

Northrop Grumman Systems Corporation

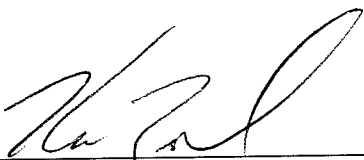
**Operable Unit 3- Interim Operation,
Maintenance and Monitoring Report**

January 2009 to March 2009

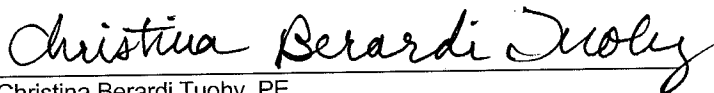
Operable Unit 3 – Soil Gas Interim Remedial Measure
Former Grumman Settling Ponds
Bethpage, New York

NYSDEC ID # 1-30-003A

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Remedial Measure

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Bethpage, New York

NYSDEC ID# 1-30-003A

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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 December 19, 2008 through March 19, 2009. The soil gas IRM 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 January 23, 2009 (ARCADIS 2009a). 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 SAP (ARCADIS 2008) was approved by the NYSDEC in a letter dated August 1, 2008 (NYSDEC 2008a).

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 (NYSDEC 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 record drawings is provided in the OM&M Manual (ARCADIS 2009a).

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 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; and,
- 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 2009a).

3. Operation and Maintenance Activities

In general, the soil gas IRM operated continuously during the reporting period with brief system shutdowns for routine maintenance or troubleshooting activities. Routine monthly OM&M activities conducted this period included inspection of all piping, appurtenances, and 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 (ARCADIS 2009a). Additionally, the following non-routine maintenance activities were also completed this period:

- As described in the 2008 Annual Summary Report (ARCADIS 2009b), all individual depressurization well flow meters were replaced with acrylic, “rotameter”-type flow meters. The flow meters were replaced to better bracket the actual flow rate range

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observed from each of the individual wells and to allow for easier monitoring of individual flow rates by system operators. The flow meters were replaced during the week of December 22, 2008.

- As referenced in the 2008 Annual Summary Report (ARCADIS 2009b), the temporary 10,000-lb vapor phase granular activated carbon (VPGAC) unit was removed from service on December 29, 2008, as approved by the NYSDEC (NYSDEC 2008b). Following removal of the VPGAC unit, temporary, flexible pipe was installed from the effluent of the heat exchanger to the stack. Final effluent pipe (i.e., rigid PVC pipe) was installed from the effluent of the heat exchanger to the stack on January 8, 2009.
- A non-routine site visit was completed on February 10, 2009 to rebalance the system depressurization wells in response to the removal of the VPGAC unit and installation of the new flow meters. System rebalancing was achieved by adjusting the individual manifold flow control valves until each of the depressurization wells respective flow rate was consistent with data from the December 2008 monitoring event. In addition, the operation of regenerative Blower BL-300 (20 hp) was replaced with regenerative Blower BL-200 (30 hp) due to the increased pressure loss caused by the new flow meters. Accordingly, the system currently operates with Blower BL-200 in operation and Blowers BL-300 and BL-400 on standby.
- A non-routine site visit was completed on February 17, 2009 in response to a system low temperature alarm from the autodialer. It was noted that the ventilation fan was left in the "hand" mode which caused the low temperature alarm. The ventilator was returned to "auto" mode (i.e., thermostat controlled) and the system was restarted. The system was down for approximately 4 hours.
- On March 12, 2009, condensate was removed from individual below grade depressurization pipelines using a liquid-vacuum truck. As referenced in the 2008 Annual Summary Report (ARCADIS 2009b), the manifold vacuum at several individual depressurization wells had gradually increased over several months of operation. The condensate removal effort generated approximately 257 gallons of condensate from the depressurization pipelines and resulted in an immediate decrease in manifold vacuum for the respective depressurization wells. Combined, these data indicate that the gradual increase in manifold vacuums was caused by the buildup of condensate within the below grade pipelines. Following removal of the condensate, the soil gas IRM system flow rates and vacuums were rebalanced the same business day.

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

4. Monitoring Activities

The following sections summarize the methodologies used for routine performance monitoring and routine compliance monitoring during the subject reporting period. The performance monitoring program is completed to ensure that the system components are operating in accordance with the manufacturers specifications 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

The routine performance monitoring event for this report period was completed on March 19, 2009, in accordance with Table C-1 of the SAP (ARCADIS 2008). A brief discussion of the routine performance monitoring methodology and/or deviations (if applicable for the subject reporting period) 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 2008). There were no significant deviations from the recording of these parameters during the routine monitoring event conducted this period. However, system operating parameters for Blowers BL-300 and BL-400 were not recorded due to these blowers being offline (i.e., these blowers have been placed in standby mode as a result of the rebalancing efforts referenced herein).

4.1.2 Vapor Samples

A screening level vapor sample was collected and monitored from VSP-601 using a photoionization detector (PID) during the routine monitoring event. In addition, due to

miscommunication with the field operator, PID measurements were inadvertently collected from individual depressurization wells during the reporting period.

A performance monitoring quantitative vapor sample (i.e., for laboratory analysis) was not collected during the March 2009 sampling event. As referenced in the 2008 Annual Summary Report (ARCADIS 2009b), the temporary VPGAC unit was permanently removed in December 2008 following NYSDEC approval (NYSDEC 2008b). Therefore, the collection of a performance monitoring quantitative vapor sample to evaluate the effectiveness of the VPGAC is no longer required.

4.2 Routine Compliance Monitoring

Routine compliance monitoring was completed on March 19, 2009 in accordance with Table C-1 of the SAP (ARCADIS 2008). A brief discussion of the routine compliance monitoring methodology and/or deviations (if applicable for the subject reporting period) from the methodology described in the SAP is provided below.

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 2009a).

4.2.2 Vapor Samples

One (1) routine, compliance monitoring vapor sample was collected for laboratory analysis from the total effluent sample location (VSP-601) during the March 19, 2009 monitoring event. The sample was collected and submitted for laboratory analysis in accordance with the requirements described in Section 4.1.2.

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 prior to the June 2009 monitoring event.

4.2.3 Condensate Samples

A compliance monitoring condensate sample was not collected for laboratory analysis during the reporting period. The collection of a compliance monitoring condensate sample for the condensate generated per the activities referenced in Section 5.1.1 has been scheduled for Spring 2009.

5. Monitoring Results and Discussion

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

5.1 Routine Performance Monitoring

This following section summarizes the results of the routine system performance monitoring event completed on March 19, 2009.

5.1.1 System Operating Parameters

A summary of the performance monitoring system operating parameters for the March 19, 2009 monitoring event is provided in Table 1.

As shown in Table 1, individual depressurization well flow rates and wellhead vacuums generally remained consistent with historical data while the individual well manifold vacuums and general blower operating parameters varied when compared to historical data. The variation in manifold vacuums and general blower operating parameters is the direct result of the increased pressure loss caused by the new manifold flow meters and the removal of the VPGAC unit.

Key data and observations are as follows:

- The observed manifold vacuum increased at all depressurization wells with the exception of Depressurization Wells DW-3S, DW-5D, and DW-4S which remained generally consistent or decreased when comparing March 2009 to December 2008 data. The observed increase in vacuum is the direct result of the increased pressure loss caused by the new manifold flow meters. The decrease in manifold vacuum at Depressurization Wells DW-3S, DW-5D, and DW-4S is likely the result of the condensate removal activities referenced in Section 3.0.

- The flow rate and wellhead vacuum at all individual depressurization wells, with the exception of Depressurization Well DW-5D, generally remained consistent when comparing March 2009 to December 2008 data. The flow rate at Depressurization Well DW-5D decreased approximately 50 percent; however was consistent with historical data (i.e., monitoring data collected prior to December 2008). This data, combined with induced vacuum monitoring data (see Section 5.2), indicate that the rebalancing effort was successful.
- PID readings from individual depressurization wells were generally consistent with historical data and varied from 0.0 parts per million by volume (ppmv) to 8.6 ppmv with the majority of the data being 0.0 ppmv. Depressurization Well DW-2S had the highest concentration at 8.6 ppmv.
- Approximately 100 gallons of condensate water was generated during the reporting period through normal system operation (i.e., collection within the liquid knockout tanks). As referenced in Section 3.0, an additional 257 gallons of condensate were generated from the below grade depressurization lines using a liquid-vacuum truck on March 12, 2009.
- The heat exchanger influent temperature 100 degrees Fahrenheit remained lower than the design influent temperature of 150 degrees Fahrenheit. Accordingly, the heat exchanger was kept on standby during the reporting period.

