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

2011 Annual Summary

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

NYSDEC ID # 1-30-003A

ARCADIS

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ARCADIS

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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) Annual 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) and the Former Grumman Plant 24 Access Road, which the NYSDEC has termed the "Former Grumman Settling Ponds Area" and designated as OU3, are referred to herein as the Site Area. A Site Area Location map is provided on Figure 1.

The Groundwater IRM has been operational since July 21, 2009. This OM&M report summarizes the Groundwater IRM OM&M activities conducted, data collected, summary of system alarms, conclusions, recommendations, and engineering certification for the groundwater IRM during 2011 (i.e. from January 1 to December 31, 2011). Additionally, this report summarizes the OM&M activities performed during the 4th Quarter of 2011 (i.e. October 1 through December 31, 2010 [the "reporting period"]). Detailed OM&M summaries for the previous three 2011 operational quarterly periods are available in the following reports (2011 Quarterly Reports):

- Quarterly OM&M Report for the Groundwater IRM, January 1 through March 31 (ARCADIS 2011c)
- Quarterly OM&M Report for the Groundwater IRM, April 1 through June 31 (ARCADIS 2011d)
- Quarterly OM&M Report for the Groundwater IRM, July 1 through September 31 (ARCADIS 2011e)

During 2011, Remedial System and Environmental Effectiveness Monitoring Programs were conducted in accordance with the NYSDEC-approved OU3 Interim Groundwater IRM OM&M Manual (OM&M Manual) (ARCADIS 2009).

As discussed in the OU3 Site Area Remedial Investigation Report (Site Area RI) (ARCADIS 2011a), Northrop Grumman does not take responsibility for Freon 12 and Freon 22, which are present in the Site Area. 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 2009), plus Toluene, Benzene, and Total Xylenes. A list of "Project VOCs" is provided in various tables throughout this report.

- "Non-project VOCs:" are VOCs, such as Freon 12 and Freon 22 that are not related to former Grumman activities but have been detected in the Site Area. As noted in the Site Area RI (ARCADIS 2011a), a sub-plume of Freon 22 has been identified originating from the area of the Town of Oyster Bay's (Town's) former ice rink (shown on Figure 2). Based on Town information (Zervos, Theodore 2007), Freon 22 was used and released to the environment.

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:

  - Ø 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 southern Site Area boundary.

  - Ø 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 Area.

3. Groundwater Interim Remedial Measure Description

The Groundwater IRM consists of:

- A "pump-and-treat system" where groundwater is:
  - Ø Extracted along the southern portion of the Northrop Grumman Former Plant 24 Access Road via four remedial wells.
  - Ø Conveyed to a treatment plant at McKay Field via four underground pipelines.
  - Ø Treated via air stripping to reduce concentrations of Project and Non-Project VOCs.
  - Ø Filtered to remove oxidized metals.
  - Ø Returned to the aquifer, via a discharge pipeline routed to a recharge basin located on the adjacent former Bethpage Navy Weapons Industrial Reserve Plant (NWIRP) property.
- A vapor phase treatment system that reduces 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:

- Four Remedial Wells (RW-1, RW-2, RW-3, and RW-4) with design pumping rates of 30 gallons per minute (gpm), 75 gpm, 75 gpm, and 30 gpm, respectively; for a total design influent rate of 210 gpm.
- One low-profile air stripper to remove VOCs from the extracted groundwater prior to discharge to the recharge basins.
- Two bag filters configured so that one is "operational" and the other is in "stand by" mode. The system control logic switches from the "operational" filter unit to the "stand by" filter unit automatically to prevent a shut down.

- Four emission control units (ECUs), two containing vapor phase granular activated carbon (VPGAC) and two containing potassium permanganate-impregnated zeolite (PPZ). The VPGAC ECUs treat the Project VOCs in the air stripper off gas, except for vinyl chloride, which is treated by the PPZ ECUs.

- The Groundwater Monitoring Network consists of 35 monitoring locations (i.e., 17 groundwater monitoring wells, 4 remedial wells, and 14 piezometers).

Additional information is provided in the OM&M Manual (ARCADIS 2009). The layout of the Groundwater IRM is shown on Figure 2 and a schematic drawing is provided on Figure 3. The groundwater sampling locations that form the Groundwater Monitoring Network are shown on Figure 4. Construction details for the monitoring wells and piezometers are provided in Appendix A.

4. Operation and Maintenance Activities

4.1 Fourth Quarter 2011

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

- The system operated full-time, 82 out of 92 days (89 percent uptime).

- The system was monitored during the majority of business days, either via a site visit or remotely by 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 of system advisories and alarms to plant operators.

- Intentional system shut downs were as follows (see Table 1 for more information):

  Ø Remedial Well RW-2 preventative quarterly maintenance, Remedial Well RW-3 rehabilitation to address iron fouling issues, and VPGAC ECUs 501 and 502 and PPZ ECU 601 media replacements (December 6 to December 12, 2011).

  Ø Air Stripper periodic maintenance (December 30, 2011).

- System shut downs due to alarm conditions were as follows (see Table 1 for more information):

  Ø Bag filter faults (October 9, 2011 and November 26, 2011): Problem: Both bag filters clogged up over the weekend/holiday before an operator was able to reach the Site. Solution: implement more frequent or more comprehensive preventative maintenance on the wells to extend periods between bag filter switchovers; such as the well maintenance work performed in December 2011, which, to date, has increased time between bag filter switchovers.

  Ø Remedial Well RW-3 motor overload (October 21, 2011): Problem: Iron fouling on/in the pump prevented proper cooling of the motor. Solution: rehabilitate the well. (Well rehabilitated from December 6, to December 13, 2011).

  Ø Remedial Well RW-4 low-pressure (December 5, 2011): Problem: suspect poor local power service. Solution: no preventative action at this time.

- A temporary power supply interruption shut down the system on October 15, 2011. The system was restarted without incident the same day.

4.2 2011 Annual System Performance and Alarm Summary

The 2011 system operation up-time is provided on Table 1 and summarized below. System shut downs that occurred in 2011 are summarized below, and are described in the 2011 Quarterly Reports (ARCADIS 2011c, ARCADIS 2011d, and ARCADIS 2011e).

In 2011:

- The system operated full-time 351, out of 365 days (96 percent uptime).
- There were 33 system shutdowns, of which:

  Ø Six (6) were due to a temporary powers or suspected poor local power service.

- Ø Eleven (11) were for system maintenance (e.g. periodic preventative system maintenance, vapor phase media changeouts, or required system repairs/upgrade).

- Ø One (1) was prior to Hurricane Irene; system was intentionally shut down prior to the arrival of the hurricane and was restarted when it was considered safe to do so.

- Ø Fifteen (15) were due to alarm conditions created during the normal operation of the system:

    - o Four (4) were due to iron build-up in the pipeline or on/in a remedial well pump which caused a low-pressure condition or a motor overload.

    - o Five (5) were due to iron precipitate build-up in the air stripper which caused blower high-vacuum, stripper high-level, and discharge pump high-pressure conditions.

    - o Two (2) were due to air intake screen blockage which caused a blower low-pressure condition.

    - o Four (4) were caused when the second bag filter clogged before an operator could change out the first spent bag filter.

For the most part, the system was able to be restarted without incident the same day or the following day that an alarm occurred.

As shown above, the majority of the operational issues are related to iron and iron build-up in the well, pump, pipeline and/or air stripper. To address iron-related problems, the following preventative maintenance/maintenance work was performed:

- Ø Continued the periodic maintenance of Remedial Well RW-2, which was started in 2010.

- Ø Initiated similar periodic maintenance of Remedial Well RW-3, starting with a well development in December 2011.

- Ø Continued to perform periodic power washings of the air stripper.

- Performed the first air stripper sludge removal event, which will be performed annually in the future. The "sludge" is mostly iron-precipitate that accumulates in the air stripper sump and can cause operational problems if not removed periodically.

While these measures will not eliminate the problems associated with iron fouling, they have lessened the impacts and provide a means to manage the problematic fouling.

5. Treatment System Compliance and Performance Monitoring

5.1 Fourth Quarter 2011 System Monitoring Activities

The following compliance and performance monitoring events were performed during this reporting period (see Appendix B, Table B-1 for a summary of the compliance and performance monitoring program requirements):

- Three (3) sampling events to collect required monthly water samples and quarterly air samples.

- Thirteen (13) weekly site visits to monitor and record key system operational parameters.

- The following additional, non-routine monitoring activities were performed during this reporting period to assess system performance:

  - On November 11, 2011, RW-1, RW-2, RW-3, RW-4, and treatment system influent water samples were analyzed for total and dissolved cadmium (Cd), and chromium (Cr). Results are provided in Appendix B.

  - On December 19, 2011, RW-2 RW-3 and treatment system influent water samples were analyzed for total and dissolved iron (Fe). Results are provided in Appendix B.

The system operation and monitoring results are summarized in the following tables, graphs, and appendices:

- 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 for each sampling 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, for each sample event, are included in Appendix C.

- System Parameters including flow rates, line pressures, and temperatures (Table 6).

- Summaries of Groundwater Recovered, VOC Mass Recovered, and VOC Recovery Rates (Table 7). Table 7 provides a breakdown of these parameters by Remedial Well and System and also breaks down the VOC Mass Recovered and VOC Recovery Rates into Project, Non-Project, and Total VOCs.

- Air Discharge Quality Evaluation and Compliance Table (Appendix D and Table 8, respectively).

- Concentrations of VOCs and Metals in Remedial Well Groundwater Samples (Tables 9 and 10, respectively).

- Cumulative Total, Project, and Non-Project VOC Mass Removed (Figure 5).

- Remedial Well Total, Project, and Non-Project VOC Concentrations (Figures 6A, 6B, and 6C, respectively).

- Influent Total, Project, and Non-Project VOC Concentrations (Figure 7).

- Total, Project, and Non-Project VOC Mass Recovery Rates (Figures 8A, 8B, and 8C, respectively).

5.2 2011 System Monitoring Activities

In addition to the system monitoring discussed above, the system compliance and performance monitoring activities performed during the previous three quarterly periods

are described in the 2011 Quarterly Reports (ARCADIS 2011c, ARCADIS 2011d, and ARCADIS 2011e).

5.3 Summary of OM&M Results and Conclusions

5.3.1 System Operation and Effectiveness

Groundwater IRM OM&M results and conclusions for the reporting period and 2011 are summarized below:

- Total volume of groundwater recovered and treated (Table 7):
  - Ø 4th Quarter 2011: 29 million gallons.
  - Ø 2011 Annual Total: 105 million gallons.
  - Ø Cumulative Total: 254 million gallons.
- Total VOC mass recovered (Table 7 and Figures 5, 8A, 8B, and 8C):
  - Ø 4th Quarter 2011: 109 pounds (lbs) of VOCs.
  - Ø 2011 Annual Total: 517 lbs of VOCs.
  - Ø Cumulative Total: 1,532 lbs of VOCs.
  - Ø The majority of the VOC mass removed during this reporting period (56% or 60 lbs) and during 2011 (61% or 314 lbs) was Non-Project VOCs, which continued the trend of removing more Non-Project VOCs than Project VOCs.
- Per well VOC mass recovered and mass removal rates (Table 7 and Figures 8A, 8B, and 8C):
  - Ø The majority of Project VOCs are recovered by RW-2 (81% during the reporting period and 82% during 2011) and RW-3 (19% during the reporting period and 17% during 2011).

- Ø The majority of the Non-Project VOCs are recovered by RW-3 (75% during the reporting period and during 2011) and RW-4 (25% during the reporting period and during 2011).

- Treatment system influent concentrations (Table 2 and Figure 7):

  - Ø Project VOC influent concentrations (120 to 161 ug/L during the reporting period) are consistent with other 2011 values, but well below the peak concentration, observed in August 2009 (~1,000 ug/L).

  - Ø Non-Project influent concentrations (190 ug/L for all three events during this reporting period) are lower than other 2011 values and are well below the peak concentration of 650 ug/L (in May 2010).

  - Ø Mercury has not been detected in an influent sample since system start-up.

- Metals concentrations in the remedial wells have remained constant during the reporting period and during 2011 (Table 10). There were two Remedial Well RW-2 samples in 2011(July and October) with elevated total iron concentrations. However, it is suspected that these apparent anomalies were from iron build-up in the pipelines.

- The air stripper, air stripper off-gas treatment system, and bag filter system performed within acceptable parameters for this reporting period and for 2011, as indicated by:

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

  - Ø Both the water and air discharges comply with their applicable standards, criteria, and guidance values (SGCs) (Tables 3, 5, and 8).

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 2010]) (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 and 2011, 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 treated water effluent met NYSDEC regulatory requirements during the reporting period and during 2011 (Table 3 and Appendix B).

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.

6.1 Hydraulic Monitoring

6.1.1 Activities

In accordance with OM&M Manual requirements and methodologies (ARCADIS 2009), a quarterly round of groundwater hydraulic monitoring was performed during this reporting period. Specifically, depth-to-water measurements were collected on October 26, 2011 from the 35 locations forming the approved monitoring well network (Figure 4).

6.1.2 Results

Figure 4 shows the water-level elevations observed on October 26, 2011 (these data are also summarized in Table 11) and the inferred horizontal groundwater flow directions.

An evaluation of vertical hydraulic gradients was also conducted. The vertical hydraulic gradient is a measure of the potential for vertical groundwater flow between two vertically separated, closely spaced (i.e., clustered or nested observation wells) observation points. The magnitude of the gradient indicates the steepness of the gradient, and the sign of the gradient indicates the direction of vertical flow (i.e., a positive vertical gradient indicates upward flow, while a negative vertical gradient indicates downward groundwater flow). The gradient does not provide information with respect to the rate of groundwater movement, which is affected by the hydraulic conductivity of the aquifer material through which the water is moving.

Table 12 provides a summary of observed vertical groundwater hydraulic gradients at key well pairs located along the Site's southern boundary during the October 26, 2011 monitoring event and the vertical gradient directions are shown on Figure 9. The vertical hydraulic gradients indicate that shallow groundwater is moving downward and deeper groundwater is being drawn upward toward the well screens of remedial wells RW-1 through RW-4, thereby documenting an area of vertical hydraulic control, in that portion of the aquifer that has Project VOC concentrations above 5 ug/L.

The hydraulic monitoring results for the other three quarterly periods are provided in the 2011 Quarterly Reports (ARCADIS 2011c, ARCADIS 2011d, and ARCADIS 2011e).

6.2 Groundwater Quality Monitoring

6.2.1 Activities

In accordance with the OM&M Manual (ARCADIS 2009), the 2011 Annual Groundwater IRM sampling event occurred during the Fourth Quarter of 2011. Groundwater samples were collected from 13 monitoring wells and analyzed for the Target Compound List (TCL) VOCs, plus Freon 12 and Freon 22, using NYSDEC Analytical Services Protocol (ASP) 2000 Method OLM4.2. Groundwater samples from 10 of the 13 monitoring wells sampled were also analyzed for total and dissolved cadmium and chromium using NYSDEC Method ILM4.0. Both analytical methods are outlined in the Quality Assurance Project Plan (QAPP) (Appendix D-1 of the OM&M Manual; ARCADIS 2009).

6.2.2 Results

Table 13 summarizes the results of laboratory analysis for VOCs in groundwater samples collected from monitoring wells associated with the Groundwater IRM. The table includes the results of samples collected during this and previous reporting periods. In general, when the 4th Quarter 2011 results are compared to the results from previous quarters, monitoring wells located side-gradient and downgradient of the recovery wells show a decrease in VOC concentrations, including MW-201-1 which is located downgradient of Remedial Well RW-2 and had shown an increase in VOC concentrations between 2009 through 2010. An exception to this is Well MW-200-1 which showed a decrease in VOC concentration between 2009 and 2010, but slightly increased in 2011.

Figure 9 is a cross section along the Site southern boundary showing Project VOC concentrations and contours. Figure 9, in combination with Figure 4, indicates that the remedial wells are intercepting the VOC-impacted groundwater and controlling its off-site migration. As discussed in the previous section, vertical hydraulic gradients indicate that the IRM has established an area of hydraulic control that encompasses that portion of the aquifer having Project VOC concentrations above 5µg/l.

Table 14 summarizes the results of laboratory analysis of metals in groundwater samples collected from monitoring wells associated with the Groundwater IRM. The November 2011 results indicate no detections of cadmium and the detections of chromium are consistent with concentrations seen during previous sampling events.

At all 10 locations the concentrations of total and dissolved cadmium and chromium were reported to be below NYSDEC's SCGs.

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, an evaluation of the operational hydraulic monitoring data indicates that the Groundwater IRM Containment system is operating as designed and the associated capture zone has developed.

An evaluation of Figure 9 indicates that the Groundwater IRM Containment system is preventing the off-site migration of groundwater that has Project VOC concentrations greater than 5 µg/l.

7. Groundwater IRM Recommendations

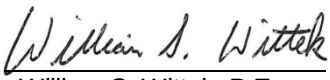
- Remove mercury from the SPDES equivalency monitoring program because Mercury has never been detected in any system water sample.

- Continue operating, maintaining, and monitoring the system in accordance with the Groundwater OM&M Manual (ARCADIS 2009) including the preventive maintenance program to address iron fouling in Remedial Wells RW-2 and RW-3 presented in the 2010 Annual Report (ARCADIS 2011b), including the modifications discussed in Section 4.2.

8. Certification

Statement of Certification

On behalf of Northrop Grumman Systems Corporation, I hereby certify and attest that the Operable Unit 3 Groundwater Interim Remedial Measure is operated in compliance with the remedial action objectives provided within the NYSDEC approved Groundwater Interim Remedial Measure Work Plan dated December 2007, which was prepared pursuant to NYSDEC Order on Consent Index # W1-0018-04-01 referencing the Former Grumman Settling Ponds Site and dated July 4, 2005, during this reporting period.



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9. References

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

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)
2009 Total																																160
2010 Total																																352
Jan-11	(2)				bbbb	b			b	#/**			b						b										(3,4) b			31
Feb-11	b		b					b		####				b		(5)		b				b						b				28
Mar-11					b		###			b				b					b					b				b				31
Apr-11			b					#/**/**			(6)b			b			b		(7)	b	b	b	b	(8)b	b		b		(9)b	b		30
May-11	(10)b	#/##,b	b		(11)b			b			(12)	bbbb	(13)bb	b		(14)b		b				b			(15)b	b		b			(16)		31
Jun-11						bb		#/##			b	(17)	b	b		b		b			(18)bb	(19)b		b			(20)bb	b	b	b		29
Jul-11		b	b		b	b		#/**/**		b		bbb			bb	(21)b	b	b	b		(22)b				bb		b	b		b		30
Aug-11	###		b					b			(23)	b		(24)b	b				b		b		b	b	b	(25)			bb		b	29
Sep-11	b		b		b	#/##/*		b		b			b			b			b		(26)bb	(27)b	bb		b	bb	b				30
Oct-11	b		#/**/**	b			b		(28)b			b			(29)b		b		b		(30)	b			b			b		b		29
Nov-11		b		b			b				#/##,b			b	b	b		b			b		b		b	(31)b		b			30
Dec-11	b		b		(32)b	(33, 34)CC,K						bb	bb	b					#/##,b			b						b		(35)b[7]	bb	23
Q4 2011																																82
2011 Total																																351
TOTAL																																**863**

Legend:

	Indicates system online for at least the majority of the day.
	Indicates system operated with reduced flow rates.
	Indicates system offline for at least the majority of the day.
#	Indicates water compliance samples were collected.
##	Indicates water performance samples were collected.
**	Indicates vapor compliance samples were collected.
*	Indicates vapor performance samples were collected.
b	Indicates filter bag unit changed over.
K	Indicates PPZ change-out.
C	Indicates Carbon change-out.

Acronyms\Key:

IRM	Interim Remedial Measure.
VPGAC	Vapor phase granular activated carbon.
ECU	Emission control unit.
SCADA	Supervisory control and data acquisition.

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

Notes:

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

1st Quarter 2011

(2) As discussed in the Operation, Maintenance, and Monitoring Report for the Groundwater Interim Remedial Measure, 2010 Annual Summary Report (ARCADIS 2011b), Remedial Well RW-2 was off-line for rehabilitation/redevelopment beginning on December 17, 2010. Remedial Well RW-2 was placed back online January 5, 2011 at 12:12 after rehabilitation/redevelopment activities were completed.

(3) The system shut down at 11:32 AM on January 29, 2011 due to a temporary power supply interruption. Melting snow fell from the roof of the building and hit the building circuit breaker handle, shutting off power to the system. The system was physically inspected and restarted. The system was off-line for approximately 2 hours.

(4) The system shut down at 8:43 PM on January 29, 2011 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 January 30, 2011 with Remedial Well RW-2 off-line for troubleshooting. Remedial Well RW-2 was later restarted at 1:30 PM on January 31, 2011.

(5) The system shut down at 9:36 AM on February 16, 2011 due to a blower high-vacuum alarm condition. The alarm condition appeared to be due to restricted air flow through the air stripper trays caused by particulate fouling. Troubleshooting was completed, and the system was restarted with all remedial wells temporarily operating at reduced flow rates. The system was off-line for approximately 6.5 hours. On February 18, 2011, blower motor drive changes were implemented to increase the remedial well flow rates to their design pumping rates. The air stripper is scheduled to be disassembled and cleaned during the next reporting period.

2nd Quarter 2011

(6) On April 11, 2011 it was discovered that one of the bag filters was leaking, so the bag filter units were switched manually and the faulty bag filter was replaced.

(7) Remedial Well RW-2 was off-line for maintenance activities using the Aqua Gard™ process beginning on April 19, 2011 at 7:43 AM . RW-2 was brought back on-line at 5:30 PM on April 20, 2011 after purging activities were completed.

(8) The system shut down at 2:19 PM on April 24, 2011 due to a blower high-vacuum alarm condition. The alarm condition appeared to be due to restricted air flow through the air stripper trays caused by particulate fouling. The system was off-line for approximately 1 hour. An air stripper cleaning was scheduled for May 11, 2011, (see Note 12) to clean the trays and address the cause of this alarm condition.

(9) The system shut down at 7:57 PM on April 29, 2011 due to a low-pressure alarm for Recovery Well Pump for RW-2.The alarm occurred due to the manifold pressure going below the set point of 27 psi. The low-pressure alarm set point was changed and the system was restarted immediately. Pressure was recorded at 24.8 psi after start up, it was suspected that iron precipitate is fouling the pump intake and the RW-2 pipeline. Maintenance was scheduled to remedy the declining line pressure. No measureable downtime was associated with this event.

(10) The system was shut down for approximately 30 minutes on May 2, 2011 to replace the bag filters. The shut down was required because the system did not trigger the notification that the bag filters needed to be replaced. Troubleshooting results indicate that a gauge/transmitter did not work correctly or there is problem with the system control code. The gauge was replaced and a code check was scheduled for May 16, 2011 (see Note 14).

(11) As a preventative measure, Remedial Well RW-2 was taken off-line at approximately 5:00 PM on May 5, 2011 to prevent a pump failure due to iron accumulation in pump. The remaining remedial wells were operational for the period. The RW-2 pump was replaced and the was restarted on May 12, 2011.

(12) The system was shutdown between 6:00 AM May 11th, 2011 and 10:45 AM May 12, 2011 for a periodic air stripper cleaning using a pressure washer. After the cleaning, approximately 6-inches of "sludge" was observed in the air stripper sump. A vacuum truck was scheduled for June 22, 2011 to remove the sludge (see Note 19).

(13) The system shut down at 7:45 AM on May 13, 2011 due a discharge pump high-pressure alarm. The high-pressure condition was due to a partially closed valve at the bag filters. The valve was opened and the system restarted. The system was off-line for approximately 2.5 hours.

(14) The system was shutdown at 11:50 AM on May 16, 2011 for approximately one hour to troubleshoot a potential minor problem with the bag filter control logic that cause the problem in Note 10.

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

Notes (continued):

(15) The system shut down at 3:48 PM on May 25, 2011 due to a motor overload alarm condition at Remedial Well RW-3. The system was off-line for approximately 20 hours. The system was restarted at 11:37 AM on May 26, 2011 without incident. It was determined that the alarm was likely due to poor power service, which is common for this area.

(16) The system shut down at 1:03 PM on May 30, 2011 due to a motor overload alarm condition at Remedial Well RW-2. The system was off-line for 2 hours. It was determined that the alarm was likely due to poor power service, which is common for this area.

(17) The system shut down at 4:24 pm on June 12, 2011 due to a high level alarm in the air stripper sump. After troubleshooting efforts the system was restarted on June 13, 2011 at 4:50 PM with RW-1 off-line. The entire system was brought back on-line on June 14, 2011 with all four wells running. It was later determined that the alarm was caused by a clogged check valve. The system was off-line for approximately 26 hours during this event and subsequent troubleshooting.

(18) The system shut down at 6:32 AM on June 21, 2011 due to a temporary power supply interruption. The power interruption also caused the neighboring Soil Gas IRM to go off-line also. The system was physically inspected and restarted at approximately 8:58 AM. The system was off-line for approximately 2.5 hours.

(19) The system was shutdown at 11:50 AM on June 22, 2011 for approximately 1.5 hours to remove the sludge from the air stripper sump using a vacuum truck. Approximately two hundred gallons of rinse water and sludge were removed.

(20) The system shut down at 5:33 AM on June 27, 2011 due to a motor overload alarm condition at Remedial Well RW-3 due to apparent poor local power service. The system was restarted about 2.5 hours later, without Remedial Well RW-2 because the RW-2 pump was scheduled to be pulled for replacement/cleaning later in the day. The RW-2 pump was pulled and replaced, and Remedial Well RW-2 was back on line at 2:13 PM.

3rd Quarter 2011

(21) The system shut down at 5:29 AM on July 16, 2011 due to a low pressure alarm condition at the process blower. The system was off-line for approximately 15.5 hours. The system was restarted at 9:00 PM the same day without incident. It was determined that the alarm was likely due to poor power service, which is common for this area.

(22) The system shut down at 6:29 PM on July 21, 2011 due a discharge pump high-pressure alarm. The high-pressure condition was due to a partially closed valve at the bag filters. The valve was opened and the system restarted. The system was off-line for approximately 16.5 hours.

(23) Remedial Well RW-2 was off-line for maintenance activities using the Aqua Gard™ process to address iron fouling issues inside the well beginning on August 11, 2011 at approximately 7:00 AM . RW-2 was brought back on-line at 5:30 PM on August 12, 2011 after purging activities were completed.

(24) The system shut down at 5:11 AM on August 14, 2011 due to a low pressure alarm at the process blower. The system was off-line for approximately 5.5 hours. The system was restarted at 10:31 AM on August 14, 2011 without incident. It was determined that the alarm was likely due to poor power service, which is common for this area.

(25) The system was shut down at approximately 3:30 PM on August 26, 2011in anticipation of Hurricane Irene to protect equipment and eliminate the potential for an accidental spill of untreated ground water to the environment. The system was restarted at 10:00 AM on August 29, 2011 after a full site inspection following the storm.

(26) Remedial Well RW-2 was off-line for pump and motor replacement beginning at 8:00 AM on September 21, 2011. RW-2 was brought back on-line at 3:00 PM the same day.

(27) The system shut down at 1:47 AM on September 22, 2011 due to a bag filter alarm condition. A bag filter alarm condition occurs when the spent bag filters in the "stand by" bag filter unit have not been replaced before the system tries to bring that bag filter unit back on-line. On September 21, 2011, maintenance work was done to address some of the iron fouling inside Remedial Well RW-2 and some of the pipelines, that night both sets of bag filters clogged in rapid succession and since an operated was not able to replace the spent filters between the bag filter changeovers, the system shut down. The system was off-line for 9.5 hours. The spent bag filters were replaced in the morning and the system was brought on line at 11:19 AM.

4th Quarter 2011

(28) The system shut down at 1:17 PM on October 9, 2011 due to a bag filter alarm condition. Both bag filters clogged up over the weekend before an operator was able to reach the site causing the system to shut down, as it was supposed to do in that situation. The system was off-line for ~25 hours. The spent bag filters were replaced and the system was brought on line at 2:22 PM on October 10, 2011.

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

Notes (continued):

(29) The system shut down at 7:22 AM on October 15, 2011 due to a temporary power supply interruption. The system was restarted at 12:51 PM after the system was inspected for any problems. The system was off-line for approximately 5.5 hours.

