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June 19, 2008

Mr. John Nohrstedt
U.S. Army Corps of Engineers
Engineering and Support Center, Huntsville
Attn: CEHNC-FS-IS
4820 University Square
Huntsville, Alabama 35816-1822

SUBJECT: Annual Report, Year 2 – SEAD-25 at Seneca Army Depot Activity; Contract DACA87-02-D-0005, Delivery Order 0036

Dear Mr. Nohrstedt:

Parsons is pleased to submit the Annual Report for Year Two for the Fire Training and Demonstration Pad (SEAD-25) at Seneca Army Depot Activity (SEDA) in Romulus, New York. This work was performed in accordance with the Scope of Work for Delivery Order 0036 under Contract No. DACA87-02-D-0005. This Annual Report provides a review of long-term groundwater monitoring for Year 2 and provides recommendations for future long-term monitoring at SEAD-25. This document also provides an annual review of the effectiveness of the remedy implemented in 2005.

Parsons appreciates the opportunity to provide you with the Annual Report, Year 2 for this work. Should you have any questions, please do not hesitate to call me at (617) 449-1405 to discuss them.

Sincerely,

Todd Heino, P.E.
Program Manager

Enclosures

cc: S. Absolom, SEDA
K. Hoddinott, USACHPPM
R. Walton, USAEC
J. Fallo, USACE, NY District
T. Battaglia, USACE, NY District

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June 19, 2008

Mr. Julio Vazquez
USEPA Region II
Superfund Federal Facilities Section
290 Broadway, 18th Floor
New York, NY 10007-1866

Mr. Kuldeep K. Gupta, P.E.
New York State Department of Environmental Conservation (NYSDEC)
Division of Environmental Remediation
Remedial Bureau A, Section C
625 Broadway
Albany, NY 12233-7015

Mr. Mark Sergott
Bureau of Environmental Exposure Investigation, Room 300
New York State Department of Health
547 River Street, Flanigan Square
Troy, NY 12180

SUBJECT: Annual Report, Year 2 – SEAD-25 at Seneca Army Depot Activity; EPA Site ID# NY0213820830 and NY Site ID# 8-50-006

Dear Mr. Vazquez/Mr. Gupta/Mr. Sergott:

Parsons is pleased to submit the Annual Report for Year Two for the Fire Training and Demonstration Pad (SEAD-25) at Seneca Army Depot Activity (SEDA) in Romulus, New York (EPA Site ID# NY0213820830 and NY Site ID# 8-50-006). This Annual Report provides a review of long-term groundwater monitoring for Year 2 and provides recommendations for future long-term monitoring at SEAD-25. This document also provides an annual review of the effectiveness of the remedy implemented in 2005.

Parsons appreciates the opportunity to provide you with the Annual Report, Year 2 for this work. Should you have any questions, please do not hesitate to call me at (617) 449-1405 to discuss them.

Sincerely,

Todd Heino, P.E.
Program Manager

Enclosures

cc: J. Nohrstedt, USACE, Huntsville
K. Hoddinott, USACHPPM
J. Fallo, USACE, NY District
S. Absolom, SEDA
R. Walton, USAEC
M. Heaney, TechLaw

US Army, Engineering & Support Center
Huntsville, AL

Seneca Army Depot Activity
Romulus, NY

DRAFT

ANNUAL REPORT, YEAR 2

FOR THE FIRE TRAINING AND DEMONSTRATION PAD (SEAD-25)
SENECA ARMY DEPOT ACTIVITY

Contract No. DACA87-02-D-0005
Delivery Order No. 0036
EPA Site ID# NY0213820830
NY Site ID# 8-50-006

PARSONS
June 2008

DRAFT

ANNUAL REPORT, YEAR 2

FOR THE FIRE TRAINING AND DEMONSTRATION PAD (SEAD-25)

SENECA ARMY DEPOT ACTIVITY, ROMULUS, NEW YORK

Prepared for:

U.S. Army, Engineering & Support Center, Huntsville
4820 University Square
Huntsville, AL 35816

and

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

Prepared by:

PARSONS
150 Federal Street
Boston, MA 02110

Contract Number DACA87-02-D-0005
Task Order No. 0036
EPA Site ID# NY0213820830
NY Site ID# 8-50-006

JUNE 2008

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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
bgs	Below ground surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
COC	Contaminant of Concern
cy	Cubic yards
DCE	Dichloroethene
ESI	Expanded Site Inspection
LTM	Long-term Monitoring
LUC	Land Use Control
NYSDEC	New York State Department of Environmental Conservation
ORP	Oxidation/reduction potential
PCE	Perchloroethene
RA	Remedial Action
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
SAP	Sampling and Analysis Plan
SEDA	Seneca Army Depot Activity
SVOC	Semivolatile Organic Carbon
TCE	Trichloroethene
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Carbon

1.0 INTRODUCTION

This Year 2 Annual Report for the Fire Training and Demonstration Pad (SEAD-25) at the Seneca Army Depot Activity (SEDA or the Depot) in Romulus, New York provides a review of long-term groundwater monitoring conducted during the past year and provides recommendations for future long-term monitoring at SEAD-25. This document also provides an annual review of the effectiveness of the remedy implemented at SEAD-25 in 2005.

In accordance with the Record of Decision (ROD) for SEAD-25 and SEAD-26 (Parsons, 2004) and the Remedial Design Work Plan and Design Report (RDR) (Parsons, 2005), a remedial action was completed in November 2005 for both areas of concern (AOCs), and the results of the action were documented in the "Construction Completion Report for SEAD-25 and SEAD-26, Final" (CCR) (Parsons, 2006). The SEAD-25 remedial action involved the removal of 1,722 cubic yards (cy) of volatile organic compound (VOC) and semivolatile organic compound (SVOC) impacted soil and sediment.

Long-term groundwater monitoring (LTM) is being performed at SEAD-25 as part of the continuing post-closure monitoring and maintenance (PCMM) operations for the two sites. Groundwater monitoring was initially required at both AOCs as a condition of the ROD since contaminant concentrations found in the groundwater at the AOCs prior to the remedial action exceeded applicable groundwater standards. Groundwater monitoring at SEAD-26 was terminated by the Army, with the approval of the EPA and the NYSDEC, after Year 1 sampling and analysis indicated that no contaminants of concern (COCs) were present in the groundwater at concentrations above defined cleanup goals. Semi-annual (i.e., twice each year) groundwater monitoring is continuing at SEAD-25.

The Year 1, Round 1 groundwater sampling events for SEAD-25 and SEAD-26 were completed between January 24, 2006 and January 31, 2006, with one sample being re-collected on April 12, 2006. The Year 1, Round 2 sampling event was performed between August 7, 2006 and August 14, 2006. The Year 1 Annual Report for SEAD-25 and SEAD-26[1] was submitted on February 2, 2007; as is indicated above, this report concluded that groundwater monitoring at SEAD-26 was no longer required, and future rounds of groundwater monitoring were to be limited to SEAD-25.

The third semi-annual round (Year 2, Round 3) of groundwater sampling at SEAD-25 was completed between June 6, 2007 and June 7, 2007, and the results were reported in a memo submitted on September 10, 2007. A fourth semi-annual round (Year 2, Round 4) of groundwater sampling was completed between March 3, 2008 and March 4, 2008, and the results were reported in a memo submitted on April 18, 2008.

[1] Annual Report for the Fire Training and Demonstration Pad (SEAD-25) and the Fire Training Pit and Area (SEAD-26) Seneca Army Depot Activity, Parsons, February 2007

2.0 SITE BACKGROUND

2.1 Site Description

SEDA is a 10,587-acre former military facility located in Seneca County near Romulus, New York, which has been owned by the United States Government and operated by the Department of the Army since 1941. SEDA is located between Seneca Lake and Cayuga Lake in Seneca County and is bordered by New York State Highway 96 on the east, New York State Highway 96A on the west, and sparsely populated farmland on the north and south.

The Fire Training and Demonstration Pad (SEAD-25) is located in the east-central portion of SEDA. The site is bounded to the east by Administration Avenue beyond which is undeveloped land covered by deciduous trees; to the south by Ordnance Drive beyond which is an open grassy field and a stand of coniferous trees; to the west by grassland, brush and conifers; and, to the north by grassland and a baseball field. A site map of the SEAD-25 area is included as **Figure 1**. SEAD-25 was in use from the late 1960s to the late 1980s. The former pad was used for fire control training. During the 1980s, the pad was used twice for fire fighting demonstrations, once in 1982 or 1983 and again in 1987.

2.2 Site Hydrology

The hydrogeologic setting for SEAD-25 was previously described in detail in Section 3.1.6 of the Final RI Report[2] dated May 1998. A brief summary of hydrogeologic conditions found in the RI Report is presented below for SEAD-25.

Groundwater contour mapping indicates that shallow groundwater flow is radial below the pad, with a stronger horizontal gradient to the south and west (**Figure 2**). The radial groundwater flow that exists below the pad at SEAD-25 is believed to be a local phenomenon that is present because of the influence of the anthropomorphic bedrock topographic mound located beneath the pad. Groundwater flow in the deeper, competent shale zone is to the west and southwest. The horizontal hydraulic gradients ranged from 0.01 feet per foot (ft/ft) to 0.02ft/ft in both the shallow saturated zone located in the till/weathered shale bedrock and in the deep saturated zone located in the competent shale bedrock.

Hydraulic conductivities at SEAD-25 were found to range from 1.0×10^{-5} centimeters per second (cm/sec) to 3.4×10^{-3} cm/sec, with an average of 6.1×10^{-4} cm/sec in shale/weathered bedrock. Both downward and upward vertical gradients were calculated for SEAD-25. The magnitude of the downward hydraulic gradients ranged from -0.04 ft/ft to -0.21 ft/ft. The magnitude of the upward hydraulic gradients ranged from 0.01 ft/ft to 0.07 ft/ft.

[2] Remedial Investigation Report for the Fire Training and Demonstration Pad (SEAD-25) and the Fire Training Pit and Area (SEAD-26) Seneca Army Depot Activity, Parsons Engineering Science, Inc., May 1998

2.3 Soil and Groundwater Impacts

The primary contaminants of concern (COCs) at SEAD-25 were aromatic VOCs, specifically benzene, toluene, ethylbenzene, and xylene (BTEX), compounds in soil and groundwater, as well as lesser amounts of selected chlorinated compounds (1,1,1-trichloroethane, 1,1-dichloroethane, 1,2-dichloroethene, trichloroethene, and chloroform) in groundwater.

The pre-remedial action impacts from BTEX compounds occurred at three soil sample locations (SB25-3, SB25-4, and SB25-5) clustered together in the western half of the pad. The vertical impacts extended from the land surface to a depth of 4 to 6 feet below the surface, which approximately corresponds to the top of competent bedrock (which was encountered at approximately 4.5 feet below ground surface during the removal action). The highest levels of BTEX were detected at soil boring SB25-3, measuring 15,810 micrograms per Kilogram (µg/Kg), 151,500 µg/Kg, and 10,200 µg/Kg at depth intervals of 0-2 feet, 2-4 feet, and 4-6 feet below ground surface (bgs), respectively. Lower concentrations of BTEX were detected in the surface soil at SB25-3 (4,200 µg/Kg) and SB25-4 (2,900 µg/Kg), respectively.

Based on the RI results, the primary impact to the groundwater is from two overlapping VOC plumes that both originate at the southwestern portion of the Fire Training and Demonstration Pad. BTEX and chlorinated ethenes were not detected in the bedrock wells at SEAD-25. The primary plume observed during the RI was approximately 200 feet long and was composed of aromatic hydrocarbon compounds that are typically associated with gasoline (BTEX). The maximum concentration of BTEX detected in the groundwater during the RI was 6,220 micrograms per Liter (µg/L) at well MW25-2. The maximum concentration of chlorinated organics, 88µg/L was also detected at well MW25-2 during the ESI. The historic SEAD-25 groundwater data are presented in **Table A-1** in **Appendix A**.

Impacts to soil in the drainage swales at SEAD-25 were mainly from SVOCs, pesticides, and heavy metals. The most significant impacts from SVOCs and metals were found in the drainage swale northwest of the pad, whereas in the other ditch the most significant impact from SVOCs was found in an upgradient location. No COCs were identified in SEAD-25 surface water that required remediation.

2.4 Summary of the Remedial Action

The excavation of the BTEX impacted soil at the SEAD-25 pad began on November 15, 2005 and was completed on December 1, 2005, with soil removal totaling 961 cy. The depth of excavation extended to the shale bedrock, approximately 4.5 feet bgs. Ten confirmatory soil samples (plus one duplicate sample) were collected from the sidewalls of the excavation area and analyzed for VOCs and SVOCs. All confirmatory soil samples representative of soil remaining on-site at the pad achieved the site-specific cleanup goals, and the soils at SEAD-25 do not require further action. The excavation of the soil at the pad removed the source of groundwater contamination.

Excavation of the SVOC impacted soil in the swale at SEAD-25 began on November 7, 2005 and was completed on November 8, 2005. The soil excavation extended to bedrock from the toe of slope on one bank to the toe of slope on the other bank, resulting in the removal and off-site disposal of 761 cy of soil from SEAD-25. After the excavation, the swale bottom consisted of exposed competent bedrock, and since no native overburden soil remained in the swale, no confirmatory samples were collected or analyzed.

A total of 1,722 cy (approximately 2,600 tons) of soil were excavated from the pad and the swale at SEAD-25 and disposed off-site at Ontario County Landfill. The pad excavation was backfilled and restored to the existing grade.

2.5 Natural Attenuation Process Evaluation

One of the purposes of long-term groundwater monitoring at SEAD-25 is to show that continued natural attenuation of the groundwater plume is occurring. This section gives a brief overview of the natural attenuation process and how the process can be evaluated. Numerous natural processes contribute to the reduction in dissolved phase contaminant concentrations over distance and time and are referred to as natural attenuation. These processes include sorption, dilution, dispersion, volatilization, and biodegradation. Of these, biodegradation is of primary interest because this process actually destroys the contaminant, and because at many sites, it is the primary attenuation mechanism. USEPA's "Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water" (USEPA, 1998) can be used as guidance in determining that natural attenuation is occurring at SEAD-25.

