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ENVIRONMENT

Mr. George Jacob
United States Environmental Protection Agency – Region 2
290 Broadway, 20th Floor
New York, New York 10007-1866

Subject:
Operational Year 7 Annual Monitoring Report,
Colesville Landfill, Broome County, New York. (Site No. 704010).

Date:
April 6, 2010

Dear Mr. Jacob:

On behalf of Broome County, ARCADIS is providing the Operational Year 7 Annual Monitoring Report for the Colesville Landfill, Broome County, New York.

Please feel free to contact me if you have any questions or comments.

Sincerely,

ARCADIS of New York, Inc.

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Broome County Division of Solid Waste Management

Operational Year 7 Annual Monitoring Report

Colesville Landfill, Broome County, New York
NYSDEC Site No. 704010

April 6, 2010

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Operational Year 7
Annual Monitoring Report
Colesville Landfill, Broome County, New York
NYSDEC Site 704010

Prepared for:
Broome County Division of Solid Waste Management

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Our Ref.:
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Date:
April 6, 2010

Table of Contents

Figures

Appendices

1. Introduction

This Operational Year 7 Annual Monitoring Report (Report) was prepared on behalf of the Broome County Division of Solid Waste Management for the Colesville Landfill, located in Broome County, New York (Site) to evaluate and document long-term monitoring (LTM) activities at the site. Remediation and monitoring activities are being conducted pursuant to the Record of Decision and Explanation of Significant Difference that were issued in March 1991 and September 2000, respectively. LTM activities (which include environmental effectiveness and remediation system performance monitoring) were performed in accordance with the LTM Plan (ARCADIS G&M, Inc. 2002), LTM Plan Addendum for Spring Water Remediation Systems (ARCADIS 2003), Interim Remedial Action Report (ARCADIS 2004), and the Proposed Modifications to the Long Term Monitoring Program (ARCADIS 2005) which were approved by the United States Environmental Protection Agency (USEPA) and New York State Department of Environmental Conservation (NYSDEC). These documents provide a detailed description of the LTM program, methodology, and rationale. Where applicable these elements are either summarized or incorporated by reference herein.

This report provides the data collected from the September 2009 water-level measurement round and the groundwater quality monitoring event conducted during Operational Year 7, Quarter Number 4 (i.e., annual monitoring event). A description of the operation, maintenance, and monitoring (OM&M) associated with the Groundwater Remediation System during Operational Year 7, Quarter Number 4 has also been provided. Included in the analysis of the results is a summary and discussion of all data collected during Operational Year 7 (October 2009 through September 2009). Following the detailed data analysis and discussion is a summary of findings, conclusions, and recommendations.

2. Methodology

The following section provides a summary of the environmental effectiveness and remedial system performance monitoring methodology for Operational Year 7, Quarter Number 4. A site plan, which shows the environmental effectiveness monitoring locations, is provided on Figure 1.

2.1 Environmental Effectiveness Monitoring

The environmental effectiveness monitoring performed during Operational Year 7, Quarter Number 4, included the following:

- Water-level (hydraulic) measurements were collected from 22 monitoring wells on September 22, 2009.

- Groundwater samples were collected from 19 monitoring wells (Year 7, Q4 list of wells plus injection test Monitoring Well TW-1) during the week of September 21, 2009 and were selectively analyzed for volatile organic compounds (VOCs), dissolved gases, and total organic carbon (TOC). Field parameters were also recorded at these monitoring locations.

- Samples (VOCs only) were collected at the SP-4 surface water location on September 24, 2009.

In accordance with the Proposed Modifications to the LTM Program (ARCADIS 2005), groundwater samples were collected from monitoring wells utilizing passive diffusive bag (PDB) samplers.

The depth to groundwater in monitoring wells was measured using methods consistent with those described in the LTM Program.

2.2 Groundwater Remediation System Performance Monitoring

Groundwater Remediation System performance monitoring activities during Operational Year 7, Quarter Number 4 were as follows:

- Pump-and-treat (PT) system recovery well influent and effluent samples were collected on October 7, 2009. The samples were analyzed for VOCs and total iron.

- One vapor sample from the PT system air stripper effluent was collected on October 7, 2009. The sample was analyzed for VOCs.

- PT system operating parameters were recorded during the quarterly OM&M site visit.

- TOC samples were collected from select injection wells during the week of September 21, 2009.

- Automated reagent injection (ARI) system operating parameters were recorded during each injection event.

- A TOC sample was collected from alternate electron donor monitoring well TW-1 on September 23, 2009.

PT system groundwater samples were collected as grab samples directly from the individual recovery pipelines connected to recovery wells GMPW-3, GMPW-4, GMPW-5, the combined influent water to the low profile air stripper, and the combined effluent after the cartridge filters. The effluent air sample was collected as a grab sample directly from the designated point located on the low profile air stripper stack.

2.3 Spring Water Remediation System Performance Monitoring

SP-5 Spring Water Remediation System OM&M was conducted on September 24, 2009. System OM&M was conducted in accordance with the LTM Plan Addendum for Spring Water Remediation Systems (ARCADIS 2003) and consisted of the collection of influent and effluent spring water samples for analysis of VOCs. Discharge flow rate and depth to water in the treatment unit were also recorded. The influent sample was collected after removing three well volumes from the influent monitoring well, which is located within the SP-5 treatment unit and screened below the liquid phase granular activated carbon (LPGAC) zone. The treatment system effluent sample was collected as a grab sample from the discharge pipe prior to entering the outfall stone apron. All spring water samples were analyzed for VOCs using USEPA Method 8260.

3. Groundwater Flow

Water-level measurements were made from existing wells on September 22, 2009. Water-level elevation data for Operational Year 7, Quarter Number 4 is provided in Table 1. A summary of water-level elevation data for Operational Year 7 is included in this table. Water-level elevations and the groundwater flow direction for the September 2009 monitoring event are shown on Figure 1. As shown on Figure 1, the groundwater flow direction in the project area (i.e., adjacent to the landfill western perimeter) and site-wide in the Operational Year 7, Quarter Number 4 round was consistent with previous rounds. The groundwater flow direction in the project area is toward the southwest from the western perimeter of the landfill. The groundwater flow direction in areas further to the east of the project area is toward the south/southwest.

Water-level elevation data for Operational Year 7 was similar to prior rounds of data. Seasonal fluctuations are observed during each operating quarter; however, the data indicate groundwater flow directions consistent with the conceptual site model (CSM)

of groundwater flow toward the discharge boundaries of the North Stream and Susquehanna River.

4. Groundwater Quality

The following sections describe the analytical results for groundwater samples collected during the September 2009 monitoring round (Operational Year 7, Quarter Number 4). A discussion of analytical results for all data collected during Operational Year 7 is also provided. Groundwater analytical data for Operational Year 7, Quarter Number 4 is provided in Tables 2 and 3. A summary of all analytical data collected during Operational Year 7 is also provided in the referenced tables. Finally, Figures D-1 through D-10 provided in Appendix D present the concentration of tetrachloroethylene (PCE)-related degradation compounds versus time or trichloroethane (TCA)-related degradation compounds versus time for monitoring wells GMMW-2, GMMW-5, GMMW-6, W-5, and TW-1. The concentration of VOCs has been converted into micromoles per liter (umol/L) by dividing the mass based concentration of a compound by the molecular weight. This conversion allows for the VOCs to be compared on a molecular basis as opposed to a mass basis. Because anaerobic in-situ reactive zones (IRZs) are constantly releasing adsorbed phase mass and degrade mass to daughter compounds with different molecular weights, the evaluation of anaerobic IRZs on a molecular basis is the proper method to analyze the data.

4.1 Volatile Organic Compounds

A comparison of Operational Year 7, Quarter Number 4 groundwater analytical results with previous analytical data indicates that the dissolved-phase plume continues to be stable and that the anaerobic IRZ is completely degrading contaminant mass. Specifically, total VOC (TVOC) concentrations for plume boundary, landfill interior, and landfill perimeter monitoring wells continue to be stable to decreasing. TVOC concentrations for mid-plume monitoring wells remain generally stable. Specific observations are provided below.

Plume boundary, landfill interior, and landfill perimeter monitoring data indicate that the dissolved phase plume is stable to decreasing in size. TVOC concentrations for plume boundary monitoring wells W-17S and W-18 remained stable at 0.0 micrograms per liter (ug/L) and 65.0 ug/L, respectively. Offsite monitoring well W-20S remained stable at below the limits of detection (0.0 ug/L). Landfill perimeter monitoring wells W-6, W-7, and W-13 remained stable at 50.3 ug/L, 10.0 ug/L, and 0.0 ug/L, respectively.

Landfill perimeter monitoring well PW-7 remained generally stable at 146.2 ug/L. Landfill interior monitoring well PW-13 decreased from 29.6 ug/L (September 2008) to 5.3 ug/L (September 2009). Landfill interior monitoring well GMMW-7 decreased from 452.5 ug/L (September 2008) to 187.7 ug/L (September 2009).

In general, TVOC concentrations in mid-plume monitoring wells located furthest from the IRZ were stable during the current reporting period. Specifically, mid-plume monitoring wells W-16S, PW-3, PW-4 and PW-5 remained stable at 51.4 ug/L, 142.0 ug/L, 94.8 ug/L, and 0.0 ug/L, respectively. TVOC concentrations in mid-plume monitoring wells located closest to the IRZ (GMMW-5, GMMW-6, W-5, GMMW-2, and TW-1) were generally stable during September 2009. Specifically, monitoring wells GMMW-2, GMMW-5, GMMW-6 and W-5 remained stable at 272.2 ug/L, 142.4 ug/L, 353.2 µg/L and 153.2 ug/L, respectively. The TVOC concentration in alternate electron donor pilot test monitoring well TW-1 decreased to 571.9 ug/L (September 2009). The concentration of toluene in TW-1 remained elevated at 490 ug/L. As described in the Operational Year 7, Quarter Number 3 Monitoring Report, ARCADIS has completed a cursory literature search and believes the increase in toluene could be a result of the following:

- Biogenic production caused by complex reactions with in-situ bacteria.
- Sorption/desorption of toluene into the EOS™ itself; and,
- Suppression of the natural attenuation of existing toluene within the anaerobic treatment zone.

ARCADIS believes the observed increase in toluene at TW-1 will be transient and the toluene will naturally attenuate and be utilized as an electron donor as it flows along the downgradient flow path out of the anaerobic reactive zone. Nonetheless, ARCADIS will continue to monitor its' presence and will use monitoring well W-5 (located downgradient of TW-1) to confirm that toluene is degrading. Toluene was not detected in monitoring well W-5. Finally, background monitoring well W-14S remained stable at 0.0 ug/L.

A comparative analysis of groundwater analytical data for VOCs during Operational Year 7 continues to corroborate historical data and indicate that the dissolved phase plume is stable to decreasing. The overall stable plume provides continued evidence that ongoing natural attenuation processes are effectively controlling the further migration of the plume. Data also indicate that the IRZ is completely degrading mass

as observed by an overall continuing stable to decreasing trend of VOCs in monitoring wells GMMW-5, GMMW-6, W-5, and GMMW-2. Additional discussion of the degradation of VOCs at these monitoring well locations is provided in Section 7.2.2 of this report.

PT system VOC analytical results are provided in Table 4. During the current reporting period, the TVOC concentration at recovery wells GMPW-3, GMPW-4, and GMPW-5 were stable when compared to prior data. Specifically, TVOC concentrations in recovery wells GMPW-3, GMPW-4, and GMPW-5 were 225.0 ug/L, 195.3 ug/L, and 0.0 ug/L, respectively. A complete evaluation of performance monitoring conducted on the PT system is provided in Section 7.1.2 of this report.

4.2 Indicators of Reducing Conditions

Groundwater analytical results for biogeochemical parameters and field parameters were collected in accordance with the LTM plan and are provided in Table 3. In addition, the concentration of methane versus time for monitoring wells GMMW-2, GMMW-5, GMMW-6, W-5, and TW-1 is provided on Figures D-1 through D-10 (Appendix D). In summary, field and laboratory groundwater data for wells GMMW-5, GMMW-6, W-5, and TW-1 indicate that strongly reducing conditions are being maintained within the IRZ. This is evidenced by the presence of reduced forms of alternate electron acceptors (i.e., methane). Further details of the ARI system performance monitoring are provided in Section 7.2.2 of this report.

4.3 Evidence of Biodegradation

Table 3 provides the results of biodegradation end product concentrations in monitoring wells and indicates the continued occurrence of bioactivity and biodegradation of VOCs within the IRZ. In addition, the concentration of ethene (Figures D-1 through D-5) or ethane (Figures D-6 through D-10) versus time for monitoring wells GMMW-2, GMMW-5, GMMW-6, W-5, and TW-1 is provided on Figures D-1 through D-10 (Appendix D). The concentration of ethane at monitoring well GMMW-5 continues to be elevated when compared to baseline conditions. GMMW-5 is located closest to the ARI injection wells and would be expected to be the first well to exhibit increases in biodegradation end products. Ethene results for monitoring well GMMW-6 remained elevated during Operational Year 7, Quarter Number 4 and continue to indicate that the IRZ extends to the vicinity of this well. Finally, as shown on Figure D-3, monitoring well GMMW-2 exhibits a gradual decrease in PCE related daughter compounds and a gradual increase in ethene. This provides

evidence that the monitoring well GMMW-2 location is being affected by groundwater that has been treated within the IRZ located upgradient of the GMMW-2 location. Additional details on the results of biogeochemical monitoring as evidence of Groundwater Remediation System performance and effectiveness are discussed in Section 7.2.2 of this report.

5. Spring Water Quality

Spring water locations SP-2 and SP-3 were observed during the OM&M site visit on September 24, 2009. During this inspection it was noted that the flow rate and water level in the stream appeared lower than typical conditions. In the general area of the SP-2 and SP-3 locations, it was noted that stagnant spring water (i.e., with iron hydroxide staining) was evident at the base of the slab-stone retaining wall. In addition, iron hydroxide staining was observed at the downgradient limit of the subsurface infiltration bed associated with the SP-4 remedy.

6. Surface Water Quality

Table 5 presents the analytical results for surface water sampling location F-6 and SP-4 during Operational Year 7. As shown in Table 5, VOC concentrations in surface water at sampling location SP-4 remained stable (i.e., only trace detections of 1,1-dichloroethane) during the reporting period. Similarly, VOC concentrations in surface water at sampling locations F-6 and SP-4 remained stable during Operational Year 7 with VOC concentrations either not detected or slightly above the limits of detection for 1,1-dichloroethane. The data continue to indicate that surface water quality is not being adversely impacted by the landfill.

7. Groundwater Remediation System Performance

The following section describes the results of the Groundwater Remediation System performance monitoring conducted during Operational Year 7, Quarter Number 4. A brief summary of system performance during Operational Year 7 is also provided.

7.1 PT System

The following section describes the results of the PT system performance monitoring conducted during Operational Year 7, Quarter Number 4.

7.1.1 Summary of Operation, Maintenance, and Monitoring

During Operational Year 7, Quarter Number 4, the PT system operated continuously with the exception of brief system shutdowns as a result of minor system alarms and routine OM&M activities. Recovery well pump intake filter socks were replaced at 45-day intervals throughout Operational Year 7, and will continue to be replaced at this interval as part of the long-term maintenance program of the PT system.

PT system OM&M for Operational Year 7, Quarter Number 4 was conducted during the week of October 5, 2009 and included operation and maintenance of system equipment, the collection of system performance samples (water and vapor), and recording system operating parameters. Table 6 provides a summary of the recorded system operating parameters for the current operating period. As shown in Table 6, the total effluent groundwater recovery rate for Operational Year 7, Quarter Number 4 was approximately 0.60-gallon per minute (gpm), with individual recovery rates of 0.01-gpm, 0.18-gpm, and 0.29-gpm in GMPW-3, GMPW-4, and GMPW-5, respectively.

The average recovery rate in recovery well GMPW-3 was below the system startup flow rate during Operational Year 7, Quarter Number 4. The average individual recovery well rates in recovery wells GMPW-4 and GMPW-5 were generally consistent with system startup flow rates during Operational Year 7, Quarter Number 4. ARCADIS believes the decreased flow rate at recovery well GMPW-3 is the result of well fouling and/or silt intrusion into the well screen. This is evidenced by the presence of silt on the pump intake filter socks inside the pump chamber, and at the mechanical flow totalizer located within the treatment building. ARCADIS is currently evaluating the most appropriate well rehabilitation program. A total of 90,664 gallons of groundwater was recovered during Operational Year 7, Quarter Number 4, and a total of 1,939,584 gallons of groundwater has been recovered since system startup. The low profile air stripper operated in accordance with the design specifications at a blower flow rate of 215 standard cubic feet per minute.

The overall system pumping rate during Operational Year 7 was consistent when compared to Operational Year 6 (ARCADIS 2009) with the exception of recovery well GMPW-3. Specifically, the total effluent groundwater recovery rate for Operational Year 7 was approximately 0.58-gpm, with individual recovery rates of 0.04-gpm, 0.17-gpm, and 0.26-gpm for recovery wells GMPW-3, GMPW-4, and GMPW-5, respectively. The average individual recovery well rate for GMPW-3 during Operational Year 7 decreased. As discussed above, ARCADIS believes it has determined the cause of the decreased performance and is currently evaluating an

appropriate corrective action. A total of 319,383 gallons of groundwater was recovered during Operational Year 7.

7.1.2 Results of Performance Sampling

PT system performance sampling for Operational Year 7, Quarter Number 4 was conducted on October 7, 2009. As discussed previously, five groundwater samples and one vapor sample were collected. Groundwater samples included collection of individual recovery well samples (GMPW-3, GMPW-4, and GMPW-5), total influent, and total effluent after the cartridge filters. The vapor sample was collected from the effluent stack of the low profile air stripper.

Table 4 provides a summary of the PT system performance groundwater sampling analytical results. As shown in Table 4, all groundwater VOCs were treated to below their respective Best Professional Judgment (BPJ) limits via the low profile air stripper. Total iron concentration after the cartridge filter (sample ID: COMBINED EFF) was 0.12 mg/L for the fourth quarter sampling event, which is below the BPJ recommended daily average limit of 0.61 mg/L and recommended daily limit of 1.2 mg/L. Based on the total groundwater recovered during the reporting period and total influent groundwater concentration, an estimated 0.13 pounds (lbs) of VOC mass were removed from the subsurface during the quarterly reporting period, as shown in Table 7. A total of approximately 3.49 lbs of VOCs have been removed from the subsurface since system startup.

