US Army
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Huntsville, AL

ANNUAL REPORT AND YEAR 4 REVIEW
ASH LANDFILL OPERABLE UNIT
SENECA ARMY DEPOT ACTIVITY

DRAFT

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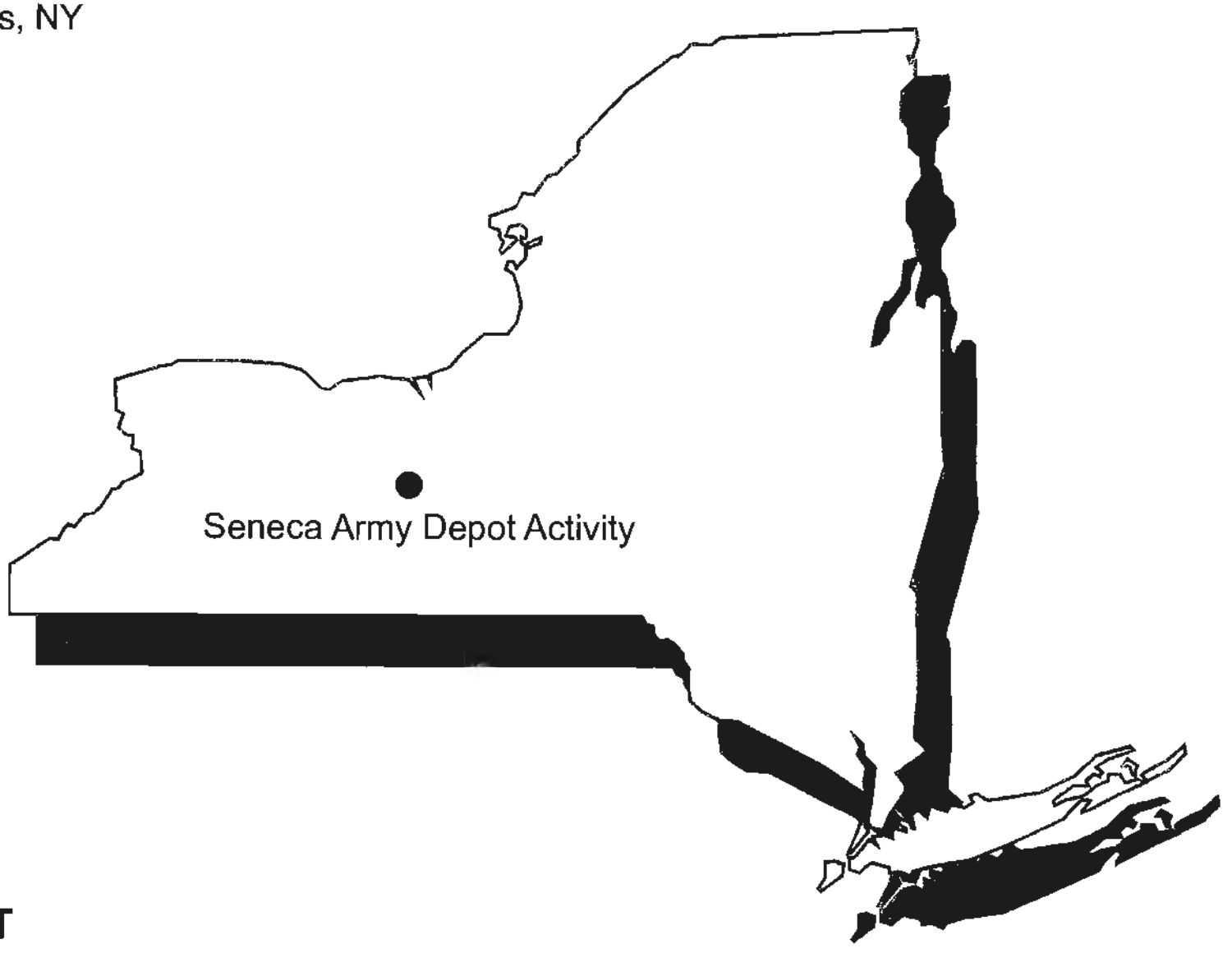
Seneca Army Depot Activity
Romulus, NY



DRAFT
ANNUAL REPORT AND YEAR 4 REVIEW
ASH LANDFILL OPERABLE UNIT
SENECA ARMY DEPOT ACTIVITY

CONTRACT NO. W912DY-08-D-0003
TASK ORDER NO. 0001
EPA Site ID# NY0213820830
NY Site ID# 8-50-006

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May 2, 2011

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: Draft Annual Report and Year Four Review – Ash Landfill Operable Unit at Seneca Army Depot Activity; W912DY-08-D-0003, Delivery Order 0001

Dear Mr. Nohrstedt:

Parsons Infrastructure & Technology Group, Inc. (Parsons) is pleased to submit the Draft Annual Report and Year Four Review for the fourth year of monitoring at the Ash Landfill Operable Unit at Seneca Army Depot Activity (SEDA) in Romulus, New York. This work was performed in accordance with the Scope of Work for Delivery Order 0001 under Contract W912DY-08-D-0003. This Annual Report and Year Four Review provides a review of long-term groundwater monitoring for 2010 and provides recommendations for future long-term monitoring at the site. This document also provides an annual review of the effectiveness of the remedy implemented in 2006. This document recommends the continuation of monitoring on a semi-annual basis for the next year.

Parsons appreciates the opportunity to provide you with the Draft Annual Report and Year Four Review 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. Battaglia, USACE, NY

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May 2, 2011

Mr. Julio Vazquez
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Mr. Kuldeep K. Gupta, P.E.
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Division of Environmental Remediation
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Mr. Mark Sergott
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Troy, NY 12180

SUBJECT: Draft Annual Report and Year Four Review – Ash Landfill Operable Unit at Seneca Army Depot Activity; EPA Site ID# NY0213820830 and NY Site ID# 8-50-006

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

Parsons Infrastructure & Technology Group, Inc. (Parsons) is pleased to submit the Draft Annual Report and Year Four Review for the fourth year of annual monitoring at the Ash Landfill Operable Unit at Seneca Army Depot Activity (SEDA) in Romulus, New York (EPA Site ID# NY0213820830 and NY Site ID# 8-50-006). This Annual Report and Year Four Review provides a review of long-term groundwater monitoring for 2010 and recommendations for future long-term monitoring at the site. This document also provides an annual review of the effectiveness of the remedy implemented in 2006. This document recommends the continuation of monitoring on a semi-annual basis for the next year.

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Sincerely,

Todd Heino, P.E.
Program Manager

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cc: M. Heaney, TechLaw
S. Absolom, SEDA
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K. Hoddinott, USACHPPM

DRAFT
ANNUAL REPORT AND YEAR 4 REVIEW
FOR THE
ASH LANDFILL OPERABLE UNIT
SENECA ARMY DEPOT ACTIVITY, ROMULUS, NEW YORK

Prepared for:

U.S. ARMY CORPS OF ENGINEERS, ENGINEERING AND SUPPORT CENTER
HUNTSVILLE, ALABAMA

and

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

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Contract Number W912DY-08-D-0003
Task Order No. 0001
EPA Site ID# NY0213820830
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May 2011

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1.0 INTRODUCTION

This Annual Report is for the Ash Landfill Operable Unit (OU), located at the Seneca Army Depot Activity (SEDA or the Depot) in Romulus, New York (**Figure 1**). This report provides a review of the fourth year of long-term groundwater monitoring of the full-scale biowall system installed in 2006. This report also provides recommendations for future long-term monitoring at the site. This report is based on an annual review of the effectiveness of the remedy implemented in 2006, and includes the following:

- A comparison of the groundwater data to the long-term groundwater monitoring (LTM) objectives, listed below in **Section 1.1**;
- An evaluation of the need to recharge (i.e., add substrate) the biowalls, as outlined in the Remedial Design Report (RDR) (Parsons, 2006c) in **Section 3.4**; and
- An assessment of the remedy's compliance with the United States Environmental Protection Agency's (USEPA's) "Guidance for Evaluation of Federal Agency Demonstrations (Section 12(h)(s))."

A remedial action (RA) was completed in October and November 2006 in accordance with the Record of Decision (ROD) for the Ash Landfill OU (Parsons, 2004), the Remedial Design Work Plan (Parsons, 2006b), and the RDR (Parsons, 2006c). The RA involved the following:

- Installation of three dual biowall systems, A1/A2, B1/B2, and C1/C2, to address volatile organic compounds (VOCs) in groundwater that exceed New York State Department of Environmental Conservation's (NYSDEC's) Class GA groundwater standards;
- Construction and establishment of a 12-inch vegetative cover over the Ash Landfill and the Non-Combustible Fill Landfill (NCFL) to prevent ecological receptors from coming into direct contact with the underlying soils that are contaminated with metals and polycyclic aromatic hydrocarbons (PAHs);
- Excavation and disposal of Debris Piles A, B, and C; and
- Re-grading of the Incinerator Cooling Water Pond to promote positive drainage.

As part of the RA at the Ash Landfill OU, LTM is being performed as part of the post-closure operations. Groundwater monitoring is required as part of the remedial design, which was formulated to comply with the ROD. The first of four rounds of groundwater sampling performed in the first year of LTM was completed between January 3, 2007 and January 4, 2007; the second round was completed between March 15, 2007 and March 17, 2007; the third round was completed between June 5, 2007 and June 7, 2007; and the last round was completed between November 13, 2007 and November 15, 2007.

The analytical and geochemical results were presented in four letter reports, submitted April 12, 2007 (Quarter 1), June 5, 2007 (Quarter 2), September 19, 2007 (Quarter 3), and February 21, 2008 (Quarter 4). The results of the Year 1 LTM were reported and evaluated in the "Annual Report and One-Year Review for the Ash Landfill" (Parsons, 2008a). As part of the Year 1 report, the Army recommended that the frequency of LTM events at the Ash Landfill OU be reduced from quarterly to semi-annually; this recommendation was approved by the USEPA and NYSDEC.

The first round of Year 2 semi-annual monitoring, referred to as Round 5, was completed between June 24, 2008 and June 26, 2008, and the results are presented in the letter report issued on January 12, 2009. Round 6 of the semi-annual monitoring was completed between December 11, 2008 and December 15, 2008, and the results are presented in the letter report issues on April 3, 2009. The results of Year 2 of the LTM program were presented in the "Annual Report and Year Two Review" (Parsons, 2009). The first round of Year 3 semi-annual monitoring, referred to as Round 7, was completed between June 1, 2009 and June 4, 2009, and the results are presented in the letter report issued on August 5, 2009. Round 8 of the semi-annual monitoring was completed between December 14, 2009 and December 18, 2009, and the results are presented in the letter report issued on March 5, 2010. The results of Year 3 of the LTM program were presented in the "Annual Report and Year Three Review" (Parsons, 2010). The first round of Year 4 semi-annual monitoring, referred to as Round 9, was completed between June 28, 2010 and July 2, 2010, and the results are presented in the letter report issued on November 2, 2010. Round 10 of the semi-annual monitoring was completed between December 14, 2010 and December 19, 2010, and the results are presented in the letter report issued on April 5, 2011

This Annual Report reviews the results of the fourth year of the LTM program as part of the ongoing evaluation of the remedy and provides conclusions and recommendations about the effectiveness of the remedial action, including the groundwater remedy and the vegetative landfill covers.

1.1 Long-Term Groundwater Monitoring Objectives

Three types of long-term groundwater monitoring are being performed: 1) plume performance monitoring, 2) biowall process monitoring, and 3) off-site compliance monitoring. On-site performance monitoring is being conducted to measure groundwater contaminant concentrations and to evaluate the effectiveness of the biowall remedy for the Ash Landfill OU. The objectives of performance and compliance monitoring are as follows:

- Confirm that there are no exceedances of groundwater standards for contaminants of concern (COCs) at the off-site compliance monitoring well MW-56;
- Document the effectiveness of the biowalls to remediate and attenuate the chlorinated ethene plume; and

- Confirm that groundwater concentrations throughout the plume are decreasing to eventually meet NYSDEC Class GA groundwater standards.

Biowall process monitoring is being conducted at two locations (shown in **Figure 2**) to determine if, and when, any biowall maintenance activities should be performed. The first location is within Biowalls B1/B2 in the segment that runs along the pilot-scale biowalls that were installed in July 2005. The second location is within Biowall C2, the furthest downgradient biowall. The objectives of biowall process monitoring for operations and maintenance (O&M) activities are as follows:

- Monitor the long-term performance and sustainability of the biowalls;
- Monitor substrate depletion and geochemical conditions under which the effectiveness of the biowalls may decline; and
- Determine if, and when, the biowalls need maintenance (i.e., need to be recharge with additional organic substrate).

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, that was owned by the United States Government and operated by the Department of the Army from 1941 until 2000. In 2000, the Army assumed a caretaker role at the SEDA, and since this time more than 8,500 acres of the property have been transferred to other parties. SEDA is located between Seneca Lake and Cayuga Lake and is bordered by New York State Highway 96 to the east, New York State Highway 96A to the west, and sparsely populated farmland to the north and south.

The location of the Ash Landfill OU, also referred to as the Ash Landfill, is composed of five historic solid waste management units (SWMUs). As shown in **Figure 3**, the five SWMUs that comprise the Ash Landfill OU are the Incinerator Cooling Water Pond (SEAD-3), the Ash Landfill (SEAD-6), the NCFL (SEAD-8), the former Debris Piles (SEAD-14), and the former Abandoned Solid Waste Incinerator Building (SEAD-15).

Prior to the Army's purchase of land for construction of the SEDA, the area of the Ash Landfill OU was used for farming. From 1941 (the date SEDA was constructed) to 1974, uncontaminated trash was burned in a series of burn pits located near the former abandoned incinerator building (Building 2207). According to the U.S. Army Environmental Hygiene Agency (USAEHA) Interim Final Report, Groundwater Contamination Survey No. 38-26-0868-88 (July 1987), the ash from the refuse burning pits was buried in the Ash Landfill (SEAD-6) from date of inception until the late 1950s or early 1960s.

The incinerator was built in 1974. Between 1974 and 1979, materials intended for disposal were transported to the incinerator. Each week the Depot generated approximately 18 tons of refuse, the

majority of which was incinerated. The source for the refuse was domestic waste from Depot activities and family housing. Large items that could not be burned were disposed at the NCFL (SEAD-8). The NCFL encompasses approximately three acres located southeast of the former incinerator building, immediately south of a SEDA railroad line. The NCFL was used as a disposal site for non-combustible materials, including construction debris, from 1969 until 1977.

Ash and other residue from the former incinerator were temporarily disposed in an unlined cooling pond immediately north of the incinerator building. The cooling pond consisted of an unlined depression approximately 50 feet in diameter and approximately 6 to 8 feet deep. When the pond filled, the fly ash and residues were removed, transported, and buried in the adjacent ash landfill east of the cooling pond. The refuse was dumped in piles and occasionally spread and compacted. No daily or final cover was applied during operation. According to an undated aerial photograph of the incinerator during operation, the active area of the Ash Landfill extended at least 500 feet north of the incinerator building, near a bend in a dirt road. A fire destroyed the incinerator on May 8, 1979, and the landfill was subsequently closed. Post-closure the landfill was apparently covered with native soil of various thicknesses, but was not closed with an engineered cover or cap. Other areas at the site were used as a grease pit and for burning debris.

2.2 Site Geology/Hydrogeology

The site is underlain by a broad north-to-south trending series of rock terraces covered by a mantle of glacial till. As part of the Appalachian Plateau, the region is underlain by a tectonically undisturbed sequence of Paleozoic rocks consisting of shales, sandstones, conglomerates, limestones and dolostones. At the Ash Landfill site, these rocks (the Ludlowville Formation) are characterized by gray, calcareous shales and mudstones and thin limestones with numerous zones of abundant invertebrate fossils. Locally, the shale is soft, gray, and fissile. The shale, which has a thin weathered zone at the top, is overlain by 2 to 3 feet of Pleistocene-age[1] till deposits. The till matrix varies locally, but generally consists of unsorted silt, clay, sand, and gravel.

The thickness of the till at the Ash Landfill OU generally ranges from 4 to 15 feet. At the location of the biowalls, the thickness of the till and weathered shale is approximately 10 to 15 feet. Groundwater is present in both the shallow till/weathered shale layer and in the deeper competent shale layer. In both water-bearing units, the predominant direction of groundwater flow is to the west, toward Seneca Lake. Based on the historical data, the wells at the Ash Landfill site exhibit rhythmic and seasonal fluctuations in the water table and the saturated thickness. Historic data at the Ash Landfill OU indicate that the saturated interval is thin (generally between 1 and 3 feet thick) in the month of September and is thickest (generally between 6 and 8.5 feet thick) between December and March.

[1] The Pleistocene Age, also known as the Late Wisconsin Age, occurred 20,000 years before present.

The average linear velocity of the groundwater in the till/weathered shale layer was calculated during the Remedial Investigation (RI) in 1994 using the following parameters: 1) average hydraulic conductivity of 4.5×10^{-4} centimeters per second (cm/sec) (1.28 feet per day [ft/day]), 2) estimated effective porosity of 15% to 20%, and 3) groundwater gradient of 1.95×10^{-2} feet per foot (ft/ft) (Parsons Engineering Science, Inc., 1994). The average linear velocity was calculated as 0.166 ft/day or 60.7 feet per year (ft/yr) at 15% effective porosity and 0.125 ft/day or 45.5 ft/yr at 20% effective porosity. The actual velocity of on-site groundwater may be locally influenced by zones of higher-than-average permeability; these zones are possibly associated with variations in the porosity of the till/weathered shale.

2.3 Soil and Groundwater Impacts

The nature and extent of the COCs at the Ash Landfill OU were evaluated through a comprehensive RI program. It was determined that surface water and sediment were not media of concern and did not require remediation. A groundwater contaminant plume that emanated from the northern end of the Ash Landfill was delineated during the RI. The primary COCs in groundwater at the Ash Landfill are VOCs; the primary COCs in soil at the Ash Landfill are chlorinated and aromatic compounds, semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), and, to a lesser degree, metals. Release of the COCs is believed to have occurred during the former activities at the Ash Landfill OU (described above).

Soil

VOCs, specifically trichloroethene (TCE), were detected in the soil in the "Bend in the Road" area. Located northwest of the Ash Landfill, this area is believed to be the source of the groundwater plume. Between 1994 and 1995, the Army conducted a Non-Time Critical Removal Action (NTCRA), also known as an Interim Removal Measure (IRM), to address VOC and PAH contamination in soil near the "Bend in the Road." The excavation limits of the NTCRA are shown on **Figure 3**. The NTCRA successfully reduced the risk associated with potential exposure to contaminated soil, and prevented continued leaching of VOCs to groundwater. Since the NTCRA, concentrations of VOCs in groundwater near the original source area have decreased by two orders of magnitude. Further remediation for VOCs in the soil at the "Bend in the Road" was not required.

The other COCs detected in the soil were PAHs and metals. PAHs were detected at concentrations above NYSDEC's Technical and Administrative Guidance Memorandum (TAGM #4046) values in the NCFL and the Debris Piles present around the former Ash Landfill. In general, the highest PAH concentrations were detected in the NCFL and small Debris Pile surface soils. The metals that were detected at elevated concentrations (significantly above TAGMs) in soils were copper, lead, mercury, and zinc. These elevated concentrations were found in the Ash Landfill, the NCFL, and the Debris Piles, with the highest concentrations of metals detected at the surface of the Debris Piles. These piles were small, localized, surface features that were visibly discernable and did not extend into the subsurface. The former debris piles were excavated and disposed offsite during the RA in 2006.

Groundwater

The primary potential impact to human health and the environment is a groundwater contaminant plume containing dissolved chlorinated solvents, primarily TCE, isomers of dichloroethene (DCE), and vinyl chloride (VC). The plume originates in the "Bend in the Road" area near the northwestern edge of the Ash Landfill and is approximately 1,100 feet long by 625 feet wide. The nearest exposure points for groundwater are three farmhouse wells located approximately 1,250 feet from the leading edge of the plume near the farmhouse. The location of the farmhouse relative to the plume at the Ash Landfill is shown on **Figure 4**. Two of the farmhouse wells draw water from the till/weathered shale aquifer and the remaining well draws water from the bedrock aquifer. As discussed in Section 4.4 of the RI (Parsons, 1994), plume profiles were constructed for geologic cross sections at the Ash Landfill; based on these profiles it was determined that the plume is vertically restricted to the upper till/weathered shale aquifer and is not present in the deeper competent shale aquifer. As noted above, the source area of the plume was removed by the NTCRA.

2.4 Summary of the Remedial Action

2.4.1 Biowalls

Three biowall pairs were installed to address groundwater contamination on-site, as documented in the Construction Completion Report (Parsons, 2007). The biowalls were constructed by excavating a linear trench to competent bedrock then backfilling the trench to the ground surface with a mixture of mulch and sand.

Biowalls A1/A2, B1/B2, and C1/C2 (as shown in **Figure 2**) were constructed perpendicular to the chlorinated solvent plume at the locations prescribed in the RDR. The entire length of Biowalls A1/A2 and the northern portion of B1/B2 were combined into a single double-width trench (minimum of 6 feet in width) due to unstable soil conditions that caused trench widening. Approximately 2,840 linear feet (lf) of biowalls were constructed in the areas downgradient of the Ash Landfill at depths ranging from 7 feet below ground surface (bgs) to 18.5 feet bgs.

A 12-inch soil cover was placed over the entire length of the biowalls to impede surface water from preferentially flowing into the biowall trenches. Trench spoils were used as the cover material and were compacted with a backhoe. A site visit in December 2010 confirmed that the mulch backfill in the trenches has settled to ground surface.

2.4.2 Incinerator Cooling Water Pond

As specified in the RDR, the Incinerator Cooling Water Pond (ICWP) was re-graded to meet the surrounding grade to prevent the accumulation of water in this inactive pond. Prior to re-grading, the vegetation on the berms surrounding the ICWP was removed with an excavator. The soil berm was then regraded with a dozer to match the surrounding grade. The ICWP was seeded with a standard meadow mix to promote vegetation and to prevent erosion.

2.4.3 Ash Landfill and NCFL Vegetative Cover

A soil cover comprised of mulch, biowall trench spoils that met the site cleanup criteria, and off-site topsoil was placed over the 2.2 acres of the Ash Landfill. The Ash Landfill was covered with 4,380 cubic yards (cy) of fill to achieve a minimum cover thickness of 12 inches. Biowall trench spoils that met the site cleanup criteria and off-site topsoil were placed over the 3.4 acre NCFL. The NCFL was covered with 6,015 cy of fill to achieve a minimum cover thickness of 12 inches. The purpose of the covers is to prevent terrestrial wildlife from directly contacting or incidentally ingesting metal-impacted soils.

2.4.4 Debris Pile Removal

During the RA, approximately 200 cy of debris was removed from Debris Piles B and C. Approximately 1,000 cy of debris was removed from within and beyond the staked limits of Debris Pile A. The total volume of debris removed was approximately 1,200 cy (1,548 tons).

2.5 Description of Technology Used in Biowalls

Reductive dechlorination is the most important process for natural biodegradation of highly chlorinated solvents (USEPA, 1998) (see **Figure 5**). Complete dechlorination of TCE and other chlorinated solvents is the goal of anaerobic biodegradation via mulch biowall technology.

Biodegradation causes measurable changes in groundwater geochemistry that can be used to evaluate the effectiveness of substrate addition in stimulating biodegradation. For anaerobic reductive dechlorination to be an effective process, generally groundwater must be sulfate-reducing or methanogenic. Thus, groundwater in which anaerobic reductive dechlorination is occurring should have the following geochemical signature:

- Depleted concentrations of dissolved oxygen (DO), nitrate, and sulfate;
- Elevated concentrations of manganese, ferrous iron, methane, carbon dioxide, chloride, and alkalinity; and
- Reduced oxidation reduction potential (ORP).

Treatment of chlorinated ethenes in groundwater using a biowall relies on the flow of groundwater under a natural hydraulic gradient through the biowall to promote contact with slowly-soluble organic matter. As the groundwater flows through the organic matter in the biowall, an anaerobic treatment zone is established in the biowall. The treatment zone may also be established downgradient of the biowall as soluble organic matter migrates with groundwater and stimulates microbial processes.

Solid-phase organic substrates used to stimulate anaerobic biodegradation of chlorinated ethenes include plant mulch and compost. To enhance microbial activity, the mulch may be composted prior

to emplacement to more readily degraded material, or mulch may be mixed with an outside source of compost. Mulch is primarily composed of cellulose and lignin, and contains "green" plant material that provides nitrogen and nutrients for microbial growth. These substrates are mixed with coarse sand and placed in a trench or excavation in a permeable reactive biowall configuration. Biodegradable vegetable oil may be added to the mulch mixture to increase the availability of soluble organic carbon.

Degradation of the organic substrate by microbial processes in the subsurface provides a number of breakdown products, including metabolic acids (e.g., butyric and acetic acids). The breakdown products and acids produced by degradation of mulch in a saturated subsurface environment provide secondary fermentable substrates for the generation of molecular hydrogen, which is the primary electron donor utilized in anaerobic reductive dechlorination of chlorinated ethenes. Thus, a mulch biowall has the potential to stimulate reductive dechlorination of chlorinated ethenes for many years. If necessary, mulch biowalls can be periodically recharged with liquid substrates (e.g., emulsified vegetable oils) to extend the life of the biowall. Vegetable oil is a substrate that is readily available to microorganisms as a carbon source that helps establish and continually develop the microbial population. Used in combination with mulch, vegetable oil has the potential to enhance and extend the duration of organic carbon release.

3.0 LONG-TERM MONITORING DATA ANALYSIS AND GROUNDWATER REMEDY EVALUATION

3.1 Sample Collection

Four rounds of sampling were conducted during the first year of LTM, as follows:

- The first quarter, referred to as 1Q2007, was completed between January 3, 2007 and January 4, 2007;
- The second quarter, referred to as 2Q2007, was completed between March 15, 2007 and March 17, 2007;
- The third quarter, referred to as 3Q2007, was completed between June 5, 2007 and June 7, 2007; and
- The fourth quarter, referred to as 4Q2007, was completed between November 13, 2007 and November 15, 2007.

Two rounds of sampling were conducted during the second year of LTM, as follows:

- Round five, referred to as 5R2008, was completed between June 24, 2008 and June 26, 2008; and

- Round six, referred to as 6R2008, was completed between December 11, 2008 and December 15, 2008.

Two rounds of sampling were conducted during the third year of LTM, as follows:

- Round seven, referred to as 7R2009, was completed between June 1, 2009 and June 4, 2009; and

- Round eight, referred to as 8R2009, was completed between December 14, 2009 and December 18, 2009.

Two rounds of sampling were conducted during the fourth year of LTM, as follows:

- Round nine, referred to as 9R2010, was completed between June 28, 2010 and July 2, 2010; and

- Round ten, referred to as 10R2010, was completed between December 14, 2010 and December 19, 2010.

The first year of sampling was quarterly, and at that time, the sampling rounds were identified as xQyyyy, where "x" is the round number, and "yyyy" is the 4 digit year. After the first year, the sample frequency was modified to semiannual. An "R" was used to replace the "Q" to denote the round. The round number has been used sequentially since the first quarterly round.

Groundwater samples were collected using low flow sampling techniques during each of the 2010 sampling rounds. Bladder pumps were used to purge the wells and collect the samples during these rounds. 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, 2006a). Field forms for 9R2010 and 10R2010 are included on a CD in **Appendix A**.

Fourteen monitoring wells were sampled and classified into three groups (listed in **Table 1**): eleven on-site plume performance monitoring wells, one off-site compliance monitoring well, and five biowall process monitoring wells. The off-site performance monitoring well, MW-56, is monitored on a semi-annual basis, and was monitored in January 2007, June 2007, June 2008, December 2008, June 2009, December 2009, June 2010, and December 2010. The well locations are shown on **Figure 6**.

Three of the biowall process monitoring wells are also plume performance wells (MWT-23, MWT-28, and MWT-29). These five wells are either within or immediately upgradient or downgradient of the biowalls and are used to assess if, and when, the biowalls may require additional substrate. The Annual Report – Year 1 recommended that groundwater samples collected from monitoring wells PT-

17 and MWT-7 be analyzed for additional geochemical parameters that are included for the process monitoring wells to better monitor the progress of the treatment zone.

As indicated in **Table 1**, samples from the wells in the biowall process monitoring group (MWT-23, MWT-26, MWT-27, MWT-28, and MWT-29) and from two wells from the on-site plume performance group (PT-17 and MWT-7) were submitted to Test America Laboratories, Inc. in Buffalo, New York for Rounds 1 through 8 and to Test America Laboratories, Inc. in Savannah, Georgia for Rounds 9 and 10 to be analyzed for:

- VOCs by USEPA SW846 Method 8260B
- Total organic carbon (TOC) by USEPA SW846 Method 9060A
- Sulfate by USEPA Method 300.1

Samples from these wells were also submitted to Microseeps, Inc. located in Pittsburgh, Pennsylvania for analysis for methane, ethane, and ethene (MEE) by AM20GAX, Microseeps' version of Method RSK 175.

During sampling in the field, the following geochemical parameters were recorded for the duration of low-flow sampling for each groundwater sample:

- pH, ORP, and conductivity were measured with a Horiba U-52 multi-parameter instrument;
- DO and temperature were measured with a YSI 85 meter; and
- Turbidity was measured with a Lamotte 2020 turbidity meter.

In addition, a HACH® DR/850 Colorimeter was used in the field to measure manganese and ferrous iron at PT-17, MWT-7, MWT-23, MWT-26, MWT-27, MTW-28, and MWT-29. Manganese and ferrous iron were measured by USEPA Method 8034 and USEPA Method 8146, respectively. A summary of the samples collected is presented in **Table 1**.

3.2 Groundwater Elevations

Historic groundwater elevations and groundwater elevations from the four years of LTM round are presented in **Figure 7** and **Table 2**. Groundwater contours and groundwater flow direction based on tenth round measurements taken on December 13, 2010 are provided in **Figure 8**; these data show that groundwater levels were relatively high during the tenth sampling event

3.3 Geochemical Data

Biodegradation causes measurable changes in groundwater geochemistry that can be used to evaluate the effectiveness of substrate addition in stimulating biodegradation. For anaerobic reductive dechlorination to be an effective process, typically groundwater will be sulfate-reducing or methanogenic. As mentioned above, geochemical parameters collected in the field that also serve as

water quality indicators (i.e., pH, ORP, DO, conductivity, and temperature) were recorded for all the wells in the LTM program. Analysis for the additional geochemical parameters of TOC, sulfate, and MEE, and field tests for ferrous iron and manganese, were completed at PT-18A, MWT-7, MWT-23, MWT-26, MWT-27, MWT-28, and MWT-29. According to USEPA guidance on natural attenuation of chlorinated solvents (USEPA, 1998), analysis of these geochemical parameters conditions are conducive for anaerobic reductive dechlorination to occur if the following geochemical signatures are identified::

- Depleted concentrations of DO and sulfate,
- Elevated concentrations of methane,
- Reduced ORP,
- Elevated concentrations of soluble organic substrate as defined by TOC in groundwater; and
- An increase in the concentrations of ferrous iron and manganese relative to background conditions.

Geochemical parameter results are shown in **Table 3**, which is organized with the most upgradient well listed first and the most downgradient well listed last. A comparison of the geochemical parameters for wells MWT-26 (upgradient of Biowall B1) to MWT-28 (in Biowall B2) for Year 4, summarized below, demonstrates the change in geochemistry across the B1/B2 Biowalls.

Dissolved Oxygen

DO is the most favored electron acceptor (i.e., yields the most energy) used by microbes during biodegradation of organic carbon, and its presence can inhibit the anaerobic degradation of chlorinated ethenes. In the wells sampled within Biowalls B1/B2 and Biowall C2, DO levels are depleted (less than 1.0 milligrams per liter [mg/L]) in both Year 4 events (see **Table 3**). DO is depleted due to the biological activity encouraged by the biowall substrate. The depletion of DO enhances the potential for anaerobic degradation of chlorinated ethenes in groundwater. The data also show that historically DO concentrations are higher in winter than in summer; the increase in DO concentrations between the two Year 4 sampling events, 9R2010 and 10R2010, likely reflects seasonal variation and not a systemic increase in DO.

Sulfate

Sulfate is used as an electron acceptor during sulfate reduction, competing with anaerobic reductive dechlorination for available substrate/electron donor. Sulfate levels lower than 20 mg/L are desired to prevent inhibition of reductive dechlorination of chlorinated ethenes (USEPA, 1998). In Year 4, concentrations were less than 20 mg/L in Biowall B2 (MWT-28) and Biowall C2 (MWT-23). the sulfate levels detected within the biowalls (at MWT-27, MWT-28, and MWT-23) were orders of

magnitude lower than the concentration of sulfate detected upgradient of Biowalls B1/B2 at MWT-26 (see **Table 3**). These conditions indicate that sulfate is being depleted and that sulfate should not inhibit anaerobic dechlorination within the bio walls.

Methane

The presence of methane in groundwater is indicative of strongly reducing methanogenic conditions. An increase in the concentrations of methane indicates that reducing conditions are optimal for anaerobic reductive dechlorination to occur. Methane was detected in the well upgradient of Biowall B1/B2 (MWT-26) at a concentration of 1,600 micrograms per liter (µg/L) in Round 10. Compared to this concentration, concentrations of methane were greater at the process wells located within biowall B2, and were at least an order of magnitude at greater at the process wells located within biowalls B1 and C2 (see **Table 3**). These data demonstrate that there is an increase in the level of methanogenic activity within the biowalls and in downgradient areas, compared to upgradient locations.

Oxidation-Reduction Potential

ORP indicates the level of electron activity in groundwater and the tendency of groundwater to accept or transfer electrons. Low ORP, less than -100 millivolts (mV), is conducive for anaerobic reductive dechlorination to occur (USEPA, 1998). During Round 10, ORP values upgradient of Biowall A1/A2 were significantly higher than ORP values in the wells within the biowalls, which were less than or equal to -100 mV (see **Table 3**). The ORP levels within Biowalls B1/B2 and C2 indicate that reducing conditions within the biowalls are sufficient to support sulfate reduction, methanogenesis, and anaerobic reductive dechlorination.

Total Organic Carbon

The presence of organic substrate is necessary to stimulate and sustain anaerobic degradation processes. In biowalls, organic carbon acts as an energy source for anaerobic bacteria and drives reductive dechlorination. Typically concentrations of TOC greater than 20 mg/L are sufficient to maintain sulfate reducing and methanogenic conditions (USEPA, 1998). As shown in **Table 3**, the TOC concentration in Biowall B1 was greater than the TOC concentrations upgradient of the biowalls. In Biowalls B2 and C2, the TOC concentrations decreased below the threshold value of 20 mg/L, but remained greater than the concentration at upgradient well, MWT-26. Downgradient of Biowall B2 (at MWT-29) and C2 (at PT-17), the concentration of TOC decreased below the threshold value of 20 mg/L. There is a decrease in the concentration of TOC as readily degraded organics (i.e., vegetable oil and cellulose) in the mulch mixture are consumed; however, TOC concentrations on-site remain sufficiently high enough to serve as an energy source for anaerobic bacteria in the biowalls. As discussed below, the change in TOC concentrations appears to have little impact on the efficiency at which chlorinated organics are degraded within the biowalls and does not indicate that the biowalls need to be recharged at this time.

Ferrous Iron and Manganese

As described in USEPA (1998), iron III (ferric iron) is an electron acceptor used by iron-reducing bacteria under anaerobic conditions; Iron II (ferrous iron) is the product. Iron III is relatively insoluble in groundwater relative to Iron II. Therefore, an increase in concentrations of Iron II in groundwater is a clear indication that anaerobic iron reduction is occurring. Similarly, USEPA (1998) states that manganese (IV) is an electron acceptor used by manganese-reducing bacteria under anaerobic environments; soluble manganese (II) is the product. Under anaerobic conditions like those at the Ash Landfill, the presence of manganese and ferrous iron in groundwater at concentrations above the natural background concentrations demonstrates that manganese reduction and iron reduction are occurring at the site. These data support the conclusion that conditions within the biowalls are anaerobic and conducive to the degradation of chlorinated ethenes.

Summary

Monitoring data for wells within the biowalls during the fourth year of LTM indicate the following:

- DO remains below 1.0 mg/L at Biowalls B1/B2 and Biowall C2;
- Concentrations of TOC remain elevated in the biowalls, and greater than at the upgradient well;
- ORP remains low, ranging from -121 mV to -100 mV;
- Sulfate remains low; mostly below 20 mg/L, and ranging from 2.8 to 25.0 mg/L;
- Methane concentrations are 12 mg/L or higher; and
- Ferrous iron concentrations are increasing in the biowalls, indicating that conditions are conducive to the degradation of chlorinated ethenes.

A multiple lines-of-evidence approach that evaluates geochemical parameters together with the analytical data indicates that conditions in the biowalls are sufficient to support anaerobic degradation processes. Substrate in the biowalls has not been significantly depleted and biodegradation continues to occur within the biowalls. Highly anaerobic conditions persist within the biowalls and sufficient levels of organic carbon, ORP, sulfate, and methane are being sustained for effective anaerobic degradation of chlorinated ethenes.

3.4 Chemical Data Analysis and Groundwater Remedy Evaluation

Table 4 summarizes the concentrations of chlorinated ethenes detected in groundwater during the ten rounds of LTM. **Table 4** is organized with the most upgradient well listed first and the most downgradient well listed last. A complete presentation of the groundwater data is provided in **Appendix B**. **Figure 6** presents the chlorinated ethene data for the ten rounds. The discussion below

focuses on data collected during Year 4 (Rounds 9 and 10) of the LTM program, and addresses how the remedial action objectives are being achieved.

Achievement of first performance monitoring objective:

- *Confirm that there are no exceedances of groundwater standards for contaminants of concern (COC) at the off-site trigger monitoring well MW-56;*

Concentrations of chlorinated ethenes at off-site well MW-56 remain low or non-detect, with concentrations of TCE, cis-DCE, and VC meeting regulatory standards. As shown in **Table 4**, the fourth year of LTM confirmed that there were no exceedances of COC groundwater standards at MW-56. VC and TCE were not detected in any of the rounds at MW-56; cis-DCE was detected at MW-56 below its Class GA groundwater standard (5 µg/L) during Year 4.

Achievement of second performance monitoring objective:

- *Document the effectiveness of the biowalls to remediate and attenuate the chlorinated ethene plume;*

TCE remains above the Class GA groundwater standard (5 µg/L) at PT-18A (upgradient of biowalls). Concentrations of TCE at PT-18A vary from 2,700 µg/L in the fourth round to 220 µg/L in the fifth round, rebounding to 2,100 µg/L in the eighth round, and decreasing to 6.3 µg/L in the tenth round (see **Table 4**). Concentrations of TCE at well MWT-25 (upgradient of Biowall A) have consistently decreased from 50 µg/L in the first quarter to below the Class GA groundwater standard at a concentration of 1.9 µg/L in Round 10.

Concentrations of TCE and cis-DCE within the biowalls at MWT-27 (in Biowall B1), MWT-28 (in Biowall B2), and MWT-23 (in Biowall C2) remain below Class GA standards, which is an expected performance measure. Cis-DCE was reported below Class GA standards in the biowalls in all rounds. Concentrations of VC were recorded above the Class GA standard in Biowalls B1 and C2, and was detected for the first time in Biowall B2. However in Year 4, VC concentrations for all three biowalls remained at or below the VC concentration at the upgradient well, MWT-26. Continued sampling is necessary to confirm any trend for VC at MWT-27 in subseequent monitoring events.

The reduction in concentrations of TCE to below detection, coupled with concentrations of cis-DCE and VC not being elevated within the biowalls, suggests that complete mineralization of chlorinated ethenes is occurring. Therefore, the biowalls are operating as expected with no loss of performance within the biowalls.

Ethene, a final product of reductive dechlorination, is only slightly elevated within the biowalls. This suggests that multiple anaerobic degradation processes may be occurring within in the biowalls. For example, ethene is not produced by anaerobic oxidation of cis-DCE or VC, nor by abiotic transformation of chlorinated ethenes by reduced iron sulfides. Alternatively, concentrations of

ethene may be low since ethene can be further reduced under highly anaerobic conditions or can off-gas with carbon dioxide or methane since it is volatile.

The overall trend in the concentrations of TCE, cis-DCE, and VC at well MWT-26 (between Biowalls A1/A2 and Biowalls B1/B2) is decreasing over time. Concentrations of TCE, cis-DCE, and VC at this well decreased during the Summer 2010 monitoring event, and increased in the Winter 2010 event. The area downgradient of MWT-26 is bounded by Biowalls B1/B2 in which the majority of concentrations of TCE, cis-DCE, and VC, except for the VC concentration in Biowall B2, remain non-detect or below their respective Class GA standards. The Army will continue to monitor well MWT-26 to see if an increasing trend in concentrations persists.

Concentrations at MWT-24 (downgradient of Biowall C2) show an overall decline over time, with some seasonal variation in cis-DCE (from 210 µg/L in the first quarter to 23 µg/L in the tenth round), and substantial decline in VC (from 45 µg/L in the second quarter to 4.3 µg/L in the tenth round). TCE has been at or below the Class GA groundwater standard (5 µg/L) at MWT-24 in all rounds, with the exception of 6.0 µg/L in Round 6 that was likely due to seasonal fluctuation (i.e., the effects of desorption during a period with frequent precipitation and subsequent high water levels).

The changes in groundwater concentrations of TCE, DCE, and VC as the groundwater passes through the biowalls are shown in **Figures 9A** through **9J** for Rounds 1 through 10, respectively. These figures show that the concentrations of TCE in groundwater within the biowalls are reduced to concentrations below detection limits. The concentration of TCE rebounds with distance downgradient of Biowalls C1/C2; this increase may be due to residual TCE that is desorbing from aquifer soils or diffusing out of low permeability soils. These results indicate that the biowalls treat the water within the biowalls and create a measurable, albeit slower, improvement in downgradient water quality, as well.

Anaerobic degradation of TCE may also occur in areas of the aquifer formation that are downgradient of the biowalls, where the presence of soluble organic carbon released from the biowalls enhances reductive dechlorination processes. In these downgradient areas, the concentrations of cis-DCE and VC are higher than they are within the biowalls. This suggests that sequential biotic reductive dechlorination of chlorinated organics is the primary degradation process in the downgradient reaction zones, with the presence of low concentrations of TCE being due to desorption from the aquifer matrix or from back diffusion of contaminated groundwater from low permeability soils. The elevated concentration of ethene, 88 µg/L and 7.9 µg/L observed at MWT-29 in Round 9 and 10 respectively, as compared to the upgradient concentration of 0.71 µg/L and 3.3 µg/L at MWT-26, also indicates that downgradient biotic reductive dechlorination is occurring. Further downgradient, TCE concentrations continued to decrease at MWT-7, which is 310 feet downgradient of Biowalls C1/C2. TCE was detected at a concentration of 330 µg/L in Round 9 and at 310 µg/L in Round 10. Additional rounds of data will be evaluated to determine long-term trends in this area.

Achievement of third performance monitoring objective:

- *Confirm that groundwater concentrations throughout the plume are decreasing to eventually meet GA standards.*

In general, concentrations of TCE, cis-DCE, and VC decreased over the ten sampling events at the wells within and downgradient of the biowalls. Time plots for monitoring wells MWT-25, MWT-26, MWT-27, MWT-28, MWT-29, MWT-22, PT-22, MWT-23, MWT-24, and PT-24 are presented in **Figures 10A** through **10J**, respectively. These plots show an overall decreasing trend for the COCs. **Figure 10B** shows a decrease in concentrations at MWT-26 in Round 9 and an increase in concentration in Round 10, which may be due to desorption and back diffusion from low permeability soils. **Figures 10E**, **10F**, and **10G** show that the concentrations at MWT-29, MWT-22, and PT-22, respectively, which are located downgradient of Biowalls B1/B2, increased in Round 9, then decreased in Round 10 during Year 4 of LTM compared to the previous year. This confirms that the higher concentrations that were observed during the winter monitoring event were likely the result of desorption during periods of seasonal high water levels, and do not reflect an overall increasing concentration trend. The time plots of the downgradient wells (MWT-29, MWT-22, MWT-24, and PT-24) show that TCE concentrations in the wells in the vicinity and downgradient of the biowalls are decreasing over time.

An exponential regression, which models first-order decay typical in biological processes, has been calculated for each monitoring well. The regression serves as a means of estimating the time required for the concentrations of chlorinated organics to meet their respective GA groundwater standards. **Table 5** summarizes the trend for each contaminant in each well and provides an estimate of the date when the standards will be achieved as estimated by the exponential regressions. Time plots with regression lines are included as **Appendix C**.

Table 5 shows that, with the exception of the PT-18A (source area well), PT-17 (downgradient of biowalls), and MWT-7 (immediately upgradient of the ZVI wall), all concentrations at the wells either comply with the Class GA groundwater standard or are expected to comply with their respective standards by 2112, with most reaching the standards by 2023. These dates are intended to provide an indication of the timeframe required for concentrations to reach acceptable levels and are not meant as a time commitment for the remedy.

There may be limiting factors in reaching the groundwater standards by the specified date, such as desorption and back diffusion from low permeability soils, that may drive the actual time required to reach compliance. As an example, the estimates of compliance dates for PT-22 in Year 4 have both increased and decreased as compared to Year 1, Year 2, and Year 3 estimates, with increases likely due to the effect of desorption on the groundwater concentrations observed during winter months when groundwater levels were high.

Time plots of the concentration of TCE, cis-DCE, and VC for wells PT-18A, PT-17, and MWT-7 are provided in **Figures 11A**, **11B**, and **11C**, respectively; these plots include historic data prior to the

installation of the biowalls. **Figures 11A, 11B,** and **11C** indicate that there is an overall decreasing trend for TCE, an overall increasing trend for cis-DCE, and no trend for VC at PT-18A, PT-17, and MWT-7. Since PT-18A is located in the Ash Landfill source area upgradient of all biowalls, decreasing trends at this location reflect natural attenuation processes.

PT-17 and MWT-7 are located 150 ft and 310 ft from Biowalls C1/C2, respectively. As such, it is possible that treatment zones have not been established this far downgradient of the biowalls. Nevertheless, an increasing trend for DCE paired with a decreasing trend for TCE may indicate that reductive dechlorination is occurring at these locations. Dates to achieve compliance at these locations cannot be estimated due to the natural variation in concentrations over time and further monitoring is necessary to determine any trends in chlorinated ethene concentrations at these wells. To date, concentrations at these wells are within historic levels and the Army will continue to evaluate any impacts of the biowalls on this portion of the plume.

Other Compounds

Non-chlorinated organics were detected in the groundwater at the Ash Landfill OU, and the data are presented in **Appendix B**. Toluene and ethyl benzene were detected in the biowalls in the first four sampling events in Year 1. The maximum concentration of toluene was 580 µg/L at MWT-23 in Quarter 4, and the maximum concentration of ethyl benzene was 1.3 J µg/L at MWT-23 in Quarter 3. The concentrations of toluene and ethyl benzene detected during Year 2 decreased significantly. Toluene was detected at a maximum concentration of 300 µg/L at MWT-23 in Round 5, and ethyl benzene was detected with a maximum concentration of 0.85 J µg/L at MWT-23 in Round 5. In Year 3, concentrations of toluene and ethyl benzene in the biowalls were below their respective Class GA groundwater standards in Round 7, and were compounds were not detected in Round 8. In Year 4, concentrations of ethyl benzene in the biowalls were below their respective Class GA groundwater standards in Rounds 9 and 10. Concentrations of toluene was below the Class GA groundwater standard in Round 9, and was not detected in Round 10. Neither toluene nor ethyl benzene is a historic COC, nor are the detections of toluene and ethyl benzene believed to be associated with historic site operations or degradation products of reductive dechlorination. The four years of data demonstrate that the concentrations of these compounds have decreased to levels below the detection and are no longer of any concern.