Numerous laboratory and field studies have shown that many organic compounds are readily biodegraded via naturally occurring processes. Benzene and other petroleum hydrocarbons biodegrade readily under aerobic (oxygen-rich) conditions, and have been shown at multiple sites to biodegrade under anaerobic (oxygen-poor) conditions as well. Chlorinated ethenes biodegrade under anaerobic conditions through a process referred to as reductive dechlorination. Some chlorinated ethenes can also be biodegraded via direct aerobic oxidation (aerobic conditions).

Geochemical data concerning potential electron acceptors, biodegradation bi-products, and related analytes can be used as an indirect measure to show that organic compounds are biodegrading in saturated soil and groundwater. Depressed concentrations, when compared to background levels, of electron acceptors such as nitrate, oxygen, and sulfate that are used by microorganisms to facilitate the oxidation of VOCs within groundwater are geochemical indicators that VOCs are biodegrading. Similarly, elevated concentrations of biodegradation byproducts, such as iron II, in groundwater are also geochemical indicators that compounds are biodegrading. Depressed oxidation/reduction potential (ORP) may also indicate the occurrence of biodegradation.

Biodegradation of chlorinated organics requires the presence of natural or anthropogenic carbon to create the conditions (anaerobic, low redox potential) necessary to stimulate reductive dechlorination

of the more chlorinated solvents such as perchloroethene (PCE) and trichloroethene (TCE). Daughter products of these compounds (dichloroethene [DCE] and vinyl chloride) can be reductively dechlorinated under reducing conditions or directly oxidized under aerobic (oxidizing) conditions. Therefore, indicators of conditions appropriate for chlorinated biodegradation would include those parameters, such as methane, already identified for petroleum biodegradation, as well as the presence of chlorinated daughter products and chloride. It should be noted, however, that the presence of road salt may interfere with chloride data interpretation.

Trends in natural attenuation parameters are more evident when higher concentrations of contaminants are present to naturally attenuate. At SEAD-25, trends in natural attenuation parameters will be difficult to interpret since the contaminant concentrations are currently low.

3.0 LONG-TERM MONITORING RESULTS

Two rounds of sampling were conducted at SEAD-25 during the Year 2 LTM. The first round (Year 2, Round 3) was completed between June 6, 2007 and June 7, 2007. Six monitoring wells [MW25-3, MW25-8, MW25-9, MW25-10 (dry), MW25-13, and MW25-15 (dry)] scheduled for sampling were either dry or held insufficient water volume for the required samples. The Year 2 Round 4 sampling was completed between March 3, 2008 and March 4, 2008.

Groundwater samples were collected using low flow sampling techniques in both the June 2007 and the March 2008 sampling rounds. A bladder pump was used to purge the wells and collect the samples during the Year 2, Round 3 sampling event. During the Year 2, Round 4 sampling event, a combination of low flow peristaltic and bladder pump methods were used to purge and sample specific wells. The peristaltic pump was used on those wells in which the water level fell below the intake of the bladder pump.

Sampling procedures, sample handling and custody, holding times, and collection of field parameters were conducted in accordance with the "Final Sampling and Analysis Plan for Seneca Army Depot Activity (SAP)" (Parsons, 2005).

Groundwater samples were collected from four monitoring (MW25-2, MW25-17, MW-25-18, and MW25-19) during the Year 2, Round 3 sampling event; samples were collected from 10 monitoring wells (MW25-2, MW25-3, MW25-8, MW25-9, MW25-10, MW25-13, MW25-15, MW25-17, MW25-18, and MW25-19) during the Year 2, Round 4 sampling event. Groundwater elevation measurements were collected from all wells located at SEAD-25 during each of the Year 2 sampling events, but two wells (MW25-10 and MW25-15) were dry during the Year 2, Round 3 sampling event.

The collected groundwater samples were analyzed for the VOCs and natural attenuation parameters. Samples collected during the June 2007 sampling round were submitted to Mircoseeps in Pittsburgh, Pennsylvania (Round 3), while samples collected in March of 2008 (Round 4) were submitted to Columbia Analytical Services (CAS) in Rochester, New York for the following analyses:

- VOCs by USEPA SW846 Method 8260B
- Methane/Ethane/Ethene by RSK-175
- Nitrate and Nitrite by USEPA Method 353.2
- Chloride by USEPA Method 300.1
- Sulfate by USEPA Method 300.1
- Iron by USEPA SW846 Method 6010B
- Sodium by USEPA SW846 Method 6010B

Analytical results reported for nine primary COCs (i.e., BTEX, and five chlorinated VOCs) were compared to groundwater cleanup goals, which are equivalent to New York's GA groundwater standards. Results of the other analyses conducted are used to assess whether there is evidence that natural attenuation is occurring.

In addition, the following geochemical parameters were measured and recorded in the field for each groundwater sample:

- Sulfide
- pH
- ORP
- Dissolved oxygen
- Conductivity
- Temperature
- Turbidity

The pH, ORP, conductivity, temperature, and turbidity of the groundwater were measured with a Horiba U-22 water quality meter, and dissolved oxygen content was measured with an YSI 85 Dissolved Oxygen Meter. The groundwater's sulfide concentration was measured in the field using a Hach DR850 Colorimeter Kit. The geochemical parameters were measured to assess whether natural attenuation was occurring.

3.1 Groundwater Elevations

SEAD-25 groundwater elevation data were recorded on June 4, 2007 (Round 3) and February 26, 2008 (Round 4). The historic groundwater elevation range is presented on **Table 1**. The groundwater levels from both Year 2 LTM events produced similar groundwater contours. Groundwater contours shown in **Figure 2**, based on the most recent groundwater elevation data (February 2008), is consistent with past groundwater contours that indicate that shallow groundwater flow is radial, with the highest elevations centered in the area of the pad. Groundwater elevation trends for SEAD-25 wells during Year 1 and Year 2 of LTM are summarized on **Figure 3A** and **Figure 3B**.

3.2 Analytical Data

Seven VOCs, including five primary COCs, were detected in SEAD-25 groundwater during the first round (June 2007). Six VOCs, including five primary COCs, were detected in samples taken during the second round (March 2008) of Year 2 LTM. The groundwater results are presented in **Table 3**, where they are compared to the groundwater cleanup goals listed in **Table 2**.

A summary of the range of concentrations found in the SEAD-25 groundwater for the primary COCs during the second year of SEAD-25 LTM is presented below:

Parameter	SEAD-25 LTM Round 3 Concentration Range (µg/L)	SEAD-25 LTM Round 4 Concentration Range (µg/L)	Groundwater Standard (µg/L)
Benzene	ND – 15 J	ND –2.3	1
Toluene	ND	ND	5
Ethyl benzene	ND – 12 J	ND – 0.39 J	5
Xylene	ND – 2.9 J	ND – 1.93 J	5
111-TCA	ND	ND	5
11-DCA	ND	ND	5
DCE	ND – 1.5 J	ND	5
TCE	ND – 0.51 J	ND	5

Note: Only detected COCs with site-specific cleanup goals are included in this summary table.

Benzene and ethyl benzene were the only primary COCs and the only VOCs that were observed to exceed the groundwater cleanup goals during Year 2 sampling events. Both of these compounds (15 J µg/L for benzene; 12 J µg/L for ethyl benzene) were observed at elevated concentrations in the groundwater at well MW25-2 during the Round 3 sampling event, while benzene was also observed at a concentration of 2.3 µg/L in well MW25-9 during the Round 4 event. Monitoring well MW25-2 is the source well, and MW25-9 is close to the former source area, the historic pad.

Figure 4 presents a historical summary of the groundwater sampling results for SEAD-25 from November 1995 to March 2008. As may be noted from a review of this figure, BTEX compounds have only been observed in three wells at SEAD-25 (MW25-2, MW25-3, and MW25-9) since 1995, and since 2006, only at wells MW25-2 and MW25-9. Generally, these data indicate that the groundwater levels of BTEX compounds have decreased since 1995 and since the 2006 remedial action.

Figure 4 also indicates that the concentrations of total chlorinated organic found in the groundwater at SEAD-25 have decreased since 1995, with the largest changes shown subsequent to the performance of the remedial action at the SWMU. Two chlorinated organics, cis-1,2-dicholorethene and trichloroethene were detected in the groundwater at well MW25-2, and cis-1,2-dichlorethene was also found in well MW25-19 during the Round 3 sampling event. No chlorinated organic compounds were detected in any of the SEAD-25 wells during the Round 4 sampling event.

3.3 Data Trends and Natural Attenuation Evaluation

There are two main lines of evidence to determine whether natural attenuation is occurring, listed below in order of significance:

1. Reduction in contaminant concentrations; and

2. Indirect geochemical indicators to assess the groundwater's assimilative capacity.

The primary line of evidence, reduction in VOC concentrations, is the only direct measure of attenuation of the plume. The well locations and concentrations are shown in **Figure 4**. Total BTEX concentrations decreased over time when compared to historic data, as shown on **Figure 4** and on the time plots (**Figures 5A**, **5B**, and **5C**). Similarly, time plots of chlorinated organics concentrations over time in MW25-2, MW25-3, and MW25-9 (**Figures 6A**, 6**B**, and 6**C**) demonstrate that chlorinated VOCs have been reduced to levels below the detection limit.

The analytical data indicate that the VOCs plume are attenuating. MW25-2 is considered the source well, since it generally has the highest concentrations of the VOCs. The Year 2 sampling rounds concentrations of BTEX compounds found at MW25-2 was three orders of magnitude lower than the historic high value of 6,220 µg/L detected during the sampling events in 1996. Similarly, the total chlorinated VOC concentrations at MW25-2 decreased from 98 µg/L in 1994 and 68 µg/L in 1995 to non-detect or at the detection limit of 2.0 µg/L in the last two rounds. Further, the concentration of BTEX detected at MW25-9 decreased from 165 µg/L in 1995 to 2.3 µg/L in February 2008. Similarly, the total chlorinated ethene concentrations at MW25-9 decreased by a factor of two from 10 µg/L in 1995 to 4.95 µg/L in January 2006, to non-detect or at the detection limit of 2.0 µg/L in the current sampling.

The geochemical parameters provide an indirect indication of the natural attenuation of the plume. Methane was detected in all wells sampled during the June 2007 (Year 2, Round 3) sampling event, and four wells during the March 2008 (Year 2, Round 4) sampling event. The detection of methane is co-located with the maximum detection of BTEX. The detection of methane is an indicator that reductive dechlorination is occurring. Data reported for the other geochemical parameters collected in the field during the Year 2 events varied in an inconsistent manner so no conclusive indication that attenuation is continuing via this route is possible. The geochemical parameters are presented in **Tables 4A** and **4B** for the first round and second round, respectively.

Overall, the direct measurements of VOC concentrations indicate that the plume is attenuating (**Figures 7A, 7B** and **7C**).

4 REMEDY EVALUATION

As discussed in **Section 2.4**, 961 cy of VOC impacted soil was removed from the pad located at SEAD-25 as is shown on **Figure 4**. The soil was removed to eliminate the source of VOCs which could have contributed to further groundwater degradation in the area. Long-term groundwater monitoring is now being performed at SEAD-25 to show that the soil removal remedy has effectively eliminated further VOC releases from the vicinity of the former pad, and that natural attenuation of the VOC plumes at SEAD-25 continues to improve the local groundwater quality.

The BTEX and chlorinated organics groundwater concentrations have decreased by more than 99% since the soil removal (shown in the time plots on **Figures 5** and **6**) due to the natural attenuation

process and the removal of the source material. The remedy of soil removal has been effective at SEAD-25.

The remedy for SEAD-25 requires the implementation and maintenance of land use controls (LUCs) at the two sites. The LUC requirements are detailed in the "Land Use Control Remedial Design for SEAD 27, 66, 64A, *Final*" (2006). The selected LUCs for SEAD-25 are as follows:

- Prevent residential housing, elementary and secondary schools, childcare facilities and playground activities, and
- Prevent access to or use of the groundwater until NYS Class GA Groundwater Standards are met.

As part of the LTM program, the Army inspected SEAD-25 to determine that the LUCs are being maintained. While performing the groundwater sampling, it was confirmed that no prohibited facilities have been constructed and no access to or use of groundwater was evident.

5 LONG-TERM MONITORING CONCLUSIONS AND RECOMMENDATIONS

5.2 Conclusions

- The concentrations of BTEX in the groundwater at SEAD-25 have decreased by up to three orders of magnitude since 1994;
- Chlorinated VOCs were not detected above cleanup goals;
- The VOC plumes at SEAD-25 are attenuating to levels close to or lower than all applicable groundwater standards;
- The soil excavation remedy at SEAD-25 has been effective; and
- Land and groundwater restrictions imposed at SEAD-25 continue to be maintained, and there are signs of unauthorized use or access.

5.3 Recommendations

Based on the historical data and the results of the Year 2 rounds of semi-annual LTM at SEAD-25, the Army recommends the following:

- Groundwater monitoring will continue on a semi-annual basis at SEAD-25 for 2008. At that time, the LTM program will be re-evaluated.

LEGEND

	DRAINAGE DITCH
	FENCE
	UNPAVED ROAD
	BRUSH LINE
	RAILROAD
760	GROUND SURFACE ELEVATION CONTOUR
	UNDERGROUND ELECTRIC UTILITY LINE
	UNDERGROUND WATER UTILITY LINE
	ROAD SIGN
	OVERHEAD UTILITY POLE
	HYDRANT
	MANHOLE
	UTILITY BOX
	DECIDOUS TREE
	COORD. GRID (250' GRID)
	POLE
SEAD-25	SURVEY MONUMENT
	NOV/DEC 2005 REMEDIATED AREAS

NOTES:

1. TOPOGRAPHY BASED ON AERIAL SURVEY BY:

   LOCKWOOD SURVEY
   36 KARLAN DRIVE
   ROCHESTER NEW YORK

2. HORIZONTAL DATUM IS BASED ON NAD83 PER SENECA ARMY DEPOT SEAD 25A MONUMENTS SURVEY CONTROL COORDINATES DATED 1994.
3. VERTICAL DATUM IS BASED ON NAD88.

