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Quarterly Operation, Maintenance, and Monitoring Report for the Groundwater Interim Remedial Measure

April through June 2010

Operable Unit 3 (Former Grumman Settling Ponds)
Bethpage, New York

NYSDEC ID # 1-30-003A

August 2010

ARCADIS

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ARCADIS

1. Introduction

Pursuant to the Administrative Order on Consent (AOC) Index # W1-0018-04-01(NYSDEC 2005), ARCADIS of New York, Inc. (ARCADIS), on behalf of Northrop Grumman Systems Corporation (Northrop Grumman), has prepared this Operable Unit 3 (OU3) Groundwater Interim Remedial Measure (Groundwater IRM) Quarterly Operation, Maintenance, and Monitoring (OM&M) Report for submittal to the New York State Department of Environmental Conservation (NYSDEC). The present day Bethpage Community Park property (Park), which the NYSDEC has termed the "Former Grumman Settling Ponds Area" and designated as OU3, is referred to herein as the Site. A Site Location Map is provided on Figure 1.

Full-time operation (i.e., system start-up) of the Groundwater IRM began on July 21, 2009. This quarterly OM&M report summarizes the Groundwater IRM OM&M activities performed between April 1, 2010 and June 30, 2010 (i.e., the "reporting period"). During this reporting period, the Remedial System and Environmental Effectiveness Monitoring Programs were completed in accordance with the NYSDEC-approved OU3 Groundwater IRM System Start-up Workplan (NYSDEC 2009b).

As discussed in the OU3 Site Area Remedial Investigation Report (ARCADIS 2008a), Northrop Grumman does not take responsibility for Freon 12 and Freon 22 present at the Site. Throughout this report, a distinction is made between the "project" and "non-project" Volatile Organic Compounds (VOCs); which are defined as follows:

- "Project VOCs:" are VOCs that may be related to former Grumman historical activities. For this report, Project VOCs are the VOCs listed in the Interim State Pollutant Elimination Discharge System (SPDES) permit equivalency (NYSDEC 2009a), and also Toluene and Benzene.

- "Non-project VOCs:" are VOCs, such as Freon 12 and Freon 22 that are not related to former Grumman activities but have been detected at the Site.

2. Groundwater Interim Remedial Measure Objectives

The remedial action objectives (RAOs) for the Groundwater IRM are as follows:

- Mitigate the off-site migration of project-related, dissolved-phase VOCs. Specifically, the Groundwater IRM addresses:

  - Groundwater that has total volatile organic compound (TVOC) concentrations greater than 5 micrograms per liter (ug/L) in the upper 20 feet of the surficial aquifer across the 1,200-foot wide lateral extent of the Site boundary.

  - Groundwater below the upper 20 feet of the surficial aquifer that has TVOC concentrations greater than 50 ug/L.

- Comply with applicable NYSDEC standards, criteria and guidance values (SCGs) for treated water and air emissions.

A secondary benefit of the Groundwater IRM is the creation of a clean-water front atop the downgradient groundwater, which minimizes the potential for vapor intrusion downgradient of the Site.

3. Groundwater Interim Remedial Measure Description

The Groundwater IRM consists of:

- A "pump-and-treat system" where groundwater is:

  - Extracted along the southern portion of the Northrop Grumman Former Plant 24 Access Road via four remedial wells.

  - Conveyed to a treatment plant at McKay Field via four underground pipelines.

  - Treated via air stripping to reduce concentrations of Project and Non-Project VOCs.

  - Filtered to remove oxidized metals.

  - Returned to the aquifer, via a discharge pipeline routed to a recharge basin located on the adjacent former Navy Weapons Industrial Reserve Plant (NWIRP) property.

- A vapor phase treatment system to reduce concentrations of Project VOCs in the air stripper off-gas prior to discharge to the atmosphere.

- A Groundwater Monitoring Network that is periodically monitored to assess the environmental effectiveness of the Groundwater IRM.

The major components of the Groundwater IRM are briefly described below; additional information is provided in the Draft Groundwater IRM OM&M Manual (OM&M Manual [ARCADIS 2009b]). The layout of the Groundwater IRM is shown on Figure 2 and a schematic drawing is provided on Figure 3. The location of the Groundwater Monitoring Network is shown on Figure 4.

Groundwater Extraction and Conveyance System

The GW IRM is designed to extract groundwater at a rate of approximately 210 gallons per minute (gpm) from four remedial wells (RW-1 through RW-4) located along the downgradient (i.e., southern) boundary of the Site (Figure 2). The individual design pumping rates for RW-1 through RW-4 are 30 gpm, 75gpm, 75 gpm, and 30 gpm, respectively. Each remedial well is equipped with a submersible pump; RW-1 and RW-4 have 3 horsepower (hp) pumps and RW-2 and RW-3 have 7.5 hp pumps. Remedial Well construction details are summarized in Table A-1 (Appendix A).

Extracted groundwater is conveyed to the treatment plant via four underground influent pipelines, one for each Remedial Well. RW-1 and RW-4 have 2-inch diameter high-density polyethylene (HDPE) pipelines and RW-2 and RW-4 have 3-inch diameter HDPE pipelines.

Groundwater Treatment

VOCs are removed from the extracted groundwater via a low-profile air stripper equipped with a 40 hp blower. Metals, such as iron, that oxidize during the air stripping process are removed from the air stripper effluent via bag filters. To eliminate the need to shut down the plant when the spent bag filters need replacement, two filter units are used so that when one unit is “on-line”, the other is in “stand by” mode. Each unit has eight bag filters.

Groundwater Discharge

Treated groundwater is pumped, using a 10 hp pump, from the air stripper to a stormwater manhole that discharges to a recharge basin on the adjacent, former NWIRP property, which is now owned by Nassau County. This discharge is permitted by Nassau County.

Air Stripper Off-gas Treatment

Project VOCs are removed from the air stripper off-gas using two 10,000 pound (lb), vapor phase granular activated carbon (VPGAC) emission control units (ECUs) and two 10,000 lb potassium permanganate-impregnated zeolite (PPZ) ECUs.

Groundwater Monitoring Network

The Groundwater Monitoring Network consists of 35 monitoring locations (i.e., 17 groundwater monitoring wells, 4 remedial wells, and 14 piezometers). Construction details for the monitoring wells and piezometers are provided in Appendix A. In accordance with the Groundwater IRM Environmental Effectiveness Monitoring Program, groundwater quality samples and depth-to-water measurements are periodically collected from the Groundwater Monitoring Network to assess the effectiveness of the Groundwater IRM.

4. Operation and Maintenance Activities

Groundwater IRM operation and maintenance (O&M) activities conducted during the reporting period are described below and summarized in Table 1:

- The Groundwater IRM treatment system operated full-time for 89 out of 91 days (98 percent uptime).
- The Groundwater IRM treatment system was monitored during most business days, either via a site visit or remotely via the wireless computer link-up.
- The Supervisory Control and Data Acquisition (SCADA) system operated as designed, and when conditions warranted (see below), shut the system down automatically and instantaneously, and provided notification to plant operators of system advisories and alarms.
- The system shut down automatically for the alarm conditions listed below. Alarm conditions were responded to and the system restarted on the same day or early the following day (see Table 1 for details):
    - Pump Overload Alarms: RW-2 motor overload alarms shut the system down on April 20 and April 24, 2010. The overload alarms were believed to be caused by iron fouling inside RW-2. After the second alarm, RW-2 was taken

off-line (from April 25 through May 14, 2010) to conduct scheduled well rehabilitation and to replace the well pump. During this period, the system was operated without RW-2.

- Blower Vacuum Alarms: A blower low-vacuum alarm briefly shut the system down on May 4, 2010 and a blower high-vacuum alarm briefly shut the system down on May 21, 2010. After both alarm events, the system was restarted without incident the same day. The blower alarms are believed to be due to fouling of the air stripper mist eliminator.

- An area-wide power interruption shut down the system on May 27, 2010. The system was restarted without incident the same day.

- In addition to the unplanned shutdowns noted above, the system was shut down intentionally between June 10 and 11, 2010 to complete scheduled maintenance activities on the air stripper.

5. Treatment System Compliance and Performance Monitoring

5.1 System Monitoring Activities

Except for the reduction of pH monitoring frequency from weekly to monthly (as approved by NYSDEC on February 8, 2010), the following compliance and performance monitoring events were performed in accordance with requirements of the OM&M Manual during this reporting period (see Appendix B, Table B-1 for a summary of the required compliance and performance monitoring program):

- Three monthly water and air sampling events.

- Fourteen weekly site visits to monitor and record key system operational parameters.

- Continuous monitoring of key system operational parameters by the SCADA system.

In addition to the required monitoring, the following additional, non-routine monitoring activities were performed during this reporting period to assess system performance:

- The following additional water sampling was performed:

  - April 12, May 10, and June 9, 2010 – treatment system influent and effluent samples were analyzed for cadmium (Cd), chromium (Cr), and manganese (Mg).

  - April 12, 2010 –RW-2 and RW-3 samples were analyzed for total iron (Fe).

- pH was measured at other locations besides the system effluent.

- The following additional vapor sampling was performed:

  - The VPGAC mid-train and PPZ mid-train were sampled during the April 12 and June 9, 2010 sampling events.

  - The system influent and VPGAC effluent/PPZ influent (system mid-train sample) were sampled during the June 9, 2010 sampling event.

- System parameters were monitored and observed at numerous additional times during this reporting period.

Field and analytical data collected during these monitoring events were used to assess performance of the Groundwater IRM and to determine whether the system discharges were compliant with project objectives. System performance and compliance results are discussed in Sections 5.2 and 5.3, respectively, of this report.

5.2 System Monitoring Results

In accordance with the OM&M Manual, the following tables, graphs, and appendices were developed to summarize the system operation during the current reporting period:

- An Operational Summary, including monitoring events, system operational days, and noteworthy site activities (Table 1).

- Summary of Influent and Effluent Water Sample Analytical Results (Tables 2 and 3, respectively). Table 3 also provides the Groundwater IRM treatment system removal efficiency. Complete validated Water Sample Analytical Result Summaries, per sample event, are included in Appendix B.

- Summary of Influent and Effluent Vapor Sample Analytical Results (Tables 4 and 5, respectively). Table 5 also provides the Groundwater IRM treatment system removal efficiency. Complete, validated Vapor Sample Analytical Results, per sample event, are included in Appendix C.
- System Parameters, including flow rates, line pressures, and temperatures (Table 6).
- Summary of Groundwater Recovered and TVOC Mass Removed (Table 7).
- Air Discharge Quality Evaluation and Compliance Table (Appendix D and Table 8, respectively).
- Cumulative TVOC Mass Removed (Figure 5).
- Remedial Well and Influent TVOC Concentrations (Figure 6).
- Influent Project, Non-Project, and Combined TVOC Concentrations (Figure 7).
- TVOC Mass Removal Rates (Figure 8).

5.3 Summary of OM&M Results

5.3.1 System Operation and Effectiveness

Groundwater IRM OM&M results for the current reporting period are summarized below:

- Total volume of groundwater recovered and treated (Table 7):
  - During this reporting period: Approximately 27 million gallons.
  - Project total (since July 2009, including groundwater pumped/treated during the system testing/troubleshooting phase): Approximately 98 million gallons.
- Total mass of VOCs recovered and estimated mass removal rates (Table 7):
  - During this reporting period: Approximately 189 pounds (lbs) of VOCs were recovered at an average rate of 1.9 lbs per operational day.

  - Project total (since July 2009, including groundwater pumped/treated during the system testing/troubleshooting phase): Approximately 730 lbs of VOCs were recovered.

- Total mass of VOCs recovered and estimated mass removal rates for each well during this reporting period (Table 7):

  - RW-1: Approximately 0.15 lbs of VOCs were recovered at an average rate of less than 0.01 lbs/day.

  - RW-2: Approximately 48 lbs of VOCs were recovered at an average rate of 0.48 lbs/day.

  - RW-3: Approximately 121 lbs of VOCs were recovered at an average rate of 1.2 lbs/day.

  - RW-4: Approximately 20 lbs of VOCs were recovered at an average rate of 0.20 lbs/day.

- During this reporting period:

  - The concentration of Project VOCs in the system influent appears to have leveled off at approximately 185 ug/L, which is significantly lower than its peak concentration of 1,035 ug/L in July 2009 (Table 2 and Figure 7). Note that RW-2, which has the highest concentration of Project VOCs, was not on-line during the May 2010 sampling event.

  - The concentration of Non-Project VOCs in the system influent decreased slightly in the last two events, down from an apparent peak concentration of ~ 800 ug/L from the previous two sampling events (Table 2 and Figure 7).

  - The amount of Non-Project VOCs in the system influent continued to be greater than the amount of Project VOCs in the system influent, a trend that started between December 2009 and January 2010 (Table 2 and Figure 7).

- The air stripper VOC removal efficiency was greater than 99.9 percent for Project and Non-Project VOCs during this reporting period (Table 3).

- The air stripper off-gas emission control system's overall efficiency calculated using all VOCs (both Project and Non-Project VOCs) was 29 to 39 percent. The system efficiency improved to 93 to 96 percent when calculated using only Project VOCs (Table 5). Note: the vapor phase treatment system was designed to reduce only Project VOCs.

5.3.2 Regulatory Status of Discharges

5.3.2.1 Air Discharge

To determine the compliance status of air discharge from the Groundwater IRM treatment system, the system's effluent vapor concentrations were compared to NYSDEC Division of Air Resources Air Guide-1 (DAR-1) Model Short-term Guideline Concentrations (SGCs [NYSDEC 2007]) (Table 5) and the effluent vapor laboratory results were compared to a site-specific modeled annual maximum allowable stack concentration (MASC). The annual MASC was calculated during each monitoring event for individual compounds using the output from the USEPA SCREEN3 Model in conjunction with the NYSDEC DAR-1 AGCs. A scaling factor was calculated using the SCREEN3 model with site-specific physical layout information (e.g. building dimensions, stack height, terrain, etc.) and operating data (e.g. air flow rate, temperature, etc.) inputs for each monitoring event. The scaling factor was then used to adjust (scale) the NYSDEC DAR-1 AGC to a site-specific MASC. A summary of the instantaneous percent (i.e., not time- weighted) of the site-specific annual MASC for Project VOCs, Freon 12, and Freon 22 is provided in Table 8. A summary of the cumulative annual percent (i.e. time-weighted) of the site-specific MASC for detected compounds is also provided in Table 8. A summary of the model inputs, outputs, and backup calculations is provided in Appendix D.

The Groundwater IRM air effluent met NYSDEC requirements throughout the reporting period, as indicated by the following:

- The measured concentrations of individual VOCs in the vapor effluent did not exceed applicable SGCs (Table 5).

- The measured concentration of individual VOCs in the vapor effluent did not exceed their applicable, instantaneous MASCs, as calculated using the USEPA SCREEN 3 Model (Table 8). Similarly, the time-weighted rolling averages for the individual Project VOCS, Freon 12, and Freon 22 are below their respective MASCs.

5.3.2.2 Water Discharge

The Groundwater IRM water effluent met NYSDEC requirements during this reporting period (Table 3 and Appendix B).

5.4 Performance and Compliance Monitoring Conclusions

Based on the data collected, the following conclusions were made about the system operation:

- The system operated within its normal operational parameters during this reporting period; except for the five unanticipated alarms that shut the plant down (which are described in Section 4).
- The system controls and interlocks functioned correctly during this reporting period.
- The majority (89 percent) of the VOC mass removed came from RW-2 and RW-3 (i.e. 169 lbs of the 189 total lbs]) (Table 7).
- Project VOCs were not detected in RW-1 or RW-4 above their respective SCGs. The majority (99% or greater) of VOCs detected in RW-4 are from non-project VOCs (i.e., Freon 22) (Appendix B).
- Concentrations of project-related VOCs appear to be leveling off. Concentrations of non-project VOCs (Freon 22) decreased during the current reporting period, but continue to remain elevated when compared with concentrations observed during system start-up. The percentage of Non-Project VOCs in the system influent is still greater than the percentage of Project VOCs (Table 2 and Figure 7).
- Mercury does not appear to be present in the site groundwater, as indicated by its absence in project water samples.
- The water discharge was compliant with project requirements.
- The air emissions were compliant with project requirements.

6. Environmental Effectiveness Monitoring

Groundwater IRM treatment system environmental effectiveness (i.e., hydraulic monitoring and groundwater quality monitoring) activities and results for this reporting period are discussed below. Environmental Effectiveness Monitoring was performed in accordance with OM&M Manual requirements and procedures.

6.1 Hydraulic Monitoring

6.1.1 Activities

In accordance with OM&M Manual requirements and methodologies, one quarterly round of hydraulic monitoring was performed during this reporting period. The depth-to-water was measured at 35 locations on April 23, 2010. The location of the 35 wells and piezometers are shown on Figure 4.

6.1.2 Results

The Groundwater IRM groundwater elevation measurements are provided in Table 9. The configuration of the potentiometric surface on April 23, 2010 is shown on Figure 4 and indicates that the groundwater containment system has established a capture zone that encompasses the southern portion of the site.

6.2 Groundwater Quality Monitoring

6.2.1 Activities

During the Second Quarter of 2010, no groundwater quality monitoring took place.

6.2.2 Results

Table 10 summarizes the results of laboratory analysis of VOCs in groundwater samples collected from monitoring wells associated with the Groundwater IRM to date. Table 11 summarizes the results of laboratory analysis of metals in groundwater samples collected from monitoring wells associated with the Groundwater IRM to date. When an appropriate amount of data has been collected, trend graphs will be developed for selected wells.

6.3 Environmental Effectiveness Monitoring Conclusions

As shown on Figure 4, ARCADIS has evaluated the operational hydraulic monitoring data and has concluded that the groundwater containment system is operating as expected and the associated capture zone has developed.

7. Groundwater IRM Recommendations

- Remove mercury from the SPDES equivalency program because mercury has never been detected in any system water sample.
- Inspect the air stripper mist eliminator and replace if fouled.
- Continue operating, maintaining, and monitoring the system per the Groundwater OM&M Manual.

8. References

ARCADIS U.S. Inc. (ARCADIS) 2008a. Remedial Investigation Report (Site Area). Operable Unit 3 – Former Grumman Settling Ponds, Bethpage, New York. NYSDEC Site #1-30-003A. February 1, 2008.

ARCADIS of New York, Inc. (ARCADIS) 2008b. Final Design Report, Operable Unit 3, Groundwater Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York. Site # 1-30-003A. August 2008.

ARCADIS of New York, Inc. (ARCADIS) 2009a. System Start-up Work Plan, Northrop Grumman Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. May 6, 2009.

ARCADIS of New York, Inc. (ARCADIS) 2009b. Draft Operation, Maintenance, and Monitoring Manual, Northrop Grumman Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. December 2009.

New York State Department of Environmental Conservation (NYSDEC), 2005, Order On Consent, Index # W1-0018-04-01, Site # 1-30-003A, July 4, 2005.

New York State Department of Environmental Conservation (NYSDEC), 2007, DAR-1 AGC/SGC Tables, Revised September 10, 2007.

New York State Department of Environmental Conservation (NYSDEC), 2009a, Interim State Pollution Discharge Elimination System (SPDES) Letter, March 19, 2009.

New York State Department of Environmental Conservation (NYSDEC), 2009b, System Start-up Work Plan Approval Letter, May 19, 2009.

New York State Department of Environmental Conservation (NYSDEC), 2009c, Draft DER-10 Technical Guidance for Site Investigation and Remediation, November, 2009.

Table 1. Operational Summary, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

MONTH	DAY 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Days Operational (1)
Jul-09																						#/b	b	#/**b	b	b	b	b	#	b	b	11
Aug-09	b	b	b	b	#/b	b	b			b	b	#/**b	b	b	b	b	b	b	#/b		b	b	b	b		b	b	b	b		b	30
Sep-09	#/b	b		b	b	b	b		b	#/**b	b	b	b	b		b	b	b		b	b		b	b		b	b		b			30
Oct-09	b			b	b			b	#/**	b			b		b			b		b	b	b		b	b			b				31
Nov-09		b			b			b		#/**									C1,2						b		b			b		30
Dec-09		#/**			b					b					b						b/P1,2				b					b		28
2009 Totals																																160
Jan-10				b				b			#/*	b					b					b				b					b	31
Feb-10		#/**b				b					b					b	C1				b					b						28
Mar-10		b					b			#/*		b						b					b					b				29
Apr-10	b				b					b		#/**	b				b			b(2)	b		b	(3)								30
May-10				b(4)						#/**				bb(5)	b	b		b			(6)	b				(7)			b		30
Jun-10									#/**	b(8)						b									b							29
2Q2010																																89
2010 Totals																																177
TOTAL																																**337**

Legend:

	Indicates system offline for at least the majority of the day.
	Indicates system online for at least the majority of the day.
	Indicates system operated with reduced flow rates.
#	Indicates water compliance samples were collected.
**	Indicates vapor compliance samples were collected.
b	Indicates filter bag unit changed over.

C1	Indicates VPGAC ECU 501 media changeout.
C2	Indicates VPGAC ECU 502 media changeout.
P1	Indicates PPZ ECU 601 media changeout.
P2	Indicates PPZ ECU 602 media changeout.

Notes:

(1) Days in which the system was operational for the majority of the day are counted as one day.

(2) The OU3 GW IRM shut down at 6:51 AM on April 20, 2010 due to a motor overload alarm condition at Remedial Well RW-2. The system was off-line for approximately 6 hours.

Notes continued on next page.

Table 1. Operational Summary, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

Notes Continued:

(3) The OU3 GW IRM shut down at 6:14 PM on April 24, 2010 due to a motor overload alarm condition at Remedial Well RW-2. The system was off-line for approximately 15 hours. The system was restarted on April 25, 2010 without Remedial Well RW-2, which was scheduled for well rehabilitation to remove the buildup of iron fouling inside the well. The RW-2 pump was replaced as part of the rehabilitation work.

(4) The OU3 GW IRM shut down at 4:55 AM on May 4, 2010 due to a low vacuum alarm condition at the process blower intake. The system was off-line for approximately 6 hours.

(5) Brought Remedial Well RW-2 back on-line on May 14, 2010 at 11:52 AM following the completion of the well rehabilitation activities and pump replacement.