(30) The system shut down at 3:37 PM on October 21, 2011 due to a motor overload alarm condition at Remedial Well RW-3. A build-up of iron precipitate is suspected of causing the motor overload. The system was off-line for approximately 22 hours. The system was restarted at 1:30 PM on October 22, 2011.

(31) The system shut down at 8:55 AM on November 26, 2011 due to a bag filter alarm condition. Both bag filters clogged up over the weekend before an operator was able to reach the site causing the system to shut down, as it was supposed to do in that situation. The system was off-line for approximately 3.5 hours. The spent bag filters were replaced and the system was brought on line at 12:18 PM.

(32) The system shut down at 5:11 PM on December 5, 2011 due to a low pressure alarm condition at Remedial Well RW-4. The system was not restarted that night because the system was to be shut down the next morning for preventative maintenance work on Remedial Wells RW-2 and RW-3. However, the system was inspected for any problems and none were found, suspect that the system shut down due to poor local power service.

(33) Preventative maintenance work on Remedial Wells RW-2 and RW-3 began on December 6, 2011. After the maintenance work on RW-2 was completed, the system was restarted with Remedial Wells RW-1, RW-2, and RW-4 on December 12, 2011 at 4:11 PM, Remedial Well RW-3 was still being worked on. The system was not back to full capacity until 7:20PM on December 13, 2012, when the Remedial Well RW-3 work was completed. The system was down for a longer than normal period because unlike Remedial Well RW-2 that was just being maintained, Remedial Well RW-3 had to be redeveloped. There were no indications of Remedial Well RW-4 pressure issues (see Note 32) during the remainder of the reporting period.

(34) The media in two Vapor Phase Granular Activated emission control units and in one Potassium-permanganate impregnated zeolite emission control unit were changed out on December 6, 2011 when the system was shutdown for well preventative maintenance work.

(35) The system was shutdown on December 30, 2011 at approximately 9:00 AM for a periodic air stripper cleaning using a pressure washer. The system was fully operational at approximately 5:00 PM the same day.

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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]	01/10/11 (µg/L)	02/10/11 (µg/L)	03/07/11 (µg/L)	04/08/11 (µg/L)	05/02/11 (µg/L)	06/08/11 (µg/L)	07/08/11 (µg/L)	08/01/11 (µg/L)	09/06/11 (µg/L)	10/03/11 (µg/L)	11/11/11 (µg/L)	12/19/11 (µg/L)
Project VOCs												
1,1,1 - Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.24	ND	ND
1,1 - Dichloroethane	**1.3**	**0.88**	**0.98**	**0.98**	**1.1**	**1.3**	0.90	0.60	0.92	0.70	0.68	0.64
1,2 - Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 - Dichloroethene	**0.98**	**0.8**	**0.78**	**1.1**	**1.2**	ND	ND	0.53	0.56	0.65	0.54	0.54
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.35	0.33	0.32
Trichloroethene	**18**	**13**	**12**	**11**	**11**	**9.2**	9.2	8.0	9.1	**8.8**	**8.4**	**8.4**
Vinyl Chloride	**25**	**15**	**19**	**23**	**28**	**20**	**20**	**19**	**23**	**16**	**16**	**21**
cis 1,2-Dichloroethene	**140**	**93**	**100**	**110**	**140**	**100**	**110**	**100**	**110**	**100**	**79**	**100**
trans 1,2-Dichloroethene	**9.3**	ND	ND	ND	ND	**1.0**	ND	ND	ND	ND	ND	0.32
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	**15**	**13**	**17**	**25**	**13**	**13**	**19**	**18**	**16**	**18**	**14**	**27**
Xylenes	ND	ND	**0.93**	**2.3**	**2.1**	**0.95**	0.98	1.6	1.8	1.7	1.4	2.6
Subtotal Project VOCs	**210**	**137**	**152**	**173**	**196**	**146**	**160**	**148**	**161**	**146**	**120**	**161**
Non-Project VOCs												
Dichlorodifluoromethane (Freon 12)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorodifluoromethane (Freon 22)	**380**	**340**	**270**	**330**	**300**	**280**	**260**	**270**	**220**	**190**	**190**	**190**
Subtotal Non-Project VOCs	**380**	**340**	**270**	**330**	**300**	**280**	**260**	**270**	**220**	**190**	**190**	**190**
Total VOCs [3]	**590**	**477**	**422**	**503**	**496**	**426**	**420**	**418**	**381**	**336**	**310**	**351**
Inorganics												
Total Iron	**600**	**440**	**440**	**950**	**1,950**	**670**	**1,300** [7]	**630**	**300**	**2,770**	**640**	**390**
Total Mercury	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH [4]	6.0	6.1	5.4 [5]	5.4 [6]	5.5	5.4	5.8 [8]	5.8	5.6	5.5	5.8	6.5

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. Data in this tables corresponds to approximately the past year of system operation.

(2) Only VOCs associated with the interim State Pollutant Discharge Elimination System (SPDES) equivalency program, plus Toluene, Benzene, Xylenes, 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 the compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

(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 March 2011 pH value was measured on March 31, 2011.

(6) The April 2011 pH value was measured on April 25, 2011.

(7) The influent and effluent metal sample labels were switched.

(8) The July 2011 pH value was measured on July 12, 2011.

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.
IRM	Interim remedial measure.
NA	Not analyzed.
ND	Analyte not detected at, or above its laboratory quantification limit.
NYSDEC	New York State Department of Environmental Conservation.
OM&M	Operation, maintenance and monitoring.
TICs	Tentatively identified compounds.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
µg/L	Micrograms per liter.

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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)	01/10/11 (µg/L)	02/10/11 (µg/L)	03/07/11 (µg/L)	04/08/11 (µg/L)	05/02/11 (µg/L)	06/08/11 (µg/L)	07/08/11 (µg/L)	08/01/11 (µg/L)	09/06/11 (µg/L)	10/03/11 (µg/L)	11/11/11 (µg/L)	12/19/11 (µg/L)
Project VOCs													
1,1,1 - Trichloroethane	5	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
1,2 - Dichloroethane	5	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
Tetrachloroethene	5	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
Vinyl Chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis 1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans 1,2-Dichloroethene	5	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
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Subtotal Project VOCs	--	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**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
Chlorodifluoromethane (Freon 22)	5	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**
Total VOCs [4]	--	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**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%
Inorganics													
Total Iron	600	**270**	**350**	**320**	**420**	**290**	**350**	**380** [9]	**320**	**220**	**880**	**330**	**300**
Total Mercury	250	ND	ND	ND	ND	ND	ND	ND [9]	ND	ND	ND	ND	ND
pH [6]	5.5 - 8.5	6.6	6.4	6.2 [7]	6.6 [8]	6.5	6.6	6.1 [10]	7.2	6.8	7.0	7.1	6.8

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. Data in this tables corresponds to approximately the past year of system operation.

(2) Only VOCs associated with the interim SPDES equivalency program, including Toluene, Benzene, Xylenes, 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 compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

(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 March 2011 pH value was measured on March 31, 2011.

(8) The April 2011 pH value was measured on April 25, 2011.

(9) The influent and effluent metal sample labels were switched.

(10) The July 2011 pH value was measured on July 12, 2011.

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.
IRM	Interim remedial measure.
ND	Analyte not detected at, or above its laboratory quantification limit.
NYSDEC	New York State Department of Environmental Conservation.
OM&M	Operation, maintenance, and monitoring.
SPDES	State pollutant discharge elimination system.
TICs	Tentatively identified compounds.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
µg/L	Micrograms per liter.
--	Not applicable.
>	Greater than.

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]	01/10/11 (µg/m^3)	04/08/11 (µg/m^3)	10/03/11 (µg/m^3)
Project VOCs			
1,1,1 - Trichloroethane	ND	**3.9**	**3.5**
1,1 - Dichloroethane	**20**	**16**	**12**
1,2 - Dichloroethane	ND	ND	ND
1,1 - Dichloroethene	**23**	**13**	**8.0**
Tetrachloroethene	ND	**6.3**	**5.0**
Trichloroethene	**290**	**200**	**140**
Vinyl Chloride	**400**	**330**	**220**
cis 1,2-Dichloroethene	**3,400**	**2,400**	**1,600**
trans 1,2-Dichloroethene	ND	ND	**1.8**
Benzene	ND	ND	**3.4**
Toluene	**290**	**480**	**320**
Xylenes	ND	**43**	**30**
Subtotal Project VOCs	**4,423**	**3,492**	**2,344**
Non-Project VOCs			
Dichlorodifluoromethane (Freon 12)	ND	**3.8**	**2.8**
Chlorodifluoromethane (Freon 22)	**3,400**	**3,900**	**2,100**
Subtotal Non-Project VOCs	**3,400**	**3,904**	**2,103**
Total VOCs [3]	**7,823**	**7,396**	**4,447**

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. Data in this tables corresponds to approximately the past year of system operation.

(2) Only VOCs that are associated with the interim State Pollutant Discharge Elimination System (SPDES) equivalency program, Toluene, Benzene, Xylenes, 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 compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

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.
IRM	Interim remedial measure.
ND	Analyte not detected at or above its laboratory reporting limit.
OM&M	Operation, maintenance, and monitoring.
TICs	Tentatively identified compounds.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
$\mu g/m^3$	Micrograms per cubic meter.

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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) ($\mu g/m^3$)	01/10/11 ($\mu g/m^3$)	04/08/11 ($\mu g/m^3$)	07/08/11 ($\mu g/m^3$)	10/03/11 ($\mu g/m^3$)
Project VOCs					
1,1,1 - Trichloroethane	9,000	ND	ND	ND	ND
1,1 - Dichloroethane	NS	**5.0**	**1.7**	**1.8**	**2.5**
1,2 - Dichloroethane	NS	ND	ND	ND	ND
1,1 - Dichloroethene	380 (4)	**4.0**	**0.83**	**1.4**	**6.2**
Tetrachloroethene	1,000	ND	ND	ND	ND
Trichloroethene	14,000	**44**	**10**	**6.0**	**8.0**
Vinyl Chloride	180,000	**73**	**77**	**47**	**77**
cis 1,2-Dichloroethene	190,000 (5)	**290**	**92**	**54**	**130**
trans 1,2-Dichloroethene	NS	ND	ND	ND	ND
Benzene	1,300	**8.2**	**5.2**	ND	**7.4**
Toluene	37,000	**74**	**45**	**31**	**32**
Xylenes	4,300	**8.3**	**4.1**	**0.85**	**3.6**
Subtotal Project VOCs	NA	**507**	**236**	**142**	**267**
Non-Project VOCs					
Dichlorodifluoromethane (Freon 12)	NS	**9.8**	**3.2**	**3.3**	**2.8**
Chlorodifluoromethane (Freon 22)	NS	**8,100**	**3,800**	**3,200**	**2,100**
Subtotal Non-Project VOCs	NA	**8,110**	**3,803**	**3,203**	**2,103**
Total VOCs (6)	NA	**8,617**	**4,039**	**3,345**	**2,370**
Treatment Efficiency (Total VOCs) (7)	NA	-- (9)	**45.4%**	--	**46.7%**
Treatment Efficiency (Project VOCs) (8)	NA	**88.5%**	**93.2%**	--	**88.6%**

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. Data in this tables corresponds to approximately the past year of system operation.

(2) Only VOCs that are associated with the interim State Pollutant Discharge Elimination System (SPDES) equivalency program, Toluene, Benzene, Xylenes, 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 October 18, 2010.

(4) An SGC was not provided in the DAR-1 AGC/SGC Tables, dated October 18, 2010. 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 $\mu g/m^3$ / 4.2 = approximately 380 $\mu g/m^3$. 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 October 18, 2010.

(5) An SGC was not provided in the DAR-1 AGC/SGC Tables, dated October 18, 2010. 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 $\mu g/m^3$ / 4.2 = approximately 190,000 $\mu g/m^3$. 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 October 18, 2010.

(6) "Total VOCs" represents the sum of individual concentrations of all compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

(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) Treatment efficiency could not be calculated for the January 2011 event because the effluent Total VOC concentration was greater than the influent Total VOC concentration due to an apparent anomalous concentration of Freon 22 in the efflunt sample.

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.
AGC	Annual guideline concentration.
IRM	Interim remedial measure.
ND	Analyte not detected at or above its laboratory reporting limit.
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 October 18, 2010.
NYSDEC	New York State Department of Environmental Conservation.
OM&M	Operation, maintenance, and monitoring.
TICs	Tentatively identified compounds.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
$\mu g/m^3$	Micrograms per cubic meter.
--	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 Influents				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)
01/10/11	30.0	75.6	75.2	30.1	217	239	58.0	57.3	69.1	57.4	5.0	2,035	8.5	5.0	1.5	1.0	0.0	528
02/10/11	30.7	75.6	75.4	30.4	219	209	57.4	54.1	66.9	56.8	6.0	2,024	8.2	4.6	3.0	1.2	0.0	529
03/07/11	30.6	75.9	75.5	30.3	218	216	57.6	51.3	64.2	57.2	6.5	1,945	8.0	4.5	2.4	1.2	0.0	529
04/08/11	30.3	75.2	75.4	30.3	217	207	58.0	44.0	60.8	57.3	7.0	1,873	7.6	4.4	1.7	1.0	0.0	533
05/02/11	30.4	75.7	75.4	30.1	218	218	58.2	24.7	59.3	58.0	7.0	1,839	7.6	4.2	2.4	1.1	0.0	537
06/08/11	30.7	75.4	75.5	30.4	219	223	57.2	33.9	57.3	57.6	6.0	2,024	9.0	5.2	3.0	1.4	0.0	537
07/08/11	30.8	76.3	75.4	30.2	220	216	57.4	52.3	56.4	57.4	7.0	1,945	8.6	4.8	3.0	1.0	0.0	532
08/01/11	30.8	75.4	75.4	30.6	219	223	57.1	46.8	53.7	57.0	6.0	1,956	8.4	4.5	3.0	1.3	0.0	541
09/06/11	30.2	74.4	75.5	30.3	216	229	58.4	24.5	49.9	57.7	7.0	1,940	8.1	4.2	3.0	1.4	0.0	538
10/03/11	30.6	75.4	75.4	30.2	219	220	59.1	53.8	43.8	58.6	7.0	1,945	8.1	4.2	3.0	1.4	0.0	537
11/11/11	30.7	74.8	75.3	30.5	218	224	57.9	28.2	37.0	57.7	8.0	1,876	7.4	3.6	2.6	1.1	0.0	531
12/19/11	30.4	74.9	75.1	30.6	217	220	57.8	59.8	51.8	58.9	4.0	1,870	7.0	3.5	1.0	2.0	0.0	528

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 year 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.

Acronyms\Key:

ECU	Emission control unit.
gpm	Gallons per minute.
inH_2O	Inches of water column.
psi	Pounds per square inch.
^oR	Degrees Rankine.
scfm	Standard cubic feet per minute.
Temp.	Temperature.

Table 7. Summary of Groundwater Recovered, VOC Mass Recovered, and VOC Mass Recovery Rates, 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]					VOC Mass Recovered (lbs) [3]															VOC Mass Recovery Rate (lbs/day) [4]													
						Total VOCs [5]					Project VOCs [6]					Non-Project VOCs [7]					Total VOCs [5]					Project VOCs [6]					Non-Project VOCs [7]				
	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	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	RW-1	RW-2	RW-3	RW-4	Total
System Pilot Test, Shakedown and Start Up Totals [8]																																			
	137	270	251	150	808	NA	NA	NA	NA	1.1	NA	NA	NA	NA	1.0	NA	NA	NA	NA	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2009 Totals [9]																																			
7/21/09 - 12/30/09	6,592	13,838	16,445	6,574	43,449	0.17	275	53	14	342	0.17	273	19	0.20	293	<0.01	0.56	35	13	48	<0.01	1.9	0.34	0.09	2.2	<0.01	1.9	0.12	0.00	1.9	<0.01	0.00	0.22	0.08	0.30
2010 Totals [10]																																			
12/30/09 - 01/05/11	15,726	35,127	38,160	15,689	104,702	0.56	172	412	89	672	0.56	171	28	0.10	200	<0.01	0.17	383	89	469	<0.01	0.46	1.1	0.24	1.8	<0.01	0.46	0.08	0.00	0.54	<0.01	0.00	1.0	0.24	1.3
January 2011 through March 2011 Totals																																			
Subtotal Jan-Mar 11 [11]	4,020	9,873	9,995	3,999	27,887	0.12	56	82	28	166	0.12	56	7.8	0.00	64	<0.01	0.33	75	28	103	<0.01	0.60	0.88	0.30	1.8	<0.01	0.60	0.08	0.00	0.69	<0.01	0.00	0.81	0.30	1.1
April 2011 through June 2011 Totals																																			
Subtotal April-June 11 [12]	3,710	8,571	9,404	3,761	25,446	0.08	39	80	21	140	0.08	39	9.2	0.00	49	<0.01	0.22	70	21	91	<0.01	0.44	0.90	0.24	1.6	<0.01	0.44	0.10	0.00	0.55	<0.01	0.00	0.79	0.24	1.0
July 2011 through September 2011 Totals																																			
Subtotal July-Sep 11 [13]	3,304	7,922	8,137	3,274	22,637	0.07	34	54	14	102	0.07	34	8.6	0.00	43	<0.01	0.25	46	14	60	<0.01	0.41	0.66	0.17	1.2	<0.01	0.41	0.10	0.00	0.52	<0.01	<0.01	0.56	0.17	0.73
October 2011 through December 2011 Totals																																			
09/26/11 - 11/11/11	1,928	4,757	4,774	1,922	13,381	0.04	18	26	6.9	51	0.04	18	4.3	0.04	22	<0.01	0.12	21	6.9	28	<0.01	0.39	0.57	0.15	1.1	<0.01	0.39	0.09	0.00	0.48	<0.01	<0.01	0.46	0.15	0.61
11/11/11 - 12/19/11	1,358	3,231	3,155	1,342	9,086	0.03	12	17	4.8	34	0.03	12	2.9	0.03	15	<0.01	0.08	14	4.8	19	<0.01	0.32	0.45	0.13	0.89	<0.01	0.32	0.08	0.00	0.39	<0.01	<0.01	0.37	0.13	0.50
12/19/11 - 01/09/12	898	2,216	2,217	898	6,229	0.02	8.3	12	3.2	24	0.02	8.2	2.0	0.02	10	<0.01	0.06	10	3.2	13	<0.01	0.40	0.57	0.15	1.1	<0.01	0.39	0.10	0.00	0.48	<0.01	<0.01	0.48	0.15	0.62
Subtotal Oct-Dec 11 [14]	4,184	10,204	10,146	4,162	28,696	0.09	38	55	15	108	0.09	38	9.2	0.09	47	<0.01	0.26	45	15	60	<0.01	0.36	0.52	0.14	1.0	<0.01	0.36	0.09	0.00	0.45	<0.01	<0.01	0.43	0.14	0.57
2011 Totals [15]	15,218	36,570	37,682	15,196	104,666	0.36	167	271	78	516	0.36	167	35	0.09	203	<0.01	1.1	236	78	314	<0.01	0.45	0.73	0.21	1.4	<0.01	0.45	0.09	0.00	0.55	<0.01	<0.01	0.64	0.21	0.85
Total [16]	37,673	85,805	92,538	37,609	253,625	1.1	614	736	181	1,531	1.1	611	82	0.39	697	<0.01	1.8	654	180	831	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

See notes on last page.

Table 7. Summary of Groundwater Recovered, VOC Mass Recovered, and VOC Mass Recovery Rates, 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 are rounded to the nearest gallon, but should only be considered accurate to two significant figures to account for error associated with field measurements.
(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 less than ten pounds are presented using two significant figures and values greater than ten pounds have been rounded to the nearest whole number; however, these values should only be considered accurate to 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 in the respective operating period. Values are presented using two significant figures.
(5) "Total VOCs" represents the sum of individual concentrations of the VOCs detected.
(6) "Project VOCs" represents the sum of individual compound concentrations of 1,1,1-Trichloroethane; 1,1-Dichloroethane; 1,2-Dichloroethane; 1,1-Dichloroethene; Tetrachloroethene; Trichloroethelyene, Vinyl Chloride; cis-1,2-Dichloroethene; trans-1,2-Dichloroethene; Benzene; Toluene; and Xylenes-o,m, and p.
(7) "Non-Project VOCs" represents the difference between Total VOCs and Project VOCs.
(8) Values based on operational data recorded prior to system startup on July 21, 2009.
(9) 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.
(10) The volume of groundwater recovered and mass recovered calculations represent the operational period between December 30, 2009 and December 31, 2010.
(11) The volume of groundwater recovered and mass recovered calculations represent the operational period between January 5, 2010 and April 8, 2011. Mass recovery rates are averages and not totals.
(12) The volume of groundwater recovered and mass recovered calculations represent the operational period between April 8, 2011 and July 6, 2011. Mass recovery rates are averages and not totals.
(13) The volume of groundwater recovered and mass recovered calculations represent the operational period between July 6, 2011 and September 26, 2011 using quarterly data collected on July 8, 2011. Mass recovery rates are averages and not totals.
(14) The volume of groundwater recovered and mass recovered calculations represent the operational period between September 26, 2011 and January 9, 2012 using quarterly data collected on October 3, 2011. Mass recovery rates are averages and not totals.
(15) The volume of groundwater recovered and mass recovered calculations represent the operational period between January 5, 2011 and January 9, 2012.
(16) "Total" refers to the amounts removed by the Operable Unit 3 Groundwater Interim Remedial Measure.

Acronyms\Key:

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

Table 8. Summary of Air Emissions Model Output, 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]				Percent AGC [4]
		1/10/11	4/8/11	7/8/11	10/3/11	
1,1 - Dichloroethane	0.63	0.12%	0.04%	0.04%	0.06%	0.07%
1,1 - Dichloroethene	70	0.00%	0.00%	0.00%	0.00%	0.00%
Acetone	30,000	0.00%	0.00%	0.00%	0.00%	0.00%
Chloroform	0.043	3.92%	1.12%	0.85%	1.64%	1.88%
Ethylbenzene	1,000	0.00%	0.00%	0.00%	0.00%	0.00%
Xylenes (o)	100	0.00%	0.00%	0.00%	0.00%	0.00%
Xylenes (m,p)	100	0.00%	0.00%	0.00%	0.00%	0.00%
Chloromethane	90	0.00%	0.00%	0.00%	0.00%	0.00%
Trichloroethene	0.5	1.35%	0.31%	0.18%	0.24%	0.52%
Vinyl Chloride	0.11	10.17%	10.89%	6.52%	10.72%	9.58%
cis 1,2 Dichloroethene	63	0.07%	0.02%	0.01%	0.03%	0.03%
Benzene	0.13	0.97%	0.62%	0.00%	0.87%	0.62%
Toluene	5,000	0.00%	0.00%	0.00%	0.00%	0.00%
Trichlorofluoromethane (Freon 11)	5,000	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%
Chlorodifluoromethane (Freon 22)	50,000	0.00%	0.00%	0.00%	0.00%	0.00%

See notes on last page.

Table 8. Summary of Air Emissions Model Output, 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) over the past year of system operation are included in this table.

(2) AGC refers to the compound-specific annual guideline concentration per the NYSDEC DAR-1 AGC/SGC tables, revised October 18, 2010. NYSDEC DAR-1 AGCs were scaled using the results of a site-specific annual USEPA SCREEN 3 model to calculate the annual 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) Percent AGC is the twelve month average at the end of the reporting period. The Percent AGC was calculated by time-weighting the "Percent MASCs" for the individual sampling events over the past year. For this period, the MASCs for February and March 2011 were assumed to be the same as for January 2011, the MASCs for May and June 2011 were assumed to be the same as for April 2011, the MASCs for August and September 2011 were assumed to be the same as for July 2011, and the MASCs for November and December 2011 were assumed to be the same as for October 2011.

Acronyms\Key:

