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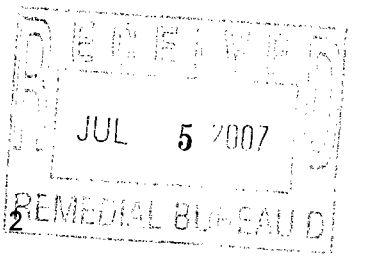

ARCADIS of New York, Inc.
Two Huntington Quadrangle
Suite 1S10
Melville
New York 11747
Tel 631 249 7600
Fax 631 249 7610
www.arcadis-us.com

ENVIRONMENT

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

Subject:
Operational Year 4 Annual Monitoring Report,
Colesville Landfill, Broome County, New York. (Site No. 704010).

Dear Mr. Jacob:

On behalf of Broome County, ARCADIS is providing the Operational Year 4 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.

Steven M. Feldman
Project Manager

Date:
July 2, 2007

Contact:
Steven M. Feldman

Phone:
(631) 391-5244

Email:
sfeldman@arcadis-us.com

Our ref:
NY000949.0019.00004

Copies:
Payson Long, NYSDEC
David Donoghue, Broome County
Julia Guastella, NYSDOH
File

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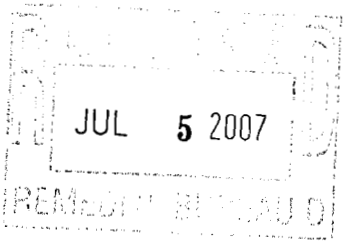

Broome County Division of Solid Waste Management

Operational Year 4 Annual Monitoring Report

Colesville Landfill, Broome County, New York

NYSDEC Site 704010

July 2, 2007

ARCADIS

Kenneth Zegel, P.E.
Senior Engineer

Steven M. Feldman
Project Director

Christina Berardi Tuohy, P.E.
Vice President
License Number 078743-1, New York

Operational Year 4
Annual Monitoring Report
Colesville Landfill,
Broome County, New York
NYSDEC Site 704010

Prepared for:
Broome County Division of Solid Waste Management

Prepared by:
ARCADIS of New York, Inc.
Two Huntington Quadrangle
Suite 1S10
Melville
New York 11747
Tel 631.249.7600
Fax 631.249.7610

Our Ref.:
NY000949.0020.00004

Date:
July 2, 2007

Tables

Figures

Appendices

1. Introduction

This Operational Year 4, Quarter Number 4 Annual Monitoring Report (Report) was prepared on behalf of the Broome County Division of Solid Waste Management to evaluate and document long-term monitoring (LTM) activities at the Colesville Landfill, located in Broome County, New York (site). Remediation and monitoring activities are being conducted pursuant to the Record of Decision (ROD) and Explanation of Significant Difference (ESD) 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 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). Where applicable these elements are either summarized or incorporated by reference herein.

This report provides the data collected from the September 2006 water-level measurement round and the results of groundwater quality monitoring conducted during Operational Year 4, Quarter Number 4 (annual monitoring event). A description of the operation, maintenance, and monitoring (OM&M) associated with the Groundwater Remediation System during Operational Year 4, Quarter Number 4 has also been included. In addition, this report describes SP-5 Spring Water Remediation System OM&M activities conducted during this quarter. Included in the analysis of results is a summary and discussion of all data collected during Operational Year 4 (September 2005 through September 2006). Following the detailed data analysis and discussion is a summary of findings, conclusions, and recommendations.

As discussed in the Operational Year 4, Quarter Number 3 Monitoring Report (ARCADIS 2007), damage occurred at the former SP-4 spring area and at recovery well GMPW-5 as a result of flooding of the North Stream. Further discussion of flood damage related sampling and/or repair progress is provided herein, where applicable.

2. Methodology

The following section provides a summary of the environmental effectiveness and remedial system performance monitoring methodology for Operational Year 4, Quarter

Number 4. A site plan, which shows the location of environmental effectiveness monitoring, is provided on Figure 1.

2.1 Environmental Effectiveness Monitoring

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

- Water-level (hydraulic) measurements were collected from 25 monitoring wells on September 20, 2006.
- Groundwater samples were collected from 18 monitoring wells (Year 4, Q4 list of wells) during the week of September 18, 2006 and were selectively analyzed for volatile organic compounds (VOCs) and select inorganic parameters. Field parameters were also recorded at these monitoring locations.
- Samples (VOCs only) were collected at the SP-4 and F-6 surface water locations on September 22, 2006.

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

Monitoring wells were purged and sampled using methods described in the LTM Plan and Proposed Modifications to Long-Term Monitoring Program.

2.2 Groundwater Remediation System Performance Monitoring

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

- Pump-and-treat (PT) system recovery well influent and effluent samples were collected during the OM&M quarterly site visit on September 22, 2006 and selectively analyzed for VOCs and total iron.
- One vapor sample from the PT system air stripper effluent was collected during the OM&M quarterly site visit on September 22, 2006 and analyzed for VOCs.
- Total organic carbon (TOC) samples were collected from injection wells IW-3, IW-8, and IW-13 on September 21, 2006.

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

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

PT system groundwater samples were collected as grab samples directly from recovery wells GMPW-3, GMPW-4, the combined influent water to the low profile air stripper, and the combined effluent after the cartridge filters. A grab sample could not be collected from recovery well GMPW-5 due to well damage caused by flooding of the North Stream. 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 22, 2006. System OM&M was conducted in accordance with the LTM Plan Addendum for Spring Water Remediation Systems (ARCADIS 2003) and consisted of recording field parameters (discharge flowrate and depth to water in treatment unit) and the collection of an influent and effluent spring water sample for analysis of VOCs. 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 riprap-lined outlet. All spring water samples were analyzed for VOCs using USEPA Method 8260.

2.4 Flood Damage Related Monitoring

At the request of the NYSDEC during a September 7, 2006 site walk, additional monitoring was conducted to investigate if surface water and/or soils or sediments were impacted as a result of the flood damage. Specifically, the following samples were collected:

- A non-routine surface water sample (VOCs only) was collected at the F-6 sampling location on September 22, 2006.

- Two additional surface water samples (VOCs only) were collected at the F-5 surface water location and at an additional location downstream of the landfill drainage culvert outfall ("DC") (See Figure 1) on September 22, 2006; and,

- Sediment samples were collected for VOCs and eight RCRA metals at the following locations:

  - Upstream of the culvert ("UC"). The sample was collected from the wetted portion of the eastern bank (landfill-side) of the North Stream at the same location as the water sample ("F-5") above.

  - At a suspected seep located on the hillside of the landfill along the North Stream ("HS"). The sample was collected from the wet seep area on the hillside immediately upstream of the culvert.

  - At the drainage culvert outfall ("CE"). The sample was collected at the base of the embankment (i.e., base of culvert).

  - Stained sediment at the former SP-4 ("SP-4") spring location. A sediment sample was collected in the vicinity of the former SP-4 spring location.

All samples were collected as grab samples directly from the North Stream (surface water) or from the soil using methods similar to those described in the LTM Plan.

3. Groundwater Flow

Water-level measurements were made from existing wells on September 20, 2006. Water-level elevation data for Operational Year 4, Quarter Number 4 is provided in Table 1. A summary of water-level elevation data for Operational Year 4 is included in this table. Water-level elevations and the groundwater flow direction for the September 2006 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 4, 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 4 was similar to prior rounds of data. Seasonal fluctuations are observed during each operating quarter; however, the data

generally indicate groundwater flow directions consistent with that observed during the Operational Year 4, Quarter Number 4 monitoring event.

4. Groundwater Quality

The following sections describe the analytical results for groundwater samples collected during the September 2006 monitoring round (Operational Year 4, Quarter Number 4). A discussion of analytical results for all data collected during Operational Year 4 is also provided. Groundwater analytical data for Operational Year 4, Quarter Number 4 is provided in Tables 2 and 3. A summary of all analytical data collected during Operational Year 4 is also provided on the referenced tables.

4.1 Volatile Organic Compounds

A comparison of Operational Year 4, Quarter Number 4 groundwater analytical results to previous analytical data indicate that the dissolved phase plume continues to be stable and that the anaerobic in-situ reactive zone (IRZ) is completely degrading contaminant mass. Specifically, total VOC (TVOC) concentrations for plume boundary, landfill interior, and landfill perimeter monitoring wells were stable to decreasing. TVOC concentrations for mid-plume monitoring wells generally decreased. 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. Total VOC (TVOC) concentrations for plume boundary monitoring wells W-17S and W-18 remained stable at 0.0 micrograms per liter (ug/L) and 48.2 ug/L, respectively. Offsite monitoring well W-20S remained stable at 0.0 ug/L. Landfill perimeter monitoring wells W-13, W-6, and W-7 remained stable at 0.0 ug/L, 48.9, ug/L, and 10.4 ug/L respectively. Landfill perimeter monitoring well PW-7 increased from 16.4 ug/L in September 2005 to 532.5 ug/L. Landfill interior monitoring well PW-13 exhibited stable concentrations at 23.1 ug/L. Landfill interior monitoring well GMMW-7 decreased from 715.5 ug/L in September 2005 to 258.8 ug/L.

In general, TVOC concentrations in mid-plume monitoring wells which would be affected first by the IRZ were stable to decreasing during the current reporting period. Specifically, mid-plume monitoring wells W-16S and PW-4 (located furthest from the IRZ), remained stable with TVOC concentrations of 55.0 ug/L and 67.4 ug/L, respectively. TVOC concentrations in mid-plume monitoring well PW-3 (also located furthest from the IRZ) decreased from 134.9 ug/L in September 2005 to 86.1 ug/L. As

shown in Table 2, TVOC concentrations in mid-plume monitoring wells located closest to the IRZ (GMMW-5, GMMW-6, W-5 and GMMW-2) decreased from the previous quarterly sampling event to 194.8 ug/L, 561.2 ug/L, 177.7 ug/L and 305.0 ug/L, respectively; mid-plume monitoring well PW-5 remained stable at 0.0 ug/L.

A comparative analysis of groundwater analytical data for VOCs during Operational Year 4 continue to corroborate historical data and indicate that the dissolved phase plume is stable with the exception of September 2006 data collected from monitoring wells PW-7 and GMMW-7 (see Section 11). However, these concentration fluctuations (both upward and downward) in areas upgradient of the IRZ are not unusual beneath a landfill. 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 a continuing decreasing trend of VOCs in monitoring wells GMMW-5, GMMW-6, W-5 and GMMW-2. It should be noted that all chloroethenes (e.g., PCE, TCE, 1,2-DCE, and VC) have been reduced to below maximum contaminant levels (MCLs) in monitoring well GMMW-5.