5.1.2 Vapor Samples

A summary of the December 2008 qualitative vapor sample analytical results (i.e., PID readings) is provided in Table 1. Qualitative vapor analyses were consistent with previous data and were 0.4 ppmv for vapor sample location VSP-601.

5.2 Routine Compliance Monitoring

This following section summarizes the results of the routine system compliance monitoring event completed on March 19, 2009.

5.2.1 Induced Vacuum Measurements

Induced vacuum measurements collected during the March 19, 2009 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 an annual time-weighted rolling

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average within all monitoring points. Accordingly, the annual time-weighted rolling average for the compliance related induced vacuum monitoring points has been provided in Table 2. As shown on Table 2, the rolling average for all compliance related monitoring points was greater than or equal to -0.1 iwc as of March 19, 2009. In addition, the average induced vacuum for compliance monitoring wells during the March 19, 2009 monitoring event was -0.19 iwc, which indicate that the soil gas IRM is operating as designed. It should be noted that several of the induced vacuums readings increased when comparing March 2009 to December 2008 data. ARCADIS believes the increase could be the result of the condensate removal activities described in Section 3.0.

5.2.2 Vapor Samples

A summary of the March 2009 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.

Total effluent (VSP-601) laboratory analytical results for the March 19, 2009 monitoring event increased when compared with analytical results from December 18, 2008 but remained consistent with historical data collected prior to December 2008. Specifically, the TVOC concentration was 2,487 ug/m³ during the March 2009 monitoring event. Additionally, the concentration of all environmentally "A" rated compounds ([i.e., VC] as defined in DAR 1 AGC/SGC tables revised September 10, 2007) was below the limits of detection during this report period. A summary of the air emissions model, completed to confirm compliance with applicable air discharge standards, is discussed in Section 6 of this report.

Several TICs were identified by the analytical laboratory. Similar to previous data, Freon 22 and Freon 142 were detected at the highest estimated concentration. The majority of the other TICs were detected for the first time during the March 2009 monitoring event and don't warrant further action. The availability of a Freon 142 calibration standard is currently being investigated by ARCADIS.

5.2.3 Condensate Samples

A condensate sample was not collected from Storage Tank ST-510 for laboratory analysis during the reporting period. 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 maximum allowable stack concentration (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 volatile organic compounds (VOCs) in the vapor effluent did not exceed their respective SGCs during all monitoring events (Table 3).
- 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.
- The concentration of all environmentally "A" rated compounds ([i.e., VC] as defined in DAR-1 AGC/SGC tables revised September 10, 2007) was below the limits of detection.

7. Conclusions and Recommendations

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

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7.1 Conclusions

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

- March 2009 compliance monitoring results indicate that the system continues to operate as designed. Specifically, a time-weighted average induced vacuum of greater than -0.1 iwc was achieved in all induced vacuum monitoring points.
- Vapor emissions currently meet applicable guidance and regulatory criteria indicating that air treatment is not required as follows:
 - 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.
 - Similarly, the concentration of all environmentally "A" rated compounds ([i.e., VC] as defined in DAR-1 AGC/SGC tables revised September 10, 2007) was below the limits of detection on both the influent and effluent vapor samples.
- The condensate removal activity for below grade pipelines removed approximately 257 gallons of condensate.
- Combined, the installation of new manifold flow meters and the removal of the VPGAC unit resulted in variation of system manifold vacuums and general system operating parameters when compared to historical data.

7.2 Recommendations

Based on the information provided herein, ARCADIS makes the following recommendations for the April 2009 to June 2009 operating period:

- Continue operating the soil gas IRM in accordance with system operating parameters recorded during this reporting period. Update Table 3 (i.e., typical operating parameters) of the OM&M Manual (ARCADIS 2009a) after at least three (3) sets of additional data have been collected under the revised operating conditions (i.e., installation of the new flow meters and removal of the VPGAC).

- Evaluate the induced vacuum at monitoring wells that exhibited an increase during the current reporting period. Consider rebalancing each monitoring wells respective depressurization well if the induced vacuum continues to be above the design criteria (i.e., -0.1 iwc).

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. 2008. 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.

ARCADIS of New York, Inc. 2009a. Operable Unit 3, Operation, Maintenance, and Monitoring Manual, Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York, Site #1-30-003A January 23, 2009.

ARCADIS of New York, Inc. 2009b. Operable Unit 3, Operation, Maintenance, and Monitoring Report, 2008 Annual Summary Report, Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York, Site #1-30-003A March 31, 2009.

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.

New York State Department of Environmental Conservation (NYSDEC), 2007, Approval Letter of 95 Percent Design, Former Grumman Settling Ponds, NYSDEC Nassau County Site No. 1-30-003A OU3 (Bethpage Community Park), September 19, 2007.

New York State Department of Environmental Conservation (NYSDEC), 2008a, 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), 2008b, Letter of Approval For Proposed Modifications, December 12, 2008.

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)
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	32.13	-22.0	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 ^(5,8)	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
10/27/08	84.98	-5.5	62.6	NM	-1.5	22.34	-0.8	62.6	NM	-0.9	13.25	-7.0 ⁽¹²⁾	62.4	NM	-0.8	23.31	-0.1	62.6	NM	-0.9	88.57	-2.2	62.6	NM	-1.4	18.42	-15.0	62.6	NM	-1.3
11/25/08	NM	-10	53.6	NM	-1.4	20.49	-4.0	54.1	NM	-0.8	12.60	-12.0	58.2	NM	-0.4	30.20	-0.8	54.6	NM	-0.6	116.98	-3.6	55	NM	-1.4	29.89	-22.0	54.3	NM	-3.1
12/18/08	95.89	-9	50.9	NM	-1.4	20.08	-1.0	51.8	NM	-0.56	12.88	-13	57.3	NM	-0.27	26.36	-1.5	51.8	NM	-0.56	89.91	-4.0	52.5	NM	-1.5	67.85	-18.0	51.8	NM	-11.4
3/19/09 ^(13,14)	95	-26	47.1	2.3	-0.848	21	-12.25	46.7	0.0	-1.74	13	-10.4	48.3	0.3	-0.505	26	-11.5	46.7	3.2	-0.780	89	-15.7	47.1	0.0	-1.60	30	-20.0	46.9	0.0	-6.45

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 10, 2008 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.
- Data point is average of readings observed which fluctuated between -4.0 and -10 iwc.
- First round of monitoring with new variable area float type air flow meters installed.
- Blower BL-300 taken off line on February 10, 2009 and replaced with Blower BL-200.
- Totalizers not recording flow due to fouling. Total of 100 gallons of condensate collected in Storage Tank ST-510 between December 19, 2008 and March 19, 2009.
- Field transcription error suspected.

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-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)
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 ^(5,8)	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⁾
10/27/08	41.72	-1.2	62.6	NM	-0.9	11.22	-2.0	62.2	NM	-0.2	154.64	-6.7	63.1	NM	-2.8	6.32	-1.5	62.7	NM	-1.8	30.65	-12.9	62.2	NM	-0.5	14.06	-0.6	62.6	NM	-0.4
11/25/07	52.72	-1.6	55.4	NM	-0.9	6.11	-1.0	55.7	NM	-0.788	62.57	-3	55.5	NM	-1.2	1.51	-0.1	61.7	NM	-0.258	54.57	-19	62.2	NM	-0.15	18.39	-0.7	54.6	NM	-0.5
12/18/08	47.97	-1.5	52.5	NM	-0.8	5.17	-1.0	53.7	NM	-0.7	53.68	-2.5	52.5	NM	-1.0	8.24	-1.5	53.2	NM	-1.4	17.91	-16.5	58.1	NM	-0.23	17.08	-0.75	51.8	NM	-0.40
3/19/09 ^(13,14)	47	-11.5	47.1	0.0	-0.946	5.1	-4.6	47.8	0.0	-1.05	59	-15.5	46.7	0.0	-1.15	8.0	-4.15	47.3	0.0	-2.39	18	-18	47.4	0.0	-0.429	19	-11	46.5	0.0	-0.955

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 10, 2008 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.
- Data point is average of readings observed which fluctuated between -4.0 and -10 iwc.
- First round of monitoring with new variable area float type air flow meters installed.
- Blower BL-300 taken off line on February 10, 2009 and replaced with Blower BL-200.
- Totalizers not recording flow due to fouling. Total of 100 gallons of condensate collected in Storage Tank ST-510 between December 19, 2008 and March 19, 2009.
- Field transcription error suspected.