Ketones were detected in some monitoring wells at the site, with higher concentrations detected in the wells located within the biowalls (see **Appendix B**). The maximum detections of acetone and methyl ethyl ketone were observed at well MWT-28 (in Biowall B2) in Quarter 1 at concentrations of 2,600 J µg/L and 4,900 J µg/L, respectively. Concentrations of ketones decreased significantly in the Year 2 sampling events. The maximum concentration of acetone was 26 J µg/L at MWT-27 in Round 6 (the associated sample duplicate was below the detection limit), and the maximum concentration of methyl ethyl ketone was 12 µg/L at MWT-23 in Round 5. Concentrations of ketones decreased even further in Year 3, and to concentrations below detection limits in Rounds 9 and 10. The maximum concentration of acetone was 11 J µg/L in MWT-27, and methyl ethyl ketone was not detected in any

of the biowall wells. Ketones were produced by fermentation reactions in the biowalls when concentrations of soluble organic carbon were high. However, ketones are readily degradable under aerobic conditions, have not persisted at the site, and were not detected within 100 feet of the site boundary.

3.5 Biowall Recharge Evaluation

The RDR calls for a recharge evaluation at the end of each year of monitoring. The evaluations completed at the end of Year 1, Year 2, and Year 3 concluded that recharge was not required and that a recharge evaluation would be performed again at the end of Year 4.

Recharge Evaluation Process

A recharge evaluation, defined on Figure 7-3 of the RDR and described below, is the determination of the need to recharge a biowall segment. The evaluation consists of the following:

- Determining the need to recharge a biowall segment requires a review of chemical concentrations and geochemical parameters by an experienced professional. A specific, absolute set of conditions or parameter values are not appropriate to determine the need to recharge. Rather, a lines-of-evidence approach will be used that correlates a decrease in the efficiency of the system to degrade chloroethenes to geochemical evidence that indicates the cause is due to substrate depletion will be used.

- The following parameters will be evaluated annually using at least two consecutive rounds of sampling data in order to determine if recharge of the biowalls is necessary:

  - COC concentrations in the biowalls (e.g., MWT-27, MWT-28, and MWT-23). If COC concentrations have rebounded by greater than 50% for any single sampling event, this will indicate that recharge should be considered. Concentrations within the biowalls, not at downgradient locations, will be used to make this evaluation so that the effectiveness of the wall itself is being measured without the interference of effects such as desorption and mixing.

  - Geochemical parameters, specifically ORP, TOC, and DO, in the biowalls (e.g., at MWT-27, MWT-28, and MWT-23). Benchmark values will be used initially to evaluate anaerobic conditions in the groundwater. The benchmarks are:

    - ORP < -100 mV
    - TOC > 20 mg/L
    - DO < 1.0 mg/L

Parameters described in the bullets above are intended to be used as guidelines and will be considered in evaluating if, and when, a depletion of bioavailable organic substrate results in a rebound in

geochemical redox conditions under which effective anaerobic degradation of chlorinated ethenes does not occur.

Recharge Evaluation for Year 4

The recharge evaluation for Year 4 indicates that recharging the biowalls is not necessary at this time.

Section 3.2 presents the geochemical data for Year 4. The values of geochemical parameters measured in Year 4 support the interpretation that reductive dechlorination is occurring in Biowalls A1/A2, B1/B2, and C1/C2. The tables below show that the geochemical parameters for the wells within the biowalls meet the benchmark values and that groundwater conditions remain highly reducing.

Parameter	Benchmark Value	MWT-27 (Qs 1, 2, 3, 4, Rs 5, 6, 7, 8, 9, 10)
ORP (mV)	< -100	-158, -145, -141, -166, -133, -126, -128, -102, -121, -111
TOC (mg/L)	> 20	2050, 1350, 755, 167, 89, 54, 81.7, 50, 61, 32
DO (mg/L)	< 1.0	0.25, 0.08, 0, 0.06, 0.18, 0.13, 0.06, 0.15, 0.05, 0.05

Parameter	Benchmark Value	MWT-28 (Qs 1, 2, 3, 4, Rs 5, 6, 7, 8, 9, 10)
ORP (mV)	< -100	-150, -113, -131, -151, -91, -95, -135, -148, -104, -100
TOC (mg/L)	> 20	1775, 171, 309, 92, 49, 28, 28.2, 25.5, 21, 12
DO (mg/L)	< 1.0	0.16, 0.09, 0, 0.08, 0.15, 0.10, 0.18, 0.29, 0.06, 0.07

Parameter	Benchmark Value	MWT-23 (Qs 1, 2, 3, 4, Rs 5, 6, 7, 8, 9, 10)
ORP (mV)	< -100	-122, -109, -87, -144, -129, -104, -117, -90, -115, -103
TOC (mg/L)	> 20	260, 210, 303, 151, 29, 20, 15.6, 17.4, 11, 5.9
DO (mg/L)	< 1.0	0.26, 0.35, 0, 0.12, 0.15, 0.20, 0.07, 0.63, 0.04, 0.29

Section 3.3 presents the analytical data for Year 4. As shown in the table below, concentrations of TCE, cDCE, and VC in the biowalls remain low and have not rebounded by greater than 50% for any sampling event. Further, the ability of the biowalls to sustain a high degree of reductive dechlorination is well established.

		TCE (µg/L)	cDCE (µg/L)	VC (µg/L)
MWT-27	Q1	ND	ND	ND
	Q2	ND	ND	ND
	Q3	ND	ND	ND
	Q4	ND	ND	ND
	R5	ND	ND	ND
	R6	ND	ND	ND
	R7	ND	ND	ND
	R8	ND	ND	3.1 J

		TCE (µg/L)	cDCE (µg/L)	VC (µg/L)
	R9	ND	0.18 J	ND
	R10	0.51 J	1.1	2.1
MWT-28	Q1	ND	ND	ND
	Q2	ND	ND	ND
	Q3	ND	ND	ND
	Q4	ND	ND	ND
	R5	ND	ND	ND
	R6	ND	ND	ND
	R7	ND	ND	ND
	R8	ND	ND	ND
	R9	ND	ND	ND
	R10	ND	0.51 J	0.64 J
MWT-23	Q1	ND	60	23
	Q2	ND	11	4.8
	Q3	ND	3.1	ND
	Q4	ND	3.6 J	3.65
	R5	ND	ND	ND
	R6	0.4	2.4	2.8
	R7	ND	0.42 J	ND
	R8	ND	0.47 J	ND
	R9	ND	0.41 J	ND
	R10	0.29 J	4.6	5.3

The analytical data at MWT-27 shows the concentration of TCE below the Class GA groundwater standard (5 µg/L) at an estimated 0.51 J µg/L. In Round 10, the concentration of cDCE was measured as 1.1 µg/L below the Class GA groundwater standard. The concentration of VC was measured above the Class GA groundwater standard at a concentration of 2.1 µg/L; however, this concentration was less than the only other instance of a detected VC concentration at MWT-27 (i.e. - 3.1 J µg/L in Round 8). The Army will continue to monitor MWT-27 in subsequent monitoring events to determine any trend for VC at this well.

At MWT-28, concentrations of cDCE and VC remain below Class GA groundwater standards, and the concentration of TCE remains below detections limits.

At MWT-23 TCE and cDCE concentrations were below Class GA groundwater standards. In Round 10, the concentrations of TCE and cDCE were measured as 0.29 J µg/L and 4.6 µg/L, respectively. This is below the Class GA groundwater standard, and overall cDCE concentrations have decreased from the first monitoring event. The concentration of VC was above the Class GA groundwater standard at 5.3 µg/L. This was the first VC detection at MWT-23 in the past four monitoring events, and overall VC concentrations have decreased from the first monitoring event. The Army will continue to monitor MWT-23 in subsequent monitoring events to determine any trend for VC at this well.

Overall, the multiple lines-of-evidence approach that evaluates geochemical parameters together with the chemical analytical data indicates that conditions in the biowalls are sufficiently anaerobic to support reductive chlorination of chlorinated ethenes. Substrate in the biowalls has not been significantly depleted and biodegradation continues to occur. Although TOC levels are below the benchmark value at MWT-28 and MWT-23, they remain higher than TOC concentrations in the upgradient well. Low DO concentrations and ORPs indicate that highly reducing conditions are being maintained with the current levels of TOC. Reductions in sulfate and the production of methane further indicate that highly anaerobic conditions are being sustained.

Based on the review of the analytical and geochemical data, the biowalls do not need to be recharged at this time, and the biowall system continues to meet the long-term monitoring objectives established in the RDR (Parsons, 2006).

3.6 Soil Remedy Evaluation

Part of the remedial action was installing a 12-inch vegetative cover over the Ash Landfill and the NCFL. The covers have been inspected and field observations from Year 4 note that the landfills are vegetated with grass and clover. At the NCFL, visual observations noted a small amount of soil erosion and the presence of rodent trails; however, the erosion and the trails cut less than 6 inches into the cover. Therefore, underlying soil has not been exposed to the environment and corrective action is not required. The Army will continue to monitor the integrity of the covers and ensure that the vegetative covers have not been breached and that the underlying soil is not exposed.

3.7 Land Use Controls (LUCs)

The remedy for the Ash Landfill OU requires the implementation and maintenance of land use controls (LUCs). The LUC requirements are detailed in the "Land Use Control Remedial Design for SEAD-27, 66, and 64A, *Addendum 3*" (2008b). The selected LUCs for the Ash Landfill OU are as follows:

- Prevent access to or use of the groundwater until cleanup levels are met;
- Maintain the integrity of any current or future remedial or monitoring system, such as monitoring wells and permeable reactive barriers;
- Prohibit excavation of the soil or construction of inhabitable structures (temporary or permanent) above the area of the existing groundwater plume; and
- Maintain the vegetative soil layer over the ash fill areas and the NCFL to limit ecological contact.

As part of the LTM program, the Army inspected the site 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 other than that needed for monitoring. As discussed in **Section 3.5**, the vegetative covers are limiting ecological contact with the underlying soil.

During 9R2010 and 10R2010, groundwater monitoring wells were inspected by field personnel. The integrity of all wells at the Ash Landfill is intact and each well is viable for groundwater elevation readings and groundwater sampling, where appropriate. Monitoring wells not required as part of the LTM were decommissioned between September 2010 and January 2011.

3.8 Operating Properly and Successfully

The implemented design has met the requirements for "operating properly and successfully" (OPS) as outlined in Section 12(h)(s) of the USEPA "Guidance for Evaluation of Federal Agency Demonstrations" (USEPA, 1996). Parsons submitted a letter on behalf of the Army to USEPA, dated June 6, 2008, declaring that the Army had determined that the remedy met the OPS requirements. The Army submitted a letter under separate cover on February 26, 2009 further certifying that the "information, data and analysis provided in Parsons' June 6, 2008 letter was true and accurate." On March 11, 2009, the USEPA transmitted a letter to the Army approving the Army's OPS demonstration. The data for Year 4 of the LTM program are consistent with the data for Year 1, Year 2. and Year 3 and demonstrate that the remedy is OPS, as described below.

The remedial action is operating "properly."

The USEPA guidance describes that "a remedial action is operating 'properly' if it is operating as designed." The Construction Completion Report (CCR) (Parsons, 2007) details that the vegetative covers were installed as designed, meeting or exceeding the 12-inch of soil cover requirement. **Section 3.5** describes that the covers are intact and effectively prevent ecological contact with the underlying soil; therefore, the vegetative covers are operating properly.

The CCR also details the construction of the biowalls. Deviation from the intended design resulted in wider-than-intended biowalls that required the emplacement of additional mulch; since this is an enhancement of the design, it is fair to say that the biowalls were constructed as designed. The geochemical data presented and discussed in **Section 3.1** indicate that conditions that are favorable to anaerobic reductive dechlorination have been established within and near the biowalls, which was the expectation of the design of the biowall system.

The remedial action is operating "successfully."

A remedial action may receive the USEPA's designation of "operating successfully" (1) if "a system will achieve the cleanup levels or performance goals delineated in the decision document" and (2) if the remedy is protective of human health and the environment. The data presented in **Section 3.3** demonstrate that concentrations of VOCs are decreasing and will eventually meet the Class GA groundwater standards. The time plots presented in **Figures 10A** through **10J** show a decreasing

trend for the COCs at the Ash Landfill OU; **Table 5** summarizes the trends in concentrations of COCs over time and provides time estimates for compliance based on exponential regressions of the time plots. The time estimates do not provide exact dates that Class GA groundwater standards will be achieved; rather they demonstrate that the concentrations in groundwater will eventually meet the groundwater standards.

Recent inspection of the vegetative covers at the Ash Landfill and the NCFL indicate that the covers are preventing ecological receptors from contacting the underlying soil; therefore, there is no threat to the environment. The LUCs have been maintained and no one is accessing the groundwater; therefore, there is no threat to human health. Based on a review of the site data, an inspection of the condition of the vegetative covers, and a confirmation that the LUCs are being maintained, the Army believes that the remedial action is operating successfully.

Based on an assessment of the design and construction of the remedial action, as well as an evaluation of the geochemical and analytical data from the three years of groundwater monitoring, the Army believes that the remedial action at the Ash Landfill meets the requirements to be designated as "operating properly and successfully".

4.0 LONG-TERM MONITORING CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Based on the results of the long-term monitoring at the Ash Landfill since the installation of the full-scale biowalls, the Army has made the following conclusions:

- TCE within the biowalls remains below or close to detection limits;
- TCE, cis-DCE, and VC are present in the groundwater at the site at concentrations above respective Class GA groundwater standards;
- Chemical results indicate that the concentrations of chlorinated ethenes are decreasing as they pass through the biowall systems;
- Geochemical parameters indicate that groundwater redox conditions are highly conducive for reductive dechlorination to occur within the biowalls;
- Concentrations of chlorinated ethenes at off-site well MW-56 are below Class GA groundwater standards;
- Continued monitoring is required to determine trends in concentrations of COCs at PT-18A, PT-17, and MWT-7;
- Recharge of the biowalls is not necessary at this time;

- The remedial action continues to meets the requirements of the USEPA's "operating properly and successfully" designation; and

- The Army will continue to monitor the performance of the biowall system, including semi-annual periodic evaluations of the potential need to recharge the biowalls.

4.2 Recommendations

Based on the first four years of long-term monitoring at the Ash Landfill OU, the Army recommends continuing the semi-annual frequency of monitoring based on the process shown in **Figure 12** (which is also Figure 7-3 of the RDR). The recommendations for LTM during year four of monitoring are as follows:

- Biowall process monitoring wells (MWT-26, MWT-27, MWT-28, MWT-29, and MWT-23) will be monitored on a semi-annual basis. Each year a recharge evaluation will be completed. As stated in the RDR (Parsons, 2006b), if a recharge is conducted, MWT-26, MWT-27, and MWT-29 would be excluded from the LTM program, as detailed in **Figure 12**. MWT-28 and MWT-23 will continue to be monitored as part of the performance monitoring wells to supplement data that will be used to determine whether additional biowall recharge is required. The recharge evaluation(s) conducted each year after the first biowall recharge would review the chemical and geochemical data at MWT-28 and MWT-23, and determine if the contaminant increase is a result of poor biowall performance or due to other issues such as seasonal variations in groundwater levels, unusual precipitation events, or desorption and back diffusion.

- Performance monitoring wells (PT-17, PT-18A, PT-22, PT-24, MWT-7, MWT-22, MWT-24, and MWT-25) will continue to be monitored on a semi-annual basis in a manner consistent with the Year 3 LTM program. In the four years of LTM events at the Ash Landfill OU, the concentrations of COCs, specifically TCE, in the wells downgradient of the source area (near PT-18A) have decreased.

- The off-site performance monitoring well (MW-56) will continue to be monitored on a semi-annual basis.

- The vegetative covers at the Ash Landfill and the NCFL will be inspected annually to ensure that they remain intact and protective of ecological receptors.

- The frequency of monitoring and the need to recharge the biowalls will be reviewed in the annual report submitted after the completion of the fifth year of LTM, based on the process outlined in **Figure 12**.

5.0 REFERENCES

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TABLES

Table 1
Groundwater Sample Collection
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Monitoring Wells	Monitoring Well Group			Laboratory Analysis			
	On-Site Plume	Biowall Process	Off-Site Performance	VOC 8260B	TOC 9060A	MEE RSK-175	Sulfate EPA 300.1
PT-18A	X (all)			X (all)			
MWT-25	X (all)			X (all)			
MWT-26		X (all)		X (all)	X (all)	X (all)	X (all)
MWT-27		X (all)		X (all)	X (all)	X (all)	X (all)
MWT-28	X (all)	X (all)		X (all)	X (all)	X (all)	X (all)
MWT-29	X (all)	X (all)		X (all)	X (all)	X (all)	X (all)
MWT-22	X (all)			X (all)			
PT-22	X (all)			X (all)			
MWT-23	X (all)	X (all)		X (all)	X (all)	X (all)	X (all)
MWT-24	X (all)			X (all)			
PT-17	X (all)			X (all)	X (5,6,7,8,9,10)	X (5,6,7,8,9,10)	X (5,6,7,8,9,10)
MWT-7	X (all)			X (all)	X (5,6,7,8,9,10)	X (5,6,7,8,9,10)	X (5,6,7,8,9,10)
PT-24	X (all)			X (all)	X (7)	X (7)	X (7)
MW-56			X (1,3,5,6,7,8,9,10)	X (all)			

Notes:
1. All samples were analyzed for field parameters including pH, ORP, dissolved oxygen, conductivity, temperature, and turbidity.
(all) - This well was sampled in all rounds of the LTM program.
(7) - This well was sampled in Round 7 of the LTM program.
(1,3,5,6,7,8,9,10) - This well was sampled in Quarters 1 and 3, and Rounds 5 - 10 of the LTM program.
(5,6,7,8,9,10) - These wells were sampled in Rounds 5 - 10 of the LTM program.

Table 2
Groundwater Elevation Data
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Monitoring Well	Top of Riser Elevation (ft)	Well Depth (rel. TOC) (ft)	LTM R10 - December 2010			Historical Data			
			Saturated Thickness (ft)	Depth to Groundwater (ft)	Water Level Elevation (ft)	Groundwater Elevation (ft)			Well Depth (ft)
						Maximum	Minimum	Range	
PT-17	640.14	11.65	9.01	2.64	637.50	637.50	629.05	8.45	11.65
PT-18A	659.05	12.85	7.05	5.80	653.25	653.25	649.68	3.57	12.85
PT-22	648.61	11.81	6.68	5.13	643.48	644.30	637.47	6.83	11.81
PT-24	636.40	11.88	7.26	4.62	631.78	632.76	627.80	4.96	11.88
MW-56	630.51	6.88	3.33	3.55	626.96	627.58	621.66	5.92	6.88
MWT-7	638.34	13.64	8.73	4.91	633.43	633.50	626.58	6.92	13.64
MWT-22	650.663	14.9	10.56	4.34	646.32	648.13	642.80	5.33	14.90
MWT-23	646.772	13.7	7.07	6.63	640.14	640.45	637.08	3.37	13.70
MWT-24	641.564	13	6.79	6.21	635.35	635.84	633.19	2.65	13.00
MWT-25	654.507	13.25	9.39	3.86	650.65	650.65	646.76	3.89	13.25
MWT-26	652.191	13.22	9.62	3.60	648.59	648.59	644.98	3.61	13.22
MWT-27	652.993	12.9	8.14	4.76	648.23	648.23	645.06	3.17	12.90
MWT-28	652.685	12.85	8.00	4.85	647.84	647.84	644.74	3.11	12.85
MWT-29	651.816	13.1	8.67	4.43	647.39	647.39	643.58	3.81	13.10

Table 3
Groundwater Geochemical Data
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Well ID	Location Description	Sample ID	Sample Round	pH	Turbidity (NTU)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	TOC (mg/L)	Sulfate (mg/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	Manganese (ug/L)	Ferrous Iron (ug/L)
PT-18A	upgradient of walls	ALBW20059	1Q2007	6.63	141	1.69	1.33	93							
		ALBW20074	2Q2007	6.44	110	2.87	0.76	-177							
		ALBW20088	3Q2007	6.71	5	1.66	0	-23							
		ALBW20103	4Q2007	6.41	0.0	1.25	0.04	-5							
		ALBW20117	5R2008	6.36	1.9	1.75	0.22	-10						8.2	> 3.3
		ALBW20132	6R2008	6.58	0.56	2.04	1.76	83							
		ALBW20147	7R2009	6.77	0.45	2.01	0.12	66							
		ALBW20162	8R2009	6.71	0.00	2.04	0.62	154							
		ALBW02177	9R2010	6.7	1.00	2.05	0.1	62						1.5	0.15
		ALBW20192	10R2010	6.66	1.50	1.25	0.16	84							
MWT-25	upgradient of Biowall A	ALBW20064	1Q2007	8	9.6	0.29	2.83	63							
		ALBW20079	2Q2007	7.27	14	2.2	2.8	52							
		ALBW20093	3Q2007	7.36	6.2	2.43	4.14	100							
		ALBW20108	4Q2007	6.9	0	1.2	0.21	65							
		ALBW20123	5R2008	6.91	0.52	1.47	0.15	-41						1.4	0.75
		ALBW20138	6R2008	6.69	1.32	1.36	2.91	90							
		ALBW20153	7R2009	7.03	1.6	1.46	0.1	-31							
		ALBW20168	8R2009	7.21	0	0.792	3.35	98							
		ALBW20183	9R2010	7.06	0.7	1.48	0.2	-116							
		ALBW20198	10R2010	7.11	2.59	1.23	0.48	-94							
MWT-26	*upgradient of Biowalls B1/B2*	ALBW20066	1Q2007	6.89	10	2.01	1.84	-3	3.9 J	958	ND	ND	ND		
		ALBW20081	2Q2007	7.26	9	1.9	0.48	-135	15.2	738	0.4	7.8	210	2.1	> 3.3
		ALBW20095	3Q2007	6.89	2.2	1.94	0.21	-170	10.3	473	1	13	390	3.1	> 3.3
		ALBW20111	4Q2007	7.08	50	1.9	0.89	-40	6.1	1060	0.16	0.4	44	0.0	1.09
		ALBW20126	5R2008	7.05	0.67	1.88	0.31	-71	5.6	600	0.82	2.9	210	1.3	0.81
		ALBW20141	6R2008	7.01	28.7	1.58	3.54	60	4.4	541	0.046	0.028	10	0.6	0.22
		ALBW20156	7R2009	6.95	2.7	1.75	0.34	-11	6.9	570	3.2	2.7	1,100	0.5	0.71
		ALBW20171	8R2009	7.01	10	2.45	4.66	71	5.6	912	2.2	1.8	610	0.7	0.18
		ALBW20186	9R2010	6.99	1.4	2.04	0.14	-81	4.6	580	2.2	0.71	740	1.7	2.67
		ALBW20202	10R2010	6.77	0.6	1.71	0.5	109	5.5	690	3.7	3.3	1600	0	0.13
MWT-27	*in Biowall B1*	ALBW20067	1Q2007	6.34	120	5.31	0.25	-158	2,050 J	ND	ND	ND			
		ALBW20082	2Q2007	6.65	87	4.37	0.08	-145	1350	ND	0.15	2.7	15,000	> 22	> 3.3
		ALBW20096	3Q2007	6.59	154	3.35	0	-141	755	1.9 J	0.081	0.33	13,500	> 22	> 3.3
		ALBW20112	4Q2007	6.43	58	5.76	0.06	-166	167	31.7	ND	0.014 J	13,000	> 22	2.19
		ALBW20127	5R2008	6.49	40	3.07	0.18	-133	88.9	ND	2.3	0.049	13,000	> 22	3.23
		ALBW20142	6R2008	5.95	24.5	2.59	0.13	-126	53.5	24	1.6	0.13	15,000	> 22	3.05
		ALBW20157	7R2009	6.68	38	2.99	0.06	-128	81.7	0.93 J	5.1	0.15	14,000	22	1.88
		ALBW20172/73	8R2009	6.32	5.1	2.38	0.15	-102	50.0	14.0	4.4	1.2	15,500	9	1.26
		ALBW20187	9R2010	6.52	1.4	2.55	0.05	-121	61	0.95 J	3.8	0.12	13,000	> 22	2.54
		ALBW20203	10R2010	6.42	8.91	2.22	0.05	-111	32	25.0	3.0	0.88	18,000	48	3.30

Notes:
> = The concentration exceeded the range of the Hach DR/850 Colorimeter field kit.
J = the reported value is an estimated concentration.
ND = Non-detect.
NS = Not sampled; water level was below the indicator probe.
1Q2007 - First round of LTM (January 2007)
2Q2007 - Second round of LTM (March 2007)
3Q2007 - Third round of LTM (June 2007)
4Q2007 - Fourth round of LTM (November 2007)
5R2008 - Fifth Round of LTM (June 2008)
6R2008 - Sixth Round of LTM (December 2008)
7R2009 - Seventh Round of LTM (June 2009)
8R2009 - Eighth Round of LTM (December 2009)
9R2010 - Ninth Round of LTM (June 2010)
10R2010 - Tenth Round of LTM (December 2010)

Empty cells indicate that the specified analysis was not completed for that well. The bolded and italicized wells are the five wells included in the biowall process monitoring group.
Analysis of TOC, sulfate, methane, ethane, and ethene were completed for the biowall process wells only.
1. During the 5R2008 event the water level in PT-17 was extremely low and water quality readings were not collected.

Table 3
Groundwater Geochemical Data
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Well ID	Location Description	Sample ID	Sample Round	pH	Turbidity (NTU)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	TOC (mg/L)	Sulfate (mg/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	Manganese (ug/L)	Ferrous Iron (ug/L)
MWT-28	***in Biowall B2***	ALBW20068	1Q2007	7.5	163	0.61	0.16	-150	1,775 J	1.7	ND	ND	12,500 J		
		ALBW20083	2Q2007	6.6	21	2.3	0.09	-113	171	ND	0.67	0.48	19,000	7.5	> 3.3
		ALBW20098	3Q2007	6.56	100	2.74	0	-131	309	ND	0.01 J	0.057	11,000	> 22	> 3.3
		ALBW20113	4Q2007	6.48	10	1.72	0.08	-151	92	ND	0.014 J	ND	11,000	> 22	2.15
		ALBW20128	5R2008	6.31	14	2.16	0.15	-91	49.2	ND	0.65	0.044	12,000	> 22	> 3.3
		ALBW20144	6R2008	5.76	17	1.58	0.10	-95	27.9	48.3	2	0.12	19,000	5.3	1.98
		ALBW20158/59	7R2009	6.49	8.5	1.73	0.18	-135	28.2	ND	1.8	0.064	13,000	20.8	2.87
		ALBW20174	8R2009	6.4	10.8	1.88	0.29	-148	25.5	3.16	1.6	0.12	15,000	6.5	2.15
		ALBW20188/89	9R2010	6.36	5.5	1.62	0.06	-104	21	ND	1.6	0.059	13,500	18.6	0.57
		ALBW20204	10R2010	6.28	4.5	0.802	0.07	-100	12	4.8	1.4	0.17	12,000	5.8	2.58
MWT-29	***downgradient of Biowall B2***	ALBW20070	1Q2007	6.49	7.2	2.1	0.33	-76	25.1 J	113	ND	ND	ND		
		ALBW20084/5	2Q2007	6.8	1.7	2.21	0.39	-53	36.7	173	25	150	8,100	7.5	> 3.3
		ALBW20099	3Q2007	6.64	1.8	1.68	0.11	-79	15.7	151	13	160	2,800	8.1	2.84
		ALBW20114	4Q2007	7.04	12.2	1.88	0.21	-101	20.9	289	19	200	2,600	8.6	> 3.3
		ALBW20129/30	5R2008	6.44	2.7	1.85	0.17	-115	14.1	174	14.5	140	3,100	0.0	> 3.3
		ALBW20145	6R2008	6.57	3.69	1.58	1.32	67	13.6	312	14	19	2,700	3.3	0.20
		ALBW20160	7R2009	6.8	1.9	1.8	0.15	-105	11.8	300	10	47	3,000	6.8	2.97
		ALBW20175	8R2009	6.87	0	2.05	0.58	-75	8.2	644	6.7	12	1,500	6.3	0.96
		ALBW20190	9R2010	6.77	2	1.74	0.06	-86	10	170	18	88	5,400	9.1	2.54
		ALBW20205	10R2010	6.71	1.07	1.31	0.56	22	7.4	300	5.1	7.9	3,100	6.4	2.60
MWT-22	downgradient of Biowall B2	ALBW20071	1Q2007	7.7	4.5	0.13	0.09	-80							
		ALBW20075	2Q2007	6.72	41	2.16	0.3	-65							
		ALBW20100	3Q2007	6.45	2.7	2.03	0.05	-107							
		ALBW20115	4Q2007	6.53	7.5	1.81	0.18	-132							
		ALBW20121	5R2008	6.38	14	2.21	0.3	-34						18.2	> 3.3
		ALBW20136	6R2008	6.44	8.17	1.86	0.57	-19							
		ALBW20151	7R2009	6.59	13	2.14	0.31	-91							
		ALBW20166	8R2009	6.5	15	0.898	0.34	-65							
		ALBW20181	9R2010	6.52	16.8	2.2	0.22	-63							
		ALBW20196	10R2010	6.39	6.8	1.34	0.07	-58							
PT-22	between Biowalls B and C	ALBW20060	1Q2007	7.70	4.5	0.13	0.09	-80							
		ALBW20086	2Q2007	6.78	7	1.18	0.78	-54							
		ALBW20089	3Q2007	6.67	0	1.44	0.09	-97							
		ALBW20104	4Q2007	6.73	5.1	1.26	0.17	-166							
		ALBW20118	5R2008	6.69	7.4	1.38	0.29	-119						0.3	1.38
		ALBW20133	6R2008	6.79	1.96	1.20	0.69	-37							
		ALBW20148	7R2009	6.76	11	1.53		-123							
		ALBW20163	8R2009	6.74	6.3	1.45	1.0	-73							
		ALBW20178	9R2010	6.87	3.6	1.39	0.4	-75							
		ALBW20193	10R2010	6.75	0.8	1.14	0.18	15							

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Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Well ID	Location Description	Sample ID	Sample Round	pH	Turbidity (NTU)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	TOC (mg/L)	Sulfate (mg/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	Manganese (ug/L)	Ferrous Iron (ug/L)
MWT-23	***in Biowall C2***	ALBW20065	1Q2007	7.2	5	0.2	0.26	-122	260 J	ND	ND	ND	12,000		
		ALBW20080	2Q2007	6.51	30	1.8	0.35	-109	210	ND	45	5.9	23,000	5.4	2.73
		ALBW20094	3Q2007	6.3	69.3	1.82	0	-87	303	ND	4.1	0.28	18,000	> 22	2.99
		ALBW20109	4Q2007	6.32	21	2.21	0.12	-144	151	2.8	0.58	0.35	16,000	> 22	2.32
		ALBW20125	5R2008	6.27	29	1.54	0.15	-129	28.4	ND	0.53	0.048	18,000	> 22	> 3.3
		ALBW20140	6R2008	6.44	32	1.86	0.20	-104	20.1	6.3	4.6	1.2	19,000	> 22	2.75
		ALBW20155	7R2009	7.72	16	1.5	0.07	-117	15.6	ND	1.6	0.16	21,000	22	2.08
		ALBW20170	8R2009	6.78	10	2.1	0.63	-90	17.4	ND	1	0.058	18,000	7	3.3
		ALBW20185	9R2010	6.38	9	1.57	0.04	-115	11	ND	2.4	0.038	18,000	>22	1.71
		ALBW20200/201	10R2010	6.41	2.8	1.07	0.29	-103	5.9	16	16	2.85	16,000	13	> 3.3
MWT-24	downgradient of Biowalls C1/C2	ALBW20063	1Q2007	7.02	10	0.762	0.27	-160							
		ALBW20078	2Q2007	6.91	59	1.08	0.32	-146							
		ALBW20092	3Q2007	6.8	5.4	1.48	0.03	-115							
		ALBW20107	4Q2007	6.81	134	1.32	0.41	-114							
		ALBW20122	5R2008	6.65	45	1.21	0.35	-43						9.1	1.54
		ALBW20137	6R2008	6.40	10	1.31	0.09	40							
		ALBW20152	7R2009	6.81	6.7	1.34	0.11	-20							
		ALBW20164	8R2009	6.61	23	0.558	1.31	59							
		ALBW20182	9R2010	6.63	6.8	1.45	0.06	-21							
		ALBW20197	10R2010	6.78	8.9	0.919	0.14	10							
PT-17[1]	downgradient of biowalls	ALBW20058	1Q2007	8	3.8	92	0.23	-111							
		ALBW20073	2Q2007	7.1	14	0.729	0.76	-151							
		ALBW20087	3Q2007	6.99	0.4	0.732	0.9	-157							
		ALBW20102	4Q2007	7.12	8.7	2	NS	-24							
		ALBW20116	5R2008		70		0.24		6	15.2	98	66	5700		
		ALBW20131	6R2008	6.68	0.85	0.796	0.30	26	2.6	45.8	6.9	6.6	390	2.8	0.43
		ALBW20146	7R2009	7.19	0.2	1	0.30	-20	4.9	28	50	56	8300	7.5	0.53
		ALBW20161	8R2009	6.75	4	0.345	0.58	-52	2.4	46.2	9.9	5	1,500	2.1	0.07
		ALBW20176	9R2010	6.73	0.9	0.816	0.11	-13	2.4	36	16	20	4,300	5.8	0.29
		ALBW20191	10R2010	6.72	0.45	0.619	0.21	42	1.5	31	4.8	3.5	900	4.0	0.06
MWT-7	immed. upgradient of ZVI wall	ALBW20062	1Q2007	6.8	19.6	0.581	0.01	62							
		ALBW20077	2Q2007	6.95	8	0.763	0.76	52							
		ALBW20091	3Q2007	6.91	4	0.586	0.19	22							
		ABLW20106	4Q2007	6.88	0	0.9	0.16	14							
		ALBW20120	5R2008	6.86	15	0.974	0.43	37	2.3	29.1	6.7	2	400	0.2	0.09
		ALBW20135	6R2008	6.85	7.37	0.859	0.28	66	29.1	3	11	0.27	670	0.8	0.16
		ALBW20150	7R2009	7.61	2.6	0.786	0.05	16	3.1	27	7.8	0.76	1100	0	0.05
		ALBW20165	8R2009	7.12	0.9	0.555	0.46	32	4.5	29.3	17	0.52	2,900	0.01	0.14
		ALBW20180	9R2010	6.85	1.35	1.04	0.02	-21	1.5	29	9	0.55	1,700	0.2	0.19
		ALBW20195	10R2010	6.85	3.3	0.758	0.06	35	1.3	31	4.5	0.2	400	1.1	0.18

Notes:
> = The concentration exceeded the range of the Hach DR/850 Colorimeter field kit.
J = the reported value is an estimated concentration.
ND = Non-detect.
NS = Not sampled; water level was below the indicator probe.
1Q2007 - First round of LTM (January 2007)
2Q2007 - Second round of LTM (March 2007)
3Q2007 - Third round of LTM (June 2007)
4Q2007 - Fourth round of LTM (November 2007)
5R2008 - Fifth Round of LTM (June 2008)
6R2008 - Sixth Round of LTM (December 2008)
7R2009 - Seventh Round of LTM (June 2009)
8R2009 - Eighth Round of LTM (December 2009)
9R2010 - Ninth Round of LTM (June 2010)
10R2010 - Tenth Round of LTM (December 2010)

Empty cells indicate that the specified analysis was not completed for that well. The bolded and italicized wells are the five wells included in the biowall process monitoring group.
Analysis of TOC, sulfate, methane, ethane, and ethene were completed for the biowall process wells only.
1. During the 5R2008 event the water level in PT-17 was extremely low and water quality readings were not collected.

Table 3
Groundwater Geochemical Data
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Well ID	Location Description	Sample ID	Sample Round	pH	Turbidity (NTU)	Specific Conductance (mS/cm)	DO (mg/L)	ORP (mV)	TOC (mg/L)	Sulfate (mg/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	Manganese (ug/L)	Ferrous Iron (ug/L)
PT-24	downgradient of ZVI wall	ALBW20061	1Q2007	8.1	10	70	0.37	-59							
		ALBW20076	2Q2007	7.58	0	0.464	2.2	-59							
		ALBW20090	3Q2007	7.22	1.3	0.557	0.13	-80							
		ALBW20105	4Q2007	7.35	9.7	2.38	0.19	-46							
		ALBW20119	5R2008	6.99	4.3	0.9	0.16	-104						0.5	0.55
		ALBW20134	6R2008	6.84	5.8	0.656	0.11	-10							
		ALBW20149	7R2009	7.14	4.1	0.679	0.05	-101							
		ALBW20164	8R2009	7.32	1	0.41	0.34	-192						1.9	0.2
		ALBW20179	9R2010	7.07	8.3	0.78	0.19	-37							
		ALBW20194	10R2010	7.05	6.14	0.568	0.09	-29							
MW-56	off-site well	ALBW20072	1Q2007	6.85	3.3	0.462	0.37	-102							
		ALBW20101	3Q2007	6.9	0	0.603	NS	-65							
		ALBW20124	5R2008	6.73	2	0.763	0.18	-132						0.4	1.18
		ALBW20139	6R2008	6.85	6	0.545	0.81	-125							
		ALBW20154	7R2009	7.01	0.1	0.623	0.23	-186							
		ALBW20169	8R2009	6.59	7.3	0.311	1.86	-149							
		ALBW20184	9R2010	6.85	3.19	0.403	0.16	-131							
		ALBW20199	10R2010	6.88	1.26	0.659	0.32	-105							

Notes:
> = The concentration exceeded the range of the Hach DR/850 Colorimeter field kit.
J = the reported value is an estimated concentration.
ND = Non-detect.
NS = Not sampled; water level was below the indicator probe.
1Q2007 - First round of LTM (January 2007)
2Q2007 - Second round of LTM (March 2007)
3Q2007 - Third round of LTM (June 2007)
4Q2007 - Fourth round of LTM (November 2007)
5R2008 - Fifth Round of LTM (June 2008)
6R2008 - Sixth Round of LTM (December 2008)
7R2009 - Seventh Round of LTM (June 2009)
8R2009 - Eighth Round of LTM (December 2009)
9R2010 - Ninth Round of LTM (June 2010)
10R2010 - Tenth Round of LTM (December 2010)

Empty cells indicate that the specified analysis was not completed for that well. The bolded and italicized wells are the five wells included in the biowall process monitoring group.
Analysis of TOC, sulfate, methane, ethane, and ethene were completed for the biowall process wells only.
1. During the 5R2008 event the water level in PT-17 was extremely low and water quality readings were not collected.

Table 4
Chlorinated Organics in Groundwater
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Upgradient

Sample Identification		Sample Date	PCE (ug/L)	TCE (ug/L)	1,1-DCE (ug/L)	cis-DCE (ug/L)	trans-DCE (ug/L)	VC (ug/L)	1,1-DCA (ug/L)
Class GA Standard (ug/L)			5	5	5	5	5	2	5
PT-18A	upgradient of walls	3-Jan-07	1 U	2000	0.64 J	220	1.6	2.4	1 U
		17-Mar-07	1 U	1000	0.73 J	170	1.4	2.9	1 U
		5-Jun-07	1 U	1100	1.4	430	3.3	3.3	1 U
		15-Nov-07	1 U	2700	2.1	720	3.4	8.2	1 U
		24-Jun-08	1 U	220	1 U	200	0.9 J	1.4	1 U
		12-Dec-08	0.36 U	1400	1.3	510	2.4	4.6	0.75 U
		4-Jun-09	0.36 U	810 J	0.8 J	260	1.8	2.6	0.75 U
		17-Dec-09	1.5 U	2100	1.5 U	630	3.5 J	7.1	2 J
		1-Jul-10	0.15 U	120	0.11 U	28	0.2 U	0.18 U	0.25 U
		19-Dec-10	0.15 U	6.3	0.11 U	0.54 J	0.2 U	0.18 U	0.25 U
MWT-25	upgradient of Biowall A	3-Jan-07	1 U	50	1 U	41	0.56 J	1.6	1 U
		17-Mar-07	1 U	55	1 U	84	1.2	9.6	1 U
		6-Jun-07	1 U	28	1 U	36	0.5 J	2.1	1 U
		15-Nov-07	1 U	26	1 U	17	1 U	0.64 J	1 U
		24-Jun-08	1 U	19	1 U	17	1 U	1 U	1 U
		15-Dec-08	0.36 U	3.2	0.29 U	0.63 J	0.13 U	0.24 U	0.75 U
		3-Jun-09	0.36 U	12	0.29 U	10	0.13 U	0.24 U	0.75 U
		17-Dec-09	0.36 U	4.2	0.38 U	3.3	0.42 U	0.24 U	0.29 U
		30-Jun-10	0.15 U	7.7	0.11 U	13	0.49 J	0.18 U	0.25 U
		19-Dec-10	0.15 U	1.9	0.11 U	0.97 J	0.2 U	0.18 U	0.25 U
MWT-26	***upgradient of Biowalls B1/B2***	3-Jan-07	1 U	10	1 U	19	0.6 J	2	1 U
		17-Mar-07	1 U	11	1 U	17	1	6.1	1 U
		5-Jun-07	1 U	3.2	1 U	11	0.7 J	4.4	1 U
		15-Nov-07	1 U	2.8	1 U	2.8	1 U	1 U	1 U
		24-Jun-08	1 U	1.7	1 U	3.3	1 U	1 U	1 U
		15-Dec-08	0.36 U	1.9	0.29 U	1	0.13 U	0.24 U	0.75 U
		3-Jun-09	0.36 U	3.6	0.29 U	6	0.13 U	3.5	0.75 U
		17-Dec-09	0.36 U	5.8	0.38 U	8.1	0.42 U	4.2	0.29 U
		29-Jun-10	0.15 U	1.7	0.11 U	5.5	0.37 J	0.18 U	0.25 U
		19-Dec-10	0.15 U	4.2	0.11 U	12	0.67 J	7.6	0.25 U
MWT-27	***in Biowall B1***	3-Jan-07	20 U	20 UJ	20 UJ	49 J	20 UJ	20 UJ	20 UJ
		16-Mar-07	20 U	20 U	20 U	20 U	20 U	20 U	20 U
		5-Jun-07	20 U	20 U	20 U	20 U	20 U	20 U	20 U
		15-Nov-07	10 U	10 U	10 U	10 U	10 U	10 U	10 U
		24-Jun-08	4 U	4 U	4 U	4 U	4 U	4 U	4 U
		15-Dec-08	3.6 U	1.8 U	2.9 U	1.6 U	1.3 U	2.4 U	7.5 U
		3-Jun-09	3.6 U	1.8 U	2.9 U	1.6 U	1.3 U	2.4 U	7.5 U
		16-Dec-09	1.8 U	2.3 U	1.9 U	1.9 U	2.1 U	3.1 J	1.5 U
		29-Jun-10	0.15 U	0.13 U	0.11 U	0.18 J	0.2 U	0.18 U	0.25 U
		20-Dec-10	0.15 U	0.51 J	0.11 U	1.1	0.2 U	2.1	0.25 U

Notes:

1. Sample duplicate pairs were collected at MWT-28 in Jan-07 and June-10; MWT-29 in Mar-07, Jun-08, and Dec-09; MWT-27 in Jun-07, Dec-08, and Dec-09; and MWT-23 in Nov-07 and Dec-10. If an analyte was detected in the sample but not detected in the duplicate (or vice versa) the non-detect value was taken at half the detection limit averaged with the detect value.
2. Wells in bold and italics are the biowall process monitoring wells.
3. Grey shading indicates that the concentration was detected above its Class GA groundwater standard. The Class GA Groundwater standard for TCE and cis-DCE is 5 ug/L; for VC the Class GA standard is 2 ug/L.

