	Vinyl Acetate	37.9	None, samples ND
	L08040517	4/26/08 13:52	WG269582	Vinyl Acetate	28.2	None, samples ND
		4/27/08 18:36	WG269609	Vinyl Acetate	57.3	None, samples ND
	L08040444	4/24/08 12:10	WG269373	Vinyl Acetate	26.2	None, samples ND
		4/23/08 19:20	WG269322	Vinyl Acetate	38.5	None, samples ND
		4/23/08 18:39	WG269320	Vinyl Acetate	41.9	None, samples ND
		4/28/08 7:13	WG269617	Vinyl Acetate	61.0	None, samples ND
8270C	L08040517	4/30/08 9:01	WG269897	Benzoic Acid	36.8	None, samples ND

IV. GC/MS INSTRUMENT PERFORMANCE CHECK
The BFB (VOA) or DFTPP (SVOA) 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__X__
Not included at this review level.

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__X__
Not included at this review level.

VI. SURROGATE
Surrogate spikes were analyzed with every sample.
Yes_X___ No____

And met the recovery limits defined in the current contract, which are the current laboratory limits.
Yes_____ No___X__
8260: Surrogates are recovered high in two samples. In one case detected results are qualified JS#, where # is the recovery observed. Data could be biased very slightly high although this is right at the edge of the upper acceptable limit. In the other, no detections are observed and no qualifiers are added.
8270: All surrogates are in control.

Method	SDG	Batch	Lab Sample #	Analyte	Result	Qualifier
8260B\5030B	L08040409	WG269081	18	4-Bromofluorobenzene	120	JS120 detects
	L08040444	WG269320	33	1,2-Dichloroethane-d4	122	None, all ND

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE
Matrix spike (MS) and matrix spike duplicates (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.
Yes__X___ No_____
8260B: There are 4 MS/MSDs which meets the 1:20 ratio.
8270C: There is 1 MS/MSD which meets the 1:20 ratio

The MS/MSDs present are shown in the table below.

Method	SDG	Client Sample ID
8260B\5030B	L08040409	MW-32-65.6-IS-4
-	L08040444	MW-164-72.6-IS-4
-	-	MW-76-88.2-IS-4
-	L08040517	MAIN DISCHARGE-IS-4
8270C\3510C	-	MAIN DISCHARGE-IS-4

The MS and MSD percent recoveries were within the limits defined in the contract, which are the current laboratory control chart limits.
Yes_____ No__X__ NA____
The full target list has been spiked. Instances where spike recoveries are out of limits are shown in the table below. In one case, the sample amount is 4x the spike level or greater. In such cases, the recovery cannot realistically be calculated, because the anticipated normal analytical variability is on the order of the spike level. Thus no qualifiers are added in these instances. For low recoveries, both non-detects and detects in the parent sample are qualified as JS#, where # is the recovery. For high recoveries, only detected results in the parent sample are so qualified. Qualified results may be biased proportional to the recovery observed.

and nondetects that are qualified may have a somewhat higher risk than normal of false negatives due to the observed bias.
The compounds that purge inefficiently that were discussed in the calibration section (these tend to give low response factors) were recovered within limits in the MS/MSDs. Thus their behavior in the matrix appears to be acceptable, although the recovery windows are wider for these compounds than for the other targets.

Method	SDG	Client Sample ID	Lab Sample ID	Analyte	MS/MSD/RPD	Qualifier
8260B	L08040444	MW-164-72.6-IS-4	25	1,1-Dichloroethene	OK/67/OK	JS67 parent
				Carbon Tetrachloride	OK/62.3/20.9	JS62D21 parent
				Isopropylbenzene	OK/73.6/OK	JS74 parent
				Trichloroethene	36/10.4/OK	JS10 parent
		MW-76-88.2-IS-4	14	Trichloroethene	-354/-203/OK	None, sample > 4x spike
8270C	L08040517	Main Discharge-IS-4	15	Bis (2-chloroethyoxy) Methane	OK/37.7/OK	JS38 parent

The MSD relative percent differences (RPD) were within the defined contract limits.
Yes ______ No __X__ NA ____
Those RPDs that are out are only qualified if the recovery is also out of limits. As the RPD increases, the matrix precision decreases.

The MS/MSD were client samples.
Yes __X__ No ____ NA ____

VIII. LABORATORY CONTROL SAMPLE
A. Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples.
Yes _X__ No ____

The LCS percent recoveries were within the limits defined in the contract (the MS limits are used as a reference or laboratory-specific limits for this matrix are defined).
Yes ______ No __X____
Both 8260B and 8270C had a few analytes that were out low in one batch, and 8260B had one batch with acetone recovered high in the LCS. When the recovery of the LCS is high, this suggests a possible high lab bias and if the impacted analyte is not detected in associated samples, no qualifier is issued. In this case, acetone was either not detected or the detections were qualified "U" due to method or field blank contamination. Hence no qualifier is added. For the low recoveries, the target is qualified as JL# in all associated samples and may be biased low.

Method	SDG	Lab Sample#	Batch	Targets Detected	LCS/LCSD /RPD	Qualifiers
8260B	L08040409	38, 40-44, 46-49	WG269192	Carbon disulfide	56.1	JL56 all samples in batch
		50-60	WG269190	Acetone	138/136/OK	None, all U or qualified U
8270C	L08040517	ALL	WG269897	2-Chloronaphthalene	47.9	JL48 samples in batch
				Bis (2-chloroethyoxy) methane	35.6	JL36 samples in batch
				Phenol	18.9	JL19 samples in batch

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.
Yes X No

B. No blank contamination was found in the Method Blank.
Yes No X
8270C: The method blank is in control.

8260B: Contamination was observed in some method blanks indicated in the table, below the reporting limit. Whenever methylene chloride or acetone is detected in associated samples at a level less than 10x the method blank (corrected for dilution), the result is qualified as UB#, where # is the corrected method blank level. Such results are usable as nondetects. Qualifiers added are summarized in the table below. For other targets, the factor used is 5x. In several cases, there are too many targets detected in the method blank to list in the table. These are mainly long-retention time analytes such as 1,2,3-trichlorobenzene and naphthalene that may be carryover from previously-run standards. Only a few samples appear to be similarly impacted.

Method	SDG	Lab Sample#	Batch	Targets Detected	Results	Qualifiers
8260B	L08040409	11,18,20,21	WG269232	1,2,3-trichlorobenzene	.37 F	None, ND
				1,2,4-trichlorobenzene	.27 F	None, ND
				Hexachlorobutadiene	.33F	None, ND
				Naphthalene	.29 F	None, ND
		31,45	WG269373	Acetone	3 F	UB3 detect
		1-8	WG269021	Too many to list		Only acetone qualified UB.27
		50-60	WG269190	Too many to list		None, ND
		38,40-49	WG269192	Too many to list		several samples qualified UB#; see EDD
		9, 22-30, 34-37, 39	WG269188	Methylene chloride		UB.28 detection
	L08040486	1-12	WG269445	Acetone	2.80F	UB2.8 detection
		13-15	WG269536	Acetone	3.35F	None, ND
	L08040517	14,18-22, 24,25	WG269609	1,2,3-Trichlorobenzene	.244F	None, ND

Method	SDG	Lab Sample #	Batch	Targets Detected	Results	Qualifiers
	L08040444	1-3, 12, 31	WG269373	Acetone	3 F	UB3 detects
		4-10,13,14	WG269322	Too many to list		several samples qualified UB#; see EDD
		17,19,20-30,32,33	WG269320	Bromomethane	0.63 F	UB.63 detects
				Methylene chloride	0.31 F	UB# detects

C. If Field Blanks were identified, no blank contamination was found.
Yes ____ No __X__
8260: There were 4 trip blanks and 2 rinse blank. A number of detections are observed, which are used to qualify associated samples using the same criteria as are used for method blanks. Qualified results from trip blanks are of the form UTB#, and for rinse blanks UFB#, to distinguish the qualifiers from those arising from method blanks.
8270: There were no field blanks.