PT system analytical VOC results are provided in Table 4. During the current reporting period, TVOC concentration at recovery wells GMPW-3 and GMPW-4 were consistent with prior rounds of data. Specifically, TVOC concentrations in recovery wells GMPW-3 and GMPW-4 were 250.2 ug/L and 417.6 ug/L, respectively. A complete evaluation of performance monitoring conducted on the PT system is provided in Section 8.1.2 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 summary, field and laboratory groundwater data for Wells GMMW-5 and GMMW-6 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 8.2.2 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. Specifically, the concentration of ethene within monitoring wells 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 4, Quarter Number 4 and continue to indicate that the IRZ has extended to the vicinity of this well. Finally, the concentration of ethane increased significantly within monitoring wells GMMW-5 and GMMW-6 during the reporting period. It is unclear if this increase is the result of sequential dechlorination of ethene or the result of dechlorination of halogentated ethanes (e.g., TCA, 1,2-DCA, etc.). Additional details on the results of biogeochemical monitoring as evidence of Groundwater Remediation System performance and effectiveness are discussed in Section 8.2.2 of this report.

5. Spring Water Quality

Spring water monitoring was not conducted during Operational Year 4, Quarter Number 4 as outlined in the LTM Plan. Nonetheless, Table 5 presents the analytical results for spring sampling locations SP-2 and SP-3 during Operational Year 4. As shown in Table 5, spring water quality remained relatively stable during the reporting year with VOC concentrations below or slightly above the limits of detection.

As discussed in the Operational Year 4, Quarter Number 3 Monitoring Report, spring water samples from the SP-2 and SP-3 spring water locations were not collected during the Operational Year 4, Quarter Number 3 period due to unsafe conditions (i.e., unstable side slopes and fallen trees) caused by flooding of the North Stream. Conditions continued to be unsafe for sample collection during the current reporting period; therefore, the SP-2 and SP-3 spring areas were not visually inspected.

6. Surface Water Quality

Table 6 presents the analytical results for surface water sampling location F-6 and SP-4 during Operational Year 4. As referenced previously, supplemental (non-routine) surface water samples were collected during the current reporting period at the request of the NYSDEC. As shown in Table 6, surface water quality remained stable during the reporting period despite the damage to the North Stream caused by flooding. Similarly, surface water quality remained stable during Operational Year 4 with VOC concentrations below or slightly above the limits of detection. The data continue to indicate that surface water is not being adversely impacted by the dissolved phase groundwater plume or the former SP-4 spring water location.

7. Status of Flood Related Damages

The following sections describe the analytical results for flood damage related surface water and soil samples collected during the September 2006 monitoring round (Operational Year 4, Quarter Number 4). In addition, a brief summary of the repair status of flood related damages to the PT system and former SP-4 spring area are provided. Flood damage related surface water analytical data is summarized in Table 12. Flood damage related soil sample analytical data is summarized in Table 13.

7.1 Analytical Data

As shown in Table 12, surface samples for the F-5 and downstream culvert locations were similar to historical surface water analytical data at the site with VOC concentrations below or slightly above the limits of detection. As shown in Table 13, soil sample analytical data was consistent with historical soil and sediment samples collected along the North Stream with various metals detected at generally low levels within or slightly above USA Background levels.

Combined, the surface water and soil analytical data indicate that surface water and soils along the North Stream were not adversely impacted as a result of the flood related damage.

7.2 Flood Related Damage Progress

As referenced in the Operational Year 4, Quarter Number 3 Monitoring Report, damage was incurred to the former SP-4 spring location and recovery well GMPW-5 as a result of flooding of the North Stream. In addition, the traditionally sampled spring locations (e.g., the SP-2 and SP-3 spring sampling locations) were made inaccessible as a result of dangerous conditions (e.g., unstable side slopes, fallen trees, etc.) along the North Stream. During the current reporting period, an inspection of flood-related damage was conducted on September 7, 2006 and was attended by David Donoghue of Broome County, Steven Feldman of ARCADIS, and Daniel Fuller and Payson Long of the NYSDEC. The reach of the North Stream between East Windsor Road and the northwest side of the landfill (i.e., approximate area of PW-7) was jointly inspected. During the inspection of flood-related damage, the soil, sediment, and surface water sampling locations for inclusion in the September sampling round were mutually agreed upon.

Subsequent to the inspection, ARCADIS was able to locate recovery well GMPW-5 on September 12, 2006. The pump was brought back on-line the same day; however, subsequent problems were encountered with operation of the pump due to fouling (sediment intrusion) of the well screen and pump.

8. Groundwater Remediation System Performance

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

8.1 PT System

The following section describes the results of the PT system performance monitoring conducted during Operational Year 4, Quarter Number 4. Included in the discussion is a brief summary of system performance during Operational Year 4.

8.1.1 Summary of Operation, Maintenance, and Monitoring

During Operational Year 4, 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. As stated previously, recovery well GMPW-5 did not operate during the majority of the current reporting period due to damage caused by flooding of the North Stream.

PT system OM&M for Operational Year 4, Quarter Number 4 was conducted on September 20 and 22, 2006 and included operation and maintenance of system equipment, the collection of system performance samples (water and vapor), and recording system operating parameters. Table 7 provides a summary of the recorded system operating parameters for the current operating period as well as an annual summary for Operational Year 4. As shown in Table 7, the total effluent groundwater recovery rate for Operational Year 4, Quarter Number 4 was approximately 0.16-gallon per minute (gpm), with individual recovery rates of 0.03-gpm and 0.13-gpm in GMPW-3 and GMPW-4, respectively. The average individual recovery well rate during Operational Year 4, Quarter Number 4 in recovery well GMPW-3 continued to be lower when compared to previous operation. ARCADIS continued to troubleshoot the cause of the decreased flow rate at GMPW-3 and now believes it is a result of a mechanical malfunction with the GMPW-3 well pump. As referenced previously, recovery well GMPW-5 was damaged as a result of flooding of the North Stream. Accordingly, this

well did not operate during the current reporting period. Recovery well GMPW-4 operated in a manner consistent with its previous operation.

A total of 12,238 gallons of groundwater was recovered during Operational Year 4, Quarter Number 4 and a total of 1,129,328 gallons of groundwater has been recovered since system startup. The low profile air stripper operated in accordance with the design specifications and had a blower discharge pressure of 8.7-inches of water column (i.w.c.) and a low profile air stripper blower flowrate of 253 standard cubic feet per minute (scfm).

The overall system pumping rate during Operational Year 4 was generally lower when compared to previous operation due to the GMPW-3 recovery well troubleshooting and damage caused by flooding of the North Stream. Accordingly, the PT system operated continuously but at a reduced capacity. As shown in Table 7, the total effluent groundwater recovery rate for Operational Year 4 was approximately 0.36-gpm, with individual recovery rates of 0.01-gpm, 0.22-gpm, and 0.14-gpm for recovery wells GMPW-3, GMPW-4, and GMPW-5, respectively. A total of 190,179 gallons of groundwater was recovered during Operational Year 4.

8.1.2 Results of Performance Sampling

PT system performance sampling for Operational Year 4, Quarter Number 4 was conducted on September 22, 2006. Four groundwater samples and one vapor sample were collected during the quarterly sampling round. Groundwater samples included the collection of individual recovery well samples (GMPW-3 and GMPW-4), 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 sampling groundwater analytical results for the Operational Year 4, Quarter Number 4 monitoring event as well as a summary of all data for Operational Year 4. 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 during Operational Year 4, Quarter Number 4. Total iron after the cartridge filters was 0.037 mg/L for the fourth quarter sampling event, which is below the BPJ recommended daily average limit of 0.61 mg/L and the 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 0.03 pounds (lbs) of VOC mass were removed from the subsurface during the

quarterly reporting period, as shown in Table 8. A total of approximately 2.03 lbs of VOCs have been removed from the subsurface since system startup.

Table 9 provides a summary of the PT system performance sampling vapor analytical results for the Operational Year 4, Quarter Number 4 monitoring event as well as a summary of all data for Operational Year 4. As shown in Table 9, trichloroethene was detected slightly above the detection limit in the air stripper effluent vapor sample during Operational Year 4, Quarter Number 4. To be conservative, a NYSDEC DAR-1 air model was calculated using the detection limit of all COCs detected in the influent groundwater. All COCs were below their respective short-term guidance concentrations (SGCs) and annual guidance concentrations (AGCs). Appendix B contains the NYSDEC DAR-1 AGC screening simulation based on the hand calculations provided in the NYSDEC DAR-1 AGC/SGC tables dated December 22, 2003.

As shown in Table 4, the PT system operated effectively during Operational Year 4 and treated influent VOCs to below their respective BPJ limits during each operational period. Total iron after the cartridge was also treated to below the BPJ recommended daily average limits during each operational period. As shown in Table 8, a total of approximately 0.41 lbs of VOC mass were recovered during Operational Year 4. Although an annual summary of NYSDEC DAR-1 screening simulations has not been provided herein, all COCs were below their respective SGCs and AGCs during each operating period of Operational Year 4.

8.2 ARI System

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

8.2.1 Summary of Operation, Maintenance, and Monitoring

The ARI system was operated intermittently during the Operational Year 4, Quarter Number 4 period due to the reduced recovery rate of the PT system. A summary of the attempted reagent injection parameters is provided below.

One reagent injection was attempted during Operational Year 4, Quarter Number 4. The injection was initiated on August 4, 2006 and was interrupted several times during the PT system troubleshooting activities referenced herein. This injection was

discontinued at injection well IW-8. Based on the number of injection events, quantity of molasses solution delivered to each injection well, and molasses solution percentage, approximately 8,612-gallons of molasses solution were delivered to the subsurface during Operational Year 4, Quarter Number 4. A total of 103,521-gallons of molasses solution have been injected since system startup. Appendix C provides a summary of the recorded system operating parameters for each of the injection events for Operational Year 4, Quarter Number 4.

Despite intermittent system shutdowns for routine OM&M, equipment repair, and damage caused by flooding of the North Stream, the ARI system operated effectively during Operational Year 4 and delivered a sufficient quantity of organic carbon to the subsurface to maintain the anaerobic IRZ. Based on the number of injection events, quantity of molasses solution delivered to each injection well, and molasses solution percentage, approximately 36,807-gallons of molasses solution was delivered to the subsurface during Operational Year 4.