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
Chlorinated Organics in Groundwater
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Sample Identification		Sample Date	PCE (ug/L)	TCE (ug/L)	1,1-DCE (ug/L)	cis-DCE (ug/L)	trans-DCE (ug/L)	VC (ug/L)	1,1-DCA (ug/L)
MWT-28	***in Biowall B2***	3-Jan-07	20 U	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ
		16-Mar-07	20 U	20 U	20 U	20 U	20 U	20 U	20 U
		5-Jun-07	20 U	20 U	20 U	20 U	20 U	20 U	20 U
		15-Nov-07	5 U	5 U	5 U	5 U	5 U	5 U	5 U
		25-Jun-08	4 U	4 U	4 U	4 U	4 U	4 U	4 U
		15-Dec-08	3.6 U	1.8 U	2.9 U	1.6 U	1.3 U	2.4 U	7.5 U
		3-Jun-09	0.36 U	0.18 U	0.29 U	0.16 U	0.13 U	0.24 U	0.75 U
		18-Dec-09	1.8 U	2.3 U	1.9 U	1.9 U	2.1 U	1.2 U	1.5 U
		29-Jun-10	0.15 U	0.13 U	0.11 U	0.15 U	0.2 U	0.18 U	0.25 U
		18-Dec-10	0.15 U	0.13 U	0.11 U	0.51 J	0.2 U	0.64 J	0.25 U
MWT-29	***downgradient of Biowall B2***	3-Jan-07	2 U	22	2 U	280	6.5	140	2 U
		16-Mar-07	4 U	19	4.5 U	220	7.75	165	4.5 U
		5-Jun-07	2 U	7.6	2 U	100	2.1	81	2 U
		14-Nov-07	1 U	4.4	1 U	96	0.83 J	74	1 U
		25-Jun-08	1 U	3.3	1 U	84	0.65 J	74	1 U
		15-Dec-08	0.36 U	6.6	0.29 U	91	0.6 J	80	0.75 U
		3-Jun-09	0.36 U	4.5	0.29 U	61	0.67 J	43	0.75 U
		16-Dec-09	0.36 U	3.5	0.38 U	37	0.65 J	29	0.29 U
		30-Jun-10	0.15 U	1.3	0.26 J	78	1.1	69	0.25 U
		19-Dec-10	0.15 U	2.1	0.4 J	38	0.77 J	27	0.25 U
MWT-22	downgradient of Biowall B2	3-Jan-07	2 U	5.2	2 U	130	2.7	98	2 U
		17-Mar-07	4 U	3.8 J	4 U	90	4 U	64	4 U
		6-Jun-07	1 U	6.5	1 U	120	3.2	81	1 U
		14-Nov-07	1 U	2.6	1 U	99	0.85 J	180	1 U
		25-Jun-08	5 U	3 J	5 U	68	5 U	42	5 U
		15-Dec-08	1.8 U	5.9	1.4 U	160	0.65 U	140	3.8 U
		3-Jun-09	0.36 U	2.2	0.29 U	66	0.77 J	89	0.75 U
		16-Dec-09	1.8 U	2.3 U	1.9 U	57	2.1 U	52	1.5 U
		1-Jul-10	0.15 U	0.6 J	0.12 J	41	1.3	57	0.25 U
		17-Dec-10	0.15 U	1.8	0.66 J	130	2.8	98	0.25 U
PT-22	between Biowalls B and C	3-Jan-07	1 U	11	1 U	57	0.86 J	22	1 U
		15-Mar-07	1 U	16	1 U	41	0.51 J	13	1 U
		5-Jun-07	1 U	8.5	1 U	61	0.72 J	32	1 U
		14-Nov-07	1 U	9.7	1 U	30	0.67 J	11	1 U
		26-Jun-08	1 U	4.1	1 U	26	0.57 J	13	1 U
		15-Dec-08	0.36 U	35	0.29 U	52	0.41 J	1.3	0.75 U
		2-Jun-09	0.36 U	6.9	0.29 U	41	0.81 J	11	0.75 U
		16-Dec-09	0.36 U	8.7	0.38 U	29	0.42 U	9.5	0.29 U
		30-Jun-10	0.15 U	4.6	0.11 U	43	0.75 J	11	0.25 U
		17-Dec-10	0.15 U	29	0.11 U	42	0.48 J	2.1	0.25 U
MWT-23	***in Biowall C2***	3-Jan-07	4 U	4 U	4 U	60	4 U	23	4 U
		16-Mar-07	4 U	4 U	4 U	11	4 U	4.8	4 U
		6-Jun-07	2 U	2 U	2 U	3.1	2 U	2 U	2 U
		16-Nov-07	7 U	7 U	2.6 U	3.6 J	7 U	3.7 J	7 U
		25-Jun-08	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		12-Dec-08	0.36 U	0.41 J	0.29 U	2.4	0.13 U	2.8	0.75 U
		2-Jun-09	0.36 U	0.18 U	0.29 U	0.42 U	0.13 U	0.24 U	0.75 U
		15-Dec-09	0.36 U	0.46 U	0.38 U	0.47 J	0.42 U	0.24 U	0.29 U
		29-Jun-10	0.15 U	0.13 U	0.11 U	0.41 J	0.2 U	0.18 U	0.25 U
		19-Dec-10	0.15 U	0.29 J	0.11 U	4.6	0.49 J	5.3	0.52 J

Notes:

1. Sample duplicate pairs were collected at MWT-28 in Jan-07 and June-10; MWT-29 in Mar-07, Jun-08, and Dec-09; MWT-27 in Jun-07, Dec-08, and Dec-09; and MWT-23 in Nov-07 and Dec-10. If an analyte was detected in the sample but not detected in the duplicate (or vice versa) the non-detect value was taken at half the detection limit averaged with the detect value.
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Table 4
Chlorinated Organics in Groundwater
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Downgradient

Sample Identification		Sample Date	PCE (ug/L)	TCE (ug/L)	1,1-DCE (ug/L)	cis-DCE (ug/L)	trans-DCE (ug/L)	VC (ug/L)	1,1-DCA (ug/L)
MWT-24	downgradient of Biowalls C1/C2	3-Jan-07	1 U	0.94 J	1 U	210	2.1	19	0.81 J
		15-Mar-07	1 U	1 U	1 U	68	0.88 J	45	0.83 J
		5-Jun-07	2 U	2 U	2 U	19	2 U	22	1.1 J
		13-Nov-07	1 U	1.6	1 U	6.7	1 U	3.8	1 U
		26-Jun-08	5 U	5 U	5 U	31	5 U	5 U	5 U
		12-Dec-08	0.36 U	6	0.29 U	52	0.13 U	3.6	0.75 U
		2-Jun-09	0.36 U	4.8	0.29 U	38	0.13 U	7.3	0.75 U
		15-Dec-09	0.36 U	4.7	0.7 J	32	0.42 U	4	0.29 U
		1-Jul-10	0.15 U	5	0.11 U	31	0.41 J	7.5	0.79 J
		17-Dec-10	0.15 U	3.3	0.11 U	23	1	4.3	0.58 J
PT-17	downgradient of biowalls	2-Jan-07	1 U	6	1 U	62	1 U	21	1 U
		15-Mar-07	2 U	11	2 U	26	2 U	21	2 U
		5-Jun-07	1 U	3.4	1 U	43	0.77 J	9.9	1 U
		13-Nov-07	1 U	15	1 U	27	0.54 J	22	1 U
		26-Jun-08	1 U	8.5	1 U	21	1 U	23	1 U
		11-Dec-08	0.36 U	9.2	0.29 U	24	0.46 J	10	0.75 U
		2-Jun-09	0.36 U	8	0.29 U	56	1.1	55	0.75 U
		15-Dec-09	0.36 U	7.8	0.38 U	65	1.8	20	0.29 U
		1-Jul-10	0.15 U	3	0.24 J	81	3.2	53	0.25 U
		18-Dec-10	0.15 U	8.1	0.42 J	39	2.2	16	0.25 U
MWT-7	immed. upgradient of ZVI wall	4-Jan-07	1 U	490	1 U	35	1 U	0.51 J	1 U
		15-Mar-07	1 U	440	1 U	42	1 U	9.7	1 U
		5-Jun-07	1 U	410	1 U	61	1 U	18	1 U
		13-Nov-07	1 U	510	1 U	90	1 U	24	1 U
		25-Jun-08	1 U	440	1 U	90	1 U	12	1 U
		15-Dec-08	0.36 U	410	0.29 U	79	0.13 U	13	0.75 U
		2-Jun-09	0.36 U	330	0.29 U	68	0.13 U	9.3	0.75 U
		15-Dec-09	0.36 U	350	0.38 U	140	0.55 J	21	0.48 J
		1-Jul-10	0.15 U	330	0.78 J	170	0.91 J	15	0.25 U
		18-Dec-10	0.15 U	310	0.98 J	120	0.75 J	15	0.25 U
PT-24	downgradient of ZVI wall	2-Jan-07	1 U	4	1 U	54	0.86 J	0.6 J	0.68 J
		15-Mar-07	1 U	2.8	1 U	38	0.81 J	1 U	1 U
		5-Jun-07	1 U	3.1	1 U	60	1.6	2.6	0.75 J
		13-Nov-07	1 U	3.8	1 U	39	1 U	1 U	0.56 J
		26-Jun-08	1 U	2.4	1 U	48	1.1	1.9	0.69 J
		12-Dec-08	0.36 U	2.2	0.29 U	34	0.36 J	0.26 J	0.75 U
		2-Jun-09	0.36 U	1.7	0.29 U	32	0.83 J	2	0.75 U
		15-Dec-09	0.36 U	1.7	0.38 U	28	0.61 J	1.6	0.29 U
		30-Jun-10	0.15 U	0.39 J	0.11 U	33	1.1	3.8	0.54 J
		17-Dec-10	0.15 U	0.53 J	0.11 U	30	1.4	7.7	0.54 J
MW-56	off-site well	4-Jan-07	1 U	1 U	1 U	1.2	1 U	1 U	1 U
		6-Jun-07	1 U	1 U	1 U	1.7	1 U	1 U	1 U
		26-Jun-08	1 U	1 U	1 U	1.3	1 U	1 U	1 U
		11-Dec-08	0.36 U	0.33 J	0.29 U	0.4 J	0.13 U	0.24 U	0.75 U
		4-Jun-09	0.36 U	0.18 U	0.29 U	1	0.13 U	0.24 U	0.75 U
		18-Dec-09	0.36 U	0.46 U	0.38 U	0.56 J	0.42 U	0.24 U	0.29 U
		1-Jul-10	0.15 U	0.13 U	0.11 U	0.61 J	0.2 U	0.18 U	0.25 U
		19-Dec-10	0.15 U	0.13 U	0.11 U	0.86 J	0.2 U	0.18 U	0.25 U

Notes:

1. Sample duplicate pairs were collected at MWT-28 in Jan-07 and June-10; MWT-29 in Mar-07, Jun-08, and Dec-09; MWT-27 in Jun-07, Dec-08, and Dec-09; and MWT-23 in Nov-07 and Dec-10. If an analyte was detected in the sample but not detected in the duplicate (or vice versa) the non-detect value was taken at half the detection limit averaged with the detect value.
2. Wells in bold and italics are the biowall process monitoring wells.
3. Grey shading indicates that the concentration was detected above its Class GA groundwater standard. The Class GA Groundwater standard for TCE and cis-DCE is 5 ug/L; for VC the Class GA standard is 2 ug/L.

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 5
Groundwater Trends
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Sampled Wells	Location			TCE	cis-1,2-DCE	VC
PT-18A[1]	upgradient of walls	Sample Date:	19-Dec-10	6.3	0.54 J	0.18 U
		Trend:		Decreasing	Increasing	Decreasing
		Est. Date[2]:				
MWT-25	upgradient of Biowall A	Sample Date:	19-Dec-10	1.9	0.97 J	0.18 U
		Trend:		Compliant	Compliant	Compliant
		Est. Date[2]:				
MWT-26	upgradient of Biowalls B1/B2	Sample Date:	19-Dec-10	4.2	12	7.6
		Trend:		Compliant	Decreasing	No Trend
		Est. Date[4]:				
MWT-27	in Biowall B1	Sample Date:	20-Dec-10	0.51 J	1.1	2.1
		Trend:		Compliant	Compliant	No Trend
		Est. Date[2]:				
MWT-28	in Biowall B2	Sample Date:	18-Dec-10	0.13 U	0.51 J	0.64 J
		Trend:		Compliant	Compliant	Compliant
		Est. Date[2]:				
MWT-29	downgradient of Biowall B2	Sample Date:	19-Dec-10	2.1	38	27
		Trend:		Compliant	Decreasing	Decreasing
		Est. Date[2]:				
MWT-22	downgradient of Biowall B2	Sample Date:	17-Dec-10	1.8	130	98
		Trend:		Compliant	Decreasing	No Trend
		Est. Date[2]:				
PT-22	between Biowalls B and C	Sample Date:	17-Dec-10	29	42	2.1
		Trend:		Increasing	Decreasing	Decreasing
		Est. Date[2]:				
MWT-23[3]	in Biowall C2	Sample Date:	19-Dec-10	0.29 J	4.6	5.3
		Trend:		Compliant	Compliant	Decreasing
		Est. Date[2]:				
MWT-24	downgradient of Biowalls C1/C2	Sample Date:	17-Dec-10	3.3	23	4.3
		Trend:		Compliant	Decreasing	Decreasing
		Est. Date[2]:				
PT-17[1]	downgradient of biowalls	Sample Date:	18-Dec-10	8.1	39	16
		Trend:		Decreasing	No Trend	No Trend
		Est. Date[2]:				
MWT-7[1]	immed. Upgradient of ZVI wall	Sample Date:	17-Dec-10	310	120	15
		Trend:		Decreasing	Increasing	No Trend
		Est. Date[2]:				
PT-24	downgradient of ZVI wall	Sample Date:		0.53 J	30	7.7
		Trend:		Compliant	Decreasing	Increasing
		Est. Date[2]:				
MW-56	off-site well	Sample Date:	18-Dec-09	0.13 U	0.86 J	0.18 U
		Trend:		Compliant	Compliant	Compliant
		Est. Date[2]:				

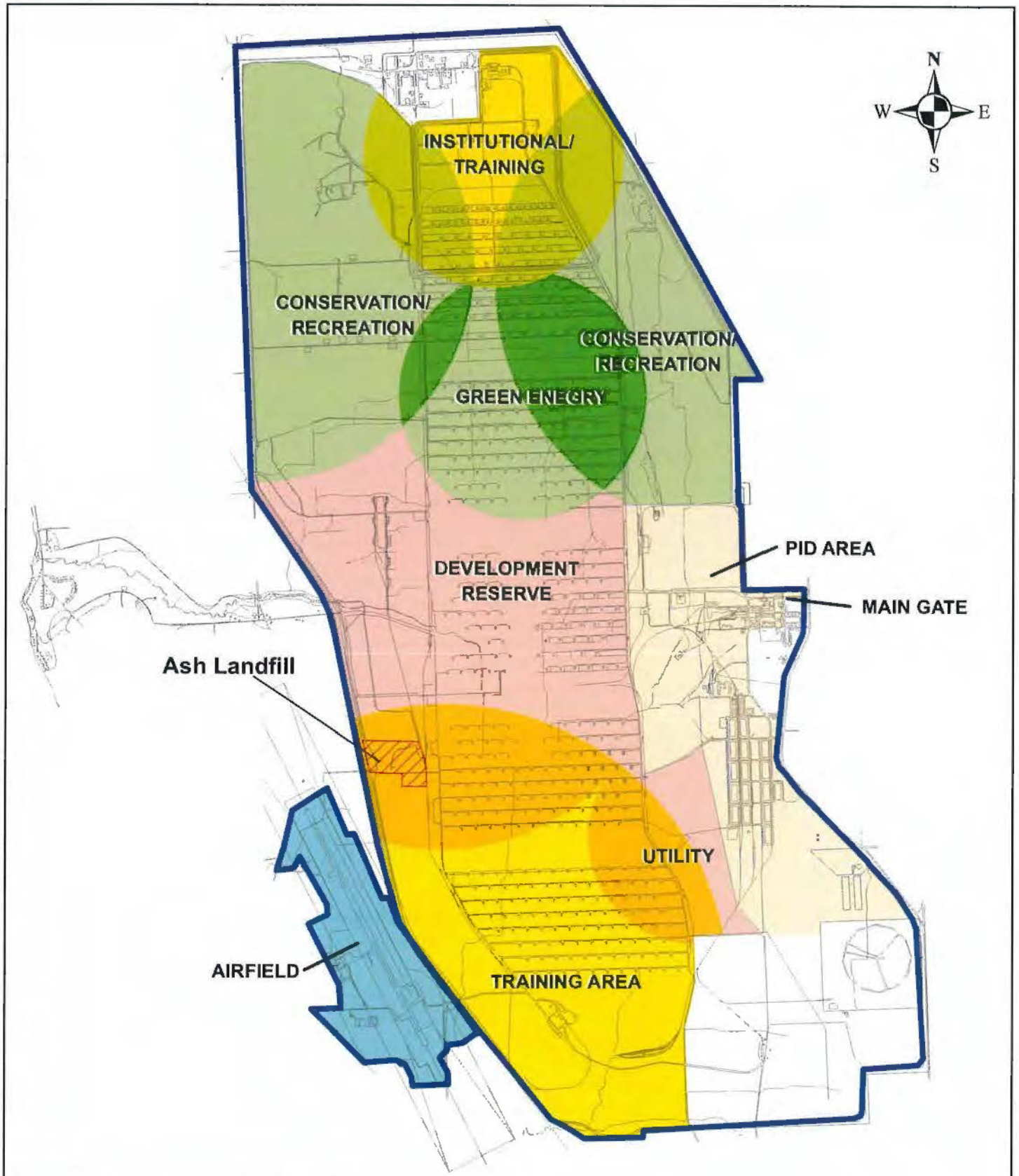
Notes:

1. The concentration of TCE at these wells has not been impacted by the biowall system and dates to achieve compliance cannot be estimated at this time due to the natural variation in concentrations over time.
2. The date that the groundwater standard will be achieved is estimated based on an exponential regression of the time plots for each well. The dates are rough estimates that indicate that the groundwater concentrations will eventually reach the GA standard and are not intended to represent a definitive timeframe in which the GA standards will be achieved.
3. The concentrations presented were an average of the sample duplicate pair.
4. Overall concentrations follow a decreasing trend; however further monitoring is needed to elucidate the dates at which compounds can be expected to reach groundwater standards.

U = compound was not detected.

J = the reported value is an estimated concentration.

FIGURES



PARSONS

SENECA ARMY DEPOT ACTIVITY

ASH LANDFILL ANNUAL REPORT

FIGURE 1

ASH LANDFILL LOCATION AT SEDA

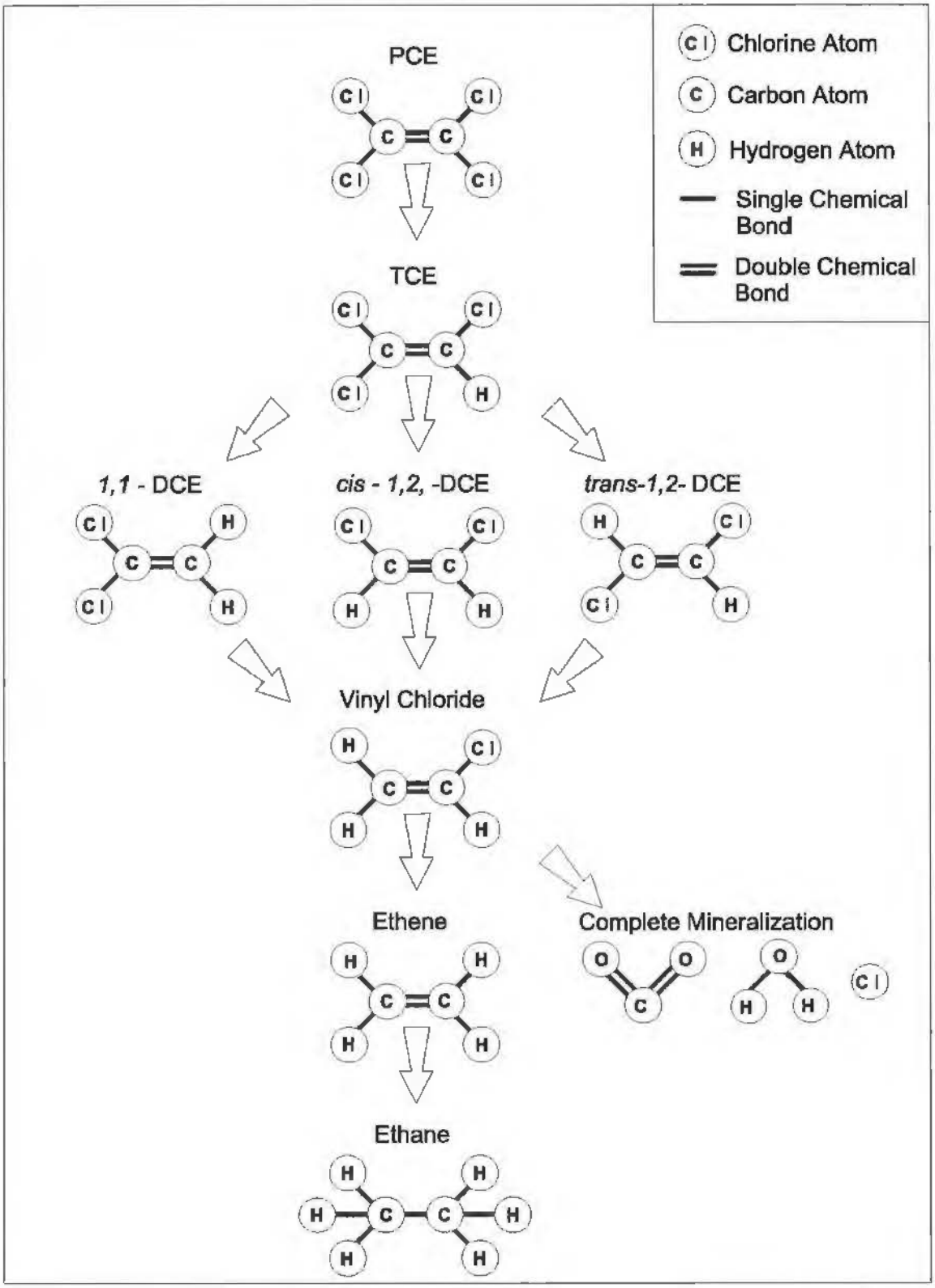
April 2011

Seneca Army Depot Boundary

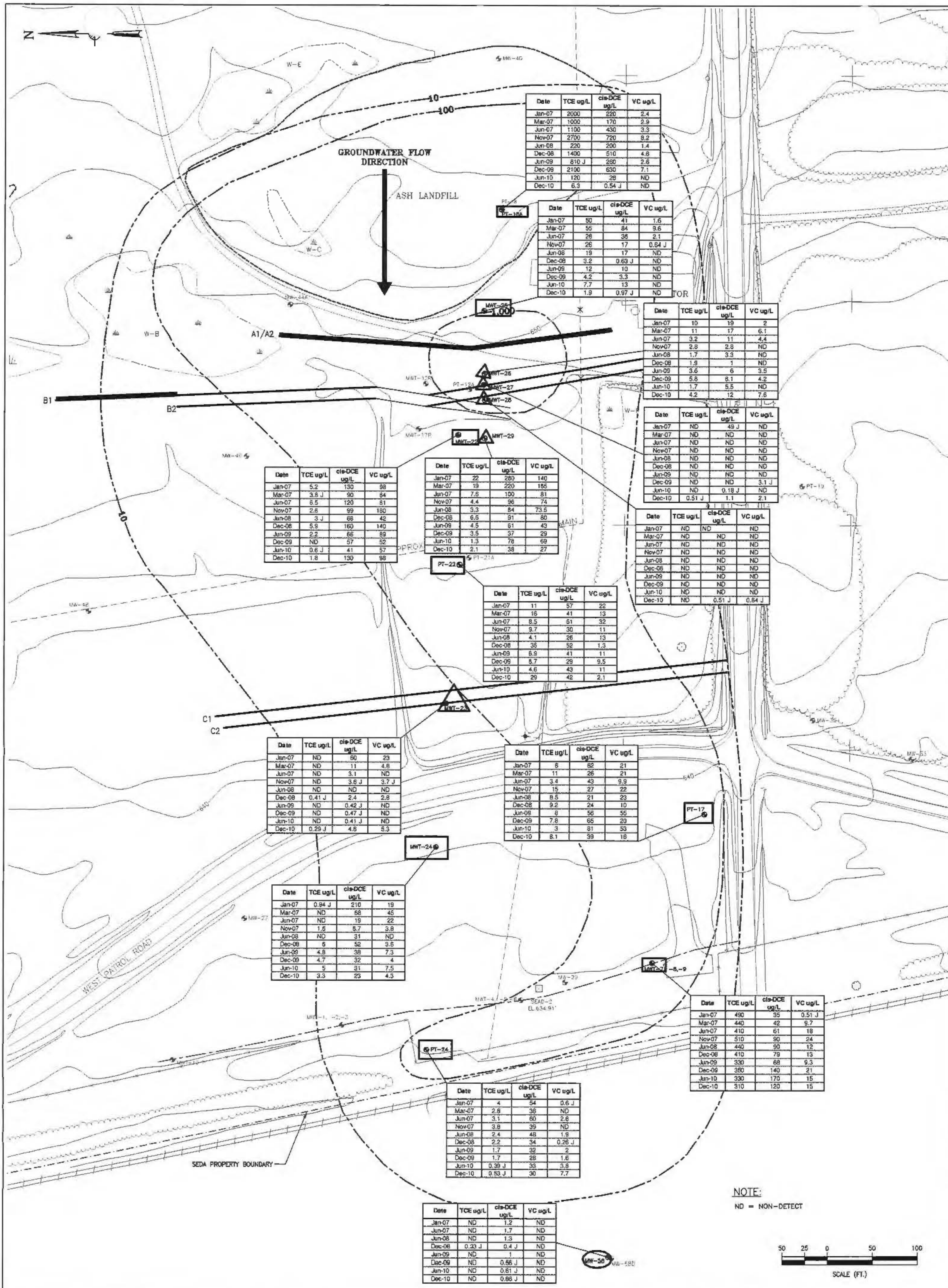
Ash Landfill (SEADs 3, 6, 8, 14 & 15)
Operational Unit Boundary

Path: P:\PIT\Projects\Huntsville Cont W912DY-08-D-0003\TO#01 - LTM Ash Landfill\Annual Report Y4\Figures\Ash_SEDA_Loc_Map.mxd

Figure 5
Reductive Dechlorination of Chlorinated Ethenes
Ash Landfill Annual Report
Seneca Army Depot Activity



(USEPA, 1998)



Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	2000	220	2.4
Mar-07	1000	170	2.9
Jun-07	1100	430	3.3
Nov-07	2700	720	8.2
Jun-08	220	200	1.4
Dec-08	1400	510	4.8
Jun-09	810 J	260	2.6
Dec-09	2100	630	7.1
Jun-10	120	28	ND
Dec-10	6.3	0.54 J	ND

Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	50	41	1.6
Mar-07	55	84	9.6
Jun-07	26	36	2.1
Nov-07	26	17	0.64 J
Jun-08	19	17	ND
Dec-08	3.2	0.63 J	ND
Jun-09	12	10	ND
Dec-09	4.2	3.3	ND
Jun-10	7.7	13	ND
Dec-10	1.9	0.97 J	ND

Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	10	19	2
Mar-07	11	17	6.1
Jun-07	3.2	11	4.4
Nov-07	2.8	2.8	ND
Jun-08	1.7	3.3	ND
Dec-08	1.9	1	ND
Jun-09	3.6	6	3.5
Dec-09	5.8	8.1	4.2
Jun-10	1.7	5.5	ND
Dec-10	4.2	12	7.6

Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	ND	49 J	ND
Mar-07	ND	ND	ND
Jun-07	ND	ND	ND
Nov-07	ND	ND	ND
Jun-08	ND	ND	ND
Dec-08	ND	ND	ND
Jun-09	ND	ND	ND
Dec-09	ND	ND	3.1 J
Jun-10	ND	0.18 J	ND
Dec-10	0.51 J	1.1	2.1

Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	ND	ND	ND
Mar-07	ND	ND	ND
Jun-07	ND	ND	ND
Nov-07	ND	ND	ND
Jun-08	ND	ND	ND
Dec-08	ND	ND	ND
Jun-09	ND	ND	ND
Dec-09	ND	ND	ND
Jun-10	ND	ND	ND
Dec-10	ND	0.51 J	0.64 J

Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	5.2	130	98
Mar-07	3.8 J	90	84
Jun-07	6.5	120	81
Nov-07	2.6	99	180
Jun-08	3 J	68	42
Dec-08	5.9	160	140
Jun-09	2.2	66	89
Dec-09	ND	57	52
Jun-10	0.6 J	41	57
Dec-10	1.8	130	98

Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	22	280	140
Mar-07	19	220	155
Jun-07	7.6	100	81
Nov-07	4.4	96	74
Jun-08	3.3	84	73.5
Dec-08	6.6	91	80
Jun-09	4.5	61	43
Dec-09	3.5	37	29
Jun-10	1.3	78	69
Dec-10	2.1	38	27

Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	11	57	22
Mar-07	16	41	13
Jun-07	8.5	61	32
Nov-07	9.7	30	11
Jun-08	4.1	26	13
Dec-08	35	52	1.3
Jun-09	6.9	41	11
Dec-09	6.7	29	9.5
Jun-10	4.6	43	11
Dec-10	29	42	2.1

Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	ND	60	23
Mar-07	ND	11	4.8
Jun-07	ND	3.1	ND
Nov-07	ND	3.6 J	3.7 J
Jun-08	ND	ND	ND
Dec-08	0.41 J	2.4	2.8
Jun-09	ND	0.42 J	ND
Dec-09	ND	0.47 J	ND
Jun-10	ND	0.41 J	ND
Dec-10	0.29 J	4.6	5.3

Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	6	62	21
Mar-07	11	26	21
Jun-07	3.4	43	9.9
Nov-07	15	27	22
Jun-08	8.5	21	23
Dec-08	9.2	24	10
Jun-09	8	56	55
Dec-09	7.8	65	20
Jun-10	3	81	53
Dec-10	8.1	39	16

Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	0.94 J	210	19
Mar-07	ND	68	45
Jun-07	ND	19	22
Nov-07	1.5	5.7	3.8
Jun-08	ND	31	ND
Dec-08	6	52	3.6
Jun-09	4.8	38	7.3
Dec-09	4.7	32	4
Jun-10	5	31	7.5
Dec-10	3.3	23	4.3

Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	490	35	0.51 J
Mar-07	440	42	9.7
Jun-07	410	61	18
Nov-07	510	90	24
Jun-08	440	90	12
Dec-08	410	79	13
Jun-09	330	68	9.3
Dec-09	350	140	21
Jun-10	330	170	15
Dec-10	310	120	15

Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	4	54	0.6 J
Mar-07	2.6	38	ND
Jun-07	3.1	60	2.6
Nov-07	3.8	39	ND
Jun-08	2.4	48	1.9
Dec-08	2.2	34	0.26 J
Jun-09	1.7	32	2
Dec-09	1.7	28	1.6
Jun-10	0.39 J	33	3.8
Dec-10	0.53 J	30	7.7

Date	TCE ug/L	cis-DCE ug/L	VC ug/L
Jan-07	ND	1.2	ND
Jun-07	ND	1.7	ND
Jun-08	ND	1.3	ND
Dec-08	0.33 J	0.4 J	ND
Jun-09	ND	1	ND
Dec-09	ND	0.56 J	ND
Jun-10	ND	0.61 J	ND
Dec-10	ND	0.66 J	ND

LEGEND:

- PAVED ROAD
- DIRT ROAD
- GROUND CONTOUR AND ELEVATION
- TREE
- WETLAND & DESIGNATION
- MONITORING WELL AND DESIGNATION
- RAILROAD TRACKS
- BRUSH
- CHAIN LINK FENCE
- UTILITY POLE
- APPROXIMATE LOCATION OF FIRE HYDRANT
- FUEL OR UNDERGROUND STORAGE TANK
- SURVEY MONUMENT (SEAD-1 EL.630.90')
- APPROXIMATE LOCATION OF WATER MAIN
- PILOT STUDY BIOWALL (2005)
- SINGLE BIOWALL (2006)
- DOUBLE-WIDE BIOWALL (2006)
- ZERO VALENT IRON WALL (1998)
- GROUNDWATER ISOCONTOUR (UG/L) BASED ON JANUARY 2000 DATA
- OFF-SITE PERFORMANCE MONITORING WELL IN L.T.M. PROGRAM
- ON-SITE PLUME PERFORMANCE MONITORING WELL IN L.T.M. PROGRAM
- BIOWALL PROCESS MONITORING WELL IN L.T.M. PROGRAM

PARSONS

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

ASH LANDFILL

ASH LANDFILL ANNUAL REPORT

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No.

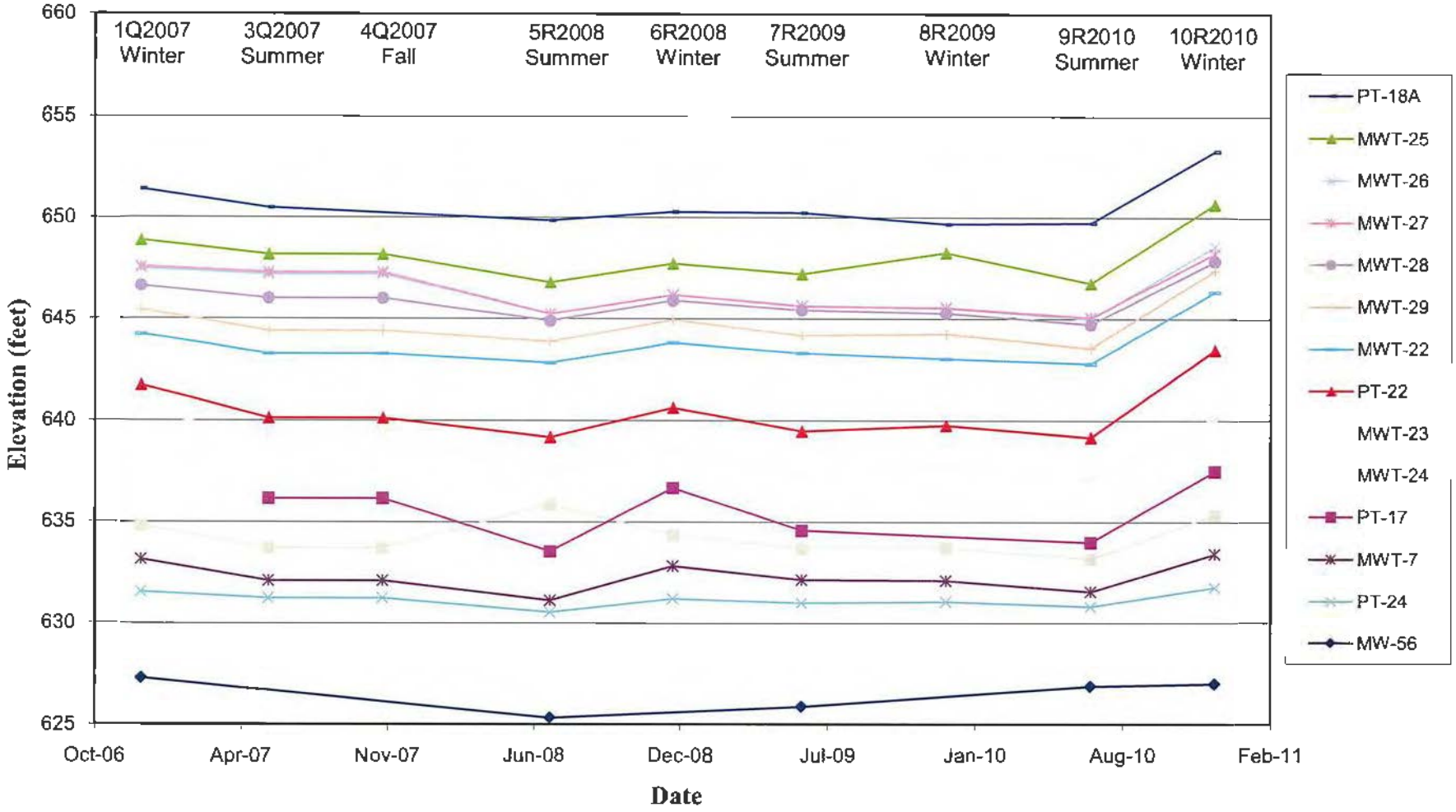
FIGURE 6

CHLORINATED ETHENES CONCENTRATIONS IN GROUNDWATER

SCALE | DATE APRIL 2011 | REV -

FILE: P:\PIT\PROJECTS\HUNTSVILLE CONT W912DY-08-D-0003\TO#01 - LTM ASH LANDFILL\ANNUAL REPORT Y4\FIGURES\FIGURE 6.DWG, DATE: 04/05/2011 10:54:01AM, p0018397

Figure 7
Groundwater Elevations
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



Note: Groundwater levels were measured on: December 12, 2006; June 4, 2007; November 7, 2007; June 23, 2008; December 23, 2008; June 1, 2009; December 14, 2009; June 28, 2010, and December 13, 2010. Groundwater elevations were not measured at well MW-56 during 3Q2007, 4Q2007, 6R2008, or 8R2009; at PT-17 during 1Q2007 or 8R2008; or at PT-18A during 4Q2007. Groundwater levels were not recorded during 2Q2007.

N

MW-39
657.63

656

654

652

650

648

646

644

642

640

638

636

634

632

630

628

W-E

MW-40
655.95

PT-18
653.25

MW-14R
650.62

W-C

INCINERATOR

MWT-25
650.65

W-D

W-B

A1/A2

B1

B2

MWT-26
648.59

PT-17A
648.14

MWT-27
648.23

MWT-28
647.84

MWT-
646.32

W-F

MW-46
648.96

MWT-17R
646.22

MWT-29
647.39

PT-19
642.22

PT-22
643.46

PT-20
642.16

MW-45
644.94

WEST SENECA ROAD

C1

C2

MWT-
640.14

MW-32
636.74

PT-17

MWT-24
635.35

MW-27
634.20

ZERO VALENT IRON WALL

MW-29
632.39

MWT-4

MWT-5
632.11

EL.634.91'

MWT-1

MWT-2
632.27

PT-24
631.78

PT-16
634.44

MWT-10
632.55

SEDA PROPERTY BOUNDARY

MW-50
626.96

FILE: P:\PIT\PROJECTS\HUNTSVILLE CONT W912DY-08-D-0003\TO 01 - LTM ASH LANDFILL\ANNUAL REPORT Y4\FIGURES\FIGURE 8.DWG, DATE: 04/05/2011 12:32:10PM, p0018397

LEGEND:

- PAVED ROAD
- DIRT ROAD
- GROUND CONTOUR AND ELEVATION
- TREE
- WETLAND & DESIGNATION
- MONITORING WELL AND DESIGNATION
- RAILROAD TRACKS
- BRUSH
- CHAIN LINK FENCE
- UTILITY POLE
- APPROXIMATE LOCATION OF FIRE HYDRANT
- FUEL OR UNDERGROUND STORAGE TANK
- SURVEY MONUMENT
- ABANDONED MONITORING WELL
- APPROXIMATE LOCATION OF WATER MAIN
- PILOT STUDY BIOWALL (2005)
- SINGLE BIOWALL (2006)
- DOUBLE-WIDE BIOWALL (2006)
- ZERO VALENT IRON WALL (1998)
- 640 GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION

70 0 70 140
(FEET)

PARSONS

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
ASH LANDFILL
ASH LANDFILL ANNUAL REPORT

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No.

FIGURE 8
ASH LANDFILL GROUNDWATER CONTOURS & GROUNDWATER FLOW DIRECTION DEC. 2010

SCALE | DATE APRIL 2011 | REV –

Figure 9A
Concentrations of VOCs Along the Biowalls - Quarter 1, 2007
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

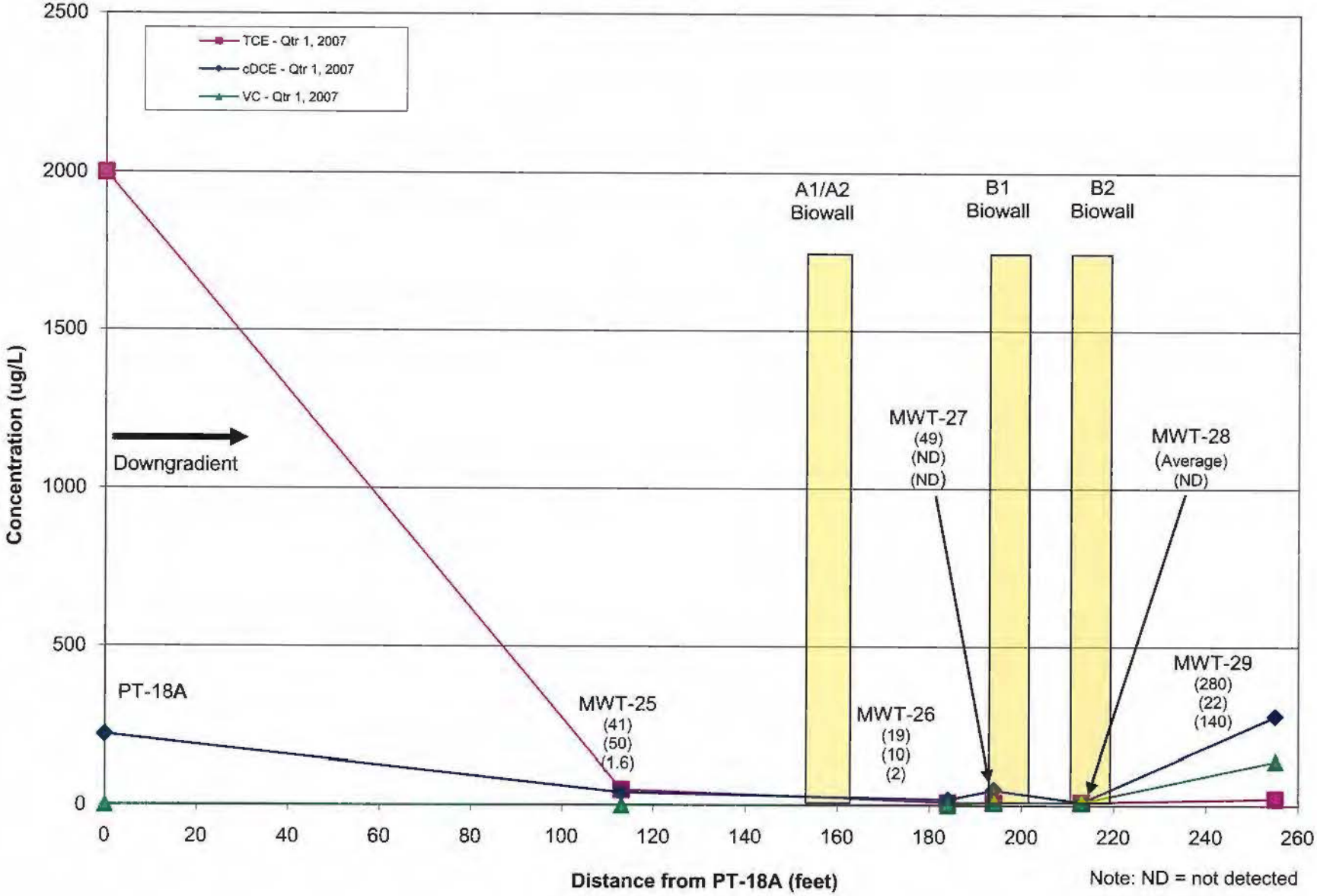


Figure 9B
Concentrations of VOCs Along the Biowalls - Quarter 2, 2007
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

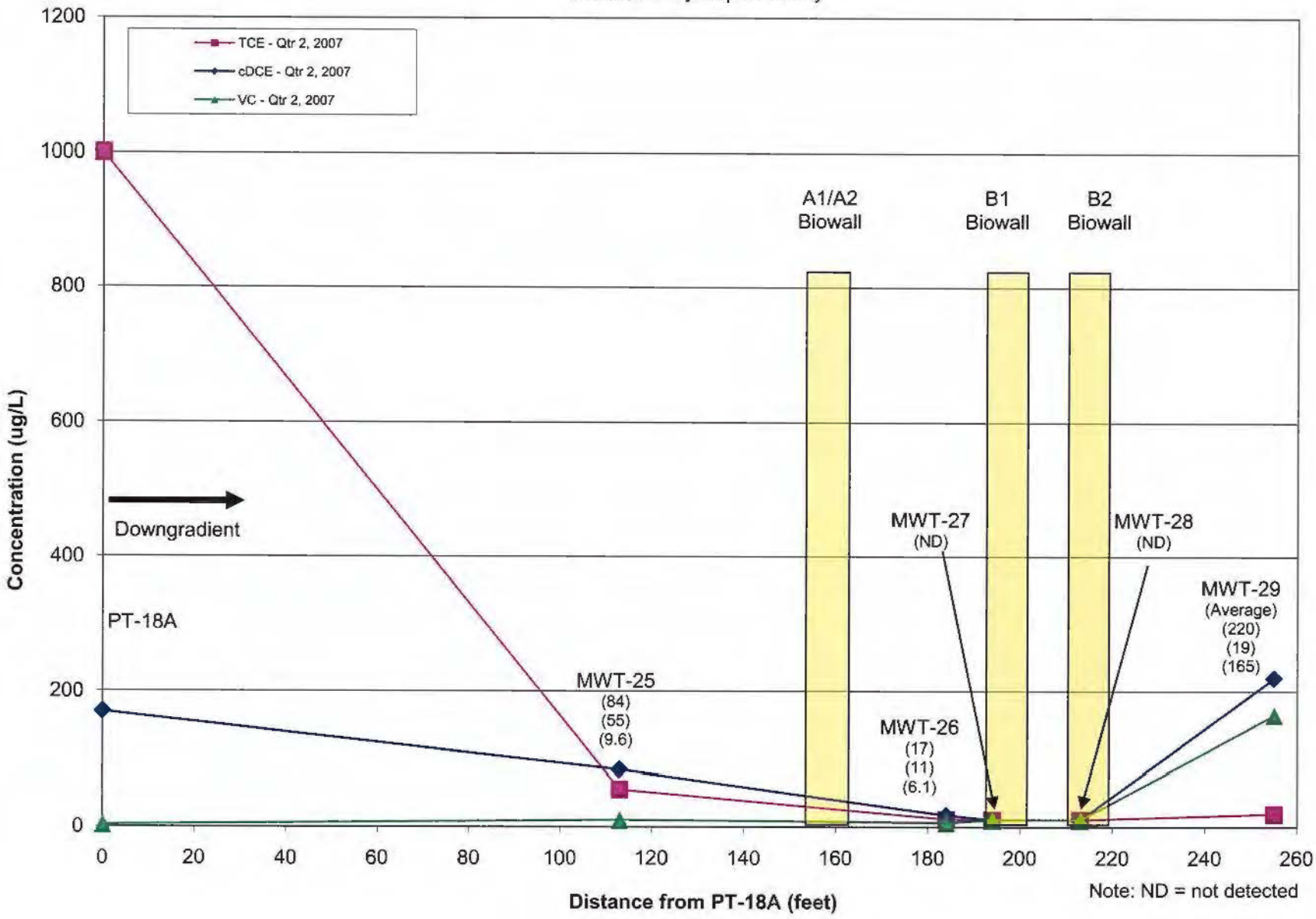


Figure 9C
Concentrations of VOCs Along the Biowalls - Quarter 3, 2007
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

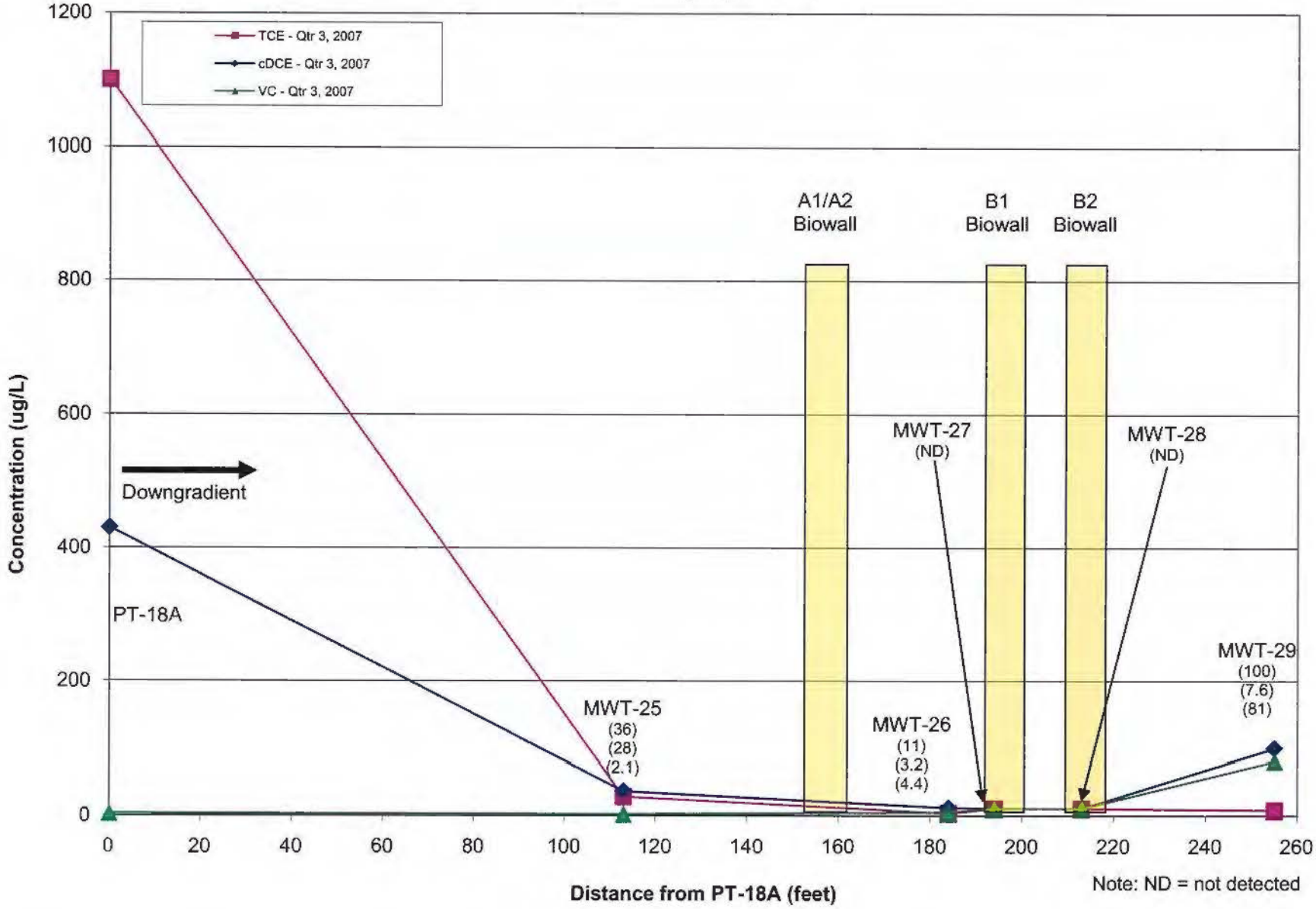


Figure 9D
Concentrations of VOCs Along the Biowalls - Quarter 4, 2007
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