SDG	Sample ID	Lab Sample ID	Analyte	Results	Qualifiers
L08040409	TB041108-IS-4	40	1,3,5-Trimethylbenzene	.313	None, UB from MB
			Acetone	3.09	UTB3.1 detections not qualified from MB
			Bromoform	.894	None, samples ND
			Bromomethane	.718	UTB.71 detects
			Dibromochloromethane	.598	None, ND in samples
			Methylene chloride	.718	None, UB from MB
			Styrene	.649	UTB.65 detect
	RB1-IS-4	54	1,4-Dichlorobenzene	1.70	UFB1.7 detects
			Benzene	.288	UFB.29 detects
			Ethylbenzene	.309	None, samples ND
			Toluene	.740	UFB.74 results < 5x FB
L08040486	TB-041508-IS-4	3	Acetone	2.59	None, ND in samples
			Dibromochloromethane	.427	None, ND in samples
			Methylene chloride	3.91	None, ND in samples
L08040517	TB-041608-IS-4	23	1,4-Dichlorobenzene	.127	UTB.13 detects
			Bromoform	1.38	None, ND in samples
			Dibromochloromethane	1.02	None, ND in sample

SDG	Sample ID	Lab Sample ID	Analyte	Results	Qualifiers
			Methylene chloride	4.13	None, ND in samples
L08040444	TB-041408-IS-4	31	Acetone	4.47	None, TB qualified UB from MG
			Methylene chloride	6.33	None, UB from MB
	RB2-IS-4	32	1,3,5-Trimethylbenzene	.308	None, ND in samples
			Bromomethane	.645	None, UB from MB
			Methylene chloride	1.57	None, UB from MB
			Toluene	.365	UFB.37 detection

X. FIELD QC
If Field duplicates were identified, they met guidance RPD of < 35% for water or < 50% for soils. 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____
8260B: There are eight samples identifiable as field duplicates. Some samples do show outliers but in each case there are many detections and the other detections meet criteria.
8270C: There is one field duplicate, which is in control.

Method	SDG	Sample ID	DUP	Comments
8260B	L08040409	MW-159-81.1-IS-4	DUP 1	1,1-DCE 4.4 in DUP, ND in sample; chloroform 1.3 in DUP, ND in sample;trans-1,2-DCE RPD 39%
	L08040409	MW-167-76.5-IS-4	DUP2	In control
	L08040409	MW-44-69-IS-4	DUP3	In control
	L08040409	MW-31-71.6-IS-4	DUP4	TCE RPD 42%
	L08040409	MW-150-90.5-IS-4	DUP5	Chloroform 1.9 in DUP, ND in sample; 1,2-DCE RPD 43%; tetrachloroethene RPD 37%;trans-1,2-DCE 4.4 in DUP, ND in sample
	L08040444	MW-157-74.8-IS-4	DUP 6	In control
	L08040409	MW-165A-73.9-IS-4	DUP7	In control

	L0804040 9	MW-170-77.7-IS-4	DUP8	In control; Note that DUP8 is impacted by a number of detections below the PQL that appear to be false positives. Some are qualified due to blank issues, some are not. These do not impact the field duplicate comparison since they are below PQL.
		MW-236-IS-4	DUP9	In control, all ND
		MAIN DISCHARGE-IS-4	DUP-2-MAIN DISCHARGE-IS-4	In control
8270C		MAIN DISCHARGE-IS-4	DUP-2-MAIN DISCHARGE-IS-4	In control, all ND

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____

Dilutions were necessary in some cases to achieve the proper quantification of high-level targets, which raises the EQLs for all other targets in the run. Only the results that are in the calibration range have been reported by the laboratory, but the undiluted results have been used for nondetected targets and results that are in range at that dilution.

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/Deliverables:

The project manager is informed of the following and the chain information is to be updated for the project file.

The chain of custody system used on this project is generated from an electronic sample tracking system. Previous reports have noted certain deficiencies. The main problems with the earlier versions of these appear to have been resolved. A few of the sample names are long and are still being truncated, but otherwise the record appears to be intact and the samples are still identifiable.

Sample Condition:
The most recent regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be less than 6° C. The sample receipt conditions are fully compliant with applicable regulations.

SDG: L08040517 - IS-4-MS main discharge sample, 1 semi-volatile bottle was received broken. There appear to be sufficient sample bottles to perform all required analyses.

For some SDGs the Sample Receiving Checklist states "NA" for whether the correct preservatives were added to the water samples, if the pH was tested on preserved water samples and if the pH ranges acceptable and some SDGs have "Yes" checked.

pH cannot be checked for 8260B samples on receipt. This is done in the laboratory at run time. In this case samples are shown on the run logs as being pH <2, so they were properly preserved.

Holding Times
Method 8270:
Method 8260:
All samples were analyzed initially within holding time. However, a number of samples were either analyzed at a dilution or analyzed at normal dilution out of hold. The samples affected are shown below, along with the qualifiers added to the run impacted. Qualifiers are JH#, where # is the number of days past the 14-day holding time at which analysis was performed. Data could be biased slightly low due to compound degradation. As samples are kept in a volatile-specific cooler, it is not expected that there would be any significant impact.

Continuing Calibrations:
8260:
Vinyl acetate was out low in a number of CCVS. No qualifiers were added, since the target is not detected in associated samples. Under such circumstances, no qualifier is added unless the drift is so great to make a possibility of false negatives significant.
8270:
Benzoic acid was out low in one CCV. No qualifiers were added, since the target is not detected in associated samples. Under such circumstances, no qualifier is added unless the drift is so great to make a possibility of false negatives significant.

Surrogate Recoveries:
8260: Surrogates are recovered high in two samples. In one case detected results are qualified JS#, where # is the recovery observed. Data could be biased very slightly high although this is right at the edge of the upper acceptable limit. In the other, no detections are observed and no qualifiers are added.
8270: All surrogates are in control.

Matrix Spikes:
8260B: There are 4 MS/MSDs which meets the 1:20 ratio.

8270C: There is 1 MS/MSD which meets the 1:20 ratio

The full target list has been spiked. Instances where spike recoveries are out of limits are shown in the table within the matrix spike section of this report. In one case, the sample amount is 4x the spike level or greater. In such cases, the recovery cannot realistically be calculated, because the anticipated normal analytical variability is on the order of the spike level. Thus no qualifiers are added in these instances. For low recoveries, both non-detects and detects in the parent sample are qualified as JS#, where # is the recovery. For high recoveries, only detected results in the parent sample are so qualified. Qualified results may be biased proportional to the recovery observed, and nondetects that are qualified may have a somewhat higher risk than normal of false negatives due to the observed bias.
The compounds that purge inefficiently that were discussed in the calibration section (these tend to give low response factors) were recovered within limits in the MS/MSDs. Thus their behavior in the matrix appears to be acceptable, although the recovery windows are wider for these compounds than for the other targets.

For the MS/MSD pairs, those RPDs that are out are only qualified if the recovery is also out of limits. As the RPD increases, the matrix precision decreases.

Method Blanks:
8270C: The method blank is in control.

8260B: Contamination was observed in some method blanks indicated in the table, below the reporting limit. Whenever methylene chloride or acetone is detected in associated samples at a level less than 10x the method blank (corrected for dilution), the result is qualified as UB#, where # is the corrected method blank level. Such results are usable as nondetects. Qualifiers added are summarized in the table below. For other targets, the factor used is 5x. In several cases, there are too many targets detected in the method blank to list in the table. These are mainly long-retention time analytes such as 1,2,3-trichlorobenzene, naphthalene, and n-propylbenzene that may be carryover from previously-run standards. Only a few samples appear to be similarly impacted.

Field Blanks:
8260: There were 3 trip blanks and 1 rinse blank. A number of detections are observed, which are used to qualify associated samples using the same criteria as are used for method blanks. Qualified results from trip blanks are of the form UTB#, and for rinse blanks UFB#, to distinguish the qualifiers from those arising from method blanks.
8270: There were no field blanks.