25 0 25 50
(feet)

PARSONS

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

ROMULUS, NEW YORK
SEAD-25 ANNUAL REPORT

DEPT. ENVIRONMENTAL ENGINEERING

Dwg. No. 744538-05200

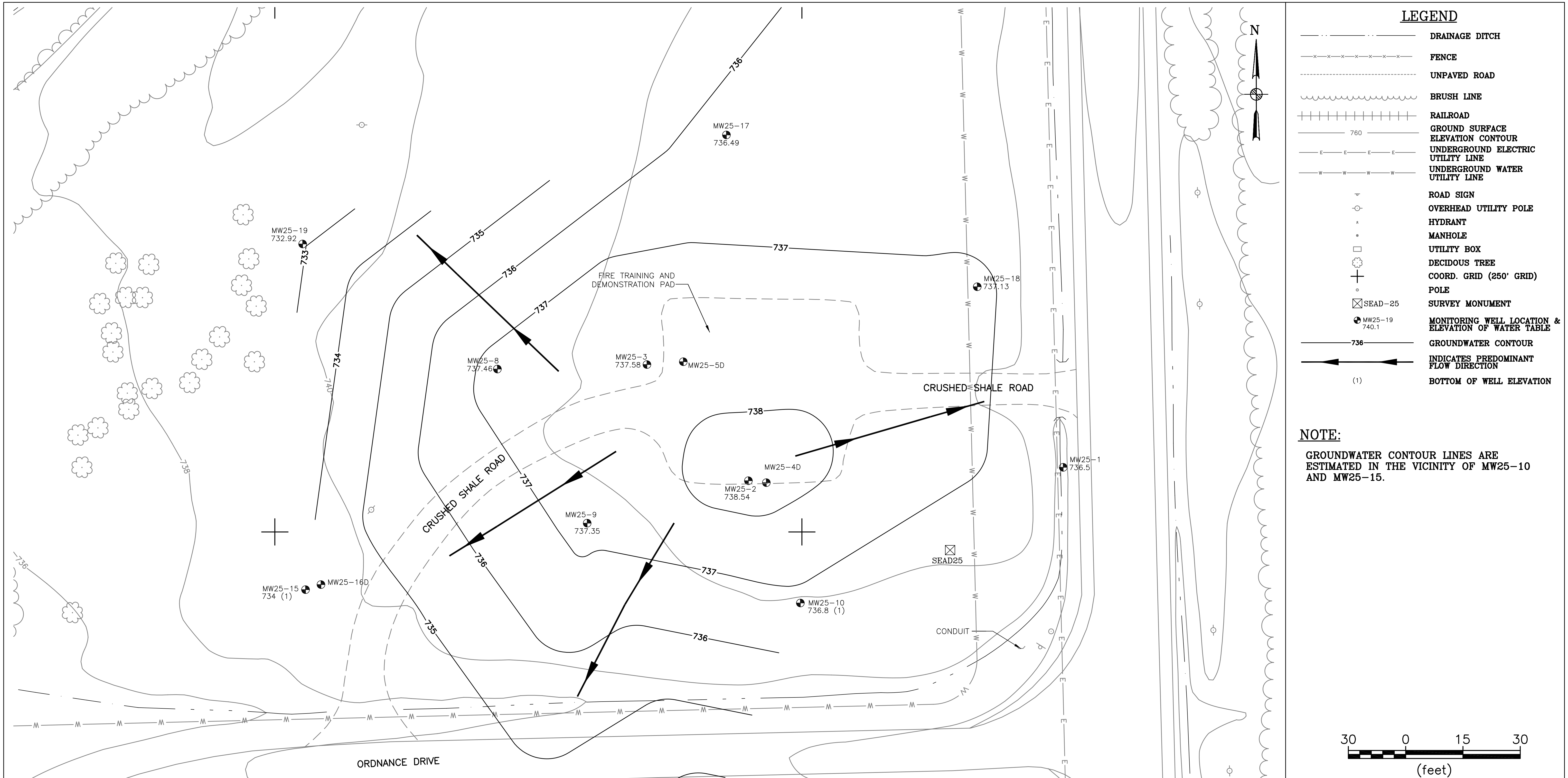
FIGURE 1

SEAD-25 SITE PLAN

SCALE AS SHOWN

DATE MAY 2008

REV


LEGEND
DRAINAGE DITCH
FENCE
UNPAVED ROAD
BRUSH LINE
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
UNDERGROUND ELECTRIC UTILITY LINE
UNDERGROUND WATER UTILITY LINE
ROAD SIGN
OVERHEAD UTILITY POLE
HYDRANT
MANHOLE
UTILITY BOX
DECIDOUS TREE
COORD. GRID (250' GRID)
POLE
SEAD-25 SURVEY MONUMENT
MW25-19 740.1 MONITORING WELL LOCATION & ELEVATION OF WATER TABLE
GROUNDWATER CONTOUR
INDICATES PREDOMINANT FLOW DIRECTION
(1) BOTTOM OF WELL ELEVATION
NOTE:
GROUNDWATER CONTOUR LINES ARE ESTIMATED IN THE VICINITY OF MW25-10 AND MW25-15.
30 0 15 30
(feet)
N
MW25-17 736.49
MW25-19 732.92
FIRE TRAINING AND DEMONSTRATION PAD
MW25-18 737.13
MW25-8 737.46
MW25-3 737.58
MW25-5D
CRUSHED SHALE ROAD
MW25-4D
MW25-2 738.54
MW25-1 736.5
MW25-9 737.35
SEAD25
MW25-15 734 (1)
MW25-16D
MW25-10 736.8 (1)
CONDUIT
ORDNANCE DRIVE
MW25-13 734.59
MW25-14D
MW25-12D
MW25-11 733.40
ADMINISTRATION AVENUE

PARSONS

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

ROMULUS, NEW YORK

SEAD-25 ANNUAL REPORT

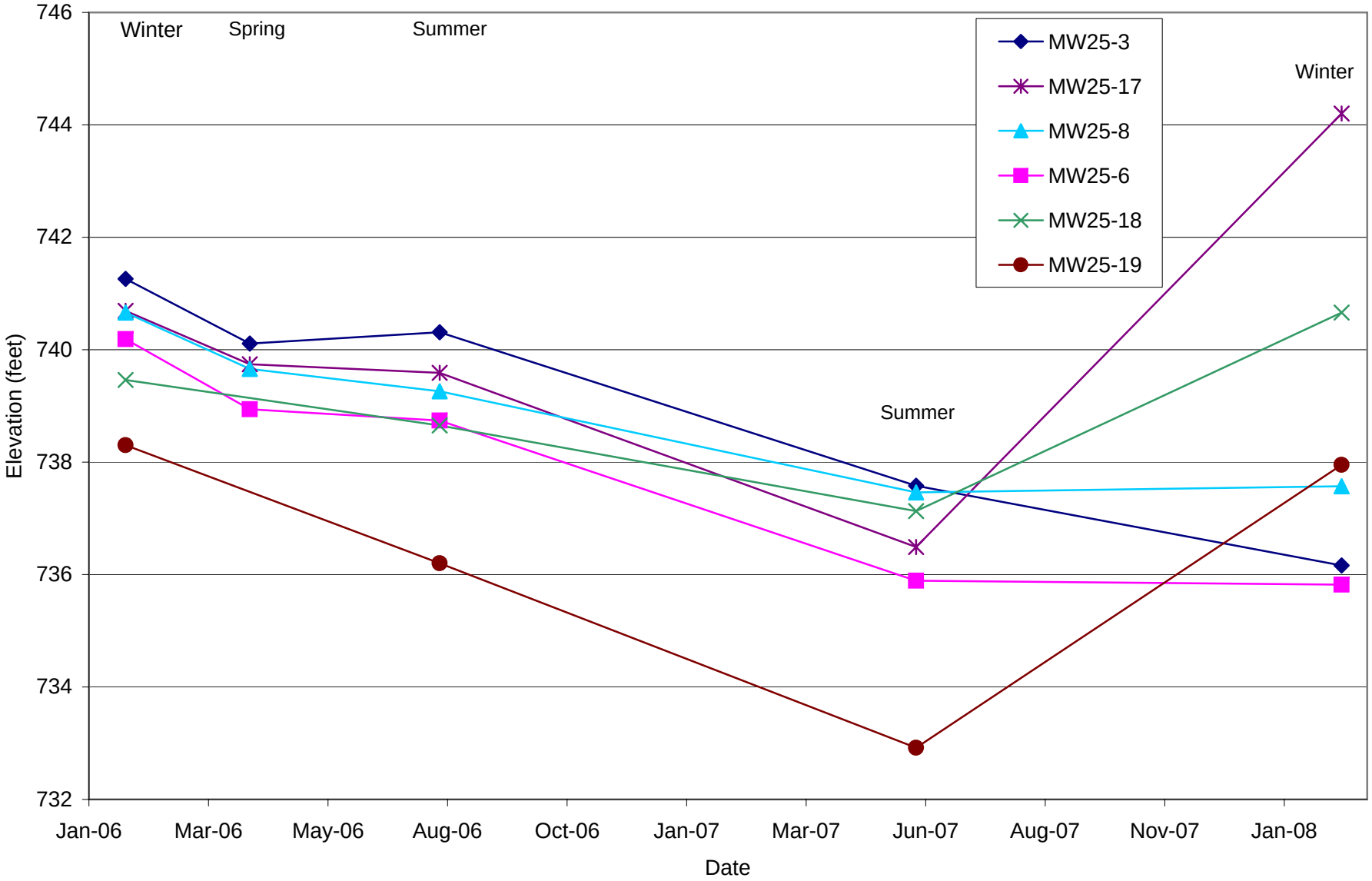
DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 744538-05200

FIGURE 2

SEAD-25 GROUNDWATER CONTOURS FOR THE TILL WEATHERED SHALE SATURATED ZONE-JUNE 2007

SCALE AS SHOWN | DATE MAY 2008 | REV

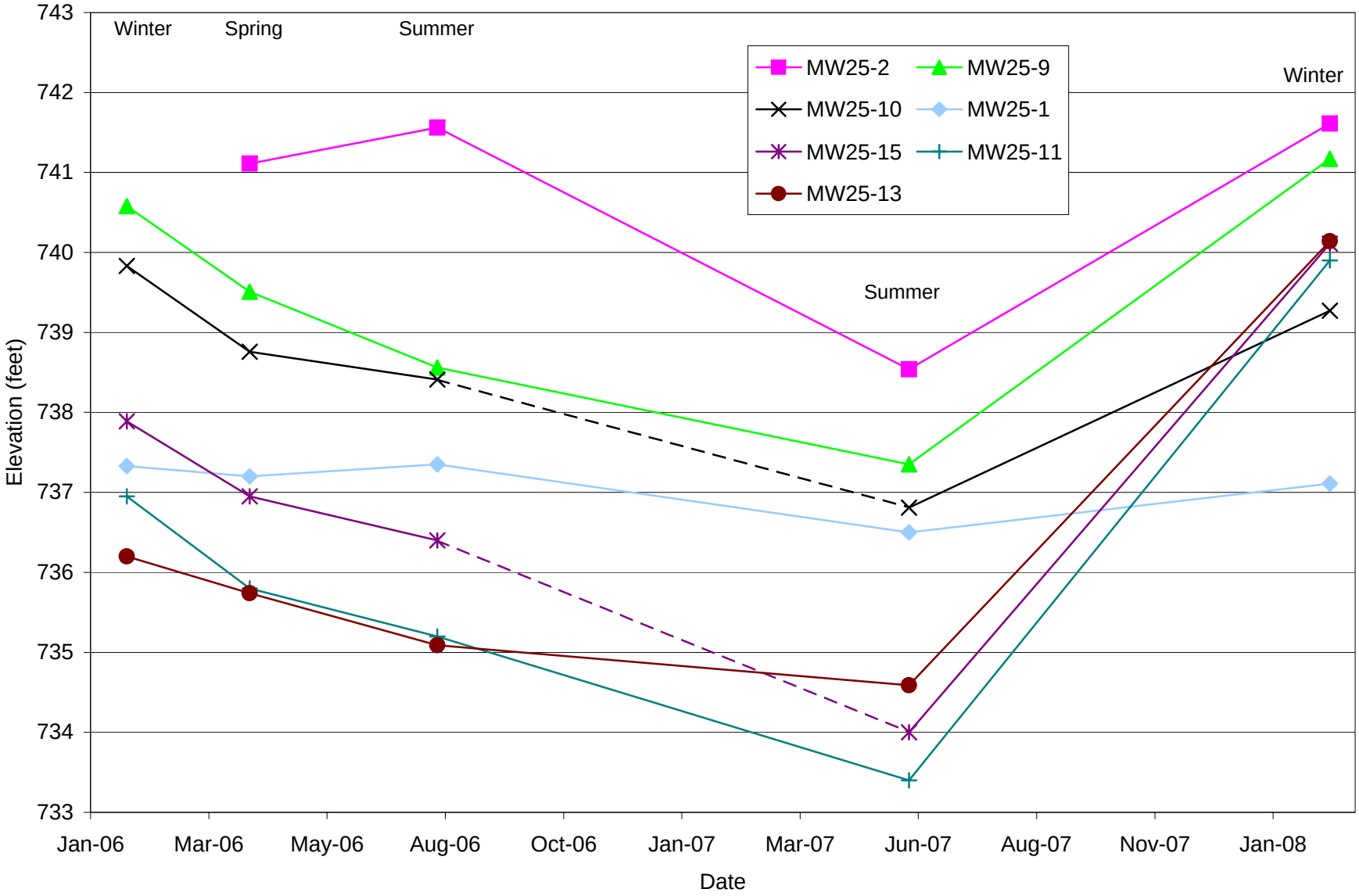
Figure 3A
SEAD-25 Groundwater Elevation - Northern Profile
SEAD-25 Annual Report
Seneca Army Depot Activity



Note: Groundwater elevation was measured on the following dates: January 24, 2006, April 4, 2006, August 9, 2006, June 4, 2007, and February 2008. MW25-18 and MW25-19 groundwater elevations were not measured on April 4, 2006.

