



Infrastructure, environment, buildings

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Subject:

Operational Year 3 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 3 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,

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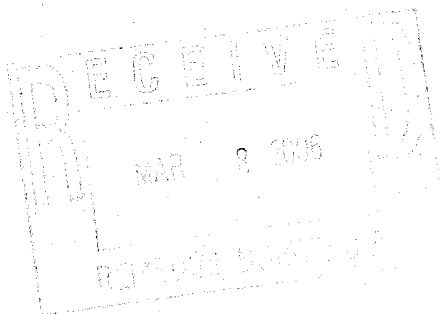
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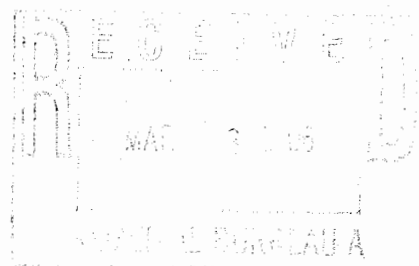
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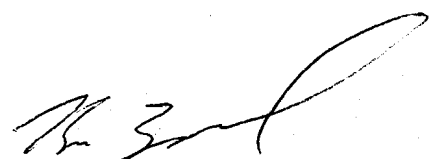
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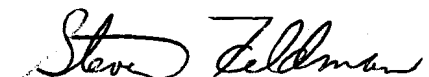
Operational Year 3 Annual Monitoring Report

**Colesville Landfill,
Broome County, New York
NYSDEC Site 704010**

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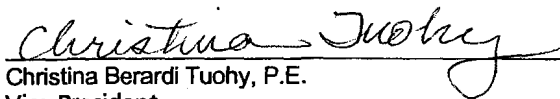


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**Operational Year 3
Annual Monitoring Report**

Colesville Landfill,
Broome County, New York
NYSDEC Site 704010

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Broome County Division of Solid Waste
Management

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1. Introduction

This Operational Year 3, 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 2005 water-level measurement round and the results of groundwater quality monitoring conducted during Operational Year 3, 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 3, 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 3 (September 2004 through September 2005). 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 3, 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 3, Quarter Number 4 included the following:

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- Water-level (hydraulic) measurements were collected from 18 monitoring wells on September 13, 2005.
- In accordance with the Proposed Modifications to Long-Term Monitoring Program (ARCADIS 2005), the following groundwater monitoring was completed:
 - Groundwater samples (annual monitoring list of wells with the exception of monitoring well PW-5 [see below]) were collected using passive diffusive bag (PDB) samplers from 16 monitoring wells during the week of September 12, 2005 and selectively analyzed for volatile organic compounds (VOCs) and dissolved gases. In addition, grab samples were collected from select wells and analyzed for total organic carbon (TOC).
 - Groundwater samples were collected using low-flow (i.e., Micropurge) sampling techniques from monitoring wells GMMW-7 and PW-5 during the week of September 12, 2005 and were analyzed for VOCs, dissolved gases, and TOC.
 - Groundwater samples were collected using low-flow sampling techniques from monitoring wells GMMW-2, GMMW-6, W-6, W-16S, W-18, and W-20S during the week of September 12, 2005 and were analyzed for VOCs and 1,4-Dioxane. For clarity, these samples were labeled with the suffix "LF" at the end of each sampling designation.

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 3, Quarter Number 4 were as follows:

- Pump-and-treat (PT) system production well influent and effluent samples were collected during the OM&M quarterly site visit on September 13, 2005 and selectively analyzed for VOCs and total iron.

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- One vapor sample from the PT system air stripper effluent was collected during the OM&M quarterly site visit on September 13, 2005 and analyzed for VOCs.
- Total organic carbon (TOC) samples were collected from injection wells IW-2, IW-8, and IW-13 on September 13, 2005.
- 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 production wells GMPW-3, GMPW-4 and 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 15, 2005. 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.

3. Groundwater Flow

Water-level measurements were made from existing wells on September 16, 2005. Water-level elevation data for Operational Year 3, Quarter Number 4 is provided in Table 1. A summary of water-level elevation data for Operational Year 3 is included in this table. Water-level elevations and the groundwater flow direction for the September 2005 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 3, 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 3 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 3, Quarter Number 4 monitoring event.

4. Groundwater Quality

The following sections describe the analytical results for groundwater samples collected during the September 2005 monitoring round (Operational Year 3, Quarter Number 4). A discussion of analytical results for all data collected during Operational Year 3 is also provided. Groundwater analytical data for Operational Year 3, Quarter Number 4 is provided in Tables 2 and 3. A summary of all analytical data collected during Operational Year 3 is also provided on the referenced tables.

4.1 Volatile Organic Compounds

A comparison of Operational Year 3, 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. Data also indicate that groundwater monitoring with PDB samplers are a suitable alternative to low-flow sampling techniques at the site. For discussion purposes, the results of PDB collected groundwater samples will be used for the comparative analysis of data provided below.

Plume boundary, landfill interior, and landfill perimeter monitoring data indicate that the dissolved phase plume is stable. As shown in Table 2, 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 69.0 ug/L, respectively. Offsite monitoring well W-20S remained stable at 0.0 ug/L. Background monitoring well W-14S also remained stable at 0.0 ug/L. Landfill perimeter monitoring wells W-13, PW-7, and W-6 remained stable at 0.0 ug/L, 16.4 ug/L, and 72.2, ug/L, respectively. Landfill perimeter monitoring well W-7 increased to 438.8 ug/L. Landfill interior monitoring well PW-13 exhibited stable concentrations at 29.4 ug/L. Newly installed landfill interior monitoring well GMMW-7 had a TVOC concentration of 715.5 ug/L.

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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, PW-3, and PW-4 (located furthest from the IRZ), remained stable with TVOC concentrations of 66.7 ug/L, 134.9 ug/L, and 71.1 ug/L, respectively. TVOC concentrations in mid-plume monitoring wells GMMW-5, GMMW-6, W-5 and GMMW-2 decreased to 520.2 ug/L, 969.7 ug/L, 223.6 ug/L and 482.4 ug/L, respectively; mid-plume monitoring well PW-5 decreased to 3.6 ug/L.

As discussed in the Proposed Modifications to Long-Term Monitoring Program (ARCADIS 2005), a subset of monitoring wells were sampled using both low-flow and PDB sampler techniques to compare the two methods. Specifically, monitoring wells GMMW-2, GMMW-6, W-6, W-16S, W-18, and W-20S were selected to make this comparison during the Year 3, Quarter Number 4 monitoring event. Table 2 provides the results of this comparison. For wells sampled using the low-flow methodology, a suffix of "LF" was added to the sample identification. As shown in Table 2, the two methods provided comparable results with an average margin of error of 5-percent.

A comparative analysis of groundwater analytical data for VOCs during Operational Year 3 continue to corroborate historical data and indicate that the dissolved phase plume is stable with the exception of September 2005 data collected from monitoring well W-7 (see Section 10). This observation 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, particularly at the downgradient edge in the vicinity of GMMW-6.

PT system analytical results for VOCs are provided in Table 4. Groundwater analytical results for PT system production wells GMPW-3, GMPW-4, and GMPW-5 are consistent with prior rounds of data. Specifically, TVOC concentrations for the Operational Year 3, Quarter Number 4 sampling round were as follows: GMPW-3 (283.6 ug/L), GMPW-4 (388.2 ug/L) and GMPW-5 (16.3 ug/L). A complete evaluation of performance monitoring conducted on the PT system is provided in Section 7.1.2 of this report.

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4.2 1,4-Dioxane

As shown in Table 2, groundwater samples collected from monitoring wells GMMW-2, GMMW-6, W-6, W-16S, W-18, and W-20S were analyzed for presence of 1,4-Dioxane. 1,4-Dioxane was not detected in any of the sampled monitoring wells.

4.3 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 7.2.2 of this report.

4.4 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 3, Quarter Number 4 and continue to indicate that the IRZ has extended to the vicinity of this well. 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 monitoring was not conducted during Operational Year 3, 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 3. 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.

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6. Surface Water Quality

A surface water sample was inadvertently not collected at the former SP-4 spring location during Operational Year 3, Quarter Number 4 and will be collected during the Operational Year 4, Quarter Number 1 monitoring event. Nonetheless, Table 6 presents the analytical results for surface water sampling location F-6 and SP-4 during Operational Year 3. As shown in Table 6, surface water quality remained stable during the reporting year 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. Groundwater Remediation System Performance

The following section describes the results of the Groundwater Remediation System performance monitoring conducted during Operational Year 3, Quarter Number 4. A brief summary of system performance during Operational Year 3 is also provided.

7.1 PT System

The following section describes the results of the PT system performance monitoring conducted during Operational Year 3, Quarter Number 4. Included in the discussion is a brief summary of system performance during Operational Year 3.

7.1.1 Summary of Operation, Maintenance, and Monitoring

During the Operational Year 3, Quarter Number 4 system operation, the PT system shutdowns or periods of intermittent operation due to mechanical problems were as follows:

- As noted in the Operational Year 3, Quarter Number 3 report the PT system did not operate between June 31, 2005 and August 1, 2005 due to a motor failure of air compressor AC-200. The compressor motor was inspected and repaired on August 1, 2005.
- During the week of July 25, 2005, recovery wells GMPW-3, GWMP-4, and GMPW-5 were redeveloped due to a noticeable decline in production (see discussion in previous Operational Year 3 quarterly reports). Following redevelopment and replacement of the AC-200 motor, the PT system was

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restarted on August 1, 2005. A significant increase in production capacity was noted following the redevelopment activities.

PT system OM&M for Operational Year 3, Quarter Number 4 was conducted on September 13, 2005 and included operation and maintenance of system equipment, the collection of system performance samples (water and vapor), and recording system operating parameters. As referenced above, redevelopment of recovery wells GMPW-3, GMPW-4, and GMPW-5 was also conducted during the reporting period. 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 3. As shown in Table 7, the total effluent groundwater recovery rate for Operational Year 3, Quarter Number 4 was approximately 0.28-gallon per minute (gpm), with individual recovery rates of 0.05-gpm, 0.15-gpm, and 0.13-gpm for production wells GMPW-3, GMPW-4, and GMPW-5, respectively. The average individual recovery well rates during Operational Year 3, Quarter Number 4 continued to be lower when compared to previous operation. As discussed in previous quarterly reports, the decline in production was the result of well screen fouling, or a similar well condition problem. However, as referenced above, all recovery wells were redeveloped during the week of July 25, 2005. Recovery rate measurements recorded, following redevelopment, indicate that the well maintenance effort was successful. Specifically, individual recovery rates increased to at or near system startup conditions.

A total of 33,099 gallons of groundwater was recovered during Operational Year 3, Quarter Number 4 and a total of 939,149 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 8.5-inches of water column (i.w.c.) and a low profile air stripper blower flowrate of 336 standard cubic feet per minute (scfm).

Overall system performance during Operational Year 3 was generally lower when compared to previous operation due to the well condition troubleshooting and rehabilitation measures referenced herein and within previous reports. 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 3 was approximately 0.30-gpm, with individual recovery rates of 0.03-gpm, 0.17-gpm, and 0.12-gpm for production wells GMPW-3, GMPW-4, and GMPW-5, respectively. A total of 158,200 gallons of groundwater was recovered during Operational Year 3.

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7.1.2 Results of Performance Sampling

PT system performance sampling for Operational Year 3, Quarter Number 4 was conducted on September 13, 2005. Five groundwater samples and one vapor sample were collected during the quarterly sampling round. Groundwater samples collected included individual production 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 sampling groundwater analytical results for the Operational Year 3, Quarter Number 4 monitoring event as well as a summary of all data for Operational Year 3. 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 3, Quarter Number 4. Total iron after the cartridge filters was 1.38 mg/L for the fourth quarter sampling event, which is above the BPJ recommended daily average limit of 0.61 mg/L and the recommended daily limit of 1.2 mg/L. It should be noted that the cartridge filters were replaced immediately following the sampling event. Based on the total groundwater recovered during the reporting period and total influent groundwater concentration, an estimated 0.05 pounds (lbs) of VOC mass were removed from the subsurface during the quarterly reporting period, as shown in Table 8. A total of approximately 1.62 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 3, Quarter Number 4 monitoring event as well as a summary of all data for Operational Year 3. As shown in Table 9, there were no constituents of concern (COCs) detected above the detection limit in the air stripper effluent vapor sample during Operational Year 3, 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 3 and treated influent VOCs to below their respective BPJ limits during each operational period. Total iron after the cartridge filters had two exceedances over its BPJ recommended daily average limit due to fouling of the cartridge filter units. The cartridge filters continue to be inspected during regular O&M visits to assess the

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changeout frequency needed for efficient operation. As shown in Table 8, a total of approximately 0.42 lbs of VOC mass were recovered during Operational Year 3. 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 3.