LCS Recoveries:
Both 8260B and 8260C had a few analytes that were out low in one batch, and 8260B had one batch with acetone recovered high in the LCS. When the recovery of the LCS is high, this suggests a possible high lab bias and if the impacted analyte is not detected in associated samples, no qualifier is issued. In this case, acetone was either not detected or the detections were qualified "U" due to method or field blank contamination. Hence no qualifier is added. For the low recoveries, the target is qualified as JL# in all associated samples and may be biased low.

EQLs:
Dilutions were necessary in some cases to achieve the proper quantification of high-level targets, which raises the EQLs for all other targets in the run. Only the results that are in the calibration range have been reported by the laboratory, but the undiluted results have been used for nondetected targets and results that are in range at that dilution.

Field QC:
8260B: There are 10 samples identifiable as field duplicates. Some samples do show outliers but in each case there are many detections and the other detections meet criteria.
8270C: There is one field duplicate, which is in control.

INORGANIC DATA QUALITY REVIEW REPORT

METALS BY ICP, ICPMS, and Mercury

SDG: L08040517

PROJECT: Memphis Defense Depot, Main Discharge; for e2m, Texas

LABORATORY: Microbac (formerly Kemron) Laboratories, Marietta, OH

SAMPLE MATRIX: Water SAMPLING DATE (Month/Year): 04/2008

ANALYSES REQUESTED: SW-846 Method 6010 (ICP), 6010 (ICPMS), 7470A

NO. OF SAMPLES: 2 Total Water

SAMPLE NO: Main Discharge-IS-4, DUP-2-IS-4

DATA REVIEWER: Diane Short

QA REVIEWER: Diane Short and Associates Inc. INITIALS/DATE: ____

Telephone Logs included Yes____ No _X___

Contractual Violations Yes____ No _X___

The project Sampling and Analysis Plan (SAP), the EPA Contract Laboratory Program National Functional Guidelines for Inorganic Review, 2002 and the SW-846 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. Per the Scope of Work, the review includes validation of all calibrations, chains of custody (for sample holding time and preservation only), and QC forms referencing the above documents.

I. DELIVERABLES
All deliverables were present as specified in the Statement of Work or project contract.
Yes__X__ No____
The following is noted for clarification:
Per the contract, all packages were reviewed for holding time, summary QC and calibration (Level III). No raw data were required for review, nor were raw data required for submission. The laboratory has submitted CLP-type summary forms for ICP and ICP/MS and mercury.
There are 16 ICP analytes, 3 ICP/MS analytes and mercury by CVAA

II. CALIBRATIONS
A. All initial instrument calibrations were performed as defined in the contract or Statement of Work (SOW). All correlation coefficients of the 3 point curve were > 0.995.
Yes__X__ No___ NA____
No raw data were required to evaluate this requirement. No % RSD data were submitted for the ICPMS and none have been required for Level III.

B. The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were analyzed at the required frequency.
Yes__X__ No____
Sequencing was not required, but sufficient calibrations were present to verify that the frequencies were met for client samples.

C. And the ICV and CCV standard percent recovery results were within the required control limits of 90 – 110% (Mercury 80 – 120%).
Yes__X_ No____
Note that a 4 point + blank curve was also submitted for the ICP and ICPMS analyses. All had correlation coefficients of > 0.005

III. CRDL STANDARDS
The 2 x CRDL standards were analyzed as required in the SOW.
Yes____ No____ NA__X_
Not required for Level III, but was present only for thallium and is acceptable. Note that a low level standard is included in the 4 point curve noted above. Arsenic does not contain a 0.005 standard as do all the other analytes with an MDL of 0.005. A 0.008 (no units given in table) standard is present and arsenic has only a 3 point curve + blank. It is possible the 0.005 MDL is not within the sensitivity of the instrument. The curve is acceptable and no further action is taken.

IV. BLANKS
Note: the highest blank associated with any particular analyte is used for the qualification process and is the value entered after the "B" blank descriptor.

A. The initial calibration blanks (ICB) and continuing calibration blanks (CCB) were analyzed at the required frequency.
Yes__X_ No____ NA____
Sequencing was not required, but sufficient calibration blanks were present to verify that the frequencies were met for client samples.

B. And the ICB and CCB results were within the required control limits.
Yes___ No__X__ NA_____

One CCB was detected for mercury at 0.117 ug/l. There are no detected results reported for mercury and no qualifier is required.

C. And all analytes in the Leach Blank were less than the CRDL, or less than 2x the instrument detection limit (IDL), whichever is lower.
Yes____ No____ NA__X__
No TCLP analysis was performed.

V. PREPARATION BLANKS
A. Preparation blanks were prepared and analyzed at the required frequency.
Yes__X__ No____

B. And all analytes in the preparation blank were less than the CRDL, or less than the instrument detection limit (IDL), whichever is lower.
Yes__X__No____
There was an unacceptable preparation blank for arsenic and the samples were re-analyzed with an acceptable blank. Only re-analyses data have been submitted to the client.

C. Field, trip, decon rinse or other field blanks are contained and identified in the package.
Yes ____ No____ NA___X__
There is not a field blank in this data set.

D. And the reported results are less than the CRDL or less than the IDL, whichever is lower.
Yes ____ No ___ NA__X__

VIA. ICP INTERFERENCE CHECK SAMPLE
A. The Interference Check Sample (ICS) was analyzed as required in the SOW or contract.
Yes__X_ No____ NA____

B. And the ICS percent recovery results were reported for all required ICS analytes and were within required control limits of 80% to 120%.
Yes__X__ No____ NA____

C. ICP analysis results for analytes not required to be present in a given ICS standard were within acceptable limits.
Yes____No____ NA__X__
Not requested by client and data not provided by laboratory.

VIB. INTERELEMENT CORRECTION FACTORS
The Interelement Correction Factors are included and complete for all possible interferent analytes.
Yes____No____ NA__X__
Review of possible other contaminants was not requested by the client.

VII. SPIKE SAMPLE RECOVERY
A. A matrix (pre-digestion) spike sample was analyzed for each digestion group and/or matrix or as required in the SOW.

Yes __X___ No____
The client sample Main Discharge was used for the MS/MSD.

B. And the Matrix spike percent recoveries were within the required control limits of 75 – 125%.
Yes ___X_ No___ NA____
Note that non-client samples were used for the arsenic re-analyses. The client sample from the original analysis has been used for qualification as it accurately represents the sample matrix.

B. A Post-digest spike was analyzed if required.
Yes__X__No____ NA____

C. The MS/MSD samples included client samples
Yes __X_ No___ NA____

VIII. DUPLICATES
A. Matrix (pre-digestion) duplicate samples were analyzed at the required frequency
Yes __X__ No___
The laboratory runs MS/MSD samples.

B. And the Matrix duplicate relative percent differences (RPD) were within the required control limits (Water 20%, Soil 35%) or the RL limits were met if the duplicate values are < 5 x RL. If the either one of the duplicate results are < 5 X RL, the RPD is not used. The QC limit used is the difference between the original and the duplicate results (± the RL) for water and (± 2X the RL) for soils.
Yes __X__ No ____ NA_____

IX. LABORATORY CONTROL SAMPLE
A. Laboratory control samples (LCS) were analyzed at the required frequency.
Yes _X___ No____

B. And LCS recoveries were within the required control limits of 80 to 120%.
Yes __X___ No____

X. ICPMS INTERNAL STANDARDS
Internal standards were added to all client and QC samples and were within the required limits of 60 – 125%.
Yes_X___No____ NA_____
A full list of IS recoveries in provided in summary form.

XI. ICP SERIAL DILUTION
A. ICP Serial Dilutions have been analyzed at the required frequency if the analyte concentrations are greater than 50 x IDL (x 100 for ICPMS).
Yes__X_ No____ NA____
Dup-2-Main Discharge was used for the serial dilution.

B. And the percent difference criteria of ± 10 % have been met.
Yes__X__ No ____ NA____

C. The serial dilution analyses were on client samples

Yes __X___ No_____
Note that non-client samples were used for the arsenic re-analyses. The client sample has been used for qualification as it accurately represents the sample matrix.

XII. INSTRUMENT DETECTION LIMITS
A. The Instrument Detection Limits have met the Quarterly reporting requirements.
Yes ___X_ No____ NA___
This was determined to be acceptable during the contractual process.

