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ENVIRONMENT

Subject:

2020 Second Quarter Operation Maintenance and Monitoring Report, Operable Unit 2, Northrop Grumman Systems Corporation and Naval Weapons Industrial Reserve Plant (NWIRP) Sites, Bethpage, New York.
(NYSDEC Site #'s 1-30-003A and B)

Date:
August 31, 2020

Contact:
Christopher Engler

Phone:
315.409.6579

Email:
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Our ref:
30038454.RPTI4
30038457.NAVI4

Dear Jason:

On behalf of Northrop Grumman Systems Corporation (Northrop Grumman), Arcadis is providing the NYSDEC with the 2020 Second Quarter Operation Maintenance and Monitoring Report (Report). This Report was prepared to document the operation, maintenance, and monitoring (OM&M) activities conducted for the on-site portion of the Operable Unit 2 (OU2) groundwater remedy and the results of ongoing volatile organic compound (VOC) and inorganic monitoring in groundwater to meet the remedial objectives set forth in the March 2001 OU2 Record of Decision (ROD).

Table 1 summarizes OU2 remedial system performance operational data, total mass removal, and water balance. Tables 2 and 3 provide the analytical results for remedial system water and vapor samples for this period, respectively. Tables 4A and 4B provide the air modeling inputs and outputs and resulting analyses, based on quarterly vapor samples collected from the Tower 96 and Tower 102 systems, respectively, for this period. Tables 5A and 5B provides a summary of percent mass emittance of TCE from second quarter 2019 through second quarter 2020. Tables 6 through 8 provide the validated analytical results of groundwater monitoring for this period. Figures 1 through 3 show the Locations of Wells and Onsite Groundwater Remedy, ONCT Groundwater Extraction and Treatment System Site Plan, and the ONCT Groundwater Extraction and Treatment System Schematic, respectively.

Please contact us if you have any questions or comments.

Sincerely,

Arcadis of New York, Inc.

Christopher Engler, P.E. 069748
Engineer of Record

Copies:

Ed Hannon – Northrop Grumman
Chris Engelhardt – NYSDEC Region 1
Donald Hesler – NYSDEC
Steven Scharf – NYSDEC
James Sullivan – New York State Department of Health
John Lovejoy - NCDOH
Brian S. Murray – NAVFAC Midlant Environmental
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TABLES

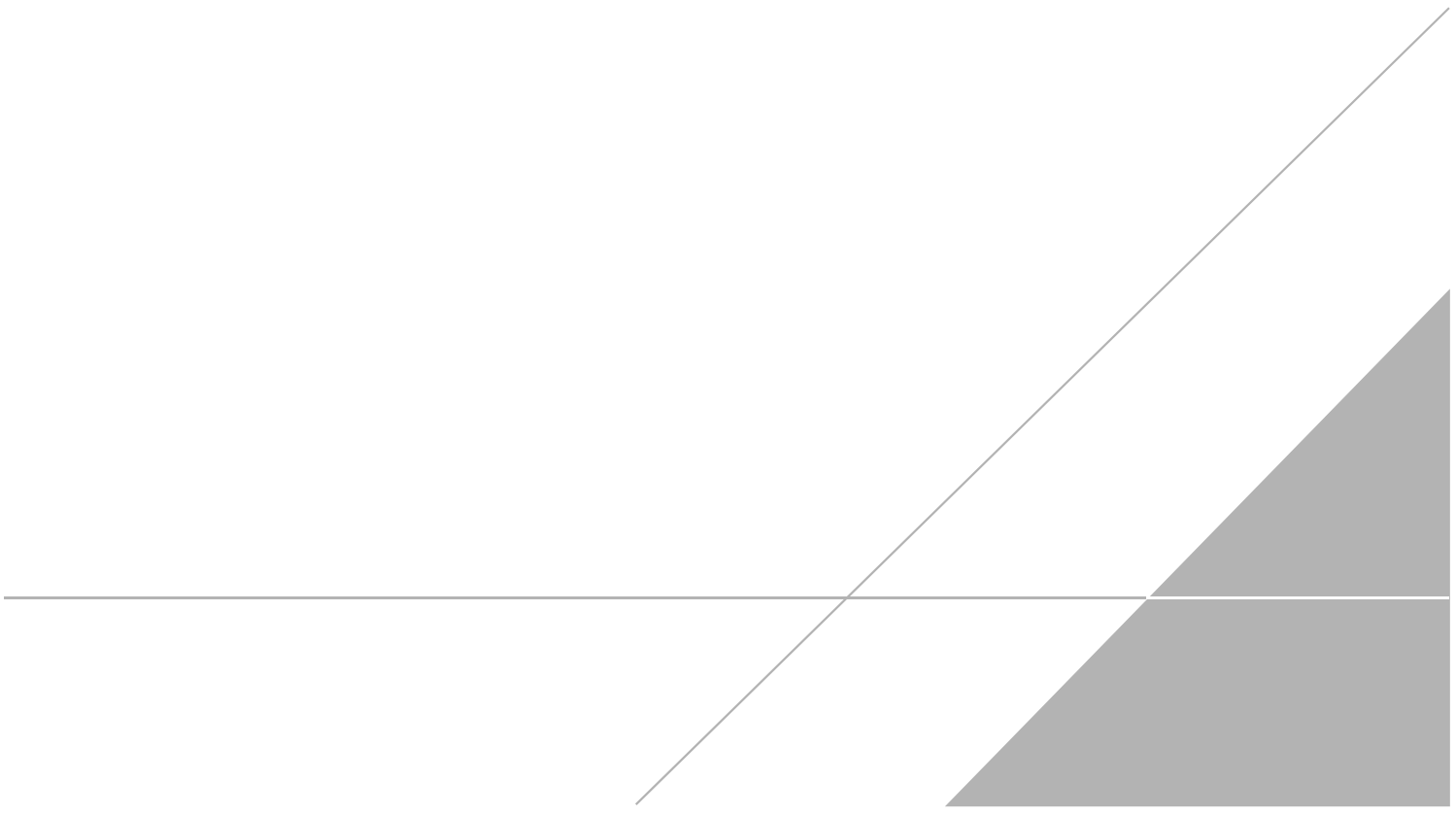

Table 1
Operational Summary for the Treatment System,
Second Quarter 2020[1] Reporting Period, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