(6) The OU3 GW IRM shut down at 11:59 AM on May 21, 2010 due to a high vacuum alarm condition at the process blower intake. The system was off-line for approximately 4 hours.

(7) The OU3 GW IRM shut down at 3:30 AM on May 27, 2010 due to a a temporary power supply interruption. The system was off-line for approximately 13 hours.

(8) The OU3 GW IRM was intentionally shut down at 1:22 PM on June 10, 2010 to perform scheduled maintenance on the system air stripper. The system was off-line for approximately 24 hours.

Acronyms\Key:

GW Groundwater.
IRM Interim Remedial Measure.
VPGAC Vapor phase granular activated carbon.
PPZ Potassium permanganate impregnated zeolite.
ECU Emission control unit.
PLC Programmable logic controller.

Table 2. Summary of Influent Water Sample Analytical Results, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

Compound [2]	08/12/09 (µg/L)	08/19/09 (µg/L)	09/01/09 (µg/L)	09/10/09 (µg/L)	10/09/09 (µg/L)	11/10/09 (µg/L)	12/02/09 (µg/L)	01/11/10 (µg/L)	02/02/10 (µg/L)	03/10/10 (µg/L)	04/12/10 (µg/L)	05/10/10 (µg/L)	06/09/10 (µg/L)
Project VOCs													
1,1,1 - Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 - Dichloroethane	2.9	3.3	2.4	2.2	1.9	2	2	2	1	ND	ND	ND	1.1
1,2 - Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 - Dichloroethene	ND	ND	1.1	ND	ND	1	1	1	ND	ND	ND	ND	0.93
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	18	17	**20**	**20**	**22**	**24**	**25**	**23**	**18**	17	17	10	**17**
Vinyl Chloride	**130**	**190**	**120**	**63**	**52**	**52**	**58**	**35**	**23**	**25**	**20**	ND	**22**
cis 1,2-Dichloroethene	**570**	**630**	**460**	**300**	**250**	**260**	**260**	**240**	**180**	**150**	**130**	**33**	**130**
trans 1,2-Dichloroethene	**71**	16	4.4	**43**	**17**	1	3	ND	**16**	ND	2.6	ND	0.9
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	**28**	**55**	**63**	**34**	**28**	**53**	**43**	**24**	13	20	15	ND	9.9
Subtotal Project VOCs	**820**	**911**	**671**	**462**	**371**	**393**	**391**	**325**	**251**	**212**	**185**	**43**	**182**
Non-Project VOCs													
Dichlorodifluoromethane (Freon 1:	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorodifluoromethane (Freon 22)	**26**	**29**	**52**	**69**	**100**	**220**	**210**	**440**	**480**	**590**	**610**	**650**	**450**
Subtotal Non-Project VOCs	**26**	**29**	**52**	**69**	**100**	**220**	**210**	**440**	**480**	**590**	**610**	**650**	**450**
Total VOCs [3]	**846**	**940**	**723**	**531**	**471**	**613**	**601**	**765**	**731**	**802**	**795**	**693**	**632**
Inorganics													
Total Iron	**1,220**	**1,620**	NA	**980**	**1,680**	**1,240**	**1,930**	**500**	**4,050**	**790**	**1,470**	**1,060**	**4,840**
Total Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
pH [4]	6.1	5.7	6.1	6.1	5.9	6.1	5.9	6.1 [5]	5.8	6.5	6.7	6.8	6.0

See notes on last page.

Table 2. Summary of Influent Water Sample Analytical Results, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

Notes:

(1) Water samples collected by ARCADIS on the dates shown and submitted to Columbia Analytical Services, Inc. for VOC analyses per NYSDEC ASP 2000, Method OLM 4.3, for iron analyses per USEPA Method 6010 and for mercury analyses per USEPA Method 7470. The VOC analyte list is provided in the DRAFT Groundwater IRM OM&M Manual (ARCADIS 2009b). Influent water samples were collected from Water Sampling Port-5 (WSP-5); refer to Figure 3 of this OM&M Report for the schematic location of WSP-5.

(2) Only VOCs associated with the interim State Pollutant Discharge Elimination System (SPDES) equivalency program, plus Toluene, Benzene, non-project related Freon 12 and Freon 22, Mercury and Iron are included in this table. Complete VOC and inorganic data summary tables, including VOC TICs, are provided in Appendix B. Laboratory data qualifiers are included in the Appendix B tables.

(3) "Total VOCs" represents the sum of individual concentrations of all compounds detected. The values used in calculations referenced in this report have not been rounded.

(4) pH samples collected and measured in the field by ARCADIS personnel on the dates listed using an Oakton Model 300 pH/conductivity meter. pH units are standard units.

(5) The January 2010 pH value was measured on December 7, 2009.

Acronyms\Key:

700	Bold data indicates that the analyte was detected at or above its reporting limit.
16	Data that is not bold indicates analyte detected but below its reporting limit; the value is estimated.
µg/L	Micrograms per liter.
ND	Analyte not detected at, or above its laboratory quantification limit.
NA	Not analyzed.
NYSDEC	New York State Department of Environmental Conservation.
USEPA	United States Environmental Protection Agency.
TICs	Tentatively identified compounds.
VOC	Volatile organic compound.
IRM	Interim remedial measure.
OM&M	Operation, maintenance and monitoring.

Table 3. Summary of Effluent Water Sample Analytical Results, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

Compound [2]	Discharge Limit [3] (µg/L)	08/12/09 (µg/L)	08/19/09 (µg/L)	09/01/09 (µg/L)	09/10/09 (µg/L)	10/09/09 (µg/L)	11/10/09 (µg/L)	12/02/09 (µg/L)	01/11/10 (µg/L)	02/02/10 (µg/L)	03/10/10 (µg/L)	04/12/10 (µg/L)	05/10/10 (µg/L)	06/09/10 (µg/L)
Project VOCs														
1,1,1 - Trichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 - Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2 - Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 - Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis 1,2 Dichloroethene	5	0.67	0.64	0.44	ND	ND	ND	0.32	ND	0.23	ND	ND	ND	ND
trans 1,2 Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Subtotal Project VOCs	--	**0.7**	**0.6**	**0.4**	**0.0**	**0.0**	**0.0**	**0.3**	**0.0**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**
Non-Project VOCs														
Dichlorodifluoromethane (Freon 12)	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorodifluoromethane (Freon 22)	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Subtotal Non-Project VOCs	--	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total VOCs [4]	--	**0.7**	**0.6**	**0.4**	**0.0**	**0.0**	**0.0**	**0.3**	**0.0**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**
Treatment Efficiency [5]	--	**> 99.9%**	**> 99.9%**	**> 99.9%**	**> 99.9%**	**> 99.9%**	**> 99.9%**	**> 99.9%**	**> 99.9%**	**> 99.9%**	**> 99.9%**	**> 99.9%**	**> 99.9%**	**> 99.9%**
Inorganics														
Total Iron	600	**1,480**	**1,870**	NA	**1,250**	**1,120**	**910**	**350**	**560**	**320**	**540**	**520**	**400**	**490**
Total Mercury	250	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
pH [6]	5.5 - 8.5	6.8	6.5	7.0	7.0	7.2	6.9	6.8	6.8 [7]	6.4	6.9	7.0	7.0	6.4

See notes on last page.

Table 3. Summary of Effluent Water Sample Analytical Results, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

Notes:

(1) Water samples collected by ARCADIS on the dates shown and submitted to Columbia Analytical Services, Inc. for VOC analyses per NYSDEC ASP 2000, Method OLM 4.3, for iron analyses per USEPA Method 6010 and for mercury analyses per USEPA Method 7470. The VOC analyte list is provided in the DRAFT Groundwater IRM OM&M Manual (ARCADIS 2009b). Effluent water samples were collected from Water Sampling Port-7 (WSP-7); refer to Figure 3 of this OM&M Report for the location of WSP-7.

(2) Only VOCs associated with the interim SPDES equivalency program, including Toluene, Benzene, non-project related Freon 12 and Freon 22, Mercury and Iron are included in this table. Complete VOC and inorganic data summary tables, including VOC TICs, are provided in Appendix B. Laboratory data qualifiers are included in the Appendix B tables.

(3) Discharge limits per the interim SPDES equivalency program or Division of Water Technical and Operational Guidance Series (TOGS 1.1.1) Quality Standards and Guidance Values and Groundwater Effluent Limitations, if the compound is not part of the interim SPDES equivalency program.

(4) Total VOCs" represents the sum of individual concentrations of all compounds detected. The values used in calculations referenced in this report have not been rounded.

(5) Treatment efficiency was calculated by dividing the difference between the influent and effluent total VOC concentrations by the influent total VOC concentration.

(6) pH samples collected and measured in the field by ARCADIS personnel on the dates listed using an Oakton Model 300 pH/conductivity meter. pH units are standard units.

(7) The January 2010 pH value was measured on December 7, 2009.

Acronyms\Key:

700	Bold data indicates that the analyte was detected at or above its reporting limit.
16	Data that is not bold indicates analyte detected but below its reporting limit; the value is estimated.
6	Bold box indicates value is greater than discharge criterion.
µg/L	Micrograms per liter.
ND	Analyte not detected at, or above its laboratory quantification limit.
NA	Not analyzed.
--	Not applicable.
NYSDEC	New York State Department of Environmental Conservation.
USEPA	United States Environmental Protection Agency.
TICs	Tentatively identified compounds.
VOC	Volatile organic compound.
IRM	Interim remedial measure.
OM&M	Operation, maintenance, and monitoring.
>	Greater than.
SPDES	State pollutant discharge elimination system.

Table 4. Summary of Influent Vapor Sample Analytical Results, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

Compound (2)	08/12/09 (µg/m^3)	09/10/09 (µg/m^3)	10/09/09 (µg/m^3)	11/10/09 (µg/m^3)	12/02/09 (µg/m^3)	02/02/10 (µg/m^3)	04/12/10 (µg/m^3)	06/09/10 (µg/m^3)
Project VOCs								
1,1,1, Trichloroethane	ND	ND	ND	5.2	ND	ND	ND	**3.6**
1,1 - Dichloroethane	ND	ND	ND	36	**29**	**26**	**20**	**15**
1,2 - Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1 - Dichloroethene	ND	ND	ND	18	**17**	**16**	**14**	**12**
Tetrachloroethene	ND	ND	ND	11	ND	**6.1**	ND	**5.5**
Trichloroethene	**300**	**360**	**330**	**400**	**420**	**370**	**280**	**230**
Vinyl Chloride	**3,000**	**1,500**	**1,200**	**1,200**	**800**	**410**	**330**	**220**
cis 1,2-Dichloroethene	**15,000**	**7,800**	**6,000**	**7,000**	**4,500**	**3,100**	**2,400**	**1,900**
trans 1,2-Dichloroethene	ND	ND	ND	9	ND	**4.6**	ND	**2.5**
Benzene	ND	ND	ND	5.5	ND	ND	ND	**2**
Toluene	**820**	**1,100**	**790**	**1200**	**770**	**370**	**340**	**150**
Subtotal Project VOCs	**19,120**	**10,760**	**8,320**	**9,885**	**6,536**	**4,303**	**3,384**	**2,541**
Non-Project VOCs								
Dichlorodifluoromethane (Freon 12)	ND	ND	ND	ND	ND	ND	ND	**3.5**
Chlorodifluoromethane (Freon 22)	ND	**550**	**7.1**	**2,800**	**2,500**	**3,700**	**4,700**	**5,200**
Subtotal Non-Project VOCs	**0**	**550**	**7.1**	**2,800**	**2,500**	**3,700**	**4,700**	**5,204**
Total VOCs (3)	**19,120**	**11,310**	**8,327**	**12,685**	**9,036**	**8,003**	**8,153**	**7,745**

See notes on last page.

Table 4. Summary of Influent Vapor Sample Analytical Results, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

Notes:

(1) Vapor samples collected by ARCADIS on the dates shown and submitted to Columbia Analytical Services, Inc. for VOC analyses per Modified USEPA Method T0-15. A VOC analyte list is provided in the DRAFT Groundwater IRM OM&M Manual (ARCADIS 2009b). Influent samples were collected at Vapor Sampling Port-1 (VSP-1); refer to Figure 3 of this OM&M Report for the location of VSP-1.

(2) Only VOCs that are associated with the interim State Pollutant Discharge Elimination System (SPDES) equivalency program, Toluene, Benzene, and non-project related Freon 12 and Freon 22 are included in this table. Complete VOC summary tables, including VOC TICs, are provided in Appendix C. Laboratory data qualifiers are included in the Appendix C tables.

(3) Total VOCs" represents the sum of individual concentrations of all compounds detected. The values used in calculations referenced in this report have not been rounded.

Acronyms\Key:

700	Bold data indicates that the analyte was detected at or above its reporting limit.
16	Data that is not bold indicates analyte detected but below its reporting limit; the value is estimated.
µg/m^3	Micrograms per cubic meter.
ND	Analyte not detected at or above its laboratory reporting limit.
USEPA	United States Environmental Protection Agency.
TICs	Tentatively identified compounds.
VOC	Volatile organic compound.
IRM	Interim remedial measure.
OM&M	Operation, maintenance, and monitoring.

Table 5. Summary of Effluent Vapor Sample Analytical Results, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

Compound [2]	Discharge Limit [3] ($\mu g/m^3$)	08/12/09 ($\mu g/m^3$)	09/10/09 ($\mu g/m^3$)	10/9/09 [9] ($\mu g/m^3$)	11/12/09 ($\mu g/m^3$)	12/02/09 ($\mu g/m^3$)	01/11/10 ($\mu g/m^3$)	02/02/10 ($\mu g/m^3$)	03/10/10 ($\mu g/m^3$)	04/12/10 ($\mu g/m^3$)	05/10/10 ($\mu g/m^3$)	06/09/10 ($\mu g/m^3$)
Project VOCs												
1,1,1 - Trichloroethane	68,000	ND	ND	--	ND	ND	ND	ND	**1**	ND	ND	**0.97**
1,1 - Dichloroethane	NS	**5.7**	**5.3**	--	**37**	**4**	**3**	ND	**6**	ND	**1.2**	**4.4**
1,2 - Dichloroethane	NS	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND
1,1 - Dichloroethene	380 [4]	ND	ND	--	5.8	**1**	ND	ND	**1**	ND	ND	**0.77**
Tetrachloroethene	1,000	ND	ND	--	ND	ND	ND	ND	**1**	ND	ND	**1.1**
Trichloroethene	14,000	**4.7**	**8.8**	--	**15**	**30**	**13**	**13**	**17**	**17**	**5.1**	**12**
Vinyl Chloride	180,000	**260**	**160**	--	**200**	**52**	**36**	**12**	**29**	**27**	ND	**5**
cis 1,2 Dichloroethene	190,000 [5]	**120**	**150**	--	**1,700**	**230**	**52**	**34**	**77**	**65**	**9.2**	**21**
trans 1,2 Dichloroethene	NS	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1,300	**21**	**17**	--	13	**12**	**8**	**17**	**5**	**29**	**7.8**	**13**
Toluene	37,000	**110**	**120**	--	**87**	**90**	**38**	**40**	**96**	**80**	ND	**44**
Subtotal Project VOCs	NA	**521**	**461**	**--**	**2,058**	**419**	**150**	**116**	**233**	**218**	**23**	**102**
Non-Project VOCs												
Dichlorodifluoromethane (Freon 12)	NS	ND	**10**	--	**61**	**2**	**3**	**3**	**4**	ND	**3.5**	**3.5**
Chlorodifluoromethane (Freon 22)	NS	**220**	**540**	--	**3,600**	**2,400**	**3,700**	**3,700**	**4,700**	**4,800**	**3,500**	**5,400**
Subtotal Non-Project VOCs	NA	**220**	**550**	**--**	**3,661**	**2,402**	**3,703**	**3,703**	**4,704**	**4,800**	**3,504**	**5,404**
Total VOCs [6]	NA	**741**	**1,011**	**--**	**5,719**	**2,822**	**3,853**	**3,819**	**4,936**	**5,018**	**3,527**	**5,506**
Treatment Efficiency w/Freons [7]	NA	**96.1%**	**91.1%**	**--**	**54.9%**	**68.8%**	**--**	**52.3%**	**--**	**38.5%**	**--**	**28.9%**
Treatment Efficiency w/o Freons [8]	NA	**97.3%**	**95.7%**	**--**	**79.2%**	**93.6%**	**--**	**97.3%**	**--**	**93.6%**	**--**	**96.0%**

See notes on last page.

Table 5. Summary of Effluent Vapor Sample Analytical Results, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

Notes:

(1) Vapor samples collected by ARCADIS on the dates shown and submitted to Columbia Analytical Services, Inc. for VOC analyses per Modified USEPA Method T0-15. A VOC analyte list is provided in the DRAFT Groundwater IRM OM&M Manual (ARCADIS 2009b). Effluent samples were collected at Vapor Sampling Port-5 (VSP-5); refer to Figure 3 of this OM&M Report for the location of VSP-5.

(2) Only VOCs that are associated with the interim State Pollutant Discharge Elimination System (SPDES) equivalency program, Toluene, Benzene, and non-project related Freon 12 and Freon 22 are included in this table. Complete VOC summary tables, including VOC TICs, are provided in Appendix C. Laboratory data qualifiers are included in the Appendix C tables.

(3) Discharge limit is compound specific short-term guidance concentration (SGC) per the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007.

(4) An SGC was not provided in the DAR-1 AGC/SGC Tables, dated September 10, 2007. An interim SGC was developed based on guidance of the New York State DAR-1 Guidelines for the Control of Toxic Ambient Air Contaminants, 1991 edition. Specifically for 1,1- dichloroethene, which is not defined as provided in Section IV.A.2.b.1 a high-toxicity compound, the Interim SGC = (smaller of Time Weighted Average [TWA] - Threshold Limit Value or TWA - Recommended Exposure Limit)/4.2. or 1,600 µg/m3 / 4.2 = approximately 380 µg/m3. An interim SGC was developed for this compound because it has a moderate toxicity rating, as specified in the DAR-1 AGC/SGC Tables, dated September 10, 2007.

(5) An SGC was not provided in the DAR-1 AGC/SGC Tables, dated September 10, 2007. An interim SGC was developed based on guidance provided in Section IV.A.2.b.1 of the New York State DAR-1 Guidelines for the Control of Toxic Ambient Air Contaminants, 1991 edition. Specifically for cis-1,2 dichloroethene, which is not defined as a high-toxicity compound, the interim SGC = (smaller of Time Weighted Average [TWA] - Threshold Limit Value or TWA - Recommended Exposure Limit)/4.2 or 790,000 µg/m3 / 4.2 = approximately 190,000 µg/m3. An interim SGC was developed for this compound because it has a moderate toxicity rating, as specified in the DAR-1 AGC/SGC Tables, dated September 10, 2007.

(6) Total VOCs" represents the sum of individual concentrations of all compounds detected. The values used in calculations referenced in this report have not been rounded.

(7) Treatment efficiency was calculated by dividing the difference between the influent and effluent total VOC concentrations by the influent total VOC concentration. Treatment efficiency is only calculated when there is a corresponding influent sample.

(8) Treatment efficiency was calculated by dividing the difference between the influent and effluent total Project VOC concentrations by the influent total Project VOC concentration. Treatment efficiency is only calculated when there is a corresponding influent sample.

(9) An effluent sample was not collected on date shown due to inadaquate air pressure in sample container.

Acronyms\Key:

700	Bold data indicates that the analyte was detected at or above its reporting limit.
16	Data that is not bold indicates analyte detected but below its reporting limit; the value is estimated.
µg/m^3	Micrograms per cubic meter.
ND	Analyte not detected at or above its laboratory reporting limit.
NA	Not applicable.
NYSDEC	New York State Department of Environmental Conservation.
USEPA	United States Environmental Protection Agency.
TICs	Tentatively identified compounds.
VOC	Volatile organic compound.
IRM	Interim remedial measure.
OM&M	Operation, maintenance, and monitoring.
NS	Guideline concentrations not specified in the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007. An interim SGC was not developed for these compounds because they have low toxicity ratings in the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007.
AGC	Annual guideline concentration.
--	Data not available or value could not be calculated.

Table 6. Summary of System Parameters, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Date [1]	Water Flow Rates [2]						Water Pressures [2]					Air Flow Rate [2]	Air Pressures [2]					Air Temp. [2]
	Remedial Well				Combined Influent	Effluent	Remedial Well Effluent [3]				Effluent	Effluent	ECU Influent		Intermediate		Effluent	Stack Temp.
	RW-1 (gpm)	RW-2 (gpm)	RW-3 (gpm)	RW-4 (gpm)	(gpm)	(gpm)	RW-1 (psi)	RW-2 (psi)	RW-3 (psi)	RW-4 (psi)	(psi)	(scfm)	GAC-501 (inH_2O)	GAC-502 (inH_2O)	PPZ-601 (inH_2O)	PPZ-602 (inH_2O)	(inH_2O)	(^oR)
07/21/09	30.7	75.0	76.0	31.0	219	217	57.0	68.2	63.2	56.0	8.0	2,022	8.5	6.5	4.5	1.5	0.5	540
08/05/09	30.3	75.2	75.4	30.1	218	229	56.6	65.7	65.2	56.9	8.5	1,999	8.4	6.5	4.8	2.0	0.1	543
09/01/09	30.4	75.2	75.7	30.7	220	220	56.9	49.9	64.2	56.5	9.0	2,116	9.0	6.9	4.2	2.1	0.0	542
09/30/09	30.3	75.3	75.4	30.4	218	228	57.2	42.9	63.9	56.5	7.5	2,097	8.5	6.6	5.0	2.1	0.1	539
10/09/09	30.5	75.3	75.3	30.7	219	223	57.0	42.3	63.6	55.9	9.0	2,065	8.5	6.5	5.0	2.1	0.0	540
11/10/09 [4]	30.4	75.2	75.6	30.2	218	230	57.1	58.9	63.4	56.8	9.0	2,126	8.6	6.5	5.0	2.0	0.0	534 [5]
12/02/09	30.4	75.3	75.2	30.2	216	228	57.1	56.3	65.2	56.8	9.0	1,935	9.0	6.0	4.5	2.0	0.0	538 [5]
12/30/09	30.4	75.4	75.4	30.6	219	220	57.2	42.2	65.3	56.6	6.5	2,220	8.5	5.3	3.3	1.2	0.0	531 [5]
01/11/10	30.5	75.7	75.7	30.4	219	218	57.5	40.6	65.6	57.0	7.0	2,184	8.7	5.3	3.5	1.1	0.0	531 [5]
02/02/10	30.5	75.6	75.7	30.9	220	216	57.2	42.9	65.1	56.5	8.0	2,135	8.6	5.1	3.4	1.3	0.0	530 [5]
03/10/10	30.8	75.2	75.2	30.6	218	229	57.5	34.3	65.9	56.9	6.5	2,099	6.0 [6]	7.7 [6]	3.4	1.2	0.0	537 [5]
04/12/10	30.1	75.2	75.6	30.5	218	229	59.0	28.2	67.2	58.2	7.5	2,086	5.8	7.5	3.2	1.1	0.0	540
05/10/10	30.3	0.0 [7]	75.6	30.6	139	137	59.3	-5.6 [7]	68.8	59.0	6.0	2,076	6.0	7.7	3.3	1.1	0.0	540
06/09/10	30.3	75.4	75.6	30.4	216	218	59.4	58.7	68.0	59.0	8.0	2,003	7.8	9.5	5.2	3.5	0.0	537

See notes on last page.