Table 8 provides a summary of the PT system performance sampling vapor analytical results for the Operational Year 7, Quarter Number 4 monitoring event as well as a summary of all data for Operational Year 7. As shown in Table 8, VOCs were not detected above their respective detection limits during the current reporting period. To be conservative, NYSDEC DAR-1 air model calculations were performed using the actual analytical data for detected constituents and the detection limit of all constituents that were not detected but have historically been detected in the influent groundwater. All VOCs were below their respective short-term guidance concentrations (SGCs) and annual guidance concentrations (AGCs). Appendix B contains the NYSDEC DAR-1 SGC and AGC screening simulation based on the hand calculations provided in the NYSDEC DAR-1 AGC/SGC tables dated September 10, 2007.

As shown in Table 4, the PT system operated effectively during Operational Year 7 and treated influent VOCs to below their respective BPJ limits during each operational period. As shown in Table 7, a total of approximately 0.46 lbs of VOC mass were

recovered during Operational Year 7. Finally, all VOCs were below their respective SGCs and AGCs during each operating period of Operational Year 7.

7.2 ARI System

The following section describes the results of the ARI system performance monitoring conducted during Operational Year 7, Quarter Number 4. A brief summary of ARI system performance for Operational Year 7 has also been provided.

7.2.1 Summary of Operation, Maintenance, and Monitoring

ARI system OM&M was conducted during the Operational Year 7, Quarter Number 4 OM&M site visit during the week of October 5, 2009 and included operation and maintenance of system equipment.

One reagent injection was conducted during Operational Year 7, Quarter Number 4. The injection was initiated on June 30, 2009 and was completed on July 25, 2009. As described in the Hydraulic Injection Test and Alternate Electron Donor Pilot Test Letter Work Plan (ARCADIS 2006), an alternate electron donor (e.g., EOS) was injected into existing injection well IW-8 during the week of December 18, 2006. Accordingly, IW-8 was not included in the current reagent injection to allow for long-term groundwater monitoring of the alternate electron donor.

A total of 10,416-gallons of molasses solution were delivered to the subsurface during Operational Year 7, Quarter Number 4. A total of 208,885-gallons of molasses solution have been injected since system startup. Appendix C provides a summary of the solution injection quantities for Operational Year 7.

7.2.2 Results of Performance Sampling

ARI system performance sampling was conducted on September 22, 2009 and included the collection of TOC samples from injection wells IW-3 and IW-13. In addition, TOC samples were collected from injection well IW-8 and monitoring well TW-1 to evaluate the long- term performance of the alternate electron donor EOS™ in providing TOC to the subsurface (ARCADIS 2006). Finally, analytical results from select wells sampled under the environmental effectiveness monitoring program were also utilized to determine the effectiveness of the ARI system.

As discussed previously, Tables 2 and 3 summarize the results of VOCs, and biogeochemical and field parameters, respectively, for the ARI system performance monitoring and environmental effectiveness Operational Year 7, Quarter Number 4 sampling event. In addition, the concentrations of PCE daughter compounds, ethene, methane, and TOC versus time for select monitoring wells are provided in Figures D-1 through D-5 of Appendix D. Likewise, the concentrations of TCA daughter compounds, ethane, methane, and TOC versus time for select monitoring wells are provided in Figures D-6 through D-10 of Appendix D. Analytical results and field parameters indicate that geochemical conditions in the current area of ARI system influence exhibit sufficient TOC within injection wells, elevated chlorinated VOC degradation products (i.e., ethene and ethane), and elevated reduced forms of alternate electron acceptors (i.e., methane). Operational Year 7, Quarter Number 4 analytical data provide strong evidence that VOCs are being completely degraded within the IRZ along the downgradient flow path.

Key observations for Operational Year 7, Quarter Number 4, are as follows:

- The TOC concentration at injection wells IW-3 (55.1 mg/L) and IW-13 (128 mg/L) indicated that sufficient organic carbon is being delivered to the subsurface to maintain the IRZ using molasses solution as an electron donor.

- The TOC in monitoring well TW-1 and injection well IW-8 was 61.4 mg/L and 422 mg/L, respectively. The data indicate that the alternate electron donor EOS™ continues to provide sufficient organic carbon to the subsurface following the one time injection in injection well IW-8 during December 2006.

- As shown on Figures D-1 through D-10, the methane concentration in monitoring wells GMMW-2, GMMW-5, GMMW-6, W-5, and TW-1 remain elevated when compared to baseline conditions. These data provide evidence that strongly reducing conditions (methanogenic) are being maintained within the IRZ.

- As shown on Figures D-1, D-2, D-3, D-6, D-7, and D-8, the concentration of ethene and/or ethane within monitoring wells GMMW-2, GMMW-5 and GMMW-6 continue to be elevated when compared to baseline conditions. GMMW-5 is located closest to the ARI injection wells and would be expected to be the first well to exhibit increases in biodegradation end products. Ethene results for monitoring well GMMW-6 remained elevated during Operational Year 7, Quarter Number 4 and continue to indicate that the IRZ has extended to the vicinity of this well. Finally, as shown on Figure D-3, results from monitoring well GMMW-2 exhibit a gradual

decrease in PCE related daughter compounds and a gradual increase in ethane. Combined with the corresponding increase in methane, these data provide evidence that the monitoring well GMMW-2 location is being affected by groundwater that has been treated within the IRZ.

- The concentrations of PCE-related daughter compounds have decreased approximately 92 percent when comparing Operational Year 7, Quarter Number 4 data to baseline conditions (i.e., pre-injection conditions) within all monitoring wells located in the vicinity of the IRZ (i.e., monitoring wells GMMW-2, GMMW-5, GMMW-6, W-5, and TW-1). The concentrations of PCE-related daughter compounds are currently at or below their respective New York State Ambient Water Quality Standards and Guidance Values (NYS WQS) within monitoring wells GMMW-5, W-5, and TW-1. The concentrations of PCE-related daughter compounds are currently slightly above NYS WQS within monitoring well GMMW-6.

- The concentrations of TCA-related daughter compounds have decreased approximately 22 percent when comparing Operational Year 7, Quarter Number 4 data to baseline conditions within all monitoring wells located in the vicinity of the IRZ. Relative changes in the concentration of TCA-related daughter compounds when compared to baseline conditions for key monitoring wells are as follows:

    - GMMW-2 – Overall decrease of 29 percent.
    - GMMW-5 – Overall increase of 50 percent.
    - GMMW-6 – Overall decrease of 58 percent.
    - W-5 – Overall decrease of 32 percent.
    - TW-1 – Overall decrease of 43 percent.

- The concentrations of TCA related daughter compounds are currently at/or below USEPA Maximum Concentration Levels (MCLs) for all monitoring wells sampled at the Site.

Overall, the current and annual data indicate that the anaerobic IRZ is completely degrading PCE-related daughter compounds and, to a lesser extent, TCA related daughter compounds. The greatest reduction in TCA-related daughter compounds

has occurred at GMMW-6, and the second greatest reduction at alternate electron donor pilot test monitoring well TW-1.

8. Spring Water Remediation System Performance

SP-5 Spring Water Remediation System OM&M was conducted on September 24, 2009 in accordance with the LTM Plan Addendum for Spring Water Remediation Systems (ARCADIS 2003). SP-5 Spring Water Remediation System Operational Year 7 analytical results are provided in Table 9. As shown in Table 9, all effluent VOCs were treated to below their respective BPJ limits via the LPGAC. Influent TVOC analytical data (58.2 ug/L) remained consistent with historical analytical data.

Table 10 contains the SP-5 spring water remediation system operating parameters recorded during Operational Year 7, Quarter Number 4. As shown in Table 10, the total effluent flow rate (0.95 gpm) was consistent with historical data. Approximately 500,105 gallons of spring water was treated and approximately 0.29 lbs of mass was recovered during the Operational Year 7 operating period. An estimated 1,609,578 gallons of spring water has been treated and an estimated 1.10 lbs of VOC mass has been recovered since system startup.

9. Conclusions

Based on the data obtained from the Operational Year 7, Quarter Number 4 monitoring event and overall system performance during Operational Year 7, ARCADIS concludes the following:

- The groundwater flow direction in the project area (i.e., adjacent to the landfill western perimeter) and site-wide in the September 2009 round was consistent with previous rounds. The groundwater flow direction in the project area is toward the southwest from the western perimeter of the landfill. The groundwater flow direction in areas further to the east of the project area is toward the south/southwest.

- The anaerobic IRZ established downgradient of the injection transect is successfully reducing the concentration of site-related VOCs through enhanced reductive dechlorination. The concentrations of PCE-related daughter compounds are currently below NYS WQS in monitoring wells GMMW-5, W-5, and TW-1, and slightly above the NYSWQS in monitoring well GMMW-6.

- The concentrations of TCA-related daughter compounds are currently below USEPA MCLs for all monitoring wells sampled at the site but are above NYS WQS for 1,1-dichloroethane and chloroethane in select monitoring wells.

- The concentrations of TCA-related daughter compounds in monitoring wells GMMW-2, GMMW-5, GMMW-6, W-5, and TW-1 have decreased an average of 22 percent from baseline conditions.

- Site-wide groundwater analytical data for VOCs are consistent with site historical data and indicate that the dissolved phase plume is stable. This observation provides continued evidence that ongoing natural attenuation processes are effectively controlling the further migration of the plume in areas beyond the present-day influence of the IRZ.

- The PT system is operating as designed and is treating recovered groundwater VOCs to below BPJ limits prior to discharge. The total recovery flow rate for Operational Year 7 was consistent with data from Operational Year 6. However, the recovery well GMPW-3 flow rate decreased when compared to Operational Year 6.

- Sufficient organic carbon was delivered to the subsurface to maintain the IRZ through the injection of a dilute molasses solution as evidenced by TOC analytical data.

- Organic carbon data from alternate electron donor injection well IW-8 and monitoring well TW-1 indicate that EOS™ is a suitable long-term source of organic carbon. Combined, the organic carbon and VOC analytical data for monitoring well TW-1 indicate that EOS™ is an effective alternate electron donor for the Site.

- VOC concentrations in surface water continue to be consistent with historical data, and surface water is not being adversely impacted by the landfill.

10. Recommendations

The following recommendations are made for Operational Year 8, Quarter Number 1 activities:

- Continue to inspect the former spring locations and the side slopes of the North Stream.

- Continue to operate the ARI system without injection well IW-8. Continue to obtain and evaluate data related to the ongoing alternate electron donor pilot program.

- Continue to replace the pneumatic pump intake filter socks every 1.5 months. Develop a corrective action plan for recovery well GMPW-3 rehabilitation.

- Evaluate whether injection amendments are available to accelerate the rate of reductive dechlorination for TCA and its daughter compounds. Similarly, continue to evaluate if EOS™ and/or other alternate electron donors are available to reduce the overall reagent/injection frequency.

11. Project Schedule

Groundwater environmental effectiveness monitoring is scheduled to be conducted for Operational Year 8 on the quarterly schedule set forth in the Proposed Modifications to Long-Term Monitoring Program (ARCADIS 2005). System OM&M of the Groundwater Remediation System will continue to be performed on a quarterly basis consistent with the LTM Plan. Recovery well maintenance will be scheduled and completed in 2010 following evaluation and selection of the most appropriate corrective action.

12. References

ARCADIS G&M, Inc. 2002. Long-Term Monitoring Plan, Colesville Landfill, Broome County, New York, NYSDEC Site 704010. June 28, 2002.

ARCADIS G&M, Inc. 2003. Long-Term Monitoring Plan Addendum for Spring Water Remediation Systems, Colesville Landfill, Broome County, New York, NYSDEC Site 704010. November 3, 2003.

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Table 1. Water-Level Measurements Collected During Opertational Year 7, Colesville Landfill, Broome County, New York.

Well Identification	MP Elevation (feet above msl)	3/26/2009 Depth to Water (feet below MP)	3/26/2009 Water-Table Elevation (feet above msl)	9/22/2009 Depth to Water (feet below MP)	9/22/2009 Water-Table Elevation (feet above msl)	MP Description
GMMW-2	1,030.95	36.75	994.20	37.45	993.50	Inner casing
GMMW-3	1,028.02	34.68	993.34	34.67	993.35	Inner casing
GMMW-4	1,042.90	46.10	996.80	46.00	996.90	Inner casing
GMMW-5	1,043.66	48.99	994.67	49.41	994.25	Inner casing
GMMW-6	1,033.58	38.97	994.59	39.52	994.04	Inner casing
GMMW-7	1,045.43	47.70	997.73	47.81	997.62	Inner casing
PW-3	988.92	11.65	977.27	13.73	975.19	Inner casing
PW-4	1,001.75	17.20	984.55	18.27	983.48	Inner casing
PW-5	986.12	0.35	985.77	0.60	985.52	Inner casing
W-5	1,051.41	52.30	999.11	52.19	999.22	Inner casing
W-6	1,050.38	50.55	999.83	50.72	999.66	Inner casing
PW-7	1,042.47	40.11	1,002.36	40.24	1,002.23	Inner casing
W-7	1,049.12	43.14	1,005.98	43.55	1,005.57	Inner casing
PW-10	1,049.29	39.11	1,010.18	39.10	1,010.19	Inner casing
PW-11	1,052.37	52.80	999.57	53.09	999.28	Inner casing
PW-13	1,072.41	62.50	1,009.91	62.10	1,010.31	Inner casing
W-13	1,053.43	48.09	1,005.34	47.19	1,006.24	Inner casing
W-14S	957.68	6.00	951.68	8.56	949.12	Inner casing
W-16S	990.33	9.22	981.11	9.55	980.78	Outer casing
W-17S	959.13	8.94	950.19	10.53	948.60	Inner casing
W-18	973.56	10.25	963.31	11.66	961.90	Inner casing
W-20S	952.68	8.45	944.43	10.74	942.14	Inner casing

msl Mean sea level.
MP Measuring point.

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Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater, Operational Year 7, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID:	GMMW-02	GMMW-02	GMMW-02	GMMW-02	GMMW-05	GMMW-05	GMMW-05	GMMW-05	GMMW-06	GMMW-06	GMMW-06
	Date:	12/16/2006	3/27/2009	6/25/2009	9/23/2009	12/16/2008	3/27/2009	6/25/2009	9/23/2009	12/16/2008	3/27/2009	6/25/2009
1,2,4-Trimethylbenzene		<10	<10	<10	<5.0	<10	0.91 J	<5.0	<5.0	<10	3.5 J	<20
1,3,5-Trimethylbenzene		<10	<10	<10	<5.0	<10	0.59 J	<5.0	<5.0	<10	<20	<20
1,1,1-Trichloroethene		7.1	4.3 J	6.8 J	5.2	<1.0	<5.0	<5.0	<5.0	2.2	3.7 J	<20
1,1,2-Trichloroethane		<1.0	<10	<10	<5.0	<1.0	<5.0	<5.0	<5.0	<1.0	<20	<20
1,1-Dichloroethane		120	130	130	110	31	46 J	62 J	56	140	200	190
1,1-Dichloroethene		1.1	<10	1.8 J	<5.0	<1.0	<5.0	<5.0	<5.0	<1.0	<20	<20
1,2-Dichloroethane		<1.0	<10	<10	<5.0	<1.0	0.86 J	0.86 J	<5.0	<1.0	<20	<20
1,2-Dichloropropane		<1.0	<10	<10	<5.0	<1.0	<5.0	<5.0	<5.0	<1.0	<20	<20
Benzene		2.5	2.3 J	2.8 J	3.0 J	1.5	0.98 J	0.98 J	1.1 J	7.4	5.7 J	4.9 J
Carbon Tetrachloride		<1.0	<10	<10	<5.0	<1.0	<5.0	<5.0	<5.0	<1.0	<20	<20
Chlorobenzene		27	26	27	29	16	11	9.6	11	32	31	25
Chloroethane		22	26	28	18	91	74	94 J	72	160	270	190
Chloroform		<1.0	<10	<10	<5.0	<1.0	<5.0	<5.0	<5.0	<1.0	<20	<20
cis-1,2-Dichloroethene		89	83	89	76	2.1	2.1 J	3.0 J	1.3 J	7.2	17 J	14 J
Dichlorodifluoromethane		<1.0	<10	<10	<5.0	<1.0	<5.0	<5.0	<5.0	2.8	10 J	<20
Ethylbenzene		<1.0	<10	<10	<5.0	<1.0	<5.0	<5.0	<5.0	2.2	<20	<20
Methylene chloride		<1.0	<10	<10	<5.0	1.5	<5.0	<5.0	<5.0 B	6.7	7.1 J	8.6 J
Methyl tert-butyl ether		<1.0	<10	<10	<5.0	<1.0	<5.0	<5.0	<5.0	<1.0	<20	<20
Naphthalene		<1.0	<10	<10	<5.0	<1.0	1.0 J	<5.0	<5.0	<1.0	<20	<20
o-Xylene		<1.0	<10	<10	<5.0	1.3	1.8 J	<5.0	<5.0	1.2	5.7 J	<20
m,p-Xylene		<2.0	<10	<10	<5.0	<2.0	2.1 J	<5.0	<5.0	4.2	7.8 J	<20
Tetrachloroethene		<1.0	<10	<10	<5.0	<1.0	<5.0	<5.0	<5.0	<1.0	<20	<20
Toluene		<1.0	<10	<10	<5.0	1.6	0.91 J	0.77 J	0.96 J	2.4	<20	<20
trans-1,2-Dichloroethene		<1.0	<10	<10	<5.0	<1.0	<5.0	<5.0	<5.0	1.2	<20	<20
Trichloroethene		21	18	20	20	<1.0	0.99 J	0.90 J	<5.0	7.8	14 J	15 J
Vinyl chloride		12	9.8 J	12	11	<1.0	1.2 J	2.5 J	<5.0	6.5	15 J	9.6 J
Total VOCs		301.7	299.4 J	317.4 J	272.2 J	146.0	144.4 J	174.6 J	142.4 J	383.8	590.5 J	457.1 J

Bold	Constituent detected above MDL.
VOCs	Volatile Organic Compounds.
ug/L	Micrograms per liter.
*	Fiald replicate.
J	Estimated value.
B	Compound considered non-detect at the listed value due to associated blank contamination.
MDL	Method detection limit.