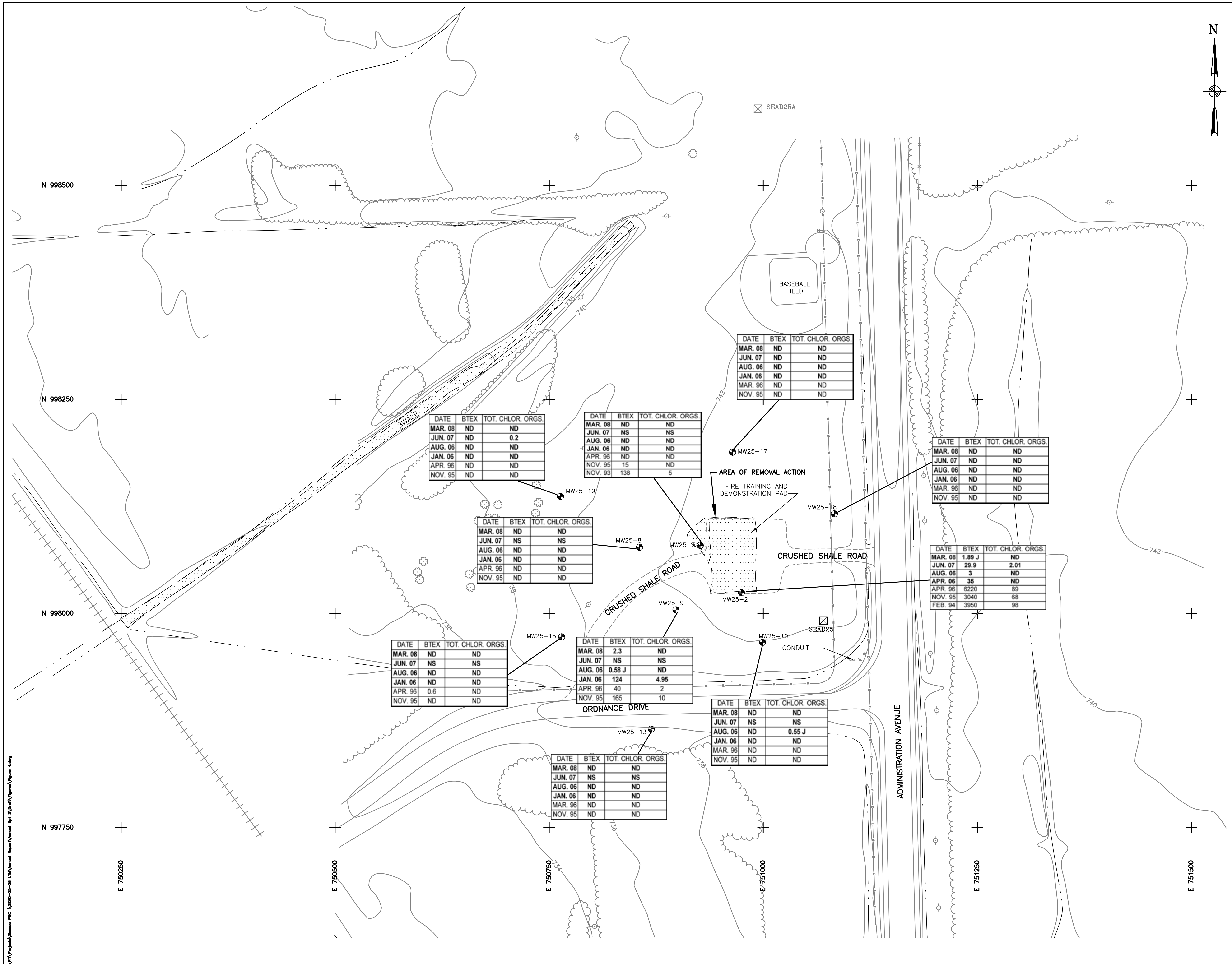
P:\PIT\Projects\Huntsville HTW\TO #36 OB & FTA Monitoring\FTA SEAD-25\Annual Rpt 2\Draft\Figures\Figure 3 - GW Elev Trends.xls\S-25 GW Elev North Profile

Figure 3B
SEAD-25 Groundwater Elevation - Southern Profile
SEAD-25 Annual Report
Seneca Army Depot Activity



Note: Groundwater elevation was measured on the following dates: January 24, 2006, April 4, 2006, August 9, 2006, June 4, 2007, and February 2008.
MW25-10 and MW25-15 were dry during the June 6, 2007 sampling event and the bottom of the well elevation are ~736.8 ft and ~734 ft, respectively.

P:\PIT\Projects\Huntsville HTW\TO #36 OB & FTA Monitoring\FTA SEAD-25\Annual Rpt 2\Draft\Figures\Figure 3 - GW Elev Trends.xls\S-25 GW Elev South profile Fig



MW25-17

DATE	BTEX	TOT. CHLOR. ORGS.
MAR. 08	**ND**	**ND**
JUN. 07	**ND**	**ND**
AUG. 06	**ND**	**ND**
JAN. 06	**ND**	**ND**
MAR. 96	ND	ND
NOV. 95	ND	ND

MW25-19

DATE	BTEX	TOT. CHLOR. ORGS.
MAR. 08	**ND**	**ND**
JUN. 07	**ND**	**0.2**
AUG. 06	**ND**	**ND**
JAN. 06	**ND**	**ND**
APR. 96	ND	ND
NOV. 95	ND	ND

MW25-3

DATE	BTEX	TOT. CHLOR. ORGS.
MAR. 08	**ND**	**ND**
JUN. 07	**NS**	**NS**
AUG. 06	**ND**	**ND**
JAN. 06	**ND**	**ND**
APR. 96	ND	ND
NOV. 95	15	ND
NOV. 93	138	5

MW25-18

DATE	BTEX	TOT. CHLOR. ORGS.
MAR. 08	**ND**	**ND**
JUN. 07	**ND**	**ND**
AUG. 06	**ND**	**ND**
JAN. 06	**ND**	**ND**
MAR. 96	ND	ND
NOV. 95	ND	ND

MW25-8

DATE	BTEX	TOT. CHLOR. ORGS.
MAR. 08	**ND**	**ND**
JUN. 07	**NS**	**NS**
AUG. 06	**ND**	**ND**
JAN. 06	**ND**	**ND**
APR. 96	ND	ND
NOV. 95	ND	ND

MW25-2

DATE	BTEX	TOT. CHLOR. ORGS.
MAR. 08	**1.89 J**	**ND**
JUN. 07	**29.9**	**2.01**
AUG. 06	**3**	**ND**
APR. 06	**35**	**ND**
APR. 96	6220	89
NOV. 95	3040	68
FEB. 94	3950	98

MW25-15

DATE	BTEX	TOT. CHLOR. ORGS.
MAR. 08	**ND**	**ND**
JUN. 07	**NS**	**NS**
AUG. 06	**ND**	**ND**
JAN. 06	**ND**	**ND**
APR. 96	0.6	ND
NOV. 95	ND	ND

MW25-9

DATE	BTEX	TOT. CHLOR. ORGS.
MAR. 08	**2.3**	**ND**
JUN. 07	**NS**	**NS**
AUG. 06	**0.58 J**	**ND**
JAN. 06	**124**	**4.95**
APR. 96	40	2
NOV. 95	165	10

MW25-10

DATE	BTEX	TOT. CHLOR. ORGS.
MAR. 08	**ND**	**ND**
JUN. 07	**NS**	**NS**
AUG. 06	**ND**	**0.55 J**
JAN. 06	**ND**	**ND**
MAR. 96	ND	ND
NOV. 95	ND	ND

MW25-13

DATE	BTEX	TOT. CHLOR. ORGS.
MAR. 08	**ND**	**ND**
JUN. 07	**NS**	**NS**
AUG. 06	**ND**	**ND**
JAN. 06	**ND**	**ND**
MAR. 96	ND	ND
NOV. 95	ND	ND

LEGEND

- DRAINAGE DITCH
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- RAILROAD
- 760 — GROUND SURFACE ELEVATION CONTOUR
- UNDERGROUND ELECTRIC UTILITY LINE
- UNDERGROUND WATER UTILITY LINE
- ROAD SIGN
- OVERHEAD UTILITY POLE
- HYDRANT
- MANHOLE
- UTILITY BOX
- DECIDOUS TREE
- COORD. GRID (250' GRID)
- POLE
- SEAD-25 — SURVEY MONUMENT
- MW25-2 — MONITORING WELL DESIGNATION
- NOV/DEC 2005 REMEDIATED AREAS

DATE	BTEX	TOT. CHLOR. ORGS.
JUN. 07	**29.9**	**2.01**
AUG. 06	**3**	**ND**
APR. 06	**35**	**ND**
NOV. 95	3040	68
FEB. 94	3950	71

CONTAMINANT CONCENTRATIONS OF BTEX (BENZENE, TOLUENE, ETHYL BENZENE AND TOTAL XYLENES) AND TOTAL CHLORINATED ORGANICS (ug/L) APR 96, NOV 95, FEB 94, & JAN 93 ARE PRE-REMEDIATION. ALL OTHER ROUNDS (BOLD) ARE POST-REMEDIATION

ND — NON-DETECT

NS — NOT SAMPLED DUE TO LOW GROUNDWATER LEVELS

NOTES:

1. THE TOTAL BTEX OR TOTAL CHLORINATED ORGANICS CONCENTRATION IS THE SUM OF DETECTED VALUES ONLY.
2. AT WELL LOCATIONS WHERE A DUPLICATE SAMPLE WAS COLLECTED, THE AVERAGE RESULT OF THE SAMPLE AND THE DUPLICATE IS PRESENTED.

25 0 25 50

(feet)

PARSONS

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

ROMULUS, NEW YORK

SEAD-25 ANNUAL REPORT

DEPT. ENVIRONMENTAL ENGINEERING

Dwg. No. 744538-05200

FIGURE 4

VOCS DETECTED IN GROUNDWATER AT SEAD-25

SCALE AS SHOWN

DATE MAY 2008

REV

Figure 5A
Concentrations of BTEX Over Time at MW25-2
SEAD-25 Annual Report
Seneca Army Depot Activity

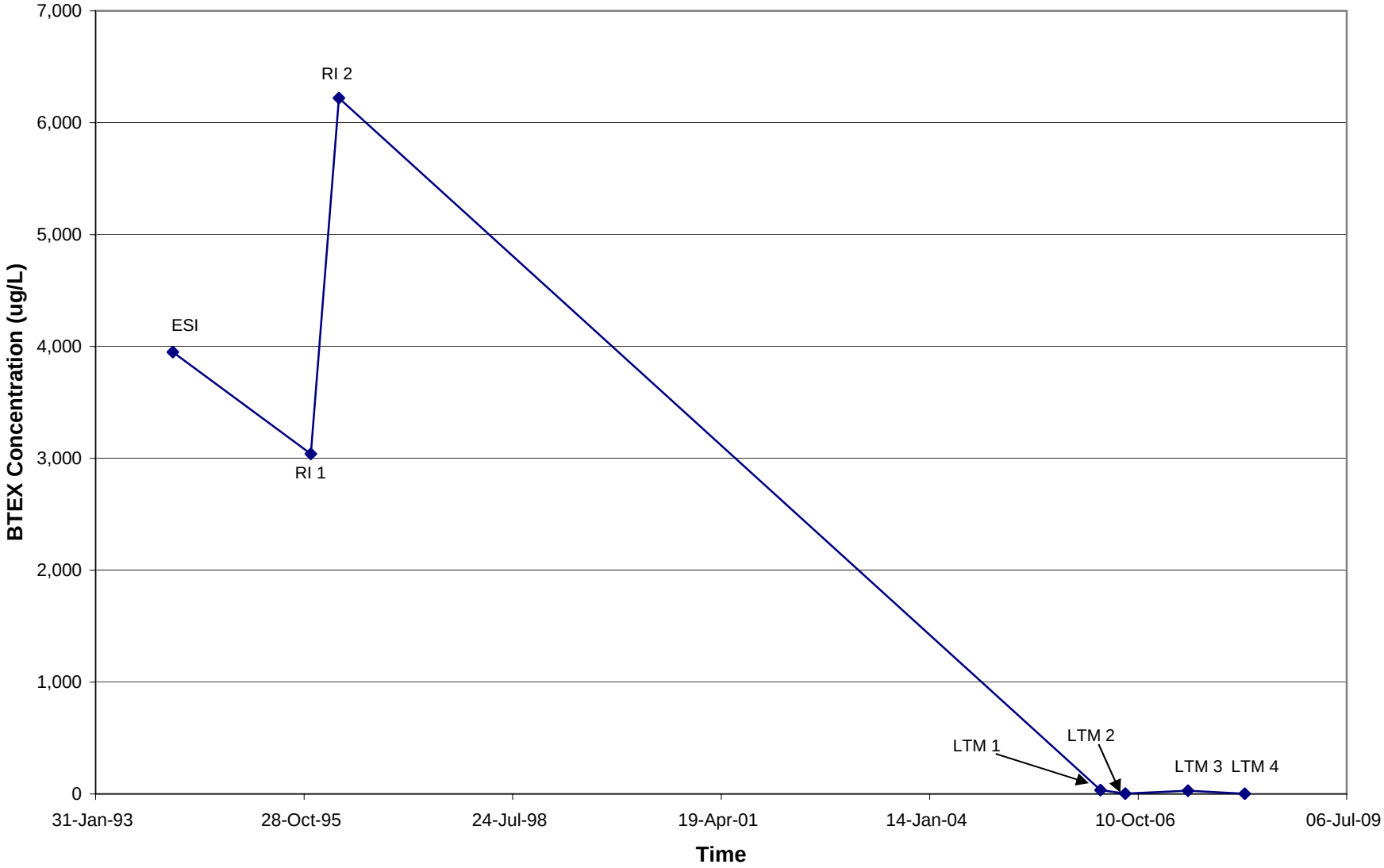


Figure 5B
Concentrations of BTEX Over Time at MW25-3
SEAD-25 Annual Report
Seneca Army Depot Activity

