

## FRANKLIN CLEANERS GROUNDWATER EXTRACTION AND TREATMENT SYSTEM

Latitude 40.688°, Longitude -73.627°

### REPORT TITLE

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### CLIENT

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Environmental Conservation

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## NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation

625 Broadway, 12th Floor, Albany, New York 12233

### Site

**NYSDEC Site No. 130050**, Franklin Cleaners Site Groundwater Extraction and Treatment System Village of Rockville Centre, Town of Hempstead, Nassau County, New York



### Project Background and Site Description

The Franklin Cleaners groundwater extraction and treatment system (GWE&TS) is actively recovering and treating the “leading edge” of a chlorinated solvent-contaminated groundwater plume emanating from the former Franklin Cleaners dry cleaner site, located approximately one mile upgradient of the GWE&TS, in the Village of Hempstead, Nassau County, New York. The groundwater plume is primarily composed of tetrachloroethene (PCE). The Franklin Cleaners GWE&TS has been in operation since September 2004. Refer to [Figure 1](#) for a site location map depicting the treatment system location.

### Groundwater Extraction and Treatment System Overview



The GWE&TS consists of two 6-inch diameter wells screened approximately 75 to 90 feet below grade. Extracted groundwater is conveyed via underground piping to a low-profile stacked-tray air stripper located in the GWE&TS building. The treated groundwater is discharged from the air stripper to a wet well equipped with two series-configured submersible pumps, which conveys the treated water via underground piping to a Nassau County Department of Public Works storm sewer manhole in accordance with all applicable discharge standards. Exhaust gas from the air stripper was treated utilizing two series-configured granular activated carbon (GAC) vessels; however, it should be noted that, based on historic low contaminant concentrations detected in the air stripper exhaust gas, the air stripper exhaust piping was reconfigured

to bypass the GAC vessels and discharge exhaust gas 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 startup and operation, and an autodial alarm notification system. Refer to [Figure 2](#) for an “as-built” treatment system layout diagram.

### Regulatory Requirements/Cleanup Goals

Site-specific remedial goals have been established through the remedy selection process as defined in 6 NYCRR Part 375-1.10, and are documented in the Record of Decision (ROD), dated March 1998. The site-specific remedial goals outlined in the March 1998 ROD are provided in [Attachment A](#). 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 potential for exposure to contaminated groundwater; and
- Provide for attainment of SCGs for groundwater, soil and indoor air within the limits of the affected area, to the extent practical.

### Treatment System Performance Summary

The GWE&TS performance during the current reporting period and since inception in September 2004 is summarized below:

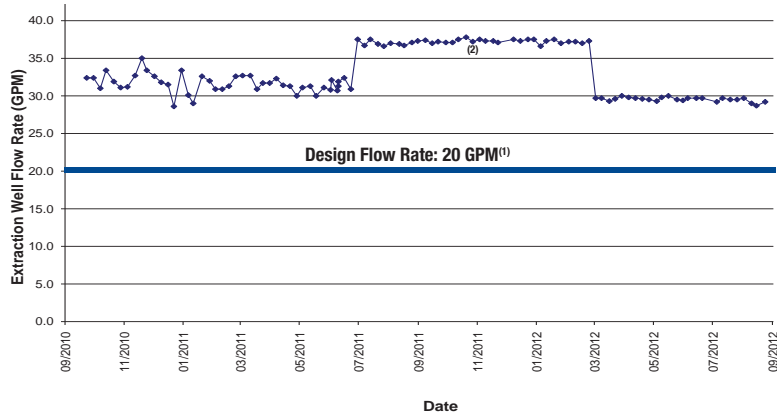
<b>System Extraction Rates and Total Flow Volumes</b>				
	<b>EW-1</b>	<b>EW-2 <sup>(1,2)</sup></b>	<b>System Influent</b>	<b>System Effluent <sup>(2)</sup></b>
<b>Average Pumping Rate - Current Reporting Period</b>	29.4 gpm	6.5 gpm	35.9 gpm	43.0 gpm
<b>Average Pumping Rate - Previous Reporting Period</b>	29.6 gpm	6.4 gpm	36.1 gpm	49.1 gpm
<b>Average Pumping Rate to Date</b>	36.4 gpm	5.1 gpm	37.4 gpm	68.4 gpm
<b>Total Flow Volume - Current Reporting Period</b>	3,702,384 gal.	799,565 gal.	4,501,949 gal.	3,991,223 gal.
<b>Total Flow Volume to Date</b>	142,071,200 gal.	18,586,706 gal.	160,657,906 gal.	202,493,020 gal.

