

Northrop Grumman Systems Corporation

**Operable Unit 3- Interim Operation,
Maintenance and Monitoring Report**

August 2008 to September 2008


Operable Unit 3 – Soil Gas Interim Remedial Measure
Former Grumman Settling Ponds
Bethpage, New York

NYSDEC ID # 1-30-003A

ARCADIS



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1. Introduction

This Operable Unit 3 (OU3) Soil Gas Interim Remedial Measure (soil gas IRM) Interim Operation, Maintenance, and Monitoring Report was prepared by ARCADIS of New York, Inc. (ARCADIS) on behalf of Northrop Grumman Systems Corporation (Northrop Grumman). This report is being submitted pursuant to the Order On Consent (Consent Order or CO) Index # W1-0018-04-01 that was executed by the New York State Department of Environmental Conservation (NYSDEC) and Northrop Grumman, effective July 4, 2005 (NYSDEC 2005). The present day Bethpage Community Park property (Park), which the NYSDEC has termed the "Former Grumman Settling Ponds Area" and designated as OU3, is referred to herein as the Site. A Site location map is provided on Figure 1.

This report summarizes the routine operation, maintenance and monitoring (OM&M) activities for the soil gas IRM performed from August 7, 2008 through September 24, 2008. System OM&M was completed in accordance with the Operable Unit 3 Soil Gas Interim Remedial Measure OM&M Manual that was submitted to the NYSDEC on August 26, 2008 (ARCADIS 2008a). System monitoring was completed in accordance with the Sampling and Analysis Plan (SAP), which was provided to the NYSDEC as Appendix C of the Soil Gas Interim Remedial Measure 95% Design Report and Design Drawings dated September 7, 2007 (ARCADIS 2007) and the OM&M Manual. The Sampling and Analysis Plan (ARCADIS 2008b) was approved by the NYSDEC in a letter dated August 1, 2008 (NYSDEC 2008).

A description of the soil gas IRM system OM&M activities completed during the reporting period is provided below.

2. Soil Gas Interim Remedial Measure System Description

The OU3 soil gas IRM was constructed in accordance with the Soil Gas Interim Remedial Measure 95% Design Report and Design Drawings, which was approved by the NYSDEC on September 19, 2007. A general site plan that shows the major process equipment, depressurization, and monitoring well locations is provided on Figure 2. A process flow diagram that shows sampling and monitoring locations is provided on Figure 3. A complete set of as-built drawings is provided in the OM&M Manual (ARCADIS 2008a).

In summary, the soil gas IRM consists of the following major components:

- 18 depressurization wells and 47 associated induced vacuum monitoring wells at the locations shown on Figure 2.
- Two (2) "dry-van" type storage containers, which contain the following equipment:
 - Three (3) 52-gallon moisture separators to remove condensate from the influent vapor stream;
 - Two (2) 20-horsepower(hp) and one (1) 30-hp regenerative type depressurization blowers;
 - A programmable logic controller (PLC) based control system;
 - An autodialer;
 - Associated piping, valves, sample ports, gauges, electrical equipment, and other devices necessary to safely control, operate, and monitor the system.
- One (1) heat exchanger to condition the effluent vapor stream prior to treatment; and,
- One (1) 10,000 pound (lb) vapor phase granular activated carbon bed (VPGAC).
- One (1) 33-foot tall by 16-inch diameter stack and associated ductwork.

A detailed description of the system is provided in the OM&M Manual (ARCADIS 2008a).

3. Operation and Maintenance Activities

The soil gas IRM operated continuously during the reporting period with only brief system shutdowns to perform routine maintenance or troubleshooting activities. The routine, monthly OM&M site visit was conducted on September 18, 2008. Routine monthly OM&M activities included inspection of all piping, appurtenances, and

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mechanical equipment for leaks, defects, or other problems and maintenance of equipment, in accordance with the manufacturers' specifications and as described in the OM&M Manual. In addition to the routine OM&M site visit, supplemental site visits were completed on a weekly basis to monitor the physical condition of the temporary site controls (i.e., temporary fence). Finally, a supplemental site visit was conducted on September 24, 2008 to resample the influent and effluent vapor stream as described in Section 4.1.2 and Section 4.2.2 below.

Discussion of the routine OM&M monitoring program and results is provided in the subsequent sections of this report.

4. Monitoring Activities

The following sections summarize the methodology used for routine performance monitoring and routine compliance monitoring during the current reporting period. The performance monitoring program is completed to ensure that the system components are operating in accordance with the manufacturers specifications, to ensure that the VPGAC unit is operating as designed (if applicable), and to ensure that the general system operating parameters remain consistent with design data and/or historical operating data. The compliance monitoring program consists of the collection of effluent vapor and/or water samples to demonstrate compliance with regulatory discharge criteria and the collection of induced vacuum readings from key monitoring points to demonstrate the soil gas IRM is achieving the design vacuum of -0.1 inches of water (iwc) within the subsurface.

A description of the monitoring activities completed during the reporting period is provided below.

4.1 Routine Performance Monitoring

Routine performance monitoring was completed on September 18, 2008 and September 24, 2008, in accordance with Table C-1 of the SAP (ARCADIS 2008b). A brief discussion of the routine performance monitoring methodology and/or deviations from the methodology described in the SAP is provided below.

4.1.1 System Operating Parameters

System operating parameters that fall under the performance monitoring program include the parameters listed in Attachments C-3.2 and C-3.3 of the SAP (ARCADIS

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2008b). There were no significant deviations from the recording of these parameters during the routine monitoring event. However, system operating parameters for Blowers BL-200 and BL-400 were not recorded due to these blowers being offline (i.e., standby).

4.1.2 Vapor Samples

One (1) routine performance monitoring vapor sample was collected for laboratory analysis from the total influent sample location (VSP-601) during the September 24, 2008 supplemental monitoring event. The sample was collected and submitted to the laboratory in accordance with the requirements set forth in the SAP (ARCADIS 2008b). The sample was analyzed using USEPA Method TO-15 with the site-specific compound list provided in the SAP (ARCADIS 2008b). Although an influent and effluent vapor sample were collected during the initial September 18, 2008 monitoring event, it was noted by project management that the effluent vapor sample was potentially inaccurate due to a mechanical failure of the vapor sample port. The September 18, 2008 vapor samples (influent and effluent) were therefore discarded prior to laboratory analysis and a supplemental monitoring event was completed on September 24, 2008 following correction of the effluent sample port mechanical problem.

As requested by the NYSDEC, Freon 12 was quantified using USEPA Method TO-15 and the top 20 tentatively identified compounds (TICs) were reported. As referenced in previous correspondence to the NYSDEC, the analytical laboratory does not currently have a calibration standard for the compound Freon 22. Accordingly, Freon 22 is scanned for and reported as a TIC. The analytical laboratory anticipates acquiring the Freon 22 calibration standard during the Fall/Winter of 2008.

In addition, a screening level vapor sample was collected and monitored from VSP-601 using a photoionization detection (PID) during the supplemental monitoring event. In accordance with previous recommendations, PID measurements were not collected from individual depressurization wells during the reporting period.

4.2 Routine Compliance Monitoring

Routine compliance monitoring was completed on September 18, 2008 and September 24, 2008 in accordance with Table C-1 of the SAP (ARCADIS 2008b). A brief discussion of the routine compliance monitoring methodology and/or deviations from the methodology described in the SAP is provided below.

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4.2.1 System Operating Parameters

System operating parameters that fall under the compliance monitoring program include the compliance-related induced vacuum measurements listed in Table 2 of the OM&M Manual (ARCADIS 2008a).

In accordance with previous recommendations, induced vacuum measurements were collected from compliance-related induced vacuum monitoring points only during the reporting period.

4.2.2 Vapor Samples

One (1) routine, compliance monitoring vapor sample was collected for laboratory analysis from the total effluent sample location (VSP-602) during the September 24, 2008 supplemental monitoring event. The sample was collected and submitted for laboratory analysis in accordance with the requirements set forth in the SAP (ARCADIS 2008b). The sample was analyzed using USEPA Method TO-15 with the site-specific compound list provided in the SAP (ARCADIS 2008b). As referenced previously, although a compliance vapor sample was collected during the September 18, 2008 monitoring event, the vapor samples were discarded due to a mechanical failure and a supplemental monitoring event was completed on September 24, 2008.

As requested by the NYSDEC, Freon 12 was quantified using USEPA Method TO-15 and the top 20TICs were reported. As referenced in previous correspondence to the NYSDEC, the analytical laboratory does not currently have a calibration standard for the compound Freon 22. Accordingly, Freon 22 is scanned for and reported as a TIC. The analytical laboratory anticipates acquiring the Freon 22 calibration standard during the Fall/Winter of 2008.

In addition, a screening level sample was collected and monitored from VSP-602 using a PID during the supplemental monitoring event.

4.2.3 Condensate Samples

Due to the lack of condensate generation, a compliance monitoring condensate sample was not collected for laboratory analysis during the reporting period.

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5. Monitoring Results and Discussion

The following sections summarize and briefly discuss the results for routine performance monitoring and routine compliance monitoring during the current reporting period.

5.1 Routine Performance Monitoring

This following section summarizes the results of the routine system performance monitoring event completed on September 18, 2008 and the supplemental monitoring event completed on September 24, 2008.

5.1.1 System Operating Parameters

A summary of the performance monitoring system operating parameters for the September 18, 2008 monitoring event is provided in Table 1. A summary of induced vacuum measurements is provided in Table 2.

As shown in Table 1, the majority of system operating parameters recorded in September 2008 remained generally consistent with operating parameters recorded during August 2008. These data indicate that the system is running as designed and is maintaining a negative pressure curtain along the southern and western property boundaries.

Additional key data and observations are as follows:

- As reported in the August 2008 monitoring report (ARCADIS 2008), the extraction flow rate at Depressurization Wells DW-3S, DW-3D, DW-5D, and DW-4S were below their previous operating data. Accordingly, it was recommended to continue to observe these wells in conjunction with their respective induced vacuum monitoring data during the September 2008 monitoring period. During the September 2008 monitoring period, the extraction flow rate increased at Depressurization Wells DW-3S and DW-3D to levels consistent with previous operation (i.e., prior to August 2008 operation). The extraction flow rate remained lower than previous operation at Depressurization Wells DW-5D and DW-4S. The extraction flow rate decreased at Depressurization Well DW-1D. Despite the overall lower extraction flow rate observed at these depressurization wells, induced vacuum data for each respective depressurization well indicate that the current flow rate at all depressurization wells is sufficient to result in an induced vacuum of

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greater than or equal to -0.1 iwc (i.e., the design criteria). The observed wellhead vacuum and extraction flow rate at the remaining depressurization wells are generally consistent when comparing September 18, 2008 to August 6, 2008 monitoring data.

- Condensate water was not generated during the reporting period.
- Perched water was not encountered in induced Vacuum Monitoring Wells VMWC-1C or VMWC-5B.
- The heat exchanger influent temperature (95 deg F) remained lower than the design influent temperature of 150 degrees. Accordingly, the heat exchanger was kept on standby during the reporting period.

5.1.2 Vapor Samples

A summary of the September 2008 qualitative vapor sample analytical results is provided in Table 1. A summary of the September 2008 total influent vapor sample laboratory analytical results for detected compounds is provided in Table 3. A summary of all vapor sample analytical results (including detected, non-detect, and TICs) is provided in Appendix A.

