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A Division of D&B Engineers and Architects, P.C.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation
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ACTIVE INDUSTRIAL UNIFORM SITE GROUNDWATER EXTRACTION AND TREATMENT SYSTEM

Latitude 40.677°, Longitude -73.365°

REPORT TITLE

Site Management Quarterly Report No. 29

REPORTING PERIOD

January 1, 2012 through March 31, 2012

CLIENT

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Site

NYSDEC Site No. 152125, Active Industrial Uniform Site Groundwater Extraction and Treatment System, Village of Lindenhurst, Town of Babylon, Suffolk County, New York.

Project Background and Site Description

The Active Industrial Uniform (the Site) groundwater extraction and treatment system (GWE&TS) was designed to recover and treat a chlorinated solvent-contaminated groundwater plume emanating from the Site, a former dry cleaning and laundry facility. Dry cleaning activities were conducted at the Site from the 1980's to 1987. The GWE&TS has been in operation since December 2001; however, D&B assumed site management duties for the Site in February 2005. Refer to *Figure 1* for a Site location map depicting the GWE&TS location.

Groundwater Extraction and Treatment System Overview

The GWE&TS consists of two, 8-inch diameter extraction wells, with one located on-site in the southwest portion of the Site (RW-1), and one located off-site, approximately 1,500 feet southwest of the Site (RW-2). Per NYSDEC direction, extraction well RW-2 was shut-down in April 2010 due to low historic VOC concentrations. Note that this well is now being monitored on a quarterly basis. Extracted groundwater is conveyed to the GWE&TS building via underground piping to two series-configured packed-tower air strippers. Based on an evaluation of each of the packed-tower air stripper's performance over the last several years of operation and in order to reduce the electrical consumption of the overall GWE&TS, one of the two air stripper towers was taken out of service in May 2011. Treated groundwater is pumped via underground piping to a storm water basin located approximately 1,000 feet west of the Site, which subsequently discharges into Little Neck Creek, in accordance with all applicable discharge standards. Exhaust gas from each air stripper tower was treated utilizing two granular activated carbon (GAC) vessels in series. Based on low historic contaminant concentrations detected in the air stripper exhaust gas, the air stripper exhaust piping was reconfigured to bypass the GAC vessels and discharge directly to the atmosphere in June 2011, per the direction of the NYSDEC. The GWE&TS is equipped with instrumentation and controls which allow for automated start-up and operation, and an autodial alarm notification system. Refer to *Figure 2* for an "as-built" system layout diagram.

Regulatory Requirements/Cleanup Goals

Site-specific remedial goals have been established through the remedy selection process and are documented in the Record of Decision (ROD), dated March 1997. The overall goal is to meet all appropriate Standards, Criteria, and Guidance (SCGs) and to be protective of human health and the environment. Implementation of the GWE&TS is specifically focused on the following goals:

- Reduce, control, or eliminate contaminated media to the extent practicable;

- Eliminate the threat to surface waters by remediating groundwater to the extent practicable;
- Mitigate the impacts of contaminated groundwater to the environment;
- Prevent, to the extent possible, migration of contaminants;
- Provide for attainment of SCGs for groundwater, soil and indoor air within the limits of the affected area, to the extent practical; and
- Reduce the threat of inhalation of Site-related vapor-phase contaminants to residents within homes downgradient of the Site.