7.2 ARI System

The following section describes the results of the ARI system performance monitoring conducted during Operational Year 3, Quarter Number 4. A brief summary of ARI system performance for Operational Year 3 has also been provided.

7.2.1 Summary of Operation, Maintenance, and Monitoring

The ARI system was operated continuously during the Operational Year 3, Quarter Number 4 period with minor shutdowns to perform routine system OM&M and during PT system troubleshooting activities.

Two reagent injections were completed during Operational Year 3, Quarter Number 4. The injection beginning on June 27, 2005 was interrupted during the PT system troubleshooting activities referenced herein. This injection was completed on August 3, 2005 following restart of the PT system. Based on the number of injection events, quantity of molasses solution delivered to each injection well, and molasses solution percentage, approximately 5,440-gallons of molasses solution were delivered to the subsurface during Operational Year 3, Quarter Number 4. A total of 66,714-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 3, Quarter Number 4.

Despite intermittent system shutdowns for routine OM&M and equipment repair, the ARI system operated effectively during Operational Year 3 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 16,330-gallons of molasses solution was delivered to the subsurface during Operational Year 3.

7.2.2 Results of Performance Sampling

ARI system performance sampling was conducted on September 13, 2005 and included the collection of TOC samples from injection wells IW-2, IW-8, and IW-13.

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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 3, Quarter Number 4 sampling event. Analytical results and field parameters indicate that geochemical conditions in the current area of ARI system influence exhibit low ORP, 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 3, 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 3, Quarter Number 4 are as follows:

- The TOC concentration in injection wells IW-2, 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 [9,000 nanograms per liter (ng/L)] when compared to baseline conditions.
- The methane concentration in monitoring well GMMW-5 increased to 24,000 µg/L.
- Ethane and ethene concentrations in monitoring well GMMW-6 remained elevated at 930 and 73,000 ng/L, respectively.
- The methane concentration in monitoring well GMMW-6 remained elevated (870 µg/L) when compared to baseline conditions.

As referenced previously, TVOC concentrations remained stable within well GMMW-5 during Operational Year 3, Quarter Number 4 when compared to the previous quarter analytical results. TVOC concentrations in well GMMW-6 remained stable when making the same comparison.

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The anaerobic IRZ continued to be maintained and completely degrade VOC mass during Operational Year 3, 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 3 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.
- Methane concentrations in monitoring well GMMW-5 increased to 24,000 ug/L during the operational year; and,
- Ethene concentrations in monitoring well GMMW-6 remained significantly above baseline conditions during the operational year.

Figure D-1 (see Appendix D) presents a summary of groundwater data for monitoring well GMMW-6 since the baseline monitoring event conducted in July 2002. As shown on Figure D-1, the decline in contaminant mass (primarily 1,2-DCE) corresponds to a significant increase in methane and degradation end product (ethene). This trend is typical for successful IRZs.

8. Spring Water Remediation System Performance

SP-5 Spring Water Remediation System OM&M was conducted on September 15, 2005 in accordance with the LTM Plan Addendum for Spring Water Remediation Systems (ARCADIS 2003). SP-5 Spring Water Remediation System Operational Year 3, Quarter Number 4 analytical results are provided in Table 10. A summary of all analytical results for Operational Year 3 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

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Year 3 data. As shown in Table 11, the recorded instantaneous flowrate was 1.13 gpm for the Operational Year 3, Quarter Number 4 monitoring event. Approximately 118,973 gallons of spring water was treated and approximately 0.09 lbs of mass was recovered during the Operational Year 3, Quarter Number 4 operating period. An estimated 788,198 gallons of spring water has been treated and an estimated 0.59 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 3 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 528,582 gallons of spring water was treated and an estimated 0.37 lbs of VOC mass was recovered during Operational Year 3.

9. Conclusions

Based on the data obtained from the Operational Year 3, Quarter Number 4 monitoring and overall system performance during Operational Year 3, 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 2005 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 well GMMW-6 decreased significantly during the operational year while the concentration of methane and ethene remained elevated.
- 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.

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- 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.
- PDB and low-flow sampling techniques produced comparable analytical data with an average deviation of 5-percent.
- 1,4-Dioxane was not detected in any of the sampled monitoring wells during the Operational Year 3, Quarter Number 3 and Quarter Number 4 monitoring events despite the presence of 1,1,1-TCA in site groundwater.

10. Recommendations

ARCADIS recommends the following based on the findings presented herein:

- Based on the comparative analysis of PDB and low-flow sampling techniques provided herein, it is recommended that the use of PDBs be employed at the Site in accordance with the Proposed Modifications to Long-Term Monitoring Program (ARCADIS 2005).
- Based on the results for 1,4-Dioxane during the Operational Year 3, Quarter Number 3 and Quarter Number 4 monitoring events, it is recommended that the sampling of 1,4-Dioxane be discontinued.
- Resample monitoring well W-7 during the Operational Year 4, Quarter Number 2 monitoring event as a result of the anomalous increase in TVOC concentrations.
- Resample surface water in the vicinity of the former SP-4 spring location during the Operational Year 4, Quarter Number 1 monitoring event.
- Based on recent experience at similar sites using enhanced biodegradation as a remedial measure for groundwater, it is recommended that larger volumes of a more dilute electron donor solution be injected into the subsurface. The benefits of the recommended methodology are as follows:

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- Injection of a larger volume ensures complete coverage of the target zone and enhances contact with adsorbed phase contaminant mass.
- Injection at a more dilute solution strength reduces the risk of pH fluctuations caused by fermentation of excess organic carbon.
- The proposed methodology requires less frequent injections and optimizes the use of electron donor solution.

11. Project Schedule

Groundwater environmental effectiveness monitoring is scheduled to be conducted for Operational Year 4 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.

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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 (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. 2005. Operational Year 3, Quarter Number 1 Monitoring Report, Colesville Landfill, Broome County, New York, NYSDEC Site 704010. April 7, 2005.

ARCADIS G&M, Inc. 2005. Operational Year 3, Quarter Number 2 Monitoring Report, Colesville Landfill, Broome County, New York, NYSDEC Site 704010. July 15, 2005.

ARCADIS G&M, Inc. 2005. Operational Year 3, Quarter Number 3 Monitoring Report, Colesville Landfill, Broome County, New York, NYSDEC Site 704010. November 17, 2005.

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

Table 1. Water-Level Measurements Collected During Operational Year 3, Colesville Landfill, Broome County, New York.

Well Identification	MP Elevation (feet above msl)	12/7/2004 Depth to Water (feet below MP)	12/7/2004 Water-Level Elevation (feet above msl)	6/21/2005 Depth to Water (feet below MP)	6/21/2005 Water-Level Elevation (feet above msl)	MP Description
GMMW-2	1030.95	37.65	993.30	AM	AM	Inner casing
GMMW-5	1043.66	46.65	997.01	47.78	995.88	Inner casing
GMMW-6	1033.56	37.17	996.39	37.77	995.79	Inner casing
GMMW-7	1045.43	NM	NM	NM	NM	Inner casing
PW-3	988.92	10.11	978.81	10.92	978.00	Inner casing
PW-4	1001.75	16.48	985.27	16.15	985.60	Inner casing
PW-5	986.12	AM	AM	AM	AM	Inner casing
W-5	1051.41	50.58	1000.83	50.35	1001.06	Inner casing
W-6	1050.38	48.05	1002.33	47.35	1003.03	Inner casing
PW-7	1042.47	38.75	1003.72	39.46	1003.01	Inner casing
W-7	1049.12	40.67	1008.45	40.87	1008.25	Inner casing
PW-10	1049.29	35.91	1013.38	35.17	1014.12	Inner casing
PW-13	1072.41	59.84	1012.57	58.73	1013.68	Inner casing
W-13	1053.43	44.96	1008.47	44.64	1008.79	Inner casing
W-14S	957.68	7.58	950.10	9.41	948.27	Inner casing
W-16S	990.33	8.66	981.67	10.59	979.74	Outer casing
W-17S	959.13	8.85	950.28	10.43	948.70	Inner casing
W-18	973.56	11.88	961.68	11.46	962.10	Inner casing
W-20S	952.88	7.75	945.13	10.00	942.88	Inner casing

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

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Table 1. Water-Level Measurements Collected During Operational Year 3, Colesville Landfill, Broome County, New York.

Well Identification	MP Elevation (feet above msl)	9/13/2005		Water-Level Elevation (feet above msl)	MP Description
		Depth to Water (feet below MP)			
GMMW-2	1030.95	36.38		994.57	Inner casing
GMMW-5	1043.66	47.16		996.50	Inner casing
GMMW-6	1033.56	38.84		994.72	Inner casing
GMMW-7	1045.43	46.89		998.54	Inner casing
PW-3	988.92	13.09		975.83	Inner casing
PW-4	1001.75	17.88		983.87	Inner casing
PW-5	986.12	AM		AM	Inner casing
W-5	1051.41	50.90		1000.51	Inner casing
W-6	1050.38	49.02		1001.36	Inner casing
PW-7	1042.47	38.79		1003.68	Inner casing
W-7	1049.12	42.24		1006.88	Inner casing
PW-10	1049.29	AM		AM	Inner casing
PW-13	1072.41	60.41		1012.00	Inner casing
W-13	1053.43	46.43		1007.00	Inner casing
W-14S	957.68	11.34		946.34	Inner casing
W-16S	990.33	10.08		980.25	Outer casing
W-17S	959.13	12.26		946.87	Inner casing
W-18	973.56	10.67		962.89	Inner casing
W-20S	952.88	11.81		941.07	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 and 1,4-Dioxane Detected in Groundwater, Operational Year 3, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: GMMW-02	GMMW-02	GMMW-02	GMMW-02	GMMW-02-LF ¹	GMMW-05	GMMW-05	GMMW-05	GMMW-05
	Date: 12/8/2004	3/24/2005	6/22/2005	9/15/2005	9/15/2005	12/7/2004	3/24/2005	6/21/2005	9/15/2005
1,1,1-Trichloroethane	62	57	57	38	40J	<10	<10	<10	<5.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0	<1.0	<5.0J	<10	<10	<10	<5.0
1,1-Dichloroethane	120	120	130	110	110J	110	150	88	47
1,1-Dichloroethene	2.3	2.8	2.7	2.0	<5.0J	<10	<10	<10	<5.0
1,2-Dichloroethane	<1.0	<1.0	<1.0	<1.0	<5.0J	<10	<10	<10	<5.0
1,2-Dichloropropane	<1.0	<1.0	<1.0	<1.0	<5.0J	<10	<10	<10	<5.0
Benzene	3.6	3.6	4.0	3.4	<5.0J	<10	<10	<10	<5.0
Chlorobenzene	44	38	42	40	39J	17	25	28	45
Chloroethane	38	40	45	37	34J	90	190	240	240
Chloroform	<1.0	<1.0	<1.0	<1.0	<5.0J	<10	<10	<10	<5
cis-1,2-Dichloroethene	150	150	150	150	150J	360	180	96	150
Dichlorodifluoromethane	1.5	<1.0	1.9	<1.0	<5.0J	<10	<10	<10	<5.0
Ethylbenzene	<1.0	<1.0	<1.0	<1.0	<5.0J	<10	<10	<10	<5.0
Methylene chloride	<2.0	1.9	2.0	<1.0	<5.0J	<10	<10	<10	<5.0
Methyl tert-butyl ether	<1.0	<1.0	<1.0	<1.0	<5.0J	<10	<10	<10	<5.0
Naphthalene	<1.0	<1.0	<1.0	<1.0	<5.0J	<10	<10	<10	<5.0
o-Xylene	<1.0	<1.0	<1.0	<1.0	<5.0J	<10	<10	<10	<5.0
Tetrachloroethene	<1.0	<1.0	<1.0	<1.0	<5.0J	<10	<10	<10	<5.0
Toluene	<1.0	<1.0	<1.0	<1.0	<5.0J	<10	<10	<10	6.2
trans-1,2-Dichloroethene	2.0	<1.0	<1.0	<1.0	<5.0J	<10	<10	<10	<5.0
Trichloroethene	110	90	100	84	78J	<10	<10	<10	<5.0
Vinyl chloride	21	20	22	18	17J	<10	31	23	32
1,4-Dioxane	NA	NA	<1.0	NA	<0.98	NA	NA	<10	NA
Total VOCs	554.4	523.3	556.6	482.4	468	577.0	576.0	475.0	520.2

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.