B. And all sample results have met the required detection limits (CRDL).
Yes__X__ No____ NA____
No dilutions were performed

XIII. PREPARATION AND ANALYSIS LOGS
A. All samples were prepared or analyzed within the required holding times referencing the SOW (time of sample receipt to preparation/distillation).
Yes___X_ No____

B. All samples were analyzed within the 40 CFR 136 (Clean Water Act) or method recommended holding times (time of sample collection to date of analysis).
Yes___X__ No____

C. Chains of Custody (COC)
1. Chains of Custody (COC) were reviewed and all fields were complete, signatures were present and cross outs were clean and initialed.
Yes__X___ No____

2. Samples were received at the required temperature and preservation.
Yes__X__ No____

XIV. FIELD QC
A. Field QC samples (duplicates, SRMs) were identified.
Yes __X__ No____
The field duplicates are identified as Main Discharge and DUP-2-Main Discharge.

B. Field duplicates were within a guidance limit of < 35% RPD limit for water or <50% RPD limit for soil. If values are < 5 x RL, the water limit is $\pm$ 2 x RL and the soil limit is $\pm$4 x RL. Final determination will be made by the project manager.
Yes __X__ No____ NA___

XV. GENERAL COMMENTS
The laboratory has complied with the requested methods and the quality of the data is acceptable. No qualifiers have been added.

The following is noted for clarification

Per the contract, all packages were reviewed for holding time, summary QC and calibration (Level III). No raw data were required for review, nor were raw data required for submission. The laboratory has submitted CLP-type summary forms for ICP and ICP/MS and mercury.
There are 16 ICP analytes, 3 ICP/MS analytes and mercury by CVAA

Blanks
One CCB was detected for mercury at 0.117 ug/l. There are no detected results reported for mercury and no qualifier is required.

Low Level Standard
CRDL check is technically not required for Level III, but was present only for thallium and is acceptable. Note that a low level standard is included in the 4 point curve noted in the text. Arsenic does not contain a 0.005 standard as do all the other analytes with an MDL of 0.005. A 0.008 (no units given in table) standard is present and arsenic has only a 3 point curve + blank. It is possible the 0.005 MDL is not within the sensitivity of the instrument. The curve is acceptable and no further action is taken.

ORGANIC DATA QUALITY REVIEW REPORT
VOLATILE ORGANICS SW-846 METHOD 8260B/5030B and Method 8270C

8260B/5030B
SDG: L08100: 573 (includes Main Discharge), 600, 653, 693
L08060: 542
L08070: 159 (main discharge)
8270C
SDG: L08100: 573 (Main Discharge)

PROJECT: Memphis Defense Depot Interim Remedial Action IRA-5 and Recovery Well, Main Discharge

LABORATORY: Microbac Laboratories (formerly Kemron Environmental Services), Marietta, OH

SAMPLE MATRIX: Water

SAMPLING DATE (Month/Year): June, October 2008

NO. OF SAMPLES: 8260B/5030B (Waters) – 116 samples including 6 trip blanks; Method 8270C: 2 waters

ANALYSES REQUESTED: SW-846 8260B, 8270C

SAMPLE NO.: See attached result forms and associated edd

DATA REVIEWER: Sammy Huntington and John Huntington

QA REVIEWER: Diane Short and Associates Inc. INITIALS/DATE: __________

Telephone Logs included Yes____ No _X__

Contractual Violations Yes____ No _X___

The EPA Contract Laboratory Program National Functional Guidelines for Organic Review, 2001, the project QAPP (11/05) and the SW-846 Method 8260B and 8270C 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 _X__ No _____
This is a Level III Report.
The instrument initial calibration forms for instrument #14 did not print to hardcopy in any of the data packages. The PDF supplied by the laboratory contained this form for all packages and was used to conduct the review for this instrument. Data are, therefore, present but not in the hard copy deliverable.

B. Chain of Custody Documentation was complete and accurate.
Yes ___X___ No ___
Chains are acceptable with the following notation.
SDG L08100573: Sample Receipt Form stated, "Received 3 VOAs – sample MW-37-173-25-1S-5 on 10/17/08 at 12:33 = that is not on COC." The project manager is updating the Chain to reflect the additional sample.

The following is noted:
The chain of custody system used on this project is generated from an electronic sample tracking system. Previous reports have noted certain deficiencies. The main problems with the earlier versions of these appear to have been resolved.

There is a gap between relinquished and received but an Airbill number is on the sample receipt form and is acceptable.

C. Samples were received at the required temperature, preservation and intact with no bubbles.
Yes __X__ No _____
The most recent regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be less than 6° C. The sample receipt conditions are fully compliant with applicable regulations.

There is an inconsistency in the log-in forms. For some SDGs the Sample Receipt Form states "NA" or "Yes" for the following:
' if the pH ranges acceptable' reviewer notes pH cannot be checked for 8260B samples on receipt. This is done in the laboratory at run time.

' if custody seals were intact. ' The reviewer does not have adequate information to evaluate this item.

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.
Yes _X__ No ____

B. Holding Times
1. The contract holding times were met for all analyses (Time of sample receipt to time of analysis (VOA) or extraction and from extraction to analysis).
Yes __X___ No _____
The laboratory notes a number of cases in which holding times were exceeded by a few hours. However, the general policy of EPA is that for samples having holding time requirements expressed in days, the holding time calculation is to be made to the nearest day. In all these instances, when calculated in that manner, the samples are in hold and no qualifiers are added.

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 __X__ No ____
See the above section.

For TB-101608-IS-5 in SDB L08100574 there are two runs reported in the hardcopy data and in the EDD. One analysis was conducted within holding time but has one low surrogate. The laboratory reanalyzed the sample, but the analysis date in the EDD and the analysis date in the hardcopy do not agree. In the hardcopy the reanalysis is reported as 11/07/08, which is 8 days after hold time expiration. In the EDD, the analysis date is reported as 10/30/08, which is in hold. The Case Narrative indicates that the analysis was 2.4 hrs after hold time expiration, and so no indication of a later holding time is indicated. The method blank summaries do not include a run for 11/7/08, so we have concluded tentatively that this is a hardcopy error and the runs are both within hold. No hold time qualifiers are applied.

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 (> 0.01 for the 2001 guidance).
Yes __X__ No ____ NA____
Per the project manager, the 2001 EPA CLP validation guidance has been applied to the common "poor responders". The validation guidance used for this project allows for a response of 0.01 for the "poor responders" if spectral integrity can be verified at low concentrations. These spectra are not commonly provided and are not part of the deliverable for these data sets. The laboratory has been tasked with providing to the client verification that the 0.01 RF is valid. Given the spectral verification is available, the data are not qualified for response >0.01 < 0.05. No data have been qualified.

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. The likelihood of matrix bias for these compounds in this site matrix is assessed in the MS/MSD section of this report.

2a.The relative standard deviation (RSD) for the five point calibration was within the 30% limit for the CCCs.
Yes _X__ 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 or a linear curve was used.
Yes __X__ No ____ NA____

3. The 12 hour system Performance Check was performed as required in SW-846.
Yes _X__ No_____ NA____

B. Continuing Calibrations

1. The midpoint standard was analyzed for each analysis at the required frequency and the QC criteria of > 0.05 (>0.01 for the 2001 validation guidance) were met.
Yes __X___ No ____ NA____

The CCVs were analyzed at the proper frequency. The same compounds showed response factors < 0.05 as did in the initial calibrations, but since all were above the 2001 validation limit of 0.01, no qualifiers have been added for this.

2. The percent difference (%D) limits of ± 20% were met. The 2001 NFG also allow for 40% D for the poor responders (pr). For other compounds the QAPP notes rejection of detected compounds with %D > 40%.
Yes _____ No __X__ NA___
A number of %D results are out of limits. Qualifiers added are shown in the table below. If the bias is high or if the bias is low enough that the potential for false positives is negligible, no qualifiers are added for non-detects. The qualifier used is JC#, where # is the %D observed. The qualifier indicates a variability to the instrument response, in these cases, a slight high shift.