1. Extraction EW-2 flow meter consistently malfunctioned from approximately January 2010 to June 2011. Based on previously recorded flow data, it has been assumed that EW-2 was operating at an average flow rate of 7 gpm during this time period.

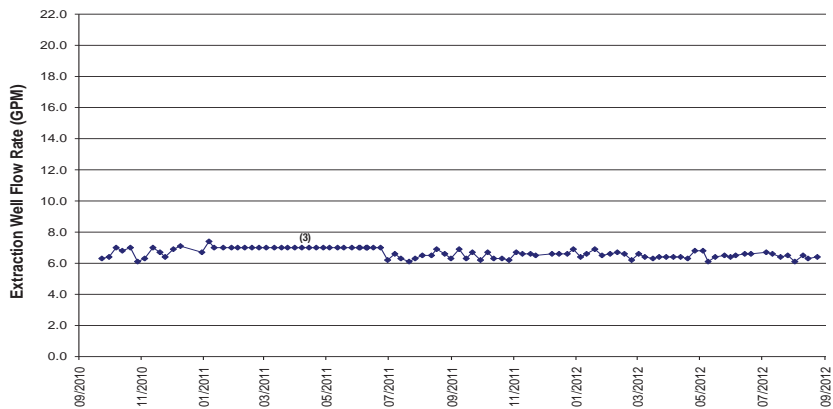
2. System influent and effluent pumping rates and volumes are monitored on a bi-weekly basis. Following replacement of the influent flow meters on June 23, 2011, total flow inconsistencies remained with respect to influent/effluent flow. As such, the effluent flow meter was replaced on May 2, 2012. Although the system influent and effluent flows are more consistent following the effluent meter change, system influent and effluent flows remain dissimilar.



### Extraction Well EW-1 Flow Rate Trend Line



### Extraction Well EW-2 Flow Rate Trend Line

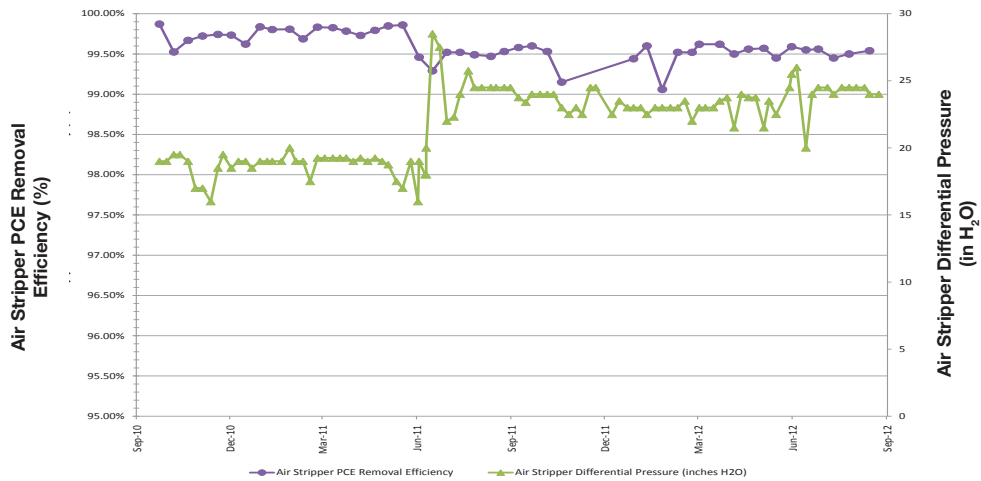


1. Based on the results of capture zone design modeling, containment of the Franklin Cleaners chlorinated plume (at an approximate 450-foot width) would be achieved with the GWE&TS operating at a minimum required pumping rate of 20 gpm, in a one or two extraction well scenario. Extraction well EW-1 has been operating at an average flow rate of approximately 36 gpm since system start-up to provide for a greater factor of safety and ensure the full width of the plume is captured. Extraction well EW-2 has been operating at an average flow rate of approximately 5 gpm since system start-up due to the elevated VOC concentrations present within this well. It should be noted that the maximum yield for EW-2 has been historically limited to a range of 5-7 gpm due to a high silty/clay component in the screened interval of this extraction well.
2. Extraction well EW-1 was set at approximately 37 gpm following replacement of the influent flow meters. Based on recommendations presented in the RSO report the flow at extraction well EW-1 was reduced to approximately 30 gpm in February 2012.
3. As detailed above, it is assumed that extraction well EW-2 was operating at an average of 7.0 gpm during this time period.