1. Samples GMMW-02-LF and GMMW-06 were inadvertently mislabeled by the reporting laboratory or in the field.

Accordingly, all data values for these samples have been qualified as estimated values.

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Table 2. Concentrations of Volatile Organic Compounds and 1,4-Dioxane Detected in Groundwater, Operational Year 3, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: GMMW-06	GMMW-06	GMMW-06	GMMW-06 ¹	GMMW-06-LF	GMMW-06-LF*	GMMW-07	PW-03	PW-03
	Date: 12/9/2004	3/24/2005	6/21/2005	9/15/2005	9/15/2005	9/15/2005	9/14/2005	3/23/2005	9/15/2005
1,1,1-Trichloroethane	<10	<10	<10	4.2J	3.6	3.8	16	13	16
1,1,2-Trichloroethane	<10	<10	<10	2.4J	2.6	2.6	2.2	<1.0	<1.0
1,1-Dichloroethane	520	390	370	380J	390	390	240	37	40
1,1-Dichloroethene	<10	<10	<10	1.2J	1.3	1.4	2.6	<1.0	<1.0
1,2-Dichloroethane	<10	<10	<10	<1.0J	2.8	<1.0	2.4	<1.0	<1.0
1,2-Dichloropropane	<10	<10	<10	<1.0J	<1.0	1.2	<1.0	<1.0	<1.0
Benzene	<10	<10	<10	7.7J	5.9	6	1.8	<1.0	<1.0
Chlorobenzene	38	31	32	43J	34	36	19	<1.0	<1.0
Chloroethane	250	190	120	200J	150	150	79	9.6	6.5
Chloroform	<10	<10	<10	1.3J	<1.0	1.3	1.2	1.7	1.6
cis-1,2-Dichloroethene	290	170	200	180J	190	190	200	42	39
Dichlorodifluoromethane	<10	<10	<10	4.6J	3.9	3.9	<1.0	<1.0	<1.0
Ethylbenzene	<10	<10	<10	<1.0J	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	21	16	<10	<1.0J	<1.0	11	<1.0	2.0	1.6
Methyl tert-butyl ether	<10	<10	<10	13J	11	<1.0	4.3	<1.0	<1.0
Naphthalene	<10	<10	<10	<1.0J	<1.0	<1.0	<1.0	<1.0	<1.0
o-Xylene	<10	<10	<10	1.4J	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	13	<10	<10	<1.0J	<1.0	<1.0	<1.0	2.7	3.3
Toluene	<10	<10	<10	2.1J	1.5	1.5	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<10	<10	<10	2.1J	1.8	<1.0	<1.0	<1.0	<1.0
Trichloroethene	16	<10	10	6.7J	9.0	9.2	59	23	25
Vinyl chloride	230	170	94	120J	110	110	88	<1.0	1.9
1,4-Dioxane	NA	NA	<1.0	NA	<0.98	NA	NA	NA	NA
Total VOCs	1,378.0	967.0	826.0	969.7	917.4	917.9	715.5	131.0	134.9

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.

1. Samples GMMW-02-LF and GMMW-06 were inadvertently mislabeled by the reporting laboratory or in the field.

Accordingly, all data values for these samples have been qualified as estimated values.

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Table 2. Concentrations of Volatile Organic Compounds and 1,4-Dioxane Detected in Groundwater, Operational Year 3, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: Date:	PW-04 12/9/2004	PW-04 3/24/2005	PW-04 6/21/2005	PW-04 9/14/2005	PW-05 3/25/2005	PW-05 9/15/2005	PW-07 9/13/2005	PW-13 9/13/2005	W-05 12/8/2004	W-05 3/24/2005	W-05 6/22/2005
1,1,1-Trichloroethane	22	<1.0	18	21	16	<1.0	<1.0	<1.0	<1.0	2	2.4	7.4
1,1,2-Trichloroethane	16	<1.0	13	23	13	<1.0	<1.0	<1.0	<1.0	97	91	120
1,1-Dichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<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	<1.0	<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	<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	<1.0	<1.0	<1.0	3.8	3.3	4.9
Chlorobenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	23	23	25
Chloroethane	4.6	4.6	4.6	9.7	4.9	1.4	<1.0	6.9	4.7	87	63	51
Chloroform	1.7	1.6	1.6	1.3	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	15	15	15	25	15	60	3.6	<1.0	<1.0	7.8	14	36
Dichlorodifluoromethane	2.0	<1.0	<1.0	1.7	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	2.3
Ethylbenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<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	<1.0	<1.0	<1.0	<2.8	1.8	<1.0
Methyl tert-butyl ether	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<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	<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	<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	<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	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	1.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	2.1	<1.0
Trichloroethene	28	20	20	27	21	2.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	<1.0	<1.0	<1.0	1.7	<1.0	2.3	<1.0	<1.0	<1.0	16	23	7.2
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0
Total VOCs		91.1	72.2	110.4	71.1	72.2	3.6	16.4	29.4	245.3	231.0	260.4

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.

1. Samples GMMW-02-LF and GMMW-06 were inadvertently mislabeled by the reporting laboratory or in the field.

Accordingly, all data values for these samples have been qualified as estimated values.

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Table 2. Concentrations of Volatile Organic Compounds and 1,4-Dioxane Detected in Groundwater, Operational Year 3, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID:		Date:		W-05	W-06	W-06	W-06-LF	W-07	W-13	W-14S	W-16S	W-16S	W-16S-LF
					9/15/2005	3/22/2005	9/14/2005	9/14/2005	3/23/2005	9/13/2005	9/13/2005	3/23/2005	9/13/2005	9/14/2005
1,1,1-Trichloroethane					<1.0	<1.0	<1.0	<1.0	<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	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane					77	31	30	33	3.6	170	23	24	23	23
1,1-Dichloroethene					<1.0	<1.0	<1.0	<1.0	<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	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane					<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene					4.2	4.8	5	5.9	<1.0	<1.0	<1.0	3.1	2.6	3.3
Chlorobenzene					18	13	18	24	3.8	27	<1.0	24	26	31
Chloroethane					110	7.4	7.8	7.9	2.8	34	<1.0	11	9.8	9.6
Chloroform					<1.0	<1.0	<1.0	<2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene					1.5	8.5	6.1	5.1	<1.0	<1.0	<1.0	<1.0	1.7	1.5
Dichlorodifluoromethane					<1.0	<1.0	<1.0	<1.0	<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	<1.0	<1.0	<1.0	<1.0
Methylene chloride					1.9	<1.0	<1.0	<1.0	<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	<1.0	<1.0	<1.0	<1.0
Naphthalene					<1.0	<1.0	<1.0	<1.0	<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	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene					<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene					1.2	<1.0	<1.0	<1.0	<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	<1.0	<1.0	<1.0	<1.0
Trichloroethene					1.5	5.5	5.3	4.8	1.1	11	<1.0	2.1	2.6	2.5
Vinyl chloride					8.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dioxane					NA	NA	NA	<0.94	NA	NA	NA	NA	NA	<0.95
Total VOCs					223.6	70.2	72.2	80.7	11.3	438.8	0.0	63.2	66.7	70.9

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.

1. Samples GMMW-02-LF and GMMW-06 were inadvertently mislabeled by the reporting laboratory or in the field.

Accordingly, all data values for these samples have been qualified as estimated values.

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Table 2. Concentrations of Volatile Organic Compounds and 1,4-Dioxane Detected in Groundwater, Operational Year 3, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: Date:	W-17S 9/13/2005	W-18 3/22/2005	W-18 9/15/2005	W-18-LF 9/15/2005	W-20S 9/13/2005	W-20S-LF 9/14/2005	TB 09-13-05 9/13/2005	FB9-15-05 9/15/2005
1,1,1-Trichloroethane		<1.0	7.1	18	17	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane		<1.0	6	17	17	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene		<1.0	<1.0	<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	<1.0	<1.0
1,2-Dichloropropane		<1.0	<1.0	<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	<1.0	<1.0
Chlorobenzene		<1.0	<1.0	<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	<1.0	<1.0
Chloroform		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene		<1.0	4.2	14	13	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoromethane		<1.0	<1.0	<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	<1.0	<1.0
Methylene chloride		<1.0	<1.0	<1.0	<1.0	<1.0	4.5	<1.0	<1.0
Methyl tert-butyl ether		<1.0	<1.0	<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	<1.0	<1.0
o-Xylene		<1.0	<1.0	<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	<1.0	<1.0
Toluene		<1.0	<1.0	<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	<1.0	<1.0
Trichloroethene		<1.0	8.7	20	20	<1.0	<1.0	<1.0	<1.0
Vinyl chloride		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dioxane		NA	NA	NA	<0.98	NA	<0.94	NA	<0.96J
Total VOCs		0.0	26.0	69.0	67.0	0.0	4.5	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.

1. Samples GMMW-02-LF and GMMW-06 were inadvertently mislabeled by the reporting laboratory or in the field.

Accordingly, all data values for these samples have been qualified as estimated values.

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

Parameters	Sample ID: Date:	GMMW-02 12/8/04	GMMW-02 3/24/05	GMMW-02 6/22/05	GMMW-02 9/15/05	GMMW-04 12/8/04
UNITS						
METALS						
Iron, Dissolved	mg/L	--	0.0548	--	--	--
Manganese, Dissolved	mg/L	--	0.032	--	--	--
GENERAL CHEMISTRY						
Bromide	mg/L	--	--	--	--	0.033
Chloride	mg/L	--	23.6	--	--	--
Nitrogen, Nitrate (As N)	mg/L	--	<0.1	--	--	--
Nitrogen, Nitrite	mg/L	--	<0.1	--	--	--
Total Organic Carbon	mg/L	<2.0	<2.0	2.86	<2.0	--
Sulfate	mg/L	--	7.26	--	--	--
Sulfide (field)	mg/L	0.031	0.21	0.57	0.203	--
Iron (field)	mg/L	0.09	--	--	--	--
FIELD PARAMETERS						
pH	Standard units	6.02	7.29	6.38	6.05	--
Specific Conductance	mmhos/cm	56	0.587	0.543	0.543	--
Turbidity	NTU	189	36	--	--	--
Dissolved Oxygen	mg/L	2.13	4.13	4.03	2.26	--
Temperature	deg C	11.15	10.75	12.62	14.54	--
ORP	mV	116	102.4	131.8	212.7	--
DISSOLVED GASES						
Carbon dioxide	mg/L	--	220	--	--	--
Carbon monoxide	mg/L	--	<0.40	--	--	--
Ethane	ng/L	--	480	--	490	--
Ethene	ng/L	--	2,800	--	2,100	--
Methane	ug/L	--	1,000	--	1,100	--
Nitrogen	mg/L	--	22	--	--	--
Oxygen	mg/L	--	4.8	--	--	--

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

Parameters	Sample ID:	GMMW-05	GMMW-05	GMMW-05	GMMW-05	GMMW-05
	Date:	12/7/04	12/8/04	3/24/05	6/21/05	9/15/05
UNITS						
METALS						
Iron, Dissolved	mg/L	--	--	187	--	--
Manganese, Dissolved	mg/L	--	--	7.38	--	--
GENERAL CHEMISTRY						
Bromide	mg/L	--	0.035	--	--	--
Chloride	mg/L	--	--	21.8	--	--
Nitrogen, Nitrate (As N)	mg/L	--	--	<0.1	--	--
Nitrogen, Nitrite	mg/L	--	--	1.54	--	--
Total Organic Carbon	mg/L	102	--	224	528	--
Sulfate	mg/L	--	--	<1	--	--
Sulfide (field)	mg/L	0.096	--	0.398	0.284	--
Iron (field)	mg/L	1.84	--	--	--	--
FIELD PARAMETERS						
pH	Standard units	5.9	--	8.12	5.39	6.17
Specific Conductance	mmhos/cm	74.5	--	1.335	1.634	1.963
Turbidity	NTU	115	--	--	--	--
Dissolved Oxygen	mg/L	0.49	--	2.99	1.64	--
Temperature	deg C	12.59	--	8.29	19.64	13.04
ORP	mV	-53	--	-31	-90.1	-75
DISSOLVED GASES						
Carbon dioxide	mg/L	--	--	290 J	--	--
Carbon monoxide	mg/L	--	--	<0.40 J	--	--
Ethane	ng/L	--	--	<5.0 J	--	68
Ethene	ng/L	--	--	36,000 J	--	9,000
Methane	ug/L	--	--	17,000 J	--	24,000
Nitrogen	mg/L	--	--	17 J	--	--
Oxygen	mg/L	--	--	2.5 J	--	--