AGC	Annual Guideline Concentration.
DAR-1	Division of Air Resources-1.
MASC	Maximum allowable stack concentration.
NYSDEC	New York State Department of Environmental Conservation.
SGC	Short-term Guideline Concentration.
USEPA	United States Environmental Protection Agency.
VOCs	Volatile Organic Compounds.
$\mu g/m^3$	Micrograms per cubic meter.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-1 7/29/2009	RW-1 8/12/2009	RW-1 9/10/2009	RW-1 11/10/2009	RW-1 12/2/2009	RW-1 2/2/2010
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5	< 5
2-Butanone	NE	**6.5 J**	< 50	< 50	< 50	< 50	< 50
2-Hexanone	50	< 50	< 50	< 50	< 50	< 50	< 50
4-methyl-2-pentanone	50	< 50	< 50	< 50	< 50	< 50	< 50
Acetone	NE	**3.5 J**	< 50	**2.9 J**	**1.5 J**	< 50	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5	< 5	< 5
Bromomethane	5	< 5	< 5	< 5	< 5	< 5 R	< 5
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5	< 5
Carbon tetrachloride	5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	< 5	< 5	< 5
Chloroethane	5	< 5	< 5	< 5	< 5	< 5	< 5
Chloroform	7	**3 J**	**2.4 J**	**1.9 J**	**1.4 J**	**1.3 J**	**0.8 J**
Chloromethane	5	< 5	< 5	< 5	< 5	< 5 R	< 5
cis-1,2-dichloroethene	5	**1.5 J**	**1.5 J**	**1.4 J**	**1.5 J**	**1.7 J**	**1.5 J**
cis-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane	50	< 5	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5	< 5
Methyl tert-Butyl Ether	5	--	--	--	--	--	< 5
Methylene Chloride	5	< 5	< 5	< 5	< 5	< 5	< 5
Styrene	5	< 5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 5	< 5	< 5	< 5	< 5	< 5
Toluene	5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,2-dichloroethene	5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5	< 5
Trichloroethylene	5	**1.3 J**	**1.7 J**	**1.5 J**	**1.8 J**	**2 J**	**2 J**
Trichlorofluoromethane (CFC-11)	5	--	--	--	--	--	< 5
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2	< 2
Xylene-o	5	< 5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5	< 5
Total VOCs (2)		**15.8**	**5.6**	**7.7**	**6.2**	**5.0**	**4.3**
Project VOCs (3)		**2.8**	**3.2**	**2.9**	**3.3**	**3.7**	**3.5**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-1 4/12/2010	RW-1 7/20/2010	RW-1 10/4/2010	RW-1 1/10/2011	RW-1 4/8/2011	RW-1 7/8/2011
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5	< 5
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50	< 50
2-Hexanone	50	< 50	< 50	< 50	< 50	< 50	< 50
4-methyl-2-pentanone	50	< 50	< 50	< 50	< 50	< 50	< 50
Acetone	NE	< 50	< 50	< 50	< 50	< 50	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5	< 5	< 5
Bromomethane	5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5	< 5
Carbon tetrachloride	5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	< 5	< 5	< 5
Chloroethane	5	< 5	< 5	< 5	< 5	< 5	< 5
Chloroform	7	**0.42 J**	**0.36 J**	**0.31 J**	< 5	< 5	< 5
Chloromethane	5	< 5	< 5	< 5	< 5	< 5	< 5
cis-1,2-dichloroethene	5	**1.5 J**	**2 J**	**1.3 J**	**1.3 J**	**0.81 J**	**0.78 J**
cis-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane	50	< 5	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5	< 5
Methyl tert-Butyl Ether	5	< 5	< 5	< 5	< 5	< 5	< 5
Methylene Chloride	5	< 5	< 5	< 5	< 5	< 5	< 5
Styrene	5	< 5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 5	< 5	< 5	< 5	< 5	< 5
Toluene	5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,2-dichloroethene	5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5	< 5
Trichloroethylene	5	**2.4 J**	**3.4 J**	**3 J**	**2.4 J**	**1.9 J**	**1.8 J**
Trichlorofluoromethane (CFC-11)	5	< 5	< 5	< 5	< 5	< 5	< 5
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2	< 2
Xylene-o	5	< 5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5	< 5
Total VOCs [2]		**4.3**	**5.8**	**4.6**	**3.7**	**2.7**	**2.6**
Project VOCs [3]		**3.9**	**5.4**	**4.3**	**3.7**	**2.7**	**2.6**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-1 10/3/2011	RW-2 7/29/2009	RW-2 8/12/2009	RW-2 9/10/2009	RW-2 11/10/2009	RW-2 12/2/2009
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 5	< 100	< 100	< 50	< 25	< 25
1,1,2,2-Tetrachloroethane	5	< 5	< 100	< 100	< 50	< 25	< 25
1,1,2-Trichloroethane	1	< 5	< 100	< 100	< 50	< 25	< 25
1,1-Dichloroethane	5	< 5	**9.2 J**	**8.8 J**	**6.4 J**	**5.2 J**	**5.3 J**
1,1-Dichloroethene	5	< 5	< 100	< 100	< 50	**2.9 J**	**3.1 J**
1,2-Dichloroethane	0.6	< 5	< 100	< 100	< 50	< 25	< 25
1,2-Dichloropropane	1	< 5	< 100	< 100	< 50	< 25	< 25
2-Butanone	NE	< 50	< 1000	< 1000	< 500	< 250	< 250
2-Hexanone	50	< 50	< 1000	< 1000	< 500	< 250	< 250
4-methyl-2-pentanone	50	< 50	< 1000	< 1000	< 500	< 250	< 250
Acetone	NE	< 50	< 1000	< 1000	< 500	< 250	< 250
Benzene	1	< 0.7	< 14	< 14	< 7	< 3.5	< 3.5
Bromodichloromethane	50	< 5	< 100	< 100	< 50	< 25	< 25
Bromoform	50	< 5	< 100	< 100	< 50	< 25	< 25
Bromomethane	5	< 5	< 100	< 100	< 50	< 25	< 25 R
Carbon Disulfide	60	< 5	< 100	< 100	< 50	< 25	< 25
Carbon tetrachloride	5	< 5	< 100	< 100	< 50	< 25	< 25
Chlorobenzene	5	< 5	< 100	< 100	< 50	< 25	< 25
Chlorodifluoromethane (Freon 22)	NE	< 5	< 100	< 100	**4 J**	**3.5 J**	**3.3 J**
Chloroethane	5	< 5	< 100	< 100	< 50	< 25	< 25
Chloroform	7	< 5	< 100	< 100	**3.4 J**	**3 J**	**2.3 J**
Chloromethane	5	< 5	< 100	< 100	< 50	< 25	< 25 R
cis-1,2-dichloroethene	5	**0.94 J**	**2,600**	**2,300**	**1,300**	**930**	**880**
cis-1,3-dichloropropene	0.4	< 5	< 100	< 100	< 50	< 25	< 25
Dibromochloromethane	50	< 5	< 100	< 100	< 50	< 25	< 25
Dichlorodifluoromethane (Freon 12)	5	< 5	< 100	< 100	< 50	< 25	< 25
Ethylbenzene	5	< 5	**13 J**	**7.2 J**	**4.8 J**	**6.4 J**	**5.1 J**
Methyl tert-Butyl Ether	5	< 5	--	--	--	--	--
Methylene Chloride	5	< 5	< 100	< 100	< 50	< 25	< 25
Styrene	5	< 5	< 100	< 100	< 50	< 25	< 25
Tetrachloroethene	5	< 5	< 100	< 100	< 50	< 25	< 25
Toluene	5	< 5	**520**	**170**	**190**	**200**	**150**
trans-1,2-dichloroethene	5	< 5	**12 J**	**21 J**	**32 J**	**6.2 J**	**2.1 J**
trans-1,3-dichloropropene	0.4	< 5	< 100	< 100	< 50	< 25	< 25
Trichloroethylene	5	**1.8 J**	**46 J**	**30 J**	**52**	**59**	**63**
Trichlorofluoromethane (CFC-11)	5	< 5	**--**	**--**	**--**	**--**	**--**
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 100	< 100	< 50	< 25	< 25
Vinyl Chloride	2	< 2	**630**	**670**	**370**	**210**	**210**
Xylene-o	5	< 5	**14 J**	**9.4 J**	**5.4 J**	**6 J**	**4.9 J**
Xylenes - m,p	5	< 5	**27 J**	**9.2 J**	**7.9 J**	**11 J**	**9 J**
Total VOCs (2)		**2.7**	**3,871**	**3,226**	**1,976**	**1,443**	**1,338**
Project VOCs (3)		**2.7**	**3,849**	**3,210**	**1,957**	**1,430**	**1,327**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-2 2/2/2010	RW-2 4/12/2010	RW-2 7/20/2010	RW-2 10/4/2010	RW-2 1/10/2011	RW-2 4/8/2011
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 25	< 13	< 13	< 13	**0.78 J**	**0.93 J**
1,1,2,2-Tetrachloroethane	5	< 25	< 13	< 13	< 13	< 13	< 13
1,1,2-Trichloroethane	1	< 25	< 13	< 13	< 13	< 13	< 13
1,1-Dichloroethane	5	**3.5 J**	**3.2 J**	**2.3 J**	**2.2 J**	**3.5 J**	**2.9 J**
1,1-Dichloroethene	5	< 25	**3 J**	**2.1 J**	**2.2 J**	**4.9 J**	**2.6 J**
1,2-Dichloroethane	0.6	< 25	< 13	< 13	< 13	< 13	< 13
1,2-Dichloropropane	1	< 25	< 13	< 13	< 13	< 13	< 13
2-Butanone	NE	< 250	< 130	< 130	< 130	< 130	< 130
2-Hexanone	50	< 250	< 130	< 130	< 130	< 130	< 130
4-methyl-2-pentanone	50	< 250	< 130	< 130	< 130	< 130	< 130
Acetone	NE	< 250	< 130	< 130	< 130 B	< 130 B	< 130
Benzene	1	< 3.5	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Bromodichloromethane	50	< 25	< 13	< 13	< 13	< 13	< 13
Bromoform	50	< 25	< 13	< 13	< 13	< 13	< 13
Bromomethane	5	< 25	< 13	< 13	< 13	< 13	< 13
Carbon Disulfide	60	< 25	< 13	< 13	< 13	< 13	< 13
Carbon tetrachloride	5	< 25	< 13	< 13	< 13	< 13	< 13
Chlorobenzene	5	< 25	< 13	< 13	< 13	< 13	< 13
Chlorodifluoromethane (Freon 22)	NE	< 25	**1.7 J**	**1.1 J**	**1 J**	**1.4 J**	< 13
Chloroethane	5	< 25	< 13	< 13	< 13	< 13	< 13
Chloroform	7	**2 J**	**1.5 J**	**1.4 J**	**1.9 J**	**1.9 J**	**1.7 J**
Chloromethane	5	< 25	< 13	< 13	< 13	< 13	< 13
cis-1,2-dichloroethene	5	**590**	**480**	**310**	**270**	**460**	**330**
cis-1,3-dichloropropene	0.4	< 25	< 13	< 13	< 13	< 13	< 13
Dibromochloromethane	50	< 25	< 13	< 13	< 13	< 13	< 13
Dichlorodifluoromethane (Freon 12)	5	< 25	< 13	< 13	< 13	< 13	< 13
Ethylbenzene	5	**1.8 J**	**2.2 J**	**1.7 J**	**1.5 J**	**2.6 J**	**3.2 J**
Methyl tert-Butyl Ether	5	< 25	< 13	< 13	< 13	< 13	< 13
Methylene Chloride	5	< 25	< 13	< 13	< 13	< 13	< 13
Styrene	5	< 25	< 13	< 13	< 13	< 13	< 13
Tetrachloroethene	5	< 25	< 13	< 13	< 13	< 13	< 13
Toluene	5	**49**	**71**	**35**	**25**	**62**	**96**
trans-1,2-dichloroethene	5	**49**	< 13	**0.95 J**	< 13	< 13	< 13
trans-1,3-dichloropropene	0.4	< 25	< 13	< 13	< 13	< 13	< 13
Trichloroethylene	5	**46**	**43**	**35**	**36**	**51**	**30**
Trichlorofluoromethane (CFC-11)	5	< 25	< 13	< 13	< 13	< 13	< 13
Trichlorotrifluoroethane (Freon 113)	5	< 25	< 13	< 13	< 13	< 13	< 13
Vinyl Chloride	2	**83**	**94**	**54**	**45**	**87**	**72**
Xylene-o	5	< 25	**2.2 J**	**1.3 J**	**0.9 J**	**2.6 J**	**3.1 J**
Xylenes - m,p	5	< 25	**3.5 J**	**2.4 J**	**1.9 J**	**3.8 J**	**6.0 J**
Total VOCs [2]		**824**	**705**	**447**	**388**	**681**	**548**
Project VOCs [3]		**821**	**699**	**443**	**383**	**676**	**544**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-2 6/8/2011	RW-2 7/8/2011	RW-2 10/3/2011	RW-3 7/29/2009	RW-3 8/12/2009
	NYSDEC SCGs					
1,1,1-Trichloroethane	5	**1.1 J**	**0.93 J**	**0.73 J**	< 5	< 5
1,1,2,2-Tetrachloroethane	5	< 5	< 13	< 13 U	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 13	< 13 U	< 5	< 5
1,1-Dichloroethane	5	**3.1 J**	**2.4 J**	**2.0 J**	**2.4 J**	**2.1 J**
1,1-Dichloroethene	5	**2.8 J**	**2.7 J**	**1.7 J**	< 5	**0.35 J**
1,2-Dichloroethane	0.6	< 5	< 13	< 13 U	< 5	< 5
1,2-Dichloropropane	1	**0.38 J**	< 13	< 13 U	< 5	< 5
2-Butanone	NE	< 50	< 130	< 130 U	< 50	< 50
2-Hexanone	50	< 50	< 130	< 130 U	< 50	< 50
4-methyl-2-pentanone	50	< 50	< 130	< 130 U	< 50	< 50
Acetone	NE	< 50	< 130	< 130 UB	< 50	< 50
Benzene	1	< 0.7	< 1.8	< 1.8 U	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 13	< 13 U	**0.35 J**	< 5
Bromoform	50	< 5	< 13	< 13 U	< 5	< 5
Bromomethane	5	< 5	< 13	< 13 U	< 5	< 5
Carbon Disulfide	60	< 5	< 13	< 13 U	< 5	< 5
Carbon tetrachloride	5	< 5	< 13	< 13 U	< 5	< 5
Chlorobenzene	5	< 5	< 13	< 13 U	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	**0.98 J**	**1.3 J**	**0.60 J**	**2.1 J**	**8.5**
Chloroethane	5	< 5	< 13	< 13 U	< 5	< 5
Chloroform	7	**1.3 J**	**1.3 J**	**1.1 J**	**2.1 J**	**2.3 J**
Chloromethane	5	< 5	< 13	< 13 U	< 5	< 5
cis-1,2-dichloroethene	5	**300 D**	**320**	**280**	**130**	**120**
cis-1,3-dichloropropene	0.4	< 5	< 13	< 13 U	< 5	< 5
Dibromochloromethane	50	< 5	< 13	< 13 U	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 13	< 13 U	< 5	< 5
Ethylbenzene	5	**1.7 J**	**2.4 J**	**2.5 J**	< 5	< 5
Methyl tert-Butyl Ether	5	< 5	< 13	< 13 U	--	--
Methylene Chloride	5	< 5	< 13	< 13 U	< 5	< 5
Styrene	5	< 5	< 13	< 13 U	< 5	< 5
Tetrachloroethene	5	**0.43 J**	< 13	**0.58 J**	**0.81 J**	**0.56 J**
Toluene	5	**62**	**81**	**72**	< 5	< 5
trans-1,2-dichloroethene	5	**0.42 J**	< 13	**0.63 J**	**0.68 J**	**0.54 J**
trans-1,3-dichloropropene	0.4	< 5	< 13	< 13 U	< 5	< 5
Trichloroethylene	5	**30**	**25**	**25**	**37**	**34**
Trichlorofluoromethane (CFC-11)	5	< 5 U	< 13	< 13 U	--	--
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 13	< 13 U	< 5	< 5
Vinyl Chloride	2	**88**	**67**	**55**	< 2	< 2
Xylene-o	5	**2.6 J**	**2.6 J**	**2.6 J**	< 5	< 5
Xylenes - m,p	5	**4.5 J**	**4.6 J**	**4.2 J**	< 5	< 5
Total VOCs [2]		**499**	**511**	**449**	**175**	**168**
Project VOCs [3]		**495**	**506**	**444**	**171**	**158**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-3 9/10/2009	RW-3 11/10/2009	RW-3 12/2/2009	RW-3 2/2/2010	RW-3 4/12/2010	RW-3 7/20/2010
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 5	< 5	< 13	< 25	< 25	< 50
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 13	< 25	< 25	< 50
1,1,2-Trichloroethane	1	< 5	< 5	< 13	< 25	< 25	< 50
1,1-Dichloroethane	5	**1.9 J**	**1.4 J**	**1.3 J**	< 25	< 25	< 50
1,1-Dichloroethene	5	**0.41 J**	**0.53 J**	< 13	< 25	< 25	< 50
1,2-Dichloroethane	0.6	< 5	< 5	< 13	< 25	< 25	< 50
1,2-Dichloropropane	1	< 5	< 5	< 13	< 25	< 25	< 50
2-Butanone	NE	< 50	< 50	< 130	< 250	< 250	< 500
2-Hexanone	50	< 50	< 50	< 130	< 250	< 250	< 500
4-methyl-2-pentanone	50	< 50	< 50	< 130	< 250	< 250	< 500
Acetone	NE	**2 J**	**3.1 J**	< 130	< 250	< 250	< 500
Benzene	1	< 0.7	< 0.7	< 1.8	< 3.5	< 3.5	< 7
Bromodichloromethane	50	< 5	< 5	< 13	< 25	< 25	< 50
Bromoform	50	< 5	< 5	< 13	< 25	< 25	< 50
Bromomethane	5	< 5	< 5	< 13	< 25	< 25	< 50
Carbon Disulfide	60	< 5	< 5	< 13	< 25	< 25	< 50
Carbon tetrachloride	5	< 5	< 5	< 13	< 25	< 25	< 50
Chlorobenzene	5	< 5	< 5	< 13	< 25	< 25	< 50
Chlorodifluoromethane (Freon 22)	NE	**93**	**490 D**	**660 D**	**1,300 D**	**1,300 D**	**1400**
Chloroethane	5	< 5	< 5	< 13	< 25	< 25	< 50
Chloroform	7	**2.9 J**	**5.9**	**6 J**	**4.3 J**	**3.2 J**	< 50
Chloromethane	5	< 5	< 5	< 13 R	< 25	< 25	< 50
cis-1,2-dichloroethene	5	**130**	**85**	**72**	**68**	**70**	**64**
cis-1,3-dichloropropene	0.4	< 5	< 5	< 13	< 25	< 25	< 50
Dibromochloromethane	50	< 5	< 5	< 13	< 25	< 25	< 50
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 13	< 25	< 25	< 50
Ethylbenzene	5	< 5	< 5	< 13	< 25	< 25	< 50
Methyl tert-Butyl Ether	5	--	--	--	< 25	< 25	< 50
Methylene Chloride	5	< 5	< 5	< 13	< 25	< 25	< 50
Styrene	5	< 5	< 5	< 13	< 25	< 25	< 50
Tetrachloroethene	5	**0.83 J**	**0.54 J**	< 13	< 25	< 25	< 50
Toluene	5	< 5	< 5	< 13	< 25	< 25	< 50
trans-1,2-dichloroethene	5	**0.59 J**	**0.52 J**	< 13	**7.2 J**	< 25	**4.8 J**
trans-1,3-dichloropropene	0.4	< 5	< 5	< 13	< 25	< 25	< 50
Trichloroethylene	5	**29**	**24**	**22**	**19 J**	**17 J**	**14 J**
Trichlorofluoromethane (CFC-11)	5	--	--	--	< 25	< 25	< 50
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 13	< 25	< 25	< 50
Vinyl Chloride	2	**0.47 J**	**0.42 J**	< 5	< 10	< 10	< 20
Xylene-o	5	< 5	< 5	< 13	< 25	< 25	< 50
Xylenes - m,p	5	< 5	< 5	< 13	< 25	< 25	< 50
Total VOCs [2]		**261**	**611**	**761**	**1,399**	**1,390**	**1,483**
Project VOCs [3]		**163**	**112**	**95**	**94**	**87**	**83**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-3 10/4/2010	RW-3 1/10/2011	RW-3 4/8/2011	RW-3 7/8/2011	RW-3 10/3/2011
	NYSDEC SCGs					
1,1,1-Trichloroethane	5	< 25	< 25	< 25	< 25	< 25 U
1,1,2,2-Tetrachloroethane	5	< 25	< 25	< 25	< 25	< 25 U
1,1,2-Trichloroethane	1	< 25	< 25	< 25	< 25	< 25 U
1,1-Dichloroethane	5	< 25	< 25	< 25	< 25	< 25 U
1,1-Dichloroethene	5	< 25	< 25	< 25	< 25	< 25 U
1,2-Dichloroethane	0.6	< 25	< 25	< 25	< 25	< 25 U
1,2-Dichloropropane	1	< 25	< 25	< 25	< 25	< 25 U
2-Butanone	NE	< 250	< 250	< 250	< 250	< 250 U
2-Hexanone	50	< 250	< 250	< 250	< 250	< 250 U
4-methyl-2-pentanone	50	< 250	< 250	< 250	< 250	< 250 U
Acetone	NE	< 250	< 250 B	< 250	< 250	< 250 U
Benzene	1	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5 U
Bromodichloromethane	50	< 25	< 25	< 25	< 25	< 25 U
Bromoform	50	< 25	< 25	< 25	< 25	< 25 U
Bromomethane	5	< 25	< 25	< 25	< 25	< 25 U
Carbon Disulfide	60	< 25	< 25	< 25	< 25	< 25 U
Carbon tetrachloride	5	< 25	< 25	< 25	< 25	< 25 U
Chlorobenzene	5	< 25	< 25	< 25	< 25	< 25 U
Chlorodifluoromethane (Freon 22)	NE	**880**	**890**	**900**	**670**	**540**
Chloroethane	5	< 25	< 25	< 25	< 25	< 25 U
Chloroform	7	**6.6 J**	**5.8 J**	**4.0 J**	**2.5 J**	**5.5 J**
Chloromethane	5	< 25	< 25	< 25	< 25	< 25 U
cis-1,2-dichloroethene	5	**64**	**74**	**93**	**110**	**92**
cis-1,3-dichloropropene	0.4	< 25	< 25	< 25	< 25	< 25 U
Dibromochloromethane	50	< 25	< 25	< 25	< 25	< 25 U
Dichlorodifluoromethane (Freon 12)	5	< 25	< 25	< 25	< 25	< 25 U
Ethylbenzene	5	< 25	< 25	< 25	< 25	< 25 U
Methyl tert-Butyl Ether	5	< 25	< 25	< 25	< 25	< 25 U
Methylene Chloride	5	< 25	< 25	< 25	< 25	< 25 U
Styrene	5	< 25	< 25	< 25	< 25	< 25 U
Tetrachloroethene	5	< 25	< 25	< 25	< 25	< 25 U
Toluene	5	< 25	< 25	< 25	< 25	< 25 U
trans-1,2-dichloroethene	5	**6.7 J**	**3.9 J**	**6.5 J**	< 25	**1.8 J**
trans-1,3-dichloropropene	0.4	< 25	< 25	< 25	< 25	< 25 U
Trichloroethylene	5	**12 J**	**10 J**	**6.8 J**	**7.7 J**	**7.5 J**
Trichlorofluoromethane (CFC-11)	5	< 25	< 25	< 25	< 25	< 25 U
Trichlorotrifluoroethane (Freon 113)	5	< 25	< 25	< 25	< 25	< 25 U
Vinyl Chloride	2	**2.6 J**	**5.1 J**	**11**	**9.9 J**	**7.1 J**
Xylene-o	5	< 25	< 25	< 25	< 25	< 25 U
Xylenes - m,p	5	< 25	< 25	< 25	< 25	< 25 U
Total VOCs [2]		**972**	**989**	**1,021**	**800**	**654**
Project VOCs [3]		**85**	**93**	**117**	**128**	**108**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-4 7/29/2009	RW-4 8/12/2009	RW-4 9/10/2009	RW-4 11/10/2009	RW-4 12/2/2009	RW-4 2/2/2010
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5	< 10	< 10
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 10	< 10
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 10	< 10
1,1-Dichloroethane	5	**0.42 J**	**0.38 J**	**0.47 J**	**0.52 J**	< 10	**0.6 J**
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	< 10	< 10
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 10	< 10
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 10	< 10
2-Butanone	NE	< 50	< 50	< 50	< 50	< 100	< 100
2-Hexanone	50	< 50	< 50	< 50	< 50	< 100	< 100
4-methyl-2-pentanone	50	< 50	< 50	< 50	< 50	< 100	< 100
Acetone	NE	< 50	< 50	< 50	**3.5 J**	< 100	< 100
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 1.4	< 1.4
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 10	< 10
Bromoform	50	< 5	< 5	< 5	< 5	< 10	< 10
Bromomethane	5	< 5	< 5	< 5	< 5	< 10 R	< 10
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 10	< 10
Carbon tetrachloride	5	< 5	< 5	< 5	< 5	< 10	< 10
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 10	< 10
Chlorodifluoromethane (Freon 22)	NE	**140**	**200**	**330 D**	**230 D**	**290**	**440 D**
Chloroethane	5	< 5	< 5	< 5	< 5	< 10	< 10
Chloroform	7	**1 J**	**0.88 J**	**0.78 J**	**0.95 J**	**0.88 J**	**0.72 J**
Chloromethane	5	< 5	< 5	< 5	< 5	< 10 R	< 10
cis-1,2-dichloroethene	5	**1.5 J**	**1.7 J**	**1.9 J**	**1.9 J**	**2.2 J**	**1.8 J**
cis-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 10	< 10
Dibromochloromethane	50	< 5	< 5	< 5	< 5	< 10	< 10
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 10	< 10
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 10	< 10
Methyl tert-Butyl Ether	5	--	--	--	--	--	< 10
Methylene Chloride	5	< 5	< 5	< 5	< 5	< 10	< 10
Styrene	5	< 5	< 5	< 5	< 5	< 10	< 10
Tetrachloroethene	5	**0.44 J**	**0.44 J**	**0.44 J**	**0.48 J**	< 10	**0.64 J**
Toluene	5	< 5	< 5	< 5	< 5	< 10	< 10
trans-1,2-dichloroethene	5	< 5	< 5	< 5	< 5	< 10	< 10
trans-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 10	< 10
Trichloroethylene	5	**1.1 J**	**1.2 J**	**1.6 J**	**1.9 J**	**1.8 J**	**1.4 J**
Trichlorofluoromethane (CFC-11)	5	--	--	--	--	--	< 10
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 10	< 10
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 4	< 4
Xylene-o	5	< 5	< 5	< 5	< 5	< 10	< 10
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 10	< 10
Total VOCs [2]		**144**	**205**	**335**	**239**	**295**	**445**
Project VOCs [3]		**3.5**	**3.7**	**4.4**	**4.8**	**4.0**	**4.4**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-4 4/12/2010	RW-4 7/20/2010	RW-4 10/4/2010	RW-4 1/10/2011	RW-4 4/8/2011	RW-4 7/8/2011
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 13	< 25	< 25	< 25	< 25	< 25
1,1,2,2-Tetrachloroethane	5	< 13	< 25	< 25	< 25	< 25	< 25
1,1,2-Trichloroethane	1	< 13	< 25	< 25	< 25	< 25	< 25
1,1-Dichloroethane	5	< 13	< 25	< 25	< 25	< 25	< 25
1,1-Dichloroethene	5	< 13	< 25	< 25	< 25	< 25	< 25
1,2-Dichloroethane	0.6	< 13	< 25	< 25	< 25	< 25	< 25
1,2-Dichloropropane	1	< 13	< 25	< 25	< 25	< 25	< 25
2-Butanone	NE	< 130	< 250	< 250	< 250	< 250	< 250
2-Hexanone	50	< 130	< 250	< 250	< 250	< 250	< 250
4-methyl-2-pentanone	50	< 130	< 250	< 250	< 250	< 250	< 250
Acetone	NE	< 130	< 250	< 250	< 250	< 250	< 250
Benzene	1	< 1.8	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5
Bromodichloromethane	50	< 13	< 25	< 25	< 25	< 25	< 25
Bromoform	50	< 13	< 25	< 25	< 25	< 25	< 25
Bromomethane	5	< 13	< 25	< 25	< 25	< 25	< 25
Carbon Disulfide	60	< 13	< 25	< 25	< 25	< 25	< 25
Carbon tetrachloride	5	< 13	< 25	< 25	< 25	< 25	< 25
Chlorobenzene	5	< 13	< 25	< 25	< 25	< 25	< 25
Chlorodifluoromethane (Freon 22)	NE	**560 D**	**840**	**850**	**820**	**650**	**520**
Chloroethane	5	< 13	< 25	< 25	< 25	< 25	< 25
Chloroform	7	**0.8 J**	< 25	< 25	< 25	< 25	< 25
Chloromethane	5	< 13	< 25	< 25	< 25	< 25	< 25
cis-1,2-dichloroethene	5	**1.5 J**	< 25	< 25	< 25	< 25	< 25
cis-1,3-dichloropropene	0.4	< 13	< 25	< 25	< 25	< 25	< 25
Dibromochloromethane	50	< 13	< 25	< 25	< 25	< 25	< 25
Dichlorodifluoromethane (Freon 12)	5	< 13	< 25	< 25	< 25	< 25	< 25
Ethylbenzene	5	< 13	< 25	< 25	< 25	< 25	< 25
Methyl tert-Butyl Ether	5	< 13	< 25	< 25	< 25	< 25	< 25
Methylene Chloride	5	< 13	< 25	< 25	< 25	< 25	< 25
Styrene	5	< 13	< 25	< 25	< 25	< 25	< 25
Tetrachloroethene	5	**0.9 J**	< 25	< 25	< 25	< 25	< 25
Toluene	5	< 13	< 25	< 25	< 25	< 25	< 25
trans-1,2-dichloroethene	5	< 13	< 25	< 25	< 25	< 25	< 25
trans-1,3-dichloropropene	0.4	< 13	< 25	< 25	< 25	< 25	< 25
Trichloroethylene	5	**1.4 J**	< 25	< 25	< 25	< 25	< 25
Trichlorofluoromethane (CFC-11)	5	< 13	< 25	< 25	< 25	< 25	< 25
Trichlorotrifluoroethane (Freon 113)	5	< 13	< 25	< 25	< 25	< 25	< 25
Vinyl Chloride	2	< 5	< 10	< 10	< 10	< 10	< 10
Xylene-o	5	< 13	< 25	< 25	< 25	< 25	< 25
Xylenes - m,p	5	< 13	< 25	< 25	< 25	< 25	< 25
Total VOCs [2]		**565**	**840**	**850**	**820**	**650**	**520**
Project VOCs [3]		**3.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-4 10/3/2011
	NYSDEC SCGs	
1,1,1-Trichloroethane	5	< 13 U
1,1,2,2-Tetrachloroethane	5	< 13 U
1,1,2-Trichloroethane	1	< 13 U
1,1-Dichloroethane	5	**0.55 J**
1,1-Dichloroethene	5	< 13 U
1,2-Dichloroethane	0.6	< 13 U
1,2-Dichloropropane	1	< 13 U
2-Butanone	NE	< 130 U
2-Hexanone	50	< 130 U
4-methyl-2-pentanone	50	< 130 U
Acetone	NE	< 130 U
Benzene	1	< 1.8 U
Bromodichloromethane	50	< 13 U
Bromoform	50	< 13 U
Bromomethane	5	< 13 U
Carbon Disulfide	60	< 13 U
Carbon tetrachloride	5	< 13 U
Chlorobenzene	5	< 13 U
Chlorodifluoromethane (Freon 22)	NE	**430**
Chloroethane	5	< 13 U
Chloroform	7	< 13 U
Chloromethane	5	< 13 U
cis-1,2-dichloroethene	5	**0.63 J**
cis-1,3-dichloropropene	0.4	< 13 U
Dibromochloromethane	50	< 13 U
Dichlorodifluoromethane (Freon 12)	5	< 13 U
Ethylbenzene	5	< 13 U
Methyl tert-Butyl Ether	5	< 13 U
Methylene Chloride	5	< 13 U
Styrene	5	< 13 U
Tetrachloroethene	5	**1.2 J**
Toluene	5	< 13 U
trans-1,2-dichloroethene	5	< 13 U
trans-1,3-dichloropropene	0.4	< 13 U
Trichloroethylene	5	< 13 U
Trichlorofluoromethane (CFC-11)	5	< 13 U
Trichlorotrifluoroethane (Freon 113)	5	< 13 U
Vinyl Chloride	2	< 5 U
Xylene-o	5	< 13 U
Xylenes - m,p	5	< 13 U
Total VOCs (2)		**432**
Project VOCs (3)		**2.4**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, 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 analysis using NYSDEC ASP 2000 Method OLM4.2. Results validated following protocols specified in Sampling and Analysis Plan in the December 2009 DRAFT OM&M Manual (ARCADIS 2009).