8.2.2 Results of Performance Sampling

ARI system performance sampling was conducted on September 21, 2006 and included the collection of TOC samples from injection wells IW-3, IW-8, and IW-13. In addition to performance sampling conducted explicitly for ARI system monitoring, 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 4, Quarter Number 4 sampling event. 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 (CVOC) degradation products (i.e., ethene and ethane), and elevated reduced forms of alternate electron acceptors (i.e., methane). Operational Year 4, 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 4, Quarter Number 4 are as follows:

- The TOC concentration in injection wells IW-3, IW-8, and IW-13 remain elevated, indicating that sufficient organic carbon is being delivered to the subsurface.

- The ethene concentration in monitoring well GMMW-5 remained elevated [7,000 nanograms per liter (ng/L)] when compared to baseline conditions.

- The ethane concentration in monitoring well GMMW-5 increased significantly during the reporting period to 41,000 ng/L.

- The methane concentration in monitoring well GMMW-5 remained elevated at 23,000 µg/L.

- Ethane and ethene concentrations in monitoring well GMMW-6 remained elevated at 6,300 and 100,000 ng/L, respectively.

- The methane concentration in monitoring well GMMW-6 remained elevated (4,300 ug/L) when compared to baseline conditions.

As referenced previously, TVOC concentrations within monitoring wells located closest to the IRZ generally decreased during the reporting period. An evaluation of IRZ performance for Operational Year 4 is provided below.

The anaerobic IRZ continued to be maintained and completely degrade VOC mass during Operational Year 4, as evidenced by strongly reducing conditions in the vicinity of the injection wells, observation of degradation end products, and observation of reduced forms of alternate electron acceptors.

A summary of key observations for Operational Year 4 are as follows:

- Elevated TOC observed within injection wells and in well GMMW-5 indicates that sufficient organic carbon is being delivered to the subsurface to maintain the anaerobic IRZ.

- Ethene concentrations in monitoring well GMMW-5 remained an order of magnitude above baseline conditions during the operational year.

- Similarly, ethane concentrations increased by an order of magnitude in GMMW-5. As referenced previously, it is unclear if this increase is the result of

sequential dechlorination of ethene or as a result of dechlorination of halogentated ethanes (e.g., TCA, 1,2-DCA, etc.).

- Methane concentrations in monitoring wells GMMW-5 and GMMW-6 remained well above baseline conditions at 23,000 ug/L and 4,300 ug/L during the operational year; and,

- Ethene and ethane concentrations in monitoring well GMMW-6 remained significantly above baseline conditions during the operational year.

Figures D-1 and D-2 (see Appendix D) presents a summary of groundwater data for PCE and PCE related daughter compounds in monitoring wells GMMW-5 and GMMW-6 since the baseline monitoring event conducted in July 2002. As shown on Figures D-1 and D-2, the decline in contaminant mass (primarily 1,2-DCE) corresponds to a significant increase in methane and degradation end product (ethene). Furthermore, the concentration of PCE and PCE related daughter compounds is at (GMMW-5) or slightly above (GMMW-6) MCLs in both wells. This trend is typical for successful IRZs.

9. Spring Water Remediation System Performance

SP-5 Spring Water Remediation System OM&M was conducted on September 22, 2006 in accordance with the LTM Plan Addendum for Spring Water Remediation Systems (ARCADIS 2003). SP-5 Spring Water Remediation System Operational Year 4, Quarter Number 4 analytical results are provided in Table 10. A summary of all analytical results for Operational Year 4 is also provided. As shown in Table 10, nearly all effluent COCs were treated to below their respective BPJ limits via the LPGAC during the operating quarter with the exception of a slight exceedance of chloroethane. As a result of the exceedance, the LPGAC was replaced during the subsequent quarterly operating period.

Table 11 contains the SP-5 Spring Water Remediation System operational parameters recorded during the current operation quarter and provides a summary of Operational Year 4 data. As shown in Table 11, the recorded instantaneous flowrate was 0.79 gpm for the Operational Year 4, Quarter Number 4 monitoring event. Approximately 75,296 gallons of spring water was treated and approximately 0.05 lbs of mass was recovered during the Operational Year 4, Quarter Number 4 operating period. An estimated 1,109,474 gallons of spring water has been treated and an estimated 0.81 lbs of VOC mass has been recovered since system startup.

As shown in Tables 10 and 11, the SP-5 Spring Water Remediation system operated effectively during Operational Year 4 and reduced groundwater VOCs to below their respective BPJ limits during each operational period, with the exception of the slight chloroethane exceedance referenced above. An estimated 321,276 gallons of spring water was treated and an estimated 0.22 lbs of VOC mass was recovered during Operational Year 4.

10. Conclusions

Based on the data obtained from the Operational Year 4, Quarter Number 4 monitoring and overall system performance during Operational Year 4, 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 2006 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. TVOC analytical results in monitoring wells GMMW-5 and GMMW-6 decreased significantly during the operational year while the concentration of methane and ethene remained elevated. Similarly, the concentration of ethane increased significantly during the operational period.

- Site-wide groundwater analytical data for VOCs is 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. Furthermore, the concentration of TVOCs in monitoring wells GMMW-2 and W-5, which are also located within relative close proximity to the IRZ, continued to decline during Operational Year 4.

- The PT system is operating as designed and is treating recovered groundwater VOCs to below BPJ limits prior to discharge.

- Sufficient organic carbon was delivered to the subsurface to maintain the IRZ as evidenced through the analytical data.
- The SP-5 Spring Water Remediation System is operating as designed and is treating spring water VOCs to below BPJ limits prior to discharge.
- A plan has been established for the repair of flood related damages caused by flooding of the North Stream; and
- The flood related damages did not cause an adverse impact to surface water or soils along the North Stream.

11. Recommendations

ARCADIS recommends the following based on the findings presented herein:

- Resample monitoring well PW-7 as a result of the anomalous increase in TVOC concentrations.
- Inspect the status of springs SP-2 and SP-3 when conditions are made safe for such inspection.
- Continue troubleshooting of the GMPW-3 recovery well pump. Consider replacing pump and reevaluating recovery performance.
- Continue to troubleshoot recovery well GMPW-5. Consider well redevelopment and replacement of the recovery pump.

12. Project Schedule

Groundwater environmental effectiveness monitoring is scheduled to be conducted for Operational Year 5 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. In accordance with the methodology outlined in the Interim Remedial Action Report, monitoring of spring location SP-4 will be conducted from the North Stream, immediately downgradient of the former spring location.

13. 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 (Site Number 704010). November 3, 2003.

ARCADIS G&M, Inc. 2004. Interim Remedial Action Report, Colesville Landfill, Broome County, New York, NYSDEC Site 704010. September 22, 2004.

ARCADIS G&M, Inc. 2006. Operational Year 4, Quarter Number 1 Monitoring Report, Colesville Landfill, Broome County, New York, NYSDEC Site 704010. June 16, 2006.

ARCADIS of New York, Inc. 2007. Operational Year 4, Quarter Number 2 Monitoring Report, Colesville Landfill, Broome County, New York, NYSDEC Site 704010. January 17, 2007.

ARCADIS of New York, Inc. 2007. Operational Year 4, Quarter Number 3 Monitoring Report, Colesville Landfill, Broome County, New York, NYSDEC Site 704010. January 30, 2007.

ARCADIS G&M, Inc. 2005. Proposed Modifications to Long-Term Monitoring Program, Colesville Landfill, Broome County, New York, NYSDEC Site 704010. June 28, 2005.

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Table 1. Water-Level Measurements Collected During Opertational Year 4, Quarter Number 4, Colesville Landfill, Broome County, New York.

Well Identification	MP Elevation (feet above msl)	3/31/2006 Depth to Water (feet below MP)	3/31/2006 Water-Table Elevation (feet above msl)	9/20/2006 Depth to Water (feet below MP)	9/20/2006 Water-Table Elevation (feet above msl)	MP Description
GMMW-2	1030.95	35.77	995.18	36.03	994.92	Inner casing
GMMW-3	1028.02	--	--	33.76	994.26	Inner casing
GMMW-4	1042.9	--	--	45.97	996.93	Inner casing
GMMW-5	1043.66	46.46	997.20	46.86	996.80	Inner casing
GMMW-6	1033.56	37.83	995.73	38.28	995.28	Inner casing
GMMW-7	1045.43	41.67	1003.76	47.27	998.16	Inner casing
PW-1	976.23	--	--	14.80	961.43	Inner casing
PW-2	NM	--	--	6.50	--	--
PW-3	988.92	11.19	977.73	12.46	976.46	Inner casing
PW-4	1001.75	16.54	985.21	16.91	984.84	Inner casing
PW-5	986.12	0.25	AM	0	AM	Inner casing
W-5	1051.41	50.64	1000.77	51.11	1000.30	Inner casing
W-6	1050.38	48.51	1001.87	48.61	1001.77	Inner casing
PW-7	1042.47	38.27	1004.20	38.81	1003.66	Inner casing
PW-8	1049.73	--	--	38.48	1011.25	Inner casing
W-7	1049.12	41.67	1007.45	41.37	1007.75	Inner casing
PW-10	1049.29	36.92	1012.37	36.69	1012.60	Inner casing
PW-11	1052.37	--	--	51.60	1000.77	Inner casing
PW-13	1072.41	60.39	1012.02	60.27	1012.14	Inner casing
W-13	1053.43	45.67	1007.76	45.16	1008.27	Inner casing
W-14S	957.68	8.44	949.24	7.27	950.41	Inner casing
W-16S	990.33	9.04	981.29	9.60	980.73	Outer casing
W-17S	959.13	10.04	949.09	9.46	949.67	Inner casing
W-18	973.56	10.35	963.21	10.39	963.17	Inner casing
W-20S	952.88	8.65	944.23	8.80	944.08	Inner casing

msl Mean sea level.
MP Measuring point.
NM Not measured.
AM Anomalous measurement.