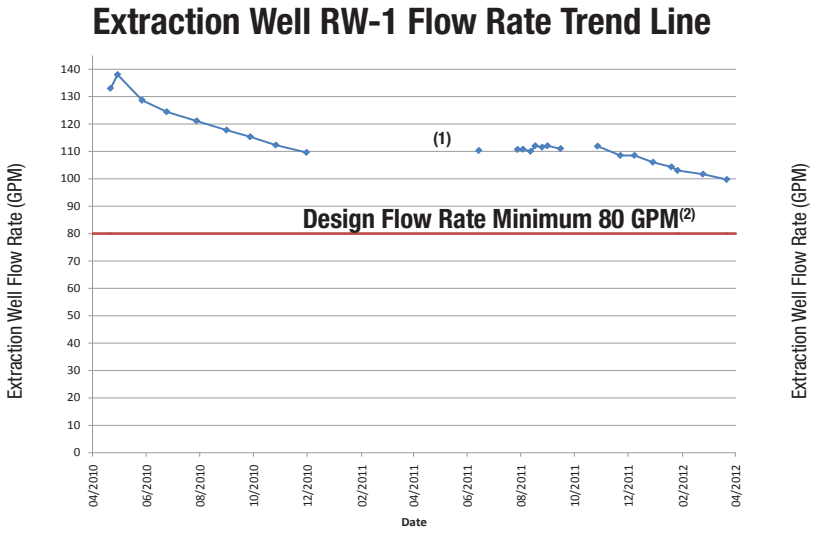
Treatment System Performance Summary

The GWE&TS performance during the current reporting period and since D&B assumed O&M duties in February 2005 is summarized below.

System Extraction Rates and Total Flow Volumes

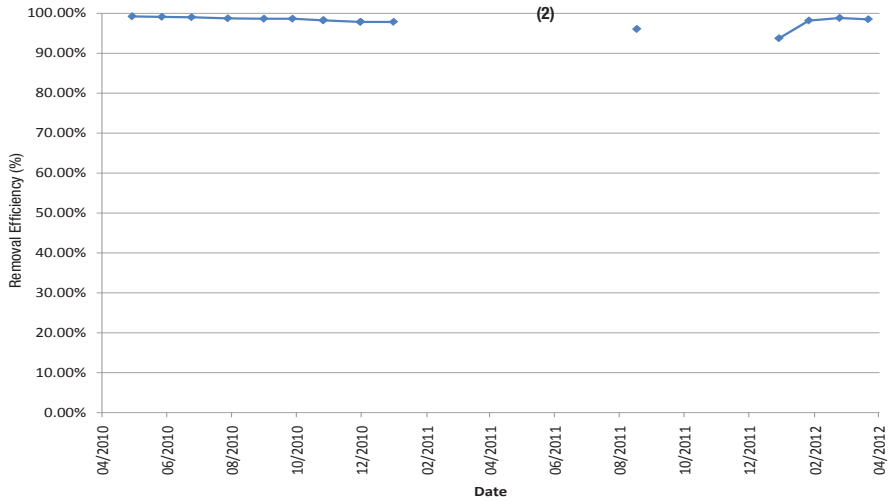
	RW-1	RW-2 (1)	System Effluent
Average Pumping Rate - Current Reporting Period	102 gpm	NA	104 gpm
Average Pumping Rate - Previous Reporting Period	109 gpm	NA	110 gpm
Average Pumping Rate to Date	74 gpm	80 gpm	105 gpm
Total Flow Volume - Current Reporting Period	12,950,810 gal.	NA	12,946,094 gal.
Total Flow Volume to Date	309,947,299 gal.	129,900,729 gal.	437,713,244 gal.

NA: Not applicable
1. As described above, extraction well RW-2 was shut down in April 2010 based on low historic VOC concentrations, as per NYSDEC direction.



1. The GWE&TS did not operate the majority of the time from December 2010 through July 2011 and September 2011 through October 2011 due to a carbon vessel bed screen failure and residential neighbor complaints pertaining to a loud noise being emitted by the GWE&TS exhaust piping.
2. Based on design information presented in the Active Industrial design documents, containment of the Active Industrial chlorinated plume could be achieved with on-site extraction well RW-1 operating at a minimum of 80% of the design flow rate of 100 GPM (80 GPM).