(2) "Total VOCs" represents the sum of individual concentrations of the VOCs detected.

(3) "Project VOCs" represents the sum of individual compound concentrations of 1,1,1-Trichloroethane; 1,1-Dichloroethane; 1,2-Dichloroethane; 1,1-Dichloroethene; Tetrachloroethene; Trichloroethene; Vinyl Chloride; cis-1,2-Dichloroethene; trans-1,2-Dichloroethene; Benzene; Toluene; and Xylenes-o,m, and p.

Acronyms\Key:

	Indicates an exceedance of an SCG.
700	Bold data indicates that the analyte was detected at or above its reporting limit.
ASP	Analytical services protocol.
B	Compound detected in associated blank sample.
D	Constituent identified from secondary dilution.
J	Value is estimated.
NE	Not established.
NYSDEC	New York State Department of Environmental Conservation.
R	Concentration for the constituent was rejected.
SCGs	Standards, criteria, and guidance values.
VOC	Volatile organic compound.
ug/L	Micrograms per liter.
< 5	Compound not detected above its laboratory quantification limit.
--	Not analyzed.

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

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-1 4/21/2009	RW-1 7/29/2009	RW-1 8/12/2009	RW-1 9/10/2009	RW-1 11/10/2009	RW-1 12/2/2009	RW-1 10/4/2010	RW-1 2/10/2011	RW-1 10/3/2011	RW-1 11/11/2011
	NYSDEC SCGs										
Total Cadmium	5	< 5	--	--	--	--	--	< 5	--	--	< 5
Dissolved Cadmium	5	< 5	--	--	--	--	--	< 5	--	--	< 5
Total Chromium	50	**24.3**	--	--	--	--	--	**27**	--	--	**23**
Dissolved Chromium	50	**20.2**	--	--	--	--	--	**27**	--	--	**24**
Total Iron	300	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	--
Dissolved Iron	300	< 100	--	--	--	--	--	< 100	< 100	< 100	--
Total Manganese	300	**23.6**	--	--	--	--	--	**12**	--	--	--
Dissolved Manganese	300	**22.4**	--	--	--	--	--	**11**	--	--	--
Total Mercury	0.7	< 0.2	--	--	--	--	--	--	--	--	--
Dissolved Mercury	0.7	< 0.2	--	--	--	--	--	--	--	--	--

See notes on last page.

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

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-2 4/21/2009	RW-2 7/29/2009	RW-2 8/12/2009	RW-2 9/10/2009	RW-2 10/9/2009	RW-2 11/10/2009	RW-2 12/2/2009	RW-2 1/11/2010	RW-2 2/2/2010	RW-2 3/10/2010
	NYSDEC SCGs										
Total Cadmium	5	< 5	--	--	--	--	--	--	--	--	--
Dissolved Cadmium	5	< 5	--	--	--	--	--	--	--	--	--
Total Chromium	50	< 10	--	--	--	--	--	--	--	--	--
Dissolved Chromium	50	< 10	--	--	--	--	--	--	--	--	--
Total Iron	300	**2,330**	**5,950**	**4,870**	**3,550**	**3,800**	**2,040**	**1,260**	**1,140**	**1,000**	**2,550**
Dissolved Iron	300	**781**	--	--	--	--	--	--	--	--	--
Total Manganese	300	**241**	--	--	--	--	--	--	--	--	--
Dissolved Manganese	300	**248**	--	--	--	--	--	--	--	--	--
Total Mercury	0.7	< 0.2	--	--	--	--	--	--	--	--	--
Dissolved Mercury	0.7	< 0.2	--	--	--	--	--	--	--	--	--

See notes on last page.

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

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-2 4/12/2010	RW-2 7/20/2010	RW-2 10/4/2010	RW-2 12/6/2010	RW-2 2/10/2011	RW-2 3/7/2011	RW-2 4/8/2011	RW-2 5/2/2011	RW-2 6/8/2011	RW-2 7/8/2011
	NYSDEC SCGs										
Total Cadmium	5	--	--	< 5	--	--	--	--	--	--	--
Dissolved Cadmium	5	--	--	< 5	--	--	--	--	--	--	--
Total Chromium	50	--	--	< 10	--	--	--	--	--	--	--
Dissolved Chromium	50	--	--	< 10	--	--	--	--	--	--	--
Total Iron	300	**880**	**1,180**	**710**	**590**	**970**	**850**	**1,000**	**890**	**830**	**3,110**
Dissolved Iron	300	--	--	**380**	**270**	**550**	**530**	**740**	**710**	**670**	**670**
Total Manganese	300	--	--	**187**	--	--	--	--	--	--	--
Dissolved Manganese	300	--	--	**192**	--	--	--	--	--	--	--
Total Mercury	0.7	--	--	--	--	--	--	--	--	--	--
Dissolved Mercury	0.7	--	--	--	--	--	--	--	--	--	--

See notes on last page.

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

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-2 8/1/2011	RW-2 9/6/2011	RW-2 10/3/2011	RW-2 11/11/2011	RW-2 12/19/2011	RW-3 4/22/2009	RW-3 7/29/2009	RW-3 9/10/2009	RW-3 11/10/2009	RW-3 12/2/2009
	NYSDEC SCGs										
Total Cadmium	5	--	--	--	< 5	--	< 5	--	--	--	--
Dissolved Cadmium	5	--	--	--	< 5	--	< 5	--	--	--	--
Total Chromium	50	--	--	--	< 10	--	**22.6**	--	--	--	--
Dissolved Chromium	50	--	--	--	< 10	--	< 10	--	--	--	--
Total Iron	300	**840**	**830**	**1,640**	**750**	**930**	**246**	< 100	< 100	< 100	< 100
Dissolved Iron	300	**670**	**650**	**640**	**540**	**750**	< 100	--	--	--	--
Total Manganese	300	--	--	--	--	--	< 10	--	--	--	--
Dissolved Manganese	300	--	--	--	--	--	< 10	--	--	--	--
Total Mercury	0.7	--	--	--	--	--	< 0.2	--	--	--	--
Dissolved Mercury	0.7	--	--	--	--	--	< 0.2	--	--	--	--

See notes on last page.

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

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-3 3/10/2010	RW-3 4/12/2010	RW-3 7/20/2010	RW-3 10/4/2010	RW-3 12/6/2010	RW-3 3/7/2011	RW-3 4/8/2011	RW-3 5/2/2011	RW-3 6/8/2011	RW-3 7/8/2011
	NYSDEC SCGs										
Total Cadmium	5	--	--	--	< 5	--	--	--	--	--	--
Dissolved Cadmium	5	--	--	--	< 5	--	--	--	--	--	--
Total Chromium	50	--	--	--	< 10	--	--	--	--	--	--
Dissolved Chromium	50	--	--	--	< 10	--	--	--	--	--	--
Total Iron	300	**200**	**470**	**890**	**350**	**340**	**530**	**480**	**480**	**570**	**450**
Dissolved Iron	300	--	--	--	< 100	**150**	**200**	**200**	**130**	**140**	**120**
Total Manganese	300	--	--	--	**35**	--	--	--	--	--	--
Dissolved Manganese	300	--	--	--	**34**	--	--	--	--	--	--
Total Mercury	0.7	--	--	--	--	--	--	--	--	--	--
Dissolved Mercury	0.7	--	--	--	--	--	--	--	--	--	--

See notes on last page.

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

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-3 8/1/2011	RW-3 9/6/2011	RW-3 10/3/2011	RW-3 11/11/2011	RW-3 12/19/2011	RW-4 4/22/2009	RW-4 7/29/2009	RW-4 8/12/2009	RW-4 9/10/2009	RW-4 11/10/2009
	NYSDEC SCGs										
Total Cadmium	5	--	--	--	< 5	--	< 5	--	--	--	--
Dissolved Cadmium	5	--	--	--	< 5	--	< 5	--	--	--	--
Total Chromium	50	--	--	--	< 10	--	< 10	--	--	--	--
Dissolved Chromium	50	--	--	--	< 10	--	< 10	--	--	--	--
Total Iron	300	**450**	**370**	**460**	**460**	**280**	< 100	< 100	< 100	< 100	< 100
Dissolved Iron	300	**120**	< 100	**110**	< 100	**200**	< 100	--	--	--	--
Total Manganese	300	--	--	--	--	--	**10.4**	--	--	--	--
Dissolved Manganese	300	--	--	--	--	--	< 10	--	--	--	--
Total Mercury	0.7	--	--	--	--	--	< 0.2	--	--	--	--
Dissolved Mercury	0.7	--	--	--	--	--	< 0.2	--	--	--	--

See notes on last page.

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

COMPOUND (ug/L)	Sample Location: / Sample Date:	RW-4 12/2/2009	RW-4 10/4/2010	RW-4 10/3/2011	RW-4 11/11/2011
	NYSDEC SCGs				
Total Cadmium	5	--	< 5	--	< 5
Dissolved Cadmium	5	--	< 5	--	< 5
Total Chromium	50	--	< 10	--	< 10
Dissolved Chromium	50	--	< 10	--	< 10
Total Iron	300	< 100	< 100	< 100	< 100
Dissolved Iron	300	--	< 100	< 100	< 100
Total Manganese	300	--	**28**	--	--
Dissolved Manganese	300	--	**29**	--	--
Total Mercury	0.7	--	--	--	--
Dissolved Mercury	0.7	--	--	--	--

Notes:

(1) Water samples collected by ARCADIS on the dates shown and submitted to Columbia Analytical Services, Inc. for metals analysis using NYSDEC ASP Method 2000 ILM4.0. Results validated following protocols specified in Sampling and Analysis Plan in the December 2009 DRAFT OM&M Manual (ARCADIS 2009).

Acronyms/Key:

	Indicates an exceedance of an SCG.
700	Bold data indicates that the analyte was detected at or above its reporting limit.
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.
< 5	Compound not detected above its laboratory quantification limit.

Table 11. Summary of Water-Level Elevations, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Well Identification	Well Casing Elevation (ft msl)	Event Date	Baseline (1) 5/8/2009 (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 02/04/10 (ft msl)	2Q2010 04/23/10 (ft msl)	3Q2010 08/26/10 (ft msl)	4Q2010 12/10/10 (ft msl)	1Q2011 02/04/11 (ft msl)	2Q2011 05/20/11 (ft msl)	3Q2011 08/09/11 (ft msl)	4Q2011 10/26/11 (ft msl)
Recovery Wells																
RW-1	125.18		69.75	69.85	70.21	70.93	70.74	70.32	70.67	74.38	72.52	71.11	70.96	72.13	70.44	72.72
RW-2	124.48		72.27	63.16	63.27	61.51	61.30	63.07	61.80	64.88	63.44	61.35	67.99	66.31	64.18	65.11
RW-3	122.84		69.40	68.05	68.04	67.88	67.68	67.29	67.64	71.4	69.44*	68.13	67.74	68.88	67.64	69.70
RW-4	121.25		69.25	69.40	70.12	70.77	70.37	70.01	70.35	74.02	71.93	70.56	67.06	71.37	69.95	72.13
Monitoring Wells																
B24MW-2	126.96		74.31	74.58	74.56	74.69	74.35	73.54	74.13	76.16	75.86	75.65	74.96	76.06	74.35	76.00
B24MW-3	127.11		72.63	71.46	69.71	72.33	72.23	71.71	72.16	75.87	74.10	72.89	72.40	74.04	72.27	74.44
B30MW-1	128.33		73.55	73.43	73.35	73.29	73.19	72.68	73.00	76.54	74.96	73.86	73.38	74.75	73.25	75.41
BCPMW-1	125.73		73.16	73.16	73.00	72.98	72.79	72.43	72.67	76.26	74.66	73.43	72.94	74.75	72.94	75.05
BCPMW-2	126.39		72.55	72.26	72.16	72.04	71.93	71.38	71.83	75.52	73.69	72.55	72.03	73.64	71.94	74.16
BCPMW-3	124.94		72.46	71.94	71.82	71.75	71.60	71.12	71.59	75.24	73.40	72.27	71.74	73.25	71.64	73.94
BCPMW-4-1	128.76		72.30	70.36	71.55	71.51	71.40	70.96	71.33	75.05	73.13	72.02	71.56	73.08	71.46	73.70
BCPMW-4-2	129.15		72.58	70.43	71.59	71.55	71.44	70.95	71.36	75.07	73.16	72.08	71.56	73.06	71.51	73.74
BCPMW-4-3	129.19		72.32	70.59	71.81	71.65	71.55	71.07	71.46	75.16	73.26	72.14	71.73	73.19	71.55	73.84
BCPMW-5-1	129.37		72.79	72.55	72.36	72.24	72.15	71.77	72.14	75.66	73.94	72.72	72.74	73.81	72.14	74.46
BCPMW-6-1	126.01		72.12	71.61	71.58	71.43	71.31	70.85	71.26	74.91	72.96	71.91	71.49	72.77	71.45	73.58
BCPMW-6-2	125.16		71.74	71.29	70.53	71.11	70.87	70.58	70.96	74.64	72.60	71.59	71.17	72.49	71.01	73.26
BCPMW-7-1	124.81		72.00	71.68	71.62	71.50	71.41	70.94	71.33	74.99	72.99	71.97	71.51	72.78	71.53	73.62
MW-200-1	123.49		72.16	70.52	71.74	71.66	72.64	70.95	71.37	75.07	73.14	72.08	71.72	72.98	71.52	73.69
MW-201-1	121.69		72.04	71.50	71.40	71.37	72.45	70.69	71.10	74.84	72.87	71.79	71.33	72.69	71.25	73.48
MW-202-1	119.27		71.90	71.48	71.46	71.40	72.26	70.72	71.13	74.83	72.82	71.77	71.32	72.66	71.21	73.46
MW-203-1	118.25		71.83	71.45	71.40	71.40	72.24	70.69	71.10	74.75	72.77	71.75	71.30	72.61	70.20	73.43
Piezometers																
PZ-1a	128.82		72.56	71.40	71.50	71.31	71.20	70.75	71.15	74.87	72.94	71.85	71.33	72.76	71.31	73.54
PZ-1b	128.92		72.47	71.35	71.37	71.21	71.11	70.67	71.09	74.78	72.88	71.82	71.28	72.70	71.24	73.47
PZ-1c	128.96		72.47	71.21	71.75	71.62	71.48	71.11	71.48	75.15	73.23	72.13	71.74	73.16	71.56	73.83
PZ-2a	128.36		72.47	71.41	71.38	71.27	71.15	70.73	71.09	74.82	72.87	71.81	71.34	72.74	71.30	73.45
PZ-2b	128.37		72.43	71.40	71.37	71.24	71.13	70.70	71.08	74.77	72.86	71.78	71.30	72.68	71.27	73.45
PZ-2c	128.55		72.41	71.75	71.66	71.57	71.44	71.02	71.40	75.05	73.15	72.05	71.68	73.05	71.52	73.74
PZ-3	124.99		72.52	71.27	71.18	71.10	71.03	70.52	70.94	74.69	72.71	71.65	70.93	72.55	71.08	73.28
PZ-4	125.31		72.50	71.38	71.29	71.21	71.11	70.64	71.07	74.81	72.83	71.78	71.45	72.64	71.32	73.42
PZ-5a	129.07		72.50	72.33	72.17	72.12	71.99	71.53	71.94	75.61	73.79	72.59	72.17	73.70	71.98	74.27
PZ-5b	129.06		72.50	72.24	72.07	71.98	71.90	71.45	71.84	75.53	73.69	72.51	72.08	73.67	71.88	74.16
PZ-6a	125.67		72.50	71.35	71.31	71.21	71.09	70.65	71.03	74.73	72.84	71.70	71.24	72.56	71.24	73.37
PZ-6b	125.74		72.50	71.29	71.22	71.12	71.00	72.54	70.93	74.7	72.65	71.58	71.11	72.46	71.14	73.28
PZ-7a	125.10		72.50	71.69	71.61	71.52	71.41	70.96	71.32	75.02	73.00	72.00	71.54	72.80	71.58	73.67
PZ-7b	125.06		72.50	71.49	71.15	71.29	71.18	70.81	71.21	74.85	72.83	71.83	71.37	72.68	71.26	73.45

Notes:
(1) Baseline readings were taken prior to system start-up, which occurred on July 21, 2009.

Acronyms/Key:
ft msl: feet relative to mean sea level
NM: not measured
*: RW-3 water level measurement collected on September 9, 2010.

Table 12. Summary of Calculated Vertical Groundwater Hydraulic Gradients, Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Observation Well Pairing			2/4/2011			5/20/2011			8/9/2011			10/26/2011		
Shallow	Deep	Vertical Distance Between Screens (ft)	Observed Head Shallow (ft msl)	Observed Head Deep (ft msl)	Vertical Hydraulic Gradient (1) (ft/ft)	Observed Head Shallow (ft msl)	Observed Head Deep (ft msl)	Vertical Hydraulic Gradient (1) (ft/ft)	Observed Head Shallow (ft msl)	Observed Head Deep (ft msl)	Vertical Hydraulic Gradient (1) (ft/ft)	Observed Head Shallow (ft msl)	Observed Head Deep (ft msl)	Vertical Hydraulic Gradient (1) (ft/ft)
PZ-1A	PZ-1B	20	71.33	71.28	-0.0025	72.76	72.7	-0.003	71.31	71.24	-0.0035	73.54	73.47	-0.0035
PZ-1B	PZ-1C	50	71.28	71.74	0.0092	72.7	73.16	0.023	71.24	71.56	0.016	73.47	73.83	0.018
PZ-2A	PZ-2B	20	71.34	71.3	-0.002	72.74	72.68	-0.003	71.3	71.27	-0.0015	73.45	73.45	0
PZ-2B	PZ-2C	50	71.3	71.68	0.0076	72.68	73.05	0.0185	71.27	71.52	0.0125	73.45	73.74	0.0145
PZ-5A	PZ-5B	45	72.17	72.08	-0.002	73.7	73.67	-0.0015	71.98	71.88	-0.005	74.27	74.16	-0.0055
PZ-6A	PZ-6B	25	71.24	71.11	-0.0052	72.56	72.46	-0.005	71.24	71.14	-0.005	73.37	73.28	-0.0045
PZ-7A	PZ-7B	48	71.54	71.37	-0.0035	72.8	72.68	-0.006	71.58	71.26	-0.016	73.67	73.45	-0.011
BCPMW-4-1	BCPMW-4-2	21	71.56	71.56	0	73.08	73.06	-0.001	71.46	71.51	0.0025	73.7	73.74	0.002
BCPMW-4-2	BCPMW-4-3	44	71.56	71.73	0.0039	73.06	73.19	0.0065	71.51	71.55	0.002	73.74	73.84	0.005
BCPMW-6-1	BCPMW-6-2	44.5	71.49	71.17	-0.0072	72.77	72.49	-0.014	71.45	71.01	-0.022	73.58	73.26	-0.016

Notes:

1. Positive groundwater hydraulic gradient indicates a vertically upward gradient and a negative groundwater hydraulic gradient indicates vertically downward gradient.

Table 13. 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-2 10/4/2010	B24MW-2 10/27/2011	B24MW-3 4/20/2009	B24MW-3 10/6/2010	B24MW-3 10/27/2011
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 5	< 5	< 5	**0.62 J**	< 5	< 5
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5	< 5
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50	< 50
2-Hexanone	50	< 50	< 50	< 50	< 50 J	< 50	< 50
4-methyl-2-pentanone	50	< 50	< 50	< 50	< 50 J	< 50	< 50
Acetone	NE	< 50 B	< 50	< 50 B	< 50	< 50	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5	< 5	< 5
Bromomethane	5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5	< 5
Carbon tetrachloride	5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	< 5	< 5	< 5
Chloroethane	5	< 5	< 5	< 5	< 5	< 5	< 5
Chloroform	7	< 5	**0.3 J**	< 5	< 5	< 5	**0.32 J**
Chloromethane	5	< 5	< 5	< 5	< 5	< 5	< 5
cis-1,2-dichloroethene	5	< 5	< 5	< 5	**10**	**1.2 J**	**0.4 J**
cis-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane	50	< 5	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5	< 5
Methyl tert-Butyl Ether	5	--	< 5	--	--	< 5	--
Methylene Chloride	5	< 5	< 5	< 5	< 5	< 5	< 5
Styrene	5	< 5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 5	< 5	< 5	**0.51 J**	< 5	< 5
Toluene	5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,2-dichloroethene	5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5	< 5
Trichloroethene	5	**3.7 J**	**4.4 J**	**3.2 J**	**45**	**5.9**	**1.4 J**
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2	< 2
Xylene-o	5	< 5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5	< 5
Total VOCs [3]		**3.7**	**4.7**	**3.2**	**56**	**7.1**	**2.1**
Project VOCs [4]		**3.7**	**4.4**	**3.2**	**56**	**7.1**	**1.8**

See notes on last page.

Table 13. 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:	B30MW-1 4/23/2009	B30MW-1 10/4/2010	B30MW-1 10/27/2011	BCPMW-1 4/28/2009	BCPMW-2 4/28/2009
	NYSDEC SCGs					
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5	< 10
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 10
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 10
1,1-Dichloroethane	5	< 5	< 5	< 5	**0.37 J**	**8 J**
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	**3.8 J**
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	**0.68 J**
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 10
2-Butanone	NE	< 50	< 50	< 50	< 50	< 100
2-Hexanone	50	< 50	< 50	< 50	< 50	< 100
4-methyl-2-pentanone	50	< 50	< 50	< 50	< 50	< 100
Acetone	NE	< 50 B	< 50 B	< 50	< 50 B	< 100
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 1.4
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 10
Bromoform	50	< 5	< 5	< 5	< 5	< 10
Bromomethane	5	< 5	< 5	< 5	< 5	< 10
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 10
Carbon tetrachloride	5	< 5	< 5	< 5	< 5	< 10
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 10
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	< 5	< 10
Chloroethane	5	< 5	< 5	< 5	< 5	< 10
Chloroform	7	< 5	< 5	< 5	**0.88 J**	< 10
Chloromethane	5	< 5	< 5	< 5	< 5	< 10
cis-1,2-dichloroethene	5	< 5	< 5	< 5	**22**	**310**
cis-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 10
Dibromochloromethane	50	< 5	< 5	< 5	< 5	< 10
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 10
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 10
Methyl tert-Butyl Ether	5	--	< 5	--	--	--
Methylene Chloride	5	< 5	< 5	< 5	**0.52 J**	< 10
Styrene	5	< 5	< 5	< 5	< 5	< 10
Tetrachloroethene	5	< 5	< 5	< 5	< 5	**1.5 J**
Toluene	5	< 5	< 5	< 5	**0.33 J**	< 10
trans-1,2-dichloroethene	5	< 5	< 5	< 5	**0.44 J**	**2.4 J**
trans-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 10
Trichloroethene	5	< 5	< 5	< 5	**190**	**180**
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 10
Vinyl Chloride	2	< 2	< 2	< 2	< 2	**4.1**
Xylene-o	5	< 5	< 5	< 5	< 5	< 10
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 10
Total VOCs [3]		0	0	0	**215**	**510**
Project VOCs [4]		0	0	0	**213**	**511**

See notes on last page.

Table 13. 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-3 4/29/2009	BCPMW-4-1 4/17/2009	BCPMW-4-1 12/1/2009	BCPMW-4-1 10/4/2010	BCPMW-4-1 10/28/2011
	NYSDEC SCGs					
1,1,1-Trichloroethane	5	< 25	< 25	**2.4 J**	**14 J**	**10 J**
1,1,2,2-Tetrachloroethane	5	< 25	< 25	< 5	< 25	< 25
1,1,2-Trichloroethane	1	< 25	< 25	**0.38 J**	< 25	< 25
1,1-Dichloroethane	5	**9.6 J**	**6.5 J**	**46**	**38**	**18 J**
1,1-Dichloroethene	5	**43**	**1.8 J**	**14**	**21 J**	**13 J**
1,2-Dichloroethane	0.6	< 25	< 25	**0.65 J**	< 25	**2.1 J**
1,2-Dichloropropane	1	< 25	< 25	**4.7 J**	**3.8 J**	**1.9 J**
2-Butanone	NE	< 250	< 250	< 50	< 250	< 250
2-Hexanone	50	< 250	< 250 J	< 50	< 250	< 250
4-methyl-2-pentanone	50	< 250	< 250 J	< 50	< 250	< 250
Acetone	NE	< 250	< 250 J	< 50	< 250	< 250B
Benzene	1	< 3.5	< 3.5	**0.44 J**	< 3.5	< 3.5
Bromodichloromethane	50	< 25	< 25	< 5	< 25	< 25
Bromoform	50	< 25	< 25	< 5	< 25	< 25
Bromomethane	5	< 25	< 25	R	< 25	< 25
Carbon Disulfide	60	< 25	< 25	< 5	< 25	< 25
Carbon tetrachloride	5	< 25	< 25	< 5	< 25	< 25
Chlorobenzene	5	< 25	< 25	< 5	< 25	< 25
Chlorodifluoromethane (Freon 22)	NE	< 25	**17 J**	**6.2**	**4.3 J**	**2.5 J**
Chloroethane	5	< 25	< 25	**2.4 J**	**4.1 J**	< 25
Chloroform	7	< 25	< 25	< 5	< 25	< 25
Chloromethane	5	< 25	< 25	R	< 25	< 25
cis-1,2-dichloroethene	5	**900**	**1800 D**	**750 D**	**510**	**500**
cis-1,3-dichloropropene	0.4	< 25	< 25	< 5	< 25	< 25
Dibromochloromethane	50	< 25	< 25	< 5	< 25	< 25
Dichlorodifluoromethane (Freon 12)	5	< 25	< 25	< 5	< 25	< 25
Ethylbenzene	5	< 25 B	< 25	< 5	< 25	< 25
Methyl tert-Butyl Ether	5	--	--	--	< 25	< 25
Methylene Chloride	5	< 25	< 25	< 5	< 25	< 25 B
Styrene	5	< 25	< 25	< 5	< 25	< 25
Tetrachloroethene	5	< 25	< 25	**0.64 J**	< 25	< 25
Toluene	5	< 25 B	< 25	< 5	< 25	< 25
trans-1,2-dichloroethene	5	**8.9 J**	**110**	**2.5 J**	**3.9 J**	**1.3 J**
trans-1,3-dichloropropene	0.4	< 25	< 25	< 5	< 25	< 25
Trichloroethene	5	**470**	**22 J**	**170**	**45**	**43**
Trichlorotrifluoroethane (Freon 113)	5	< 25	< 25	< 5	< 25	< 25
Vinyl Chloride	2	**300**	**180**	**540 D**	**220**	**32**
Xylene-o	5	< 25 B	< 25	**8**	< 25	< 25
Xylenes - m,p	5	< 25 B	< 25	< 5	< 25	< 25
Total VOCs [3]		**1,732**	**2,137**	**1,548**	**864**	**624**
Project VOCs [4]		**1,732**	**2,120**	**1,535**	**852**	**620**

See notes on last page.