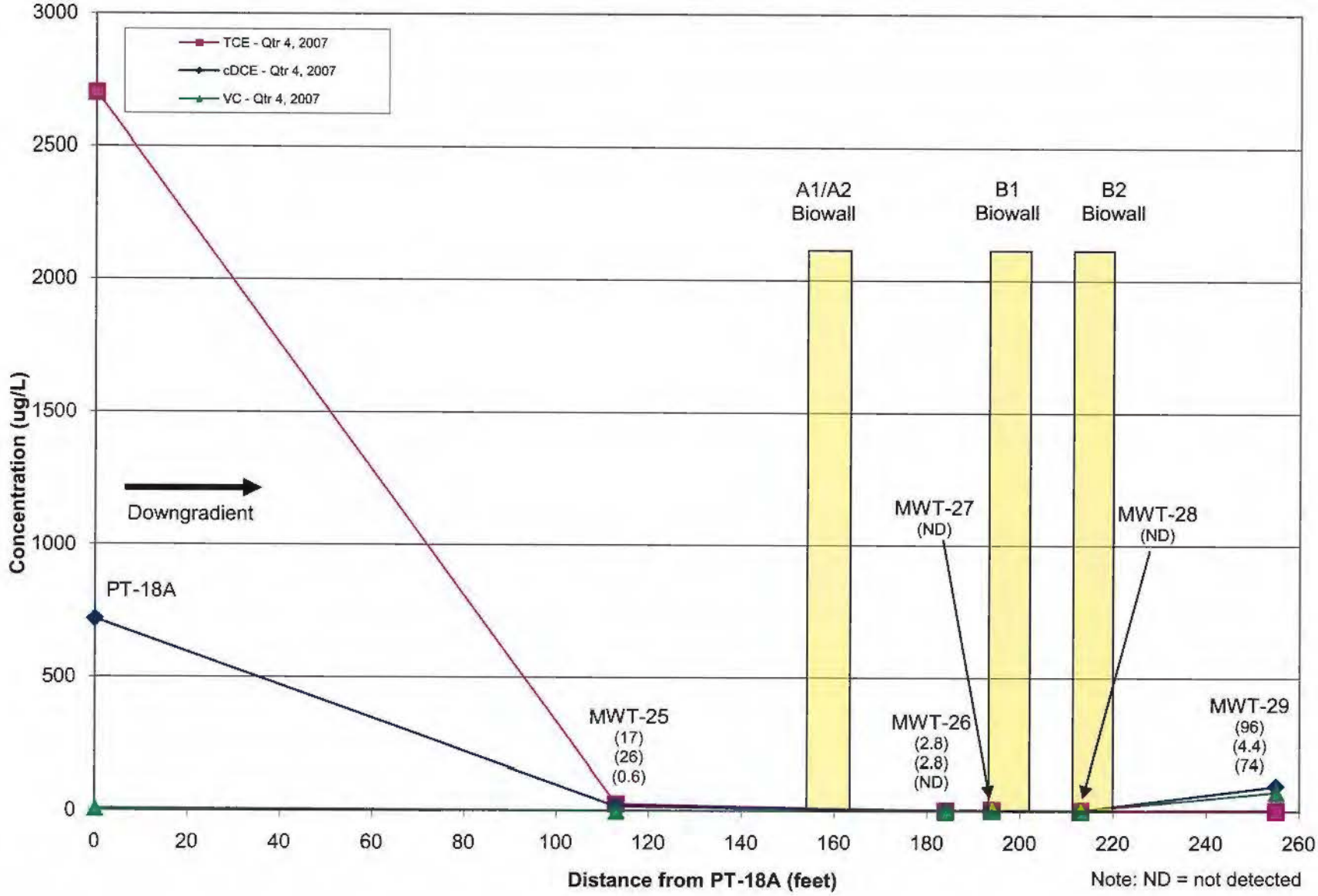
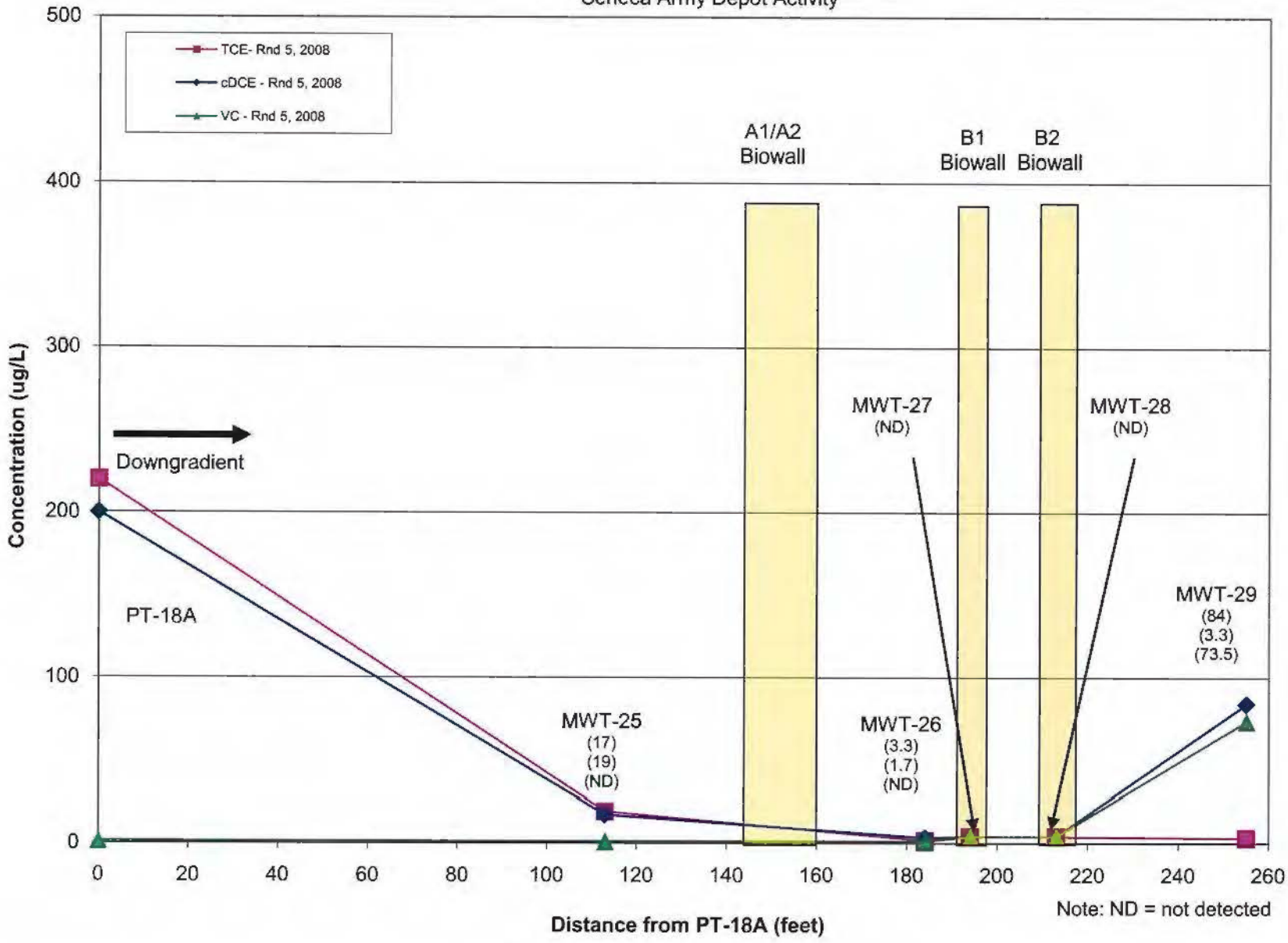


Figure 9E
Concentrations of VOCs Along the Biowalls - Round 5, 2008
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



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4/19/2011

Figure 9F
Concentrations of VOCs Along the Biowalls - Round 6, 2008
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

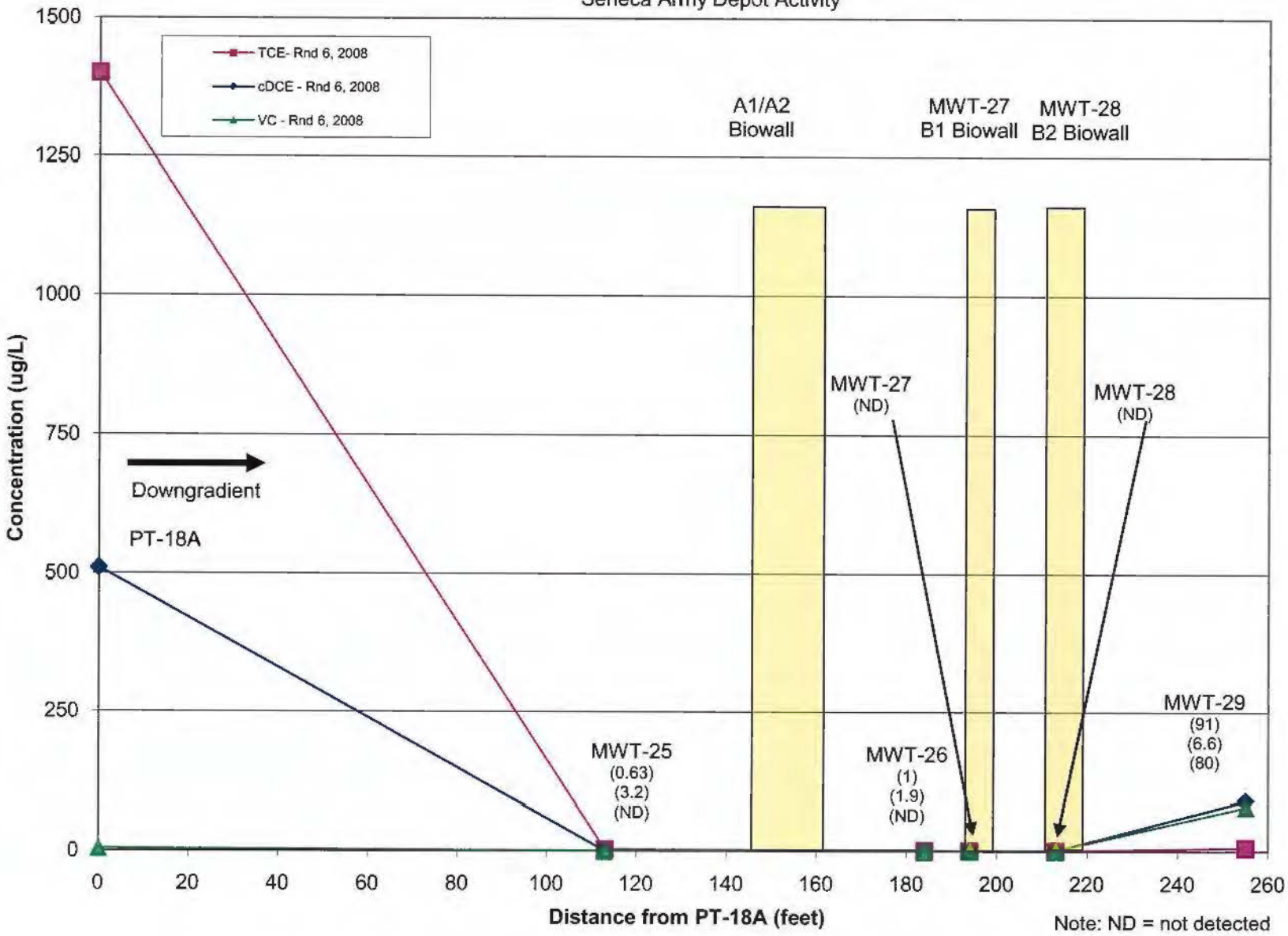


Figure 9G
Concentrations of VOCs Along the Biowalls - Round 7, 2009
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

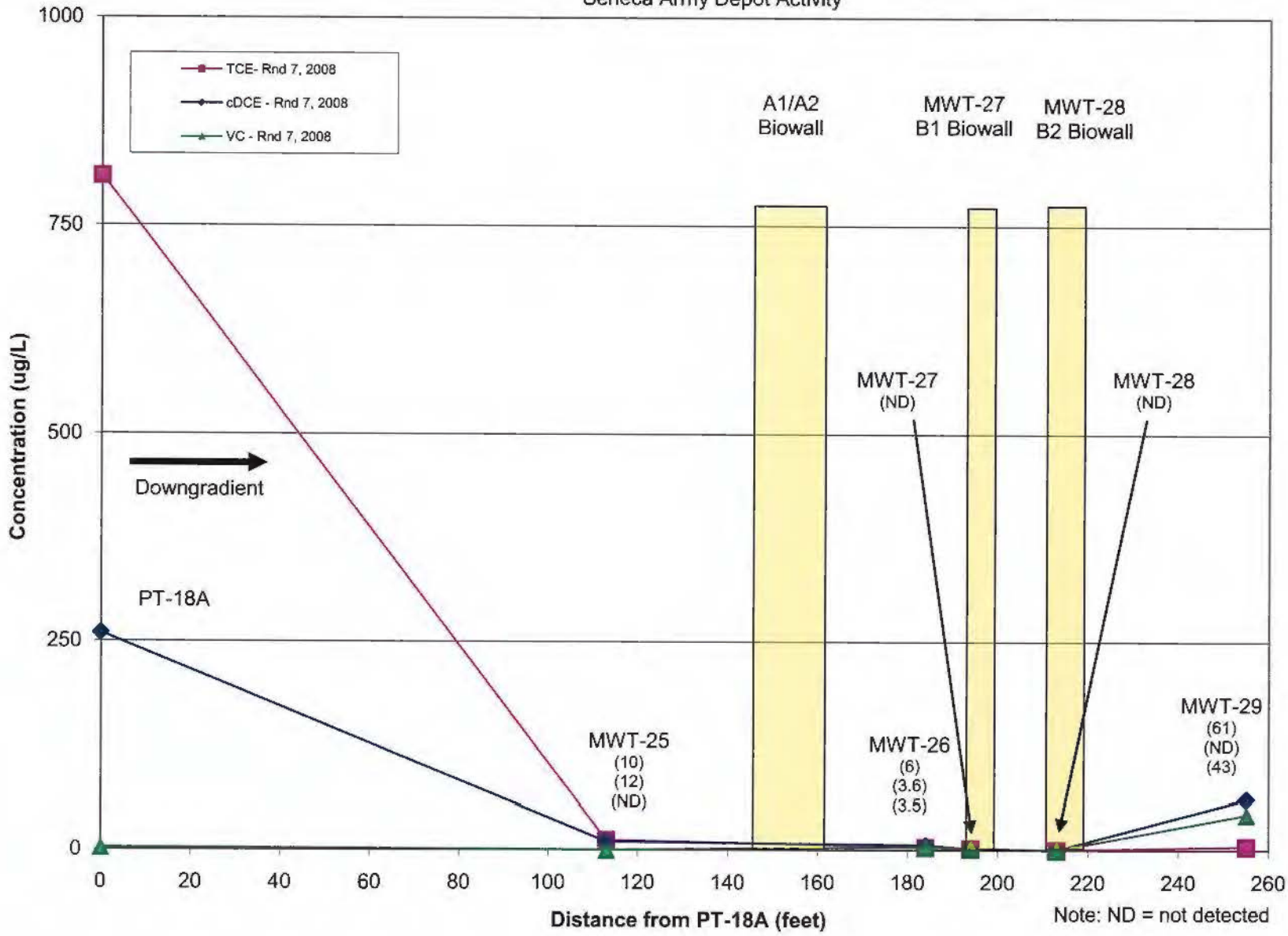
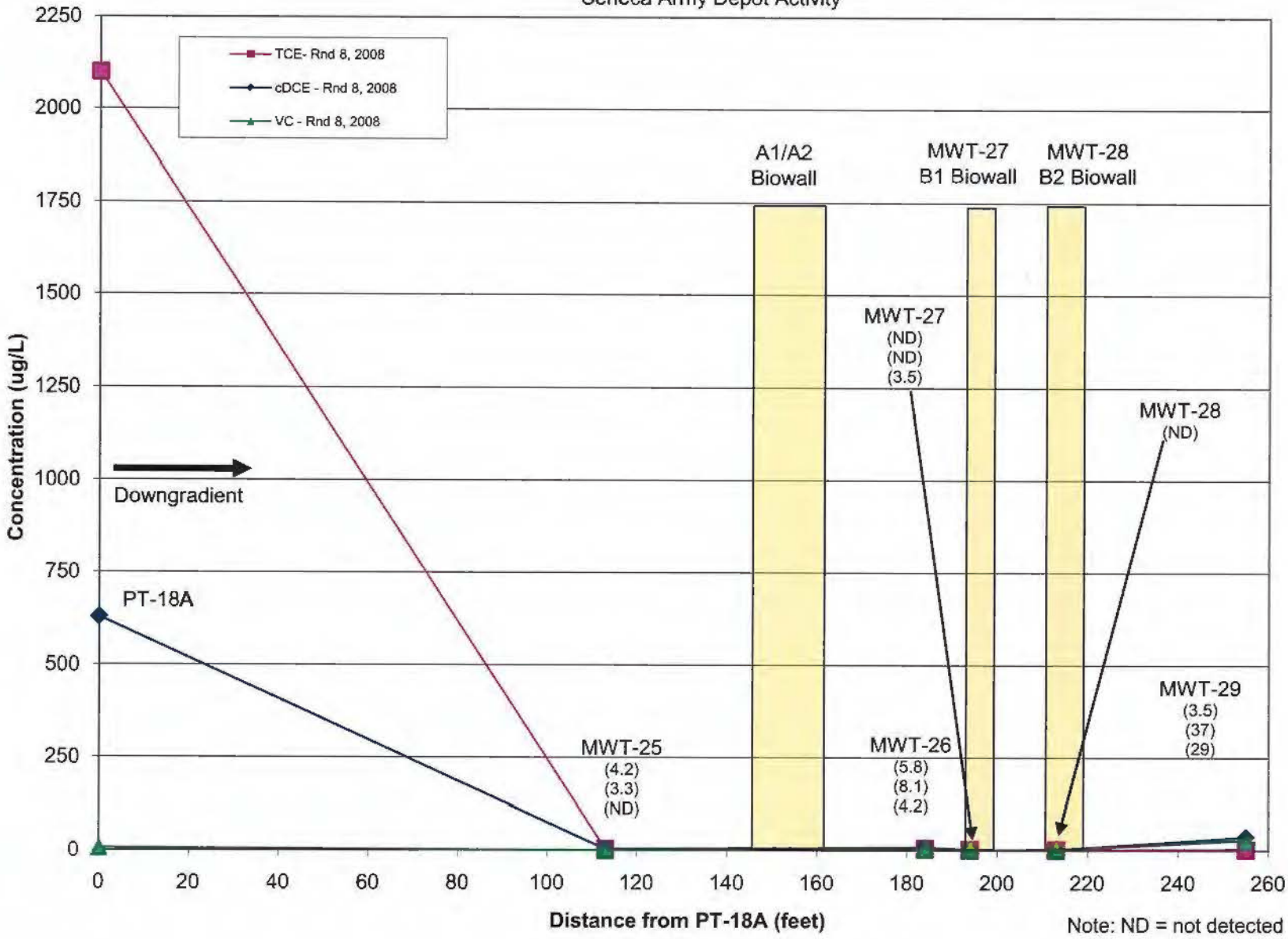
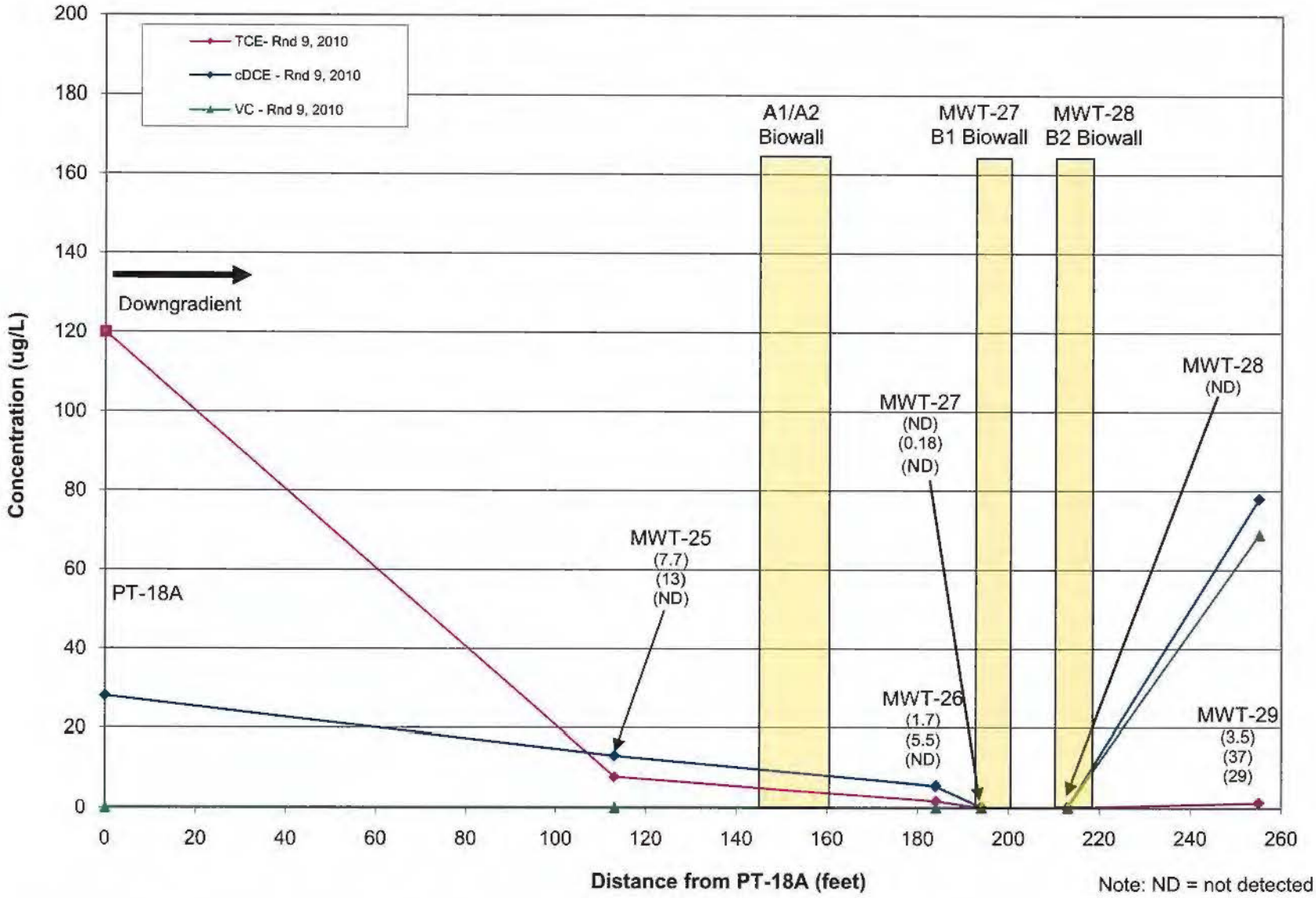


Figure 9H
Concentrations of VOCs Along the Biowalls - Round 8, 2009
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



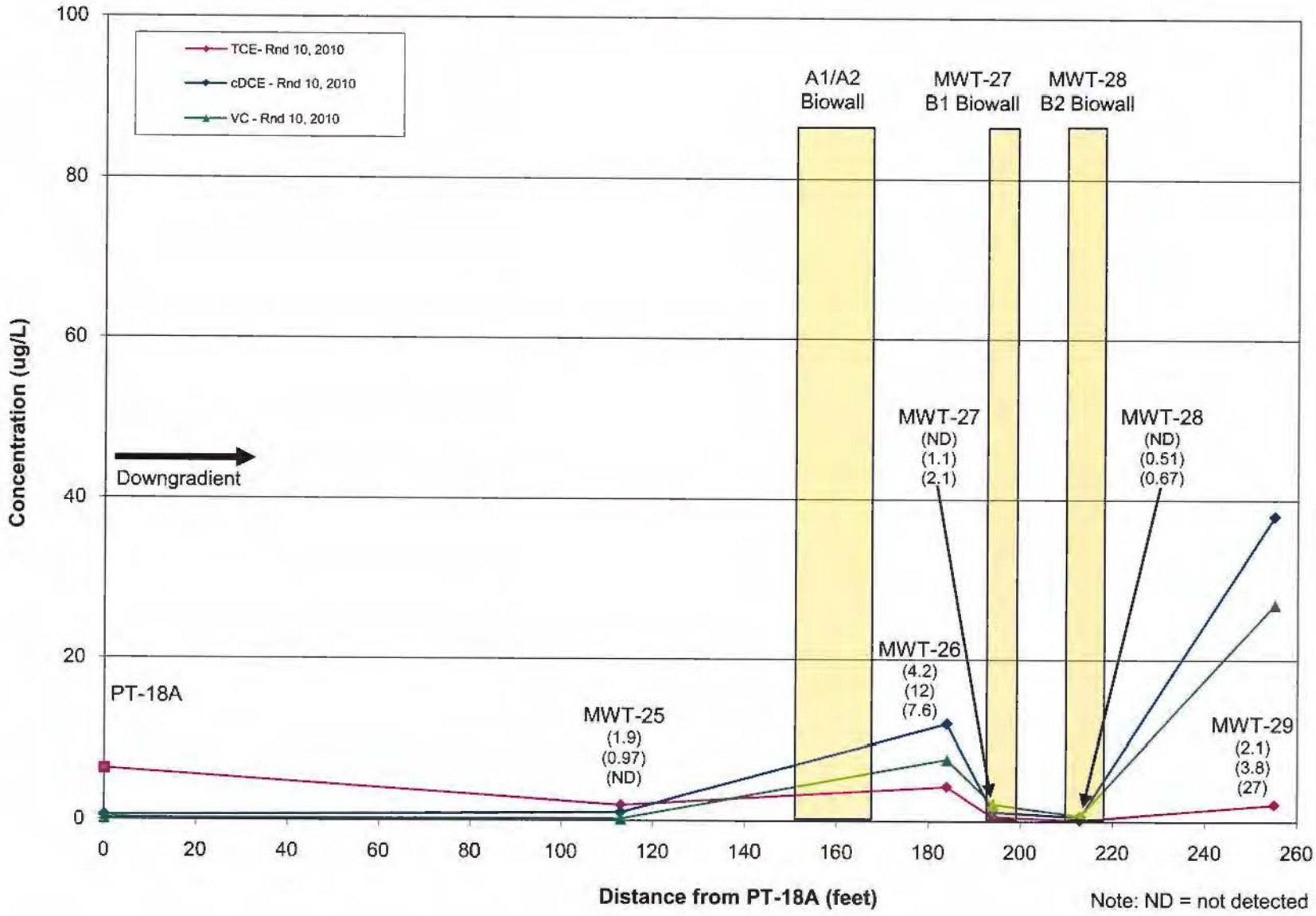
Note: ND = not detected

Figure 9I
Concentrations of VOCs Along the Biowalls - Round 9, 2010
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



Note: ND = not detected

Figure 9J
Concentrations of VOCs Along the Biowalls - Round 10, 2010
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



Note: ND = not detected

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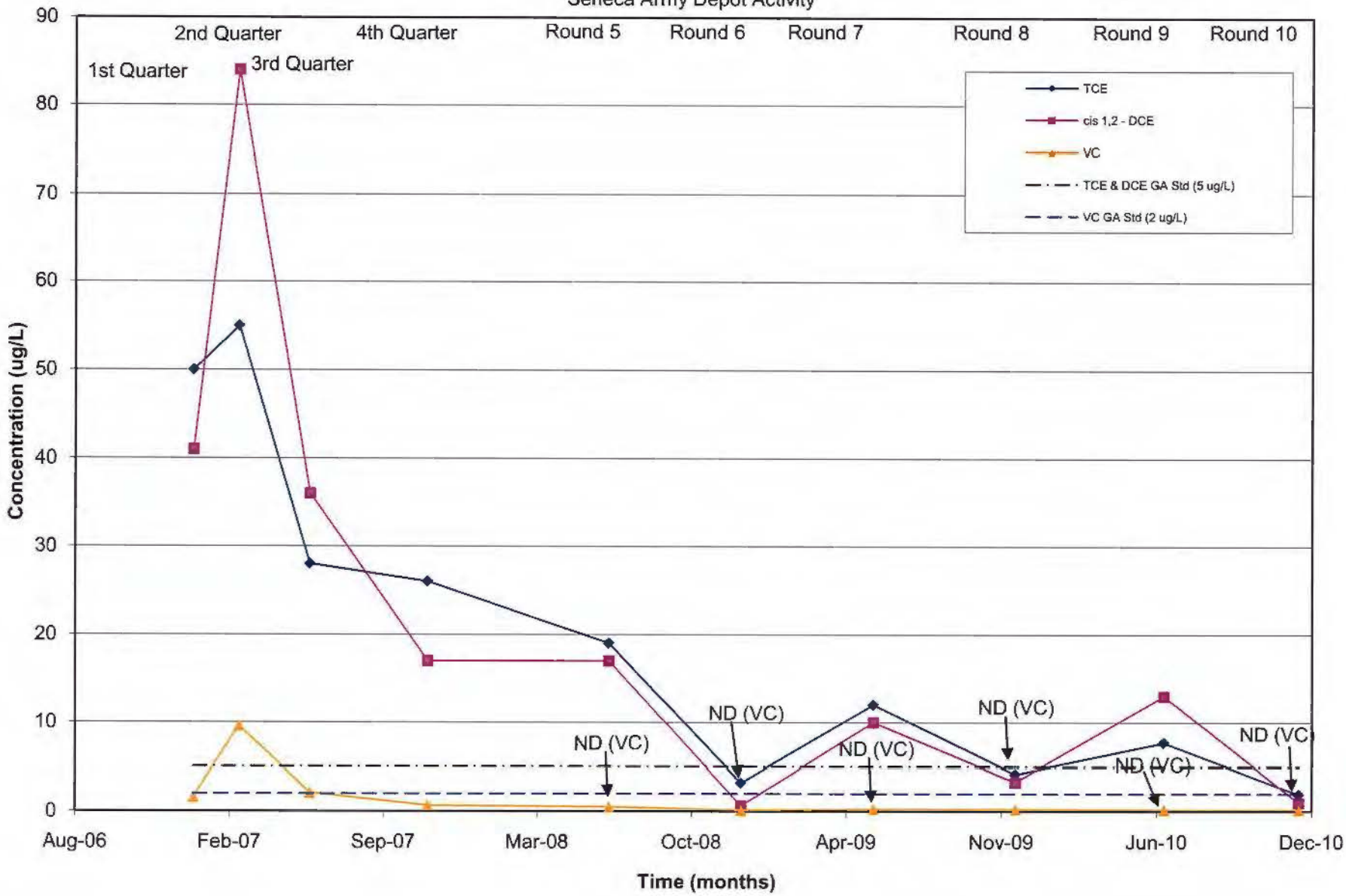
4/19/2011

Figure 10A
Concentrations of Chlorinated Organics Over Time at MWT-25
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



Note:
ND = not detected.

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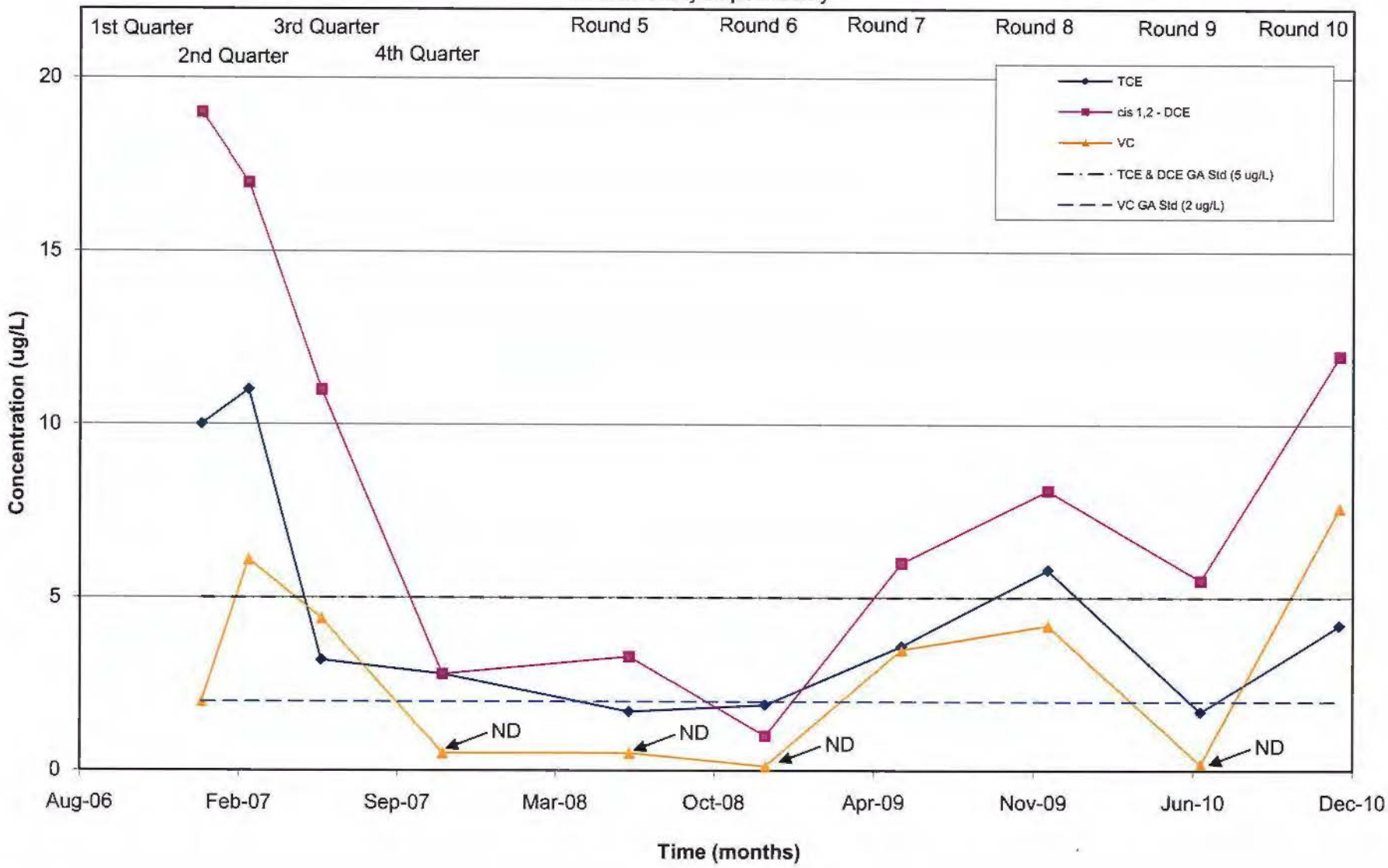
4/19/2011

Figure 10B
Concentrations of Chlorinated Organics Over Time at MWT-26
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

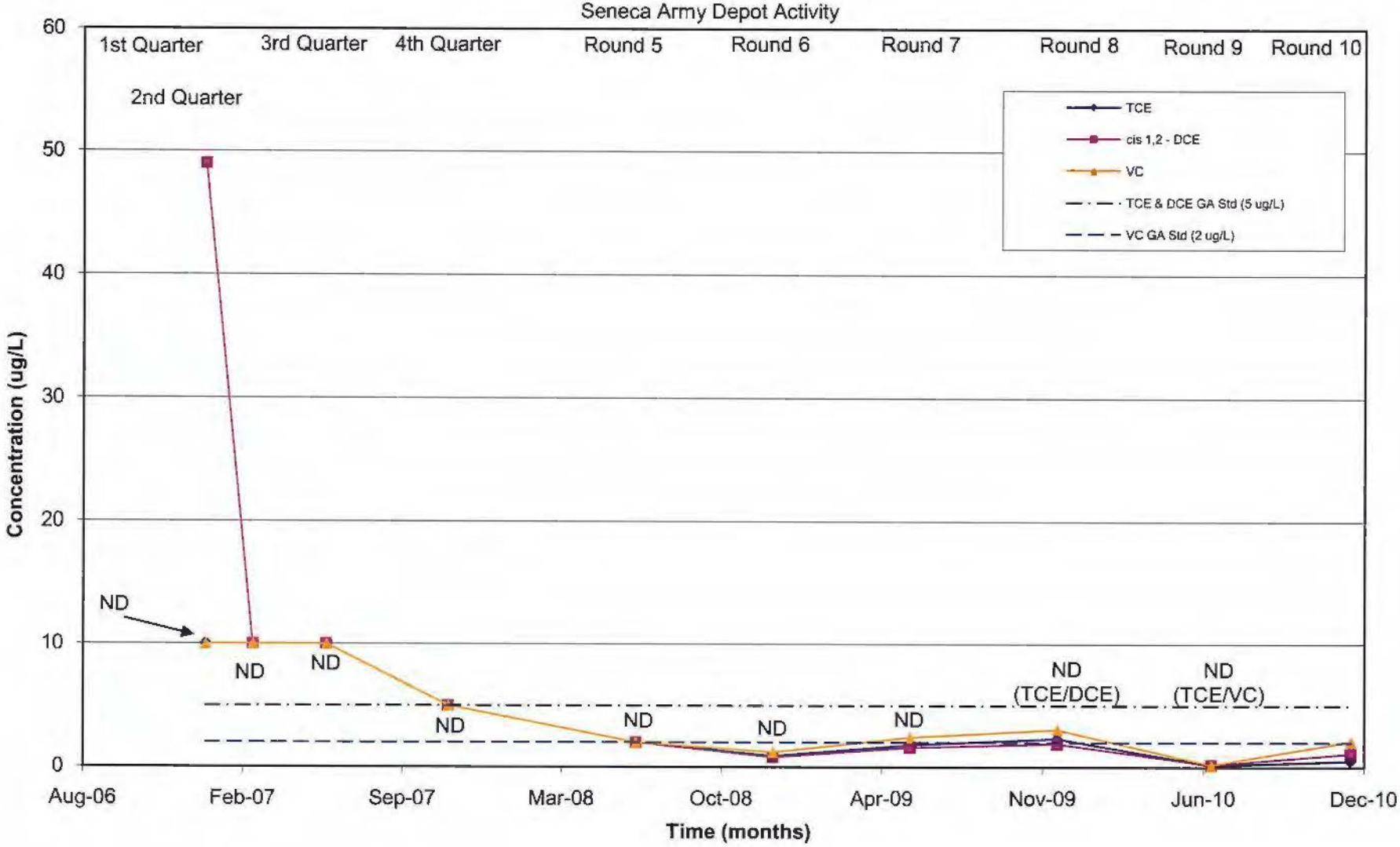


Note:
ND = not detected.

P:\PIT\Projects\Huntsville Cont W912DY-08-D-0003\TO#01 - LTM Ash Landfill\Annual Report Y4\Figures\Figure 10 Well Conc vs Time.xls MWT-26

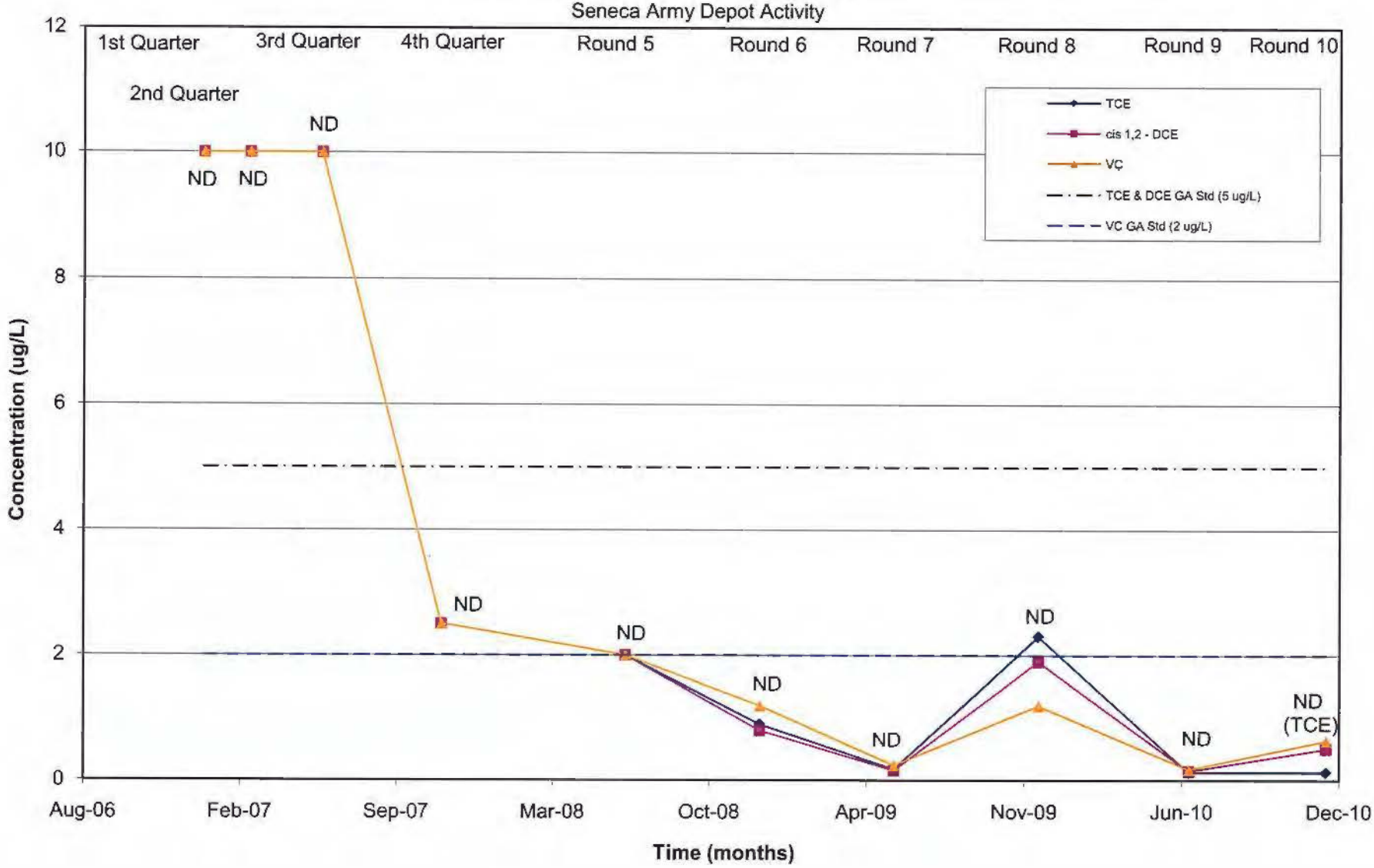
4/19/2011

Figure 10C
Concentrations of Chlorinated Organics Over Time at MWT-27
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



Note:
Round 3 and Round 6 data is the average of the sample and its duplicate.
ND = not detected.

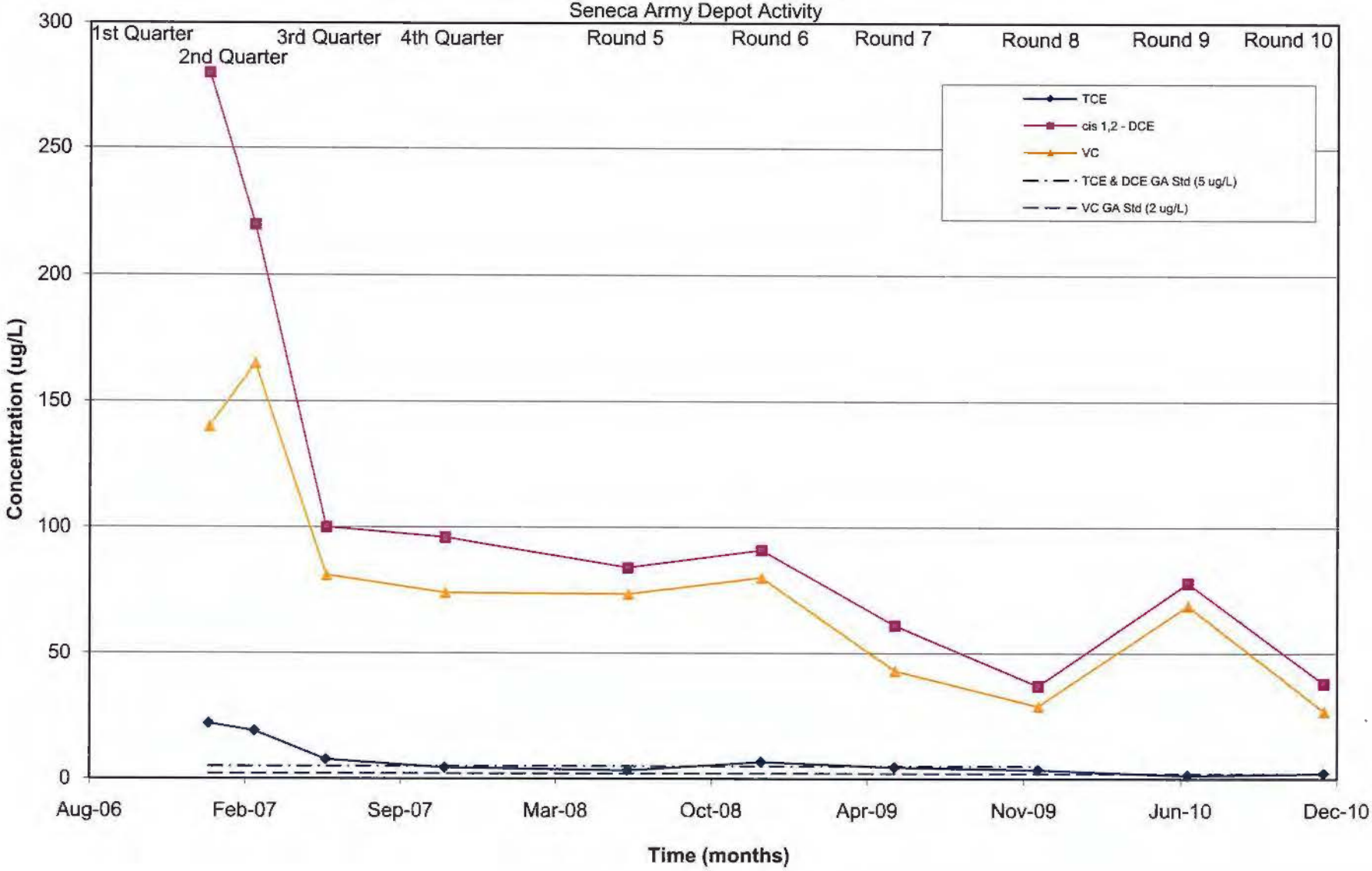
Figure 10D
Concentrations of Chlorinated Organics Over Time at MWT-28
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



Note:
Round 3 and Round 6 data is the average of the sample and its duplicate.
ND = not detected.

P:\PIT\Projects\Huntsville Cont W912DY-08-D-0003\TO#01 - LTM Ash Landfill\Annual Report Y4\Figures\Figure 10 Well Conc vs Time.xls MWT-28 4/19/2011

Figure 10E
Concentrations of Chlorinated Organics Over Time at MWT-29
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



Note:
Round 2 and Round 5 data is the average of the sample and its duplicate.