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

Parameters	Sample ID: Date:	GMMW-06 12/7/04	GMMW-06 12/9/04	GMMW-06 3/24/05	GMMW-06 6/21/05	GMMW-06 9/15/05
UNITS						
METALS						
Iron, Dissolved	mg/L	--	--	13.9	--	--
Manganese, Dissolved	mg/L	--	--	4.16	--	--
GENERAL CHEMISTRY						
Bromide	mg/L	--	--	--	--	--
Chloride	mg/L	--	--	14.8	--	--
Nitrogen, Nitrate (As N)	mg/L	--	--	<0.1	--	--
Nitrogen, Nitrite	mg/L	--	--	0.306	--	--
Total Organic Carbon	mg/L	--	57.9	7.09	9.75	5.44
Sulfate	mg/L	--	--	1.08	--	--
Sulfide (field)	mg/L	0.073	--	0.27	0.039	0.052
Iron (field)	mg/L	1.17	--	--	--	--
FIELD PARAMETERS						
pH	Standard units	6.21	--	8.22	6.41	6.67
Specific Conductance	mmhos/cm	0.149	--	1.291	0.914	0.816
Turbidity	NTU	93.3	--	45	--	--
Dissolved Oxygen	mg/L	0.7	--	2.76	2.77	--
Temperature	deg C	10.69	--	6.2	16.21	16.31
ORP	mV	-61	--	20.4	-59.8	-55.6
DISSOLVED GASES						
Carbon dioxide	mg/L	--	--	240 J	--	--
Carbon monoxide	mg/L	--	--	<0.40 J	--	--
Ethane	ng/L	--	--	2,300 J	--	930
Ethene	ng/L	--	--	140,000 J	--	73,000
Methane	ug/L	--	--	2,500 J	--	870
Nitrogen	mg/L	--	--	25 J	--	--
Oxygen	mg/L	--	--	3.4 J	--	--

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

Parameters	Sample ID: Date:	GMMW-07 9/14/05	GMPW-01 12/8/04	PW-03 3/23/05	PW-03 9/13/05	PW-04 12/8/04
<u>UNITS</u>						
<u>METALS</u>						
Iron, Dissolved	mg/L	--	--	--	--	--
Manganese, Dissolved	mg/L	--	--	--	--	--
<u>GENERAL CHEMISTRY</u>						
Bromide	mg/L	--	0.022	--	--	--
Chloride	mg/L	--	--	--	--	--
Nitrogen, Nitrate (As N)	mg/L	--	--	--	--	--
Nitrogen, Nitrite	mg/L	--	--	--	--	--
Total Organic Carbon	mg/L	2.05	--	<2.0	--	<2.0
Sulfate	mg/L	--	--	--	--	--
Sulfide (field)	mg/L	0.153	--	0.034	--	0.061
Iron (field)	mg/L	--	--	--	--	0.17
<u>FIELD PARAMETERS</u>						
pH	Standard units	6.18	--	6.43	6.42	5.6
Specific Conductance	mmhos/cm	0.321	--	0.588	0.608	57.4
Turbidity	NTU	--	--	--	--	42.7
Dissolved Oxygen	mg/L	0.66	--	13.42	--	3.44
Temperature	deg C	14.5	--	6.46	15.02	12.91
ORP	mV	224.7	--	97.5	--	171
<u>DISSOLVED GASES</u>						
Carbon dioxide	mg/L	--	--	--	--	--
Carbon monoxide	mg/L	--	--	--	--	--
Ethane	ng/L	580	--	--	--	--
Ethene	ng/L	5,100	--	--	--	--
Methane	ug/L	710	--	--	--	--
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 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 3, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: Date:	PW-04 3/24/05	PW-04 6/21/05	PW-04 9/13/05	PW-05 3/25/05	PW-05 9/15/05
<u>UNITS</u>						
<u>METALS</u>						
Iron, Dissolved	mg/L	0.0436	--	--	--	--
Manganese, Dissolved	mg/L	0.00998	--	--	--	--
<u>GENERAL CHEMISTRY</u>						
Bromide	mg/L	--	--	--	--	--
Chloride	mg/L	443	--	--	--	--
Nitrogen, Nitrate (As N)	mg/L	1.2	--	--	--	--
Nitrogen, Nitrite	mg/L	<1.0	--	--	--	--
Total Organic Carbon	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Sulfate	mg/L	4.06	--	--	--	--
Sulfide (field)	mg/L	0.02	0.007	--	0.045	0.134
Iron (field)	mg/L	--	--	--	--	--
<u>FIELD PARAMETERS</u>						
pH	Standard units	6.53	5.31	--	7.41	7.85
Specific Conductance	mmhos/cm	1.657	1.397	--	0.24	0.243
Turbidity	NTU	--	--	--	--	--
Dissolved Oxygen	mg/L	7.59	4.76	--	1.11	1.67
Temperature	deg C	9.50	12.08	--	8.75	10.32
ORP	mV	112.3	264.2	--	119.9	5.9
<u>DISSOLVED GASES</u>						
Carbon dioxide	mg/L	210	--	--	--	--
Carbon monoxide	mg/L	<0.40	--	--	--	--
Ethane	ng/L	63	--	40	--	30
Ethene	ng/L	140	--	76	--	670
Methane	ug/L	28	--	5.3	--	5.5
Nitrogen	mg/L	23	--	--	--	--
Oxygen	mg/L	5.2	--	--	--	--

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

Parameters	Sample ID: Date:	PW-07 9/13/05	PW-13 9/13/05	W-05 12/8/04	W-05 3/24/05	W-05 6/22/05
UNITS						
METALS						
Iron, Dissolved	mg/L	--	--	--	33.9	--
Manganese, Dissolved	mg/L	--	--	--	3.31	--
GENERAL CHEMISTRY						
Bromide	mg/L	--	--	--	--	--
Chloride	mg/L	--	--	--	19.5	--
Nitrogen, Nitrate (As N)	mg/L	--	--	--	<0.1	--
Nitrogen, Nitrite	mg/L	--	--	--	<0.1	--
Total Organic Carbon	mg/L	--	--	<2.0 J	4.24	38.6
Sulfate	mg/L	--	--	--	2.09	--
Sulfide (field)	mg/L	--	--	0.236	0.024	0.302
Iron (field)	mg/L	--	--	1.96	--	--
FIELD PARAMETERS						
pH	Standard units	3.28	5.78	6.24	7.94	6.62
Specific Conductance	mmhos/cm	0.267	0.18	78.6	0.738	0.667
Turbidity	NTU	--	--	186	--	--
Dissolved Oxygen	mg/L	--	--	1.69	8.14	5.64
Temperature	deg C	15.02	13.64	11.04	9.68	10.72
ORP	mV	--	--	-79	-10.8	-39.4
DISSOLVED GASES						
Carbon dioxide	mg/L	--	--	--	200 J	--
Carbon monoxide	mg/L	--	--	--	<0.40 J	--
Ethane	ng/L	--	--	--	13,000 J	--
Ethene	ng/L	--	--	--	11,000 J	--
Methane	ug/L	--	--	--	1,200 J	--
Nitrogen	mg/L	--	--	--	23 J	--
Oxygen	mg/L	--	--	--	2.8 J	--

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

Parameters	Sample ID: Date:	W-05 9/15/05	W-06 3/22/05	W-06 9/14/05	W-07 3/23/05	W-07 9/13/05
	<u>UNITS</u>					
<u>METALS</u>						
Iron, Dissolved	mg/L	--	--	--	--	--
Manganese, Dissolved	mg/L	--	--	--	--	--
<u>GENERAL CHEMISTRY</u>						
Bromide	mg/L	--	--	--	--	--
Chloride	mg/L	--	--	--	--	--
Nitrogen, Nitrate (As N)	mg/L	--	--	--	--	--
Nitrogen, Nitrite	mg/L	--	--	--	--	--
Total Organic Carbon	mg/L	3.83	<2.0	--	<2.0	--
Sulfate	mg/L	--	--	--	--	--
Sulfide (field)	mg/L	--	0.098	0.149	0.116	--
Iron (field)	mg/L	--	--	--	--	--
<u>FIELD PARAMETERS</u>						
pH	Standard units	7.72	6.93	6.17	6.79	--
Specific Conductance	mmhos/cm	0.837	0.546	0.438	0.489	--
Turbidity	NTU	--	--	--	--	--
Dissolved Oxygen	mg/L	--	6.13	1.07	3.00	--
Temperature	deg C	13.91	12.42	14.96	9.82	--
ORP	mV	--	25	38.8	36.9	--
<u>DISSOLVED GASES</u>						
Carbon dioxide	mg/L	--	--	--	--	--
Carbon monoxide	mg/L	--	--	--	--	--
Ethane	ng/L	25,000	--	--	--	--
Ethene	ng/L	8,900	--	--	--	--
Methane	ug/L	2,200	--	--	--	--
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 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 3, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: Date:	W-13 9/13/05	W-14S 9/13/05	W-16S 3/23/05	W-16S 9/14/05	W-17S 9/13/05
<u>UNITS</u>						
<u>METALS</u>						
Iron, Dissolved	mg/L	--	--	--	--	--
Manganese, Dissolved	mg/L	--	--	--	--	--
<u>GENERAL CHEMISTRY</u>						
Bromide	mg/L	--	--	--	--	--
Chloride	mg/L	--	--	--	--	--
Nitrogen, Nitrate (As N)	mg/L	--	--	--	--	--
Nitrogen, Nitrite	mg/L	--	--	--	--	--
Total Organic Carbon	mg/L	--	--	<2.0	--	--
Sulfate	mg/L	--	--	--	--	--
Sulfide (field)	mg/L	--	--	0.013	--	--
Iron (field)	mg/L	--	--	--	--	--
<u>FIELD PARAMETERS</u>						
pH	Standard units	5.40	8.31	6.45	5.93	6.09
Specific Conductance	mmhos/cm	0.582	0.093	0.453	0.394	0.215
Turbidity	NTU	--	--	--	--	--
Dissolved Oxygen	mg/L	--	--	4.38	2.21	--
Temperature	deg C	12.70	17.41	6.66	16.58	15.31
ORP	mV	--	--	94.4	390	--
<u>DISSOLVED GASES</u>						
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 3, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: Date:	W-18 3/22/05	W-18 9/15/05	W-20S 9/13/05	IW-01 12/8/04	IW-02 6/23/05
<u>UNITS</u>						
<u>METALS</u>						
Iron, Dissolved	mg/L	--	--	--	--	--
Manganese, Dissolved	mg/L	--	--	--	--	--
<u>GENERAL CHEMISTRY</u>						
Bromide	mg/L	--	--	--	--	--
Chloride	mg/L	--	--	--	--	--
Nitrogen, Nitrate (As N)	mg/L	--	--	--	--	--
Nitrogen, Nitrite	mg/L	--	--	--	--	--
Total Organic Carbon	mg/L	<2.0	--	--	3300	20,200
Sulfate	mg/L	--	--	--	--	--
Sulfide (field)	mg/L	0.342	--	0.016	--	--
Iron (field)	mg/L	--	--	--	--	--
<u>FIELD PARAMETERS</u>						
pH	Standard units	6.66	6.10	5.76	3.73	--
Specific Conductance	mmhos/cm	0.226	0.373	0.093	0.296	--
Turbidity	NTU	<20	--	--	755	--
Dissolved Oxygen	mg/L	10.78	4.28	3.28	5.11	--
Temperature	deg C	6.8	15.23	21.81	10.38	--
ORP	mV	108.4	166.5	305.3	119	--
<u>DISSOLVED GASES</u>						
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 3, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: Date:	IW-02 9/13/05	IW-08 12/8/04	IW-08 6/23/05	IW-08 9/13/05	IW-13 12/8/04
<u>UNITS</u>						
<u>METALS</u>						
Iron, Dissolved	mg/L	--	--	--	--	--
Manganese, Dissolved	mg/L	--	--	--	--	--
<u>GENERAL CHEMISTRY</u>						
Bromide	mg/L	--	--	--	--	--
Chloride	mg/L	--	--	--	--	--
Nitrogen, Nitrate (As N)	mg/L	--	--	--	--	--
Nitrogen, Nitrite	mg/L	--	--	--	--	--
Total Organic Carbon	mg/L	20,900	961	10,700	42,700	314
Sulfate	mg/L	--	--	--	--	--
Sulfide (field)	mg/L	--	--	--	--	--
Iron (field)	mg/L	--	--	--	--	--
<u>FIELD PARAMETERS</u>						
pH	Standard units	3.9	3.69	--	1.91	4.96
Specific Conductance	mmhos/cm	--	0.124	--	3.675	86.2
Turbidity	NTU	--	433	--	--	530
Dissolved Oxygen	mg/L	--	5.01	--	--	3.91
Temperature	deg C	--	10.01	--	16.64	9.92
ORP	mV	--	164	--	--	-4.0
<u>DISSOLVED GASES</u>						
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 3, Colesville Landfill, Broome County, New York.