Table 13. 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-4-2 4/17/2009	BCPMW-4-2 12/4/2009	BCPMW-4-2 10/7/2010	BCPMW-4-2 10/28/2011	BCPMW-4-3 4/17/2009
	NYSDEC SCGs					
1,1,1-Trichloroethane	5	< 250	< 10	< 5	**0.33 J**	< 5
1,1,2,2-Tetrachloroethane	5	< 250	< 10	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 250	< 10	< 5	< 5	< 5
1,1-Dichloroethane	5	**57 J**	**8.7 J**	**7.3**	**2.6 J**	< 5
1,1-Dichloroethene	5	**34 J**	**2.7 J**	**1.9 J**	**1.1 J**	< 5
1,2-Dichloroethane	0.6	< 250	< 10	**0.91 J**	**0.85 J**	< 5
1,2-Dichloropropane	1	< 250	< 10	**0.9 J**	**0.39 J**	< 5
2-Butanone	NE	< 2500	< 100	< 50	< 50	< 50
2-Hexanone	50	< 2500 J	< 100	< 50	< 50	< 50 J
4-methyl-2-pentanone	50	< 2500 J	< 100	< 50	< 50	< 50 J
Acetone	NE	< 2500 J	< 100	< 50 B	< 50	< 50 J
Benzene	1	< 35	< 1.4	< 0.7	< 0.7 U	< 0.7
Bromodichloromethane	50	< 250	< 10	< 5	< 5	< 5
Bromoform	50	< 250	< 10	< 5	< 5	< 5
Bromomethane	5	< 250	< 10	< 5	< 5	< 5
Carbon Disulfide	60	< 250	< 10	< 5	< 5	< 5
Carbon tetrachloride	5	< 250	< 10	< 5	< 5	< 5
Chlorobenzene	5	< 250	< 10	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 250	**0.8 J**	< 5	< 5	< 5
Chloroethane	5	< 250	**1.1 J**	**0.79 J**	< 5	< 5
Chloroform	7	< 250	< 10	**0.96 J**	**0.62 J**	**0.53 J**
Chloromethane	5	< 250	R	< 5	< 5	< 5
cis-1,2-dichloroethene	5	**18000 D**	**270**	**99**	**59**	**0.37 J**
cis-1,3-dichloropropene	0.4	< 250	< 10	< 5	< 5	< 5
Dibromochloromethane	50	< 250	< 10	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 250	< 10	< 5	< 5	< 5
Ethylbenzene	5	**62 J**	**0.78 J**	< 5	< 5	< 5
Methyl tert-Butyl Ether	5	**--**	**--**	**0.35 J**	**0.28 J**	--
Methylene Chloride	5	< 250	< 10	< 5	< 5	< 5
Styrene	5	< 250	< 10	< 5	< 5	< 5
Tetrachloroethene	5	< 250	**0.82 J**	**0.73 J**	**0.59 J**	< 5
Toluene	5	**2400**	< 10 B	< 5	< 5	< 5
trans-1,2-dichloroethene	5	< 250	**1.3 J**	**0.65 J**	**0.41 J**	< 5
trans-1,3-dichloropropene	0.4	< 250	< 10	< 5	< 5	< 5
Trichloroethene	5	< 250	**310**	**66**	**50**	**0.56 J**
Trichlorotrifluoroethane (Freon 113)	5	< 250	< 10	< 5	< 5	< 5
Vinyl Chloride	2	**6300**	**58**	**54**	**20**	< 2
Xylene-o	5	**110 J**	< 10 B	< 5	< 5	< 5
Xylenes - m,p	5	**190 J**	< 10 B	< 5	< 5	< 5
Total VOCs [3]		**27,153**	**655**	**233**	**136**	**1.5**
Project VOCs [4]		**27,091**	**652**	**231**	**134**	**0.9**

See notes on last page.

Table 13. 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-4-3 12/1/2009	BCPMW-4-3 10/7/2010	BCPMW-4-3 10/28/2011	BCPMW-5-1 4/23/2009
	NYSDEC SCGs				
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 100
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 100
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 100
1,1-Dichloroethane	5	< 5	< 5	< 5	< 100
1,1-Dichloroethene	5	< 5	< 5	< 5	**21 J**
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 100
1,2-Dichloropropane	1	< 5	< 5	< 5	< 100
2-Butanone	NE	< 50	< 50	< 50	< 1000
2-Hexanone	50	< 50	< 50	< 50	< 1000
4-methyl-2-pentanone	50	< 50	< 50	< 50	< 1000
Acetone	NE	< 50	< 50	< 50	< 1000
Benzene	1	< 0.7	< 0.7	< 0.7	< 14
Bromodichloromethane	50	< 5	< 5	< 5	< 100
Bromoform	50	< 5	< 5	< 5	< 100
Bromomethane	5	< 5	< 5	< 5	< 100
Carbon Disulfide	60	< 5	< 5	< 5	< 100
Carbon tetrachloride	5	< 5	< 5	< 5	< 100
Chlorobenzene	5	< 5	< 5	< 5	< 100
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	< 100
Chloroethane	5	< 5	< 5	< 5	< 100
Chloroform	7	**0.32 J**	< 5	< 5	< 100
Chloromethane	5	R	< 5	< 5	< 100
cis-1,2-dichloroethene	5	< 5	< 5	< 5	**960**
cis-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 100
Dibromochloromethane	50	< 5	< 5	< 5	< 100
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 100
Ethylbenzene	5	< 5	< 5	< 5	**48 J**
Methyl tert-Butyl Ether	5	--	< 5	< 5	**--**
Methylene Chloride	5	< 5	< 5	< 5	< 100
Styrene	5	< 5	< 5	< 5	< 100
Tetrachloroethene	5	< 5	< 5	**0.27 J**	< 100
Toluene	5	< 5	< 5	< 5	**2700**
trans-1,2-dichloroethene	5	< 5	< 5	< 5	< 100
trans-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 100
Trichloroethene	5	**0.51 J**	**0.41 J**	**0.74 J**	**220**
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	**0.38 J**	< 100
Vinyl Chloride	2	< 2	< 2	< 2	**330**
Xylene-o	5	< 5	< 5	< 5	**40 J**
Xylenes - m,p	5	< 5	< 5	< 5	**110**
Total VOCs [3]		**0.83**	**0.41**	**1.39**	**4,429**
Project VOCs [4]		**0.51**	**0.41**	**1.01**	**4,381**

See notes on last page.

Table 13. 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-6-1 4/20/2009	BCPMW-6-1 12/4/2009	BCPMW-6-1 10/6/2010	BCPMW-6-1 10/31/2011
	NYSDEC SCGs				
1,1,1-Trichloroethane	5	< 5	< 5	< 100	< 250
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 100	< 250
1,1,2-Trichloroethane	1	< 5	< 5	< 100	< 250
1,1-Dichloroethane	5	**0.3 J**	< 5	< 100	< 250
1,1-Dichloroethene	5	< 5	< 5	< 100	< 250
1,2-Dichloroethane	0.6	< 5	< 5	< 100	< 250
1,2-Dichloropropane	1	< 5	< 5	< 100	< 250
2-Butanone	NE	< 50	< 50	< 1000	< 2500
2-Hexanone	50	< 50 J	< 50	< 1000	< 2500
4-methyl-2-pentanone	50	< 50 J	< 50	< 1000	< 2500
Acetone	NE	< 50 J	< 50	< 1000	< 2500
Benzene	1	< 0.7	< 0.7	< 14	< 35
Bromodichloromethane	50	< 5	< 5	< 100	< 250
Bromoform	50	< 5	< 5	< 100	< 250
Bromomethane	5	< 5	R	< 100	< 250
Carbon Disulfide	60	< 5	< 5	< 100	< 250
Carbon tetrachloride	5	< 5	< 5	< 100	< 250
Chlorobenzene	5	< 5	< 5	< 100	< 250
Chlorodifluoromethane (Freon 22)	NE	**4500 D**	**1700 EJ**	**10000 D**	**7100**
Chloroethane	5	< 5	< 5	< 100	< 250
Chloroform	7	**1.7 J**	**0.32 J**	< 100	< 250
Chloromethane	5	< 5	R	< 100	< 250
cis-1,2-dichloroethene	5	**21**	**1.7 J**	< 100	< 250
cis-1,3-dichloropropene	0.4	< 5	< 5	< 100	< 250
Dibromochloromethane	50	< 5	< 5	< 100	< 250
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 100	< 250
Ethylbenzene	5	< 5	< 5	< 100	< 250
Methyl tert-Butyl Ether	5	--	--	<100	< 250
Methylene Chloride	5	< 5	< 5	< 100	< 250
Styrene	5	< 5	< 5	< 100	< 250
Tetrachloroethene	5	**0.34 J**	< 5	< 100	< 250
Toluene	5	< 5	< 5	< 100	< 250
trans-1,2-dichloroethene	5	< 5	< 5	< 100	< 250
trans-1,3-dichloropropene	0.4	< 5	< 5	< 100	< 250
Trichloroethene	5	**4.9 J**	**1.6 J**	< 100	< 250
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 100	< 250
Vinyl Chloride	2	< 2	< 2	< 40	< 100
Xylene-o	5	< 5	< 5	< 100	< 250
Xylenes - m,p	5	< 5	< 5	< 100	< 250
Total VOCs (3)		**4,528**	**1,704**	**10,000**	**7,100**
Project VOCs (4)		**27**	**2.3**	**0**	**0**

See notes on last page.

Table 13. 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-6-2 5/8/2009	BCPMW-6-2 12/4/2009	BCPMW-6-2 10/6/2010	BCPMW-6-2 10/31/2011	BCPMW-7-1 4/20/2009
	NYSDEC SCGs					
1,1,1-Trichloroethane	5	< 5	**0.78 J**	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	**0.37 J**	**0.65 J**	**0.47 J**	**0.41 J**	< 5
1,1-Dichloroethene	5	< 5	**0.44 J**	< 5	**0.3 J**	< 5
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50
2-Hexanone	50	< 50	< 50	< 50	< 50	< 50 J
4-methyl-2-pentanone	50	< 50	< 50	< 50	< 50	< 50 J
Acetone	NE	< 50	< 50	< 50	< 50	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5	< 5
Bromomethane	5	< 5	R	< 5	< 5	< 5
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5
Carbon tetrachloride	5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	< 5	**2.6 J**
Chloroethane	5	< 5	< 5	< 5	< 5	< 5
Chloroform	7	**0.53 J**	< 5	**0.41 J**	**0.3 J**	< 5
Chloromethane	5	< 5	R	< 5	< 5	< 5
cis-1,2-dichloroethene	5	< 5	< 5	< 5	< 5	< 5
cis-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane	50	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5
Methyl tert-Butyl Ether	5	--	--	<5	**0.33 J**	--
Methylene Chloride	5	< 5	< 5	< 5	< 5	< 5
Styrene	5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 5	**0.79 J**	**2.1 J**	**1.8 J**	< 5
Toluene	5	< 5	< 5	< 5	< 5	< 5
trans-1,2-dichloroethene	5	< 5	< 5	< 5	< 5	< 5
trans-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene	5	< 5	**0.45 J**	< 5	< 5	< 5
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2
Xylene-o	5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5
Total VOCs (3)		**0.9**	**3.1**	**3.0**	**3.1**	**2.6**
Project VOCs (4)		**0.4**	**3.1**	**2.6**	**2.5**	**0.0**

See notes on last page.

Table 13. 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-7-1 12/1/2009	BCPMW-7-1 10/7/2010	BCPMW-7-1 11/1/2011	MW-200-1 4/29/2009	MW-200-1 12/2/2009
	NYSDEC SCGs					
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	< 5	< 5	< 5	**0.79 J**	< 5
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50
2-Hexanone	50	< 50	< 50	< 50	< 50	< 50
4-methyl-2-pentanone	50	< 50	< 50	< 50	< 50	< 50
Acetone	NE	< 50	< 50	< 50	< 50 B	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5	< 5
Bromomethane	5	R	< 5	< 5	< 5	R
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5
Carbon tetrachloride	5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	**1.5 J**	**5.2**	**9.2**	< 5	< 5
Chloroethane	5	< 5	< 5	< 5	< 5	< 5
Chloroform	7	< 5	< 5	< 5	**2.3 J**	**2.3 J**
Chloromethane	5	R	< 5	< 5	< 5	R
cis-1,2-dichloroethene	5	< 5	< 5	< 5	**38**	**5.7**
cis-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane	50	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5
Methyl tert-Butyl Ether	5	--	< 5	**0.22 J**	--	--
Methylene Chloride	5	< 5	< 5	< 5	< 5	< 5
Styrene	5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 5	< 5	< 5	**0.54 J**	< 5
Toluene	5	< 5	< 5	< 5	< 5	< 5
trans-1,2-dichloroethene	5	< 5	< 5	< 5	**0.3 J**	< 5
trans-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene	5	< 5	< 5	< 5	**34**	**12**
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2
Xylene-o	5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5
Total VOCs [3]		**1.5**	**5.2**	**9.4**	**76**	**20**
Project VOCs [4]		**0.0**	**0.0**	**0.2**	**74**	**18**

See notes on last page.

Table 13. 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-200-1 10/5/2010	MW-200-1 11/3/2011	MW-201-1 5/1/2009	MW-201-1 12/2/2009	MW-201-1 10/5/2010
	NYSDEC SCGs					
1,1,1-Trichloroethane	5	< 5	< 5	**5.5 J**	**3.3 J**	< 50
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 25	< 50	< 50
1,1,2-Trichloroethane	1	< 5	< 5	< 25	< 50	< 50
1,1-Dichloroethane	5	< 5	< 5	**10 J**	**9 J**	**14 J**
1,1-Dichloroethene	5	< 5	< 5	**7.9 J**	**8.1 J**	**6.9 J**
1,2-Dichloroethane	0.6	< 5	< 5	< 25	< 50	< 50
1,2-Dichloropropane	1	< 5	< 5	< 25	< 50	< 50
2-Butanone	NE	< 50	< 50	< 250	< 500	< 500
2-Hexanone	50	< 50	< 50	< 250	< 500	< 500
4-methyl-2-pentanone	50	< 50	< 50	< 250	< 500	< 500
Acetone	NE	< 50	< 50	< 250 B	< 500	< 500
Benzene	1	< 0.7	< 0.7	< 3.5	< 7	< 7
Bromodichloromethane	50	< 5	< 5	< 25	< 50	< 50
Bromoform	50	< 5	< 5	< 25	< 50	< 50
Bromomethane	5	< 5	< 5	< 25	< 50	< 50
Carbon Disulfide	60	< 5	< 5	< 25	< 50	< 50
Carbon tetrachloride	5	< 5	< 5	< 25	< 50	< 50
Chlorobenzene	5	< 5	< 5	< 25	< 50	< 50
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 25	< 50	< 50
Chloroethane	5	< 5	< 5	< 25	< 50	< 50
Chloroform	7	**0.5 J**	**0.21 J**	< 25	< 50	**4.2 J**
Chloromethane	5	< 5	< 5	< 25	R	< 50
cis-1,2-dichloroethene	5	**3.5 J**	**11**	**970 D**	**1300**	**3900 D**
cis-1,3-dichloropropene	0.4	< 5	< 5	< 25	< 50	< 50
Dibromochloromethane	50	< 5	< 5	< 25	< 50	< 50
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 25	< 50	< 50
Ethylbenzene	5	< 5	< 5	< 25	< 50	< 50
Methyl tert-Butyl Ether	5	< 5	< 5	--	--	<50
Methylene Chloride	5	< 5	< 5	< 25	< 50	< 50
Styrene	5	< 5	< 5	< 25	< 50	< 50
Tetrachloroethene	5	< 5	**0.43 J**	< 25	< 50	< 50
Toluene	5	< 5	< 5	< 25	< 50	< 50
trans-1,2-dichloroethene	5	< 5	< 5	**2.7 J**	**3.5 J**	**6.7 J**
trans-1,3-dichloropropene	0.4	< 5	< 5	< 25	< 50	< 50
Trichloroethene	5	**7**	**20**	**160**	**230**	**72**
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 25	< 50	< 50 U
Vinyl Chloride	2	< 2	< 2	< 10	**38**	**820**
Xylene-o	5	< 5	< 5	< 25	< 50	**7.2 J**
Xylenes - m,p	5	< 5	< 5	< 25	< 50	< 50
Total VOCs [3]		**11**	**32**	**1,156**	**1,592**	**4,831**
Project VOCs [4]		**11**	**31**	**1,156**	**1,592**	**4,827**

See notes on last page.

Table 13. 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-201-1 11/3/2011	MW-202-1 5/1/2009	MW-202-1 12/2/2009	MW-202-1 10/6/2010	MW-202-1 11/3/2011
	NYSDEC SCGs					
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5	**0.32 J**
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	**0.51 J**	< 5	< 5	< 5	**0.86 J**
1,1-Dichloroethene	5	**0.21 J**	< 5	< 5	< 5	**0.72 J**
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50
2-Hexanone	50	< 50	< 50	< 50	< 50	< 50
4-methyl-2-pentanone	50	< 50	< 50	< 50	< 50	< 50
Acetone	NE	< 50	< 50	< 50	< 50	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5	< 5
Bromomethane	5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5
Carbon tetrachloride	5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	**0.61 J**	**0.21 J**
Chloroethane	5	< 5	< 5	< 5	< 5	< 5
Chloroform	7	**3.2 J**	**6.2**	**6.7**	**0.93 J**	< 5
Chloromethane	5	< 5	< 5	< 5	< 5	< 5
cis-1,2-dichloroethene	5	**61**	**0.64 J**	**0.58 J**	< 5	< 5
cis-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane	50	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5
Methyl tert-Butyl Ether	5	**0.75 J**	--	--	< 5	**0.37 J**
Methylene Chloride	5	< 5	< 5	< 5	< 5	< 5
Styrene	5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	**0.24 J**	< 5	< 5	**0.48 J**	**0.92 J**
Toluene	5	< 5 J	< 5	< 5	< 5	< 5
trans-1,2-dichloroethene	5	< 5	< 5	< 5	< 5	< 5
trans-1,3-dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene	5	**20**	**7.5**	**9.3**	**2.4 J**	**0.78 J**
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	**0.43 J**	**0.44 J**
Vinyl Chloride	2	< 2 U	< 2	< 2	< 2	< 2
Xylene-o	5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5
Total VOCs [3]		**86**	**14**	**17**	**4.9**	**4.6**
Project VOCs [4]		**82**	**8.1**	**9.9**	**2.9**	**3.6**

See notes on last page.

Table 13. 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-203-1 5/1/2009	MW-203-1 12/2/2009	MW-203-1 10/5/2010	MW-203-1 11/1/2011
	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	**0.32 J**
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 B	< 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	**73**	**17**	**29**	**8.9**
Chloroethane	5	< 5	< 5	< 5	< 5
Chloroform	7	**7.9**	**2.6 J**	**1.5 J**	**0.68 J**
Chloromethane	5	< 5	< 5	< 5	< 5
cis-1,2-dichloroethene	5	**1.6 J**	**0.83 J**	**0.97 J**	**1.4 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
Methyl tert-Butyl Ether	5	--	--	**0.88 J**	**0.41 J**
Methylene Chloride	5	< 5	< 5	< 5	< 5
Styrene	5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 5	< 5	< 5	**0.35 J**
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
Trichloroethene	5	**1.3 J**	**0.7 J**	**1.6 J**	**2.9 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]		**84**	**21**	**34**	**15.0**
Project VOCs [4]		**2.9**	**1.5**	**2.6**	**5.0**

See notes on last page.

Table 13. 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)

Notes:

(1) Results validated following protocols specified in Sampling and Analysis Plan in the December 2009 DRAFT OM&M Manual (ARCADIS 2009).
(2) Samples analyzed for the TCL VOCs using NYSDEC ASP 2000 Method OLM4.2.
(3) "Total VOCs" represents the sum of individual concentrations of the VOCs detected.
(4) "Project VOCs" represents the sum of individual compound concentrations of 1,1,1-Trichloroethane; 1,1-Dichloroethane; 1,2-Dichloroethane; 1,1-Dichloroethene; Tetrachloroethene; Trichloroethene; Vinyl Chloride; cis-1,2-Dichloroethene; trans-1,2-Dichloroethene; Benzene; Toluene; and Xylenes-o,m, and p.

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.
TCL	Target compound list.
VOC	Volatile Organic Compound.
ASP	Analytical services protocol.
SCGs	Standards, criteria, and guidance values.
ug/L	Micrograms per liter.
NE	Not established.
E	Concentration for the constituent exceeded the calibration range.
J	Value is estimated.
D	Constituent identified from secondary dilution.
R	Concentration for the constituent was rejected.
B	Compound detected in associated blank sample.
< 5	Compound not detected above its laboratory quantification limit.

Table 14. 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-4-1 10/4/2010	BCPMW-4-1 10/28/2011
	NYSDEC SCGs								
Cadmium (total)	5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Cadmium (dissolved)	5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chromium (total)	50	**40.3**	**28.2**	**20.8**	< 10	< 10	**22.7**	**43**	**25**
Chromium (dissolved)	50	< 10	**10.6**	< 10	< 10	< 10	**12.8**	**41**	**22**
Iron (total)	300	--	**597**	--	< 100	**2,080**	**103**	--	--
Iron (dissolved)	300	--	< 100	--	< 100	**1,760**	< 100	--	--
Manganese (total)	300	--	**16.9**	--	**12.7**	**51.4**	**11.2**	--	--
Manganese (dissolved)	300	--	**13.7**	--	**11.3**	**49.2**	< 10	--	--

See notes on last page.

Table 14. 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-4-2 4/17/2009	BCPMW-4-2 10/7/2010	BCPMW-4-2 10/28/2011	BCPMW-4-3 4/17/2009	BCPMW-4-3 10/7/2010	BCPMW-4-3 10/28/2011	BCPMW-5-1 4/23/2009
	NYSDEC SCGs							
Cadmium (total)	5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Cadmium (dissolved)	5	< 5	--	< 5	< 5	< 5	< 5	< 5
Chromium (total)	50	**10.6**	< 10	< 10	< 10	< 10	< 10	< 10
Chromium (dissolved)	50	< 10	--	< 10	< 10	< 10	< 10	< 10
Iron (total)	300	**4,630**	--	--	< 100	--	--	**7,420**
Iron (dissolved)	300	**4,080**	--	--	< 100	--	--	**6,370**
Manganese (total)	300	**228**	--	--	< 10	--	--	**145**
Manganese (dissolved)	300	**217**	--	--	< 10	--	--	**131**

See notes on last page.

Table 14. 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-6-1 4/20/2009	BCPMW-6-1 10/6/2010	BCPMW-6-1 10/31/2011	BCPMW-6-2 5/8/2009	BCPMW-6-2 10/6/2010	BCPMW-6-2 10/31/2011	BCPMW-7-1 4/20/2009	BCPMW-7-1 10/7/2010	BCPMW-7-1 11/1/2011
	NYSDEC SCGs									
Cadmium (total)	5	< 5	<5	< 5	< 5	<5	<5	< 5	< 5	< 5
Cadmium (dissolved)	5	< 5	<5	< 5	< 5	<5	<5	< 5	< 5	< 5
Chromium (total)	50	< 10	< 10	**14**	**10.3**	<10	<10	< 10	< 10	< 10
Chromium (dissolved)	50	< 10	<10	< 10	< 10	<10	<10	< 10	< 10	< 10
Iron (total)	300	< 100	--	--	--	--	--	< 100	--	--
Iron (dissolved)	300	< 100	--	--	--	--	--	< 100	--	--
Manganese (total)	300	< 10	--	--	--	--	--	**106**	--	--
Manganese (dissolved)	300	< 10	--	--	--	--	--	**94.8**	--	--

See notes on last page.

Table 14. 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:	MW-200-1 4/29/2009	MW-200-1 10/5/2010	MW-200-1 11/3/2011	MW-201-1 5/1/2009	MW-201-1 10/5/2010	MW-201-1 11/3/2011	MW-202-1 5/1/2009	MW-202-1 10/6/2010	MW-202-1 11/3/2010
	NYSDEC SCGs									
Cadmium (total)	5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Cadmium (dissolved)	5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chromium (total)	50	< 10	**14**	**48**	< 10	< 10	< 10	**16.5**	**15**	**23**
Chromium (dissolved)	50	< 10	< 10	**13**	< 10	< 10	< 10	< 10	<10	< 10
Iron (total)	300	--	--	--	--	--	--	--	--	--
Iron (dissolved)	300	--	--	--	--	--	--	--	--	--
Manganese (total)	300	--	--	--	--	--	--	--	--	--
Manganese (dissolved)	300	--	--	--	--	--	--	--	--	--

See notes on last page.

Table 14. 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:	MW-203-1 5/1/2009	MW-203-1 10/5/2010	MW-203-1 11/1/2011
	NYSDEC SCGs			
Cadmium (total)	5	< 5	< 5	< 5
Cadmium (dissolved)	5	< 5	< 5	< 5
Chromium (total)	50	**31.5**	**31**	**37**
Chromium (dissolved)	50	< 10	< 10	< 10
Iron (total)	300	--	--	--
Iron (dissolved)	300	--	--	--
Manganese (total)	300	--	--	--
Manganese (dissolved)	300	--	--	--

Notes:

(1) Results validated following protocols specified in Sampling and Analysis Plan in the December 2009 DRAFT OM&M Manual (ARCADIS 2009).

(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.

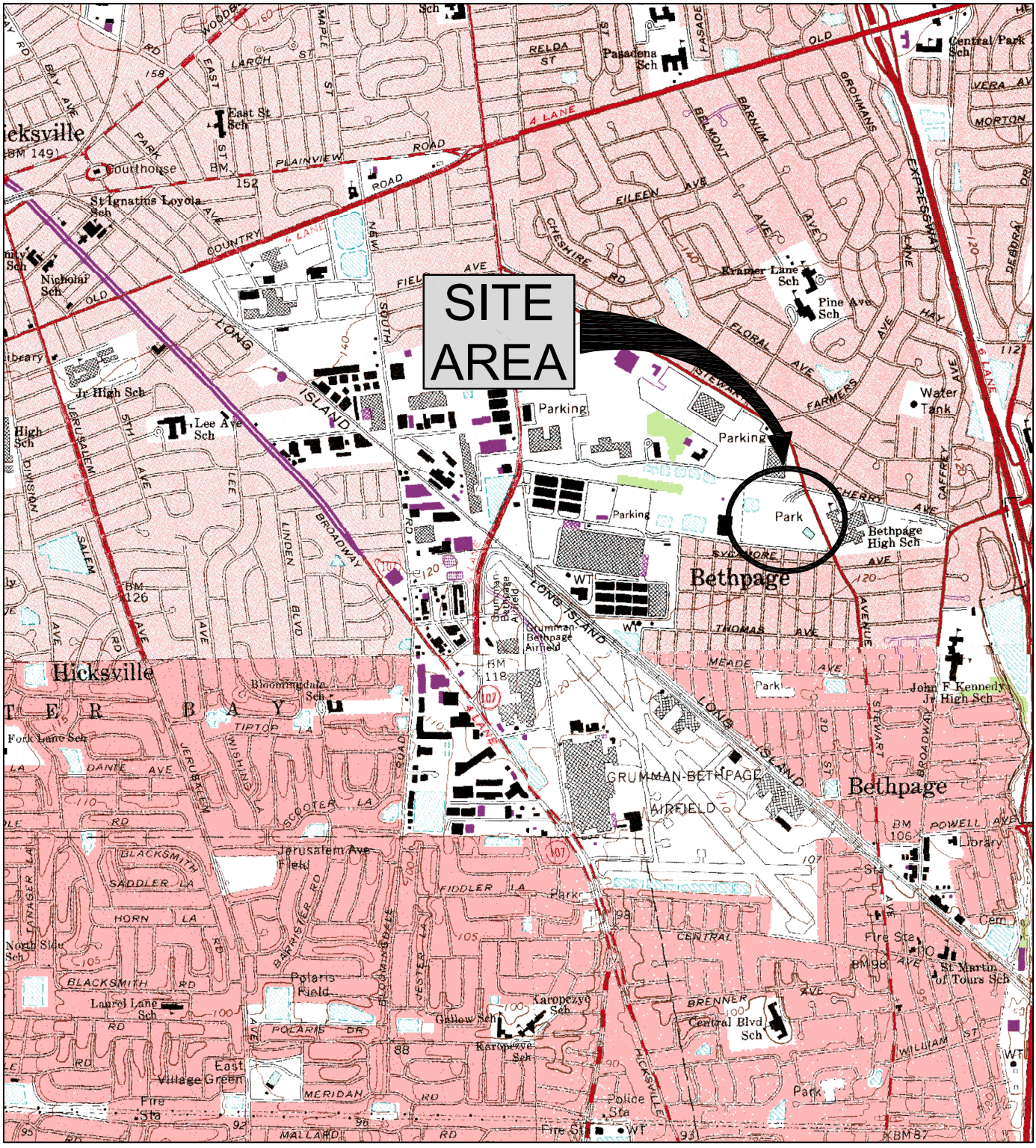
ASP Analytical services protocol.

SCGs Standards, criteria, and guidance values.

ug/L Micrograms per liter.

-- Not analyzed.