Table 6. Summary of System Parameters, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Notes:

(1) Operational data collected by ARCADIS on days noted. Parameters listed were typically recorded during compliance monitoring events. Data in this table corresponds to approximately the past three quarters of system operation.

(2) Instantaneous values from field-mounted instruments, except for the combined influent water-flow rate, which is the sum of individual well flow rates via the Supervisory Control and Data Acquisition (SCADA) System.

(3) Remedial Well effluent pressure readings measured at the influent manifold within the treatment system building.

(4) Parameters shown were recorded during the November 2, 2009 site visit and represent the conditons for this monitoring period.

(5) Total effluent air temperature gauge (TI-601) malfunctioning; the value shown was measured at the mid-train air temperature gauge (TI-501).

(6) The emission control units were reconfigured after the February 17, 2010 VPGAC media replacement event. VPGAC ECU-502 was placed in the lead position and VPGAC ECU-501 was placed in the lag position.

(7) Remedial Well RW-2 was off-line between April 24 and May 14, 2010 for rehabilitation activities and to replace the well pump and motor.

Acronyms\Key:

^{o}R	Degrees Rankine.
gpm	Gallons per minute.
inH_2O	Inches of water column.
NM	Not measured.
psi	Pounds per square inch.
scfm	Standard cubic feet per minute.
Temp.	Temperature.
ECU	Emission control unit.
VPGAC	Vapor phase granular activated carbon.

Table 7. Summary of Groundwater Recovered and TVOC Mass Removed, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Operating Period [1]	Volume of Groundwater Recovered (x1,000 gal) [2]					TVOC Mass Recovered (lbs) [3]					TVOC Mass Recovery Rate (lbs/day) [4]				
	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total
System Pilot Test, Shakedown and Start Up Totals [5]															
	137	270	251	150	808	NA	NA	NA	NA	1.1	NA	NA	NA	NA	NA
2009 Totals [6]															
7/21/09 - 12/30/09	6,592	13,838	16,445	6,574	43,449	0.41	280	54	13	350	<0.01	1.9	0.3	0.1	2.2
January 2010 through March 2010 Totals															
Subtotal Jan-Mar 10 [7]	3,805	9,389	9,411	3,790	26,395	0.13	65	109	14	188	<0.01	0.75	1.3	0.16	2.2
April 2010 through June 2010 Totals															
03/29/10 - 04/26/10	1,179	2,785	2,934	1,178	8,076	0.04	16	34	5.5	56	<0.01	0.57	1.2	0.20	2.0
04/26/10 - 06/01/10	1,561	1,914	3,842	1,556	8,873	0.06	11	45	7.3	63	<0.01	0.31	1.3	0.20	1.8
06/01/10 - 07/06/10	1,455	3,625	3,633	1,462	10,175	0.05	21	42	6.9	70	<0.01	0.60	1.2	0.20	2.0
Subtotal April-June 10 [8]	4,195	8,324	10,409	4,196	27,124	0.15	48	121	20	189	<0.01	0.48	1.2	0.20	1.9
Subtotal 2010 [9]	8,000	17,713	19,820	7,986	53,519	0.28	113	230	34	377	<0.01	0.60	1.2	0.20	2.0
Total [10]	14,730	31,820	36,520	14,710	97,780	0.69	390	280	47	730	NA	NA	NA	NA	NA

See notes on last page.

Table 7. Summary of Groundwater Recovered and TVOC Mass Removed, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Notes:

(1) Represents operating period between consecutive monitoring events.
(2) Volume of groundwater recovered is based on individual local well totalized flow readings. Listed value is the difference between totalized flow values recorded between consecutive monitoring events. The total groundwater recovered during a given operating period is the sum of the individual well flow totals. Values shown have been rounded to the nearest gallon.
(3) Mass recovered per well was calculated by multiplying the TVOC concentration from the most recent sampling event by the number of gallons extracted between sampling events. The total amount recovered during a given operating period is the sum of masses recovered from each of the individual wells. Values shown have been rounded to include two significant figures to account for error associated with field measurements and analytical data.
(4) Mass recovery rates were calculated by dividing the total mass recovered for each well and for the system by the number of days the system operated during the respective operating period. Values shown have been rounded to include two significant figures to account for error associated with field measurements and analytical data.
(5) Values based on operational data recorded prior to system startup on July 21, 2009.
(6) The volume of groundwater recovered and mass recovered calculations represent the operational period between system start-up on July 21, 2009 and December 30, 2009.
(7) The volume of groundwater recovered and mass recovered calculations represent the operational period between December 30, 2009 and March 31, 2010.
(8) The volume of groundwater recovered and mass recovered calculations represent the operational period between March 31, 2010 and June 30, 2010.
(9) "Subtotal 2010" refers to the amounts removed by the OU3 Groundwater IRM during 2010; mass recovery rates are averages and not totals.
(10) "Total" refers to the amounts removed by the Operable Unit 3 Groundwater Interim Remedial Measure. Total volume of groundwater recovered reported is rounded to the nearest 10 gallons. Total mass recovered reported has been rounded to include two significant figures to account for error associated with field measurements and analytical data.

Acronyms\Key:

TVOC	Total volatile organic compounds.
gal	Gallons.
IRM	Interim Remedial Measure.
lbs	Pounds.
lbs/day	Pounds per day.
NA	Not applicable.
<	Less than.

Table 8. Air Emissions Model Output Summary, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Compound [1]	AGC [2] ($\mu g/m^3$)	Percent of MASC Per Event [3]											Cumulative % MASC [4]
		7/24/09	8/12/09	9/10/09	11/10/09	12/2/09	1/11/10	2/2/10	3/10/10	4/12/10	5/10/10	6/9/10	
1,1,1 - Trichloroethane	1,000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1,1 - Dichloroethane	0.63	0.09%	0.14%	0.13%	0.90%	0.09%	0.07%	0.00%	0.14%	0.00%	0.03%	0.11%	0.12%
1,2 - Dichloroethane	0.038	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1,1 - Dichloroethene	70	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2-Butanone	5,000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Acetone	28,000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Chloroform	0.043	0.00%	0.00%	0.00%	10.72%	2.05%	1.51%	2.83%	2.82%	0.00%	1.25%	2.37%	1.16%
Ethylbenzene	1,000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Xylenes (o)	100	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Xylenes (m,p)	100	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Chloromethane	90	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Methylene Chloride	2.1	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Tetrachloroethene	1	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.02%	0.00%
Trichloroethene	0.5	0.28%	0.14%	0.27%	0.46%	0.93%	0.40%	0.40%	0.52%	0.52%	0.16%	0.36%	0.40%
Vinyl Chloride	0.11	7.40%	35.78%	22.18%	27.94%	7.30%	5.07%	1.68%	4.05%	3.76%	0.00%	0.69%	10.90%
cis 1,2 Dichloroethene	63	0.01%	0.03%	0.04%	0.41%	0.06%	0.01%	0.01%	0.02%	0.02%	0.00%	0.01%	0.05%
trans 1,2 Dichloroethene	63	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Benzene	0.13	5.57%	2.45%	1.99%	1.54%	1.43%	0.93%	2.02%	0.54%	3.42%	0.92%	1.52%	1.62%
Toluene	5,000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2-Hexanone	48	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Trichlorofluoromethane (Freon 11)	1,000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Dichlorodifluoromethane (Freon 12)	12,000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Chlorodifluoromethane (Freon 22)	50,000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

See notes on last page.

Table 8. Air Emissions Model Output Summary, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Notes:

(1) Only VOCs that were detected in the effluent vapor sample (VSP-5) since system start up are included in this table.

(2) AGC refers to the compound-specific annual guideline concentration per the NYSDEC DAR-1 AGC/SGC tables, revised September 10, 2007. NYSDEC DAR-1 AGCs were scaled using the results of a site-specific annual USEPA SCREEN 3 model to calculate the annual maximum allowable stack concentration (MASC) per monitoring event.

(3) Percent of AGC (or Percent MASC) was calculated by dividing the actual effluent concentration by the site-specific annual MASC. Detailed calculations are included in Appendix D.

(4) Cumulative percent of the MASC was calculated using a time-weighted average of the percent MASC per event.

Acronyms\Key:

µg/m^3	Micrograms per cubic meter.
NYSDEC	New York State Department of Environmental Conservation.
USEPA	United States Environmental Protection Agency.
SGC	Short-term Guideline Concentration.
AGC	Annual Guideline Concentration.
DAR-1	Division of Air Resources-1.
VOCs	Volatile Organic Compounds.

Table 9. Summary of Water Level Elevations, Groundwater IRM, Northrop Grumman Systems Corporation, Operable Unit 3 (Former Bethpage Settling Ponds), Bethpage, New York.

Well Identification	Well Casing Elevations (ft msl)	Event Date	Baseline 5/8/2009 (ft msl)	Week 1, Day 2 07/22/09 (ft msl)	Week 1, Day5 07/25/09 (ft msl)	Week 2 7/27/09 (ft msl)	Week 3 08/05/09 (ft msl)	Week 6 08/27/09 (ft msl)	Week 7 09/01/09 (ft msl)	Week 8 09/11/09 (ft msl)	Week 9 09/17/09 (ft msl)	Week 10 09/23/09 (ft msl)	Week 20 11/30/09 (ft msl)	1Q2010 2/4/2010 (ft msl)	2Q2010 04/23/10 (ft msl)
Recovery Wells															
RW-1	125.18		69.75	71.53	NM	NM	NM	70.88	69.85	70.21	70.93	70.74	70.32	70.67	74.38
RW-2	124.48		72.27	65.94	65.66	67.57	65.60	63.42	63.16	63.27	61.51	61.30	63.07	61.80	64.88
RW-3	122.84		69.40	68.61	68.52	68.55	68.49	67.89	68.05	68.04	67.88	67.68	67.29	67.64	71.4
RW-4	121.25		69.25	71.11	71.21	71.21	71.23	70.55	69.40	70.12	70.77	70.37	70.01	70.35	74.02
Monitoring Wells															
B24MW-2	126.96		74.31	74.71	74.75	74.92	75.04	74.48	74.58	74.56	74.69	74.35	73.54	74.13	76.16
B24MW-3	127.11		72.63	72.86	73.03	73.04	73.07	72.37	71.46	69.71	72.33	72.23	71.71	72.16	75.87
B30MW-1	128.33		73.55	73.78	73.92	73.97	73.92	73.27	73.43	73.35	73.29	73.19	72.68	73.00	76.54
BCPMW-1	125.73		73.16	73.37	73.69	73.57	73.56	72.83	73.16	73.00	72.98	72.79	72.43	72.67	76.26
BCPMW-2	126.39		72.55	71.37	72.75	72.69	72.71	72.01	72.26	72.16	72.04	71.93	71.38	71.83	75.52
BCPMW-3	124.94		72.46	64.59	72.44	72.44	72.39	71.74	71.94	71.82	71.75	71.60	71.12	71.59	75.24
BCPMW-4-1	128.76		72.30	72.26	72.18	72.12	72.13	71.51	70.36	71.55	71.51	71.40	70.96	71.33	75.05
BCPMW-4-2	129.15		72.58	72.25	72.21	72.24	72.16	71.53	70.43	71.59	71.55	71.44	70.95	71.36	75.07
BCPMW-4-3	129.19		72.32	72.34	72.37	72.31	72.31	71.67	70.59	71.81	71.65	71.55	71.07	71.46	75.16
BCPMW-5-1	129.37		72.79	72.88	73.05	73.52	73.42	72.22	72.55	72.36	72.24	72.15	71.77	72.14	75.66
BCPMW-6-1	126.01		72.12	72.21	72.15	72.09	72.09	71.47	71.61	71.58	71.43	71.31	70.85	71.26	74.91
BCPMW-6-2	125.16		71.74	71.77	71.83	71.73	71.73	71.11	71.29	70.53	71.11	70.87	70.58	70.96	74.64
BCPMW-7-1	124.81		72.00	72.22	72.23	72.14	72.14	71.55	71.68	71.62	71.50	71.41	70.94	71.33	74.99
MW-200-1	123.49		72.16	72.30	72.22	72.25	72.22	71.58	70.52	71.74	71.66	72.64	70.95	71.37	75.07
MW-201-1	121.69		72.04	72.10	72.03	71.99	71.96	71.38	71.50	71.40	71.37	72.45	70.69	71.10	74.84
MW-202-1	119.27		71.90	71.98	72.07	72.02	72.94	71.35	71.48	71.46	71.40	72.26	70.72	71.13	74.83
MW-203-1	118.25		71.83	71.99	71.96	72.01	71.93	71.32	71.45	71.40	71.40	72.24	70.69	71.10	74.75
Piezometers															
PZ-1a	128.82		72.56	72.03	71.95	71.90	71.90	71.30	71.40	71.50	71.31	71.20	70.75	71.15	74.87
PZ-1b	128.92		72.47	71.74	71.84	71.76	71.78	71.18	71.35	71.37	71.21	71.11	70.67	71.09	74.78
PZ-1c	128.96		72.47	72.32	72.36	72.26	72.34	71.65	71.21	71.75	71.62	71.48	71.11	71.48	75.15
PZ-2a	128.36		72.47	72.02	71.95	71.88	71.87	71.27	71.41	71.38	71.27	71.15	70.73	71.09	74.82
PZ-2b	128.37		72.43	70.32	71.90	71.87	71.86	71.26	71.40	71.37	71.24	71.13	70.70	71.08	74.77
PZ-2c	128.55		72.41	70.60	72.28	72.21	72.21	71.57	71.75	71.66	71.57	71.44	71.02	71.40	75.05
PZ-3	124.99		72.52	47.10	71.77	71.68	71.72	71.10	71.27	71.18	71.10	71.03	70.52	70.94	74.69
PZ-4	125.31		72.50	53.89	71.75	71.77	71.84	71.20	71.38	71.29	71.21	71.11	70.64	71.07	74.81
PZ-5a	129.07		72.50	75.43	72.81	72.75	72.79	72.12	72.33	72.17	72.12	71.99	71.53	71.94	75.61
PZ-5b	129.06		72.50	75.43	72.67	72.66	72.72	72.01	72.24	72.07	71.98	71.90	71.45	71.84	75.53
PZ-6a	125.67		72.50	72.85	71.94	71.85	71.84	71.24	71.35	71.31	71.21	71.09	70.65	71.03	74.73
PZ-6b	125.74		72.50	72.63	71.84	71.76	71.76	71.16	71.29	71.22	71.12	71.00	72.54	70.93	74.7
PZ-7a	125.10		72.50	68.82	72.24	72.16	72.16	71.57	71.69	71.61	71.52	71.41	70.96	71.32	75.02
PZ-7b	125.06		72.50	68.66	72.01	71.46	71.94	71.31	71.49	71.15	71.29	71.18	70.81	71.21	74.85

Notes and Abbreviations:

ft msl: feet relative to mean sea level

NM: not measured

Table 10. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

COMPOUND (ug/L)	Sample Location: / Sample Date:	B24MW-2 4/23/2009	B24MW-3 4/20/2009	B30MW-1 4/23/2009	BCPMW-1 4/28/2009	BCPMW-2 4/28/2009	BCPMW-3 4/29/2009
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 5	**0.62 J**	< 5	< 5	< 10	< 25
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 10	< 25
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 10	< 25
1,1-Dichloroethane	5	< 5	< 5	< 5	**0.37 J**	**8 J**	**9.6 J**
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	**3.8 J**	**43**
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	**0.68 J**	< 25
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 10	< 25
2-Butanone	NE	< 50	< 50	< 50	< 50	< 100	< 250
2-Hexanone	50	< 50	< 50 J	< 50	< 50	< 100	< 250
4-methyl-2-pentanone	50	< 50	< 50 J	< 50	< 50	< 100	< 250
Acetone	NE	< 50 B	< 50	< 50 B	< 50 B	< 100	< 250
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 1.4	< 3.5
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 10	< 25
Bromoform	50	< 5	< 5	< 5	< 5	< 10	< 25
Bromomethane	5	< 5	< 5	< 5	< 5	< 10	< 25
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 10	< 25
Carbon tetrachloride	5	< 5	< 5	< 5	< 5	< 10	< 25
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 10	< 25
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	< 5	< 10	< 25
Chloroethane	5	< 5	< 5	< 5	< 5	< 10	< 25
Chloroform	7	< 5	< 5	< 5	**0.88 J**	< 10	< 25
Chloromethane	5	< 5	< 5	< 5	< 5	< 10	< 25
cis-1,2-dichloroethene	5	< 5	**10**	< 5	**22**	**310**	**900**
cis-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 10	< 25
Dibromochloromethane	50	< 5	< 5	< 5	< 5	< 10	< 25
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 10	< 25
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 10	< 25 B
Methylene Chloride	5	< 5	< 5	< 5	**0.52 J**	< 10	< 25
Styrene	5	< 5	< 5	< 5	< 5	< 10	< 25
Tetrachloroethene	5	< 5	**0.51 J**	< 5	< 5	**1.5 J**	< 25
Toluene	5	< 5	< 5	< 5	**0.33 J**	< 10	< 25 B
trans-1,2-dichloroethene	5	< 5	< 5	< 5	**0.44 J**	**2.4 J**	**8.9 J**
trans-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 10	< 25
Trichloroethylene	5	**3.7 J**	**45**	< 5	**190**	**180**	**470**
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 10	< 25
Vinyl Chloride	2	< 2	< 2	< 2	< 2	**4.1**	**300**
Xylene-o	5	< 5	< 5	< 5	< 5	< 10	< 25 B
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 10	< 25 B
Total VOCs [3]		**3.7**	**56.1**	0	**214.5**	**510.5**	**1,731.5**

See notes on last page.

Table 10. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

COMPOUND (ug/L)	Sample Location:	BCPMW-4-1	BCPMW-4-1	BCPMW-4-2	BCPMW-4-2	BCPMW-4-3	BCPMW-4-3
	Sample Date:	4/17/2009	12/1/2009	4/17/2009	12/4/2009	4/17/2009	12/1/2009
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 25	**2.4 J**	< 250	< 10	< 5	< 5
1,1,2,2-Tetrachloroethane	5	< 25	< 5	< 250	< 10	< 5	< 5
1,1,2-Trichloroethane	1	< 25	**0.38 J**	< 250	< 10	< 5	< 5
1,1-Dichloroethane	5	**6.5 J**	**46**	**57 J**	**8.7 J**	< 5	< 5
1,1-Dichloroethene	5	**1.8 J**	**14**	**34 J**	**2.7 J**	< 5	< 5
1,2-Dichloroethane	0.6	< 25	**0.65 J**	< 250	< 10	< 5	< 5
1,2-Dichloropropane	1	< 25	**4.7 J**	< 250	< 10	< 5	< 5
2-Butanone	NE	< 250	< 50	< 2500	< 100	< 50	< 50
2-Hexanone	50	< 250 J	< 50	< 2500 J	< 100	< 50 J	< 50
4-methyl-2-pentanone	50	< 250 J	< 50	< 2500 J	< 100	< 50 J	< 50
Acetone	NE	< 250 J	< 50	< 2500 J	< 100	< 50 J	< 50
Benzene	1	< 3.5	**0.44 J**	< 35	< 1.4	< 0.7	< 0.7
Bromodichloromethane	50	< 25	< 5	< 250	< 10	< 5	< 5
Bromoform	50	< 25	< 5	< 250	< 10	< 5	< 5
Bromomethane	5	< 25	R	< 250	< 10	< 5	< 5
Carbon Disulfide	60	< 25	< 5	< 250	< 10	< 5	< 5
Carbon tetrachloride	5	< 25	< 5	< 250	< 10	< 5	< 5
Chlorobenzene	5	< 25	< 5	< 250	< 10	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	**17 J**	**6.2**	< 250	**0.8 J**	< 5	< 5
Chloroethane	5	< 25	**2.4 J**	< 250	**1.1 J**	< 5	< 5
Chloroform	7	< 25	< 5	< 250	< 10	**0.53 J**	**0.32 J**
Chloromethane	5	< 25	R	< 250	R	< 5	R
cis-1,2-dichloroethene	5	**1800 D**	**750 D**	**18000 D**	**270**	**0.37 J**	< 5
cis-1,3-dichloropropene	0.4	< 25	< 5	< 250	< 10	< 5	< 5
Dibromochloromethane	50	< 25	< 5	< 250	< 10	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 25	< 5	< 250	< 10	< 5	< 5
Ethylbenzene	5	< 25	< 5	**62 J**	**0.78 J**	< 5	< 5
Methylene Chloride	5	< 25	< 5	< 250	< 10	< 5	< 5
Styrene	5	< 25	< 5	< 250	< 10	< 5	< 5
Tetrachloroethene	5	< 25	**0.64 J**	< 250	**0.82 J**	< 5	< 5
Toluene	5	< 25	< 5	**2400**	< 10 B	< 5	< 5
trans-1,2-dichloroethene	5	**110**	**2.5 J**	< 250	**1.3 J**	< 5	< 5
trans-1,3-dichloropropene	0.4	< 25	< 5	< 250	< 10	< 5	< 5
Trichloroethylene	5	**22 J**	**170**	< 250	**310**	**0.56 J**	**0.51 J**
Trichlorotrifluoroethane (Freon 113)	5	< 25	< 5	< 250	< 10	< 5	< 5
Vinyl Chloride	2	**180**	**540 D**	**6300**	**58**	< 2	< 2
Xylene-o	5	< 25	**8**	**110 J**	< 10 B	< 5	< 5
Xylenes - m,p	5	< 25	< 5	**190 J**	< 10 B	< 5	< 5
Total VOCs [3]		**2,137.3**	**1,548.3**	**27,153**	**655**	**1.5**	**0.83**

See notes on last page.