Figure 10F
Concentrations of Chlorinated Organics Over Time at MWT-22
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

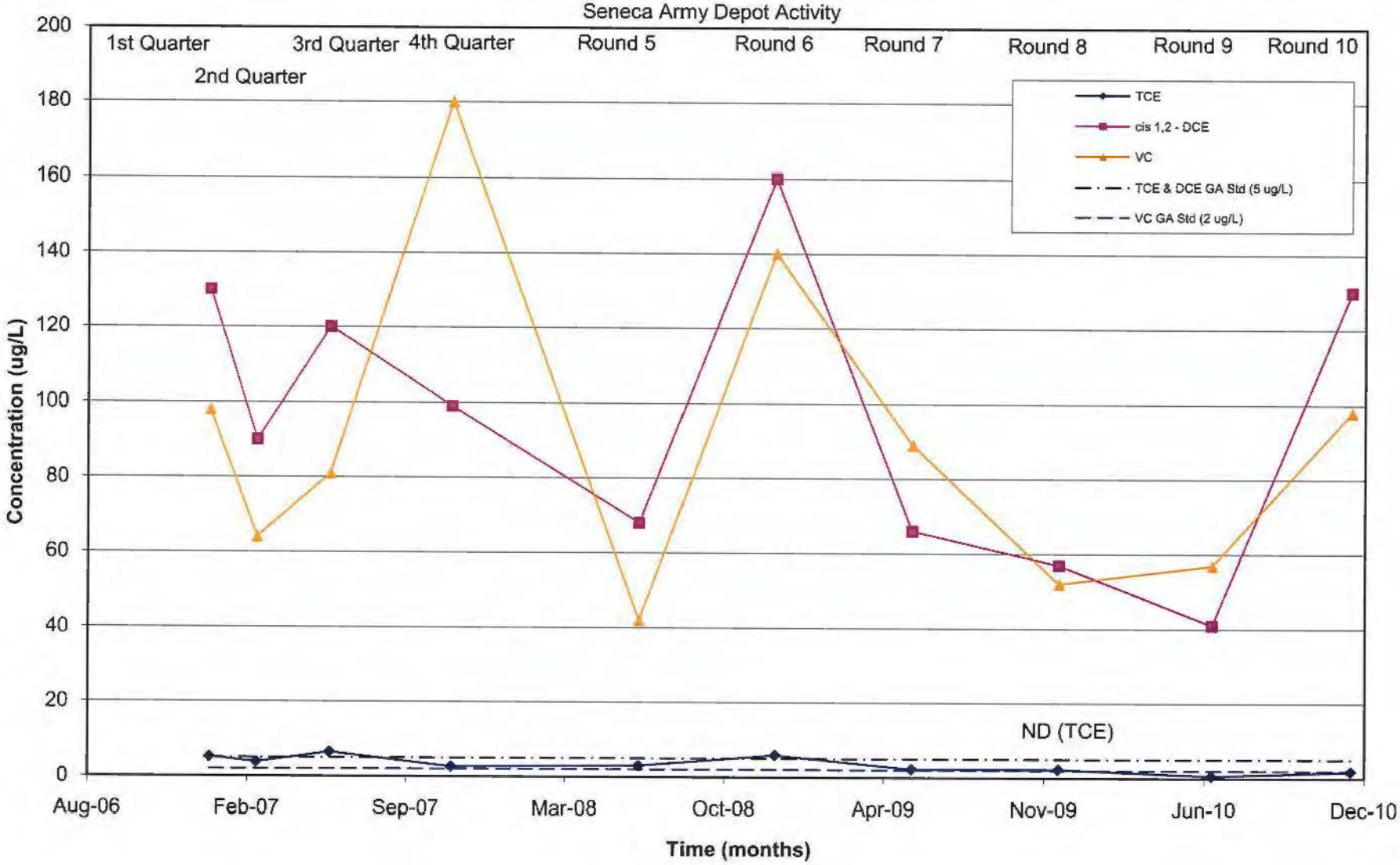
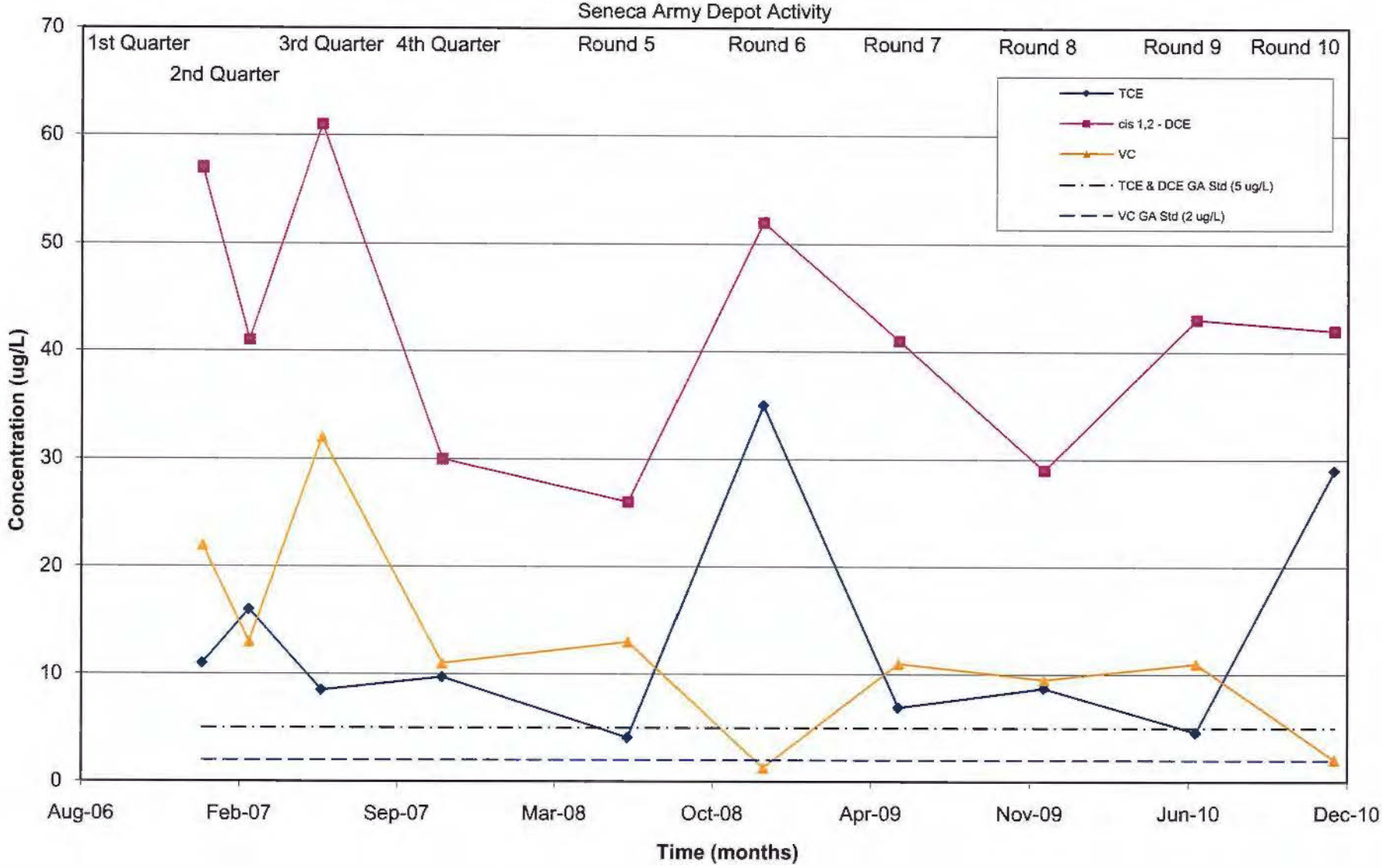
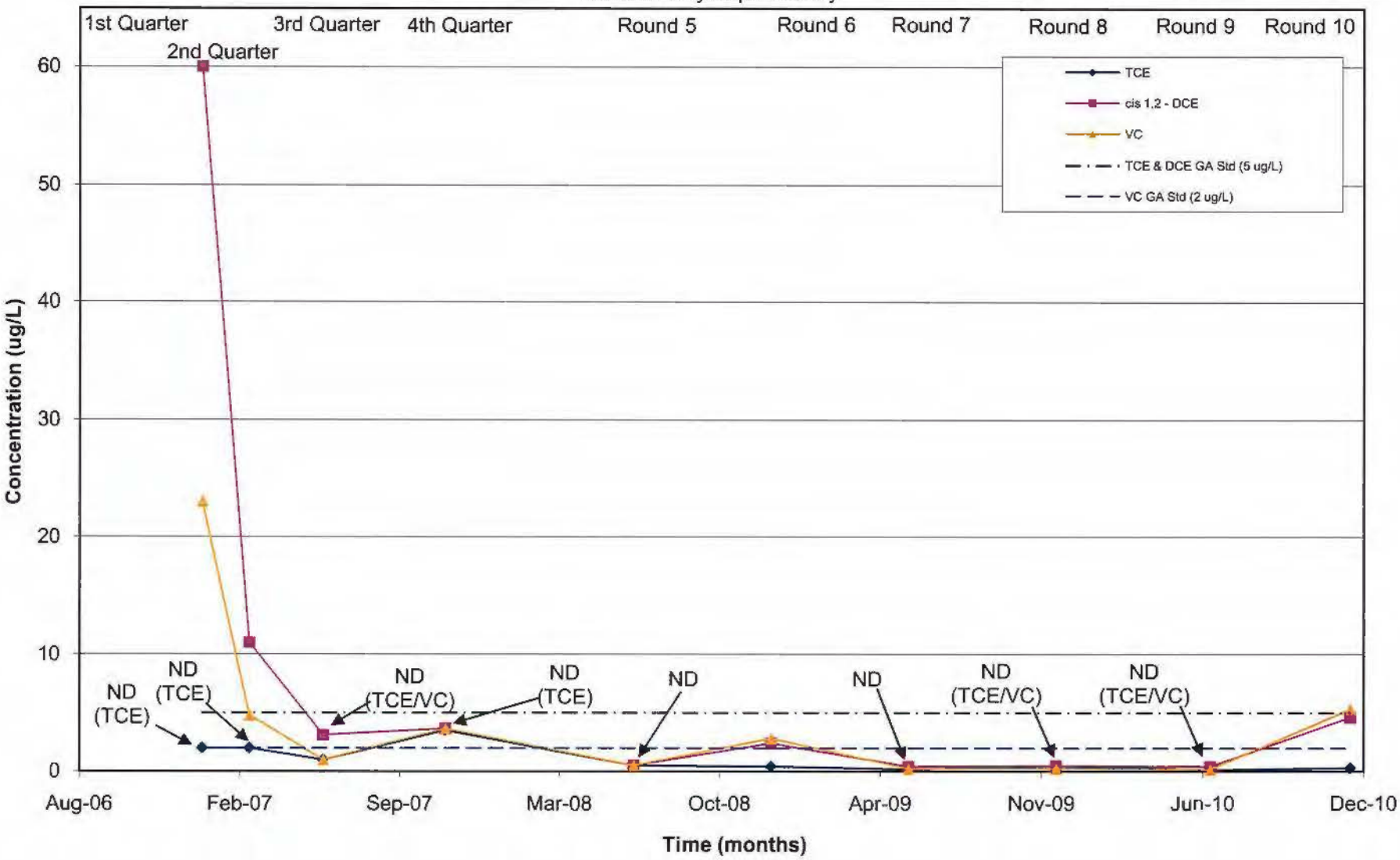


Figure 10G
Concentrations of Chlorinated Organics Over Time at PT-22
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



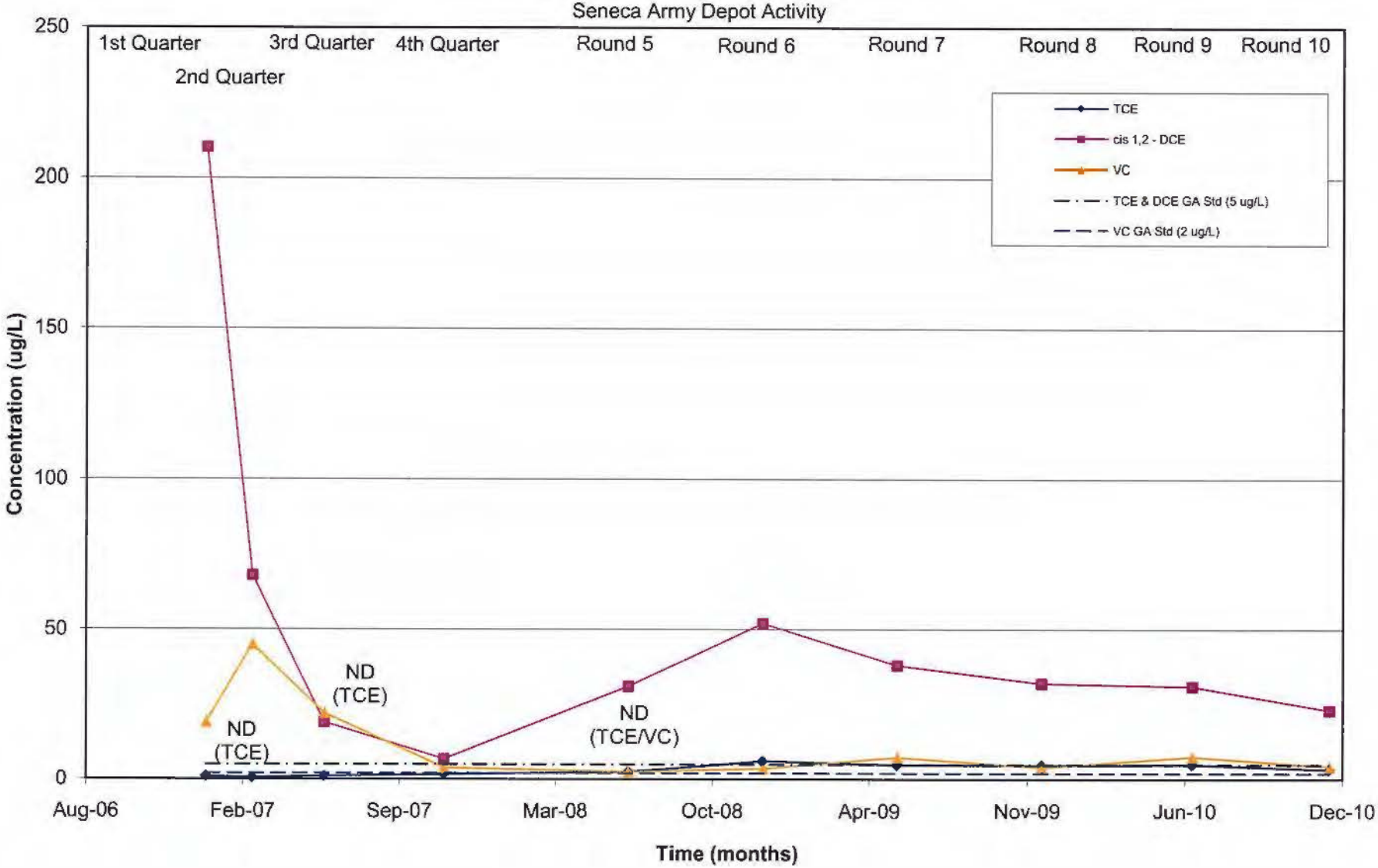
Note:
ND= not detected.

Figure 10H
Concentrations of Chlorinated Organics Over Time at MWT-23
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



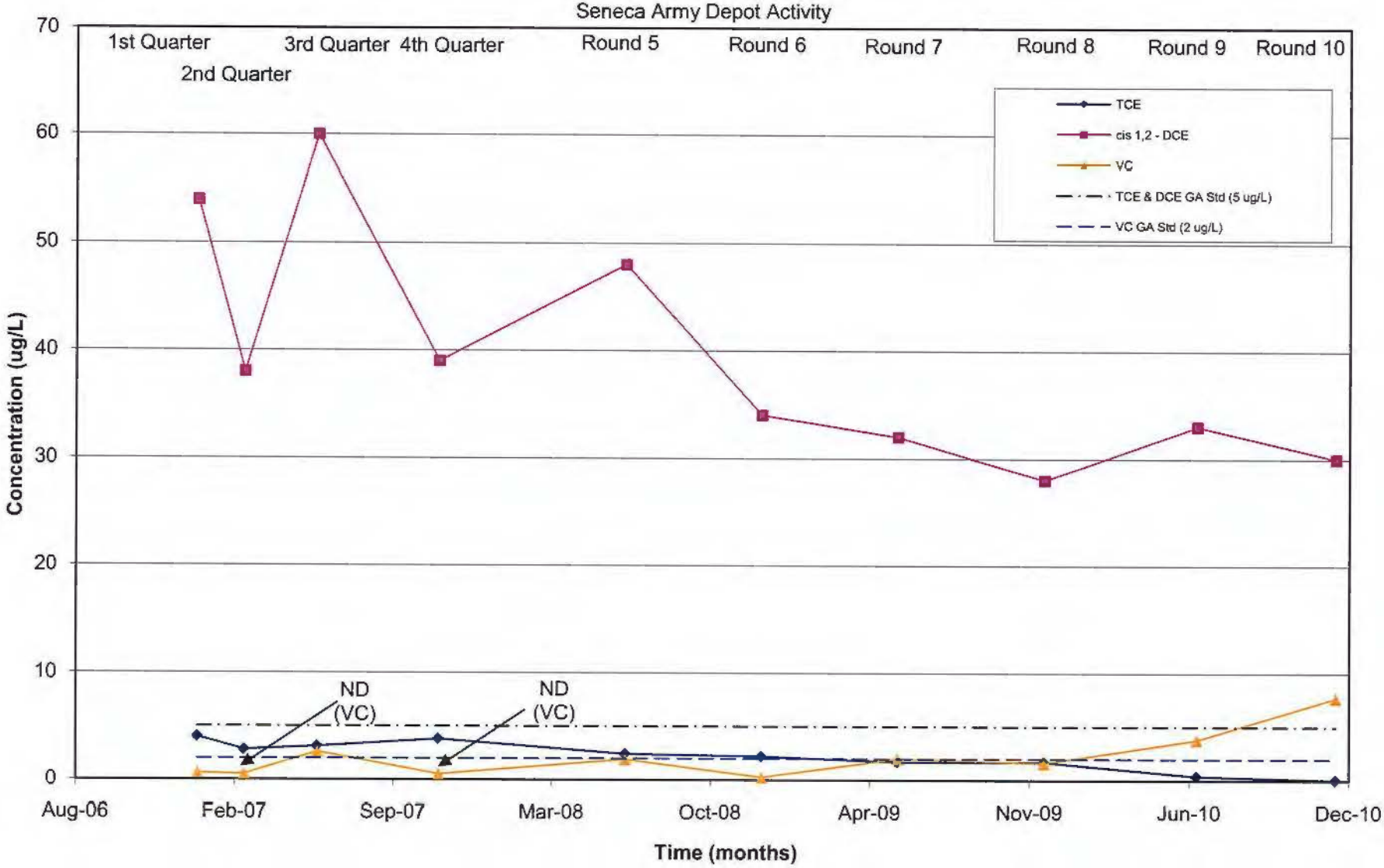
Note:
Round 4 data is the average of the sample and its duplicate.
ND = not detected.

Figure 10I
Concentrations of Chlorinated Organics Over Time at MWT-24
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



Note:
ND = not detected.

Figure 10J
Concentrations of Chlorinated Organics Over Time at PT-24
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

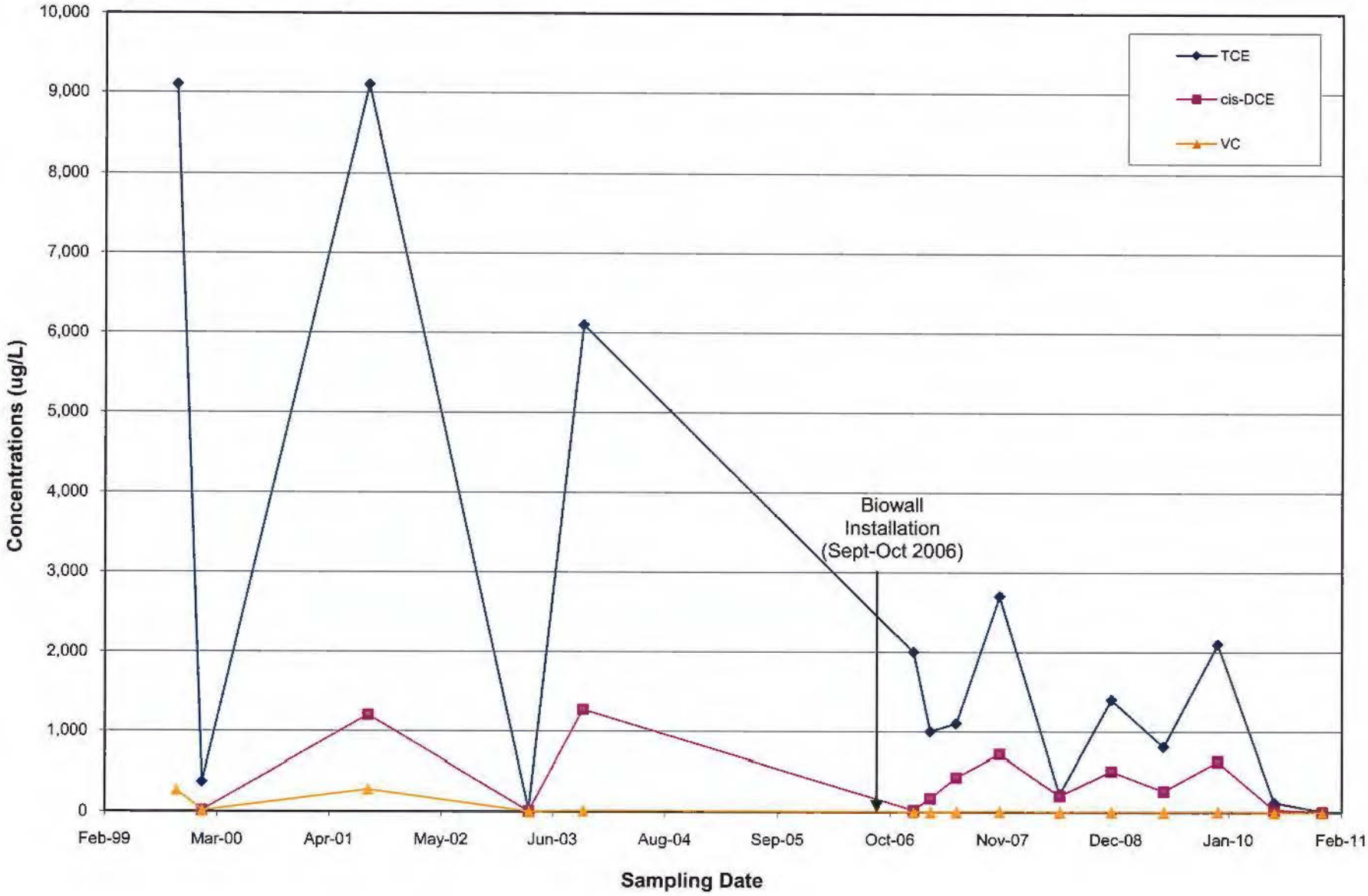


Note:
ND = not detected.

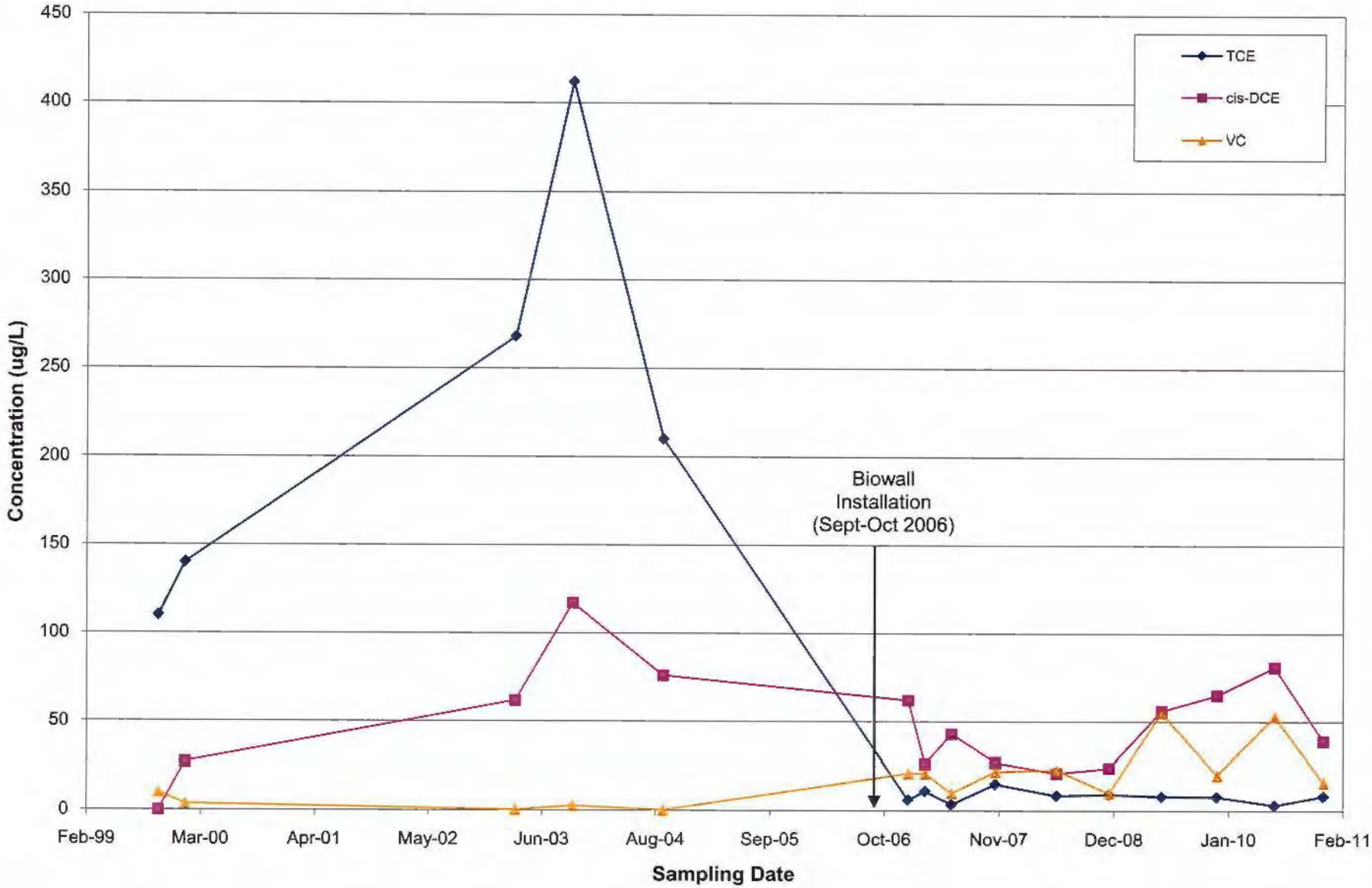
P:\PIT\Projects\Huntsville Cont W912DY-08-D-0003\TO#01 - LTM Ash Landfill\Annual Report Y4\Figures\Figure 10 Well Conc vs Time.xls PT-24

4/19/2011

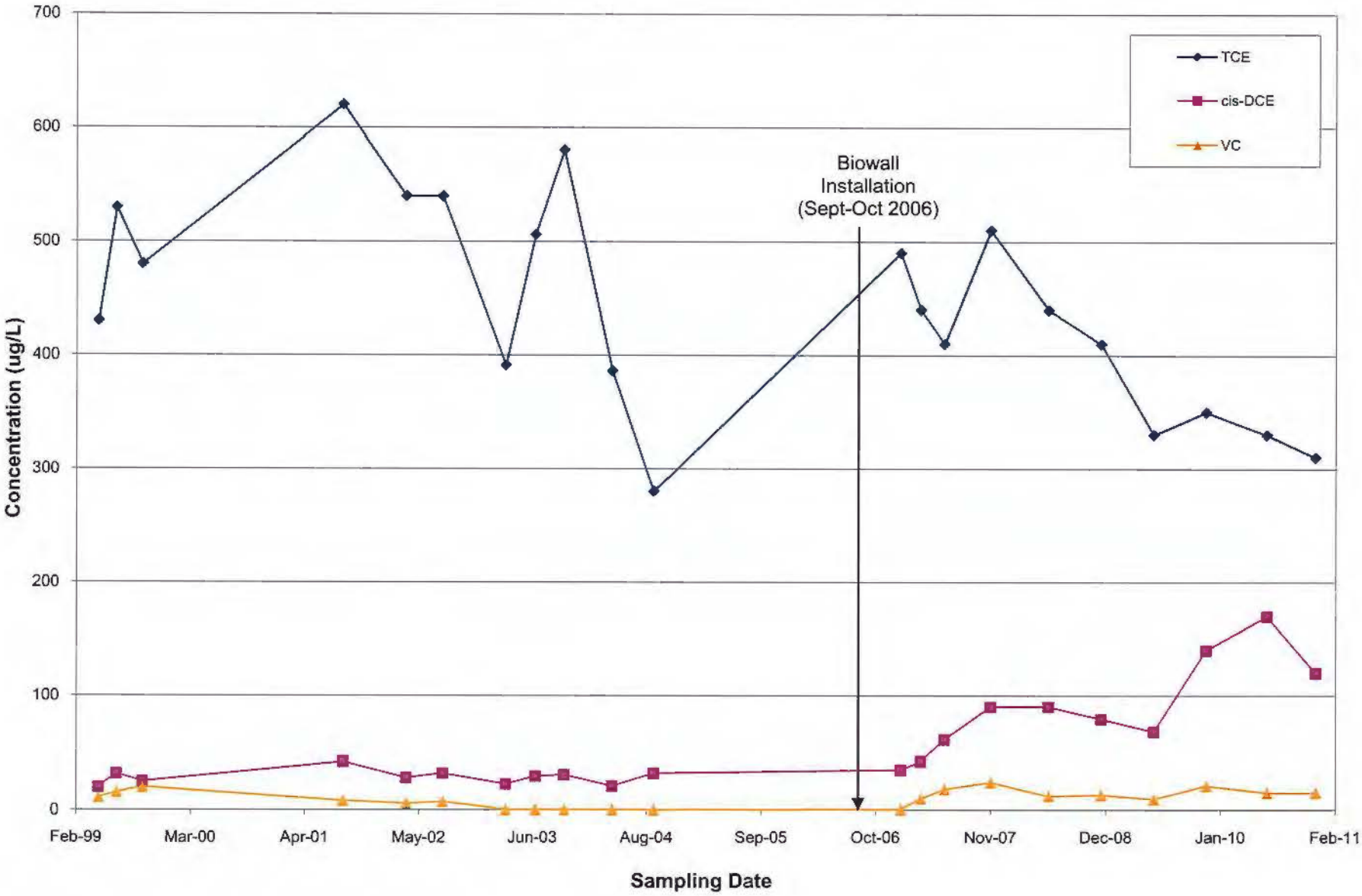
Figure 11A
Historic Concentrations of Chlorinated Organics at PT-18A
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

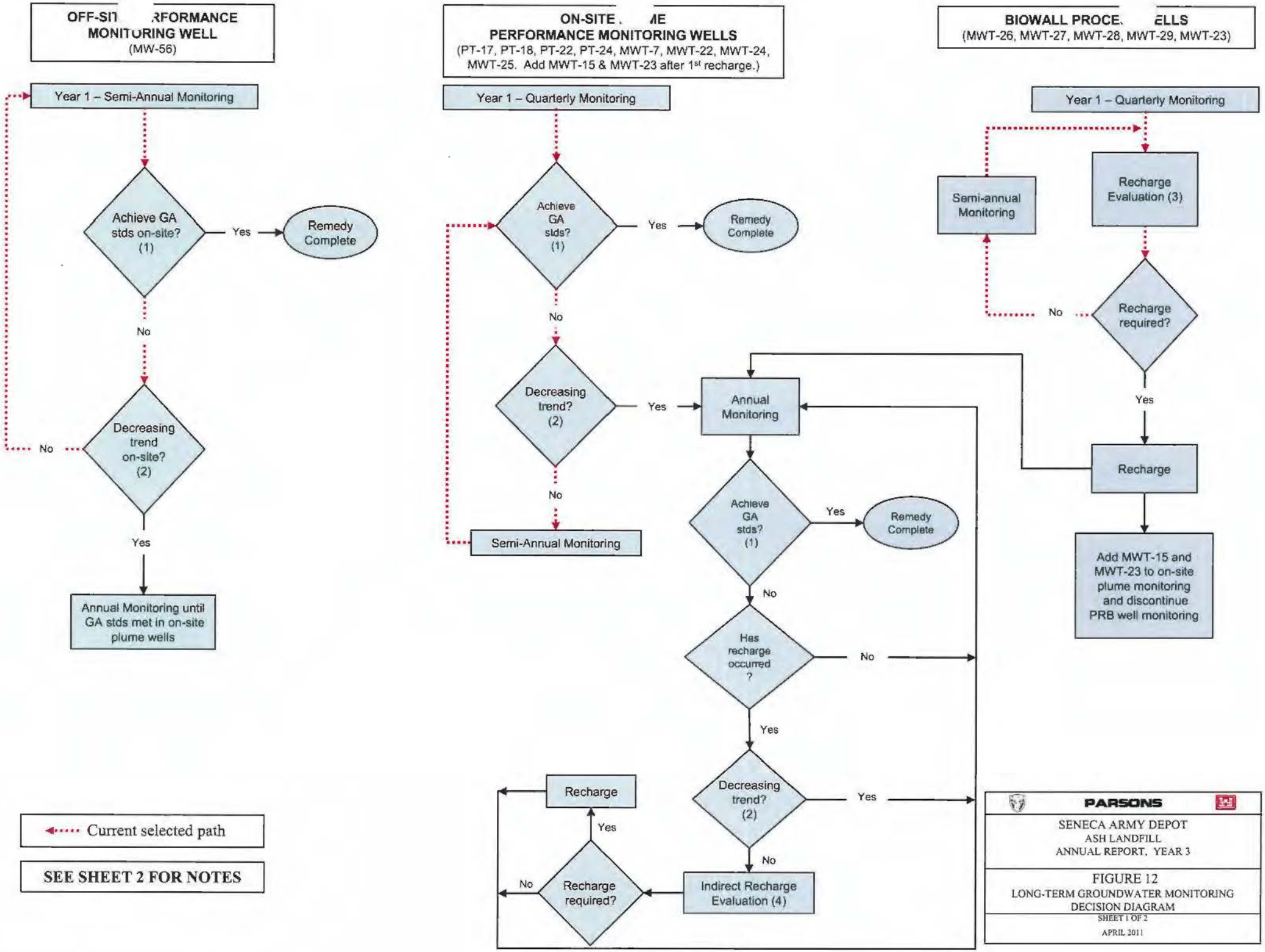


Figu 1B
Historic Concentrations of C rinated Organics at PT-17
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



Figu 1C
Historic Concentrations of Chlorinated Organics at MWT-7
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity




OFF-SITE PERFORMANCE MONITORING WELL
(MW-56)
Year 1 – Semi-Annual Monitoring
Achieve GA stds on-site? (1)
Yes
Remedy Complete
No
Decreasing trend on-site? (2)
No
Yes
Annual Monitoring until GA stds met in on-site plume wells
ON-SITE PERFORMANCE MONITORING WELLS
(PT-17, PT-18, PT-22, PT-24, MWT-7, MWT-22, MWT-24, MWT-25. Add MWT-15 & MWT-23 after 1st recharge.)
Year 1 – Quarterly Monitoring
Achieve GA stds? (1)
Yes
Remedy Complete
No
Decreasing trend? (2)
Yes
Annual Monitoring
No
Semi-Annual Monitoring
Achieve GA stds? (1)
Yes
Remedy Complete
No
Has recharge occurred ?
No
Yes
Decreasing trend? (2)
Yes
No
Indirect Recharge Evaluation (4)
Recharge required?
No
Yes
Recharge
BIOWALL PROCESS CELLS
(MWT-26, MWT-27, MWT-28, MWT-29, MWT-23)
Year 1 – Quarterly Monitoring
Semi-annual Monitoring
Recharge Evaluation (3)
Recharge required?
No
Yes
Recharge
Add MWT-15 and MWT-23 to on-site plume monitoring and discontinue PRB well monitoring
Current selected path
SEE SHEET 2 FOR NOTES
PARSONS
SENECA ARMY DEPOT
ASH LANDFILL
ANNUAL REPORT, YEAR 3
FIGURE 12
LONG-TERM GROUNDWATER MONITORING DECISION DIAGRAM
SHEET 1 OF 2
APRIL 2011

NOTES:

1. Achieving GA Stds: The condition of achieving GA standards applies to achieving groundwater standards for all COCs in all of the On-Site Plume Wells. If GA standards are achieved in the On-Site Plume Wells for two successive monitoring events, then the remedy is complete and no further monitoring is required at the site.

2. Decreasing Trend: After each year of sampling, the Army will review the results to determine if the chemical concentrations of the COCs are increasing, decreasing, or are unchanged. Graphical and statistical analyses will be used as the basis for this determination. For example, data points will be plotted and a best fit line (linear regression) will be graphed. The slope of the best fit line is representative of the trend in concentration; a negative slope indicates a decreasing trend in COC concentrations. A decreasing COC trend indicates that the potential for contaminants to migrate and negatively impact groundwater further downgradient is decreasing, and that the plume is being effectively managed by the remedy. Any evaluation of trends in contaminant concentrations will take into account that historic data at the Ash Landfill shows that there are seasonal fluctuations in contaminant concentrations. Semi-annual monitoring during wet and dry seasons is appropriate until it is established in which season maximum concentrations are observed. Annual monitoring would occur in the season of maximum concentrations.

3. Recharge Evaluation:

• Determining the need to recharge a biowall segment requires a review of chemical concentrations and geochemical parameters by an experienced professional. A specific, absolute set of conditions or parameter values are not appropriate to determine the need to recharge. Rather, a lines-of-evidence approach will be used that correlates a decrease in the efficiency of the system to degrade chloroethenes to geochemical evidence that indicates the cause is due to substrate depletion.

• The following parameters will be evaluated on an annual basis using at least two consecutive rounds of sampling data in order to determine if recharge of the biowalls is necessary:

a. COC concentrations in the wall. If COC concentrations have rebounded by greater than 50% for any single sampling event, this will indicate that recharge should be considered. Concentrations within the biowalls, not at downgradient locations, will be used to make this evaluation so that the effectiveness of the wall itself is being measured without the interference of effects such as desorption and mixing.

b. Geochemical parameters, specifically ORP, TOC, and DO, in the wall. Benchmark values will be used initially to evaluate anaerobic conditions in the groundwater. These benchmarks are:

- ORP < -100 Mv
- TOC > 20 mg/L
- DO < 1.0 mg/L

Parameters described in a and b above are intended to be used as guidelines and will be considered in the evaluation if, and when, a depletion of bioavailable organic substrate results in a rebound in geochemical redox conditions under which effective biodegradation does not occur.

4. **Indirect Recharge Evaluation**: Once the biowalls are recharged the first time, an indirect recharge evaluation will be conducted if an increasing trend in COC concentrations is observed in the plume performance monitoring wells. An increasing trend is a positive slope on the best-fit line, described in *Note 2* above. Two biowall monitoring wells, MWT-15 and MWT-23, will be added to the Plume Performance Monitoring program after the first recharge is completed. The evaluation will review the chemical and geochemical data and determine if the contaminant increase is a result of poor biowall performance or due to other issues, such as seasonal variations, recent precipitation events, desorption, etc. As stated in Note 2, a rebound in concentrations of COCs of 50% in MWT-15 and MWT-23 in two consecutive monitoring rounds is a major indication that recharge is needed. Once this COC rebound is observed, the geochemical parameter concentrations at MWT-15 and MWT-23 will be reviewed. In addition, conditions at the other plume performance wells will be reviewed and compared to the conditions observed at those wells at the time that the initial recharge was required. The Army will determine if similar conditions in the well provide further proof that carbon source recharge is needed again.

APPENDICES

Appendix A Field Forms for 9R2010 and 10R2010 (CD)
Appendix B Complete Groundwater Data
Appendix C Regression Plots

APPENDIX A

FIELD FORMS FOR 9R2010 and 10R2010 (CD)

APPENDIX B

COMPLETE GROUNDWATER DATA

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								PT-18A	PT-18A	PT-18A	PT-18A	PT-18A	PT-18A
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20059	ALBW20074	ALBW20088	ALBW20103	ALBW20117	ALBW20132
Sample Date								1/3/2007	3/17/2007	6/5/2007	11/15/2007	6/24/2008	12/12/2008
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								1	2	3	4	5	6
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	148	1 U	1 U	1 U	1 U	1 U	0.26 UJ
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	1 U	1 U	0.21 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	148	1 U	1 U	1 UJ	1 U	1 UJ	0.31 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	148	1 U	1 U	1 U	1 U	1 U	0.23 U
1,1-Dichloroethane	UG/L	1.1	9%	5	0	14	148	1 U	1 U	1 U	1 U	1 U	0.75 U
1,1-Dichloroethene	UG/L	2.1	11%	5	0	16	148	0.64 J	0.73 J	1.4	2.1	1 U	1.3
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	1 U	1 U	0.41 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	148	1 U	1 U	1 U	1 U	1 UJ	1 UJ
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	148	1 U	1 U	1 U	1 U	1 U	0.17 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1 U	1 U	1 U	1 U	1 U	0.2 U
1,2-Dichloroethane	UG/L	5.6	13%	0.6	16	19	148	1 U	1 U	1 U	1 U	1 U	0.21 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	148	1 U	1 U	1 U	1 U	1 U	0.14 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1 U	1 U	1 U	1 U	1 U	0.16 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1 U	1 U	1 U	1 U	1 U	0.16 U
Acetone	UG/L	2600	25%		0	37	148	5 U	2 J	7	5 U	5 U	1.3 U
Benzene	UG/L	0	0%	1	0	0	148	1 U	1 U	1 U	1 U	1 U	0.16 U
Bromodichloromethane	UG/L	0	0%	80 [b]	0	0	148	1 U	1 U	1 U	1 U	1 U	0.38 U
Bromoform	UG/L	0	0%	80 [b]	0	0	148	1 U	1 U	1 U	1 U	1 U	0.26 U
Carbon disulfide	UG/L	0	0%		0	0	148	1 U	1 U	1 U	1 U	1 U	0.19 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	1 U	1 U	0.27 UJ
Chlorobenzene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	1 U	1 U	0.18 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	148	1 U	1 U	1 U	1 U	1 U	0.32 U
Chloroethane	UG/L	1.1	5%	5	0	7	148	1 U	1 U	1 U	1 U	1 UJ	0.32 U
Chloroform	UG/L	27	10%	7	4	15	148	27	13 U	14	8.7	1 U	2.2
Cis-1,2-Dichloroethene	UG/L	720	84%	5	98	124	148	220	170	430	720	290	510
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	1 U	1 U	1 U	1 U	1 U	0.36 U
Cyclohexane	UG/L	0	0%		0	0	148	1 U	1 U	1 U	1 U	1 U	0.22 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	1 U	1 U	0.28 UJ
Ethyl benzene	UG/L	1.3	6%	5	0	9	148	1 U	1 U	1 U	1 U	1 U	0.18 U
Isopropylbenzene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	1 U	1 U	0.19 U
Methyl Acetate	UG/L	6	1%		0	2	148	1 U	1 UJ	1 U	1 UJ	1 UJ	0.17 U
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	148	1 U	1 U	1 U	1 U	1 U	0.16 U
Methyl bromide	UG/L	0	0%	5	0	0	147	1 U	1 U	1 U	1 U	1 UJ	0.28 U
Methyl butyl ketone	UG/L	0	0%		0	0	148	5 U	5 U	5 U	5 UJ	5 UJ	1.2 U
Methyl chloride	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	1 U	1 UJ	0.34 U
Methyl cyclohexane	UG/L	0	0%		0	0	148	1 U	1 U	1 U	1 U	1 U	0.22 U
Methyl ethyl ketone	UG/L	4900	14%		0	21	148	5 U	5 U	5 U	5 U	5 UJ	1.3 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	148	5 U	5 U	5 U	5 U	5 UJ	0.91 U
Methylene chloride	UG/L	18	8%	5	7	12	148	1 UJ	1 U	1 U	1 U	1 U	0.44 UJ
Styrene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	1 U	1 U	0.18 U
Tetrachloroethene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	1 U	1 U	0.36 U
Toluene	UG/L	590	18%	5	16	27	148	1 U	1 U	1 U	1 U	1 U	0.51 U
Total Xylenes	UG/L	0	0%	5	0	0	148	3 U	3 U	3 U	3 U	3 U	0.93 U
Trans-1,2-Dichloroethene	UG/L	8	47%	5	3	69	148	1.6	1.4	3.3	3.4	0.9 J	2.4
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	1 U	1 U	1 U	1 U	1 U	0.37 U

Appendix B

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								PT-18A	PT-18A	PT-18A	PT-18A	PT-18A	PT-18A
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20059	ALBW20074	ALBW20088	ALBW20103	ALBW20117	ALBW20132
Sample Date								1/3/2007	3/17/2007	6/5/2007	11/15/2007	6/24/2008	12/12/2008
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								1	2	3	4	5	6
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Trichloroethene	UG/L	2700	70%	5	55	103	148	2000	1000	1100	2700	220	1400
Trichlorofluoromethane	UG/L	0	0%	5	0	0	148	1 U	1 U	1 UJ	1 U	1 UJ	0.15 UJ
Vinyl chloride	UG/L	180	66%	2	85	97	148	2.4	2.9	3.3	8.2	1.4	4.6
Other													
Iron	UG/L	296000	100%		11	12	12						
Iron+Manganese	UG/L	352900	100%		12	12	12						
Manganese	UG/L	56900	100%		12	12	12						
Ethane	UG/L	98	90%		0	65	72						
Ethene	UG/L	200	90%		0	65	72						
Methane	UG/L	23000	96%		0	69	72						
Sulfate	MG/L	1060	72%	250000	2	52	72						
Total Organic Carbon	MG/L	2050	100%		0	72	72						

Notes:

1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
   a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
   b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