**Treatment System Performance Summary (cont.)**

**Air Stripper PCE Removal Efficiency and Differential Pressure <sup>(1)</sup>**

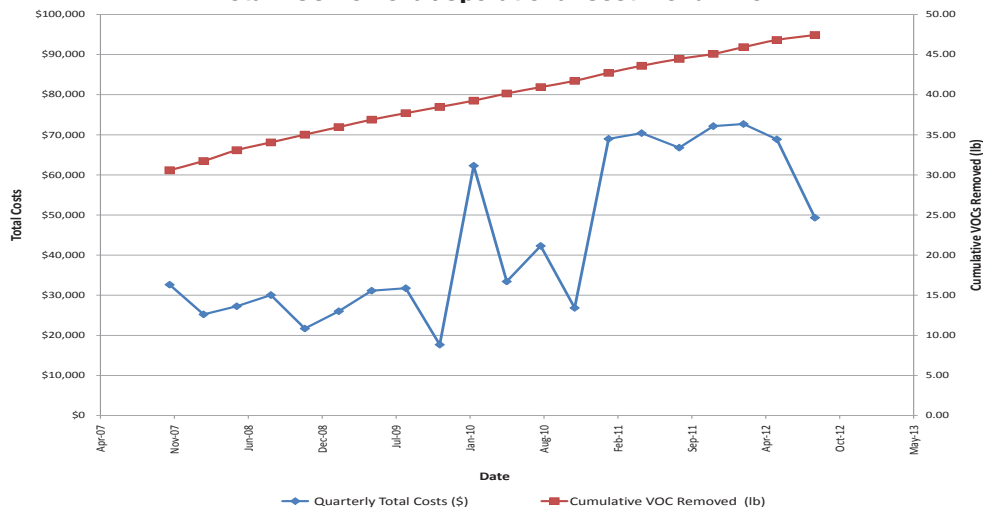


<b>Total VOC Removal Assessment</b>	
VOC Removal - Current Reporting Period	0.62 lbs.
VOC Removal - Previous Reporting Period	0.89 lbs.
Average VOC Removal to Date (per period)	0.94 lbs.
Total VOC Removal to Date	47.4 lbs.

<b>Total VOC Removal Costs <sup>(2)</sup></b>	
VOC Removal Cost - Current Reporting Period	\$79,578 per lb.
VOC Removal Cost - Previous Reporting Period	\$77,382 per lb.
Average VOC Removal Cost to Date <sup>(3)</sup>	\$39,224 per lb.

1. The approximate PCE removal efficiency for the low-profile stacked-tray air stripper ranged from 99.56% to 99.45% during this reporting period. Additionally, it should be noted that the average differential pressure across the low-profile air stripper was well below 45 inches of water (manufacturer's recommended threshold for equipment maintenance) during this reporting period.
2. 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. Due to the relatively high VOC removal costs, a RSO evaluation has been performed for the Franklin Cleaners Site in order to improve the efficiency and effectiveness of the GWE&TS, while at the same time, reducing the overall associated operating costs. System modifications based on recommendations presented in the RSO are planned to be implemented in the near future.
3. Average calculated from system start-up (September 2004) through current reporting period.

**Total VOC Removal/Operational Cost Trend Line**





## System Operation and Maintenance

Routine and non-routine system maintenance completed during this reporting period, as well as a summary of the alarm conditions and associated system runtime/downtime for this reporting period, are summarized below. Refer to [Attachment B](#) for operation and maintenance logs, as prepared by 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		
				Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12
Extraction Well Pumps	Grundfos Pump Corp.	Redi-Flo-4 Model 25E3	As needed based on flow trends						
Air Stripper	Carbonair	STAT Model 180	As needed based on differential pressure readings						
Pressure Blower	New York Blower Company	Model 2506A	Bi-Monthly		7/11/12				
Vapor Carbon Vessels	Tetrasolv Filtration Inc.	Model VF-1000	As needed based on PID screening results						
Wet Well Pumps	Flygt Corporation	Model CP3085	Annual		7/10/12				
Sump Pump	Grundfos Pump Corp.	Model KP-350	As needed						

: Planned activity

### Non-Routine System Maintenance:

- Restart system due to power failure likely due to severe storms on June 6, 2012;
- ReProgram autodialer on July 19, 2012;
- On site to meet LIPA. System turned off for LIPA to deenergize a nearby transformer on August 7, 2012;
- On site to meet LIPA to restart system on August 10, 2012.