Method	SDG	CCV Date	Batch	Analyte	%D	Bias	Qualifiers Added
8260B	L08100573	10/29/08 23:24	WG286406	1,2,3-Trichlorobenzene	29.4	high	none, ND
				1,2,4-Trichlorobenzene	31.7	high	none, ND
				1,2,4-Trimethylbenzene	28.8	high	none, ND
				1,3,5-Trimethylbenzene	26.8	high	none, ND
				n-Butylbenzene	36.8	high	none, ND
				Naphthalene	39.2	high	none, ND
				p-Isopropyltoluene	28.0	high	none, ND(pr)
		10/30/08 12:41	WG286487	1,2,3-Trichlorobenzene	28.1	high	none, ND
				1,2,4-Trichlorobenzene	30.1	high	none, ND
				1,2,4-Trimethylbenzene	28.5	high	none, ND
				1,2-Dichloroethane	29.3	high	none, ND
				1,3,5-Trimethylbenzene	25.2	high	none, ND
				Bromodichloromethane	25.1	high	none, ND
				n-Butylbenzene	32.7	high	none, ND
				Naphthalene	38.6	high	none, ND
				Vinyl Acetate	25.4	high	none, ND(pr)
	L08100600	10/31/08 9:23	WG286568	n-Butylbenzene	30.3	high	none, ND
				Naphthalene	31.6	high	none, ND
		10/31/08 13:04	WG286581	Dichlorodifluoromethane	30.0	low	none, ND
		10/31/08 23:13	WG286673	Bromoform	27.1	high	none, ND
				1,2,3-Trichlorobenzene	26.1	high	none, ND
				1,2-Dichloroethane	27.8	high	JC28 detect
				Dibromochloromethane	25.6	high	none, ND
				Dichlorodifluoromethane	30.8	low	none, ND
				Naphthalene	42.8	high	none, ND
		11/1/08 12:15	WG286692	2-Hexanone	35.4	high	none, ND
				Acetone	25.6	high	none, ND (pr)
				2-Butanone	37.7	high	none, ND (pr)
		11/2/08 14:19	WG286707	Vinyl Acetate	26.4	low	none, ND
	L08100693	11/4/08 8:53	WG286839	Bromomethane	54.8	high	none, ND
				Chloromethane	34.8	high	none, ND
				Dichlorodifluoromethane	29.8	high	none, ND
				Trichlorofluoromethane	25.9	high	none, ND
				Vinyl Acetate	47.6	high	none, ND (pr)
	L08100653	11/1/08 12:15	WG286692	2-Hexanone	35.4	high	none, ND (pr)
				Acetone	25.6	high	None, (pr)
				2-Butanone	37.7	high	none, ND
		11/2/08 14:19	WG286707	Vinyl Acetate	26.4	low	none, ND (pr)
8270C	L08100573	10/27/08 9:35	WG286249	Benzoic Acid	38.4	low	none, ND (pr)

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB (VOA) or DFTPP (SVOA) 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 __X___ No ____ NA_ __

VI. SURROGATE

Surrogate spikes were analyzed with every sample.
Yes _X___ No____

And met the recovery limits defined in the QAPP of 70 – 130%.
Yes _____ No ___X __
8260B: Surrogates were out of laboratory limits in a number of samples, mainly high. Only data that exceed the QAPP limits are qualified. When a surrogate is out of limits high, all detected targets in the sample are qualified as JS#, where # is the recovery (%R). When a surrogate is out of limits low, all detected and non-detected results in the sample are so qualified. Results may be biased roughly proportional to the magnitude of the recovery.

Method	SDG	Lab Sample ID	Client Sample ID	Surrogate	%R	Qualifiers
8260B	L08100573	-27	MW-148-86.35-IS-5	1,2-Dichloroethane-d4	125*	None
	L08100573	-29	MW-161-82-IS-5	1,2-Dichloroethane-d4	123*	None
	L08100573	-29	MW-161-82-IS-5	1,2-Dichloroethane-d4	125*	None
	L08100573	-48	TB-101608-IS-5	Dibromofluoromethane	73*	None
	L08100600	-09	MW-130-70.25-IS-5	1,2-Dichloroethane-d4	130*	None
	L08100600	-10	MW-145-90.75-IS-5	1,2-Dichloroethane-d4	128*	None
	L08100600	-11	MW-149-92.15-IS-5	1,2-Dichloroethane-d4	132*	None, ND
	L08100600	-22	MW-158A-88.25-IS-5	1,2-Dichloroethane-d4	128*	None
	L08100600	-25	MW-159-81.85-IS-5	1,2-Dichloroethane-d4	130*	None
	L08100600	-26	MW-160-84.35-IS-5	1,2-Dichloroethane-d4	132*	JS132 detects
	L08100600	-06	MW-54-90.25-IS-5	1,2-Dichloroethane-d4	124*	None
	L08100600	-08	MW-79-93.25-IS-5	1,2-Dichloroethane-d4	129*	None
	L08100600	-03	TB-101508-IS-5	1,2-Dichloroethane-d4	120*	None

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Matrix spike (MS) and matrix spike duplicates (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.
Yes ___X__ No _____
8260B: There are 8 MS/MSDs which meets the 1:20 ratio.
8270C: There is 1 MS/MSD which meets the 1:20 ratio

The MS/MSDs present are shown in the table below.

Method	SDG	Client Sample ID	Lab Sample ID
8260B\5030B	L08100573	MAIN DISCHARGE-IS-5	L08100573-13
	L08100573	RW-4-IS-5	L08100573-05
	L08100600	MW-156-67.75-IS-5	L08100600-18
	L08100600	MW-158A-88.25-IS-5	L08100600-22

Method	SDG	Client Sample ID	Lab Sample ID
	L08100600	MW-166A-78.17-IS-5	L08100600-30
	L08100653	MW-10-IS-5	L08100653-02
	L08100693	MW-230-IS-5	L08100693-03
	L0807159	MAIN DISCHARGE	L08070159-01
8270C\3510C	L08100573	MAIN DISCHARGE-IS-5	L08100573-13

The MS and MSD percent recoveries were within the limits defined in the QAPP of 70 – 130% with 5 compounds allowed to be within 60 – 140%.
Yes _____ No __X___NA___
The table below shows the qualifiers added to parent samples only for MS/MSD outliers. A number of targets are out of limits, but in some instances the parent sample is > 4x the spike level. In such cases, no qualifier is added because the spike is of the order of the normal variability of measurement and recovery calculations are not meaningful. In other cases the recoveries are elevated but there are no detections in the parent sample, hence no qualifiers. Data for the parent sample are qualified JMS#, where # is the recovery. Data could be, in these cases, biased low proportional to the spike recovery. Data for the JS60 and JS61 could be removed per the 5 outlier allowance.

Method	SDG	Client Sample ID	Lab Sample ID	Analyte	Qualifier
8260B	L08100573	RW-4-IS-5	L08100573-05	1,1,2,2-Tetrachloroethane	JMS50
8260B	L08100600	MW-156-67.75-IS-5	L08100600-18	1,1,2,2-Tetrachloroethane	JMS52
8260B	L08100573	MAIN DISCHARGE-IS-5	L08100573-13	1,1,2,2-Tetrachloroethane	JMS51
8260B	L08100693	MW-230-IS-5	L08100693-03	1,1-Dichloroethene	JMS60 None
8260B	L08100600	MW-158A-88.25-IS-5	L08100600-22	cis-1,2-Dichloroethene	JMS41
8260B	L08100600	MW-166A-78.17-IS-5	L08100600-30	Trichloroethene	JMS61 None

The MSD relative percent differences (RPD) were within the defined contract limits.
Yes ___X__ No ____NA____
Those RPDs that are out of limits are only qualified if the recovery is also out of limits. As the RPD increases, the matrix precision decreases. All RPDs were within limits.