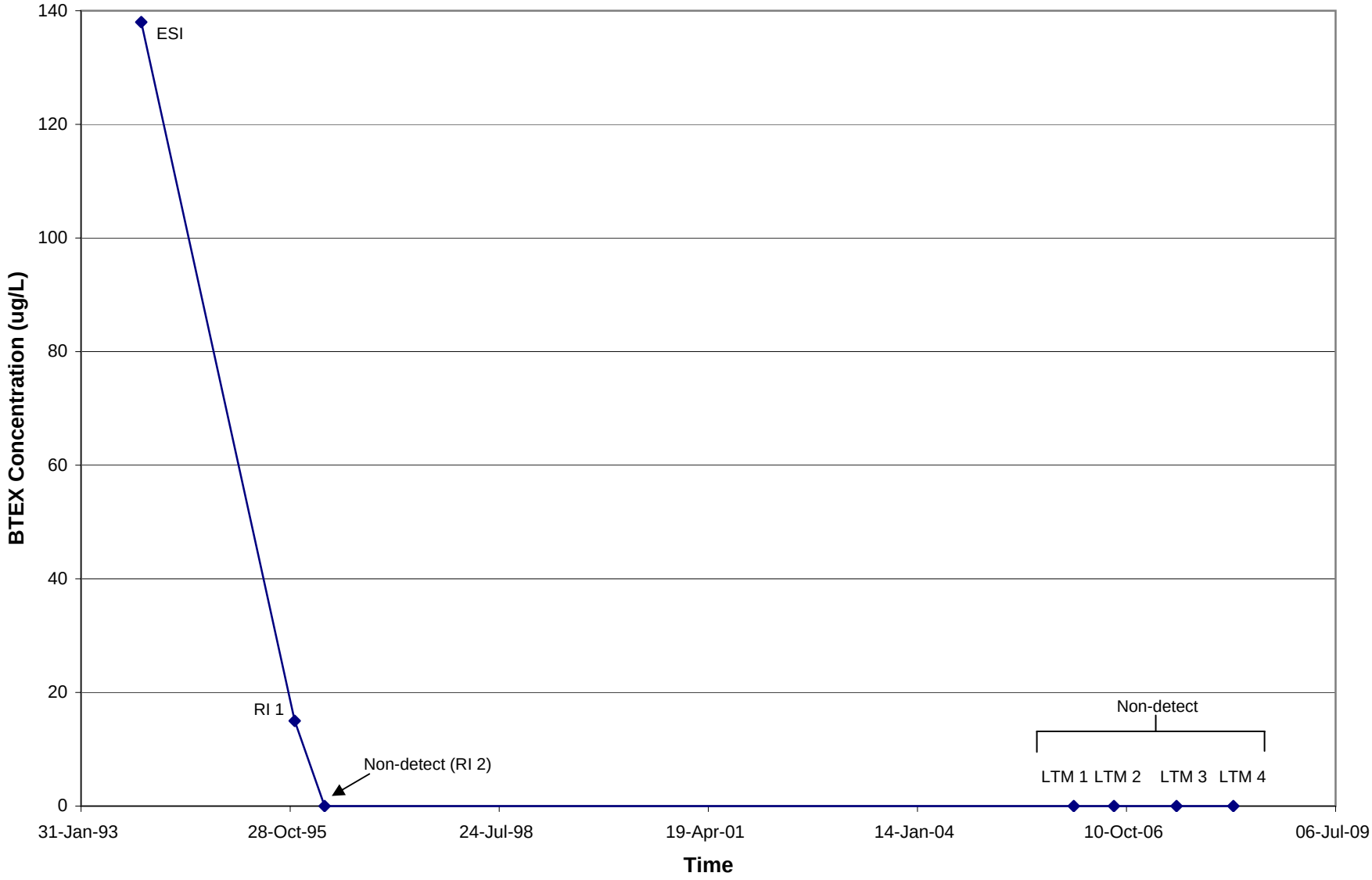


Figure 5C
Concentrations of BTEX Over Time at MW25-9
SEAD-25 Annual Report
Seneca Army Depot Activity

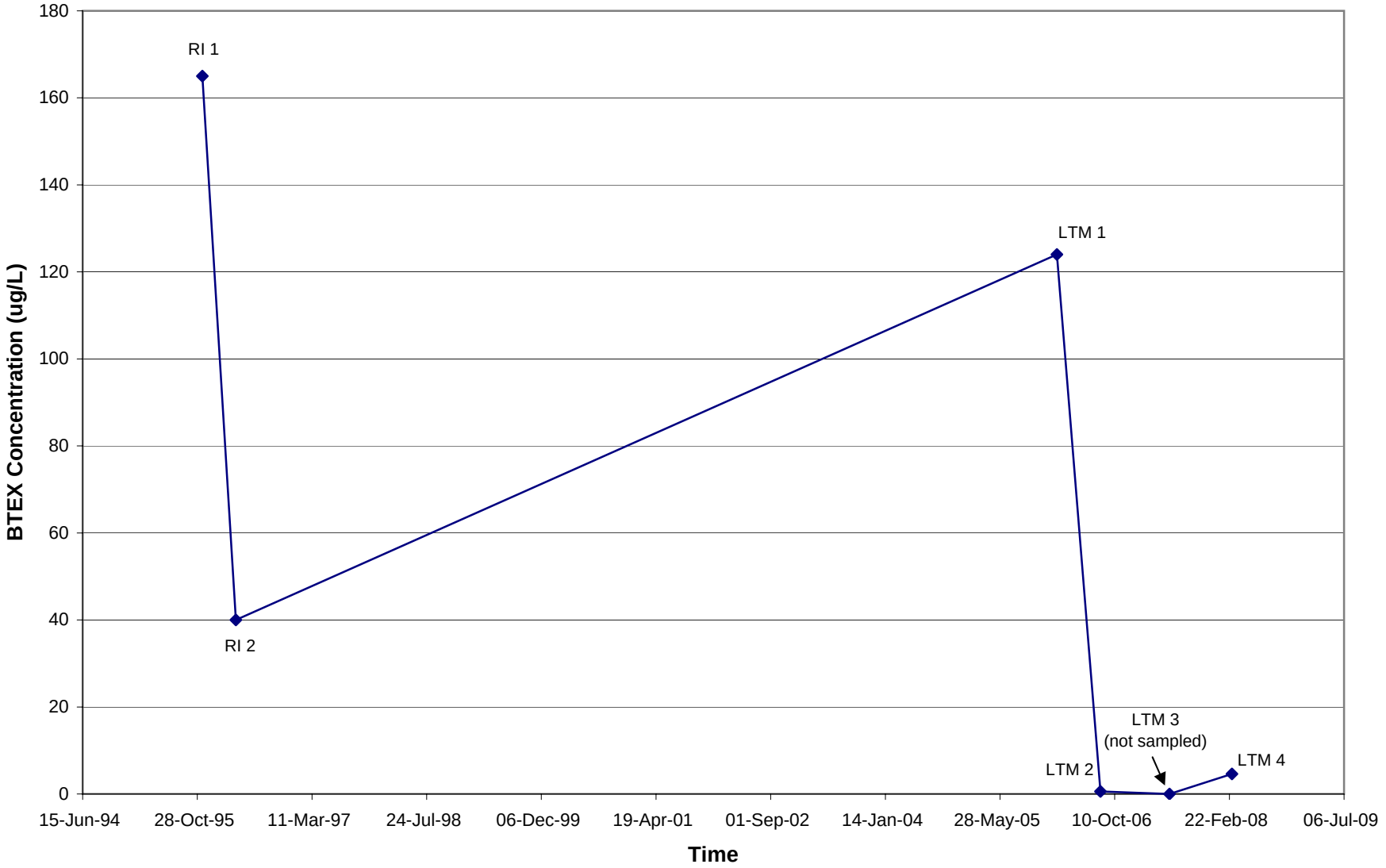


Figure 6A
Chlorinated VOC Concentrations at MW25-2
SEAD-25 Annual Report
Seneca Army Depot Activity

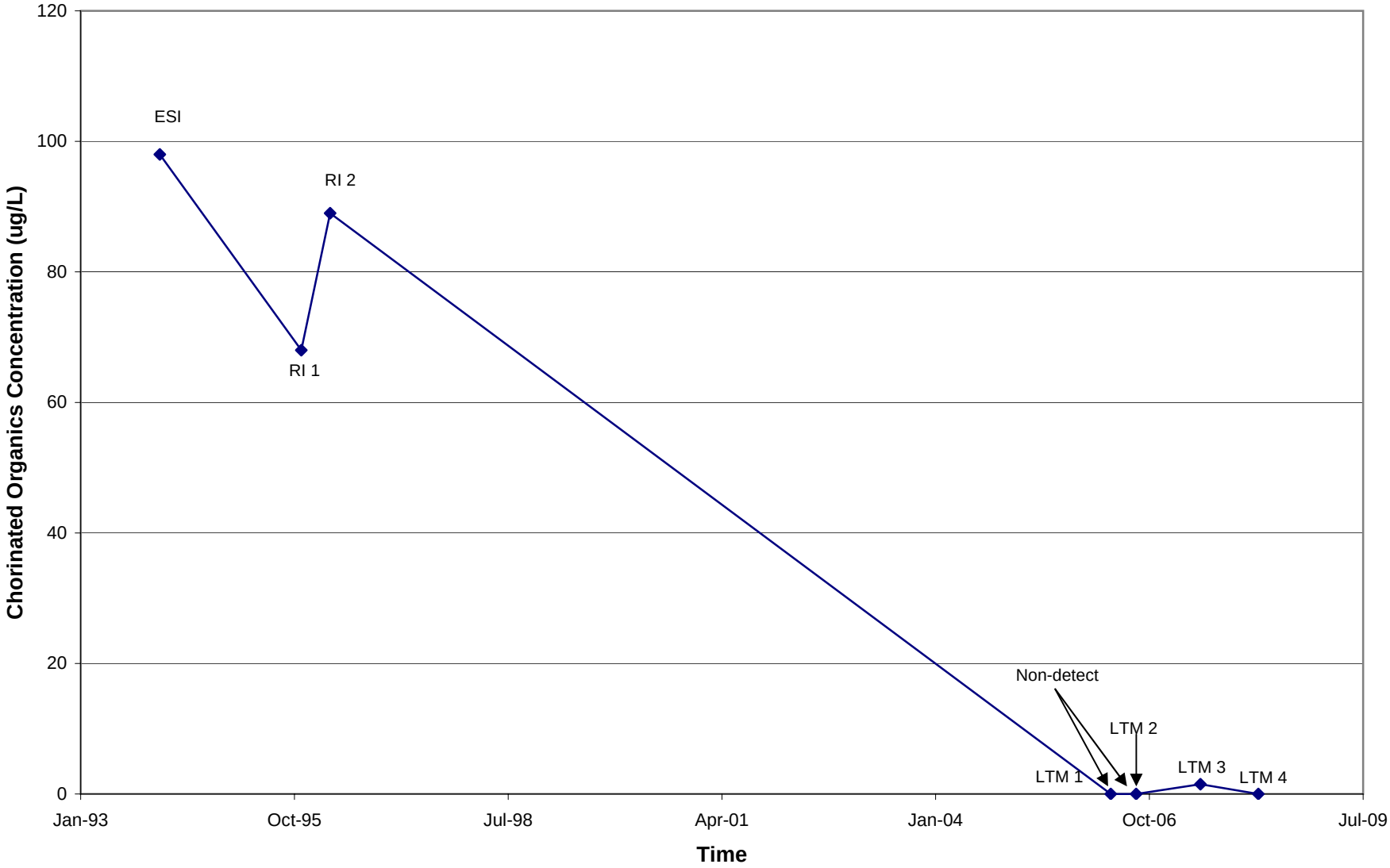


Figure 6B
Chlorinated VOC Concentrations at MW25-3
SEAD-25 Annual Report
Seneca Army Depot Activity