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)
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
10/27/08	92.13	-10.5	62.6	NM	-0.1	79.59	-8.0	62.6	NM	-2.5	32.94	-4.1	62.2	NM	-2.4	51.69	-4.5	62.4	NM	-2.9	54.19	-10	62.0	NM	-3.5	43.20	-8.1	62.2	NM	-2.5
11/25/08	81.50	-15.5	55.4	NM	-2.8	85.93	-11.5	55.5	NM	-3.15	41.96	-7	55.4	NM	-2.13	8.66	-0.5	55.5	NM	-0.5	55.91	-14	54.5	NM	-4.1	45.90	-11.0	54.3	NM	-3.49
12/18/08	70.52	-14.5	52.3	NM	-2.1	71.12	-11	52.5	NM	-2.9	28.13	-10	52.5	NM	-1.3	60.09	-5.25	51.6	NM	-2.9	43.00	-14	51.8	NM	-2.4	35.52	NM	51.4	NM	-2.4
3/19/09 ^(13,14)	73	-23	46.5	0.0	-2.10	73	-25	46.4	0.0	-3.10	29	-17	46.4	8.6	-1.41	55	-38	NA	0.0	-3.75	40	-22	46.4	0.4	-2.62	39	-23.0	46.4	0.0	-3.20

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 10, 2008 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.
- Data point is average of readings observed which fluctuated between -4.0 and -10 iwc.
- First round of monitoring with new variable area float type air flow meters installed.
- Blower BL-300 taken off line on February 10, 2009 and replaced with Blower BL-200.
- Totalizers not recording flow due to fouling. Total of 100 gallons of condensate collected in Storage Tank ST-510 between December 19, 2008 and March 19, 2009.
- Field transcription error suspected.

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 Blower 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 Influent 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)	(iwc)	(Gallons)	(Gallons)	(Gallons)	(iwc)	(iwc)	(scfm)	(ppmv)	(iwc)	(iwc)	(scfm)	(ppmv)	(iwc)	(iwc)	(scfm)	(ppmv)	(scfm)	(ppmv)	(°F)	(iwc)	(°F)	(ppmv)	(°F)	(%)	(ft bmp)	(ft bmp)	(ft bmp)	(ft bmp)	(ft bmp)		
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	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	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	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	95	1.6	91	0.1	NM	NM	52.78	Dry	54.36	Dry	Dry		
10/27/08	0	-18	0	132.67	9,996,202.71	35.94	0	0	NM	NM	-20.1	1.5	552	NM	0	0	NM	NM	523.21	0.2	85	1.6	85	0.1	NM	NM	52.95	Dry	54.54	Dry	Dry		
11/25/08	0	-23	0	132.67	9,996,202.71	35.94	NM	NM	NM	NM	-24.0	1	NM	NM	NM	NM	NM	NM	487.30	1.4	95	1.3	70	NM	NM	NM	53.03	Dry	54.70	Dry	Dry		
12/18/08	0	-20	0	132.67	9,996,202.72	35.94	NM	NM	NM	NM	-23.5	1.2	NM	NM	NM	NM	NM	NM	539.73	0.0	80	1.4	74	0.0	NM	NM	NM	NM	NM	NM	NM		
3/19/09 ^(13,14)	-41	0	0	132.67 ⁽¹⁵⁾	9996202.71 ⁽¹⁵⁾	35.94 ⁽¹⁵⁾	-44	3	828 ⁽¹⁶⁾	1.1	NM	NM	NM	NM	NM	NM	NM	NM	533.6337	0.4	100	2.7	90	NM	NM	NM	Dry	Dry	55.60	Dry	Dry		

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 10, 2008 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. Data point is average of readings observed which fluctuated between -4.0 and -10 iwc.
13. First round of monitoring with new variable area float type air flow meters installed.
14. Blower BL-300 taken off line on February 10, 2009 and replaced with Blower BL-200.
15. Totalizers not recording flow due to fouling. Total of 100 gallons of condensate collected in Storage Tank ST-510 between December 19, 2008 and March 19, 2009.
16. Field transcription error suspected.

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 2. Summary of Induced Vacuum Readings, Northrop Grumman Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York. ⁽¹⁾⁽⁴⁾

Well ID:	DW-7S			DW-7D	DW-3S				DW-3D			DW-5S		DW-5D	DW-1S									
Date	VMWC-14A ⁽²⁾	VMWC-14B ⁽²⁾	VMWC-14D ⁽²⁾	VMWC-9A	VMWC-9B	VMWC-10B	VMWC-11B ⁽²⁾	VMWC-10D	VMWC-11D	VMWC-12D ⁽²⁾	VMWC-15A ⁽²⁾	VMWC-15B ⁽²⁾	VMWC-15D ⁽²⁾	VMWC-1A	VMWC-2A	VMWC-4A	VMWC-3A ⁽²⁾	VMWC-1B	VMWC-4B	VMWC-3B ⁽²⁾	VMWC-1C	VMWC-2C	VMWC-4C	VMWC-3C ⁽²⁾
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 ⁽³⁾	-0.11	-0.11	-0.11	-0.13	-0.13	-0.11	-0.34	-0.241 ⁽³⁾	-0.26	-1.14	-0.39	-0.30	-0.16	-0.32	-0.290 ⁽³⁾	-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
10/27/08	-0.097	-0.139	-0.144	NM	NM	NM	-0.135	NM	NM	-0.143	-0.129	-0.127	-0.110	NM	NM	NM	-0.180	NM	NM	-0.180	NM	NM	NM	-0.182
11/25/08	-0.125	-0.194	-0.201	NM	NM	NM	-0.156	NM	NM	-0.162	-0.165	-0.155	-0.145	NM	NM	NM	-0.106	NM	NM	-0.109	NM	NM	NM	-0.109
12/18/08	-0.102	-0.171	-0.203	NM	NM	NM	-0.151	NM	NM	-0.165	-0.200	-0.199	-0.199	NM	NM	NM	-0.110	NM	NM	-0.116	NM	NM	NM	-0.089
03/19/09	-0.149	-0.245	-0.275	NM	NM	NM	-0.217	NM	NM	-0.212	-0.180	-0.179	-0.192	NM	NM	NM	-0.118	NM	NM	-0.123	NM	NM	NM	-0.125
Time Weighted ⁽⁵⁾																								
Rolling Average:	-0.11	-0.17	-0.19	NA	NA	NA	-0.16	NA	NA	-0.18	-0.16	-0.16	-0.15	NA	NA	NA	-0.28	NA	NA	-0.18	NA	NA	NA	-0.17

Gross Average Compliance Points
03/19/09 -0.19

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. Compliance vapor monitoring point.
- 3. Original parameter collected on 8/6/08 was erroneous, data point reported is second reading taken on 08/07/08.
- 4. Compliance goal is -0.1 iwc induced vacuum at all compliance monitoring points.
- 5. 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⁾⁽⁴⁾

Well ID:		DW-1D				DW-4D	DW-8S		DW-2S								DW-2D						DW-11S	
Date	VMWC-1D	VMWC-2D	VMWC-4D	VMWC-3D ⁽²⁾	VMWC-16D ⁽²⁾	VMWC-16A ⁽²⁾	VMWC-16B ⁽²⁾	VMWC-5A	VMWC-6A	VMWC-8A	VMWC-7A ⁽²⁾	VMWC-5B	VMWC-6B	VMWC-8B	VMWC-7B ⁽²⁾	VMWC-5D	VMWC-6D	VMWC-8D	VMWC-7D	VMWC-13D ⁽²⁾	VMWC-17D ⁽²⁾	VMWC-18A ⁽²⁾	VMWC-18B ⁽²⁾	
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	
10/27/08	NM	NM	NM	-0.240	-0.136	-0.148	-0.163	NM	NM	NM	-0.136	NM	NM	NM	-0.144	NM	NM	NM	NM	-0.227	-0.675	-0.127	-0.130	
11/25/08	NM	NM	NM	-0.122	-0.120	-0.177	-0.192	NM	NM	NM	-0.187	NM	NM	NM	-0.193	NM	NM	NM	NM	-0.100	-0.166	-0.146	-0.176	
12/18/08	NM	NM	NM	-0.111	-0.063	-0.153	-0.174	NM	NM	NM	-0.154	NM	NM	NM	-0.162	NM	NM	NM	NM	-0.136	-0.219	-0.126	-0.162	
03/19/09	NM	NM	NM	-0.278	-0.152	-0.134	-0.145	NM	NM	NM	-0.163	NM	NM	NM	-0.151	NM	NM	NM	NM	-0.364	-0.308	-0.140	-0.170	
Time Weighted Rolling Average:	NA	NA	NA	-0.28	-0.16	-0.16	-0.18	NA	NA	NA	-0.16	NA	NA	NA	-0.16	NA	NA	NA	NA	-0.20	-0.22	-0.14	-0.17	