The MS/MSD were client samples.
Yes __X_ No ____NA____

VIII. LABORATORY CONTROL SAMPLE

A. Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples.
Yes _X___ No ____

The LCS percent recoveries were within the QAPP of 80-120% for water and 75 – 125% for soil. Five compounds are allowed to be 60 – 140%. If an LCS and LCSD are analyzed, both samples must have the same compounds out for data to be qualified.
Yes ______ No __X____
Two targets were out high in LCS runs. These indicate potential high lab bias for the impacted targets. Qualifiers are added only if the associated sample has a detected result, since the bias is high. Qualifiers added are shown in the table below. Data for all detected data are qualified JL#, where # is the LCS recovery.

Method	SDG	Client Sample ID	Lab Sample ID	Batch	Analyte	LCS Qualifier
8260B	L08100573	MW-15-IS-5	L08100573-45	WG286406	1,1,2-Trichloroethane	JL126
8260B	L08100573	MW-15-IS-5	L08100573-45	WG286406	1,2-Dichloroethane	JL133

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.
Yes _X___ No____

B. No blank contamination was found in the Method Blank.
Yes____ No _X___

Contamination was observed in some method blanks and resulted in qualifiers as shown in the table below. Whenever methylene chloride or acetone is detected in associated samples at a level less than 10x the method blank (corrected for dilution), the result is qualified as UB#, where # is the corrected method blank level. Such results are usable as nondetects. Qualifiers added are summarized in the table below. For other targets, the factor used is 5x.

Method	SDG	Client Sample ID	Lab Sample ID	Batch	Analyte	Qualifier
8260B	L08100573	MW-157-75.95-IS-5	L08100573-28	WG286487	Bromomethane	UB3.3
8260B	L08100573	MW-174-IS-5	L08100573-50	WG286406	Bromomethane	UB3.2
8260B	L08100573	MW-148-86.35-IS-5	L08100573-27	WG286487	Bromomethane	UB3.3
8260B	L08100573	DUP2-IS-5	L08100573-47	WG286406	Bromomethane	UB3.2
8260B	L08100573	MW-172-IS-5	L08100573-49	WG286406	Bromomethane	UB3.2
8260B	L08100573	MW-15-IS-5	L08100573-45	WG286406	Bromomethane	UB3.2
8260B	L08100573	DUP1-IS-5	L08100573-46	WG286406	Bromomethane	UB3.2
8260B	L08100573	TB-101608-IS-5	L08100573-48	WG286406	Bromomethane	UB3.2
8260B	L08100573	TB-101608-IS-5	L08100573-48	WG286406	Chloromethane	UB.25
8260B	L08100573	MW-157-75.95-IS-5	L08100573-28	WG286487	Chloromethane	UB.45
8260B	L08100573	MW-148-86.35-IS-5	L08100573-27	WG286487	Chloromethane	UB.45
8260B	L08100573	TSVE-CW-101708	L08100573-53	WG286499	Methylene chloride	UB.3
8260B	L08100600	MW-159-81.85-IS-5	L08100600-25	WG286673	Bromomethane	UB3.2
8260B	L08100600	MW-67-268.25-IS-5	L08100600-07	WG286568	Bromomethane	UB3.2
8260B	L08100600	MW-79-93.25-IS-5	L08100600-08	WG286568	Bromomethane	UB3.2
8260B	L08100600	MW-158A-88.25-IS-5	L08100600-22	WG286673	Bromomethane	UB3.2
8260B	L08100600	MW-54-90.25-IS-5	L08100600-06	WG286568	Bromomethane	UB3.2
8260B	L08100600	MW-43-167.25-IS-5	L08100600-04	WG286568	Bromomethane	UB3.2
8260B	L08100600	MW-44-69.75-IS-5	L08100600-05	WG286568	Bromomethane	UB3.2
8260B	L08100600	TB-101508-IS-5	L08100600-03	WG286568	Bromomethane	UB3.2
8260B	L08100600	MW-156-67.75-IS-5	L08100600-18	WG286673	Bromomethane	UB3.2
8260B	L08100600	MW-150-88.51-IS-5	L08100600-12	WG286673	Bromomethane	UB3.2
8260B	L08100600	MW-150-88.51-IS-5	L08100600-12	WG286673	Chloromethane	UB.33
8260B	L08100600	TB-101508-IS-5	L08100600-03	WG286568	Chloromethane	UB.5
8260B	L08100600	MW-149-92.15-IS-5	L08100600-11	WG286568	Chloromethane	UB.5

C. If Field Blanks were identified, no blank contamination was found.
Yes____ No __X__

For TB-101608-IS-5 in SDB L08100574 there are two runs reported in the hardcopy data and in the EDD (see the holding time summary for a discussion of this). The results for the two runs are significantly different, with higher levels and more detections in one of them. This run has been used for the purposes of data qualification. A number of samples are qualified due to trip blanks, with qualifiers being added in the same manner as for method blanks. For clarity, the trip blank qualifier is UTB#, where # is the level in the trip blank.

Method	SDG	Matrix	TB Count
8260B\5030B	L08100573	Water	3
8260B\5030B	L08100600	Water	1
8260B\5030B	L08100653	Water	1
8260B\5030B	L08100693	Water	1

Method	SDG	Sample ID	Sample Date	Analyte	Result	Qualifier
8260B	L08100573	TB-101608-IS-5	10/16/2008	1,4-Dichlorobenzene	1.09J	UTB1.1 detects
		TB-101608-IS-5	10/16/2008	Acetone	19.7Q	UTB# detects
		TB-101608-IS-5	10/16/2008	Benzene	0.164F	None, ND in samples
		TB-101608-IS-5	10/16/2008	Bromomethane	3.3J	None, UB from MB
		TB-101608-IS-5	10/16/2008	Chloromethane	0.41F	None, UB from MB
		TB-101608-IS-5	10/16/2008	Naphthalene	0.424Q	UTB.42 detect
		TB-101608-IS-5	10/16/2008	Toluene	0.415F	UTB.42 detects
		TB-101708-IS-5	10/17/2008	1,4-Dichlorobenzene	0.149F	From earlier TB
		TB2-101708-IS-5	10/17/2008		All OK	None
	L08100600	TB-101508-IS-5	10/20/2008	1,4-Dichlorobenzene	1.44J	UTB1.4 detects
		TB-101508-IS-5	10/20/2008	Acetone	31.2J	UTB31 detects
		TB-101508-IS-5	10/20/2008	Benzene	0.166F	None, sample > 5x
		TB-101508-IS-5	10/20/2008	Bromomethane	2.84J	None, UB from MB
		TB-101508-IS-5	10/20/2008	Chloromethane	0.3F	None, UB from MB
		TB-101508-IS-5	10/20/2008	MEK (2-Butanone)	4.81F	None, ND in samples
		TB-101508-IS-5	10/20/2008	Naphthalene	0.277Q	None, ND in samples
		TB-101508-IS-5	10/20/2008	Toluene	0.418F	None, ND in samples
	L08100653	TB101308-IS-5	10/21/2008	1,4-Dichlorobenzene	0.161F	UTB.16 detects
	L08100693	TB-101408	10/22/2008	1,4-Dichlorobenzene	1.02	UTB1 detects
		TB-101408	10/22/2008	Acetone	20.9Q	None, ND in samples
		TB-101408	10/22/2008	Benzene	0.166F	None, ND in samples
		TB-101408	10/22/2008	Bromomethane	0.65Q	UTB.65 detects
		TB-101408	10/22/2008	Chloromethane	0.542Q	UTB.54 detects
		TB-101408	10/22/2008	MEK (2-Butanone)	5.59F	None, ND in samples
		TB-101408	10/22/2008	Naphthalene	0.317F	None, ND in samples
		TB-101408	10/22/2008	Toluene	0.364F	None, ND in samples
	L08070159	Trip Blank		1,4-Dichlorobenzene	.131	UTB.13 detect

X. FIELD QC

If Field duplicates were identified, they met guidance RPD of < 35% for water or < 50% for soils. 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 __X__ No ____ NA____

8260B: There are 13 samples identifiable as field duplicates. Some samples do show outliers but in each case there are many detections and the other detections meet criteria.

8270C: There is one field duplicate, which is in control.

