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Infrastructure, environment, buildings

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

ENVIRONMENT

Subject:
Operational Year 8 Quarter 1 Monitoring Report,
Colesville Landfill, Broome County, New York. (Site No. 704010).

Date:
June 15, 2010

Dear Mr. Jacob:

On behalf of Broome County, ARCADIS is providing the Operational Year 8 Quarter 1 Monitoring Report for the Colesville Landfill, Broome County, New York.

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

Sincerely,

ARCADIS

Steven M. Feldman
Project Manager

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Julia Kenney, NYSDOH
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Broome County

Division of Solid Waste Management

Operational Year 8

Quarter Number 1

Monitoring Report

June 2010

ARCADIS

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Operational Year 8
Quarter Number 1
Monitoring Report

Colesville Landfill,
Broome County, New York
NYSDEC Site 704010

Prepared for:
Broome County Division of Solid Waste Management

Prepared by:
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Our Ref..
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Date:
June 15, 2010

Tables

Figures

Appendices

1. Introduction

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

This report describes the results of the December 2009 groundwater quality monitoring event conducted during Operational Year 8, Quarter Number 1. A description of the operation, maintenance, and monitoring (OM&M) associated with the Groundwater Remediation System from October 2009 through December 2009 has also been provided. 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 8, Quarter Number 1. A site plan showing the environmental effectiveness monitoring locations is provided on Figure 1.

2.1 Environmental Effectiveness Monitoring

The environmental effectiveness monitoring performed during Operational Year 8, Quarter Number 1 included the following:

- Groundwater samples were collected from six monitoring wells (Year 8, Q1 list of wells plus alternate electron donor test well TW-1) during the week of December 21, 2009. The samples were selectively analyzed for volatile organic compounds (VOCs), dissolved gases, and total organic carbon (TOC). Field parameters were also recorded at these monitoring locations.

- Samples (VOCs only) were collected at the SP-4 and F-6 surface water locations on December 23, 2009.

- Samples were collected for VOCs and metals analyses from two shallow piezometers located near the SP-4 remediation based on the premise that the samples were representative of spring water along the nearby embankment of the stream.

In accordance with the Proposed Modifications to the Long-Term Monitoring Program (ARCADIS G&M, Inc. 2005), groundwater samples were collected from monitoring wells utilizing passive diffusive bag samplers.

2.2 Groundwater Remediation System Performance Monitoring

Groundwater Remediation System performance monitoring activities during Operational Year 8, Quarter Number 1, were as follows:

- Pump-and-treat (PT) system recovery well influent, combined influent, and effluent samples were collected on January 7, 2010. The samples were selectively analyzed for VOCs and total iron.

- One vapor sample from the PT system air stripper effluent was collected on January 7, 2010. The sample was analyzed for VOCs.

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

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

- A TOC sample was collected from alternate electron donor monitoring well TW-1 on December 22, 2009.

PT system groundwater samples were collected as grab samples directly from the individual recovery pipelines connected to recovery wells GMPW-4, GMPW-5, the combined influent water to the low profile air stripper, and the combined effluent after the cartridge filters. A groundwater sample was not collected from recovery well GMPW-3. The well pump for recovery well GMPW-3 was removed from operation on January 7, 2010 as a result of a faulty intake poppet. ARCADIS believes that the malfunctioning intake poppet on the pump was caused by excessively fine sand and silt content in the water within the well. Recovery well GMPW-3 was retrofitted from an existing site well and was not the ideal well design, which may account for the high fine sand and silt content. ARCADIS is currently evaluating corrective measures that may be implemented moving forward, and recovery well GMPW-3 will remain offline until a corrective action has been determined. 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 December 22, 2009. System OM&M was conducted in accordance with the LTM Plan Addendum for Spring Water Remediation Systems (ARCADIS G&M, Inc. 2003) and consisted of the collection of influent and effluent spring water samples for analysis of VOCs. Discharge flow rate and depth to water in the treatment unit were also recorded. The influent sample was collected after removing three well volumes from the influent monitoring well, which is located within the SP-5 treatment unit and screened below the liquid phase granular activated carbon (LPGAC) zone. The treatment system effluent sample was collected as a grab sample from the discharge pipe prior to entering the outfall stone apron. All spring water samples were analyzed for VOCs using USEPA Method 8260.

3. Groundwater Flow

A synoptic round of water level measurements will be conducted during Quarters 2 and 4 for evaluation of groundwater flow conditions.

4. Groundwater Quality

The following sections describe the analytical results for groundwater samples collected during the December 2009 monitoring round (Operational Year 8, Quarter Number 1). Groundwater analytical results are provided in Tables 1 and 2. Where

applicable, the previous round of analytical results for the respective sampling location has been provided in the same table for comparative purposes.

4.1 Volatile Organic Compounds

As shown in Table 1, total VOC (TVOC) concentrations in all monitoring wells sampled during the reporting period remained generally consistent when compared to analytical results from the previous round. Specifically, the TVOC concentration in monitoring wells GMMW-2, GMMW-5, W-5, GMMW-6, and PW-4 were 248.2 micrograms per liter (ug/L), 164.4 ug/L, 173.5 ug/L, 308.3 ug/L, and 76.1 ug/L, respectively. The TVOC concentration in monitoring well TW-1 (162.6 ug/L) decreased when compared to September 2009 data but remained consistent with historical monitoring data. Further discussion of the TW-1 analytical data is provided in Section 7.2.2.

During the current reporting period, the TVOC concentration at recovery wells GMPW-4 and GMPW-5 remained consistent with prior rounds of data. Specifically, TVOC concentrations in recovery wells GMPW-4 and GMPW-5 were 110.5 ug/L, and 0.0 ug/L, respectively. A complete evaluation of performance monitoring conducted on the PT system is provided in Section 7.1.2 of this report.

4.2 Indicators of Reducing Conditions

Groundwater analytical results for biogeochemical parameters and field parameters were collected in accordance with the LTM plan and are provided in Table 2. In summary, field and laboratory groundwater data for Wells TW-1, GMMW-2, GMMW-5, GMMW-6, and W-5 indicate that reducing conditions are being maintained within the IRZ. This is evidenced by the presence of reduced forms of alternate electron acceptors (i.e., methane) at a concentration significantly higher than baseline conditions. Further details of the ARI system performance monitoring are provided in Section 7.2.2 of this report.

4.3 Evidence of Biodegradation

Table 2 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 concentrations of ethene at monitoring wells GMMW-2 and GMMW-6 continue to be elevated when compared to baseline conditions. Similarly, the concentration of ethane remained elevated at monitoring wells GMMW-5 and GMMW-6 during the reporting period. 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

The embankment of the North Stream was inspected for springs during the OM&M site visit on December 23, 2009. Springs were not observed at the SP-2 area, but iron hydroxide staining was observed in the SP-3 area at the base of the heavy stone retaining well. A spring was also observed at the SP-4 area. Shallow groundwater samples were collected from piezometers PZ-2 and PZ-3, located in close proximity to the SP-4 spring (Figure 2). The 2-foot screens of the piezometers are open to an interval of approximately 1 to 3 feet below the water table. The piezometers were sampled based on the premise that the shallow groundwater is representative of spring water quality. The analytical results for VOCs and metals in the samples collected from the piezometers are provided in Tables 3 and 4, respectively. VOCs were not detected in PZ-3, and low-level concentrations of VOCs were detected in PZ-2, with the exception of chloroethane (93 ug/L). Concentrations of metals were consistently higher in PZ-2 than in PZ-3. There was no standing water in PZ-4, and could therefore not be sampled.

6. Surface Water Quality

Surface water quality analytical results for the Operational Year 8, Quarter Number 1 monitoring round are summarized in Table 1. As shown in Table 1, surface water quality at the SP-4 and F-6 sampling locations remained generally consistent when compared to analytical results from the previous round. Specifically, the TVOC concentration at the SP-4 and F-6 sampling locations were both 0.0 ug/L. The data indicate that surface water quality is not being adversely impacted by the landfill.

7. Groundwater Remediation System Performance

The following sections describe the results of the Groundwater Remediation System performance monitoring conducted during Operational Year 8, Quarter Number 1.

7.1 PT System

The following section describes the results of the PT system performance monitoring conducted during Operational Year 8, Quarter Number 1.

7.1.1 Summary of Operation, Maintenance, and Monitoring

During Operational Year 8, Quarter Number 1, the PT system operated continuously with the exception of the following circumstances: brief system shutdowns as a result of minor system alarms and routine OM&M activities; and placing the PT system offline between approximately December 7, 2009 and January 7, 2010 due to a low pressure alarm condition on the compressed air line for the recovery well pumps. The alarm condition was caused by a tear in the compressed air line for recovery well GMPW-4 pump. The tear was repaired on January 7, 2010. Routine maintenance was also completed on recovery well GMPW-3 and GMPW-5 pumps during the January 7, 2010 site visit. Upon inspection, the intake poppet for recovery well GMPW-3 pump was found to be faulty. As discussed in Section 2.2, ARCADIS believes that the malfunctioning intake poppet on the pump was caused by excessively fine sand and silt content in the water within the well, and is currently evaluating corrective measures that may be implemented moving forward. Recovery well GMPW-3 will remain offline until a corrective action has been determined. The pump was removed for servicing and the system was restarted on January 7, 2010 with only recovery wells GMPW-4 and GMPW-5 online.

PT system OM&M for Operational Year 8, Quarter Number 1 was conducted during the week of January 4, 2010 and included operation and maintenance of system equipment, the collection of system performance samples (water and vapor), and recording system operating parameters. Table 5 provides a summary of the recorded system operating parameters for the current operating period. As shown in Table 5, the total effluent groundwater recovery rate for Operational Year 8, Quarter Number 1 was approximately 0.25 gallons per minute (gpm), with individual recovery rates of 0.01 gpm, 0.09 gpm, and 0.09 gpm in GMPW-3, GMPW-4, and GMPW-5, respectively. The average individual recovery well pumping rates during Operational Year 8, Quarter Number 1 were lower than previous data (i.e., Operational Year 7, Quarter Number 4) and baseline (startup) conditions. The lower flow rates during Operation Year 8, Quarter Number 1 are a result of the malfunctioning pump in recovery well GMPW-3 and the system being offline between approximately December 7, 2009 and January 7, 2010.

A total of 33,257 gallons of groundwater was recovered during Operational Year 8, Quarter Number 1 and a total of 1,972,841 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 flow rate of 183 standard cubic feet per minute.

7.1.2 Results of Performance Sampling

PT system performance sampling for Operational Year 8, Quarter Number 1 was conducted on January 7, 2010. As discussed previously, four groundwater samples and one vapor sample were collected. Groundwater samples included collection of individual recovery well samples (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 6 provides a summary of the PT system performance groundwater sampling analytical results. As shown in Table 6, all groundwater VOCs were treated to below their respective Best Professional Judgment (BPJ) limits via the low profile air stripper. Based on the total groundwater recovered during the reporting period and total influent groundwater concentration, an estimated 0.03 pounds (lbs) of VOC mass were removed from the subsurface during the quarterly reporting period, as shown in Table 7. A total of approximately 3.52 lbs of VOCs have been removed from the subsurface since system startup.

Table 8 provides a summary of the PT system performance vapor sampling analytical results. As shown in Table 8, VOCs were not detected above their respective detection limits. To be conservative, a NYSDEC DAR-1 air model was calculated using the actual analytical data for detected constituents and the detection limit of all constituents that were not detected but have historically been detected in the influent groundwater. All COCs were below their respective short-term guideline concentrations (SGCs) and annual guideline 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 September 10, 2007.

7.2 ARI System

The following section describes the results of the ARI system performance monitoring conducted during Operational Year 8, Quarter Number 1.

7.2.1 Summary of Operation, Maintenance, and Monitoring

ARI system OM&M was conducted during the Operational Year 8, Quarter Number 1 OM&M site visit during the week of December 21, 2009. The visit included operation and maintenance of system equipment and the collection of samples for analysis of

TOC from injection wells IW-3 and IW-13. In addition, a TOC sample was collected from injection well IW-8 and monitoring well TW-1 to evaluate the long-term performance of the alternate electron donor in providing TOC to the subsurface.

One reagent injection was initiated during Operational Year 8, Quarter Number 1; however, the injection was not completed as a result of the system being offline between December 7, 2009 and January 7, 2010 (see Section 7.1.1). The injection will be reported in the Year 8, Quarter Number 2 report. As described in the Hydraulic Injection Test and Alternate Electron Donor Pilot Test Letter Work Plan (ARCADIS G&M, Inc. 2006), a slow-release alternate electron donor (e.g., emulsified edible oil [EOS]) was injected into existing injection well IW-8 during the week of December 18, 2006. Accordingly, IW-8 was not included in the current reagent injection to allow for long-term groundwater monitoring of the alternate electron donor.

Appendix C provides a summary of the recorded system operating parameters for each of the injection events for Operational Year 8, Quarter Number 1.

7.2.2 Results of Performance Sampling

ARI system performance sampling was conducted during the week of December 21, 2009. As discussed previously, this event consisted of collecting TOC samples at two injection wells. In addition, analytical results from select monitoring wells under the environmental effectiveness monitoring program were used to determine the effectiveness of the ARI system. A summary of key observations is as follows:

- The TOC concentrations at injection wells IW-3 and IW-13 were 43.8 mg/L and 1,910 mg/L, which indicate that sufficient organic carbon is being delivered to the subsurface to maintain the IRZ.

- The TOC in monitoring well TW-1 was 55.1 mg/L. The TOC in injection well IW-8 was 308 mg/L. These data indicate that the slow-release alternate electron donor (EOS™) continues to provide sufficient organic carbon to the subsurface following the one time injection in injection well IW-8 in December 2006.

- VOC data for monitoring well TW-1 decreased when compared to September 2009 data but remained consistent when compared to historical data (i.e., prior to June 2009). The decrease in TVOCs was caused by a drop in the concentration of toluene. As described in previous reports, ARCADIS believes

the presence of toluene is of biogenic production, sorption/desorption of toluene into the EOS™ itself, or suppression of the natural attenuation of existing toluene within the anaerobic treatment zone. However, ARCADIS believes the observed increase in toluene at TW-1 will be transient and the toluene will naturally attenuate and be utilized as an electron donor as it flows along the downgradient flow path out of the anaerobic reactive zone. The current declining trend of toluene corroborates these assumptions. ARCADIS will continue to monitor its presence and confirm that toluene is degrading. The data indicate a stable to decreasing trend in the concentration of VOCs in the vicinity of the alternate electron donor pilot test.

- Monitoring wells in close proximity to the anaerobic IRZ (i.e., GMMW-5, W-5, GMMW-6 and GMMW-2) exhibited stable VOC concentrations and remain significantly lower than baseline conditions.

- The methane concentration in monitoring wells GMMW-5 and TW-1 remained elevated at 9,600 ug/L and 15,000 ug/L, respectively. Additionally, the methane concentration at monitoring well W-5 has increased 82 percent since the one time injection of the EOS™ at injection well IW-8. These data provide evidence that strongly reducing conditions (methanogenic) are being maintained within the IRZ.

- The ethene concentration in monitoring wells GMMW-2 and GMMW-6 remained elevated at 12,000 nanograms per liter (ng/L) and 40,000 ng/L, respectively.

- The ethane concentration remained elevated in monitoring wells GMMW-5 and GMMW-6 at 39,000 ng/L and 9,000 ng/L, respectively.

8. Spring Water Remediation System Performance

SP-5 Spring Water Remediation System OM&M was conducted on December 22, 2009 in accordance with the LTM Plan Addendum for Spring Water Remediation Systems (ARCADIS G&M, Inc. 2003). SP-5 remediation system analytical results are provided in Table 9. As shown in Table 9, all effluent COCs were treated to below their respective BPJ limits via the LPGAC. Influent TVOC analytical data (58.6 ug/L) remained consistent with historical analytical data. Table 10 provides the SP-5 Spring Water Remediation System field parameters recorded during Operational Year 8, Quarter Number 1. As shown in Table 10, the SP-5 remedial system treated

approximately 142,662 gallons of spring water during the operating period. An estimated 0.07 lbs of VOCs was removed by the SP-5 remedial system during the same period. An estimated 1,752,240 gallons of spring water have been treated and an estimated 1.17 lbs of VOC mass have been recovered since system startup.

9. Conclusions

Based on the data obtained from the Operational Year 8, Quarter Number 1 monitoring, ARCADIS concludes the following:

- The anaerobic IRZ established downgradient of the injection transect is successfully reducing the concentration of site-related VOCs through enhanced reductive dechlorination.
- The PT system is operating as designed and is treating VOCs in the recovered groundwater to below BPJ limits prior to discharge.
- Sufficient organic carbon was available in the subsurface to maintain the IRZ.
- Surface water quality continues to be consistent with historical data indicating that groundwater is being remediated and is not causing an adverse impact to surface water along the North Stream.
- Ongoing TOC data from the alternate electron donor pilot test indicate the EOS™ is an effective product to provide sufficient organic carbon to the subsurface over long periods of time. VOC data from monitoring well TW-1 continues to indicate stable to decreasing VOCs in the alternate electron donor pilot test area.
- SP-5 remediation system operating parameters are consistent with historical operation and indicate that the maintenance activities completed in September 2008 and discussed in the Operational Year 7 Annual Monitoring Report (ARCADIS of New York, Inc. 2009) were successful in mitigating the presence of tailwater.
- The data collected from PZ-2 indicate that spring water should be further evaluated to assess potential risks to ecological receptors.

10. Recommendations

The following recommendations are made for Operational Year 8, Quarter Number 2 activities:

- Continue to inspect the former spring locations and the side slopes of the North Stream. Sample the spring water for VOCs and metals, and determine whether the spring(s) pose an ecological risk.

- Continue to operate the ARI system without injection well IW-8. Continue to obtain and evaluate data related to the ongoing slow-release alternate electron donor pilot program. If data are favorable, consider transitioning to a slower release alternate electron donor such as EOS™ on a full-scale basis. Likewise, consider the evaluation and/or use of more economical slow release electron donors such as cheese whey.

- Continue to monitor the concentration of toluene at monitoring well TW-1. In addition, monitor the concentration of toluene at monitoring well W-5 to confirm that it is biodegrading along the downgradient flow path.

- Continue to evaluate recovery well GMPW-3 to determine an appropriate corrective measure.

11. Project Schedule

Groundwater environmental effectiveness monitoring is scheduled to be conducted for Operational Year 8 on the quarterly schedule set forth in the Proposed Modifications to Long-Term Monitoring Program (ARCADIS G&M, Inc. 2005). System OM&M of the Groundwater Remediation System will continue to be performed on a quarterly basis consistent with the LTM Plan.

12. References

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

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

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 Proposed Modifications to Long-Term Monitoring Program, Broome County, New York, NYSDEC Site 704010. June 28, 2005.

ARCADIS G&M, Inc. 2006. Hydraulic Injection Test and Alternate Electron Donor Pilot Test, Colesville Landfill, Broome County, New York (Site No. 704010). November 30, 2006.

ARCADIS of New York, Inc. 2009. Operational Year 6 Annual Monitoring Report, Colesville Landfill, Broome County, New York (Site No. 704010). April 30, 2009.

Table 1. Concentrations of Volatile Organic Compounds Detected in Groundwater and Surface Water, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID:	GMMW-02	GMMW-02	GMMW-05	GMMW-05	GMMW-05*	GMMW-06	GMMW-06
	Date:	9/23/2009	12/22/2009	9/23/2009	12/22/2009	12/22/2009	9/23/2009	12/22/2009
1,1,1,2-Tetrachloroethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,1,2,2-Tetrachloroethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,1,1-Trichloroethane		5.2	5.9 J	<5.0	<5.0	<5.0	<5.0	1.6 J
1,1,2-Trichloroethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,2,3-Trichlorobenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,2,3-Trichloropropane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,2,4-Trichlorobenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,2,4-Trimethylbenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,3,5-Trimethylbenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,2-Dibromo-3-chloropropane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,1-Dichloroethane		110	110 J	56	66	65	160	150 J
1,1-Dichloroethene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,1-Dichloropropene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,2-Dibromoethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,2-Dichlorobenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,2-Dichloroethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,2-Dichloropropane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,2-Dichloroethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,2-Dichloropropane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,3-Dichlorobenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,3-Dichloropropane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
1,4-Dichlorobenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
2-Chlorotoluene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
2,2-Dichloropropane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
4-Chlorotoluene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Benzene		3.0 J	2.6 J	1.1 J	1.4 J	1.4 J	5.5	3.9 J
Bromobenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Bromochloromethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Bromodichloromethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Bromoform		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Bromomethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
n-Butylbenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Carbon Tetrachloride		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Chlorobenzene		29	30	11	14	14	27	24
Chloroethane		18	1.0	72	79	77	120	99
Chloroform		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Chloromethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
cis-1,2-Dichloroethene		76	67	1.3 J	1.3 J	1.3 J	16	8.8 J
cis-1,3-Dichloropropene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Dibromochloromethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Dibromomethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Dichlorodifluoromethane		<5.0	<10	<5.0	<5.0	<5.0	4.0 J	<10
Ethylbenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Hexachlorobutadiene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Isopropylbenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
p-Isopropyltoluene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Methylene chloride		<5.0	1.7 J	<5.0 B	1.8 J	1.8 J	<5.0 B	4.4 J
Methyl tert-butyl ether		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Naphthalene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
o-Xylene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
m,p-Xylene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
n-Propylbenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10

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Table 1. Concentrations of Volatile Organic Compounds Detected in Groundwater and Surface Water, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	GMMW-02 9/23/2009	GMMW-02 12/22/2009	GMMW-05 9/23/2009	GMMW-05 12/22/2009	GMMW-05* 12/22/2009	GMMW-06 9/23/2009	GMMW-06 12/22/2009
sec-Butylbenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Styrene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
tert-Butylbenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
trans-1,3-Dichloropropene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Trichlorofluoromethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Tetrachloroethene		<5.0	<10	<5.0	<5.0	<5.0	<5.0	<10
Toluene		<5.0	<10	**0.96 J**	**0.92 J**	**0.87 J**	<5.0	<10
trans-1,2-Dichloroethene		<5.0	<10	<5.0	<5.0	<5.0	**1.1 J**	<10
Trichloroethene		**20**	**20**	<5.0	<5.0	<5.0	**10**	**9.8 J**
Vinyl chloride		**11**	**10**	<5.0	<5.0	<5.0	**9.6**	**6.8 J**
Total VOCs		**272.2 J**	**248.2 J**	**142.4 J**	**164.4 J**	**161.3 J**	**353.2 J**	**308.3 J**

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

Table 1. Concentrations of Volatile Organic Compounds Detected in Groundwater and Surface Water, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	PW-04 9/23/2009	PW-04 12/22/2009	W-05 9/23/2009	W-05 12/22/2009	TW-1 9/23/2009	TW-1 12/22/2009	SP-4 9/24/2009
1,1,1,2-Tetrachloroethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,1,2,2-Tetrachloroethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,1,1-Trichloroethane		**10**	**9.9**	<5.0	<5.0	<20	<5.0	<5.0
1,1,2-Trichloroethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,2,3-Trichlorobenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,2,3-Trichloropropane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,2,4-Trichlorobenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,2,4-Trimethylbenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,3,5-Trimethylbenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,2-Dibromo-3-chloropropane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,1-Dichloroethane		**26**	**17**	**51**	**53**	<20	**5.7**	**3.1 J**
1,1-Dichloroethene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,1-Dichloropropene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,2-Dibromoethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,2-Dichlorobenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,2-Dichloroethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,2-Dichloropropane		<5.0	<5.0	<5.0	**0.71 J**	<20	<5.0	<5.0
1,2-Dichloroethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,2-Dichloropropane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,3-Dichlorobenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,3-Dichloropropane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
1,4-Dichlorobenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
2-Chlorotoluene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
2,2-Dichloropropane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
4-Chlorotoluene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Benzene		<5.0	<5.0	5.4	**5.5**	<20	**2.5 J**	<5.0
Bromobenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Bromochloromethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Bromodichloromethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Bromoform		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Bromomethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
n-Butylbenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Carbon Tetrachloride		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Chlorobenzene		<5.0	<5.0	**5.4**	**6.4**	**6.9 J**	**9.5**	<5.0
Chloroethane		**5.9**	**3.1 J**	**86**	**100**	**75**	**99**	<5.0
Chloroform		**0.91 J**	**1.1 J**	<5.0	<5.0	<20	<5.0	<5.0
Chloromethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
cis-1,2-Dichloroethene		**24**	**20**	**2.9 J**	**2.6 J**	<20	**1.8 J**	<5.0
cis-1,3-Dichloropropene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Dibromochloromethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Dibromomethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Dichlorodifluoromethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Ethylbenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Hexachlorobutadiene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Isopropylbenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
p-Isopropyltoluene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Methylene chloride		<5.0	<5.0	<5.0 B	**2.4 J**	<20 B	<5.0	<5.0
Methyl tert-butyl ether		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Naphthalene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
o-Xylene		<5.0	<5.0	**1.7 J**	**1.5 J**	<20	**0.92 J**	<5.0
m,p-Xylene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
n-Propylbenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0

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Table 1. Concentrations of Volatile Organic Compounds Detected in Groundwater and Surface Water, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	PW-04 9/23/2009	PW-04 12/22/2009	W-05 9/23/2009	W-05 12/22/2009	TW-1 9/23/2009	TW-1 12/22/2009	SP-4 9/24/2009
sec-Butylbenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Styrene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
tert-Butylbenzene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
trans-1,3-Dichloropropene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Trichlorofluoromethane		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Tetrachloroethene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Toluene		<5.0	<5.0	<5.0	<5.0	**490**	**42**	<5.0
trans-1,2-Dichloroethene		<5.0	<5.0	<5.0	<5.0	<20	<5.0	<5.0
Trichloroethene		**28**	**25**	**0.77 J**	**1.4 J**	<20	<5.0	<5.0
Vinyl chloride		<5.0	<5.0	<5.0	<5.0	<20	**1.2 J**	<5.0
Total VOCs		**94.8 J**	**76.1 J**	**153.2 J**	**173.5 J**	**571.9 J**	**162.6 J**	**3.1 J**

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

Table 1. Concentrations of Volatile Organic Compounds Detected in Groundwater and Surface Water, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	SP-4 12/23/2009	F-6 6/25/2009	F-6 12/23/2009	TBV 220912 12/22/2009	TBV 230912 12/23/2009
1,1,1,2-Tetrachloroethane		<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane		<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane		<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane		<5.0	<5.0	<5.0	<5.0	<5.0
1,2,3-Trichlorobenzene		<5.0	<5.0	<5.0	<5.0	<5.0
1,2,3-Trichloropropane		<5.0	<5.0	<5.0	<5.0	<5.0
1,2,4-Trichlorobenzene		<5.0	<5.0	<5.0	<5.0	<5.0
1,2,4-Trimethylbenzene		<5.0	<5.0	<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene		<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dibromo-3-chloropropane		<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane		<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene		<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloropropene		<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dibromoethane		<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichlorobenzene		<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane		<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane		<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane		<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane		<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichlorobenzene		<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichloropropane		<5.0	<5.0	<5.0	<5.0	<5.0
1,4-Dichlorobenzene		<5.0	<5.0	<5.0	<5.0	<5.0
2-Chlorotoluene		<5.0	<5.0	<5.0	<5.0	<5.0
2,2-Dichloropropane		<5.0	<5.0	<5.0	<5.0	<5.0
4-Chlorotoluene		<5.0	<5.0	<5.0	<5.0	<5.0
Benzene		<5.0	<5.0	<5.0	<5.0	<5.0
Bromobenzene		<5.0	<5.0	<5.0	<5.0	<5.0
Bromochloromethane		<5.0	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane		<5.0	<5.0	<5.0	<5.0	<5.0
Bromoform		<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane		<5.0	<5.0	<5.0	<5.0	<5.0
n-Butylbenzene		<5.0	<5.0	<5.0	<5.0	<5.0
Carbon Tetrachloride		<5.0	<5.0	<5.0	<5.0	<5.0
Chlorobenzene		<5.0	<5.0	<5.0	<5.0	<5.0
Chloroethane		<5.0	<5.0	<5.0	<5.0	<5.0
Chloroform		<5.0	<5.0	<5.0	<5.0	<5.0
Chloromethane		<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene		<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,3-Dichloropropene		<5.0	<5.0	<5.0	<5.0	<5.0
Dibromochloromethane		<5.0	<5.0	<5.0	<5.0	<5.0
Dibromomethane		<5.0	<5.0	<5.0	<5.0	<5.0
Dichlorodifluoromethane		<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene		<5.0	<5.0	<5.0	<5.0	<5.0
Hexachlorobutadiene		<5.0	<5.0	<5.0	<5.0	<5.0
Isopropylbenzene		<5.0	<5.0	<5.0	<5.0	<5.0
p-Isopropyltoluene		<5.0	<5.0	<5.0	<5.0	<5.0
Methylene chloride		<5.0	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether		<5.0	<5.0	<5.0	<5.0	<5.0
Naphthalene		<5.0	<5.0	<5.0	<5.0	<5.0
o-Xylene		<5.0	<5.0	<5.0	<5.0	<5.0
m,p-Xylene		<5.0	<5.0	<5.0	<5.0	<5.0
n-Propylbenzene		<5.0	<5.0	<5.0	<5.0	<5.0

Footnotes on next page.

Table 1. Concentrations of Volatile Organic Compounds Detected in Groundwater and Surface Water, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	SP-4 12/23/2009	F-6 6/25/2009	F-6 12/23/2009	TBV 220912 12/22/2009	TBV 230912 12/23/2009
sec-Butylbenzene		<5.0	<5.0	<5.0	<5.0	<5.0
Styrene		<5.0	<5.0	<5.0	<5.0	<5.0
tert-Butylbenzene		<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene		<5.0	<5.0	<5.0	<5.0	<5.0
Trichlorofluoromethane		<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene		<5.0	<5.0	<5.0	<5.0	<5.0
Toluene		<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene		<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene		<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl chloride		<5.0	<5.0	<5.0	<5.0	<5.0
Total VOCs		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

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

ARCADIS

Table 2. Concentrations of General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	Units	GMMW-02 09/23/09	GMMW-02 12/22/09	GMMW-05 09/23/09	GMMW-05 12/22/09	GMMW-06 09/23/09	GMMW-06 12/22/09
GENERAL CHEMISTRY								
Total Organic Carbon		mg/L	**1.0**	**1.3**	**8.5**	**6.5**	**2.3**	**2.4**
FIELD PARAMETERS								
pH		Standard units	**6.54**	**6.51**	**6.31**	**6.09**	**6.37**	**6.22**
Specific Conductance		mmhos/cm	**0.665**	**0.659**	**0.394**	**0.434**	**0.884**	**0.818**
Turbidity		NTU	--	--	--	--	--	--
Dissolved Oxygen		mg/L	--	--	--	--	--	--
Temperature		deg C	**14.90**	**7.60**	**16.80**	**7.30**	**14.60**	**6.90**
ORP		mV	--	--	--	--	--	--
DISSOLVED GASES								
Carbon dioxide		mg/L	--	--	--	--	--	--
Carbon monoxide		mg/L	--	--	--	--	--	--
Ethane		ng/L	**730**	**810**	**37,000**	**39,000**	**8,600**	**9,000**
Ethene		ng/L	**14,000**	**12,000**	**1,700**	**1,300**	**35,000**	**40,000**
Methane		ug/L	**7,900**	**8,900**	**12,000**	**9,600**	**2,800**	**3,600**
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	Estimated value.

ARCADIS

Table 2. Concentrations of General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	PW-04 09/23/09	PW-04 12/22/09	W-05 09/23/09	W-05 12/22/09	IW-03 09/22/09	IW-03 12/23/09
	Units						
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L	<1.0	<1.0	**7.2**	**6.2**	**55.1**	43.8
FIELD PARAMETERS							
pH	Standard units	**5.56**	**5.24**	**6.31**	**6.18**	**6.60**	**6.24**
Specific Conductance	mmhos/cm	**1.93**	**2.28**	**0.924**	**0.920**	**0.526**	**0.593**
Turbidity	NTU	--	--	--	--	--	--
Dissolved Oxygen	mg/L	--	--	--	--	--	--
Temperature	deg C	**15.30**	**8.20**	**13.60**	**7.80**	**17.80**	**7.10**
ORP	mV	--	--	--	--	--	--
DISSOLVED GASES							
Carbon dioxide	mg/L	--	--	--	--	--	--
Carbon monoxide	mg/L	--	--	--	--	--	--
Ethane	ng/L	**13 J**	**8.0 J**	**14,000**	**16,000**	--	--
Ethene	ng/L	**30**	**<25**	**980**	**1,200**	--	--
Methane	ug/L	**7.4**	**1.2**	**15,000**	**11,000**	--	--
Nitrogen	mg/L	--	--	--	--	--	--
Oxygen	mg/L	--	--	--	--	--	--

Bold Constituent detected above MDL.

mg/L	Milligrams per liter.
mmhos/cm	Millimhos per centimeter.
NTU	Nephelometric Turbidity Units.
deg C	Degrees Celsius.
mV	Millivolts.
ng/L	Nanograms per liter.
--	Not analyzed or collected.
ug/L	Micrograms per liter.
IW	Injection well.
ORP	Oxidation-reduction potential.
J	Estimated value.

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Table 2. Concentrations of General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	IW-08 09/22/09	IW-08 12/23/09	IW-13 09/22/09	IW-13 12/23/09	TW-1 09/23/09	TW-1 12/22/09
	Units						
GENERAL CHEMISTRY							
Total Organic Carbon	mg/L	**422**	**308**	**128**	**1,910**	**61.4**	**55.1**
FIELD PARAMETERS							
pH	Standard units	**6.30**	**6.16**	**6.06**	**4.59**	**6.40**	**6.35**
Specific Conductance	mmhos/cm	**1.47**	**1.72**	**0.557**	**0.320**	**1.22**	**1.18**
Turbidity	NTU	--	--	--	--	--	--
Dissolved Oxygen	mg/L	--	--	--	--	--	--
Temperature	deg C	**15.30**	**5.50**	**15.00**	**7.40**	**14.80**	**7.10**
ORP	mV	--	--	--	--	--	--
DISSOLVED GASES							
Carbon dioxide	mg/L	--	--	--	--	--	
Carbon monoxide	mg/L	--	--	--	--	--	
Ethane	ng/L	--	--	--	--	**4,000**	**3,600**
Ethene	ng/L	--	--	--	--	**750**	**640**
Methane	ug/L	--	--	--	--	**14,000**	**15,000**
Nitrogen	mg/L	--	--	--	--	--	--
Oxygen	mg/L	--	--	--	--	--	--

Bold Constituent detected above MDL.

mg/L	Milligrams per liter.
mmhos/cm	Millimhos per centimeter.
NTU	Nephelometric Turbidity Units.
deg C	Degrees Celsius.
mV	Millivolts.
ng/L	Nanograms per liter.
--	Not analyzed or collected.
ug/L	Micrograms per liter.
IW	Injection well.
ORP	Oxidation-reduction potential.
J	Estimated value.

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Table 3. Concentrations of Volatile Organic Compounds Detected in Aqueous Samples Collected from Piezometers PZ-2 and PZ-3, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.[1]

Constituents (units in ug/L)	Sample ID: / Date:	PZ-2 12/23/2009	PZ-3 12/23/2009	TBV 230912 12/23/2009
1,1,1,2-Tetrachloroethane		<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane		<5.0	<5.0	<5.0
1,1,1-Trichloroethane		<5.0	<5.0	<5.0
1,1,2-Trichloroethane		<5.0	<5.0	<5.0
1,2,3-Trichlorobenzene		<5.0	<5.0	<5.0
1,2,3-Trichloropropane		<5.0	<5.0	<5.0
1,2,4-Trichlorobenzene		<5.0	<5.0	<5.0
1,2,4-Trimethylbenzene		<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene		<5.0	<5.0	<5.0
1,2-Dibromo-3-chloropropane		<5.0	<5.0	<5.0
1,1-Dichloroethane		<5.0	<5.0	<5.0
1,1-Dichloroethene		**18**	<5.0	<5.0
1,1-Dichloropropene		<5.0	<5.0	<5.0
1,2-Dibromoethane		<5.0	<5.0	<5.0
1,2-Dichlorobenzene		<5.0	<5.0	<5.0
1,2-Dichloroethane		<5.0	<5.0	<5.0
1,2-Dichloropropane		<5.0	<5.0	<5.0
1,3-Dichlorobenzene		<5.0	<5.0	<5.0
1,3-Dichloropropane		<5.0	<5.0	<5.0
1,4-Dichlorobenzene		<5.0	<5.0	<5.0
2-Chlorotoluene		<5.0	<5.0	<5.0
2,2-Dichloropropane		<5.0	<5.0	<5.0
4-Chlorotoluene		<5.0	<5.0	<5.0
Benzene		**1.5 J**	<5.0	<5.0
Bromobenzene		<5.0	<5.0	<5.0
Bromochloromethane		<5.0	<5.0	<5.0
Bromodichloromethane		<5.0	<5.0	<5.0
Bromoform		<5.0	<5.0	<5.0
Bromomethane		<5.0	<5.0	<5.0
n-Butylbenzene		<5.0	<5.0	<5.0
Carbon Tetrachloride		<5.0	<5.0	<5.0
Chlorobenzene		**12**	<5.0	<5.0
Chloroethane		**93**	<5.0	<5.0
Chloroform		<5.0	<5.0	<5.0
Chloromethane		<5.0	<5.0	<5.0
cis-1,2-Dichloroethene		**3.6 J**	<5.0	<5.0
cis-1,3-Dichloroethene		<5.0	<5.0	<5.0
Dibromochloromethane		<5.0	<5.0	<5.0
Dibromomethane		<5.0	<5.0	<5.0
Dichlorodifluoromethane		<5.0	<5.0	<5.0
Ethylbenzene		<5.0	<5.0	<5.0
Hexachlorobutadiene		<5.0	<5.0	<5.0
Isopropylbenzene		<5.0	<5.0	<5.0
p-Isopropyltoluene		<5.0	<5.0	<5.0
Methylene chloride		<5.0	<5.0	<5.0
Methyl tert-butyl ether		<5.0	<5.0	<5.0
Naphthalene		<5.0	<5.0	<5.0
o-Xylene		<5.0	<5.0	<5.0
m,p-Xylene		<5.0	<5.0	<5.0
n-Propylbenzene		<5.0	<5.0	<5.0

See notes on last page.

Table 3. Concentrations of Volatile Organic Compounds Detected in Aqueous Samples Collected from Piezometers PZ-2 and PZ-3, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.[1]

Constituents (units in ug/L)	Sample ID: / Date:	PZ-2 12/23/2009	PZ-3 12/23/2009	TBV 230912 12/23/2009
sec-Butylbenzene		<5.0	<5.0	<5.0
Styrene		<5.0	<5.0	<5.0
tert-Butylbenzene		<5.0	<5.0	<5.0
trans-1,3-Dichloropropene		<5.0	<5.0	<5.0
Trichlorofluoromethane		<5.0	<5.0	<5.0
Tetrachloroethene		<5.0	<5.0	<5.0
Toluene		<5.0	<5.0	<5.0
trans-1,2-Dichloroethene		<5.0	<5.0	<5.0
Trichloroethene		**1.0 J**	<5.0	<5.0
Vinyl chloride		**2.8 J**	<5.0	<5.0
Total VOCs		**131.9 J**	**0.0**	**0.0**

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

1. Samples were collected from piezometers PZ-2 and PZ-3 during Operational Year 8, Quarter Number 1 in response to a United States Environmental Protection Agency request.

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Table 4. Concentrations of Metals Detected in Aqueous Samples Collected from Piezometers PZ-2 and PZ-3, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.[1]

Constituents (units in ug/L)	Sample ID: / Date:	PZ-2 12/23/2009	PZ-3 12/23/2009
Aluminum		**1,810**	**170 J**
Antimony		<15.0	<15.0
Arsenic		**172**	<15.0
Barium		**144**	**4.50 J**
Beryllium		<5.00	<5.00
Cadmium		<5.00	<5.00
Calcium		**82,700**	**4,060**
Chromium		**8.50**	**2.60 J**
Cobalt		**5.70**	<5.00
Copper		<10.0 B	<10.0 B
Iron		**54,700**	**33,300**
Lead		**3.40 J**	<15.0
Magnesium		**20,600**	**844**
Manganese		**9,270**	**398**
Mercury		<0.200	<0.200
Nickel		**9.60**	**2.20 J**
Potassium		**2,890**	**497 J**
Selenium		**<38.0**	<38.0
Silver		<5.00 B	<5.00
Sodium		**9,260**	**2,990**
Thallium		<15.0	<15.0
Vanadium		**7.20**	<5.00
Zinc		**687**	**8.10 J**

Notes:

1. Samples were collected from piezometers PZ-2 and PZ-3 during Operational Year 8, Quarter Number 1 in response to a United States Environmental Protection Agency request.

J	Estimated value.
ug/L	Micrograms per liter.
B	Compound considered non-detect at the listed value due to associated blank contamination.

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Table 5. PT System Operating Parameters, Operational Year 8, Quarter Number 1, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Date	Time Recorded	Air Stripper Measurements: Blower Discharge Pressure PI-301 (i.w.c.)	Air Stripper Measurements: Blower Effluent Flowrate (scfm)	Flow Measurements: Total[1] Effluent Totalizer FQI-401 (gallons)	Flow Measurements: Water Bypass[2] Totalizer FQI-402 (gallons)	Flow Measurements: GMPW-3[3,5] Totalizer FQI-101 (gallons)	Flow Measurements: GMPW-4[4] Totalizer FQI-102 (gallons)	Flow Measurements: GMPW-5[4] Totalizer FQI-103 (gallons)
10/7/2009	3:22 PM	9.2	215	763,754.6	229,442.2	50,138.0	115,029.4	170,459.7
1/7/2010	2:04 PM	8.4	183	797,011.2	247,553.8	51,739.1	127,497.3	182,515.9
		Average Daily Flowrate (gpm) =		**0.25**	**0.14**	**0.01**	**0.09**	**0.09**
		Total Groundwater Recovered During Reporting Period (gallons) =		**33,257**	**18,112**	**1,601**	**12,468**	**12,056**

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

Notes:

1. Total effluent totalizer replaced on December 23, 2005.
2. Water bypass totalizer damaged as a result of freezing in February, 2007. Totalizer replaced on June 25, 2008.
3. GMPW-3 well totalizer replaced on October 7, 2009.
4. GMPW-4 and GMPW-5 well totalizers replaced on June 26, 2008.
5. GMPW-3 well pump was removed from operation on January 7, 2010 as a result of a faulty intake poppet.

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Table 6. Concentrations of Volatile Organic Compounds and Selected Metals Detected in Aqueous Samples Collected from the PT System, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York[5,6].

Constituents (units in ug/L)	Model Technology BPJ Limits[1,2]	Sample ID: Date:	GMPW-3 INF[7] –	GMPW-4 INF 1/7/2010	GMPW-5 INF 1/7/2010	COMBINED INF 1/7/2010	COMBINED EFF 1/7/2010
1,1,1,2-Tetrachloroethane	NA		--	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	NA		--	<5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane	10-20		--	**4.3 J**	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	10		--	<5.0	<5.0	<5.0	<5.0
1,2,3-Trichlorobenzene	NA		--	<5.0	<5.0	<5.0	<5.0
1,2,3-Trichloropropane	NA		--	<5.0	<5.0	<5.0	<5.0
1,2,4-Trichlorobenzene	NA		--	<5.0	<5.0	<5.0	<5.0
1,2,4-Trimethylbenzene	NA		--	**0.88 J**	<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene	NA		--	<5.0	<5.0	<5.0	<5.0
1,2-Dibromo-3-chloropropane	NA		--	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	10		--	**28**	<5.0	**16**	<5.0
1,1-Dichloroethene	10		--	<5.0	<5.0	<5.0	<5.0
1,1-Dichloropropene	NA		--	<5.0	<5.0	<5.0	<5.0
1,2-Dibromoethane	NA		--	<5.0	<5.0	<5.0	<5.0
1,2-Dichlorobenzene	NA		--	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	10-30		--	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	NA		--	<5.0	<5.0	<5.0	<5.0
1,3-Dichlorobenzene	NA		--	<5.0	<5.0	<5.0	<5.0
1,3-Dichloropropane	NA		--	<5.0	<5.0	<5.0	<5.0
1,4-Dichlorobenzene	NA		--	<5.0	<5.0	<5.0	<5.0
2-Chlorotoluene	NA		--	<5.0	<5.0	<5.0	<5.0
2,2-Dichloropropane	NA		--	<5.0	<5.0	<5.0	<5.0
4-Chlorotoluene	NA		--	<5.0	<5.0	<5.0	<5.0
Benzene	5		--	**1.9 J**	<5.0	**1.1 J**	<5.0
Bromobenzene	NA		--	<5.0	<5.0	<5.0	<5.0
Bromochloromethane	NA		--	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane	NA		--	<5.0	<5.0	<5.0	<5.0
Bromoform	NA		--	<5.0	<5.0	<5.0	<5.0
Bromomethane	NA		--	<5.0	<5.0	<5.0	<5.0
n-Butylbenzene	NA		--	<5.0	<5.0	<5.0	<5.0
Carbon Tetrachloride	NA		--	<5.0	<5.0	<5.0	<5.0
Chlorobenzene	NA		--	**6.4**	<5.0	**3.6 J**	<5.0
Chloroethane	NA		--	**12**	<5.0	**7.4**	<5.0
Chloroform	NA		--	<5.0	<5.0	<5.0	<5.0

See notes on last page.

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Table 6. Concentrations of Volatile Organic Compounds and Selected Metals Detected in Aqueous Samples Collected from the PT System, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York[5,6].

Constituents (units in ug/L)	Model Technology BPJ Limits[1,2]	Sample ID: Date:	GMPW-3 INF[7] –	GMPW-4 INF 1/7/2010	GMPW-5 INF 1/7/2010	COMBINED INF 1/7/2010	COMBINED EFF 1/7/2010
Chloromethane	10		--	<5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene	10		--	**23 J**	<5.0	**14 J**	<5.0
cis-1,3-Dichloropropene	NA		--	<5.0	<5.0	<5.0	<5.0
Dibromochloromethane	NA		--	<5.0	<5.0	<5.0	<5.0
Dibromomethane	NA		--	<5.0	<5.0	<5.0	<5.0
Dichlorodifluoromethane	NA		--	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	5		--	<5.0	<5.0	<5.0	<5.0
Hexachlorobutadiene	NA		--	<5.0	<5.0	<5.0	<5.0
Isopropylbenzene	NA		--	<5.0	<5.0	<5.0	<5.0
p-Isopropyltoluene	NA		--	<5.0	<5.0	<5.0	<5.0
Methylene Chloride	10-50		--	<5.0 B	<5.0	<5.0	<5.0
Methyl tert-butyl ether	50		--	<5.0	<5.0	<5.0	<5.0
Naphthalene	10		--	<5.0	<5.0	<5.0	<5.0
o-Xylene	5		--	<5.0	<5.0	<5.0	<5.0
m,p-Xylene	5		--	<5.0	<5.0	<5.0	<5.0
n-Propylbenzene	NA		--	<5.0	<5.0	<5.0	<5.0
sec-Butylbenzene	NA		--	<5.0	<5.0	<5.0	<5.0
Styrene	NA		--	<5.0	<5.0	<5.0	<5.0
tert-Butylbenzene	NA		--	<5.0	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene	NA		--	<5.0	<5.0	<5.0	<5.0
Trichlorofluoromethane	10		--	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene	10		--	<5.0	<5.0	<5.0	<5.0
Toluene	5		--	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	10-50		--	<5.0	<5.0	<5.0	<5.0
Trichloroethene	10		--	**34**	<5.0	**19**	<5.0
Vinyl Chloride	10-50		–	<5.0	<5.0	**1.1 J**	<5.0
Total VOCs			–	**110.5 J**	**0.0**	**62.2 J**	**0.0**
Metals (units in mg/L)	Model Technology BPJ Limits[3,4] (mg/L)						
Total Iron	1.2 / 0.61		--	**2.13**	**0.095 J**	**0.581**	**0.822**

See notes on last page.

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Table 6. Concentrations of Volatile Organic Compounds and Selected Metals Detected in Aqueous Samples Collected from the PT System, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York[5,6].

Notes:

1. Model Technology Best Professional Judgment (BPJ) Limits recommended for Air Stripping with appropriate pretreatment from Attachment C of TOGS 1.2.1.
2. When a range is listed for the BPJ limit, a variation in available references was found. Recommended daily maximum limits should be in this range.
3. Model Technology BPJ Limits recommended for Lime, Settle and Filter treatment.
4. The recommended daily maximum permit limit is 1.2 mg/L and the recommended daily average permit limit is 0.61 mg/L.
5. Production wells were sampled in accordance with the schedule set forth in Table 3 of the Long-Term Monitoring Plan (ARCADIS 2002).
6. Bold values indicate compound detected above method detection limit.
7. GMPW-3 well pump was removed from operation on January 7, 2010 as a result of a faulty intake poppet. Therefore, a sample was not collected at this sample location during the January 2010 sampling event.

NA	No BPJ limit listed.
J	Estimated value.
ug/L	Micrograms per liter.
mg/L	Milligrams per liter.
VOCs	Volatile organic compounds.
PT	Pump and treat.
B	Compound considered non-detect at the listed value due to associated blank contamination.
--	Data not available.

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Table 7. PT System Mass Removal Rate of Volatile Organic Compounds, Operational Year 8, Quarter Number 1, 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)
10/7/2009	165.6	763,755	NA	NA	NA
1/7/2010	62.2	797,011	33,257	101.5	0.03
			Total Estimated Mass Removed During Operational Year 8, Quarter Number 1 (lbs) =		**0.03**
			Total Estimated Mass Removed During Operational Year 8 (lbs) =		**0.03**
			Total Estimated Mass Removed Since System Startup (lbs) =		**3.52**

Notes:

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

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

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

Compounds (units in ppbv)	CAS Numbers	Sample ID: Sampled:	Effluent 01/07/10
1,1,2,2-Tetrachloroethane	108-38-3		<7.8
1,1,1-Trichloroethane (Methyl Chloroform)	71-55-6		<7.8
1,1,2-Trichloroethane	79-00-5		<7.8
1,2,4-Trimethylbenzene	95-63-6		<7.8
1,3,5-Trimethylbenzene	108-67-8		<7.8
1,1-Dichloroethane	75-34-3		<7.8
1,1-Dichloroethene (Vinylidene Chloride)	75-35-4		<7.8
1,2 - Dichlorobenzene	95-50-1		<7.8
1,2-Dichloroethane	107-06-2		<7.8
1,2-Dichloropropane	78-87-5		<7.8
1,3-Dichlorobenzene	541-73-1		<7.8
1,4-Dichlorobenzene	106-46-7		<7.8
2-Propanol (Isopropyl alcohol)	67-63-0		<31
Benzene	71-43-2		<7.8
Bromomethane	74-83-9		<7.8
Carbon Tetrachloride	56-23-5		<7.8
Chlorobenzene	108-90-7		<7.8
Chloroethane (Ethyl Chloride)	75-00-3		<7.8
Chloromethane	74-87-3		<31
Chloroform	67-66-3		<7.8
cis-1,2-Dichloroethylene	156-59-2		<7.8
Dichlorodifluoromethane (Freon 12)	75-71-8		<7.8
Ethyl benzene	100-41-4		<7.8
Freon 113	76-13-1		<7.8
Freon 114	76-14-2		<7.8
Methylene Chloride (Dichloromethane)	75-09-2		<7.8
Methyl tert-butyl ether	1634-04-4		<7.8
o-Xylene	95-47-6		<7.8
m,p-Xylene	108-38-3/106-42-3		<7.8
Tetrachloroethene	127-18-4		<7.8
Toluene	108-88-3		<7.8
trans-1,2-dichloroethylene	156-60-5		<7.8
Trichloroethene	79-01-6		<7.8
Trichlorofluoromethane	75-69-4		<7.8
Vinyl Chloride	75-01-4		<7.8

ppbv: parts per billion by volume

Notes:

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

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Table 9. Concentrations of Volatile Organic Compounds Detected in Aqueous Samples Collected from the SP-5 Spring Water Remediation System, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Model Technology BPJ Limits[1,2]	Sample ID:	SP-5 INF.	SP-5 EFF.
		Date:	12/22/2009	12/22/2009
VOCs				
1,1,1,2-Tetrachloroethane	NA		<5.0	<5.0
1,1,2,2-Tetrachloroethane	NA		<5.0	<5.0
1,1,1-Trichloroethane	10-20		<5.0	<5.0
1,1,2-Trichloroethane	10		<5.0	<5.0
1,2,3-Trichlorobenzene	NA		<5.0	<5.0
1,2,3-Trichloropropane	NA		<5.0	<5.0
1,2,4-Trichlorobenzene	NA		<5.0	<5.0
1,2,4-Trimethylbenzene	NA		<5.0	<5.0
1,3,5-Trimethylbenzene	NA		<5.0	<5.0
1,2-Dibromo-3-chloropropane	NA		<5.0	<5.0
1,1-Dichloroethane	10		**20**	**1.2 J**
1,1-Dichloroethene	10		<5.0	<5.0
1,1-Dichloropropene	NA		<5.0	<5.0
1,2-Dibromoethane	NA		<5.0	<5.0
1,2-Dichlorobenzene	NA		<5.0	<5.0
1,2-Dichloroethane	10-30		<5.0	<5.0
1,2-Dichloropropane	NA		<5.0	<5.0
1,3-Dichlorobenzene	NA		<5.0	<5.0
1,3-Dichloropropane	NA		<5.0	<5.0
1,4-Dichlorobenzene	NA		<5.0	<5.0
2-Chlorotoluene	NA		<5.0	<5.0
2,2-Dichloropropane	NA		<5.0	<5.0
4-Chlorotoluene	NA		<5.0	<5.0
Benzene	5		**1.6 J**	<5.0
Bromobenzene	NA		<5.0	<5.0
Bromochloromethane	NA		<5.0	<5.0
Bromodichloromethane	NA		<5.0	<5.0
Bromoform	NA		<5.0	<5.0
Bromomethane	NA		<5.0	<5.0
n-Butylbenzene	NA		<5.0	<5.0
Carbon Tetrachloride	NA		<5.0	<5.0
Chlorobenzene	NA		**28**	<5.0
Chloroethane	NA		**5.7**	**3.9 J**
Chloroform	NA		<5.0	<5.0
Chloromethane	10		<5.0	<5.0
cis-1,2-Dichloroethene	10		**1.1 J**	<5.0
cis-1,3-Dichloroethene	NA		<5.0	<5.0
Dibromochloromethane	NA		<5.0	<5.0
Dibromomethane	NA		<5.0	<5.0
Dichlorodifluoromethane	NA		<5.0	<5.0
Ethylbenzene	5		<5.0	<5.0
Hexachlorobutadiene	NA		<5.0	<5.0
Isopropylbenzene	NA		<5.0	<5.0
p-Isopropyltoluene	NA		<5.0	<5.0
Methylene Chloride	10-50		<5.0	<5.0
Methyl tert-butyl ether	50		<5.0	<5.0
Naphthalene	10		<5.0	<5.0

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds Detected in Aqueous Samples Collected from the SP-5 Spring Water Remediation System, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Model Technology BPJ Limits[1,2]	Sample ID: Date:	SP-5 INF. 12/22/2009	SP-5 EFF. 12/22/2009
VOCs				
o-Xylene	5		<5.0	<5.0
m&p-Xylenes	5		<5.0	<5.0
n-Propylbenzene	NA		<5.0	<5.0
sec-Butylbenzene	NA		<5.0	<5.0
Styrene	NA		<5.0	<5.0
tert-Butylbenzene	NA		<5.0	<5.0
trans-1,3-Dichloropropene	NA		<5.0	<5.0
Trichlorofluoromethane	10		<5.0	<5.0
Tetrachloroethene	10		<5.0	<5.0
Toluene	5		<5.0	<5.0
trans-1,2-Dichloroethene	10-50		<5.0	<5.0
Trichloroethene	10		**2.2** J	<5.0
Vinyl Chloride	10-50		<5.0	<5.0
Total VOCs			**58.6** J	**5.1** J

Bold Constituent detected above MDL.

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

Notes:

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

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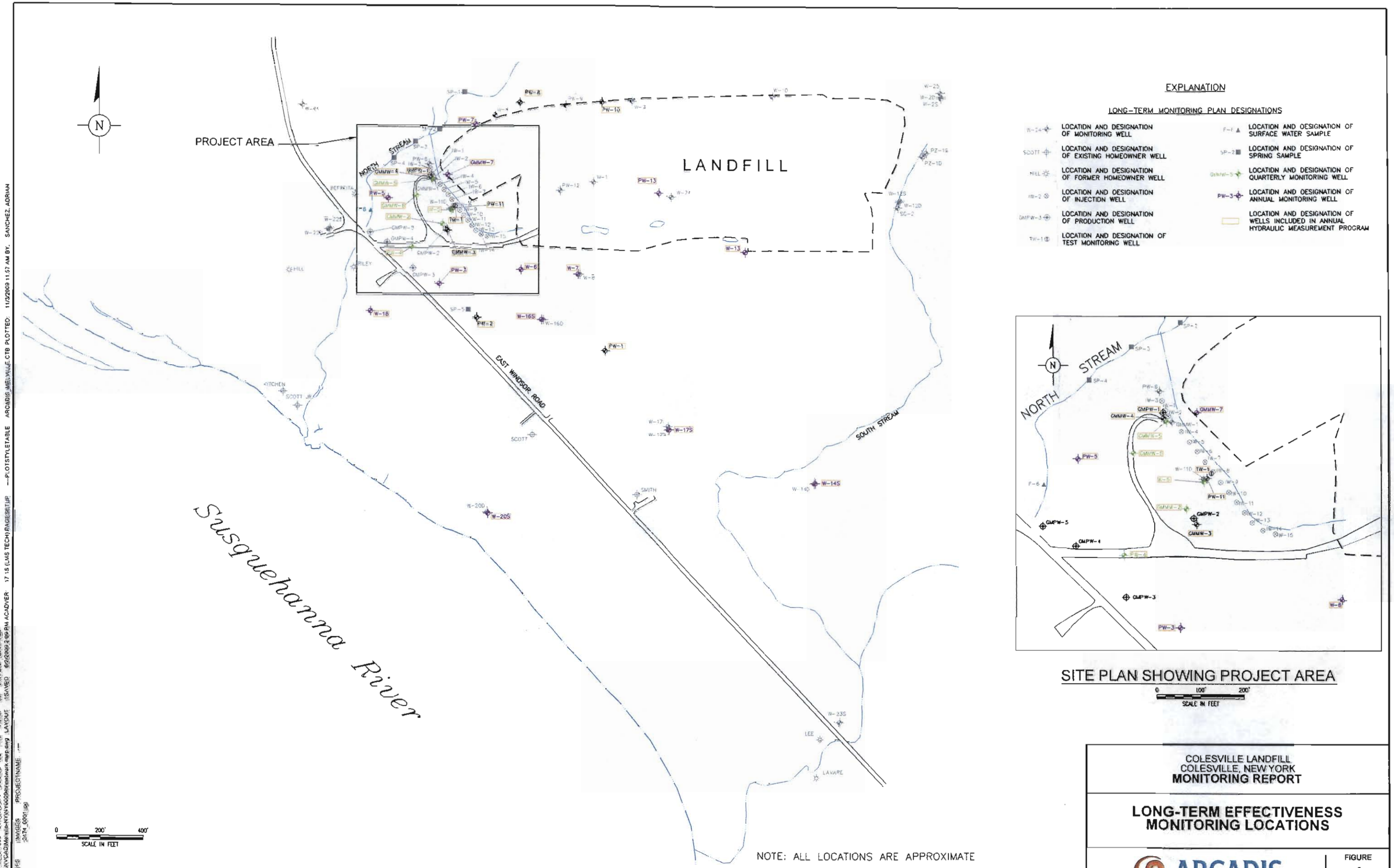
Table 10. Spring Water Remediation System Mass Removal Rate of Volatile Organic Compounds, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

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)
9/24/2009	58.2	0.95	0.30	NA	NA	NA
12/22/2009	58.6	1.3	0.00	142,662	58.4	0.07
				Total Estimated Mass Removed During Current Quarter (lbs) =		**0.07**
				Total Estimated Mass Removed Since System Startup (lbs) =		**1.17**
				Total Effluent Treated Since System Startup (gallons) =		**1,752,240**

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.
NM	Not measured.

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).



NOTE: ALL LOCATIONS ARE APPROXIMATE

EXPLANATION

LONG-TERM MONITORING PLAN DESIGNATIONS

- W-24 — LOCATION AND DESIGNATION OF MONITORING WELL
- SCOTT — LOCATION AND DESIGNATION OF EXISTING HOMEOWNER WELL
- HILL — LOCATION AND DESIGNATION OF FORMER HOMEOWNER WELL
- IW-2 — LOCATION AND DESIGNATION OF INJECTION WELL
- GMPW-3 — LOCATION AND DESIGNATION OF PRODUCTION WELL
- TW-1 — LOCATION AND DESIGNATION OF TEST MONITORING WELL
- F-6 — LOCATION AND DESIGNATION OF SURFACE WATER SAMPLE
- SP-2 — LOCATION AND DESIGNATION OF SPRING SAMPLE
- GMMW-5 — LOCATION AND DESIGNATION OF QUARTERLY MONITORING WELL
- PW-3 — LOCATION AND DESIGNATION OF ANNUAL MONITORING WELL
- LOCATION AND DESIGNATION OF WELLS INCLUDED IN ANNUAL HYDRAULIC MEASUREMENT PROGRAM

SITE PLAN SHOWING PROJECT AREA

0 100' 200'
SCALE IN FEET

COLESVILLE LANDFILL
COLESVILLE, NEW YORK
MONITORING REPORT

LONG-TERM EFFECTIVENESS MONITORING LOCATIONS

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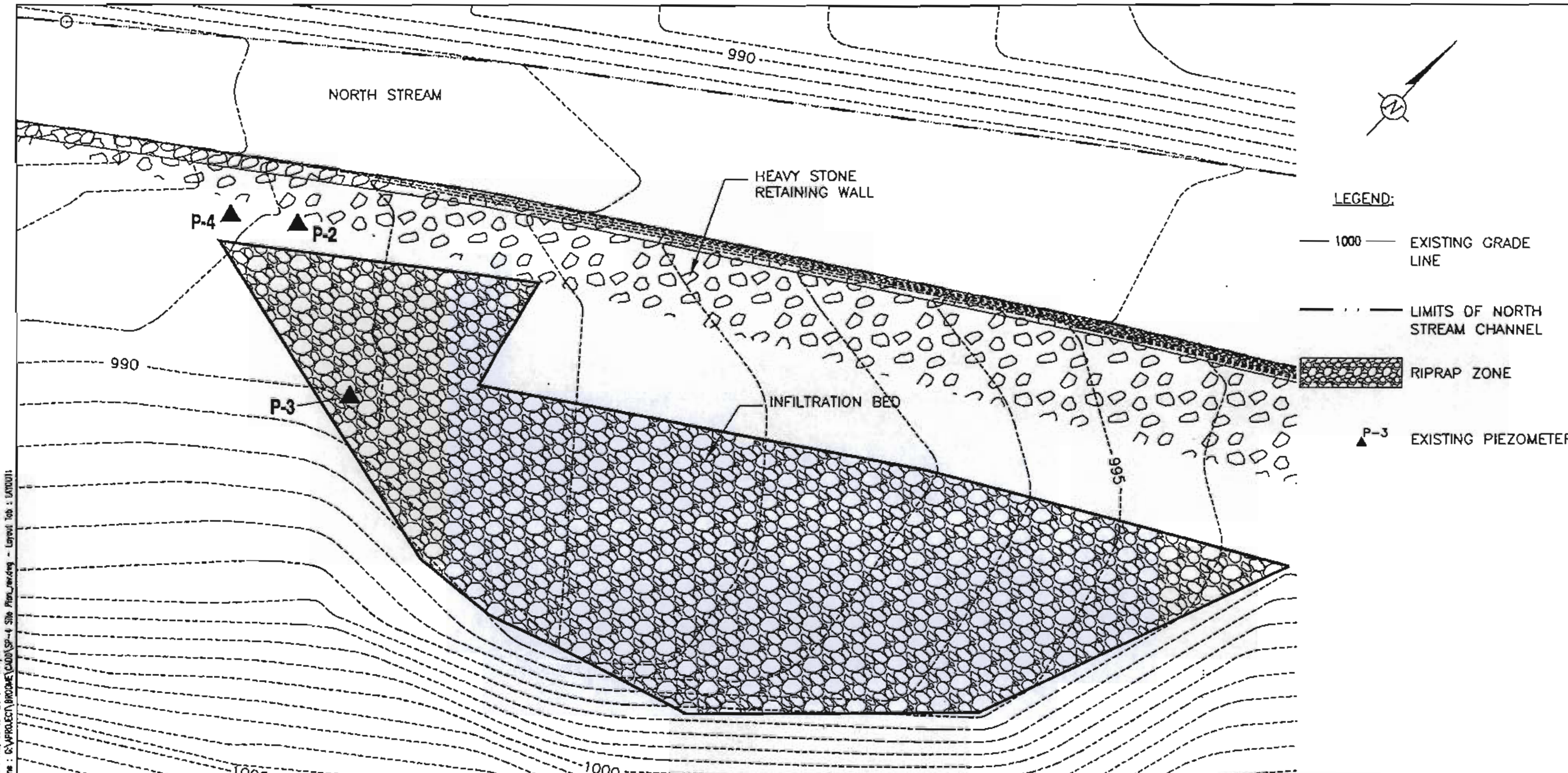
FIGURE 1



SP-4 SPRING AREA SITE PLAN

0 10
SCALE IN FEET

NOTE:

1. BASE MAP TAKEN FROM "TOPOGRAPHIC SITE SURVEY, COLESVILLE LANDFILL." BY RONALD SCHIESS, PLS, NY LIC NO. 049554, SOUTHERN TIER SURVEYING, LLP, DATED DECEMBER 14, 1999, REVISED AUGUST 2004, DECEMBER 2007 AND APRIL 2008.

ENGINEERING DESIGN:
ALL PROFESSIONAL ENGINEERING SERVICES DEPICTED ON THIS DRAWING HAVE BEEN PERFORMED FOR ARCADIS BY ARCADIS ENGINEERS & ARCHITECTS OF NEW YORK, P.C. A PROFESSIONAL CORPORATION QUALIFIED TO PERFORM SUCH SERVICES IN THE STATE OF NEW YORK.

REV.	ISSUED	DATE DESCRIPTION	
2	05/08	AS BUILT	JH / KZ
1	8/19/04	AS BUILT	JH / KZ

KEYPLAN

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PROJECT TITLE: COLESVILLE LANDFILL, BROOME COUNTY, NEW YORK

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED
S. FELDMAN	N. VALKENBURG	C. TUOHY	K. ZEGEL
SHEET TITLE: SP-4 SPRING AREA AS-BUILT SITE PLAN		TASK/PHASE NUMBER: 00007	DRAWN BY: T. PERRET
		PROJECT NUMBER: NY000949.0017	DRAWING NUMBER: 2

Acad Version : R17.1s (LMS Tech)
User Name : ebonchez
Date\Time : Thu, 05 Jun 2008 - 6:04pm
Path\Name : G:\APROJECT\BROOME\CADD\SP-4 Site Plan_rev.dwg - Layout Tab : LAYOUT1

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Appendix A

Groundwater Sampling Logs

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	12/22/09
Site/Well No.	GMW-2	Replicate No.	—	Code No.	
Weather	Sun 20°F	Sampling Time: Begin	1405	End	1416

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	37.52
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	none
Appearance	Clear
pH (s.u.)	6.51
Conductivity (mS/cm)	659 uS
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	7.6
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	Redeployed a PDB

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA Vials	3	HCL
Ethene, Ethane, Methane	40 ML Vials	2	~~BAK~~
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

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

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

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	12/22/09
Site/Well No.	GMMW-5	Replicate No.	REPV220912	Code No.	
Weather	Sun 20°	Sampling Time:	Begin 1225	End	1236

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	49.35
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	Slight
Appearance	Clear
pH (s.u.)	6.09
Conductivity (mS/cm)	4.34 uS
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	7.30
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	

Redeployed a PDB

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA Vials	3/3	HCL
Ethene, Ethane, Methane	40 ML Vials	2	~~BAK~~
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

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

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

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Water Sampling Log

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

Site Location: Harpursville, NY | Date: 12/22/09

Site/Well No.: GMMW-6 | Replicate No.: MS/MSD | Code No.: ____

Weather: Sun 20° | Sampling Time: Begin 1426 End 1440

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	39.54
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	
Appearance	Clear
pH (s.u.)	6.22
Conductivity (mS/cm)	818 uS
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	6.9
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	Redeployed a PDB

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA Vials	3/2/2	HCL
Ethene, Ethane, Methane	40 ML Vials	2	~~BAK~~
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

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

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

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	12/22/09
Site/Well No.	PW-4	Replicate No.	—	Code No.	—
Weather	Sunny wind 20	Sampling Time: Begin	1352	End	1358

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	18.04
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin ____ end ____
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	none
Appearance	Clear
pH (s.u.)	5.76
Conductivity (mS/cm)	2.28 mS
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	8.2
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	Redeployed on PDB

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA Vials	3	HCL
Ethene, Ethane, Methane	40 ML Vials	2	~~BAK~~
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

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

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

ARCADIS

Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	12/22/09
Site/Well No.	(s)- 5	Replicate No.	—	Code No.	—
Weather	Sun 20° F	Sampling Time: Begin	1149	End	1157

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	52.49
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin — end —
Pumping Rate (gpm)	—
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	clear
Odor	none
Appearance	clear
pH (s.u.)	6.18
Conductivity (mS/cm)	920. us
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	7.80
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	Redeployed in PDB

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA Vials	3	HCL
Ethene, Ethane, Methane	40 ML Vials	2	~~BAK~~
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic	—	HNO3

Sampling Personnel: KB

Well Casing Volumes

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

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

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	12/22/09
Site/Well No.	TW-1	Replicate No.	–	Code No.	–
Weather	Sun 20°	Sampling Time: Begin	1206	End	1212

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	
Depth to Water (ft bmp)	52.27
Water-Level Elevation (ft)	
Water Column in Well (ft)	
Casing Diameter/Type	2"
Gallons in Well	
Gallons Pumped/Bailed Prior to Sampling	
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin – end –
Pumping Rate (gpm)	–
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	yellow
Odor	(none)
Appearance	yellow / clear
pH (s.u.)	6.35
Conductivity (mS/cm)	1175 us
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	7.1
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer / PDB
Remarks	Redeployed a PDB

Constituents Sampled	Container Description	Number	Preservative
8260B VOLATILES	40 ML VOA Vials	3	HCL
Ethene, Ethane, Methane	40 ML Vials	2	~~BAK~~
TOC	40 ML Vials	2	H2SO4
Total Iron	250 ml plastic	–	HNO3

Sampling Personnel: KB

Well Casing Volumes

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

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

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Surface Water Sampling Form

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

Site Location: Harpursville NY Date: 12/23/09

Site/Well No.: SP-4 Replicate No.: —

Weather: Light snow 18°F Sampling Time: Begin 11:18 End 1122

Site Conditions

Water Quality Meter: Oak Ton

Location Condition: Stone to Cobble

Little ice

Vegetation: dormant

Depth of Water: 3"

Estimated Flow Rate: 5'/8sec

Collection Method: Direct collection

Field Parameters

Color: Clear

Odor: none

Appearance: Clear

pH (s.u.): 7.14

Conductivity (mS/cm): 127 uS

Temperature (°C): 1.1

DO (mg/L):

Turbidity (NTU):

ORP:

Time:

Remarks:

Constituents Sampled: See COC Sampling Personnel: KA

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Surface Water Sampling Form

Project Colesville Landfill Project No. NY000949.0021 Page ___ of ___

Site Location Harpursville NY Date 12/23/09

Site/Well No. F-6 Replicate No. —

Weather Light snow 18° Sampling Time: Begin 0955 End 0957

Site Conditions

Water Quality Meter: ~~Quanta~~ OakTon

Location Condition: Cobble to stone
Little ice build up

Vegetation: dec mest

Depth of Water: 5"

Estimated Flow Rate: 8 sec / 5'

Collection Method: direct grab

Field Parameters

Color: Clear

Odor: none

Appearance: Clear

pH (s.u.): 7.35

Conductivity (mS/cm): 139.3us

Temperature (°C): 0.5

DO (mg/L):

Turbidity (NTU):

ORP:

Time:

Remarks:

Some orange staining along the bank

Constituents Sampled: See COC Sampling Personnel: KB

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	12/23/09
Site/Well No.	MW-3	Replicate No.	—	Code No.	
Weather	Light Snow 18°	Sampling Time: Begin	0840	End	0843

Evacuation Data

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

Field Parameters

Color	Yellow/Clear
Odor	~~Strong~~ Strong
Appearance	—
pH (s.u.)	6.24
Conductivity (mS/cm)	593 uS
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	7.1
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer
Remarks	

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

Sampling Personnel: KB

Well Casing Volumes

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

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

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	12/23/09
Site/Well No.	IW-8	Replicate No.	—	Code No.	—
Weather	Light Snow IR	Sampling Time: Begin	0907	End	0911

Evacuation Data

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

Field Parameters

Color	dark Tan
Odor	Strong
Appearance	Bubbly
pH (s.u.)	6.16
Conductivity (mS/cm)	1722 uS
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	5.5
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer /
Remarks	

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

Sampling Personnel: KB

Well Casing Volumes

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

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

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	12/23/09
Site/Well No.	IW-13	Replicate No.	—	Code No.	—
Weather	Light Snow 18°	Sampling Time: Begin	0849	End	0855

Evacuation Data

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

Field Parameters

Color	dark Tan/clear
Odor	Strong
Appearance	—
pH (s.u.)	4.59
Conductivity (mS/cm)	2.32 ms
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	7.4
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer
Remarks	

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

Sampling Personnel: KB

Well Casing Volumes

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

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

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Water Sampling Log

Project	Colesville Landfill	Project No.	NY000949.0022	Page	1 of 1
Site Location	Harpursville, NY			Date	12/22/09
Site/Well No.	SP-5 influent	Replicate No.	—	Code No.	—
Weather	Sun 20° wind	Sampling Time: Begin	1506	End	1508

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	—
Land Surface Elevation (ft)	—
Sounded Well Depth (ft bmp)	4.15
Depth to Water (ft bmp)	0.0
Water-Level Elevation (ft)	
Water Column in Well (ft)	4.15
Casing Diameter/Type	2"
Gallons in Well	0.666
Gallons Pumped/Bailed Prior to Sampling	1.92
Sample Pump Intake Setting (ft bmp)	—
Purge Time	begin 1500 end
Pumping Rate (gpm)	
Evacuation Method	2" Disposable poly bailer

Field Parameters

Color	Clear
Odor	none
Appearance	Clear
pH (s.u.)	6.05
Conductivity (mS/cm)	5.00 ms
(µmhos/cm)	
Turbidity (NTU)	
Temperature (°C)	6.78
Dissolved Oxygen (mg/L)	
ORP	
Sampling Method	Bailer
Remarks	

Constituents Sampled	Container Description	Number	Preservative
8021 VOLATILES	40 ML VOA VIALS	3	HCL
Ethene, Ethane, Methane	40 ML Vials	—	
TOC	40 ml amber vials	—	Unpres.
Total Iron	250 ML Plastic	—	HNO3

Sampling Personnel: KA

Well Casing Volumes

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

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

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Surface Water Sampling Form

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

Site Location: Harpursville NY | Date: 12/22/09

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

Weather: Sun 20° | Sampling Time: Begin 1515 End 1518

Site Conditions

Water Quality Meter: OAKTon

Location Condition: Orange Staining Flow

Vegetation: dormant

Depth of Water: —

Estimated Flow Rate: 300 mL / 3.66 Sec

Collection Method: Direct collection

Field Parameters

Color: Clear

Odor: None

Appearance: orange particles

pH (s.u.): 6.30

Conductivity (mS/cm): 449 uS

Temperature (°C): 6.3

DO (mg/L):

Turbidity (NTU):

ORP:

Time:

Remarks:

Constituents Sampled: See COC | Sampling Personnel: KA

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Appendix B

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

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Table B-1. NYSDEC DAR-1 Air Modeling Data, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Parameters for 1/7/10 Sampling Event			
Discharge Temperature[1]	T	509	°R
Ambient Temperature[2]	Ta	490	°R
Stack Diameter	D	6	in
Stack Radius	R	0.25	ft
Stack Area	A	0.20	ft^2
Exit Velocity	V	15.0	fps
Exit Flow	Q	177	acfm
Exit Flow	Q	183	scfm
Stack Height	h_s	17	ft
Building Height	h_b	13.25	ft
Ratio of Heights	h_s/h_b	1.28	
Plume rise credit? $h_s/h_b > 1.5$?	(If no, $h_e=h_s$)	(If Yes, $h_e = h_s + 1.1 (F_m)^{1/3}$)	
Momentum Flux	$F_m = T_e/T * V2 * R2$	n/a	ft^4/s^2
Effective Stack Height	h_e	17	ft
Reduction Factor? $2.5 > h_s/h_b > 1.5$?		No, do not reduce impact	
Actual Annual Impact	C_a	$RF*6*Q_a/h_e^{2.25}$	
Mass Flow	Q_a	S lbs emitted for last 12 months	

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

Notes/Assumptions:

1. The stack discharge temperature is 49.0 °F based on recorded parameters.
2. The ambient temperature is approximately 30.0 °F based on recorded conditions.
3. Calculations assume that the system will run with the maximum allowable concentrations between quarterly readings.

Table B-2. NYSDEC DAR-1 Air Modeling Data, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Calculation of the Short-Term Guideline Concentration (SGC) for Sampling Event on 1/7/2010

Compounds	CAS Numbers	Maximum Limit (SGC[2]) (ug/m^3)	Analytical Concentration (ppb)	Detection Limit Used[3]	Actual Emissions C_a (ug/m^3)	Mass/hour (lb/hr)	Maximum Potential Impact (Step III.A.3 in DAR-1)[1] (ug/m^3)	Short Term Impact (Step III.A.5 in DAR-1)[1] (ug/m^3)	Percent of the SGC (%)
1,1,2,2-Tetrachloroethane	79-34-5	--	7.8	*	34.42	4.84E-05	0.0083	0.53714	NA
1,1,1-Trichloroethane (Methyl Chloroform)	71-55-6	68,000	7.8	*	43.26	6.08E-05	0.0104	0.67507	9.9E-04
1,1,2-Trichloroethane	79-00-5	--	7.8	*	43.26	6.08E-05	0.0104	0.67507	NA
1,2,4-Trimethylbenzene	95-63-6	--	7.8	*	38.97	5.47E-05	0.0094	0.60813	NA
1,3,5-Trimethylbenzene	108-67-8	--	7.8	*	38.97	5.47E-05	0.0094	0.60813	NA
1,1-Dichloroethane	75-34-3	--	7.8	*	32.09	4.51E-05	0.0077	0.50076	NA
1,1-Dichloroethene (Vinylidene Chloride)	75-35-4	380[4]	7.8	*	31.44	4.42E-05	0.0075	0.49054	1.3E-02
1,2-Dichlorobenzene	95-50-1	30,000	7.8	*	47.67	6.70E-05	0.0114	0.74383	2.5E-03
1,2-Dichloroethane	107-06-2	--	7.8	*	32.09	4.51E-05	0.0077	0.50071	NA
1,2-Dichloropropane	78-87-5	--	7.8	*	36.64	5.15E-05	0.0088	0.57170	NA
1,3-Dichlorobenzene	541-73-1	30,000	7.8	*	47.67	6.70E-05	0.0114	0.74383	2.5E-03
1,4-Dichlorobenzene	106-46-7	--	7.8	*	47.67	6.70E-05	0.0114	0.74383	NA
2-Propanol (Isopropyl alcohol)	67-63-0	120,000	31	*	77.45	1.09E-04	0.0186	1.20856	1.0E-03
Benzene	71-43-2	1,300	7.8	*	25.33	3.56E-05	0.0061	0.39521	3.0E-02
Bromomethane	74-83-9	3,900	7.8	*	30.79	4.32E-05	0.0074	0.48042	1.2E-02
Carbon Tetrachloride	56-23-5	1,900	7.8	*	49.88	7.01E-05	0.0120	0.77838	4.1E-02
Chlorobenzene	108-90-7	--	7.8	*	36.50	5.13E-05	0.0088	0.56952	NA
Chloroethane (Ethyl Chloride)	75-00-3	--	7.8	*	20.92	2.94E-05	0.0050	0.32645	NA
Chloromethane	74-87-3	22,000	31	*	65.07	9.14E-05	0.0156	1.01531	4.6E-03
Chloroform	67-66-3	150	7.8	*	38.71	5.44E-05	0.0093	0.60408	4.0E-01
cis-1,2 - Dichloroethylene	156-59-2	190,000[5]	7.8	*	31.44	4.42E-05	0.0075	0.49054	2.6E-04
Dichlorofluoromethane (Freon 12)	75-71-8	--	7.8	*	39.20	5.51E-05	0.0094	0.61172	NA
Ethyl benzene	100-41-4	54,000	7.8	*	34.42	4.84E-05	0.0083	0.53714	9.9E-04
Freon 113	76-13-1	96,000	7.8	*	60.76	8.53E-05	0.0146	0.94809	9.9E-04
Freon 114	76-14-2	--	7.8	*	55.42	7.78E-05	0.0133	0.86480	NA
Methylene Chloride (Dichloromethane)	75-09-2	14,000	7.8	*	27.54	3.87E-05	0.0066	0.42977	3.1E-03
Methyl tert-butyl ether	1634-04-4	--	7.8	*	28.58	4.01E-05	0.0069	0.44601	NA
o-Xylene	95-47-6	4,300	7.8	*	34.42	4.84E-05	0.0083	0.53714	1.2E-02
m,p-Xylene	108-38-3/106-42-3	4,300	7.8	*	33.77	4.74E-05	0.0081	0.52692	1.2E-02

See notes on last page.

Table B-2. NYSDEC DAR-1 Air Modeling Data, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Calculation of the Short-Term Guideline Concentration (SGC) for Sampling Event on 1/7/2010

Compounds	CAS Numbers	Maximum Limit (SGC[2]) (ug/m^3)	Analytical Concentration (ppb)	Detection Limit Used[3]	Actual Emissions C_a (ug/m^3)	Mass/hour (lb/hr)	Maximum Potential Impact (Step III.A.3 in DAR-1)[1] (ug/m^3)	Short Term Impact (Step III.A.5 in DAR-1)[1] (ug/m^3)	Percent of the SGC (%)
Tetrachloroethene	127-18-4	1,000	7.8	*	53.78	7.55E-05	0.0129	0.83915	8.4E-02
Toluene	108-88-3	37,000	7.8	*	29.87	4.20E-05	0.0072	0.46615	1.3E-03
trans-1,2-dichloroethylene	156-60-5	--	7.8	*	31.45	4.42E-05	0.0076	0.49079	NA
Trichloroethene	79-01-6	14,000	7.8	*	42.61	5.98E-05	0.0102	0.66484	4.7E-03
Trichlorofluoromethane	75-69-4	68,000	7.8	*	44.55	6.26E-05	0.0107	0.69510	1.0E-03
Vinyl Chloride	75-01-4	180,000	7.8	*	20.27	2.85E-05	0.0049	0.31623	1.8E-04

See notes on last page.

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

Notes:

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

Table B-2. NYSDEC DAR-1 Air Modeling Data, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Calculation of AGC based on 1/7/2010 Sampling Event

Compounds	CAS Numbers	Maximum Limit on C_a (AGC[1]) (ug/m^3)	Maximum Mass Flow Q_a (lb/yr)	Lab Data (ppb)	Detection Limit Used[2]	Actual Emissions C_a (ug/m^3)	Actual Mass Flow per Hour (lb/hr)	Actual Mass Flow per Year (lb/yr)	Percent of Annual (%)
1,1,2,2-Tetrachloroethane	79-34-5	16	1,564.87	7.8	*	34.42	2.36E-05	0.19960	**0.01**
1,1,1-Trichloroethane (Methyl Chloroform)	71-55-6	1,000	97,804.50	7.8	*	43.26	2.97E-05	0.25085	**0.00**
1,1,2-Trichloroethane	79-00-5	1.4	136.93	7.8	*	43.26	2.97E-05	0.25085	**0.18**
1,2,4-Trimethylbenzene	95-63-6	290	28,363.30	7.8	*	38.97	2.68E-05	0.22598	**0.00**
1,3,5-Trimethylbenzene	108-67-8	290	28,363.30	7.8	*	38.97	2.68E-05	0.22598	**0.00**
1,1-Dichloroethane	75-34-3	0.063	6.16	7.8	*	32.09	2.20E-05	0.18608	**3.02**
1,1-Dichloroethene (Vinylidene Chloride)	75-35-4	70	6,846.31	7.8	*	31.44	2.16E-05	0.18228	**0.00**
1,2-Dichlorobenzene	95-50-1	360	35,209.62	7.8	*	47.67	3.27E-05	0.27640	**0.00**
1,2-Dichloroethane	107-06-2	0.038	3.72	7.8	*	32.09	2.20E-05	0.18606	**5.01**
1,2-Dichloropropane	78-87-5	4	391.22	7.8	*	36.64	2.52E-05	0.21244	**0.05**
1,3-Dichlorobenzene	541-73-1	360	35,209.62	7.8	*	47.67	3.27E-05	0.27640	**0.00**
1,4-Dichlorobenzene	106-46-7	0.09	8.80	7.8	*	47.67	3.27E-05	0.27640	**3.14**
2-Propanol (Isopropyl alcohol)	67-63-0	7,000	684,631.48	31	*	77.45	5.32E-05	0.44909	**0.00**
Benzene	71-43-2	0.13	12.71	7.8	*	25.33	1.74E-05	0.14686	**1.16**
Bromomethane	74-83-9	5	489.02	7.8	*	30.79	2.11E-05	0.17852	**0.04**
Carbon Tetrachloride	56-23-5	0.067	6.55	7.8	*	49.88	3.43E-05	0.28924	**4.41**
Chlorobenzene	108-90-7	110	10,758.49	7.8	*	36.50	2.51E-05	0.21163	**0.00**
Chloroethane (Ethyl Chloride)	75-00-3	1,000	97,804.50	7.8	*	20.92	1.44E-05	0.12131	**0.00**
Chloromethane	74-87-3	90	8,802.40	31	*	65.07	4.47E-05	0.37728	**0.00**
Chloroform	67-66-3	0.043	4.21	7.8	*	38.71	2.66E-05	0.22447	**5.34**
cis-1,2 - Dichloroethylene	156-59-2	63	6,161.68	7.8	*	31.44	2.16E-05	0.18228	**0.00**
Dichlorofluoromethane (Freon 12)	75-71-8	12,000	1,173,653.96	7.8	*	39.20	2.69E-05	0.22731	**0.00**
Ethyl benzene	100-41-4	1,000	97,804.50	7.8	*	34.42	2.36E-05	0.19960	**0.00**
Freon 113	76-13-1	180,000	17,604,809.41	7.8	*	60.76	4.17E-05	0.35230	0.00
Freon 114	76-14-2	17,000	1,662,676.44	7.8	*	55.42	3.81E-05	0.32136	0.00
Methylene Chloride (Dichloromethane)	75-09-2	2.1	205.39	7.8	*	27.54	1.89E-05	0.15970	0.08
Methyl tert-butyl ether	1634-04-4	3,000	293,413.49	7.8	*	28.58	1.96E-05	0.16574	0.00
o-Xylene	95-47-6	100	9,780.45	7.8	*	34.42	2.36E-05	0.19960	0.00
m,p-Xylene	108-38-3/106-42-3	100	9,780.45	7.8	*	33.77	2.32E-05	0.19580	0.00
Tetrachloroethene	127-18-4	1	97.80	7.8	*	53.78	3.69E-05	0.31182	0.32

See notes on last page.

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Table B-2. NYSDEC DAR-1 Air Modeling Data, Operational Year 8, Quarter Number 1, Colesville Landfill, Broome County, New York.

Calculation of AGC based on 1/7/2010 Sampling Event

Compounds	CAS Numbers	Maximum Limit on C_a (AGC[1]) (ug/m^3)	Maximum Mass Flow Q_a (lb/yr)	Lab Data (ppb)	Detection Limit Used[2]	Actual Emissions C_a (ug/m^3)	Actual Mass Flow per Hour (lb/hr)	Actual Mass Flow per Year (lb/yr)	Percent of Annual (%)
Toluene	108-88-3	5,000	489,022.48	7.8	*	29.87	2.05E-05	0.17322	**0.00**
trans-1,2-dichloroethylene	156-60-5	63	6,161.68	7.8	*	31.45	2.16E-05	0.18238	**0.00**
Trichloroethene	79-01-6	0.50	48.90	7.8	*	42.61	2.93E-05	0.24705	**0.51**
Trichlorofluoromethane	75-69-4	1,000	97,804.50	7.8	*	44.55	3.06E-05	0.25830	**0.00**
Vinyl Chloride	75-01-4	0.11	10.76	7.8	*	20.27	1.39E-05	0.11751	**1.09**

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

Notes/Assumptions:

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

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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 8, Quarter Number 1 Injection Quantities, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

NO INJECTIONS COMPLETED DURING REPORTING PERIOD

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Table C-2. Automated Reagent Injection System, Operational Year 8, Quarter Number 1 Operating Parameters, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

NO INJECTIONS COMPLETED DURING THE REPORTING PERIOD