Parameters	Sample ID:	IW-13	IW-13
	Date:	6/23/05	9/13/05
<u>UNITS</u>			
<u>METALS</u>			
Iron, Dissolved	mg/L	--	--
Manganese, Dissolved	mg/L	--	--
<u>GENERAL CHEMISTRY</u>			
Bromide	mg/L	--	--
Chloride	mg/L	--	--
Nitrogen, Nitrate (As N)	mg/L	--	--
Nitrogen, Nitrite	mg/L	--	--
Total Organic Carbon	mg/L	156	507
Sulfate	mg/L	--	--
Sulfide (field)	mg/L	--	--
Iron (field)	mg/L	--	--
<u>FIELD PARAMETERS</u>			
pH	Standard units	--	4.96
Specific Conductance	mmhos/cm	--	0.906
Turbidity	NTU	--	--
Dissolved Oxygen	mg/L	--	--
Temperature	deg C	--	--
ORP	mV	--	--
<u>DISSOLVED GASES</u>			
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 3, Colesville Landfill, Broome County, New York^{5,6}.

Constituents	Model Technology BPJ Limits ^{1,2} (ug/L)	Sample ID: Date:	GMPW-3 12/9/2004	GMPW-3 3/23/2005	GMPW-3 6/22/2005	GMPW-3 9/13/2005	GMPW-4 12/9/2004	GMPW-4 3/23/2005	GMPW-4 6/22/2005	GMPW-4 9/13/2005
1,1,1-Trichloroethane	10-20		49	67	50	49	59	74	52	46
1,1,2-Trichloroethane	10		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	10		47	56	47	53	53	100	78	83
1,1-Dichloroethene	10		2.6	3.8	3.2	3.6	3.0	4.6	3.4	3.0
1,2-Dichloroethane	10-30		<1.0	<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	<1.0
Benzene	5		4.3	4.8	<1	4.8	4.8	7.2	5.4	6
Chlorobenzene	NA		<1.0	<1.0	<1.0	<1.0	<1.0	4.5	3.5	4
Chloroethane	NA		12	13	12	17	14	26	27	28
Chloroform	NA		<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0
cis-1,2-Dichloroethene	10		68	88	64	87	77	140	88	89
Dichlorodifluoromethane	NA		<1.0	<1.0	1.3	<1.0	<1.0	<1.0	2.3	2.3
Methylene Chloride	10-50		<4.6	4.5	3.1	3.2	<4.5	5.2	3.7	4.9
Naphthalene	10		<1.0	<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	<1.0
Styrene	NA		<1.0	<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	<1.0
Toluene	5		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	10-50		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	10		49	59	62	56	58	110	83	81
Vinyl Chloride	10-50		7.8	8.0	3.6	10	9.6	29	30	41
Total VOCs			239.7	304	246	283.6	275.4	502	376	388.2

Model Technology
BPJ Limits^{3,4}
(mg/L)

Metals (units in mg/L)	1.2 / 0.61	1.28	0.262	3.80	1.97	0.543	1.07	2.72	0.878
Total Iron									

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 3, Colesville Landfill, Broome County, New York^{5,6}.

Constituents	Model Technology BPJ Limits ^{1,2} (ug/L)	Sample ID:	GMPW-5 12/9/2004	GMPW-5 3/23/2005	GMPW-5 6/22/2005	GMPW-5 9/13/2005	T. INFLUENT 12/9/2004	T. INFLUENT 3/23/2005	T. INFLUENT 6/22/2005	T. INFLUENT 9/13/2005
1,1,1-Trichloroethane	10-20	51	64	34	2.4	57	71	25	26J	<1.0J
1,1,2-Trichloroethane	10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0J
1,1-Dichloroethane	10	67	66	44	4.2	73	85	36	32J	<1.0J
1,1-Dichloroethene	10	2.5	3.6	1.8	<1.0	3.1	4.1	1.2	<1.0	<1.0J
1,2-Dichloroethane	10-30	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0J
1,2-Dichloropropane	NA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0J
Benzene	5	5.6	5.1	1.1	<1.0	6.2	6.1	<1.0	<1.0	2.6J
Chlorobenzene	NA	1.7	<1.0	<1.0	<1.0	2.0	2.7	<1.0	<1.0	<1.0J
Chloroethane	NA	20	16	11	<1.0	22	27	8.8	11J	<1.0J
Chloroform	NA	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0J
cis-1,2-Dichloroethene	10	87	99	60	5.3	93	120	48	46J	<1.0J
Dichlorodifluoromethane	NA	1.1	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	<1.0J
Methylene Chloride	10-50	<4.4	4.8	2.3	<1	4.3	4.9	2.0	<1.0	<1.0J
Naphthalene	10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0J
o-Xylene	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0J
Styrene	NA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0J
Tetrachloroethene	10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0J
Toluene	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0J
trans-1,2-Dichloroethene	10-50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0J
Trichloroethene	10	64	67	57	4.4	71	90	48	35J	<1.0J
Vinyl Chloride	10-50	19	10	5.2	<1.0	22	20	4.6	8.2J	<1.0J
Total VOCs		318.9	336	216	16.3	353.0	432	174	160.8	

Model Technology BPJ Limits^{3,4} (mg/L)

Metals (units in mg/L)					
Total Iron	1.2 / 0.61	1.20	0.478	3.89	0.116
				1.66	0.561
					5.02
					0.709J

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 3, Colesville Landfill, Broome County, New York^{5,6}.

Constituents	Model Technology BPJ Limits ^{1,2} (ug/L)	Sample ID: T. EFFLUENT AC	T. EFFLUENT AC	T. EFFLUENT AC	T. EFFLUENT AC
		Date: 12/9/2004	3/23/2005	6/22/2005	9/13/2005
1,1,1-Trichloroethane	10-20	1.6	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	10	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	10	3.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	10	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	10-30	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	NA	<1.0	<1.0	<1.0	<1.0
Benzene	5	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	NA	<1.0	<1.0	<1.0	<1.0
Chloroethane	NA	<1.0	<1.0	<1.0	<1.0
Chloroform	NA	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	10	4.2	1.9	<1.0	<1.0
Dichlorodifluoromethane	NA	<1.0	<1.0	<1.0	<1.0
Methylene Chloride	10-50	<1.0	<1.0	<1.0	<1.0
Naphthalene	10	<1.0	<1.0	<1.0	<1.0
o-Xylene	5	<1.0	<1.0	<1.0	<1.0
Styrene	NA	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	10	<1.0	<1.0	<1.0	<1.0
Toluene	5	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	10-50	<1.0	<1.0	<1.0	<1.0
Trichloroethene	10	2.4	1.3	<1.0	<1.0
Vinyl Chloride	10-50	<1.0	<1.0	<1.0	<1.0
Total VOCs		8.2	3.2	0	0

Metals (units in mg/L)	Model Technology BPJ Limits ^{3,4} (mg/L)			
Total Iron	1.2 / 0.61	--	0.76	0.454
				1.38

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 2, Colesville Landfill, Broome County, New York^{3,6}.

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.
BC	Before Cartridge Filter.
PT	Pump and Treat.
--	Not Analyzed or Collected.
<	Analyte Below Detection Limit.
T.	Total.

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Table 5. Concentrations of Volatile Organic Compounds Detected in Springs, Operational Year 3, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: Date:	SP-2 12/7/2004	SP-2 6/22/2005	SP-3 12/7/2004	SP-3 6/22/2005
1,1,1-Trichloroethane		<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane		<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane		<1.0	<1.0	2.0	1.3
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
1,4-Dioxane		NA	NA	NA	NA
Benzene		<1.0	<1.0	<1.0	<1.0
Chlorobenzene		<1.0	<1.0	<1.0	<1.0
Chloroethane		<1.0	<1.0	<1.0	<1.0
Chloroform		<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene		<1.0	<1.0	<1.0	5.5
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		<1.0	<1.0	<1.0	<1.0
Vinyl chloride		<1.0	<1.0	<1.0	<1.0
Total VOCs		0.0	0.0	2.0	6.8

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 3, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID:		F-6		SP-4		SP-4	
	Date:		12/7/2004	6/22/2005	12/7/04	3/25/05	6/22/05	
1,1,1-Trichloroethane			<1.0	<1.0	<1.0	<1.0	<1.0	
1,1,2-Trichloroethane			<1.0	<1.0	<1.0	<1.0	<1.0	
1,1-Dichloroethane			<1.0	2.0	1.2	1.4	<1.0	
1,1-Dichloroethene			<1.0	<1.0	<1.0	<1.0	<1.0	
1,2-Dichloroethane			<1.0	<1.0	<1.0	<1.0	<1.0	
1,2-Dichloropropane			<1.0	<1.0	<1.0	<1.0	<1.0	
1,4-Dioxane			NA	NA	NA	NA	NA	
Benzene			<1.0	<1.0	<1.0	<1.0	<1.0	
Chlorobenzene			<1.0	<1.0	<1.0	<1.0	<1.0	
Chloroethane			<1.0	<1.0	<1.0	<1.0	<1.0	
Chloroform			<1.0	<1.0	<1.0	<1.0	<1.0	
cis-1,2-Dichloroethene			<1.0	<1.0	<1.0	<1.0	<1.0	
Dichlorodifluoromethane			<1.0	<1.0	<1.0	<1.0	<1.0	
Ethylbenzene			<1.0	<1.0	<1.0	<1.0	<1.0	
Methylene chloride			<1.0	<1.0	<1.0	<1.0	<1.0	
Methyl tert-butyl ether			<1.0	<1.0	<1.0	<1.0	<1.0	
Naphthalene			<1.0	<1.0	<1.0	<1.0	<1.0	
o-Xylene			<1.0	<1.0	<1.0	<1.0	<1.0	
Tetrachloroethene			<1.0	<1.0	<1.0	<1.0	<1.0	
Toluene			<1.0	<1.0	<1.0	<1.0	<1.0	
trans-1,2-Dichloroethene			<1.0	<1.0	<1.0	<1.0	<1.0	
Trichloroethene			<1.0	<1.0	<1.0	<1.0	<1.0	
Vinyl chloride			<1.0	<1.0	<1.0	<1.0	<1.0	
Total VOCs			0.0	2.0	1.2	1.4	0.0	

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 3, Quarter Number 4 and Annual Summary, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Date	Time Recorded	Air Stripper Measurements			Flow Measurements			
		Blower Discharge Pressure PI-301 (i.w.c.)	Blower Effluent Flowrate (scfm)	Total Effluent FQI-401 (gallons)	Water Bypass Totalizer FQI-402 (gallons)	GMPW-3 Totalizer FQI-101 (gallons)	GMPW-4 Totalizer FQI-102 (gallons)	GMPW-5 Totalizer FQI-103 (gallons)
6/24/2005	11:20 AM	8.7	375	906,050.1	810,793.1	360,475.7	269,880.4	298,009.0
9/13/2005	4:40 PM	8.5	336 ¹	939,149.4	837,354.5	366,874.4	287,300.0	312,707.8
Average Daily Flowrate During Reporting Period (gpm) = 0.28								
Total Groundwater Recovered During Reporting Period (gallons) = 33,099								
Average Daily Flowrate During Operational Year 3 (gpm) = 0.30								
Total Groundwater Recovered During Operational Year 3 (gallons) = 158,200								

Notes:

- gpm Gallons per minute.
- i.w.c. Inches of water column.
- scfm Standard cubic feet per minute.
- 1. Exit velocity was not recorded on 9/13/2005 due to equipment malfunction. Exit velocity measured during an interim site visit on 8/1/2005 is provided above.