Qualitative vapor analyses (i.e., PID readings) were consistent with previous data and were 0.4 parts per million by volume (ppmv) for vapor sample location VSP-601. Total influent (VSP-601) laboratory analytical results for the September 24, 2008 supplemental monitoring event were generally consistent with analytical results from August 6, 2008. Specifically, TVOC concentrations were 3,348 ug/m³ during the September 2008 monitoring event, and the VC concentration was below the limits of detection. Trichloroethylene (TCE) was detected at a concentration of 1,500 ug/m³ which is consistent with previous data.

Chlorodifluoromethane and Freon 142 were reported as TICs by the laboratory during the September 2008 monitoring event. As requested by the NYSDEC, chlorodifluoromethane will be added to the quantitative laboratory compound list during Fall 2008 as soon as the calibration standard is received by the laboratory.

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5.2 Routine Compliance Monitoring

This following section summarizes the results of the routine system compliance monitoring event completed on September 18, 2008 and the supplemental compliance monitoring event completed on September 24, 2008.

5.2.1 Induced Vacuum Measurements

Induced vacuum measurements collected during the September 18, 2008 monitoring event are summarized in Table 2. As referenced in the 95% Design Report, the soil gas IRM was designed to maintain a negative pressure of -0.1 iwc on a time-weighted rolling average within all monitoring points. Accordingly, the time-weighted rolling average for all induced vacuum monitoring points has been provided in Table 2. As shown on Table 2, the rolling average for all individual monitoring points was greater than -0.1 iwc as of September 18, 2008. In addition, the average induced vacuum for compliance monitoring wells during the September 18, 2008 monitoring event was -0.19 iwc, which indicate that the soil gas IRM is operating as designed. These data are consistent with data from the August 6, 2008 monitoring event.

5.2.2 Vapor Samples

A summary of the September 2008 qualitative vapor sample analytical results is provided in Table 1. A summary of the September 2008 total effluent vapor sample laboratory analytical results for detected compounds is provided in Table 3. A summary of all vapor sample analytical results (including detected, non-detect, and TICs) is provided in Appendix A.

Qualitative vapor analyses (i.e., PID readings) for total effluent sample port VSP-602 were consistent with previous data and were 0.1 ppmv. Total effluent (VSP-602) laboratory analytical results for the September 24, 2008 supplemental monitoring event increased when compared with analytical results from August 6, 2008. Specifically, the TVOC concentration was 829 ug/m³ during the September 2008 monitoring event. The primary reason for the increase in TVOC concentration is the partial breakthrough of 1,2 DCE through the VPGAC unit. It should be noted that despite the increased concentration of 1,2 DCE, the effluent concentration of 1,2 DCE only represents 0.03 percent of the modeled annual maximum allowable stack concentration (MASC).

VC was detected at a concentration (4.9 ug/m³) that is slightly above the limits of detection. TCE was detected at a concentration of 120 ug/m³. Although the

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concentration of TCE increased when compared to analytical results from August 6, 2008, it is still only 0.78 percent of its respective MASC. A summary of the air emissions model, completed to confirm compliance with applicable air discharge standards, is discussed in Section 6 of this report.

5.2.3 Condensate Samples

As discussed previously, a condensate sample was not collected from Storage Tank ST-510 for laboratory analysis during the reporting period due to the lack of condensate water generation. Nonetheless, a table that indicates no samples were collected during the reporting period is provided as Table 4. A similar appendix table has been provided in Appendix B.

6. Air Emissions Model

Effluent vapor laboratory analytical results were compared to the NYSDEC Division of Air Resources Air Guide-1 (DAR-1) Short-term Guideline Concentrations (SGCs). In addition, effluent vapor laboratory analytical results were compared to a site-specific modeled annual MASC. The annual MASC was calculated during each monitoring event for individual compounds using the output from a United States Environmental Protection Agency (USEPA) Screen 3 model in conjunction with the NYSDEC DAR-1 Annual Guideline Concentrations (AGCs). Specifically, a scaling factor was calculated using the SCREEN3 model with site-specific physical layout (e.g., building dimension, stack height, terrain, etc.) and operating data (e.g., discharge 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 annual MASC. A summary of the instantaneous percent (e.g., not time-weighted) of the site-specific annual MASC for detected compounds is provided in Table 5. A summary of the cumulative annual percent (i.e., time-weighted) of the site-specific MASC for detected compounds is also provided on Table 5. A summary of the model input, outputs, and backup calculations is provided in Appendix C.

In summary, the soil gas IRM effluent vapor met applicable air discharge criteria based on the following:

- The actual concentrations of individual VOCs in the vapor effluent did not exceed their respective SGCs during all monitoring events (Table 3). It should also be noted that all influent (i.e., prior to treatment) individual VOC concentrations were also below their respective SGCs.

- The actual concentration of individual VOCs in the vapor effluent did not exceed their respective instantaneous MASCs, as calculated using the USEPA SCREEN 3 Model (Table 5). Similarly, the time-weighted rolling average for all detected compounds is currently well below the MASCs.

7. Conclusions and Recommendations

The following section summarizes the conclusions and recommendations based on the results of performance and compliance monitoring provided herein.

7.1 Conclusions

Based on the information provided herein, ARCADIS makes the following conclusions:

- VPGAC effluent data indicate that the VPGAC unit is removing TCE from the influent vapor stream as designed. The VPGAC effluent concentration of TCE increased when compared to previous data but is still significantly below applicable discharge criteria.
- September 2008 compliance monitoring results indicate that the system continues to operate as designed. Specifically, a time-weight average induced vacuum of greater than -0.1 iwc was achieved in all induced vacuum monitoring points.
- The actual concentrations of individual VOCs in the vapor effluent did not exceed their respective SGCs during the reporting period.
- The actual concentration of individual VOCs in the vapor effluent did not exceed their respective MASCs as calculated using the USEPA SCREEN 3 model.

7.2 Recommendations

Based on the information provided herein, ARCADIS makes the following recommendations:

- Continue operating the system in accordance with system operating parameters recorded in August/September 2008.

- Evaluate October 2008 vacuum and flow rate data from Depressurization Wells DW-5D, DW-4S, and DW-1D in conjunction with each wells respective induced vacuum monitoring points. If flow rates continue to decline and/or an individual wells respective induced vacuum does not meet design criteria, consider making system adjustments to increase the flow at the respective location.
- Continue to collect system operational data and influent and effluent vapor samples for laboratory analysis on a monthly basis for the next two operating months (i.e., October and December 2008) as requested by the NYSDEC. If data is favorable and continue to indicate a stable trend for all operating parameters and vapor analytical data, perform performance and compliance monitoring on a quarterly basis thereafter.

8. References

ARCADIS of New York, Inc. 2007. 95% Design Report, Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York, Site #1-30-003A September 7, 2007.

ARCADIS of New York, Inc. 2008a. Operable Unit 3 –Operation, Maintenance, and Monitoring Manual, Operable Unit 3, Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York, Site #1-30-003A August 26, 2008.

ARCADIS of New York, Inc. 2008b. 95% Design Report, Appendix C, Sampling and Analysis Plan, Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York, Site #1-30-003A February 8, 2008.

New York State Department of Environmental Conservation (NYSDEC), 2008, Approval Letter regarding Former Grumman Settling Ponds, NYSDEC Nassau County Site No. 1-30-003A OU3 (Bethpage Community Park), August 1, 2008.

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

New York State Department of Environmental Conservation, Division of Air Resources-1 (DAR-1) Guidelines for the Control of Toxic Ambient Air Contaminants dated 1991 and the AGC/SGC Tables dated September 10, 2007.

Table 1. Summary of General System Operating Parameters, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

	Extraction Well DW-7S Parameters					Extraction Well DW-7D Parameters					Extraction Well DW-3S Parameters					Extraction Well DW-3D Parameters					Extraction Well DW-5S Parameters					Extraction Well DW-5D Parameters				
Date	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum
	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)
02/18/08 ⁽¹⁾	58	-3.55	55.7	7.2	-2.0	76	-7.2	56.1	29.3	-2.5	80	-7.3	55.7	2.8	-2.5	113	-15.43	53.9	13.3	-4.5	100	-4.6	57.2	0.0	-3.0	52	-16.1	56.8	0.0	-13.5
02/19/08 ⁽¹⁾	53	-3.80	NM	9.7	-2.0	78	-7.4	NM	26.7	-2.5	45	-2.5	NM	6.5	-1.75	108	-16.3	NM	16.4	-3.5	57	-2.5	NM	0.0	-2.0	52	-18	NM	0.0	-13.5
02/25/08 ⁽¹⁾	55	-5.5	NM	4.2	-2.0	74	-13	NM	5.8	-2.7	37	-2.03	NM	2.1	-1.5	71	-26	NM	6.6	-2.7	20	-1.05	NM	0.4	-1.5	56	-24.1	NM	0.0	-17.5
03/03/08 ⁽¹⁾	53	-6	NM	2.8	-2.0	84	-13.0	NM	0.8	-2.7	45	-2.5	NM	1.2	-1.5	88	-16	NM	1.9	-2.7	20	-1.4	NM	0.8	-1.5	66	-27	NM	0.0	-15.2
03/17/08 ⁽¹⁾	76	-9	NM	2.6	-2.5	50	-8.00	NM	0.4	-2.0	45	-2.8	NM	1.1	-2.0	83	-16	NM	0.1	-2.7	20	-1.5	NM	0.0	-2.5	70	-32	NM	0.0	-25.0
04/16/08	84.97	-10.46	50.3	2.7	NM	41.10	-2	55.4	2.0	NM	15.48	-0.41	58.6	0.6	NM	28.56	-1.07	57.0	4.6	NM	34.44	-0.77	55.0	0.0	NM	33.95	-0.22	57.5	0.6	NM
05/19/08	72.43	-5.0	57.0	5.0	-4.0	19.76	-0.800	62.2	2.1	-1.5	14.98	-0.45	62.2	0.0	-2.0	23.35	-2.0	59.3	3.5	-3.0	77.92	-2.5	59.9	2.5	-2.5	19.73	-14.0	59.0	0.0	-10.5
06/02/08	86.01	-5.8	65.8	0.0	-1.8	23.40	-0.7	72.8	0.0	-0.9	16.09	-0.4	71.0	0.0	-1.1	26.95	-2.0	71.7	0.0	-1.3	86.18	-2.3	65.4	0.0	-2.8	16.56	-14.0	74.3	0.0	-10.0
07/07/08	49.33	-4.4	69.4	4.7	-2.2	18.04	-1.2	76.1	2.6	-1.0	17.56	-0.4	74.1	2.3	-1.2	17.63	-11	77.9	3.1	-2.2	121.21	-2.2	71.0	2.1	-2.7	15.22	-14.2	82.2	2.3	-10
08/06/08 ^(5,6)	78.62	-4.5	76.3	NM	-2.5	19.49	-0.9 ⁽⁹⁾	80.6	NM	-1.7	9.84	-2.0 ⁽⁶⁾	76.8	NM	-1.0	12.84	-11.5	80.0	NM	-1.1	82.68	-2.1	75.1	NM	-2.0	4.62	-14.5	81.6	NM	-0.9
09/18/08	95.06	-4.5	69.4	NM	-1.5	23.22	-0.8	68.7	NM	-0.7	13.29	-3.0	69.4	NM	-0.2	23.56	-2.1	68.8	NM	-1.0	84.01	-2.2	69.6	NM	-0.80	6.91	-14.5	69.0	NM	-1.0

Notes and Abbreviations:

- °F - Degrees Fahrenheit
DW- Depressurization well
ft bmp - Feet below measuring point
iwc - Inches of water column
NM -Not measured
scfm - Standard cubic feet per minute
ppmv - Parts per million by volume
VMWC - Vapor monitoring well cluster

1. Flow rate at manifold on associated dates quantified using venturi flow meter and associated flow chart. Remaining flow rates measured with a hotwire anemometer and calculated to standard conditions using the formula below.
2. Access point covered by insulation no measurement taken during this round.
3. Blowers BL-200 and BL-400 were taken off-line on April 10th during system rebalancing.
4. Field recording error suspected.
5. Temperature readings are erroneous due to field measurement error. July 7, 2008 temperature readings used for conversion of flow to scfm.
6. Data point is average of readings observed which fluctuated between -0.9 and -3.0 iwc.
7. Original parameter not collected on 8/6/08 or was erroneous, data point reported is second reading taken on 08/07/08.
8. Wellhead vacuum gauges replaced during reporting period with lower range/higher accuracy gauges.
9. Gauge vacuum at 0.0 iwc manometer reading used for table.
10. New gauge range too high to collect measurable reading.
11. Vacuum reading taken using digital manometer during this round of monitoring.
12. Photoionization detector (PID) measurements taken on 9/24/08 during corresponding influent and effluent vapor sampling event.