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Table 2. Concentrations of Voletile Organic Compounds Detected in Groundwater, Operationel Year 7, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID:	GMMW-06	GMMW-06*	GMMW-07	PW-03	PW-04	PW-04	PW-04	PW-04	PW-05	PW-07	PW-13
	Date:	9/23/2009	9/23/2009	9/23/2009	9/22/2009	12/16/2006	3/27/2009	6/25/2009	9/23/2009	9/22/2009	9/24/2009	9/24/2009
1,2,4-Trimethylbenzene		<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene		<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane		<5.0	<5.0	**3.1 J**	**6.9**	**6.4 J**	**8.8**	**11**	**10**	<5.0	**6.1**	<5.0
1,1,2-Trichloroethane		<5.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane		**160**	**160**	**55**	**48**	**7.8 J**	**9.6**	**19**	**26**	<5.0	**66**	<5.0
1,1-Dichloroethene		<5.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane		<5.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane		<5.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene		**5.5**	**5.5**	**1.6 J**	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon Tetrachloride		<5.0	<5.0	<5.0	<5.0	**1.6 J**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorobenzene		**27**	**26**	**17**	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	**8.1**	**1.9 J**
Chloroethane		**120**	**100**	**16**	**6.0**	**1.8 J**	**9.3**	**7.2 J**	**5.9**	<5.0	**32**	**2.0 J**
Chloroform		<5.0	<5.0	<5.0	<5.0	**1.1 J**	**0.92 J**	**1.3 J**	**0.91 J**	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene		**16**	**14**	**40**	**43**	**13 J**	**7.1**	**10**	**24**	<5.0	**15**	<5.0
Dichlorodifluoromethane		**4.0 J**	**3.9 J**	<5.0	<5.0	**1.0 J**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene		<5.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene chloride		<5.0 B	<5.0 B	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether		<5.0	<5.0	<5.0	<5.0	<1.0	<5.0	**0.23 J**	<5.0	<5.0	<5.0	<5.0
Naphthalene		<5.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
o-Xylene		<5.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
m,p-Xylene		<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene		<5.0	<5.0	<5.0	**2.2 J**	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene		<5.0	**0.97 J**	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene		**1.1 J**	**0.99 J**	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene		**10**	**10**	**27**	**32**	**21 J**	**24**	**23**	**28**	<5.0	**9.6**	**1.4 J**
Vinyl chloride		**9.6**	**8.6**	**28**	**3.9 J**	<1.0	<5.0	<5.0	<5.0	<5.0	**9.4**	<5.0
Total VOCs		**353.2 J**	**330.0 J**	**187.7 J**	**142.0 J**	**55.7 J**	**59.7 J**	**71.7 J**	**94.8 J**	**0.0**	**146.2**	**5.3 J**

Bold	Constituent detected above MDL.
VOCs	Volatile Organic Compounds.
ug/L	Micrograms per liter.
*	Field replicate.
J	Estimated value.
B	Compound considered non-detect at the listed value due to associated blank contamination.
MDL	Method detection limit.

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Table 2. Concentrations of Volatile Organic Compounds Detected in Groundweter, Operational Year 7, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID:	TW-01	TW-01	TW-01	TW-01	W-05	W-05	W-05	W-05	W-06	W-07	W-13
	Date:	12/16/2008	3/27/2009	6/25/2009	9/23/2009	12/16/2008	3/27/2009	6/25/2009	9/23/2009	9/22/2009	9/22/2009	9/24/2009
1,2,4-Trimethylbenzene		<10	<5.0	<50	<20	<10	<5.0	<20	<5.0	<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene		<10	<5.0	<50	<20	<10	<5.0	<20	<5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane		<1.0	<5.0	<50	<20	<1.0	<5.0	<20	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethene		<1.0	<5.0	<50	<20	<1.0	<5.0	<20	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane		<1.0	**2.1 J**	<50	<20	**55**	**49**	70	**51**	**16**	**4.4 J**	<5.0
1,1-Dichloroethene		<1.0	<5.0	<50	<20	<1.0	<5.0	<20	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane		<1.0	<5.0	<50	<20	<1.0	<5.0	<20	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane		<1.0	<5.0	<50	<20	<1.0	<5.0	<20	<5.0	<5.0	<5.0	<5.0
Benzene		2.5	**2.5 J**	<50	<20	**5.8**	**6.0**	5.6 J	**5.4**	**2.0 J**	<5.0	<5.0
Carbon Tetrachloride		<1.0	<5.0	<50	<20	<1.0	<5.0	<20	<5.0	<5.0	<5.0	<5.0
Chlorobenzene		**6.5**	**6.3**	<50	**6.9 J**	**7.7**	**7.3**	**6.0 J**	5.4	**11**	<5.0	<5.0
Chloroethane		**83**	**110**	**140**	**75**	**120**	**110**	**210**	**86**	**6.6**	**3.5 J**	<5.0
Chloroform		<1.0	<5.0	<50	<20	<1.0	<5.0	<20	<5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene		2.3	**2.0 J**	<50	<20	3.0	**4.3 J**	<20	2.9 J	**4.1 J**	**1.3 J**	<5.0
Dichlorodifluoromethane		<1.0	<5.0	<50	<20	<1.0	<5.0	<20	<5.0	3.5 J	<5.0	<5.0
Ethylbenzene		<1.0	<5.0	<50	<20	<1.0	<5.0	<20	<5.0	<5.0	<5.0	<5.0
Methylene chloride		<1.0	<5.0	20 J	<20 B	3.1	<5.0 B	5.9 J	<5.0 B	<5.0	<5.0	<5.0
Methyl tert-butyl ether		<1.0	<5.0	<50	<20	<1.0	<5.0	<20	<5.0	<5.0	<5.0	<5.0
Naphthalene		<1.0	<5.0	<50	<20	<1.0	<5.0	<20	<5.0	<5.0	<5.0	<5.0
o-Xylene		<1.0	**1.0 J**	<50	<20	**1.7**	**2.4 J**	<20	**1.7 J**	<5.0	<5.0	<5.0
m,p-Xylene		<2.0	<5.0	<50	<20	**1.0 J**	<5.0	<20	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene		<1.0	<5.0	<50	<20	<1.0	<5.0	<20	<5.0	<5.0	<5.0	<5.0
Toluene		**85**	**18**	**590**	**490**	<1.0	<5.0	<20	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene		<1.0	<5.0	<50	<20	<1.0	<5.0	<20	<5.0	<5.0	<5.0	<5.0
Trichloroethene		<1.0	**1.1 J**	<50	<20	**1.2**	2.0 J	<20	**0.77 J**	5.0	**0.81 J**	<5.0
Vinyt chloride		**1.5**	<5.0	<50	<20	**1.1**	<5.0	<20	<5.0	**2.1 J**	<5.0	<5.0
Total VOCs		160.8	143.0 J	750.0 J	571.9 J	199.6 J	181.0 J	297.5 J	153.2 J	50.3 J	10.0 J	0.0

Bold	Constituent detected above MDL.
VOCs	Volatile Organic Compounds.
ug/L	Micrograms per liter.
*	Field replicate.
J	Estimated value.
B	Compound considered non-detect at the listed value due to associated blank contamination.
MDL	Method detection limit.

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Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater, Operational Year 7, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID:	W-14S	W-16S	W-17S	W-18	W-20S	FBV240909
	Date:	9/22/2009	9/22/2009	9/22/2009	9/24/2009	9/22/2009	9/24/2009
1,2,4-Trimethylbenzene		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane		<5.0	<5.0	<5.0	**13**	<5.0	<5.0
1,1,2-Trichloroethane		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane		<5.0	**16**	<5.0	**15**	<5.0	<5.0
1,1-Dichloroethene		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene		<5.0	**2.3 J**	<5.0	<5.0	<5.0	<5.0
Carbon Tetrachloride		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorobenzene		<5.0	**23**	<5.0	<5.0	<5.0	<5.0
Chloroethane		<5.0	**5.0**	<5.0	<5.0	<5.0	<5.0
Chloroform		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene		<5.0	**1.7 J**	<5.0	**15**	<5.0	<5.0
Dichlorodifluoromethane		<5.0	**1.3 J**	<5.0	<5.0	<5.0	<5.0
Ethylbenzene		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene chloride		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Naphthalene		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
o-Xylene		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
m,p-Xylene		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethane		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene		<5.0	<5.0	<5.0	<5.0	<5.0	**2.9 J**
trans-1,2-Dichloroethene		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene		<5.0	**2.1 J**	<5.0	**22**	<5.0	<5.0
Vinyl chloride		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total VOCs		**0.0**	**51.4 J**	**0.0**	**65.0**	**0.0**	**2.9 J**

Bold Constituent detected above MDL.
VOCs Volatile Organic Compounds.
ug/L Micrograms per liter.
* Field replicate.
J Estimated value.
B Compound considered non-detect at the listed value due to associated blank contamination.
MDL Method detection limit.

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Table 3. Concentrations of General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 7, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	GMMW-02 12/16/08	GMMW-02 03/27/09	GMMW-02 06/25/09	GMMW-02 09/23/09	GMMW-05 12/16/08	GMMW-05 03/27/09
	UNITS						
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L	**4.2**	**0.71 J**	**1.3**	**1.0**	**18**	**19**
FIELD PARAMETERS							
pH	Standard units	**6.85**	**6.74**	**6.65**	**6.54**	**6.37**	**6.44**
Specific Conductance	mmhos/cm	**0.773**	**0.622**	**0.620**	**0.665**	**0.530**	**0.288**
Turbidity	NTU	--	--	--	--	--	--
Dissolved Oxygen	mg/L	**2.08**	--	--	--	**1.26**	--
Temperature	deg C	**6.72**	**9.90**	**19.00**	**14.90**	**7.76**	**10.10**
ORP	mV	**-40**	--	--	--	**-30**	--
DISSOLVED GASES							
Carbon dioxide	mg/L	**140**	**58**	--	--	**110**	**91**
Carbon monoxide	mg/L	<1.00	<1.00	--	--	<1.00	<1.00
Ethane	ng/L	**600**	**110**	**1,200**	**730**	**32,000**	**25,000**
Ethene	ng/L	**16,000**	**3,400**	**16,000**	**14,000**	**500**	**600**
Methane	ug/L	**3,300**	**970**	**5,900**	**7,900**	**12,000**	**6,100**
Nitrogen	mg/L	**19.00**	**17.00**	--	--	**9.60**	**16.00**
Oxygen	mg/L	**3.70**	**8.70**	--	--	**2.10**	**2.20**

Bold	**Constituent detected above MDL.**
mg/L	Milligrams per liter.
mmhos/cm	Millimhos per centimeter.
NTU	Nephelometric Turbidity Units.
deg C	Degrees Celsius.
mV	Millivolts.
ng/L	Nanograms per liter.
--	Not analyzed or collected.
ug/L	Micrograms per liter.
IW	Injection well.
ORP	Oxidation-reduction potential.
J	Qualifier assigned to analytical data indicating result is estimated.
MDL	Method detection limit.

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Table 3. Concentrations of General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 7, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	GMMW-05 06/25/09	GMMW-05 09/23/09	GMMW-06 12/16/08	GMMW-06 03/27/09	GMMW-06 06/25/09	GMMW-06 09/23/09
	UNITS						
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L	**12.4**	**8.5**	**5.4**	**5.1**	**3.3**	**2.3**
FIELD PARAMETERS							
pH	Standard units	**6.99**	**6.31**	**6.48**	**6.59**	**6.61**	**6.37**
Specific Conductance	mmhos/cm	**0.290**	**0.394**	**1.133**	**0.987**	**0.840**	**0.884**
Turbidity	NTU	--	--	--	--	--	--
Dissolved Oxygen	mg/L	--	--	**2.10**	--	--	--
Temperature	deg C	**25.60**	**16.80**	**7.35**	**10.50**	**20.60**	**14.60**
ORP	mV	--	--	**-1**	--	--	--
DISSOLVED GASES							
Carbon dioxide	mg/L	--	--	**250**	**290**	--	--
Carbon monoxide	mg/L	--	--	<1.00	<1.00	--	--
Ethane	ng/L	**37,000**	**37,000**	**8,000**	**7,700**	**8,600**	**8,600**
Ethene	ng/L	**3,100**	**1,700**	**26,000**	**31,000**	**44,000**	**35,000**
Methane	ug/L	**9,900**	**12,000**	**4,900**	**2,100**	**2,300**	**2,800**
Nitrogen	mg/L	--	--	**14.00**	**17.00**	--	--
Oxygen	mg/L	--	--	**2.30**	**2.30**	--	--

Bold	**Constituent detected above MDL.**
mg/L	Milligrams per liter.
mmhos/cm	Millimhos per centimeter.
NTU	Nephelometric Turbidity Units.
deg C	Degrees Celsius.
mV	Millivolts.
ng/L	Nanograms per liter.
--	Not analyzed or collected.
ug/L	Micrograms per liter.
IW	Injection well.
ORP	Oxidation-reduction potential.
J	Qualifier assigned to analytical data indicating result is estimated.
MDL	Method detection limit.

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Table 3. Concentrations of General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 7, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	GMMW-07 09/23/09	PW-03 09/22/09	PW-04 12/16/08	PW-04 03/27/09	PW-04 06/25/09	PW-04 09/23/09
	UNITS						
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L	<1.0	–	**1.1**	<1.0	<1.0	<1.0
FIELD PARAMETERS							
pH	Standard units	**6.26**	**6.41**	**5.91**	**5.79**	5.72	**5.56**
Specific Conductance	mmhos/cm	**0.240**	**0.501**	**1.049**	**0.714**	**1.040**	**1.931**
Turbidity	NTU	–	–	--	--	–	--
Dissolved Oxygen	mg/L	–	--	**5.92**	--	--	--
Temperature	deg C	**13.70**	**16.90**	**6.55**	**8.60**	**17.10**	**15.30**
ORP	mV	–	–	**36**	--	--	--
DISSOLVED GASES							
Carbon dioxide	mg/L	–	–	**200**	**240**	--	--
Carbon monoxide	mg/L	–	–	<1.00	<1.00	--	--
Ethane	ng/L	**320**	–	<25	**34**	**32**	**13 J**
Ethene	ng/L	**2,600**	–	**18 J**	**78**	**100**	**30**
Methane	ug/L	**620**	–	**0.14**	**4.30**	**13**	**7.4**
Nitrogen	mg/L	–	–	**15.00**	**15.00**	--	--
Oxygen	mg/L	–	–	**6.50**	**3.40**	–	--

Bold	**Constituent detected above MDL.**
mg/L	Milligrams per liter.
mmhos/cm	Millimhos per centimeter.
NTU	Nephelometric Turbidity Units.
deg C	Degrees Celsius.
mV	Millivolts.
ng/L	Nanograms per liter.
--	Not analyzed or collected.
ug/L	Micrograms per liter.
IW	Injection well.
ORP	Oxidation-reduction potential.
J	Qualifier assigned to analytical data indicating result is estimated.
MDL	Method detection limit.

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Table 3. Concentrations of General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 7, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	PW-05 09/22/09	PW-07 09/24/09	PW-13 09/24/09	W-05 12/16/08	W-05 03/27/09	W-05 06/25/09
	UNITS						
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L	<1.0	--	--	**7.1**	**6.9**	**8.6**
FIELD PARAMETERS							
pH	Standard units	**7.02**	**6.01**	**5.58**	**6.48**	**6.45**	**6.40**
Specific Conductance	mmhos/cm	**0.283**	**0.273**	**0.139**	**1.086**	**0.912**	**0.890**
Turbidity	NTU	--	--	--	--	--	--
Dissolved Oxygen	mg/L	--	--	--	**2.17**	--	--
Temperature	deg C	**16.90**	**12.40**	**12.70**	**4.74**	**10.50**	**22.20**
ORP	mV	--	--	--	**-11**	--	--
DISSOLVED GASES							
Carbon dioxide	mg/L	--	--	--	**290**	**280**	--
Carbon monoxide	mg/L	--	--	--	<1.00	<1.00	--
Ethane	ng/L	<25	--	--	**14,000**	**10,000**	**13,000**
Ethene	ng/L	**16 J**	--	--	**1,100**	**760**	**1,100**
Methane	ug/L	**1.3**	--	--	**8,300**	**9,400**	**15,000**
Nitrogen	mg/L	--	--	--	**12.00**	**11.00**	--
Oxygen	mg/L	--	--	--	**2.10**	**2.80**	--

Bold	**Constituent detected above MDL.**
mg/L	Milligrams per liter.
mmhos/cm	Millimhos per centimeter.
NTU	Nephelometric Turbidity Units.
deg C	Degrees Celsius.
mV	Millivolts.
ng/L	Nanograms per liter.
--	Not analyzed or collected.
ug/L	Micrograms per liter.
IW	Injection well.
ORP	Oxidation-reduction potential.
J	Qualifier assigned to analytical data indicating result is estimated.
MDL	Method detection limit.

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Table 3. Concentrations of General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 7, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	W-05 09/23/09	W-06 09/22/09	W-07 09/22/09	W-13 09/24/09	W-14S 09/22/09	W-16S 09/22/09
	UNITS						
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L	7.2	--	--	--	--	--
FIELD PARAMETERS							
pH	Standard units	**6.31**	**6.30**	**6.23**	**5.93**	**5.27**	**6.13**
Specific Conductance	mmhos/cm	**0.924**	**0.530**	**0.441**	**0.397**	**0.064**	**0.395**
Turbidity	NTU	--	--	--	--	--	--
Dissolved Oxygen	mg/L	--	--	--	--	--	--
Temperature	deg C	**13.60**	**12.60**	**11.90**	**12.90**	**14.50**	**14.00**
ORP	mV	--	--	--	--	--	--
DISSOLVED GASES							
Carbon dioxide	mg/L	--	--	--	--	--	--
Carbon monoxide	mg/L	--	--	--	--	--	--
Ethane	ng/L	**14,000**	--	--	--	--	--
Ethene	ng/L	**980**	--	--	--	--	--
Methane	ug/L	**15,000**	--	--	--	--	--
Nitrogen	mg/L	--	--	--	--	--	--
Oxygen	mg/L	--	--	--	--	--	--

Bold	**Constituent detected above MDL.**
mg/L	Milligrams per liter.
mmhos/cm	Millimhos per centimeter.
NTU	Nephelometric Turbidity Units.
deg C	Degrees Celsius.
mV	Millivolts.
ng/L	Nanograms per liter.
--	Not analyzed or collected.
ug/L	Micrograms per liter.
IW	Injection well.
ORP	Oxidation-reduction potential.
J	Qualifier assigned to analytical data indicating result is estimated.
MDL	Method detection limit.