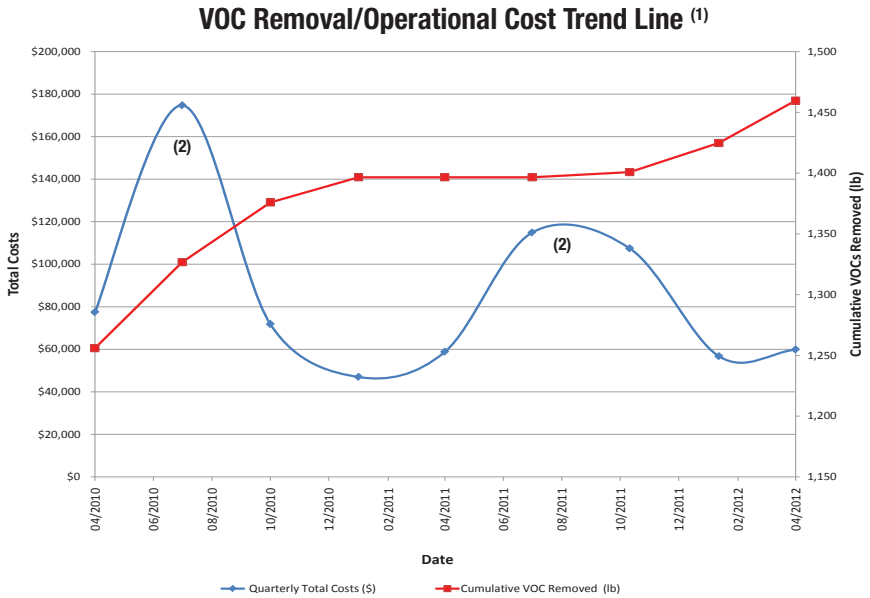
Air Stripper VOC Removal Efficiency (1)



VOC Removal Assessment (3)	
VOC Removal - Current Reporting Period	34.92 lbs.
VOC Removal - Previous Reporting Period	23.96 lbs.
Average VOC Removal to Date	25.99 lbs.
Total VOC Removal to Date	1,460 lbs.

VOC Removal Costs (3)	
VOC Removal Cost - Current Reporting Period (4)	$1,713 per lb.
VOC Removal Cost - Previous Reporting Period	$2,366 per lb.
Average VOC Removal Cost to Date (4)	$2,001 per lb.

1. The packed-tower air strippers have operated at an approximate efficiency ranging from 92.65% to 99.47% since D&B assumed O&M duties in February 2005.
2. The GWE&TS did not operate the majority of the time from December 2010 through July 2011 and September 2011 through October 2011 due to a shut down related to a carbon vessel bed screen failure and residential neighbor complaints pertaining to a loud noise being emitted by the GWE&TS exhaust piping.
3. The VOC removal costs include monthly utility charges, maintenance costs and engineering costs. Capital construction costs and NYSDEC project management effort are not included in this evaluation.
4. Average calculated from when D&B assumed O&M duties in February 2005 through this reporting period.



1. The VOC removal costs include monthly utility charges, maintenance costs and engineering costs. Capital construction costs and NYSDEC project management effort are not included in this evaluation.
2. Costs reflected for these reporting periods are primarily the result of contaminated soil excavation activities and NYSDEC-approved system modifications, per the approval of the NYSDEC.

System Operation and Maintenance

Routine and non-routine maintenance completed during this reporting period and a summary of the alarm conditions and associated GWE&TS runtime/downtime for this reporting period are summarized below. Refer to *Attachment A* for operation and maintenance logs, as prepared by the NYSDEC "call-out" contractor for this reporting period.

Routine Equipment Maintenance Schedule Summary

Major System Component	Manufacturer	Model Number	Maintenance Frequency	Maintenance Summary					
				Current Reporting Period			Next Reporting Period		
				Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12
Extraction Well Pump RW-1	Grundfos Pump Corp.	150550-2	As needed based on flow trends						
Extraction Well Pump RW-2	Grundfos Pump Corp.	1505100-5	As needed based on flow trends						
Pressure Blower (1)	Cincinnati Fan	PB-18	Bi-Monthly						
Vapor Carbon Vessels	Cameron Great Lake	VS7.2x6.7x8.6-5000-DUAL	As needed based on analytical results						
Air Strippers	Branch Environmental	48T-25H	As needed based contaminant concentrations						
Air Stripper Transfer Pumps (1)	Magnatex Pumps, Inc.	MTA-A10-P-F20-2-FE	Quarterly						

Planned Activity

1. Note that the pressure blower and air stripper transfer pump maintenance items were not completed during this reporting period, nor the previous reporting period.