Standard Conditions Calculation:

$$scfm = \text{Flow rate} \times \text{Area} \times (T_s/T_m) \times (P_m/P_s)$$

Flow rate in feet per minute
Area in square feet
Ts - Standard Temperature in Rankine
Tm - Measured Temperature in Rankine
Pm - Measured Pressure in pounds per square inch
Ps - Standard Pressure in pounds per square inch

Table 1. Summary of General System Operating Parameters, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

	Extraction Well DW-6S Parameters					Extraction Well DW-6D Parameters					Extraction Well DW-1S Parameters					Extraction Well DW-1D Parameters					Extraction Well DW-4S Parameters					Extraction Well DW-4D Parameters				
Date	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum
	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)
02/18/08 ⁽¹⁾	170	-13.1	55.0	0.0	-6.0	44	-16.0	60.2	0.0	-14.0	160	-11.8	54.1	0.0	-5.0	20	-16.8	62.4	0.0	-15.0	170	-12.0	54.6	0.0	-2.0	8	-2.0	60.8	0.0	-3.0
02/19/08 ⁽¹⁾	167	-13.6	NM	0.0	-6.0	48	-17.5	NM	0.0	-14.0	235	-19.78	NM	0.0	-8.0	20	-18	NM	0.0	-16.0	155	-13.5	NM	0.0	-5.5	8	-1.95	NM	0.0	-1.5
02/25/08 ⁽¹⁾	167	-16.0	NM	0.0	-6.0	94	-23.5	NM	0.0	-20.5	228	-25.4	NM	NM	-7.2	28	-24.25	NM	0.0	-25.0	160	-16.0	NM	0.0	-5.5	8	-1.1	NM	0.0	-2.0
03/03/08 ⁽¹⁾	170	-16.0	NM	0.5	-5.5	55	-25.2	NM	0.0	-20	208	-26.79	NM	0.1	-7.0	32	-26.5	NM	0.0	-25.0	160	-16.0	NM	1.1	-5.70	8	-1.0	NM	0.0	-2.0
03/17/08 ⁽¹⁾	185	-22	NM	0.0	-6.0	65	-31	NM	1.2	-22	208	-29	NM	0.0	-7.5	32	-32.6	NM	0.0	-30	176	-26	NM	0.0	-6.0	8	-1.25	NM	0.0	-1.75
04/16/08	49.50	-1.44	53.6	0.2	NM	10.55	-1.86	57.5	1.9	NM	89.48	-3.31	52.3	0.0	NM	3.97	-0.79	61.3	0.0	NM	48.16	-1.43	55.5	0.0	NM	9.27	-0.48	60.6	0.0	NM
05/19/08	42.93	-1.2	61.8	2.5	-1.3	11.47	-2.6	60.0	0.0	-2.0	147.62	-10.5	55.5	0.0	-4.5	6.60	-1.8	64.4	0.3	-2.5	32.14	-1.0	61.7	1.7	-2.7	15.01	-1.1	63.3	0.6	-2.2
06/02/08	48.18	-1.2	68.0	0.0	-1.2	14.88	-2.2	72.5	0.0	-2.5	179.95	-10.3	61.3	0.0	-4.2	8.54	-1.8	74.1	0.0	-5.1	30.98	-0.7	66.2	0.0	-2.1	17.44	-1.2	71.6	0.0	-2.7
07/07/08	52.63	-1.5	71.6	1.2	-2.0	14.89	-2.1	75.2	3.3	-2.2	153.47	-6	68.5	2.3	-3.8	8.71	-1.3	77.3	2.2	-4.7	38.23	-0.2	72.8	1.2	-2.1	18.41	-1.1	73	2.5	-1.8
08/06/08 ^(5,9)	41.38	-1.2	75.4	NM	-1.0	11.75	-2.1	79.9	NM	-0.9 ⁽⁶⁾	137.92	-6.2	75	NM	-3.0	12.86	-1.2	80.7	NM	-1.1	12.93	-0.8	87	NM	-0.6	12.97	-1.0	80.7	NM	0 ⁽¹⁰⁾
09/18/08	41.91	-1.1	69.8	NM	-0.9	12.59	-2.1	69.6	NM	-1.5	152.30	-6.2	70.5	NM	-3.0	6.33	-1.5	69.6	NM	-1.5	9.34	-11.5	70.3	NM	-0.5	14.47	-0.5	69.6	NM	-0.38 ⁽¹¹⁾

Notes and Abbreviations:

- °F - Degrees Fahrenheit
- DW- Depressurization well
- ft bmp - Feet below measuring point
- iwc - Inches of water column
- NM -Not measured
- scfm - Standard cubic feet per minute
- ppmv - Parts per million by volume
- VMWC - Vapor monitoring well cluster

- Flow rate at manifold on associated dates quantified using venturi flow meter and associated flow chart. Remaining flow rates measured with a hotwire anemometer and calculated to standard conditions using the formula below.
- Access point covered by insulation no measurement taken during this round.
- Blowers BL-200 and BL-400 were taken off-line on April 10th during system rebalancing.
- Field recording error suspected.
- Temperature readings are erroneous due to field measurement error. July 7, 2008 temperature readings used for conversion of flow to scfm.
- Data point is average of readings observed which fluctuated between -0.9 and -3.0 iwc.
- Original parameter not collected on 8/6/08 or was erroneous, data point reported is second reading taken on 08/07/08.
- Wellhead vacuum gauges replaced during reporting period with lower range/higher accuracy gauges.
- Gauge vacuum at 0.0 iwc manometer reading used for table.
- New gauge range too high to collect measurable reading.
- Vacuum reading taken using digital manometer during this round of monitoring.
- Photoionization detector (PID) measurements taken on 9/24/08 during corresponding influent and effluent vapor sampling event.

Standard Conditions Calculation:

scfm = flow rate*Area*(Ts/Tm)*(Pm/Ps)

- flow rate in feet per minute
- Area in square feet
- Ts - Standard Temperature in Rankine
- Tm - Measured Temperature in Rankine
- Pm - Measured Pressure in pounds per square inch
- Ps - Standard Pressure in pounds per square inch

Table 1. Summary of General System Operating Parameters, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

	Extraction Well DW-8S Parameters					Extraction Well DW-9S Parameters					Extraction Well DW-2S Parameters					Extraction Well DW-2D Parameters					Extraction Well DW-10S Parameters					Extraction Well DW-11S Parameters				
Date	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum	Flow Rate at Manifold	Vacuum at Manifold	Temperature at Manifold	PID Measured Concentration	Wellhead Vacuum
	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)	(scfm)	(iwc)	(°F)	(ppmv)	(iwc)
02/18/08 ⁽¹⁾	135	-9.1	55.0	0.0	-3.0	72	-10.0	57.3	0.0	-4.5	45	-5.1	61.1	0.0	-2.5	80	-11.9	55.2	0.0	-7.0	75	-13.5	57.5	0.0	-5.0	80	-1.5	55.2	0.0	-13.0
02/19/08 ⁽¹⁾	140	-12.0	NM	0.0	-3.5	72	-10.4	NM	0.0	-4.5	65	-10	NM	0.0	-3.6	82	-12.7	NM	0.0	-8.0	75	-13.7	NM	0.0	-5.2	70	-16.04	NM	0.0	-10
02/25/08 ⁽¹⁾	138	-14.90	NM	0.3	-3.5	72	-12.3	NM	0.4	-4.7	67	-12.2	NM	0.4	-4.0	40	-6.2	NM	0.0	-5.7	75	-16.0	NM	0.4	-5.5	77	-19.5	NM	0.3	-9.0
03/03/08 ⁽¹⁾	140	-18.2	NM	0.9	-3.7	76	-13.4	NM	0.1	-5.0	67	-13.85	NM	0.0	-4.5	40	-5.1	NM	0.0	-4.9	78	-17.16	NM	0.2	-5.5	72	-21	NM	0.0	-9.8
03/17/08 ⁽¹⁾	140	-18	NM	0.2	-4.0	76	-12.0	NM	0.1	-5.5	65	-15.2	NM	0.0	-4.5	50	-6	NM	0.0	-5.0	77	-17.6	NM	0.1	-5.5	77	-20	NM	0.0	-9.0
04/16/08	35.32	-2.13	55.4	0.2	NM	28.89	-1.47	56.1	0.2	NM	34.18	-2.2	56.8	0.1	NM	19.24	-0.8	58.6	0.0	NM	24.42	-1.64	57.3	0.0	NM	32.38	-3.14	55.2	0.4	NM
05/19/08	65.68	-9.0	59.1	2.2	-3.5	64.77	-6.8	59.0	0.8	-4.2	33.64	-3.5	61.7	0.8	-1.7	46.61	-4.3	59.3	1.2	-4.0	48.22	-7.2	59.0	0.7	-3.5	42.94	-6.0	59.9	1.1	-3.7
06/02/08	72.85	-9.2	62.0	0.0	-3.9	68.01	-6.8	62.4	0.0	-4.5	34.15	-4.1	67.6	0.0	-1.8	50.56	-4.4	66.3	0.0	-4.1	52.84	-9.0	65.8	0.0	-3.8	46.34	-6.0	66.3	0.0	-3.7
07/07/08	102.21	-9	70.5	2.5	-4.1	87.48	-7.0	70.1	0.7	-4.5	41.33	-3.7	71.7	2.0	-1.8	56.29	-4.4	71.0	2.1	-4.0	68.91	-7.9	70.5	2.1	-2.5	56.39	-6.2	71.2	1.9	-3.8
08/06/08 ^(5,8)	94.43	-9.0	80.1	NM	-2.7	68.18	-7.1	80.9	NM	-2.5	30.27	-3.1	81.9	NM	-1.9	50.43	-4.5	83.9	NM	-3.0	61.75	-7.8	80.8	NM	-3.5	47.67	-6.4	82.2	NM	-3.5
09/18/08	100.42	-9.0	70.7	NM	-2.3	75.43	-7.0	70.7	NM	-2.5	34.54	-3.5	70.7	NM	-1.5	50.31	-4.5	70.1	NM	-3.0	56.60	-7.5	70.3	NM	-3.5	50.04	-6.5	70.3	NM	-3.5

Notes and Abbreviations:

- °F - Degrees Fahrenheit
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ft bmp - Feet below measuring point
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NM -Not measured
scfm - Standard cubic feet per minute
ppmv - Parts per million by volume
VMWC - Vapor monitoring well cluster

1. Flow rate at manifold on associated dates quantified using venturi flow meter and associated flow chart. Remaining flow rates measured with a hotwire anemometer and calculated to standard conditions using the formula below.
2. Access point covered by insulation no measurement taken during this round.
3. Blowers BL-200 and BL-400 were taken off-line on April 10th during system rebalancing.
4. Field recording error suspected.
5. Temperature readings are erroneous due to field measurement error. July 7, 2008 temperature readings used for conversion of flow to scfm.
6. Data point is average of readings observed which fluctuated between -0.9 and -3.0 iwc.
7. Original parameter not collected on 8/6/08 or was erroneous, data point reported is second reading taken on 08/07/08.
8. Wellhead vacuum gauges replaced during reporting period with lower range/higher accuracy gauges.
9. Gauge vacuum at 0.0 iwc manometer reading used for table.
10. New gauge range too high to collect measurable reading.
11. Vacuum reading taken using digital manometer during this round of monitoring.
12. Photoionization detector (PID) measurements taken on 9/24/08 during corresponding influent and effluent vapor sampling event.