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Table 3. Concentrations of General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 7, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	W-17S 09/22/09	W-18 09/24/09	W-20S 09/22/09	IW-03 12/16/08	IW-03 03/26/09	IW-03 06/24/09
	UNITS						
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L	–	–	--	**230**	**92.7**	**56.8**
FIELD PARAMETERS							
pH	Standard units	**5.96**	**5.76**	**6.59**	**5.98**	**6.28**	**6.22**
Specific Conductance	mmhos/cm	**0.253**	**0.443**	**0.089**	**0.823**	**0.534**	–
Turbidity	NTU	–	–	--	--	--	--
Dissolved Oxygen	mg/L	–	–	--	**1.84**	--	--
Temperature	deg C	**13.30**	**16.40**	**14.60**	**6.84**	**10.00**	--
ORP	mV	–	--	--	**73**	--	--
DISSOLVED GASES							
Carbon dioxide	mg/L	–	–	--	--	--	--
Carbon monoxide	mg/L	–	–	--	--	--	–
Ethane	ng/L	–	–	--	--	--	--
Ethene	ng/L	–	–	--	--	–	--
Methane	ug/L	--	–	–	--	--	--
Nitrogen	mg/L	–	--	–	–	--	--
Oxygen	mg/L	–	--	--	--	--	--

Bold	**Constituent detected above MDL.**
mg/L	Milligrams per liter.
mmhos/cm	Millimhos per centimeter.
NTU	Nephelometric Turbidity Units.
deg C	Degrees Celsius.
mV	Millivolts.
ng/L	Nanograms per liter.
–	Not analyzed or collected.
ug/L	Micrograms per liter.
IW	Injection well.
ORP	Oxidation-reduction potential.
J	Qualifier assigned to analytical data indicating result is estimated.
MDL	Method detection limit.

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Table 3. Concentrations of General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 7, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	IW-03 09/22/09	IW-08 12/16/08	IW-08 3/26/09	IW-08 06/24/09	IW-08 09/22/09	IW-13 12/16/08
	UNITS						
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L	**55.1**	**1,200**	**766**	**781**	**422**	**1,100**
FIELD PARAMETERS							
pH	Standard units	**6.60**	**4.67**	**5.35**	**5.33**	**6.30**	**4.80**
Specific Conductance	mmhos/cm	**0.526**	**2.070**	**1.435**	--	**1.471**	**1.550**
Turbidity	NTU	--	--	--	--	--	--
Dissolved Oxygen	mg/L	--	**2.86**	--	--	--	**2.03**
Temperature	deg C	**17.80**	**2.46**	**10.30**	--	**15.30**	**5.65**
ORP	mV	--	**96**	--	--	--	**71**
DISSOLVED GASES							
Carbon dioxide	mg/L	--	--	--	--	--	--
Carbon monoxide	mg/L	--	--	--	--	--	--
Ethane	ng/L	--	--	--	--	--	--
Ethene	ng/L	--	--	--	--	--	--
Methane	ug/L	--	--	--	--	--	--
Nitrogen	mg/L	--	--	--	--	--	--
Oxygen	mg/L	--	--	--	--	--	--

Bold	**Constituent detected above MDL.**
mg/L	Milligrams per liter.
mmhos/cm	Millimhos per centimeter.
NTU	Nephelometric Turbidity Units.
deg C	Degrees Celsius.
mV	Millivolts.
ng/L	Nanograms per liter.
--	Not analyzed or collected.
ug/L	Micrograms per liter.
IW	Injection well.
ORP	Oxidation-reduction potential.
J	Qualifier assigned to analytical data indicating result is estimated.
MDL	Method detection limit.

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Table 3. Concentrations of General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 7, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	IW-13 03/26/09	IW-13 06/24/09	IW-13 09/22/09	TW-1 12/16/08	TW-1 03/27/09	TW-1 06/25/09
	UNITS						
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L	**624**	**1,080**	**128**	**160**	**85.7**	**75.9**
FIELD PARAMETERS							
pH	Standard units	**5.22**	**4.91**	**6.06**	**6.48**	**6.48**	**7.00**
Specific Conductance	mmhos/cm	**0.951**	--	**0.557**	**1.800**	**1.366**	**1.190**
Turbidity	NTU	--	--	--	--	--	--
Dissolved Oxygen	mg/L	--	--	--	**1.21**	--	--
Temperature	deg C	**10.30**	--	**15.00**	**5.43**	**10.70**	**18.90**
ORP	mV	--	--	--	**-24**	--	--
DISSOLVED GASES							
Carbon dioxide	mg/L	--	--	--	**400**	**380**	--
Carbon monoxide	mg/L	--	--	--	<1.00	<1.00	--
Ethane	ng/L	--	--	--	**520**	**1,000**	**3,000**
Ethene	ng/L	--	--	--	**480**	**430**	**750**
Methane	ug/L	--	--	--	**15,000**	**13,000**	**17,000**
Nitrogen	mg/L	--	--	--	**4.90**	**6.40**	--
Oxygen	mg/L	--	--	--	**1.70**	**1.90**	--

Bold	**Constituent detected above MDL.**
mg/L	Milligrams per liter.
mmhos/cm	Millimhos per centimeter.
NTU	Nephelometric Turbidity Units.
deg C	Degrees Celsius.
mV	Millivolts.
ng/L	Nanograms per liter.
--	Not analyzed or collected.
ug/L	Micrograms per liter.
IW	Injection well.
ORP	Oxidation-reduction potential.
J	Qualifier assigned to analytical data indicating result is estimated.
MDL	Method detection limit.

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Table 3. Concentrations of General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 7, Colesville Landfill, Broome County, New York.

Parameters		Sample ID: TW-1 Date: 09/23/09
	UNITS	
GENERAL CHEMISTRY		
Total Organic Carbon	mg/L	**61.4**
FIELD PARAMETERS		
pH	Standard units	**6.40**
Specific Conductance	mmhos/cm	**1.218**
Turbidity	NTU	--
Dissolved Oxygen	mg/L	--
Temperature	deg C	**14.80**
ORP	mV	--
DISSOLVED GASES		
Carbon dioxide	mg/L	--
Carbon monoxide	mg/L	--
Ethane	ng/L	**4,000**
Ethene	ng/L	**750**
Methane	ug/L	**14,000**
Nitrogen	mg/L	--
Oxygen	mg/L	--

Bold	**Constituent detected above MDL.**
mg/L	Milligrams per liter.
mmhos/cm	Millimhos per centimeter.
NTU	Nephelometric Turbidity Units.
deg C	Degrees Celsius.
mV	Millivolts.
ng/L	Nanograms per liter.
--	Not analyzed or collected.
ug/L	Micrograms per liter.
IW	Injection well.
ORP	Oxidation-reduction potential.
J	Qualifier assigned to analytical data indicating result is estimated.
MDL	Method detection limit.

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Table 4. Concentrations of Volatile Organic Compounds and Selected Metals Detected in Aqueous Samples Collected from the PT System, Operational Year 7, Colesville Landfill, Broome County, New York. [5,6]

Constituents	Model Technology BPJ Limits[1,2] (ug/L)	Sample ID: Date:	GMPW-3 12/17/2008	GMPW-3 3/27/2009	GMPW-3 6/25/2009	GMPW-3 10/7/2009	GMPW-4 12/17/2008	GMPW-4 3/27/2009	GMPW-4 6/25/2009	GMPW-4 10/7/2009
1,1,1-Trichloroethane	10-20		4.2	20	22	15	9.6	11	9.1	6.5
1,1,2-Trichloroethane	10		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	10		34	55	67	50	67	70	87	63
1,1-Dichloroethene	10		<1.0	2.3 J	2.8 J	1.7 J	1.2	<5.0	1.1 J	<5.0
1,2-Dichloroethane	10-30		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	NA		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Benzene	5		1.4	4.0 J	3.9 J	3.4 J	2.6	3.8 J	3.1 J	3.1 J
Carbon Tetrachloride	NA		<1.0	<5.0	<5.0	<5.0	1.7	<5.0	<5.0	<5.0
Chlorobenzene	NA		4.2	2.8 J	4.5 J	2.9 J	7.3	12	7.4	7.5
Chloroethane	NA		11	17	33	18	26	33	60	28
Chloroform	NA		<1.0	<5.0	0.69 J	<5.0	<1.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene	10		21	65	74	62	38	51	42	33
Dichlorodifluoromethane	NA		<1.0	<5.0	2.2 J	<5.0	1.5	<5.0	2.1 J	<5.0
Ethylbenzene	5		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Methylene Chloride	10-50		1.2	<5.0 B	<5.0	<5.0 B	1.7	<5.0 B	<5.0	<5.0 B
Methyl tert-butyl ether	50		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Naphthalene	10		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
o-Xylene	5		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Tetrachloroethene	10		<1.0	<5.0	1.4 J	<5.0	<1.0	<5.0	<5.0	<5.0
Toluene	5		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	10-50		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Trichloroethene	10		22	68	69	59	47	68	52	47
Vinyl Chloride	10-50		3.0	20	19	13	8.9	5.8	9.0	7.2
Total VOCs			102.0	254.1 J	299.5 J	225.0 J	212.5	254.6 J	272.8 J	195.3 J
Metals (units in mg/L)	Model Technology BPJ Limits[3,4] (mg/L)									
Total Iron	1.2 / 0.61		0.784	2.67	15.2	2.53 J	1.61	0.164	0.173	0.466 J

See Notes on Last Page.

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Table 4. Concentrations of Volatile Organic Compounds and Selected Metals Detected in Aqueous Samples Collected from the PT System, Operational Year 7, Colesville Landfill, Broome County, New York. [5,6]

Constituents	Model Technology BPJ Limits[1,2] (ug/L)	Sample ID: / Date:	GMPW-5 12/17/2008	GMPW-5 3/27/2009	GMPW-5 6/25/2009	GMPW-5 10/7/2009	COMBINED INF 12/17/2008	COMBINED INF 3/27/2009	COMBINED INF 6/25/2009	COMBINED INF 10/7/2009
1,1,1-Trichloroethane	10-20		<1.0	<5.0	<5.0	<5.0	**6.7**	**16**	**9.0**	**5.1**
1,1,2-Trichloroethane	10		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	10		<1.0	<5.0	<5.0	<5.0	**46**	**49**	**52**	**50**
1,1-Dichloroethene	10		<1.0	<5.0	<5.0	<5.0	<1.0	**1.5 J**	**1.1 J**	<5.0
1,2-Dichloroethane	10-30		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	NA		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Benzene	5		<1.0	<5.0	<5.0	<5.0	**1.8**	**3.3 J**	**2.2 J**	**2.2 J**
Carbon Tetrachloride	NA		<1.0	<5.0	<5.0	<5.0	**1.2**	<5.0	<5.0	<5.0
Chlorobenzene	NA		<1.0	<5.0	<5.0	<5.0	**5.1**	**4.0 J**	**4.6 J**	**6.4**
Chloroethane	NA		<1.0	<5.0	<5.0	<5.0	**16**	**27**	**34**	**31**
Chloroform	NA		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene	10		<1.0	<5.0	<5.0	<5.0	**26**	**53**	**35**	**26**
Dichlorodifluoromethane	NA		<1.0	<5.0	<5.0	<5.0	**1**	<5.0	**1.3 J**	**1.7 J**
Ethylbenzene	5		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Methylene Chloride	10-50		<1.0	<5.0	<5.0	<5.0	**1.3**	<5.0 B	<5.0	<5.0 B
Methyl tert-butyl ether	50		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Naphthalene	10		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
o-Xylene	5		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Tetrachloroethene	10		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Toluene	5		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	10-50		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Trichloroethene	10		<1.0	<5.0	<5.0	<5.0	**32**	**58**	**39**	**38**
Vinyl Chloride	10-50		<1.0	<5.0	<5.0	<5.0	**6.2**	**14**	**8.8**	**5.2**
Total VOCs			**0.0**	**0.0**	**0.0**	**0.0**	**143.3**	**225.8 J**	**187.0 J**	**165.6 J**
Metals (units in mg/L)	Model Technology BPJ Limits[3,4] (mg/L)									
Total Iron	1.2 / 0.61		<0.040	**0.421**	<0.04	**0.102 J**	**2.73**	**7.17**	**45.1**	**3.05 J**

See Notes on Last Page.

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Table 4. Concentrations of Volatile Organic Compounds and Selected Metals Detected in Aqueous Samples Collected from the PT System, Operational Year 7, Colesville Landfill, Broome County, New York. [5,6]

Constituents	Model Technology BPJ Limits[1,2] (ug/L)	Sample ID: COMBINED EFF	COMBINED EFF	COMBINED EFF	COMBINED EFF
		Date: 12/17/2008	3/27/2009	6/25/2009	10/7/2009
1,1,1-Trichloroethane	10-20	<1.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	10	<1.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	10	<1.0	<5.0	**1.3 J**	<5.0
1,1-Dichloroethene	10	<1.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	10-30	<1.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	NA	<1.0	<5.0	<5.0	<5.0
Benzene	5	<1.0	<5.0	<5.0	<5.0
Carbon Tetrachloride	NA	<1.0	<5.0	<5.0	<5.0
Chlorobenzene	NA	<1.0	<5.0	<5.0	<5.0
Chloroethane	NA	<1.0	<5.0	<5.0	<5.0
Chloroform	NA	<1.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene	10	<1.0	<5.0	<5.0	<5.0
Dichlorodifluoromethane	NA	<1.0	<5.0	<5.0	<5.0
Ethylbenzene	5	<1.0	<5.0	<5.0	<5.0
Methylene Chloride	10-50	<1.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	50	<1.0	<5.0	<5.0	<5.0
Naphthalene	10	<1.0	<5.0	<5.0	<5.0
o-Xylene	5	<1.0	<5.0	<5.0	<5.0
Tetrachloroethene	10	<1.0	<5.0	<5.0	<5.0
Toluene	5	<1.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	10-50	<1.0	<5.0	<5.0	<5.0
Trichloroethene	10	<1.0	<5.0	**0.78 J**	<5.0
Vinyl Chloride	10-50	<1.0	<5.0	<5.0	<5.0
Total VOCs		**0.0**	**0.0**	**2.1 J**	**0.0**

Metals (units in mg/L)	Model Technology BPJ Limits[3,4] (mg/L)				
Total Iron	1.2 / 0.61	**0.095**	**0.172**	**1.35**	**0.120 J**

See Notes on Last Page.

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Table 4. Concentrations of Volatile Organic Compounds and Selected Metals Detected in Aqueous Samples Collected from the PT System, Operational Year 7, Colesville Landfill, Broome County, New York. [5,6]

Notes:

1. Model Technology Best Professional Judgment (BPJ) Limits recommended for Air Stripping with appropriate pretreatment from Attachment C of TOGS 1.2.1.
2. When a range is listed for the BPJ limit, a variation in available references was found. Recommended daily maximum limits should be in this range.
3. Model Technology BPJ Limits recommended for Lime, Settle and Filter treatment.
4. The recommended daily maximum permit limit is 1.2 mg/L and the recommended daily average permit limit is 0.61 mg/L.
5. Production wells were sampled in accordance with the schedule set forth in Table 3 of the Long-Term Monitoring Plan (ARCADIS 2002).
6. Bold values indicate compound detected above method detection limit.

NA	No BPJ limit listed.
J	Estimated Value.
ug/L	Micrograms Per Liter.
mg/L	Milligrams Per Liter.
VOCs	Volatile Organic Compounds.
PT	Pump and Treat.
--	Not Analyzed or Collected.
B	Compound considered non-detect at the listed value due to associated blank contamination.

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Table 5. Concentrations of Volatile Organic Compounds Detected in Surface Water, Operational Year 7, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	F-6 12/17/2008	F-6 6/25/2009	SP-4 12/17/2008	SP-4 3/27/2009	SP-4 6/25/2009	SP-4 9/24/2009
1,2,4-Trimethylbenzene		<1.0	<5.0	<10	<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene		<1.0	<5.0	<10	<5.0	<5.0	<5.0
1,1,1-Trichloroethane		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
1,1-Dichloroethane		<1.0	<5.0	<1.0	<5.0	**1.4 J**	**3.1 J**
1,1-Dichloroethene		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
1,2-Dichloroethane		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
1,2-Dichloropropane		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Benzene		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Carbon Tetrachloride		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Chlorobenzene		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Chloroethane		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Chloroform		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Dichlorodifluoromethane		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Ethylbenzene		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Methylene chloride		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Naphthalene		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
o-Xylene		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
m,p-Xylene		<2.0	<5.0	<2.0	<5.0	<5.0	<5.0
Tetrachloroethene		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Toluene		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Trichloroethene		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Vinyl chloride		<1.0	<5.0	<1.0	<5.0	<5.0	<5.0
Total VOCs		**0.0**	**0.0**	**0.0**	**0.0**	**1.4 J**	**3.1 J**

Bold Constituent detected above MDL.
VOCs Volatile Organic Compounds.
ug/L Micrograms per liter.
J Estimated value.
MDL Method detection limit.

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Table 6. PT System Operating Parameters, Operational Year 7, Quarter Number 4 and Annual Summary, Groundwater Remediation System, Colesville Landfill, York, Broome County, New York.

Date	Time Recorded	Air Stripper Measurements: Blower Discharge Pressure PI-301 (i.w.c.)	Air Stripper Measurements: Blower Effluent Flowrate (scfm)	Flow Measurements: Total[1] Effluent Totalizer FQI-401 (gallons)	Flow Measurements: Water Bypass[2] Totalizer FQI-402 (gallons)	Flow Measurements: GMPW-3[3] Totalizer FQI-101 (gallons)	Flow Measurements: GMPW-4[4] Totalizer FQI-102 (gallons)	Flow Measurements: GMPW-5[4] Totalizer FQI-103 (gallons)
12/15/2008	2:10 PM	9.0	218	525,195.7	101,677.2	41,136.7	43,394.3	59,388.8
3/26/2009	4:14 PM	9.1	242	611,399.7	152,690.4	41,447.6	67,878.8	104,347.5
6/25/2009	12:55 PM	8.7	208	673,090.9	180,814.2	49,135.8	88,035.8	126,463.9
10/7/2009	3:22 PM	9.2	215	763,754.6	229,442.2	50,138.0	115,029.4	170,459.7
Average Daily Flowrate During Reporting Period (gpm) =				**0.60**	**0.32**	**0.01**	**0.18**	**0.29**
Total Groundwater Recovered During Reporting Period (gallons) =				**90,664**	**48,628**	**1,002**	**26,994**	**43,996**
Average Daily Flowrate During Operational Year 7 (gpm) =				**0.58**	NA	**0.04**	**0.17**	**0.26**
Total Groundwater Recovered During Operational Year 7 (gallons) =				**319,363**	NA	**24,349**	**93,388**	**142,400**

gpm Gallons per minute.
i.w.c. Inches of water column.
scfm Standard cubic feet per minute.
NA Not applicable.