Non-Routine System Maintenance:

- The site fencing was repaired and the treatment system building heaters were restarted and inspected on Janurary 3, 2012;
- A new float switch for the SVE knock out drum was installed and additional insulation was installed on the air stripper pressure transducers on January 24, 2012. Note that the float switch was also attempted to be installed on January 17, 2012, but the "call-out" contractor noted that the switch which was ordered did not fit the SVE knock out drum;
- Inspection of treatment system building heaters on February 2, 2012.

System Runtime/Downtime Summary		
Runtime - Current Reporting Period [1]	2,122 hours	97.2%
Downtime - Current Reporting Period [1]	62 hours	2.8%
Total Runtime to Date [2]	47,245 hours	77.3%
Total Downtime to Date [2]	13,902 hours	22.7%

1. Total elapsed runtime for current reporting period is 2,184 hours (January 1, 2012 through March 31, 2012).
2. Based on when D&B assumed O&M duties in February 2005.

Alarm Conditions

- A high level alarm caused the GWE&TS to shut-down on January 30 and 31, 2012. The motor starter was reset and the GWE&TS was restarted on January 31, 2012.
- A power outage triggered an alarm condition on February 16, 2012. The variable frequency drive (VFD) for transfer pump 1 was reset and the GWE&TS was restarted on February 16, 2012;
- An undervoltage alarm caused the GWE&TS to shut down on February 20 and March 14, 2012. The VFD for transfer pump 2 was reset and the GWE&TS was restarted on February 20 and March 14, 2012, respectively.

IRM Activities

As detailed in the past several Quarterly Reports, an area of contaminated soil was delineated and excavated from the Site in June and July 2011 as part of an Interim Remedial Measure (IRM). In order to limit waste disposal costs, the NYSDEC decided to remediate the excavated soil on-site utilizing an ex-situ SVE system.

The following bullets summarize the IRM activities completed during this reporting period:

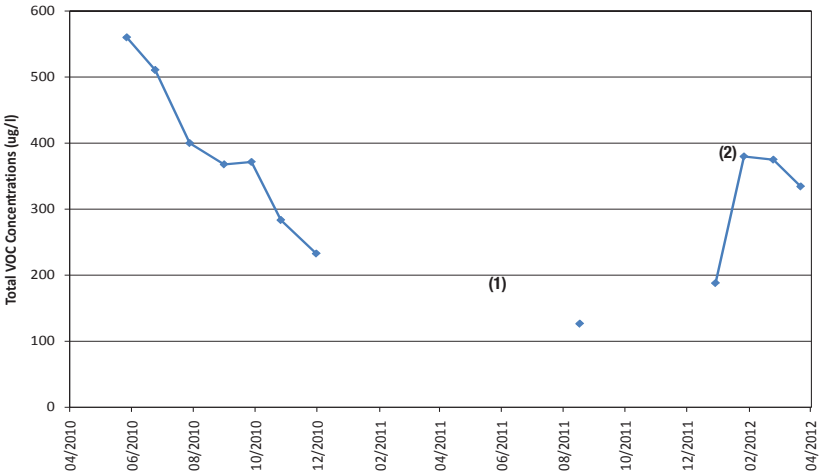
- The SVE system was "checked" by the "call-out" contractor on January 5 and 11, 2012;
- The SVE system knock out drum was drained into the system influent piping on January 26, 2012;
- The SVE system was shut-down on January 19, 2012 based on confirmatory soil sample results;
- The excavation area to the west of the treatment system building was backfilled and regraded with the excavated soil on January 25, 26, 27 and 31, 2012. Note that a community air monitoring plan (CAMP) was implemented during backfilling activities; and
- Composite concrete samples were collected from the concrete pile for disposal purposes on February 28, 2012.