### General Facility Maintenance:

- Facility landscaping activities were performed on June 6, 26, July 5, 15 and August 2, 2012.
- Clean fresh air inlet screen on June 14, 2012.

### Alarm Conditions:

One alarm condition (power failure) occurred on June 22, 2012 likely attributable to severe storms during this time and the system was restarted on June 25, 2012. No other alarm conditions occurred during this reporting period.



### System Runtime/Downtime Summary

Runtime - Current Reporting Period <sup>(1)</sup>	2,066 hours	93.5%
Downtime - Current Reporting Period <sup>(1)</sup>	142 hours <sup>(3)</sup>	6.5%
Total Runtime to Date <sup>(2)</sup>	69,494 hours	90.6%
Total Downtime to Date	6,548 hours	9.4%

- Total elapsed time for current reporting period, 2,208 hours (June 1, 2012 through August 31, 2012).
- Based on a system start-up date of September 20, 2004.
- Downtime for this reporting period is the result of routine system maintenance and a power failure likely attributable to severe weather. In addition, the system was shut down due to LIPA working on a nearby transformer. While working on the transformer, electricity was temporarily unavailable for approximately three days.

### System Monitoring and Sampling Results

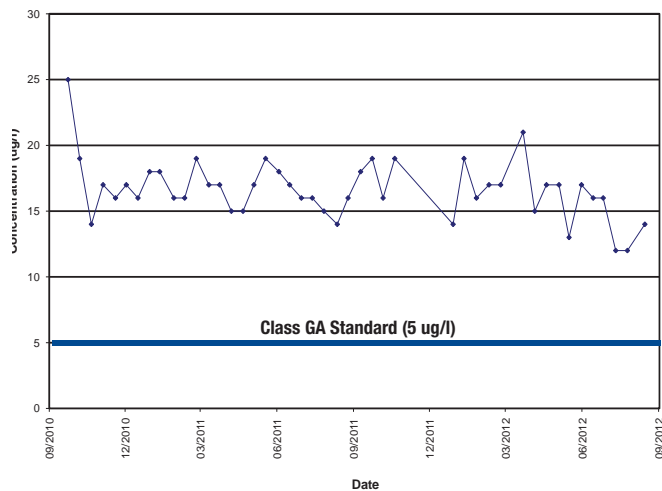
A summary of the pertinent routine system monitoring and sampling results are provided below. Refer to [Attachment C](#) for tabulated analytical results.

### Extraction Wells - System Influent PCE Concentration Ranges/Averages <sup>(1)</sup>

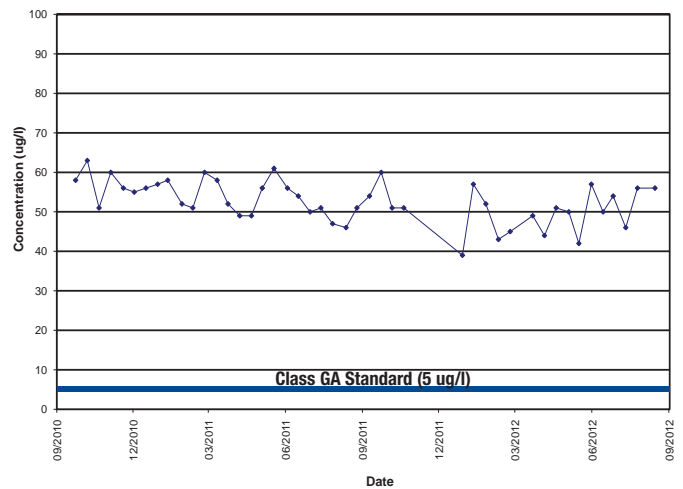
Sample Point	Current Reporting Period	Previous Reporting Period	Average to Date	Groundwater Standard
Extraction Well EW-1	12 ug/l - 16 ug/l	13 ug/l - 21 ug/l	18 ug/l	5.0 ug/l (Class GA)
Extraction Well EW-2	46 ug/l - 56 ug/l	42 ug/l - 57 ug/l	92 ug/l	5.0 ug/l (Class GA)

- In addition to the PCE concentrations presented in this table, chloroform and trichloroethene were detected in one or more system influent samples; however, these compounds were detected at concentrations well below their respective Class GA Groundwater Standards.