Table 10. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

COMPOUND (ug/L)	Sample Location: / Sample Date:	BCPMW-5-1 4/23/2009	BCPMW-6-1 4/20/2009	BCPMW-6-1 12/4/2009	BCPMW-6-2 5/8/2009	BCPMW-6-2 12/4/2009
	NYSDEC SCGs					
1,1,1-Trichloroethane	5	< 100	< 5	< 5	< 5	**0.78 J**
1,1,2,2-Tetrachloroethane	5	< 100	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 100	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	< 100	**0.3 J**	< 5	**0.37 J**	**0.65 J**
1,1-Dichloroethene	5	**21 J**	< 5	< 5	< 5	**0.44 J**
1,2-Dichloroethane	0.6	< 100	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 100	< 5	< 5	< 5	< 5
2-Butanone	NE	< 1000	< 50	< 50	< 50	< 50
2-Hexanone	50	< 1000	< 50 J	< 50	< 50	< 50
4-methyl-2-pentanone	50	< 1000	< 50 J	< 50	< 50	< 50
Acetone	NE	< 1000	< 50 J	< 50	< 50	< 50
Benzene	1	< 14	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 100	< 5	< 5	< 5	< 5
Bromoform	50	< 100	< 5	< 5	< 5	< 5
Bromomethane	5	< 100	< 5	R	< 5	R
Carbon Disulfide	60	< 100	< 5	< 5	< 5	< 5
Carbon tetrachloride	5	< 100	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 100	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 100	**4500 D**	**1700 EJ**	< 5	< 5
Chloroethane	5	< 100	< 5	< 5	< 5	< 5
Chloroform	7	< 100	**1.7 J**	**0.32 J**	**0.53 J**	< 5
Chloromethane	5	< 100	< 5	R	< 5	R
cis-1,2-dichloroethene	5	**960**	**21**	**1.7 J**	< 5	< 5
cis-1,3-dichloropropene	0.4	< 100	< 5	< 5	< 5	< 5
Dibromochloromethane	50	< 100	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 100	< 5	< 5	< 5	< 5
Ethylbenzene	5	**48 J**	< 5	< 5	< 5	< 5
Methylene Chloride	5	< 100	< 5	< 5	< 5	< 5
Styrene	5	< 100	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 100	**0.34 J**	< 5	< 5	**0.79 J**
Toluene	5	**2700**	< 5	< 5	< 5	< 5
trans-1,2-dichloroethene	5	< 100	< 5	< 5	< 5	< 5
trans-1,3-dichloropropene	0.4	< 100	< 5	< 5	< 5	< 5
Trichloroethylene	5	**220**	**4.9 J**	**1.6 J**	< 5	**0.45 J**
Trichlorotrifluoroethane (Freon 113)	5	< 100	< 5	< 5	< 5	< 5
Vinyl Chloride	2	**330**	< 2	< 2	< 2	< 2
Xylene-o	5	**40 J**	< 5	< 5	< 5	< 5
Xylenes - m,p	5	**110**	< 5	< 5	< 5	< 5
Total VOCs [3]		**4,429**	**4,528.2**	**1,703.6**	**0.9**	**3.1**

See notes on last page.

Table 10. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2)

COMPOUND (ug/L)	Sample Location:	BCPMW-7-1	BCPMW-7-1	MW-200-1	MW-200-1	MW-201-1	MW-201-1
	Sample Date:	4/20/2009	12/1/2009	4/29/2009	12/2/2009	5/1/2009	12/2/2009
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5	**5.5 J**	**3.3 J**
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 25	< 50
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 25	< 50
1,1-Dichloroethane	5	< 5	< 5	**0.79 J**	< 5	**10 J**	**9 J**
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	**7.9 J**	**8.1 J**
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 25	< 50
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 25	< 50
2-Butanone	NE	< 50	< 50	< 50	< 50	< 250	< 500
2-Hexanone	50	< 50 J	< 50	< 50	< 50	< 250	< 500
4-methyl-2-pentanone	50	< 50 J	< 50	< 50	< 50	< 250	< 500
Acetone	NE	< 50	< 50	< 50 B	< 50	< 250 B	< 500
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 3.5	< 7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 25	< 50
Bromoform	50	< 5	< 5	< 5	< 5	< 25	< 50
Bromomethane	5	< 5	R	< 5	R	< 25	< 50
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 25	< 50
Carbon tetrachloride	5	< 5	< 5	< 5	< 5	< 25	< 50
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 25	< 50
Chlorodifluoromethane (Freon 22)	NE	**2.6 J**	**1.5 J**	< 5	< 5	< 25	< 50
Chloroethane	5	< 5	< 5	< 5	< 5	< 25	< 50
Chloroform	7	< 5	< 5	**2.3 J**	**2.3 J**	< 25	< 50
Chloromethane	5	< 5	R	< 5	R	< 25	R
cis-1,2-dichloroethene	5	< 5	< 5	**38**	**5.7**	**970 D**	**1300**
cis-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 25	< 50
Dibromochloromethane	50	< 5	< 5	< 5	< 5	< 25	< 50
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 25	< 50
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 25	< 50
Methylene Chloride	5	< 5	< 5	< 5	< 5	< 25	< 50
Styrene	5	< 5	< 5	< 5	< 5	< 25	< 50
Tetrachloroethene	5	< 5	< 5	**0.54 J**	< 5	< 25	< 50
Toluene	5	< 5	< 5	< 5	< 5	< 25	< 50
trans-1,2-dichloroethene	5	< 5	< 5	**0.3 J**	< 5	**2.7 J**	**3.5 J**
trans-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 25	< 50
Trichloroethylene	5	< 5	< 5	**34**	**12**	**160**	**230**
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 25	< 50
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 10	**38**
Xylene-o	5	< 5	< 5	< 5	< 5	< 25	< 50
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 25	< 50
Total VOCs (3)		**2.6**	**1.5**	**75.9**	**20**	**1,156.1**	**1,591.9**

See notes on last page.

Table 10. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

COMPOUND (ug/L)	Sample Location: / Sample Date:	MW-202-1 5/1/2009	MW-202-1 12/2/2009	MW-203-1 5/1/2009	MW-203-1 12/2/2009
	NYSDEC SCGs				
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5
2-Butanone	NE	< 50	< 50	< 50	< 50
2-Hexanone	50	< 50	< 50	< 50	< 50
4-methyl-2-pentanone	50	< 50	< 50	< 50	< 50
Acetone	NE	< 50	< 50	< 50 B	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5
Bromomethane	5	< 5	< 5	< 5	< 5
Carbon Disulfide	60	< 5	< 5	< 5	< 5
Carbon tetrachloride	5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	**73**	**17**
Chloroethane	5	< 5	< 5	< 5	< 5
Chloroform	7	**6.2**	**6.7**	**7.9**	**2.6 J**
Chloromethane	5	< 5	< 5	< 5	< 5
cis-1,2-dichloroethene	5	**0.64 J**	**0.58 J**	**1.6 J**	**0.83 J**
cis-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5
Dibromochloromethane	50	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5
Methylene Chloride	5	< 5	< 5	< 5	< 5
Styrene	5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 5	< 5	< 5	< 5
Toluene	5	< 5	< 5	< 5	< 5
trans-1,2-dichloroethene	5	< 5	< 5	< 5	< 5
trans-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5
Trichloroethylene	5	**7.5**	**9.3**	**1.3 J**	**0.7 J**
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5
Vinyl Chloride	2	< 2	< 2	< 2	< 2
Xylene-o	5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5
Total VOCs [3]		**14.3**	**16.6**	**83.8**	**21.1**

See notes on last page.

Table 11. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

COMPOUND (ug/L)	Sample Location: / Sample Date:	B24MW-2 4/23/2009	B24MW-3 4/20/2009	BCPMW-1 4/28/2009	BCPMW-2 4/28/2009	BCPMW-3 4/29/2009	BCPMW-4-1 4/17/2009	BCPMW-4-2 4/17/2009	BCPMW-4-3 4/17/2009	BCPMW-5-1 4/23/2009	BCPMW-6-1 4/20/2009	BCPMW-6-2 5/8/2009
	NYSDEC SCGs											
Cadmium (total)	5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Cadmium (dissolved)	5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chromium (total)	50	**40.3**	**28.2**	**20.8**	< 10	< 10	**22.7**	**10.6**	< 10	< 10	< 10	**10.3**
Chromium (dissolved)	50	< 10	**10.6**	< 10	< 10	< 10	**12.8**	< 10	< 10	< 10	< 10	< 10
Iron (total)	300	--	**597**	--	< 100	**2,080**	**103**	**4,630**	< 100	**7,420**	< 100	--
Iron (dissolved)	300	--	< 100	--	< 100	**1,760**	< 100	**4,080**	< 100	**6,370**	< 100	--
Manganese (total)	300	--	**16.9**	--	**12.7**	**51.4**	**11.2**	**228**	< 10	**145**	< 10	--
Manganese (dissolved)	300	--	**13.7**	--	**11.3**	**49.2**	< 10	**217**	< 10	**131**	< 10	--

See notes on last page.

Table 11. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2)

COMPOUND (ug/L)	Sample Location: / Sample Date:	BCPMW-7-1 4/20/2009	MW-200-1 4/29/2009	MW-201-1 5/1/2009	MW-202-1 5/1/2009	MW-203-1 5/1/2009
	NYSDEC SCGs					
Cadmium (total)	5	< 5	< 5	< 5	< 5	< 5
Cadmium (dissolved)	5	< 5	< 5	< 5	< 5	< 5
Chromium (total)	50	< 10	< 10	< 10	**16.5**	**31.5**
Chromium (dissolved)	50	< 10	< 10	< 10	< 10	< 10
Iron (total)	300	< 100	--	--	--	--
Iron (dissolved)	300	< 100	--	--	--	--
Manganese (total)	300	**106**	--	--	--	--
Manganese (dissolved)	300	**94.8**	--	--	--	--

Notes:

(1) Results validated following protocols specified in March 2006 RI/FS Work Plan (ARCADIS G&M, Inc. 2006).

(2) Samples analyzed for the metals using NYSDEC ASP Method 2000 ILM4.0.

Acronyms/Key:

Indicates an exceedance of an SCG.

Bold value indicates a detection.

RI/FS Remedial Investigation/Feasibility Study.

NYSDEC New York State Department of Environmental Conservation.

ASP Analytical services protocol.

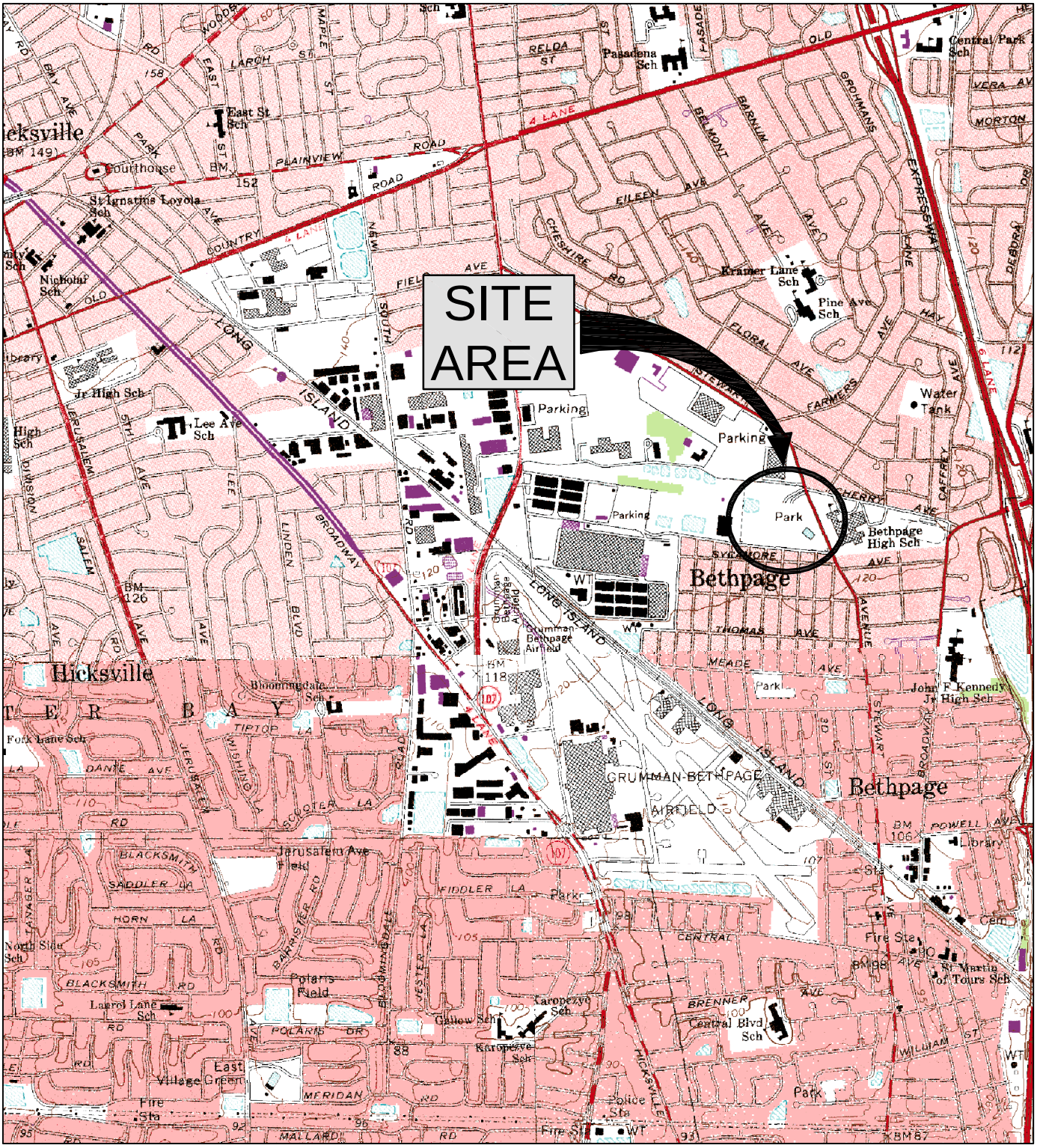
SCGs Standards, criteria, and guidance values.

ug/L Micrograms per liter.

-- Not analyzed.

> 5U Compound not detected above its laboratory quantification limit.

> 5 Compound not detected above its laboratory quantification limit.



SOURCE:
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USGS 7.5 MIN. FREEPORT QUADRANGLE, FREEPORT, NY., 1994
USGS 7.5 MIN. HICKSVILLE QUADRANGLE, HICKSVILLE, NY., 1967, PHOTOREVISED 1979
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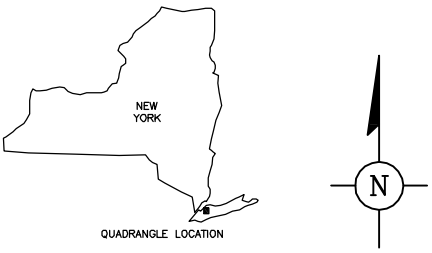

GROUNDWATER INTERIM REMEDIAL MEASURE
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK

SITE LOCATION MAP

ARCADIS

FIGURE
1

CITY:MELVILLE DIV/GROUP:ENR1 DB:ALS LD: PIC: PM:CSG TM:BW LYR:ON=*;OFF=*REF*
G:\APROJECTS\Northrop Grumman\Superfund\2009\OU3\NY001464.0909 OM&M\Groundwater RMOM&M Reports\July thru Sept\Figures\cadd\01_sitelocation.dwg LAYOUT: 1SAVED: 11/24/2009 9:24 AM ACADVER: 17.1S (LMS TECH) PAGESETUP: ---PLOTSTYLETABLE: ARCADIS_MELVILLE.CTB
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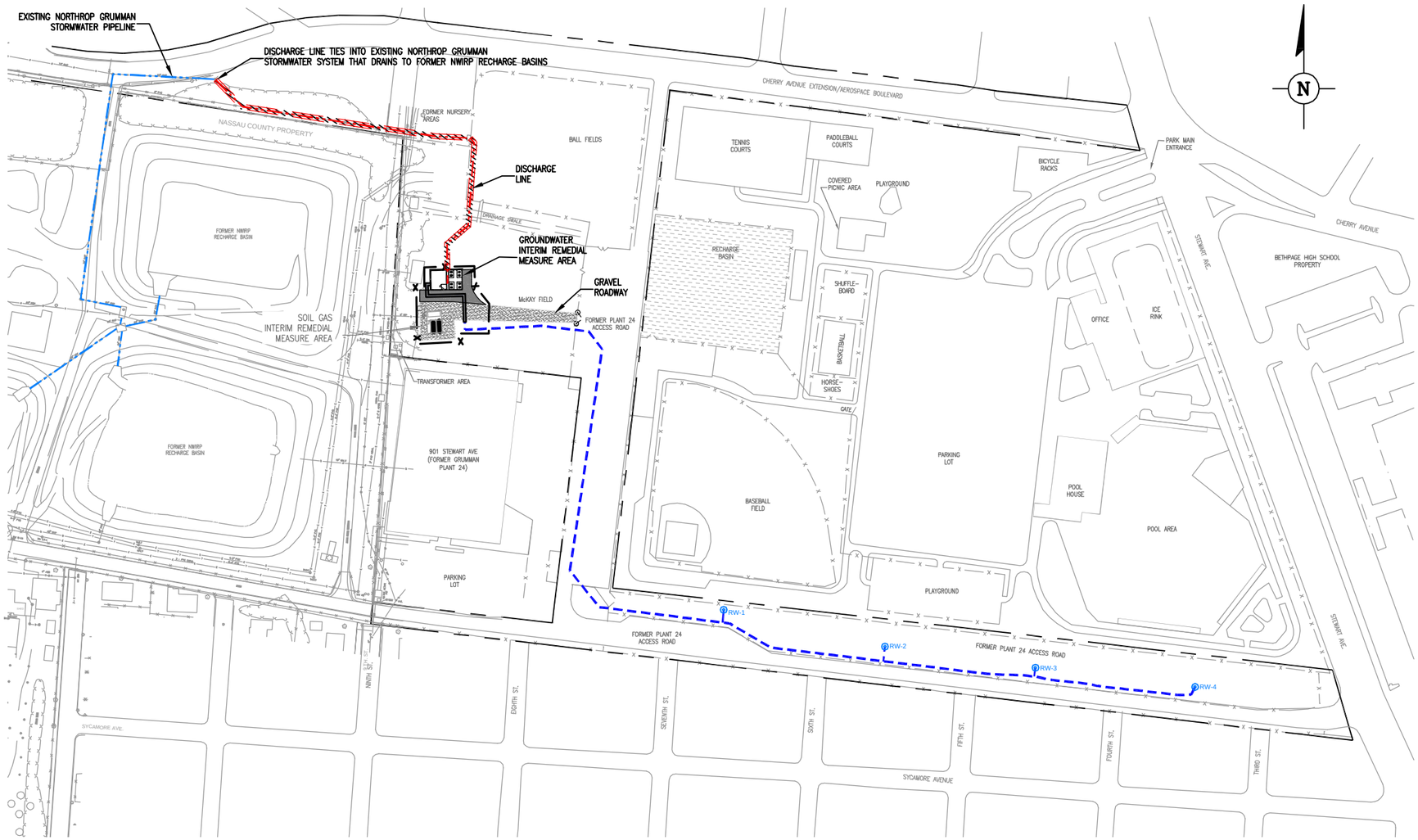

GROUNDWATER INTERIM REMEDIAL MEASURE
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK

SITE AND GROUNDWATER INTERIM REMEDIAL MEASURE LAYOUT

ARCADIS

FIGURE
2

CITY:MELVILLE DIV/GROUP:ENR1 DB:ALS LD: PIC: PM:CSG TM: LYR:ON=*;OFF=*REF*
G:\APROJECT\Northrop Grumman\Superfund\2009\OU3\NY001464.0909 OM&M\Groundwater IRM\OM&M Reports\July thru Sept\Figures\cadd\02_sitesystemlayout.dwg LAYOUT: 2SAVED: 11/24/2009 9:22 AM ACADVER: 17.1S (LMS TECH) PAGESETUP: ---PLOTSTYLETABLE: ARCADIS_MELVILLE.CTB
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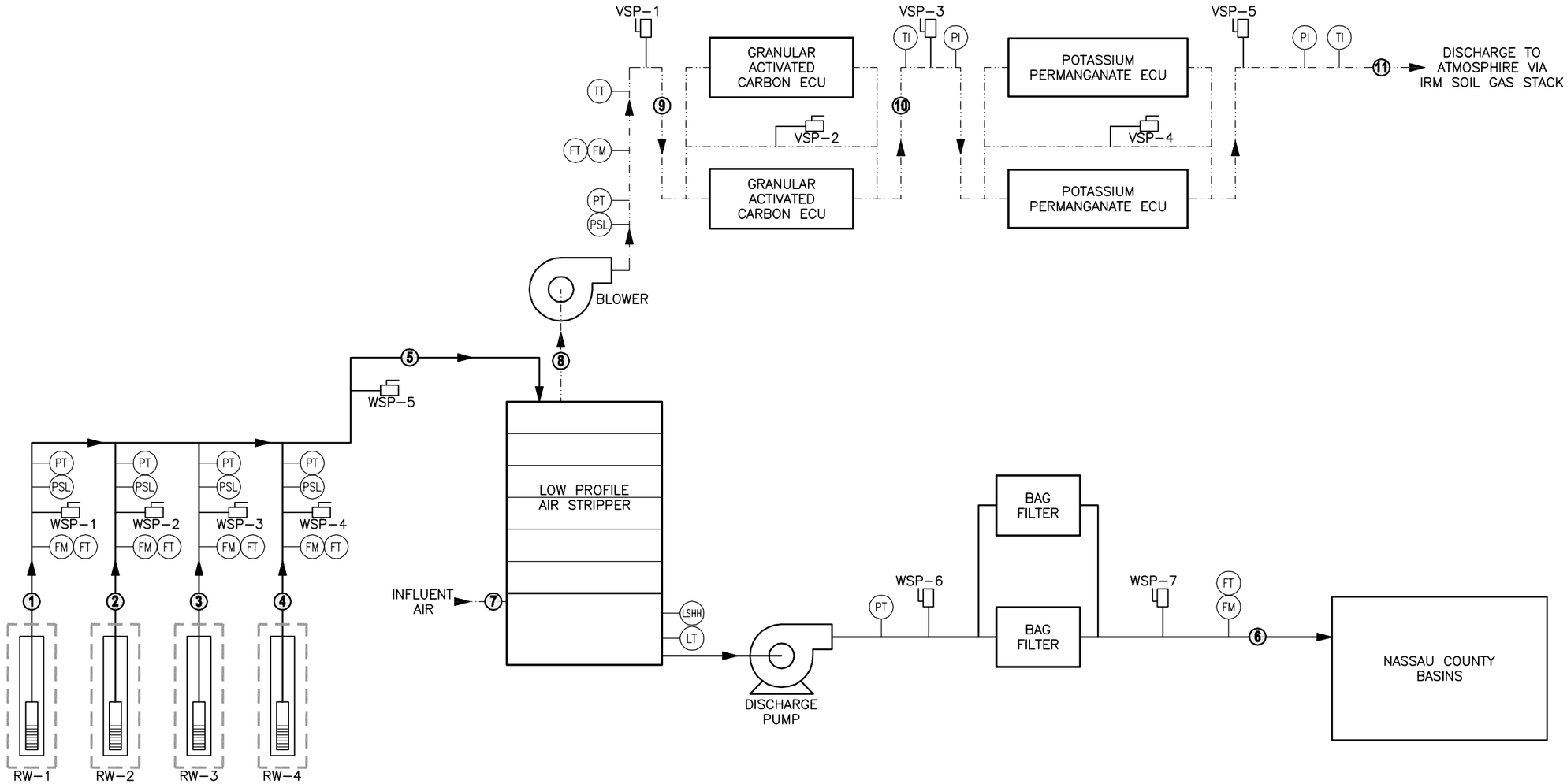
BCP_Aerial.jpg



LEGEND:

- PROCESS WATER
- PROCESS AIR
- FM — INSTRUMENT
- SAMPLE PORT
- FLOW DIRECTION
- FM FLOW METER
- FT FLOW RATE TRANSMITTER
- PSL PRESSURE VACUUM LOW
- PT PRESSURE TRANSMITTER
- PI PRESSURE INDICATOR
- LSHH LEVEL SWITCH HIGH HIGH
- LT LEVEL TRANSMITTER
- TT TEMPERATURE TRANSMITTER
- TI TEMPERATURE INDICATOR
- ⑧ PROCESS DESIGNATION
- WSP WATER SAMPLE PORT
- VSP VAPOR SAMPLE PORT

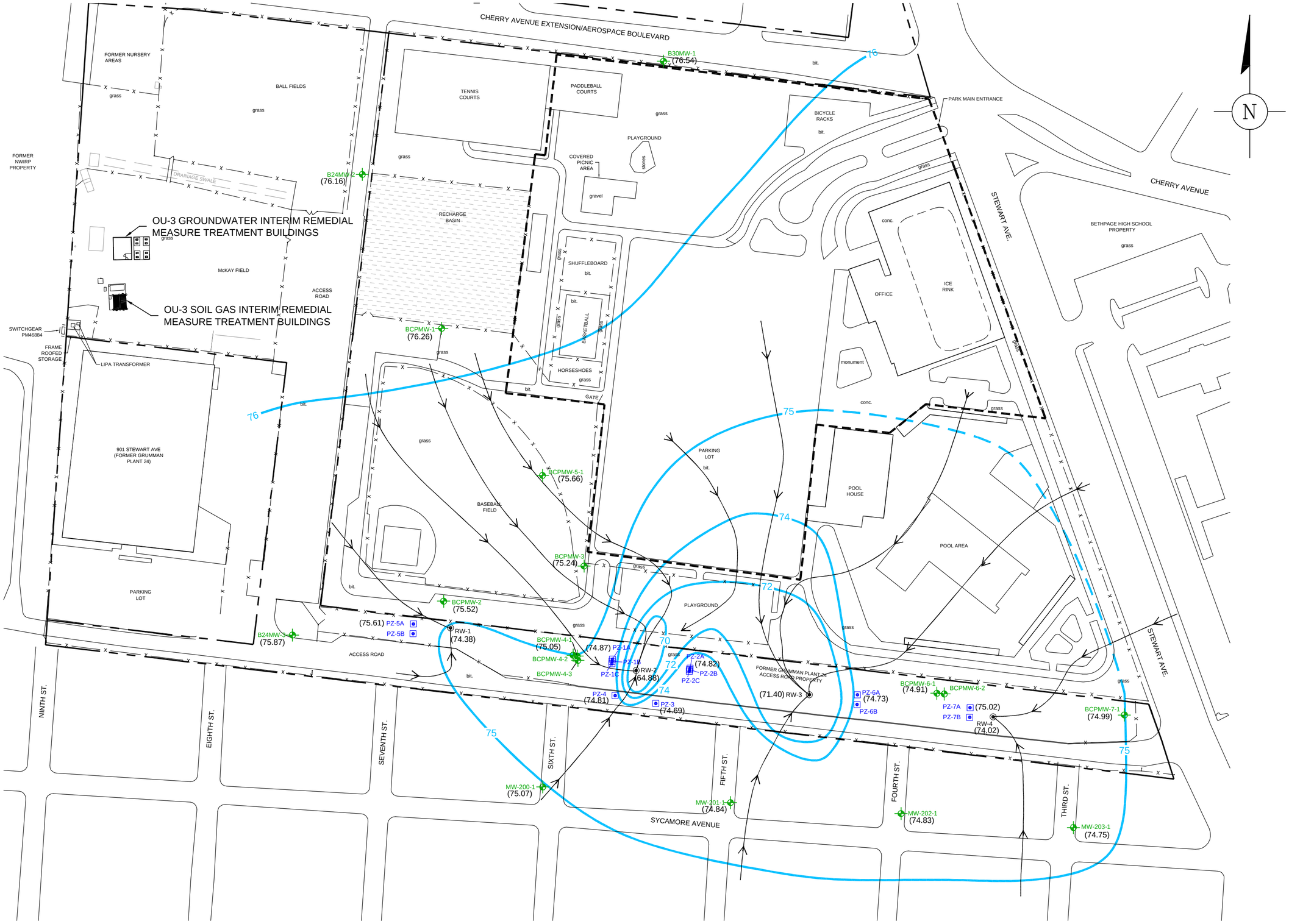
PROCESS	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
Mass Loading (lbs/day)											
Trichloroethene	0.009	0.041	0.082	0.008	0.140	<0.008	0.000	0.140	0.140	<0.014	<0.014
cis -1,2 Dichloroethene	0.007	1.877	0.431	0.030	2.346	<0.008	0.000	2.346	2.346	<0.235	<0.235
Vinyl Chloride	0.000	0.443	0.001	0.000	0.444	<0.003	0.000	0.444	0.444	0.444	<0.044
Flow Rate (gpm)	40	85	85	40	250	250	---	---	---	---	---
Flow Rate (CFM)	---	---	---	---	---	---	1,300 - 1,600	1,300	1,535	1,557	1,581
Pressure (feet of water)	10	10	10	10	8	15	---	---	---	---	---
Pressure (inches of water)	---	---	---	---	---	---	0	- 28 to - 38	12	6	0
pH	6.4	6.4	6.4	6.4	6.4	6.2	---	---	---	---	---
Temperature	55	55	55	55	55	55	10	55	97	95	95
Relative Humidity	---	---	---	---	---	---	20 - 80	100	<50	<50	<50

GROUNDWATER INTERIM REMEDIAL MEASURE
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK

GROUNDWATER TREATMENT SYSTEM PROCESS SCHEMATIC, PROCESS FLOW DIAGRAM, AND MONITORING LOCATIONS

ARCADIS

FIGURE 3



LEGEND:

- NORTHROP GRUMMAN PROPERTY LINE
- FENCE
- BASIN
- bit. BITUMINOUS PAVEMENT
- MW-200-1/BCPMW-1 MONITORING WELL
- PZ-2C PIEZOMETER
- RW-2 RECOVERY WELL
- 70 GROUNDWATER ELEVATION CONTOUR (RELATIVE TO MEAN SEA LEVEL DASHED WHERE INFERRED)
- HORIZONTAL COMPONENT OF DIRECTION OF GROUNDWATER FLOW
- (72.64) WATER-LEVEL ELEVATION (FEET MEAN SEA LEVEL)

NOTES:

1. ALL MONITORING WELLS, RECOVERY WELLS, AND PIEZOMETERS SURVEYED TO NORTH AMERICAN DATUM (NAD) 83.
2. PARK FEATURES SHOWN WERE PRESENT PRIOR TO TOWN OF OYSTER BAY REDEVELOPMENT IN 2005.

GROUNDWATER INTERIM REMEDIAL MEASURE
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK

GROUNDWATER MONITORING WELL NETWORK AND CONFIGURATION OF THE WATER TABLE AND GROUNDWATER FLOW DIRECTIONS APRIL 23, 2010

ARCADIS

FIGURE 4

CITY:(Rreg0) DIV/GROUP:(Rreg0) DB:(Rreg0) LD:(Opt) PIC:(Opt) PM:(Rreg0) TM:(Opt) LYR:(Opt)On=*;Off=*REF*
G:\ENVCAD\Melville-NY\ACTIVITY\01496\09100\0005\2010\07\FIGURE 4.dwg
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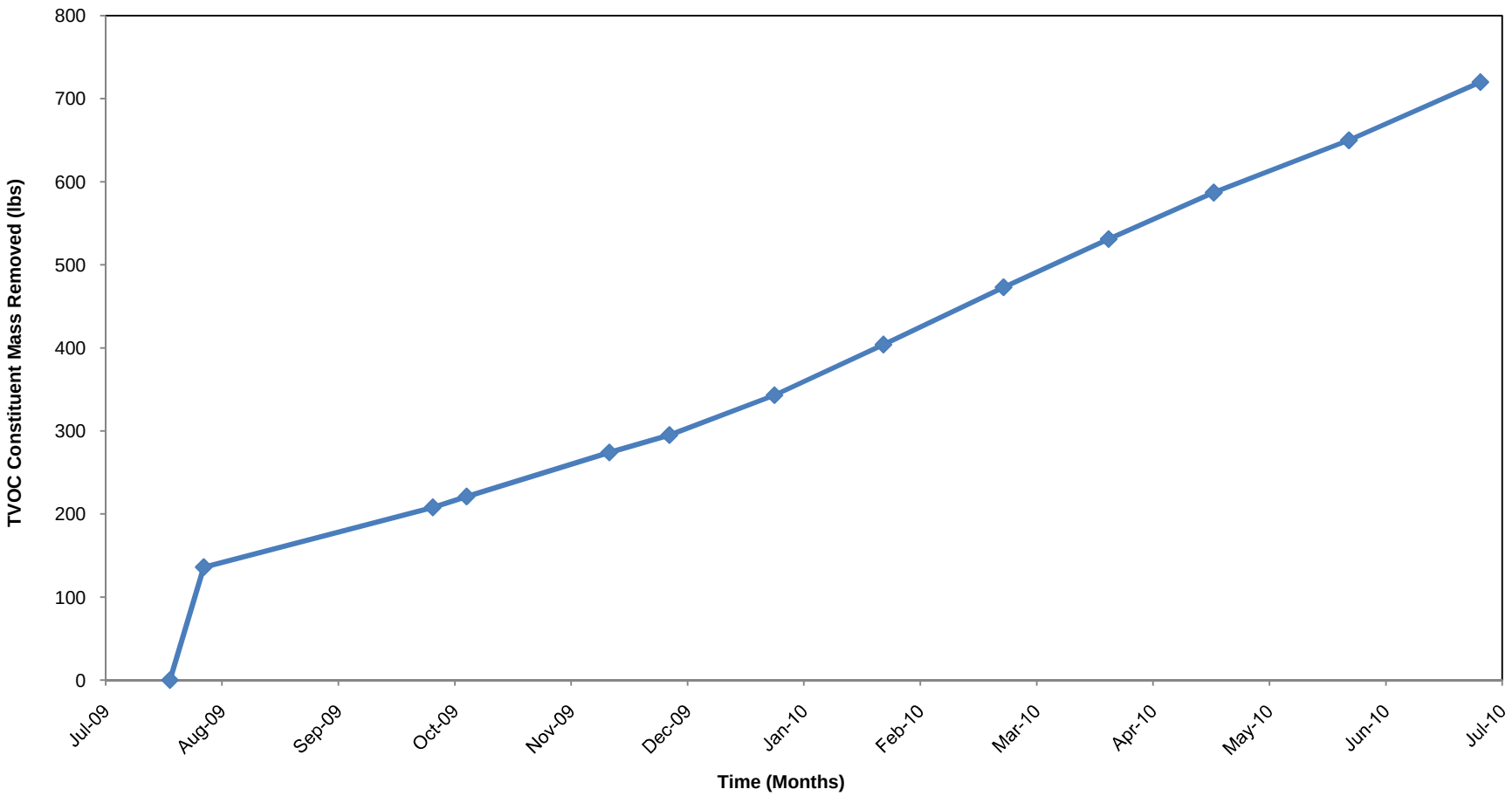


Notes:

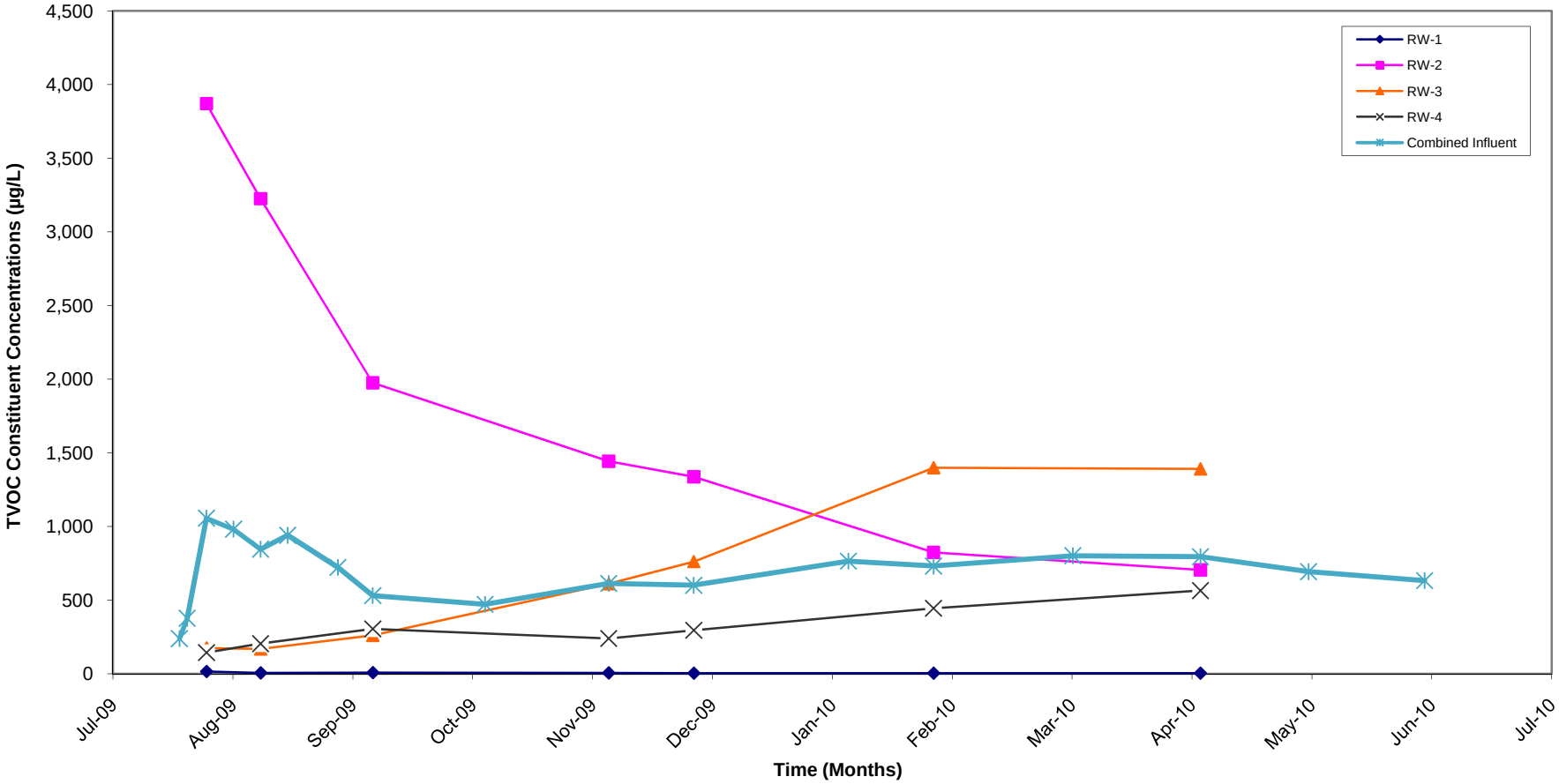
TVOC = Total volatile organic compound.
lbs = Pounds.

GROUNDWATER INTERIM REMEDIAL MEASURE
OPERABLE UNIT-3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

CUMULATIVE TVOC MASS REMOVED THROUGH JUNE 2010

ARCADIS

FIGURE 5



Notes:

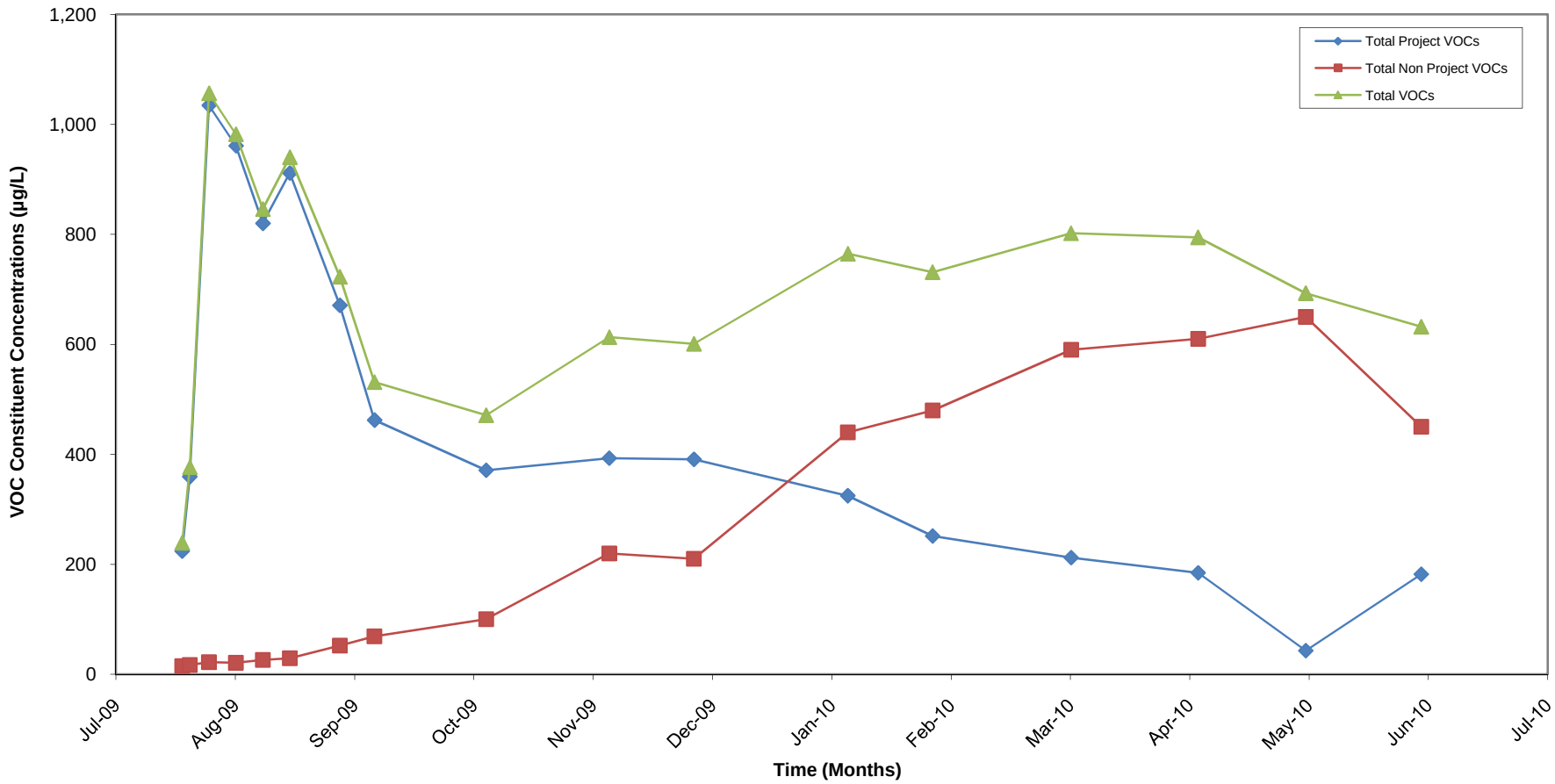
TVOC = Total volatile organic compound.
µg/L = Micrograms per liter.

GROUNDWATER INTERIM REMEDIAL MEASURE
OPERABLE UNIT-3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

TVOC CONCENTRATIONS IN SYSTEM INFLUENT AND WELLS THROUGH JUNE 2010

ARCADIS

FIGURE 6



Notes:

TVOC = Total volatile organic compound.
VOC = Volatile organic compound.
µg/L = Micrograms per liter.