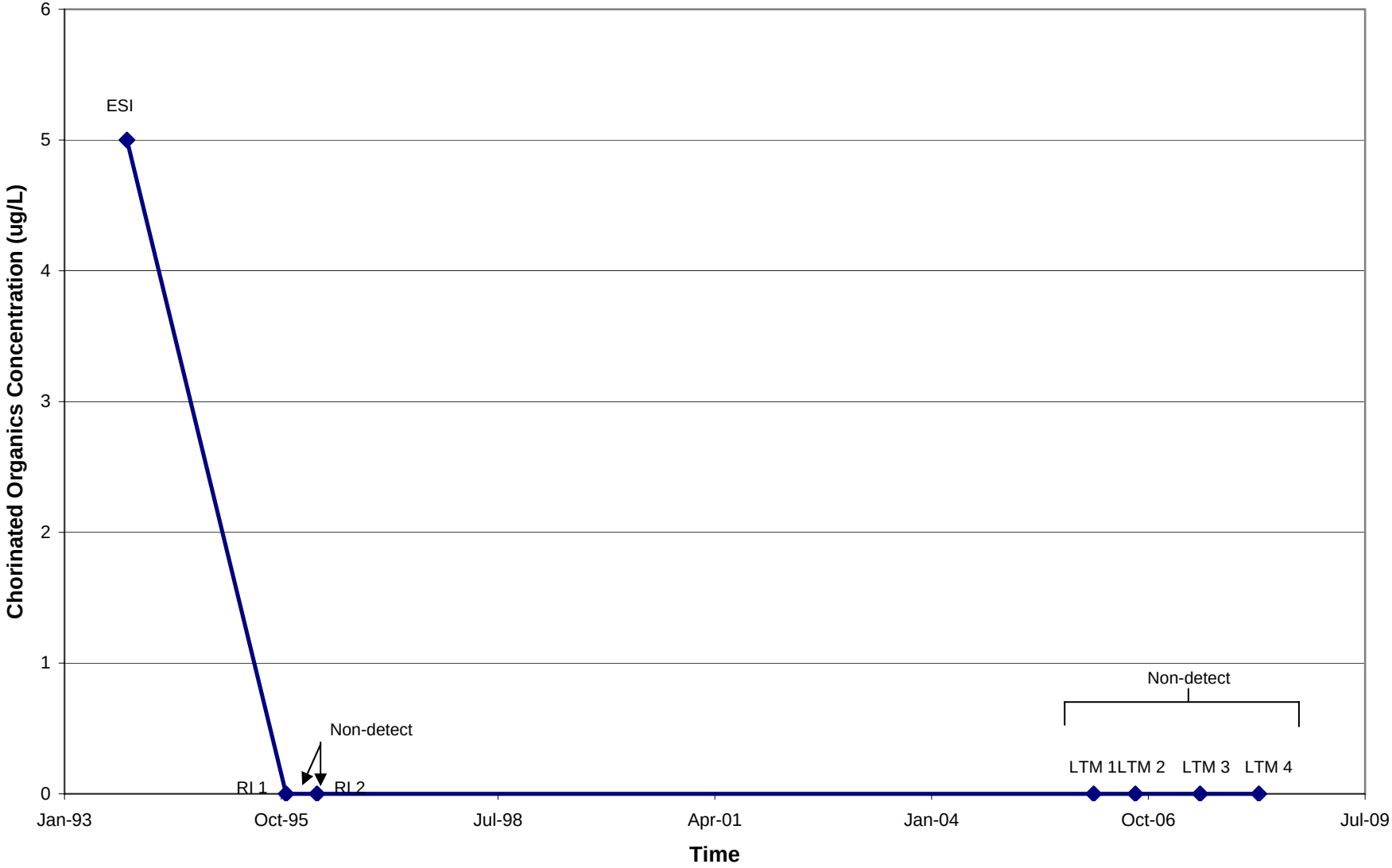
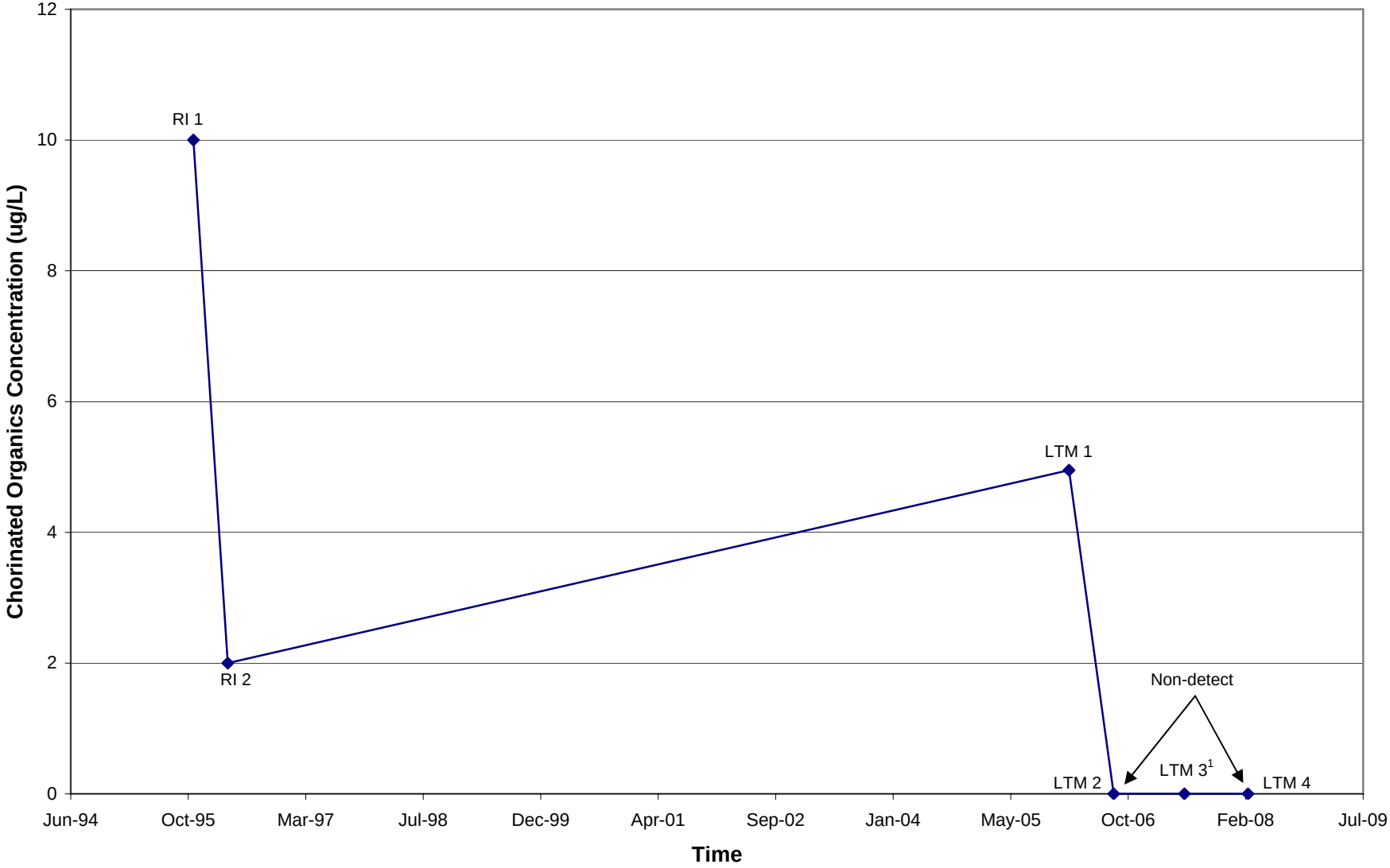
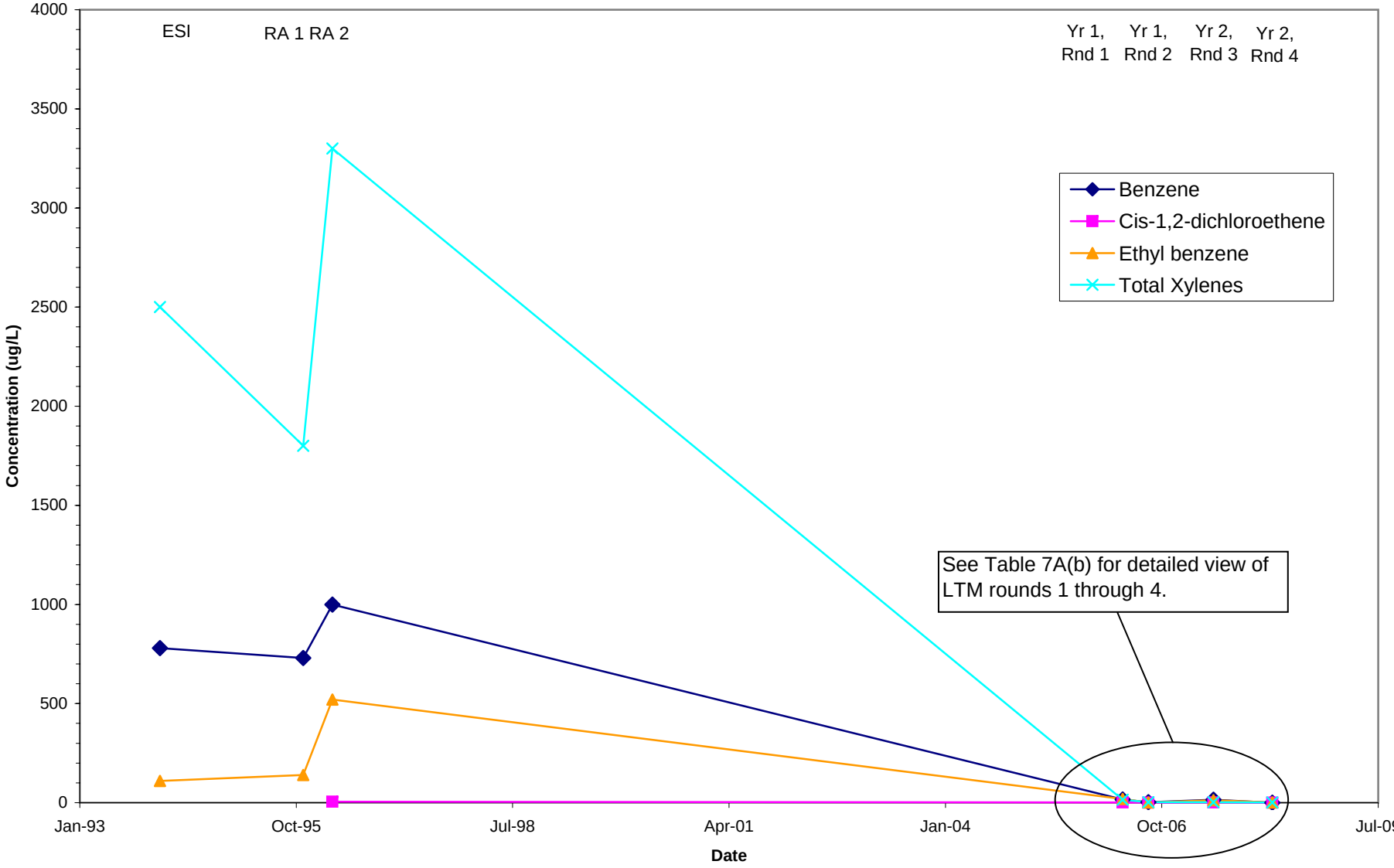


Figure 6C
Chlorinated VOC Concentrations at MW25-9
SEAD-25 Annual Report
Seneca Army Depot Activity



Note:
1. LTM 3 was not sampled

Figure 7A
Concentrations of Detected Chemicals of Concern in MW25-2 (Near Former Source)
SEAD-25 Annual Report
Seneca Army Depot Activiy

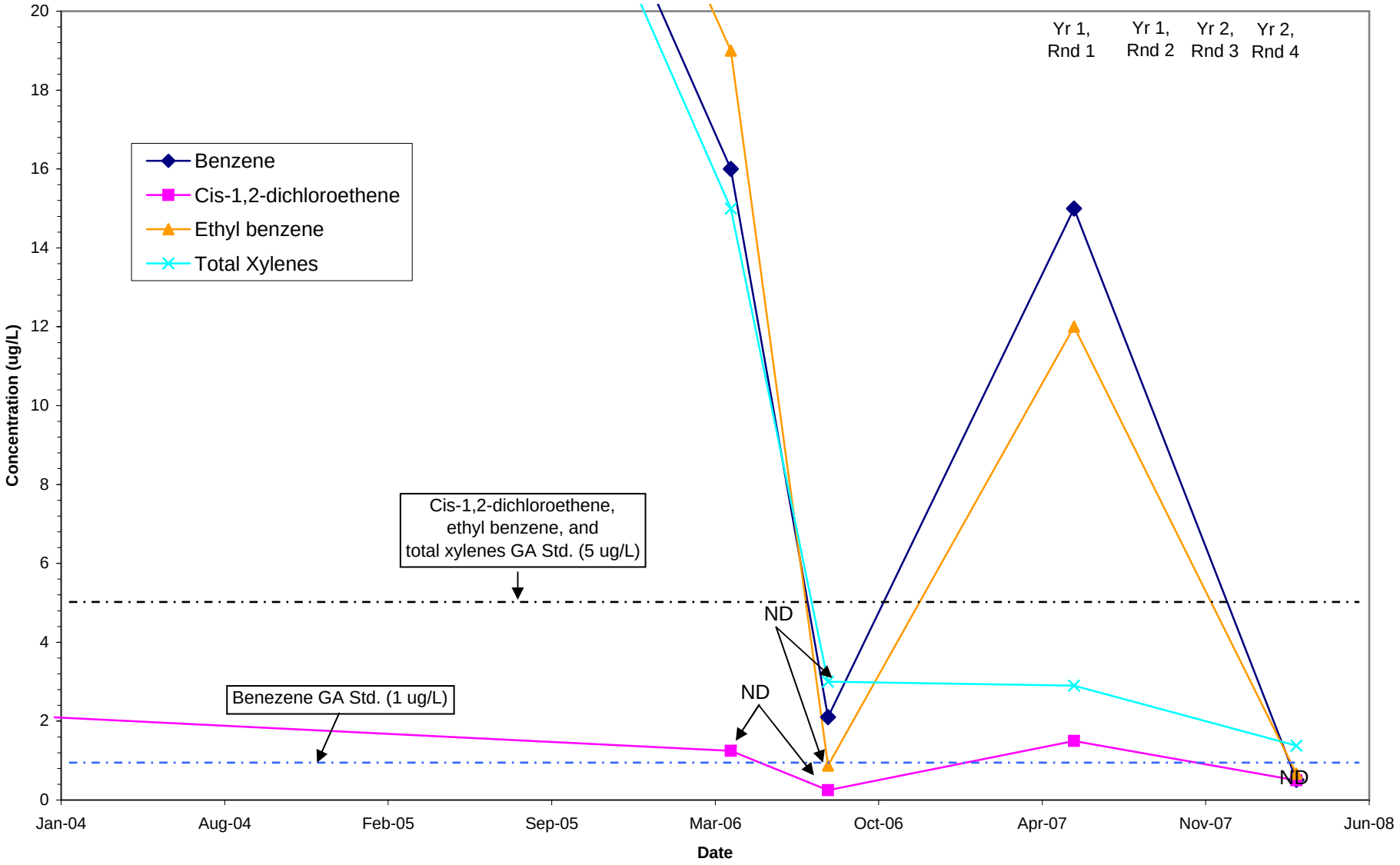


Note:
ND = Non-deteced values presented at half its original value.