Standard Conditions Calculation:

scfm = flow rate*Area*(Ts/Tm)*(Pm/Ps)

- flow rate in feet per minute
Area in square feet
Ts - Standard Temperature in Rankine
Tm - Measured Temperature in Rankine
Pm - Measured Pressure in pounds per square inch
Ps - Standard Pressure in pounds per square inch

Table 1. Summary of General System Operating Parameters, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

		Knock Out Tank Parameters						Blower Parameters ⁽³⁾ BL-200				Blower Parameters ⁽³⁾ BL-300				Blower Parameters ⁽³⁾ BL-400				Combined Effluent Parameters VSP-601						Stack Parameters VSP-602			Water levels in Wells				
		Vacuum			Totalizer			Influent Vacuum	Effluent Pressure	Effluent Flow Rate	Effluent PID	Influent Vacuum	Effluent Pressure	Effluent Flow Rate	Effluent PID	Influent Vacuum	Effluent Pressure	Effluent Flow Rate	Effluent PID	Total Effluent Flow Rate	Total Effluent PID	Heat Exchanger Influent Temp.	Total Effluent Pressure	VPGAC Influent Temperature	VPGAC Effluent PID	Discharge Temperature	Effluent Relative Humidity	VMWC-1D	VMWC-5D	B24MW-3	VMWC-1C	VMWC-5B	
Date	Influent KO-200	Influent KO-300	Influent KO-400	Effluent KO-200	Effluent KO-300	Effluent KO-400	(iwc)																										(iwc)
02/18/08 ⁽¹⁾	-17.9	-37.9	-34.8	33.66	9,996,124	35.99	-19.5	6.2	499.59	6.4	-40	12.0	594.88	0.0	-38	11.5	643.39	0.0	1963.69	0.9	100	9.6	93	0.0	NM	NM	52.13	Dry	53.75	Dry	Dry		
02/19/08 ⁽¹⁾	-19.5	-39.5	-36.0	33.66	9,996,124	35.99	-20.5	9.0	432.20	2.7	-40.6	12.0	841.92	1.6	-38.5	10.0	604.74	1.3	1673.81	NM	95	9.8	84	NM	NM	NM	52.17	Dry	53.77	Dry	Dry		
02/25/08 ⁽¹⁾	-27.4	-42.0	-39.8	57.34	9,996,124	35.99	-28.3	8.2	433.60	NM	-42.9	10.4	821.99	NM	-42.1	10.2	653.35	NM	1678.65	2.4	94	9.0	94	0.0	NM	NM	52.19	49.12	53.89	38.20	Dry		
03/03/08 ⁽¹⁾	-26.5	-44.0	-42.0	128.57	9,996,124	35.99	-28.5	7.6	391.71	NM	-45.2	10.1	752.16	NM	-43.9	10.0	685.41	NM	1792.84	0.5	104	8.6	94	0.0	NM	NM	Dry	Dry	53.90	Dry	Dry		
03/17/08 ⁽¹⁾	-33	-43	-41	132.70	9,996,272.5 ⁽⁴⁾	35.99	-34.3	7.6	411.73	NM	-45.4	10.1	717.83	NM	-43.8	10.0	805.36	NM	1773.50	0.0	102.5	8.0	96	0.0	NM	NM	Dry	Dry	53.62	Dry	Dry		
04/16/08	0	-32	0	132.67	9,996,202.72	35.94	0	0	0	NM	-35	1	641	1.0	0	0	0	NM	NM	1.0	90	0.9	82	0.7	NM	NM	51.55	48.47	53.25	Dry	Dry		
05/19/08	0	-18	0	132.67	9,996,202.72	35.94	0	0	NM	NM	-19.5	1.5	666	3.1	0	0	0	NM	NM	NM ⁽²⁾	4.6	85	1.4	74	1.7	NM	NM	51.53	48.50	53.20	Dry	Dry	
06/02/08	0	-15.5	0	132.67	9,996,202.72	35.94	0	0	NM	NM	-19.5	1.2	746	0.0	0	0	0	NM	NM	NM ⁽²⁾	0.0	85	1.6	85	0.0	NM	NM	51.71	50.55	53.33	Dry	Dry	
07/07/08	0	-17	0	132.67	9,996,202.72	35.94	0	0	NM	NM	-19.8	1.5	829	0.9	0	0	0	NM	NM	NM ⁽²⁾	0.7	85	1.5	90	0.0	NM	NM	52.25	Dry	53.9	Dry	Dry	
08/06/08	0	-18	0	132.67	9,996,202.72	35.94	NM	NM	NM	NM	-20.0	1.5	640	NM	NM	NM	NM	NM	NM ⁽²⁾	0.0	98	1.6	95	0.0	NM	NM	52.62 ⁽⁷⁾	Dry ⁽⁷⁾	54.2	Dry	Dry		
09/18/08	0	-18	0	132.67	9,996,202.72	35.94	0	0	NM	NM	-20	1.5	633	NM	0	0	NM	NM	583.44	0.4 ⁽¹²⁾	95	1.6	91	0.1 ⁽¹²⁾	NM	NM	52.78	Dry	54.36	Dry	Dry		

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- Flow rate at manifold on associated dates quantified using venturi flow meter and associated flow chart. Remaining flow rates measured with a hotwire anemometer and calculated to standard conditions using the formula below.
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- Blowers BL-200 and BL-400 were taken off-line on April 10th during system rebalancing.
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- Temperature readings are erroneous due to field measurement error. July 7, 2008 temperature readings used for conversion of flow to scfm.
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- Photoionization detector (PID) measurements taken on 9/24/08 during corresponding influent and effluent vapor sampling event.

Standard Conditions Calculation:

scfm = flow rate*Area*(Ts/Tm)*(Pm/Ps)

- flow rate in feet per minute
- Area in square feet
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- Tm - Measured Temperature in Rankine
- Pm - Measured Pressure in pounds per square inch
- Ps - Standard Pressure in pounds per square inch

Table 2. Summary of Induced Vacuum Readings, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.⁽¹⁾

Well ID:	DW-7S			DW-7D	DW-3S				DW-3D			DW-5S		DW-5D	DW-1S									
Date	VMWC-14A ⁽⁴⁾	VMWC-14B ⁽⁴⁾	VMWC-14D ⁽⁴⁾	VMWC-9A	VMWC-9B	VMWC-10B	VMWC-11B ⁽⁴⁾	VMWC-10D	VMWC-11D	VMWC-12D ⁽⁴⁾	VMWC-15A ⁽⁴⁾	VMWC-15B ⁽⁴⁾	VMWC-15D ⁽⁴⁾	VMWC-1A	VMWC-2A	VMWC-4A	VMWC-3A ⁽⁴⁾	VMWC-1B	VMWC-4B	VMWC-3B ⁽⁴⁾	VMWC-1C	VMWC-2C	VMWC-4C	VMWC-3C ⁽⁴⁾
02/18/08	-0.05	-0.26	-0.31	-0.51	-0.67	-0.50	-0.41	-0.57	-0.43	-0.34	-0.52	-0.41	-0.35	-0.12	-0.10	-0.07	-0.07	-0.15	-0.08	-0.08	-0.11	-0.11	-0.09	-0.08
02/19/08	-0.09	-0.27	-0.30	-0.42	-0.53	-0.40	-0.33	-0.48	-0.40	-0.31	-0.30	-0.30	-0.35	-0.74	-0.61	-0.50	-0.42	-0.93	-0.58	-0.42	-0.78	-0.66	-0.61	-0.46
02/25/08	-0.09	-0.26	-0.31	-0.39	-0.49	-0.39	-0.34	-0.44	-0.36	-0.31	-0.23	-0.23	-0.27	-0.70	-0.58	-0.44	-0.40	-0.88	-0.54	-0.42	-0.74	-0.62	-0.55	-0.44
03/03/08	-0.11	-0.28	-0.31	-0.38	-0.44	-0.37	-0.31	-0.41	-0.33	-0.27	-0.19	-0.21	-0.25	-0.62	-0.48	-0.40	-0.32	-0.78	-0.46	-0.38	-0.66	-0.54	-0.49	-0.39
03/17/08	-0.11	-0.28	-0.31	-0.39	-0.50	-0.36	-0.29	-0.39	-0.36	-0.54	-0.25	-0.25	-0.28	-0.70	-0.60	-0.44	-0.38	-0.89	-0.50	-0.40	-0.68	-0.60	-0.52	-0.43
04/16/08	-0.11	-0.16	-0.18	-0.15	-0.17	-0.14	-0.13	-0.14	-0.13	-0.11	-0.09	-0.09	-0.08	-0.20	-0.16	-0.16	-0.11	-0.24	-0.16	-0.11	-0.19	-0.16	-0.16	-0.11
05/19/08	-0.099	-0.143	-0.163	-0.170	-0.199	-1.490	-0.154	-0.083	-0.219	-0.143	-0.159	-0.125	-0.159	-0.425	-0.369	-1.377	-0.221	-0.410	-0.299	-0.283	-0.423	-0.372	-0.333	-0.218
06/02/08	-0.095	-0.146	-0.148	-0.165	-0.171	-0.165	-0.165	-0.142	-0.135	-0.127	-0.150	-0.140	-0.133	-0.437	-0.339	-0.492	-0.200	-0.505	-0.299	-0.213	-0.408	-0.335	-0.313	-0.212
07/07/08	-0.097	-0.146	-0.149	-0.123	-0.135	-0.129	-0.122	-0.131	-0.129	-0.125	-0.127	-0.126	-0.133	-0.303	-0.258	-0.193	-0.152	-0.409	-0.227	-0.160	-0.331	-0.263	-0.219	-0.164
08/06/08	-0.10	-0.15	-0.15	-0.10	-0.16	-0.11	-0.146 ⁽⁵⁾	-0.11	-0.11	-0.11	-0.13	-0.13	-0.11	-0.34	-0.241 ⁽⁵⁾	-0.26	-1.14	-0.39	-0.30	-0.16	-0.32	-0.290 ⁽⁵⁾	-0.29	-0.16
09/18/08	-0.121	-0.186	-0.198	NM	NM	NM	-0.184	NM	NM	-0.255	-0.140	-0.144	-0.138	NM	NM	NM	-0.193	NM	NM	-0.204	NM	NM	NM	-0.207
Time Weighted ⁽⁷⁾																								
Rolling Average:	-0.102	-0.185	-0.199	NA	NA	NA	-0.189	NA	NA	-0.203	-0.160	-0.157	-0.163	NA	NA	NA	-0.417	NA	NA	-0.234	NA	NA	NA	-0.237

Gross Average Compliance Points
09/18/08 -0.20

Notes and Abbreviations:

DW Depressurization Well
NA Not Applicable
NM Not Measured
VMWC Vapor Monitoring Well Cluster

1. All induced vacuum measurements units in inches of water column (iwc).
2. Data point appears to be erroneous based on vacuum readings at further vapor point greater than that recorded at the closer location.
3. Data point is average of readings taken which fluctuated between -0.22 and -0.29 iwc.
4. Compliance vapor monitoring point.
5. Original parameter collected on 8/6/08 was erroneous, data point reported is second reading taken on 08/07/08.
6. Compliance goal is -0.1 iwc induced vacuum at all compliance monitoring points.
7. Non-compliance monitoring point measurements not taken as recommended in the February to June 2008 Operations Maintenance and Monitoring Report and Startup Summary.