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

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								PT-18A	PT-18A	PT-18A	PT-18A	MWT-25	MWT-25
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20147	ALBW20162	ALBW20177	ALBW20192	ALBW20064	ALBW20079
Sample Date								6/4/2009	12/17/2009	7/1/2010	12/19/2010	1/3/2007	3/17/2007
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								7	8	9	10	1	2
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	148	0.26 U	1.1 U	0.5 U	0.5 U	1 U	1 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	148	0.21 U	0.85 U	0.18 U	0.18 U	1 U	1 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	148	0.31 U	1.2 UJ	0.5 U	0.5 U	1 U	1 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	148	0.23 U	0.92 U	0.13 U	0.13 U	1 U	1 U
1,1-Dichloroethane	UG/L	1.1	9%	5	0	14	148	0.75 U	1.5 U	0.25 U	0.25 U	1 U	1 U
1,1-Dichloroethene	UG/L	2.1	11%	5	0	16	148	0.8 J	2 J	0.11 U	0.11 U	1 U	1 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	148	0.41 U	1.6 U	0.25 U	0.25 U	1 U	1 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	148	1 U	1.6 U	0.44 U	0.44 U	1 U	1 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	148	0.17 U	0.66 U	0.25 U	0.25 U	1 U	1 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.2 U	0.81 U	0.21 U	0.21 U	1 U	1 U
1,2-Dichloroethane	UG/L	5.6	13%	0.6	16	19	148	0.21 U	0.86 U	0.1 U	0.1 U	1 U	1 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	148	0.14 U	1.3 U	0.13 U	0.13 U	1 U	1 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.16 U	1.4 U	0.25 U	0.25 U	1 U	1 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.16 U	1.6 U	0.28 U	0.28 U	1 U	1 U
Acetone	UG/L	2600	25%		0	37	148	1.3 UJ	5.4 U	5 U	5 UJ	5 U	5 U
Benzene	UG/L	0	0%	1	0	0	148	0.16 U	1.6 U	0.25 U	0.25 U	1 U	1 U
Bromodichloromethane	UG/L	0	0%	80 [a]	0	0	148	0.39 U	1.5 U	0.25 U	0.25 U	1 U	1 U
Bromoform	UG/L	0	0%	80 [a]	0	0	148	0.26 U	1 U	0.5 U	0.5 U	1 U	1 U
Carbon disulfide	UG/L	0	0%		0	0	148	0.19 U	0.78 U	0.6 U	0.6 U	1 U	1 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	148	0.27 U	1.1 U	0.5 U	0.5 U	1 U	1 U
Chlorobenzene	UG/L	0	0%	5	0	0	148	0.32 U	1.3 U	0.25 U	0.25 U	1 U	1 U
Chlorodibromomethane	UG/L	0	0%	80 [a]	0	0	148	0.32 U	1.3 U	0.1 U	0.1 U	1 U	1 U
Chloroethane	UG/L	1.1	5%	5	0	7	148	0.32 U	1.3 UJ	1 U	1 U	1 U	1 U
Chloroform	UG/L	27	10%	7	4	15	148	9	3.1 J	2.1	0.27 J	1 U	1 U
Cis-1,2-Dichloroethene	UG/L	720	84%	5	98	124	148	260	630	28	0.54 J	41	64
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	0.36 U	1.4 U	0.11 U	0.11 U	1 U	1 U
Cyclohexane	UG/L	0	0%		0	0	148	0.53 U	2.1 U	0.25 U	0.25 U	1 U	1 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	148	0.29 U	1.1 U	0.25 U	0.25 U	1 U	1 U
Ethyl benzene	UG/L	1.3	6%	5	0	9	148	0.18 U	0.74 U	0.11 U	0.11 U	1 U	1 U
Isopropylbenzene	UG/L	0	0%	5	0	0	148	0.19 U	0.77 U	0.1 U	0.1 U	1 U	1 U
Methyl Acetate	UG/L	6	1%		0	2	148	0.17 U	2 U	0.19 U	0.19 U	1 U	1 UJ
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	148	0.16 U	0.64 U	0.2 U	0.8 UJ	1 U	1 U
Methyl bromide	UG/L	0	0%	5	0	0	147	0.28 U	1.1 UJ	0.8 U	1 U	1 U	1 U
Methyl butyl ketone	UG/L	0	0%		0	0	148	1.2 U	5 U	1 U	0.33 U	5 U	5 U
Methyl chloride	UG/L	0	0%	5	0	0	148	0.35 U	1.4 U	0.33 U	0.1 U	1 U	1 U
Methyl cyclohexane	UG/L	0	0%		0	0	148	0.5 U	2 U	0.1 U	1 U	1 U	1 U
Methyl ethyl ketone	UG/L	4900	14%		0	21	148	1.3 U	5.3 U	1 U	1 U	5 U	5 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	148	0.91 U	3.6 U	1 U	0.2 U	5 U	5 U
Methylene chloride	UG/L	18	8%	5	7	12	148	0.44 U	1.8 U	1 U	1 U	1 U	1 U
Styrene	UG/L	0	0%	5	0	0	148	0.18 U	0.74 U	0.11 U	0.11 U	1 U	1 U
Tetrachloroethene	UG/L	0	0%	5	0	0	148	0.36 U	1.5 U	0.15 U	0.15 U	1 U	1 U
Toluene	UG/L	590	18%	5	16	27	148	0.51 U	2 U	0.33 U	0.33 U	1 U	1 U
Total Xylenes	UG/L	0	0%	5	0	0	148	0.66 U	2.6 U	0.2 U	0.2 U	3 U	3 U
Trans-1,2-Dichloroethene	UG/L	8	47%	5	3	69	148	1.8	3.5 J	0.2 U	0.2 U	0.56 J	1.2
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	0.37 U	1.5 U	0.21 U	0.21 U	1 U	1 U

Appendix B

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								PT-18A	PT-18A	PT-18A	PT-18A	MWT-25	MWT-25
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20147	ALBW20162	ALBW20177	ALBW20192	ALBW20064	ALBW20079
Sample Date								6/4/2009	12/17/2009	7/1/2010	12/19/2010	1/3/2007	3/17/2007
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								7	8	9	10	1	2
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Trichloroethene	UG/L	2700	70%	5	55	103	148	810 J	2100	120	6.3	50	55
Trichlorofluoromethane	UG/L	0	0%	5	0	0	148	0.15 U	0.61 UJ	0.25 U	0.25 U	1 U	1 U
Vinyl chloride	UG/L	180	66%	2	85	97	148	2.6	7.1	0.18 U	0.18 U	1.6	9.6
Other													
Iron	UG/L	296000	100%		11	12	12						
Iron+Manganese	UG/L	352900	100%		12	12	12						
Manganese	UG/L	56900	100%		12	12	12						
Ethane	UG/L	98	90%		0	65	72						
Ethene	UG/L	200	90%		0	65	72						
Methane	UG/L	23000	96%		0	69	72						
Sulfate	MG/L	1060	72%	250000	2	52	72						
Total Organic Carbon	MG/L	2050	100%		0	72	72						

Notes:

1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
   a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
   b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

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

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-25	MWT-25	MWT-25	MWT-25	MWT-25	MWT-25
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20093	ALBW20108	ALBW20123	ALBW20138	ALBW20153	ALBW20168
Sample Date								6/6/2007	11/15/2007	6/24/2008	12/15/2008	6/3/2009	12/17/2009
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								3	4	5	6	7	8
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	148	1 U	1 U	1 U	0.26 U	0.26 U	0.26 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.21 U	0.21 U	0.21 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	148	1 UJ	1 U	1 UJ	0.31 U	0.31 U	0.31 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	148	1 U	1 U	1 U	0.23 U	0.23 U	0.23 U
1,1-Dichloroethane	UG/L	1.1	9%	5	0	14	148	1 U	1 U	1 U	0.75 U	0.75 U	0.38 U
1,1-Dichloroethene	UG/L	2.1	11%	5	0	16	148	1 U	1 U	1 U	0.29 U	0.29 U	0.29 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.41 U	0.41 U	0.41 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	148	1 U	1 U	1 UJ	1 UJ	1 UJ	0.39 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	148	1 U	1 U	1 U	0.17 U	0.17 U	0.17 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1 U	1 U	1 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	UG/L	5.6	13%	0.6	16	19	148	1 U	1 U	1 U	0.21 U	0.21 U	0.21 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	148	1 U	1 U	1 U	0.14 U	0.14 U	0.32 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1 U	1 U	1 U	0.16 U	0.16 U	0.36 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1 U	1 U	1 U	0.16 U	0.16 U	0.39 U
Acetone	UG/L	2600	25%		0	37	148	4.5 J	5 U	5 U	1.3 U	1.3 U	1.3 U
Benzene	UG/L	0	0%	1	0	0	148	1 U	1 U	1 U	0.16 U	0.16 U	0.41 U
Bromodichloromethane	UG/L	0	0%	80 [b]	0	0	148	1 U	1 U	1 U	0.38 U	0.39 U	0.39 U
Bromoform	UG/L	0	0%	80 [b]	0	0	148	1 U	1 U	1 U	0.26 U	0.26 UJ	0.26 U
Carbon disulfide	UG/L	0	0%		0	0	148	1 U	1 U	1 U	0.19 U	0.19 UJ	0.19 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.27 U	0.27 U	0.27 U
Chlorobenzene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.18 U	0.32 U	0.32 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	148	1 U	1 U	1 U	0.32 U	0.32 U	0.32 U
Chloroethane	UG/L	1.1	5%	5	0	7	148	1 U	1 U	1 UJ	0.32 U	0.32 U	0.32 U
Chloroform	UG/L	27	10%	7	4	15	148	1 U	1 U	1 U	0.34 U	0.34 U	0.34 U
Cis-1,2-Dichloroethene	UG/L	720	84%	5	98	124	148	36	17	17	0.63 J	10	3.3
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	1 U	1 U	1 U	0.36 U	0.36 U	0.36 U
Cyclohexane	UG/L	0	0%		0	0	148	1 U	1 U	1 U	0.22 U	0.53 U	0.53 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.28 U	0.29 U	0.29 U
Ethyl benzene	UG/L	1.3	6%	5	0	9	148	1 U	1 U	1 U	0.18 U	0.18 U	0.18 U
Isopropylbenzene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.19 U	0.19 U	0.19 U
Methyl Acetate	UG/L	6	1%		0	2	148	1 U	1 UJ	1 UJ	0.17 U	0.17 UJ	0.5 U
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	148	1 U	1 U	1 U	0.16 U	0.16 U	0.16 U
Methyl bromide	UG/L	0	0%	5	0	0	147	1 U	1 U	1 UJ	0.28 U	0.28 U	0.28 UR
Methyl butyl ketone	UG/L	0	0%		0	0	148	5 U	5 UJ	5 UJ	1.2 U	1.2 U	1.2 U
Methyl chloride	UG/L	0	0%	5	0	0	148	1 U	1 U	1 UJ	0.34 U	0.35 U	0.35 U
Methyl cyclohexane	UG/L	0	0%		0	0	148	1 U	1 U	1 U	0.22 U	0.5 U	0.5 U
Methyl ethyl ketone	UG/L	4900	14%		0	21	148	5 U	5 U	5 UJ	1.3 U	1.3 U	1.3 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	148	5 U	5 U	5 UJ	0.91 U	0.91 U	0.91 U
Methylene chloride	UG/L	18	8%	5	7	12	148	1 U	1 U	1 U	0.44 UJ	0.44 U	0.44 U
Styrene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.18 U	0.18 U	0.18 U
Tetrachloroethene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.36 U	0.36 U	0.36 U
Toluene	UG/L	590	18%	5	16	27	148	4.6	1 U	1 U	0.51 U	0.51 U	0.51 U
Total Xylenes	UG/L	0	0%	5	0	0	148	3 U	3 U	3 U	0.93 U	0.66 U	0.66 U
Trans-1,2-Dichloroethene	UG/L	8	47%	5	3	69	148	0.5 J	1 U	1 U	0.13 U	0.13 U	0.42 U
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	1 U	1 U	1 U	0.37 U	0.37 U	0.37 U

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Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	ASH LANDFILL MWT-25 GW ALBW20093 6/6/2007 SA LTM 3 Value (Q)	ASH LANDFILL MWT-25 GW ALBW20108 11/15/2007 SA LTM 4 Value (Q)	ASH LANDFILL MWT-25 GW ALBW20123 6/24/2008 SA LTM 5 Value (Q)	ASH LANDFILL MWT-25 GW ALBW20138 12/15/2008 SA LTM 6 Value (Q)	ASH LANDFILL MWT-25 GW ALBW20153 6/3/2009 SA LTM 7 Value (Q)	ASH LANDFILL MWT-25 GW ALBW20168 12/17/2009 SA LTM 8 Value (Q)
Trichloroethene	UG/L	2700	70%	5	55	103	148	28	26	19	3.2	12	4.2
Trichlorofluoromethane	UG/L	0	0%	5	0	0	148	1 UJ	1 U	1 UJ	0.15 U	0.15 U	0.15 UJ
Vinyl chloride	UG/L	180	66%	2	85	97	148	2.1	0.64 J	1 U	0.24 U	0.24 U	0.24 U
Other													
Iron	UG/L	296000	100%		11	12	12						
Iron+Manganese	UG/L	352900	100%		12	12	12						
Manganese	UG/L	56900	100%		12	12	12						
Ethane	UG/L	98	90%		0	65	72						
Ethene	UG/L	200	90%		0	65	72						
Methane	UG/L	23000	96%		0	69	72						
Sulfate	MG/L	1060	72%	250000	2	52	72						
Total Organic Carbon	MG/L	2050	100%		0	72	72						

Notes:

1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
   a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
   b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

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

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-25	MWT-25	MWT-26	MWT-26	MWT-26	MWT-26
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20183	ALBW20198	ALBW20086	ALBW20081	ALBW20095	ALBW20111
Sample Date								6/30/2010	12/19/2010	1/3/2007	3/17/2007	6/5/2007	11/15/2007
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								9	10	1	2	3	4
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	148	0.5 U	0.5 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	148	0.18 U	0.18 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	148	0.5 UJ	0.5 U	1 U	1 U	1 UJ	1 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	148	0.13 U	0.13 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	UG/L	1.1	9%	5	0	14	148	0.25 U	0.25 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	UG/L	2.1	11%	5	0	16	148	0.11 U	0.11 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	148	0.25 U	0.25 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	148	0.44 U	0.44 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	148	0.25 U	0.25 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.21 U	0.21 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	UG/L	5.6	13%	0.6	16	19	148	0.1 U	0.1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	148	0.13 U	0.13 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.25 U	0.25 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.28 U	0.28 U	1 U	1 U	1 U	1 U
Acetone	UG/L	2600	25%		0	37	148	5 U	5 UJ	5 U	17	5 U	5 U
Benzene	UG/L	0	0%	1	0	0	148	0.25 U	0.25 U	1 U	1 U	1 U	1 U
Bromodichloromethane	UG/L	0	0%	80 [h]	0	0	148	0.25 U	0.25 U	1 U	1 U	1 U	1 U
Bromoform	UG/L	0	0%	80 [h]	0	0	148	0.5 U	0.5 U	1 U	1 U	1 U	1 U
Carbon disulfide	UG/L	0	0%		0	0	148	0.6 U	0.6 U	1 U	1 U	1 U	1 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	148	0.5 U	0.5 U	1 U	1 U	1 U	1 U
Chlorobenzene	UG/L	0	0%	5	0	0	148	0.25 U	0.25 U	1 U	1 U	1 U	1 U
Chlorodibromomethane	UG/L	0	0%	80 [h]	0	0	148	0.1 U	0.1 U	1 U	1 U	1 U	1 U
Chloroethane	UG/L	1.1	5%	5	0	7	148	1 U	1 UJ	1 U	1 U	1 U	1 U
Chloroform	UG/L	27	10%	7	4	15	148	0.14 U	0.14 U	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethene	UG/L	720	84%	5	98	124	148	13	0.87 J	19	17	11	2.8
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	0.11 U	0.11 U	1 U	1 U	1 U	1 U
Cyclohexane	UG/L	0	0%		0	0	148	0.25 U	0.25 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	148	0.25 U	0.25 U	1 U	1 U	1 U	1 U
Ethyl benzene	UG/L	1.3	6%	5	0	9	148	0.11 U	0.11 U	1 U	1 U	1 U	1 U
Isopropylbenzene	UG/L	0	0%	5	0	0	148	0.1 U	0.1 U	1 U	1 U	1 U	1 U
Methyl Acetate	UG/L	6	1%		0	2	148	0.19 UJ	0.19 U	1 U	1 UJ	1 U	1 UJ
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	148	0.2 U	0.8 U	1 U	1 U	1 U	1 U
Methyl bromide	UG/L	0	0%	5	0	0	147	0.8 UJ	1 U	1 U	1 U	1 U	1 U
Methyl butyl ketone	UG/L	0	0%		0	0	148	1 UJ	0.33 U	5 U	5 U	5 U	5 UJ
Methyl chloride	UG/L	0	0%	5	0	0	148	0.33 U	0.1 U	1 U	1 U	1 U	1 U
Methyl cyclohexane	UG/L	0	0%		0	0	148	0.1 U	1 U	1 U	1 U	1 U	1 U
Methyl ethyl ketone	UG/L	4900	14%		0	21	148	1 U	1 U	5 U	15	5 U	5 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	148	1 U	0.2 U	5 U	5 U	5 U	5 U
Methylene chloride	UG/L	18	8%	5	7	12	148	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	UG/L	0	0%	5	0	0	148	0.11 U	0.11 U	1 U	1 U	1 U	1 U
Tetrachloroethene	UG/L	0	0%	5	0	0	148	0.15 U	0.15 U	1 U	1 U	1 U	1 U
Toluene	UG/L	590	18%	5	16	27	148	0.33 U	0.33 U	1 U	1 U	1 U	1 U
Total Xylenes	UG/L	0	0%	5	0	0	148	0.2 U	0.2 U	3 U	3 U	3 U	3 U
Trans-1,2-Dichloroethene	UG/L	8	47%	5	3	69	148	0.49 J	0.2 U	0.6 J	1	0.7 J	1 U
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	0.21 U	0.21 U	1 U	1 U	1 U	1 U

Appendix B

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-25	MWT-25	MWT-26	MWT-26	MWT-26	MWT-26
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20183	ALBW20198	ALBW20066	ALBW20081	ALBW20095	ALBW20111
Sample Date								6/30/2010	12/19/2010	1/3/2007	3/17/2007	6/5/2007	11/15/2007
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								9	10	1	2	3	4
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Trichloroethene	UG/L	2700	70%	5	55	103	148	7.7	1.9	10	11	3.2	2.8
Trichlorofluoromethane	UG/L	0	0%	5	0	0	148	0.25 U	0.25 U	1 U	1 U	1 UJ	1 U
Vinyl chloride	UG/L	180	66%	2	85	97	148	0.18 U	0.18 U	2	6.1	4.4	1 U
Other													
Iron	UG/L	296000	100%		11	12	12			275 J	844		
Iron+Manganese	UG/L	352900	100%		12	12	12			1043 J	2464		
Manganese	UG/L	56900	100%		12	12	12			768	1620		
Ethane	UG/L	98	90%		0	65	72			2 U	0.4	1	0.16
Ethene	UG/L	200	90%		0	65	72			2 U	7.8	13	0.4
Methane	UG/L	23000	96%		0	69	72			2 U	210	390	44
Sulfate	MG/L	1060	72%	250000	2	52	72			958	738	473	1060
Total Organic Carbon	MG/L	2050	100%		0	72	72			3.9 J	15.2	10.3	6.1

Notes:

1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
   a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
   b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

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

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-26	MWT-26	MWT-26	MWT-26	MWT-26	MWT-26
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20126	ALBW20141	ALBW20156	ALBW20171	ALBW20186	ALBW20202
Sample Date								6/24/2008	12/15/2008	6/3/2009	12/17/2009	6/29/2010	12/19/2010
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								5	6	7	8	9	10
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	148	1 U	0.26 U	0.26 U	0.26 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	148	1 U	0.21 U	0.21 U	0.21 U	0.18 U	0.18 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	148	1 U	0.31 U	0.31 U	0.31 UJ	0.5 U	0.5 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	148	1 U	0.23 U	0.23 U	0.23 U	0.13 U	0.13 U
1,1-Dichloroethane	UG/L	1.1	9%	5	0	14	148	1 U	0.75 U	0.75 U	0.38 U	0.25 U	0.25 U
1,1-Dichloroethene	UG/L	2.1	11%	5	0	16	148	1 U	0.29 U	0.29 U	0.29 U	0.11 U	0.11 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	148	1 U	0.41 U	0.41 U	0.41 U	0.25 U	0.25 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	148	1 U	1 UJ	1 UJ	0.39 U	0.44 U	0.44 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	148	1 U	0.17 U	0.17 U	0.17 U	0.25 U	0.25 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1 U	0.2 U	0.2 U	0.2 U	0.21 U	0.21 U
1,2-Dichloroethane	UG/L	5.6	13%	0.6	16	19	148	1 U	0.21 U	0.21 U	0.21 U	0.1 U	0.1 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	148	1 U	0.14 U	0.14 U	0.32 U	0.13 U	0.13 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1 U	0.16 U	0.16 U	0.36 U	0.25 U	0.25 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1 U	0.16 U	0.16 U	0.39 U	0.28 U	0.28 U
Acetone	UG/L	2600	25%		0	37	148	5 U	1.3 U	1.3 U	1.3 U	5 U	5 UJ
Benzene	UG/L	0	0%	1	0	0	148	1 U	0.16 U	0.16 U	0.41 U	0.25 U	0.25 U
Bromodichloromethane	UG/L	0	0%	80 [L]	0	0	148	1 U	0.38 U	0.39 U	0.39 U	0.25 U	0.25 U
Bromoform	UG/L	0	0%	80 [b]	0	0	148	1 U	0.26 U	0.26 UJ	0.26 U	0.5 U	0.5 U
Carbon disulfide	UG/L	0	0%		0	0	148	1 U	0.19 U	0.19 UJ	0.19 U	0.6 U	0.6 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	148	1 U	0.27 U	0.27 U	0.27 U	0.5 U	0.5 U
Chlorobenzene	UG/L	0	0%	5	0	0	148	1 U	0.18 U	0.32 U	0.32 U	0.25 U	0.25 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	148	1 U	0.32 U	0.32 U	0.32 U	0.1 U	0.1 U
Chloroethane	UG/L	1.1	5%	5	0	7	148	1 UJ	0.32 U	0.32 U	0.32 UJ	1 UJ	1 UJ
Chloroform	UG/L	27	10%	7	4	15	148	1 U	0.34 U	0.34 U	0.34 U	0.14 U	0.14 U
Cis-1,2-Dichloroethene	UG/L	720	84%	5	98	124	148	3.3	1	6	8.1	5.5	12
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	1 U	0.36 U	0.36 U	0.36 U	0.11 U	0.11 U
Cyclohexane	UG/L	0	0%		0	0	148	1 U	0.22 U	0.53 U	0.53 U	0.25 U	0.25 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	148	1 U	0.28 U	0.29 U	0.29 U	0.25 U	0.25 U
Ethyl benzene	UG/L	1.3	6%	5	0	9	148	1 U	0.18 U	0.18 U	0.18 U	0.11 U	0.11 U
Isopropylbenzene	UG/L	0	0%	5	0	0	148	1 U	0.19 U	0.19 U	0.19 U	0.1 U	0.1 U
Methyl Acetate	UG/L	6	1%		0	2	148	1 UJ	0.17 U	0.17 UJ	0.5 U	0.19 U	0.19 U
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	148	1 U	0.16 U	0.16 U	0.16 U	0.2 U	0.8 U
Methyl bromide	UG/L	0	0%	5	0	0	147	1 UJ	0.28 U	0.28 U	0.28 UJ	0.8 UJ	1 U
Methyl butyl ketone	UG/L	0	0%		0	0	148	5 UJ	1.2 U	1.2 U	1.2 U	1 U	0.33 U
Methyl chloride	UG/L	0	0%	5	0	0	148	1 U	0.34 U	0.35 U	0.35 U	0.33 U	0.1 U
Methyl cyclohexane	UG/L	0	0%		0	0	148	1 U	0.22 U	0.5 U	0.5 U	0.1 U	1 U
Methyl ethyl ketone	UG/L	4900	14%		0	21	148	5 U	1.3 U	1.3 U	1.3 U	1 U	1 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	148	5 U	0.91 U	0.91 U	0.91 U	1 U	0.2 U
Methylene chloride	UG/L	18	8%	5	7	12	148	1 U	0.44 UJ	0.44 U	0.44 U	1 U	1 U
Styrene	UG/L	0	0%	5	0	0	148	1 U	0.18 U	0.18 U	0.18 U	0.11 U	0.11 U
Tetrachloroethene	UG/L	0	0%	5	0	0	148	1 U	0.36 U	0.36 U	0.36 U	0.15 U	0.15 U
Toluene	UG/L	590	18%	5	16	27	148	1 U	0.51 U	0.51 U	0.51 U	0.33 U	0.33 U
Total Xylenes	UG/L	0	0%	5	0	0	148	3 U	0.93 U	0.66 U	0.66 U	0.2 U	0.2 U
Trans-1,2-Dichloroethane	UG/L	8	47%	5	3	69	148	1 U	0.13 U	0.13 U	0.42 U	0.37 J	0.67 J
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	1 U	0.37 U	0.37 U	0.37 U	0.21 U	0.21 U

Table B-1
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-26	MWT-26	MWT-26	MWT-26	MWT-26	MWT-26
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20126	ALBW20141	ALBW20156	ALBW20171	ALBW20186	ALBW20202
Sample Date								6/24/2008	12/15/2008	6/3/2009	12/17/2009	6/29/2010	12/19/2010
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								5	6	7	8	9	10
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Trichloroethene	UG/L	2700	70%	5	55	103	148	1.7	1.9	3.6	5.8	1.7	4.2
Trichlorofluoromethane	UG/L	0	0%	5	0	0	148	1 UJ	0.15 U	0.15 U	0.15 UJ	0.25 U	0.25 U
Vinyl chloride	UG/L	180	66%	2	85	97	148	1 U	0.24 U	3.5	4.2	0.18 U	7.6
Other													
Iron	UG/L	296000	100%		11	12	12						
Iron+Manganese	UG/L	352900	100%		12	12	12						
Manganese	UG/L	56900	100%		12	12	12						
Ethane	UG/L	98	90%		0	65	72	0.82	0.046	3.2	2.2	2.2	3.7
Ethene	UG/L	200	90%		0	65	72	2.9	0.028	2.7	1.8	0.71	3.3
Methane	UG/L	23000	96%		0	69	72	210	10	1100	610	740	1600
Sulfate	MG/L	1060	72%	250000	2	52	72	600	541	570	912	680	690
Total Organic Carbon	MG/L	2050	100%		0	72	72	5.6	4.4	6.9	5.6	4.6	5.5

Notes:

1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
   a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
   b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

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

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-27	MWT-27	MWT-27	MWT-27	MWT-27	MWT-27
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20067	ALBW20082	ALBW20097	ALBW20096	ALBW20112	ALBW20127
Sample Date								1/3/2007	3/16/2007	6/5/2007	6/5/2007	11/15/2007	6/24/2008
QC Code								SA	SA	DU	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								1	2	3	3	4	5
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	148	20 UJ	20 U	20 U	20 U	10 U	4 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	148	20 UJ	20 U	20 UJ	20 UJ	10 U	4 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
1,1-Dichloroethane	UG/L	1.1	9%	5	0	14	148	20 UJ	20 U	20 U	20 U	10 U	4 U
1,1-Dichloroethene	UG/L	2.1	11%	5	0	16	148	20 UJ	20 U	20 U	20 U	10 U	4 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
1,2-Dichloroethane	UG/L	5.6	13%	0.6	16	19	148	20 UJ	20 U	20 U	20 U	10 U	4 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Acetone	UG/L	2600	25%		0	37	148	2000 J	1300	1300	1300	30 J	20 U
Benzene	UG/L	0	0%	1	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Bromodichloromethane	UG/L	0	0%	80 [b]	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Bromoform	UG/L	0	0%	80 [b]	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Carbon disulfide	UG/L	0	0%		0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Chlorobenzene	UG/L	0	0%	5	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Chloroethane	UG/L	1.1	5%	5	0	7	148	20 UJ	20 U	20 U	20 U	10 U	4 UJ
Chloroform	UG/L	27	10%	7	4	15	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Cis-1,2-Dichloroethene	UG/L	720	64%	5	98	124	148	49 J	20 U	20 U	20 U	10 U	4 U
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Cyclohexane	UG/L	0	0%		0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Ethyl benzene	UG/L	1.3	6%	5	0	9	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Isopropylbenzene	UG/L	0	0%	5	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Methyl Acetate	UG/L	6	1%		0	2	148	20 UJ	20 UJ	20 U	20 U	10 UJ	4 UJ
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Methyl bromide	UG/L	0	0%	5	0	0	147	20 UJ	20 U	20 U	20 U	10 U	4 UJ
Methyl butyl ketone	UG/L	0	0%		0	0	148	100 UJ	100 U	100 U	100 U	50 UJ	20 UJ
Methyl chloride	UG/L	0	0%	5	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Methyl cyclohexane	UG/L	0	0%		0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Methyl ethyl ketone	UG/L	4900	14%		0	21	148	4100 J	2200	1700	1800	50 U	20 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	148	100 UJ	100 U	100 U	100 U	50 U	20 U
Methylene chloride	UG/L	18	8%	5	7	12	148	18 J	20 U	13 J	11 J	10 U	4 U
Styrene	UG/L	0	0%	5	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Tetrachloroethene	UG/L	0	0%	5	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Toluene	UG/L	590	18%	5	16	27	148	20 UJ	20 U	20 U	20 U	7.3 J	5.9
Total Xylenes	UG/L	0	0%	5	0	0	148	60 UJ	60 U	60 U	60 U	30 U	12 U
Trans-1,2-Dichloroethene	UG/L	8	47%	5	3	69	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	20 UJ	20 U	20 U	20 U	10 U	4 U

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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-27	MWT-27	MWT-27	MWT-27	MWT-27	MWT-27
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20067	ALBW20082	ALBW20097	ALBW20096	ALBW20112	ALBW20127
Sample Date								1/3/2007	3/16/2007	6/5/2007	6/5/2007	11/15/2007	6/24/2008
QC Code								SA	SA	DU	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								1	2	3	3	4	5
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Trichloroethene	UG/L	2700	70%	5	55	103	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Trichlorofluoromethane	UG/L	0	0%	5	0	0	148	20 UJ	20 U	20 UJ	20 UJ	10 U	4 UJ
Vinyl chloride	UG/L	180	66%	2	85	97	148	20 UJ	20 U	20 U	20 U	10 U	4 U
Other													
Iron	UG/L	296000	100%		11	12	12	296000 J	229000				
Iron+Manganese	UG/L	352900	100%		12	12	12	352900 J	273500				
Manganese	UG/L	56900	100%		12	12	12	56900	44500				
Ethane	UG/L	98	90%		0	65	72	10000 UJ	0.15	0.079	0.082	0.025 U	2.3
Ethene	UG/L	200	90%		0	65	72	10000 UJ	2.7	0.32	0.34	0.014 J	0.049
Methane	UG/L	23000	96%		0	69	72	10000 UJ	15000	13000	14000	13000	13000
Sulfate	MG/L	1060	72%	250000	2	52	72	10 U	10 U	2.7	2 U	31.7	2 U
Total Organic Carbon	MG/L	2050	100%		0	72	72	2050 J	1350	771	738	167	88.9

Notes:

1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
   a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
   b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

U = compound was not detected

J = the reported value is and estimated concentration

UJ= the compound was not detected; the associated reporting limit is approximate.

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-27	MWT-27	MWT-27	MWT-27	MWT-27	MWT-27
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20143	ALBW20142	ALBW20157	ALBW20173	ALBW20172	ALBW20187
Sample Date								12/15/2008	12/15/2008	6/3/2009	12/16/2009	12/16/2009	6/29/2010
QC Code								DU	SA	SA	DU	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								6	6	7	8	8	9
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	148	2.6 UJ	2.6 UJ	2.6 U	1.3 U	1.3 U	0.5 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	148	2.1 UJ	2.1 UJ	2.1 U	1.1 U	1.1 U	0.18 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	148	3.1 UJ	3.1 UJ	3.1 U	1.5 U	1.5 U	0.5 UJ
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	148	2.3 UJ	2.3 UJ	2.3 U	1.2 U	1.2 U	0.13 U
1,1-Dichloroethane	UG/L	1.1	9%	5	0	14	148	7.5 U	7.5 U	7.5 U	1.9 U	1.9 U	0.25 U
1,1-Dichloroethene	UG/L	2.1	11%	5	0	16	148	2.9 U	2.9 U	2.9 U	1.5 U	1.5 U	0.11 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	148	4.1 UJ	4.1 UJ	4.1 U	2 U	2 U	0.25 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	148	10 UJ	10 UJ	10 UJ	2 U	2 U	0.44 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	148	1.7 UJ	1.7 UJ	1.7 U	0.83 U	0.83 U	0.25 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	148	2 U	2 U	2 U	1 U	1 U	0.21 U
1,2-Dichloroethane	UG/L	5.6	13%	0.6	16	19	148	2.1 U	2.1 U	2.1 U	1.1 U	1.1 U	0.1 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	148	1.4 U	1.4 U	1.4 U	1.6 U	1.6 U	0.13 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1.6 U	1.6 U	1.6 U	1.8 U	1.8 U	0.25 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1.6 U	1.6 U	1.6 U	2 U	2 U	0.28 U
Acetone	UG/L	2600	25%		0	37	148	13 UJ	26 J	13 U	6.7 U	6.7 U	11 J
Benzene	UG/L	0	0%	1	0	0	148	1.6 U	1.6 U	1.6 U	2 U	2 U	0.25 U
Bromodichloromethane	UG/L	0	0%	80 [b]	0	0	148	3.8 U	3.8 U	3.9 U	1.9 U	1.9 U	0.25 U
Bromoform	UG/L	0	0%	80 [b]	0	0	148	2.6 UJ	2.6 UJ	2.6 UJ	1.3 U	1.3 U	0.5 U
Carbon disulfide	UG/L	0	0%		0	0	148	1.9 U	1.9 U	1.9 UJ	0.97 U	0.97 U	0.6 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	148	2.7 UJ	2.7 UJ	2.7 U	1.3 U	1.3 U	0.5 U
Chlorobenzene	UG/L	0	0%	5	0	0	148	1.8 U	1.8 U	3.2 U	1.6 U	1.6 U	0.25 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	148	3.2 U	3.2 U	3.2 U	1.6 U	1.6 U	0.1 U
Chloroethane	UG/L	1.1	5%	5	0	7	148	3.2 U	3.2 U	3.2 U	1.6 U	1.6 U	1 U
Chloroform	UG/L	27	10%	7	4	15	148	3.4 U	3.4 U	3.4 U	1.7 U	1.7 U	0.14 U
Cis-1,2-Dichloroethene	UG/L	720	84%	5	98	124	148	1.6 U	1.6 U	1.6 U	1.9 U	1.9 U	0.18 J
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	3.6 U	3.6 U	3.6 U	1.8 U	1.8 U	0.11 U
Cyclohexane	UG/L	0	0%		0	0	148	2.2 UJ	2.2 UJ	5.3 U	2.7 U	2.7 U	0.25 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	148	2.8 U	2.8 U	2.9 U	1.4 U	1.4 U	0.25 U
Ethyl benzene	UG/L	1.3	6%	5	0	9	148	1.8 U	1.8 U	1.8 U	0.92 U	0.92 U	0.11 U
Isopropylbenzene	UG/L	0	0%	5	0	0	148	1.9 U	1.9 U	1.9 U	0.96 U	0.96 U	0.1 U
Methyl Acetate	UG/L	6	1%		0	2	148	1.7 UJ	1.7 UJ	1.7 UJ	2.5 U	2.5 U	0.19 UJ
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	148	1.6 UJ	1.6 UJ	1.6 U	0.8 U	0.8 U	0.2 U
Methyl bromide	UG/L	0	0%	5	0	0	147	2.8 U	2.8 U	2.8 U	1.4 U	1.4 U	0.8 UJ
Methyl butyl ketone	UG/L	0	0%		0	0	148	12 U	12 U	12 U	6.2 U	6.2 U	1 UJ
Methyl chloride	UG/L	0	0%	5	0	0	148	3.4 U	3.4 U	3.5 U	1.7 U	1.7 U	0.33 U
Methyl cyclohexane	UG/L	0	0%		0	0	148	2.2 UJ	2.2 UJ	5 U	2.5 U	2.5 U	0.1 U
Methyl ethyl ketone	UG/L	4900	14%		0	21	148	13 UJ	13 UJ	13 U	6.6 U	6.6 U	1 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	148	9.1 UJ	9.1 UJ	9.1 U	4.5 U	4.5 U	1 U
Methylene chloride	UG/L	18	8%	5	7	12	148	4.4 UJ	4.4 UJ	4.4 U	2.2 U	2.2 U	1 U
Styrene	UG/L	0	0%	5	0	0	148	1.8 U	1.8 U	1.8 U	0.92 U	0.92 U	0.11 U
Tetrachloroethene	UG/L	0	0%	5	0	0	148	3.6 U	3.6 U	3.6 U	1.8 U	1.8 U	0.15 U
Toluene	UG/L	590	18%	5	16	27	148	7.2 J	6.9 J	5.1 U	2.6 U	2.6 U	0.61 J
Total Xylenes	UG/L	0	0%	5	0	0	148	9.3 U	9.3 U	6.6 U	3.3 U	3.3 U	0.2 U
Trans-1,2-Dichloroethene	UG/L	8	47%	5	3	69	148	1.3 U	1.3 U	1.3 U	2.1 U	2.1 U	0.2 U
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	3.7 U	3.7 U	3.7 U	1.8 U	1.8 U	0.21 U

Appendix B

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-27	MWT-27	MWT-27	MWT-27	MWT-27	MWT-27
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20143	ALBW20142	ALBW20157	ALBW20173	ALBW20172	ALBW20187
Sample Date								12/15/2008	12/15/2008	6/3/2009	12/16/2009	12/16/2009	6/29/2010
QC Code								DU	SA	SA	DU	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								6	6	7	8	8	9
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Trichloroethene	UG/L	2700	70%	5	55	103	148	1.8 U	1.8 U	1.8 U	2.3 U	2.3 U	0.13 U
Trichlorofluoromethane	UG/L	0	0%	5	0	0	148	1.5 UJ	1.5 UJ	1.5 U	0.76 U	0.76 U	0.25 U
Vinyl chloride	UG/L	180	66%	2	85	97	148	2.4 U	2.4 U	2.4 U	2.9 J	3.2 J	0.18 U
Other													
Iron	UG/L	296000	100%		11	12	12						
Iron+Manganese	UG/L	352900	100%		12	12	12						
Manganese	UG/L	56900	100%		12	12	12						
Ethane	UG/L	98	90%		0	65	72	1.6	1.6	5.1	4.3	4.4	3.8
Ethene	UG/L	200	90%		0	65	72	0.12	0.13	0.15	1.1	1.2	0.12
Methane	UG/L	23000	96%		0	69	72	15000	15000	14000	16000	15000	13000
Sulfate	MG/L	1060	72%	250000	2	52	72	23.8	24.2	0.93 J	14 J	13.9 J	0.95 J
Total Organic Carbon	MG/L	2050	100%		0	72	72	53.1	53.8	81.7	50.9	49	61

Notes:

1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
   a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
   b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

U = compound was not detected

J = the reported value is and estimated concentration

UJ= the compound was not detected; the associated reporting limit is approximate.

Appendix B

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-27	MWT-28	MWT-28	MWT-28	MWT-28	MWT-28
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20203	ALBW20069	ALBW20068	ALBW20083	ALBW20098	ALBW20113
Sample Date								12/18/2010	1/3/2007	1/3/2007	3/16/2007	6/5/2007	11/15/2007
QC Code								SA	DU	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								10	1	1	2	3	4
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	148	0.5 U	20 UJ	20 UJ	20 U	20 U	5 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	148	0.18 U	20 UJ	20 UJ	20 U	20 U	5 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	148	0.5 U	20 UJ	20 UJ	20 U	20 UJ	5 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	148	0.13 U	20 UJ	20 UJ	20 U	20 U	5 U
1,1-Dichloroethane	UG/L	1.1	9%	5	0	14	148	0.25 U	20 UJ	20 UJ	20 U	20 U	5 U
1,1-Dichloroethene	UG/L	2.1	11%	5	0	16	148	0.11 U	20 UJ	20 UJ	20 U	20 U	5 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	148	0.25 U	20 UJ	20 UJ	20 U	20 U	5 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	148	0.44 U	20 UJ	20 UJ	20 U	20 U	5 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	148	0.25 U	20 UJ	20 UJ	20 U	20 U	5 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.21 U	20 UJ	20 UJ	20 U	20 U	5 U
1,2-Dichloroethane	UG/L	5.6	13%	0.6	16	19	148	0.1 U	20 UJ	20 UJ	20 U	20 U	5 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	148	0.13 U	20 UJ	20 UJ	20 U	20 U	5 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.25 U	20 UJ	20 UJ	20 U	20 U	5 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.28 U	20 UJ	20 UJ	20 U	20 U	5 U
Acetone	UG/L	2600	25%		0	37	148	5 UJ	2600 J	2500 J	170	520	25 U
Benzene	UG/L	0	0%	1	0	0	148	0.25 U	20 UJ	20 UJ	20 U	20 U	5 U
Bromodichloromethane	UG/L	0	0%	80 [b]	0	0	148	0.25 U	20 UJ	20 UJ	20 U	20 U	5 U
Bromoform	UG/L	0	0%	80 [b]	0	0	148	0.5 U	20 UJ	20 UJ	20 U	20 U	5 U
Carbon disulfide	UG/L	0	0%		0	0	148	0.6 U	20 UJ	20 UJ	20 U	20 U	5 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	148	0.5 U	20 UJ	20 UJ	20 U	20 U	5 U
Chlorobenzene	UG/L	0	0%	5	0	0	148	0.25 U	20 UJ	20 UJ	20 U	20 U	5 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	148	0.1 U	20 UJ	20 UJ	20 U	20 U	5 U
Chloroethane	UG/L	1.1	5%	5	0	7	148	1 UJ	20 UJ	20 UJ	20 U	20 U	5 U
Chloroform	UG/L	27	10%	7	4	15	148	0.14 U	20 UJ	20 UJ	20 U	20 U	5 U
Cis-1,2-Dichloroethene	UG/L	720	84%	5	98	124	148	1.1	20 UJ	20 UJ	20 U	20 U	5 U
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	0.11 U	20 UJ	20 UJ	20 U	20 U	5 U
Cyclohexane	UG/L	0	0%		0	0	148	0.25 U	20 UJ	20 UJ	20 U	20 U	5 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	148	0.25 U	20 UJ	20 UJ	20 U	20 U	5 U
Ethyl benzene	UG/L	1.3	6%	5	0	9	148	0.11 U	20 UJ	20 UJ	20 U	20 U	5 U
Isopropylbenzene	UG/L	0	0%	5	0	0	148	0.1 U	20 UJ	20 UJ	20 U	20 U	5 U
Methyl Acetate	UG/L	6	1%		0	2	148	0.19 U	20 UJ	20 UJ	20 UJ	20 U	5 UJ
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	148	0.8 U	20 UJ	20 UJ	20 U	20 U	5 U
Methyl bromide	UG/L	0	0%	5	0	0	147	1 U	20 UJ	20 UJ	20 U	20 U	5 U
Methyl butyl ketone	UG/L	0	0%		0	0	148	0.33 U	100 UJ	100 UJ	100 U	100 U	25 UJ
Methyl chloride	UG/L	0	0%	5	0	0	148	0.1 U	20 UJ	20 UJ	20 U	20 U	5 U
Methyl cyclohexane	UG/L	0	0%		0	0	148	1 U	20 UJ	20 UJ	20 U	20 U	5 U
Methyl ethyl ketone	UG/L	4900	14%		0	21	148	1 U	4900 J	4900 J	180	510	25 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	148	0.2 U	100 UJ	100 UJ	100 U	100 U	25 U
Methylene chloride	UG/L	18	8%	5	7	12	148	1 U	14 J	13 J	20 U	9.3 J	5 U
Styrene	UG/L	0	0%	5	0	0	148	0.11 U	20 UJ	20 UJ	20 U	20 U	5 U
Tetrachloroethene	UG/L	0	0%	5	0	0	148	0.15 U	20 UJ	20 UJ	20 U	20 U	5 U
Toluene	UG/L	590	18%	5	16	27	148	0.33 U	350 J	330 J	160	500	310
Total Xylenes	UG/L	0	0%	5	0	0	148	0.2 U	60 UJ	60 UJ	60 U	60 U	15 U
Trans-1,2-Dichloroethene	UG/L	8	47%	5	3	69	148	0.2 U	20 UJ	20 UJ	20 U	20 U	5 U
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	0.21 U	20 UJ	20 UJ	20 U	20 U	5 U

Table B-1
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-27	MWT-28	MWT-28	MWT-28	MWT-28	MWT-28
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20203	ALBW20069	ALBW20068	ALBW20083	ALBW20098	ALBW20113
Sample Date								12/18/2010	1/3/2007	1/3/2007	3/16/2007	6/5/2007	11/15/2007
QC Code								SA	DU	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								10	1	1	2	3	4
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Trichloroethene	UG/L	2700	70%	5	55	103	148	0.51 J	20 UJ	20 UJ	20 U	20 U	5 U
Trichlorofluoromethane	UG/L	0	0%	5	0	0	148	0.25 U	20 UJ	20 UJ	20 U	20 UJ	5 U
Vinyl chloride	UG/L	180	66%	2	85	97	148	2.1	20 UJ	20 UJ	20 U	20 U	5 U
Other													
Iron	UG/L	296000	100%		11	12	12		271000 J	278000 J	33000		
Iron+Manganese	UG/L	352900	100%		12	12	12		301800 J	309800 J	37450		
Manganese	UG/L	56900	100%		12	12	12		30800	31800	4450		
Ethane	UG/L	98	90%		0	65	72	3	10000 UJ	10000 UJ	0.67	0.01 J	0.014 J
Ethene	UG/L	200	90%		0	65	72	0.88	10000 UJ	10000 UJ	0.48	0.057	0.025 U
Methane	UG/L	23000	96%		0	69	72	18000	13000 J	12000 J	19000	11000	11000
Sulfate	MG/L	1060	72%	250000	2	52	72	25	2.3	2 U	2 U	2 U	2 U
Total Organic Carbon	MG/L	2050	100%		0	72	72	32	1730 J	1820 J	171	309	92

Notes:

1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
   a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
   b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