Further details, including a figure depicting the excavation area and all associated sample locations and a summary of all endpoint and sidewall sample results, are provided in the Final Engineering Report for the Active Industrial Uniform Site, dated January 2012.

System Monitoring and Sampling Results

A summary of the pertinent routine treatment system monitoring and sampling results are provided below.

Extraction Well RW-1 Total VOC Concentration Trend Line



1. The GWE&TS did not operate during the majority of the time from December 2010 through July 2011 and September 2011 through October 2011 due to a carbon vessel bed screen failure and a continuous loud noise emitted by the GWE&TS exhaust piping.
2. This increase in total VOC concentration in extraction well RW-1 influent is likely a lagging effect of the disturbance of the subsurface and contaminants during the latest soil removal IRM completed in June and July 2011.

Extraction Well RW-1 - System Influent Contaminant Concentration Ranges/Averages [3]

Contaminant [5]	Current Reporting Period	Previous Reporting Period [4]	Average to Date	Class GA Groundwater Standard
Tetrachlorothene (PCE)	210 ug/l - 230 ug/l	46 ug/l	225 ug/l	5.0 ug/l
Trichlorothene (TCE)	42 ug/l - 53 ug/l	140 ug/l	64 ug/l	5.0 ug/l
cis-1,2-Dichloroethene (cis-1,2-DCE)	71 ug/l - 120 ug/l	ND	98 ug/l	5.0 ug/l
trans-1,2-Dichloroethene (trans-1,2-DCE)	0.59 ug/l - 1.1 ug/l	1.1 ug/l	0.16 ug/l	5.0 ug/l
Vinyl chloride (VC)	0.65 ug/l - 0.94 ug/l	0.79 ug/l	0.71 ug/l	2.0 ug/l
1,1,1-Trichloroethane (1,1,1-TCA)	ND	ND	0.13 ug/l	5.0 ug/l
Iron	115 ug/l - 268 ug/l	186 ug/l	167 ug/l	300 ug/l
Manganese	1,010 ug/l - 1,080 ug/l	935 ug/l	1,261 ug/l	300 ug/l
Sodium	23,300 ug/l - 26,100 ug/l	25,200 ug/l	25,194 ug/l	20,000 ug/l
pH	--	--	6.2	6.5-8.5

ND: Constituent concentration below the analytical detection limit. - - : Not analyzed.

Red font denotes an exceedance of the applicable standard.

3. Only includes constituents historically detected in exceedance of their respective Class GA Groundwater Standard.
4. Only one round of samples was collected during this monitoring period (December 29, 2011), due to system downtime.
5. Click on the blue-colored contaminants for graphs of VOC concentrations over the last 2 years. These graphs were developed for VOCs detected in extraction well RW-1 above the Class GA Groundwater Standards for this and/or the previous reporting periods.

Aqueous-Phase Air Stripper Effluent Concentration Ranges (1)			
Discharge Permit Parameters	Current Reporting Period	Previous Reporting Period (2)	Site-Specific Effluent Limit
PCE	1.4 - 1.8 ug/l	2.3 ug/l	4.0 ug/l
TCE	0.61 - 0.68 ug/l	0.83 ug/l	10.0 ug/l
cis-1,2-DCE	2.4 - 4.5 ug/l	8.6 ug/l (3)	10.0 ug/l
trans-1,2-DCE	ND	ND	10.0 ug/l
VC	ND	ND	10.0 ug/l
1,1,1-TCA	ND	ND	5.0 ug/l
Iron	418 ug/l	1,500 ug/l	4,000 ug/l
Manganese	749 ug/l	1,070 ug/l	2,000 ug/l
Sodium	25,800 ug/l	25,500 ug/l	NA
pH	--	--	6-9

ND: Constituent concentration below the analytical detection limit. NA: Not applicable. - - : Not analyzed.