Table 2. Summary of Induced Vacuum Readings, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.⁽¹⁾

Well ID:	DW-1D					DW-4D	DW-8S		DW-2S								DW-2D						DW-11S	
Date	VMWC-1D	VMWC-2D	VMWC-4D	VMWC-3D ⁽⁴⁾	VMWC-16D ⁽⁴⁾	VMWC-16A ⁽⁴⁾	VMWC-16B ⁽⁴⁾	VMWC-5A	VMWC-6A	VMWC-8A	VMWC-7A ⁽⁴⁾	VMWC-5B	VMWC-6B	VMWC-8B	VMWC-7B ⁽⁴⁾	VMWC-5D	VMWC-6D	VMWC-8D	VMWC-7D	VMWC-13D ⁽⁴⁾	VMWC-17D ⁽⁴⁾	VMWC-18A ⁽⁴⁾	VMWC-18B ⁽⁴⁾	
02/18/08	-1.16	-0.99	-0.16	-0.90	-0.51	-0.04	-0.10	-0.07	-0.04	-0.40	-0.08	-0.10	-0.05	-0.02	-0.03	-1.91	-1.47	-0.03 ⁽²⁾	-1.03	-0.17	-0.39	-0.05	-0.07	
02/19/08	-1.31	-1.08	-0.86	-0.96	-0.54	-0.26	-0.26	-0.62	-0.37	-0.29	-0.22	-0.74	-1.73	-0.33	-0.23	-2.19	-0.37 ⁽²⁾	-1.88	-1.4	-0.44	-0.53	-0.25	-0.26 ⁽³⁾	
02/25/08	-1.56	-1.23	-0.97	-1.07	-0.39	-0.29	-0.30	-0.70	-0.42	-0.31	-0.28	-0.82	-0.46	-0.35	-0.29	-1.21	-1.09	-0.88	-0.89	-0.39	-0.22	-0.24	-0.3	
03/03/08	-1.56	-1.20	-0.90	-0.98	-0.27	-0.26	-0.27	-0.68	-0.40	-0.31	-0.27	-0.83	-0.44	-0.35	-0.30	-0.90	-0.72	-0.65	-0.53	-0.24	-0.16	-0.24	-0.27	
03/17/08	-1.72	-1.51	-0.96	-1.15	-0.43	-0.31	-0.35	-0.69	-0.41	-0.33	-0.25	-0.78	-0.42	-0.36	-0.28	-1.15	-0.92	-0.82	-0.65	NM	-0.25	-0.29	-0.34	
04/16/08	-0.18	-0.15	-0.18	-0.13	-0.09	-0.08	-0.08	-0.26	-0.14	NM	-0.09	-0.22	-0.15	NM	-0.09	-0.23	-0.21	NM	-0.17	NM	-0.08	-0.08	-0.09	
05/19/08	-0.424	-0.391	-0.309	-0.310	-0.147	-0.162	-0.170	-0.328	-0.209	-0.180	-0.157	-0.327	-0.213	-0.156	-0.164	-1.097	-0.879	-0.763	-0.694	-0.223	-0.237	-0.139	-0.163	
06/02/08	-0.345	-0.283	-0.253	-0.227	-0.195	-0.159	-0.168	-0.310	-0.190	-0.148	-0.142	-0.311	-0.199	-0.169	-0.141	-1.047	-0.838	-0.730	-0.743	-0.180	NM	-0.129	-0.151	
07/07/08	-0.366	-0.269	-0.238	-0.311	-0.170	-0.160	-0.171	-0.310	-0.185	-0.156	-0.136	-0.344	-0.201	-0.170	-0.148	-1.047	-0.846	-0.757	-0.501	-0.189	NM	-0.132	-0.160	
08/06/08	-0.32	-0.27	-0.30	-0.22	-0.14	-0.14	-0.16	-0.24	-0.19	-0.19	-0.16	-0.34	-0.20	-0.19	-0.15	-0.95	-0.77	-0.75	-0.55	-0.19	-0.17	-0.13	-0.16	
09/18/08	NM	NM	NM	-0.342	-0.259	-0.165	-0.181	NM	NM	NM	-0.217	NM	NM	NM	-0.168	NM	NM	NM	NM	-0.388	-0.217	-0.134	-0.161	
Time Weighted Rolling Average:	NA	NA	NA	-0.460	-0.218	-0.179	-0.193	NA	NA	NA	-0.169	NA	NA	NA	-0.175	NA	NA	NA	NA	-0.224	-0.215	-0.160	-0.188	

Notes and Abbreviations:

DW Depressurization Well
NA Not Applicable
NM Not Measured
VMWC Vapor Monitoring Well Cluster

1. All induced vacuum measurements units in inches of water column (iwc).
2. Data point appears to be erroneous based on vacuum readings at further vapor point greater than that recorded at the closer location.
3. Data point is average of readings taken which fluctuated between -0.22 and -0.29 iwc.
4. Compliance vapor monitoring point.
5. Original parameter collected on 8/6/08 was erroneous, data point reported is second reading taken on 08/07/08.
6. Compliance goal is -0.1 iwc induced vacuum at all compliance monitoring points.
7. Non-compliance monitoring point measurements not taken as recommended in the February to June 2008 Operations Maintenance and Monitoring Report and Startup Summary.

Table 3. Summary of Total Influent and Effluent Vapor Sample Analytical Results, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.⁽²⁾

Compound ⁽³⁾ (units in ug/m3)	Location ID: Sample Date:		VSP-601 2/18/2008	VSP-602 2/18/2008	VSP-601 2/19/2008	VSP-602 2/19/2008	VSP-601 2/25/2008	VSP-602 2/25/2008
	CAS No.	SGC						
1,1,1-Trichloroethane	71-55-6	68,000	110	< 0.62	71	< 0.61	35	< 0.63
1,1-Dichloroethane	75-34-3	NS	43	< 0.62	33	< 0.61	45	< 0.63
1,1-Dichloroethene	75-35-4	—	< 14	< 0.62	< 11	< 0.61	< 25	< 0.63
2-Butanone	78-93-3	13,000	16	< 0.62	< 11	< 0.61	< 25	< 0.63
Acetone	67-64-1	180,000	< 140	< 6.2	< 110	< 6.1	< 250	< 6.3
Benzene	71-43-2	1,300	67	< 0.62	22	< 0.61	< 25	< 0.63
Trichlorofluoromethane (CFC-11)	75-69-4	68,000	< 14	< 0.62	< 11	< 0.61	< 25	< 0.63
Chloroform	67-66-3	150	34	< 0.62	24	< 0.61	< 25	< 0.63
cis-1,2-Dichloroethene	156-59-2	190,000 ⁽¹⁾	5800	< 0.62	4600	< 0.61	2900	< 0.63
Dichlorodifluoromethane (Freon 12)	75-71-8	NS	< 14	< 0.62	< 11	0.71	< 25	5.7
Tetrachloroethene	127-18-4	1,000	340	< 0.62	200	< 0.61	82	< 0.63
Toluene	108-88-3	37,000	92	< 0.62	98	< 0.61	34	< 0.63
trans-1,2-Dichloroethene	156-60-5	NS	120	< 0.62	71	< 0.61	< 25	< 0.63
Trichloroethylene	79-01-6	14,000	14000	< 0.62	9400	< 0.61	5100	< 0.63
Vinyl Chloride	75-01-4	180,000	< 14	< 0.62	< 11	< 0.61	< 25	1.1
TVOC			20,622	0.0	14,519	0.71	8,196	6.8

Notes and Abbreviations:

Bold Compound detected above method detection limit

CAS No. Chemical abstracts service list number

D Compound detected at a secondary dilution

NS Guideline concentrations not specified in the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007.

SGC Short-term guideline concentrations specified in the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007.

TVOC Total volatile organic compounds

ug/m³ Micrograms per cubic meter

1. An SGC was not provided in the DAR-1 AGC/SGC Tables, dated September 10, 2007. An interim SGC was developed based on in Section IV.A.2.b.1 of guidance provided 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 793,000 ug/m³ / 4.2 = 190,000 ug/m³.
2. Samples were collected by O&M personnel on the dates shown and submitted to Columbia Analytical Services Laboratory (Simi Valley, CA or Rochester, NY locations) for VOC analyses using USEPA Method TO-15 modified in accordance with the project Sampling and Analysis Plan (ARCADIS 2008). Data presented in this table corresponds to the period February - September 2008.
3. Table summarizes detected compounds only.

Table 3. Summary of Total Influent and Effluent Vapor Sample Analytical Results, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.⁽²⁾

Compound ⁽³⁾ (units in ug/m3)	Location ID: Sample Date:	VSP-601 3/3/2008	VSP-602 3/3/2008	VSP-601 3/17/2008	VSP-602 3/17/2008	VSP-601 4/16/2008	VSP-602 4/16/2008
	CAS No. SGC						
1,1,1-Trichloroethane	71-55-6 68,000	26	< 0.63	35	< 14	<25	< 15
1,1-Dichloroethane	75-34-3 NS	47	< 0.63	59	< 11	31	< 11
1,1-Dichloroethene	75-35-4 --	< 13	< 0.63	< 10	< 10	< 10	< 10
2-Butanone	78-93-3 13,000	< 13	< 0.63	< 16	< 16	< 16	< 16
Acetone	67-64-1 180,000	< 130	< 6.3	< 31	< 31	< 31	< 31
Benzene	71-43-2 1,300	< 13	< 0.63	< 8.4	< 8.4	< 8.4	< 8.4
Trichlorofluoromethane (CFC-11)	75-69-4 68,000	< 13	< 0.63	< 15	< 15	< 15	< 15
Chloroform	67-66-3 150	27	< 0.63	35	< 13	<22	< 13
cis-1,2-Dichloroethene	156-59-2 190,000 ⁽¹⁾	1600	< 0.63	1400 D	< 10	1100	78
Dichlorodifluoromethane (Freon 12)	75-71-8 NS	13	8.3	46	< 26	<46	< 26
Tetrachloroethene	127-18-4 1,000	45	< 0.63	39	< 3.6	54	< 3.7
Toluene	108-88-3 37,000	61	< 0.63	140	< 10	37	< 10
trans-1,2-Dichloroethene	156-60-5 NS	< 13	< 0.63	10	< 10	<19	< 10
Trichloroethylene	79-01-6 14,000	2500	< 0.63	1500 D	< 2.8	1300	< 2.9
Vinyl Chloride	75-01-4 180,000	200	40	980 D	920 D	120	710
TVOC		4,519	48.3	4,244	920	2,642	788

Notes and Abbreviations:

- Bold** Compound detected above method detection limit
CAS No. Chemical abstracts service list number
D Compound detected at a secondary dilution
NS Guideline concentrations not specified in the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007.
SGC Short-term guideline concentrations specified in the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007.
TVOC Total volatile organic compounds
ug/m³ Micrograms per cubic meter

1. An SGC was not provided in the DAR-1 AGC/SGC Tables, dated September 10, 2007. An interim SGC was developed based on in Section IV.A.2.b.1 of guidance provided 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 793,000 ug/m3 / 4.2 = 190,000 ug/m3.
2. Samples were collected by O&M personnel on the dates shown and submitted to Columbia Analytical Services Laboratory (Simi Valley, CA or Rochester, NY locations) for VOC analyses using USEPA Method TO-15 modified in accordance with the project Sampling and Analysis Plan (ARCADIS 2008). Data presented in this table corresponds to the period February - September 2008.
3. Table summarizes detected compounds only.