Extraction Well EW-1 PCE Concentration Trend Line



Extraction Well EW-2 PCE Concentration Trend Line





### Aqueous-Phase Air Stripper Effluent Concentration Ranges

Discharge Permit Parameters	Current Reporting Period	Previous Reporting Period	Site-Specific Effluent Limit
PCE	ND	ND	5.0 ug/l
TCE	ND	ND	10.0 ug/l
1,1-DCE	ND	ND	10.0 ug/l
Cis-1,2-DCE	ND	ND	10.0 ug/l
1,1,1-TCA	ND	ND	10.0 ug/l
Iron	ND - 192	ND	1,000 ug/l
Manganese	11.3 - 31.7 ug/l	12.8 ug/l - 16.3 ug/l	1,000 ug/l
pH (Field Screening Results)	<b>6.39</b> - 6.59	6.74 - 7.36	6.5 - 8.5

ND: Constituent concentration below the analytical detection limit.  
Site-specific effluent limits, per the SPDES permit equivalency.  
Red font denotes an exceedance of the site-specific effluent limits.

### Vapor-Phase Discharge

	System Vapor Discharge	Site-Specific Discharge Limit
Total VOC Concentrations (field screening with PID) <sup>(1)</sup>	0.0 - 1.2 ppm	NA
Total VOC Concentrations (laboratory analysis)	106.1 ug/m <sup>3</sup>	NA
Average Pressure Blower Flow Rate	986 cfm	NA
Maximum Total VOC Emissions <sup>(2)</sup>	4.0E - 04 lbs/hr	0.5 lbs/hr <sup>(3)</sup>

NA: Not applicable

- The PID screening is utilized as a means to instantaneously monitor total vapor-phase VOC discharge concentrations.
- Total VOC emissions were calculated utilizing the laboratory-analyzed emissions data.
- The site-specific effluent limit of 0.5 lbs/hr was developed in consultation with the NYSDEC as a means to monitor the vapor-phase VOCs discharged by the GWE&TS.

### Groundwater Monitoring Summary

The network of groundwater monitoring wells was sampled to determine groundwater quality at, and in the vicinity of, the Site. Groundwater samples were collected from three groundwater monitoring wells located in close proximity to the leading edge of the Franklin Cleaners plume (ASMW-1 through ASMW-3), and four groundwater monitoring wells located downgradient of the leading edge of the plume (ASMW-4 through ASMW-7). Note that groundwater monitoring wells ASMW-4 through ASMW-7 act as early warning or "sentinel" wells for a cluster of Village of Rockville Centre public supply wells located downgradient of the treatment system building. The locations of the groundwater monitoring wells are depicted on [Figure 3](#).

All seven of the sampled groundwater monitoring wells were found to be accessible during the groundwater monitoring/sampling event conducted on June 12 and 13, 2012. All groundwater monitoring wells were located as indicated on the site map and the concrete well pads (where applicable), protective casings, surface seals, well IDs, PVC well risers, well plugs and locks were observed to be present and in good condition, with the following exceptions:

- All groundwater monitoring wells had visible well IDs, with the exception of groundwater monitoring wells ASMW-4 through ASMW-7;
- The well cover at groundwater monitoring well ASMW-5 is currently below the final surface grade. The well pad has



been destroyed and/or removed and the locking well cap has been damaged. In addition, the well riser will need to be extended and resurveyed;

- As detailed in the past few quarterly reports, the well pad and protective casing/manhole at groundwater monitoring well ASMW-6 was observed to have been demolished and/or removed; and
- As detailed in the past few quarterly reports, a large PVC vault and drainage ring structure was observed to have been installed directly over and around groundwater monitoring well ASMW-7. Note that it was presumed that runoff from a portion of the newly paved area was discharged into this ring structure. However, based on recent information obtained from Molloy College, this ring structure was installed in order to provide for a clear below grade area for the future installation of a new below grade well head on this well so it may be used for irrigation by Molloy College. As such, a new sample port must be installed on the well head in order to allow for routine sampling of this well to continue. In addition, the PVC cover installed over the well is cracked.