< 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
USGS 7.5 MIN. HUNTINGTON QUADRANGLE, HUNTINGTON, NY. 1967, PHOTOREVISED 1979

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

SITE AREA LOCATION

ARCADIS

FIGURE
1

CITY:MELVILLE DIV/GROUP:ENR1 DB:ALS LD: PIC: PM:CSG TM:BW LYR:ON=*;OFF=*REF*
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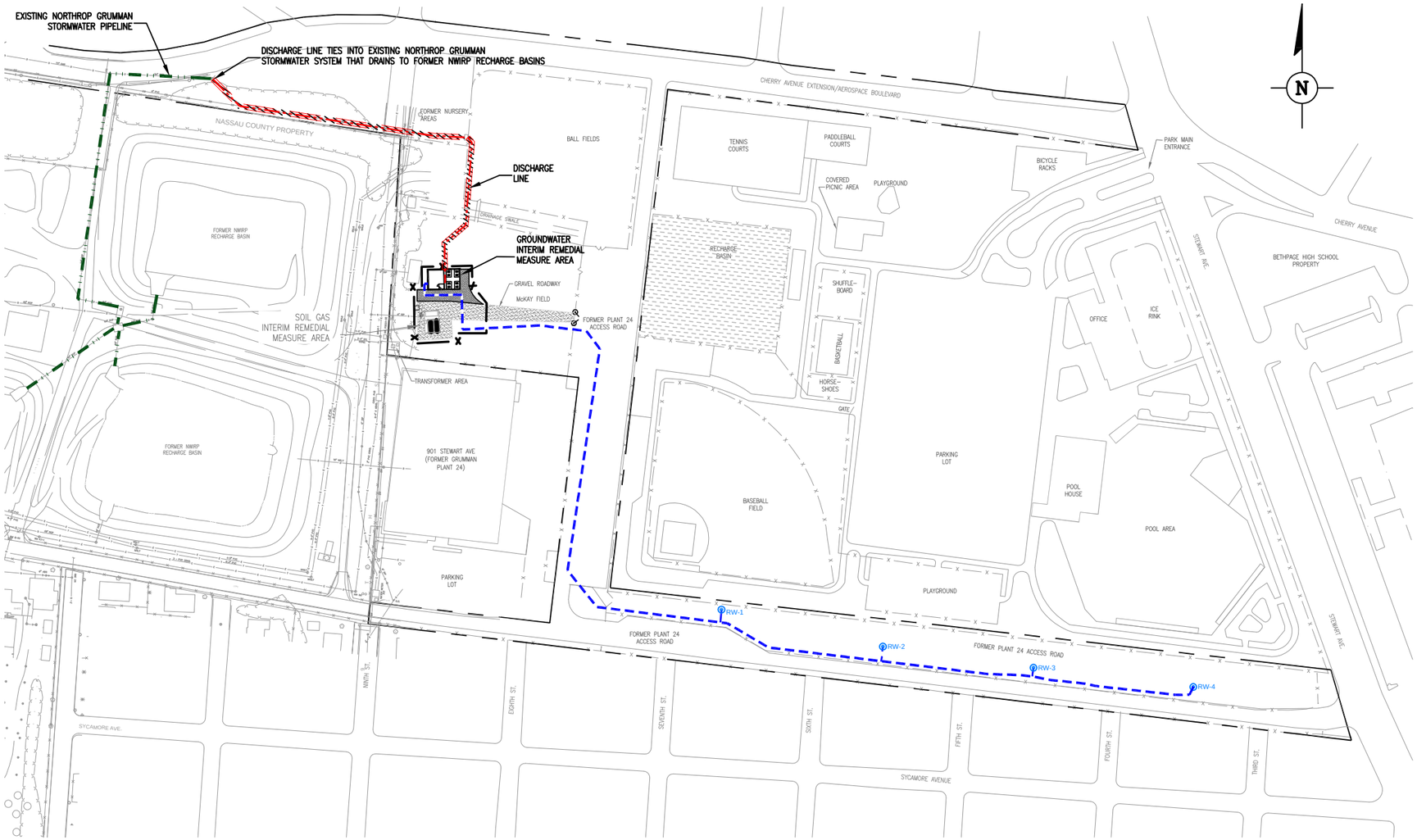

GROUNDWATER INTERIM REMEDIAL MEASURE
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

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*
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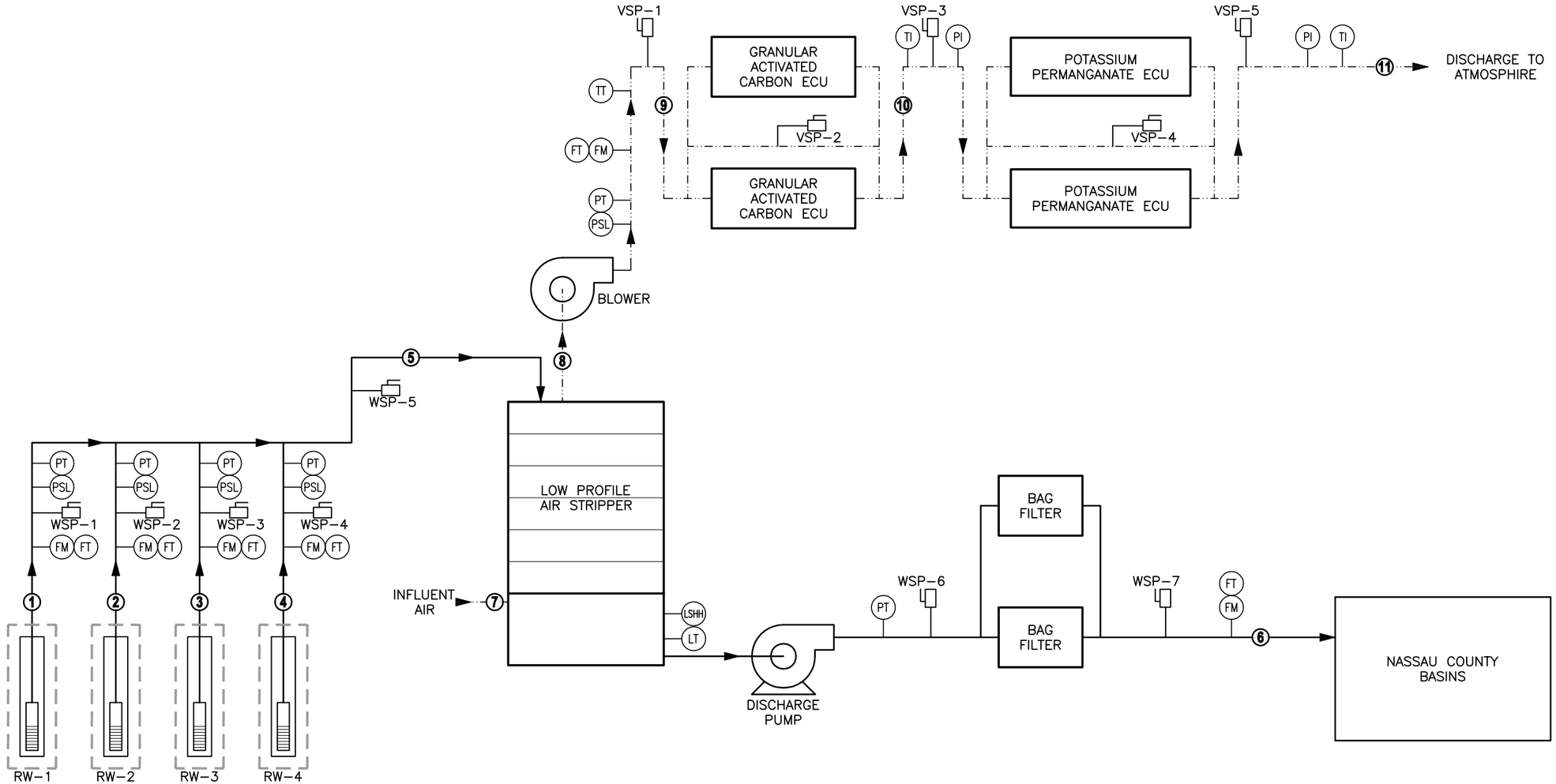

LEGEND:

- 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)
BETHPAGE, NEW YORK

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

ARCADIS

FIGURE
3

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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PLOTTED: 11/12/2010 3:02 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: NY001491.0000.00012

CHERRY AVENUE EXTENSION/AEROSPACE BOULEVARD

B30MW-1 (75.41)

FORMER NURSERY AREAS

BALL FIELDS

TENNIS COURTS

PADDLEBALL COURTS

PLAYGROUND

BICYCLE RACKS

PARK MAIN ENTRANCE

COVERED PICNIC AREA

gravel

stones

(76.00) B24MW-2

DRAINAGE SWALE

RECHARGE BASIN

OU-3 GROUNDWATER INTERIM REMEDIAL MEASURE TREATMENT BUILDINGS

McKAY FIELD

ACCESS ROAD

OU-3 SOIL GAS INTERIM REMEDIAL MEASURE TREATMENT BUILDINGS

(75.05) BCPMW-1

SHUFFLEBOARD

BASKETBALL

HORSESHOES

GATE

LIPA TRANSFORMER

901 STEWART AVE (FORMER GRUMMAN PLANT 24)

PARKING LOT

BASEBALL FIELD

BCPMW-5-1 (74.46)

BCPMW-3 (73.94)

BCPMW-2 (74.16)

PZ-5A

(74.27) PZ-5B

RW-1 (72.72)

B24MW-3 (74.44)

BCPMW-4-1 (73.70)

BCPMW-4-2

BCPMW-4-3

(73.54) PZ-1A

PZ-1B

PZ-1C

PZ-2A (73.45)

PZ-2B

PZ-2C

RW-2 (65.41)

(73.42) PZ-4

PZ-3 (73.28)

FORMER GRUMMAN PLANT 24 ACCESS ROAD PROPERTY

(69.70) RW-3

PZ-6A (73.37)

PZ-6B

BCPMW-6-1 (73.58)

BCPMW-6-2 (73.67)

PZ-7A

PZ-7B

RW-4 (72.13)

BCPMW-7-1 (73.62)

BETHPAGE HIGH SCHOOL PROPERTY

OFFICE

ICE RINK

monument

conc.

POOL HOUSE

POOL AREA

PLAYGROUND

MW-200-1 (73.69)

(73.48) MW-201-1

MW-202-1 (73.46)

MW-203-1 (73.43)

SYCAMORE AVENUE

EIGHTH ST.

SEVENTH ST.

SIXTH ST.

FIFTH ST.

FOURTH ST.

THIRD ST.

STEWART AVE.

CHERRY

75

76

74

73

69

71

67

N

EXPLANATION:

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

NOTES:

1. 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.

0 100' 200'

SCALE IN FEET

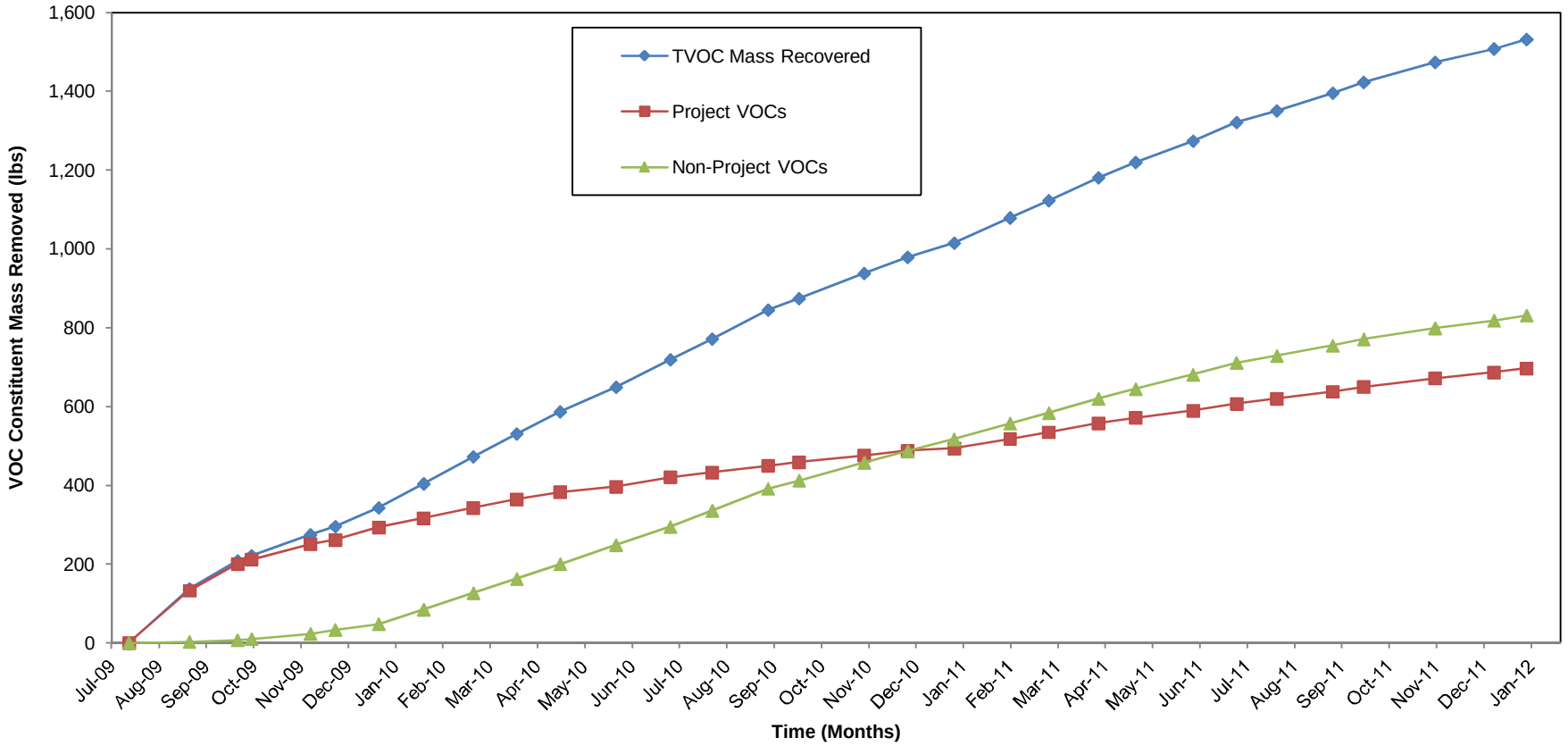
NORTHROP GRUMMAN SYSTEMS CORPORATION
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLINGONDS)
BETHPAGE, NEW YORK

GROUNDWATER MONITORING WELL NETWORK AND CONFIGURATION OF THE SHALLOW POTENTOMETRIC SURFACE AND GROUNDWATER FLOW DIRECTIONS FOURTH QUARTER 2011

ARCADIS

FIGURE 4

CITY:(Read) DIV/GROUP:(Read) DB:(Read) LD:(Opt) PIC:(Opt) PM:(Read) TM:(Opt) LYR:(On)(On)=*;OFF=*REF*
G:\ENVCAD\Arcgis\e-NY\ACTIVITY\01486\111\2\GWSM\2011 4th Qtr\NY1486_111_2_GWSM FO4.dwg LAYOUT: 4 SAVED: 3/23/2012 10:49 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: --- PLOTTED: 3/23/2012 12:12 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ---
Xref_01



Notes:

VOC = Volatile organic compound.

lbs = Pounds.

Total VOCs = Sum of VOCs detected.

Project VOCs = Sum of 1,1,1-Trichloroethane; 1,1-Dichloroethane; 1,2-Dichloroethane; 1,1-Dichloroethene; Tetrachloroethene; Trichloroethene; Vinyl Chloride; cis-1,2-Dichloroethene; trans-1,2-Dichloroethene; Benzene; Toluene: and Total Xylenes.

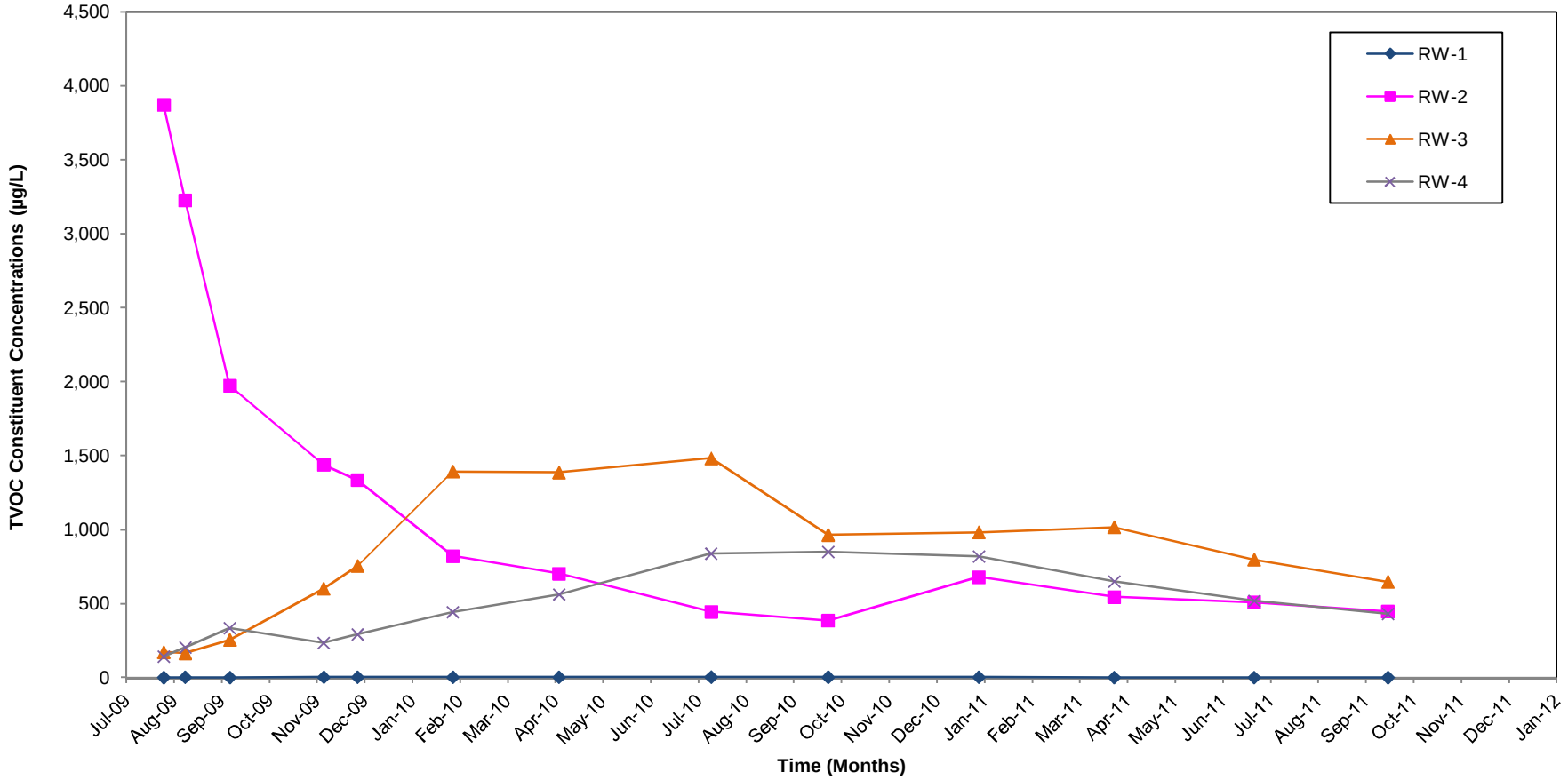
Non-Project VOCs = Sum of Total VOCs that are not Project VOCs.

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

CUMULATIVE TOTAL, PROJECT, AND NON-PROJECT VOC MASS REMOVED THROUGH DECEMBER 2011

ARCADIS

FIGURE 5



Notes:

VOC = Volatile organic compound.

µg/L = Micrograms per liter.

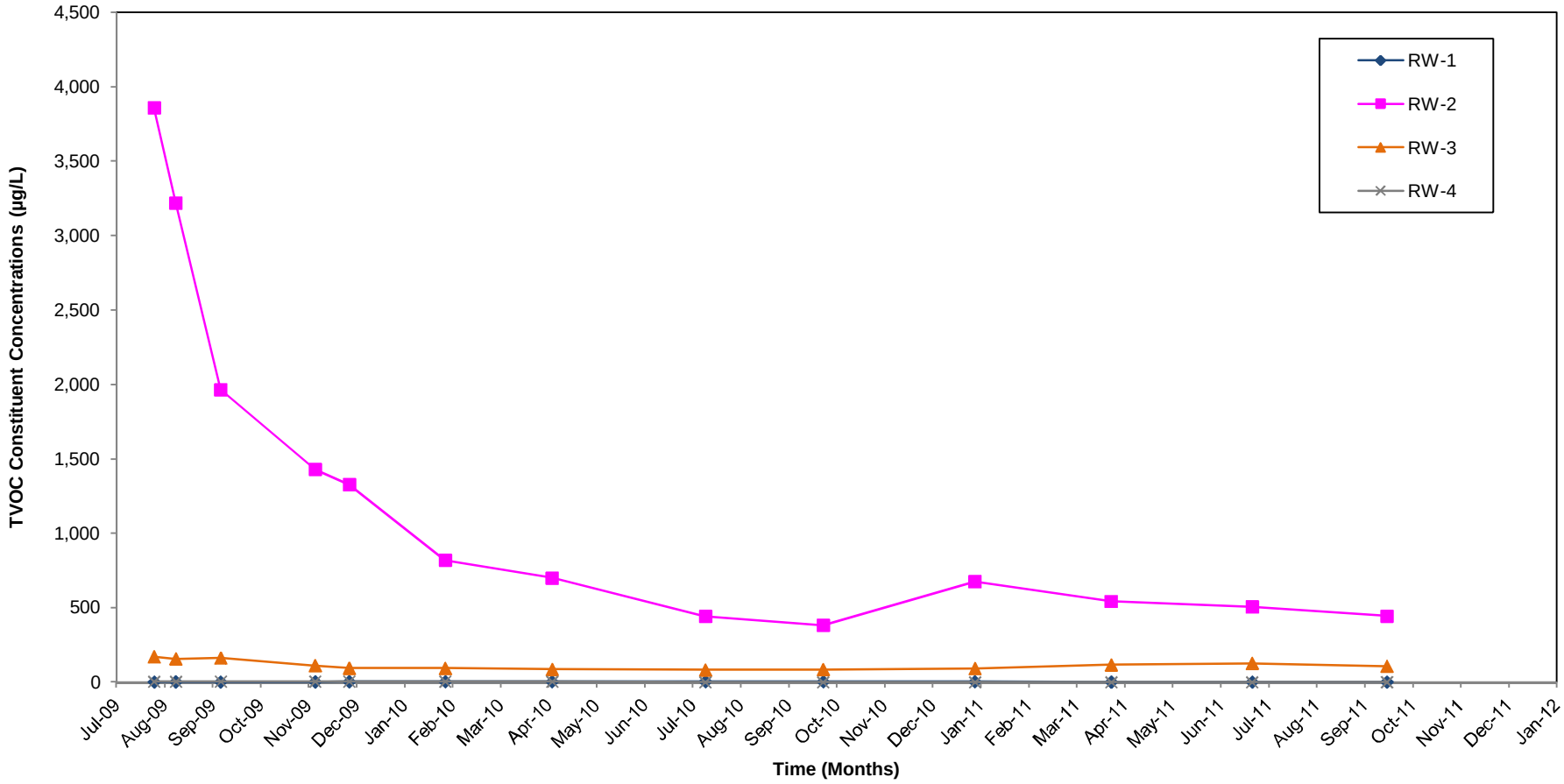
Total VOCs = Sum of VOCs detected.

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

REMEDIAL WELL TOTAL VOC CONCENTRATIONS THROUGH DECEMBER 2011

ARCADIS

FIGURE 6A



Notes:
VOC = Volatile organic compound.

µg/L = Micrograms per liter.

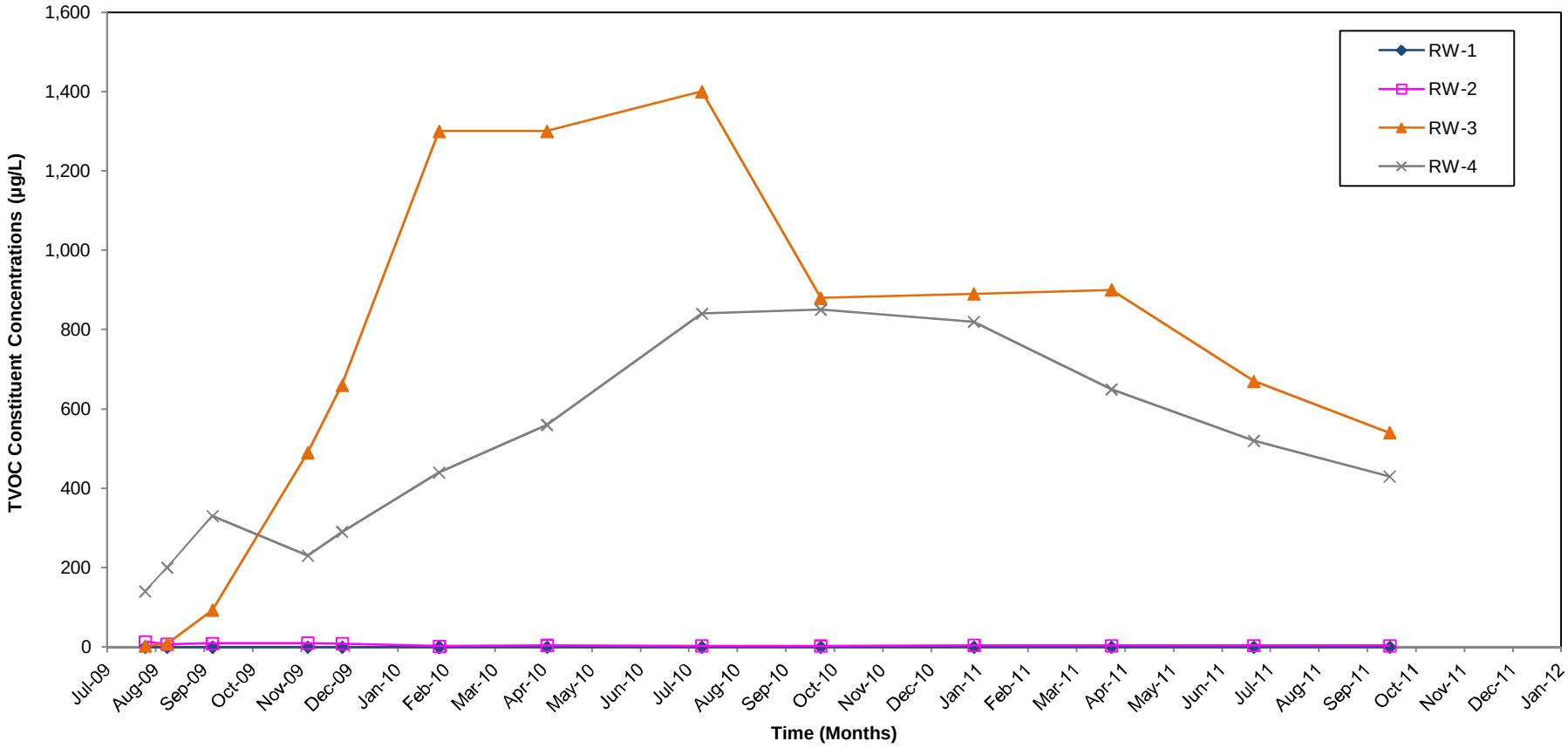
Project VOCs = Sum of 1,1,1-Trichloroethane; 1,1-Dichloroethane; 1,2- Dichloroethane; 1,1-Dichloroethene; Tetrachloroethene; Trichloroethene; Vinyl Chloride; cis-1,2-Dichloroethene; trans-1,2-Dichloroethene; Benzene; Toluene: and Total Xylenes.

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

REMEDIAL WELL PROJECT VOC CONCENTRATIONS THROUGH DECEMBER 2011

ARCADIS

FIGURE 6B



Notes:

VOC = Volatile organic compound.

µg/L = Micrograms per liter.