GROUNDWATER INTERIM REMEDIAL MEASURE
OPERABLE UNIT-3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

INFLUENT PROJECT, NON-PROJECT, AND COMBINED TVOC CONCENTRATIONS THROUGH JUNE 2010

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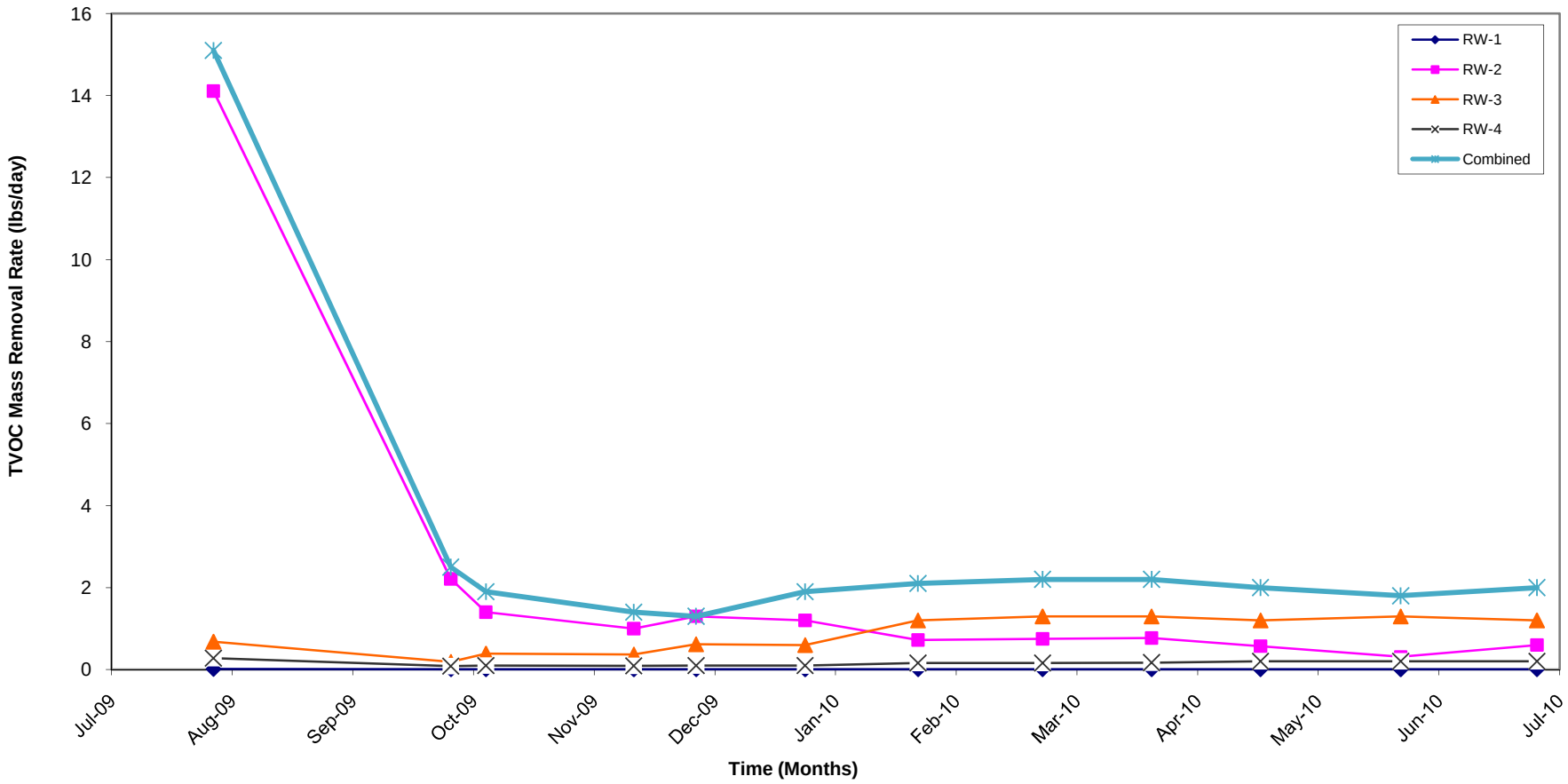
FIGURE 7



GROUNDWATER INTERIM REMEDIAL MEASURE
OPERABLE UNIT-3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

TVOC MASS REMOVAL RATES THROUGH JUNE 2010

Notes:

TVOC = Total volatile organic compound.
lbs/day = Pounds per day.

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FIGURE 8

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Appendix A

Well Construction Information and Environmental Effectiveness Monitoring Program.

Table A-1. Well Construction Information and Environmental Effectiveness Monitoring Program, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York. [1,2]

Well ID	Well Diameter (inches)	Depth to Screen Top (ft bls)	Depth to Screen Bottom (ft bls)	Screen Length (ft)	Well Depth (ft)	Well Materials	Water Levels [3]	MONITORING ACTIVITY WATER QUALITY [4] VOC	Cd/Cr/Hg	Fe/Mn
Monitoring Wells										
BCPMW-1	2	50	65	15	65	Sch. 40 PVC	Quarterly	Baseline	Baseline	--
BCPMW-2	2	60	75	15	75	Sch. 40 PVC	Quarterly	Baseline	Baseline	Baseline
BCPMW-3	2	59	74	15	74	Sch. 40 PVC	Quarterly	Baseline	Baseline	Baseline
BCPMW-4-1	4	45	65	20	70	Sch. 40 PVC	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	Baseline
BCPMW-4-2	4	68.5	83.5	15	88.5	Sch. 40 PVC	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	Baseline
BCPMW-4-3	4	115	125	10	130	Sch. 40 PVC	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	Baseline
BCPMW-5-1	4	50	65	15	70	Sch. 80 PVC/ SS	Quarterly	Baseline	Baseline	Baseline
BCPMW-6-1	4	88.5	98.5	10	103.5	Sch. 40 PVC	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
BCPMW-6-2	4	133	143	10	148	Sch. 40 PVC	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
BCPMW-7-1	4	90	100	10	105	Sch. 40 PVC	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
B24MW-2	2	54	74	20	74	PVC	Quarterly	Baseline/Annual	Baseline	--
B24MW-3	2	55	70	15	70	PVC	Quarterly	Baseline/Annual	Baseline	--
B30MW-1	2	57	72	15	72	PVC	Quarterly	Baseline/Annual	Baseline	--
MW-200-1	4	85	95	10	100	Sch. 40 PVC/ SS	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
MW-201-1	4	70	80	10	85	Sch. 40 PVC/ SS	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
MW-202-1	4	125	135	10	140	Sch. 40 PVC/ SS	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
MW-203-1	4	103	113	10	118	Sch. 40 PVC/ SS	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
Remedial Wells [6]										
RW-01	8	108	128	20	134	Sch. 80 PVC/SS	Quarterly	Baseline/Quarterly	Baseline/Quarterly	--
RW-02	6	84	104	20	104	Steel/SS	Quarterly	Baseline/Quarterly	Baseline/Quarterly	--
RW-03	8	84	104	20	107	Sch. 80 PVC/SS	Quarterly	Baseline/Quarterly	Baseline/Quarterly	--
RW-04	8	110	130	20	133	Sch. 80 PVC/SS	Quarterly	Baseline/Quarterly	Baseline/Quarterly	--

See notes on last page.

Table A-1. Well Construction Information and Environmental Effectiveness Monitoring Program, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York. (1,2)

Well ID	Well Diameter (inches)	Depth to Screen Top (ft bls)	Depth to Screen Bottom (ft bls)	Screen Length (ft)	Well Depth (ft)	Well Materials	Water Levels (3)	MONITORING ACTIVITY WATER QUALITY (4) VOC	Cd/Cr/Hg	Fe/Mn
Piezometers										
PZ-01a	2	60	65	5	68	Sch. 40 PVC	Quarterly	--	--	--
PZ-01b	1	80	85	5	88	Sch. 40 PVC	Quarterly	--	--	--
PZ-01c	1	130	135	5	138	Sch. 40 PVC	Quarterly	--	--	--
PZ-02a	2	60	65	5	68	Sch. 40 PVC	Quarterly	--	--	--
PZ-02b	1	80	85	5	85	Sch. 40 PVC	Quarterly	--	--	--
PZ-02c	1	130	135	5	138	Sch. 40 PVC	Quarterly	--	--	--
PZ-03	1	80	85	5	88	Sch. 40 PVC	Quarterly	--	--	--
PZ-04	1	80	85	5	88	Sch. 40 PVC	Quarterly	--	--	--
PZ-05a	2	65	70	5	74	Sch. 40 PVC	Quarterly	--	--	--
PZ-05b	1	110	115	5	117	Sch. 40 PVC	Quarterly	--	--	--
PZ-06a	2	65	70	5	72	Sch. 40 PVC	Quarterly	--	--	--
PZ-06b	1	90	95	5	97	Sch. 40 PVC	Quarterly	--	--	--
PZ-07a	2	65	70	5	72	Sch. 40 PVC	Quarterly	--	--	--
PZ-07b	1	113	118	5	120	Sch. 40 PVC	Quarterly	--	--	--

Notes:

(1) Water samples will be collected and analyzed in accordance with the method and procedures described in this Sampling and Analysis Plan (SAP).

(2) Approximate locations of the wells and piezometers in the OU-3 Groundwater Interim Remedial Measure Monitoring Program are shown in Figure 1.

(3) Water levels will be measured in all wells/piezometers during the baseline monitoring event. Water levels will be measured in accordance with the procedures presented in this SAP.

(4) VOC: VOCs, per Table D-3 in the Quality Assurance Project Plan (QAPP), using NYSDEC ASP 2000 Method OLM 4.3.
Cd/Cr/Hg: Cadmium and Chromium using USEPA Method 6010 and Mercury using USEPA Method 7472: Mercury will only be analyzed for samples collected during the baseline monitoring.
Fe/Mn: Iron and Manganese using USEPA Method 6010, both total and dissolved.

(5) Semiannual wells will be monitored annually after Year 1.

(6) Some of the analyses listed here are also covered in the Remedial System Sampling Program.

Acronyms\Key:

Sch. 80 PVC	Schedule 80 polyvinyl chloride.
Sch. 40 PVC	schedule 40 polyvinyl chloride.
SS	Stainless steel.
Steel	Low carbon steel.
ft	Feet.
ft ms	Feet relative to mean sea level.
ft bls	Feet below land surface.
--	Not applicable.
VOC	Volatile organic compound.

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Appendix B

Compliance and Performance Program and Water Sample Analytical Results

Table B-1. Compliance and Performance Program Elements, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York.

Sample Location/Instrument [1]	Parameter (Method) [2]	Frequency			
		Short-Term [3] (first month)	Short-Term [3] (five month period following first month)	Long-Term [4]	SCADA Data Acquisition
Water Samples [5]					
Remedial Well 1 (WSP-1)	VOCs (NYSDEC 2000 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010)	Bi-Weekly	Annually	Annually	NA
Remedial Well 2 (WSP-2)	VOCs (NYSDEC 2000 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010)	Bi-Weekly	Annually	Annually	NA
Remedial Well 3 (WSP-3)	VOCs (NYSDEC 2000 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010)	Bi-Weekly	Annually	Annually	NA
Remedial Well 4 (WSP-4)	VOCs (NYSDEC 2000 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010)	Bi-Weekly	Annually	Annually	NA
Air Stripper Influent (WSP-5)	VOCs (NYSDEC 2000 OLM 4.3)	1-hr [6]; Days 1, 3, & Weekly	Monthly	Quarterly	NA
	Iron (USEPA 6010)	1-hr [6]; Days 1, 3, & Weekly	Monthly	Quarterly	NA
Air Stripper Effluent (WSP-6)	Iron (USEPA 6010)	1-hr [6]; As Needed	As Needed	As Needed	NA
Plant Effluent (WSP-7)	**VOCs (NYSDEC 2000 OLM 4.3)**	**1-hr [6]; Days 1, 3, & Weekly**	**Monthly**	**Monthly**	NA
	Iron (USEPA 6010)	**1-hr [6]; Days 1, 3, & Weekly**	**Monthly**	**Monthly**	NA
	ph (field)	**1-hr [6]; Days 1, 3, & Weekly**	**Monthly**	**Monthly**	NA
Air Samples [7] [8]					
Air Stripper Effluent/ECU-1 Influent (VSP-1)	VOCs (TO-15 Modified)	Monthly	Monthly	Quarterly	NA
ECU-1 Effluent/ECU-2 Influent (VSP-2)	VOCs (TO-15 Modified)	As Needed	As Needed	As Needed	NA
ECU-2 Effluent/ECU-3 Influent (VSP-3)	VOCs (TO-15 Modified)	As Needed	As Needed	As Needed	NA
ECU-3 Effluent/ECU-4 Influent (VSP-4)	VOCs (TO-15 Modified)	As Needed	As Needed	As Needed	NA
Total Effluent (VSP-5)	**VOCs (TO-15 Modified)**	**Monthly**	**Monthly**	**Quarterly**	NA

See notes on last page.

Table B-1. Compliance and Performance Program Elements, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York.

Sample Location/Instrument [1]	Parameter (Method) [2]	Frequency			
		Short-Term [3] (first month)	Short-Term [3] (five month period following first month)	Long-Term [4]	SCADA Data Acquisition
Water Flow Measurements					
Remedial Well RW-1 (FT - 110)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-2 (FT - 120)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-3 (FT - 130)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-4 (FT - 140)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Combined Influent (FR - 200)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
System Effluent (FT-700)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Air Flow Measurements					
Air Stripper Effluent (FT-500)	Flow rate (SCFM)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Water Pressure Measurements					
Remedial Well RW-1 (PT - 110)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-2 (PT - 120)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-3 (PT - 130)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-4 (PT - 140)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Air Stripper Effluent (PT-700)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Air Temperature & Relatively Humidity Measurements					
Air Stripper Effluent (TT-500)	Temperature	Weekly	Weekly	Weekly	Continuously
ECU Mid-Train (TI-503)	Temperature	Weekly	Weekly	Weekly	NA
Effluent (TI-603)	Temperature	Weekly	Weekly	Weekly	NA

See notes on last page.

Table B-1. Compliance and Performance Program Elements, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York.

Sample Location/Instrument [1]	Parameter (Method) [2]	Frequency			
		Short-Term [3] (first month)	Short-Term [3] (five month period following first month)	Long-Term [4]	SCADA Data Acquisition
Air Pressure Measurements					
Air Stripper Effluent (PT-500)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	Continuously
ECU #1 Influent (PI-501)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA
ECU #2 Influent (PI-502)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA
ECU #3 Influent (PI-601)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA
ECU #4 Influent (PI-602)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA
System Effluent (PI-603)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA

See notes on last page.

Table B-1. Compliance and Performance Program Elements, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York.

Notes:

(1) Refer to Figure 3 of this Operation, Maintenance, & Monitoring (OM&M) Report and Appendix E of the Groundwater IRM OM&M Manual (OM&M Manual (ARCADIS 2009c)) for a diagram showing referenced sample locations and measurement points.
(2) Parameters/methods may be modified based on review of short-term and/or long-term testing results. Parameters shown in **Bold** indicate parameters that require NYSDEC notification/approval prior to change in monitoring schedule.
(3) Short-term schedule is tentative. Modification may be required/recommended based on the results of start-up and performance testing. In addition, per the Interim treated effluent (water) discharge criteria, per NYSDEC letter dated March 19, 2009 (NYSDEC 2009a), select samples are being analyzed for Mercury (Hg), this analyte is not expected to be a long-term analyte.
(4) Long-term schedule is tentative. Modification may be required/recommended based on the results of short-term testing or water quality trends.
(5) Water samples will be collected in accordance with the methods described in the Sampling and Analysis Plan, which is included as Appendix A of the OM&M Manual (ARCADIS 2009c). Samples will be analyzed in accordance with the methods and procedures described in the Sampling and Analysis Plan.
(6) Per NYSDEC request, a 1-hr pilot test was performed during system shake-down. 1-hr pilot test samples were also analyzed for mercury.
(7) Air samples collected and analyzed in accordance with methods described in the Sampling and Analysis Plan, which is included as Appendix A of the OM&M Manual (ARCADIS 2009c).
(8) Additional air samples will be collected to help calculate media usage rates and to help determine media changeout frequencies.

Acronyms\Key:

NA	Not applicable.
ECU	Emissions control unit.
VOCs	Volatile organic compounds (refer Tables D-3 and D-5 in the Quality Assurance Project Plan (QAPP) (Appendix D of the OM&M Manual (ARCADIS 2009c)) for the analyte lists for aqueous and air samples, respectively).
gal.	Gallons.
gpm	Gallons per minute.
i.w.g.	Inches water gauge.
NYSDEC	New York State Department of Environmental Conservation.
EPA	U.S. Environmental Protection Agency.
SCADA	Supervisory Control And Data Acquisition.
OM&M	Operation, maintenance and monitoring.

Table B-2. Water Sample Analytical Results - April 12, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2,3]

COMPOUND (ug/L)	Sample ID: / Sample Location: / Sample Date:	WSP-01 RW-1 4/12/2010	WSP-02 RW-2 4/12/2010	WSP-02 dup. RW-2 4/12/2010	WSP-03 RW-3 4/12/2010	WSP-04 RW-4 4/12/2010	WSP-05 Influent 4/12/2010	WSP-07 Effluent 4/12/2010
Volatile Organic Chemicals								
1,1,1-Trichloroethane		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
1,1,2,2-Tetrachloroethane		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
1,1,2-Trichloroethane		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
1,1-Dichloroethane		< 5 U	**3.2 J**	**3.6 J**	< 25 U	< 13 U	< 25 U	< 5 U
1,1-Dichloroethene		< 5 U	**3 J**	**3 J**	< 25 U	< 13 U	< 25 U	< 5 U
1,2-Dichloroethane		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
1,2-Dichloropropane		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
2-Butanone		< 50 U	< 130 U	< 130 U	< 250 U	< 130 U	< 250 U	< 50 U
2-Hexanone		< 50 U	< 130 U	< 130 U	< 250 U	< 130 U	< 250 U	< 50 U
4-methyl-2-pentanone		< 50 U	< 130 U	< 130 U	< 250 U	< 130 U	< 250 U	< 50 U
Acetone		< 50 U	< 130 U	< 130 U	< 250 U	< 130 U	< 250 U	< 50 U
Benzene		< 0.7 U	< 1.8 U	< 1.8 U	< 3.5 U	< 1.8 U	< 3.5 U	< 0.7 U
Bromodichloromethane		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Bromoform		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Bromomethane		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Carbon Disulfide		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Carbon tetrachloride		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Chlorobenzene		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Chlorodifluoromethane (Freon 22)		< 5 U	**1.7 J**	**1.7 J**	**1,300 D**	**560 D**	**610**	< 5 U
Chloroethane		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Chloroform		**0.42 J**	**1.5 J**	**1.6 J**	**3.2 J**	**0.8 J**	< 25 U	< 5 U
Chloromethane		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
cis-1,2-dichloroethene		**1.5 J**	**480**	**440 D**	**70**	**1.5 J**	**130**	< 5 U
cis-1,3-dichloropropene		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Dibromochloromethane		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Dichlorodifluoromethane (Freon 12)		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Ethylbenzene		< 5 U	**2.2 J**	**2.1 J**	< 25 U	< 13 U	< 25 U	< 5 U
Methyl tert-Butyl Ether		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Methylene Chloride		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Styrene		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Tetrachloroethene		< 5 U	< 13 U	< 13 U	< 25 U	**0.9 J**	< 25 U	< 5 U
Toluene		< 5 U	**71**	**73**	< 25 U	< 13 U	**15 J**	< 5 U
trans-1,2-dichloroethene		< 5 U	< 13 U	**3.4 J**	< 25 U	< 13 U	**2.6 J**	< 5 U
trans-1,3-dichloropropene		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Trichloroethylene		**2.4 J**	**43**	**45**	**17 J**	**1.4 J**	**17 J**	< 5 U
Trichlorofluoromethane (CFC-11)		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Trichlorotrifluoroethane (Freon 113)		< 5 U	< 13 U	< 13 U	< 25 U	< 13 U	< 25 U	< 5 U
Vinyl Chloride		< 2 U	**94**	**96**	< 10 U	< 5 U	**20**	< 2 U
Xylene-o		< 5 U	**2.2 J**	**2.3 J**	< 25 U	< 13 U	< 25 U	< 5 U
Xylenes - m,p		< 5 U	**3.5 J**	**3.4 J**	< 25 U	< 13 U	< 25 U	< 5 U
Subtotal VOCs [4]		**4.3**	**705**	**675**	**1,390**	**565**	**795**	0.0
Tentatively Identified Compounds		ND	ND	ND	ND	ND	ND	ND
Subtotal TICs [5]		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total VOCs [6]		**4.3**	**705**	**675**	**1,390**	**565**	**795**	0.0

See notes on last page.

Table B-2. Water Sample Analytical Results - April 12, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2,3)

COMPOUND (ug/L)	Sample ID: / Sample Location: / Sample Date:	WSP-01 RW-1 4/12/2010	WSP-02 RW-2 4/12/2010	WSP-02 dup. RW-2 4/12/2010	WSP-03 RW-3 4/12/2010	WSP-04 RW-4 4/12/2010	WSP-05 Influent 4/12/2010	WSP-07 Effluent 4/12/2010
Metals								
Cadmium (Dissolved)		--	--	--	--	--	< 5 U	< 5 U
Cadmium (Total)		--	--	--	--	--	< 5 U	< 5 U
Chromium (Dissolved)		--	--	--	--	--	< 10 U	< 10 U
Chromium (Total)		--	--	--	--	--	**10**	< 10 U
Iron (Dissolved)		--	--	--	--	--	**200**	**160**
Iron (Total)		--	**880**	--	**470**	--	**1,470**	**520**
Manganese (Dissolved)		--	--	--	--	--	**70**	**84**
Manganese (Total)		--	--	--	--	--	**70**	**90**
Mercury (Dissolved)		--	--	--	--	--	< 0.3 U	< 0.3 U
Mercury (Total)		--	--	--	--	--	< 0.3 U	< 0.3 U

Notes:

(1) Samples collected by ARCADIS on the dates shown and submitted to Columbia Analytical Services, Inc. for VOC analyses using New York State Department of Environmental Conservation ASP 2000 Method OLM 4.3 and metals using USEPA Method 6010, except for mercury, which was analyzed using USEPA Method 7470.
(2). Refer to Figure 3 of this OM&M Report for schematic sample locations.
(3). Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M Manual (ARCADIS 2009c).
(4) "Subtotal VOCs" represents the sum of individual concentrations of all volatile organic chemicals detected.
(5) Sum of TICs.
(6) Sum of VOCs and TICs.