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Table 8. PT System Mass Removal Rate of Volatile Organic Compounds, Operational Year 3, 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)
6/24/2005	174	906,050.1	NA	NA	NA
9/13/2005	160.8	939,149.4	33,099	167.3	0.05
Total Estimated Mass Removed During Operational Year 3, Quarter Number 4 (lbs) =					
Total Estimated Mass Removed During Operational Year 3 (lbs) =					
Total Estimated Mass Removed Since System Startup (lbs) =					
0.05					
0.42					
1.62					

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 3, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Compounds	CAS Numbers	Sample ID: Date Sampled:	Effluent 12/9/2004 ppbv	Effluent 3/23/2005 ppbv	Effluent 6/24/2005 ppbv	Effluent 9/13/2005 ppbv
Vinyl Chloride	75-01-4		<13	<7.3	<5.0	<7.2
Chloroethane(Ethyl Chloride)	75-00-3		<13	<7.3	<5.0	<7.2
1,1-Dichloroethene(Vinylidene Chloride)	75-35-4		<13	<7.3	<5.0	<7.2
Methylene Chloride(Dichloromethane)	75-09-2		<13	<7.3	<5.0	<7.2
1,1-Dichloroethane	75-34-3		18	30	<5.0	<7.2
cis-1,2-Dichloroethylene	156-59-2		37	50	<5.0	<7.2
Chloroform	67-66-3		<13	<7.3	<5.0	<7.2
1,1,1-Trichloroethane(Methyl Chloroform)	71-55-6		<13	16	<5.0	<7.2
Benzene	71-43-2		<13	<7.3	<5.0	<7.2
Trichloroethene	79-01-6		16	26	<5.0	<7.2
Toluene	108-88-3		<13	<7.3	<5.0	<7.2
Ethyl benzene	100-41-4		<13	<7.3	<5.0	<7.2
m,p-Xylene	108-38-3/106-42-3		<13	<7.3	<5.0	<7.2
o-Xylene	95-47-6		<13	<7.3	<5.0	<7.2
1,2,4-Trimethylbenzene	95-63-6		<13	<7.3	<5.0	<7.2
2-Propanol (Isopropyl alcohol)	67-63-0		<13	<7.3	160	<7.2
Dichlorodifluoromethane(Freon 12)	75-71-8		<13	<7.3	<5.0	<7.2

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 3, Colesville Landfill, Broome County, New York.

Constituents	Model Technology BPJ Limits ^{1,2} (ug/L)	Sample ID: SP-5 INF. Date: 12/8/04	SP-5 INF. 3/25/2005	SP-5 INF. 6/23/2005	SP-5 INF. 09/15/05	SP-5 EFF. 12/8/04	SP-5 EFF. 3/25/2005	SP-5 EFF. 6/23/2005	SP-5 EFF. 09/15/05
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	31	33	32	41	7.0	<1.0	3.1	3.8
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	2.6	3.8	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	10-25	30	28	32	39	6.4	<1.0	1.5	<1.0
Chloroethane	10	9.0	9.0	9.3	12	2.8	3.8	9.8	12
cis-1,2-Dichloroethene	10	<1.0	1.7	2.1	2.6	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoromethane	NA	1.4	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0
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	2.2	2.5	3.1	3.6	<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		76.4	77.0	82.5	102.0	16.2	3.8	14.4	15.8

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 3, 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)
6/23/2005	82.5	0.72	0	NA	NA	NA
9/15/2005	102.0	1.13	0	118,973	91.7	0.09

Total Estimated Mass Removed During Operational Year 3, Quarter Number 4 (lbs) =

0.09

Total Estimated Mass Removed During Operational Year 3 (lbs) =

0.37

Total Estimated Mass Removed Since System Startup (lbs) =

0.59

Total Effluent Treated During Operational Year 3 (gallons) =

528,582

Total Effluent Treated Since System Startup (gallons) =

788,198

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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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: 9/16/05

Well Identification	Depth to Water (feet below MP)	Comments
GMMW-2	36.38	
GMMW-5	47.16	
GMMW-6	38.84	
GMMW-7	46.89	
PW-3	13.09	
PW-4	17.88	
PW-5	.65	
W-5	50.90	
W-6	49.02	
PW-7	38.79	
W-7	42.24	
PW-10	63.35	
PW-13	60.41	
W-13	46.43	
W-14S	11.34	
W-16S	10.08	Top of Outer Casing
W-17S	12.26	
W-18	10.67	11.71 - 1.04
W-20S	11.81	

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Water Sampling Log

Project COLEBURN Project No. NY 000980008-0003A Page 1 of 1
 Site Location HARPERSVILLE NY Date 9-13-05
 Site/Well No. MW-143 Replicate No. Code No.
 Weather Sampling Time: Begin 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
 Gallons in Well
 Gallons Pumped/Bailed
 Prior to Sampling
 Sample Pump Intake
 Setting (ft bmp)
 Purge Time begin end
 Pumping Rate (gpm)
 Evacuation Method

Field Parameters

Color
 Odor
 Appearance
 pH (s.u.) 8.31
 Conductivity (mS/cm)
 (umhos/cm) 93
 Turbidity (NTU)
 Temperature (°C) 17.41
 Dissolved Oxygen (mg/L)
 Salinity (%)
 Sampling Method PDB
 Remarks

Constituents Sampled

Container Description

Number

Preservative

Sampling Personnel

Well Casing Volumes

Gal./ft.	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 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 GERAGHTY & MILLER

Water Sampling Log

Project COLETSVILLE Project No. N1000480-0013-0003 Page 1 of 1
 Site Location COLETSVILLE NY Date 9-13-05
 Site/Well No. MW-163 Replicate No. _____ Code No. _____
 Weather _____ Sampling Time: Begin _____ End _____

Evacuation Data

Field Parameters

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 _____
 Gallons in Well _____
 Gallons Pumped/Bailed Prior to Sampling _____
 Sample Pump Intake Setting (ft bmp) _____
 Purge Time begin _____ end _____
 Pumping Rate (gpm) _____
 Evacuation Method _____

Color COLORLESS
 Odor NONE
 Appearance CLEAR
 pH (s.u.) 6.14
 Conductivity (mS/cm) _____
 (µmhos/cm) 444
 Turbidity (NTU) _____
 Temperature (°C) 15.66
 Dissolved Oxygen (mg/L) _____
 Salinity (%) _____
 Sampling Method PDB
 Remarks _____

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel

GW fm

Well Casing Volumes				
Gal./ft.	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 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	µmhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

Water Sampling Log

Project COLESVILLE NY Project No. NY 600949.0018.0003A Page 1 of
 Site Location HARPERSVILLE NY Date 9-13-05
 Site/Well No. MW-173 Replicate No. Code No.
 Weather Sampling Time: Begin 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
 Gallons in Well
 Gallons Pumped/Bailed Prior to Sampling
 Sample Pump Intake Setting (ft bmp)
 Purge Time begin end
 Pumping Rate (gpm)
 Evacuation Method

Field Parameters

Color CLOUDY
 Odor None
 Appearance TURBID
 pH (s.u.) 6.09
 Conductivity (mS/cm)
 (umhos/cm) 215
 Turbidity (NTU)
 Temperature (°C) 15.31
 Dissolved Oxygen (mg/L)
 Salinity (%)
 Sampling Method
 Remarks

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel

GW FM

Gals./ft.	Well Casing Volumes			
	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 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

Water Sampling Log

Project COLEBORNE Project No. NY 000880000-001 Page 1 of 1
 Site Location COLEBORNE NY Date 9-13-05
 Site/Well No. MW-20S Replicate No. _____ Code No. _____
 Weather _____ Sampling Time: Begin _____ 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 _____
 Gallons in Well _____
 Gallons Pumped/Bailed
 Prior to Sampling _____
 Sample Pump Intake
 Setting (ft bmp) _____
 Purge Time begin _____ end _____
 Pumping Rate (gpm) _____
 Evacuation Method _____

Field Parameters

Color COLEB 135
 Odor NONE
 Appearance SOE & TURBID
 pH (s.u.) 6.01
 Conductivity
 (µS/cm) _____
 (µmhos/cm) 97
 Turbidity (NTU) _____
 Temperature (°C) 15.99
 Dissolved Oxygen (mg/L) _____
 Salinity (%) _____
 Sampling Method PDS
 Remarks _____

Constituents Sampled

Container Description

Number

Preservative

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel

GWFM

Well Casing Volumes

Gal./ft.	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 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	µmhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

Water Sampling Log

Project

COLUMBIAProject No. NYSDSR-00000034Page 1 of 1

Site Location

Date 9-13-05

Site/Well No.

GM PW-3

Replicate No.

Code No.

Weather

Sampling Time:

Begin

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

Gallons in Well

Gallons Pumped/Bailed
Prior to SamplingSample Pump Intake
Setting (ft bmp)

Purge Time

begin

end

Pumping Rate (gpm)

Evacuation Method

Field Parameters

Color

Colorless

Odor

None

Appearance

Clear

pH (s.u.)

6.07Conductivity
(mS/cm)

(µmhos/cm)

426

Turbidity (NTU)

Temperature (°C)

17.06

Dissolved Oxygen (mg/L)

Salinity (%)

Sampling Method

Sample Port

Remarks

Constituents Sampled

Container Description

Number

Preservative

Sampling Personnel

GW & DM

Well Casing Volumes

Gal./ft.

1-1/4" = 0.06

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.09

2-1/2" = 0.26

3-1/2" = 0.50

6" = 1.47

bmp below measuring point
°C Degrees Celsius
ft feet
gpm Gallons per minute
mg/L Milligrams per liter

ml milliliter
mS/cm Milisiemens per centimeter
msl mean sea-level
N/A Not Applicable
NR Not Recorded

NTU Nephelometric Turbidity Units
PVC Polyvinyl chloride
s.u. Standard units
µmhos/cm Micromhos per centimeter
VOC Volatile Organic Compounds

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Water Sampling Log

Project COLEBUSH Project No. NY000480-0018-00034 Page 1 of
 Site Location COLEBUSH NY Date 9-13-05
 Site/Well No. GMPW-4 Replicate No. Code No.
 Weather CLEAR 80° Sampling Time: Begin 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
 Gallons in Well
 Gallons Pumped/Bailed Prior to Sampling
 Sample Pump Intake Setting (ft bmp)
 Purge Time begin end
 Pumping Rate (gpm)
 Evacuation Method

Field Parameters

Color Colorless
 Odor None
 Appearance Slightly Turb
 pH (s.u.) 5.90
 Conductivity (mS/cm)
 (umhos/cm) 491
 Turbidity (NTU)
 Temperature (°C) 17.44
 Dissolved Oxygen (mg/L)
 Salinity (%)
 Sampling Method Sample Port
 Remarks

Constituents Sampled

Container Description

Number

Preservative

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel

GW DM

Well Casing Volumes

Gal./ft.	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 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 GERAGHTY & MILLER

Water Sampling Log

Project COLEBROOK Project No. NY 000980-008-00031 Page 1 of 1
 Site Location COLEBROOK NY Date 9-13-05
 Site/Well No. GmPW-5 Replicate No. _____ Code No. _____
 Weather Clear 80° Sampling Time: Begin _____ 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 _____
 Gallons in Well _____
 Gallons Pumped/Bailed Prior to Sampling _____
 Sample Pump Intake Setting (ft bmp) _____
 Purge Time begin _____ end _____
 Pumping Rate (gpm) _____
 Evacuation Method _____

Field Parameters

Color Colorless
 Odor None
 Appearance Clear
 pH (s.u.) 6.15
 Conductivity (mS/cm) _____
 (umhos/cm) 199
 Turbidity (NTU) _____
 Temperature (°C) 17.72
 Dissolved Oxygen (mg/L) _____
 Salinity (%) _____
 Sampling Method _____
 Remarks _____

Constituents Sampled

Container Description

Number

Preservative

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel

GW DN

Well Casing Volumes

Gal./ft.	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 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

Water Sampling Log

Project COLEBURN Project No. NP0004.0021.0024 Page 1 of 1
 Site Location COLEBURN NY Date 9-15-06
 Site/Well No. GMMW-5 Replicate No. _____ Code No. _____
 Weather OVERCAST 75° Sampling Time: Begin _____ 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 _____
 Gallons in Well _____
 Gallons Pumped/Bailed Prior to Sampling _____
 Sample Pump Intake Setting (ft bmp) _____
 Purge Time begin _____ end _____
 Pumping Rate (gpm) _____
 Evacuation Method _____

Field Parameters

Color GREEN TINT
 Odor MODERATE
 Appearance TURBID
 pH (s.u.) 6.17
 Conductivity (mS/cm) _____
 (µmhos/cm) 1,963
 Turbidity (NTU) _____
 Temperature (°C) 13.04
 Dissolved Oxygen (mg/L) _____
 Salinity (ppt) 0.00 -75
 Sampling Method _____
 Remarks _____

Constituents Sampled

Container Description

Number

Preservative

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Sampling Personnel

Well Casing Volumes

Gal./ft.	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 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	µmhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not recorded	VOC	Volatile Organic Compounds

Water Sampling Log

Project

NY 00 COLVILLE

Project No.