1. Only includes constituents historically detected in exceedance of their respective Class GA Groundwater Standard in influent water.
2. Only one round of samples was collected during this monitoring period (December 29, 2011), due to system downtime.
3. Note that this cis-1,2-dichloroethene was not detected in the influent water sample collected this reporting period.

Vapor-Phase Air Stripper Effluent Concentrations (1)			
	Current Reporting Period	Previous Reporting Period	Site-Specific Limits
PCE	--	0.00139 lbs/hr	0.007 lbs/hr
TCE	--	0.00036 lbs/hr	0.006 lbs/hr
Xylene	--	ND	0.001 lbs/hr
1,2-DCE (total)	--	0.00195 lbs/hr	0.003 lbs/hr
VC	--	ND	0.014 lbs/hr
1,1,1-TCA	--	ND	0.001 lbs/hr
Maximum Total VOC Emissions	--	0.00375 lbs/hr	0.5 lbs/hr (2)

ND: Constituent concentration below the analytical detection limit. - - : Not analyzed. NA: Not applicable.

1. Vapor-phase effluent samples for laboratory analysis are collected on a semi-annual basis and were not collected during this reporting period.
2. The site-specific effluent limit of 0.5 lbs/hr was developed in consultation with the NYSDEC and is utilized as a means to monitor total vapor-phase VOCs emitted by the GWE&TS.

Quarterly Groundwater Monitoring Summary

The network of groundwater monitoring wells was sampled to determine groundwater quality at, and in the vicinity of, the Site. Samples were collected from six on-site groundwater monitoring wells (MW-103 through MW-107 and MW-5S), one off-site groundwater monitoring well (MW-2S) and off-site extraction well RW-2. The locations of the on-site groundwater monitoring wells are depicted in *Figure 3*, and the locations of the off-site groundwater monitoring wells are depicted on *Figure 4*.

Groundwater Monitoring Well Condition Summary:

All seven groundwater monitoring wells and extraction well RW-2 were found to be accessible during the groundwater monitoring sampling event conducted on March 14, 2012. Although all groundwater monitoring wells were located as indicated on the Site map, none had visible well IDs. All groundwater monitoring well concrete well pads (where applicable), protective casings, surface seals, PVC well risers, well plugs and locks were observed to be present and in good condition, with the following exceptions:

- No monitoring wells had visible IDs;
- Concrete well pads and protective casings are not present at monitoring well locations MW-104 and MW-5S.

A summary of the field inspection logs for all groundwater monitoring wells assessed during this reporting period are provided in *Attachment B*.

Groundwater Monitoring Results Summary:

A headspace reading was collected utilizing a PID at each groundwater monitoring well immediately after the removal of the well caps and plugs. The on-site groundwater monitoring wells exhibited concentrations of total VOCs ranging from 0.0 ppm to a maximum concentration of 0.4 ppm detected in groundwater monitoring well MW-105. VOCs were not detected in the headspace of the off-site groundwater monitoring wells.

Note that monitoring wells MW-101, MW-102, MW-108, MW-109 and MW-111 are now sampled on a semi-annual basis. As such, groundwater samples were not collected from these wells during this reporting period.

Below is a table summarizing the site-specific contaminants of concern in on-site and off-site groundwater. Refer to

Attachment C for analytical data results.