Acronyms\Key:

Bold value indicates a detection.

dup	Duplicate sample.
VOC	Volatile organic compound.
USEPA	United States Environmental Protection Agency.
ug/L	Micrograms per liter.
OM&M	Operation, maintenance and monitoring.
--	Not sampled.
ND	TIC not detected.
< 5 U	Not detected above its laboratory quantification limit.
TICs	Tentatively identified compounds.
J	Estimated value.
D	Concentration is based on a diluted sample analysis.

Table B-3. Water Sample Analytical Results - May 10, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2,3]

COMPOUND (ug/L)	Sample ID: / Sample Location: / Sample Date:	WSP-05 Influent 5/10/2010	WSP-07 Effluent 5/10/2010
Volatile Organic Chemicals			
1,1,1-Trichloroethane		< 25 U	< 5 U
1,1,2,2-Tetrachloroethane		< 25 U	< 5 U
1,1,2-Trichloroethane		< 25 U	< 5 U
1,1-Dichloroethane		< 25 U	< 5 U
1,1-Dichloroethene		< 25 U	< 5 U
1,2-Dichloroethane		< 25 U	< 5 U
1,2-Dichloropropane		< 25 U	< 5 U
2-Butanone		< 250 U	**1.2 J**
2-Hexanone		< 250 U	< 50 U
4-methyl-2-pentanone		< 250 U	< 50 U
Acetone		< 250 U	< 50 U
Benzene		< 3.5 U	< 0.7 U
Bromodichloromethane		< 25 U	< 5 U
Bromoform		< 25 U	< 5 U
Bromomethane		< 25 U	< 5 U
Carbon Disulfide		< 25 U	< 5 U
Carbon tetrachloride		< 25 U	< 5 U
Chlorobenzene		< 25 U	< 5 U
Chlorodifluoromethane (Freon 22)		**650**	< 5 U
Chloroethane		< 25 U	< 5 U
Chloroform		**1.6 J**	< 5 U
Chloromethane		< 25 U	< 5 U
cis-1,2-dichloroethene		**33**	< 5 U
cis-1,3-dichloropropene		< 25 U	< 5 U
Dibromochloromethane		< 25 U	< 5 U
Dichlorodifluoromethane (Freon 12)		< 25 U	< 5 U
Ethylbenzene		< 25 U	< 5 U
Methyl tert-Butyl Ether		< 25 U	< 5 U
Methylene Chloride		< 25 U	< 5 U
Styrene		< 25 U	< 5 U
Tetrachloroethene		< 25 U	< 5 U
Toluene		< 25 U	< 5 U
trans-1,2-dichloroethene		< 25 U	< 5 U
trans-1,3-dichloropropene		< 25 U	< 5 U
Trichloroethylene		**10 J**	< 5 U
Trichlorofluoromethane (CFC-11)		< 25 U	< 5 U
Trichlorotrifluoroethane (Freon 113)		< 25 U	< 5 U
Vinyl Chloride		< 10 U	< 2 U
Xylene-o		< 25 U	< 5 U
Xylenes - m,p		< 25 U	< 5 U
Subtotal VOCs [4]		**695**	**1.2**
Tentatively Identified Compounds		ND	ND
Subtotal TICs [5]		ND	ND
Total VOCs [6]		**695**	**1.2**

See notes on last page.

Table B-3. Water Sample Analytical Results - May 10, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2,3)

COMPOUND (ug/L)	Sample ID: / Sample Location: / Sample Date:	WSP-05 Influent 5/10/2010	WSP-07 Effluent 5/10/2010
Metals			
Cadmium (Dissolved)		< 5 U	< 5 U
Cadmium (Total)		< 5 U	< 5 U
Chromium (Dissolved)		< 10 U	< 10 U
Chromium (Total)		< 10 U	< 10 U
Iron (Dissolved)		< 100 U	< 100 U
Iron (Total)		**1,060**	**400**
Manganese (Dissolved)		**26**	**26**
Manganese (Total)		**26**	**31**
Mercury (Dissolved)		< 0.3 U	< 0.3 U
Mercury (Total)		< 0.3 U	< 0.3 U

Notes:

(1) Samples collected by ARCADIS on the dates shown and submitted to Columbia Analytical Services, Inc. for VOC analyses using New York State Department of Environmental Conservation ASP 2000 Method OLM 4.3 and metals using USEPA Method 6010, except for mercury, which was analyzed using USEPA Method 7470.
(2). Refer to Figure 3 of this OM&M Report for schematic sample locations.
(3). Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M Manual (ARCADIS 2009c).
(4) "Subtotal VOCs" represents the sum of individual concentrations of all volatile organic chemicals detected.
(5) Sum of TICs.
(6) Sum of VOCs and TICs.

Acronyms\Key:

Bold value indicates a detection.

VOC	Volatile organic compound.
USEPA	United States Environmental Protection Agency.
ug/L	Micrograms per liter.
OM&M	Operation, maintenance and monitoring.
ND	TIC not detected.
< 5 U	Not detected above its laboratory quantification limit.
TICs	Tentatively identified compounds.
J	Estimated value.

Table B-4. Water Sample Analytical Results - June 9, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2,3]

COMPOUND (ug/L)	Sample ID: / Sample Location: / Sample Date:	WSP-05 Influent 6/9/2010	WSP-07 Effluent 6/9/2010
Volatile Organic Chemicals			
1,1,1-Trichloroethane		< 13 U	< 5 U
1,1,2,2-Tetrachloroethane		< 13 U	< 5 U
1,1,2-Trichloroethane		< 13 U	< 5 U
1,1-Dichloroethane		**1.1 J**	< 5 U
1,1-Dichloroethene		**0.93 J**	< 5 U
1,2-Dichloroethane		< 13 U	< 5 U
1,2-Dichloropropane		< 13 U	< 5 U
2-Butanone		< 130 U	< 50 U
2-Hexanone		< 130 U	< 50 U
4-methyl-2-pentanone		< 130 U	< 50 U
Acetone		< 130 U	< 50 U
Benzene		< 1.8 U	< 0.7 U
Bromodichloromethane		< 13 U	< 5 U
Bromoform		< 13 U	< 5 U
Bromomethane		< 13 U	< 5 U
Carbon Disulfide		< 13 U	< 5 U
Carbon tetrachloride		< 13 U	< 5 U
Chlorobenzene		< 13 U	< 5 U
Chlorodifluoromethane (Freon 22)		**450**	< 5 U
Chloroethane		< 13 U	< 5 U
Chloroform		**1.5 J**	< 5 U
Chloromethane		< 13 U	< 5 U
cis-1,2-dichloroethene		**130**	< 5 U
cis-1,3-dichloropropene		< 13 U	< 5 U
Dibromochloromethane		< 13 U	< 5 U
Dichlorodifluoromethane (Freon 12)		< 13 U	< 5 U
Ethylbenzene		< 13 U	< 5 U
Methyl tert-Butyl Ether		< 13 U	< 5 U
Methylene Chloride		< 13 U	< 5 U
Styrene		< 13 U	< 5 U
Tetrachloroethene		< 13 U	< 5 U
Toluene		**9.9 J**	< 5 U
trans-1,2-dichloroethene		**0.9 J**	< 5 U
trans-1,3-dichloropropene		< 13 U	< 5 U
Trichloroethylene		**17**	< 5 U
Trichlorofluoromethane (CFC-11)		< 13 U	< 5 U
Trichlorotrifluoroethane (Freon 113)		< 13 U	< 5 U
Vinyl Chloride		**22**	< 2 U
Xylene-o		< 13 U	< 5 U
Xylenes - m,p		< 13 U	< 5 U
Subtotal VOCs [4]		**633**	0.0
Tentatively Identified Compounds		ND	ND
Subtotal TICs [5]		ND	ND
Total VOCs [6]		**633**	0.0

See notes on last page.

Table B-4. Water Sample Analytical Results - June 9, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2,3)

COMPOUND (ug/L)	Sample ID: / Sample Location: / Sample Date:	WSP-05 Influent 6/9/2010	WSP-07 Effluent 6/9/2010
Metals			
Cadmium (Dissolved)		< 5 U	< 5 U
Cadmium (Total)		< 5 U	< 5 U
Chromium (Dissolved)		< 10 U	< 10 U
Chromium (Total)		**12**	< 10 U
Iron (Dissolved)		**120**	**140**
Iron (Total)		**4,840**	**490**
Manganese (Dissolved)		**69**	**82**
Manganese (Total)		**69**	**82**
Mercury (Dissolved)		< 0.3 U	< 0.3 U
Mercury (Total)		< 0.3 U	< 0.3 U

Notes:

(1) Samples collected by ARCADIS on the dates shown and submitted to Columbia Analytical Services, Inc. for VOC analyses using New York State Department of Environmental Conservation ASP 2000 Method OLM 4.3 and metals using USEPA Method 6010, except for mercury, which was analyzed using USEPA Method 7470.
(2). Refer to Figure 3 of this OM&M Report for schematic sample locations.
(3). Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M Manual (ARCADIS 2009c).
(4) "Subtotal VOCs" represents the sum of individual concentrations of all volatile organic chemicals detected.
(5) Sum of TICs.
(6) Sum of VOCs and TICs.

Acronyms\Key:

Bold value indicates a detection.

VOC	Volatile organic compound.
USEPA	United States Environmental Protection Agency.
ug/L	Micrograms per liter.
OM&M	Operation, maintenance and monitoring.
ND	TIC not detected.
< 5 U	Not detected above its laboratory quantification limit.
TICs	Tentatively identified compounds.
J	Estimated value.

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Appendix C

Vapor Sample Analytical Results

Table C-1. Vapor Sample Analytical Results - April 12, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2,3]

COMPOUND (ug/m^3)	Location ID: / Sample Location: / Sample Date:	VSP-1 Influent 4/12/2010	VSP-2 VPGAC Mid-Train 4/12/2010	VSP-4 PPZ Mid-Train 4/12/2010	VSP-5 Effluent 4/12/2010
Volatile Organic Chemicals					
1,1,1-Trichloroethane		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
1,1,2,2-Tetrachloroethane		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
1,1,2-Trichloroethane		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
1,1-Dichloroethane		**20**	< 0.89 U	< 18 U	< 9.1 U
1,1-Dichloroethene		**14**	< 0.89 U	< 18 U	< 9.1 U
1,2-Dichloroethane		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
1,2-Dichloropropane		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
1,3-butadiene		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
1-Chloro-1,1-difluoroethane (CFC 142b)		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
2-Butanone		< 92 U	**30**	< 180 U	< 91 U
2-Hexanone		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
4-methyl-2-pentanone		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Acetone		< 92 U	**360**	**390**	**200**
Benzene		< 9.2 U	**11**	**25**	**29**
Bromodichloromethane		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Bromoform		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Bromomethane		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Carbon Disulfide		< 92 U	< 8.9 U	< 180 U	< 91 U
Carbon tetrachloride		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Chlorobenzene		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Chlorodifluoromethane (Freon 22)		**4,700 D**	**4,100 D**	**4,500 D**	**4,800 D**
Chloroethane		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Chloroform		**23**	< 0.89 U	< 18 U	< 9.1 U
Chloromethane		< 9.2 U	**0.89**	< 18 U	< 9.1 U
cis-1,2-dichloroethene		**2,400 D**	**2.3**	**120**	**65**
cis-1,3-dichloropropene		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Dibromochloromethane		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Dichlorodifluoromethane (Freon 12)		< 9.2 U	**3.4**	< 18 U	< 9.1 U
Ethylbenzene		**12**	< 0.89 U	< 18 U	< 9.1 U
Methyl tert-Butyl Ether		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Methylene Chloride		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Styrene		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Tetrachloroethene		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Toluene		**340**	< 0.89 U	**77**	**80**
trans-1,2-dichloroethene		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
trans-1,3-dichloropropene		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Trichloroethylene		**280**	< 0.89 U	**27**	**17**
Trichlorofluoromethane (CFC-11)		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Trichlorotrifluoroethane (Freon 113)		< 9.2 U	< 0.89 U	< 18 U	< 9.1 U
Vinyl Chloride		**330**	**300 D**	**42**	**27**
Xylene-o		**13**	< 0.89 U	< 18 U	< 9.1 U
Xylenes - m,p		**21**	< 1.8 U	< 36 U	< 18 U
Subtotal VOCs [4]		**8,153**	**4,808**	**5,181**	**5,218**

See notes on last page.

Table C-1. Vapor Sample Analytical Results - April 12, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2,3]

COMPOUND (ug/m^3)	Location ID: / Sample Location: / Sample Date:	VSP-1 Influent 4/12/2010	VSP-2 VPGAC Mid-Train 4/12/2010	VSP-4 PPZ Mid-Train 4/12/2010	VSP-5 Effluent 4/12/2010
Tentatively Identified Compounds					
2-Butoxyethanol		--	**9.3 JN**	--	--
2-Methyl-trans-decalin		--	--	**3,400 JN**	--
2-Phenyl-2-Propanol		**53 JN**	**9.4 JN**	--	**270 JN**
2-syn-methyl-cis-decalin		--	--	**2,500 JN**	--
3-Penten-2-one		--	**11 JN**	--	--
ACETALDEHYDE		--	**33 JN**	--	**120 JN**
Acetophenone		**70 JN**	**7.7 JN**	--	**240 JN**
C10H22 Compound		--	**9.6 JN**	--	--
C11H20 Compound		--	--	**5,900 JN**	--
C11H22 Compound		--	--	**1,400 JN**	--
C11H24 Branched Alkane		--	--	**890 JN**	--
C11H24 Branched Alkane		--	--	**1,400 JN**	--
C12H24 Compound		--	--	**2,800 JN**	--
C12H26 Branched Alkane		--	--	**3,100 JN**	--
C12H26 Branched Alkane		--	--	**5,700 JN**	--
C12H26 Branched Alkane		--	--	**4,900 JN**	--
C12H26 Branched Alkane		--	--	**1,300 JN**	--
C12H26 Branched Alkane		--	--	**4,800 JN**	--
C12H26 Branched Alkane		--	--	**4,200 JN**	--
C12H26 Branched Alkane		--	--	**2,100 JN**	--
C12H26 Branched Alkane		--	--	**4,000 JN**	--
C13H28 Branched Alkane		--	**33 JN**	**3,900 JN**	--
C13H28 Branched Alkane		--	**11 JN**	--	--
C13H28 Branched Alkane		--	**13 JN**	--	--
C13H28 Branched Alkane		--	**49 JN**	--	--
C13H28 Branched Alkane		--	**11 JN**	--	--
C14H30 Branched Alkane		--	**12 JN**	--	--
Chloroisopropylalcohol		--	**6.7 JN**	--	--
HEXAMETHYLCYCLOTRISILOXANE		**50 JN**	**61 JN**	--	--
Methylnaphthalene Isomer		--	--	**4,300 JN**	--
N-DODECANE		--	**33 JN**	--	--
N-TRIDECANE		--	**42 JN**	--	--
PROPYLENE GLYCOL		--	**19 JN**	--	--
Trimethylsilanol		--	**41 JN**	--	--
Unidentified Compound		--	**8.7 JN**	**4,500 JN**	--
Unidentified Compound		--	**9.4 JN**	**2,000 JN**	--
Unidentified Compound		--	--	**2,000 JN**	--
Subtotal TICs [5]		**173**	**430**	**65,090**	**630**
Total VOCs [6]		**8,326**	**5,238**	**70,271**	**5,848**

See notes on last page.

Table C-1. Vapor Sample Analytical Results - April 12, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2,3)

Notes:

(1) Samples collected by ARCADIS on the dates shown and submitted to Columbia Analytical Services, Inc. for VOC analyses per Modified US Method TO-15.
(2) Refer to Figure 3 of this OM&M Report for schematic sample locations.
(3) Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M Manual (ARCADIS 2009c).
(4) "Subtotal VOCs" represents the sum of individual concentrations of all volatile organic chemicals detected.
(5) Sum of TICs.
(6) Sum of VOCs and TICs.

Acronyms\Key:

Bold value indicates a detection.

ug/m^3	Micrograms per cubic meter.
USEPA	United States Environmental Protection Agency.
VPGAC	Vapor phase granular activated carbon.
PPZ	Potassium permanganate impregnated zeolite.
VOC	Volatile organic compound.
OM&M	Operation, maintenance and monitoring.
TIC	Tentatively identified compound.
--	TIC not detected.
< 9.2 U	Undetected above its laboratory quantification limit.
D	Concentration is based on a diluted sample analysis.
JN	Compound tentatively identified, concentration is estimated.

Table C-2. Vapor Sample Analytical Results - May 10, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2,3]

COMPOUND (ug/m^3)	Location ID: / Sample Location: / Sample Date:	VSP-5 / Effluent / 5/10/2010
Volatile Organic Chemicals		
1,1,1-Trichloroethane		< 0.75 U
1,1,2,2-Tetrachloroethane		< 0.75 U
1,1,2-Trichloroethane		< 0.75 U
1,1-Dichloroethane		**1.2**
1,1-Dichloroethene		< 0.75 U
1,2-Dichloroethane		< 0.75 U
1,2-Dichloropropane		< 0.75 U
1,3-butadiene		< 0.75 U
1-Chloro-1,1-difluoroethane (CFC 142b)		< 0.75 U
2-Butanone		**9.2**
2-Hexanone		< 0.75 U
4-methyl-2-pentanone		< 0.75 U
Acetone		**95**
Benzene		**7.8**
Bromodichloromethane		< 0.75 U
Bromoform		< 0.75 U
Bromomethane		< 0.75 U
Carbon Disulfide		< 7.5 U
Carbon tetrachloride		< 0.75 U
Chlorobenzene		< 0.75 U
Chlorodifluoromethane (Freon 22)		**3,500 D**
Chloroethane		< 0.75 U
Chloroform		**3.5**
Chloromethane		**0.97**
cis-1,2-dichloroethene		**9.2**
cis-1,3-dichloropropene		< 0.75 U
Dibromochloromethane		< 0.75 U
Dichlorodifluoromethane (Freon 12)		**3.5**
Ethylbenzene		< 0.75 U
Methyl tert-Butyl Ether		< 0.75 U
Methylene Chloride		< 0.75 U
Styrene		< 0.75 U
Tetrachloroethene		< 0.75 U
Toluene		< 0.75 U
trans-1,2-dichloroethene		< 0.75 U
trans-1,3-dichloropropene		< 0.75 U
Trichloroethylene		**5.1**
Trichlorofluoromethane (CFC-11)		< 0.75 U
Trichlorotrifluoroethane (Freon 113)		< 0.75 U
Vinyl Chloride		< 0.75 U
Xylene-o		< 0.75 U
Xylenes - m,p		< 1.5 U
Subtotal VOCs [4]		**3,635**

See notes on last page.

Table C-2. Vapor Sample Analytical Results - May 10, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2,3)

COMPOUND (ug/m^3)	Location ID: / Sample Location: / Sample Date:	VSP-5 / Effluent / 5/10/2010
Tentatively Identified Compounds		
2,5-Dimethylfuran		**4.9 JN**
2-Phenyl-2-Propanol		**26 JN**
ACETALDEHYDE		**28 JN**
Acetophenone		**78 JN**
BENZALDEHYDE		**6.2 JN**
Benzene, 1-methylethyl-		**11 JN**
Methyl Propenyl Ketone		**8.9 JN**
Methyl Vinyl Ketone		**11 JN**
n-BUTANOL		**4.9 JN**
Subtotal TICs (5)		**179**
Total VOCs (6)		**3,814**

Notes:

(1) Samples collected by ARCADIS on the dates shown and submitted to Columbia Analytical Services, Inc. for VOC analyses per Modified U Method TO-15.
(2) Refer to Figure 3 of this OM&M Report for schematic sample locations.
(3) Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M Manual (ARCADIS 2009c).
(4) "Subtotal VOCs" represents the sum of individual concentrations of all volatile organic chemicals detected.
(5) Sum of TICs.
(6) Sum of VOCs and TICs.

Acronyms\Key:

Bold value indicates a detection.

ug/m^3	Micrograms per cubic meter.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
OM&M	Operation, maintenance and monitoring.
TIC	Tentatively identified compound.
< 9.2 U	Undetected above its laboratory quantification limit.
D	Concentration is based on a diluted sample analysis.
JN	Compound tentatively identified, concentration is estimated.