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. Compliance vapor monitoring point.
3. Original parameter collected on 8/6/08 was erroneous, data point reported is second reading taken on 08/07/08.
4. Compliance goal is -0.1 iwc induced vacuum at all compliance monitoring points.
5. 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. 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/m ³)	Location ID: Sample Date:	VSP-601 3/17/2008	VSP-602 3/17/2008	VSP-601 4/16/2008	VSP-602 4/16/2008	VSP-601 5/19/2008	VSP-602 5/19/2008
	CAS No. SGC						
1,1,1-Trichloroethane	71-55-6 68,000	35	< 14	<25	< 15	38	< 2.7
1,1-Dichloroethane	75-34-3 NS	59	< 11	31	< 11	25	5.8
1,1-Dichloroethene	75-35-4 --	< 10	< 10	< 10	< 10	< 19	< 1.9
2-Butanone	78-93-3 13,000	< 16	< 16	< 16	< 16	< 28	< 2.9
Acetone	67-64-1 180,000	< 31	< 31	< 31	< 31	< 57	< 5.8
Benzene	71-43-2 1,300	< 8.4	< 8.4	< 8.4	< 8.4	19	< 1.6
Carbon Tetrachloride	56-23-5 --	< 3.3	< 3.3	< 3.3	< 3.3	< 6.1	< 0.62
Trichlorofluoromethane (CFC-11)	75-69-4 68,000	< 15	< 15	< 15	< 15	< 27	< 2.8
Chloroform	67-66-3 150	35	< 13	<22	< 13	44	< 2.4
cis-1,2-Dichloroethene	156-59-2 190,000 ⁽¹⁾	1400 D	< 10	1100	78	950	180
Dichlorodifluoromethane (Freon 12)	75-71-8 NS	46	< 26	<46	< 26	< 48	< 4.9
Tetrachloroethene	127-18-4 1,000	39	< 3.6	54	< 3.7	42	< 0.67
Toluene	108-88-3 37,000	140	< 10	37	< 10	< 18	< 1.8
trans-1,2-Dichloroethene	156-60-5 NS	10	< 10	<19	< 10	< 19	< 1.9
Trichloroethylene	79-01-6 14,000	1500 D	< 2.8	1300	< 2.9	1000	5.3
Vinyl Chloride	75-01-4 180,000	980 D	920 D	120	710	< 12	65
TVOC		4,244	920	2,642	788	2,118	256.1

Notes and Abbreviations:

Bold Compound detected above method detection limit

CAS No. Chemical abstracts service list number

D Compound detected at a secondary dilution

J Estimated

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 prior year up to and including current quarter.
3. Table summarizes detected compounds only.

Because we can Carbon treatment was removed from service after NYSDEC approval in December 2008. Therefore, the total effluent sample is now taken at VSP-601.

100% recycled paper produced by wind power energy

Table 3. 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/m ³)	Location ID: Sample Date:	VSP-601 6/2/2008	VSP-602 6/2/2008	VSP-601 7/7/2008	VSP-602 7/7/2008	VSP-601 8/6/2008	VSP-602 8/6/2008
	CAS No. SGC						
1,1,1-Trichloroethane	71-55-6 68,000	44	< 2.5	48	< 6.5	47	< 4.4
1,1-Dichloroethane	75-34-3 NS	27	7.6	28	11	26	9.2
1,1-Dichloroethene	75-35-4 --	< 18	< 1.8	< 18	< 4.7	< 22	< 3.2
2-Butanone	78-93-3 13,000	28	< 2.7	27	< 7	< 32	< 4.7
Acetone	67-64-1 180,000	< 55	8.4	< 53	< 14	< 65	< 9.6
Benzene	71-43-2 1,300	< 15	< 1.5	150	< 3.8	22	< 2.6
Carbon Tetrachloride	56-23-5 --	< 5.8	< 0.58	< 5.6	< 1.5	< 6.8	< 1
Trichlorofluoromethane (CFC-11)	75-69-4 68,000	< 26	< 2.6	< 25	< 6.7	< 31	5.5
Chloroform	67-66-3 150	55	3	88	8.4	89	8.2
cis-1,2-Dichloroethene	156-59-2 190,000 ⁽¹⁾	930	230 D	1100	350	990	320 D
Dichlorodifluoromethane (Freon 12)	75-71-8 NS	< 45	< 4.5	< 44	< 12	< 54	< 8
Tetrachloroethene	127-18-4 1,000	48	2.2	61	< 1.6	56	< 1.1
Toluene	108-88-3 37,000	< 17	< 1.7	< 17	< 4.5	< 20	< 3
trans-1,2-Dichloroethene	156-60-5 NS	< 18	2.8	< 18	< 4.7	< 22	3.6
Trichloroethylene	79-01-6 14,000	1100	6.5	1500	7.7	1400	9.2
Vinyl Chloride	75-01-4 180,000	< 12	13	< 11	5.9	< 14	4.9
TVOC		2,232	273.5	3,002	383	2,630	361

Notes and Abbreviations:

Bold Compound detected above method detection limit

CAS No. Chemical abstracts service list number

D Compound detected at a secondary dilution

J Estimated

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 prior year up to and including current quarter.

3. Table summarizes detected compounds only.

¹Because we carbon treatment was removed from service after NYSDEC approval in December 2008. Therefore, the total effluent sample is now taken at VSP-601.

²100% recycled paper produced by wind power energy

Table 3. 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/m ³)			Location ID: Sample Date:	VSP-601 9/24/2008	VSP-602 9/24/2008	VSP-601 10/27/2008	VSP-602 10/27/2008	VSP-601 11/25/2008	VSP-602 11/25/2008
	CAS No.	SGC							
1,1,1-Trichloroethane	71-55-6	68,000		77	9.7	61	< 15	68	23
1,1-Dichloroethane	75-34-3	NS		47	26	33	30	38	32
1,1-Dichloroethene	75-35-4	--		< 21	3.5	< 14	< 11	< 20	< 13
2-Butanone	78-93-3	13,000		< 31	< 3.2	< 20	< 16	< 30	< 19
Acetone	67-64-1	180,000		< 63	< 6.3	< 41	< 32	< 60	< 38
Benzene	71-43-2	1,300		< 17	< 1.7	< 11	< 8.5	43	< 10
Carbon Tetrachloride	56-23-5	--		< 6.7	< 0.67	< 4.3	< 3.3	8.4	< 4
Trichlorofluoromethane (CFC-11)	75-69-4	68,000		< 30	11	< 19	< 15	< 29	< 18
Chloroform	67-66-3	150		160	35	95	45	< 25	53
cis-1,2-Dichloroethene	156-59-2	190,000 ⁽¹⁾		1500	620 D	1100	830	1200	770
Dichlorodifluoromethane (Freon 12)	75-71-8	NS		< 53	< 5.3	< 34	< 26	< 50	69
Tetrachloroethene	127-18-4	1,000		64	0.88	32	< 3.6	31	< 4.3
Toluene	108-88-3	37,000		< 20	< 2	< 13	< 10	< 19	< 12
trans-1,2-Dichloroethene	156-60-5	NS		< 21	8.6	< 14	< 11	< 20	< 13
Trichloroethylene	79-01-6	14,000		1500	120	1100	120	960	310
Vinyl Chloride	75-01-4	180,000		< 14	4.9	< 8.8	< 6.8	< 13	< 8.2
TVOC				3,348	829	2,421	1,025	2,348	1,257

Notes and Abbreviations:

Bold Compound detected above method detection limit

CAS No. Chemical abstracts service list number

D Compound detected at a secondary dilution

J Estimated

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 prior year up to and including current quarter.
3. Table summarizes detected compounds only.

~~Because we can~~ Carbon treatment was removed from service after NYSDEC approval in December 2008. Therefore, the total effluent sample is now taken at VSP-601.