Table 3. Summary of Total Influent and Effluent Vapor Sample Analytical Results, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.⁽²⁾

Compound ⁽³⁾ (units in ug/m3)	Location ID: Sample Date:	VSP-601 5/19/2008	VSP-602 5/19/2008	VSP-601 6/2/2008	VSP-602 6/2/2008	VSP-601 7/7/2008	VSP-602 7/7/2008	
CAS No.	SGC							
1,1,1-Trichloroethane	71-55-6	68,000	38	< 2.7	44	< 2.5	48	< 6.5
1,1-Dichloroethane	75-34-3	NS	25	5.8	27	7.6	28	11
1,1-Dichloroethene	75-35-4	--	< 19	< 1.9	< 18	< 1.8	< 18	< 4.7
2-Butanone	78-93-3	13,000	< 28	< 2.9	28	< 2.7	27	< 7
Acetone	67-64-1	180,000	< 57	< 5.8	< 55	8.4	< 53	< 14
Benzene	71-43-2	1,300	19	< 1.6	< 15	< 1.5	150	< 3.8
Trichlorofluoromethane (CFC-11)	75-69-4	68,000	< 27	< 2.8	< 26	< 2.6	< 25	< 6.7
Chloroform	67-66-3	150	44	< 2.4	55	3	88	8.4
cis-1,2-Dichloroethene	156-59-2	190,000 ⁽¹⁾	950	180	930	230 D	1100	350
Dichlorodifluoromethane (Freon 12)	75-71-8	NS	< 48	< 4.9	< 45	< 4.5	< 44	< 12
Tetrachloroethene	127-18-4	1,000	42	< 0.67	48	2.2	61	< 1.6
Toluene	108-88-3	37,000	< 18	< 1.8	< 17	< 1.7	< 17	< 4.5
trans-1,2-Dichloroethene	156-60-5	NS	< 19	< 1.9	< 18	2.8	< 18	< 4.7
Trichloroethylene	79-01-6	14,000	1000	5.3	1100	6.5	1500	7.7
Vinyl Chloride	75-01-4	180,000	< 12	65	< 12	13	< 11	5.9
TVOC			2,118	256.1	2,232	273.5	3,002	383

Notes and Abbreviations:

- Bold** Compound detected above method detection limit
CAS No. Chemical abstracts service list number
D Compound detected at a secondary dilution
NS Guideline concentrations not specified in the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007.
SGC Short-term guideline concentrations specified in the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007.
TVOC Total volatile organic compounds
ug/m³ Micrograms per cubic meter

1. An SGC was not provided in the DAR-1 AGC/SGC Tables, dated September 10, 2007. An interim SGC was developed based on in Section IV.A.2.b.1 of guidance provided 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 793,000 ug/m3 / 4.2 = 190,000 ug/m3.
2. Samples were collected by O&M personnel on the dates shown and submitted to Columbia Analytical Services Laboratory (Simi Valley, CA or Rochester, NY locations) for VOC analyses using USEPA Method TO-15 modified in accordance with the project Sampling and Analysis Plan (ARCADIS 2008). Data presented in this table corresponds to the period February - September 2008.
3. Table summarizes detected compounds only.

Table 3. Summary of Total Influent and Effluent Vapor Sample Analytical Results, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.⁽²⁾

Compound ⁽³⁾ (units in ug/m3)	Location ID: Sample Date:	VSP-601 8/6/2008	VSP-602 8/6/2008	VSP-601 9/24/2008	VSP-602 9/24/2008
	CAS No. SGC				
1,1,1-Trichloroethane	71-55-6 68,000	47	< 4.4	77	9.7
1,1-Dichloroethane	75-34-3 NS	26	9.2	47	26
1,1-Dichloroethene	75-35-4 --	< 22	< 3.2	< 21	3.5
2-Butanone	78-93-3 13,000	< 32	< 4.7	< 31	< 3.2
Acetone	67-64-1 180,000	< 65	< 9.6	< 63	< 6.3
Benzene	71-43-2 1,300	22	< 2.6	< 17	< 1.7
Trichlorofluoromethane (CFC-11)	75-69-4 68,000	< 31	5.5	< 30	11
Chloroform	67-66-3 150	89	8.2	160	35
cis-1,2-Dichloroethene	156-59-2 190,000 ⁽¹⁾	990	320 D	1500	620 D
Dichlorodifluoromethane (Freon 12)	75-71-8 NS	< 54	< 8	< 53	< 5.3
Tetrachloroethene	127-18-4 1,000	56	< 1.1	64	0.88
Toluene	108-88-3 37,000	< 20	< 3	< 20	< 2
trans-1,2-Dichloroethene	156-60-5 NS	< 22	3.6	< 21	8.6
Trichloroethylene	79-01-6 14,000	1400	9.2	1500	120
Vinyl Chloride	75-01-4 180,000	< 14	4.9	< 14	4.9
TVOC		2,630	361	3348	829

Notes and Abbreviations:

Bold Compound detected above method detection limit

CAS No. Chemical abstracts service list number

D Compound detected at a secondary dilution

NS Guideline concentrations not specified in the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007.

SGC Short-term guideline concentrations specified in the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007.

TVOC Total volatile organic compounds

ug/m³ Micrograms per cubic meter

1. An SGC was not provided in the DAR-1 AGC/SGC Tables, dated September 10, 2007. An interim SGC was developed based on in Section IV.A.2.b.1 of guidance provided 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 793,000 ug/m³ / 4.2 = 190,000 ug/m³.
2. Samples were collected by O&M personnel on the dates shown and submitted to Columbia Analytical Services Laboratory (Simi Valley, CA or Rochester, NY locations) for VOC analyses using USEPA Method TO-15 modified in accordance with the project Sampling and Analysis Plan (ARCADIS 2008). Data presented in this table corresponds to the period February - September 2008.
3. Table summarizes detected compounds only.

ARCADIS

Table 4. Summary of Condensate Sample Analytical Results, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York. ⁽²⁾

	Location ID:	NA
	Sample Date:	NA
Compound ⁽³⁾ (units in ug/L)		
	CAS No.	
1,1-Dichloroethane	75-34-3	
2-Butanone	78-93-3	
Acetone	67-64-1	
cis-1,2-Dichloroethene	156-59-2	No Sampling Performed During The Report Period
Isopropylbenzene	98-82-8	
Toluene	108-88-3	
trans-1,2-Dichloroethene	156-60-5	
Trichloroethylene	79-01-6	
Vinyl Chloride	75-01-4	
TVOC ⁽¹⁾		NA

Notes and Abbreviations:

Bold	Compound detected above method detection limit
CAS No.	Chemical abstracts service list number
D	Compound detected at a secondary dilution
TVOC	Total volatile organic compounds
ug/L	Micorgrams per liter
NA	Not applicable

1. Total volatile organic compounds determined by summing individual detections and rounding to the nearest whole number.
2. Samples were collected by O&M personnel on the dates shown and submitted to Columbia Analytical Services Laboratory (Rochester, NY) for VOC analyses using Method 8260 in accordance with the project Sampling and Analysis Plan (ARCADIS 2008) . Data presented in this table corresponds to the period August - September 2008.
3. Table summarizes detected compounds only.

ARCADIS

Table 5. Air Emissions Model Output Summary, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Compound ⁽¹⁾	AGC ⁽²⁾ ($\mu\text{g}/\text{m}^3$)	Percent of MASC Per Event ⁽³⁾											Cumulative % MASC ⁽⁴⁾
		2/18/2008	2/19/2008	2/25/2008	3/3/2008	3/17/2008	4/16/2008	5/19/2008	6/2/2008	7/7/2008	8/6/2008	9/24/2008	
Vinyl chloride	0.11	0.00%	0.00%	0.04%	1.60%	36.84%	20.63%	1.91%	0.41%	0.20%	0.14%	0.14%	5.38%
1,1-Dichloroethane	0.63	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.04%	0.06%	0.05%	0.13%	0.04%
Trichloroethylene	0.5	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.05%	0.06%	0.06%	0.78%	0.07%
Tetrachloroethylene	1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
cis-1,2-Dichloroethylene	63	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.03%	0.01%
Dichlorodifluoromethane (Freon 12)	12,000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Acetone	28,000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Chloroform	0.043	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.24%	0.68%	0.62%	2.63%	0.44%
trans-1,2-Dichloroethene	63	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Trichlorofluoromethane (Freon 11)	1,000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1,1-Dichloroethene	70	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1,1,1-Trichloroethane	1,000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