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

Table B-1
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-28	MWT-28	MWT-28	MWT-28	MWT-28	MWT-28
Matrix								GW	GW	GW	GW	GW	GROUNDWATER
Sample ID								ALBW20128	ALBW20144	ALBW20159	ALBW20158	ALBW20174	ALBW20188
Sample Date								6/25/2008	12/15/2008	6/3/2009	6/3/2009	12/18/2009	6/29/2010
QC Code								SA	SA	DU	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								5	6	7	7	8	9
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	148	4 U	2.6 U	0.26 U	0.26 U	1.3 U	0.5 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	148	4 U	2.1 U	0.21 U	0.21 U	1.1 U	0.18 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	148	4 U	3.1 U	0.31 U	0.31 U	1.5 UJ	0.5 UJ
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	148	4 U	2.3 U	0.23 U	0.23 U	1.2 U	0.13 U
1,1-Dichloroethane	UG/L	1.1	9%	5	0	14	148	4 U	7.5 U	0.75 U	0.75 U	1.9 U	0.25 U
1,1-Dichloroethene	UG/L	2.1	11%	5	0	16	148	4 U	2.9 U	0.29 U	0.29 U	1.5 U	0.11 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	148	4 U	4.1 U	0.41 U	0.41 U	2 U	0.25 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	148	4 U	10 UJ	1 UJ	1 UJ	2 U	0.44 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	148	4 U	1.7 U	0.17 U	0.17 U	0.83 U	0.25 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	148	4 U	2 U	0.2 U	0.2 U	1 U	0.21 U
1,2-Dichloroethane	UG/L	5.6	13%	0.6	16	19	148	4 U	2.1 U	0.21 U	0.21 U	1.1 U	0.1 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	148	4 U	1.4 U	0.14 U	0.14 U	1.6 U	0.13 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	148	4 U	1.6 U	0.16 U	0.16 U	1.8 U	0.25 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	148	4 U	1.6 U	0.16 U	0.16 U	2 U	0.28 U
Acetone	UG/L	2600	25%		0	37	148	20 U	13 U	1.9 J	1.9 J	6.7 U	6.2 J
Benzene	UG/L	0	0%	1	0	0	148	4 U	1.6 U	0.16 U	0.16 U	2 U	0.25 U
Bromodichloromethane	UG/L	0	0%	80 [b]	0	0	148	4 U	3.8 U	0.39 U	0.39 U	1.9 U	0.25 U
Bromoform	UG/L	0	0%	80 [b]	0	0	148	4 U	2.6 U	0.26 UJ	0.26 UJ	1.3 U	0.5 U
Carbon disulfide	UG/L	0	0%		0	0	148	4 U	1.9 U	0.19 UJ	0.19 UJ	0.97 U	0.6 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	148	4 U	2.7 U	0.27 U	0.27 U	1.3 U	0.5 U
Chlorobenzene	UG/L	0	0%	5	0	0	148	4 U	1.8 U	0.32 U	0.32 U	1.6 U	0.25 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	148	4 U	3.2 U	0.32 U	0.32 U	1.6 U	0.1 U
Chloroethane	UG/L	1.1	5%	5	0	7	148	4 UJ	3.2 U	0.32 U	0.32 U	1.6 UJ	1 U
Chloroform	UG/L	27	10%	7	4	15	148	4 U	3.4 U	0.34 U	0.34 U	1.7 U	0.14 U
Cis-1,2-Dichloroethene	UG/L	720	84%	5	98	124	148	4 U	1.6 U	0.16 U	0.16 U	1.9 U	0.15 U
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	4 U	3.6 U	0.36 U	0.36 U	1.8 U	0.11 U
Cyclohexane	UG/L	0	0%		0	0	148	4 U	2.2 U	0.53 U	0.53 U	2.7 U	0.25 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	148	4 U	2.8 U	0.29 U	0.29 U	1.4 U	0.25 U
Ethyl benzene	UG/L	1.3	6%	5	0	9	148	4 U	1.8 U	0.18 U	0.18 U	0.92 U	0.17 J
Isopropylbenzene	UG/L	0	0%	5	0	0	148	4 U	1.9 U	0.19 U	0.19 U	0.96 U	0.1 U
Methyl Acetate	UG/L	6	1%		0	2	148	4 UJ	1.7 U	0.17 UJ	0.17 UJ	2.5 U	0.19 UJ
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	148	4 U	1.6 U	0.16 U	0.16 U	0.8 U	0.2 U
Methyl bromide	UG/L	0	0%	5	0	0	147	4 UJ	2.8 U	0.28 U	0.28 U	1.4 UJ	0.8 UJ
Methyl butyl ketone	UG/L	0	0%		0	0	148	20 UJ	12 U	1.2 U	1.2 U	6.2 U	1 UJ
Methyl chloride	UG/L	0	0%	5	0	0	148	4 U	3.4 U	0.35 U	0.35 U	1.7 U	0.33 U
Methyl cyclohexane	UG/L	0	0%		0	0	148	4 U	2.2 U	0.5 U	0.5 U	2.5 U	0.1 U
Methyl ethyl ketone	UG/L	4900	14%		0	21	148	20 U	13 U	1.3 U	1.3 U	6.6 U	1 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	148	20 U	9.1 U	0.91 U	0.91 U	4.5 U	1 U
Methylene chloride	UG/L	18	8%	5	7	12	148	4 U	4.4 UJ	0.44 U	0.44 U	2.2 U	1 U
Styrene	UG/L	0	0%	5	0	0	148	4 U	1.8 U	0.18 U	0.18 U	0.92 U	0.11 U
Tetrachloroethene	UG/L	0	0%	5	0	0	148	4 U	3.6 U	0.36 U	0.36 U	1.8 U	0.15 U
Toluene	UG/L	590	18%	5	16	27	148	5 U	5.1 U	0.6 J	0.57 J	2.6 U	0.52 J
Total Xylenes	UG/L	0	0%	5	0	0	148	12 U	9.3 U	0.66 U	0.66 U	3.3 U	0.2 U
Trans-1,2-Dichloroethene	UG/L	8	47%	5	3	69	148	4 U	1.3 U	0.13 U	0.13 U	2.1 U	0.2 U
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	4 U	3.7 U	0.37 U	0.37 U	1.8 U	0.21 U

Appendix B

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-28	MWT-28	MWT-28	MWT-28	MWT-28	MWT-28
Matrix								GW	GW	GW	GW	GW	GROUNDWATER
Sample ID								ALBW20128	ALBW20144	ALBW20159	ALBW20158	ALBW20174	ALBW20188
Sample Date								6/25/2008	12/15/2008	6/3/2009	6/3/2009	12/18/2009	6/29/2010
QC Code								SA	SA	DU	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								5	6	7	7	8	9
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Trichloroethene	UG/L	2700	70%	5	55	103	148	4 U	1.8 U	0.18 U	0.18 U	2.3 U	0.13 U
Trichlorofluoromethane	UG/L	0	0%	5	0	0	148	4 UJ	1.5 U	0.15 U	0.15 U	0.76 UJ	0.25 U
Vinyl chloride	UG/L	180	66%	2	85	97	148	4 U	2.4 U	0.24 U	0.24 U	1.2 U	0.18 U
													1.6
Other													
Iron	UG/L	296000	100%		11	12	12						
Iron+Manganese	UG/L	352900	100%		12	12	12						
Manganese	UG/L	56900	100%		12	12	12						
Ethane	UG/L	98	90%		0	65	72	0.65	2	1.7	1.9	1.6	1.6
Ethene	UG/L	200	90%		0	65	72	0.044	0.12	0.066	0.062	0.12	0.057
Methane	UG/L	23000	96%		0	69	72	12000	19000	12000	14000	15000	14000
Sulfate	MG/L	1060	72%	250000	2	52	72	2 U	48.3	0.35 U	0.35 U	3.16	0.5 U
Total Organic Carbon	MG/L	2050	100%		0	72	72	49.2	27.9	27.6	28.7	25.5	21

Notes:
1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
 a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
 b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

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

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-28	MWT-28	MWT-29	MWT-29	MWT-29	MWT-29
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20189	ALBW20204	ALBW20070	ALBW20085	ALBW20084	ALBW20099
Sample Date								6/29/2010	12/18/2010	1/3/2007	3/16/2007	3/16/2007	6/5/2007
QC Code								DU	SA	SA	DU	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								9	10	1	2	2	3
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	148	0.5 U	0.5 U	2 U	4 U	5 U	2 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	148	0.18 U	0.18 U	2 U	4 U	5 U	2 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	148	0.5 UJ	0.5 U	2 U	4 U	5 U	2 UJ
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	148	0.13 U	0.13 U	2 U	4 U	5 U	2 U
1,1-Dichloroethane	UG/L	1.1	9%	5	0	14	148	0.25 U	0.25 U	2 U	4 U	5 U	2 U
1,1-Dichloroethene	UG/L	2.1	11%	5	0	16	148	0.11 U	0.11 U	2 U	4 U	5 U	2 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	148	0.25 U	0.25 U	2 U	4 U	5 U	2 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	148	0.44 U	0.44 U	2 U	4 U	5 U	2 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	148	0.25 U	0.25 U	2 U	4 U	5 U	2 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.21 U	0.21 U	2 U	4 U	5 U	2 U
1,2-Dichloroethane	UG/L	5.6	13%	0.6	16	19	148	0.1 U	0.1 U	2 U	4 U	5 U	2 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	148	0.13 U	0.13 U	2 U	4 U	5 U	2 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.25 U	0.25 U	2 U	4 U	5 U	2 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.28 U	0.28 U	2 U	4 U	5 U	2 U
Acetone	UG/L	2600	25%		0	37	148	5.9 J	5 UJ	10 U	14 J	15 J	5.7 J
Benzene	UG/L	0	0%	1	0	0	148	0.25 U	0.25 U	2 U	4 U	5 U	2 U
Bromodichloromethane	UG/L	0	0%	80 [b]	0	0	148	0.25 U	0.25 U	2 U	4 U	5 U	2 U
Bromoform	UG/L	0	0%	80 [b]	0	0	148	0.5 U	0.5 U	2 U	4 U	5 U	2 U
Carbon disulfide	UG/L	0	0%		0	0	148	0.6 U	0.6 U	2 U	4 U	5 U	2 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	148	0.5 U	0.5 U	2 U	4 U	5 U	2 U
Chlorobenzene	UG/L	0	0%	5	0	0	148	0.25 U	0.25 U	2 U	4 U	5 U	2 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	148	0.1 U	0.1 U	2 U	4 U	5 U	2 U
Chloroethane	UG/L	1.1	5%	5	0	7	148	1 U	1 U	2 U	4 U	5 U	2 U
Chloroform	UG/L	27	10%	7	4	15	148	0.14 U	0.14 U	2 U	4 U	5 U	2 U
Cis-1,2-Dichloroethene	UG/L	720	84%	5	98	124	148	0.15 U	0.51 J	280	220	220	100
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	0.11 U	0.11 U	2 U	4 U	5 U	2 U
Cyclohexane	UG/L	0	0%		0	0	148	0.25 U	0.25 U	2 U	4 U	5 U	2 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	148	0.25 U	0.25 U	2 U	4 U	5 U	2 U
Ethyl benzene	UG/L	1.3	6%	5	0	9	148	0.17 J	0.11 U	2 U	4 U	5 U	2 U
Isopropylbenzene	UG/L	0	0%	5	0	0	148	0.1 U	0.1 U	2 U	4 U	5 U	2 U
Methyl Acetate	UG/L	6	1%		0	2	148	0.19 UJ	0.19 U	2 U	4 UJ	5 UJ	2 U
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	148	0.2 U	0.8 UJ	2 U	4 U	5 U	2 U
Methyl bromide	UG/L	0	0%	5	0	0	147	0.8 UJ	1 U	2 U	4 U	5 U	2 U
Methyl butyl ketone	UG/L	0	0%		0	0	148	1 UJ	0.33 U	10 U	20 U	25 U	10 U
Methyl chloride	UG/L	0	0%	5	0	0	148	0.33 U	0.1 U	2 U	4 U	5 U	2 U
Methyl cyclohexane	UG/L	0	0%		0	0	148	0.1 U	1 U	2 U	4 U	5 U	2 U
Methyl ethyl ketone	UG/L	4900	14%		0	21	148	1 U	1 U	10 U	20 U	25 U	10 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	148	1 U	0.2 U	10 U	20 U	25 U	10 U
Methylene chloride	UG/L	18	8%	5	7	12	148	1 U	1 U	2 U	4 U	2.5 J	2 U
Styrene	UG/L	0	0%	5	0	0	148	0.11 U	0.11 U	2 U	4 U	5 U	2 U
Tetrachloroethene	UG/L	0	0%	5	0	0	148	0.15 U	0.15 U	2 U	4 U	5 U	2 U
Toluene	UG/L	590	18%	5	16	27	148	0.48 J	0.33 U	2.6	2.2 J	5 U	2 U
Total Xylenes	UG/L	0	0%	5	0	0	148	0.2 U	0.2 U	6 U	12 U	15 U	6 U
Trans-1,2-Dichloroethene	UG/L	8	47%	5	3	69	148	0.2 U	0.2 U	6.5	8	7.5	2.1
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	0.21 U	0.21 U	2 U	4 U	5 U	2 U

Appendix B

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-28	MWT-28	MWT-29	MWT-29	MWT-29	MWT-29
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20189	ALBW20204	ALBW20070	ALBW20085	ALBW20084	ALBW20099
Sample Date								6/29/2010	12/18/2010	1/3/2007	3/16/2007	3/16/2007	6/5/2007
QC Code								DU	SA	SA	DU	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								9	10	1	2	2	3
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Trichloroethene	UG/L	2700	70%	5	55	103	148	0.13 U	0.13 U	22	19	19	7.6
Trichlorofluoromethane	UG/L	0	0%	5	0	0	148	0.25 U	0.25 U	2 U	4 U	5 U	2 UJ
Vinyl chloride	UG/L	180	66%	2	85	97	148	0.18 U	0.64 J	140	170	160	81
Other													
Iron	UG/L	296000	100%		11	12	12			1370 J	2550	2470	
Iron+Manganese	UG/L	352900	100%		12	12	12			8620 J	9050	8750	
Manganese	UG/L	56900	100%		12	12	12			7250	6500	6280	
Ethane	UG/L	98	90%		0	65	72	1.5	1.4	2000 U	25	20	13
Ethene	UG/L	200	90%		0	65	72	0.061	0.17	2000 U	150	120	160
Methane	UG/L	23000	96%		0	69	72	13000	12000	2000 U	8100	6500	2800
Sulfate	MG/L	1060	72%	250000	2	52	72	0.5 U	4.8	113	173	179	151
Total Organic Carbon	MG/L	2050	100%		0	72	72	21	12	25.1 J	36.7	35	15.7

Notes:

1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
   a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
   b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

U = compound was not detected

J = the reported value is and estimated concentration

UJ= the compound was not detected; the associated reporting limit is approximate

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-29	MWT-29	MWT-29	MWT-29	MWT-29	MWT-29
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20114	ALBW20130	ALBW20129	ALBW20145	ALBW20160	ALBW20175
Sample Date								11/14/2007	6/25/2008	6/25/2008	12/15/2008	6/3/2009	12/16/2009
QC Code								SA	DU	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								4	5	5	6	7	8
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	148	1 U	1 U	1 U	0.26 UJ	0.26 U	0.26 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.21 UJ	0.21 U	0.21 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.31 UJ	0.31 U	0.31 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	148	1 U	1 U	1 U	0.23 UJ	0.23 U	0.23 U
1,1-Dichloroethane	UG/L	1.1	9%	5	0	14	148	1 U	1 U	1 U	0.75 U	0.75 U	0.38 U
1,1-Dichloroethene	UG/L	2.1	11%	5	0	16	148	1 U	1 U	1 U	0.29 U	0.29 U	0.29 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.41 UJ	0.41 U	0.41 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	148	1 U	1 U	1 U	1 UJ	1 UJ	0.39 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	148	1 U	1 U	1 U	0.17 UJ	0.17 U	0.17 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1 U	1 U	1 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	UG/L	5.6	13%	0.6	16	19	148	1 U	1 U	1 U	0.21 U	0.21 U	0.21 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	148	1 U	1 U	1 U	0.14 U	0.14 U	0.32 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1 U	1 U	1 U	0.16 U	0.16 U	0.36 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	148	1 U	1 U	1 U	0.16 U	0.16 U	0.39 U
Acetone	UG/L	2600	25%		0	37	148	5 U	5 U	5 U	1.3 UJ	1.3 U	1.3 U
Benzene	UG/L	0	0%	1	0	0	148	1 U	1 U	1 U	0.16 U	0.16 U	0.41 U
Bromodichloromethane	UG/L	0	0%	80 [b]	0	0	148	1 U	1 U	1 U	0.38 U	0.39 U	0.39 U
Bromoform	UG/L	0	0%	80 [b]	0	0	148	1 U	1 U	1 U	0.26 UJ	0.26 UJ	0.26 U
Carbon disulfide	UG/L	0	0%		0	0	148	1 U	1 U	1 U	0.19 U	0.19 UJ	0.19 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.27 UJ	0.27 U	0.27 U
Chlorobenzene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.18 U	0.32 U	0.32 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	148	1 U	1 U	1 U	0.32 U	0.32 U	0.32 U
Chloroethane	UG/L	1.1	5%	5	0	7	148	1 U	1 UJ	1 UJ	0.32 U	0.32 U	0.32 U
Chloroform	UG/L	27	10%	7	4	15	148	1 U	1 U	1 U	0.34 U	0.34 U	0.34 U
Cis-1,2-Dichloroethene	UG/L	720	84%	5	98	124	148	96	85	83	91	61	37
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	1 U	1 U	1 U	0.36 U	0.36 U	0.36 U
Cyclohexane	UG/L	0	0%		0	0	148	1 U	1 U	1 U	0.22 UJ	0.53 U	0.53 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.28 U	0.29 U	0.29 U
Ethyl benzene	UG/L	1.3	6%	5	0	9	148	1 U	1 U	1 U	0.18 U	0.18 U	0.18 U
Isopropylbenzene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.19 U	0.19 U	0.19 U
Methyl Acetate	UG/L	6	1%		0	2	148	1 UJ	1 UJ	1 UJ	0.17 UJ	0.17 UJ	0.5 U
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	148	1 U	1 U	1 U	0.16 UJ	0.16 U	0.16 U
Methyl bromide	UG/L	0	0%	5	0	0	147	1 U	1 UJ	1 UJ	0.28 U	0.28 U	0.28 U
Methyl butyl ketone	UG/L	0	0%		0	0	148	5 UJ	5 UJ	5 UJ	1.2 U	1.2 U	1.2 U
Methyl chloride	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.34 U	0.35 U	0.35 U
Methyl cyclohexane	UG/L	0	0%		0	0	148	1 U	1 U	1 U	0.22 UJ	0.5 U	0.5 U
Methyl ethyl ketone	UG/L	4900	14%		0	21	148	5 U	5 U	5 U	1.3 UJ	1.3 U	1.3 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	148	5 U	5 U	5 U	0.91 UJ	0.91 U	0.91 U
Methylene chloride	UG/L	18	8%	5	7	12	148	1 U	1 U	1 U	0.44 UJ	0.44 U	0.44 U
Styrene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.18 U	0.18 U	0.18 U
Tetrachloroethene	UG/L	0	0%	5	0	0	148	1 U	1 U	1 U	0.36 U	0.36 U	0.36 U
Toluene	UG/L	590	18%	5	16	27	148	2.1	1 U	1 U	0.51 U	0.51 U	0.51 U
Total Xylenes	UG/L	0	0%	5	0	0	148	3 U	3 U	3 U	0.93 U	0.66 U	0.66 U
Trans-1,2-Dichloroethene	UG/L	8	47%	5	3	69	148	0.83 J	0.68 J	0.62 J	0.6 J	0.67 J	0.65 J
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	1 U	1 U	1 U	0.37 U	0.37 U	0.37 U

Appendix B

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-29	MWT-29	MWT-29	MWT-29	MWT-29	MWT-29
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20114	ALBW20130	ALBW20129	ALBW20145	ALBW20160	ALBW20175
Sample Date								11/14/2007	6/25/2008	6/25/2008	12/15/2008	6/3/2009	12/16/2009
QC Code								SA	DU	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								4	5	5	6	7	8
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Trichloroethene	UG/L	2700	70%	5	55	103	148	4.4	3.3	3.2	6.6	4.5	3.5
Trichlorofluoromethane	UG/L	0	0%	5	0	0	148	1 U	1 UJ	1 UJ	0.15 UJ	0.15 U	0.15 U
Vinyl chloride	UG/L	180	66%	2	85	97	148	74	74	73	80	43	29
Other													
Iron	UG/L	296000	100%		11	12	12						
Iron+Manganese	UG/L	352900	100%		12	12	12						
Manganese	UG/L	56900	100%		12	12	12						
Ethane	UG/L	98	90%		0	65	72	19	14	15	14	10	6.7
Ethene	UG/L	200	90%		0	65	72	200	140	140	19	47	12
Methane	UG/L	23000	96%		0	69	72	2600	3000	3200	2700	3000	1500
Sulfate	MG/L	1060	72%	250000	2	52	72	289	174	173	312	300	544 J
Total Organic Carbon	MG/L	2050	100%		0	72	72	20.9	14	14.2	13.6	11.8	8.2

Notes:

1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
   a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
   b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

U = compound was not detected

J = the reported value is and estimated concentration

UJ= the compound was not detected; the associated reporting limit is approximate.

Appendix B

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-29	MWT-29	MWT-22	MWT-22	MWT-22	MWT-22
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20190	ALBW20205	ALBW20071	ALBW20075	ALBW20100	ALBW20115
Sample Date								6/30/2010	12/19/2010	1/4/2007	3/17/2007	6/6/2007	11/14/2007
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								9	10	1	2	3	4
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	148	0.5 U	0.5 U	2 U	4 U	1 U	1 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	148	0.18 U	0.18 U	2 U	4 U	1 U	1 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	148	0.5 UJ	0.5 U	2 U	4 U	1 UJ	1 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	148	0.13 U	0.13 U	2 U	4 U	1 U	1 U
1,1-Dichloroethane	UG/L	1.1	9%	5	0	14	148	0.25 U	0.25 U	2 U	4 U	1 U	1 U
1,1-Dichloroethene	UG/L	2.1	11%	5	0	16	148	0.26 J	0.4 J	2 U	4 U	1 U	1 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	148	0.25 U	0.25 U	2 U	4 U	1 U	1 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	148	0.44 U	0.44 U	2 U	4 U	1 U	1 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	148	0.25 U	0.25 U	2 U	4 U	1 U	1 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.21 U	0.21 U	2 U	4 U	1 U	1 U
1,2-Dichloroethane	UG/L	5.6	13%	0.6	16	19	148	0.1 U	0.1 U	2 U	4 U	1 U	1 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	148	0.13 U	0.13 U	2 U	4 U	1 U	1 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.25 U	0.25 U	2 U	4 U	1 U	1 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	148	0.28 U	0.28 U	2 U	4 U	1 U	1 U
Acetone	UG/L	2600	25%		0	37	148	5 U	5 UJ	10 U	18 J	38	5 U
Benzene	UG/L	0	0%	1	0	0	148	0.25 U	0.25 U	2 U	4 U	1 U	1 U
Bromodichloromethane	UG/L	0	0%	80 [b]	0	0	148	0.25 U	0.25 U	2 U	4 U	1 U	1 U
Bromoform	UG/L	0	0%	80 [b]	0	0	148	0.5 U	0.5 U	2 U	4 U	1 U	1 U
Carbon disulfide	UG/L	0	0%		0	0	148	0.6 U	0.6 U	2 U	4 U	1 U	1 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	148	0.5 U	0.5 U	2 U	4 U	1 U	1 U
Chlorobenzene	UG/L	0	0%	5	0	0	148	0.25 U	0.25 U	2 U	4 U	1 U	1 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	148	0.1 U	0.1 U	2 U	4 U	1 U	1 U
Chloroethane	UG/L	1.1	5%	5	0	7	148	1 U	1 U	2 UJ	4 U	1 U	1 U
Chloroform	UG/L	27	10%	7	4	15	148	0.14 U	0.14 J	2 U	4 U	1 U	1 U
Cis-1,2-Dichloroethene	UG/L	720	84%	5	98	124	148	78	38	130	90	120	99
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	0.11 U	0.11 U	2 U	4 U	1 U	1 U
Cyclohexane	UG/L	0	0%		0	0	148	0.25 U	0.25 U	2 U	4 U	1 U	1 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	148	0.25 U	0.25 U	2 U	4 U	1 U	1 U
Ethyl benzene	UG/L	1.3	6%	5	0	9	148	0.11 U	0.11 U	2 U	4 U	1 U	1 U
Isopropylbenzene	UG/L	0	0%	5	0	0	148	0.1 U	0.1 U	2 U	4 U	1 U	1 U
Methyl Acetate	UG/L	6	1%		0	2	148	0.19 UJ	0.19 U	2 U	4 UJ	1 U	1 UJ
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	148	0.2 U	0.8 UJ	2 U	4 U	1 U	1 U
Methyl bromide	UG/L	0	0%	5	0	0	147	0.8 UJ	1 U	2 U	4 U	1 U	1 U
Methyl butyl ketone	UG/L	0	0%		0	0	148	1 UJ	0.33 U	10 U	20 U	5 U	5 UJ
Methyl chloride	UG/L	0	0%	5	0	0	148	0.33 U	0.1 U	2 U	4 U	1 U	1 U
Methyl cyclohexane	UG/L	0	0%		0	0	148	0.1 U	1 U	2 U	4 U	1 U	1 U
Methyl ethyl ketone	UG/L	4900	14%		0	21	148	1 U	1 U	6 J	20 U	5 U	5 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	148	1 U	0.2 U	10 U	20 U	5 U	5 U
Methylene chloride	UG/L	18	8%	5	7	12	148	1 U	1 U	1.2 J	4 U	1 U	1 U
Styrene	UG/L	0	0%	5	0	0	148	0.11 U	0.11 U	2 U	4 U	1 U	1 U
Tetrachloroethene	UG/L	0	0%	5	0	0	148	0.15 U	0.15 U	2 U	4 U	1 U	1 U
Toluene	UG/L	590	18%	5	16	27	148	0.33 U	0.33 U	2 U	4 U	1 U	1 U
Total Xylenes	UG/L	0	0%	5	0	0	148	0.2 U	0.2 U	6 U	12 U	3 U	3 U
Trans-1,2-Dichloroethene	UG/L	8	47%	5	3	69	148	1.1	0.77 J	2.7	4 U	3.2	0.85 J
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	0.21 U	0.21 U	2 U	4 U	1 U	1 U

Appendix B

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-29	MWT-29	MWT-22	MWT-22	MWT-22	MWT-22
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20190	ALBW20205	ALBW20071	ALBW20075	ALBW20100	ALBW20115
Sample Date								6/30/2010	12/19/2010	1/4/2007	3/17/2007	6/6/2007	11/14/2007
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								9	10	1	2	3	4
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Trichloroethene	UG/L	2700	70%	5	55	103	148	1.3	2.1	5.2	3.8 J	6.5	2.6
Trichlorofluoromethane	UG/L	0	0%	5	0	0	148	0.25 U	0.25 U	2 U	4 U	1 UJ	1 U
Vinyl chloride	UG/L	180	66%	2	85	97	148	69	27	98	64	81	180
Other													
Iron	UG/L	296000	100%		11	12	12						
Iron+Manganese	UG/L	352900	100%		12	12	12						
Manganese	UG/L	56900	100%		12	12	12						
Ethane	UG/L	98	90%		0	65	72	18	5.1				
Ethene	UG/L	200	90%		0	65	72	88	7.9				
Methane	UG/L	23000	96%		0	69	72	5400	3100				
Sulfate	MG/L	1060	72%	250000	2	52	72	170	300				
Total Organic Carbon	MG/L	2050	100%		0	72	72	10	7.4				

Notes:

1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
   a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
   b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

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

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-22	MWT-22	MWT-22	MWT-22	MWT-22	MWT-22
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20121	ALBW20136	ALBW20151	ALBW20166	ALBW20181	ALBW20196
Sample Date								6/25/2008	12/15/2008	6/3/2009	12/16/2009	7/1/2010	12/17/2010
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								5	6	7	8	9	10
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	148	5 U	1.3 UJ	0.26 U	1.3 U	0.5 U	0.5 U
1,1 2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	148	5 U	1 UJ	0.21 U	1.1 U	0.18 U	0 18 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	148	5 UJ	1.6 UJ	0.31 U	1.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	148	5 U	1.2 UJ	0.23 U	1.2 U	0.13 U	0.13 U
1,1-Dichloroethane	UG/L	1.1	9%	5	0	14	148	5 U	3.8 U	0.75 U	1.9 U	0.25 U	0 25 U
1,1-Dichloroethene	UG/L	2.1	11%	5	0	16	148	5 U	1.4 U	0.29 U	1.5 U	0.12 J	0.66 J
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	148	5 U	2 UJ	0.41 U	2 U	0.25 U	0.25 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	148	5 UJ	5 UJ	1 UJ	2 U	0.44 U	0.44 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	148	5 U	0.85 UJ	0.17 U	0.83 U	0.25 U	0.25 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	148	5 U	1 U	0.2 U	1 U	0.21 U	0.21 U
1,2-Dichloroethane	UG/L	5.6	13%	0.6	16	19	148	5 U	1 U	0.21 U	1.1 U	0.1 U	0.25 J
1,2-Dichloropropane	UG/L	0	0%	1	0	0	148	5 U	0.7 U	0.14 U	1.6 U	0.13 U	0.13 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	148	5 U	0.8 U	0.16 U	1.8 U	0.25 U	0.25 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	148	5 U	0.8 U	0.16 U	2 U	0.28 U	0.28 U
Acetone	UG/L	2600	25%		0	37	148	25 U	6.5 UJ	2.5 J	6.7 U	5 U	5 UJ
Benzene	UG/L	0	0%	1	0	0	148	5 U	0.8 U	0.16 U	2 U	0.25 U	0.25 U
Bromodichloromethane	UG/L	0	0%	80 [b]	0	0	148	5 U	1.9 U	0.39 U	1.9 U	0.25 U	0.25 U
Bromoform	UG/L	0	0%	80 [b]	0	0	148	5 U	1.3 UJ	0.26 UJ	1.3 U	0.5 U	0.5 U
Carbon disulfide	UG/L	0	0%		0	0	148	5 U	0.95 U	0.19 UJ	0.97 U	0.6 U	0.6 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	148	5 U	1.4 UJ	0.27 U	1.3 U	0.5 U	0.5 U
Chlorobenzene	UG/L	0	0%	5	0	0	148	5 U	0.9 U	0.32 U	1.6 U	0.25 U	0.25 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	148	5 U	1.6 U	0.32 U	1.6 U	0.1 U	0.1 U
Chloroethane	UG/L	1.1	5%	5	0	7	148	5 UJ	1.6 U	0.32 U	1.6 U	1 U	1 U
Chloroform	UG/L	27	10%	7	4	15	148	5 U	1.7 U	0.34 U	1.7 U	0.14 U	0.14 U
Cis-1,2-Dichloroethene	UG/L	720	84%	5	98	124	148	68	160	66	57	41	130
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	5 U	1.8 U	0.36 U	1.8 U	0.11 U	0.11 U
Cyclohexane	UG/L	0	0%		0	0	148	5 U	1.1 UJ	0.53 U	2.7 U	0.25 U	0.25 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	148	5 U	1.4 U	0.29 U	1.4 U	0.25 UJ	0.25 U
Ethyl benzene	UG/L	1.3	6%	5	0	9	148	5 U	0.9 U	0.18 U	0.92 U	0.11 U	0.11 U
Isopropylbenzene	UG/L	0	0%	5	0	0	148	5 U	0.95 U	0.19 U	0.96 U	0.1 U	0.1 U
Methyl Acetate	UG/L	6	1%		0	2	148	5 UJ	0.85 UJ	0.17 UJ	2.5 U	0.19 U	0.19 U
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	148	5 U	0.8 UJ	0.16 U	0.8 U	0.2 U	0.8 UJ
Methyl bromide	UG/L	0	0%	5	0	0	147	5 UJ	1.4 U	0.28 U	1.4 U	0.8 U	1 U
Methyl butyl ketone	UG/L	0	0%		0	0	148	25 UJ	6 U	1.2 U	6.2 U	1 U	0.33 U
Methyl chloride	UG/L	0	0%	5	0	0	148	5 UJ	1.7 U	0.35 U	1.7 U	0.33 U	0 1 U
Methyl cyclohexane	UG/L	0	0%		0	0	148	5 U	1.1 UJ	0.5 U	2.5 U	0.1 U	1 U
Methyl ethyl ketone	UG/L	4900	14%		0	21	148	25 UJ	6.5 UJ	1.3 U	6.6 U	1 U	1 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	148	25 UJ	4.6 UJ	0.91 U	4.5 U	1 U	0.2 U
Methylene chloride	UG/L	18	8%	5	7	12	148	5 U	2.2 UJ	0.44 U	2.2 U	1 U	1 U
Styrene	UG/L	0	0%	5	0	0	148	5 U	0.9 U	0.18 U	0.92 U	0.11 U	0.11 U
Tetrachloroethene	UG/L	0	0%	5	0	0	148	5 U	1.8 U	0.36 U	1.8 U	0.15 U	0.15 U
Toluene	UG/L	590	18%	5	16	27	148	5 U	2.6 U	0.51 U	2.6 U	0.33 U	0.33 U
Total Xylenes	UG/L	0	0%	5	0	0	148	15 U	4.6 U	0.66 U	3.3 U	0.2 U	0.2 U
Trans-1,2-Dichloroethene	UG/L	8	47%	5	3	69	148	5 U	0.65 U	0.77 J	2.1 U	1.3	2.8
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	148	5 U	1.8 U	0.37 U	1.8 U	0.21 U	0.21 U

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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-22	MWT-22	MWT-22	MWT-22	MWT-22	MWT-22
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20121	ALBW20136	ALBW20151	ALBW20166	ALBW20181	ALBW20196
Sample Date								6/25/2008	12/15/2008	6/3/2009	12/16/2009	7/1/2010	12/17/2010
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								5	6	7	8	9	10
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Trichloroethene	UG/L	2700	70%	5	55	103	148	3 J	5.9	2.2	2.3 U	0.6 J	1.8
Trichlorofluoromethane	UG/L	0	0%	5	0	0	148	5 UJ	0.75 UJ	0.15 U	0.76 U	0.25 U	0.25 U
Vinyl chloride	UG/L	180	66%	2	85	97	148	42	140	89	52	57	98
Other													
Iron	UG/L	296000	100%		11	12	12						
Iron+Manganese	UG/L	352900	100%		12	12	12						
Manganese	UG/L	56900	100%		12	12	12						
Ethane	UG/L	98	90%		0	65	72						
Ethene	UG/L	200	90%		0	65	72						
Methane	UG/L	23000	96%		0	69	72						
Sulfate	MG/L	1060	72%	250000	2	52	72						
Total Organic Carbon	MG/L	2050	100%		0	72	72						

Notes:

1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
   a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
   b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

U = compound was not detected

J = the reported value is and estimated concentration

UJ= the compound was not detected; the associated reporting limit is approximate.

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-7	MWT-7	MWT-7	MWT-7	MWT-7	MWT-7
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20077	ALBW20091	ALBW20106	ALBW20120	ALBW20135	ALBW20150
Sample Date								3/15/2007	6/5/2007	11/13/2007	6/25/2008	12/15/2008	6/2/2009
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								2	3	4	5	6	7
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	118	1 U	1 U	1 U	1 U	0.26 U	0.26 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	118	1 U	1 U	1 U	1 U	0.21 U	0.21 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	118	1 U	1 UJ	1 U	1 UJ	0.31 U	0.31 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	118	1 U	1 U	1 U	1 U	0.23 U	0.23 U
1,1-Dichloroethane	UG/L	1.1	7%	5	0	8	118	1 U	1 U	1 U	1 U	0.75 U	0.75 U
1,1-Dichloroethene	UG/L	2.1	7%	5	0	8	118	1 U	1 U	1 U	1 U	0.29 U	0.29 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	118	1 U	1 U	1 U	1 U	0.41 U	0.41 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	118	1 U	1 U	1 U	1 UJ	1 UJ	1 UJ
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	118	1 U	1 U	1 U	1 U	0.17 U	0.17 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	118	1 U	1 U	1 U	1 U	0.2 U	0.2 U
1,2-Dichloroethane	UG/L	5.6	11%	0.6	11	13	118	1 U	1 U	1 U	1 U	0.21 U	0.21 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	118	1 U	1 U	1 U	1 U	0.14 U	0.14 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	118	1 U	1 U	1 U	1 U	0.16 U	0.16 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	118	1 U	1 U	1 U	1 U	0.16 U	0.16 U
Acetone	UG/L	2600	29%		0	34	118	5 U	5 U	5 U	5 U	1.3 U	1.3 U
Benzene	UG/L	0	0%	1	0	0	118	1 U	1 U	1 U	1 U	0.16 U	0.16 U
Bromodichloromethane	UG/L	0	0%	80 [b]	0	0	118	1 U	1 U	1 U	1 U	0.38 U	0.39 U
Bromoform	UG/L	0	0%	80 [b]	0	0	118	1 U	1 U	1 U	1 U	0.26 U	0.26 UJ
Carbon disulfide	UG/L	0	0%		0	0	118	1 U	1 U	1 U	1 U	0.19 U	0.19 UJ
Carbon tetrachloride	UG/L	0	0%	5	0	0	118	1 U	1 U	1 U	1 U	0.27 U	0.27 U
Chlorobenzene	UG/L	0	0%	5	0	0	118	1 U	1 U	1 U	1 U	0.18 U	0.32 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	118	1 U	1 U	1 U	1 U	0.32 U	0.32 U
Chloroethane	UG/L	1.1	6%	5	0	7	118	1 U	1 U	0.65 J	1 UJ	0.93 J	0.61 J
Chloroform	UG/L	27	5%	7	4	6	118	1 U	1 U	1 U	1 U	0.34 U	0.34 U
Cis-1,2-Dichloroethene	UG/L	720	81%	5	80	96	118	42	61	90	90	79	68
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	118	1 U	1 U	1 U	1 U	0.36 U	0.36 U
Cyclohexane	UG/L	0	0%		0	0	118	1 U	1 U	1 U	1 U	0.22 U	0.53 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	118	1 U	1 U	1 U	1 U	0.28 U	0.29 U
Ethyl benzene	UG/L	1.3	3%	5	0	4	118	1 U	1 U	1 U	1 U	0.18 U	0.18 U
Isopropylbenzene	UG/L	0	0%	5	0	0	118	1 U	1 U	1 U	1 U	0.19 U	0.19 U
Methyl Acetate	UG/L	6	2%		0	2	118	1 UJ	1 U	1 UJ	1 UJ	0.17 U	0.17 UJ
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	118	1 U	1 U	1 U	1 U	0.16 U	0.16 U
Methyl bromide	UG/L	0	0%	5	0	0	117	1 U	1 U	1 U	1 UJ	0.28 U	0.28 U
Methyl butyl ketone	UG/L	0	0%		0	0	118	5 U	5 U	5 UJ	5 UJ	1.2 U	1.2 U
Methyl chloride	UG/L	0	0%	5	0	0	118	1 U	1 U	1 U	1 UJ	0.34 U	0.35 U
Methyl cyclohexane	UG/L	0	0%		0	0	118	1 U	1 U	1 U	1 U	0.22 U	0.5 U
Methyl ethyl ketone	UG/L	4900	18%		0	21	118	5 U	5 U	5 U	5 UJ	1.3 U	1.3 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	118	5 U	5 U	5 U	5 UJ	0.91 U	0.91 U
Methylene chloride	UG/L	18	10%	5	7	12	118	1 U	1 U	1 U	1 U	0.44 UJ	0.44 U
Styrene	UG/L	0	0%	5	0	0	118	1 U	1 U	1 U	1 U	0.18 U	0.18 U
Tetrachloroethene	UG/L	0	0%	5	0	0	118	1 U	1 U	1 U	1 U	0.36 U	0.36 U
Toluene	UG/L	590	19%	5	16	23	118	1 U	1 U	1 U	1 U	0.51 U	0.51 U
Total Xylenes	UG/L	0	0%	5	0	0	118	3 U	3 U	3 U	3 U	0.93 U	0.66 U
Trans-1,2-Dichloroethene	UG/L	8	42%	5	3	50	118	1 U	1 U	1 U	1 U	0.13 U	0.13 U
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	118	1 U	1 U	1 U	1 U	0.37 U	0.37 U
Trichloroethene	UG/L	2700	68%	5	48	80	118	440	310	510	440	410	330
Trichlorofluoromethane	UG/L	0	0%	5	0	0	118	1 U	1 UJ	1 U	1 UJ	0.15 U	0.15 U
Vinyl chloride	UG/L	180	66%	2	67	78	118	9.7	18	24	12	13	9.3

Table B-1
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-7	MWT-7	MWT-7	MWT-7	MWT-7	MWT-7
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20077	ALBW20091	ALBW20106	ALBW20120	ALBW20135	ALBW20150
Sample Date								3/15/2007	6/5/2007	11/13/2007	6/25/2008	12/15/2008	6/2/2009
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								2	3	4	5	6	7
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Other													
Iron	UG/L	296000	100%		11	12	12						
Iron+Manganese	UG/L	352900	100%		12	12	12						
Manganese	UG/L	56900	100%		12	12	12						
Ethane	UG/L	98	88%		0	49	56				6.7	11	7.8
Ethene	UG/L	200	88%		0	49	56				2	0.27	0.76
Methane	UG/L	23000	95%		0	53	56				400	670	1100
Sulfate	MG/L	1060	70%		0	39	56				29.1	29.1	27
Total Organic Carbon	MG/L	2050	100%		0	56	56				2.3	3	3.1

Notes:
1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
 a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
 b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

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

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Seneca Army Depot Activity

Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-7	MWT-7	MWT-7	PT-24	PT-24	PT-24
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20165	ALBW20180	ALBW20195	ALBW20061	ALBW20076	ALBW20090
Sample Date								12/15/2009	7/1/2010	12/18/2010	1/2/2007	3/15/2007	6/5/2007
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								8	9	10	1	2	3
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	118	0.26 U	0.5 U	0.5 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	118	0.21 U	0.18 U	0.18 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	118	0.31 U	0.5 U	0.5 U	1 U	1 U	1 UJ
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	118	0.23 U	0.13 U	0.13 U	1 U	1 U	1 U
1,1-Dichloroethane	UG/L	1.1	7%	5	0	8	118	0.38 U	0.25 U	0.25 U	0.68 J	1 U	0.75 J
1,1-Dichloroethene	UG/L	2.1	7%	5	0	8	118	0.48 J	0.78 J	0.98 J	1 U	1 U	1 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	118	0.41 U	0.25 U	0.25 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	118	0.39 U	0.44 U	0.44 U	1 U	1 U	1 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	118	0.17 U	0.25 U	0.25 U	1 U	1 U	1 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	118	0.2 U	0.21 U	0.21 U	1 U	1 U	1 U
1,2-Dichloroethane	UG/L	5.6	11%	0.6	11	13	118	0.21 U	0.1 U	0.1 U	1 U	1 U	1 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	118	0.32 U	0.13 U	0.13 U	1 U	1 U	1 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	118	0.36 U	0.25 U	0.25 U	1 U	1 U	1 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	118	0.39 U	0.28 U	0.28 U	1 U	1 U	1 U
Acetone	UG/L	2600	29%		0	34	118	1.3 U	5 U	5 UJ	5 U	5 U	5 U
Benzene	UG/L	0	0%	1	0	0	118	0.41 U	0.25 U	0.25 U	1 U	1 U	1 U
Bromodichloromethane	UG/L	0	0%	80 [b]	0	0	118	0.39 U	0.25 U	0.25 U	1 U	1 U	1 U
Bromoform	UG/L	0	0%	80 [b]	0	0	118	0.26 UJ	0.5 U	0.5 U	1 U	1 U	1 U
Carbon disulfide	UG/L	0	0%		0	0	118	0.19 UJ	0.6 U	0.6 U	1 U	1 U	1 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	118	0.27 U	0.5 U	0.5 U	1 U	1 U	1 U
Chlorobenzene	UG/L	0	0%	5	0	0	118	0.32 U	0.25 U	0.25 U	1 U	1 U	1 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	118	0.32 U	0.1 U	0.1 U	1 U	1 U	1 U
Chloroethane	UG/L	1.1	6%	5	0	7	118	0.32 UJ	1 U	1 U	1 U	1 U	1 U
Chloroform	UG/L	27	5%	7	4	6	118	0.34 U	0.14 U	0.14 U	1 U	1 U	1 U
Cis-1,2-Dichloroethene	UG/L	720	81%	5	80	96	118	140	170	120	54	38	60
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	118	0.36 U	0.11 U	0.11 U	1 U	1 U	1 U
Cyclohexane	UG/L	0	0%		0	0	118	0.53 U	0.25 U	0.25 U	1 U	1 U	1 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	118	0.29 U	0.25 UJ	0.25 U	1 U	1 U	1 U
Ethyl benzene	UG/L	1.3	3%	5	0	4	118	0.18 U	0.11 U	0.11 U	1 U	1 U	1 U
Isopropylbenzene	UG/L	0	0%	5	0	0	118	0.19 U	0.1 U	0.1 U	1 U	1 U	1 U
Methyl Acetate	UG/L	6	2%		0	2	118	0.5 U	0.19 U	0.19 U	1 U	1 UJ	1 U
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	118	0.16 U	0.2 U	0.8 UJ	1 U	1 U	1 U
Methyl bromide	UG/L	0	0%	5	0	0	117	0.28 U	0.8 U	1 U	1 U	1 U	1 U
Methyl butyl ketone	UG/L	0	0%		0	0	118	1.2 U	1 U	0.33 U	5 U	5 U	5 U
Methyl chloride	UG/L	0	0%	5	0	0	118	0.35 UJ	0.33 U	0.1 U	1 U	1 U	1 U
Methyl cyclohexane	UG/L	0	0%		0	0	118	0.5 U	0.1 U	1 U	1 U	1 U	1 U
Methyl ethyl ketone	UG/L	4900	18%		0	21	118	1.3 U	1 U	1 U	5 U	5 U	5 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	118	0.91 U	1 U	0.2 U	5 U	5 U	5 U
Methylene chloride	UG/L	18	10%	5	7	12	118	0.44 U	1 U	1 U	1 U	1 U	1 U
Styrene	UG/L	0	0%	5	0	0	118	0.18 U	0.11 U	0.11 U	1 U	1 U	1 U
Tetrachloroethene	UG/L	0	0%	5	0	0	118	0.36 U	0.15 U	0.15 U	1 U	1 U	1 U
Toluene	UG/L	590	19%	5	16	23	118	0.51 U	0.33 U	0.33 U	1 U	1 U	1 U
Total Xylenes	UG/L	0	0%	5	0	0	118	0.66 U	0.2 U	0.2 U	3 U	3 U	3 U
Trans-1,2-Dichloroethene	UG/L	8	42%	5	3	50	118	0.55 J	0.91 J	0.75 J	0.86 J	0.81 J	1.6
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	118	0.37 U	0.21 U	0.21 U	1 U	1 U	1 U
Trichloroethene	UG/L	2700	68%	5	48	80	118	350	330	310	4	2.8	3.1
Trichlorofluoromethane	UG/L	0	0%	5	0	0	118	0.15 U	0.25 U	0.25 U	1 U	1 U	1 UJ
Vinyl chloride	UG/L	180	66%	2	67	78	118	21	15	15	0.6 J	1 U	2.6

Appendix B

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MWT-7	MWT-7	MWT-7	PT-24	PT-24	PT-24
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20165	ALBW20180	ALBW20195	ALBW20061	ALBW20076	ALBW20090
Sample Date								12/15/2009	7/1/2010	12/18/2010	1/2/2007	3/15/2007	6/5/2007
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								8	9	10	1	2	3
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Other													
Iron	UG/L	296000	100%		11	12	12						
Iron+Manganese	UG/L	352900	100%		12	12	12						
Manganese	UG/L	56900	100%		12	12	12						
Ethane	UG/L	98	88%		0	49	56	17	9	4.5			
Ethene	UG/L	200	88%		0	49	56	0.52	0.55	0.2			
Methane	UG/L	23000	95%		0	53	56	2900	1700	400			
Sulfate	MG/L	1060	70%		0	39	56	29.3 J	29	31			
Total Organic Carbon	MG/L	2050	100%		0	56	56	4.5 J	1.5	1.3			

Notes:
1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
 a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
 b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