P:\PIT\Projects\Huntsville HTW\TO #36 OB & FTA Monitoring\FTA SEAD-25\Annual Rpt 2\Draft\Figures\Figure 7 - VOC Trends.xls\Figure 7A

6/17/2008

Figure 7A(b)
Concentrations of Detected Chemicals of Concern in MW25-2 (Near Former Source)
SEAD-25 Annual Report
Seneca Army Depot Activiy

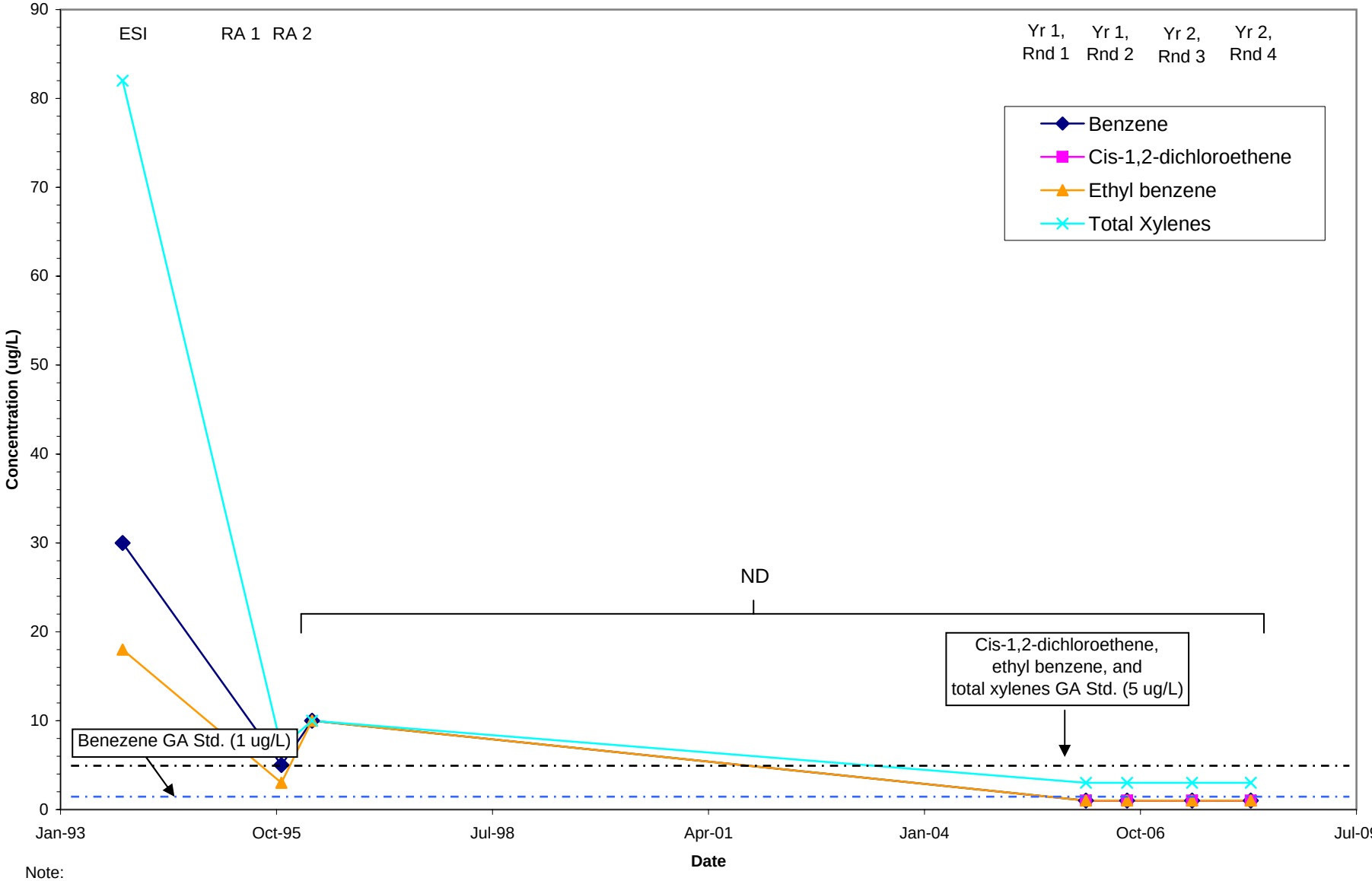


Note:
ND = Non-deteced values presented at half its original value.

P:\PIT\Projects\Huntsville HTW\TO #36 OB & FTA Monitoring\FTA SEAD-25\Annual Rpt 2\Draft\Figures\Figure 7 - VOC Trends.xls\Figure 7A(b)

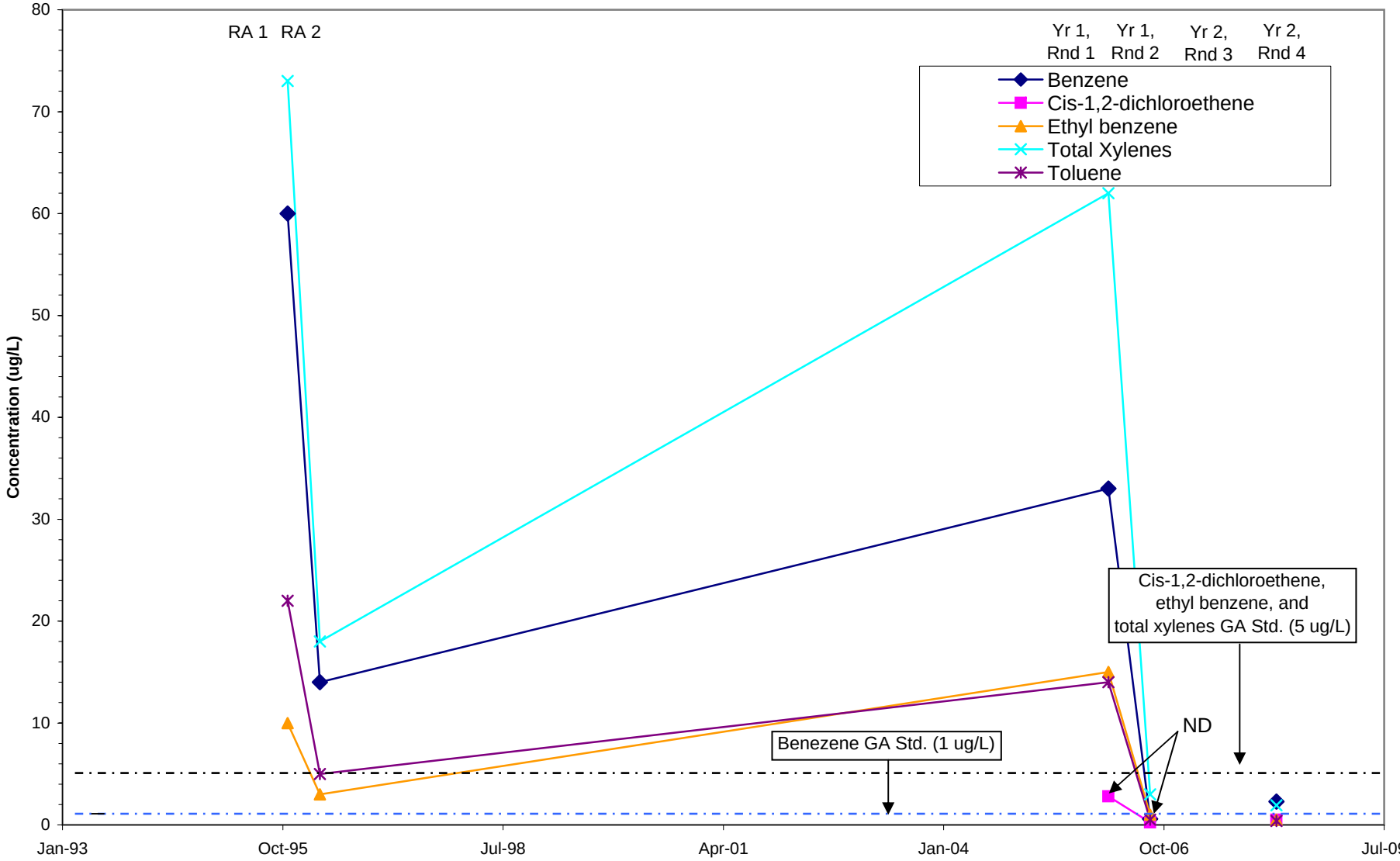
6/17/2008

Figure 7B
Concentrations of Detected Chemicals of Concern in MW25-3 (Near Former Source)
SEAD-25 Annual Report
Seneca Army Depot Activiy



Note:
ND = Non-deteced values presented at half its original value.

Figure 7C
Concentrations of Detected Chemicals of Concern in MW25-9 (Near Former Source)
SEAD-25 Annual Report
Seneca Army Depot Activiy



Note:
ND = Non-detect at half its original value.
Round 3 samples not collected due to low sample levels.

Table 1
SEAD-25 Groundwater Elevation Data
SEAD-25 Annual Report, Year 2
Seneca Army Depot Activity

Monitoring Well	Top of Riser Elevation (ft)	Well Depth (ft)	Year 2, Round 3 - June 2007				Round 4 - March 2008				Historical Data[1]		
			Date Measured	Saturated Thickness (ft)	Depth to Groundwater (ft)	Water Level Elevation (ft)	Date Measured	Saturated Thickness (ft)	Depth to Groundwater (ft)	Water Level Elevation (ft)	Groundwater Elevation (ft)		
											Maximum	Minimum	Range
MW25-1	743.00	7.77	6/4/2007	1.27	6.50	736.50	2/26/2008	1.88	5.89	737.11	737.54	736.50	1.04
MW25-2	746.36	11.31	6/4/2007	3.49	7.82	738.54	2/26/2008	6.56	4.75	741.61	742.05	738.54	3.51
MW25-3	745.76	8.87	6/4/2007	0.69	8.18	737.58	2/26/2008	4.28	4.59	741.17	742.67	737.58	5.09
MW25-6	744.44	14.27	6/4/2007	5.72	8.55	735.89	2/26/2008	9.73	4.54	739.90	740.70	735.89	4.81
MW25-8	742.46	5.47	6/4/2007	0.47	5.00	737.46	2/26/2008	3.15	2.32	740.14	740.93	737.46	3.47
MW25-9	742.36	5.42	6/4/2007	0.41	5.01	737.35	2/26/2008	3.17	2.25	740.11	740.95	737.35	3.60
MW25-10	743.01	6.20	6/4/2007		dry		2/26/2008	2.46	3.74	739.27	740.58	738.06	2.52
MW25-11	740.25	7.00	6/4/2007	0.15	6.85	733.40	2/26/2008	2.91	4.09	736.16	737.68	733.40	4.28
MW25-13	739.64	5.53	6/4/2007	0.48	5.05	734.59	2/26/2008	1.71	3.82	735.82	737.15	734.59	2.56
MW25-15	741.00	7.00	6/4/2007		dry		2/26/2008	3.57	3.43	737.57	738.29	736.31	1.98
MW25-17	743.94	11.27	6/4/2007	3.82	7.45	736.49	2/26/2008	7.99	3.28	740.66	741.20	736.49	4.71
MW25-18	744.35	11.22	6/4/2007	4.00	7.22	737.13	2/26/2008	11.07	0.15	744.20	744.20	737.13	7.07
MW25-19	741.95	12.00	6/4/2007	2.97	9.03	732.92	2/26/2008	8.00	4.00	737.95	738.41	732.92	5.49

Notes:

1. Groundwater levels were recorded in April 1994, November 1995, December 1995, March 1996, January 2006, April 2006, August 2006, June 2007 and, February 2008.
2. The bedrock wells are not included as part of the LTM program and are not included in this table.

Table 2
SEAD-25 Site-Specific Cleanup Goals for Groundwater
SEAD-25 Annual Report, Year 2
Seneca Army Depot Activity

	Groundwater NYSDEC Class GA Standard[1] ug/L
Volatile Organic Compounds	
1,1,1-Trichloroethane	5
1,1-Dichloroethane	5
1,2-Dichloroethene (total)	5
Benzene	1
Cis-1,2-Dichloroethene	5
Chloroform	7
Ethyl benzene	5
Toluene	5
Trichloroethene	5
Xylene (total)	5

Notes:

1. NYSDEC AWQS for Class GA waters. From 6 NYCRR Parts 701-705. TOGS 1.1.1, June 1998.

Table 3
SEAD-25 VOC Concentrations in Groundwater
SEAD-25 Annual Report, Year 2
Seneca Army Depot Activity

Facility								SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25
Location ID								MW25-10	MW25-13	MW25-15	MW25-17	MW25-17	MW25-17	MW25-17	MW25-18
Matrix								GW	GW	GW	GW	GW	GW	GW	GW
Sample ID								25LM20039	25LM20040	25LM20041	25LM20024	25LM20028	25LM20032	25LM20033	25LM20029
Sample Date								3/4/2008	3/3/2008	3/3/2008	6/7/2007	6/7/2007	3/4/2008	3/4/2008	6/6/2007
QC Code								SA	SA	SA	DU	SA	DU	SA	SA
Study ID								S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM
Sampling Round								4	4	4	3	3	4	4	3
Parameter[1]	Units	Maximum Value	Frequency of Detection	Cleanup Goal[2]	Number of Exceedances	Number of Times Detected	Number of Analyses	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds															
1,1,1-Trichloroethane	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ
1,1-Dichloroethane	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ
Benzene	UG/L	15	19%	1	2	3	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ
Cis-1,2-Dichloroethene	UG/L	1.5	13%	5	0	2	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ
Chloroform	UG/L	0	0%	7	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ
Ethyl benzene	UG/L	12	13%	5	1	2	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ
Toluene	UG/L	0.39	6%	5	0	1	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ
Total Xylenes	UG/L	2.9	19%	5	0	3	16	2 U	2 U	2 U	3 U	3 U	1 U	1 U	3 U
Trichloroethene	UG/L	0.51	6%	5	0	1	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ

Notes:
1. Only parameters with site-specific cleanup goals listed in Table 2 are included.
2. The cleanup goal values are NYSDEC Class GA Groundwater Standards (TOGS 1.1.1, June 1998).
3. Shading indicates concentration above cleanup goal.

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate

Table 3
SEAD-25 VOC Concentrations in Groundwater
SEAD-25 Annual Report, Year 2
Seneca Army Depot Activity

Facility								SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25
Location ID								MW25-18	MW25-19	MW25-19	MW25-2	MW25-2	MW25-3	MW25-8	MW25-9
Matrix								GW	GW	GW	GW	GW	GW	GW	GW
Sample ID								25LM20034	25LM20030	25LM20035	25LM20020	25LM20031	25LM20036	25LM20037	25LM20038
Sample Date								3/5/2008	6/7/2007	3/3/2008	6/6/2007	3/4/2008	3/4/2008	3/4/2008	3/4/2008
QC Code								SA	SA	SA	SA	SA	SA	SA	SA
Study ID								S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM
Sampling Round								4	3	4	3	4	4	4	4
Parameter[1]	Units	Maximum Value	Frequency of Detection	Cleanup Goal[2]	Number of Exceedances	Number of Times Detected	Number of Analyses	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds															
1,1,1-Trichloroethane	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
1,1-Dichloroethane	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Benzene	UG/L	15	19%	1	2	3	16	1 U	1 U	1 U	15 J	0.51 J	1 U	1 U	2.3
Cis-1,2-Dichloroethene	UG/L	1.5	13%	5	0	2	16	1 U	0.2 J	1 U	1.5 J	1 U	1 U	1 U	1 U
Chloroform	UG/L	0	0%	7	0	0	16	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Ethyl benzene	UG/L	12	13%	5	1	2	16	1 U	1 U	1 U	12 J	0.67 J	1 U	1 U	1 U
Toluene	UG/L	0.39	6%	5	0	1	16	1 U	1 U	1 U	1.6 U	1 U	1 U	1 U	0.39 J
Total Xylenes	UG/L	2.9	19%	5	0	3	16	1 U	3 U	1 U	2.9 J	0.71 J	1 U	1 U	1.93 J
Trichloroethene	UG/L	0.51	6%	5	0	1	16	1 U	1 U	1 U	0.51 J	1 U	1 U	1 U	1 U

Notes:
1. Only parameters with site-specific cleanup goals listed in Table 2 are included.
2. The cleanup goal values are NYSDEC Class GA Groundwater Standards (TOGS 1.1.1, June 1998).
3. Shading indicates concentration above cleanup goal.