Notes:

1. Total effluent totalizer replaced on December 23, 2005.
2. Water bypass totalizer damaged as a result of freezing in February, 2007. Totalizer replaced on June 25, 2008.
3. GMPW-3 well totalizer replaced on October 7, 2009.
4. GMPW-4 and GMPW-5 well totalizers replaced on June 26, 2008.

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Table 7. PT System Mass Removal Rate of Volatile Organic Compounds, Operational Year 7, Quarter Number 4 and Annual Summary, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Date Sampled	Total VOC Influent Concentration (ug/L)	Total Effluent Totalizer FQI-401 (gallons)	Total Groundwater Recovered[1] Between Sampling Intervals (gal)	Influent Concentration[2] Geometric Mean (ug/L)	Total Estimated Mass[3] Removed (lbs)
6/25/2009	187.0	673,091	NA	NA	NA
10/7/2009	165.6	763,755	90,664	176.0	0.13
			Total Estimated Mass Removed During Operational Year 7, Quarter Number 4 (lbs) =		**0.13**
			Total Estimated Mass Removed During Operational Year 7 (lbs) =		**0.46**
			Total Estimated Mass Removed Since System Startup (lbs) =		**3.49**

Notes:

NA	Not applicable.
ug/L	Micrograms per liter.
gal	Gallons.
lbs	Pounds.
VOC	Volatile organic compound.

1. Total Groundwater Recovered Between Sampling Intervals = Well Totalizer Reading for current sampling event - Well Totalizer Reading for prior sampling event.
2. Influent Concentration Geometric Mean = (Influent Concentration for prior sampling event x Influent Concentration for current sampling event) ^ (1/2).
3. Total Mass Removed = (Total Groundwater Recovered Between Sampling Intervals) x Influent Concentration Geometric Mean x 3.7854 L/gallon x (1 lb / 453,592,370 ug).

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Table 8. Concentrations of Volatile Organic Compounds Detected in Air Stripper Effluent, Operational Year 7, Groundwater Remediation System, Colesville Landfill, Broome County, New York[1].

Compounds	CAS Numbers	Sample ID: Date Sampled:	Effluent 12/17/2008 ppbv	Effluent 3/27/2009 ppbv	Effluent 6/25/2009 ppbv	Effluent 10/7/2009 ppbv
Vinyl Chloride	75-01-4		<7.8	<7.8	<8.6	<8.4
Chloroethane (Ethyl Chloride)	75-00-3		<7.8	<7.8	<8.6	<8.4
1,1-Dichloroethene (Vinylidene Chloride)	75-35-4		<7.8	<7.8	<8.6	<8.4
Methylene Chloride (Dichloromethane)	75-09-2		<7.8	<7.8	<8.6	<8.4
1,1-Dichloroethane	75-34-3		<7.8	<7.8	<8.6	<8.4
cis-1,2-Dichloroethylene	156-59-2		<7.8	<7.8	<8.6	<8.4
Chloroform	67-66-3		<7.8	<7.8	<8.6	<8.4
1,1,1-Trichloroethane (Methyl Chloroform)	71-55-6		<7.8	<7.8	<8.6	<8.4
Benzene	71-43-2		<7.8	<7.8	<8.6	<8.4
Trichloroethene	79-01-6		<7.8	<7.8	<8.6	<8.4
Toluene	108-88-3		<7.8	<7.8	<8.6	<8.4
Ethyl benzene	100-41-4		<7.8	<7.8	<8.6	<8.4
m,p-Xylene	108-38-3/106-42-3		<7.8	<7.8	<8.6	<8.4
o-Xylene	95-47-6		<7.8	<7.8	<8.6	<8.4
1,2,4-Trimethylbenzene	95-63-6		<7.8	<7.8	<8.6	<8.4
2-Propanol (Isopropyl alcohol)	67-63-0		<7.8	<7.8	<8.6	<8.4
Dichlorodifluoromethane (Freon 12)	75-71-8		<7.8	<7.8	<8.6	<8.4

Bold Constituent detected above MDL.
ppbv Parts per billion by volume.
MDL Method detection limit.

Notes:

1. Samples collected by ARCADIS personnel on the dates shown and submitted to Air Toxics Laboratories LTD. for volatile organic compound (VOC) analyses using a modified United States Environmental Protection Agency Method TO-14A.

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Table 9. Concentrations of Volatile Organic Compounds Detected in Aqueous Samples Collected from the SP-5 Spring Water Remediation System, Operational Year 7, Colesville Landfill, Broome County, New York.

Constituents	Model Technology BPJ Limits[1,2] (ug/L)	Sample ID:	SP-5 INF.	SP-5 INF.	SP-5 INF.	SP-5 INF	SP-5 EFF.	SP-5 EFF.	SP-5 EFF.	SP-5 EFF
		Date:	12/17/08	3/26/09	6/25/09	9/24/09	12/17/08	3/26/09	6/25/09	9/24/09
VOCs (units in ug/L)										
1,2,4-Trimethylbenzene	NA		<1.0	**0.89 J**	<5.0	<5.0	<1.0	**0.87 J**	<5.0	<5.0
Isopropylbenzene	NA		<1.0	**1.3 J**	<5.0	<5.0	<1.0	**1.2 J**	<5.0	<5.0
1,1,1-Trichloroethane	10		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	10		**24**	**27**	**26**	**22**	**12**	**16**	<5.0	<5.0
1,2-Dichloroethane	10-100		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Benzene	5		**2.1**	**2.1 J**	**1.8 J**	**2.0 J**	<1.0	<5.0	<5.0	<5.0
Chlorobenzene	10-25		**36**	**36**	**19**	**23**	**17**	**12**	<5.0	<5.0
Chloroethane	10		**6.4**	**9.1**	**9.6**	**7.7**	**4.7**	**7.3**	**3.8 J**	**3.6 J**
cis-1,2-Dichloroethene	10		**1.4**	**1.6 J**	**1.8 J**	**1.9 J**	<1.0	<5.0	<5.0	<5.0
Dichlorodifluoromethane	NA		<1.0	**3.2 J**	<5.0	<5.0	<1.0	**2.5 J**	<5.0	<5.0
Ethylbenzene	5		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
o-Xylene	5		<1.0	**1.4 J**	<5.0	<5.0	<1.0	**1.4 J**	<5.0	<5.0
m&p-Xylenes	5		<1.0	**1.7 J**	<5.0	<5.0	<1.0	**1.7 J**	<5.0	<5.0
Toluene	5		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	10-100		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Trichloroethene	10		**2.4**	**3.2 J**	**2.0 J**	**1.6 J**	**1.4**	**1.4 J**	<5.0	<5.0
Vinyl Chloride	10		<1.0	<5.0	<5.0	<5.0	<1.0	<5.0	<5.0	<5.0
Total VOCs			**48.3**	**87.5 J**	**60.2 J**	**58.2 J**	**23.1**	**44.4 J**	**3.8 J**	**3.6 J**

Bold Constituent detected above MDL.

ug/L	Micrograms per liter.
VOCs	Volatile organic compounds.
<	Analyte below detection limit.
INF.	Influent.
EFF.	Effluent.
NA	No BPJ limit listed.
J	Estimated value.
MDL	Method detection limit.

Notes:

1. Model Technology Best Professional Judgment (BPJ) Limits recommended for carbon adsorption with appropriate pretreatment from Attachment C of TOGS 1.2.1.
2. When a range is listed for the BPJ limit, a variation in available references was found. Recommended daily maximum limits should be in this range.

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Table 10. SP-5 Spring Water Remediation System Operating Parameters, Operational Year 7, Quarter Number 4 and Annual Summary, Colesville Landfill, Broome County, New York.

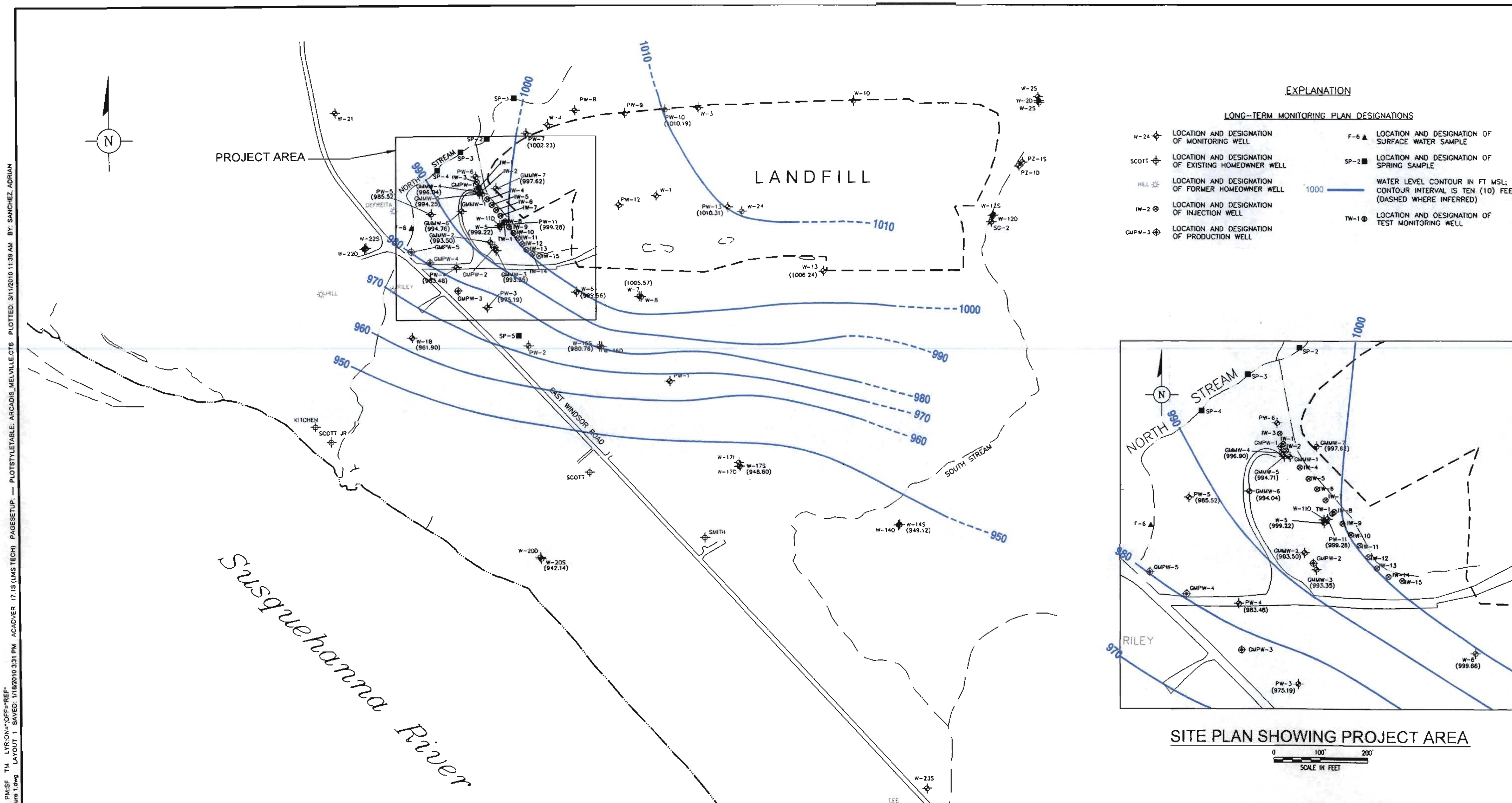
Date Sampled	Total VOC Influent Concentration (ug/L)	Effluent Flowrate (gpm)	Depth to Water (feet btc)	Total Groundwater Treated[1] Between Sampling Intervals (gal)	Influent Concentration[2] Geometric Mean (ug/L)	Total Estimated Mass[3] Removed (lbs)
6/25/2009	60.2	1.8	0.10	NA	NA	NA
9/24/2009	58.2	0.95	0.30	172,240	59.2	0.09

Total Estimated Mass Removed During Operational Year 7, Quarter Number 4 (lbs) =	**0.09**
Total Estimated Mass Removed During Operational Year 7 (lbs) =	**0.29**
Total Estimated Mass Removed Since System Startup (lbs) =	**1.10**
Total Effluent Treated During Operational Year 7 (gallons) =	**500,105**
Total Effluent Treated Since System Startup (gallons) =	**1,609,578**

Notes:

NA	Not applicable.
ug/L	Micrograms per liter.
gpm	Gallons per minute.
btc	Below top of casing.
gal	Gallons.
lbs	Pounds.
VOC	Volatile organic compound.

1. Total Spring Water Treated Between Sampling Intervals = Geometric Mean of Effluent Flowrate x 1440 min/day x days between sampling events.
2. Influent Concentration Geometric Mean = (Influent Concentration for prior sampling event x Influent Concentration for current sampling event)^(1/2).
3. Total Mass Removed = (Total Groundwater Treated Between Sampling Intervals) x Influent Concentration Geometric Mean x 3.7854 L/gallon x (1 lb / 453,592,370 ug).



EXPLANATION
LONG-TERM MONITORING PLAN DESIGNATIONS
W-24 LOCATION AND DESIGNATION OF MONITORING WELL
SCOTT LOCATION AND DESIGNATION OF EXISTING HOMEOWNER WELL
HILL LOCATION AND DESIGNATION OF FORMER HOMEOWNER WELL
IW-2 LOCATION AND DESIGNATION OF INJECTION WELL
GMPW-3 LOCATION AND DESIGNATION OF PRODUCTION WELL
F-6 LOCATION AND DESIGNATION OF SURFACE WATER SAMPLE
SP-2 LOCATION AND DESIGNATION OF SPRING SAMPLE
1000 WATER LEVEL CONTOUR IN FT MSL; CONTOUR INTERVAL IS TEN (10) FEET (DASHED WHERE INFERRED)
TW-1 LOCATION AND DESIGNATION OF TEST MONITORING WELL
PROJECT AREA
LANDFILL
Susquehanna River
EAST WINDSOR ROAD
NORTH STREAM
SOUTH STREAM
SCALE IN FEET
NOTE: ALL LOCATIONS ARE APPROXIMATE
SITE PLAN SHOWING PROJECT AREA

COLESVILLE LANDFILL
COLESVILLE, NEW YORK
MONITORING REPORT

SITE PLAN SHOWING WATER-LEVEL ELEVATIONS ON SEPTEMBER 22, 2009

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FIGURE 1

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Appendix **A**

Groundwater Sampling Logs

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/23/09
Site/Well No.	GMW(1) - 2	Replicate No.	—	Code No.	
Weather	overcast 70's	Sampling Time: Begin	1245	End	

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	none
Appearance	Clear
pH (s.u.)	6.54
Conductivity (mS/cm)	665.3 us
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	14.9
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	Rode played a PDB

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials	2	BAK
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/23/09
Site/Well No.	GSMW-5	Replicate No.	MS/MSD	Code No.	—
Weather	overcast 70	Sampling Time: Begin	1202	End	1210

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	yellow tint
Odor	mod.
Appearance	Tiny black particles
pH (s.u.)	6.31
Conductivity (mS/cm)	394.4 uS
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	16.8
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	Redeployed a PDB

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	8	HCL (MS/MSD)
Ethene, Ethane, Methane	40 ML Vials	2	
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic		HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/23/09
Site/Well No.	GMMW-6	Replicate No.	REP	Code No.	—
Weather	Cloudy 70S	Sampling Time: Begin	1230	End	1239

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons In Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	Slight
Appearance	Clear tiny Black particles
pH (s.u.)	6.37
Conductivity (mS/cm)	883.5 us
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	14.6
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	Redeployed on PDB

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials	2	
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/23/09
Site/Well No.	GMMW-7	Replicate No.	—	Code No.	
Weather	partly cloudy 70's	Sampling Time: Begin	1330	End	

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	none
Appearance	Clear
pH (s.u.)	6.21
Conductivity (mS/cm)	240.3 us
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	13.7
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	—

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials	2	BAK
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/23/09
Site/Well No.	TW-1	Replicate No.	—	Code No.	—
Weather	overcast 70°	Sampling Time: Begin	1147	End	1154

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	yellow
Odor	Strong
Appearance	Small Black particles
pH (s.u.)	6.40
Conductivity (mS/cm)	1218 us
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	14.8
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	Redeployed on PDB

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials	2	BAK
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/22/09
Site/Well No.	PLW-3	Replicate No.	—	Code No.	
Weather	Cloudy 60's	Sampling Time:	Begin 13.55	End	

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Brown
Odor	None
Appearance	Cloudy
pH (s.u.)	6.41
Conductivity (mS/cm)	500.7
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	16.9
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials		
TOC	40 ML Vials		H2SO4
Total Iron	250 ml plastic		HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/23/09
Site/Well No.	PW-4	Replicate No.	—	Code No.	
Weather	Overcast 70's	Sampling Time: Begin	1310	End	1315

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	None
Appearance	Clear
pH (s.u.)	5.56
Conductivity (mS/cm)	193 us
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	15.3
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	Redeployed a PDB.