Method	SDG	Field Duplicate	Parent Sample	Observations
8260B	L08100573	DUP1-IS-5	MW-172-IS-5	OK
8260B	L08100573	DUP2-IS-5	MW-187-IS-5	OK

Method	SDG	Field Duplicate	Parent Sample	Observations
8260B	L08100573	DUP3-IS-5	MW-225-IS-5	OK
8260B	L08100573	DUP6-IS-5	RW-1B-IS-5	OK
8260B	L08100573	DUP8-IS-5	MW-32-66.84-IS-5	OK
8260B	L08100573	MAIN DISCHARGE-IS-5-DUP	MAIN DISCHARGE-IS-5	OK
8260B	L08100600	DUP11-IS-5	MW-132-IS-5	OK
8260B	L08100600	DUP9-IS-5	MW-154-61.45-IS-5	OK
8260B	L08100653	DUP10-IS-5	MW-74-IS-5	OK
8260B	L08100653	DUP5-IS-5	MW-240-IS-5	OK
8260B	L08100653	DUP7-IS-5	MW-3-IS-5	OK
8260B	L08100693	DUP4-IS-5	MW-236-IS-5	OK
8260B	L08070159	DUP-1	MAIN DISCHARGE	OK
8270C	L08100573	MAIN DISCHARGE-IS-5-DUP	MAIN DISCHARGE-IS-5	OK

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____

Dilutions were necessary in some cases to achieve the proper quantification of high-level targets, which raises the EQLs for all other targets in the run. Only the results that are in the calibration range have been reported by the laboratory, but the undiluted results have been used for nondetected targets and results that are in range at that dilution.

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:

<u>Chain of Custody/Deliverables:</u>

No qualifiers have been added for chain of custody issues.

Chains are acceptable with the following notation.

SDG L08100573: Sample Receipt Form stated, "Received 3 VOAs – sample MW-37-173-25-1S-5 on 10/17/08 at 12:33 = that is not on COC." The project manager is updating the Chain to reflect the additional sample.

Sample Condition:
The most recent regulations (See Federal Register, March 12, 2007, 40CFR Part 122) require only that the temperature of samples delivered to the laboratory be less than 6° C. The sample receipt conditions are fully compliant with applicable regulations.

There is an inconsistency in the log-in forms. For some SDGs the Sample Receipt Form states "NA" or "Yes" for the following:
' if the pH ranges acceptable' reviewer notes pH cannot be checked for 8260B samples on receipt. This is done in the laboratory at run time.

' if custody seals were intact. ' The reviewer does not have adequate information to evaluate this item.

Holding Times
The laboratory notes a number of cases in which holding times were exceeded by a few hours. However, the general policy of EPA is that for samples having holding time requirements expressed in days, the holding time calculation is to be made to the nearest day. In all these instances, when calculated in that manner, the samples are in hold and no qualifiers are added.

For TB-101608-IS-5 in SDB L08100574 there are two runs reported in the hardcopy data and in the EDD. One analysis was conducted within holding time but has one low surrogate. The laboratory reanalyzed the sample, but the analysis date in the EDD and the analysis date in the hardcopy do not agree. In the hardcopy the reanalysis is reported as 11/07/08, which is 8 days after hold time expiration. In the EDD, the analysis date is reported as 10/30/08, which is in hold. The Case Narrative indicates that the analysis was 2.4 hrs after hold time expiration, and so no indication of a later holding time is indicated. The method blank summaries do not include a run for 11/7/08, so we have concluded tentatively that this is a hardcopy error and the runs are both within hold. No hold time qualifiers are applied.

Continuing Calibrations:
A number of %D results are out of limits. Qualifiers added are shown in the table within the body of this report. If the bias is high or if the bias is low enough that the potential for false positives is negligible, no qualifiers are added for non-detects. The qualifier used is JC#, where # is the %D observed. The qualifier indicates a variability to the instrument response, in these cases, a slight high shift.

Surrogate Recoveries:
8260B: Surrogates were out of laboratory limits in a number of samples, mainly high. Only one sample has been qualified for exceeding the QAPP limits. When a surrogate is out of limits high, detected targets in the sample are qualified as JS#, where # is the recovery. Results may be biased roughly proportional to the magnitude of the recovery.

Matrix Spikes:
8260B: There are 8 MS/MSDs which meets the 1:20 ratio.
8270C: There is 1 MS/MSD which meets the 1:20 ratio.
The table in the body of the report shows the qualifiers added to parent samples only for MS/MSD outliers. A number of targets are out of limits, but in some instances the parent sample is > 4x the spike level. In such cases, no qualifier is added because the spike is of the order of the normal variability of measurement and recovery calculations are not meaningful. In other cases the recoveries are elevated but there are no detections in the parent sample, hence no qualifiers. Data for the parent sample are qualified JMS#, where # is the

recovery. Data could be, in these cases, biased low proportional to the spike recovery. Data for the JS60 and JS61 could be removed per the 5 outlier allowance.

Method Blanks:
Contamination was observed in some method blanks and resulted in qualifiers as shown in the table within the body of this report. Whenever methylene chloride or acetone is detected in associated samples at a level less than 10x the method blank (corrected for dilution), the result is qualified as UB#, where # is the corrected method blank level. Such results are usable as nondetects. Qualifiers added are summarized in the table in the text. For other targets, the factor used is 5x.

Field Blanks:
For TB-101608-IS-5 in SDB L08100574 there are two runs reported in the hardcopy data and in the EDD (see the holding time summary for a discussion of this). The results for the two runs are significantly different, with higher levels and more detections in one of them. This run has been used for the purposes of data qualification. A number of samples are qualified due to trip blanks, with qualifiers being added in the same manner as for method blanks. For clarity, the trip blank qualifier is UTB#, where # is the level in the trip blank.

LCS Recoveries:
A number of targets were out high in LCS runs. These indicate potential high lab bias for the impacted targets. Qualifiers are added only if the associated sample has a detected result, since the bias is high. Qualifiers added are shown in the table below. Data for all detected data are qualified JL#, where # is the LCS recovery.

EQLs:
Dilutions were necessary in some cases to achieve the proper quantification of high-level targets, which raises the EQLs for all other targets in the run. Only the results that are in the calibration range have been reported by the laboratory, but the undiluted results have been used for nondetected targets and results that are in range at that dilution.

Field QC:
8260B: There are 13 samples identifiable as field duplicates. Some samples do show outliers but in each case there are many detections and the other detections meet criteria.
8270C: There is one field duplicate, which is in control.

INORGANIC DATA QUALITY REVIEW REPORT

METALS BY ICP, ICPMS, and Mercury

SDG: L08100573

PROJECT: Memphis Defense Depot, Main Discharge; for e2m

LABORATORY: Microbac (formerly Kemron Laboratories), Marietta, OH

SAMPLE MATRIX: Water SAMPLING DATE (Month/Year): 8/2008

ANALYSES REQUESTED: SW-846 Method 6010 (ICP), 6010 (ICPMS), 7470A

NO. OF SAMPLES: 2 Total Water

SAMPLE NO: Main Discharge-IS-5, DUP-IS-5

DATA REVIEWER: Richard A Kulp

QA REVIEWER: Diane Short and Associates Inc. INITIALS/DATE: ____

Telephone Logs included Yes____ No _X___

Contractual Violations Yes____ No _X___

The project Sampling and Analysis Plan (SAP), the EPA Contract Laboratory Program National Functional Guidelines for Inorganic Review, 2002 and the SW-846 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. Per the Scope of Work, the review includes validation of all calibrations, chains of custody (for sample holding time and preservation only), and QC forms referencing the above documents.

I. DELIVERABLES
All deliverables were present as specified in the Statement of Work or project contract.
Yes___X___ No___
The following is noted for clarification:
Per the contract, all packages were reviewed for holding time, summary QC and calibration (Level III). No raw data were required for review, nor were raw data required for submission. No Internal Standard recoveries are submitted for the ICPMS and may not be required for Level III. The laboratory has submitted CLP-type summary forms for ICP and ICP/MS and mercury.
There are 19 ICP analytes and 3 ICP/MS analytes.