Field inspection logs for all groundwater monitoring wells assessed during this period are provided in [Attachment D](#).

**Groundwater Monitoring Results Summary:**

A headspace reading was collected at each of the sampled groundwater monitoring wells immediately after the removal of the well caps utilizing a PID. VOCs were not detected in the headspace of any monitoring well during this reporting period.

Below is a detailed summary of PCE concentrations in site groundwater. Refer to [Attachment C](#) for analytical data results.

<b>Groundwater Monitoring Wells - PCE Concentrations</b>								
	<b>Treatment System Effectiveness Monitoring Wells</b>			<b>Sentinel Monitoring Wells</b>				<b>Class GA Groundwater Standard</b>
<b>Monitoring Well <sup>(1)</sup></b>	<b>ASMW-1</b>	<b>ASMW-2</b>	<b>ASMW-3</b>	<b>ASMW-4</b>	<b>ASMW-5</b>	<b>ASMW-6</b>	<b>ASMW-7</b>	
<b>Current Reporting Period</b>	24 ug/l	3.9 ug/l	ND	ND	ND	ND	ND	5.0 ug/l
<b>Previous Reporting Period</b>	22 ug/l	11 ug/l	--	ND	--	--	--	5.0 ug/l
<b>2-Year PCE Trend Analysis <sup>(2)</sup></b>	Increasing	Increasing	Stable	Stable	Stable	Stable	Stable	

ND: Constituent concentration below the analytical detection limit.

--: Not sampled.

Red font denotes an exceedance of the Class GA Groundwater Standard.

In addition to PCE, the following containments were detected below their respective Class GA standards in one or more monitoring well during this reporting period: 1,1-dichloroethene, chloroform and 1,1,1-trichloroethane.

1. Click on monitoring well IDs for graphs depicting PCE concentrations over the last 2 years in wells exhibiting exceedances of the Class GA Groundwater Standard for this and the previous reporting period.

2. Trend analysis is calculated on an increase or decrease of 5.0 ug/l over a 2-year time frame.

Downgradient early warning “sentinel” groundwater monitoring wells ASMW-4 through ASMW-7 for the Rockville Centre Water District exhibited non-detect VOC concentrations this reporting period.

A figure depicting the current PCE concentrations in groundwater is provided as [Figure 4](#). In comparison with the previous reporting period, PCE concentrations have slightly increased in groundwater monitoring well ASMW-1 and decreased in monitoring well ASMW-2. As described above, PCE concentrations in these two wells are slightly increasing over a 2-year period. PCE concentrations have remained non-detect in downgradient “sentinel” wells ASMW-4 through ASMW-7. Note that, groundwater contaminant data is limited to the west and south of ASMW-1 and the treatment system building, as the current monitoring well network does not include wells in these areas.





**Data Validation:**

All sample results have been reviewed by D&B and are deemed valid and usable for environmental assessment purposes. No qualification of the data was necessary based on D&B's review. Data Validation Checklists are presented in [Attachment E](#).

All analytical data associated with the Franklin Cleaners GWE&TS project have been submitted to the NYSDEC in the required EQulS format and within 30 days of receipt of the data from the NYSDEC "call-out" contractor.