NY 000449.0021.0803

Page

1 of 1

Site Location

COLVILLE

Date

9-15-08

Site/Well No.

W-5

Replicate No.

Code No.

Weather

Sampling Time:

Begin

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

Gallons in Well

Gallons Pumped/Bailed
Prior to Sampling

Sample Pump Intake
Setting (ft bmp)

Purge Time

Pumping Rate (gpm)

Evacuation Method

begin

end

Field Parameters

Color

Colorless

Odor

SUBTLE

Appearance

CLEAR

pH (s.u.)

7.72

Conductivity
(mS/cm)

(umhos/cm)

837

Turbidity (NTU)

Temperature (°C)

13.91

Dissolved Oxygen (mg/L)

Salinity (%)

Sampling Method

Remarks

Constituents Sampled

Container Description

Number

Preservative

See COC

Sampling Personnel

GW

Well Casing Volumes

Gal./ft.

1-1/4" = 0.06

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.09

2-1/2" = 0.26

3-1/2" = 0.50

6" = 1.47

bmp below measuring point
°C Degrees Celsius
ft feet
gpm Gallons per minute
mg/L Milligrams per liter

ml milliliter
mS/cm Milisiemens per centimeter
msl mean sea-level
N/A Not Applicable
NR Not recorded

NTU Nephelometric Turbidity Units
PVC Polyvinyl chloride
s.u. Standard units
umhos/cm Micromhos per centimeter
VOC Volatile Organic Compounds

Water Sampling Log

Project COLBOSVILLE Project No. NY 000949.002/00034 Page 1 of
 Site Location COLBOSVILLE NY Date 9-15-05
 Site/Well No. PW-3 Replicate No. Code No.
 Weather Sampling Time: Begin 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
 Gallons in Well
 Gallons Pumped/Bailed
 Prior to Sampling
 Sample Pump Intake
 Setting (ft bmp)
 Purge Time begin end
 Pumping Rate (gpm)
 Evacuation Method

Field Parameters

Color COLORED
 Odor SLIGHT
 Appearance SLIGHTLY TURBID
 pH (s.u.) 6.42
 Conductivity
~~ms/cm~~
 (µmhos/cm) 608
 Turbidity (NTU)
 Temperature (°C) 15.02
 Dissolved Oxygen (mg/L)
 Salinity (%)
 Sampling Method
 Remarks

Constituents Sampled

Container Description

Number

Preservative

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel

Well Casing Volumes
 Gal./ft. 1-1/4" = 0.06 2" = 0.16 3" = 0.37 4" = 0.65
 1-1/2" = 0.09 2-1/2" = 0.26 3-1/2" = 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	µmhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

Well ID: PW-5

NY 000949.0021
5-15-05

DD03A

Pw-5

9-15-05

QWfm

TH

Serial #:

Purge Method:

Screen Interval (ft bmp):

Top · 5

Bottom

Figure 1 is a line graph showing the relationship between the number of days of exposure to a 12-hour shift and the number of days of exposure to a 12-hour shift. The x-axis is labeled 'Number of days of exposure to a 12-hour shift' and ranges from 0 to 10. The y-axis is labeled 'Number of days of exposure to a 12-hour shift' and ranges from 0 to 10. The data points are connected by a line, showing a positive correlation.

Pump Intake Depth (ft bmp):

Purge time

Start:

Finish:

[illegible]

Color:

COLLEES

Odor:

Now

Appearance:

CLIM

Container:

No.

Preservative:

Parameter:

PID Reading

Q. 2

Comments

Water Sampling Log

Project

COLEBROOK

Project No. NY000480-0018-0003A

Page 1 of 1

Site Location

COLEBROOK NY

Date

9-13-05

Site/Well No.

PW-7

Replicate No.

Code No.

Weather

CLEAR 80°

Sampling Time:

Begin

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

Gallons in Well

Gallons Pumped/Bailed
Prior to SamplingSample Pump Intake
Setting (ft bmp)

Purge Time

begin

end

Pumping Rate (gpm)

Evacuation Method

Field Parameters

Color

COLEBROOK

Odor

MODERATE

Appearance

TURBID

pH (s.u.)

3.28?

Conductivity

~~(mS/cm)~~

(µmhos/cm)

267

Turbidity (NTU)

Temperature (°C)

15.02

Dissolved Oxygen (mg/L)

Salinity (%)

Sampling Method

PDB

Remarks

Constituents Sampled

Container Description

Number

Preservative

Sampling Personnel

Well Casing Volumes

Gal./ft.

1-1/4" = 0.06

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.09

2-1/2" = 0.26

3-1/2" = 0.50

6" = 1.47

bmp below measuring point
°C Degrees Celsius
ft feet
gpm Gallons per minute
mg/L Milligrams per liter

ml milliliter
mS/cm Millisiemens per centimeter
msl mean sea-level
N/A Not Applicable
NR Not Recorded

NTU Nephelometric Turbidity Units
PVC Polyvinyl chloride
s.u. Standard units
µmhos/cm Micromhos per centimeter
VOC Volatile Organic Compounds

Project	<u>COLBETUM</u>	Project No.	<u>NY 000480-0018-0034</u>	Page	<u>1</u> of <u> </u>
Site Location	<u>COLBETUM NY</u>			Date	<u>9-13-05</u>
Site/Well No.	<u>PW-13</u>	Replicate No.	<u> </u>	Code No.	<u> </u>
Weather	<u>CLEAR 80°</u>	Sampling Time:	Begin <u> </u>	End	<u> </u>

Field Parameters

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 _____

Gallons in Well _____

Gallons Pumped/Bailed
Prior to Sampling _____

Sample Pump Intake
Setting (ft bmp) _____

Purge Time begin _____ end _____

Pumping Rate (gpm) _____

Evacuation Method _____

Color	COLORLESS
Odor	None
Appearance	CLEAR
pH (s.u.)	5.78
Conductivity (mS/cm)	
(µmhos/cm)	180
Turbidity (NTU)	
Temperature (°C)	13.64
Dissolved Oxygen (mg/L)	
Salinity (‰)	
Sampling Method	PDB
Remarks	

Remarks

NEED NEATIER WRITING

Constituents Sampled

Container Description

Number

Preservative

Sampling Personnel

Well Casing Volumes

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

lmp	below measuring point
°C	Degrees Celsius
ft	feet
gpm	Gallons per minute
mg/L	Miligrams per liter

ml	milliliter
mS/cm	Milisiemens per centimeter
msl	mean sea-level
N/A	Not Applicable
NR	Not Recorded

NTU	Nephelometric Turbidity Units
PVC	Polyvinyl chloride
s.u.	Standard units
umhos/cm	Micromhos per centimeter
VOC	Volatile Organic Compounds

Water Sampling Log

Project

COLORADO

Project No.

NY 000949.0021.00039

Page

1 of

Site Location

COLORADO NY

Date

9-15-05

Site/Well No.

SP-5 INF

Replicate No.

Code No.

Weather

CLEAR 80°

Sampling Time:

Begin

End

Evacuation Data

Field Parameters

Measuring Point

Color

COLORLESS

MP Elevation (ft)

Odor

SLIGHT

Land Surface Elevation (ft)

Appearance

CLEAR

Sounded Well Depth (ft bmp)

pH (s.u.)

6.27

Depth to Water (ft bmp)

Conductivity
(mS/cm)

Water-Level Elevation (ft)

(umhos/cm)

Water Column in Well (ft)

Turbidity (NTU)

Casing Diameter/Type

Temperature (°C)

Gallons in Well

Dissolved Oxygen (mg/L)

Gallons Pumped/Bailed
Prior to Sampling

Salinity (%)

Sample Pump Intake
Setting (ft bmp)

Sampling Method

Purge Time

begin

end

Remarks

Pumping Rate (gpm)

Evacuation Method

Constituents Sampled

Container Description

Number

Preservative

Sampling Personnel

Well Casing Volumes

Gal./Ft.

1-1/4" = 0.06

2" = 0.16

3" = 0.37

4" = 0.65

1-1/2" = 0.09

2-1/2" = 0.26

3-1/2" = 0.50

6" = 1.47

bmp below measuring point
°C Degrees Celsius
ft feet
gpm Gallons per minute
mg/L Milligrams per liter

ml milliliter
mS/cm Milisiemens per centimeter
msl mean sea-level
N/A Not Applicable
NR Not Recorded

NTU Nephelometric Turbidity Units
PVC Polyvinyl chloride
s.u. Standard units
umhos/cm Micromhos per centimeter
VOC Volatile Organic Compounds

ARCADIS GERAGHTY & MILLER

Water Sampling Log

Project COLEBURN Project No. NYSDOT/9-0021 ⁰⁰³⁰ Page 1 of 1
 Site Location COLEBURN NY Date 9-15-00
 Site/Well No. SP-5 - 20' OFF Replicate No. _____ Code No. _____
 Weather CLAR 80° Sampling Time: Begin _____ End _____

Evacuation Data

Field Parameters

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 _____
 Gallons in Well _____
 Gallons Pumped/Bailed
 Prior to Sampling _____
 Sample Pump Intake
 Setting (ft bmp) _____
 Purge Time begin _____ end _____
 Pumping Rate (gpm) _____
 Evacuation Method _____

Color Brown
 Odor NONE
 Appearance TURBID
 pH (s.u.) 6.64
 Conductivity (mS/cm) _____
 (µmhos/cm) 558
 Turbidity (NTU) _____
 Temperature (°C) 18.52
 Dissolved Oxygen (mg/L) _____
 Salinity (%) _____
 Sampling Method _____
 Remarks _____

Constituents Sampled

Container Description

Number

Preservative

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Sampling Personnel

Gal./ft.	Well Casing Volumes				
	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	
	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 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	µmhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

Water Sampling Log

Project COLEBURN Project No. NY 000949-0021-0003 Page 1 of 1
 Site Location COLEBURN NY Date 9-15-2009
 Site/Well No. DW-2 Replicate No. Code No.
 Weather CLEAR 80° Sampling Time: Begin 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
 Gallons in Well
 Gallons Pumped/Bailed Prior to Sampling
 Sample Pump Intake Setting (ft bmp)
 Purge Time begin end
 Pumping Rate (gpm)
 Evacuation Method

Field Parameters

Color Blank
 Odor Small
 Appearance TURBID
 pH (s.u.) 3.90
 Conductivity (mS/cm)
 (µmhos/cm) 20
 Turbidity (NTU)
 Temperature (°C)
 Dissolved Oxygen (mg/L)
 Salinity (%)
 Sampling Method
 Remarks

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel

Gal./ft.	Well Casing Volumes				
	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	
	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 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	µmhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NF	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS GEOTECHNICAL Water Sampling Log

Project COLEBORNE Project No. NY000920.028 ⁰⁰⁰³⁹ Page 1 of 1
 Site Location COLEBORNE NY Date 9-13-08
 Site/Well No. @ DW-8 Replicate No. _____ Code No. _____
 Weather Clear 80° Sampling Time: Begin _____ 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 _____
 Gallons in Well _____
 Gallons Pumped/Bailed Prior to Sampling _____
 Sample Pump Intake Setting (ft bmp) _____
 Purge Time begin _____ end _____
 Pumping Rate (gpm) _____
 Evacuation Method _____