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Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater, Operational Year 4, 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:	12/21/2005	3/30/2006	7/27/2006	9/21/2006	12/21/2005	3/30/2006	7/27/2006	9/21/2006	12/21/2005	3/30/2006	7/27/2006
1,1,1-Trichloroethane		**30**	**24**	**19**	**16**	<1.0	<1.0	<1.0	<5.0	**4.9**	**8.2**	**6**
1,1,2-Trichloroethane		<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	**2.6**	<1.0	<5.0
1,1-Dichloroethane		**95**	**110**	**83**	**75**	**22**	**62**	**3.5**	<5.0	**370**	**440**	**250**
1,1-Dichloroethene		**2.1**	**2**	**1.3**	<5.0	<1.0	<1.1	<1.0	<5.0	**1.5**	<1.0	<5.0
1,2-Dichloroethane		<1.0	<1.0	<1.0	<5.0	**2**	<1.0	**3.5**	<5.0	**3**	<1.0	<5.0
1,2-Dichloropropane		<1.0	<1.0	<1.0	<5.0	<1.0	<1.1	<1.0	<5.0	**1.3**	<1.0	<5.0
Benzene		**3**	**2.8**	**2.9**	<5.0	**1.3**	**1.4**	**2.5**	<5.0	**6.1**	**5.9**	**7.1**
Chlorobenzene		**38**	**37**	**32**	**31**	**19**	**17**	**22**	**19**	**39**	**36**	**33**
Chloroethane		**27**	**34**	**24**	**21**	**120**	**160**	**230**	**170**	**150**	**190**	**150**
Chloroform		<1.0	<1.0	<1.0	<5.0	<1.0	<1.1	<1.0	<5.0	**1.5**	<1.0	<5.0
cis-1,2-Dichloroethene		**140**	**140**	**100**	**100**	**43**	**38**	**16**	**5.8**	**200**	**200**	**64**
Dichlorodifluoromethane		**1.1**	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	**3.6**	<1.0	<5.0
Ethylbenzene		<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<5.0
Methylene chloride		**2**	**1.4**	**1.6**	<5.0	**2.5**	**2.4**	**2.8**	<5.0	**11**	**11**	**12**
Methyl tert-butyl ether		<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<5.0
Naphthalene		<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<5.0
o-Xylene		<1.0	<1.0	<1.0	<5.0	**3.5**	**1.8**	**3.2**	<5.0	**1.2**	<1.0	<5.0
Tetrachloroethene		<1.0	<1.0	<1.0	<5.0	<1.0	<1.1	<1.0	<5.0	<1.0	<1.0	<5.0
Toluene		<1.0	<1.0	<1.0	<5.0	**3.2**	**2.8**	**4.8**	<5.0	**1.4**	<1.0	<5.0
trans-1,2-Dichloroethene		<1.0	<1.0	<1.0	<5.0	<1.0	<1.1	<1.0	<5.0	1.9 J	<1.0	<5.0
Trichloroethene		**82**	**67**	**60**	**49**	**1.6**	<1.1	<1.0	<5.0	**5.6**	**9**	<1.0
Vinyl chloride		**15**	**17**	**14**	**13**	**9.8**	**12**	**11**	<5.0	**95**	**87**	**29**
Total VOCs		**435.2**	**435.2**	**337.8**	**305.0**	**227.9**	**297.4**	**299.3**	**194.8**	**899.6**	**987.1**	**551.1**

Bold	**Constituent detected above MDL.**
VOCs	Volatile Organic Compounds.
ug/L	Micrograms per liter.
*	Field replicate.
J	Estimated value.
MDL	Method detection limit.
NA	Not analyzed.

Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater, Operational Year 4, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	GMMW-06 9/21/2006	GMMW-07 9/21/2006	PW-03 9/21/2006	PW-04 12/21/2005	PW-04 3/30/2006	PW-04 7/27/2006	PW-04 9/21/2006	PW-05 9/21/2006	PW-07 9/21/2006	PW-13 9/21/2006	W-05 12/21/2005
1,1,1-Trichloroethane		**7**	<5.0	**5.4**	**13**	**18**	**12**	**13**	<1.0	**140**	<1.0	<1.0
1,1,2-Trichloroethane		**1.8**	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane		**190**	**74**	**31**	**8.8**	**17**	**13**	**11**	<1.0	**160**	**4.9**	**72**
1,1-Dichloroethene		<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**4.9**	<1.0	<1.0
1,2-Dichloroethane		**2**	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane		**1.3**	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene		**9.5**	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.6**	<1.0	**5.2**
Chlorobenzene		**45**	**7.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**27**	**8.9**	**19**
Chloroethane		**180**	**18**	**5.3**	**2.4**	**7.2**	**2.5**	**3.2**	<1.0	**110**	**4.6**	**84**
Chloroform		<5.0	<5.0	<1.0	**1.4**	**1.4**	**1.5**	**1.2**	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene		**64**	**110**	**27**	**7.5**	**13**	**15**	**15**	<1.0	**27**	**1.3**	**3.2**
Dichlorodifluoromethane		**6.6**	<5.0	<1.0	**1.3**	**2.1**	ND	**2.0**	<1.0	<1.0	<1.0	<1.0
Ethylbenzene		**1.4**	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride		**6.8**	<5.0	<1.0	<1.0	<1.0	**1.2**	<1.0	<1.0	**1.8**	<1.0	**2.5**
Methyl tert-butyl ether		<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene		<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**9.2**	<1.0	<1.0
o-Xylene		**2.8**	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.3**
Tetrachloroethene		<5.0	<5.0	**2.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene		**3.1**	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.3**
trans-1,2-Dichloroethene		**1.8**	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene		**4.1**	**22**	**15**	**17**	**17**	**15**	**22**	<1.0	**17**	**2.2**	**3.3**
Vinyl chloride		**34**	**27**	<1.0	<1.0	**1.5**	<1.0	<1.0	<1.0	**34**	**1.2**	**5.1**
Total VOCs		**561.2**	**258.8**	**86.1**	**51.4**	**77.2**	**60.2**	**67.4**	**0.0**	**532.5**	**23.1**	**196.9**

Bold	**Constituent detected above MDL.**
VOCs	Volatile Organic Compounds.
ug/L	Micrograms per liter.
*	Field replicate.
J	Estimated value.
MDL	Method detection limit.
NA	Not analyzed.

Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater, Operational Year 4, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	W-05 3/30/2006	W-05 7/27/2006	W-05 9/21/2006	W-05* 9/21/2006	W-06 9/21/2006	W-07 3/30/2006	W-07 9/21/2006	W-13 9/21/2006	W-14S 9/21/2006	W-16S 9/21/2006	W-17S 9/21/2006
1,1,1-Trichloroethane		<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane		<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane		**94**	**81**	**70**	**77**	**16**	**13**	**3.9**	<1.0	<1.0	**24**	<1.0
1,1-Dichloroethene		<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane		<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane		<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene		**5.2**	**4.6**	**5.7**	**6.7**	**2.3**	<1.0	<1.0	<1.0	<1.0	**1.4**	<1.0
Chlorobenzene		**20**	**18**	**14**	**17**	**8.2**	**3.1**	**1.6**	<1.0	<1.0	**19**	<1.0
Chloroethane		**95**	**79**	**88**	**96**	**4.2**	**8.3**	**1.9**	<1.0	<1.0	**7.3**	<1.0
Chloroform		<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene		**3.2**	**1.7**	<5.0	<5.0	**8**	**2**	**1.8**	<1.0	<1.0	**1.3**	<1.0
Dichlorodifluoromethane		**2.3**	<1.0	<5.0	<5.0	**2.6**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene		<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride		**2.5**	**3.1**	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methyl tert-butyl ether		<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene		<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o-Xylene		<1.0	**1.1**	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene		<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene		<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene		<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene		**2.8**	**1.7**	<5.0	<5.0	**6**	**1.2**	**1.2**	<1.0	<1.0	**2**	<1.0
Vinyl chloride		**6.2**	**3.1**	<5.0	<5.0	**1.6**	**1.9**	<1.0	<1.0	<1.0	<1.0	<1.0
Total VOCs		**231.2**	**193.3**	**177.7**	**196.7**	**48.9**	**29.5**	**10.4**	**0.0**	**0.0**	**55.0**	**0.0**

Bold	**Constituent detected above MDL.**
VOCs	Volatile Organic Compounds.
ug/L	Micrograms per liter.
*	Field replicate.
J	Estimated value.
MDL	Method detection limit.
NA	Not analyzed.

Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater, Operational Year 4, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	W-18 9/21/2006	W-20S 9/21/2006	TBV092106 9/21/2006	FBV092106 9/21/2006
1,1,1-Trichloroethane		**13**	<1.0	<1.0	<1.0
1,1,2-Trichloroethane		<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane		**10**	<1.0	<1.0	<1.0
1,1-Dichloroethene		<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane		<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane		<1.0	<1.0	<1.0	<1.0
Benzene		<1.0	<1.0	<1.0	<1.0
Chlorobenzene		<1.0	<1.0	<1.0	<1.0
Chloroethane		**1.4**	<1.0	<1.0	<1.0
Chloroform		<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene		**8.8**	<1.0	<1.0	<1.0
Dichlorodifluoromethane		<1.0	<1.0	<1.0	<1.0
Ethylbenzene		<1.0	<1.0	<1.0	<1.0
Methylene chloride		<1.0	<1.0	<1.0	<1.0
Methyl tert-butyl ether		<1.0	<1.0	<1.0	<1.0
Naphthalene		<1.0	<1.0	<1.0	<1.0
o-Xylene		<1.0	<1.0	<1.0	<1.0
Tetrachloroethene		<1.0	<1.0	<1.0	<1.0
Toluene		<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene		<1.0	<1.0	<1.0	<1.0
Trichloroethene		**15**	<1.0	<1.0	<1.0
Vinyl chloride		<1.0	<1.0	<1.0	<1.0
Total VOCs		**48.2**	**0.0**	**0.0**	**0.0**

Bold	**Constituent detected above MDL.**
VOCs	Volatile Organic Compounds.
ug/L	Micrograms per liter.
*	Field replicate.
J	Estimated value.
MDL	Method detection limit.
NA	Not analyzed.

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Table 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 4, Colesville Landfill, Broome County, New York.

