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ENVIRONMENT

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

Date:
January 2, 2008

Subject:
Operational Year 5 Quarter Number 2 Monitoring Report,
Colesville Landfill, Broome County, New York. (Site No. 704010).

Dear Mr. Jacob:

On behalf of Broome County, ARCADIS is providing the Operational Year 5 Quarter Number 2 Monitoring Report for the Colesville Landfill, Broome County, New York.

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

Sincerely,

ARCADIS of New York, Inc.

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Project Manager

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Broome County
Division of Solid Waste Management

Operational Year 5
Quarter Number 2
Monitoring Report

January 2, 2008

ARCADIS

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Operational Year 5
Quarter Number 2
Monitoring Report

Colesville Landfill,
Broome County, New York
NYSDEC Site 704010

Prepared for:
Broome County Division of Solid Waste Management

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January 2, 2008

Table of Contents

1. **Introduction** 1

2. **Methodology** 1

   2.1 Environmental Effectiveness Monitoring 2

   2.2 Groundwater Remediation System Performance Monitoring 2

   2.3 Spring Water Remediation System Performance Monitoring 3

3. **Groundwater Flow** 3

4. **Groundwater Quality** 3

   4.1 Volatile Organic Compounds 3

   4.2 Indicators of Reducing Conditions 4

   4.3 Evidence of Biodegradation 4

5. **Spring Water Quality** 4

6. **Surface Water Quality** 5

7. **Status of Flood Related Damages** 5

8. **Groundwater Remediation System Performance** 6

   8.1 PT System 6

      8.1.1 Summary of Operation, Maintenance, and Monitoring 6

      8.1.2 Results of Performance Sampling 7

   8.2 ARI System 7

      8.2.1 Summary of Operation, Maintenance, and Monitoring 8

      8.2.2 Results of Performance Sampling 8

9. **Spring Water Remediation System Performance** 9

10. **Conclusions** 9

11. **Recommendations** 10

12. Project Schedule 10

13. References 11

Tables

Table 1 Water-Level Measurements Collected During Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Table 2 Concentrations of Volatile Organic Compounds Detected in Groundwater and Surface Water, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Table 3 Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Table 4 PT Groundwater Remediation System Operating Parameters, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Table 5 Concentrations of Volatile Organic Compounds and Selected Metals Detected in Aqueous Samples Collected from the PT System, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Table 6 PT Groundwater Remediation System Mass Removal Rate of Volatile Organic Compounds, Operational Year 5, Quarter Number 2, Colesville Landfiill, Broome County, New York.

Table 7 Concentrations of Volatile Organic Compounds Detected in Groundwater Remediation System Air Stripper Effluent, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Figures

Figure 1 Long-Term Effectiveness Monitoring Locations, Colesville Landfill, Broome County, New York.

Appendices

A Groundwater Sampling Logs

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

C Automated Reagent Injection System Operating Parameters

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 (ROD) and Explanation of Significant Difference (ESD) that were issued in March 1991 and September 2000, respectively. LTM activities (which include environmental effectiveness and remediation system performance monitoring) were performed in accordance with the LTM Plan (ARCADIS G&M, Inc. 2002), LTM Plan Addendum for Spring Water Remediation Systems (ARCADIS 2003), and Interim Remedial Action Report (ARCADIS 2004), 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 March 2007 groundwater quality monitoring event conducted during Operational Year 5, Quarter Number 2. A description of the operation, maintenance, and monitoring (OM&M) associated with the Groundwater Remediation System from December 2007 through March 2007 has also been included. In addition, this report describes SP-5 Spring Water Remediation System OM&M activities conducted during this quarter. Following the detailed data analysis and discussion is a summary of findings, conclusions, and recommendations.

As referenced in previous monitoring reports (ARCADIS 2007), damage occurred at the former SP-4 spring area and at recovery well GMPW-5 as a result of flooding of the North Stream. Further discussion of the flood damage is provided herein when applicable to the LTM program and/or OM&M of the Groundwater Remediation System. Repair of the damaged components will be discussed in future Monitoring Reports.

2. Methodology

The following section provides a summary of the environmental effectiveness and remedial system performance monitoring methodology for Operational Year 5, Quarter Number 2. A site plan, which shows the location of environmental effectiveness monitoring, is provided on Figure 1.

2.1 Environmental Effectiveness Monitoring

The environmental effectiveness monitoring performed during Operational Year 5, Quarter Number 2 included the following:

- Water-level (hydraulic) measurements were collected from 20 monitoring wells on March 26, 2007.
- Groundwater samples were collected from five monitoring wells (Year 5, Q2 list of wells) during the week of March 26, 2007 and were selectively analyzed for volatile organic compounds (VOCs) and select inorganic parameters. Field parameters were also recorded at these monitoring locations.
- Samples (VOCs only) were collected at the SP-4 and F-6 surface water locations on March 27, 2007.

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

2.2 Groundwater Remediation System Performance Monitoring

Groundwater Remediation System performance monitoring activities during Operational Year 5, Quarter Number 2 were as follows:

- Pump-and-treat (PT) system recovery well influent and effluent samples were collected on March 9, 2007. The samples were selectively analyzed for VOCs and total iron.
- One vapor sample from the PT system air stripper effluent was collected on March 9, 2007. The sample was analyzed for VOCs.
- PT system operating parameters were recorded during the quarterly OM&M site visit.
- Total Organic Carbon (TOC) samples were collected from select injection wells on March 27, 2007.

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

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

2.3 Spring Water Remediation System Performance Monitoring

SP-5 Spring Water Remediation System OM&M could not be conducted during Operational Year 5, Quarter Number 2 due to clogging of the SP-5 effluent riprap infiltration zone. Maintenance has been scheduled to be conducted in parallel with maintenance of the former SP-4 spring area (see Section 12 below).

3. Groundwater Flow

Water-level measurements were made from existing wells on March 26, 2007. Water-level elevation data for Operational Year 5, Quarter Number 2 is provided in Table 1. In summary, the groundwater flow direction in the project area (i.e., adjacent to the landfill western perimeter) and site-wide in the Operational Year 5, Quarter Number 2 round was consistent with previous rounds. The groundwater flow direction in the project area is toward the southwest from the western perimeter of the landfill. The groundwater flow direction in areas further to the east of the project area is toward the south/southwest.

4. Groundwater Quality

The following sections describe the analytical results for groundwater samples collected during the March 2007 monitoring round (Operational Year 5, Quarter Number 2). Groundwater analytical results are provided in Tables 2 and 3. 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 2, total VOC (TVOC) concentrations in all monitoring wells sampled during the reporting period were consistent with prior data. Specifically, monitoring well

GMMW-5, which is located closest to the IRZ, remained stable at a TVOC concentration of 196.2 micrograms per liter (ug/L) during the current reporting period. Similarly, TVOC concentrations in mid-plume monitoring wells PW-4, W-5, GMMW-2, and GMMW-6 remained stable at 59.7ug/L, 215.2 ug/L, 325.6 ug/L, and 519.6 ug/L respectively.

PT system analytical VOC results are provided in Table 5. During the current reporting period, the TVOC concentration at recovery wells GMPW-3 and GMPW-4 were consistent with prior rounds of data. Specifically, TVOC concentrations in recovery wells GMPW-3 and GMPW-4 were 276.5 ug/L and 399.6 ug/L, respectively. The TVOC concentration at recovery well GMPW-5 remained at 0.0 ug/L. A complete evaluation of performance monitoring conducted on the PT system is provided in Section 8.1.2 of this report.

4.2 Indicators of Reducing Conditions

Groundwater analytical results for biogeochemical parameters and field parameters were collected in accordance with the LTM plan and are provided in Table 2. In summary, field and laboratory groundwater data for Wells GMMW-5 and GMMW-6 indicate that strongly reducing conditions are being maintained within the IRZ. This is evidenced by the presence of reduced forms of alternate electron acceptors (i.e., methane). Further details of the ARI system performance monitoring are provided in Section 8.2.2 of this report.

4.3 Evidence of Biodegradation

Table 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 concentration of ethene and ethane within monitoring wells GMMW-5 and GMMW-6 continue to be elevated when compared to baseline conditions. Additional details on the results of biogeochemical monitoring as evidence of Groundwater Remediation System performance and effectiveness are discussed in Section 8.2.2 of this report.

5. Spring Water Quality

Spring water samples from the SP-2 and SP-3 spring water locations were not collected during the Operational Year 5, Quarter Number 2 period due to construction

activities being conducted in response to the flood damage along North Stream. Further details regarding the flood damage related activities is provided in Section 7.

6. Surface Water Quality

Surface water quality analytical results for the Operational Year 5, Quarter Number 2 monitoring round are summarized in Table 1. As shown in Table 1, surface water quality at the F-6 and SP-4 sampling locations remains consistent with prior rounds of analytical data. Specifically, TVOC concentrations at the F-6 and SP-4 sampling locations were below the limits of detection at both sampling locations.

7. Status of Flood Related Damages

As referenced in the previous monitoring reports, damage was incurred to the former SP-4 spring location and recovery well GMPW-5 as a result of flooding of the North Stream. In addition, the traditionally sampled spring locations (e.g., the SP-2 and SP-3 spring sampling locations) were made inaccessible as a result of dangerous conditions (e.g., unstable side slopes, fallen trees, etc.) along the North Stream.

During the current reporting period, the following actions were taken:

- Broome County completed the stabilization of the landfill side-slopes adjacent to the North Stream.

- ARCADIS conducted a second visual inspection of the SP-2 and SP-3 spring locations during the week of March 27, 2007. It was noted that the SP-2 and SP-3 springs could not be located any longer following the stabilization of the landfill side-slopes. However, several small areas of ponding were noted between the stream and the stabilized landfill slope. ARCADIS will re-inspect these areas during the Operational Year 5, Quarter Number 3 monitoring event to assess if the ponding is a result of snow melt or the generation of new springs.

- A subcontractor was contracted for restoration of the former SP-4 spring area and maintenance of the SP-5 remediation system. Work is anticipated to begin during the following operational quarter.

8. Groundwater Remediation System Performance

The following section describes the results of the Groundwater Remediation System performance monitoring conducted during Operational Year 5, Quarter Number 2.

8.1 PT System

The following section describes the results of the PT system performance monitoring conducted during Operational Year 5, Quarter Number 2.

8.1.1 Summary of Operation, Maintenance, and Monitoring

During Operational Year 5, Quarter Number 2, the PT system operated continuously until approximately February 18, 2007. On February 18 (or there about), the system shut down due to freezing conditions within the treatment building which resulted in the damage of several system appurtenances (e.g., valves, flowmeters, pump heads, etc.). The PT system was repaired between March 7 and March 9, 2007 and was subsequently restarted on March 9, 2007.

PT system OM&M for Operational Year 5, Quarter Number 2 was conducted during the system repairs between March 7 and March 9, 2007 and included operation and maintenance of system equipment, the collection of system performance samples (water and vapor), and recording system operating parameters. Table 4 provides a summary of the recorded system operating parameters for the current operating period. As shown in Table 4, the total effluent groundwater recovery rate for Operational Year 5, Quarter Number 2 was approximately 0.53-gallon per minute (gpm), with individual recovery rates of 0.41-gpm, 0.07-gpm, and 0.06-gpm in GMPW-3, GMPW-4, and GMPW-5, respectively. The average individual recovery well rate in recovery well GMPW-3 increased to near startup conditions during Operational Year 5, Quarter Number 2. This was most likely a direct result of the pump replacement which was completed during Operation Year 5, Quarter Number 1. The average recovery rate in recovery wells GMPW-4 and GMPW-5 were slightly lower when compared to previous operation. The decrease in recovery rate was most likely due to the system down time caused by the freezing conditions and associated maintenance activities.

A total of 76,993 gallons of groundwater was recovered during Operational Year 5, Quarter Number 2 and a total of 1,252,823 gallons of groundwater has been recovered since system startup. The low profile air stripper operated in accordance with the design specifications but the blower flowrate was not recorded due to a malfunctioning

measuring device. However, the blower discharge pressure was 8.9 inches of water (IWC), which is within the limits for normal system operation.

8.1.2 Results of Performance Sampling

PT system performance sampling for Operational Year 5, Quarter Number 2 was conducted on March 9, 2007. As discussed previously, five groundwater samples and one vapor sample were collected. Groundwater samples included collection of individual recovery well samples (GMPW-3, GMPW-4, and GMPW-5), total influent, and total effluent after the cartridge filters. The vapor sample was collected from the effluent stack of the low profile air stripper.

Table 5 provides a summary of the PT system performance groundwater sampling analytical results. As shown in Table 5, all groundwater VOCs were treated to below their respective Best Professional Judgment (BPJ) limits via the low profile air stripper with the exception of m,p-xylene, which was detected slightly above its BPJ limit. The total iron concentration after the cartridge filter was below the respective recommended daily average BPJ limit. Based on the total groundwater recovered during the reporting period and total influent groundwater concentration, an estimated 0.17 pounds (lbs) of VOC mass were removed from the subsurface during the quarterly reporting period, as shown in Table 6. A total of approximately 2.30 lbs of VOCs have been removed from the subsurface since system startup.

Table 7 provides a summary of the PT system performance vapor sampling analytical results. As shown in Table 7, VOCs were not detected above their respective detection limits with the exception of m,p-xylene (56 ppbv). To be conservative, a NYSDEC DAR-1 air model was calculated using the actual analytical data for detected constituents or the detection limit of all constituents, which were not detected but have historically been detected in the influent groundwater. All COCs were below their respective short-term guidance concentrations (SGCs) and annual guidance concentrations (AGCs). Appendix B contains the NYSDEC DAR-1 AGC screening simulation based on the hand calculations provided in the NYSDEC DAR-1 AGC/SGC tables dated December 22, 2003.

8.2 ARI System

The following section describes the results of the ARI system performance monitoring conducted during Operational Year 5, Quarter Number 2.

8.2.1 Summary of Operation, Maintenance, and Monitoring

ARI system OM&M was conducted during the Operational Year 5, Quarter Number 2 OM&M site visit during the week of March 27, 2007 and included operation and maintenance of system equipment and the collection of samples for analysis of TOC from injection wells IW-3, IW-9, and IW-13. As described in the Hydraulic Injection Test and Alternate Electron Donor Pilot Test Letter Work Plan (ARCADIS 2006), alternate electron donor pilot test reagent injections were completed during the week of December 18, 2007. The reagent injection letter work plan was approved by the NYSDEC on December 8, 2006. Therefore, a full-scale reagent injection was not conducted during the current reporting period. A summary of the pilot test methodology and results will be provided following completion of the pilot test post-injection monitoring period. It is anticipated that the post-injection monitoring period will be completed during the first quarter of 2008 (e.g., during the Operational Year 6, Quarter Number 2 monitoring period).

8.2.2 Results of Performance Sampling

ARI system performance sampling was conducted on March 27, 2007. As discussed previously, this event consisted of obtaining TOC samples at three injection wells. In addition, analytical results from select monitoring wells under the environmental effectiveness monitoring program were utilized to determine the effectiveness of the ARI system. A summary of key observations is as follows:

- The TOC concentration at monitoring well GMMW-5 (96.4 mg/L), and injection wells IW-3 (32.5 mg/L), IW-8 (426 mg/L), and IW-13 (13 mg/L) indicate that sufficient organic carbon remained in the subsurface to maintain the IRZ.

- The methane concentration in monitoring wells GMMW-5 and GMMW-6 remained significantly elevated at 29,000 micrograms per liter (ug/L) and 1,800 ug/L, respectively. These data provide evidence that strongly reducing conditions (methanogenic) are being maintained within the IRZ.

- The ethene concentration in monitoring wells GMMW-5 and GMMW-6 remained elevated at 6,200 nanograms per liter (ng/L) and 100,000 ng/L, respectively.

- Similarly, the ethane concentration in monitoring wells GMMW-5 and GMMW-6 remained elevated at 20,000 nanograms per liter (ng/L) and 4,800 ng/L, respectively.

- TVOC concentrations remained stable but significantly lower than baseline conditions in monitoring wells GMMW-5 and GMMW-6.

9. Spring Water Remediation System Performance

As referenced previously, SP-5 Spring Water Remediation System OM&M could not be conducted during Operational Year 5, Quarter Number 2 due to clogging of the SP-5 effluent riprap infiltration zone. Maintenance has been scheduled to be conducted in parallel with maintenance to the former SP-4 spring area.

10. Conclusions

Based on the data obtained from the Operational Year 5, Quarter Number 2 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 pumping rate of recovery well GMPW-3 was similar to startup conditions indicating that the replacement of the recovery pump may have resolved the recent decline in observed pumping rate.

- Despite being down temporarily due to freezing of several system components, the PT system is operating as designed and is treating recovered groundwater VOCs to below BPJ limits prior to discharge.

- Broome County completed the stabilization of the landfill side-slopes adjacent to the North Stream.

- A subcontractor was contracted for restoration of the former SP-4 spring area and maintenance of the SP-5 remediation system. Work is anticipated to begin during the following operational quarter; and,

- Surface water quality continues to be consistent with historical data indicating that impacted groundwater and/or flood related damages are not causing an adverse impact to surface water along the North Stream.

11. Recommendations

The following recommendations are made for Operational Year 5, Quarter Number 3 activities:

- Re-inspect the SP-2 and SP-3 spring locations and areas of ponding noted during Operational Year 5, Quarter Number 2.
- Continue to operate the ARI system without injection well IW-8. Obtain and evaluate data related to the ongoing alternate electron donor pilot program.
- Continue to evaluate the performance of recovery well GMPW-5 to determine if the observed decrease during the current reporting period was a result of system down time caused by freezing conditions.
- Perform maintenance of the former SP-4 spring area; and,
- Perform maintenance of the SP-5 spring water remediation system while mobilized for maintenance of the former SP-4 spring area.

12. Project Schedule

Groundwater environmental effectiveness monitoring is scheduled to be conducted for Operational Year 5 on the quarterly schedule set forth in the Proposed Modifications to Long-Term Monitoring Program (ARCADIS 2005). System OM&M of the Groundwater Remediation System will continue to be performed on a quarterly basis consistent with the LTM Plan. Maintenance of the SP-5 spring water remediation system will be completed concurrently with maintenance activities for the former SP-4 spring location. It is anticipated that these repairs will be completed during Operational Year 5, Quarter Number 3. Repair status of the damaged remedial components will be documented in future Monitoring Reports and through interim correspondence with the NYSDEC and USEPA.

13. References

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

ARCADIS G&M, Inc. 2003. Long-Term Monitoring Plan Addendum for Spring Water Remediation Systems, Colesville Landfill, Broome County, New York, 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 Operational Year 3 Annual Monitoring Report, Broome County, New York, NYSDEC Site 704010. March 2, 2006.

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.

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Table 1. Water-Level Measurements Collected During Opertational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Well Identification	MP Elevation (feet above msl)	3/26/2007 Depth to Water (feet below MP)	3/26/2007 Water-Table Elevation (feet above msl)	MP Description
GMMW-2	1030.95	35.50	995.45	Inner casing
GMMW-3	1028.02	33.33	994.69	Inner casing
GMMW-4	1042.9	45.75	997.15	Inner casing
GMMW-5	1043.66	48.20	995.46	Inner casing
GMMW-6	1033.56	37.65	995.91	Inner casing
GMMW-7	1045.43	46.93	998.50	Inner casing
PW-3	988.92	9.45	979.47	Inner casing
PW-4	1001.75	16.02	985.73	Inner casing
PW-5	986.12	0	986.12	Inner casing
W-5	1051.41	51.00	1000.41	Inner casing
W-6	1050.38	48.24	1002.14	Inner casing
PW-7	1042.47	38.99	1003.48	Inner casing
W-7	1049.12	40.74	1008.38	Inner casing
PW-10	1049.29	36.42	1012.87	Inner casing
PW-11	1052.37	51.29	1001.08	Inner casing
PW-13	1072.41	60.16	1012.25	Inner casing
W-13	1053.43	45.61	1007.82	Inner casing
W-14S	957.68	NM	--	Inner casing
W-16S	990.33	NM	--	Outer casing
W-17S	959.13	8.04	951.09	Inner casing
W-18	973.56	9.45	964.11	Inner casing
W-20S	952.88	7.05	945.83	Inner casing

msl Mean sea level.
MP Measuring point.
NM Not measured.
AM Anomalous measurement.
TOP Water level was at the top of well casing.
-- Water level not recorded.

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Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater and Surface Water, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	GMMW-02 12/8/2006	GMMW-02 3/26/2007	GMMW-05 12/7/2006	GMMW-5 3/26/2007	GMMW-5* 3/26/2007	GMMW-06 12/7/2006	GMMW-06 3/26/2007	PW-04 12/7/2006	PW-04 3/26/2007
1,1,1-Trichloroethane		**14**	**12**	<5.0	<1.0	<1.0	**3.7**	**5.2**	**13**	**10**
1,1,2-Trichloroethane		<1.0	<1.0	<5.0	<1.0	<1.0	**1.2**	**1.4**	<1.0	<1.0
1,1-Dichloroethane		**76**	**78**	**23**	**32**	**32**	**200**	**170**	**12**	**9.3**
1,1-Dichloroethene		**1.3**	**1.3**	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane		<1.0	<1.0	<5.0	**2.1**	**2.2**	**1.9**	<1.0	<1.0	<1.0
1,2-Dichloropropane		<1.0	<1.0	<5.0	<1.0	<1.0	**1.2**	**1.2**	<1.0	<1.0
Benzene		**2.7**	**2.5**	<5.0	**1.6**	**1.6**	**9.8**	**7.7**	<1.0	<1.0
Carbon Tetrachloride		<1.0	**1.8**	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.7**
Chlorobenzene		**32**	**32**	**21**	**26**	**26**	**46**	**38**	<1.0	<1.0
Chloroethane		**23**	**24**	**150**	**120**	**130**	**190**	**180**	**3.8**	**3**
Chloroform		<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	**1.3**	**1.2**	**1**
cis-1,2-Dichloroethene		**110**	**110**	<5.0	**2.7**	**2.7**	**30**	**54**	**14**	**9.2**
Dichlorodifluoromethane		<1.0	<1.0	<5.0	<1.0	<1.0	**5.1**	**5.1**	**1.7**	**1.5**
Ethylbenzene		<1.0	<1.0	<5.0	<1.0	**1.1**	**2.4**	**1.6**	<1.0	<1.0
Methylene chloride		<1.0	<1.0	<5.0	**1.7**	**1.8**	**7.6**	**6.1**	<1.0	<1.0
Methyl tert-butyl ether		<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene		<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o-Xylene		<1.0	<1.0	<5.0	**3**	**3.1**	**3.1**	**1.4**	<1.0	<1.0
m,p-Xylene		<2.0	<2.0	<10.0	<2.0	<2.0	**5.8**	**3.6**	<2.0	<2.0
Tetrachloroethene		<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene		<1.0	<1.0	<5.0	**5.3**	**5.2**	**3.3**	**2**	<1.0	<1.0
trans-1,2-Dichloroethene		<1.0	<1.0	<5.0	<1.0	<1.0	**1.9**	**1.5**	<1.0	<1.0
Trichloroethene		**52**	**49**	<5.0	<1.0	<1.0	**2**	**8.5**	**24**	**24**
Vinyl chloride		**13**	**15**	<5.0	**1.8**	**1.9**	**21**	**31**	<1.0	<1.0
Total VOCs		**324.0**	**325.6**	**194.0**	**196.2**	**207.6**	**536.0**	**519.6**	**69.7**	**59.7**

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

Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater and Surface Water, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	W-05 12/8/2006	W-05 3/26/2007	F-6 12/13/2006	F-6 3/27/2007	SP-4 12/13/2006	SP-4 3/27/2007	TBV032607 3/26/2007	FBV032607 3/26/2007
1,1,1-Trichloroethane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane		**79**	**66**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene		**6.8**	**5.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon Tetrachloride		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene		**16**	**13**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane		**120**	**120**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene		**2.7**	**2.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoromethane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride		**3**	**2.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methyl tert-butyl ether		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o-Xylene		<1.0	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
m,p-Xylene		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Tetrachloroethene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene		**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene		**1.5**	**1.7**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl chloride		<1.0	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total VOCs		**230.1**	**215.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

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

Table 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	GMMW-02 12/8/06	GMMW-02 3/26/07	GMMW-05 12/7/06	GMMW-05 3/26/07
	UNITS				
METALS					
Iron, Dissolved	mg/L	--	--	--	--
Manganese, Dissolved	mg/L	--	--	--	--
GENERAL CHEMISTRY					
Bromide	mg/L	--	--	--	**0.306**
Chloride	mg/L	--	--	--	--
Nitrogen, Nitrate (As N)	mg/L	--	--	--	--
Nitrogen, Nitrite	mg/L	--	--	--	--
Total Organic Carbon	mg/L	**4.38**	<2.00	**28**	**96.4**
Sulfate	mg/L	--	--	--	--
Sulfide (field)	mg/L	--	--	--	--
Iron (field)	mg/L	--	--	--	--
FIELD PARAMETERS					
pH	Standard units	**5.89**	**6.56**	**7.2**	**6.56**
Specific Conductance	mmhos/cm	**0.628**	**0.442**	**0.713**	**0.754**
Turbidity	NTU	--	**4.9**	--	**13.3**
Dissolved Oxygen	mg/L	--	--	--	--
Temperature	deg C	**7.1**	**10.4**	**6.1**	**10.5**
ORP	mV	--	--	--	--
DISSOLVED GASES					
Carbon dioxide	mg/L	--	--	--	--
Carbon monoxide	mg/L	--	--	--	--
Ethane	ng/L	**740**	**830**	**86,000**	**20,000**
Ethene	ng/L	**5,300**	**5,300**	**15,000**	**6,200**
Methane	ug/L	**2,900**	**4,000**	**17,000**	**29,000**
Nitrogen	mg/L	--	--	--	--
Oxygen	mg/L	--	--	--	--

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

Table 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	GMMW-06 12/7/06	GMMW-06 3/26/07	PW-04 12/7/06	PW-04 3/26/07
	UNITS				
METALS					
Iron, Dissolved	mg/L	--	--	--	--
Manganese, Dissolved	mg/L	--	--	--	--
GENERAL CHEMISTRY					
Bromide	mg/L	--	--	--	--
Chloride	mg/L	--	--	--	--
Nitrogen, Nitrate (As N)	mg/L	--	--	--	--
Nitrogen, Nitrite	mg/L	--	--	--	--
Total Organic Carbon	mg/L	**246**	**4.55**	**3.59**	<2.00
Sulfate	mg/L	--	--	--	--
Sulfide (field)	mg/L	--	--	--	--
Iron (field)	mg/L	--	--	--	--
FIELD PARAMETERS					
pH	Standard units	**6.9**	**6.61**	**5.38**	**5.56**
Specific Conductance	mmhos/cm	**0.814**	**0.821**	**0.961**	**1.82**
Turbidity	NTU	--	**8.1**	--	**126**
Dissolved Oxygen	mg/L	--	--	--	--
Temperature	deg C	**9.4**	**10.3**	**8.6**	**9.9**
ORP	mV	--	--	--	--
DISSOLVED GASES					
Carbon dioxide	mg/L	--	--	--	--
Carbon monoxide	mg/L	--	--	--	--
Ethane	ng/L	**6,700**	**4,800**	**52**	**62**
Ethene	ng/L	**120,000**	**100,000**	**290**	**150**
Methane	ug/L	**7,800**	**1,800**	**12**	**12**
Nitrogen	mg/L	--	--	--	--
Oxygen	mg/L	--	--	--	--

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

Table 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	W-05 12/8/06	W-05 3/26/07	IW-03 12/8/06	IW-03 3/27/07
	UNITS				
METALS					
Iron, Dissolved	mg/L	--	--	--	--
Manganese, Dissolved	mg/L	--	--	--	--
GENERAL CHEMISTRY					
Bromide	mg/L	--	**0.445**	--	--
Chloride	mg/L	--	--	--	--
Nitrogen, Nitrate (As N)	mg/L	--	--	--	--
Nitrogen, Nitrite	mg/L	--	--	--	--
Total Organic Carbon	mg/L	**7.81**	**7.61**	**3,780**	**32.5**
Sulfate	mg/L	--	--	--	--
Sulfide (field)	mg/L	--	--	--	--
Iron (field)	mg/L	--	--	--	--
FIELD PARAMETERS					
pH	Standard units	**6.19**	**6.46**	**4.06**	**5.64**
Specific Conductance	mmhos/cm	**1.059**	**0.829**	**1.81**	**0.376**
Turbidity	NTU	--	**41**	--	--
Dissolved Oxygen	mg/L	--	--	--	--
Temperature	deg C	**7.2**	**10.6**	**9.3**	--
ORP	mV	--	--	--	--
DISSOLVED GASES					
Carbon dioxide	mg/L	--	--	--	--
Carbon monoxide	mg/L	--	--	--	--
Ethane	ng/L	**18,000**	**20,000**	--	--
Ethene	ng/L	**4,600**	**4,400**	--	--
Methane	ug/L	**2,000**	**2,300**	--	--
Nitrogen	mg/L	--	--	--	--
Oxygen	mg/L	--	--	--	--

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

Table 3. Concentrations of Selected Metals, General Chemistry, Field Parameters, and Dissolved Gases Detected in Groundwater, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Parameters	Sample ID: / Date:	IW-08 12/8/06	IW-09 3/27/07	IW-13 12/8/06	IW-13 3/27/07
	UNITS				
METALS					
Iron, Dissolved	mg/L	--	--	--	--
Manganese, Dissolved	mg/L	--	--	--	--
GENERAL CHEMISTRY					
Bromide	mg/L	--	<0.1	--	--
Chloride	mg/L	--	--	--	--
Nitrogen, Nitrate (As N)	mg/L	--	--	--	--
Nitrogen, Nitrite	mg/L	--	--	--	--
Total Organic Carbon	mg/L	**5,890**	**426**	**22.1**	**13**
Sulfate	mg/L	--	--	--	--
Sulfide (field)	mg/L	--	--	--	--
Iron (field)	mg/L	--	--	--	--
FIELD PARAMETERS					
pH	Standard units	**3.51**	**3.51**	**5.89**	**5.87**
Specific Conductance	mmhos/cm	**2.19**	**2.19**	**0.722**	**0.473**
Turbidity	NTU	--	--	--	**86**
Dissolved Oxygen	mg/L	--	--	--	--
Temperature	deg C	**6.6**	**6.6**	**6.2**	--
ORP	mV	--	--	--	--
DISSOLVED GASES					
Carbon dioxide	mg/L	--	--	--	--
Carbon monoxide	mg/L	--	--	--	--
Ethane	ng/L	--	--	--	--
Ethene	ng/L	--	--	--	--
Methane	ug/L	--	--	--	--
Nitrogen	mg/L	--	--	--	--
Oxygen	mg/L	--	--	--	--

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

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Table 4. PT Groundwater System Operating Parameters, Operational Year 5, Quarter Number 2, 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 Totalizer FQI-101 (gallons)	Flow Measurements: GMPW-4[3] Totalizer FQI-102 (gallons)	Flow Measurements: GMPW-5 Totalizer FQI-103 (gallons)
12/17/2006	10:00 AM	NM	349	1,175,830.0	1,023,400.0	379,055.0	108,500.0	399,822.0
3/27/2007	3:00 PM	8.9	NM	NM	NM	437,782.2	118,370.7	408,216.7
		Average Daily Flowrate (gpm) =		**0.53**	**NA**	**0.41**	**0.07**	**0.06**
		Total Groundwater Recovered During Reporting Period (gallons) =		**76,993**	**NA**	**58,727**	**9,871**	**8,395**

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

Notes:

1. The total effluent totalizer was damaged as a result of freezing. Accordingly, the average daily flowrate and total groundwater recovered were calculated by summing the the values recorded/calculated from the individual recovery wells.
2. The water bypass totalizer was damaged as a result of freezing.
3. GMPW-4 totalizing flow meter malfuctioned and was replaced on 12/23/2005.

Table 5. Concentrations of Volatile Organic Compounds and Selected Metals Detected in Aqueous Samples Collected from the PT System, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York

Constituents	Model Technology BPJ Limits[1,2] (ug/L)	Sample ID: Date:	GMPW-3 INF 3/9/2007	GMPW-4 INF 3/9/2007	GMPW-5 INF 3/9/2007	COMBINED INF 3/9/2007	EFFLUENT AC II 3/9/2007
1,1,1-Trichloroethane	10-20		**31**	**31**	<1.0	**31**	<1.0
1,1,2-Trichloroethane	10		<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	10		**53**	**84**	<1.0	**65**	<1.0
1,1-Dichloroethene	10		**2.5**	**2.6**	<1.0	**2.9**	<1.0
1,2-Dichloroethane	10-30		<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	NA		<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	5		**4.5**	**4.8**	<1.0	**4.4**	<1.0
Carbon Tetrachloride	10		**4.6**	**4.7**	<1.0	<1.0	<1.0
Chlorobenzene	NA		<1.0	**9.6**	<1.0	**5**	<1.0
Chloroethane	NA		**14**	**32**	<1.0	**28**	<1.0
Chloroform	NA		<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	10		**84**	**92**	<1.0	**82**	<1.0
Dichlorodifluoromethane	NA		<1.0	**1.5**	<1.0	**1.9**	<1.0
Ethylbenzene	5		<1.0	<1.0	<1.0	<1.0	**3.5**
Methylene Chloride	10-50		**2.1**	**2.4**	<1.0	**2.4**	<1.0
Methyl tert-butyl ether	50		<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene	10		<1.0	<1.0	<1.0	<1.0	<1.0
o-Xylene	5		<1.0	<1.0	<1.0	<1.0	**2.9**
m,p-Xylene	5		<2.0	<2.0	<2.0	<2.0	**10**
Tetrachloroethene	10		<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	5		<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	10-50		<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	10		**73**	**110**	<1.0	**78**	<1.0
Vinyl Chloride	10-50		**7.8**	**25**	<1.0	**19**	<1.0
Total VOCs			**276.5**	**399.6**	**0.0**	**319.6**	**16.4**

Metals (units in mg/L)	Model Technology BPJ Limits[3,4] (mg/L)					
Total Iron	1.2 / 0.61	**1.17**	**0.775**	**2.44**	**0.294**	**0.477**

See Notes on Last Page.

Table 5. Concentrations of Volatile Organic Compounds and Selected Metals Detected in Aqueous Samples Collected from the PT System, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York[2,5].

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.

NA	No BPJ limit listed.
J	Estimated Value.
ug/L	Micrograms Per Liter.
mg/L	Milligrams Per Liter.
VOCs	Volatile Organic Compounds.
AC	After Cartridge Filter.
BC	Before Cartridge Filter.
PT	Pump and Treat.
--	Not Analyzed or Collected.
<	Analyte Below Detection Limit.
Bold	**Compound detected above method detection limit.**

Production wells were sampled in accordance with the schedule set forth in Table 3 of the Long-Term Monitoring Plan (ARCADIS 2002).

Table 6. PT Groundwater Remediation System Mass Removal Rate of Volatile Organic Compounds, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Date Sampled	Total VOC Influent Concentration (ug/L)	Total Effluent Totalizer[1] FQI-401 (gallons)	Total Groundwater Recovered[2] Between Sampling Intervals (gal)	Influent Concentration[3] Geometric Mean (ug/L)	Total Estimated Mass[4] Removed (lbs)
12/17/2006	215.8	1,175,830.0	NA	NA	NA
3/9/2007	319.6	1,252,822.6	76,993	263	0.17
			Total Estimated Mass Removed During Operational Year 5, Quarter Number 2 (lbs) =		**0.17**
			Total Estimated Mass Removed Since System Startup (lbs) =		**2.30**

Notes:

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

1. Total effluent totalizer damaged during current reporting period due to freezing. Value estimated from the sum of individual recovery wells.
2. Total Groundwater Recovered Between Sampling Intervals = Well Totalizer Reading for current sampling event - Well Totalizer Reading for prior sampling event.
3. Influent Concentration Geometric Mean = (Influent Concentration for prior sampling event x Influent Concentration for current sampling event) ^ (1/2).
4. 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).

Table 7. Concentrations of Volatile Organic Compounds Detected in Air Stripper Effluent, Operational Year 5, Quarter Number 2, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Compounds	CAS Numbers	Sample ID: Date Sampled:	Effluent 3/9/2007 ppbv
Vinyl Chloride	75-01-4		<7.2
Chloroethane(Ethyl Chloride)	75-00-3		<7.2
1,1-Dichloroethene(Vinylidene Chloride)	75-35-4		<7.2
Methylene Chloride(Dichloromethane)	75-09-2		<7.2
1,1-Dichloroethane	75-34-3		<7.2
cis-1,2-Dichloroethylene	156-59-2		<7.2
Chloroform	67-66-3		<7.2
1,1,1-Trichloroethane(Methyl Chloroform)	71-55-6		<7.2
Benzene	71-43-2		<7.2
Trichloroethene	79-01-6		<7.2
Toluene	108-88-3		<7.2
Ethyl benzene	100-41-4		<7.2
m,p-Xylene	108-38-3/106-42-3		**56**
o-Xylene	95-47-6		<7.2
1,2,4-Trimethylbenzene	95-63-6		<7.2
2-Propanol (Isopropyl alcohol)	67-63-0		<7.2
Dichlorodifluoromethane(Freon 12)	75-71-8		<7.2

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

Notes/Assumptions:

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

Appendix A

Groundwater Sampling Logs

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

Date: 3/26/07

Well Identification		Depth to Water (feet below MP)	Comments
* GMMW-2		35.50	
GMMW-3		~~38.90~~ 33.33	
GMMW-4		45.75	
* GMMW-5		~~48.~~ 30	
* GMMW-6		37.65	
GMMW-7		46.93	
PW-3		9.45	
* PW-4		16.02	
PW-5		Top of Casing	
* W-5		51.00	
W-6		48.24	
PW-7		38.99	
W-7		40.74	
PW-10		36.42	
PW-11		51.29	
PW-13		60.16	
W-13		45.61	
W-14S		—	Could not get to too much water
W-16S		—	Some thing is blocking the water
W-17S		8.04	
W-18		9.45	
W-20S		7.05	

ARCADIS G&M
Low Flow Groundwater Sampling Form

RePv 032607 + Page 1 of 1

Project/No. N4000949.0020 Well GMW4-S Date 3/26/07

Total depth (ft bmp) — Screen Setting (ft bmp) — Casing Diameter (inches) 2"

Measuring Point Description — Static Water Level (ft bmp) 48.20

Pump Intake (ft bmp) — Sampling Time: Begin _____ End 1245

Weather Partly Cloudy 50° PDB Bag Bailer

Sampled by: KA / Fran

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes
			6.56	10.5	0.754			13.3	

Color: Slight yellow color Strong odor Appearance Clear

G:\TECHNICL\FIELD LOGS\Low Flow Sampling Form.XLS- Sheet1

ARCADIS G&M

Low Flow Groundwater Sampling Form

Page 1 of 1

Project/No. NY4000 949.0020 Well BMMW-6 MS/MSD Date 3/26/07

Total depth (ft bmp) — Screen Setting (ft bmp) — Casing Diameter (inches) 2"

Measuring Point Description — Static Water Level (ft bmp) 37.65

Pump Intake (ft bmp) — Sampling Time: Begin _____ End 13.15

Weather Partly cloudy 50° F PDB Bag Bailer

Sampled by: KA/Ken

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes
		37.65	6.61	10.3	0.821			8.1	

Clear
Mild odor
Clear - Small black pieces

G:\TECHNICL\FIELD LOGS\Low Flow Sampling Form.XLS- Sheet1

ARCADIS G&M

Low Flow Groundwater Sampling Form

Page 1 of 1

Project/No. N4000949.0020 Well GMMW-2 Date 3/26/07

Total depth (ft bmp) — Screen Setting (ft bmp) — Casing Diameter (inches) 2"

Measuring Point Description — Static Water Level (ft bmp) 35.50

Pump Intake (ft bmp) — Sampling Time: Begin _____ End 13:30

Weather Partly cloudy 50°F PDB Bag Bailer

Sampled by : KA / J. Fran

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes
		35.50	6.56	10.4	0.442			4.9	

Color Clear
Odor Slight
Appearance Clear

32.1 4" GMMW-3

ARCADIS G&M

Low Flow Groundwater Sampling Form

Page 1 of 1

Project/No. N4000949.0020 Well PW-4 Date 3/26/07

Total depth (ft bmp) — Screen Setting (ft bmp) — Casing Diameter (inches) — 2"

Measuring Point Description — Static Water Level (ft bmp) 16.02

Pump Intake (ft bmp) — Sampling Time: Begin ____ End 14:00

Weather Partly Cloudy 50° PDB Bag Bailer

Sampled by : KA / Fran

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes
			5.56	9.9	1.82			1260	

Samples were Clear + Lt Brown
[illegible] no odor
Appearance Little silt

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Low Flow Groundwater Sampling Form

Page 1 of 1

Project/No. 14000949.0020 Well W-5 Date 3/26/07

Total depth (ft bmp) — Screen Setting (ft bmp) — Casing Diameter (inches) — 2"

Measuring Point Description — Static Water Level (ft bmp) 51.0'

Pump Intake (ft bmp) — Sampling Time: Begin _____ End 1425

Weather Partly Cloudy 50° PDB Bag Bailer

Sampled by : KA IRon

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes
			6.46	10.6	0.829			41.0	

Clear Slightly Cloudy
Slight odor
Cloudy - tiny White organ

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Surface water

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Low Flow Groundwater Sampling Form

Page 1 of 2

Project/No. N4000 949.0020 Well SP-4 Date 3/27/07

Total depth (ft bmp) — Screen Setting (ft bmp) — Casing Diameter (inches) —

Measuring Point Description — Static Water Level (ft bmp) —

Pump Intake (ft bmp) — Sampling Time: Begin — End 1247

Weather Sun 55° (rain the night Before)

Sampled by: KA

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes
			6.73	5.6	0.066		12.65		

Direct Collection Clear/Cloudiness River color

1.0' disp

Rest - 10'/5 Sec Approx.

→

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Surface water

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Low Flow Groundwater Sampling Form

Page 1 of 1

Project/No. NY000949.0020 Well F-6 Date 3/27/07

Total depth (ft bmp) — Screen Setting (ft bmp) — Casing Diameter (inches) —

Measuring Point Description — Static Water Level (ft bmp) —

Pump Intake (ft bmp) — Sampling Time: Begin — End 1228

Weather Sun 55° (rain the night before)

Sampled by : KA

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes
			6.62	6.2	0.076				

Direct collection ~1.0' deep in middle

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Flow Rate 10sec / 20' Approx

Clear / Slightly Cloudy - River odor

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Low Flow Groundwater Sampling Form

Page 1 of 1

Project/No. N4000949.0020 Well TW-1 Date 3/27/07

Total depth (ft bmp) — Screen Setting (ft bmp) — Casing Diameter (inches) 2"

Measuring Point Description — Static Water Level (ft bmp) —

Pump Intake (ft bmp) — Sampling Time: Begin _____ End 1057

Weather Sun 55°

Sampled by: KA / Ryan Bailer

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes
			6.29		0.745				

Color Black gray color
Strong odor
Cloudy / Black pieces - small

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Low Flow Groundwater Sampling Form

Page 1 of 1

Project/No. N4000 949.0020 Well IW-3 Date 3/27/07

Total depth (ft bmp) — Screen Setting (ft bmp) — Casing Diameter (inches) 2"

Measuring Point Description — Static Water Level (ft bmp) —

Pump Intake (ft bmp) — Sampling Time: Begin _____ End 1040

Weather Sun 55°

Sampled by : KA / FSan Bailer

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes
			5.64		0.376				

Color Brown - slight green tint
Strong odor

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Low Flow Groundwater Sampling Form

Page 1 of 1

Project/No. NY000949.0020 Well IW-2 Date 3/27/07

Total depth (ft bmp) — Screen Setting (ft bmp) — Casing Diameter (inches) 2"

Measuring Point Description — Static Water Level (ft bmp) —

Pump Intake (ft bmp) — Sampling Time: Begin ____ End 1030

Weather Sun 55°

Sampled by: KA / Pron

Bailer

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes
			5.93		0.170				

Color Brown/green
and strong odor

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Low Flow Groundwater Sampling Form

Page 1 of 1

Project/No. N4000949.0020 Well IW-9 Date 3/27/07

Total depth (ft bmp) — Screen Setting (ft bmp) — Casing Diameter (inches) 2"

Measuring Point Description — Static Water Level (ft bmp) —

Pump Intake (ft bmp) — Sampling Time: Begin _____ End 10:10

Weather Sun 55° Boiler

Sampled by: KA | Fran

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes
			4.76		0.459				

Brown Color
Strong Mol. odor
Brown appearance

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Low Flow Groundwater Sampling Form

Page 1 of 1

Project/No. N4000949.0020 Well IW-13 Date 3/27/07

Total depth (ft bmp) — Screen Setting (ft bmp) — Casing Diameter (inches) 2"

Measuring Point Description — Static Water Level (ft bmp) —

Pump Intake (ft bmp) — Sampling Time: Begin _____ End 10:00

Weather Sun 55° Bailer

Sampled by : KA / EGM

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes
			5.87		0.473			86	

Color - yellow tint
odor - slight odor
Appearance - clear

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ARCADIS G&M

Low Flow Groundwater Sampling Form

Page 1 of 1

Project/No. NY000949.0020 Well IW-7 Date 3/27/07

Total depth (ft bmp) — Screen Setting (ft bmp) _____ Casing Diameter (inches) _____

Measuring Point Description — Static Water Level (ft bmp) _____

Pump Intake (ft bmp) — Sampling Time: Begin _____ End —

Weather Sun 55° * Did not Sample Blockage at 34.3' - no water

Sampled by: KA/Fran

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes

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ARCADIS G&M

Low Flow Groundwater Sampling Form

Page 1 of 1

Project/No. N4000949.0020 Well IW-8 Date 3/27/07

Total depth (ft bmp) — Screen Setting (ft bmp) — Casing Diameter (inches) 2"

Measuring Point Description — Static Water Level (ft bmp) —

Pump Intake (ft bmp) — Sampling Time: Begin — End —

Weather Sun 55° * Did not Sample Could not open

Sampled by : KA / Ryan

Date/Time	Rate (ml/min)	DTW (ft bmp)	pH (s.u.)	TEMP. (C)	Cond. umhos or ms/cm	Redox (mV)	DO (mg/L)	TURB (NTU)	Notes

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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 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Parameters for 3/9/2007 Sampling Event			
Discharge Temperature[1]	T	520	°R
Ambient Temperature	Ta	484	°R
Stack Diameter	D	6	in
Stack Radius	R	0.25	ft
Stack Area	A	0.20	ft^2
Exit Velocity [6]	V	29.1	fps
Exit Flow	Q	343	acfm
Exit Flow	Q	349	scfm
Stack Height	h_s	17	ft
Building Height	h_b	13.25	ft
Ratio of Heights	h_s/h_b	1.28	
Plume rise credit? $h_s/h_b > 1.5$?	(If no, $h_e=h_s$)	(If Yes, $h_e = h_s + 1.1 (F_m)^{1/3}$)	
Momentum Flux	Fm = Ta/T * V2 * R2	n/a	ft^4/s^2
Effective Stack Height	h_e	17.0	ft
Reduction Factor? $2.5 > h_s/h_b > 1.5$?		No, do not reduce impact	
Actual Annual Impact	C_a	$RF*6*Q_a/h_e^{2.25}$	
Mass Flow	Q_a	S lbs emitted for last 12 months	

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

Notes/Assumptions:

1. Stack temperature was inadvertantely not recorded during the current reporting period. Accordingly, a stack discharge temperature of 60°F was used based on historical recorded parameters.
2. The ambient temperature is approximately 24°F based on recorded conditions.
3. Calculations assume that the system will run with the maximum allowable concentrations between quarterly readings.
4. AGC refers to the Annual Guideline Concentration as determined using the hand calculations in the DAR-1 AGC/SGC Tables dated December 22, 2003.
5. To be conservative the lower detection limit was used for compounds that were below the limit of detection, but are found in the influent groundwater of the Groundwater Remediation System.
6. The exit velocity was inadvertantely not recorded during the current reporting period. Accordingly, the exit velocity recorded during Operation Year 5, Quarter Number 1 was used for calculations herein.

Table B-2. NYSDEC DAR-1 Air Modeling Data, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Calculation of the Short-Term Guideline Concentration (SGC) for Sampling Event on 03/09/2007

Compounds	CAS Numbers	Maximum Limit (SGC) (ug/m^3)	Analytical Concentration (ppb)	Detection Limit Used	Actual Emissions C_a (ug/m^3)	Mass/hour (lb/hr)	Maximum Potential Impact (Step III.A.3 in DAR-1) (ug/m^3)	Short Term Impact (Step III.A.5 in DAR-1) (ug/m^3)	Percent of the SGC (%)
Vinyl Chloride	75-01-4	180,000	7.2	*	18.71	2.63E-05	0.0045	0.29191	1.6E-04
Chloroethane(Ethyl Chloride)	75-00-3	--	7.2	*	19.31	2.71E-05	0.0046	0.30134	NA
1,1-Dichloroethene(Vinylidene Chloride)	75-35-4	--	7.2	*	29.02	4.08E-05	0.0070	0.45280	NA
Methylene Chloride(Dichloromethane)	75-09-2	14,000	7.2	*	25.42	3.57E-05	0.0061	0.39671	2.8E-03
1,1-Dichloroethane	75-34-3	--	7.2	*	29.62	4.16E-05	0.0071	0.46224	NA
cis-1,2 - Dichloroethylene	156-59-2	--	7.2	*	29.02	4.08E-05	0.0070	0.45280	NA
1,1,1-Trichloroethane(Methyl Chloroform)	71-55-6	68,000	7.2	*	39.93	5.61E-05	0.0096	0.62314	9.2E-04
Trichloroethene	79-01-6	54,000	7.2	*	39.33	5.52E-05	0.0094	0.61370	1.1E-03
m,p-Xylene	108-38-3/106-42-3	4,300	56	*	242.44	3.41E-04	0.0582	3.78300	8.8E-02
Dichlorofluoromethane(Freon 12)	75-71-8	--	7.2	*	36.19	5.08E-05	0.0087	0.56466	NA

ug/m^3: Micrograms per cubic meter
ppb: parts per billion
*: Analyte concentration below detection limit, detection limit was used in calculations
lb/hr: pounds per hour
--: No SGC listed for compound
NA: Not applicable

Notes:

1. DAR-1 refers to DAR-1 AGC/SGC Tables dated December 22, 2003.
2. SGC refers to the Short-Term Guideline Concentration as determined using the hand calculations in the DAR-1 AGC/SGC Tables dated December 22, 2003.
3. To be conservative the lower detection limit was used for compounds that were below the limit of detection, but are found in the influent groundwater of the Groundwater Remediation System.

Table B-3. NYSDEC DAR-1 Air Modeling Data, Operational Year 5, Quarter Number 2, Colesville Landfill, Broome County, New York.

Parameters for 3/9/2007 Sampling Event

Compounds	CAS Numbers	Maximum Limit on C_a (AGC[4]) ug/m^3	Maximum Mass Flow Q_a lb/yr	Lab Data ppb	Detection Limit Used[5]	Actual Emissions C_a ug/m^3	Actual Mass Flow per Hour lb/hr	Actual Mass Flow per Year lb/yr	**Percent of Annual** %
Vinyl Chloride	75-01-4	0.11	10.76	7.2	*	18.71	2.44E-05	0.21067	**1.96**
Chloroethane(Ethyl Chloride)	75-00-3	10,000	978,044.97	7.2	*	19.31	2.52E-05	0.21748	**0.00**
1,1-Dichloroethene(Vinylidene Chloride)	75-35-4	70	6,846.31	7.2	*	29.02	3.79E-05	0.32680	**0.00**
Methylene Chloride(Dichloromethane)	75-09-2	2.1	205.39	7.2	*	25.42	3.32E-05	0.28632	**0.14**
1,1-Dichloroethane	75-34-3	0.63	61.62	7.2	*	29.62	3.87E-05	0.33361	**0.54**
cis-1,2-Dichloroethylene	156-59-2	1,900	185,828.54	7.2	*	29.02	3.79E-05	0.32680	**0.00**
1,1,1-Trichloroethane(Methyl Chloroform)	71-55-6	1,000	97,804.50	7.2	*	39.93	5.21E-05	0.44973	**0.00**
Trichloroethene	79-01-6	0.5	48.90	7.2	*	39.33	5.13E-05	0.44292	**0.91**
m,p-Xylene	108-38-3/106-42-3	700	68,463.15	**56**	*	242.44	3.16E-04	2.73027	**0.00**
Dichlorodifluoromethane(Freon 12)	75-71-8	12,000	1,173,653.96	7.2	*	17.99	2.35E-05	0.20258	**0.00**

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

Notes/Assumptions:

1. Stack temperature was inadvertantely not recorded during the current reporting period. Accordingly, a stack discharge temperature of 60°F was used based on historical recorded parameters.
2. The ambient temperature is approximately 24°F based on recorded conditions.
3. Calculations assume that the system will run with the maximum allowable concentrations between quarterly readings.
4. AGC refers to the Annual Guideline Concentration as determined using the hand calculations in the DAR-1 AGC/SGC Tables dated December 22, 2003.
5. To be conservative the lower detection limit was used for compounds that were below the limit of detection, but are found in the influent groundwater of the Groundwater Remediation System.

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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 5, Quarter Number 2 Injection Quantities, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

NO INJECTIONS COMPLETED DURING REPORTING PERIOD