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials	2	BAK
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/22/09
Site/Well No.	PW-5	Replicate No.	—	Code No.	
Weather	Cloudy 60's	Sampling Time: Begin	1220	End	—

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	none
Appearance	Clear
pH (s.u.)	7.02
Conductivity (mS/cm)	283.0
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	16.9
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	area around the well has dried up significantly (Still water present)

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials	2	
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/24/09
Site/Well No.	PW-7	Replicate No.	—	Code No.	—
Weather	Cloudy 70	Sampling Time: Begin	1020	End	

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin end
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Orange
Odor	None
Appearance	Cloudy
pH (s.u.)	6.01
Conductivity (mS/cm)	273.3 us
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	12.4
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	Orange Residue on the PDB Bag

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials	—	
TOC	40 ML Vials	—	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/24/09
Site/Well No.	PW-13	Replicate No.	—	Code No.	—
Weather	Cloudy 70's	Sampling Time: Begin	945	End	

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	Medium
Appearance	Tiny orange particles
pH (s.u.)	5.58
Conductivity (mS/cm)	139.3 us
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	12.7
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials	—	
TOC	40 ML Vials	—	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/23/09
Site/Well No.	W-5	Replicate No.	—	Code No.	—
Weather	Overcast 70	Sampling Time: Begin	1130	End	1140

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	~~Clear~~ Slight
Appearance	Clear
pH (s.u.)	6.31
Conductivity (mS/cm)	923.6
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	13.6
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	Redeployed a PDB

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials	2	BAK
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic		HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean see-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/22/09
Site/Well No.	W-6	Replicate No.	—	Code No.	—
Weather	Cloudy 60's	Sampling Time:	Begin 1330	End	

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	none
Appearance	Clear
pH (s.u.)	6.30
Conductivity (mS/cm)	529.7
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	12.6
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials		
TOC	40 ML Vials		H2SO4
Total Iron	250 ml plastic		HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/22/09
Site/Well No.	W-7	Replicate No.	—	Code No.	
Weather	Cloudy 60's	Sampling Time: Begin	1324	End	

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Orange
Odor	none
Appearance	Cloudy
pH (s.u.)	6.23
Conductivity (mS/cm)	490.7
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	11.9
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials	—	
TOC	40 ML Vials	—	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/22/09
Site/Well No.	(w)-145	Replicate No.	—	Code No.	—
Weather	Cloudy 65	Sampling Time: Begin	1047	End	—

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	none
Appearance	Orange Rust Particles
pH (s.u.)	5.27
Conductivity (mS/cm)	
(µmhos/cm)	103.97 us
Turbidity (NTU)	
Temperature (°C)	14.5
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials	—	
TOC	40 ML Vials	—	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/24/09
Site/Well No.	W-13	Replicate No.	—	Code No.	
Weather	Cloudy 70°	Sampling Time:	Begin 1005	End	

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin end
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	None
Appearance	Course particles
pH (s.u.)	5.93
Conductivity (mS/cm)	396.8
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	12.9
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials		
TOC	40 ML Vials		H2SO4
Total Iron	250 ml plastic		HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/22/09
Site/Well No.	W-165	Replicate No.	—	Code No.	
Weather	Cloudy 60's	Sampling Time: Begin	1128	End	—

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Cloudy
Odor	none
Appearance	Cloudy
pH (s.u.)	6.13
Conductivity (mS/cm)	395.2 us
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	14.0
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials	—	
TOC	40 ML Vials	—	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/22/09
Site/Well No.	W-175	Replicate No.	—	Code No.	—
Weather	Cloudy 60's	Sampling Time: Begin	1109	End	

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	—
Gallons Pumped/Bailed Prior to Sampling	—
Sample Pump Intake Setting (ft bmp)	—
Purge Time	begin end
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	
Odor	none
Appearance	
pH (s.u.)	5.96
Conductivity (mS/cm)	252.8 uS
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	13.30
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials	—	
TOC	40 ML Vials	—	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/24/09
Site/Well No.	W-18	Replicate No.	—	Code No.	
Weather	Cloudy, 70	Sampling Time: Begin	0925	End	

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Cloudy
Odor	None
Appearance	Cloudy
pH (s.u.)	5.76
Conductivity (mS/cm)	442.9 us
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	16.4
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials		
TOC	40 ML Vials		H2SO4
Total Iron	250 ml plastic		HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/22/09
Site/Well No.	MW-20S	Replicate No.	—	Code No.	
Weather	Cloudy 60's	Sampling Time:	Begin 1158	End	

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	
Odor	
Appearance	
pH (s.u.)	6.59
Conductivity (mS/cm)	88.95 uS
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	14.6
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials		
TOC	40 ML Vials		H2SO4
Total Iron	250 ml plastic		HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/22/09
Site/Well No.	IW-3	Replicate No.	—	Code No.	
Weather	Cloudy	Sampling Time:	Begin 4:15 (16:15)	End	

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	yellow
Odor	strong
Appearance	clear
pH (s.u.)	6.60
Conductivity (mS/cm)	525.5 uS
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	17.8
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS		HCL
Ethene, Ethane, Methane	40 ML Vials		
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic		HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minule	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/22/09
Site/Well No.	IW-8	Replicate No.	—	Code No.	—
Weather	Cloudy Cool's	Sampling Time:	Begin 1700	End	

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	dark yellow
Odor	strong
Appearance	Clear
pH (s.u.)	6.30
Conductivity (mS/cm)	1471.0 us
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	15.3
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer
Remarks	well plug covered in wet sand / dirt

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS		HCL
Ethene, Ethane, Methane	40 ML Vials		
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic		HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/22/09
Site/Well No.	IW-13	Replicate No.	—	Code No.	—
Weather	Cloudy, 60's	Sampling Time: Begin	1640	End	—

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Yellow
Odor	Strong
Appearance	Clear
pH (s.u.)	6.06
Conductivity (mS/cm)	557.2
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	15.0
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA VIALS		HCL
Ethene, Ethane, Methane	40 ML Vials		
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic		HNO3

Sampling Personnel: KB

Well Casing Volumes

Gal./Ft.				
1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	
1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47	

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Surface Water Sampling Form

Project: Colesville Landfill | Project No.: NY000949.0022 | Page: of

Site Location: Harpursville NY | Date: 9/24/09

Site/Well No.: SP-4 | Replicate No.: —

Weather: Cloudy | Sampling Time: Begin 1125 End:

Site Conditions

Water Quality Meter: Quanta

Location Condition: Cobble + Stone Brown Coating on Stones

Vegetation:

Depth of Water: 5"

Estimated Flow Rate: 5' / 12 Sec.

Collection Method: Direct collection

Field Parameters

Color	Clear
Odor	None
Appearance	Clear
pH (s.u.)	6.87
Conductivity (mS/cm)	172.6 us
Temperature (°C)	14.4
DO (mg/L)	
Turbidity (NTU)	
ORP	
Time	

Remarks:

Constituents Sampled: See COC | Sampling Personnel: KA

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Surface Water Sampling Form

Project Colesville Landfill Project No. NY000949.0022 Page 1 of 1

Site Location Harpursville NY Date 9/24/08

Site/Well No. SP-5 effluent Replicate No. —

Weather Sun 70's Sampling Time: Begin 1230 End

Site Conditions

Water Quality Meter: ~~Quanta~~ ultrameter

Location Condition: —

Vegetation: —

Depth of Water: —

Estimated Flow Rate: 600 mL / 10 Sec

Collection Method: Direct collection

Field Parameters

Color: Clear

Odor: none

Appearance: clear - trace particles

pH (s.u.): 6.51

Conductivity (mS/cm): 495.0

Temperature (°C): 16.6

DO (mg/L):

Turbidity (NTU):

ORP:

Time:

Remarks:

Constituents Sampled: See COC Sampling Personnel: KA

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	9/24/09
Site/Well No.	influent SP-5	Replicate No.	—	Code No.	
Weather	Sun 70's	Sampling Time: Begin	1222	End	

Evacuation Data

Measuring Point	Top of casing
MP Elevation (ft)	—
Land Surface Elevation (ft)	—
Sounded Well Depth (ft bmp)	4.10
Depth to Water (ft bmp)	0.30
Water-Level Elevation (ft)	
Water Column in Well (ft)	3.80
Casing Diameter/Type	2"
Gallons in Well	0.60
Gallons Pumped/Bailed Prior to Sampling	1.82
Sample Pump Intake Setting (ft bmp)	—
Purge Time	begin 1215 end
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	none
Appearance	Clear. Tiny particles
pH (s.u.)	6.31
Conductivity (mS/cm)	523.4
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	15.7
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8021 VOLATILES	40 ML VOA VIALS	2	HCL
Ethene, Ethane, Methane	40 ML Vials		
TOC			Unpres.
Total Iron			HNO3

Sampling Personnel: KA

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Milisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

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Appendix B

New York State Department of
Environmental Conservation DAR-1
Air Modeling Data

ARCADIS

Table B-1. NYSDEC DAR-1 Air Modeling Data, Operational Year 7, Quarter Number 4, Colesville Landfill, Broome County, New York.

Parameters for 10/7/09 Sampling Event			
Discharge Temperature[1]	T	510	°R
Ambient Temperature[2]	Ta	524	°R
Stack Diameter	D	6	in
Stack Radius	R	0.25	ft
Stack Area	A	0.20	ft^2
Exit Velocity	V	17.7	fps
Exit Flow	Q	208	acfm
Exit Flow	Q	215	scfm
Stack Height	h_s	17	ft
Building Height	h_b	13.25	ft
Ratio of Heights	h_s/h_b	1.28	
Plume rise credit? h_s/h_b > 1.5?	(If no, $h_e=h_s$)	(If Yes, $h_e = h_s + 1.1 (F_m)^{1/3}$)	
Momentum Flux	$F_m = T_a/T * V2 * R2$	n/a	ft^4/s^2
Effective Stack Height	h_e	17	ft
Reduction Factor? 2.5 > h_s/h_b > 1.5?		No, do not reduce impact	
Actual Annual Impact	C_a	$RF*6*Q_a/h_e^{2.25}$	
Mass Flow	Q_a	S lbs emitted for last 12 months	

°R: degrees Rankine
in: inches
ft: feet
ft^2: square feet
fps: feet per second
acfm: actual cubic feet per minute
scfm: standard cubic feet per minute
ft^4/s^2: feet to the fourth per square second

Notes/Assumptions:

1. The stack discharge temperature is 50.0 °F based on recorded parameters.
2. The ambient temperature is approximately 64.0 °F based on recorded conditions.
3. Calculations assume that the system will run with the maximum allowable concentrations between quarterly readings.

Table B-2. NYSDEC DAR-1 Air Modeling Data, Operational Year 7, Quarter Number 4, Colesville Landfill, Broome County, New York.

Calculation of the Short-Term Guideline Concentration (SGC) for Sampling Event on 10/7/2009

Compounds	CAS Numbers	Maximum Limit (SGC[2]) (ug/m^3)	Analytical Concentration (ppb)	Detection Limit Used[3]	Actual Emissions C_a (ug/m^3)	Mass/hour (lb/hr)	Maximum Potential Impact (Step III.A.3 in DAR-1)[1] (ug/m^3)	Short Term Impact (Step III.A.5 in DAR-1)[1] (ug/m^3)	Percent of the SGC (%)
Vinyl Chloride	75-01-4	180,000	8.4	*	21.82	3.07E-05	0.0052	0.34056	1.9E-04
Chloroethane (Ethyl Chloride)	75-00-3	–	8.4	*	22.53	3.16E-05	0.0054	0.35156	NA
1,1-Dichloroethene (Vinylidene Chloride)	75-35-4	380[4]	8.4	*	33.85	4.76E-05	0.0081	0.52827	1.4E-02
Methylene Chloride (Dichloromethane)	75-09-2	14,000	8.4	*	29.66	4.17E-05	0.0071	0.46283	3.3E-03
1,1-Dichloroethane	75-34-3	–	8.4	*	34.56	4.85E-05	0.0083	0.53928	NA
cis-1,2 - Dichloroethylene	156-59-2	190,000[5]	8.4	*	33.85	4.76E-05	0.0081	0.52827	2.8E-04
Chloroform	67-66-3	150	8.4	*	41.69	5.86E-05	0.0100	0.65055	4.3E-01
1,1,1-Trichloroethane (Methyl Chloroform)	71-55-6	68,000	8.4	*	46.59	6.54E-05	0.0112	0.72699	1.1E-03
Benzene	71-43-2	1,300	8.4	*	27.28	3.83E-05	0.0065	0.42561	3.3E-02
Trichloroethene	79-01-6	14,000	8.4	*	45.88	6.45E-05	0.0110	0.71599	5.1E-03
Toluene	108-88-3	37,000	8.4	*	32.17	4.52E-05	0.0077	0.50201	1.4E-03
Ethyl benzene	100-41-4	54,000	8.4	*	37.07	5.21E-05	0.0089	0.57846	1.1E-03
m,p-Xylene	108-38-3/106-42-3	4,300	8.4	*	36.37	5.11E-05	0.0087	0.56745	1.3E-02
o-Xylene	95-47-6	4,300	8.4	*	37.07	5.21E-05	0.0089	0.57846	1.3E-02
1,2,4-Trimethylbenzene	95-63-6	–	8.4	*	41.97	5.90E-05	0.0101	0.65490	NA
2-Propanol (Isopropyl alcohol)	67-63-0	120,000	8.4	*	20.99	2.95E-05	0.0050	0.32748	2.7E-04
Dichlorofluoromethane (Freon 12)	75-71-8	–	8.4	*	42.22	5.93E-05	0.0101	0.65877	NA

See Notes on Next Page.

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Table B-2. NYSDEC DAR-1 Air Modeling Data, Operational Year 7, Quarter Number 4, Colesville Landfill, Broome County, New York.

Calculation of AGC based on 10/7/2009 Sampling Event

Compounds	CAS Numbers	Maximum Limit on C_a (AGC[1]) (ug/m^3)	Maximum Mass Flow Q_a (lb/yr)	Lab Data (ppb)	Detection Limit Used[2]	Actual Emissions C_a (ug/m^3)	Actual Mass Flow per Hour (lb/hr)	Actual Mass Flow per Year (lb/yr)	Percent of Annual (%)
Vinyl Chloride	75-01-4	0.11	10.76	8.4	*	21.82	1.76E-05	0.14905	1.39
Chloroethane (Ethyl Chloride)	75-00-3	10,000	978,044.97	8.4	*	22.53	1.82E-05	0.15386	0.00
1,1-Dichloroethene (Vinylidene Chloride)	75-35-4	70	6,846.31	8.4	*	33.85	2.73E-05	0.23120	0.00
Methylene Chloride (Dichloromethane)	75-09-2	2.1	205.39	8.4	*	29.66	2.39E-05	0.20256	0.10
1,1-Dichloroethane	75-34-3	0.63	61.62	8.4	*	34.56	2.79E-05	0.23602	0.38
cis-1,2-Dichloroethylene	156-59-2	63	6,161.68	8.4	*	33.85	2.73E-05	0.23120	0.00
Chloroform	67-66-3	0.04	4.21	8.4	*	41.69	3.36E-05	0.28472	6.77
1,1,1-Trichloroethane (Methyl Chloroform)	71-55-6	1,000	97,804.50	8.4	*	46.59	3.76E-05	0.31817	0.00
Benzene	71-43-2	0.13	12.71	8.4	*	27.28	2.20E-05	0.18627	1.47
Trichloroethene	79-01-6	0.5	48.90	8.4	*	45.88	3.70E-05	0.31336	0.64
Toluene	108-88-3	400	39,121.80	8.4	*	32.17	2.60E-05	0.21971	0.00
Ethyl benzene	100-41-4	1,000	97,804.50	8.4	*	37.07	2.99E-05	0.25317	0.00
m,p-Xylene	108-38-3/106-42-3	100	9,780.45	8.4	*	36.37	2.94E-05	0.24835	0.00
o-Xylene	95-47-6	700	68,463.15	8.4	*	37.07	2.99E-05	0.25317	0.00
1,2,4-Trimethylbenzene	95-63-6	290	28,363.30	8.4	*	41.97	3.39E-05	0.28662	0.00
2-Propanol (Isopropyl alcohol)	67-63-0	7,000	684,631.48	8.4	*	20.99	1.69E-05	0.14332	0.00
Dichlorodifluoromethane (Freon 12)	75-71-8	12,000	1,173,653.96	8.4	*	20.99	1.69E-05	0.14332	0.00

ug/m^3: micrograms per cubic meter
lb/yr: pounds per year
lb/hr: pounds per hour
ppb: parts per billion
*: analyte concentration below detection limit, detection limit was used in calculations

Notes/Assumptions:

1. AGC refers to the Annual Guideline Concentration as determined using the hand calculations in the DAR-1 AGC/SGC Tables dated September 10, 2007.
2. To be conservative the lower detection limit was used for compounds that were below the limit of detection, but are found in the influent groundwater of the Groundwater Remediation System.

ug/m^3: micrograms per cubic meter
ppb: parts per billion
*: analyte concentration below detection limit, detection limit was used in calculations
lb/hr: pounds per hour
--: no SGC listed for compound; an interim SGC was not developed for these compounds because they have low toxicity ratings, as specified in the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007.
NA: not applicable

Notes:

1. DAR-1 refers to DAR-1 AGC/SGC Tables dated September 10,2007.
2. SGC refers to the Short-Term Guideline Concentration as determined using the hand calculations in the DAR-1 AGC/SGC Tables dated September 10, 2007.
3. To be conservative the lower detection limit was used for compounds that were below the limit of detection, but are found in the influent groundwater of the Groundwater Remediation System.
4. An SGC was not provided in the DAR-1 AGC/SGC Tables, dated September 10, 2007. An interim SGC was developed based on in Section IV.A.2.b.1 of guidance provided the New York State DAR-1 Guidelines for the Control of Toxic Ambient Air Contaminants, 1991 edition. Specifically for 1,1- dichloroethene, which is not defined as a moderate-toxicity compound, the Interim SGC = (smaller of Time Weighted Average [TWA] - Threshold Limit Value or TWA - Recommended Exposure Limit)/4.2. or 1,600 µg/m^3 / 4.2 = approximately 380 µg/m^3. An interim SGC was developed for this compound because it has a moderate toxicity rating, as specified in the DAR-1 AGC/SGC Tables, dated September 10, 2007.
5. An SGC was not provided in the DAR-1 AGC/SGC Tables, dated September 10, 2007. An interim SGC was developed based on in Section IV.A.2.b.1 of guidance provided the New York State DAR-1 Guidelines for the Control of Toxic Ambient Air Contaminants, 1991 edition. Specifically for cis-1,2 dichloroethene, which is not defined as a moderate-toxicity compound, the interim SGC = (smaller of Time Weighted Average [TWA] - Threshold Limit Value or TWA - Recommended Exposure Limit)/4.2 or 790,000 µg/m^3 / 4.2 = approximately 190,000 µg/m^3. An interim SGC was developed for this compound because it has a moderate toxicity rating, as specified in the DAR-1 AGC/SGC Tables, dated September 10, 2007.