Parameters		Sample ID: GMMW-02 Date: 12/22/05	GMMW-02 3/30/06	GMMW-02 7/27/06	GMMW-02 9/21/06	GMMW-05 12/22/05
GENERAL CHEMISTRY						
Total Organic Carbon	mg/L	**5.07**	**4.6**	<2.0	<2.0	**84.3**
FIELD PARAMETERS						
pH	Standard units	**6.4**	**6.4**	**6.54**	**6.52**	**6.47**
Specific Conductance	mmhos/cm	**0.472**	**0.704**	**0.1245**	**0.515**	**0.603**
Turbidity	NTU	--	--	--	--	--
Dissolved Oxygen	mg/L	--	--	--	--	--
Temperature	deg C	**7.7**	**13.1**	**18.6**	**10.6**	**6**
ORP	mV	--	--	--	--	--
DISSOLVED GASES						
Carbon dioxide	mg/L	--	**220**	**180**	**240**	--
Carbon monoxide	mg/L	--	**<1.0**	**<1**	**<1**	--
Ethane	ng/L	--	**550**	**550**	**510**	--
Ethene	ng/L	--	**2,900**	**3,600**	**3,700**	--
Methane	ug/L	--	**1,500**	**1,600**	**2,300**	--
Nitrogen	mg/L	--	**23**	**14**	**20**	--
Oxygen	mg/L	--	**3.7**	**1.3**	**2.3**	--

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.

Table 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 4, Colesville Landfill, Broome County, New York.

Parameters		Sample ID: / Date:	GMMW-05 3/30/06	GMMW-05 7/27/06	GMMW-05 9/21/06	GMMW-06 12/22/05	GMMW-06 3/30/06
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L		**37.6**	**24.1**	**32**	**5**	**19.8**
FIELD PARAMETERS							
pH	Standard units		**6.07**	**6.6**	**6.34**	**6.78**	**6.59**
Specific Conductance	mmhos/cm		**0.687**	**1.039**	**0.652**	**0.869**	**1.139**
Turbidity	NTU		--	--	--	--	--
Dissolved Oxygen	mg/L		--	--	--	--	--
Temperature	deg C		**10.4**	**18.8**	**13.2**	**6.7**	**11.1**
ORP	mV		--	--	--	--	--
DISSOLVED GASES							
Carbon dioxide	mg/L		**170**	**200**	**160**	--	**210**
Carbon monoxide	mg/L		<1.0	<1.0	<1.0	--	<1.0
Ethane	ng/L		**1,400**	**11,000**	**41,000**	--	**1,500**
Ethene	ng/L		**50,000**	**36,000**	**7,000**	--	**110,000**
Methane	ug/L		**18,000**	**23,000**	**23,000**	--	**2,400**
Nitrogen	mg/L		**13**	**4.1**	**9**	--	**20**
Oxygen	mg/L		**2.6**	**0.99**	**2.7**	--	**2.9**

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.

Table 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 4, Colesville Landfill, Broome County, New York.

Parameters		Sample ID: / Date:	GMMW-06 7/27/06	GMMW-06 9/21/06	GMMW-7 9/21/06	PW-03 9/21/06	PW-04 12/22/05
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L		**38.6**	<200	<2.0	--	**2.47**
FIELD PARAMETERS							
pH	Standard units		**6.66**	**6.67**	**7.13**	**6.44**	**6.86**
Specific Conductance	mmhos/cm		**1.225**	**1.235**	**0.248**	**0.627**	**0.362**
Turbidity	NTU		--	--	--	--	--
Dissolved Oxygen	mg/L		--	--	--	--	--
Temperature	deg C		**16.3**	**11.8**	**11**	**15.2**	**7.2**
ORP	mV		--	--	--	--	--
DISSOLVED GASES							
Carbon dioxide	mg/L		**200**	**260**	**92**	--	--
Carbon monoxide	mg/L		<1.0	<1.0	<1.0	--	--
Ethane	ng/L		**2,300**	**6,300**	**420**	--	--
Ethene	ng/L		**110,000**	**100,000**	**3,000**	--	--
Methane	ug/L		**3,900**	**4,300**	**470**	--	--
Nitrogen	mg/L		**14**	**20**	**23**	--	--
Oxygen	mg/L		**1.6**	**4.2**	**4.7**	--	--

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.

Table 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 4, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	PW-04 3/30/06	PW-04 7/27/06	PW-04 9/21/06	PW-05 9/21/06	PW-07 9/21/06
GENERAL CHEMISTRY						
Total Organic Carbon	mg/L	**3.98**	ND	<2.00	<2.00	--
FIELD PARAMETERS						
pH	Standard units	**6.02**	**5.73**	**6.04**	**7.98**	**6.3**
Specific Conductance	mmhos/cm	**0.647**	**0.591**	**0.85**	**0.276**	**0.367**
Turbidity	NTU	--	--	--	--	--
Dissolved Oxygen	mg/L	--	--	--	--	--
Temperature	deg C	**10**	**17.7**	**12.5**	**12.70**	**11.50**
ORP	mV	--	--	--	--	--
DISSOLVED GASES						
Carbon dioxide	mg/L	**220**	**190**	**240**	<5.0	--
Carbon monoxide	mg/L	<1.0	<1.0	<1.0	<1.0	--
Ethane	ng/L	**70**	<25	**27**	**38**	--
Ethene	ng/L	**310**	**160**	**47**	<25	--
Methane	ug/L	**31**	**10**	**7.1**	**7.3**	--
Nitrogen	mg/L	**14**	**15**	**20**	**28**	--
Oxygen	mg/L	**2.8**	**4.2**	**6.1**	**2.3**	--

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.

Table 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 4, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	PW-13 9/21/06	W-05 12/22/05	W-05 3/30/06	W-05 7/27/06	W-05 9/21/06
GENERAL CHEMISTRY						
Total Organic Carbon	mg/L	--	**7.86**	**6.79**	**3.87**	**5.75**
FIELD PARAMETERS						
pH	Standard units	**6.19**	**5.02**	**6.77**	**6.52**	**6.64**
Specific Conductance	mmhos/cm	**0.243**	**0.839**	**0.946**	**0.417**	**0.903**
Turbidity	NTU	--	--	--	--	--
Dissolved Oxygen	mg/L	--	--	--	--	--
Temperature	deg C	**11.40**	**8.60**	**12.50**	**17.7**	**12.50**
ORP	mV	--	--	--	--	--
DISSOLVED GASES						
Carbon dioxide	mg/L	--	--	**210**	**190**	**260**
Carbon monoxide	mg/L	--	--	<1.0	<1.0	<1.0
Ethane	ng/L	--	--	**16,000**	**18,000**	**19,000**
Ethene	ng/L	--	--	**8,100**	**9,500**	**5,900**
Methane	ug/L	--	--	**1,500**	**2,000**	**2,600**
Nitrogen	mg/L	--	--	**15**	**16**	**21**
Oxygen	mg/L	--	--	**1.8**	**1.5**	**4.9**

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.

Table 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 4, Colesville Landfill, Broome County, New York.

Parameters		Sample ID: / Date:	W-06 9/20/06	W-07 9/20/06	W-13 9/20/06	W-14S 9/20/06	W-16S 9/20/06
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L		--	--	--	--	--
FIELD PARAMETERS							
pH	Standard units		**6.08**	**6.27**	**6.04**	**6.34**	**6.5**
Specific Conductance	mmhos/cm		**0.386**	**0.291**	**0.553**	**0.0783**	**0.437**
Turbidity	NTU		--	--	--	--	--
Dissolved Oxygen	mg/L		--	--	--	--	--
Temperature	deg C		**11.90**	**11.70**	**11.27**	**11.27**	**14**
ORP	mV		--	--	--	--	--
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.

Table 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 4, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	W-17S 9/20/06	W-18 9/20/06	W-20S 9/20/06	IW-02 12/22/05	IW-03 3/30/06
GENERAL CHEMISTRY						
Total Organic Carbon	mg/L	--	--	--	**4010**	**630**
FIELD PARAMETERS						
pH	Standard units	**6.4**	**6.47**	**6.15**	**4.24**	--
Specific Conductance	mmhos/cm	**0.1871**	**0.301**	**0.146**	--	--
Turbidity	NTU	--	--	--	--	--
Dissolved Oxygen	mg/L	--	--	--	--	--
Temperature	deg C	**15**	**16.2**	**14.2**	--	--
ORP	mV	--	--	--	--	--
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.

Table 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 4, Colesville Landfill, Broome County, New York.

Parameters		Sample ID: / Date:	IW-03 7/28/06	IW-03 9/21/06	IW-08 12/22/05	IW-08 3/30/06	IW-08 7/28/06
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L		**430**	**21200**	**2100**	**2000**	**274**
FIELD PARAMETERS							
pH	Standard units		**5.32**	**4.76**	**4.14**	--	**4.68**
Specific Conductance	mmhos/cm		--	--	--	--	--
Turbidity	NTU		--	--	--	--	--
Dissolved Oxygen	mg/L		--	--	--	--	--
Temperature	deg C		--	--	--	--	--
ORP	mV		--	--	--	--	--
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.

Table 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 4, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	IW-08 9/21/06	IW-13 12/22/05	IW-13 3/30/06	IW-13 7/28/06	IW-13 9/21/06
GENERAL CHEMISTRY						
Total Organic Carbon	mg/L	**5240**	**577**	**80.7**	**40.5**	**22.9**
FIELD PARAMETERS						
pH	Standard units	**4.97**	**5.43**	--	**6.26**	**6.21**
Specific Conductance	mmhos/cm	--	--	--	--	--
Turbidity	NTU	--	--	--	--	--
Dissolved Oxygen	mg/L	--	--	--	--	--
Temperature	deg C	--	--	--	--	--
ORP	mV	--	--	--	--	--
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.