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Table 3. 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/m ³)	Location ID: Sample Date:	VSP-601 12/18/2008	VSP-602 12/18/2008	VSP-601 ⁽⁴⁾ 3/19/2009
	CAS No. SGC			
1,1,1-Trichloroethane	71-55-6 68,000	75 J	< 18	57 J
1,1-Dichloroethane	75-34-3 NS	33 J	29	30 J
1,1-Dichloroethene	75-35-4 --	< 12 J	< 13	< 12 J
2-Butanone	78-93-3 13,000	< 18 J	< 19	< 17 J
Acetone	67-64-1 180,000	< 36 J	< 39	< 130 J
Benzene	71-43-2 1,300	63 J	< 10	15 J
Carbon Tetrachloride	56-23-5 --	< 3.8 J	< 4.1	< 3.8 J
Trichlorofluoromethane (CFC-11)	75-69-4 68,000	< 17 J	< 18	< 17 J
Chloroform	67-66-3 150	52 J	42	30 J
cis-1,2-Dichloroethene	156-59-2 190,000 ⁽¹⁾	1000 J	730	1400 DJ
Dichlorodifluoromethane (Freon 12)	75-71-8 NS	< 30 J	< 32	< 29 J
Tetrachloroethene	127-18-4 1,000	21 J	< 4.4	24 J
Toluene	108-88-3 37,000	12 J	< 12	11J
trans-1,2-Dichloroethene	156-60-5 NS	< 12 J	< 13	< 12 J
Trichloroethylene	79-01-6 14,000	710 J	130	920J
Vinyl Chloride	75-01-4 180,000	< 7.8 J	< 8.3	< 2.7 J
TVOC		1,966 J	931	2487 J

Notes and Abbreviations:

Bold Compound detected above method detection limit

CAS No. Chemical abstracts service list number

D Compound detected at a secondary dilution

J Estimated

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 prior year up to and including current quarter.
3. Table summarizes detected compounds only.

~~Because we carbon treatment was removed from service after NYSDEC approval in December 2008. Therefore, the total effluent sample is now taken at VSP-601.~~

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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	Micograms per liter
NA	Not applicable

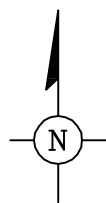
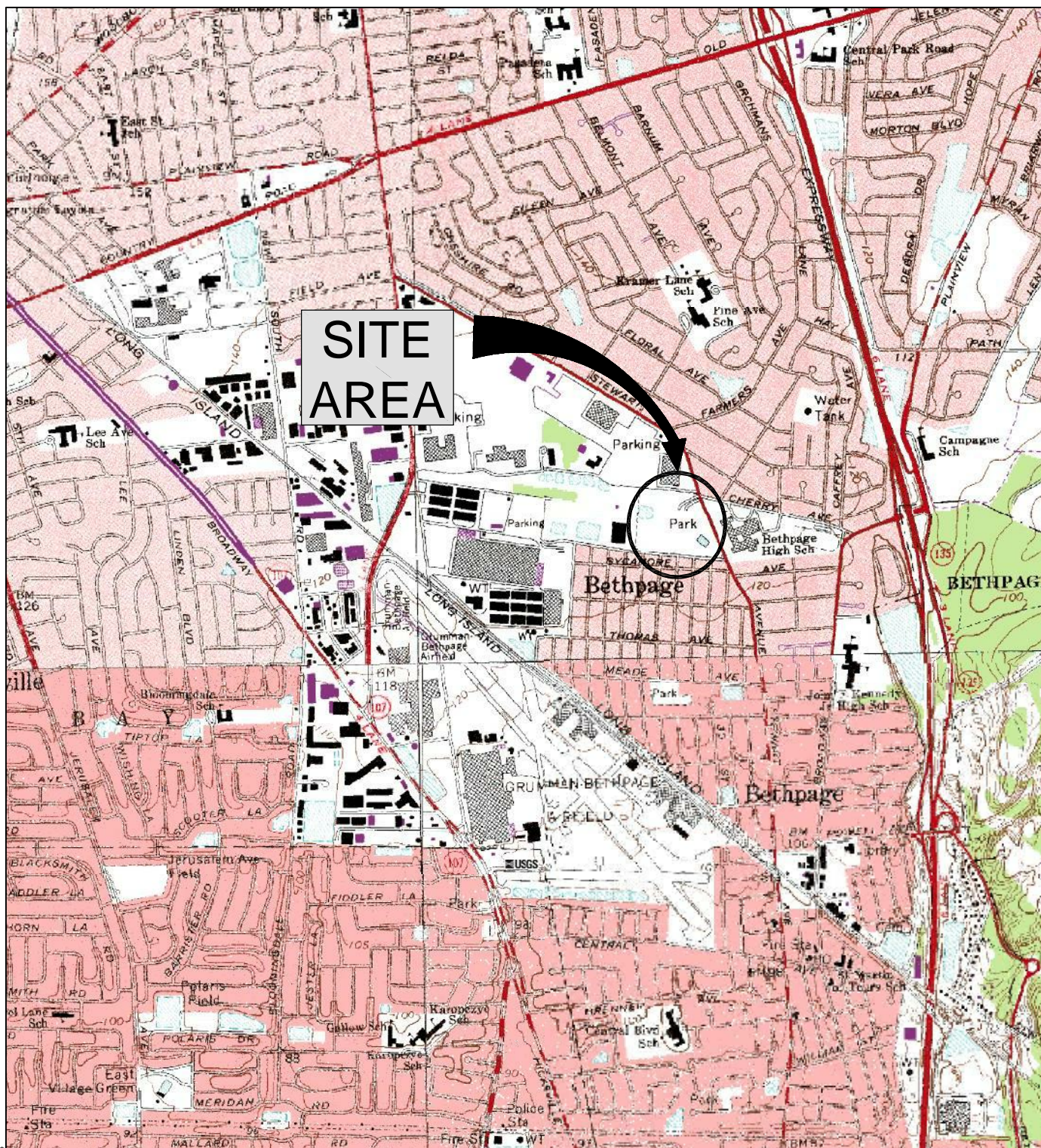
1. Total volatile organic compounds determined by summing individual detections and rounding to the nearest whole number.
2. Samples were collected by O&M personnel on the dates shown and submitted to Columbia Analytical Services Laboratory (Rochester, NY) for VOC analyses using Method 8260 in accordance with the project Sampling and Analysis Plan (ARCADIS 2008) . Data presented in this table corresponds to January - March 2009.
3. Table summarizes detected compounds only.

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⁾ (µg/m ³)	Percent of MASC Per Event ⁽³⁾											Cumulative % MASC ⁽⁴⁾
		03/17/08	04/16/08	05/19/08	06/02/08	07/07/08	08/06/08	09/24/08	10/27/08	11/25/08	12/18/08	03/19/09	
Vinyl chloride	0.11	36.84%	20.63%	1.91%	0.41%	0.20%	0.14%	0.14%	0.00%	0.00%	0.00%	0.00%	2.91%
1,1-Dichloroethane	0.63	0.00%	0.00%	0.03%	0.04%	0.06%	0.05%	0.13%	0.14%	0.14%	0.13%	0.13%	0.09%
Trichloroethylene	0.5	0.00%	0.00%	0.03%	0.05%	0.06%	0.06%	0.78%	0.71%	1.66%	0.73%	4.95%	0.73%
Tetrachloroethylene	1	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%
cis-1,2-Dichloroethylene	63	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	0.03%	0.04%	0.03%	0.03%	0.06%	0.02%
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%	0.24%	0.68%	0.62%	2.63%	3.07%	3.29%	2.75%	1.88%	1.52%
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%
Benzene	0.13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.31%	0.00%
Toluene	5,000	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

See notes last page.