**Findings and Recommendations**

**Findings:**

- Extraction Well Flow: The analytical results of the system influent samples demonstrate that groundwater extraction wells EW-1 and EW-2 continue to capture VOC-contaminated groundwater. Extraction well EW-1 operated at an average flow rate of 29.4 gpm throughout this reporting period and extraction well EW-2 operated at an average flow rate of 6.5 gpm throughout this reporting period;
- Treatment System Runtime: The treatment system was operational for approximately 93.5% of this reporting period (approximately 2,066 hours);
- GWE&TS Routine Maintenance: All required maintenance items were completed per the requirements of the routine maintenance schedule;
- Air Stripper: The air stripper continues to operate efficiently and within its design specifications;
- Air Stripper Discharge Parameters (Aqueous-phase): All aqueous-phase discharge analytes were detected at concentrations below their respective site-specific effluent limits. Note, two of the three field-screened pH results were detected at values below the site-specific effluent pH range during this reporting period;
- Air Stripper Discharge Parameters (Vapor-phase): The vapor-phase discharge piping outlet exhibited laboratory-analyzed total VOCs at concentration well below the Site-Specific total VOC effluent limit;
- Groundwater Monitoring Well Inspection/Sampling Summary:
  - Monitoring Well Conditions: All groundwater monitoring wells had visible well IDs, with the exception of groundwater monitoring wells ASMW-4 through ASMW-7. All groundwater monitoring wells were sealed at the surface and competent, with the exception of wells ASMW-6 and ASMW-7. In addition, the well pads at wells ASMW-6 and ASMW-7 have been destroyed and/or removed;
  - Monitoring Well PCE Exceedances: Concentrations of PCE detected in groundwater monitoring well ASMW-1 exhibited an exceedance of the Class GA Standard of 5.0 ug/l, at a concentration of 24 ug/l;
  - Monitoring Well PCE Detections: Although PCE was detected in groundwater monitoring well ASMW-2, PCE was detected below its Class GA Standard of 5.0 ug/l. In addition, PCE was not detected in groundwater monitoring well ASMW-3; and
  - Sentinel Monitoring Wells (ASMW-4, ASMW-5, ASMW-6 and ASMW-7): The downgradient early warning "sentinel" groundwater monitoring wells for the Rockville Center Water District again exhibited non-detect concentrations of PCE during this reporting period. Therefore, D&B concludes that the selected remedy is functioning as intended by the ROD.

**Recommendations:**

- General Treatment System: Continue operation of the GWE&TS;
- RSO Evaluation: A RSO evaluation of the GWE&TS has been completed in order to improve the efficiency, effectiveness and net environmental benefit of the GWE&TS which included several recommendations for monitoring well repairs and resurveys, as well as the plume re-delineation recommendation discussed below:



- o Groundwater Plume Re-delineation: Based on the fairly consistent PCE concentrations detected in groundwater monitoring well ASMW-1, D&B recommends re-delineation of the groundwater plume via installing and sampling several temporary geoprobe wells along the leading edge, length and up/sidegradient areas of the plume to more accurately define its current location and extent. Based on the results of the plume re-delineation, it may be warranted to install additional permanent monitoring wells and/or modify the current extraction well configuration in order to optimize and accelerate the recovery and treatment of the entire groundwater plume. D&B will provide a plume re-delineation scope of work for review and approval in the near future.
- o ASMW-7: D&B recommends that the NYSDEC ensure that an appropriate sample port is installed on ASMW-7 following Molloy College's upgrade of the well head.

**Reclassification/Delisting Evaluation**

The Site was originally listed as a Class 2 Inactive Hazardous Waste Site by the NYSDEC on June 17, 1993. Since this time, completion of the following project phases has occurred, as summarized below:

<b>Project Phases and Completion Dates</b>	
<b>Project Phase</b>	<b>Completion Date</b>
<b>Remedial Investigation</b>	03/1998
<b>Remedial Design</b>	02/2001
<b>Groundwater Extraction and Treatment System Construction</b>	07/2003 <sup>(2)</sup>
<b>Remedial Action (Source Area Remediation)</b>	03/2007 <sup>(1)</sup>

1. Source area contaminated soil and groundwater were remediated with the Air Sparge/Soil Vapor Extraction (AS/SVE) system beginning in September 2003. The on-site AS/SVE system has successfully removed the contaminants from the vadose zone and greatly diminished groundwater contaminants to below detectable limits. Although confirmation soil samples met the required remedial goals, a subslab depressurization system replaced the on-site AS/SVE system in 2006 due to the detection of elevated vapor phase VOC concentrations in the basement level and below the basement floor slab.
2. Construction of the GWE&TS was completed in July 2003. The GWE&TS was placed into routine operation in September 2004 and currently continues to meet remedial objectives as originally designed.

Given the above, NYSDEC is currently reclassifying the Franklin Cleaners GWE&TS Site pursuant to the requirements identified in 6 NYCRR §375-2.7 as a Class 4 Site since the "source area" contamination does not appear to constitute a significant threat to public health or the environment based on remedial efforts performed to date. In doing so, the NYSDEC has implemented a post-remedial indoor air study within the source area structures/buildings to verify current site conditions, in support of the proposed Site reclassification. Site delisting is not feasible at this time, as all remediation and post-remediation activities have not been satisfactorily completed.

**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  
Senior Vice President

  
Date

**Project Manager:**

  
Stephen E. Tauss  
Geologist II

  
Date