II. CALIBRATIONS
A. All initial instrument calibrations were performed as defined in the contract or Statement of Work (SOW). All correlation coefficients of the 3 point curve were > 0.995.
Yes __X__ No___ NA____
No raw data were required to evaluate this requirement. No % RSD data were submitted for the ICPMS and none have been required for Level III.

B. The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were analyzed at the required frequency.
Yes __X__ No____
Sequencing was not required, but sufficient calibrations were present to verify that the frequencies were met for client samples.

C. And the ICV and CCV standard percent recovery results were within the required control limits of 90 – 110% (Mercury 80 – 120%).
Yes __X_ No____

III. CRDL STANDARDS
The 2 x CRDL standards were analyzed as required in the SOW.
Yes ____ No____ NA__X_
Not required, but was present only for thallium and is acceptable.

IV. BLANKS
Note: the highest blank associated with any particular analyte is used for the qualification process and is the value entered after the "B" blank descriptor.

A. The initial calibration blanks (ICB) and continuing calibration blanks (CCB) were analyzed at the required frequency.
Yes___X_ No____ NA____
Sequencing was not required, but sufficient calibration blanks were present to verify that the frequencies were met for client samples.

B. And the ICB and CCB results were within the required control limits.
Yes ___ No __X__ NA _____

The CCB results for antimony were 0.154F, 0.170F, and 0.200F. The antimony results in both samples were non-detect, therefore no qualifications were required.

C. And all analytes in the Leach Blank were less than the CRDL, or less than 2x the instrument detection limit (IDL), whichever is lower.
Yes____ No____ NA__X__
No TCLP analysis was performed.

V. PREPARATION BLANKS
A. Preparation blanks were prepared and analyzed at the required frequency.
Yes__X__ No____

B. And all analytes in the preparation blank were less than the CRDL, or less than the instrument detection limit (IDL), whichever is lower.
Yes__X__No____

C. Field, trip, decon rinse or other field blanks are contained and identified in the package.
Yes ____ No____ NA___X_
There is not a field blank in this data set.

D. And the reported results are less than the CRDL or less than the IDL, whichever is lower.
Yes ____ No ___ NA__X__

VIA. ICP INTERFERENCE CHECK SAMPLE
A. The Interference Check Sample (ICS) was analyzed as required in the SOW or contract.
Yes__X_ No____ NA____

B. And the ICS percent recovery results were reported for all required ICS analytes and were within required control limits of 80% to 120%.
Yes__X__ No____ NA____

C. ICP analysis results for analytes not required to be present in a given ICS standard were within acceptable limits.
Yes____No____ NA__X__
Not requested by client and data not provided by laboratory.

VIB. INTERELEMENT CORRECTION FACTORS
The Interelement Correction Factors are included and complete for all possible interferent analytes.
Yes____No____ NA__X__
Review of possible other contaminants was not requested by the client.

VII. SPIKE SAMPLE RECOVERY
A. A matrix (pre-digestion) spike sample was analyzed for each digestion group and/or matrix or as required in the SOW.
Yes __X___ No____
The client sample Main Discharge was used for the MS/MSD.

B. And the Matrix spike percent recoveries were within the required control limits of 75 – 125%.

Yes __X_ No ___ NA____
High results were reported for calcium, but the spike amount is less than ¼ the sample value and the recovery is statistically invalid. No qualifier is required.

B. A Post-digest spike was analyzed if required.
Yes__X__No____ NA____

C. The MS/MSD samples included client samples
Yes __X_ No___ NA____

VIII. DUPLICATES
A. Matrix (pre-digestion) duplicate samples were analyzed at the required frequency
Yes __X__ No____
The laboratory runs MS/MSD samples.

B. And the Matrix duplicate relative percent differences (RPD) were within the required control limits (Water 20%, Soil 35%) or the RL limits were met if the duplicate values are < 5 x RL. If the either one of the duplicate results are < 5 X RL, the RPD is not used. The QC limit used is the difference between the original and the duplicate results (± the RL) for water and (± 2X the RL) for soils.
Yes __X__ No ____ NA_____

IX. LABORATORY CONTROL SAMPLE
A. Laboratory control samples (LCS) were analyzed at the required frequency.
Yes _X___ No____

B. And LCS recoveries were within the required control limits of 80 to 120%.
Yes __X___ No____

X. MSA RESULTS AND GRAPHITE FURNACE ANALYSIS (GFAA)
Duplicate injections were performed for all analyses and the RSDs were less than 20% for all reported results. (Method of Standard Additions (MSA) requires only a single injection).
Yes ____ No ____ NA__X___
Graphite furnace was not done.

XI. ICP SERIAL DILUTION
A. ICP Serial Dilutions have been analyzed at the required frequency if the analyte concentrations are greater than 50 x IDL (x 100 for ICPMS).
Yes__X_ No____ NA____
Dup-2-Main Discharge was used for the serial dilution.

B. And the percent difference criteria of ± 10 % have been met.
Yes __X__ No ____ NA____
The sample results are less than 50X the MDL.

C. The serial dilution analyses were on client samples
Yes __X___ No_____

XII. INSTRUMENT DETECTION LIMITS
A. The Instrument Detection Limits have met the Quarterly reporting requirements.
Yes __X_ No____ NA___
This was determined to be acceptable during the contractual process.

B. And all sample results have met the required detection limits (CRDL).
Yes__X__ No____ NA____
No dilutions were performed

XIII. PREPARATION AND ANALYSIS LOGS
A. All samples were prepared or analyzed within the required holding times referencing the SOW (time of sample receipt to preparation/distillation).
Yes___X_ No____

B. All samples were analyzed within the 40 CFR 136 (Clean Water Act) or method recommended holding times (time of sample collection to date of analysis).
Yes___X__ No____

C. Chains of Custody (COC)
1. Chains of Custody (COC) were reviewed and all fields were complete, signatures were present and cross outs were clean and initialed.
Yes__X___ No____

2. Samples were received at the required temperature and preservation.
Yes__X__ No____

XIV. FIELD QC
A. Field QC samples (duplicates, SRMs) were identified.
Yes __X__ No____
The field duplicates are identified as Main Discharge and DUP-2-Main Discharge.

B. Field duplicates were within a guidance limit of < 35% RPD limit for water or <50% RPD limit for soil. If values are < 5 x RL, the water limit is $\pm$ 2 x RL and the soil limit is $\pm$4 x RL. Final determination will be made by the project manager.
Yes __X__ No____ NA___

Main Discharge	DUP-2-Main Discharge	Comment
Zinc: 0.0427	0.0797 (RL=0.02)	Ok $\pm$ 2 x RL
Iron: 0.382	0.387 (RL = 0.1)	Ok $\pm$ 2 x RL
Barium: 0.0999	0.103 (RL=0.01	Ok $\pm$ 2 x RL
Manganese: 0.0782	0.0797 (RL=0.01)	Ok $\pm$ 2 x RL
Potassium: 0.839	0.815 (RL=1.0)	Ok $\pm$ 2 x RL

Most of the reported values are near the reporting limit and subject to inherent variation at low levels.

XV. GENERAL COMMENTS
The laboratory has complied with the requested methods and the quality of the data is acceptable and usable. No qualifications were required.

Qualification or Comments in Detail

Deliverables

The following is noted for clarification:
Per the contract, all packages were reviewed for holding time, summary QC and calibration (Level III). No raw data were required for review, nor were raw data required for submission. No Internal Standard recoveries are submitted for the ICPMS and may not be required for Level III. The laboratory has submitted CLP-type summary forms for ICP and ICP/MS and mercury.
There are 18 ICP analytes and 5 ICP/MS analytes.

Matrix Spikes/Matrix Spike Duplicates

High results were reported for calcium, but the spike amount is less than ¼ the sample value and the recovery is statistically invalid. No qualifier is required.

Field Duplicates

The field duplicates are identified as Main Discharge and Dup-2-Main Discharge. Most of the reported values are near the reporting limit and subject to inherent variation at low levels.

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FINAL PAGE

PART I

ADMINISTRATIVE RECORD

PART I

FINAL PAGE