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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 4, Quarter Number 4, Colesville Landfill, Broome County, New York. 5,6

Constituents	Model Technology BPJ Limits[1,2] (ug/L)	Sample ID: Date:	GMPW-3 INF 12/22/2005	GMPW-3 INF 3/30/2006	GMPW-3 INF 7/27/2006	GMPW-3 INF 9/22/2006	GMPW-4 INF 12/22/2005	GMPW-4 INF 3/30/2006	GMPW-4 INF 7/27/2006
1,1,1-Trichloroethane	10-20		**42**	**50**	**37**	**35**	**43**	**50**	**33**
1,1,2-Trichloroethane	10		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	10		**81**	**67**	**57**	**52**	**84**	**110**	**81**
1,1-Dichloroethene	10		**3.6**	**4.1**	**2.8**	**2.6**	**3.4**	**3.7**	**2.6**
1,2-Dichloroethane	10-30		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	NA		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	5		**5.2**	**5.2**	**4.7**	**4.6**	**5.5**	**5.1**	**4.6**
Chlorobenzene	NA		**2.7**		<1.0	<1.0	**4.5**	**5.8**	**6**
Chloroethane	NA		**27**	**23**	**20**	**16**	**29**	**40**	**34**
Chloroform	NA		<1.0	<1.0	<1.0	<1.0	<1.0	**1.2**	<1.0
cis-1,2-Dichloroethene	10		**88**	**110**	**83**	**73**	**91**	**120**	**84**
Dichlorodifluoromethane	NA		**1.8**	**2.4**	**1.9**	<1.0	**1.8**	**2.9**	**2.2**
Ethylbenzene	5		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride	10-50		**4.0**	**3.6**	**3.6**	**2.4**	**4.0**	**4.5**	**4.1**
Methyl tert-butyl ether	50		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene	10		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o-Xylene	5		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	10		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	5		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	10-50		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	10		**68**	**59**	**63**	**57**	**81**	**97**	**80**
Vinyl Chloride	10-50		**40**	**13**	**11**	**7.6**	**43**	**42**	**31**
Total VOCs			**363.3**	**337.3**	**284**	**250.2**	**390.2**	**482.2**	**362.5**
Metals (units in mg/L)	Model Technology BPJ Limits[3,4] (mg/L)								
Total Iron	1.2 / 0.61		**4.92**	**0.343**	**0.364**	**0.404**	**0.891**	**1.53**	**3.63**

See Notes on Last Page.

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

Constituents	Model Technolog BPJ Limits[1,2] (ug/L)	Sample ID: Date:	GMPW-4 INF 9/22/2006	GMPW-5 INF 12/22/2005	GMPW-5 INF 3/30/2006	COMBINED INF 12/22/2005	COMBINED INF 3/30/2006	COMBINED INF 7/28/2006
1,1,1-Trichloroethane	10-20		**39**	**6**	**45**	**43**	**37**	**38**
1,1,2-Trichloroethane	10		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	10		**91**	**10**	**85**	**52**	**67**	**65**
1,1-Dichloroethene	10		**3.2**	<1.0	**2.6**	**3.5**	**2.8**	**2.7**
1,2-Dichloroethane	10-30		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	NA		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	5		**5.4**	<1.0	4	**4.6**	**3.7**	**4.8**
Chlorobenzene	NA		**7.8**	<1.0	1.7	<1.0	**2.4**	**1.3**
Chloroethane	NA		**40**	**2.9**	**29**	**15**	**24**	**22**
Chloroform	NA		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	10		**94**	**13**	**110**	**88**	**82**	**85**
Dichlorodifluoromethane	NA		**3.8**	<1.0	<1.0	**1.1**	<1.0	**1.9**
Ethylbenzene	5		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride	10-50		**3.4**	<1.0	3.9	**3.1**	**2.9**	**3.8**
Methyl tert-butyl ether	50		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene	10		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o-Xylene	5		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	10		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	5		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	10-50		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	10		**86**	**5.4**	**56**	**45**	**56**	**68**
Vinyl Chloride	10-50		**44**	**2.0**	**16.0**	**12**	**22**	**15**
Total VOCs			**417.6**	**39.3**	**353.2**	**267.3**	**299.8**	**307.5**
Metals (units in mg/L)	Model Technology BPJ Limits[3,4] (mg/L)							
Total Iron	1.2 / 0.61		**1.27**	**0.285**	**1.09**	**0.533**	**2.65**	**4.9**

See Notes on Last Page.

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

Constituents	Model Technolog BPJ Limits[1,2] (ug/L)	Sample ID:	COMBINED INF	EFFLUENT AC II	EFFLUENT AC II	EFFLUENT AC II	EFFLUENT AC II
		Date:	9/22/2006	12/22/2005	3/30/2006	7/28/2006	9/22/2006
1,1,1-Trichloroethane	10-20		**34**	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	10		<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	10		**63**	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	10		**2.4**	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	10-30		<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	NA		<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	5		**4.6**	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	NA		**2.6**	<1.0	<1.0	<1.0	<1.0
Chloroethane	NA		**23**	<1.0	<1.0	<1.0	<1.0
Chloroform	NA		<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	10		**78**	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoromethane	NA		<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	5		<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride	10-50		**2.7**	<1.0	<1.0	<1.0	<1.0
Methyl tert-butyl ether	50		<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene	10		<1.0	<1.0	<1.0	<1.0	<1.0
o-Xylene	5		<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	10		<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	5		<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	10-50		<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	10		**64**	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	10-50		**18**	<1.0	<1.0	<1.0	<1.0
Total VOCs			**292.3**	**0**	**0**	**0**	**0**
Metals (units in mg/L)	Model Technology BPJ Limits[3,4] (mg/L)						
Total Iron	1.2 / 0.61		**2.57**	**0.206**	**0.072**	**0.558**	**0.037**

See Notes on Last Page.

Table 4. Concentrations of Volatile Organic Compounds and Selected Metals Detected in Aqueous Samples Collected from the PT System, Operational Year 4, Quarter Number 4, 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.
AC	After Cartridge Filter.
PT	Pump and Treat.
--	Not Analyzed or Collected.

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Table 5. Concentrations of Volatile Organic Compounds Detected in Springs, Operational Year 4, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: Date:	SP-2 12/23/2005	SP-2 3/31/2006	SP-3 12/23/2005
1,1,1-Trichloroethane		<1.0	<1.0	<1.0
1,1,2-Trichloroethane		<1.0	<1.0	<1.0
1,1-Dichloroethane		**46**	**26**	**6**
1,1-Dichloroethene		<1.0	<1.0	<1.0
1,2-Dichloroethane		<1.0	<1.0	<1.0
1,2-Dichloropropane		<1.0	<1.0	<1.0
Benzene		<1.0	<1.0	<1.0
Chlorobenzene		**2.9**	**2.5**	**1.1**
Chloroethane		**7**	<1.0	<1.0
Chloroform		<1.0	<1.0	<1.0
cis-1,2-Dichloroethene		**3.7**	**1.6**	**1.6**
Dichlorodifluoromethane		<1.0	<1.0	<1.0
Ethylbenzene		<1.0	<1.0	<1.0
Methylene chloride		<1.0	<1.0	<1.0
Methyl tert-butyl ether		<1.0	<1.0	<1.0
Naphthalene		<1.0	<1.0	<1.0
o-Xylene		<1.0	<1.0	<1.0
Tetrachloroethene		<1.0	<1.0	<1.0
Toluene		<1.0	<1.0	<1.0
trans-1,2-Dichloroethene		<1.0	<1.0	<1.0
Trichloroethene		**3.5**	**2.6**	<1.0
Vinyl chloride		**2.1**	<1.0	<1.0
Total VOCs		**65.2**	**32.7**	**8.7**

Bold **Constituent detected above MDL.**
VOCs Volatile Organic Compounds.
ug/L Micrograms per liter.
MDL Method detection limit.
NA Not analyzed.

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Table 6. Concentrations of Volatile Organic Compounds Detected in Surface Water, Operational Year 4, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: Date:	F-6 12/23/2005	F-6 7/28/2006	F-6 9/22/2006	SP-4 3/31/2006	SP-4 7/28/2006	SP-4 9/22/2006
1,1,1-Trichloroethane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane		**1.7**	**3.0**	**2.6**	**3.5**	**4.9**	**4.8**
1,1-Dichloroethene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene		<1.0	**1.1**	<1.0	<1.0	**1.7**	**1.7**
Dichlorodifluoromethane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methyl tert-butyl ether		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o-Xylene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total VOCs		**1.7**	**4.1**	**2.6**	**3.5**	**6.6**	**6.5**

Bold **Constituent detected above MDL.**
VOCs Volatile Organic Compounds.
ug/L Micrograms per liter.
MDL Method detection limit.
NA Not analyzed.

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Table 7. PT System Operating Parameters, Operational Year 4, Quarter Number 4 and Annual Summary, Groundwater Remediation System, Colesville Landfill, 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 Effluent Totalizer FQI-401 (gallons)[1]	Flow Measurements: Water Bypass Totalizer FQI-402 (gallons)[1]	Flow Measurements: GMPW-3 Totalizer FQI-101 (gallons)[1][3]	Flow Measurements: GMPW-4 Totalizer FQI-102 (gallons)[1]	Flow Measurements: GMPW-5 Totalizer FQI-103 (gallons)[2]
7/28/2006	1:10 PM	8.6	325	1,117,090.0	981,809.0	371,630.7	67,327.1	384,879.0
9/20/2006	12:27 PM	8.7	253	1,129,328.1	984,979.0	374,144.5	77,787.1	NM
Average Daily Flowrate During Reporting Period (gpm) =				**0.16**	**0.04**	**0.03**	**0.13**	**0.00**
Total Groundwater Recovered During Reporting Period (gallons) =				**12,238**	**3,170**	**2,514**	**10,460**	**0**
Average Daily Flowrate During Operational Year 4 (gpm) =				**0.36**	**0.28**	**0.01**	**0.22**	**0.14**
Total Groundwater Recovered During Operational Year 4 (gallons) =				**190,179**	**147,625**	**7,270**	**114,877**	**72,171**

Notes:

gpm	Gallons per minute.
i.w.c.	Inches of water column.
scfm	Standard cubic feet per minute.
NM	Not measured; well down due to flood damage.
1.	Flow totals taken at 16:50 9-22-06
2	GMPW-5 shutdown during reporting Year 4 Quarter 3 period due to damage caused by local flooding.
3.	GMPW-4 totalizing flow meter malfuctioned and was replaced on 12/23/2005(Year 4 Quarter 1). Average daily flow rate and total groundwater recovered during this reporting period was based on total groundwater recovered calculated by subtracting volume of groundwater recovered from GMPW-3 and GMPW-5 well from the total effluent groundwater flow recovered during this reporting period.

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Table 8. PT System Mass Removal Rate of Volatile Organic Compounds, Operational Year 4, 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)
7/28/2006	307.5	1,117,090.0	NA	NA	NA
9/20/2006	292.3	1,129,328.1	12,238.1	300	0.03
			Total Estimated Mass Removed During Operational Year 4, Quarter Number 4 (lbs) =		**0.03**
			Total Estimated Mass Removed During Operational Year 4 (lbs) =		**0.41**
			Total Estimated Mass Removed Since System Startup (lbs) =		**2.03**

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 9. Concentrations of Volatile Organic Compounds Detected in Air Stripper Effluent, Operational Year 4, Quarter Number 4, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Compounds	CAS Numbers	Sample ID: Date Sampled:	Effluent 9/22/2006 ppbv
Vinyl Chloride	75-01-4		<7.0
Chloroethane(Ethyl Chloride)	75-00-3		<7.0
1,1-Dichloroethene(Vinylidene Chloride)	75-35-4		<7.0
Methylene Chloride(Dichloromethane)	75-09-2		<7.0
1,1-Dichloroethane	75-34-3		<7.0
cis-1,2-Dichloroethylene	156-59-2		<7.0
Chloroform	67-66-3		<7.0
1,1,1-Trichloroethane(Methyl Chloroform)	71-55-6		<7.0
Benzene	71-43-2		<7.0
Trichloroethene	79-01-6		**12**
Toluene	108-88-3		<7.0
Ethyl benzene	100-41-4		<7.0
m,p-Xylene	108-38-3/106-42-3		<7.0
o-Xylene	95-47-6		<7.0
1,2,4-Trimethylbenzene	95-63-6		<7.0
2-Propanol (Isopropyl alcohol)	67-63-0		<7.0
Dichlorodifluoromethane(Freon 12)	75-71-8		<7.0

Bold Constituent detected above MDL.
ppbv: parts per billion by volume

Notes/Assumptions:

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 USEPA Method TO-14A.

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Table 10. Concentrations of Volatile Organic Compounds Detected in Aqueous Samples Collected from the SP-5 Spring Water Remediation System, Operational Year 4, Colesville Landfill, Broome County, New York.

Constituents	Model Technology BPJ Limits[1,2] (ug/L)	Sample ID: / Date:	SP-5 INF. 12/23/2005	SP-5 INF. 3/31/2006	SP-5 INF. 7/28/2006	SP-5 INF. 9/22/2006	SP-5 EFF. 12/23/2005	SP-5 EFF. 3/31/2006	SP-5 EFF. 7/28/2006	SP-5 EFF. 9/22/2006
VOCs (units in ug/L)										
1,1,1-Trichloroethane	10		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	10		**33**	**40**	**32**	**27**	<1.0	**3.9**	**5.4**	**9.6**
1,2-Dichloroethane	10-100		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	5		**2.8**	**2.8**	**3**	**2.8**	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	10-25		**24**	**33**	**31**	**34**	<1.0	**2.2**	**1.4**	<1.0
Chloroethane	10		**9.3**	**11**	**9.8**	**7.3**	**1.4**	**8.2**	**10**	**7.6**
cis-1,2-Dichloroethene	10		**1.6**	**1.9**	**1.8**	**1.8**	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoromethane	NA		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.3**
Ethylbenzene	5		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	5		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	10-100		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	10		**2.7**	**2.8**	**2**	**2.2**	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	10		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total VOCs			**73.4**	**91.5**	**79.6**	**75.1**	**1.4**	**14.3**	**16.8**	**18.5**

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.

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 11. SP-5 Spring Water Remediation System Mass Removal Rate of Volatile Organic Compounds, Operational Year 4, 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)
7/28/2006	79.6	1.10	0	NA	NA	NA
9/22/2006	75.1	0.79	0	75,296	77.3	0.05
				Total Estimated Mass Removed During Operational Year 4, Quarter Number 4 (lbs) =		**0.05**
				Total Estimated Mass Removed During Operational Year 4 (lbs) =		**0.22**
				Total Estimated Mass Removed Since System Startup (lbs) =		**0.81**
				Total Effluent Treated During Operational Year 4 (gallons) =		**321,276**
				Total Effluent Treated Since System Startup (gallons) =		**1,109,474**

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 = 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).

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Table 12. Summary of Analytical Data for Flood Damage related Surface Water Samples, Operational Year 4, Quarter Number 4, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Site ID: / Sample ID: / Date:	F5 / F-5 / 9/22/2006	DC / Downstream Culvert / 9/22/2006
1,1,1-Trichloroethane		**1.6**	<1.0
1,1,2-Trichloroethane		<1.0	<1.0
1,1-Dichloroethane		**2.1**	**4.5**
1,1-Dichloroethene		<1.0	<1.0
1,2-Dichloroethane		<1.0	<1.0
1,2-Dichloropropane		<1.0	<1.0
Benzene		<1.0	<1.0
Chlorobenzene		<1.0	<1.0
Chloroethane		<1.0	<1.0
Chloroform		<1.0	<1.0
cis-1,2-Dichloroethene		<1.0	**1.7**
Dichlorodifluoromethane		<1.0	<1.0
Ethylbenzene		<1.0	<1.0
Methylene chloride		<1.0	<1.0
Methyl tert-butyl ether		<1.0	<1.0
Naphthalene		<1.0	<1.0
o-Xylene		<1.0	<1.0
Tetrachloroethene		<1.0	<1.0
Toluene		<1.0	<1.0
trans-1,2-Dichloroethene		<1.0	<1.0
Trichloroethene		<1.0	<1.0
Vinyl chloride		<1.0	<1.0
Total VOCs		**3.7**	**6.2**

Bold **Constituent detected above MDL.**
VOCs Volatile Organic Compounds.
ug/L Micrograms per liter.
MDL Method detection limit.
NA Not analyzed.

Table 13. Summary of Analytical Data for Flood Damage Related Soil and Sediment Samples, Operational Year 4, Quarter Number 4, Colesville Landfill, Broome County, New York.

Constituents	Site ID: / Sample ID: / Date:	UC Upstream Culvert 9/22/2006	HD Hillside Seep 9/22/2006	CE Culvert Embankment 9/22/2006	SP4 SP-4 9/22/2006
VOC's	UNITS				
1,1-Dichloroethane	ug/Kg	<1.0	**2.7**	<1.0	**4.7**
1,2-Dichlorobenzene	ug/Kg	<1.0	**1.1**	<1.0	<1.0
1,4-Dichlorobenzene	ug/Kg	<1.0	**1.7**	<1.0	<1.0
Benzene	ug/Kg	<1.0	**1.6**	<1.0	<1.0
Chlorobenzene	ug/Kg	<1.0	**27**	<1.0	**1.6**
Chloroethane	ug/Kg	<1.0	<1.0	<1.0	**7.6**
cis-1,2-Dichloroethene	ug/Kg	<1.0	<1.0	<1.0	<1.0
Metals					
Arsenic	ug/g	**8.18**	**9.97**	**4.85**	**20.4**
Barium	ug/g	**50.1**	**58.8**	**33.8**	**33.5**
Cadmium	ug/g	**2.3**	**2.52**	**1.64**	**1.29**
Chromium	ug/g	**14.6**	**14.6**	**12.2**	**8.38**
Lead	ug/g	**7.73**	**6.14**	**8.24**	**6.04**
Mercury	ug/g	**12.9**	**3.19**	**8.8**	**2.93**
Selenium	ug/g	<0.429	<0.429	<0.444	<0.416
Silver	ug/g	<0.858	<0.858	<0.889	<0.831

Bold	**Constituent detected above MDL.**
1.	VOC's by EPA Method 8021
2.	Total Mercury by EPA Method 7471
3.	ICP Metals by EPA 200.7
VOCs	Volatile Organic Compounds.
ug/Kg	Micrograms per Kilogram.
ug/g	Micrograms per gram.
MDL	Method detection limit.
NA	Not analyzed.

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Appendix A

Water-Level Measurement and
Groundwater Sampling Logs,

Table 3. Field Measurements of Depth to Water in Select Wells, Colesville Landfill, Broome County, New York.

Date: 9/20/06

Well Identification		Depth to Water (feet below MP)	Comments
GMMW-2		36.03	
GMMW-3		33.76	
GMMW-4		~~16.91~~ 45.97	
GMMW-5		46.86	
GMMW-6		38.28	
GMMW-7		47.27	
PW-1		14.8	
PW-2		6.5	
PW-3		12.46	
PW-4		16.91	
PW-5		~~51.11~~ TOP OF casing 0.0	
PW-7		38.81	
PW-8		38.48	
PW-10		36.69	
PW-11		51.60	
PW-13		60.27	
W-5		51.11	
W-6		48.61	
W-7		41.37	
W-13		45.16	
W-14S		7.27	
W-16S		9.60	
W-17S		9.46	
W-18		10.39	
W-20S		8.80	

Continuing Sampling 9/20/06

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Time:	Activities: DTW	pH	Temp °C	Cond	Time
W-20S	8.8	6.15	14.2	146.0	10:42
W-13	45.16	6.04	11.27	553.0	11:20
PW-13	60.27	6.19	11.4	243.0	11:34
PW-7	38.81	6.30	11.5	367	12:05
W-7	41.37	6.29	11.7	291	12:25
W-6	48.61	6.08	11.9	386	12:40
W-14S	7.27	6.34	16.5	78.3	13:08
W-17S	9.46	6.40	15.0	187.1	13:22
W-16S	9.60	6.50	14.0	.437	13:44
W-18	10.39	6.47	16.2	301	14:02
PW-3	12.46	6.44	15.2	627	14:15
	Weather: Party cloudy Little Rain 57° - 65				
9/21/06					
	Weather - Sunny 65°				
IW-3	—	4.76	—	—	10:06
IW-8	—	4.97	—	—	10:15
IW-13	—	6.21	—	—	10:25
GMMW-5	46.86	6.34	13.2	652	1205
W5	51.11	6.64	12.5	903	12:40
GMMW-6	38.28	6.67	11.8	1235	13:02
~~GMMW-4~~ PW-4	16.91	6.04	12.5	850	13:32
GMMW-2	36.03	6.52	10.6	515	14:10
PW-5	0.0	7.98	12.7	276	14 27
GMMW-1	47.27	7.13	11.0	248	14 48

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Appendix B

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

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

Parameters for 9/20/2006 Sampling Event				
Discharge Temperature		T	522	°R
Ambient Temperature		Ta	525	°R
Stack Diameter		D	6	in
Stack Radius		R	0.25	ft
Stack Area		A	0.20	ft^2
Exit Velocity		V	21.3	fps
Exit Flow		Q	250	acfm
Exit Flow		Q	253	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	Fm = Ta/T * V2 * R2		n/a	ft^4/s^2
Effective Stack Height		h_e	17.0	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	

fps: feet per second
acfm: actual cubic feet per minute
ug/m^3: micrograms per cubic meter
lb/yr: pounds per year
lb/hr: pounds per hour
ppb: parts per billion

Notes/Assumptions:

1. The stack discharge temperature is 62 °F based on recorded parameters.
2. The ambient temperature is approximately 65 °F based on recorded conditions.
3. Calculations assume that the system will run with the maximum allowable concentrations between quarterly readings.
4. AGC refers to the Annual Guideline Concentration as determined using the hand calculations in the DAR-1 AGC/SGC Tables dated December 22, 2003.
5. 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.