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate

Table 4
Summary of SEAD-25 Geochemical Parameters
SEAD-25 Annual Report
Seneca Army Depot Activity

Well ID	Date	Round	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)	Turbidity (NTU)	pH (Std units)	Conductivity (S/m)	Iron (ug/L)	Sodium (ug/L)	Chloride (mg/L)	Nitrate (mg/L-N)	Nitrite (mg/L-N)	Sulfate (mg/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	Sulfide (mg/L)
MW25-10	1/31/06	1	4.22	107	5	1.09	6.97	0.464	62.8	8870	0.73	0.05 U	0.05 U	18.1	2 U	2 U	2 U	0.1
	8/9/06	2	4.23	138.8	21.56	195	6.56	0.701	358	6530 J	0.71 J	0.05 U	0.05 U	18.4	2 U	2 U	2 U	0.28
	3/4/08	4	3.65	130	3.6	2.36	7.31	0.473	100 U	6090	0.2 U	0.102 J	0.102	12.9	1 U	1 U	2 U	0.02
MW25-13	1/31/06	1	0.94	38	3.8	21	7.27	0.492	320	40600	2.5	0.05 U	0.05 U	15.6	2 U	2 U	2 U	0.02
	8/9/06	2	4.1	-22.2	23.42	100	6.98	0.699	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/3/08	4	4.79	97	3	16.4	7.52	0.639	NS	NS	NS	NS	NS	NS	NS	0.639	NS	0
MW25-15	1/31/06	1	2.93	82	5.3	1.1	7.2	0.36	56	3080	0.66	0.05 U	0.05 U	14.4	2 U	2 U	2 U	0
	8/14/06	2	1.99	222.1	18.76	27.4	5.8	0.651	850	6630 J	1.4 J	0.05 U	0.087	17.9	2 U	2 U	2 U	0.8
	3/3/08	4	4.57	139	4.7	3.58	7.25	0.477	100 U	6340	0.2 U	0.16 J	0.16	13.3	1 U	1 U	2 U	0
MW25-17	1/31/06	1	8.46	68	6.3	3.4	7.69	0.462	46.1	4240	0.7	0.05 U	0.05 U	17.2	2 U	2 U	2 U	0.01
	8/11/06	2	5.31	157	18.27	1.7	6.72	0.593	8.8 U	5170 J	1.4 J	0.11	0.05 U	16.3	2 U	2 U	2 U	0
	6/7/07 [1]	3	0.31	134	13.2	12	7.2	0.418	0.44 J	8.5 J	3.6	0.23	1.3	6.55	0.615 UJ	3.44 J	18.5	0.06
	3/4/08 [1]	4	8.24	155	6	2.03	7.3	0.532	100 U	4550	0.2 U	0.798 J	0.798	19.6	1 U	1 U	2 U	0.01
MW25-18	1/31/06	1	3.99	63	7.2	31.8	7.62	0.494	462	22300	18.6	0.05 U	0.05 U	24.8	2 U	2 U	2 U	0.12
	8/14/06	2	6.21	46	24.41	6.22	7.32	0.858	357	41900 J	55.6	0.32	0.05 U	30.1	2 U	2 U	2 U	0.02
	6/6/07	3	0.96	98	13	11	7.15	0.54	0.5 J	37 J	59	0.024 J	2	2	0.5	1.5 J	31	1.04
	3/5/08	4	4.68	144	4.9	5.04	7.31	0.713	107	20400	18	0.199 J	0.199	16.8	1 U	1 U	2 U	0.01
MW25-3	1/31/06	1	1.19	79	4.3	2.2	7.1	0.49	86	12300	2.1	0.05 U	0.05 U	39.9	2 U	2 U	2 U	0.04
	1/31/06	1	1.19	79	4.3	2.2	7.1	0.49	76.4	12000	2.3	0.05 U	0.05 U	39.8	2 U	2 U	2 U	0.04
	8/11/06	2	3.6	77.9	21.54	1.2	7.02	0.686	3820	11300 J	1.5 J	0.05 U	0.05 U	44.9	2 U	2 U	2 U	0.03
	3/4/08	4	0.87	124	3.5	2	7.15	0.675	107	5540	2.66	0.098 J	0.098	100	1 U	1 U	0.34 J	0.01
MW25-8	1/31/06	1	0.84	-70	4.1	2.4	7.3	0.494	329	5110	1.4	0.05 U	0.05 U	19.5	2 U	2 U	2 U	0.04
	8/11/06	2	2.92	33.4	25.01	8.7	6.97	0.72	667	7060 J	0.73 J	0.13	0.05 U	28.2	2 U	2 U	2 U	0.09
	3/4/08	4	2.21	61	2.7	5.1	7.46	0.427	349	4180	0.2 U	0.607 J	0.607	17.3	1 U	1 U	0.36 J	0.03
MW25-9	1/31/06	1	5.33	91	4.8	2.49	7.15	0.535	56.9	14500	1.1	0.05 U	0.05 U	21.8	2 U	2 U	29	0.02
	8/9/06	2	5.22	62.5	23.11	3.38	7.15	0.718	12 U	16400 J	0.99 J	0.1	0.05 U	25.3	2 U	2 U	2 U	0.45
	3/4/08	4	2.02	99	3.3	1.3	7.33	0.59	100 U	8380	0.2 U	0.05 UJ	0.05	24.8	1 U	1 U	2.4 J	0
MW25-2 [1]	4/12/06	1	6.29	-11	10.5	16.1	7.17	0.551	2510	4730	6.5	0.05 U	0.05 U	39.6	2 U	2 U	80 J	0.01
	8/9/06 [1]	2	0.3	-82	26.55	2.3	6.93	0.562	666.5	5600 J	2.2 J	0.05 U	0.05 U	32.1	10 U	10 U	35.5	0.15
	6/6/07	3	0.07	-92	12.4	11	7.11	0.454	2.6 J	6	4	0.24	4.2	170	0.5	0.5	22	
	3/4/08	4	1.35	-60	3.2	2.78	7.15	0.64	711	3460	0.2 U	0.305 J	0.305	31.1	1 U	1 U	3.2 J	0
MW25-19	6/7/07	3	0.05	117	13.4	17	7.04	0.427	1.2 J	3.8 J	4.5	1.1	4.6	29	0.72 J	1.4 J	23	0.1
	3/3/08	4	5.84	161	5.8	16.4	7.23	0.478	515	4520	0.2 U	2 U	0.194 J	0.194	24.3	0.478	2 U	0.01

Note:
NS = not sampled
1. Duplicate samples have been averaged

Appendix A-1
Complete Groundwater Data
SEAD-25 Annual Report
Seneca Army Depot Activity

Facilty								SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25
Location ID								MW25-10	MW25-13	MW25-15	MW25-17	MW25-17	MW25-17	MW25-17
Matrix								GW	GW	GW	GW	GW	GW	GW
Sample ID								25LM20039	25LM20040	25LM20041	25LM20024	25LM20028	25LM20032	25LM20033
Sample Date								3/4/2008	3/3/2008	3/3/2008	6/7/2007	6/7/2007	3/4/2008	3/4/2008
QC Code								SA	SA	SA	DU	SA	DU	SA
Study ID								S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM
Sampling Round								4	4	4	3	3	4	4
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goal[1]	Number of Exceedances	Number of Times Detected	Number of Analyses	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds														
1,1,1-Trichloroethane	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	UG/L	0	0%	0.6	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	UG/L	0	0%		0	0	16	10 UJ	10 UJ	10 UJ	5 U	5 U	10 UJ	10 UJ
Benzene	UG/L	15	19%	1	2	3	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	UG/L	0	0%	80	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	UG/L	0	0%	80	0	0	16	1 UJ	1 UJ	1 UJ	2 U	2 U	1 UJ	1 UJ
Carbon disulfide	UG/L	0	0%		0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorodibromomethane	UG/L	0	0%	80	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	UG/L	0	0%	5	0	0	16	2 U	2 U	2 U	1 U	1 U	2 U	2 U
Chloroform	UG/L	0	0%	7	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethene	UG/L	1.5	13%	5	0	2	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl benzene	UG/L	12	13%	5	1	2	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	UG/L	0.45	6%	5	0	1	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Meta/Para Xylene	UG/L	1.9	19%		0	3	16	1 U	1 U	1 U	2 U	2 U	1 U	1 U
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl bromide	UG/L	0	0%	5	0	0	16	2 U	2 U	2 U	1 U	1 U	2 U	2 U
Methyl butyl ketone	UG/L	0	0%		0	0	16	5 U	5 U	5 U	2 U	2 U	5 U	5 U
Methyl chloride	UG/L	0	0%	5	0	0	16	2 U	2 U	2 U	1 U	1 U	2 U	2 U
Methyl ethyl ketone	UG/L	0.93	19%		0	3	16	5 U	5 U	5 U	2 U	2 U	0.75 J	0.93 J
Methyl isobutyl ketone	UG/L	0	0%		0	0	16	5 U	5 U	5 U	1 U	1 U	5 U	5 U
Methylene chloride	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Naphthalene	UG/L	0.23	17%		0	1	6				1 U	1 U		
Ortho Xylene	UG/L	1.5	6%	5	0	1	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	UG/L	0.39	6%	5	0	1	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,2-Dichloroethene	UG/L	0	0%	5	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	UG/L	0.51	6%	5	0	1	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	UG/L	0	0%	2	0	0	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Notes:
1. The cleanup goal values are NYSDEC Class GA Groundwater Standards (TOGS 1.1.1, June 1998).
2. Shading indicates concentration above cleanup goal.

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate

Appendix A-1
Complete Groundwater Data
SEAD-25 Annual Report
Seneca Army Depot Activity

Facilty								SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25	SEAD-25
Location ID								MW25-18	MW25-18	MW25-19	MW25-19	MW25-2	MW25-2	MW25-3	MW25-8	MW25-9
Matrix								GW	GW	GW	GW	GW	GW	GW	GW	GW
Sample ID								25LM20029	25LM20034	25LM20030	25LM20035	25LM20020	25LM20031	25LM20036	25LM20037	25LM20038
Sample Date								6/6/2007	3/5/2008	6/7/2007	3/3/2008	6/6/2007	3/4/2008	3/4/2008	3/4/2008	3/4/2008
QC Code								SA	SA	SA	SA	SA	SA	SA	SA	SA
Study ID								S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM	S-25 LTM
Sampling Round								3	4	3	4	3	4	4	4	4
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goal[1]	Number of Exceedances	Number of Times Detected	Number of Analyses	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds																
1,1,1-Trichloroethane	UG/L	0	0%	5	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
1,1-Dichloroethane	UG/L	0	0%	5	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
1,1-Dichloroethene	UG/L	0	0%	5	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
1,2-Dichloroethane	UG/L	0	0%	0.6	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Acetone	UG/L	0	0%		0	0	16	5 UJ	10 UJ	5 U	10 UJ	5 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Benzene	UG/L	15	19%	1	2	3	16	1 UJ	1 U	1 U	1 U	**15** J	0.51 J	1 U	1 U	**2.3**
Bromodichloromethane	UG/L	0	0%	80	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Bromoform	UG/L	0	0%	80	0	0	16	2 UJ	1 UJ	2 U	1 UJ	2 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Carbon disulfide	UG/L	0	0%		0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Chlorobenzene	UG/L	0	0%	5	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Chlorodibromomethane	UG/L	0	0%	80	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Chloroethane	UG/L	0	0%	5	0	0	16	1 UJ	2 U	1 U	2 U	1 UJ	2 U	2 U	2 U	2 U
Chloroform	UG/L	0	0%	7	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethene	UG/L	1.5	13%	5	0	2	16	1 UJ	1 U	0.2 J	1 U	1.5 J	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Ethyl benzene	UG/L	12	13%	5	1	2	16	1 UJ	1 U	1 U	1 U	**12** J	0.67 J	1 U	1 U	1 U
Isopropylbenzene	UG/L	0.45	6%	5	0	1	16	1 UJ	1 U	1 U	1 U	0.45 J	1 U	1 U	1 U	1 U
Meta/Para Xylene	UG/L	1.9	19%		0	3	16	2 UJ	1 U	2 U	1 U	1.9 J	0.71 J	1 U	1 U	0.43 J
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	10 U	1 U	1 U	1 U
Methyl bromide	UG/L	0	0%	5	0	0	16	1 UJ	2 U	1 U	2 U	1 U	1 U	2 U	2 U	2 U
Methyl butyl ketone	UG/L	0	0%		0	0	16	2 U	5 U	2 U	5 U	2 U	2 U	5 U	5 U	5 U
Methyl chloride	UG/L	0	0%	5	0	0	16	1 UJ	2 U	1 U	2 U	1 UJ	5 U	2 U	2 U	2 U
Methyl ethyl ketone	UG/L	0.93	19%		0	3	16	2 UJ	0.5 J	2 U	5 U	2 UJ	2 U	5 U	5 U	5 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	16	1 UJ	5 U	1 U	5 U	1 UJ	5 U	5 U	5 U	5 U
Methylene chloride	UG/L	0	0%	5	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Naphthalene	UG/L	0.23	17%		0	1	6	1 UJ	1 U	1 U		0.23 J				
Ortho Xylene	UG/L	1.5	6%	5	0	1	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1.5
Styrene	UG/L	0	0%	5	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Tetrachloroethene	UG/L	0	0%	5	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Toluene	UG/L	0.39	6%	5	0	1	16	1 UJ	1 U	1 U	1 U	1.6 U	1 U	1 U	1 U	0.39 J
Trans-1,2-Dichloroethene	UG/L	0	0%	5	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U
Trichloroethene	UG/L	0.51	6%	5	0	1	16	1 UJ	1 U	1 U	1 U	0.51 J	1 U	1 U	1 U	1 U
Vinyl chloride	UG/L	0	0%	2	0	0	16	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U

Notes:
1. The cleanup goal values are NYSDEC Class GA Groundwater Standards (TOGS 1.1.1, June 1998).
2. Shading indicates concentration above cleanup goal.

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate