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Infrastructure, buildings, environment, communications

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ENVIRONMENTAL

Subject:
Operational Year 2, Quarter Number 3 Monitoring Report,
Colesville Landfill, Broome County, New York. (Site No. 704010).

Dear Mr. Jacob:

Date:
23 December 2004

On behalf of Broome County, ARCADIS is providing the Operational Year 2, Quarter Number 3 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 G&M, Inc.

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Operational Year 2
Quarter Number 3
Monitoring Report

Colesville Landfill,
Broome County, New York
NYSDEC Site 704010

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Operational Year 2
Quarter Number 3
Monitoring Report

Colesville Landfill,
Broome County, New York
NYSDEC Site 704010

Prepared for:
Broome County Division of Solid Waste Management

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A Water-Level Measurement and 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 to evaluate and document long-term monitoring (LTM) activities at the Colesville Landfill, located in Broome County, New York (site). Remediation and monitoring activities are being conducted pursuant to the Record of Decision (ROD) and Explanation of Significant Difference (ESD) that were issued in March 1991 and September 2000, respectively. LTM activities (which include environmental effectiveness and remediation system performance monitoring) were performed in accordance with the LTM Plan (ARCADIS G&M, Inc. 2002), which was approved by the United States Environmental Protection Agency (USEPA) and New York State Department of Environmental Conservation (NYSDEC). The LTM Plan provides a detailed description of the LTM program, methodology, and rationale. Where applicable these elements are either summarized or incorporated by reference herein.

This report provides the data collected from the June 2004 water-level measurement round and the results of groundwater quality monitoring conducted during Operational Year 2, Quarter Number 3. A description of the operation, maintenance, and monitoring (OM&M) associated with the Groundwater Remediation System from March 2004 through June 2004 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.

2. Methodology

The following section provides a summary of the environmental effectiveness and remedial system performance monitoring methodology for Operational Year 2, Quarter Number 3. A site plan showing sampling locations is provided on Figure 1.

2.1 Environmental Effectiveness Monitoring

The environmental effectiveness monitoring performed during Operational Year 2, Quarter Number 3 included the following:

- Water-level (hydraulic) measurements were collected from 18 monitoring wells on June 15, 2004.

- Groundwater samples (Year 2, Q3 list of wells plus W-16S and GMMW-4) were collected from 7 monitoring wells during the week of June 14, 2004 and selectively analyzed for volatile organic compounds (VOCs), selected inorganics, general chemistry, and field parameters.

- Groundwater samples collected from monitoring wells GMMW-5 and W-5 were also analyzed for dissolved gases.

- Samples (VOCs only) were collected and field parameters were measured at the surface water location (F-6) on June 15, 2004.

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

Monitoring wells were purged and sampled using methods described in the LTM Plan.

2.2 Groundwater Remediation System Performance Monitoring

Groundwater Remediation System performance monitoring activities during Operational Year 2, Quarter Number 3 were as follows:

- Pump-and-treat (PT) system production well influent and effluent samples were collected during the OM&M quarterly site visit on June 15, 2004 and selectively analyzed for VOCs and total iron.

- One vapor sample from the PT system air stripper effluent was collected during the OM&M quarterly site visit on June 15, 2004 and analyzed for VOCs.

- Total organic carbon (TOC) samples were collected from injection wells IW-3, IW-8, and IW-14 on June 17, 2004.

- Field parameters were measured in injection wells IW-3, IW-8, and IW-14, on June 17, 2004.

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

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

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

Prior to TOC sampling in the injection wells on June 17, 2004, field parameters were recorded using a Hereba U22 multi-parameter, water quality meter. The Hereba multi-probe was placed in a bailed sample of groundwater for the collection of the field measurements. Field parameters were recorded after each of three well volumes was removed from the well.

2.3 Spring Water Remediation System Performance Monitoring

SP-5 Spring Water Remediation System OM&M was conducted on June 15, 2004. System OM&M was conducted in accordance with the LTM Plan Addendum for Spring Water Remediation Systems (ARCADIS 2003) and consisted of recording field parameters (discharge flowrate and depth to water in treatment unit) and the collection of an influent and effluent spring water sample for analysis of VOCs. The influent sample was collected after removing three well volumes from the influent monitoring well, which is located within the SP-5 treatment unit and screened below the liquid phase granular activated carbon (LPGAC) zone. The treatment system effluent sample was collected as a grab sample from the discharge pipe prior to entering the riprap-lined outlet. All spring water samples were analyzed for VOCs using USEPA Method 8260.

3. Groundwater Flow

The depth to water in existing wells was measured on June 15, 2004. Water-level elevation data are provided in Table 1. The groundwater flow direction in the project area (i.e., adjacent to the landfill western perimeter) and site-wide in the Operational Year 2, Quarter Number 3 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 June 2004 monitoring round (Operational Year 2, Quarter Number

3). Groundwater analytical results are provided in Tables 2 and 3. Where applicable, the previous round of analytical results for the respective sampling location have been provided on the same table for comparative purposes.

4.1 Volatile Organic Compounds

Groundwater analytical results for VOCs are provided in Table 2. As shown in Table 2, total VOC (TVOC) concentrations for monitoring wells PW-4 and W-5 remained generally consistent when compared with analytical results from the previous round. Monitoring wells GMMW-2, GMMW-5, GMMW-6, and W-16S exhibited an increase in TVOC concentrations when compared with the previous round of analytical results.

Recovery well analytical results for VOCs are provided in Table 5. Groundwater analytical results for PT system production wells GMPW-3 and GMPW-5 decreased when compared to prior rounds of data. Groundwater analytical results for production well GMPW-4 increased when compared with prior rounds of data. Specifically, TVOC concentrations for the Operational Year 2, Quarter Number 3 sampling round were as follows: GMPW-3 (253.9 micrograms per liter [µg/L]), GMPW-4 (644.4 µg/L) and GMPW-5 (0.0 µg/L). 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 are provided in Table 3. Based on the groundwater data collected during Operational Year 2, Quarter Number 3, monitoring wells located immediately downgradient of the injection transect (GMMW-5) continue to indicate strong reducing conditions needed to enhance the reductive dechlorination of VOCs. The key indicators of these conditions are depressed dissolved oxygen and low oxidation-reduction potential (ORP). Further details of the ARI system performance monitoring are provided in Section 7.2.2 of this report.

4.3 Evidence of Biodegradation

Table 3 provides the results of biodegradation end product concentrations in monitoring wells and indicates the continued occurrence of bioactivity and biodegradation of VOCs within the plume. Specifically, biogeochemical results (methane, ethane, and ethene) for monitoring well GMMW-5 continue to be elevated when compared to baseline conditions. GMMW-5 is located closest to the ARI injection wells and would be expected to be the first wells to exhibit increases in

biodegradation end products. Additional details on the results of biogeochemical monitoring as evidence of Groundwater Remediation System performance and effectiveness are discussed in Section 7.2.2 of this report.

5. Spring Water Quality

Spring water monitoring was conducted at sampling locations SP-2, SP-3, SP-4 and SP-5 during the Operational Year 2, Quarter Number 3 sampling round. Analytical results for the SP-5 Spring Water Remediation System are discussed in Section 8 of this report. TVOCs for spring location SP-2 (119.4 ug/L) increased when compared to the previous round of results while TVOCs for spring locations SP-3 (9.6 ug/L) and SP-4 (126.0 ug/L) were stable to decreasing when compared to their previous round of analytical results.

6. Surface Water Quality

Surface water monitoring was conducted at sampling location F-6 during the Operational Year 2, Quarter Number 3 monitoring event in accordance with the LTM Plan. As discussed in the previous quarterly report, the F-6 monitoring location was incorrectly sampled during the Operational Year 2, Quarter Number 2 monitoring event and would be resampled during the Operational Year 2, Quarter Number 3 monitoring event. The Operational Year 2, Quarter Number 3 F-6 sample results collected on June 17, 2004 were non-detect for all compounds indicating that surface water is not being adversely impacted.

7. Groundwater Remediation System Performance

The following section describes the results of the Groundwater Remediation System performance monitoring conducted during Operational Year 2, Quarter Number 3.

7.1 PT System

The following section describes the results of the PT system performance monitoring conducted during Operational Year 2, Quarter Number 3.

7.1.1 Summary of Operation, Maintenance, and Monitoring

During the Operational Year 2, Quarter Number 3 system operation, the PT system operated intermittently due to mechanical problems related to compressor AC-200.

System shutdowns or periods of intermittent operation during Quarter Number 3 were as follows:

- On April 22, 2004 it was noted that the pneumatic pump in Production Well GMPW-3 was not operating correctly due to fouling of the pump intake. The pump intake was cleaned and a new filter sock was installed on May 14, 2004 to resolve this problem and the well was brought back on-line.

- On April 26, 2004, an AC-200 motor starter fault caused the air compressor to shut down the PT system for two days. The PT system was brought back on-line on April 28, 2004 and then shut down again on May 15, 2004 with another AC-200 motor starter fault. The motor capacitors were replaced on May 27, 2004 and the PT system was brought back on-line.

- On June 1, 2004 the PT system shut down again as a result of an AC-200 motor fault. The air compressor motor was replaced on June 14, 2004 and the PT system was brought back on-line.

PT system OM&M was conducted on June 15, 2004 and included operation and maintenance of system equipment, collection of system performance samples (water and vapor), and recording system operating parameters. Table 4 provides a summary of the recorded system operating parameters. As shown in Table 4, the total effluent groundwater recovery rate was approximately 0.44-gallon per minute (gpm), with individual recovery rates of 0.10-gpm, 0.161-gpm, and 0.20-gpm for production wells GMPW-3, GMPW-4, and GMPW-5, respectively. The average individual recovery well rates decreased during Operational Year 2, Quarter Number 3 compared to the average Operational Year 1, Quarter Number 2 recovery rates. The decrease in recovery rates is directly attributable to the air compressor motor faults described previously. GMPW-3 exhibited an additional decline in performance due to the fouling of the pump intake. A total of 61,936 gallons of groundwater was recovered during the reporting period and a total of 724,225.5 gallons of groundwater has been recovered since system startup. The low profile air stripper operated in accordance with the design specifications and had a blower discharge pressure of 9.5-inches of water column (i.w.c.) and a low profile air stripper blower flowrate of 598 standard cubic feet per minute (scfm).

7.1.2 Results of Performance Sampling

PT system performance sampling for Operational Year 2, Quarter Number 3 was conducted on June 15, 2004. As discussed previously, five groundwater samples and

one vapor sample were collected. Groundwater samples included individual production well samples (GMPW-3, GMPW-4 and GMPW-5), total influent, and total effluent after the cartridge filters. The vapor sample was collected from the effluent stack of the low profile air stripper.

Table 5 provides a summary of the PT system performance sampling groundwater analytical results. As shown in Table 5, all VOCs were treated to below their respective Best Professional Judgment (BPJ) limits via the low profile air stripper. Total iron after the cartridge filters was 0.794 mg/L, slightly above the BPJ recommended daily average limit of 0.61 mg/L and below the recommended daily limit of 1.2 mg/L. Based on the total groundwater recovered during the reporting period and total influent groundwater concentration, an estimated 0.18 pounds (lbs) of VOC mass were removed from the subsurface during the quarterly reporting period, as shown in Table 6. A total of approximately 1.00 lbs of VOCs have been removed from the subsurface since system startup.

Table 7 provides a summary of the PT system performance sampling vapor analytical results. As shown in Table 7, there were no constituents of concern (COCs) detected above the detection limit in the air stripper effluent vapor sample. To be conservative, a NYSDEC DAR-1 air model was calculated using the individual vapor actual analytical data or the detection limit of all COCs detected in the influent groundwater. All COCs were below their respective short-term guidance concentrations (SGCs) and annual guidance concentrations (AGCs). Appendix B contains the NYSDEC DAR-1 AGC screening simulation based on the hand calculations provided in the NYSDEC DAR-1 AGC/SGC tables dated December 22, 2003.

7.2 ARI System

The following section describes the results of the ARI system performance monitoring conducted during Operational Year 2, Quarter Number 3.

7.2.1 Summary of Operation, Maintenance, and Monitoring

System operation during Operational Year 2, Quarter Number 3 had occasional interruptions due to troubleshooting of system alarms. Despite these interruptions in operation, sufficient molasses solution was delivered to the subsurface to maintain the existing reducing environment. ARI system OM&M was conducted during the Operational Year 2, Quarter Number 3 OM&M site visit on June 15, 2004 and included operation and maintenance of system equipment. In addition, ARI system operating parameters were recorded during each automated injection event. The

injection frequency was increased to a monthly basis (from bi-weekly) and the injection volume per well was increased to 160 gallons (from 80 gallons) beginning with the injection on March 12, 2004. This was conducted in an effort to push the molasses solution further from the injection wells to ensure adequate organic carbon distribution within the subsurface. During Operational Year 2, Quarter Number 3, three complete automated injections were conducted. Injections beginning on March 12, 2004 and May 14, 2004 were interrupted due to Groundwater Remediation System alarm conditions and/or minor system problems. These injections were subsequently completed at later dates.

Based on the number of injection events, quantity of molasses solution delivered to each injection well, and molasses solution percentage, approximately 8,160-gallons of molasses solution were delivered to the subsurface during Operational Year 2, Quarter Number 3. A total of 47,184-gallons of molasses solution have been injected since system startup. Appendix C provides a summary of the recorded system operating parameters for each of the injection events for this period.

7.2.2 Results of Performance Sampling

ARI system performance sampling was conducted on June 15, 2004. As discussed previously, the June 15, 2004 event consisted of measuring downhole field parameters and collecting TOC samples from injection wells IW-3, IW-8, and IW-14. In addition to performance sampling conducted explicitly for ARI system monitoring, analytical results of monitoring well GMMW-5, sampled under the environmental effectiveness monitoring program, was also used to determine the effectiveness of the ARI system.

Analytical results and field parameter measurements provided in Tables 2 and 3 indicate that geochemical conditions in the current area of ARI system influence exhibit a lack of dissolved oxygen (DO), low ORP, sufficient TOC within injection wells, and an increase in chlorinated VOC (CVOC) degradation products. Key observations are as follows:

- The laboratory analytical DO concentration of 0.42 mg/L in monitoring well GMMW-5 indicates strongly anaerobic conditions in the subsurface.
- The elevated TOC concentration in well GMMW-5 of 554 mg/L indicates that sufficient organic carbon is being delivered to the subsurface.
- Ethene concentrations increased significantly in monitoring well GMMW-5 to 7,900 nanograms per liter (ng/L), when compared to its previous round of

monitoring results. This provides evidence that complete biodegradation of CVOC mass is occurring.

- The methane concentration in monitoring well GMMW-5 increased significantly to 11,000 µg/L when compared to its previous round of monitoring data. This continues to indicate the presence of strongly reducing methanogenic conditions that are ideal for reductive dechlorination of CVOCs.

TVOC concentrations increased within well GMMW-5 during Operational Year 2, Quarter Number 3 when compared to the Operational Year 2, Quarter Number 2 analytical results. As discussed in previous quarterly reports, the increase in TVOC concentrations demonstrate that adsorbed phase mass has been transferred to the dissolved phase, making it available for treatment within the anaerobic in-situ reactive zone (IRZ).

8. Spring Water Remediation System Performance

SP-5 Spring Water Remediation System OM&M was conducted on June 15, 2004 in accordance with the LTM Plan Addendum for Spring Water Remediation Systems (ARCADIS 2003). SP-5 Spring Water Remediation System Operational Year 2, Quarter Number 3 analytical results are provided in Table 8. As shown in Table 8, all effluent COCs were treated to below their respective BPJ limits via the LPGAC. Table 9 contains the SP-5 Spring Water Remediation System field parameters recorded during the Operational Year 2, Quarter Number 3 sampling round. As shown in Table 9, the SP-5 remedial system has treated approximately 55,313 gallons of spring water this quarter. Approximately 128,605 gallons of spring water have been treated since system startup and 0.10 lbs of VOCs from the influent spring water have been removed by the SP-5 remedial system. The recorded instantaneous flowrate was 0.396 gpm for the Operational Year 2, Quarter Number 3 monitoring event.

9. Conclusions

Based on the data obtained from the Operational Year 2, Quarter Number 3 monitoring, ARCADIS concludes the following:

- The groundwater flow direction in the project area (i.e., adjacent to the landfill western perimeter) and site-wide in the June 2004 round was consistent with previous rounds. The groundwater flow direction in the project area is toward the southwest from the western perimeter of the landfill. The groundwater flow

direction in areas further to the east of the project area is toward the south/southwest.

- The TVOC analytical results in wells located closest to the ARI injection well line (GMMW-5) exhibited an increase in concentrations when compared to the Operational Year 2, Quarter Number 2 round, which demonstrates that adsorbed phase mass has been transferred to the dissolved phase making it available for treatment within the anaerobic IRZ.

- Biogeochemical conditions observed in wells closest to the ARI system injection wells indicate increasing levels of biodegradation end products (i.e., methane).

- Groundwater within the current ARI influence area exhibited increasing levels of VOC degradation products (i.e., ethene).

- The Groundwater Remediation System operated intermittently during the reporting period due to mechanical problems with air compressor AC-200. The problem was ultimately resolved on June 14, 2004 and the system currently operates as designed.

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

- The ARI system is operating as designed and has maintained an anaerobic IRZ in the vicinity of the injection wells.

- The SP-5 Spring Water Remediation System is operating as designed and is treating recovered VOCs to below BPJ limits prior to discharge.

10. Recommendations

The following recommendations are provided for additional operational monitoring during future quarterly monitoring events:

- Collect groundwater samples to be analyzed for bromide on an as needed basis from wells GMMW-4, GMPW-1, and GMMW-5 to confirm the horizontal groundwater seepage velocity in the vicinity of the ARI system injection wells.

- Resample spring location SP-2 in accordance with the requirements outlined in the LTM Plan.

11. Project Schedule

Groundwater environmental effectiveness monitoring is scheduled to be conducted for the remainder of Year 2004 on the quarterly schedule set forth in the LTM Plan. Performance monitoring of the Groundwater Remediation System will also be performed 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 (Site Number 704010). November 3, 2003.

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Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater, Springs, and Surface Water, Operational Year 2, Quarter Number 3 Sampling Round, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: Date:	GMMW-02 3/8/04	GMMW-02 6/16/04	GMMW-05 3/8/04	GMMW-05 6/17/04	GMMW-06 3/8/04	GMMW-06 6/16/04	PW-04 3/8/04	PW-04 6/16/04	PW-04* 6/16/04	W-05 3/8/04	W-05 6/17/04
1,1,1-Trichloroethane		**67**	**71**	<50	<10	**1.4**	<1.0	**21**	**25**	**25**	**2.3**	<10
1,1,2-Trichloroethane		<1.0	<1.0	<50	<10	**4.3**	**4.4**	<1.0	<1.0	<1.0	<1.0	<10
1,1-Dichloroethane		**110**	**130**	**190**	**230**	**560**	**1,100**	**13**	**18**	**19**	**160**	**180**
1,1-Dichloroethene		**2.8**	**3.0**	<50	<10	**3.3**	**2.8**	<1.0	<1.0	<1.0	<1.0	<10
1,2-Dichloroethane		<1.0	<1.0	<50	<10	**5.0**	**5.0**	<1.0	<1.0	<1.0	**1.0**	<10
1,2-Dichloropropane		<1.0	<1.0	<50	<10	**1.2**	**1.2**	<1.0	<1.0	<1.0	<1.0	<10
Benzene		**3.4**	**3.6**	<50	<10	**5.7**	**6.1**	<1.0	<1.0	<1.0	**3.8**	<10
Chlorobenzene		**47**	**50**	<50	**24**	**34**	<1.0	<1.0	<1.0	<1.0	**25**	**29**
Chloroethane		**38**	**42**	<50	**70**	**180**	**420**	**2.9**	**4.1**	**3.9**	**110**	**130**
Chloroform		<1.0	<1.0	<50	<10	**2.6**	**2.3**	**1.7**	**1.7**	**1.7**	<1.0	<10
cis-1,2-Dichloroethene		**170**	**190**	**320**	**660**	**820**	**1,100**	**15**	**22**	**22**	**3.1**	<10
Dichlorodifluoromethane		**1.8**	<1.0	<50	<10	**4.0**	**8.8**	**1.6**	<1.0	<1.0	**1.4**	<10
Ethylbenzene		<1.0	<1.0	<50	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
Methylene chloride		<2.3	**2.3**	<50	<10	<11	**13**	<1.0	<1.0	<1.0	<3.3	<10
Naphthalene		<1.0	<1.0	<50	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
o-Xylene		<1.0	<1.0	<50	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
Tetrachloroethene		<1.0	<1.0	<50	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
Toluene		<1.0	<1.0	<50	<10	<1.0	<1.0	<1.0	<1.0	<1.0	**2.7**	<10
trans-1,2-Dichloroethene		**2.0**	**1.8**	<50	<10	**4.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<10
Trichloroethene		**130**	**130**	<50	<10	**21**	**16**	**26**	**26**	**26**	**1.1**	<10
Vinyl chloride		**24**	**24**	<50	**41**	**190**	**520**	<1.0	<1.0	<1.0	**16**	<10
Total VOCs		**596.0**	**647.7**	**510.0**	**1025.0**	**1,836.6**	**3199.6**	**81.2**	**96.8**	**97.6**	**326.4**	**339.0**

Bold Constituent detected above MDL.

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

Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater, Springs, and Surface Water, Operational Year 2, Quarter Number 3 Sampling Round, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: / Date:	W-16S 4/1/03	W-16S 6/16/04	SP-2 12/16/03	SP-2 6/15/04	SP-3 12/16/03	SP-3 6/15/04	SP-4 12/16/03	SP-4 6/15/04	F-6 3/9/04	F-6 6/15/04	FB 6-16-04 6/16/04
1,1,1-Trichloroethane		<1.0	<1.0	<1.0	**1.6**	<1.0	<1.0	**5.0**	<10	<10	<1.0	<1.0
1,1,2-Trichloroethane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
1,1-Dichloroethane		**15**	**21**	<1.0	**63**	<1.0	**7.8**	**80**	**67**	**34**	<1.0	<1.0
1,1-Dichloroethene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
1,2-Dichloroethane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
1,2-Dichloropropane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
Benzene		**4.0**	**3.0**	<1.0	**1.3**	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
Chlorobenzene		**26**	**26**	<1.0	<1.0	<1.0	<1.0	**8.1**	<10	<10	<1.0	<1.0
Chloroethane		<1.0	**11**	<1.0	**28**	<1.0	**1.8**	**33**	**30**	**48**	<1.0	<1.0
Chloroform		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
cis-1,2-Dichloroethene		**1.6**	<1.0	<1.0	**2.1**	<1.0	<1.0	**34**	<10	**40**	<1.0	<1.0
Dichlorodifluoromethane		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
Ethylbenzene		<1.0	<1.0	<1.0	**6.6**	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
Methylene chloride		<1.0	<1.0	<1.0	**1.3**	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
Naphthalene		<1.0	<1.0	<1.4	**6.2**	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
o-Xylene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
Tetrachloroethene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
Toluene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
trans-1,2-Dichloroethene		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<10	<1.0	<1.0
Trichloroethene		**2.5 J**	<1.0	<1.0	**4.2**	<1.0	<1.0	**2.6**	<10	<10	<1.0	<1.0
Vinyl chloride		<1.0 J	**1.9**	<1.0	**5.1**	<1.0	<1.0	**34**	**29**	**37**	<1.0	<1.0
Total VOCs		**49.1**	**62.9**	**0.0**	**119.4**	**0.0**	**9.6**	**196.7**	**126.0**	**159.0**	**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.
-- Not analyzed.
NA Not applicable.

Table 2. Concentrations of Volatile Organic Compounds Detected in Groundwater, Springs, and Surface Water, Operational Year 2, Quarter Number 3 Sampling Round, Colesville Landfill, Broome County, New York.

Constituents (units in ug/L)	Sample ID: Date:	FB 6-17-04 6/17/04	TB 6-17-04 6/17/04
1,1,1-Trichloroethane		<1.0	<1.0
1,1,2-Trichloroethane		<1.0	<1.0
1,1-Dichloroethane		<1.0	<1.0
1,1-Dichloroethene		<1.0	<1.0
1,2-Dichloroethane		<1.0	<1.0
1,2-Dichloropropane		<1.0	<1.0
Benzene		<1.0	<1.0
Chlorobenzene		<1.0	<1.0
Chloroethane		<1.0	<1.0
Chloroform		<1.0	<1.0
cis-1,2-Dichloroethene		<1.0	<1.0
Dichlorodifluoromethane		<1.0	<1.0
Ethylbenzene		<1.0	<1.0
Methylene chloride		<1.0	<1.0
Naphthalene		<1.0	<1.0
o-Xylene		<1.0	<1.0
Tetrachloroethene		<1.0	<1.0
Toluene		<1.0	<1.0
trans-1,2-Dichloroethene		<1.0	<1.0
Trichloroethene		<1.0	<1.0
Vinyl chloride		<1.0	<1.0
Total VOCs		**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.
-- Not analyzed.
NA Not applicable.

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

Parameters	Sample ID: / Date:	GMMW-02 3/8/2004	GMMW-02 6/16/2004	GMMW-04 4/22/2004	GMMW-04 6/17/2004	GMMW-05 3/8/2004	GMMW-05 4/22/2004	GMMW-05 6/17/2004
	UNITS							
METALS								
Iron	mg/L	--	--	--	--	--	--	--
Iron, Dissolved	mg/L	**0.130**	--	--	--	**330**	--	--
Manganese	mg/L	--	--	--	--	--	--	--
Manganese, Dissolved	mg/L	**0.0413**	--	--	--	**15.7**	--	--
GENERAL CHEMISTRY								
Bromide	mg/L	--	--	<0.10	<0.10	--	<0.40	<0.20
Chloride	mg/L	**17.6**	--	--	--	**48.2**	--	--
Nitrogen, Nitrate (As N)	mg/L	<0.1	--	--	--	<0.2	--	--
Nitrogen, Nitrite	mg/L	<0.1	--	--	--	<0.2	--	--
Total Organic Carbon	mg/L	**2.23**	<2.0	--	--	**1,630**	--	**554**
Sulfate	mg/L	**6.66**	--	--	--	**2.69**	--	--
Sulfide (field)	mg/L	--	**0.031**	--	--	--	--	**0.227**
Iron (field)	mg/L	--	--	--	--	--	--	--
FIELD PARAMETERS								
pH	Standard units	**6.37**	**6.07**	--	**6.58**	**5.42**	--	**5.67**
Specific Conductance	mmhos/cm	**60**	**0.44**	--	**0.524**	**0.4**	--	**1.699**
Turbidity	NTU	**125**	**2.27**	--	--	**130**	--	**12.4**
Dissolved Oxygen	mg/L	**0.2**	**2.99**	--	--	**0.3**	--	**1.4**
Temperature	deg C	**12.5**	**12.39**	--	**16.84**	**9.9**	--	**17.91**
ORP	mV	**64**	**293.5**	--	--	**-146**	--	**21.7**
DISSOLVED GASES								
Carbon dioxide	mg/L	**190**	--	--	--	**450**	--	**490**
Carbon monoxide	mg/L	<0.40	--	--	--	<0.40	--	<0.40
Ethane	ng/L	**490**	--	--	--	**130**	--	**110**
Ethene	ng/L	**3,000**	--	--	--	**2,300**	--	**7,900**
Methane	ug/L	**720**	--	--	--	**5,600**	--	**11,000**
Nitrogen	mg/L	**13**	--	--	--	**7.9**	--	**11**
Oxygen	mg/L	**0.72**	--	--	--	**0.63**	--	**0.42**

[1] Spring water sample
[2] Surface water sample
[•] Duplicate sample

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

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

Parameters	Sample ID: / Date:	GMMW-06 3/8/2004	GMMW-06 6/16/2004	PW-04 3/8/2004	PW-04 6/16/2004	PW-04* 6/16/2004	W-05 3/8/2004	W-05 6/17/2004
	UNITS							
METALS								
Iron	mg/L	--	--	--	--	--	--	--
Iron, Dissolved	mg/L	**2.28**	--	**0.207**	--	--	**21.5**	--
Manganese	mg/L	--	--	--	--	--	--	--
Manganese, Dissolved	mg/L	**3.62**	--	**0.00868**	--	--	**2.59**	--
GENERAL CHEMISTRY								
Bromide	mg/L	--	--	--	--	--	--	--
Chloride	mg/L	**34.6**	--	**173**	--	--	**44.2**	--
Nitrogen, Nitrate (As N)	mg/L	<0.1	--	**1.48**	--	--	<0.2	--
Nitrogen, Nitrite	mg/L	<0.1	--	<0.1	--	--	<0.2	--
Total Organic Carbon	mg/L	**21.3**	<20	<2.0	<2.0	<2.0	**7.96**	<2.0
Sulfate	mg/L	<1.0	--	**5.44**	--	--	**6.16**	--
Sulfide (field)	mg/L	--	**0.032**	**0.011**	**0.011**	**0.011**	--	**0.411**
Iron (field)	mg/L	--	--	--	--	--	--	--
FIELD PARAMETERS								
pH	Standard units	**6.73**	**6.11**	**5.91**	**5.56**	**5.56**	**6.64**	**5.72**
Specific Conductance	mmhos/cm	**0.12**	**0.941**	**80**	**0.738**	**0.738**	**0.11**	**0.645**
Turbidity	NTU	**170**	**27.5**	**80**	**7.11**	**7.11**	**110**	--
Dissolved Oxygen	mg/L	**0.3**	**0.46**	**1.9**	**2.41**	**2.41**	**0.3**	--
Temperature	deg C	**11.1**	**16.27**	**10.7**	**14.0**	**14.0**	**14.7**	**15.28**
ORP	mV	**-89**	**50.6**	**188**	**351.7**	**351.7**	**-141**	--
DISSOLVED GASES								
Carbon dioxide	mg/L	**160**	--	**180**	--	--	**160**	**210**
Carbon monoxide	mg/L	<0.40	--	<0.40	--	--	<0.40	<0.40
Ethane	ng/L	**800**	--	**45**	--	--	**36,000**	**32,000**
Ethene	ng/L	**84,000**	--	**110**	--	--	**12,000**	**21,000**
Methane	ug/L	**530**	--	**3.9**	--	--	**2,900**	**2,600**
Nitrogen	mg/L	**16**	--	**15**	--	--	**14**	**18**
Oxygen	mg/L	**0.85**	--	**3.5**	--	--	**0.79**	**0.57**

[1] Spring water sample
[2] Surface water sample
* Duplicate sample

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

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

Parameters	Sample ID: / Date:	W-16S 4/1/2003	W-16S 6/16/2004	IW-03 3/10/2004	IW-03 6/17/2004	IW-08 3/10/2004	IW-08 6/17/2004	IW-13 3/10/2004
	UNITS							
METALS								
Iron	mg/L	--	--	--	--	--	--	--
Iron, Dissolved	mg/L	--	--	--	--	--	--	--
Manganese	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	**3.49**	<2.0	**1,520**	**4,160**	**362**	**3,010**	**124**
Sulfate	mg/L	--	--	--	--	--	--	--
Sulfide (field)	mg/L	**0.03**	**0.008**	--	--	--	--	--
Iron (field)	mg/L	--	--	--	--	--	--	--
FIELD PARAMETERS								
pH	Standard units	**6.28**	**6.20**	**4.61**	**3.82**	**4.79**	**4.52**	**5.93**
Specific Conductance	mmhos/cm	**0.433**	**0.351**	**0.12**	**1.861**	**0.12**	**2.274**	**80**
Turbidity	NTU	**7.3**	**0.76**	**640**	--	**180**	--	**140**
Dissolved Oxygen	mg/L	**4.59**	**1.91**	**2.2**	**4.1**	**1.8**	**5.47**	**2.6**
Temperature	deg C	**6.9**	**12.72**	**8.9**	**12.6**	**9.0**	**13.07**	**9.0**
ORP	mV	**156.9**	**230.9**	**109**	**194.1**	**103**	**25.4**	**10**
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	--	--	--	--	--	--	--

[1] Spring water sample
[2] Surface water sample
[*] Duplicate sample

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

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

Parameters	Sample ID:	IW-14	SP-2[1]	SP-2[1]	SP-3[1]	SP-3[1]	SP-4[1]	SP-4[1]
	Date:	6/17/2004	12/16/2003	6/15/2004	12/16/2003	6/15/2004	12/16/2003	6/15/2004
	UNITS							
METALS								
Iron	mg/L	--	--	--	--	--	--	--
Iron, Dissolved	mg/L	--	--	--	--	--	--	--
Manganese	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	**332**	--	--	--	--	--	--
Sulfate	mg/L	--	--	--	--	--	--	--
Sulfide (field)	mg/L	--	--	--	--	--	--	--
Iron (field)	mg/L	--	--	--	--	--	--	--
FIELD PARAMETERS								
pH	Standard units	**4.76**	**7.54**	**6.43**	**7.29**	**7.02**	**6.63**	**6.60**
Specific Conductance	mmhos/cm	**0.642**	**0.072**	**0.008**	**0.048**	**0.138**	**0.753**	**0.798**
Turbidity	NTU	--	**>999**	--	**727**	--	--	--
Dissolved Oxygen	mg/L	--	**5.12**	**5.09**	**3.37**	**9.53**	**1.32**	**1.89**
Temperature	deg C	**13.0**	**2.11**	**12.8**	**1.76**	**12.96**	**4.70**	**14.24**
ORP	mV	--	**49**	**49.8**	**45**	**85.5**	**-49.9**	**-11.3**
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	--	--	--	--	--	--	--

1 Spring water sample
2 Surface water sample
* Duplicate sample

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

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

Parameters		Sample ID:	F-6[2]	F-6[2]	FB 6-16-04	FB 6-17-04
		Date:	3/9/2004	6/15/2004	6/16/2004	6/17/2004
	UNITS					
METALS						
Iron	mg/L		--	--	--	--
Iron, Dissolved	mg/L		--	--	--	--
Manganese	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		--	--	<2.0	<2.0
Sulfate	mg/L		--	--	--	--
Sulfide (field)	mg/L		--	--	--	--
Iron (field)	mg/L		--	--	--	--
FIELD PARAMETERS						
pH	Standard units		**7.02**	**6.98**	--	--
Specific Conductance	mmhos/cm		**90**	**0.147**	--	--
Turbidity	NTU		**>999**	**--**	--	--
Dissolved Oxygen	mg/L		**0.9**	**9.55**	--	--
Temperature	deg C		**5.8**	**13.71**	--	--
ORP	mV		**-113**	**167.7**	--	--
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		--	--	--	--

1 Spring water sample
2 Surface water sample
* Duplicate sample

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

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Table 4. PT System Operating Parameters, Operational Year 2, Quarter Number 3, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Date	Time Recorded	Air Stripper Measurements: Blower Discharge Pressure PI-301 (i.w.c.)	Air Stripper Measurements: Blower Effluent Flowrate (scfm)	Flow Measurements: Total Effluent Totalizer FQI-401 (gallons)	Flow Measurements: Water Bypass Totalizer FQI-402 (gallons)	Flow Measurements: GMPW-3 Totalizer FQI-101 (gallons)	Flow Measurements: GMPW-4 Totalizer FQI-102 (gallons)	Flow Measurements: GMPW-5 Totalizer FQI-103 (gallons)
3/9/2004	12:00 PM	9.5	192.3	662,290.0	604,530.0	329,893.0	146,803.0	198,573.0
6/15/2004	7:30 PM	9.4	598.0	724,225.5	655,519.0	343,638.0	168,801.0	226,932.0
		Average Daily Flowrate (gpm) =		**0.44**	**0.36**	**0.10**	**0.16**	**0.20**
		Total Groundwater Recovered During Reporting Period (gallons) =		**61,936**	**50,989**	**13,745**	**21,998**	**28,359**

Notes:

gpm	Gallons per minute.
i.w.c.	Inches of water column.
scfm	Standard cubic feet per minute.

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Table 5. Concentrations of Volatile Organic Compounds and Selected Metals Detected in Aqueous Samples Collected from the PT System, Operational Year 2, Quarter Number 3, Colesville Landfill, Broome County, New York[5,6].

Constituents	Model Technology BPJ Limits[1,2] (ug/L)	Sample ID: Date:	GMPW-3 6/15/04	GMPW-4 6/15/04	GMPW-5 6/15/04	TOTAL INFLUENT 6/15/04	TOTAL EFFLUENT AC 6/15/04
1,1,1-Trichloroethane	10-20		**64**	**140**	<1.0	**91**	<1.0
1,1,2-Trichloroethane	10		<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	10		**44**	**120**	<1.0	**70**	<1.0
1,1-Dichloroethene	10		**3.0**	**6.7**	<1.0	**4.2**	<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		**4.9**	**9.7**	<1.0	**6.2**	<1.0
Chlorobenzene	NA		<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	NA		**12**	**38**	<1.0	**21**	<1.0
Chloroform	NA		<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	10		**72**	**170**	<1.0	**110**	<1.0
Dichlorodifluoromethane	NA		<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride	10-50		**6.8**	**13**	<1.0	**8.3**	<1.0
Naphthalene	10		<1.0	<1.0	<1.0	<1.0	<1.0
o-Xylene	5		<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	10		<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	5		<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	10-50		<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	10		**38**	**120**	<1.0	**66**	<1.0
Vinyl Chloride	10-50		**9.2**	**27**	<1.0	**15**	<1.0
Total VOCs			**253.9**	**644.4**	**0.0**	**391.7**	**0.0**
Metals (units in mg/L)	Model Technology BPJ Limits[3,4] (mg/L)						
Total Iron	1.2 / 0.61		**3.97**	**1.69**	**0.719**	**2.08**	**0.794**

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 2, Quarter Number 3, Colesville Landfill, Broome County, New York[5,6].

Notes:

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

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

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Table 6. PT System Mass Removal Rate of Volatile Organic Compounds, Operational Year 2, Quarter Number 3, 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)
3/10/2004	324.0	662,290	NA	NA	NA
6/15/2004	391.7	724,225	61,935	356.2	0.18
			Total Estimated Mass Removed During Operational Year 2, Quarter Number 3 (lbs) =		**0.18**
			Total Estimated Mass Removed Since System Startup (lbs) =		**1.00**

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).

Table 7. Concentrations of Volatile Organic Compounds Detected in Air Stripper Effluent, Operational Year 2, Quarter Number 3, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Compounds	CAS Numbers	Sample ID: Effluent Date Sampled: 6/15/2004 ppbv
Vinyl Chloride	75-01-4	<11
Chloroethane(Ethyl Chloride)	75-00-3	<11
1,1-Dichloroethene(Vinylidene Chloride)	75-35-4	<11
Methylene Chloride(Dichloromethane)	75-09-2	<11
1,1-Dichloroethane	75-34-3	<11
cis-1,2-Dichloroethylene	156-59-2	<11
Chloroform	67-66-3	<11
1,1,1-Trichloroethane(Methyl Chloroform)	71-55-6	<11
Benzene	71-43-2	<11
Trichloroethene	79-01-6	<11
Toluene	108-88-3	<11
Ethyl benzene	100-41-4	<11
m,p-Xylene	108-38-3/106-42-3	<11
o-Xylene	95-47-6	<11
1,2,4-Trimethylbenzene	95-63-6	<11
2-Propanol (Isopropyl alcohol)	67-63-0	<11
Dichlorodifluoromethane(Freon 12)	75-71-8	<11

ppbv: parts per billion by volume

Notes/Assumptions:

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

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Table 8. Concentrations of Volatile Organic Compounds Detected in Aqueous Samples Collected from the SP-5 Spring Water Remediation System, Operational Year 2, Quarter Number 3, Colesville Landfill, Broome County, New York.

Constituents	Model Technology BPJ Limits[1,2] (ug/L)	Sample ID: Date:	SP-5 INFLUENT 6/15/04	SP-5 EFFLUENT 6/15/04
VOCs (units in ug/L)				
1,1,1-Trichloroethane	10		<1	<1.0
1,1-Dichloroethane	10		**27**	<1.0
1,2-Dichloroethane	10-100		<1	<1.0
Benzene	5		**3**	<1.0
Chlorobenzene	10-25		**55**	<1.0
Chloroethane	10		**12**	**5.7**
cis-1,2-Dichloroethene	10		**2.7**	<1.0
Ethylbenzene	5		<1	<1.0
Toluene	5		<1	<1.0
trans-1,2-Dichloroethene	10-100		<1	<1.0
Trichloroethene	10		**1.4**	<1.0
Vinyl Chloride	10		<1	<1.0
Total VOCs			**101.1**	**5.7**

Bold Constituent detected above MDL.

ug/L Micrograms per liter.

VOCs Volatile organic compounds.

< Analyte below detection limit.

Notes:

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

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Table 9. Spring Water Remediation System Mass Removal Rate of Volatile Organic Compounds, Operational Year 2, Quarter Number 3, 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)
3/10/2004	96.0	0.352	0.19	NA	NA	NA
6/15/2004	101.1	0.396	0.19	55,313	98.5	0.05
					Total Estimated Mass Removed During Quarter (lbs) =	**0.05**
					Total Estimated Mass Removed Since System Startup (lbs) =	**0.10**
					Total Effluent Treated to Date (gallons) =	**128,605**

Notes:

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

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

Appendix A

Water-Level Measurement and Groundwater Sampling Logs.

Water Level Record

Project NYD00949.0017.0003A

Date 6/15/04

Well (s)	Depth to Water (ft)	Time	Remarks
W-18	13.44		Top of steel casing
W-20-S	11.25		TOP OF PVC
W-14-S	~~[illegible]~~ 10.20		TOP OF PVC
W-14-D	9.26		TOP OF PVC
W-17-S	11.57		TOP OF PVC — top of steel casing
W-16-S	11.12 [illegible]	11.17	~~TOP OF PVC (PVC is cracked) (2" no tube)~~
W-3	9.07 [illegible]		Stickup broke (TOP OF PVC)
PW-4	18.00		TOP OF PVC
PW-5	0.00		TOP OF PVC
GMMW-2	37.51		TOP OF PVC
W-6	49.73		TOP OF PVC
W-7	42.82		TOP OF PVC
PW-13	60.08		TOP OF PVC
W-13	~~[illegible]~~ 46.42		TOP OF PVC
PW-10	37.86		TOP OF PVC
PW-7	36.62		TOP OF PVC
GMMW-6	40.01		TOP OF PVC
GMMW-5	49.27		Top of PVC
W-5	52.18		Top of PVC

ARCADIS GERAGHTY & MILLER
Low-Flow Groundwater Sampling Log

Project Number: NY000947.0019 **Task:** 0005A **Well ID:** PW-4

Date: 6/16/04 **Sampled By:** KT FM

Sampling Time: 12:16 **Recorded By:** KT FM

Weather: Sunny 75 **Coded Replicate No.:** Rep 6.16.04

WELL IMFORMATION

Casing Material: PVC **Purge Method:** Redi Flo

Casing Diameter: 2" **Purge Rate:** 350 ml/min

Total Depth: **Total Volume Purged:**

Depth to Water: 17.96 **Pump Intake Depth**

Water Column: **Pump on:** 11:43 **Off:** 12:20

Gallons/Foot: **Parameters Sampled:** VOC . TOC

Gallons in Well:

FIELD PARAMETER MEASUREMENTS

Time	Rate ml./min)	Gallons Purged	Turbidity (NTUs)	REDOX (mV)	pH (SI Units	Conductivity (umhos/cm)	Temp (°C)	Depth to Water.	Diss. Oxygen	Comments
11:45	350		[illegible] 200	270.9	5.54	658	11.39	17.96	4.66	
11:50			90.5	358.5	5.34	674	11.79		3.98	
11:55			51.5	371.7	5.36	704	12.79		3.15	
12:00			25.1	362.3	5.47	734	13.48	18.93	2.58	
12:05			10.25	355.7	5.51	740	13.67		2.57	
12:10			8.84	353.0	5.55	739	13.98		2.43	
12:15			7.11	351.7	5.56	738	14.00	18.97	2.41	
			S² 0.011							

Well Secure: yes, PID = 0.0 **Purge Water Disposal:**

Color: clear, colorless, odorless **Turbidity(qualitative):**

ARCADIS GERAGHTY & MILLER
Low-Flow Groundwater Sampling Log

Project Number: NY000949.0019 Task: 0003A Well ID: GMMW-2
Date: 6/16/04 Sampled By: KT FM
Sampling Time: 11:11 Recorded By: KT FM
Weather: Sunny, 75 Coded Replicate No.:

WELL INFORMATION

Casing Material: PVC Purge Method: reduced flow
Casing Diameter: 2" Purge Rate: 500 ml/min
Total Depth: 60' Total Volume Purged:
Depth to Water: 37' Pump Intake Depth
Water Column: Pump on: 10:36 Off: 11:15
Gallons/Foot: Parameters Sampled: VOC, TOC
Gallons in Well:

FIELD PARAMETER MEASUREMENTS

Time	Rate ml./min)	Gallons Purged.	Turbidity (NTUs)	REDOX (mV)	pH (SI Units)	Conductivity (µmhos/cm)	Temp (°C)	Depth to Water.	Diss. Oxygen.	Comments
10:40	500			150.9	6.40	421	10.51		1.81	
10:45	↓		97.7	235.3	6.11	404	11.90		1.86	
10:50	↓		63.2	259.8	6.15	435	12.44	43.53	3.15	
10:55	↓		19.9	271.2	6.12	441	12.48		3.42	
11:00	↓		5.26	282.8	6.11	441	12.42	43.53	3.20	
11:05	↓		3.11	290.0	6.07	440	12.39		3.05	
11:10	↓		2.27	293.5	6.07	440	12.39	43.53	2.99	
			S=0.031							

Well Secure: Yes PID=0.0 Purge Water Disposal:
Color: clear colorless odorless Turbidity(qualitative):

ARCADIS GERAGHTY & MILLER

Water Sampling Log

Project _____ Project No. _____ Page 1 of _____

Site Location _____ Date 6/17/04

Site/Well No. GMW-4 Replicate No. _____ Code No. _____

Weather _____ Sampling Time: Begin _____ End _____

Evacuation Data

Measuring Point _____

MP Elevation (ft) _____

Land Surface Elevation (ft) _____

Sounded Well Depth (ft bmp) _____

Depth to Water (ft bmp) _____

Water-Level Elevation (ft) _____

Water Column in Well (ft) _____

Casing Diameter/Type _____

Gallons in Well _____

Gallons Pumped/Bailed Prior to Sampling _____

Sample Pump Intake Setting (ft bmp) _____

Purge Time begin _____ end _____

Pumping Rate (gpm) _____

Evacuation Method _____

Field Parameters

Color _____

Odor _____

Appearance _____

pH (s.u.) 6.58

Conductivity (mS/cm) 524

(µmhos/cm) _____

Turbidity (NTU) _____

Temperature (°C) 16.84

Dissolved Oxygen (mg/L) _____

Salinity (%) _____

Sampling Method _____

Remarks _____

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel _____

Well Casing Volumes

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

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

ARCADIS GERAGHTY & MILLER
Low-Flow Groundwater Sampling Log

Project Number: NY000949.0017 Task: 00034 Well ID: GMW-5
Date: 6/17/04 Sampled By: KT FM
Sampling Time: 9:21 Recorded By: KT FM
Weather: rain, 70 Coded Replicate No.:

WELL IMFORMATION

Casing Material: PVC Purge Method: redi Flow
Casing Diameter: 2" Purge Rate: 300 ml/min
Total Depth: 65' Total Volume Purged:
Depth to Water: 47.04 Pump Intake Depth
Water Column: Pump on: 8:48 Off:
Gallons/Foot: Parameters Sampled: VOC, TOC, Bromide, Permanent gases
Gallons in Well:

FIELD PARAMETER MEASUREMENTS

Time	Rate ml./min)	Gallons Purged	Turbidity (NTUs)	REDOX (mV)	pH (SI Units	Conductivity (µmhos/cm)	Temp (°C)	Depth to Water.	Diss. Oxygen	Comments
8:50	300		25.2	8.1	5.77	1232	14.21	47.04	1.58	
9:55			14.5	6.9	5.74	1363	16.72		1.17	
9:00			19.0	13.5	5.65	1701	16.56	51.95	1.36	
9:05			16.8	20.5	5.60	1785	17.19	52.40	1.30	
9:10			12.5	23.1	5.62	1769	17.37	52.06	1.26	
9:15			12.4	21.9	5.65	1716	17.94		1.12	
9:20	↓		12.4	21.7	5.67	1699	17.91	54.70	1.40	
			S^{2-}							
			.227							

Well Secure: Yes, DTP = 0.0 Purge Water Disposal:
Color: Cloudy, small sediment, brown-yellow Turbidity(qualitative):

ARCADIS GERAGHTY & MILLER
Low-Flow Groundwater Sampling Log

Project Number: NY000948.0017 Task: 0003A Well ID: GrnMW-6
Date: 6/16/04 Sampled By: KT FM
Sampling Time: 2:01 Recorded By: KT FM
Weather: Sunny, 75 Coded Replicate No.: MS/MSD

WELL IMFORMATION

Casing Material: pvc Purge Method: redflo
Casing Diameter: 2" Purge Rate: 350
Total Depth: 50' Total Volume Purged:
Depth to Water: 39.05 Pump Intake Depth
Water Column: Pump on: 1:20 Off: 2:05
Gallons/Foot: Parameters Sampled: VOC, TOC
Gallons in Well:

FIELD PARAMETER MEASUREMENTS

Time	Rate mL/min)	Gallons Purged	Turbidity (NTUs)	REDOX (mV)	pH (SI Units	Conductivity (µmhos/cm)	Temp (°C)	Depth to Water	Diss. Oxygen	Comments
1:30			>200	145.5	6.09	988	14.65	39.05	3.11	
1:35			>200	113.7	5.90	983	14.64		.74	
1:40			100.9	114.8	5.89	987	14.61		.46	
1:45			78.7	84.6	5.96	1013	15.60	4500	.42	
1:50			48.5	76.6	6.01	1025	16.02	44.80	.41	
1:55			33.8	118.4	6.05	964	15.47		.40	
2:00			27.5	50.6	6.11	941	16.27	45.2	.46	
			S2- 0.037							

Well Secure: Yes, PID = 0.0 Purge Water Disposal:
Color: Clear, colorless, slight Turbidity(qualitative):

ARCADIS GERAGHTY & MILLER

Water Sampling Log

Project: NY000949.0017.00014 | Project No. _____ | Page 1 of _____

Site Location: Colesville, NY | Date: 6/17/01

Site/Well No.: W-5 | Replicate No. _____ | Code No. _____

Weather: rain, 65 | Sampling Time: Begin _____ End _____

Evacuation Data

Measuring Point	
MP Elevation (ft)	
Land Surface Elevation (ft)	
Sounded Well Depth (ft bmp)	61.5'
Depth to Water (ft bmp)	52.18'
Water-Level Elevation (ft)	
Water Column in Well (ft)	9.32
Casing Diameter/Type	2" (.16)
Gallons in Well	1.49
Gallons Pumped/Bailed Prior to Sampling	4.47
Sample Pump Intake Setting (ft bmp)	
Purge Time	begin _____ end _____
Pumping Rate (gpm)	
Evacuation Method	

Field Parameters

Field Parameters	I	IV	2V	3V
Color				brown/black
Odor				odorless
Appearance				turbid
pH (s.u.)	6.06	6.03	5.67	5.72
Conductivity (mS/cm)	.166	164	578	645
(µmhos/cm)				
Turbidity (NTU)				
Temperature (°C)	13.90	11.51	14.18	15.24
Dissolved Oxygen (mg/L)				
~~Salinity (%)~~ Turb				

Sampling Method: _____

Remarks: S² - 0.411

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel: KT / FM

Well Casing Volumes

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

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

ARCADIS GERAGHTY & MILLER

Low-Flow Groundwater Sampling Log

Project Number: ______ Task: ______ Well ID: W-16S

Date: 6/16/04 Sampled By: KT FM

Sampling Time: 9:46 Recorded By: KT FM

Weather: sunny, 75 Coded Replicate No.: ______

WELL IMFORMATION

Casing Material: [illegible] Purge Method: redi flo

Casing Diameter: 2" Purge Rate: 450 ml/min

Total Depth: 22' Total Volume Purged: ______

Depth to Water: 11.17 Pump Intake Depth ______

Water Column: ______ Pump on: 9:08 Off: 9:49

Gallons/Foot: ______ Parameters Sampled: VOC, TOC

Gallons In Well: ______

FIELD PARAMETER MEASUREMENTS

Time	Rate ml./min)	Gallons Purged.	Turbidity (NTUs)	REDOX (mV) ORP	pH (SI Units	Conductivity (μmhos/cm) ms/cm	Temp (°C)	Depth to Water.	Diss. Oxygen. mg/L	Comments
9:10	450			129.0	6.17	335	11.40	–	0.52	
9:15	↓			94.6	6.17	338	12.0	–	0.43	
9:20	350			84.7	6.20	338	12.59	–	.72	
9:25	│			130.6	6.21	340	12.39	–	2.36	
9:30	│			175.3	6.23	346	12.46	–	2.67	
9:35	│			202.8	6.21	350	12.70	–	2.50	
9:40	│			220.7	6.20	351	12.76	–	2.13	
9:45	↓		0.76	230.9	6.20	351	12.72		1.91	
			5?5.008							

Well Secure: yes pin = 0.0 Purge Water Disposal: ______

Color: [illegible] Turbidity(qualitative): ______

ARCADIS GERAGHTY & MILLER

Water Sampling Log

Project: Celesville, NY | Project No. _____ | Page 1 of _____

Site Location _____ | Date _____

Site/Well No.: GM Piv-1 | Replicate No. _____ | Code No. _____

Weather _____ | Sampling Time: Begin _____ End _____

Evacuation Data

Measuring Point _____

MP Elevation (ft) _____

Land Surface Elevation (ft) _____

Sounded Well Depth (ft bmp) _____

Depth to Water (ft bmp) _____

Water-Level Elevation (ft) _____

Water Column in Well (ft) _____

Casing Diameter/Type _____

Gallons in Well _____

Gallons Pumped/Bailed Prior to Sampling _____

Sample Pump Intake Setting (ft bmp) _____

Purge Time begin _____ end _____

Pumping Rate (gpm) _____

Evacuation Method _____

Field Parameters

Color _____

Odor _____

Appearance _____

pH (s.u.) 6.80

Conductivity (mS/cm) 350

(µmhos/cm) _____

Turbidity (NTU) _____

Temperature (°C) 16.63

Dissolved Oxygen (mg/L) _____

Salinity (%) _____

Sampling Method _____

Remarks _____

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel _____

Well Casing Volumes

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

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

ARCADIS GERAGHTY & MILLER

Water Sampling Log

Project _____ Project No. _____ Page 1 of _____

Site Location _____ Date 6/15/04

Site/Well No. F-6 Replicate No. _____ Code No. _____

Weather _____ Sampling Time: Begin _____ End _____

Evacuation Data

Measuring Point _____

MP Elevation (ft) _____

Land Surface Elevation (ft) _____

Sounded Well Depth (ft bmp) _____

Depth to Water (ft bmp) _____

Water-Level Elevation (ft) _____

Water Column in Well (ft) _____

Casing Diameter/Type _____

Gallons in Well _____

Gallons Pumped/Bailed Prior to Sampling _____

Sample Pump Intake Setting (ft bmp) _____

Purge Time begin _____ end _____

Pumping Rate (gpm) _____

Evacuation Method _____

Field Parameters

Color _____

Odor _____

Appearance _____

pH (s.u.) 6.98

Conductivity (mS/cm) .147

ORP (µmhos/cm) 167.7

Turbidity (NTU) _____

Temperature (°C) 13.71

Dissolved Oxygen (mg/L) 9.55

Salinity (%) _____

Sampling Method _____

Remarks _____

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel _____

Well Casing Volumes

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

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

ARCADIS GERAGHTY & MILLER

Water Sampling Log

Project _____ Project No. _____ Page 1 of _____

Site Location _____ Date 6/15/04

Site/Well No. SP-2 Replicate No. _____ Code No. _____

Weather _____ Sampling Time: Begin _____ End _____

Evacuation Data

Measuring Point _____

MP Elevation (ft) _____

Land Surface Elevation (ft) _____

Sounded Well Depth (ft bmp) _____

Depth to Water (ft bmp) _____

Water-Level Elevation (ft) _____

Water Column in Well (ft) _____

Casing Diameter/Type _____

Gallons in Well _____

Gallons Pumped/Bailed Prior to Sampling _____

Sample Pump Intake Setting (ft bmp) _____

Purge Time begin _____ end _____

Pumping Rate (gpm) _____

Evacuation Method _____

Field Parameters

Color _____

Odor _____

Appearance _____

pH (s.u.) 6.43

Conductivity (~~mS/cm~~) 0.008

ORP (~~µmhos/cm~~) 49.8

Turbidity (NTU) _____

Temperature (°C) 12.80

Dissolved Oxygen (mg/L) 5.09

Salinity (%) _____

Sampling Method _____

Remarks Spring flowing from side of hill (location of sample collection)

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel KT / JH

Well Casing Volumes (Gal./Ft.)

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

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

ARCADIS GERAGHTY & MILLER

Water Sampling Log

Project _____ Project No. _____ Page 1 of _____

Site Location _____ Date 6/15/04

Site/Well No. SP-3 Replicate No. _____ Code No. _____

Weather _____ Sampling Time: Begin _____ End _____

Evacuation Data

Measuring Point _____

MP Elevation (ft) _____

Land Surface Elevation (ft) _____

Sounded Well Depth (ft bmp) _____

Depth to Water (ft bmp) _____

Water-Level Elevation (ft) _____

Water Column in Well (ft) _____

Casing Diameter/Type _____

Gallons in Well _____

Gallons Pumped/Bailed Prior to Sampling _____

Sample Pump Intake Setting (ft bmp) _____

Purge Time begin _____ end _____

Pumping Rate (gpm) _____

Evacuation Method _____

Field Parameters

Color _____

Odor _____

Appearance _____

pH (s.u.) 7.02

Conductivity (mS/cm) 0.138

ORP (µmhos/cm) 85.5

Turbidity (NTU) _____

Temperature (°C) 12.96

Dissolved Oxygen (mg/L) 9.53

Salinity (%) _____

Sampling Method _____

Remarks _____

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel _____

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		Project No.		Page	1 of
Site Location				Date	6/15/04
Site/Well No.	SP-4	Replicate No.		Code No.	
Weather		Sampling Time:	Begin	End	

Evacuation Data		Field Parameters	
Measuring Point		Color	
MP Elevation (ft)		Odor	
Land Surface Elevation (ft)		Appearance	
Sounded Well Depth (ft bmp)		pH (s.u.)	6.60
Depth to Water (ft bmp)		Conductivity (mS/cm)	0.798
Water-Level Elevation (ft)		ORP ~~(µmhos/cm)~~	-11.3
Water Column in Well (ft)		Turbidity (NTU)	
Casing Diameter/Type		Temperature (°C)	14.24
Gallons in Well		Dissolved Oxygen (mg/L)	1.89
Gallons Pumped/Bailed Prior to Sampling		Salinity (%)	
Sample Pump Intake Setting (ft bmp)		Sampling Method	
Purge Time	begin ____ end ____	Remarks	2.6 stream gauge
Pumping Rate (gpm)			
Evacuation Method			

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel ____________________

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

ARCADIS GERAGHTY & MILLER

Water Sampling Log

Project _____ Project No. _____ Page 1 of _____

Site Location _____ Date 6/15/04

Site/Well No. SP-5 Replicate No. _____ Code No. _____

Weather _____ Sampling Time: Begin _____ End _____

Evacuation Data

Measuring Point _____

MP Elevation (ft) _____

Land Surface Elevation (ft) _____

Sounded Well Depth (ft bmp) _____

Depth to Water (ft bmp) _____

Water-Level Elevation (ft) _____

Water Column in Well (ft) _____

Casing Diameter/Type _____

Gallons in Well _____

Gallons Pumped/Bailed Prior to Sampling _____

Sample Pump Intake Setting (ft bmp) _____

Purge Time begin _____ end _____

Pumping Rate (gpm) _____

Evacuation Method _____

Field Parameters

Color _____

Odor _____

Appearance _____

~~pH (s.u.)~~ influent 2.25"

~~Conductivity~~ (mS/cm) effluent 100ml/45

(µmhos/cm) Used discharge pipe

~~Turbidity (NTU)~~ → orange floc on

Temperature (°C) top

Dissolved Oxygen (mg/L) _____

Salinity (%) _____

Sampling Method 1 gallon x 100 ml x 60 sec

Remarks 3785 ml 4 sec min

= 0.396 gal/~~min~~.

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel _____

Well Casing Volumes

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

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

ARCADIS GERAGHTY & MILLER

Water Sampling Log

Project _____ Project No. _____ Page 1 of _____

Site Location _____ Date 6/17/04

Site/Well No. IW-3 Replicate No. _____ Code No. _____

Weather _____ Sampling Time: Begin _____ End _____

Evacuation Data

Measuring Point _____

MP Elevation (ft) _____

Land Surface Elevation (ft) _____

Sounded Well Depth (ft bmp) _____

Depth to Water (ft bmp) _____

Water-Level Elevation (ft) _____

Water Column in Well (ft) _____

Casing Diameter/Type _____

Gallons in Well _____

Gallons Pumped/Bailed Prior to Sampling _____

Sample Pump Intake Setting (ft bmp) _____

Purge Time begin _____ end _____

Pumping Rate (gpm) _____

Evacuation Method _____

Field Parameters

Color _____

Odor _____

Appearance _____

pH (s.u.) 3.82

Conductivity (mS/cm) 1861

ORP (µmhos/cm) 199.1

Turbidity (NTU) _____

Temperature (°C) 12.60

Dissolved Oxygen (mg/L) 7.10

Salinity (%) _____

Sampling Method _____

Remarks _____

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel _____

Well Casing Volumes

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

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

ARCADIS GERAGHTY & MILLER

Water Sampling Log

Project _____ Project No. _____ Page 1 of _____

Site Location _____ Date 6/17/04

Site/Well No. IW-8 Replicate No. _____ Code No. _____

Weather _____ Sampling Time: Begin _____ End _____

Evacuation Data

Measuring Point _____

MP Elevation (ft) _____

Land Surface Elevation (ft) _____

Sounded Well Depth (ft bmp) _____

Depth to Water (ft bmp) _____

Water-Level Elevation (ft) _____

Water Column in Well (ft) _____

Casing Diameter/Type _____

Gallons in Well _____

Gallons Pumped/Bailed Prior to Sampling _____

Sample Pump Intake Setting (ft bmp) _____

Purge Time begin _____ end _____

Pumping Rate (gpm) _____

Evacuation Method _____

Field Parameters

Color _____

Odor _____

Appearance _____

pH (s.u.) 4.52

Conductivity (mS/cm) 1.271

OR ~~(umhos/cm)~~ 25.4

Turbidity (NTU) _____

Temperature (°C) 13.07

Dissolved Oxygen (mg/L) 5.47

Salinity (%) _____

Sampling Method _____

Remarks * took 10 bailers, then took sample

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel KT

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 _____ Project No. _____ Page 1 of _____

Site Location _____ Date 6/17/07

Site/Well No. IW-14 Replicate No. _____ Code No. _____

Weather _____ Sampling Time: Begin _____ End _____

Evacuation Data

Measuring Point _____

MP Elevation (ft) _____

Land Surface Elevation (ft) _____

Sounded Well Depth (ft bmp) _____

Depth to Water (ft bmp) _____

Water-Level Elevation (ft) _____

Water Column in Well (ft) _____

Casing Diameter/Type _____

Gallons in Well _____

Gallons Pumped/Bailed Prior to Sampling _____

Sample Pump Intake Setting (ft bmp) _____

Purge Time begin _____ end _____

Pumping Rate (gpm) _____

Evacuation Method _____

Field Parameters

Color _____

Odor _____

Appearance _____

pH (s.u.) 4.76

Conductivity (mS/cm) 642

(µmhos/cm) _____

Turbidity (NTU) _____

Temperature (°C) 13.03

Dissolved Oxygen (mg/L) _____

Salinity (%) _____

Sampling Method _____

Remarks X took 10 bailers, then took sample

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel KT

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

Parameters for 6/15/2004 Sampling Event				
Discharge Temperature		T	523.67	°R
Ambient Temperature		Ta	523.67	°R
Stack Diameter		D	6	in
Stack Radius		R	0.25	ft
Stack Area		A	0.20	ft^2
Exit Velocity		V	50.37	fps
Exit Flow		Q	593	acfm
Exit Flow		Q	598	scfm
Stack Height		h_s	17	ft
Building Height		h_b	13.25	ft
Ratio of Heights		h_s/h_b	1.28	
Plume rise credit? $h_s/h_b > 1.5$?		(If no, $h_e=h_s$)	(If Yes, $h_e = h_s + 1.1 (F_m)^{1/3}$)	
Momentum Flux	Fm = Ta/T * V2 * R2		n/a	ft^4/s^2
Effective Stack Height		h_e	17.0	ft
Reduction Factor? $2.5 > h_s/h_b > 1.5$?			No, do not reduce impact	
Actual Annual Impact		C_a	$RF*6*Q_a/h_e^{2.25}$	
Mass Flow		Q_a	S lbs emitted for last 12 months	

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

Notes/Assumptions:

1. The stack discharge temperature is 64°F based on recorded parameters.
2. The ambient temperature is approximately 64°F, the average temperature for June 15.
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.

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

Calculation of the Short-Term Guideline Concentration (SGC) for Sampling Event on 6/15/2004

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	11	*	28.58	6.40E-05	0.0109	0.71117	4.0E-04
Chloroethane(Ethyl Chloride)	75-00-3	--	11	*	29.50	6.61E-05	0.0113	0.73415	NA
1,1-Dichloroethene(Vinylidene Chloride)	75-35-4	--	11	*	44.33	9.93E-05	0.0170	1.10317	NA
Methylene Chloride(Dichloromethane)	75-09-2	14,000	11	*	38.84	8.70E-05	0.0149	0.96651	6.9E-03
1,1-Dichloroethane	75-34-3	--	11	*	45.26	1.01E-04	0.0173	1.12615	NA
cis-1,2 - Dichloroethylene	156-59-2	--	11	*	44.33	9.93E-05	0.0170	1.10317	NA
1,1,1-Trichloroethane(Methyl Chloroform)	71-55-6	68,000	11	*	61.01	1.37E-04	0.0234	1.51815	2.2E-03
Trichloroethene	79-01-6	54,000	11	*	60.09	1.35E-04	0.0230	1.49516	2.8E-03
Dichlorofluoromethane(Freon 12)	75-71-8	--	11	*	55.29	1.24E-04	0.0212	1.37569	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 2, Quarter Number 3, Colesville Landfill, Broome County, New York.

Calculation of AGC based on 6/15/2004 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	11	*	28.58	6.40E-05	0.55649	**5.17**
Chloroethane(Ethyl Chloride)	75-00-3	10,000	978,044.97	11	*	29.50	6.61E-05	0.57447	**0.00**
1,1-Dichloroethene(Vinylidene Chloride)	75-35-4	70.00	6,846.31	11	*	44.33	9.93E-05	0.86322	**0.01**
Methylene Chloride(Dichloromethane)	75-09-2	2.10	205.39	11	*	38.84	8.70E-05	0.75629	**0.37**
1,1-Dichloroethane	75-34-3	1	61.62	11	*	45.26	1.01E-04	0.88121	**1.43**
cis-1,2 - Dichloroethylene	156-59-2	1,900	185,828.54	11	*	44.33	9.93E-05	0.86322	**0.00**
1,1,1-Trichloroethane(Methyl Chloroform)	71-55-6	1,000	97,804.50	11	*	61.01	1.37E-04	1.18794	**0.00**
Trichloroethene	79-01-6	0.50	48.90	11	*	60.09	1.35E-04	1.16996	**2.39**
Dichlorodifluoromethane(Freon 12)	75-71-8	12,000	1,173,653.96	11	*	27.48	6.16E-05	0.53512	**0.00**

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

Notes/Assumptions:

1. The stack discharge temperature is 64°F based on recorded parameters.
2. The ambient temperature is approximately 64°F, the average temperature for June 15.
3. Calculations assume that the system will run with the maximum allowable concentrations between quarterly readings.
4. AGC refers to the Annual Guideline Concentration as determined using the hand calculations in the DAR-1 AGC/SGC Tables dated December 22, 2003.
5. To be conservative the lower detection limit was used for compounds that were below the limit of detection, but are found in the influent groundwater of the Groundwater Remediation System.

Appendix C

Automated Reagent Injection
System Operating Parameters

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Table C-1. Automated Reagent Injection System Summary of Operational Year 2, Quarter Number 3 Injection Quantities, Groundwater Remediation System, Colesville Landfill, Broome County, New York.

Summary of Automated Reagant Injections

Date	Total Quantity of Molasses Solution Injected (gal.)	Total Quantity of Molasses Injected (gal.)	Total Quantity of Rinse Water Injected (gal.)
3/12/2004	1760	176	0
3/23/2004	960	96	157
4/9/2004	2720	272	157
5/14/2004	1600	160	0
5/27/2004	1120	112	157
Quarter Totals (gal.) =	**8,160**	**816**	**471**
Totals Since Startup (gal.) =	**47,184**	**5,961**	**6,268**

Notes:

gal. Gallons

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

Injection Number 40a

Injection Date = 3/12/2004

Molasses to Water Ratio (%) = 10.0

Programmed Mixing Time (min.)[1] = 60

Injection Well ID	Molasses Solution Injection Quantity (gal.)	Rinse[2] Quantity (gal.)	Raw Molasses Per Well (gal.)	Min. Injection Flowrate (gpm)	Max. Injection Pressure (psi)
PW-6	NM	NM	NM	NM	NM
IW-3	NM	NM	NM	NM	NM
IW-1	NM	NM	NM	NM	NM
IW-2	NM	NM	NM	NM	NM
GMMW-1	NM	NM	NM	NM	NM
IW-4	NM	NM	NM	NM	NM
IW-5	160	0	16.0	12	23
IW-6	160	0	16.0	12	27
IW-7	160	0	16.0	0	28
IW-8	160	0	16.0	17	28
IW-9	160	0	16.0	17	26
IW-10	160	0	16.0	0	27
IW-11	160	0	16.0	19	28
IW-12	160	0	16.0	13	32
IW-13	160	0	16.0	0	33
IW-14	160	0	16.0	8	32
IW-15	160	0	16.0	0	33
Totals (gal.) =	1760	0	176.0	NA	NA

Notes:

gal.	Gallons.
min.	Minutes.
i.w.c.	Inches of water column.
psi	Pounds per square inch.
gpm	Gallons per minute.
NA	Not applicable.
NM	Not measured.
1.	Programmed mixing time is calculated from the expiration time of the molasses injection countdown timer to the startup of transfer pump TP-900 during an injection sequence or from the end of transfer pump TP-600 operation to the restart of an injection during a mixing sequence.
2.	Rinse quantity is approximately 1-pipeline volume for each injection well.
3.	Molasses solution injected manually.
4.	Parameters not recorded by system.

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

Injection Number 40b

Injection Date = 3/23/2004

Molasses to Water Ratio (%) = 10.0 Programmed Mixing Time (min.)[1] = 60

Injection Well ID	Molasses Solution Injection Quantity (gal.)	Rinse[2] Quantity (gal.)	Raw Molasses Per Well (gal.)	Min. Injection Flowrate (gpm)	Max. Injection Pressure (psi)
PW-6[4]	160	5	16.0	NM	NM
IW-3[4]	160	5	16.0	NM	NM
IW-1[3,4]	160	4	16.0	NM	NM
IW-2[3,4]	160	3	16.0	NM	NM
GMMW-1[3,4]	160	3	16.0	NM	NM
IW-4[3,4]	160	4	16.0	NM	NM
IW-5	NM	5	NM	NM	NM
IW-6	NM	7	NM	NM	NM
IW-7	NM	8	NM	NM	NM
IW-8	NM	9	NM	NM	NM
IW-9	NM	11	NM	NM	NM
IW-10	NM	12	NM	NM	NM
IW-11	NM	13	NM	NM	NM
IW-12	NM	15	NM	NM	NM
IW-13	NM	16	NM	NM	NM
IW-14	NM	18	NM	NM	NM
IW-15	NM	19	NM	NM	NM
Totals (gal.) =	960	157	96.0	NA	NA

Notes:

gal. Gallons.
min. Minutes.
i.w.c. Inches of water column.
psi Pounds per square inch.
gpm Gallons per minute.
NA Not applicable.
NM Not measured.
1. Programmed mixing time is calculated from the expiration time of the molasses injection countdown timer to the startup of transfer pump TP-900 during an injection sequence or from the end of transfer pump TP-600 operation to the restart of an injection during a mixing sequence.
2. Rinse quantity is approximately 1-pipeline volume for each injection well.
3. Molasses solution injected manually.
4. Parameters not recorded by system.

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

Injection Number 41

Injection Date = 4/9/2004

Molasses to Water Ratio (%) = 10.0 Programmed Mixing Time (min.)[1] = 60

Injection Well ID	Molasses Solution Injection Quantity (gal.)	Rinse[2] Quantity (gal.)	Raw Molasses Per Well (gal.)	Min. Injection Flowrate (gpm)	Max. Injection Pressure (psi)
PW-6[4]	160	5	16.0	NM	NM
IW-3[4]	160	5	16.0	NM	NM
IW-1[4]	160	4	16.0	NM	NM
IW-2[4]	160	3	16.0	NM	NM
GMMW-1[4]	160	3	16.0	NM	NM
IW-4[4]	160	4	16.0	NM	NM
IW-5[4]	160	5	16.0	NM	NM
IW-6[4]	160	7	16.0	NM	NM
IW-7[4]	160	8	16.0	NM	NM
IW-8[4]	160	9	16.0	NM	NM
IW-9[4]	160	11	16.0	NM	NM
IW-10[4]	160	12	16.0	NM	NM
IW-11[4]	160	13	16.0	NM	NM
IW-12[4]	160	15	16.0	NM	NM
IW-13[4]	160	16	16.0	NM	NM
IW-14[4]	160	18	16.0	NM	NM
IW-15[4]	160	19	16.0	NM	NM
Totals (gal.) =	2720	157	272.0	NA	NA

Notes:

gal. Gallons.
min. Minutes.
i.w.c. Inches of water column.
psi Pounds per square inch.
gpm Gallons per minute.
NA Not applicable.
NM Not measured.

1. Programmed mixing time is calculated from the expiration time of the molasses injection countdown timer to the startup of transfer pump TP-900 during an injection sequence or from the end of transfer pump TP-600 operation to the restart of an injection during a mixing sequence.
2. Rinse quantity is approximately 1-pipeline volume for each injection well.
3. Molasses solution injected manually.
4. Parameters not recorded by system.

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

Injection Number 42a

Injection Date = 5/14/2004

Molasses to Water Ratio (%) = 10.0 Programmed Mixing Time (min.)[1] = 60

Injection Well ID	Molasses Solution Injection Quantity (gal.)	Rinse[2] Quantity (gal.)	Raw Molasses Per Well (gal.)	Min. Injection Flowrate (gpm)	Max. Injection Pressure (psi)
PW-6	NM	NM	NM	NM	NM
IW-3	NM	NM	NM	NM	NM
IW-1	NM	NM	NM	NM	NM
IW-2	NM	NM	NM	NM	NM
GMMW-1	NM	NM	NM	NM	NM
IW-4	NM	NM	NM	NM	NM
IW-5	NM	NM	NM	NM	NM
IW-6[4]	160	NM	16.0	NM	NM
IW-7[4]	160	NM	16.0	NM	NM
IW-8[4]	160	NM	16.0	NM	NM
IW-9[4]	160	NM	16.0	NM	NM
IW-10[4]	160	NM	16.0	NM	NM
IW-11[4]	160	NM	16.0	NM	NM
IW-12[4]	160	NM	16.0	NM	NM
IW-13[4]	160	NM	16.0	NM	NM
IW-14[4]	160	NM	16.0	NM	NM
IW-15[4]	160	NM	16.0	NM	NM
Totals (gal.) =	1600	0	160.0	NA	NA

Notes:

gal.	Gallons.
min.	Minutes.
i.w.c.	Inches of water column.
psi	Pounds per square inch.
gpm	Gallons per minute.
NA	Not applicable.
NM	Not measured.
1.	Programmed mixing time is calculated from the expiration time of the molasses injection countdown timer to the startup of transfer pump TP-900 during an injection sequence or from the end of transfer pump TP-600 operation to the restart of an injection during a mixing sequence.
2.	Rinse quantity is approximately 1-pipeline volume for each injection well.
3.	Molasses solution injected manually.
4.	Parameters not recorded by system.

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

Injection Number 42b

Injection Date = 5/27/2004

Molasses to Water Ratio (%) = 10.0 Programmed Mixing Time (min.)[1] = 60

Injection Well ID	Molasses Solution Injection Quantity (gal.)	Rinse[2] Quantity (gal.)	Raw Molasses Per Well (gal.)	Min. Injection Flowrate (gpm)	Max. Injection Pressure (psi)
PW-6[4]	160	5	16.0	NM	NM
IW-3[4]	160	5	16.0	NM	NM
IW-1[4]	160	4	16.0	NM	NM
IW-2[4]	160	3	16.0	NM	NM
GMMW-1[4]	160	3	16.0	NM	NM
IW-4[4]	160	4	16.0	NM	NM
IW-5[4]	160	5	16.0	NM	NM
IW-6[4]	NM	7	NM	NM	NM
IW-7[4]	NM	8	NM	NM	NM
IW-8[4]	NM	9	NM	NM	NM
IW-9[4]	NM	11	NM	NM	NM
IW-10[4]	NM	12	NM	NM	NM
IW-11[4]	NM	13	NM	NM	NM
IW-12[4]	NM	15	NM	NM	NM
IW-13[4]	NM	16	NM	NM	NM
IW-14[4]	NM	18	NM	NM	NM
IW-15[4]	NM	19	NM	NM	NM
Totals (gal.) =	1120	157	112.0	NA	NA

Notes:

gal. Gallons.
min. Minutes.
i.w.c. Inches of water column.
psi Pounds per square inch.
gpm Gallons per minute.
NA Not applicable.
NM Not measured.
1. Programmed mixing time is calculated from the expiration time of the molasses injection countdown timer to the startup of transfer pump TP-900 during an injection sequence or from the end of transfer pump TP-600 operation to the restart of an injection during a mixing sequence.
2. Rinse quantity is approximately 1-pipeline volume for each injection well.
3. Molasses solution injected manually.
4. Parameters not recorded by system.