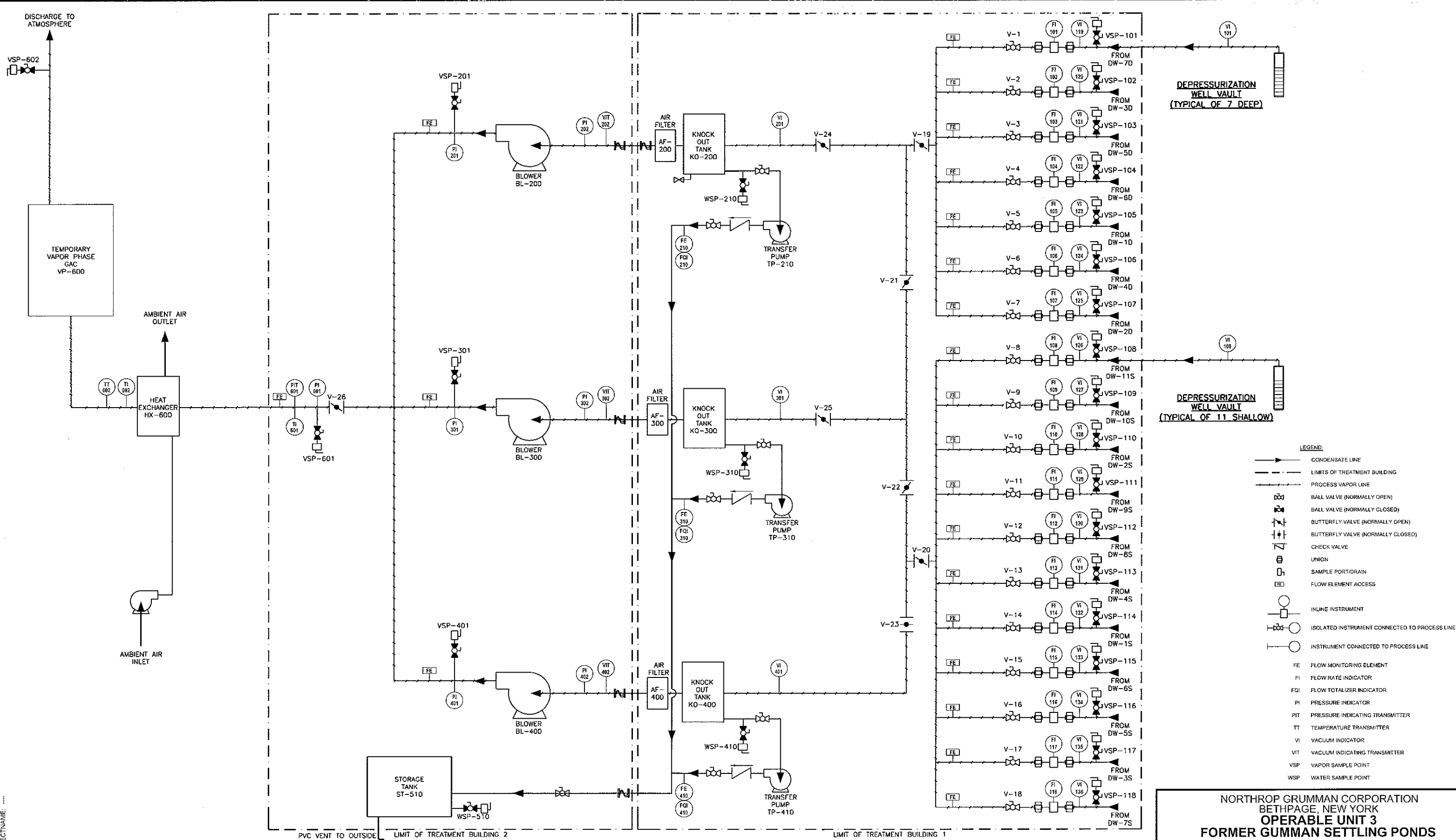
Notes:

1. Compounds listed include all compounds detected in the system effluent vapor stream.
2. AGC refers to the compound-specific annual guideline concentration per the NYSDEC DAR-1 AGC/SGC tables, revised September 10, 2007. NYSDEC DAR-1 AGCs were scaled using the results of a site-specific annual USEPA SCREEN 3 model to calculate the annual maximum allowable stack concentration (MASC) per monitoring event.
3. Percent of AGC was calculated by dividing the actual effluent concentration by the site-specific annual MASC. Detailed calculations are included in Appendix C.
4. Cumulative percent of the MASC was calculated using a time-weighted average of the percent MASC per event.

$\mu\text{g}/\text{m}^3$ - Micrograms per cubic meter.

AGC - Annual guideline concentration.

CITY: (Reqd) DIV: GROUP: (Reqd) DB: (Reqd) LD: (Opt) PIC: (Opt) TM: (Opt) LVR: (Opt) OFF: (Ref)
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NORTHROP GRUMMAN CORPORATION
BETHPAGE, NEW YORK
OPERABLE UNIT 3
FORMER GUMMAN SETTLING PONDS

PROCESS FLOW DIAGRAM
SOIL GAS INTERIM REMEDIAL MEASURE

ARCADIS

FIGURE
3

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Appendix A

Summary of Vapor Sample
Analytical Results Including
Tentatively Identified Compounds

Appendix A-1. Summary of Total Influent and Effluent Vapor Sample Analytical Results, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.⁽¹⁾

Compound (units in ug/m3)	Location ID: Sample Date:	VSP-601 9/24/2008	VSP-602 9/24/2008
	CAS No.		
1,1,1-Trichloroethane	71-55-6	77	9.7
1,1,2,2-Tetrachloroethane	79-34-5	< 7.3	< 0.73
1,1,2-Trichloroethane	79-00-5	< 29	< 2.9
1,1-Dichloroethane	75-34-3	47	26
1,1-Dichloroethene	75-35-4	< 21	3.5
1,2-Dichloroethane	107-06-2	< 22	< 2.2
1,2-Dichloropropane	78-87-5	< 25	< 2.5
1,3-Butadiene	106-99-0	< 24	< 2.4
2-Butanone	78-93-3	< 31	< 3.2
2-Hexanone	591-78-6	< 22	< 2.2
4-Methyl-2-Pentanone	108-10-1	< 44	< 4.4
Acetone	67-64-1	< 63	< 6.3
Benzene	71-43-2	< 17	< 1.7
Bromodichloromethane	75-27-4	< 7.1	< 0.72
Bromoform	75-25-2	< 55	< 5.5
Bromomethane	74-83-9	< 21	< 2.1
Carbon Disulfide	75-15-0	< 17	< 1.7
Carbon Tetrachloride	56-23-5	< 6.7	< 0.67
Trichlorofluoromethane (CFC-11)	75-69-4	< 30	11
Chlorobenzene	108-90-7	< 25	< 2.5
Chlorodibromomethane	124-48-1	< 9.1	< 0.91
Chloroethane	75-00-3	< 28	< 2.8
Chloroform	67-66-3	160	35
Chloromethane	74-87-3	< 22	< 2.2
cis-1,2-Dichloroethene	156-59-2	1500	620 D
cis-1,3-Dichloropropene	10061-01-5	< 48	< 4.9
Ethylbenzene	100-41-4	< 46	< 4.6
Trichlorotrifluoroethane (Freon 113)	76-13-1	< 8.2	< 0.82
Dichlorodifluoromethane (Freon 12)	75-71-8	< 53	< 5.3
Methyl Tert-Butyl Ether	1634-04-4	< 38	< 3.9
Methylene Chloride	75-09-2	< 18	< 1.9
Styrene	100-42-5	< 45	< 4.6
Tetrachloroethene	127-18-4	64	0.88
Toluene	108-88-3	< 20	< 2
trans-1,2-Dichloroethene	156-60-5	< 21	8.6
trans-1,3-Dichloropropene	10061-02-6	< 24	< 2.4
Trichloroethylene	79-01-6	1500	120
Vinyl Chloride	75-01-4	< 14	4.9
Xylene-o	95-47-6	< 46	< 4.6
Xylenes - m,p	NA	< 92	< 9.3
TVOC		3348	829

Notes and Abbreviations on last page.

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Appendix A-1. Summary of Total Influent and Effluent Vapor Sample Analytical Results, Northrop Grumman Operable Unit 3
Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.⁽¹⁾

Notes and Abbreviations:

Bold	Compound detected above method detection limit
CAS No.	Chemical abstracts service list number
D	Compound detected at a secondary dilution
TVOC	Total volatile organic compounds
ug/m ³	Micrograms per cubic meter

1. Samples were collected by O&M personnel on the dates shown and submitted to Columbia Analytical Services Laboratory (Rochester, NY) for VOC analyses using USEPA Method TO-15 modified in accordance with the project Sampling and Analysis Plan (ARCADIS 2008) . Data presented in this table corresponds to the period August - September 2008.

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Appendix A-2. Summary of Total Influent and Effluent Vapor Sample Analytical Results, Tentatively Identified Compounds, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.⁽²⁾

Tentatively Identified Compounds ^(3,4,5) (units in ppbv)	Location ID:	VSP-601	VSP-602
	Sample Date:	09/24/08	09/24/08
Chlorodifluoromethane + Propene + Propane		--	--
Hexamethylcyclotrisiloxane ⁽¹⁾		--	--
2-Ethyl-1-hexanol		--	--
n-Nonanal		--	--
Chlorodifluoromethane (Freon 22)		270	140
Ethanol		--	--
Acetophenone		--	--
alpha-Cumyl Alcohol		--	--
Chloroethene		--	--
Methylcyclohexane		--	--
Propane		--	--
Acetaldehyde		--	--
Unknown CFC		--	--
3-Methyl-Hexane		--	--
Heptane		--	--
Unknown cyclic hydrocarbon		--	--
1,2,4-trimethylcyclopentane		--	--
Unknown aliphatic hydrocarbon		--	--
Unknown aliphatic hydrocarbon		--	--
1,3-dimethyl-cis-cyclohexane		--	--
Ethane, 1-chloro-1,1-difluoro (Freon 142)		190	140

Notes and Abbreviations:

-- Not Reported during this sampling event.

Bold Detected

ppbv Parts per billion by volume.

1. Possible laboratory artifact.

2. Samples were collected by O&M personnel on the dates shown and submitted to Columbia Analytical Services Laboratory (Rochester, NY) for VOC analyses using USEPA Method TO-15 modified in accordance with the project Sampling and Analysis Plan (ARCADIS 2008). Data presented in this table corresponds to the period August - September 2008.

3. Tentatively Identified Compounds (TICs) are identified based on review of mass spectrometry results via a comprehensive library search of all organic compounds.

4. All results are estimated.

5. Results from initial analytical run tabulated when multiple dilutions reported by laboratory.

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Appendix B

Summary of Condensate Sample
Analytical Results Including
Tentatively Identified Compounds

Appendix B-1. Summary of Condensate Sample Analytical Results, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York. ⁽²⁾

Compound (units in ug/L)	Location ID: Sample Date:	NA NA
CAS No.		
1,1,1-Trichloroethane	71-55-6	No Sampling Performed During The Report Period
1,1,2,2-Tetrachloroethane	79-34-5	
1,1,2-Trichloroethane	79-00-5	
1,1-Dichloroethane	75-34-3	
1,1-Dichloroethene	75-35-4	
1,2,4-Trichlorobenzene	120-82-1	
1,2-Dibromo-3-Chloropropane (DBCP)	96-12-8	
1,2-Dibromoethane (EDB)	106-93-4	
1,2-Dichlorobenzene	95-50-1	
1,2-Dichloroethane	107-06-2	
1,2-Dichloropropane	78-87-5	
1,4-Dichlorobenzene	106-46-7	
2-Butanone	78-93-3	
2-Hexanone	591-78-6	
4-Methyl-2-Pentanone	108-10-1	
Acetone	67-64-1	
Benzene	71-43-2	
Bromodichloromethane	75-27-4	
Bromoform	75-25-2	
Bromomethane	74-83-9	
Carbon Disulfide	75-15-0	
Carbon Tetrachloride	56-23-5	
Trichlorofluoromethane (CFC-11)	75-69-4	
Chlorobenzene	108-90-7	
Chlorodibromomethane	124-48-1	
Chloroethane	75-00-3	
Chloroform	67-66-3	
Chloromethane	74-87-3	
cis-1,2-Dichloroethene	156-59-2	
cis-1,3-Dichloropropene	10061-01-5	
Cyclohexane	110-82-7	
Ethylbenzene	100-41-4	
Trichlorotrifluoroethane (Freon 113)	76-13-1	
Dichlorodifluoromethane (Freon 12)	75-71-8	
Isopropylbenzene	98-82-8	
m-Dichlorobenzene	541-73-1	
Methyl Acetate	79-20-9	
Methyl tert-butyl ether	1634-04-4	
Methylcyclohexane	108-87-2	
Methylene Chloride	75-09-2	
Styrene	100-42-5	
Tetrachloroethene	127-18-4	
Toluene	108-88-3	
trans-1,2-Dichloroethene	156-60-5	
trans-1,3-Dichloropropene	10061-02-6	
Trichloroethylene	79-01-6	
Vinyl Chloride	75-01-4	
Xylene-o	95-47-6	
Xylenes - m,p	179601-23-1	
TVOC		NA

Notes and abbreviations on next page.