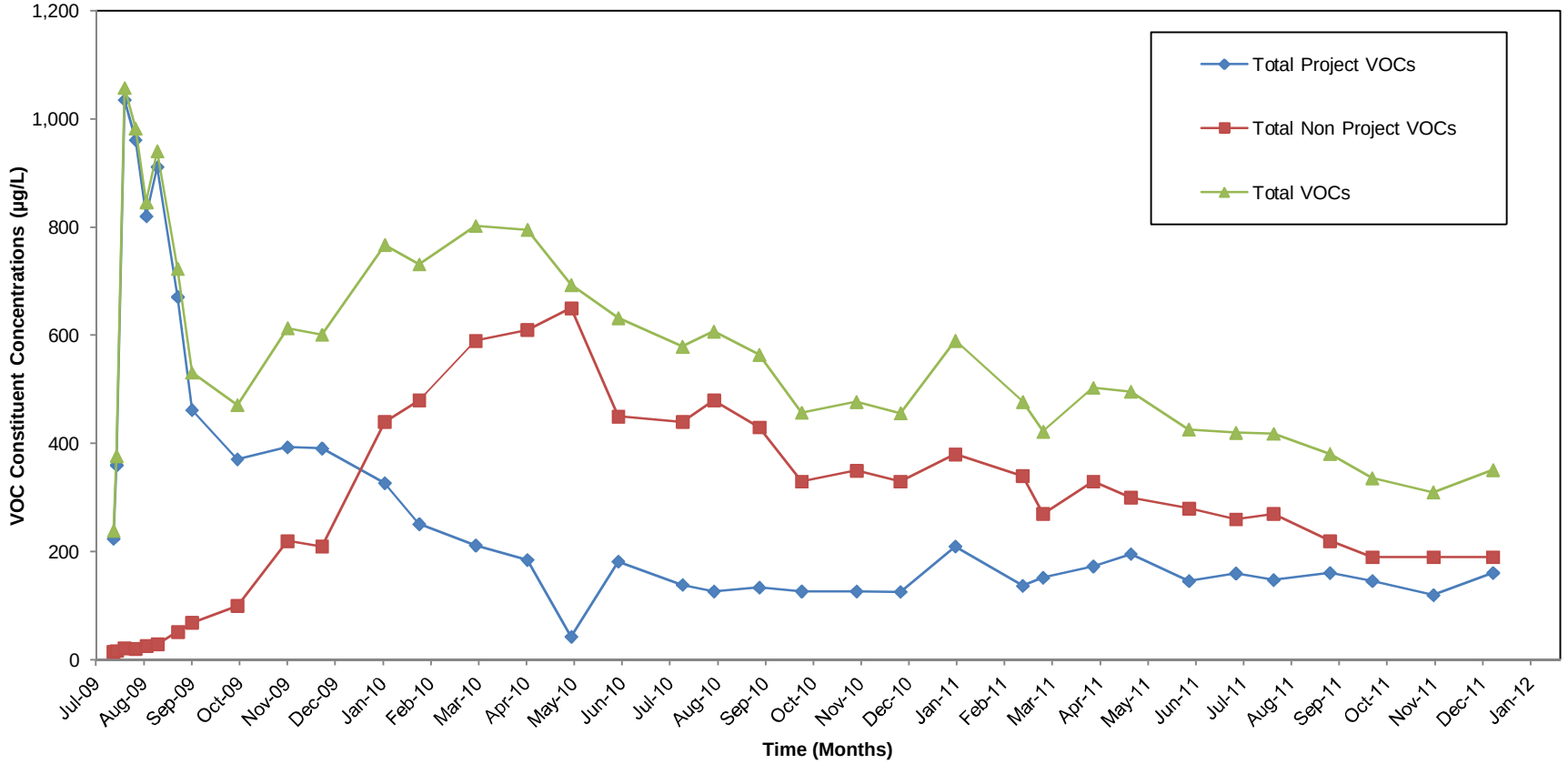
Non-Project VOCs = Sum of Total VOCs that are not Project VOCs.

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

REMEDIAL WELL NON-PROJECT VOC CONCENTRATIONS THROUGH DECEMBER 2011

ARCADIS

FIGURE
6C



Notes:
VOC = Volatile organic compound.

ug/L = Microgram per liter.

Total VOCs = Sum of VOCs detected.

Project VOCs = Sum of 1,1,1-Trichloroethane; 1,1-Dichloroethane; 1,2-Dichloroethane; 1,1-Dichloroethene; Tetrachloroethene; Trichloroethene; Vinyl Chloride; cis-1,2-Dichloroethene; trans-1,2-Dichloroethene; Benzene; Toluene: and Total Xylenes.

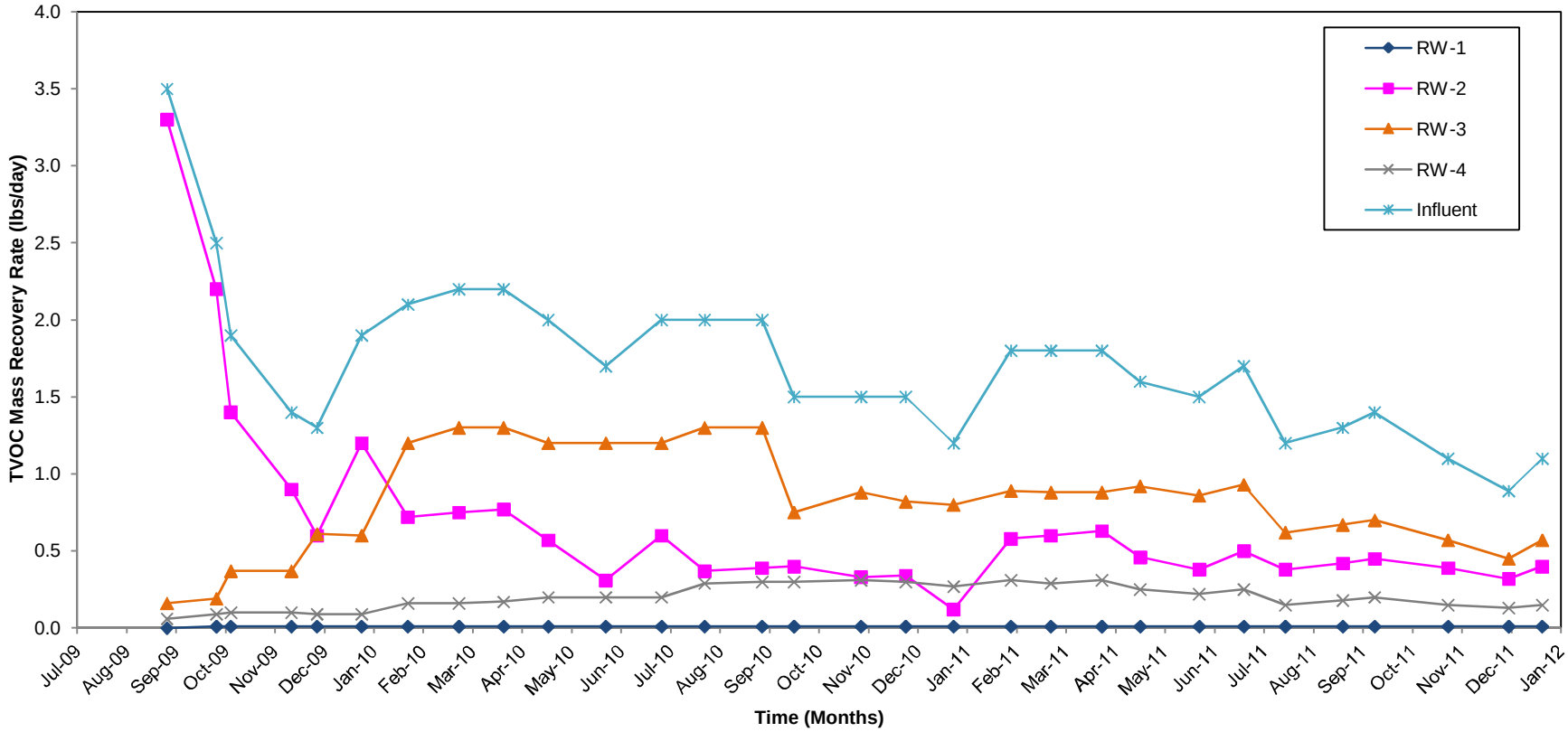
Non-Project VOCs = Sum of Total VOCs that are not Project VOCs.

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

INFLUENT TOTAL, PROJECT, AND NON-PROJECT VOC CONCENTRATIONS THROUGH DECEMBER 2011

ARCADIS

FIGURE
7



Notes:
VOC = Volatile organic compound.

lbs/day = Pounds per day.

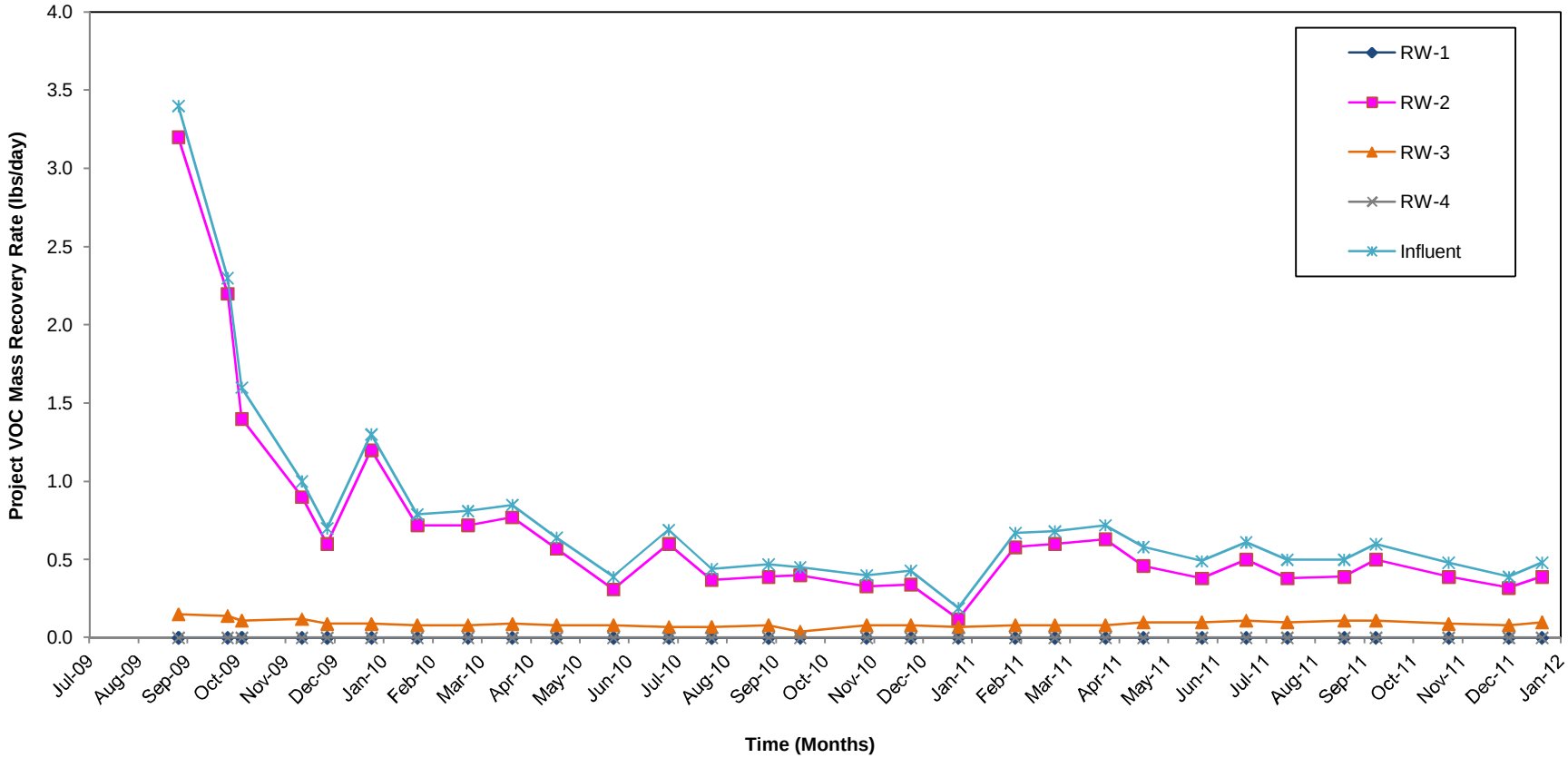
Total VOCs = Sum of VOCs detected.

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

TOTAL VOC MASS RECOVERY RATES THROUGH DECEMBER 2011

ARCADIS

FIGURE
8A



Notes:

VOC = Volatile organic compound.

lbs/day = Pounds per day.

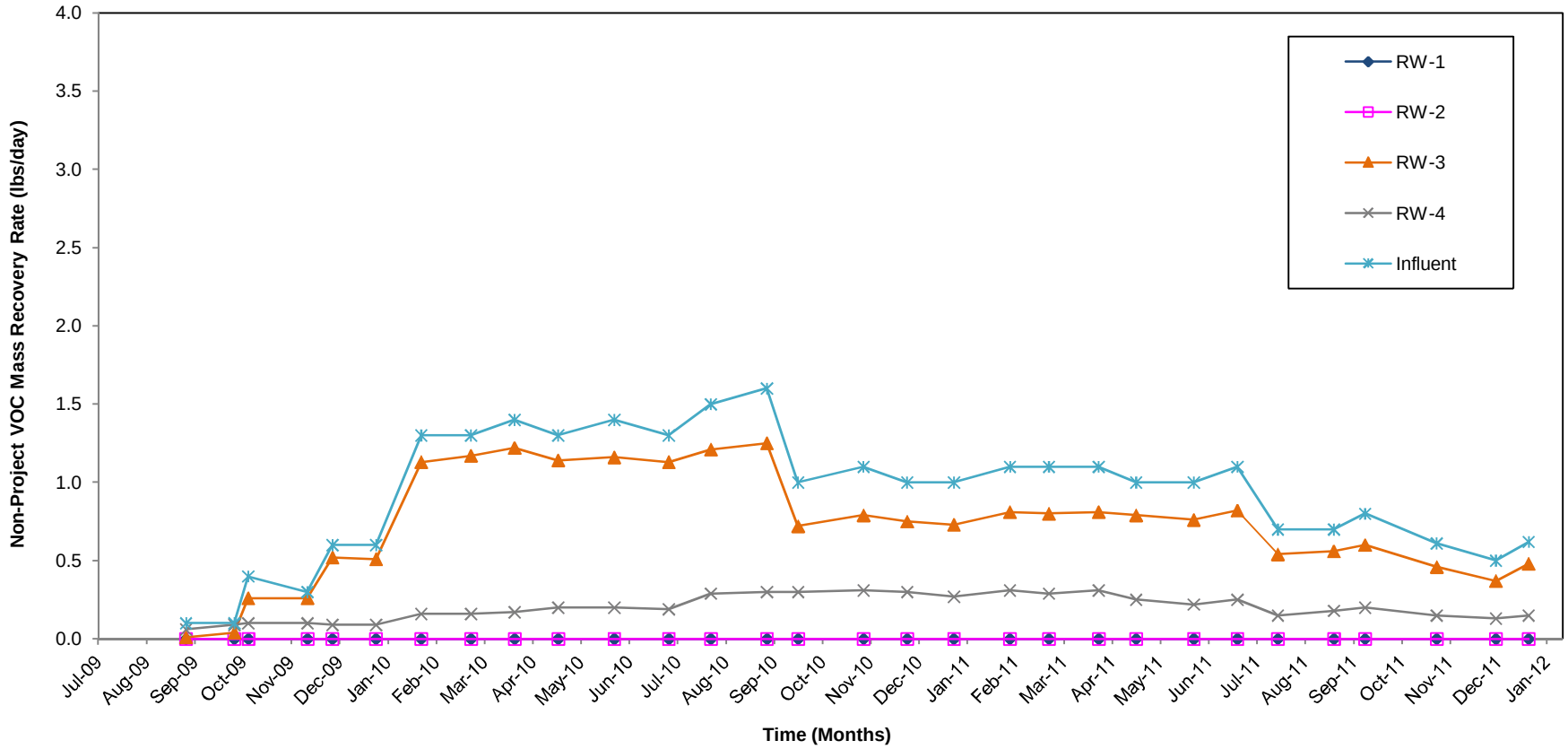
Project VOCs = Sum of 1,1,1-Trichloroethane; 1,1-Dichloroethane; 1,2- Dichloroethane; 1,1-Dichloroethene; Tetrachloroethene; Trichloroethene; Vinyl Chloride; cis-1,2-Dichloroethene; trans-1,2-Dichloroethene; Benzene; Toluene: and Total Xylenes.

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

PROJECT VOC MASS RECOVERY RATES THROUGH DECEMBER 2011

ARCADIS

FIGURE 8B



Notes:

VOC = Volatile organic compound.

lbs/day = Pounds per day.

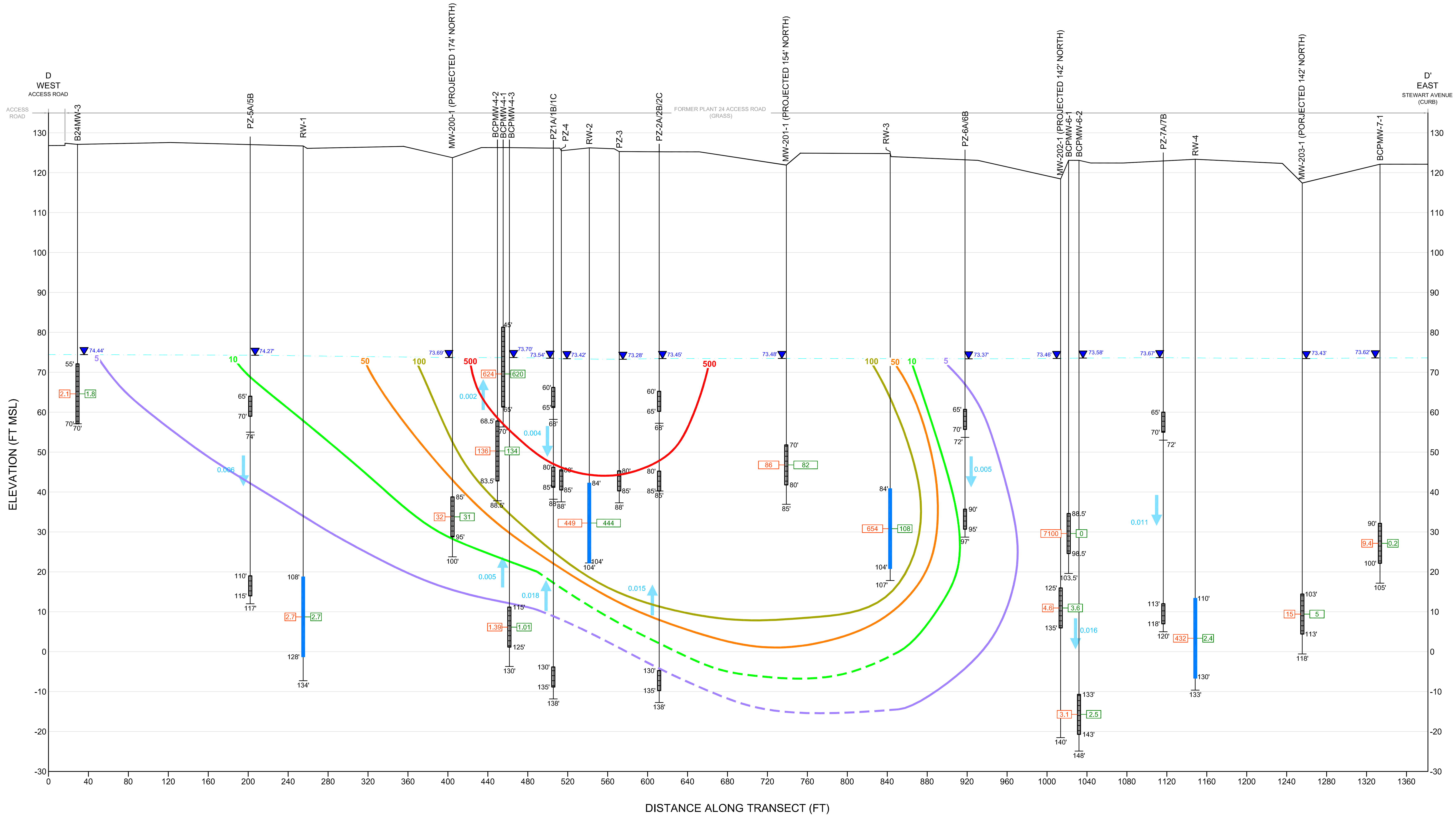
Non-Project VOCs = Sum of Total VOCs that are not Project VOCs.

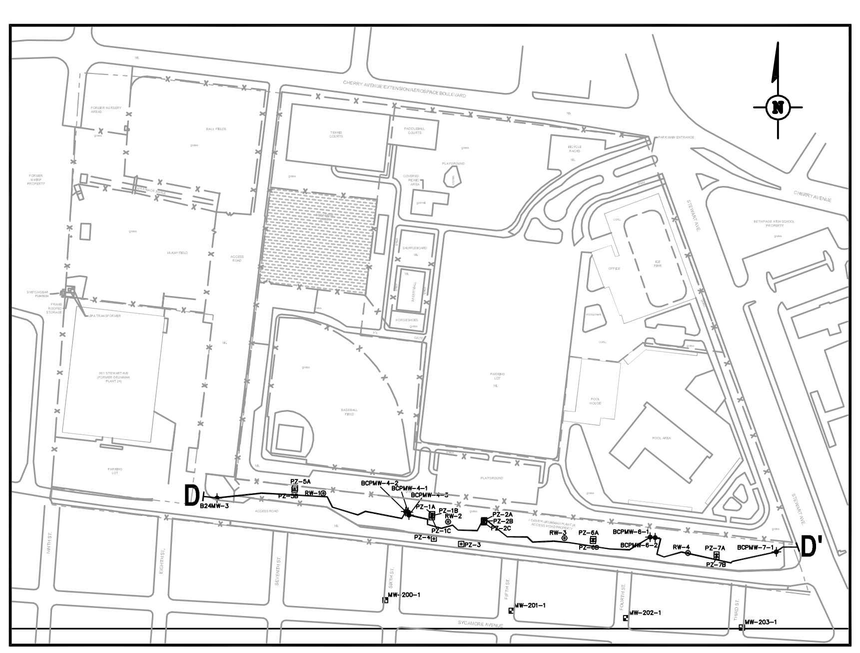
GROUNDWATER INTERIM REMEDIAL MEASURE
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

NON-PROJECT VOC MASS RECOVERY RATES THROUGH DECEMBER 2011

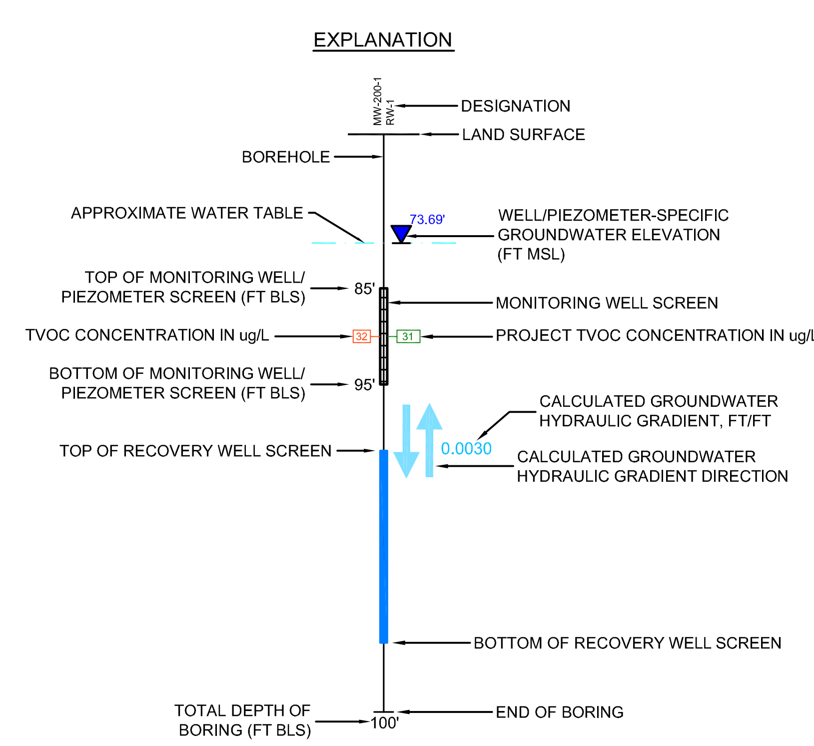
ARCADIS

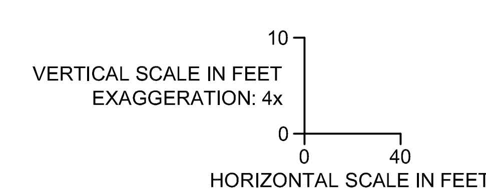
FIGURE
8C





KEY PLAN
SHOWING CROSS SECTION D-D'





DEFINITIONS:
FT - FEET
MSL - MEAN SEA LEVEL
TCE - TRICHLOROETHENE
ug/L - MICROGRAMS PER LITER
TVOC - TOTAL VOLATILE ORGANIC COMPOUND

DEFINITION OF CONTOURS
(DASHED WHERE INFERRED)

- 5 — 5 µg/L
- 10 — 10 µg/L
- 50 — 50 µg/L
- 100 — 100 µg/L
- 500 — 500 µg/L
- 1,000 — 1,000 µg/L

NOTES:

1. WATER LEVEL ELEVATIONS CALCULATED FROM DATA COLLECTED ON OCTOBER 26, 2011.
2. MONITORING WELL TVOC/PROJECT TVOC DATA FROM THE OCTOBER 2011 SAMPLING ROUND. RESULT REPRESENTATIVE OF ENTIRE WELL SCREEN INTERVAL.
3. CONTOURS ARE BASED ON PROJECT TVOC DATA, SEE TABLE 11.
4. THE GROUNDWATER INTERIM REMEDIAL MEASURE (IRM) HAS BEEN DESIGNED TO ADDRESS GROUNDWATER THAT HAS TVOC CONCENTRATIONS GREATER THAN 5 µg/L IN THE UPPER 20 FEET OF THE SURFICIAL AQUIFER AND GROUNDWATER BELOW THE UPPER 20 FEET OF THE SURFICIAL AQUIFER THAT HAS TVOC CONCENTRATIONS GREATER THAN 50 µg/L.
5. PROJECT VOCS ARE VOCS THAT MAY BE RELATED TO FORMER GRUMMAN HISTORICAL ACTIVITIES. NON-PROJECT VOCS ARE VOCS THAT ARE NOT RELATED TO FORMER GRUMMAN ACTIVITIES BUT HAVE BEEN DETECTED IN THE SITE AREA. PLEASE REFER TO THE REPORT TABLES FOR LISTS OF PROJECT AND NON-PROJECT VOCS.

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

CROSS SECTION D-D' SHOWING TVOCs IN GROUNDWATER AND DIRECTION OF VERTICAL GROUNDWATER HYDRAULIC GRADIENTS FOURTH QUARTER 2011

ARCADIS

FIGURE 9

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	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/Annual	--
RW-02	6	84	104	20	104	Steel/SS	Quarterly	Baseline/Quarterly	Baseline/Annual	--
RW-03	8	84	104	20	107	Sch. 80 PVC/SS	Quarterly	Baseline/Quarterly	Baseline/Annual	--
RW-04	8	110	130	20	133	Sch. 80 PVC/SS	Quarterly	Baseline/Quarterly	Baseline/Annual	--

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	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 the 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 the 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: Cadmium and Chromium using USEPA Method 6010.
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 (Table B-1) and some of the analyses and/or frequencies may be modified based on review of short-term and/or long-term testing results. (e.g. the Cd/Cr sampling frequency was changed from quarterly to annually in 2011).

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.

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
	Cadmium and Chromium (USEPA 6010)[11]	---			
Remedial Well 2 (WSP-2)	VOCs (NYSDEC 2000 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010)	Bi-Weekly	Annually	Annually	NA
	Cadmium and Chromium (USEPA 6010)[11]	---			
Remedial Well 3 (WSP-3)	VOCs (NYSDEC 2000 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010)	Bi-Weekly	Annually	Annually	NA
	Cadmium and Chromium (USEPA 6010)[11]	---			
Remedial Well 4 (WSP-4)	VOCs (NYSDEC 2000 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010)	Bi-Weekly	Annually	Annually	NA
	Cadmium and Chromium (USEPA 6010)[11]	---	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
	Mercury (USEPA 7470) [7]	**1-hr [6]; Days 1, 3, & Weekly**	**Monthly**	**Monthly**	NA
	pH (field) [8]	**1-hr [6]; Days 1, 3, & Weekly**	**Monthly**	**Monthly**	NA
Air Samples [9] [10]					
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.

(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. The 1-hr pilot test samples were also analyzed for Mercury (Hg).

(7) Per the interim treated effluent (water) discharge criteria provided in the NYSDEC letter dated March 19, 2009 (NYSDEC 2009a), select samples are being analyzed for Mercury (Hg). However, this analyte is not expected to be a long-term analyte since it is not a site contaminant of concern.