Site-Specific Contaminant of Concern Concentrations

Monitoring Well (1)(2)	PCE		TCE		cis-1,2-DCE		Vinyl Chloride		Site-Specific 2-Year Contaminant Trend Analysis
	Current Reporting Period	Previous Reporting Period	Current Reporting Period	Previous Reporting Period	Current Reporting Period	Previous Reporting Period	Current Reporting Period	Previous Reporting Period	
On-Site Monitoring Wells									
MW-101	NS	1.0 ug/l	NS	0.57 ug/l	NS	ND	NS	ND	Stable
MW-102	NS	1.0 ug/l	NS	ND	NS	ND	NS	ND	Stable
MW-103	ND	ND	ND	ND	ND	ND	ND	ND	Decreasing
MW-104	4.5 ug/l	ND	0.44 ug/l	ND	0.23 ug/l	ND	ND	ND	Decreasing
MW-105	ND	0.76 ug/l	ND	ND	ND	ND	ND	ND	Decreasing
MW-106	2.8 ug/l	6.4 ug/l	4.1 ug/l	7.3 ug/l	22.0 ug/l	51 ug/l	5.4 ug/l	27 ug/l	Decreasing
MW-107	3.6 ug/l	3.0 ug/l	1.3 ug/l	1.1 ug/l	0.78 ug/l	0.70 ug/l	ND	ND	Stable
MW-108	NS	1.8 ug/l	NS	ND	NS	ND	NS	ND	Decreasing
MW-5S	ND	59 ug/l	0.19 ug/l	4.6 ug/l	ND	1.6 ug/l	ND	ND	Increasing
Off-Site Monitoring Wells									
MW-109	NS	0.75 ug/l	NS	2.1 ug/l	NS	2.0 ug/l	NS	ND	Increasing
MW-111	NS	ND	NS	ND	NS	ND	NS	ND	Stable
MW-2S	39.0 ug/l	9.4 ug/l	24.0 ug/l	5.7 ug/l	450 ug/l	370 ug/l	0.77 ug/l	ND	Increasing
RW-2 (3)	ND	ND	0.59 ug/l	0.61 ug/l	0.50 ug/l	1.4 ug/l	ND	ND	Stable

ND: Constituent concentration below the analytical detection limit. NS: Not sampled.

Red font denotes an exceedance of the constituents Class GA Groundwater Standard (5.0 ug/l for PCE, TCE and cis-1,2-DCE, and 2.0 ug/l for VC).

In addition, 1,1-dichloroethane and trans-1,2-dichloroethene were detected in off-site monitoring wells MW-109 and MW-2S, respectively, well below their Class GA Groundwater Standards.

1. Click on monitoring well IDs for graphs depicting contaminant concentrations over the last 2 years in wells exhibiting exceedances of the Class GA Groundwater Standards for this and the previous reporting period.
2. Groundwater monitoring wells MW-101, MW-102, MW-108, MW-109 and MW-111 are now sampled on a semi-annual basis. As such, samples were not collected during this reporting period.
3. Extraction well RW-2 is now sampled on a quarterly basis in order to better monitor off-site contaminant concentrations.

The vast majority of the groundwater monitoring wells exhibit overall decreasing or stable concentrations of the site-specific contaminants over the past 2-year period. A figure depicting total VOC concentrations in on-site and off-site wells is provided as Figure 5. In comparison to the previous reporting period, total VOC concentrations have decreased in the majority of the monitoring wells, with the exception of slight to moderate increases within monitoring wells MW-104, MW-107 and MW-2S.

Data Validation:

All sample results have been reviewed by D&B and deemed valid and usable for environmental assessment purposes. Data

Validation Checklists are presented in *Attachment D*.

Findings and Recommendations

Findings:

- General: The GWE&TS was operational for for the majority of this reporting period;
- GWE&TS Maintenance: Routine maintenance of the pressure blower and transfer pump were not completed as per the requirements of the April 2002 O&M Plan;
- SVE System: The SVE system was shut-down during this reporting period;
- Monitoring Well Conditions: All groundwater monitoring wells were observed to be in good condition, with the following exceptions:
  - No monitoring wells had visible well IDs; and
  - Concrete well pads and protective casings are not present at monitoring wells MW-104 and MW-5S;
- Monitoring Well Contaminant Concentrations: On-site groundwater monitoring well MW-106 and off-site monitoring well MW-2S exhibited one or more of the site-specific VOCs at concentrations exceeding their respective Class GA Groundwater Standards during this reporting period. Note that contaminant concentrations in monitoring well MW-106 have decreased compared to the previous reporting period.