Field Parameters

Color Blow
 Odor Strong
 Appearance Dark
 pH (s.u.) 191
 Conductivity (mS/cm) 3675
 (µmhos/cm) _____
 Turbidity (NTU) _____
 Temperature (°C) 16.64
 Dissolved Oxygen (mg/L) _____
 Salinity (%) _____
 Sampling Method _____
 Remarks _____

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel

Gal./ft.	Well Casing Volumes			
	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 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
feet	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	µmhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not recorded	VOC	Volatile Organic Compounds

ARCAIDS GERAGHTY & MULLIN

Water Sampling Log

Project COLEBROOK Project No. NY 100449-0021-0003 Page 1 of 1
 Site Location COLEBROOK NY Date 9-15-05
 Site/Well No. IW-13 Replicate No. _____ Code No. _____
 Weather Clear 80° Sampling Time: Begin _____ 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 _____
 Gallons in Well _____
 Gallons Pumped/Bailed Prior to Sampling _____
 Sample Pump Intake Setting (ft bmp) _____
 Purge Time begin _____ end _____
 Pumping Rate (gpm) _____
 Evacuation Method _____

Field Parameters

Color Brown
 Odor Strong
 Appearance FURBISH
 pH (s.u.) 4.96
 Conductivity (mS/cm) _____
 (umhos/cm) 906
 Turbidity (NTU) _____
 Temperature (°C) _____
 Dissolved Oxygen (mg/L) _____
 Salinity (%) _____
 Sampling Method _____
 Remarks _____

Constituents Sampled	Container Description	Number	Preservative
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Sampling Personnel

GAL/FT	Well Casing Volumes			
	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 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

Water Sampling Log

Project COLEBURN Project No. N4000980-0034 Page 1 of 1
 Site Location NEAR COLEBURN Date 9-13-05
 Site/Well No. TOTAL EFFLUENT Replicate No. Code No.
 Weather Sampling Time: Begin 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
 Gallons in Well
 Gallons Pumped/Bailed
 Prior to Sampling
 Sample Pump Intake
 Setting (ft bmp)
 Purge Time begin end
 Pumping Rate (gpm)
 Evacuation Method

Field Parameters

Color COLEBURN
 Odor None
 Appearance Clear
 pH (s.u.) 6.46
 Conductivity
 (mS/cm)
 (µmhos/cm) 364
 Turbidity (NTU)
 Temperature (°C) 19.97
 Dissolved Oxygen (mg/L)
 Salinity (%)
 Sampling Method PDB
 Remarks

Constituents Sampled

Container Description

Number

Preservative

Sampling Personnel

Gal/ft	Well Casing Volumes			
	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 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	µmhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

Task:

0023A

Well ID:

mw-165 (SAMPLE 2)

Date:

9-14-05

Sampled By:

~~the~~ GW_{FM}

Sampling Time:

Recorded By:

粗 机

Weather:

CLEAR 80°

Coded Replicate No.:

Instrument Identification

Water Quality Meter(s):

Serial #:

Purging Information

Casing Material:

Purge Method:

low flow

Casing Diameter:

Screen Interval (ft bmp): Top

Bottom

Sounded Depth (ft bmp):

Pump Intake Depth (ft bmp):

Depth to Water (ft bmp):

Purge time

Start:

Finish:

Field Parameter Measurements Taken During Purging

[illegible]

Sample Condition

Color:

Odor:

Appearance:

Sample Collection

Parameter:

Container:

No.

Preservative:

PID Reading

Comments

Comments _____

Low-Flow Groundwater Sampling Log

Project Number:

Date:

Sampling Time:

Weather:

Task:

Sampled By:

Recorded By:

Coded Replicate No.:

Well ID:

Instrument Identification

Water Quality Meter(s):

Serial #:

Purging Information

Casing Material:

Purge Method:

Casing Diameter:

Screen Interval (ft bmp): Top

Bottom

Sounded Depth (ft bmp):

Pump Intake Depth (ft bmp):

Depth to Water (ft bmp):

Purge time

Start:

Finish:

Field Parameter Measurements Taken During Purging

[illegible]

52- .052 mg/L

Sample Condition

Color:

Odor:

Appearance:

Sample Collection

Parameter:

Container:

No.

Preservative:

PID Reading

Comments

* DO Prob mF

NUMB0094-0021

19-15.06

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

Overcast

0003A

Commw-2 (S. Anurag)

Copy from

for

SAMPLE 6

Water Quality Meter(s):

Serial #:

Casing Material:

Purge Method:

Casing Diameter:

Screen Interval (ft bmp): Top

Bottom

Sounded Depth (ft bmp):

Pump Intake Depth (ft bmp):

Depth to Water (ft bmp):

Purge time

Start:

Finish:

Field Parameter Measurements Taken During Purging

[illegible]

Color:

Odor:

Appearance:

Sample Collection

Parameter:

Container:

No.

Preservative:

PID Reading

Comments

ARCADIS

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 3, Quarter Number 4, Colesville Landfill, Broome County, New York.

Parameters for 9/13/2005 Sampling Event

Discharge Temperature	T	518	°R
Ambient Temperature	Ta	520	°R
Stack Diameter	D	6	in
Stack Radius	R	0.25	ft
Stack Area	A	0.20	ft ²
Exit Velocity (6)	V	28.0	fps
Exit Flow	Q	330	acfm
Exit Flow	Q	336	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, $h_e = h_b$)	(If Yes, $h_e = h_b + 1.1 (F_m)^{1/3}$)	
Momentum Flux	$F_m = T_a/T \cdot V^2 \cdot R^2$	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	$RF \cdot 6 \cdot Q_e / h_e^{2.25}$	
Mass Flow	Q _a	S lbs emitted for last 12 months	

fps: feet per second
 acfm: actual cubic feet per minute
 ug/m³: 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 64°F based on recorded parameters.
2. The ambient temperature is approximately 60°F, the average temperature recorded in Binghamton, NY on September 13.
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.
6. Exit velocity was not recorded on 9/13/2005 due to equipment malfunction. Exit velocity measured during an interim site visit on 8/1/2005 was used in the calculations.

ARCADIS

Table B-2. NYSDEC DAR-1 Air Modeling Data, Operational Year 3, Quarter Number 4, Colesville Landfill, Broome County, New York.

Page 2 of 3

Calculation of the Short-Term Guideline Concentration (SGC) for Sampling Event on 9/13/2005

Compounds	CAS Numbers	Maximum Limit (SGC)	Analytical Concentration (ppb)	Detection Limit Used	Actual Emissions C_a (ug/m ³)	Mass/hour (lb/hr)	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	7.2	*	18.71	2.63E-05	0.0045	0.29191	1.6E-04
Chloroethane(Ethyl Chloride)	75-00-3	--	7.2	*	19.31	2.71E-05	0.0046	0.30134	NA
1,1-Dichloroethene(Vinylidene Chloride)	75-35-4	--	7.2	*	29.02	4.08E-05	0.0070	0.45280	NA
Methylene Chloride(Dichloromethane)	75-09-2	14,000	7.2	*	25.42	3.57E-05	0.0061	0.39871	2.8E-03
1,1-Dichloroethane	75-34-3	--	7.2	*	29.62	4.16E-05	0.0071	0.46224	NA
cis-1,2 - Dichloroethylene	156-59-2	--	7.2	*	29.02	4.08E-05	0.0070	0.45280	NA
1,1,1-Trichloroethane(Methyl Chloroform)	71-55-6	68,000	7.2	*	39.93	5.61E-05	0.0096	0.62314	9.2E-04
Trichloroethene	79-01-6	54,000	7.2	*	39.33	5.52E-05	0.0094	0.61370	1.1E-03
Dichlorofluoromethane(Freon 12)	75-71-8	--	7.2	*	36.19	5.08E-05	0.0087	0.56466	NA

ug/m³: 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:

- DAR-1 refers to DAR-1 AGC/SGC Tables dated December 22, 2003.
- 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.
- 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.

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Table B-3. NYSDEC DAR-1 Air Modeling Data, Operational Year 3, Quarter Number 4, Colesville Landfill, Broome County, New York.

Calculation of AGC based on 9/13/2005 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 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	7.2	*	18.71	2.35E-05	0.20248	1.88
Chloroethane(Ethyl Chloride)	75-00-3	10,000	978,044.97	7.2	*	19.31	2.43E-05	0.20902	0.00
1,1-Dichloroethene(Vinylidene Chloride)	75-35-4	70	6,846.31	7.2	*	29.02	3.65E-05	0.31409	0.00
Methylene Chloride(Dichloromethane)	75-09-2	2.1	205.39	7.2	*	25.42	3.20E-05	0.27518	0.13
1,1-Dichloroethane	75-34-3	0.63	61.62	7.2	*	29.62	3.73E-05	0.32063	0.52
cis-1,2-Dichloroethylene	156-59-2	1,900	185,828.54	7.2	*	29.02	3.65E-05	0.31409	0.00
1,1,1-Trichloroethane(Methyl Chloroform)	71-55-6	1,000	97,804.50	7.2	*	39.93	5.02E-05	0.43224	0.00
Trichloroethene	79-01-6	0.5	48.90	7.2	*	39.33	4.95E-05	0.42569	0.87
Dichlorodifluoromethane(Freon 12)	75-71-8	12,000	1,173,653.96	7.2	*	17.99	2.26E-05	0.19470	0.00

fps: feet per second
 acfm: actual cubic feet per minute
 ug/m³: 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 64°F based on recorded parameters.
2. The ambient temperature is approximately 60°F, the average temperature recorded in Binghamton, NY on September 13.
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.

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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 3, Quarter Number 4 Injection Quantities, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Summary of Automated Reagent Injections

Date	Total Quantity of Molasses Solution Injected (gal.)	Total Quantity of Molasses Injected (gal.)	Total Quantity of Rinse Water Injected (gal.)
6/27/2005	2,720	272	157
8/22/2005	2,720	272	157
Quarter Totals (gal.) =	5,440	544	314
Totals For Operational Year 3 (gal.) =	16,330	1,632	942
Totals Since Startup (gal.) =	66,714	7,913	7,367

Notes:

gal. Gallons

Table C-2. Automated Reagent Injection System, Operational Year 3, Quarter Number 4 Operating Parameters, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Injection Number 49					
Injection Start Date =		6/27/2005			
Injection Completion Date =		8/3/2005			
Molasses to Water Ratio (%) =		10.0		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 ³ Pressure (psi)
PW-6	160	5	16.0	NM	NM
IW-3	160	5	16.0	NM	NM
IW-1	160	4	16.0	NM	NM
IW-2	160	3	16.0	NM	NM
GMMW-1	160	3	16.0	NM	NM
IW-4	160	4	16.0	NM	NM
IW-5	160	5	16.0	NM	NM
IW-6	160	7	16.0	NM	NM
IW-7	160	8	16.0	NM	NM
IW-8	160	9	16.0	NM	NM
IW-9	160	11	16.0	NM	NM
IW-10	160	12	16.0	NM	NM
IW-11	160	13	16.0	NM	NM
IW-12	160	15	16.0	NM	NM
IW-13	160	16	16.0	NM	NM
IW-14	160	18	16.0	NM	NM
IW-15	160	19	16.0	NM	NM
Totals (gal.) =	2720	157	272.0	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.

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.

Table C-2. Automated Reagent Injection System, Operational Year 3, Quarter Number 4 Operating Parameters, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Injection Number 50					
Injection Start Date =		8/22/2005			
Injection Completion Date =		8/25/2005			
Molasses to Water Ratio (%) =		10.0		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	160	5	16.0	NM	26
IW-3	160	5	16.0	NM	25
IW-1	160	4	16.0	NM	24
IW-2	160	3	16.0	NM	25
GMMW-1	160	3	16.0	NM	0
IW-4	160	4	16.0	NM	25
IW-5	160	5	16.0	NM	26
IW-6	160	7	16.0	NM	25
IW-7	160	8	16.0	NM	25
IW-8	160	9	16.0	NM	26
IW-9	160	11	16.0	NM	25
IW-10	160	12	16.0	NM	25
IW-11	160	13	16.0	NM	25
IW-12	160	15	16.0	NM	25
IW-13	160	16	16.0	NM	25
IW-14	160	18	16.0	NM	23
IW-15	160	19	16.0	NM	26
Totals (gal.) =	2720	157	272.0	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.

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 Figure

Figure D-1. Concentration of PCE Daughter Products Versus Time in GMMW-6.