(8) As authorized by the NYSDEC, the pH monitoring frequency was reduced from weekly to monthly beginning on February 8, 2010.

(9) 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).

(10) Additional air samples will be collected to help calculate media usage rates and to help determine media changeout frequencies.

(11) Cadium and Chromium analyses are part of the Environmental Effectiveness Monitoring Program (Table A-1) and are shown here for consistency.

Acronyms\Key:

NA	Not applicable.
---	Not Required
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 - October 3, 2011, 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 10/3/2011	WSP-02 RW-2 10/3/2011	WSP-03 RW-3 10/3/2011	WSP-04 RW-4 10/3/2011	WSP-05 Influent 10/3/2011	WSP-05 dup. Influent 10/3/2011	WSP-07 Effluent 10/3/2011
Volatile Organic Compounds								
1,1,1-Trichloroethane		< 5 U	**0.73 J**	< 25 U	< 13 U	**0.24 J**	**0.25 J**	< 5 U
1,1,2,2-Tetrachloroethane		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
1,1,2-Trichloroethane		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
1,1-Dichloroethane		< 5 U	**2.0 J**	< 25 U	**0.55 J**	**0.70 J**	**0.65 J**	< 5 U
1,1-Dichloroethene		< 5 U	**1.7 J**	< 25 U	< 13 U	**0.65 J**	**0.75 J**	< 5 U
1,2-Dichloroethane		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
2-Butanone (MEK)		< 50 U	< 130 U	< 250 U	< 130 U	< 50 U	< 50 U	< 50 U
2-Hexanone (MBK)		< 50 U	< 130 U	< 250 U	< 130 U	< 50 U	< 50 U	< 50 U
4-methyl-2-pentanone (MIBK)		< 50 U	< 130 U	< 250 U	< 130 U	< 50 U	< 50 U	< 50 U
Acetone		< 50 U	< 130 UB	< 250 U	< 130 U	< 50 U	< 50 UB	< 50 UB
Benzene		< 0.7 U	< 1.8 U	< 3.5 U	< 1.8 U	< 0.7 U	< 0.7 U	< 0.7 U
Bromodichloromethane		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Bromoform		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Bromomethane		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Carbon Disulfide		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Carbon tetrachloride		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Chlorobenzene		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Chlorodifluoromethane (Freon 22)		< 5 U	**0.6 J**	**540**	**430**	**190 D**	**200 D**	< 5 U
Chloroethane		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Chloroform		< 5 U	**1.1 J**	**5.5 J**	< 13 U	**1.8 J**	**2.0 J**	< 5 U
Chloromethane		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
cis-1,2-dichloroethene		**0.94 J**	**280**	**92**	**0.63 J**	**100**	**100**	< 5 U
cis-1,3-dichloropropene		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Dibromochloromethane		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Dichlorodifluoromethane (Freon 12)		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Ethylbenzene		< 5 U	**2.5 J**	< 25 U	< 13 U	**0.55 J**	**0.69 J**	< 5 U
Methyl tert-Butyl Ether		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Methylene Chloride		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Styrene		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Tetrachloroethene		< 5 U	**0.58 J**	< 25 U	**1.2 J**	**0.35 J**	**0.41 J**	< 5 U
Toluene		< 5 U	**72**	< 25 U	< 13 U	**18**	**19**	< 5 U
trans-1,2-dichloroethene		< 5 U	**0.63 J**	**1.8 J**	< 13 U	< 5 U	**0.25 J**	< 5 U
trans-1,3-dichloropropene		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Trichloroethylene		**1.8 J**	**25**	**7.5 J**	< 13 U	**8.8**	**9.0**	< 5 U
Trichlorofluoromethane (Freon 11)		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Trichlorotrifluoroethane (Freon 113)		< 5 U	< 13 U	< 25 U	< 13 U	< 5 U	< 5 U	< 5 U
Vinyl Chloride		< 2 U	**55**	**7.1 J**	< 5 U	**16**	**17**	< 2 U
Xylene-o		< 5 U	**2.6 J**	< 25 U	< 13 U	**0.69 J**	**0.66 J**	< 5 U
Xylenes - m,p		< 5 U	**4.2 J**	< 25 U	< 13 U	**1.0 J**	**1.1 J**	< 5 U
Subtotal VOCs [4]		**3**	**449**	**654**	**432**	**339**	**352**	0
Tentatively Identified Compounds		ND	ND	ND	ND	ND	ND	ND
Subtotal TICs [5]		0	0	0	0	0	0	0
Total VOCs [6]		**3**	**449**	**654**	**432**	**339**	**352**	0

See notes on last page.

Table B-2. Water Sample Analytical Results - October 3, 2011, 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 10/3/2011	WSP-02 RW-2 10/3/2011	WSP-03 RW-3 10/3/2011	WSP-04 RW-4 10/3/2011	WSP-05 Influent 10/3/2011	WSP-05 dup. Influent 10/3/2011	WSP-07 Effluent 10/3/2011
Metals								
Cadmium (Dissolved)		--	--	--	--	--	--	--
Cadmium (Total)		--	--	--	--	--	--	--
Chromium (Dissolved)		--	--	--	--	--	--	--
Chromium (Total)		--	--	--	--	--	--	--
Iron (Dissolved)		< 100 U	**640**	**110**	< 100 U	**200**	--	**140**
Iron (Total)		< 100 U	**1,640**	**460**	< 100 U	**2,770**	--	**880**
Manganese (Dissolved)		--	--	--	--	--	--	--
Manganese (Total)		--	--	--	--	--	--	--
Mercury (Dissolved)		--	--	--	--	--	--	--
Mercury (Total)		--	--	--	--	--	--	< 0.2 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 VOCs detected. Values shown have been rounded to the nearest whole number.

(5) "Subtotal TICs" represents the sum of individual TICs detected. Values shown have been rounded to the nearest whole number.

(6) "Total VOCs" represent the sum of VOCs and TICs detected. Values shown have been rounded to the nearest whole number.

Acronyms\Key:

Bold value indicates a detection.

D	Compound reported from the dailuted analysese as the concentration in the initial analysis was outside the calibration range.
dup.	Duplicate.
J	Estimated value.
ND	TIC not detected.
OM&M	Operation, maintenance and monitoring.
TIC	Tentatively identified compound.
UB	Compound considered non-detect due to associated blank contamination.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
ug/L	Micrograms per liter.
--	Not analyzed.
< 5 U	Compound not detected above its laboratory quantification limit.

Table B-3. Water Sample Analytical Results - November 11, 2011, 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 11/11/2011	WSP-02 RW-2 11/11/2011	WSP-03 RW-3 11/11/2011	WSP-04 RW-4 11/11/2011	WSP-05 Influent 11/11/2011	WSP-07 Effluent 11/11/2011
Volatile Organic Compounds							
1,1,1-Trichloroethane		--	--	--	--	< 5 U	< 5 U
1,1,2,2-Tetrachloroethane		--	--	--	--	< 5 U	< 5 U
1,1,2-Trichloroethane		--	--	--	--	< 5 U	< 5 U
1,1-Dichloroethane		--	--	--	--	**0.68 J**	< 5 U
1,1-Dichloroethene		--	--	--	--	**0.54 J**	< 5 U
1,2-Dichloroethane		--	--	--	--	< 5 U	< 5 U
1,2-Dichloropropane		--	--	--	--	< 5 U	< 5 U
2-Butanone (MEK)		--	--	--	--	< 50 U	< 50 U
2-Hexanone (MBK)		--	--	--	--	< 50 U	< 50 U
4-methyl-2-pentanone (MIBK)		--	--	--	--	< 50 U	< 50 U
Acetone		--	--	--	--	< 50 U	**1.2 J**
Benzene		--	--	--	--	< 0.7 U	< 0.7 U
Bromodichloromethane		--	--	--	--	< 5 U	< 5 U
Bromoform		--	--	--	--	< 5 U	< 5 U
Bromomethane		--	--	--	--	< 5 U	< 5 U
Carbon Disulfide		--	--	--	--	< 5 U	< 5 U
Carbon tetrachloride		--	--	--	--	< 5 U	< 5 U
Chlorobenzene		--	--	--	--	< 5 U	< 5 U
Chlorodifluoromethane (Freon 22)		--	--	--	--	**190 D**	< 5 U
Chloroethane		--	--	--	--	< 5 U	< 5 U
Chloroform		--	--	--	--	**2.2 J**	< 5 U
Chloromethane		--	--	--	--	< 5 U	< 5 U
cis-1,2-dichloroethene		--	--	--	--	**79**	< 5 U
cis-1,3-dichloropropene		--	--	--	--	< 5 U	< 5 U
Dibromochloromethane		--	--	--	--	< 5 U	< 5 U
Dichlorodifluoromethane (Freon 12)		--	--	--	--	< 5 U	< 5 U
Ethylbenzene		--	--	--	--	**0.38 J**	< 5 U
Methyl tert-Butyl Ether		--	--	--	--	< 5 U	< 5 U
Methylene Chloride		--	--	--	--	< 5 U	< 5 U
Styrene		--	--	--	--	< 5 U	< 5 U
Tetrachloroethene		--	--	--	--	**0.33 J**	< 5 U
Toluene		--	--	--	--	**14**	< 5 U
trans-1,2-dichloroethene		--	--	--	--	< 5 U	< 5 U
trans-1,3-dichloropropene		--	--	--	--	< 5 U	< 5 U
Trichloroethylene		--	--	--	--	**8.4**	< 5 U
Trichlorofluoromethane (Freon 11)		--	--	--	--	< 5 U	< 5 U
Trichlorotrifluoroethane (Freon 113)		--	--	--	--	< 5 U	< 5 U
Vinyl Chloride		--	--	--	--	**16**	< 2 U
Xylene-o		--	--	--	--	**0.61 J**	< 5 U
Xylenes - m,p		--	--	--	--	**0.76 J**	< 5 U
Subtotal VOCs [4]		--	--	--	--	**313**	**1**
Tentatively Identified Compounds		--	--	--	--	ND	ND
Subtotal TICs [5]		--	--	--	--	0	0
Total VOCs [6]		--	--	--	--	**313**	**1**

See notes on last page.

Table B-3. Water Sample Analytical Results - November 11, 2011, 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 11/11/2011	WSP-02 RW-2 11/11/2011	WSP-03 RW-3 11/11/2011	WSP-04 RW-4 11/11/2011	WSP-05 Influent 11/11/2011	WSP-07 Effluent 11/11/2011
Metals							
Cadmium (Dissolved)		< 5 U	< 5 U	< 5 U	< 5 U	--	< 5 U
Cadmium (Total)		< 5 U	< 5 U	< 5 U	< 5 U	--	< 5 U
Chromium (Dissolved)		**24**	< 10 U	< 10 U	< 10 U	--	< 10 U
Chromium (Total)		**23**	< 10 U	< 10 U	< 10 U	--	< 10 U
Iron (Dissolved)		--	**540**	< 100 U	< 100 U	**130**	**140**
Iron (Total)		--	**750**	**460**	< 100 U	**640**	**330**
Manganese (Dissolved)		--	--	--	--	--	--
Manganese (Total)		--	--	--	--	--	--
Mercury (Dissolved)		--	--	--	--	--	--
Mercury (Total)		--	--	--	--	--	< 0.2 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 VOCs detected. Values shown have been rounded to the nearest whole number.

(5) "Subtotal TICs" represents the sum of individual TICs detected. Values shown have been rounded to the nearest whole number.

(6) "Total VOCs" represent the sum of VOCs and TICs detected. Values shown have been rounded to the nearest whole number.

Acronyms\Key:

Bold value indicates a detection.

D	Compound reported from the dailuted analysese as the concentration in the initial analysis was outside the calibration range.
J	Estimated value.
ND	TIC not detected.
OM&M	Operation, maintenance and monitoring.
TIC	Tentatively identified compound.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
ug/L	Micrograms per liter.
--	Not analyzed.
< 5 U	Compound not detected above its laboratory quantification limit.

Table B-4. Water Sample Analytical Results - December 19, 2011, 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-02 RW-2 12/19/2011	WSP-03 RW-3 12/19/2011	WSP-05 Influent 12/19/2011	WSP-05 dup. Influent 12/19/2011	WSP-07 Effluent 12/19/2011
Volatile Organic Compounds						
1,1,1-Trichloroethane		--	--	< 5 U	**0.22 J**	< 5 U
1,1,2,2-Tetrachloroethane		--	--	< 5 U	< 5 U	< 5 U
1,1,2-Trichloroethane		--	--	< 5 U	< 5 U	< 5 U
1,1-Dichloroethane		--	--	**0.64 J**	**0.76 J**	< 5 U
1,1-Dichloroethene		--	--	**0.54 J**	**0.46 J**	< 5 U
1,2-Dichloroethane		--	--	< 5 U	< 5 U	< 5 U
1,2-Dichloropropane		--	--	< 5 U	< 5 U	< 5 U
2-Butanone (MEK)		--	--	< 50 U	< 50 U	< 50 U
2-Hexanone (MBK)		--	--	< 50 U	< 50 U	< 50 U
4-methyl-2-pentanone (MIBK)		--	--	< 50 U	< 50 U	< 50 U
Acetone		--	--	< 50 U	< 50 U	< 50 U
Benzene		--	--	< 0.7 U	< 0.7 U	< 0.7 U
Bromodichloromethane		--	--	< 5 U	< 5 U	< 5 U
Bromoform		--	--	< 5 U	< 5 U	< 5 U
Bromomethane		--	--	< 5 U	< 5 U	< 5 U
Carbon Disulfide		--	--	< 5 U	< 5 U	< 5 U
Carbon tetrachloride		--	--	< 5 U	< 5 U	< 5 U
Chlorobenzene		--	--	< 5 U	< 5 U	< 5 U
Chlorodifluoromethane (Freon 22)		--	--	**190**	**200**	< 5 U
Chloroethane		--	--	< 5 U	< 5 U	< 5 U
Chloroform		--	--	**2.5 J**	**2.6 J**	< 5 U
Chloromethane		--	--	< 5 U	< 5 U	< 5 U
cis-1,2-dichloroethene		--	--	**100**	**100**	< 5 U
cis-1,3-dichloropropene		--	--	< 5 U	< 5 U	< 5 U
Dibromochloromethane		--	--	< 5 U	< 5 U	< 5 U
Dichlorodifluoromethane (Freon 12)		--	--	< 5 U	< 5 U	< 5 U
Ethylbenzene		--	--	**0.68 J**	**0.84 J**	< 5 U
Methyl tert-Butyl Ether		--	--	< 5 U	< 5 U	< 5 U
Methylene Chloride		--	--	< 5 U	< 5 U	< 5 U
Styrene		--	--	< 5 U	< 5 U	< 5 U
Tetrachloroethene		--	--	**0.32 J**	**0.49 J**	< 5 U
Toluene		--	--	**27**	**28**	< 5 U
trans-1,2-dichloroethene		--	--	**0.32 J**	**0.41 J**	< 5 U
trans-1,3-dichloropropene		--	--	< 5 U	< 5 U	< 5 U
Trichloroethylene		--	--	**8.4**	**8.9**	< 5 U
Trichlorofluoromethane (Freon 11)		--	--	< 5 U	< 5 U	< 5 U
Trichlorotrifluoroethane (Freon 113)		--	--	**0.21 J**	< 5 U	< 5 U
Vinyl Chloride		--	--	**21**	**21**	< 2 U
Xylene-o		--	--	**0.95 J**	**0.88 J**	< 5 U
Xylenes - m,p		--	--	**1.6 J**	**1.5 J**	< 5 U
Subtotal VOCs [4]		--	--	**354**	**366**	0
Tentatively Identified Compounds		--	--	ND	ND	ND
Subtotal TICs [5]		--	--	0	0	0
Total VOCs [6]		--	--	**354**	**366**	0

See notes on last page.

Table B-4. Water Sample Analytical Results - December 19, 2011, 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-02 RW-2 12/19/2011	WSP-03 RW-3 12/19/2011	WSP-05 Influent 12/19/2011	WSP-05 dup. Influent 12/19/2011	WSP-07 Effluent 12/19/2011
Metals						
Cadmium (Dissolved)		--	--	--	--	--
Cadmium (Total)		--	--	--	--	--
Chromium (Dissolved)		--	--	--	--	--
Chromium (Total)		--	--	--	--	--
Iron (Dissolved)		**750**	**200**	**230**	--	**260**
Iron (Total)		**930**	**280**	**390**	--	**300**
Manganese (Dissolved)		--	--	--	--	--
Manganese (Total)		--	--	--	--	--
Mercury (Dissolved)		--	--	--	--	--
Mercury (Total)		--	--	--	--	< 0.2 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 VOCs detected. Values shown have been rounded to the nearest whole number.

(5) "Subtotal TICs" represents the sum of individual TICs detected. Values shown have been rounded to the nearest whole number.

(6) "Total VOCs" represent the sum of VOCs and TICs detected. Values shown have been rounded to the nearest whole number.

Acronyms\Key:

Bold value indicates a detection.

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

Appendix C

Vapor Sample Analytical Results

Table C-1. Vapor Sample Analytical Results - October 3, 2011, 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 10/3/2011	VSP-5 Effluent 10/3/2011
Volatile Organic Compounds			
1,1,1-Trichloroethane		**3.5**	< 0.69 U
1,1,2,2-Tetrachloroethane		< 0.74 U	< 0.69 U
1,1,2-Trichloroethane		< 0.74 U	< 0.69 U
1,1-Dichloroethane		**12**	**2.5**
1,1-Dichloroethene		**8.0**	**6.2**
1,2-Dichloroethane		< 0.74 U	< 0.69 U
1,2-Dichloropropane		**1.2**	< 0.69 U
1,3-butadiene		< 0.74 U	< 0.69 U
1-Chloro-1,1-difluoroethane (Freon 142b)		< 0.74 U	< 0.69 U
2-Butanone (MEK)		< 7.4 U	< 6.9 U
2-Hexanone (MBK)		< 0.74 U	< 0.69 U
4-methyl-2-pentanone (MIBK)		< 0.74 U	< 0.69 U
Acetone		< 7.4 U	**200**
Benzene		**3.4**	**7.4**
Bromodichloromethane		**1.8**	< 0.69 U
Bromoform		**0.79**	< 0.69 U
Bromomethane		< 0.74 U	< 0.69 U
Carbon Disulfide		< 7.4 U	< 6.9 U
Carbon tetrachloride		< 0.74 U	< 0.69 U
Chlorobenzene		< 0.74 U	< 0.69 U
Chlorodifluoromethane (Freon 22)		**2,100 D**	**2,100 D**
Chloroethane		< 0.74 U	< 0.69 U
Chloroform		**32**	**4.6**
Chloromethane		< 0.74 U	< 0.69 U
cis-1,2-dichloroethene		**1,600 D**	**130**
cis-1,3-dichloropropene		< 0.74 U	< 0.69 U
Dibromochloromethane		**0.85**	< 0.69 U
Dichlorodifluoromethane (Freon 12)		**2.8**	**2.8**
Ethylbenzene		**11**	**0.92**
Methyl tert-Butyl Ether		**1.3**	< 0.69 U
Methylene Chloride		< 0.74 U	< 0.69 U
Styrene		< 0.74 U	< 0.69 U
Tetrachloroethene		**5.0**	< 0.69 U
Toluene		**320 D**	**32**
trans-1,2-dichloroethene		**1.8**	< 0.69 U
trans-1,3-dichloropropene		< 0.74 U	< 0.69 U
Trichloroethylene		**140 D**	**8.0**
Trichlorofluoromethane (Freon 11)		**1.5**	**2.7**
Trichlorotrifluoroethane (Freon 113)		**2.2**	< 0.69 U
Vinyl Chloride		**220 D**	**77**
Xylene-o		**11**	**1.1**
Xylenes - m,p		**19**	**2.5**
Subtotal VOCs [4]		**4,499**	**2,578**

See notes on last page.

Table C-1. Vapor Sample Analytical Results - October 3, 2011, 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 10/3/2011	VSP-5 Effluent 10/3/2011
Tentatively Identified Compounds			
1-Methyldecahydronapthalene + Unknown Compound		--	**39 JN**
2,5-Hexanedione		**23 JN**	--
2-Ethyl- 1-Hexanol		--	**11 JN**
2-Hydroxypropyl methacrylate		**24 JN**	--
2-Methyldecahydronapthalene		--	**31 JN**
2-Phenyl-2-Propanol		**220 JN**	**40 JN**
Acetophenone		**73 JN**	**64 JN**
Alpha-Methyl Styrene		**16 JN**	--
Hexamethyl Cyclotrisloxane		**81 JN**	**120 JN**
Methylcylohexane		**5.1 JN**	--
Pentylcyclohexane		--	**18 JN**
Propylene Glycol		**15 JN**	--
Siloxane with Highest Concentration		**6.4 JN**	--
Undecane		--	**19 JN**
Unidentified Oxygenated Compound		**9.7 JN**	**32 JN**
Unknown with Highest Concentration		**16 JN**	**30 JN**
Unknown with 2nd Highest Concentration		**5.6 JN**	**12 JN**
Unknown C11H20 Compound		--	**17 JN**
Unknown C12H24 Compound		--	**18 JN**
Unknown C12H26 Branched Alkane with Highest Concentration		--	**31 JN**
Unknown C12H26 Branched Alkane with 2nd Highest Concentration		--	**29 JN**
Unknown C12H26 Branched Alkane with 3rd Highest Concentration		--	**27 JN**
Unknown C12H26 Branched Alkane with 4th Highest Concentration		--	**27 JN**
Unknown C12H26 Branched Alkane with 5th Highest Concentration		--	**21 JN**
Unknown C12H26 Branched Alkane with 6th Highest Concentration		--	**16 JN**
Unknown C13H28 Branched Alkane		--	**26 JN**
Subtotal TICs (5)		**495**	**628**
Total VOCs (6)		**4,994**	**3,206**

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 VOCs detected. Values shown have been rounded to the nearest whole number.

(5) "Subtotal TICs" represents the sum of individual top 20 TICs detected. Values shown have been rounded to the nearest whole number.

(6) "Total VOCs" represent the sum of VOCs and TICs detected. Values shown have been rounded to the nearest whole number.

Acronyms\Key:

Bold value indicates a detection.

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

Appendix D

Air Discharge Quality Evaluation

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

Parameters	Date Sampled:	01/10/11	04/08/11	07/08/11	10/03/11
SCREEN3 Model Input					
Source Type		Point	Point	Point	Point
Emission Rate (g/s)		1	1	1	1
Stack Height (ft)		13.5	13.5	13.5	13.5
Stack Height (m)		4.1	4.1	4.1	4.1
Stack Inside Diameter (m)		0.36	0.36	0.36	0.36
Air Flow Rate (scfm)(1)		2,035	1,873	1,945	1,945
Air Flow Rate (acfm @ stack temp)(2)		2,027	1,884	1,952	1,971
Stack Gas Exit Temperature (K)(1)		293	296	296	298
Ambient Air Temperature (K)(3)		273	278	304	290
Receptor Height (m)(4)		1.5	1.5	1.5	1.5
Urban/Rural		Urban	Urban	Urban	Urban
Building Height (m)		2.6	2.6	2.6	2.6
Min Horizontal Bldg Dim (m)		7.9	7.9	7.9	7.9
Max Horizontal Bldg Dim (m)		9.8	9.8	9.8	9.8
Consider Bldg Downwash?		Yes	Yes	Yes	Yes
Simple/Complex Terrain Above Stack		Simple	Simple	Simple	Simple
Simple/Complex Terrain Above Stack Base		Simple	Simple	Simple	Simple
Meteorology		Full	Full	Full	Full
Automated Distances Array		Yes	Yes	Yes	Yes
Terrain Height Above Stack Base		0	0	0	0
SCREEN3 Model Output					
1-HR Max Concentration at Receptor Height ($\mu g/m^3$) (5)		2,002	2,187	2,071	2,057
Annualization Factor(6)		0.08	0.08	0.08	0.08
Average Annual Concentration at Receptor Height ($\mu g/m^3$)(7)		160.2	175.0	165.7	164.6
Distance To Max Concentration (m)(8)		8	8	8	8

See notes on last page.

Table D-1. Annual 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.

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

Compound	Actual Effluent Concentrations[(1)] ($\mu g/m^3$)			
	1/10/11	04/08/11	07/08/11	10/03/11
1,1 - Dichloroethane	5.0	1.7	1.8	2.5
1,1 - Dichloroethene	4.0	0.83	1.4	6.2
Acetone	340	110	15	200
Chloroform	11	3.1	2.4	4.6
Ethylbenzene	2.7	1.2	0	0.92
Xylenes (o)	3.4	1.4	0.85	1.1
Xylenes (m,p)	4.9	2.7	0	2.5
Chloromethane	2.6	0	0	0
Trichloroethene	44	10	6.0	8.0
Vinyl Chloride	73	77	47	77
cis 1,2 Dichloroethene	290	92	54	130
Benzene	8.2	5.2	0	7.4
Toluene	74	45	31	32
Trichlorofluoromethane (Freon 11)	0	0	1.6	2.7
Dichlorodifluoromethane (Freon 12)	9.8	3.2	3.3	2.8
Chlorodifluoromethane (Freon 22)	8,100	3,800	3,200	2,100

See notes on last page.

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

Compound	AGC[2] ($\mu g/m^3$)	Maximum Allowable Stack Concentration[3] ($\mu g/m^3$)			
		1/10/11	04/08/11	07/08/11	10/03/11
1,1 - Dichloroethane	0.63	4.11E+03	4.05E+03	4.13E+03	4.11E+03
1,1 - Dichloroethene	70	4.57E+05	4.50E+05	4.59E+05	4.57E+05
Acetone	30,000	1.96E+08	1.93E+08	1.97E+08	1.96E+08
Chloroform	0.043	2.81E+02	2.76E+02	2.82E+02	2.81E+02
Ethylbenzene	1,000	6.53E+06	6.43E+06	6.55E+06	6.53E+06
Xylenes (o)	100	6.53E+05	6.43E+05	6.55E+05	6.53E+05
Xylenes (m,p)	100	6.53E+05	6.43E+05	6.55E+05	6.53E+05
Chloromethane	90	5.87E+05	5.78E+05	5.90E+05	5.88E+05
Trichloroethene	0.5	3.26E+03	3.21E+03	3.28E+03	3.27E+03
Vinyl Chloride	0.11	7.18E+02	7.07E+02	7.21E+02	7.18E+02
cis 1,2 Dichloroethene	63	4.11E+05	4.05E+05	4.13E+05	4.11E+05
Benzene	0.13	8.48E+02	8.35E+02	8.52E+02	8.49E+02
Toluene	5,000	3.26E+07	3.21E+07	3.28E+07	3.27E+07
Trichlorofluoromethane (Freon 11)	5,000	3.26E+07	3.21E+07	3.28E+07	3.27E+07
Dichlorodifluoromethane (Freon 12)	12,000	7.83E+07	7.71E+07	7.86E+07	7.84E+07
Chlorodifluoromethane (Freon 22)	50,000	3.26E+08	3.21E+08	3.28E+08	3.27E+08

See notes on last page.

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

Compound	Percent of Maximum Allowable Stack Concentration[4]			
	1/10/11	4/8/11	7/8/11	10/3/11
1,1 - Dichloroethane	0.12%	0.04%	0.04%	0.06%
1,1 - Dichloroethene	0.00%	0.00%	0.00%	0.00%
Acetone	0.00%	0.00%	0.00%	0.00%
Chloroform	3.92%	1.12%	0.85%	1.64%
Ethylbenzene	0.00%	0.00%	0.00%	0.00%
Xylenes (o)	0.00%	0.00%	0.00%	0.00%
Xylenes (m,p)	0.00%	0.00%	0.00%	0.00%
Chloromethane	0.00%	0.00%	0.00%	0.00%
Trichloroethene	1.35%	0.31%	0.18%	0.24%
Vinyl Chloride	10.17%	10.89%	6.52%	10.72%
cis 1,2 Dichloroethene	0.07%	0.02%	0.01%	0.03%
Benzene	0.97%	0.62%	0.00%	0.87%
Toluene	0.00%	0.00%	0.00%	0.00%
Trichlorofluoromethane (Freon 11)	0.00%	0.00%	0.00%	0.00%
Dichlorodifluoromethane (Freon 12)	0.00%	0.00%	0.00%	0.00%
Chlorodifluoromethane (Freon 22)	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 past year of system operation.

(2) AGC refers to the compound-specific annual guideline concentration per the NYSDEC DAR-1 AGC/SGC tables, revised October 18, 2010.

(3) 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 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.