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Appendix B-1. Summary of Condensate Sample Analytical Results, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York. ⁽²⁾

Notes and Abbreviations:

Bold	Compound detected above method detection limit
CAS No.	Chemical abstracts service list number
D	Compound detected at a secondary dilution
TVOC	Total volatile organic compounds
ug/L	Micograms per liter
NA	Not applicable

1. Total volatile organic compounds determined by summing individual detections and rounding to the nearest whole number.
2. Samples were collected by O&M personnel on the dates shown and submitted to Columbia Analytical Services Laboratory (Rochester, NY) for VOC analyses using Method 8260 in accordance with the project Sampling and Analysis Plan (ARCADIS 2008) . Data presented in this table corresponds to the period August - September 2008.

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Appendix B-2. Summary of Condensate Sample Analytical Results, Tentatively Identified Compounds (TICs), Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York. ⁽²⁾

Tentatively Identified Compounds ^(1,3) (units in ug/L)	Sample ID:	NA
	Date:	NA
Unknown	No Sampling Performed During The Report Period	
Ethanol		
Furan, tetrahydro-		
Unknown alcohol		
Cyclohexanone		
Isopropyl Alcohol		
Butanal		
Heptanal		
1-Hexanol, 2-ethyl-		

Notes and Abbreviations:

- Not Reported
 - Bold** Detected
 - J Estimated value
 - N Presumptive evidence of this constituent. Calibrations were not run for these constituents; therefore, the results should be used for qualitative purposes only.
 - NA Not applicable
 - ug/L Micograms per liter
- TICs are identified based on review of mass spectrometry results via a comprehensive library search of all organic compounds.
 - Samples were collected by O&M personnel on the dates shown and submitted to Columbia Analytical Services Laboratory (Rochester, NY) for VOC analyses using Method 8260 in accordance with the project Sampling and Analysis Plan (ARCADIS 2008) . Data presented in this table corresponds to the period August -September 2008.
 - All results are estimated.

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Appendix C

Air Modeling Calculations

Table C-1. Summary of SCREEN3 Model Input and Outputs, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Parameters	Date Sampled:	2/18/2008	2/19/2008	2/25/2008	3/3/2008	3/17/2008	4/16/2008	5/19/2008	6/2/2008	7/7/2008	8/6/2008	9/24/2008
SCREEN3 Model Input												
Source Type	Point	Point	Point	Point	Point	Point	Point	Point	Point	Point	Point	Point
Emission Rate (g/s)	1	1	1	1	1	1	1	1	1	1	1	1
Stack Height (ft)	33	33	33	33	33	33	33	33	33	33	33	33
Stack Height (m)	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
Stack Inside Diameter (m)	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
Air Flow Rate (scfm) ⁽¹⁾	1,964	1,674	1,679	1,793	1,774	641	666	746	829	640	638	
Air Flow Rate (acfm @ stack temp) ⁽²⁾	2,048	1,717	1,754	1,873	1,859	655	671	766	860	670	668	
Stack Gas Exit Temperature (K) ⁽¹⁾	307	302	308	308	309	301	296	303	305	308	308	
Ambient Air Temperature (K) ⁽³⁾	283	275	274	275	276	281	284	294	298	299	289	
Receptor Height (m) ⁽⁴⁾	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Urban/Rural	Urban	Urban	Urban	Urban	Urban	Urban	Urban	Urban	Urban	Urban	Urban	
Building Height (m)	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	
Min Horizontal Bldg Dim (m)	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	
Max Horizontal Bldg Dim (m)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Consider Bldg Downwash?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Simple/Complex Terrain Above Stack	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	
Simple/Complex Terrain Above Stack Base	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	
Meteorology	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	
Automated Distances Array	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Terrain Height Above Stack Base	0	0	0	0	0	0	0	0	0	0	0	
SCREEN3 Model Output												
1-HR Max	596.3	698.3	638.3	622.9	627.6	1,292	1,278	1,200	1,129	1,279	1,281	
Annualization Factor ⁽⁶⁾	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	
Average Annual Concentration at Receptor Height (ug/m ³) ⁽⁷⁾	47.7	55.9	51.1	49.8	50.2	103.4	102.2	96	90.3	102.3	102.5	
Distance To Max Concentration (m) ⁽⁸⁾	66	61	64	64	64	45	45	47	48	45	45	

See notes last page.

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Table C-1. Summary of SCREEN3 Model Input and Outputs, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Notes

1. The stack air flow rate (in scfm) and temperature were measured using a handheld thermo-anemometer. Values were measured immediately prior to where the effluent air stream enters the vapor-phase carbon unit.
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.

g/s - Grams per second

ft - Feet

m - Meters

scfm - Standard cubic feet per minute

acfm - Actual cubic feet per minute

K - Kelvin

$\mu\text{g}/\text{m}^3$ - Micrograms per cubic meter

Table C-2. Summary of Annual Maximum Allowable Stack Concentration Calculations, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Compound	Actual Effluent Concentrations ⁽¹⁾ (µg/m ³)										
	2/18/2008	2/19/2008	2/25/2008	3/3/2008	3/17/2008	4/16/2008	5/19/2008	6/2/2008	7/7/2008	8/6/2007	9/24/2008
Vinyl chloride	0	0	1.1	40	920	710	65	13	6	4.9	4.9
1,1-Dichloroethane	0	0	0	0	0	0	5.8	7.6	11	9.2	26
Trichloroethylene	0	0	0	0	0	0	5.3	6.5	7.7	9.2	120
Tetrachloroethylene	0	0	0	0	0	0	0	2.2	0	0	0.88
cis-1,2-Dichloroethylene	0	0	0	0	0	78	180	230	350	320	620
Dichlorodifluoromethane (Freon 12)	0	0.71	5.7	8.3	0	0	0	0	0	0	0
Acetone	0	0	0	0	0	0	0	8.4	0	0	0
Chloroform	0	0	0	0	0	0	0	3	8	8.2	35
trans-1,2-Dichloroethene	0	0	0	0	0	0	0	2.8	0	3.6	8.6
Trichlorofluoromethane (Freon 11)	0	0	0	0	0	0	0	0	0	5.5	11
1,1-Dichloroethene	0	0	0	0	0	0	0	0	0	0	3.5
1,1,1-Trichloroethane	0	0	0	0	0	0	0	0	0	0	9.7

Compound	AGC ⁽²⁾ (µg/m ³)	Annual Maximum Allowable Stack Concentration (µg/m ³)										
		2/18/2008	2/19/2008	2/25/2008	3/3/2008	3/17/2008	4/16/2008	5/19/2008	6/2/2008	7/7/2008	8/6/2008	9/24/2008
Vinyl chloride	0.11	2.39E+03	2.43E+03	2.60E+03	2.50E+03	2.50E+03	3.44E+03	3.40E+03	3.17E+03	3.00E+03	3.40E+03	3.40E+03
1,1-Dichloroethane	0.63	1.37E+04	1.39E+04	1.49E+04	1.43E+04	1.43E+04	1.97E+04	1.95E+04	1.82E+04	1.72E+04	1.95E+04	1.95E+04
Trichloroethylene	0.5	1.08E+04	1.10E+04	1.18E+04	1.14E+04	1.14E+04	1.56E+04	1.54E+04	1.44E+04	1.36E+04	1.55E+04	1.55E+04
Tetrachloroethylene	1	2.17E+04	2.21E+04	2.36E+04	2.27E+04	2.27E+04	3.13E+04	3.09E+04	2.88E+04	2.73E+04	3.09E+04	3.09E+04
cis-1,2-Dichloroethylene	63	1.37E+06	1.39E+06	1.49E+06	1.43E+06	1.43E+06	1.97E+06	1.95E+06	1.82E+06	1.72E+06	1.95E+06	1.95E+06
Dichlorodifluoromethane (Freon 12)	12,000	2.60E+08	2.65E+08	2.84E+08	2.73E+08	2.72E+08	3.75E+08	3.71E+08	3.46E+08	3.27E+08	3.71E+08	3.71E+08
Acetone	28,000	6.07E+08	6.18E+08	6.62E+08	6.36E+08	6.36E+08	8.76E+08	8.65E+08	8.07E+08	7.64E+08	8.66E+08	8.66E+08
Chloroform	0.043	9.33E+02	9.49E+02	1.02E+03	9.77E+02	9.76E+02	1.35E+03	1.33E+03	1.24E+03	1.17E+03	1.33E+03	1.33E+03
trans-1,2-Dichloroethene	63	1.37E+06	1.39E+06	1.49E+06	1.43E+06	1.43E+06	1.97E+06	1.95E+06	1.82E+06	1.72E+06	1.95E+06	1.95E+06
Trichlorofluoromethane (Freon 11)	1,000	2.17E+07	2.21E+07	2.36E+07	2.27E+07	2.27E+07	3.13E+07	3.09E+07	2.88E+07	2.73E+07	3.09E+07	3.09E+07
1,1-Dichloroethene	70	1.52E+06	1.55E+06	1.65E+06	1.59E+06	1.59E+06	2.19E+06	2.16E+06	2.02E+06	1.91E+06	2.16E+06	2.17E+06
1,1,1-Trichloroethane	1,000	2.17E+07	2.21E+07	2.36E+07	2.27E+07	2.27E+07	3.13E+07	3.09E+07	2.88E+07	2.73E+07	3.09E+07	3.09E+07

See notes last page.

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Table C-2. Summary of Annual Maximum Allowable Stack Concentration Calculations, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.

Compound	Percent of Annual Maximum Allowable Stack Concentration ⁽⁴⁾										
	2/18/2008	2/19/2008	2/25/2008	3/3/2008	3/17/2008	4/16/2008	5/19/2008	6/2/2008	7/7/2008	8/6/2008	9/24/2008
Vinyl chloride	0.00%	0.00%	0.04%	1.60%	36.84%	20.63%	1.91%	0.41%	0.20%	0.14%	0.14%
1,1-Dichloroethane	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.04%	0.06%	0.05%	0.13%
Trichloroethylene	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.05%	0.06%	0.06%	0.78%
Tetrachloroethylene	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%
cis-1,2-Dichloroethylene	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.03%
Dichlorodifluoromethane (Freon 12)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Acetone	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Chloroform	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.24%	0.68%	0.62%	2.63%
trans-1,2-Dichloroethene	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Trichlorofluoromethane (Freon 11)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1,1-Dichloroethene	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1,1,1-Trichloroethane	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Notes:

1. Actual effluent concentrations are analytical results from air samples collected on the dates shown.
2. AGC refers to the compound-specific annual guideline concentration per the NYSDEC DAR-1 AGC/SGC tables, revised September 10, 2007.
3. Annual maximum allowable stack concentrations were calculated by dividing the product of the annual guideline concentration of a compound and the ratio of the SCREEN3 gas emission rate and the SCREEN 3 average annual concentration at receptor height by the air flow rate at the stack temperature and multiplying by the appropriate conversion factors.
4. Percent of MASC was calculated by dividing the actual effluent concentration by the MASC for a given monitoring event.

µg/m³ - Micrograms per cubic meter
 AGC - Annual guideline concentration