Calculation of the Short-Term Guideline Concentration (SGC) for Sampling Event on 9/20/2006

Compounds	CAS Numbers	Maximum Limit (SGC) (ug/m^3)	Analytical Concentration (ppb)	Detection Limit Used	Actual Emissions C_a (ug/m^3)	Mass/hour (lb/hr)	Maximum Potential Impact (Step III.A.3 in DAR-1) (ug/m^3)	Short Term Impact (Step III.A.5 in DAR-1) (ug/m^3)	Percent of the SGC (%)
Vinyl Chloride	75-01-4	180,000	7.0	*	18.19	2.55E-05	0.0044	0.28380	1.6E-04
Chloroethane(Ethyl Chloride)	75-00-3	--	7.0	*	18.78	2.64E-05	0.0045	0.29297	NA
1,1-Dichloroethene(Vinylidene Chloride)	75-35-4	--	7.0	*	28.21	3.96E-05	0.0068	0.44023	NA
Methylene Chloride(Dichloromethane)	75-09-2	14,000	7.0	*	24.72	3.47E-05	0.0059	0.38569	2.8E-03
1,1-Dichloroethane	75-34-3	--	7.0	*	28.80	4.05E-05	0.0069	0.44940	NA
cis-1,2 - Dichloroethylene	156-59-2	--	7.0	*	28.21	3.96E-05	0.0068	0.44023	NA
1,1,1-Trichloroethane(Methyl Chloroform)	71-55-6	68,000	7.0	*	38.83	5.45E-05	0.0093	0.60583	8.9E-04
Trichloroethene	79-01-6	54,000	12.0	*	65.55	9.21E-05	0.0157	1.02284	1.9E-03
Dichlorofluoromethane(Freon 12)	75-71-8	--	7.0	*	35.18	4.94E-05	0.0084	0.54898	NA

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
NA: Not applicable

Notes:

1. DAR-1 refers to DAR-1 AGC/SGC Tables dated December 22, 2003.
2. SGC refers to the Short-Term Guideline Concentration as determined using the hand calculations in the DAR-1 AGC/SGC Tables dated December 22, 2003.
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.

Calculation of AGC based on 9/20/2006 Sampling Event

Compounds	CAS Numbers	Maximum Limit on C_a (AGC[4]) ug/m^3	Maximum Mass Flow Q_a lb/yr	Lab Data ppb	Detection Limit Used[5]	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	7	*	18.19	1.73E-05	0.14940	**1.39**
Chloroethane(Ethyl Chloride)	75-00-3	10,000	978,044.97	7	*	18.78	1.78E-05	0.15423	**0.00**
1,1-Dichloroethene(Vinylidene Chloride)	75-35-4	70	6,846.31	7	*	28.21	2.68E-05	0.23175	**0.00**
Methylene Chloride(Dichloromethane)	75-09-2	2.1	205.39	7	*	24.72	2.34E-05	0.20304	**0.10**
1,1-Dichloroethane	75-34-3	0.63	61.62	7	*	28.80	2.73E-05	0.23658	**0.38**
cis-1,2-Dichloroethylene	156-59-2	1,900	185,828.54	7	*	28.21	2.68E-05	0.23175	**0.00**
1,1,1-Trichloroethane(Methyl Chloroform)	71-55-6	1,000	97,804.50	7	*	38.83	3.68E-05	0.31892	**0.00**
Trichloroethene	79-01-6	0.5	48.90	**12**	*	65.55	6.22E-05	0.53845	**1.10**
Dichlorodifluoromethane(Freon 12)	75-71-8	12,000	1,173,653.96	7	*	17.49	1.66E-05	0.14366	**0.00**

fps: feet per second
acfm: actual cubic feet per minute
ug/m^3: micrograms per cubic meter
lb/yr: pounds per year
lb/hr: pounds per hour
ppb: parts per billion

Notes/Assumptions:

1. The stack discharge temperature is 62 °F based on recorded parameters.
2. The ambient temperature is approximately 65 °F based on recorded conditions.
3. Calculations assume that the system will run with the maximum allowable concentrations between quarterly readings.
4. AGC refers to the Annual Guideline Concentration as determined using the hand calculations in the DAR-1 AGC/SGC Tables dated December 22, 2003.
5. 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.

Appendix C

Automated Reagent Injection System
Operating Parameters

Table C-1. Automated Reagent Injection System Summary of Operational Year 4, 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.)
8/4/2006	8,612	86.1	0
Quarter Totals (gal.) =	**8,612**	**86**	**0**
Totals For Operational Year 4 (gal.) =	**36,807**	**368**	**314**
Totals Since Startup (gal.) =	**103,521**	**8,281**	**7,681**

Notes:

gal. Gallons

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

Injection Number 53

Injection Start Date =	8/4/2006		
Injection Completion Date =	NA		
Molasses to Water Ratio (%) =	1.0	Programmed Mixing Time (min.) [1] =	60

Injection Well ID	Molasses Solution Injection Quantity (gal.)	Rinse[2] Quantity (gal.)	Raw Molasses Per Well (gal.)	Min. Injection[3] Flowrate (gpm)	Max. Injection Pressure (psi)
PW-6	0	0	0.0	NM	NM
IW-3	0	0	0.0	NM	NM
IW-1	0	0	0.0	NM	NM
IW-2	0	0	0.0	NM	NM
GMMW-1	0	0	0.0	NM	NM
IW-4	0	0	0.0	NM	NM
IW-5	0	0	0.0	NM	NM
IW-6	0	0	0.0	NM	NM
IW-7	0	0	0.0	NM	NM
IW-8	482	0	4.8	NM	NM
IW-9	1,230	0	12.3	NM	32
IW-10	1,230	0	12.3	NM	32
IW-11	1,230	0	12.3	NM	31
IW-12	1,230	0	12.3	NM	31
IW-13	1,230	0	12.3	NM	30
IW-14	989	0	9.9	NM	33
IW-15	989	0	9.9	NM	34
Totals (gal.) =	8,612	0	86.1	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.
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.	Rinse quantity is approximately 1-pipeline volume for each injection well.
3.	Parameter not measured due to SCADA system malfunction.

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Appendix D

Degradation Trend Figures

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

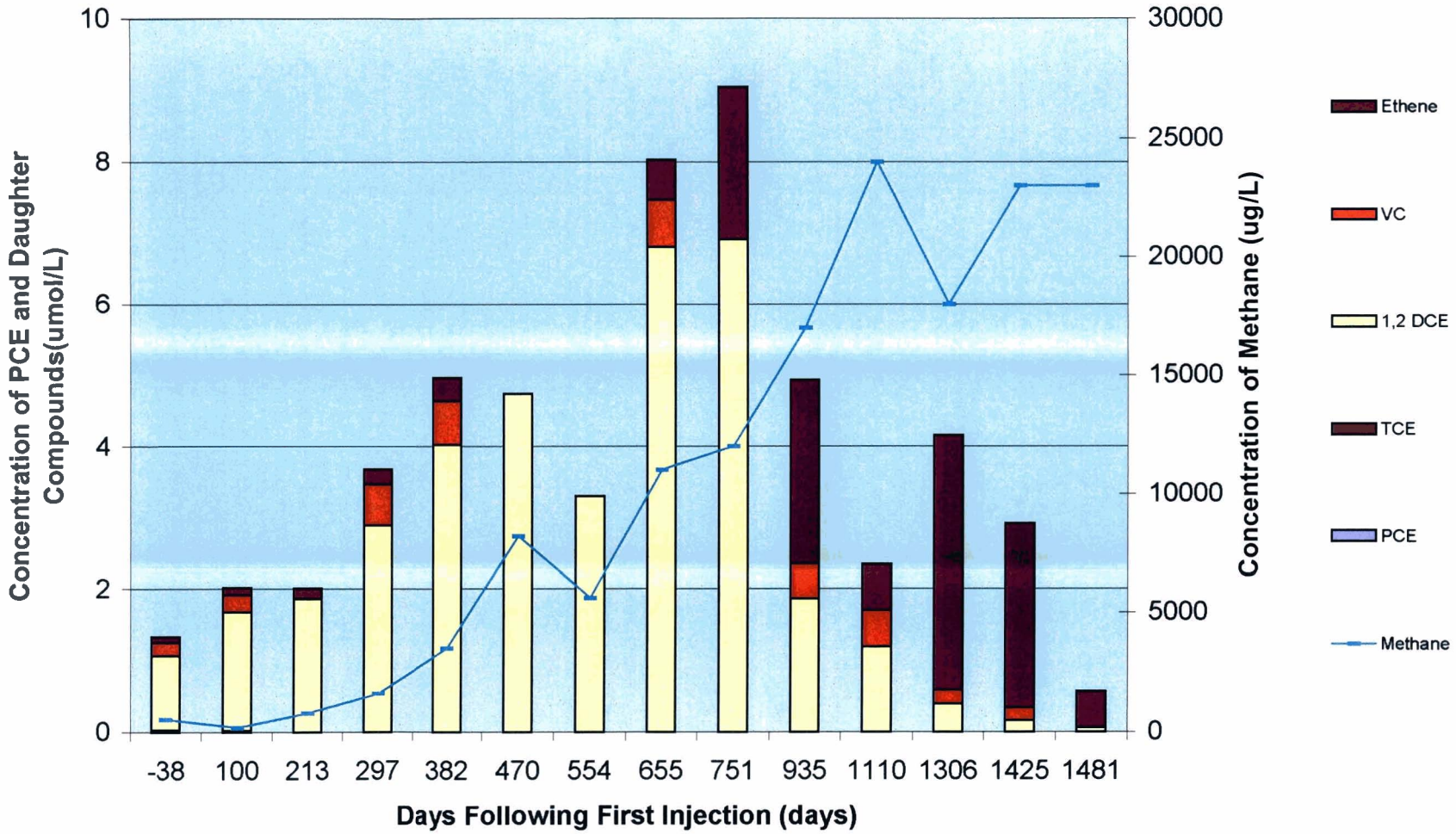

Figure D-2. Concentrations of PCE Daughter Products Versus Time in GMMW-6