CITY: MELVILLE, NY DIV: GROUP-ENV/ENR DBALS LD: PIC: PMCSG TMKZ LYRON-OFF-REF.
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 PROJECTNAME: NY001464.0908.00004
 XREFS:



SOURCE:
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 USGS 7.5 MIN. FREEPORT QUADRANGLE, FREEPORT, NY, 1994
 USGS 7.5 MIN. HICKSVILLE QUADRANGLE, HICKSVILLE, NY, 1967, PHOTOREVISED 1979
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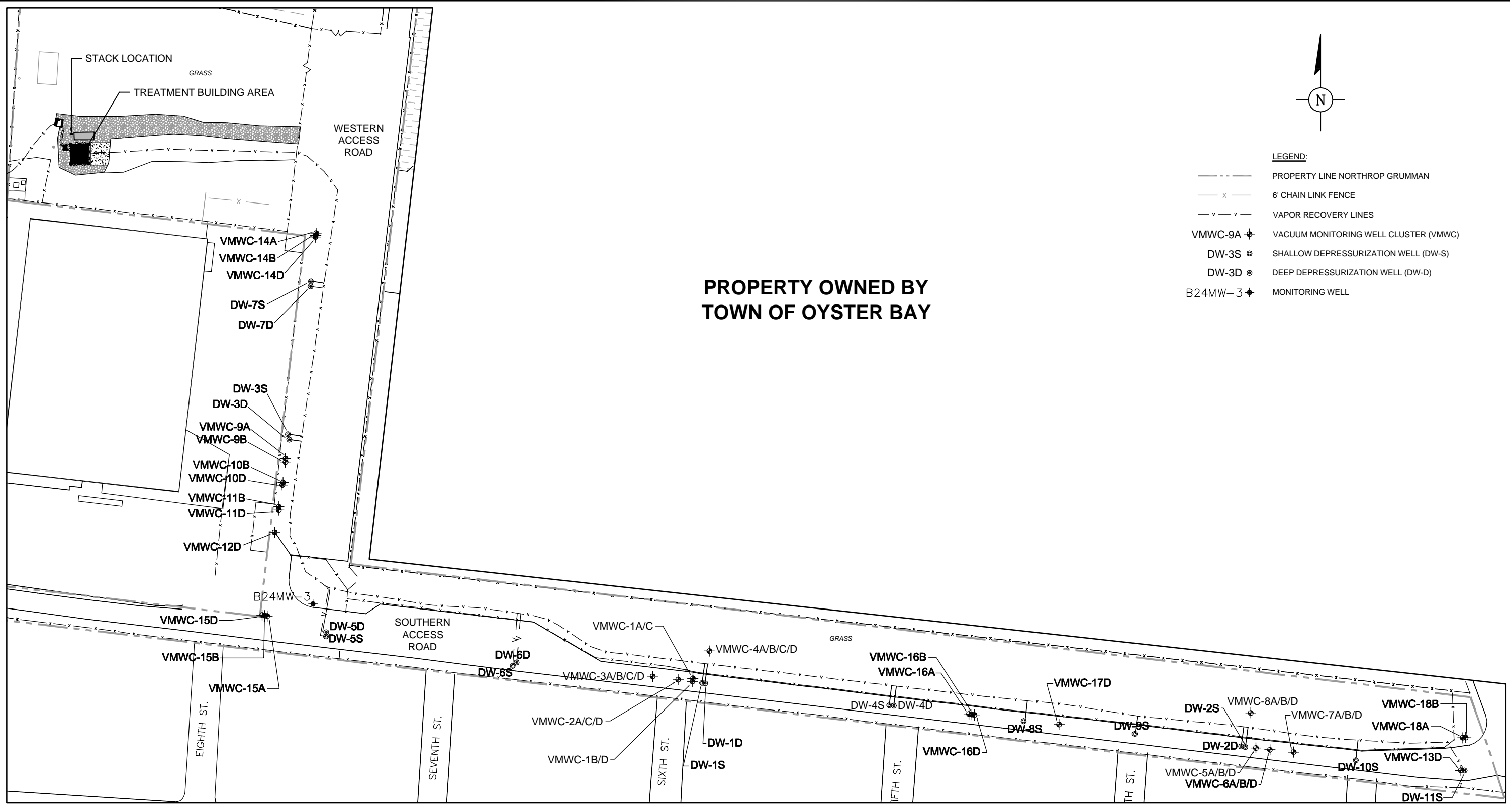
**NORTHROP GRUMMAN SYSTEMS CORPORATION
 BETHPAGE, NEW YORK
 OPERABLE UNIT 3
 FORMER GRUMMAN SETTLING PONDS**

**SITE LOCATION MAP
 SOIL GAS INTERIM REMEDIAL MEASURE**

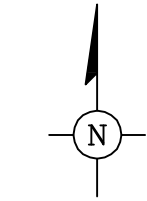


FIGURE
1

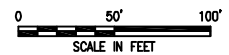
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XREFS: 1464.X01
IMAGES: PROJECTNAME: NY01493.090000001



PROPERTY OWNED BY
TOWN OF OYSTER BAY



- LEGEND:
- PROPERTY LINE NORTHROP GRUMMAN
 - x - 6' CHAIN LINK FENCE
 - v - v - VAPOR RECOVERY LINES
 - VMWC-9A + VACUUM MONITORING WELL CLUSTER (VMWC)
 - DW-3S ● SHALLOW DEPRESSURIZATION WELL (DW-S)
 - DW-3D ● DEEP DEPRESSURIZATION WELL (DW-D)
 - B24MW-3 + MONITORING WELL



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

GENERAL SITE PLAN
SOIL GAS INTERIM REMEDIAL MEASURE


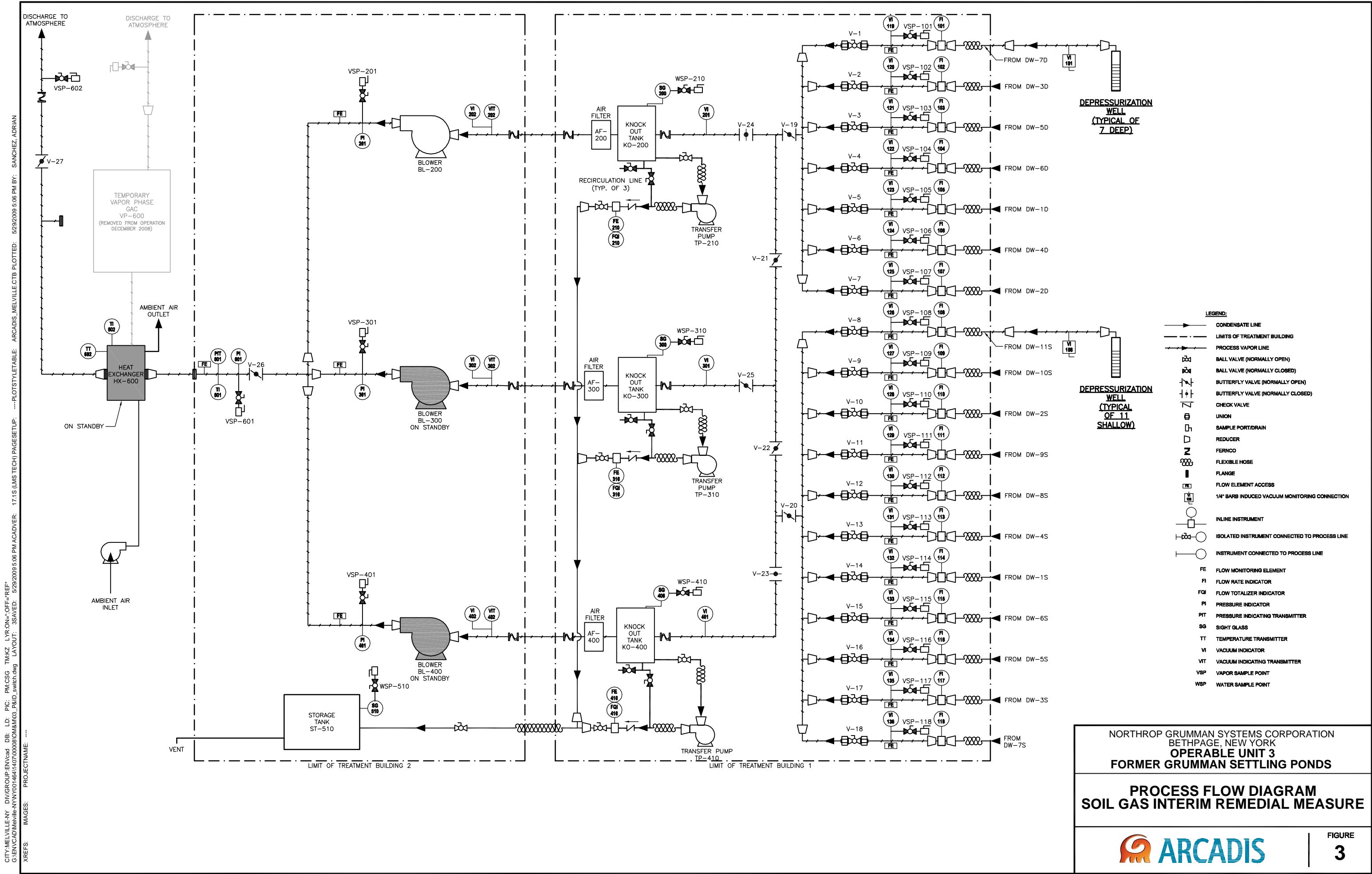


FIGURE
2



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PROJECT NAME: SOIL GAS INTERIM REMEDIAL MEASURE

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Appendix A

Summary of Vapor Sample
Analytical Results Including
Tentatively Identified Compounds