Recommendations:

- General GWE&TS: Continued operation of GWE&TS;
- GWE&TS Routine Maintenance: D&B recommends that the NYSDEC "call-out" contractor adhere to the routine maintenance schedule in order to reduce the GWE&TS downtime and premature equipment failure. It is recommended to complete maintenance activities for the pressure blower and transfer pump as soon as possible;
- Vapor-phase Discharge Monitoring: Monitor vapor-phase discharge utilizing a PID on a routine basis in order to monitor instantaneous VOC concentrations within vapor-phase discharge;
- Monitoring Well Conditions: Well IDs should be permanently fixed and clearly marked on each groundwater monitoring well for identification purposes. In addition, it is recommended to install protective casings and well pads at monitoring wells MW-104 and MW-5S in order to ensure these wells are properly protected; and
- RSO Evaluation: Based on the identification of several below grade structures and contaminated soil to the west of the GWE&TS in 2010 and 2011 and consistently elevated contaminant concentrations detected in several monitoring wells and extraction well RW-1, D&B recommends performing a Remedial Site Optimization (RSO) evaluation to further investigate residual on-site soil contamination, GWE&TS equipment efficiency and operation, and possibly consider alternative remedial technologies, such as monitored natural alternation (MNA) and/or in-situ chemical injections. It is further recommended that the RSO include the following:
  - Extraction Well ROI Analysis: In order to ensure on-site extraction RW-1 well is operating at an optimal and efficient flow rate, D&B recommends performing a radius of influence (ROI) analysis for the extraction well.
  - Temporary Geoprobe Wells: Based on the elevated contaminant concentrations detected in on-site monitoring well MW-106 and off-site monitoring well MW-2S, it may be warranted to install and sample several temporary geoprobe wells at and downgradient of the Site to more accurately define the current location of the groundwater plume. Based on the results of the temporary well sampling, it may be warranted to install additional permanent monitoring wells in these areas and/or modify the current extraction well configuration in order to optimize and accelerate the recovery and treatment of the entire groundwater plume.

The Site was originally listed as a Class 2 Inactive Hazardous Waste Site by the NYSDEC in November 1990. Since this time, completion of the following project phases has occurred, as summarized below:

Project Phases and Completion Dates

Project Phase	Completion Date
Remedial Investigation	04/1994
Phase II Remedial Design Investigation	12/1998
Remedial Design	06/2000
Groundwater Extraction and Treatment System Construction	12/2001 (1)
UST Removal and Phase I Contaminated Soil Removal IRM	06/2010
Phase II Contaminated Soil Removal IRM	07/2011

1. Construction of the GWE&TS was completed in December 2001. The GWE&TS was placed into routine operation in December 2001 and D&B assumed O&M duties in February 2005.

Given the above, it does not appear that the Active Industrial Uniform Site can be reclassified at this time, pursuant to the requirements identified in 6 NYCRR §375-2.7, as site-related contamination has not been fully remediated and continues to constitute a significant threat to public health and the environment. As such, Site delisting is not recommended at this time, as all remediation and post-remediation activities have not been satisfactorily completed. However, as detailed in several previous Quarterly Reports, several USTs, below-grade drainage structures and contaminated soil have been identified and were removed from the Site, which will likely expedite overall remediation and Site closure.

Report Certification:

I have personally examined and am familiar with the information submitted in the referenced report. To the best of my knowledge and belief, and based upon my inquiry of those individuals immediately responsible for obtaining the information reported therein, I certify that the submitted information is true, accurate, and complete.

Project Director: Richard M. Walka — 9.12.12
Richard M. Walka — **Date**
Senior Vice President

Project Manager: Stephen E. Tauss — 9/12/12
Stephen E. Tauss — **Date**
Geologist II