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Appendix C

Automated Reagent Injection System
Operating Parameters

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Table C-1. Automated Reagent Injection System Summary of Operational Year 7, Quarter Number 4 Injection Quantities, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Summary of Automated Reagant Injections

Date	Total Quantity of Molasses Solution Injected (gal.)	Total Quantity of Molasses Injected (gal.)	Total Quantity of Rinse Water Injected (gal.)
7/25/2009	10,416	114	134
Quarter Totals (gal.) =	**10,416**	**114**	**134**
Totals for Operational Year 7 (gal.) =	**36,838**	**378**	**582**
Totals Since Startup (gal.) =	**208,885**	**9,391**	**9,153**

Notes:

gal. Gallons

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Table C-2. Automated Reagent Injection System, Operational Year 7, Quarter Number 4 Operating Parameters, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Injection Number 61

Injection Start Date = 6/30/2009
Injection Completion Date = 7/25/2009

Molasses to Water Ratio (%) = 1.0 Programmed Mixing Time (min.)[1] = 60

Injection Well ID	Molasses Solution Injection Quantity (gal.)	Rinse Quantity (gal.)	Raw Molasses Per Well (gal.)	Min. Injection[2] Flowrate (gpm)	Max. Injection Pressure (psi)
PW-6	530[4]	5	5.3	NM	0[4]
IW-3	530	5	5.3	NM	27
IW-1	530	5	5.3	NM	26
IW-2	210	4	2.1	NM	29
GMMW-1	210	3	2.1	NM	9[4]
IW-4	140	3	1.4	NM	26
IW-5	989	4	9.9	NM	27
IW-6	989	5	9.9	NM	27
IW-7	989	7	9.9	NM	28
IW-8[3]	0	0	0.0	NM	0
IW-9	1,230[4]	20	12.3[4]	NM	0[4]
IW-10	1,230	11	12.3	NM	29
IW-11	238	13	2.4	NM	31
IW-12	1,230	13	12.3	NM	30
IW-13	1,230	15	12.3	NM	30
IW-14	140	3	1.4	NM	26
IW-15	989	18	9.9	NM	28
Totals (gal.) =	10,416	134	114.0	NA	NA

Notes:

gal.	Gallons.
min.	Minutes.
i.w.c.	Inches of water column.
psi	Pounds per square inch.
gpm	Gallons per minute.
NA	Not applicable.
NM	Not measured.
SCADA	Supervisory control and data acquisition.
1.	Programmed mixing time is calculated from the expiration time of the molasses injection countdown timer to the startup of transfer pump TP-900 during an injection sequence or from the end of transfer pump TP-600 operation to the restart of an injection during a mixing sequence.
2.	Parameter not measured due to SCADA system malfunction.
3.	Injection not conducted into IW-8 for ongoing Alternate Electron Donor Pilot test evaluation.
4.	Parameter not measured due to SCADA system malfunction. Molasses solution injection quantity and raw molasses per well reported were manually recorded during the injection.

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Appendix **D**

Degradation Trend Figures

Figure D-1. Concentrations of PCE Daughter Products Versus Time in GMMW-05

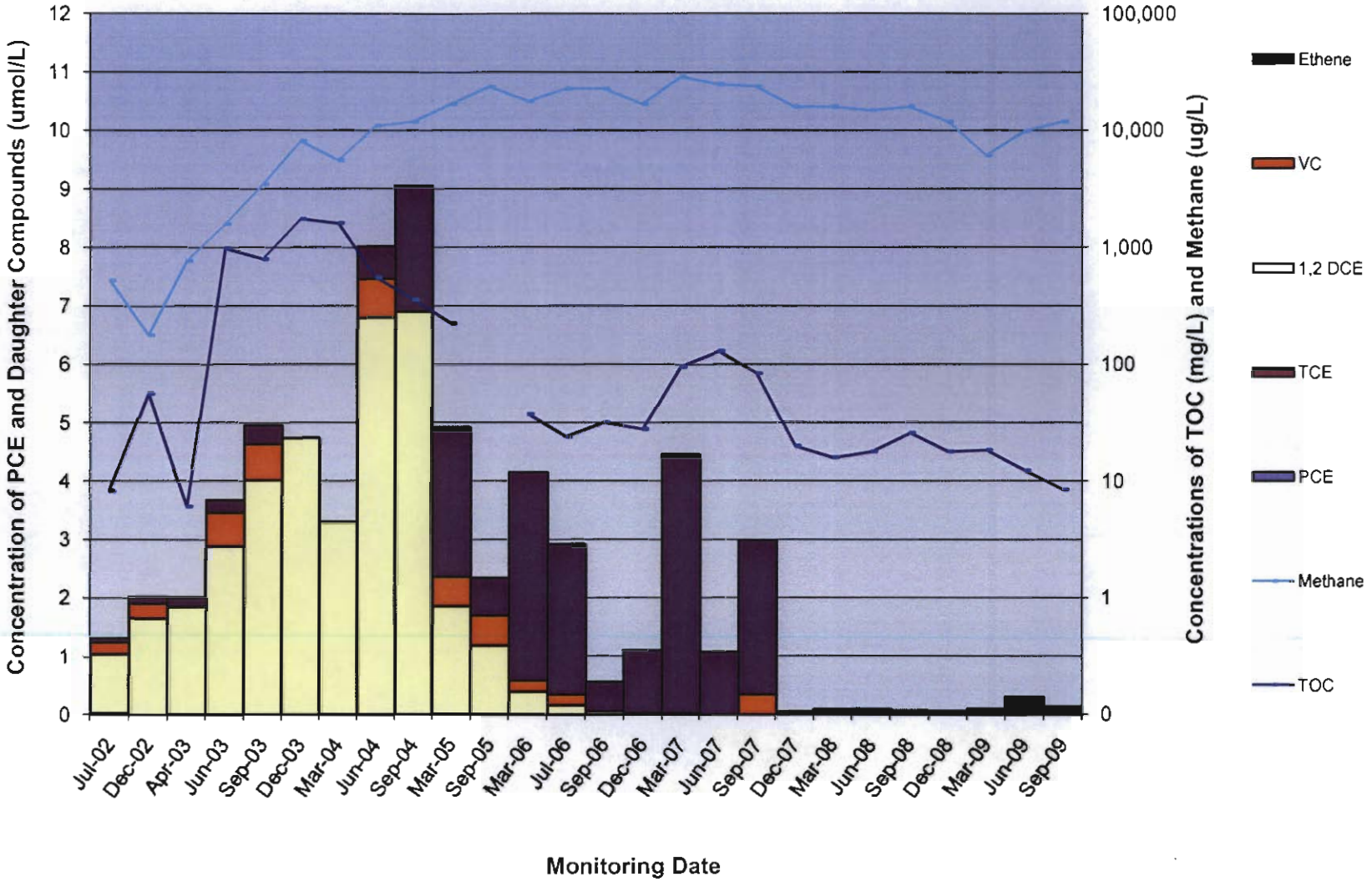

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Figure D-2. Concentrations of PCE Daughter Products Versus Time in GMMW-06