Appendix A-1. Summary of Total 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 3/19/2009
	CAS No.	
1,1,1-Trichloroethane	71-55-6	57 J
1,1,2,2-Tetrachloroethane	79-34-5	< 4 UJ
1,1,2-Trichloroethane	79-00-5	< 16 UJ
1,1-Dichloroethane	75-34-3	30 J
1,1-Dichloroethene	75-35-4	< 12 UJ
1,2-Dichloroethane	107-06-2	< 12 UJ
1,2-Dichloropropane	78-87-5	< 14 UJ
1,3-Butadiene	106-99-0	< 13 UJ
2-Butanone	78-93-3	< 17 UJ
2-Hexanone	591-78-6	< 12 UJ
4-Methyl-2-Pentanone	108-10-1	< 24 UJ
Acetone	67-64-1	< 130 UJ
Benzene	71-43-2	15 J
Bromodichloromethane	75-27-4	< 4 UJ
Bromoform	75-25-2	< 31 UJ
Bromomethane	74-83-9	< 12 UJ
Carbon Disulfide	75-15-0	< 9.1 UJ
Carbon Tetrachloride	56-23-5	< 3.8 UJ
Trichlorofluoromethane (CFC-11)	75-69-4	< 17 UJ
Chlorobenzene	108-90-7	< 14 UJ
Chlorodibromomethane	124-48-1	< 5.1 UJ
Chloroethane	75-00-3	< 16 UJ
Chloroform	67-66-3	30 J
Chloromethane	74-87-3	< 12 UJ
cis-1,2-Dichloroethene	156-59-2	1400 DJ
cis-1,3-Dichloropropene	10061-01-5	< 27 UJ
Ethylbenzene	100-41-4	< 25 UJ
Trichlorotrifluoroethane (Freon 113)	76-13-1	< 4.6 UJ
Dichlorodifluoromethane (Freon 12)	75-71-8	< 29 UJ
Methyl Tert-Butyl Ether	1634-04-4	< 21 UJ
Methylene Chloride	75-09-2	< 10 UJ
Styrene	100-42-5	< 25 UJ
Tetrachloroethene	127-18-4	24 J
Toluene	108-88-3	11J
trans-1,2-Dichloroethene	156-60-5	< 12 UJ
trans-1,3-Dichloropropene	10061-02-6	< 13 UJ
Trichloroethylene	79-01-6	920J
Vinyl Chloride	75-01-4	< 2.7 UJ
Xylene-o	95-47-6	< 25 UJ
Xylenes - m,p	NA	< 51 UJ
TVOC		2487

Notes and Abbreviations on last page.

Appendix A-1. Summary of Total 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
J	Estimated Value
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 January - March 2009.

Appendix A-2. Vapor Sample Analytical Results, Tentatively Identified Compounds, Northrop Grumman
Operable Unit 3 Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds, Bethpage, New York.^(1,2,3)

Location ID: VSP-601^{(4) (5)}
Sample Date: 3/19/2009

Chlorodifluoromethane (Freon 22)	1500
Acetophenone	67
Methylcyclohexane	130
Heptane	87
Unknown cyclic hydrocarbon	36
Unknown aliphatic hydrocarbon	33
Unknown aliphatic hydrocarbon	41
1,3-dimethyl-cis-cyclohexane	54
Ethane, 1-chloro-1,1-difluoro (Freon 142) ⁽²⁾	910
3-Methylheptane	33
Octane	70
3-Methylnonane	34
Unknown aliphatic hydrocarbon	59

Notes and Abbreviations:

-- Not Reported during this sampling event.
Detected
ppbv Parts per billion by volume.

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).
2. Tentatively Identified Compounds (TICs) are identified based on review of mass spectrometry results via a comprehensive library search of all organic compounds.
3. All results are estimated.
4. Carbon treatment was removed from service after NYSDEC approval in December 2008. Therefore, the Total Effluent sample is now taken at VSP-601.
5. Results from 3/19/09 sampling in ug/m3.

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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:	NA
	Sample Date:	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 January - March 2009.

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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
1. TICs are identified based on review of mass spectrometry results via a comprehensive library search of all organic compounds.
 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 January - March 2009.
 3. 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:	03/17/08	04/16/08	05/19/08	06/02/08	07/07/08	08/06/08
SCREEN3 Model Input							
Source Type		Point	Point	Point	Point	Point	Point
Emission Rate (g/s)		1	1	1	1	1	1
Stack Height (ft)		33	33	33	33	33	33
Stack Height (m)		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
Air Flow Rate (scfm) ⁽¹⁾		1,774	641	666	746	829	640
Air Flow Rate (acfm @ stack temp) ⁽²⁾		1,859	655	671	766	860	670
Stack Gas Exit Temperature (K) ⁽¹⁾		309	301	296	303	305	308
Ambient Air Temperature (K) ⁽³⁾		276	281	284	294	298	299
Receptor Height (m) ⁽⁴⁾		1.5	1.5	1.5	1.5	1.5	1.5
Urban/Rural		Urban	Urban	Urban	Urban	Urban	Urban
Building Height (m)		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
Max Horizontal Bldg Dim (m)		5.0	5.0	5.0	5.0	5.0	5.0
Consider Bldg Downwash?		Yes	Yes	Yes	Yes	Yes	Yes
Simple/Complex Terrain Above Stack		Simple	Simple	Simple	Simple	Simple	Simple
Simple/Complex Terrain Above Stack Base		Simple	Simple	Simple	Simple	Simple	Simple
Meteorology		Full	Full	Full	Full	Full	Full
Automated Distances Array		Yes	Yes	Yes	Yes	Yes	Yes
Terrain Height Above Stack Base		0	0	0	0	0	0
SCREEN3 Model Output							
1-HR Max		627.6	1,292	1,278	1,200	1,129	1,279
Annualization Factor ⁽⁶⁾		0.08	0.08	0.08	0.08	0.08	0.08
Average Annual Concentration at Receptor Height (ug/m ³) ⁽⁷⁾		50.2	103.4	102.2	96	90.3	102.3
Distance To Max Concentration (m) ⁽⁸⁾		64	45	45	47	48	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.

Parameters	Date Sampled:	09/24/08	10/27/08	11/25/08	12/18/08	03/19/09
SCREEN3 Model Input						
Source Type		Point	Point	Point	Point	Point
Emission Rate (g/s)		1	1	1	1	1
Stack Height (ft)		33	33	33	33	33
Stack Height (m)		10.1	10.1	10.1	10.1	10.1
Stack Inside Diameter (m)		0.41	0.41	0.41	0.41	0.41
Air Flow Rate (scfm) ⁽¹⁾		638	552	487	540	534
Air Flow Rate (acfm @ stack temp) ⁽²⁾		668	567	487	543	553
Stack Gas Exit Temperature (K) ⁽¹⁾		308	303	294	296	305
Ambient Air Temperature (K) ⁽³⁾		289	286	279	275	279
Receptor Height (m) ⁽⁴⁾		1.5	1.5	1.5	1.5	1.5
Urban/Rural		Urban	Urban	Urban	Urban	Urban
Building Height (m)		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
Max Horizontal Bldg Dim (m)		5.0	5.0	5.0	5.0	5.0
Consider Bldg Downwash?		Yes	Yes	Yes	Yes	Yes
Simple/Complex Terrain Above Stack		Simple	Simple	Simple	Simple	Simple
Simple/Complex Terrain Above Stack Base		Simple	Simple	Simple	Simple	Simple
Meteorology		Full	Full	Full	Full	Full
Automated Distances Array		Yes	Yes	Yes	Yes	Yes
Terrain Height Above Stack Base		0	0	0	0	0
SCREEN3 Model Output						
1-HR Max		1,281	1,373	1,454	1,374	1,289
Annualization Factor ⁽⁶⁾		0.08	0.08	0.08	0.08	0.08
Average Annual Concentration at Receptor Height (ug/m ³) ⁽⁷⁾		102.5	109.8	116.3	109.9	103.1
Distance To Max Concentration (m) ⁽⁸⁾		45	43	42	43	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