Table C-3. Vapor Sample Analytical Results - June 9, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2,3]

COMPOUND (ug/m^3)	Location ID: / Sample Location: / Sample Date:	VSP-1 Influent 6/9/2010	VSP-2 VPGAC Mid-Train 6/9/2010	VSP-3 VPGAC Effluent 6/9/2010	VSP-4 PPZ Mid-Train 6/9/2010	VSP-5 Effluent 6/9/2010
Volatile Organic Chemicals						
1,1,1-Trichloroethane		**3.6**	< 0.77 U	< 0.75 U	< 7 U	**0.97**
1,1,2,2-Tetrachloroethane		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
1,1,2-Trichloroethane		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
1,1-Dichloroethane		**15**	< 0.77 U	< 0.75 U	< 7 U	**4.4**
1,1-Dichloroethene		**12**	**0.99**	< 0.75 U	< 7 U	**0.77**
1,2-Dichloroethane		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
1,2-Dichloropropane		**1.3**	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
1,3-butadiene		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
1-Chloro-1,1-difluoroethane (CFC 142b)		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
2-Butanone		< 7.4 U	**34**	**11**	< 70 U	**9.1**
2-Hexanone		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
4-methyl-2-pentanone		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Acetone		< 7.4 U	**600**	**350**	**250**	**170**
Benzene		**2.1**	**6.6**	**2**	**10**	**13**
Bromodichloromethane		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Bromoform		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Bromomethane		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Carbon Disulfide		< 7.4 U	< 7.7 U	< 7.5 U	< 70 U	< 7.6 U
Carbon tetrachloride		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Chlorobenzene		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Chlorodifluoromethane (Freon 22)		**5,200**	**5,300**	**5,400**	**5,500**	**5,400**
Chloroethane		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Chloroform		**20**	< 0.77 U	< 0.75 U	< 7 U	**6.7**
Chloromethane		< 0.74 U	< 0.77 U	**0.91**	< 7 U	**2.8**
cis-1,2-dichloroethene		**1,900**	**7.6**	< 0.75 U	**150**	**21**
cis-1,3-dichloropropene		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Dibromochloromethane		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Dichlorodifluoromethane (Freon 12)		**3.5**	**3.1**	**3.1**	< 7 U	**3.5**
Ethylbenzene		**7.9**	< 0.77 U	< 0.75 U	< 7 U	**0.79**
Methyl tert-Butyl Ether		**1.9**	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Methylene Chloride		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Styrene		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Tetrachloroethene		**5.5**	< 0.77 U	< 0.75 U	< 7 U	**1.1**
Toluene		**150**	< 0.77 U	< 0.75 U	**45**	**44**
trans-1,2-dichloroethene		**2.5**	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
trans-1,3-dichloropropene		< 0.74 U	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Trichloroethylene		**230**	< 0.77 U	< 0.75 U	**31**	**12**
Trichlorofluoromethane (CFC-11)		**1.4**	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Trichlorotrifluoroethane (Freon 113)		**1.3**	< 0.77 U	< 0.75 U	< 7 U	< 0.76 U
Vinyl Chloride		**220**	**240**	**290**	**60**	**5**
Xylene-o		**8.2**	< 0.77 U	< 0.75 U	< 7 U	**1.4**
Xylenes - m,p		**16**	< 1.5 U	< 1.5 U	< 14 U	**2.4**
Subtotal VOCs [4]		**7,802**	**6,192**	**6,057**	**6,046**	**5,699**

See notes on last page.

Table C-3. Vapor Sample Analytical Results - June 9, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2,3]

COMPOUND (ug/m^3)	Location ID: / Sample Location: / Sample Date:	VSP-1 Influent 6/9/2010	VSP-2 VPGAC Mid-Train 6/9/2010	VSP-3 VPGAC Effluent 6/9/2010	VSP-4 PPZ Mid-Train 6/9/2010	VSP-5 Effluent 6/9/2010
Tentatively Identified Compounds						
1-(2-Methoxypropoxy)-2-Propanol		--	--	**4.2 JN**	--	--
2,5-Hexanedione		**120 JN**	--	--	--	--
2-Butoxyethanol		--	**95 JN**	**210 JN**	--	--
2-Chloropropanol		--	**5.2 JN**	--	--	--
2-ETHYL-1-HEXANOL		--	**11 JN**	**13 JN**	--	--
2-Methyl-trans-decalin		--	--	--	**780 JN**	**92 JN**
2-Phenyl-2-Propanol		**350 JN**	**460 JN**	**520 JN**	--	--
2-syn-methyl-cis-Decalin		--	--	--	**480 JN**	**56 JN**
ACETALDEHYDE		--	**9.3 JN**	**16 JN**	--	--
ACETIC ACID		**3.7 JN**	--	--	--	--
Acetophenone		**130 JN**	**320 JN**	**130 JN**	--	**50 JN**
BENZALDEHYDE		**4.9 JN**	**4.1 JN**	**7.2 JN**	--	--
Benzene, 1-methylethyl-		**33 JN**	**27 JN**	**29 JN**	--	--
C11 - C22 Compound		--	--	--	**350 JN**	--
C11H20 Compound		--	--	--	**1,100 JN**	**130 JN**
C11H24 Branched Alkane		--	--	--	**240 JN**	**24 JN**
C11H24 Branched Alkane		--	--	--	**460 JN**	**53 JN**
C12H26 Branched Alkane		--	--	--	**1,000 JN**	**110 JN**
C12H26 Branched Alkane		--	--	--	**720 JN**	**85 JN**
C12H26 Branched Alkane		--	--	--	**790 JN**	**74 JN**
C12H26 Branched Alkane		--	--	--	**220 JN**	--
C12H26 Branched Alkane		--	--	--	**910 JN**	**84 JN**
C12H26 Branched Alkane		--	--	--	**830 JN**	**85 JN**
C12H26 Branched Alkane		--	--	--	**390 JN**	**33 JN**
C13H26 compound		--	--	--	**230 JN**	**26 JN**
C13H28 Branched Alkane		--	--	--	**720 JN**	**81 JN**
Chloroisopropylalcohol		--	**26 JN**	--	--	--
CYCLOHEXANONE		--	--	**14 JN**	--	--
HEXAMETHYLCYCLOTRISILOXANE		**6.3 JN**	**13 JN**	**79 JN**	--	--
Methyl vinyl ketone		--	**7 JN**	--	--	--
Methylcyclohexane		**5.1 JN**	--	--	--	--
Methylpropenylketone		--	**37 JN**	**18 JN**	--	--
n-BUTANOL		--	**4.6 JN**	--	--	--
N-UNDECANE		--	--	--	**750 JN**	--
Pentylcyclohexane		--	--	--	**910 JN**	**85 JN**
PHENOL		--	**5.7 JN**	--	--	--
Propylene Carbonate		**5.7 JN**	--	--	--	--
PROPYLENE GLYCOL		**51 JN**	--	--	--	--
trans-Decalin		--	--	--	--	**35 JN**
Trimethylsilanol		--	**97 JN**	**70 JN**	--	--
Unidentified Compound		--	--	**4.5 JN**	**300 JN**	**40 JN**

See notes on last page.

Unidentified Compound	**5.1 JN**	--	--	--	**27 JN**
Unidentified Compound	**4.7 JN**	--	--	**980 JN**	**120 JN**
Unidentified Compound	--	--	--	**350 JN**	**40 JN**
Unidentified Oxygenated Compound	**4.1 JN**	**7.8 JN**	--	--	--
Unidentified Oxygenated Compound	**110 JN**	--	--	--	--
Unidentified Oxygenated Compound	**56 JN**	--	--	--	--
Unidentified Siloxane	**5 JN**	**7.7 JN**	**27 JN**	--	--
Subtotal TICs [5]	**895**	**1,137**	**1,142**	**12,510**	**1,330**
Total VOCs [6]	**8,697**	**7,329**	**7,199**	**18,556**	**7,029**

Table C-3. Vapor Sample Analytical Results - June 9, 2010, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2,3)

COMPOUND	Location ID: / Sample Location: / Sample Date:	VSP-1 Influent 6/9/2010	VSP-2 VPGAC Mid-Train 6/9/2010	VSP-3 VPGAC Effluent 6/9/2010	VSP-4 PPZ Mid-Train 6/9/2010	VSP-5 Effluent 6/9/2010
(ug/m^3)						

Notes:

(1) Samples collected by ARCADIS on the dates shown and submitted to Columbia Analytical Services, Inc. for VOC analyses per Modified USEPA Method TO-15.
(2) Refer to Figure 3 of this OM&M Report for schematic sample locations.
(3) Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M Manual (ARCADIS 2009c).
(4) "Subtotal VOCs" represents the sum of individual concentrations of all volatile organic chemicals detected.
(5) Sum of TICs.
(6) Sum of VOCs and TICs.

Acronyms\Key:

Bold value indicates a detection.

ug/m^3	Micrograms per cubic meter.
USEPA	United States Environmental Protection Agency.
VPGAC	Vapor phase granular activated carbon.
PPZ	Potassium permanganate impregnated zeolite.
VOC	Volatile organic compound.
OM&M	Operation, maintenance and monitoring.
TIC	Tentatively identified compound.
--	TIC not detected.
< 9.2 U	Undetected above its laboratory quantification limit.
JN	Compound tentatively identified, concentration is estimated.

ARCADIS

Appendix D

Air Discharge Quality Evaluation

Table D-1. Summary of SCREEN3 Model Input and Outputs, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Parameters	Date Sampled:	07/24/09	8/12/09 [9]	09/10/09	11/10/09	12/02/09	01/11/10	02/02/10	03/10/10	04/12/10	05/10/10	06/09/10
SCREEN3 Model Input												
Source Type		Point	Point	Point	Point	Point	Point	Point	Point	Point	Point	Point
Emission Rate (g/s)		1	1	1	1	1	1	1	1	1	1	1
Stack Height (ft)		13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
Stack Height (m)		4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Stack Inside Diameter (m)		0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Air Flow Rate (scfm)[1]		2,020	1,999	2,077	2,126	1,935	2,184	2,135	2,099	2,086	2,076	2,003
Air Flow Rate (acfm @ stack temp)[2]		2,058	2,048	2,116	2,142	1,964	2,188	2,135	2,127	2,125	2,115	2,029
Stack Gas Exit Temperature (K)[1]		300	302	300	297	299	295	294	298	300	300	298
Ambient Air Temperature (K)[3]		298	296	296	281	278	269	269	280	285	283	288
Receptor Height (m)[4]		1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Urban/Rural		Urban	Urban	Urban	Urban	Urban	Urban	Urban	Urban	Urban	Urban	Urban
Building Height (m)		2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Min Horizontal Bldg Dim (m)		7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
Max Horizontal Bldg Dim (m)		9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
Consider Bldg Downwash?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Simple/Complex Terrain Above Stack		Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple
Simple/Complex Terrain Above Stack Base		Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple
Meteorology		Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Automated Distances Array		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Terrain Height Above Stack Base		0	0	0	0	0	0	0	0	0	0	0
SCREEN3 Model Output												
1-HR Max Concentration at Receptor Height ($\mu g/m^3$) [5]		1,941	1,958	1,909	1,900	2,084	1,876	1,912	1,912	1,911	1,919	1,985
Annualization Factor[6]		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Average Annual Concentration at Receptor Height ($\mu g/m^3$)[7]		155.3	156.6	152.7	152	166.7	150.1	153	153	152.9	153.5	158.8
Distance To Max Concentration (m)[8]		8	8	8	8	8	8	8	8	8	8	8

See notes on last page.

Table D-1. Summary of SCREEN3 Model Input and Outputs, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Notes:

(1) The stack air flow rate (in scfm) and temperature were measured using inline instrumentation. Values were measured at the blower effluent location.
(2) The stack air flow rate at the stack temperature (in acfm) was calculated by dividing the stack air flow rate in scfm by the ratio of the standard temperature to the actual stack gas exit temperature.
(3) The ambient temperature was recorded from the weather.newday.com website for Islip, New York. The mean actual temperature from the website was used in model calculation.
(4) The receptor height corresponds to the average inhalation level.
(5) SCREEN3 calculated constituent concentration at listed conditions at the specified inhalation level.
(6) A USEPA time averaging conversion factor of 1/0.08 was used to convert the 1-hour maximum concentration output to an annual average.
(7) Average annual constituent concentration at the receptor height was calculated by multiplying the one hour maximum concentration by the annualization factor.
(8) SCREEN3 calculated distance to the 1-hour maximum concentration.
(9) The effluent air flow was not recorded on August 12, 2009. The air flow measurement used in calculations was recorded on August 5, 2009.

Acronyms\Key:

$\mu g/m^3$	Micrograms per cubic meter.
acfm	Actual cubic feet per minute.
ft	Feet.
g/s	Grams per second.
K	Kelvin.
m	Meters.
scfm	Standard cubic feet per minute.
USEPA	United States Environmental Protection Agency.

Table D-2. Summary of Annual Maximum Allowable Stack Concentration Calculations, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Compound	Actual Effluent Concentrations[(1)] (µg/m^3)										
	7/24/09	8/12/09	9/10/09	11/10/09	12/2/09	1/11/10	2/2/10	3/10/10	4/12/10	5/10/10	6/9/10
1,1,1 - Trichloroethane	0.96	0	0	0	0	0	0	0.91	0	0	0.97
1,1 - Dichloroethane	3.9	5.7	5.3	37	3.7	2.8	0	5.9	0	1.2	4.4
1,2 - Dichloroethane	0	0	0	0	0	0	0	0	0	0	0
1,1 - Dichloroethene	0	0	0	5.8	1.4	0	0	0.97	0	0	0.77
2-Butanone	0	0	0	0	5.5	16	42	17	0	9.2	9.1
Acetone	0	0	0	310	13	61	550	98	200	95	170
Chloroform	0	0	0	30	5.7	4.2	7.9	7.9	0	3.5	6.7
Ethylbenzene	0	0	0	1.4	3	1.1	0	1.8	0	0	0.79
Xylenes (o)	0	0	0	1.6	3.4	1.4	0	3.1	0	0	1.4
Xylenes (m,p)	0	0	0	2.8	6.2	2.3	0	5.1	0	0	2.4
Chloromethane	0	0	0	18	0	0	8.8	0.82	0	0.97	2.8
Methylene Chloride	0	0	0	2.5	0	0	0	0	0	0	0
Tetrachloroethene	0.64	0	0	0	0	0	0	1.2	0	0	1.1
Trichloroethene	9.3	4.7	8.8	15	30	13	13	17	17	5.1	12
Vinyl Chloride	54	260	160	200	52	36	12	29	27	0	5.0
cis 1,2 Dichloroethene	47	120	150	1,700	230	52	34	77	65	9.2	21
trans 1,2 Dichloroethene	0	0	0	0	0	0	0	0	0	0	0
Benzene	48	21	17	13	12	7.8	17	4.6	29	7.8	13
Toluene	1.5	110	120	87	90	38	40	96	80	0	44
2-Hexanone	0	0	0	0	0	0	0	0.81	0	0	0
Trichlorofluoromethane (Freon 11)	0	0	0	2.2	0	0	0	0	0	0	0
Dichlorodifluoromethane (Freon 12)	5.1	0	10	61	2.4	2.9	3.3	3.8	0	3.5	3.5
Chlorodifluoromethane (Freon 22)	0	220	540	0	2,400	3,700	3,700	4,700	4,800	3,500	5,400

See notes on last page.

Table D-2. Summary of Annual Maximum Allowable Stack Concentration Calculations, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Compound	AGC[2]	Annual Maximum Allowable Stack Concentration[3] (µg/m^3)										
	(µg/m^3)	7/24/09	8/12/09	09/10/09	11/10/09	12/2/09	1/11/10	2/2/10	3/10/10	4/12/10	5/10/10	6/9/10
1,1,1 - Trichloroethane	1,000	6.63E+06	6.61E+06	6.56E+06	6.51E+06	6.47E+06	6.45E+06	6.49E+06	6.51E+06	6.52E+06	6.53E+06	6.58E+06
1,1 - Dichloroethane	0.63	4.18E+03	4.16E+03	4.13E+03	4.10E+03	4.08E+03	4.06E+03	4.09E+03	4.10E+03	4.11E+03	4.11E+03	4.14E+03
1,2 - Dichloroethane	0.038	2.52E+02	2.51E+02	2.49E+02	2.47E+02	2.46E+02	2.45E+02	2.46E+02	2.47E+02	2.48E+02	2.48E+02	2.50E+02
1,1 - Dichloroethene	70	4.64E+05	4.62E+05	4.59E+05	4.56E+05	4.53E+05	4.52E+05	4.54E+05	4.56E+05	4.56E+05	4.57E+05	4.60E+05
2-Butanone	5,000	3.31E+07	3.30E+07	3.28E+07	3.25E+07	3.24E+07	3.23E+07	3.24E+07	3.26E+07	3.26E+07	3.26E+07	3.29E+07
Acetone	28,000	1.86E+08	1.85E+08	1.84E+08	1.82E+08	1.81E+08	1.81E+08	1.82E+08	1.82E+08	1.83E+08	1.83E+08	1.84E+08
Chloroform	0.043	2.85E+02	2.84E+02	2.82E+02	2.80E+02	2.78E+02	2.77E+02	2.79E+02	2.80E+02	2.80E+02	2.81E+02	2.83E+02
Ethylbenzene	1,000	6.63E+06	6.61E+06	6.56E+06	6.51E+06	6.47E+06	6.45E+06	6.49E+06	6.51E+06	6.52E+06	6.53E+06	6.58E+06
Xylenes (o)	100	6.63E+05	6.61E+05	6.56E+05	6.51E+05	6.47E+05	6.45E+05	6.49E+05	6.51E+05	6.52E+05	6.53E+05	6.58E+05
Xylenes (m,p)	100	6.63E+05	6.61E+05	6.56E+05	6.51E+05	6.47E+05	6.45E+05	6.49E+05	6.51E+05	6.52E+05	6.53E+05	6.58E+05
Chloromethane	90	5.97E+05	5.95E+05	5.90E+05	5.86E+05	5.82E+05	5.81E+05	5.84E+05	5.86E+05	5.87E+05	5.87E+05	5.92E+05
Methylene Chloride	2.1	1.39E+04	1.39E+04	1.38E+04	1.37E+04	1.36E+04	1.35E+04	1.36E+04	1.37E+04	1.37E+04	1.37E+04	1.38E+04
Tetrachloroethene	1	6.63E+03	6.61E+03	6.56E+03	6.51E+03	6.47E+03	6.45E+03	6.49E+03	6.51E+03	6.52E+03	6.53E+03	6.58E+03
Trichloroethene	0.5	3.31E+03	3.30E+03	3.28E+03	3.25E+03	3.24E+03	3.23E+03	3.24E+03	3.26E+03	3.26E+03	3.26E+03	3.29E+03
Vinyl Chloride	0.11	7.29E+02	7.27E+02	7.21E+02	7.16E+02	7.12E+02	7.10E+02	7.14E+02	7.16E+02	7.17E+02	7.18E+02	7.23E+02
cis 1,2 Dichloroethene	63	4.18E+05	4.16E+05	4.13E+05	4.10E+05	4.08E+05	4.06E+05	4.09E+05	4.10E+05	4.11E+05	4.11E+05	4.14E+05
trans 1,2 Dichloroethene	63	4.18E+05	4.16E+05	4.13E+05	4.10E+05	4.08E+05	4.06E+05	4.09E+05	4.10E+05	4.11E+05	4.11E+05	4.14E+05
Benzene	0.13	8.62E+02	8.59E+02	8.53E+02	8.46E+02	8.41E+02	8.39E+02	8.43E+02	8.46E+02	8.48E+02	8.48E+02	8.55E+02
Toluene	5,000	3.31E+07	3.30E+07	3.28E+07	3.25E+07	3.24E+07	3.23E+07	3.24E+07	3.26E+07	3.26E+07	3.26E+07	3.29E+07
2-Hexanone	48	3.18E+05	3.17E+05	3.15E+05	3.12E+05	3.11E+05	3.10E+05	3.11E+05	3.13E+05	3.13E+05	3.13E+05	3.16E+05
Trichlorofluoromethane (Freon 11)	1,000	6.63E+06	6.61E+06	6.56E+06	6.51E+06	6.47E+06	6.45E+06	6.49E+06	6.51E+06	6.52E+06	6.53E+06	6.58E+06
Dichlorodifluoromethane (Freon 12)	12,000	7.96E+07	7.93E+07	7.87E+07	7.81E+07	7.77E+07	7.74E+07	7.78E+07	7.81E+07	7.83E+07	7.83E+07	7.89E+07
Chlorodifluoromethane (Freon 22)	50,000	3.31E+08	3.30E+08	3.28E+08	3.25E+08	3.24E+08	3.23E+08	3.24E+08	3.26E+08	3.26E+08	3.26E+08	3.29E+08

See notes on last page.

Table D-2. Summary of Annual Maximum Allowable Stack Concentration Calculations, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Compound	Percent of Annual Maximum Allowable Stack Concentration[4]										
	7/24/09	8/12/09	09/10/09	11/10/09	12/2/09	1/11/10	2/2/10	3/10/10	4/12/10	5/10/10	6/9/10
1,1,1 - Trichloroethane	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1,1 - Dichloroethane	0.09%	0.14%	0.13%	0.90%	0.09%	0.07%	0.00%	0.14%	0.00%	0.03%	0.11%
1,2 - Dichloroethane	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1,1 - Dichloroethene	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2-Butanone	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Acetone	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Chloroform	0.00%	0.00%	0.00%	10.72%	2.05%	1.51%	2.83%	2.82%	0.00%	1.25%	2.37%
Ethylbenzene	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Xylenes (o)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Xylenes (m,p)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Chloromethane	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Methylene Chloride	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Tetrachloroethene	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.02%
Trichloroethene	0.28%	0.14%	0.27%	0.46%	0.93%	0.40%	0.40%	0.52%	0.52%	0.16%	0.36%
Vinyl Chloride	7.40%	35.78%	22.18%	27.94%	7.30%	5.07%	1.68%	4.05%	3.76%	0.00%	0.69%
cis 1,2 Dichloroethene	0.01%	0.03%	0.04%	0.41%	0.06%	0.01%	0.01%	0.02%	0.02%	0.00%	0.01%
trans 1,2 Dichloroethene	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Benzene	5.57%	2.45%	1.99%	1.54%	1.43%	0.93%	2.02%	0.54%	3.42%	0.92%	1.52%
Toluene	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2-Hexanone	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Trichlorofluoromethane (Freon 11)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Dichlorodifluoromethane (Freon 12)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Chlorodifluoromethane (Freon 22)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Notes:

(1) Actual effluent concentrations are analytical results from air samples collected on the dates shown. Data in this table corresponds to approximately the first year of system operation.

(2) AGC refers to the compound-specific annual guideline concentration per the NYSDEC DAR-1 AGC/SGC tables, revised September 10, 2007.

(3) Annual maximum allowable stack concentrations were calculated by dividing the product of the annual guideline concentration of a compound and the ratio of the SCREEN3 gas emission rate and the SCREEN 3 average annual concentration at receptor height by the air flow rate at the stack temperature and multiplying by the appropriate conversion factors.

(4) Percent of MASC was calculated by dividing the actual effluent concentration by the MASC for a given monitoring event.

Acronyms\Key:

$\mu g/m^3$ Micrograms per cubic meter.
AGC Annual guideline concentration.
MASC Maximum allowable stack concentration.