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

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								PT-24	PT-24	PT-24	PT-24	PT-24	PT-24
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20105	ALBW20119	ALBW20134	ALBW20149	ALBW20164	ALBW20179
Sample Date								11/13/2007	6/26/2008	12/12/2008	6/2/2009	12/15/2009	6/30/2010
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								4	5	6	7	8	9
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	118	1 U	1 U	0.26 U	0.26 U	0.26 U	0.5 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	118	1 U	1 U	0.21 U	0.21 U	0.21 U	0.18 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	118	1 U	1 UJ	0.31 U	0.31 U	0.31 U	0.5 UJ
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	118	1 U	1 U	0.23 U	0.23 U	0.23 U	0.13 U
1,1-Dichloroethane	UG/L	1.1	7%	5	0	8	118	0.56 J	0.69 J	0.75 U	0.75 U	0.38 U	0.54 J
1,1-Dichloroethene	UG/L	2.1	7%	5	0	8	118	1 U	1 U	0.29 U	0.29 U	0.29 U	0.11 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	118	1 U	1 U	0.41 U	0.41 U	0.41 U	0.25 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	118	1 U	1 UJ	1 UJ	1 UJ	0.39 U	0.44 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	118	1 U	1 U	0.17 U	0.17 U	0.17 U	0.25 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	118	1 U	1 U	0.2 U	0.2 U	0.2 U	0.21 U
1,2-Dichloroethane	UG/L	5.6	11%	0.6	11	13	118	1 U	1 U	0.21 U	0.21 U	0.21 U	0.1 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	118	1 U	1 U	0.14 U	0.14 U	0.32 U	0.13 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	118	1 U	1 U	0.16 U	0.16 U	0.36 U	0.25 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	118	1 U	1 U	0.16 U	0.16 U	0.39 U	0.28 U
Acetone	UG/L	2600	29%		0	34	118	5 U	5 U	1.3 U	1.3 U	1.3 U	5 U
Benzene	UG/L	0	0%	1	0	0	118	1 U	1 U	0.16 U	0.16 U	0.41 U	0.25 U
Bromodichloromethane	UG/L	0	0%	80 [b]	0	0	118	1 U	1 U	0.38 U	0.39 U	0.39 U	0.25 U
Bromoform	UG/L	0	0%	80 [b]	0	0	118	1 U	1 U	0.26 U	0.26 UJ	0.26 UJ	0.5 U
Carbon disulfide	UG/L	0	0%		0	0	118	1 U	1 U	0.19 U	0.19 UJ	0.19 UJ	0.6 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	118	1 U	1 U	0.27 U	0.27 U	0.27 U	0.5 U
Chlorobenzene	UG/L	0	0%	5	0	0	118	1 U	1 U	0.18 U	0.32 U	0.32 U	0.25 U
Chlorodibromomethane	UG/L	0	0%	80 [b]	0	0	118	1 U	1 U	0.32 U	0.32 U	0.32 U	0.1 U
Chloroethane	UG/L	1.1	6%	5	0	7	118	1 U	1 UJ	0.32 U	0.32 U	0.32 UJ	1 U
Chloroform	UG/L	27	5%	7	4	6	118	1 U	1 U	0.34 U	0.34 U	0.34 U	0.14 U
Cis-1,2-Dichloroethene	UG/L	720	81%	5	80	96	118	39	48	34	33	28	33
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	118	1 U	1 U	0.36 U	0.36 U	0.36 U	0.11 U
Cyclohexane	UG/L	0	0%		0	0	118	1 U	1 U	0.22 U	0.53 U	0.53 U	0.25 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	118	1 U	1 U	0.28 U	0.29 U	0.29 U	0.25 U
Ethyl benzene	UG/L	1.3	3%	5	0	4	118	1 U	1 U	0.18 U	0.18 U	0.18 U	0.11 U
Isopropylbenzene	UG/L	0	0%	5	0	0	118	1 U	1 U	0.19 U	0.19 U	0.19 U	0.1 U
Methyl Acetate	UG/L	6	2%		0	2	118	1 UJ	1 UJ	0.17 U	0.17 UJ	0.5 U	0.19 UJ
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	118	1 U	1 U	0.16 U	0.16 U	0.16 U	0.2 U
Methyl bromide	UG/L	0	0%	5	0	0	117	1 U	1 UJ	0.28 U	0.28 U	0.28 U	0.8 UJ
Methyl butyl ketone	UG/L	0	0%		0	0	118	5 UJ	5 UJ	1.2 U	1.2 U	1.2 U	1 UJ
Methyl chloride	UG/L	0	0%	5	0	0	118	1 U	1 UJ	0.34 U	0.35 U	0.35 UJ	0.33 U
Methyl cyclohexane	UG/L	0	0%		0	0	118	1 U	1 U	0.22 U	0.5 U	0.5 U	0.1 U
Methyl ethyl ketone	UG/L	4900	18%		0	21	118	5 U	5 UJ	1.3 U	1.3 U	1.3 U	1 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	118	5 U	5 UJ	0.91 U	0.91 U	0.91 U	1 U
Methylene chloride	UG/L	18	10%	5	7	12	118	1 U	1 U	0.44 UJ	0.44 U	0.44 U	1 U
Styrene	UG/L	0	0%	5	0	0	118	1 U	1 U	0.18 U	0.18 U	0.18 U	0.11 U
Tetrachloroethene	UG/L	0	0%	5	0	0	118	1 U	1 U	0.36 U	0.36 U	0.36 U	0.15 U
Toluene	UG/L	590	19%	5	16	23	118	1 U	1 U	0.51 U	0.51 U	0.51 U	0.33 U
Total Xylenes	UG/L	0	0%	5	0	0	118	3 U	3 U	0.93 U	0.66 U	0.66 U	0.2 U
Trans-1,2-Dichloroethene	UG/L	8	42%	5	3	50	118	1 U	1.1	0.36 J	0.83 J	0.61 J	1.1
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	118	1 U	1 U	0.37 U	0.37 U	0.37 U	0.21 U
Trichloroethene	UG/L	2700	68%	5	48	80	118	3.8	2.4	2.2	1.7	1.7	0.39 J
Trichlorofluoromethane	UG/L	0	0%	5	0	0	118	1 U	1 UJ	0.15 U	0.15 U	0.15 U	0.25 U
Vinyl chloride	UG/L	180	66%	2	67	78	118	1 U	1.9	0.26 J	2	1.6	3.8

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								PT-24	PT-24	PT-24	PT-24	PT-24	PT-24
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20105	ALBW20119	ALBW20134	ALBW20149	ALBW20164	ALBW20179
Sample Date								11/13/2007	6/26/2008	12/12/2008	6/2/2009	12/15/2009	6/30/2010
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								4	5	6	7	8	9
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Other													
Iron	UG/L	296000	100%		11	12	12						
Iron+Manganese	UG/L	352900	100%		12	12	12						
Manganese	UG/L	56900	100%		12	12	12						
Ethane	UG/L	98	88%		0	49	56						
Ethene	UG/L	200	88%		0	49	56						
Methane	UG/L	23000	95%		0	53	56						
Sulfate	MG/L	1060	70%		0	39	56						
Total Organic Carbon	MG/L	2050	100%		0	56	56						

Notes:
1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
 a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
 b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

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

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								PT-24	MW-56	MW-56	MW-56	MW-56	MW-56
Matrix								GW	GW	GW	GW	GW	GW
Sample ID								ALBW20194	ALBW20072	ALBW20101	ALBW20124	ALBW20139	ALBW20154
Sample Date								12/17/2010	1/4/2007	6/6/2007	6/26/2008	12/11/2008	6/4/2009
QC Code								SA	SA	SA	SA	SA	SA
Study ID								LTM	LTM	LTM	LTM	LTM	LTM
Sampling Round								10	1	3	5	6	7
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds													
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	118	0.5 U	1 U	1 U	1 U	0.26 UJ	0.26 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	118	0.18 U	1 U	1 U	1 U	0.21 U	0.21 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	118	0.5 U	1 U	1 UJ	1 UJ	0.31 U	0.31 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	118	0.13 U	1 U	1 U	1 U	0.23 U	0.23 U
1,1-Dichloroethane	UG/L	1.1	7%	5	0	8	118	0.54 J	1 U	1 U	1 U	0.75 U	0.75 U
1,1-Dichloroethene	UG/L	2.1	7%	5	0	8	118	0.11 U	1 U	1 U	1 U	0.29 U	0.29 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	118	0.25 U	1 U	1 U	1 U	0.41 U	0.41 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	118	0.44 U	1 U	1 U	1 UJ	1 UJ	1 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	118	0.25 U	1 U	1 U	1 U	0.17 U	0.17 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	118	0.21 U	1 U	1 U	1 U	0.2 U	0.2 U
1,2-Dichloroethane	UG/L	5.6	11%	0.6	11	13	118	0.1 U	1 U	1 U	1 U	0.21 U	0.21 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	118	0.13 U	1 U	1 U	1 U	0.14 U	0.14 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	118	0.25 U	1 U	1 U	1 U	0.16 U	0.16 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	118	0.28 U	1 U	1 U	1 U	0.16 U	0.16 U
Acetone	UG/L	2600	29%		0	34	118	5 UJ	5 U	5 U	5 U	1.3 U	1.3 UJ
Benzene	UG/L	0	0%	1	0	0	118	0.25 U	1 U	1 U	1 U	0.16 U	0.16 U
Bromodichloromethane	UG/L	0	0%	80 [5]	0	0	118	0.25 U	1 U	1 U	1 U	0.38 U	0.39 U
Bromoform	UG/L	0	0%	80 [5]	0	0	118	0.5 U	1 U	1 U	1 U	0.26 U	0.26 U
Carbon disulfide	UG/L	0	0%		0	0	118	0.6 U	1 U	1 U	1 U	0.19 U	0.19 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	118	0.5 U	1 U	1 U	1 U	0.27 UJ	0.27 U
Chlorobenzene	UG/L	0	0%	5	0	0	118	0.25 U	1 U	1 U	1 U	0.18 U	0.32 U
Chlorodibromomethane	UG/L	0	0%	80 [5]	0	0	118	0.1 U	1 U	1 U	1 U	0.32 U	0.32 U
Chloroethane	UG/L	1.1	6%	5	0	7	118	1 U	1 U	1 U	1 UJ	0.32 U	0.32 U
Chloroform	UG/L	27	5%	7	4	6	118	0.16 J	1 U	1 U	1 U	0.34 U	0.34 U
Cis-1,2-Dichloroethene	UG/L	720	81%	5	80	96	118	30	1.2	1.7	1.3	0.4 J	1
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	118	0.11 U	1 U	1 U	1 U	0.36 U	0.36 U
Cyclohexane	UG/L	0	0%		0	0	118	0.25 U	1 U	1 U	1 U	0.22 U	0.53 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	118	0.25 U	1 U	1 U	1 U	0.28 UJ	0.29 U
Ethyl benzene	UG/L	1.3	3%	5	0	4	118	0.11 U	1 U	1 U	1 U	0.18 U	0.18 U
Isopropylbenzene	UG/L	0	0%	5	0	0	118	0.1 U	1 U	1 U	1 U	0.19 U	0.19 U
Methyl Acetate	UG/L	6	2%		0	2	118	0.19 U	1 U	1 U	1 UJ	0.17 U	0.17 U
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	118	0.8 UJ	1 U	1 U	1 U	0.16 U	0.16 U
Methyl bromide	UG/L	0	0%	5	0	0	117	1 U	1 U	1 U	1 UJ	0.28 U	0.28 U
Methyl butyl ketone	UG/L	0	0%		0	0	118	0.33 U	5 U	5 U	5 UJ	1.2 U	1.2 U
Methyl chloride	UG/L	0	0%	5	0	0	118	0.1 U	1 U	1 U	1 UJ	0.34 U	0.35 U
Methyl cyclohexane	UG/L	0	0%		0	0	118	1 U	1 U	1 U	1 U	0.22 U	0.5 U
Methyl ethyl ketone	UG/L	4900	18%		0	21	118	1 U	5 U	5 U	5 UJ	1.3 U	1.3 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	118	0.2 U	5 U	5 U	5 UJ	0.91 U	0.91 U
Methylene chloride	UG/L	18	10%	5	7	12	118	1 U	1 U	1 U	1 U	0.44 UJ	0.44 U
Styrene	UG/L	0	0%	5	0	0	118	0.11 U	1 U	1 U	1 U	0.18 U	0.18 U
Tetrachloroethene	UG/L	0	0%	5	0	0	118	0.15 U	1 U	1 U	1 U	0.36 U	0.36 U
Toluene	UG/L	590	19%	5	16	23	118	0.33 U	1 U	1 U	1 U	0.51 U	0.51 U
Total Xylenes	UG/L	0	0%	5	0	0	118	0.2 U	3 U	3 U	3 U	0.93 U	0.66 U
Trans-1,2-Dichloroethene	UG/L	8	42%	5	3	50	118	1.4	1 U	1 U	1 U	0.13 U	0.13 U
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	118	0.21 U	1 U	1 U	1 U	0.37 U	0.37 U
Trichloroethene	UG/L	2700	68%	5	48	80	118	0.53 J	1 U	1 U	1 U	0.33 J	0.18 U
Trichlorofluoromethane	UG/L	0	0%	5	0	0	118	0.25 U	1 U	1 UJ	1 UJ	0.15 UJ	0.15 U
Vinyl chloride	UG/L	180	66%	2	67	78	118	7.7	1 U	1 U	1 U	0.24 U	0.24 U

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	ASH LANDFILL PT-24 GW ALBW20194 12/17/2010 SA LTM 10 Value (Q)	ASH LANDFILL MW-56 GW ALBW20072 1/4/2007 SA LTM 1 Value (Q)	ASH LANDFILL MW-56 GW ALBW20101 6/6/2007 SA LTM 3 Value (Q)	ASH LANDFILL MW-56 GW ALBW20124 6/26/2008 SA LTM 5 Value (Q)	ASH LANDFILL MW-56 GW ALBW20139 12/11/2008 SA LTM 6 Value (Q)	ASH LANDFILL MW-56 GW ALBW20154 6/4/2009 SA LTM 7 Value (Q)
Other													
Iron	UG/L	296000	100%		11	12	12						
Iron+Manganese	UG/L	352900	100%		12	12	12						
Manganese	UG/L	56900	100%		12	12	12						
Ethane	UG/L	98	88%		0	49	56						
Ethene	UG/L	200	88%		0	49	56						
Methane	UG/L	23000	95%		0	53	56						
Sulfate	MG/L	1060	70%		0	39	56						
Total Organic Carbon	MG/L	2050	100%		0	56	56						

Notes:
1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
   a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
   b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

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

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MW-56	MW-56	MW-56
Matrix								GW	GW	GW
Sample ID								ALBW20169	ALBW20184	ALBW20199
Sample Date								12/18/2009	7/1/2010	12/19/2010
QC Code								SA	SA	SA
Study ID								LTM	LTM	LTM
Sampling Round								8	9	10
Parameter	Units	Maximum Value	Frequency of Detection	Cleanup Goals [1]	Number of Exceedances	Number of Times Detected	Number of Samples Analyzed	Value (Q)	Value (Q)	Value (Q)
Volatile Organic Compounds										
1,1,1-Trichloroethane	UG/L	0.76	3%	5	0	4	118	0.26 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	UG/L	0	0%	5	0	0	118	0.21 U	0.18 U	0.18 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	UG/L	0	0%	5	0	0	118	0.31 UJ	0.5 U	0.5 U
1,1,2-Trichloroethane	UG/L	0	0%	1	0	0	118	0.23 U	0.13 U	0.13 U
1,1-Dichloroethane	UG/L	1.1	7%	5	0	8	118	0.38 U	0.25 U	0.25 U
1,1-Dichloroethene	UG/L	2.1	7%	5	0	8	118	0.29 U	0.11 U	0.11 U
1,2,4-Trichlorobenzene	UG/L	0	0%	5	0	0	118	0.41 U	0.25 U	0.25 U
1,2-Dibromo-3-chloropropane	UG/L	0	0%	0.04	0	0	118	0.39 U	0.44 U	0.44 U
1,2-Dibromoethane	UG/L	0	0%	0.0006	0	0	118	0.17 U	0.25 U	0.25 U
1,2-Dichlorobenzene	UG/L	0	0%	3	0	0	118	0.2 U	0.21 U	0.21 U
1,2-Dichloroethane	UG/L	5.6	11%	0.6	11	13	118	0.21 U	0.1 U	0.1 U
1,2-Dichloropropane	UG/L	0	0%	1	0	0	118	0.32 U	0.13 U	0.13 U
1,3-Dichlorobenzene	UG/L	0	0%	3	0	0	118	0.36 U	0.25 U	0.25 U
1,4-Dichlorobenzene	UG/L	0	0%	3	0	0	118	0.39 U	0.28 U	0.28 U
Acetone	UG/L	2600	29%		0	34	118	1.3 U	5 U	5 UJ
Benzene	UG/L	0	0%	1	0	0	118	0.41 U	0.25 U	0.25 U
Bromodichloromethane	UG/L	0	0%	80 [a]	0	0	118	0.39 U	0.25 U	0.25 U
Bromoform	UG/L	0	0%	80 [a]	0	0	118	0.26 U	0.5 U	0.5 U
Carbon disulfide	UG/L	0	0%		0	0	118	0.19 U	0.6 U	0.6 U
Carbon tetrachloride	UG/L	0	0%	5	0	0	118	0.27 U	0.5 U	0.5 U
Chlorobenzene	UG/L	0	0%	5	0	0	118	0.32 U	0.25 U	0.25 U
Chlorodibromomethane	UG/L	0	0%	80 [a]	0	0	118	0.32 U	0.1 U	0.1 U
Chloroethane	UG/L	1.1	6%	5	0	7	118	0.32 UJ	1 U	1 UJ
Chloroform	UG/L	27	5%	7	4	6	118	0.34 U	0.14 U	0.24 J
Cis-1,2-Dichloroethene	UG/L	720	81%	5	80	96	118	0.56 J	0.61 J	0.86 J
Cis-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	118	0.36 U	0.11 U	0.11 U
Cyclohexane	UG/L	0	0%		0	0	118	0.53 U	0.25 U	0.25 U
Dichlorodifluoromethane	UG/L	0	0%	5	0	0	118	0.29 U	0.25 UJ	0.25 U
Ethyl benzene	UG/L	1.3	3%	5	0	4	118	0.18 U	0.11 U	0.11 U
Isopropylbenzene	UG/L	0	0%	5	0	0	118	0.19 U	0.1 U	0.1 U
Methyl Acetate	UG/L	6	2%		0	2	118	0.5 U	0.19 U	0.19 U
Methyl Tertbutyl Ether	UG/L	0	0%		0	0	118	0.16 U	0.2 U	0.8 U
Methyl bromide	UG/L	0	0%	5	0	0	117	0.28 UJ	0.8 U	1 U
Methyl butyl ketone	UG/L	0	0%		0	0	118	1.2 U	1 U	0.33 U
Methyl chloride	UG/L	0	0%	5	0	0	118	0.35 U	0.33 U	0.1 U
Methyl cyclohexane	UG/L	0	0%		0	0	118	0.5 U	0.1 U	1 U
Methyl ethyl ketone	UG/L	4900	18%		0	21	118	1.3 U	1 U	1 U
Methyl isobutyl ketone	UG/L	0	0%		0	0	118	0.91 U	1 U	0.2 U
Methylene chloride	UG/L	18	10%	5	7	12	118	0.44 U	1 U	1 U
Styrene	UG/L	0	0%	5	0	0	118	0.18 U	0.11 U	0.11 U
Tetrachloroethene	UG/L	0	0%	5	0	0	118	0.36 U	0.15 U	0.15 U
Toluene	UG/L	590	19%	5	16	23	118	0.51 U	0.33 U	0.33 U
Total Xylenes	UG/L	0	0%	5	0	0	118	0.66 U	0.2 U	0.2 U
Trans-1,2-Dichloroethene	UG/L	8	42%	5	3	50	118	0.42 U	0.2 U	0.2 U
Trans-1,3-Dichloropropene	UG/L	0	0%	0.4	0	0	118	0.37 U	0.21 U	0.21 U
Trichloroethene	UG/L	2700	68%	5	48	80	118	0.46 U	0.13 U	0.13 U
Trichlorofluoromethane	UG/L	0	0%	5	0	0	118	0.15 UJ	0.25 U	0.25 U
Vinyl chloride	UG/L	180	66%	2	67	78	118	0.24 U	0.18 U	0.18 U

Table B-1
Complete Groundwater Data for Ash Landfill Long Term Monitoring
Ash Landfill Annual Report, Year 4
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Facility								ASH LANDFILL	ASH LANDFILL	ASH LANDFILL
Location ID								MW-56	MW-56	MW-56
Matrix								GW	GW	GW
Sample ID								ALBW20169	ALBW20184	ALBW20199
Sample Date								12/18/2009	7/1/2010	12/19/2010
QC Code								SA	SA	SA
Study ID								LTM	LTM	LTM
Sampling Round								8	9	10
Parameter	**Units**	**Maximum Value**	**Frequency of Detection**	**Cleanup Goals [1]**	**Number of Exceedances**	**Number of Times Detected**	**Number of Samples Analyzed**	Value (Q)	Value (Q)	Value (Q)
Other										
Iron	UG/L	296000	100%		11	12	12			
Iron+Manganese	UG/L	352900	100%		12	12	12			
Manganese	UG/L	56900	100%		12	12	12			
Ethane	UG/L	98	88%		0	49	56			
Ethene	UG/L	200	88%		0	49	56			
Methane	UG/L	23000	95%		0	53	56			
Sulfate	MG/L	1060	70%		0	39	56			
Total Organic Carbon	MG/L	2050	100%		0	56	56			

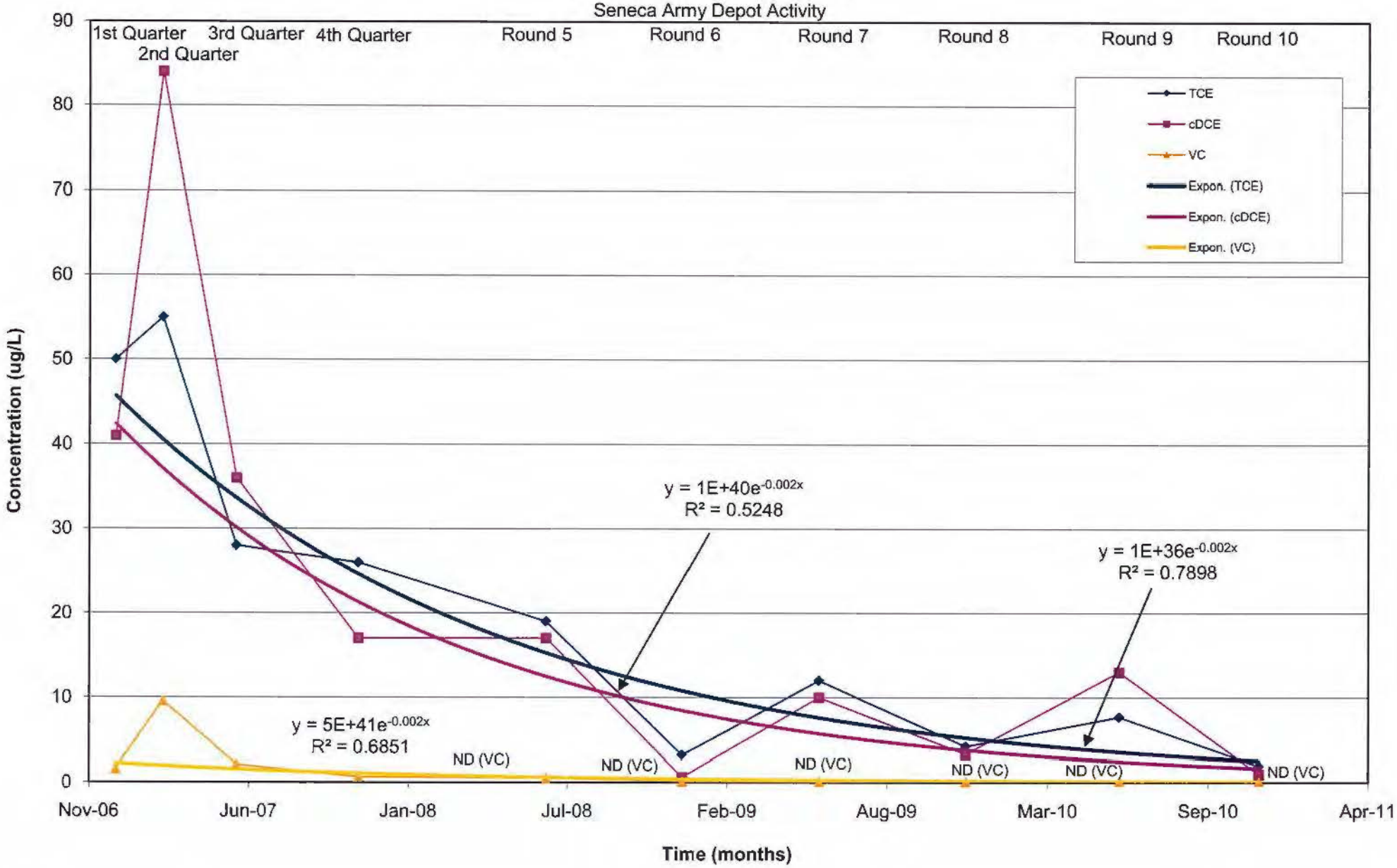
Notes:
1. The cleanup goal values are NYSDEC Class GA GW Standards unless noted otherwise.
 a. NYSDEC Class GA GW Standards (TOGS 1.1.1, June 1998).
 b. Federal Maximum Contaminant Level (http://www.epa.gov/safewater/contaminants/index.html)
2. Shading indicates a concentration above the GA GW standard.

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

APPENDIX C

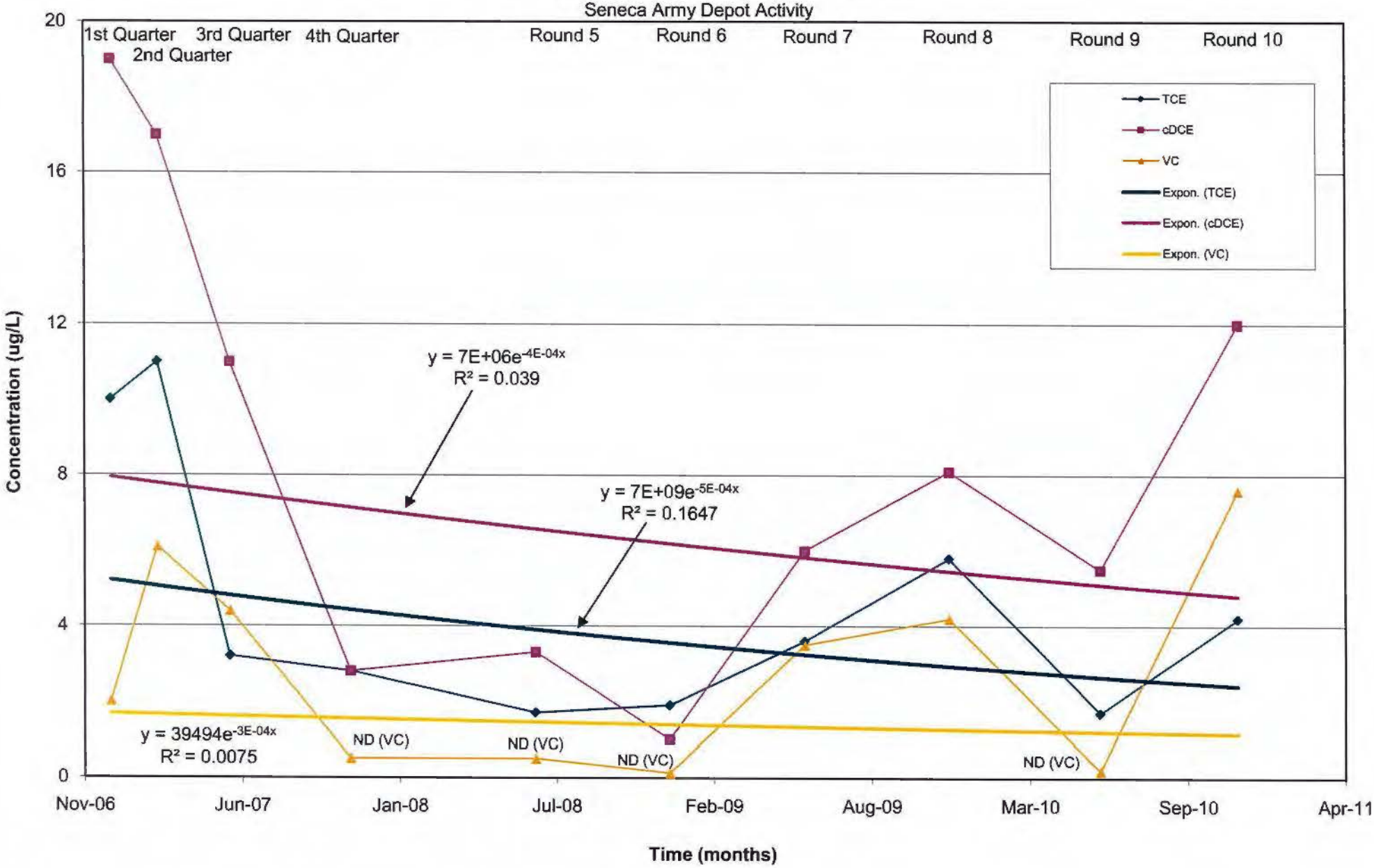
REGRESSION PLOTS

Fig -1
Regression Plot of Well Concentrations At MWT-25
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



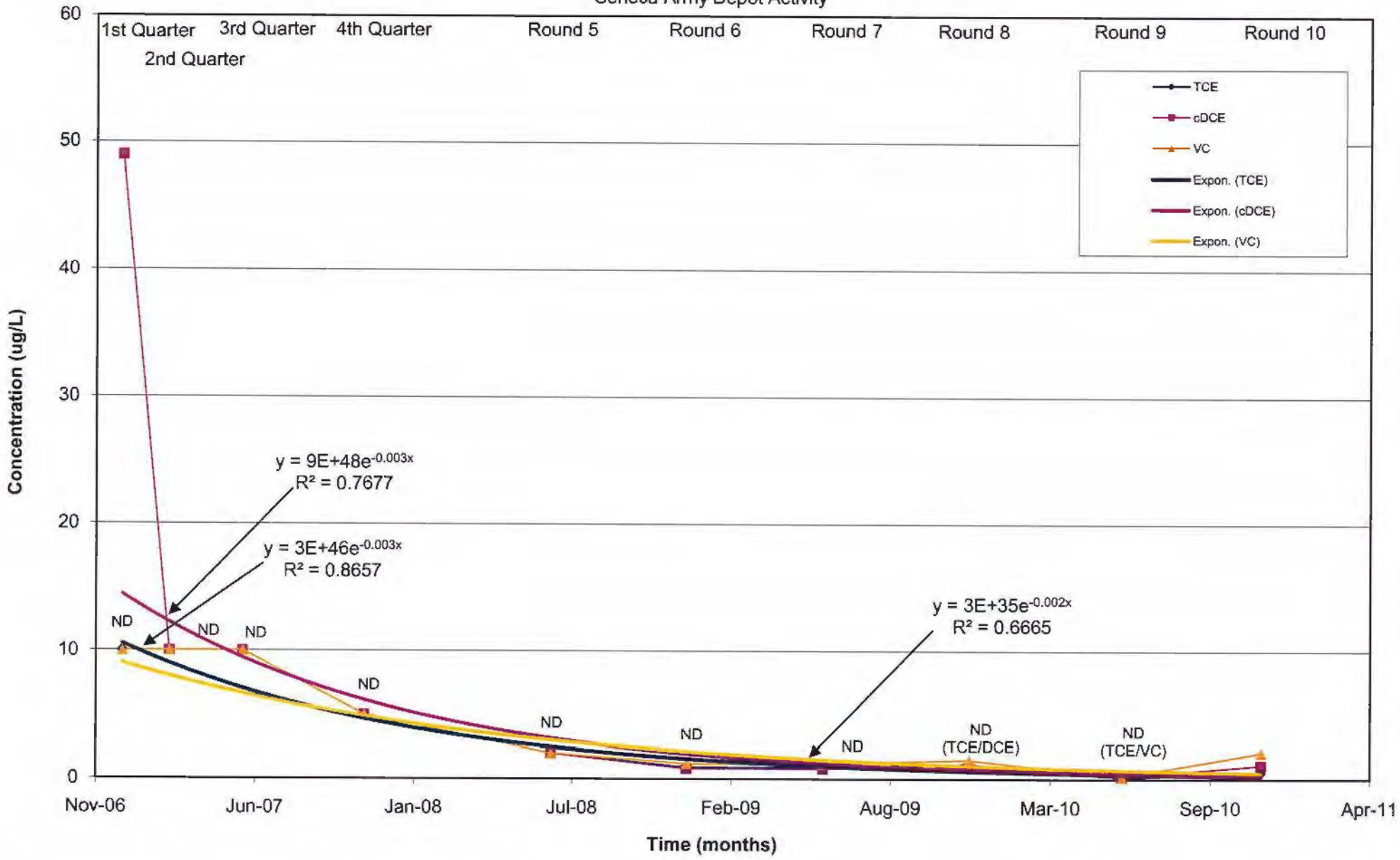
ND = not detected.

Figure C-2
Regression Plot of Well Concentrations At MWT-26
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



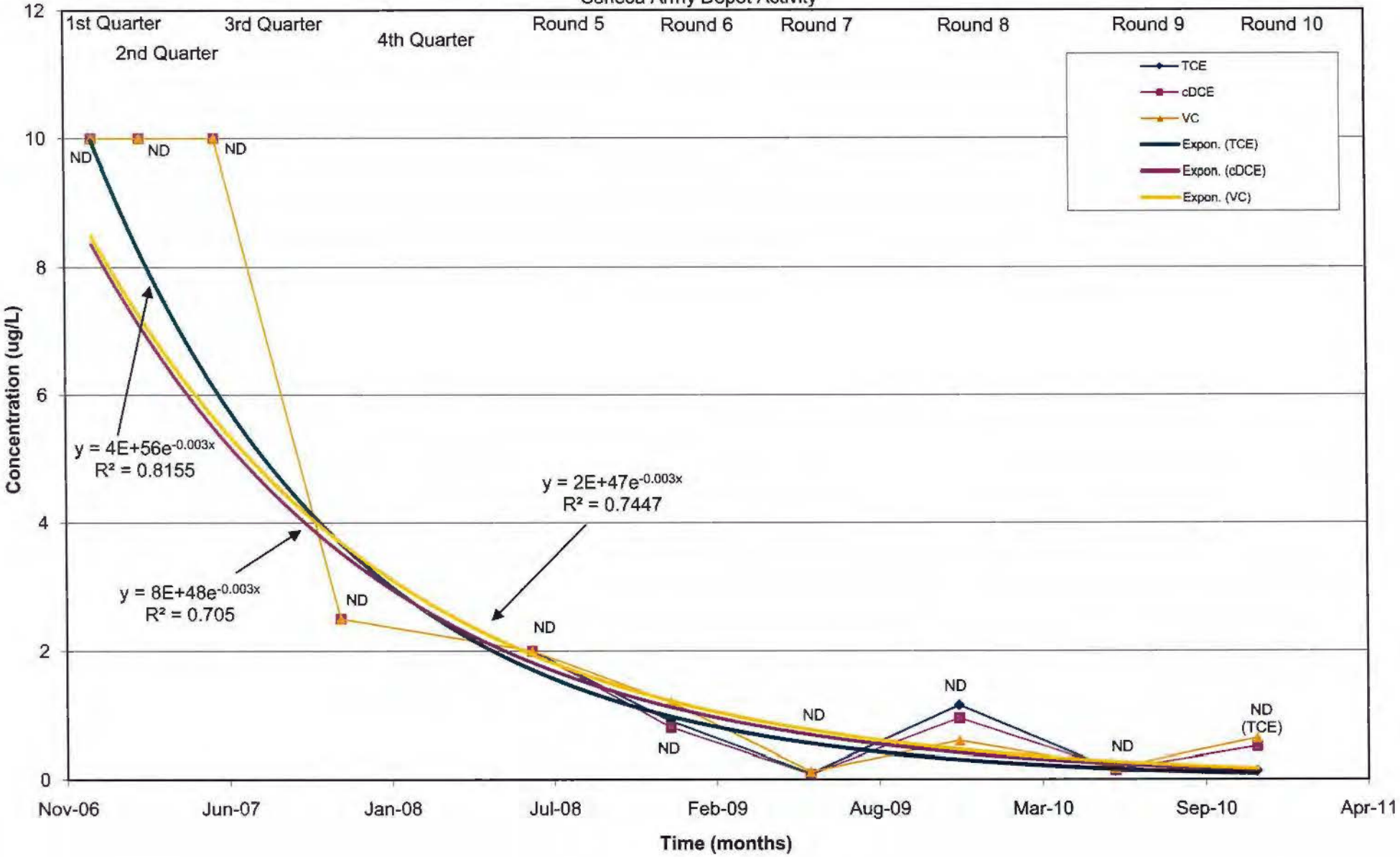
ND = not detected.

Fig [illegible]-3
Regression Plot of Well Concentrations At MWT-27
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



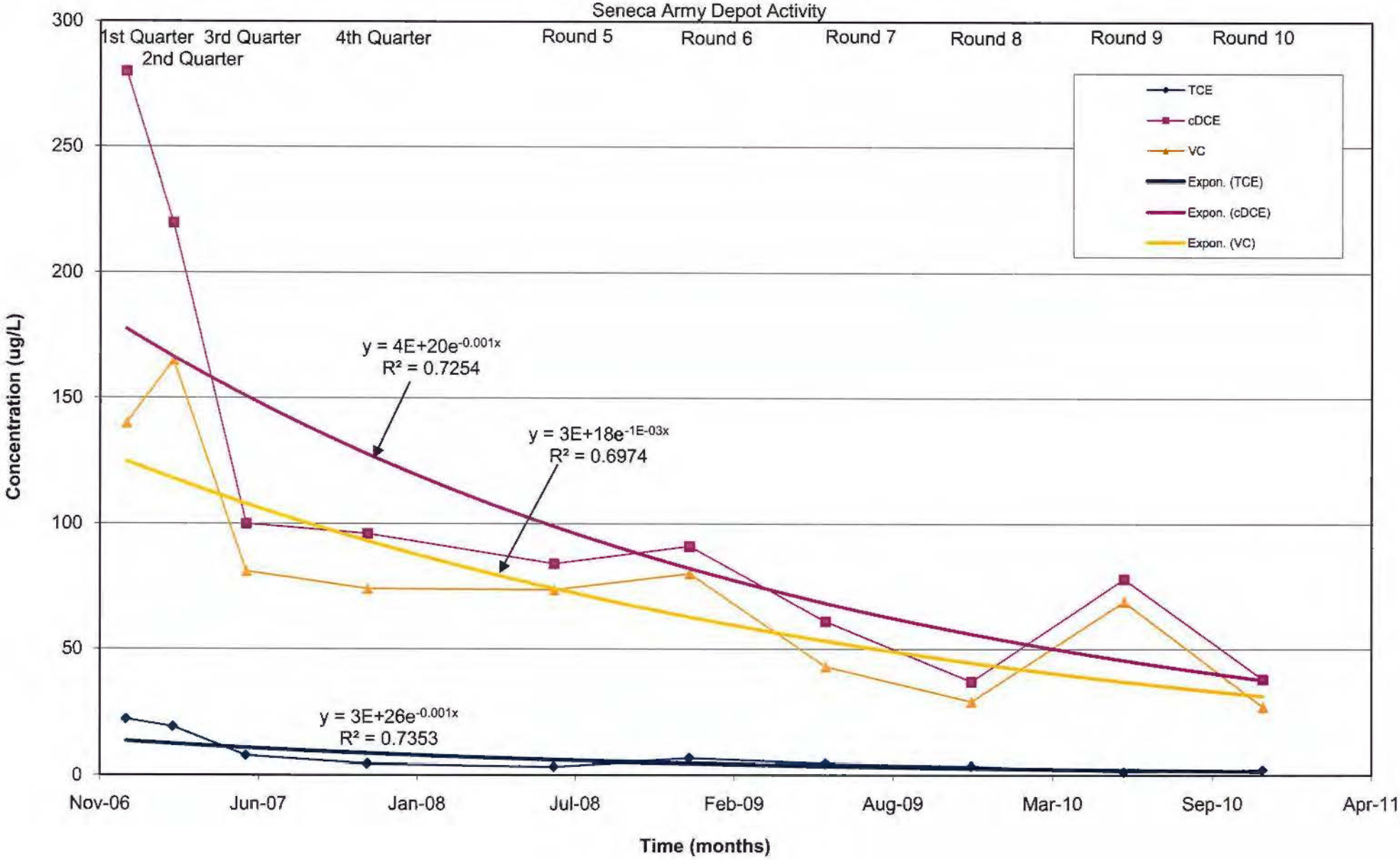
ND = not detected.

Figure C-4
Regression Plot of Well Concentrations At MWT-28
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



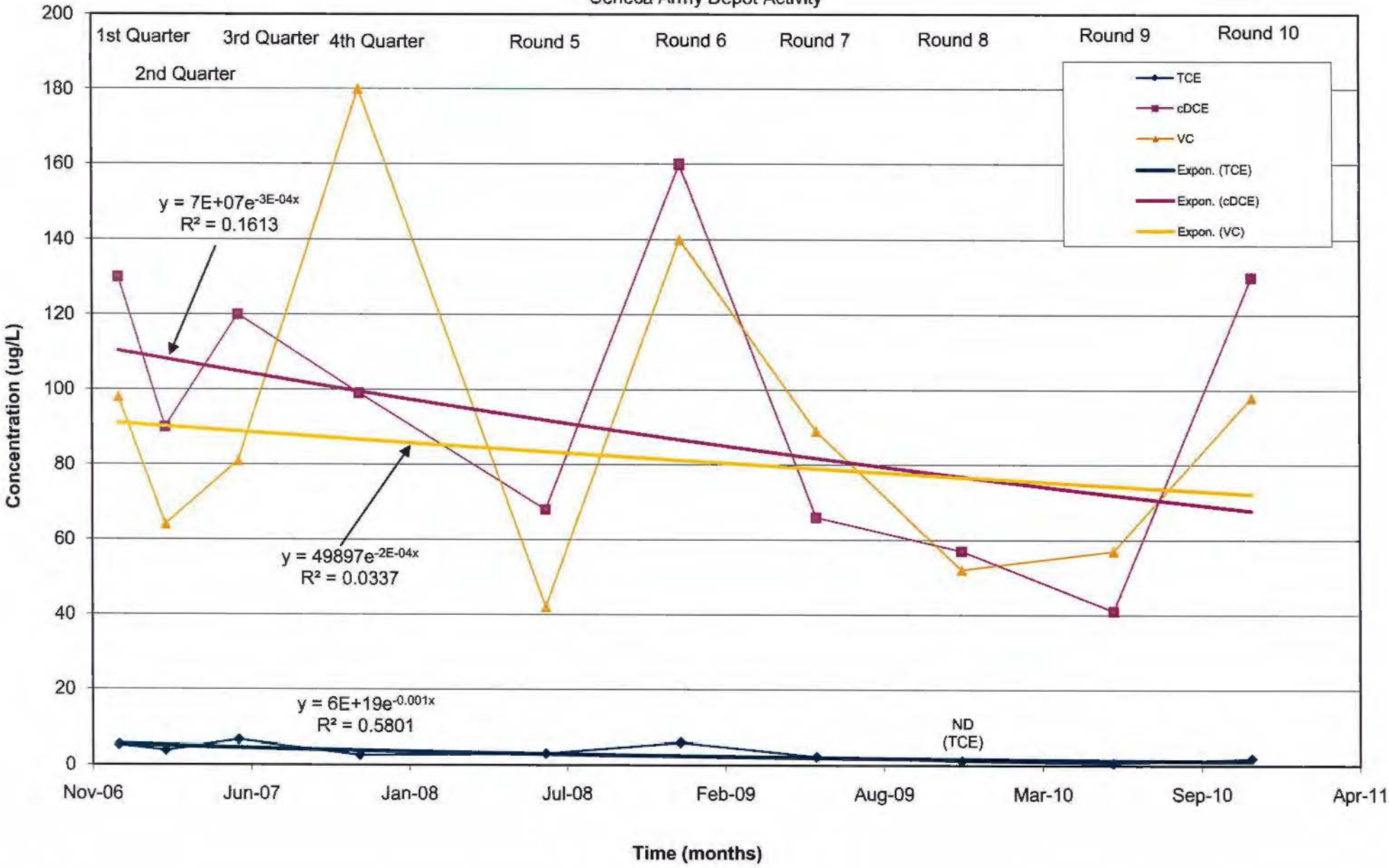
ND = not detected.

Fig -5
Regression Plot of Well Concentrations At MWT-29
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



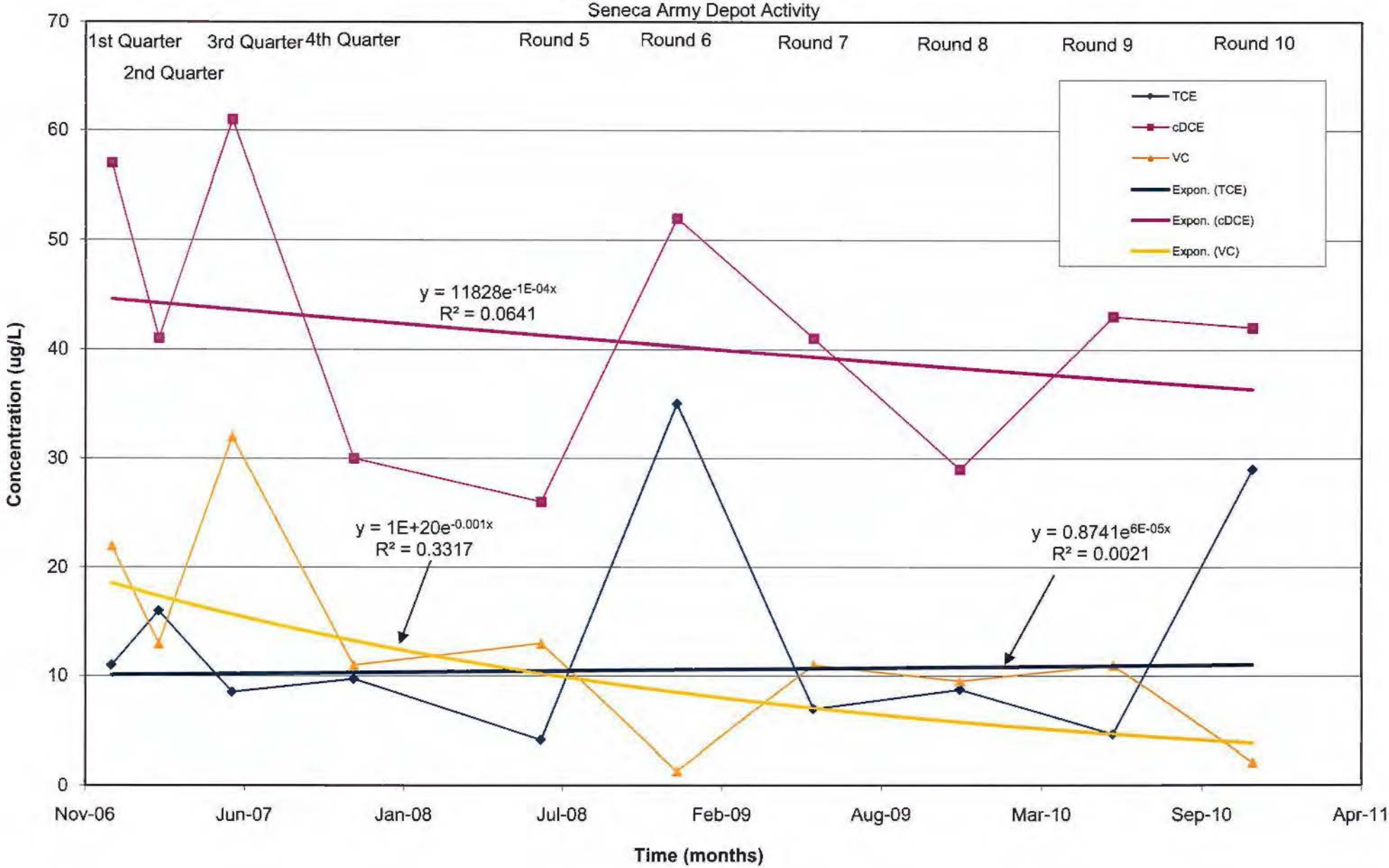
ND = not detected.

Figure C-6
Regression Plot of Well Concentrations At MWT-22
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



ND = not detected.

Figure C-7
Regression Plot of Well Concentrations At PT-22
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity



ND = not detected.

Figure C-10
Regression Plot of Well Comcentrations At PT-24
Ash Landfill Annual Report, Year 4
Seneca Army Depot Activity