µg/m³ - 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)					
	03/17/08	04/16/08	05/19/08	06/02/08	07/07/08	08/06/07
Vinyl chloride	920	710	65	13	6	4.9
1,1-Dichloroethane	0	0	5.8	7.6	11	9.2
Trichloroethylene	0	0	5.3	6.5	7.7	9.2
Tetrachloroethylene	0	0	0	2.2	0	0
cis-1,2-Dichloroethylene	0	78	180	230	350	320
Dichlorodifluoromethane (Freon 12)	0	0	0	0	0	0
Acetone	0	0	0	8.4	0	0
Chloroform	0	0	0	3	8	8.2
trans-1,2-Dichloroethene	0	0	0	2.8	0	3.6
Trichlorofluoromethane (Freon 11)	0	0	0	0	0	5.5
1,1-Dichloroethene	0	0	0	0	0	0
1,1,1-Trichloroethane	0	0	0	0	0	0
Benzene	0	0	0	0	0	0
Toluene	0	0	0	0	0	0

Compound	AGC ⁽²⁾ (µg/m ³)	Annual Maximum Allowable Stack Concentration (µg/m ³)					
		03/17/08	04/16/08	05/19/08	06/02/08	07/07/08	08/06/08
Vinyl chloride	0.11	2.50E+03	3.44E+03	3.40E+03	3.17E+03	3.00E+03	3.40E+03
1,1-Dichloroethane	0.63	1.43E+04	1.97E+04	1.95E+04	1.82E+04	1.72E+04	1.95E+04
Trichloroethylene	0.5	1.14E+04	1.56E+04	1.54E+04	1.44E+04	1.36E+04	1.55E+04
Tetrachloroethylene	1	2.27E+04	3.13E+04	3.09E+04	2.88E+04	2.73E+04	3.09E+04
cis-1,2-Dichloroethylene	63	1.43E+06	1.97E+06	1.95E+06	1.82E+06	1.72E+06	1.95E+06
Dichlorodifluoromethane (Freon 12)	12,000	2.72E+08	3.75E+08	3.71E+08	3.46E+08	3.27E+08	3.71E+08
Acetone	28,000	6.36E+08	8.76E+08	8.65E+08	8.07E+08	7.64E+08	8.66E+08
Chloroform	0.043	9.76E+02	1.35E+03	1.33E+03	1.24E+03	1.17E+03	1.33E+03
trans-1,2-Dichloroethene	63	1.43E+06	1.97E+06	1.95E+06	1.82E+06	1.72E+06	1.95E+06
Trichlorofluoromethane (Freon 11)	1,000	2.27E+07	3.13E+07	3.09E+07	2.88E+07	2.73E+07	3.09E+07
1,1-Dichloroethene	70	1.59E+06	2.19E+06	2.16E+06	2.02E+06	1.91E+06	2.16E+06
1,1,1-Trichloroethane	1,000	2.27E+07	3.13E+07	3.09E+07	2.88E+07	2.73E+07	3.09E+07
Benzene	0.13	2.95E+03	4.07E+03	4.02E+03	3.75E+03	3.55E+03	4.02E+03
Toluene	5,000	1.14E+08	1.56E+08	1.54E+08	1.44E+08	1.36E+08	1.55E+08

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	Actual Effluent Concentrations ⁽¹⁾ (µg/m ³)				
	09/24/08	10/27/08	11/25/08	12/18/08	3/19/09
Vinyl chloride	4.9	0	0	0	0
1,1-Dichloroethane	26	30	32	29	30
Trichloroethylene	120	120	310	130	920
Tetrachloroethylene	0.88	0	0	0	24
cis-1,2-Dichloroethylene	620	830	770	730	1,400
Dichlorodifluoromethane (Freon 12)	0	0	69	0	0
Acetone	0	0	0	0	0
Chloroform	35	45	53	42	30
trans-1,2-Dichloroethene	8.6	0	0	0	0
Trichlorofluoromethane (Freon 11)	11	0	0	0	0
1,1-Dichloroethene	3.5	0	0	0	0
1,1,1-Trichloroethane	9.7	0	23	0	57
Benzene	0	0	0	0	15
Toluene	0	0	0	0	11

Compound	AGC ⁽²⁾ (µg/m ³)	Annual Maximum Allowable Stack Concentration (µg/m ³)				
		09/24/08	10/27/08	11/25/08	12/18/08	3/19/09
Vinyl chloride	0.11	3.40E+03	3.74E+03	4.12E+03	3.91E+03	4.09E+03
1,1-Dichloroethane	0.63	1.95E+04	2.14E+04	2.36E+04	2.24E+04	2.34E+04
Trichloroethylene	0.5	1.55E+04	1.70E+04	1.87E+04	1.78E+04	1.86E+04
Tetrachloroethylene	1	3.09E+04	3.40E+04	3.74E+04	3.55E+04	3.72E+04
cis-1,2-Dichloroethylene	63	1.95E+06	2.14E+06	2.36E+06	2.24E+06	2.34E+06
Dichlorodifluoromethane (Freon 12)	12,000	3.71E+08	4.08E+08	4.49E+08	4.26E+08	4.46E+08
Acetone	28,000	8.66E+08	9.53E+08	1.05E+09	9.94E+08	1.04E+09
Chloroform	0.043	1.33E+03	1.46E+03	1.61E+03	1.53E+03	1.60E+03
trans-1,2-Dichloroethene	63	1.95E+06	2.14E+06	2.36E+06	2.24E+06	2.34E+06
Trichlorofluoromethane (Freon 11)	1,000	3.09E+07	3.40E+07	3.74E+07	3.55E+07	3.72E+07
1,1-Dichloroethene	70	2.17E+06	2.38E+06	2.62E+06	2.49E+06	2.60E+06
1,1,1-Trichloroethane	1,000	3.09E+07	3.40E+07	3.74E+07	3.55E+07	3.72E+07
Benzene	0.13	4.02E+03	4.42E+03	4.86E+03	4.62E+03	4.83E+03
Toluene	5,000	1.55E+08	1.70E+08	1.87E+08	1.78E+08	1.86E+08

See notes on 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⁾					
	03/17/08	04/16/08	05/19/08	06/02/08	07/07/08	08/06/08
Vinyl chloride	36.84%	20.63%	1.91%	0.41%	0.20%	0.14%
1,1-Dichloroethane	0.00%	0.00%	0.03%	0.04%	0.06%	0.05%
Trichloroethylene	0.00%	0.00%	0.03%	0.05%	0.06%	0.06%
Tetrachloroethylene	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%
cis-1,2-Dichloroethylene	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%
Dichlorodifluoromethane (Freon 12)	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%
Chloroform	0.00%	0.00%	0.00%	0.24%	0.68%	0.62%
trans-1,2-Dichloroethene	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%
1,1-Dichloroethene	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%
Benzene	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Toluene	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

See notes last page.

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⁾				
	09/24/08	10/27/08	11/25/08	12/18/08	3/19/09
Vinyl chloride	0.14%	0.00%	0.00%	0.00%	0.00%
1,1-Dichloroethane	0.13%	0.14%	0.14%	0.13%	0.13%
Trichloroethylene	0.78%	0.71%	1.66%	0.73%	4.95%
Tetrachloroethylene	0.00%	0.00%	0.00%	0.00%	0.06%
cis-1,2-Dichloroethylene	0.03%	0.04%	0.03%	0.03%	0.06%
Dichlorodifluoromethane (Freon 12)	0.00%	0.00%	0.00%	0.00%	0.00%
Acetone	0.00%	0.00%	0.00%	0.00%	0.00%
Chloroform	2.63%	3.07%	3.29%	2.75%	1.88%
trans-1,2-Dichloroethene	0.00%	0.00%	0.00%	0.00%	0.00%
Trichlorofluoromethane (Freon 11)	0.00%	0.00%	0.00%	0.00%	0.00%
1,1-Dichloroethene	0.00%	0.00%	0.00%	0.00%	0.00%
1,1,1-Trichloroethane	0.00%	0.00%	0.00%	0.00%	0.00%
Benzene	0.00%	0.00%	0.00%	0.00%	0.31%
Toluene	0.00%	0.00%	0.00%	0.00%	0.00%

Notes:

1. Actual effluent concentrations are analytical results from air samples collected on the dates shown. Data in this table corresponds to 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 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