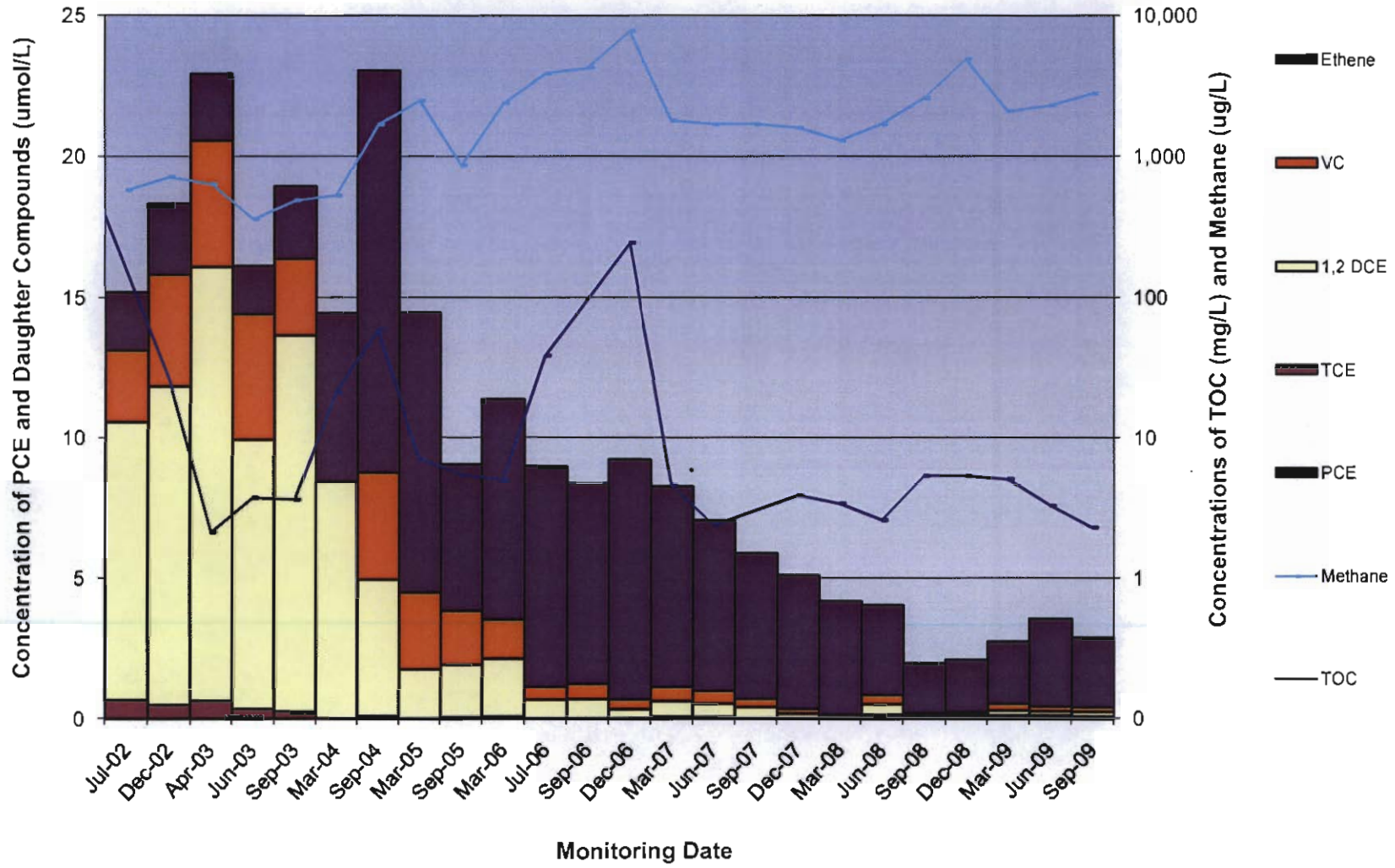

Figure D-3. Concentrations of PCE Daughter Products Versus Time in GMMW-02

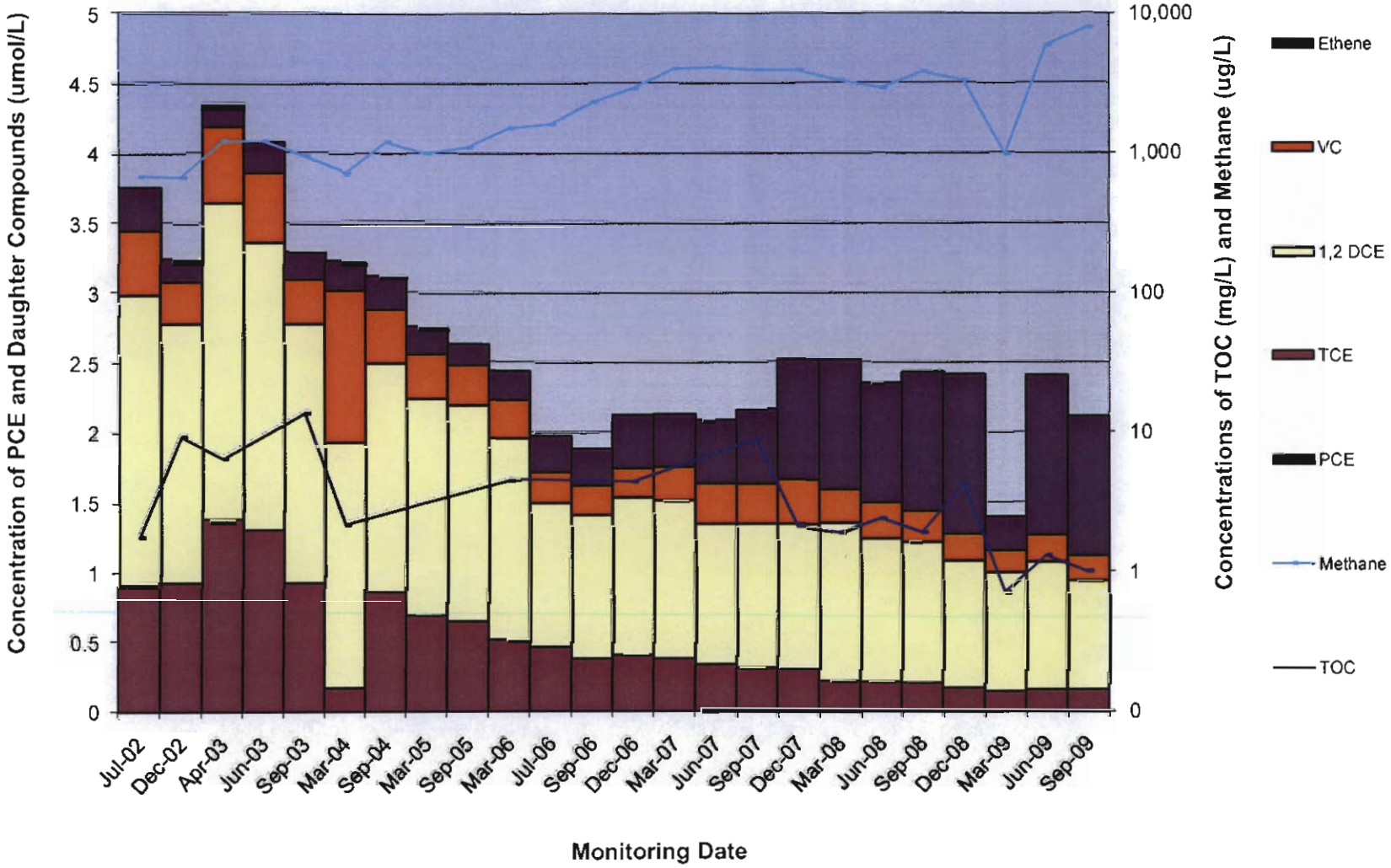

Figure D-4. Concentrations of PCE Daughter Products Versus Time in W-05

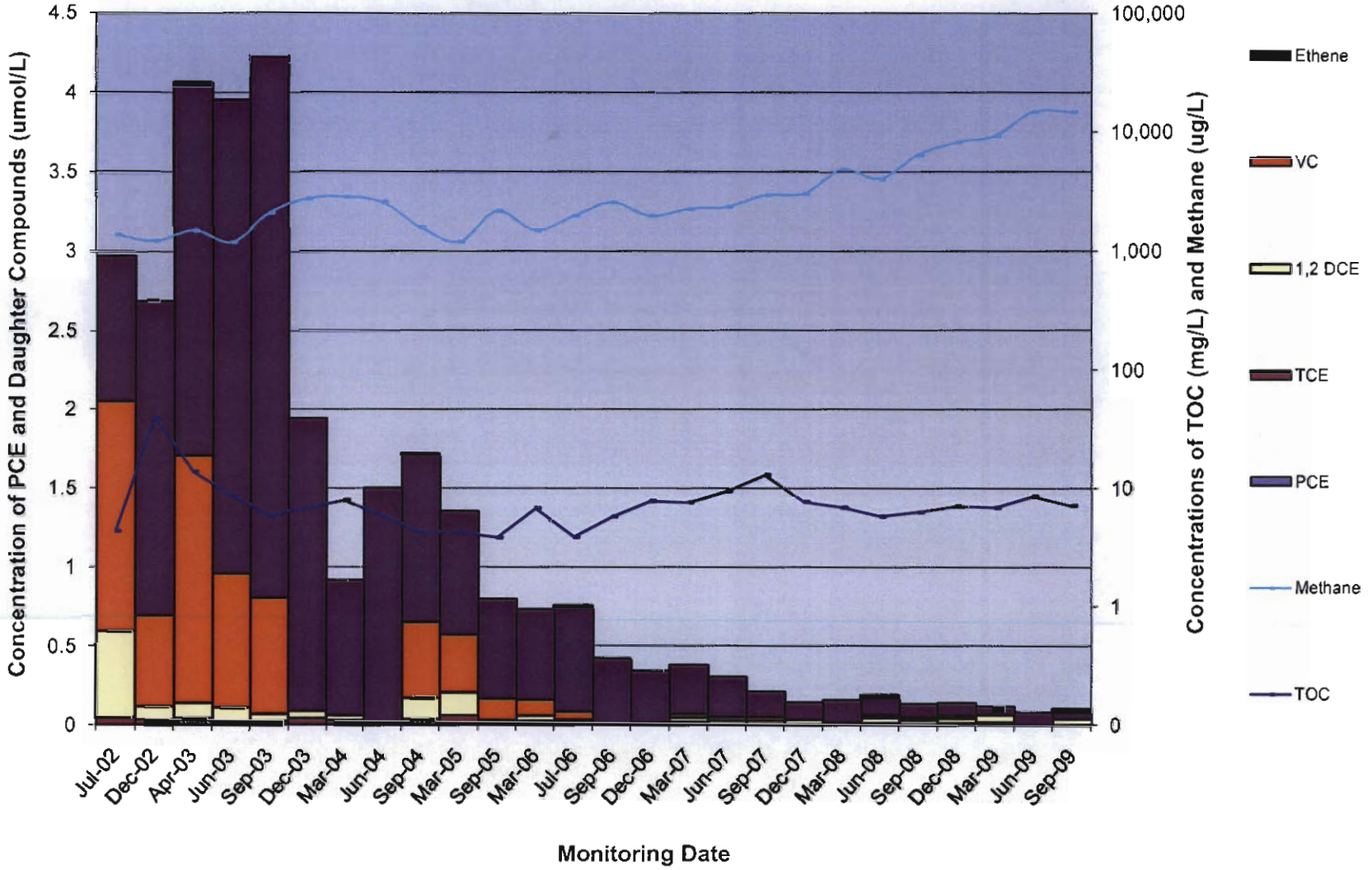

Figure D-5. Concentrations of PCE Daughter Products Versus Time in TW-1

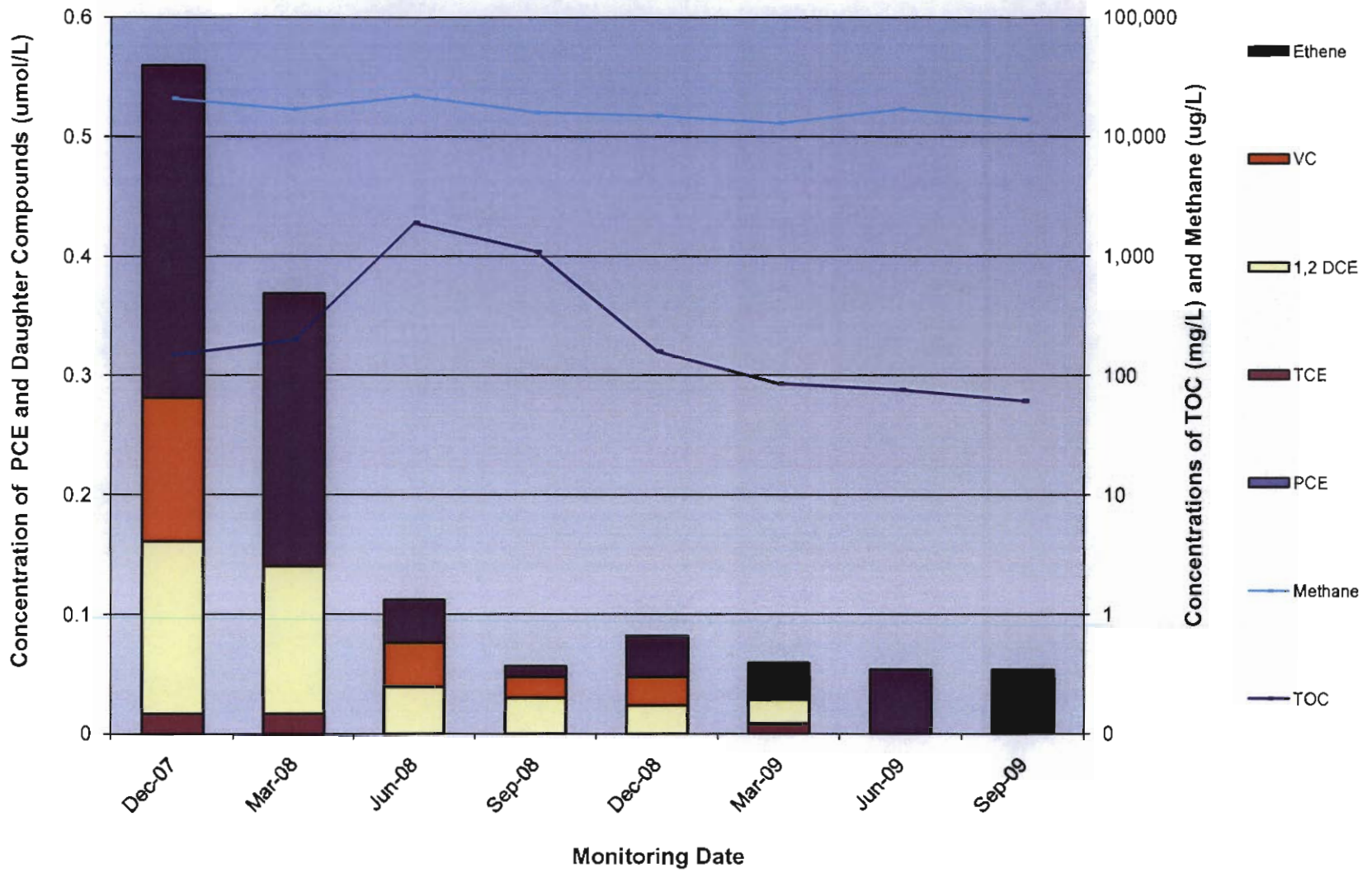

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Figure D-6. Concentrations of 1,1,1-TCA Daughter Products Versus Time in GMMW-05

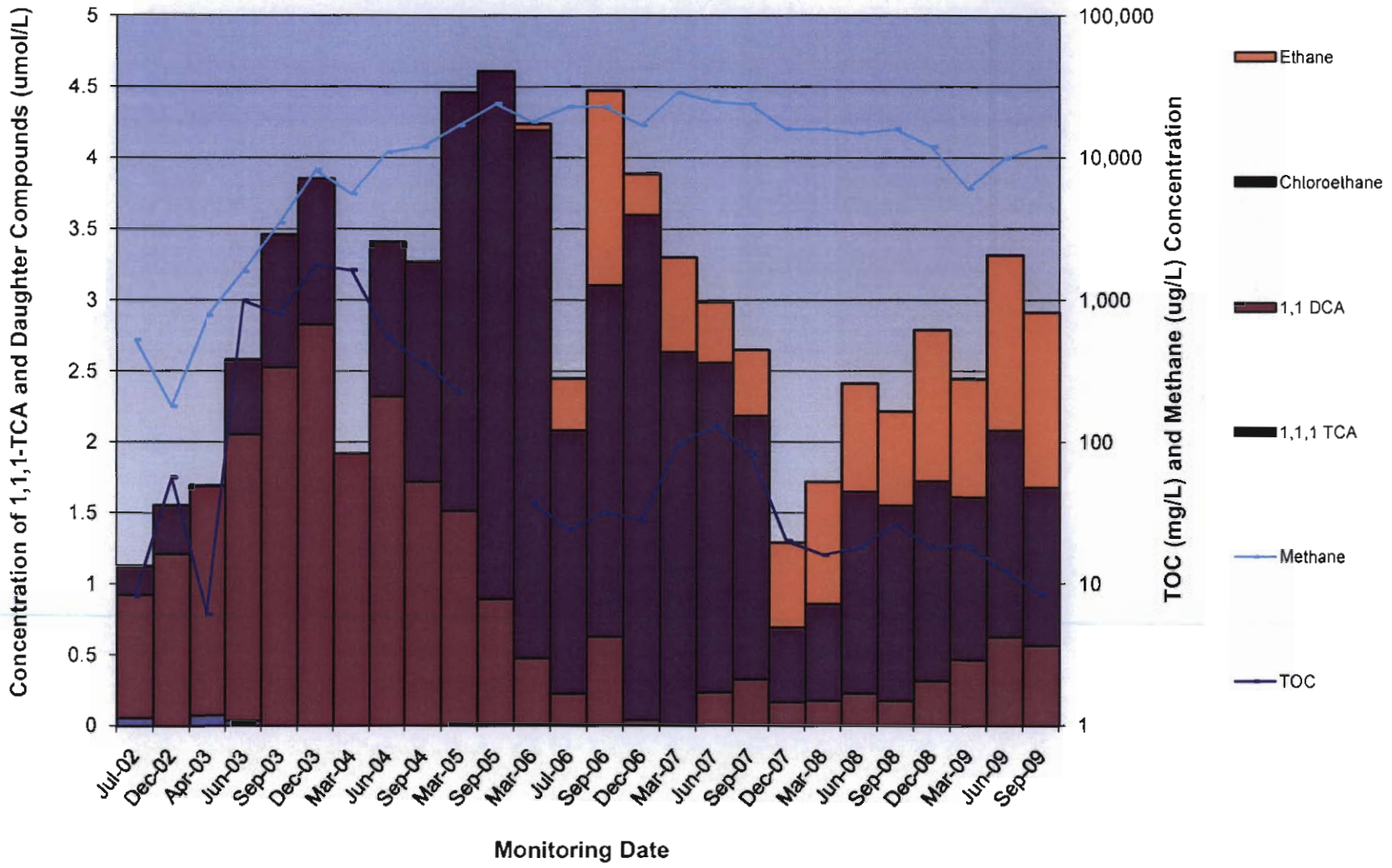

Figure D-7. Concentrations of 1,1,1-TCA Daughter Products Versus Time in GMMW-06

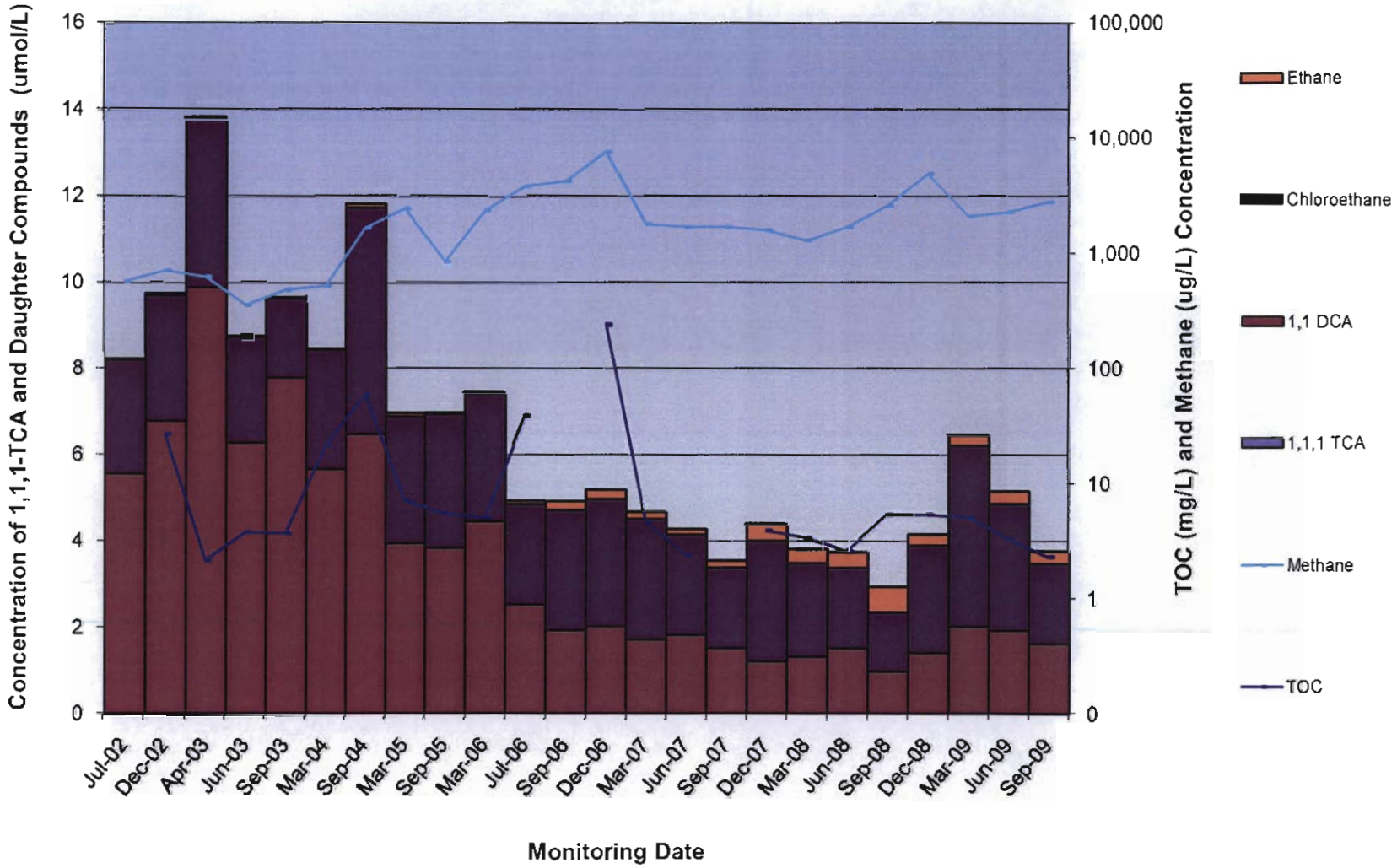

Figure D-8. Concentrations of 1,1,1-TCA Daughter Products Versus Time in GMMW-02

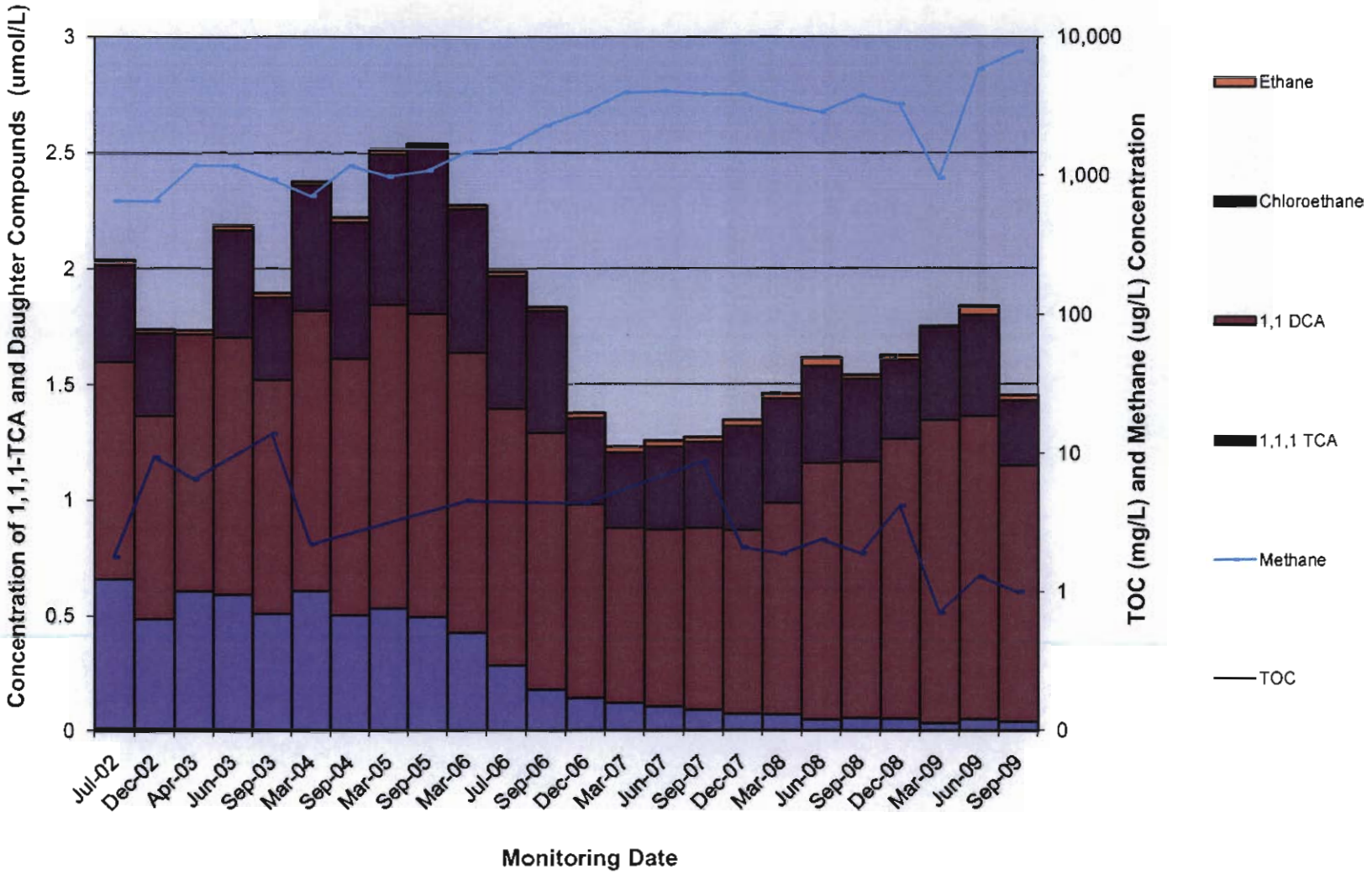

Figure D-9. Concentrations of 1,1,1-TCA Daughter Products Versus Time in W-05

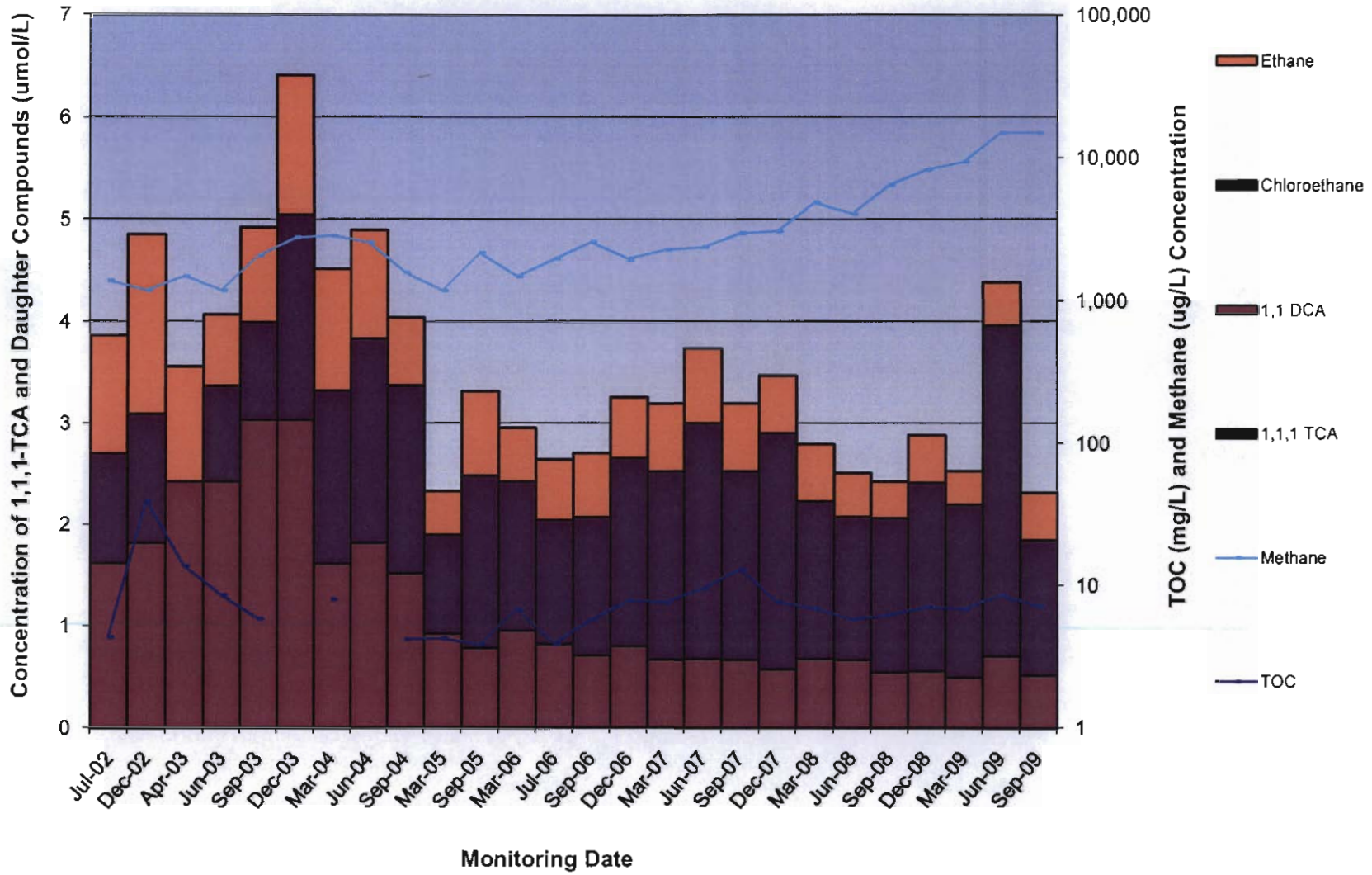

Figure D-10. Concentrations of 1,1,1-TCA Daughter Products Versus Time in TW-1