	Quarterly Flow Rates (gpm)		Quarterly Flow Volumes (MG)			Quarterly VOC Concentrations (µg/L)		VOC Mass Removed (lbs)	
	Model Design [2]	Operational Average [3,4]	Design [2]	Actual [3,4]	% of Design	TCE [5]	TVOC [5,6]	Quarterly	Cumulative
Influent Groundwater									
Well 1 [7]	800	806	104.8	74.6	71%	647	680	424	50,914
Well 3R [7]	700	807	91.7	74.5	81%	226	270	168	92,621
Well 17 [7]	1,000	1,102	131.0	141.1	108%	118	140	165	54,430
Well 18 [7]	600	1,007	78.6	128.4	163%	34	54	58	6,926
Well 19 [7]	700	511	91.7	65.5	71%	94	120	66	9,076
Total [8]	**3,800**	**4,233**	**498**	**484**	**97%**	**--**	**--**	**881**	**213,967**
Effluent Groundwater [9]									
Calpine	100 - 400	76	--	9.8	--	--	--	--	--
OXY Biosparge [10]	2 - 42	0	--	0	--	--	--	--	--
West Recharge Basins	1,112 - 1,455	944	--	123.7	--	--	0.0	--	--
South Recharge Basins [10]	2,231	2,676	292.4	350.6	120%	--	1.2	--	--
Total [11]	**--**	**3,696**	**--**	**484**	**--**				
Additional Flow to South Recharge Basins									
Storm Water Runoff Contributing to South Recharge Basins Flow Volume [11]	--	--	--	15.2	--	--	--	--	--
Total Flow Volume to South Recharge Basins [10,11,12]			**292**	**366**	**125%**				

Treatment Efficiencies [13]	
Tower 96 System:	>99.9%
Tower 102 System:	>99.9%

See Notes and Abbreviations on last page.

Table 1
Operational Summary for the Treatment System,
Second Quarter 2020[(1)] Reporting Period, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Notes and Abbreviations:

(1) Quarterly reporting period: April 01, 2020 through June 30, 2020.

(2) "Design" flow rates were determined for the five remedial wells and for the South Recharge Basins based on computer modeling (ARCADIS G&M, Inc. 2003c, modified in April 2005). Flow rates for Calpine Power Plant (Calpine), Occidental Chemical (OXY) Biosparge, and West Recharge Basin flow rates are typical flow rates and are provided for reader information. "Design" flow volumes represent the volume of water that is expected to be pumped/discharged during the reporting period and is calculated by multiplying the design rate by the reporting period duration.

(3) "Average" flow rates for the remedial wells represent the average actual pumping rates when the pumps are operational and do not take into account the time that a well is not operational. During this quarterly reporting period, the remedial wells operated for the following percentages of thequarter: Well 1 (70.6%), Well 3R (70.5%), Well 17 (97.7%), Well 18 (97.3%), and Well 19 (97.8%). "Actual" flow volumes are determined via totalized values computed by SCADA using the instantaneous flow rates transmitted from local flow meters.

(4) "Average" flow rates for the system discharges represent the average flow rate during the entire reporting period and are determined by dividing the total flow during the reporting period by the reporting period duration. For this quarter the quarterly flow rates to the south and west recharge basins (SRB and WRB, respectively) were calculated using the remedial well flow rates and additional information and assumptions on flow distribution as follows. Only Tower 96 was pumping water into the distribution line for Calpine usage and T102 system steam condenser; given the relief valves on the distribution line had been set so that balance of water goes to the WRB. The resulting effluent water directed to the WRB was therefore calculated as the total remedial well water flow to Tower 96 minus Calpine usage and minus the Tower 102 steam condenser usage (119 gpm/15.6 MG). Furthermore, the Tower 102 system used approximately 119 gpm of water from the distribution line for the T102 system steam condenser and added approximately 15.6 MG of additional discharge to the Tower 102 system. The resulting effluent water directed to the SRB was therefore calculated as the total remedial well water flow to Tower 102 plus Tower 102 steam condenser usage.

(5) The TCE and TVOC concentrations are from the quarterly sampling events performed during this reporting period on May 13, 2020.

(6) The TVOC concentration for the two sets of recharge basins are their respective average monthly SPDES concentrations for the current quarter.

(7) Tower 102 was shutdown from 5/20/20 to 5/21/20 in order to take field measurements of the South Recharge Basin flow control structures. After measurements were taken, the system would not restart. As such, Lexington assisted in troubleshooting and repair. Tower 102 shutdown from 6/9/2020 to 6/11/20 due to a blown fuse on one of the phase legs in the T102 main control panel. Tower 96 shutdown from 5/24/20 to 6/2/20 due to blower mechanical and steam valve issues and subsequent repair. Tower 96 was shutdown from 6/7/20 to 6/25/20 in order to make further repairs to the blower and to complete scheduled boiler replacements.

(8) Total pumpage/recharge rates are accurate to ±15% based on expected or typical precision/accuracy factors for the gauges and meters.

(9) There are four possible discharges for the effluent groundwater: South Recharge Basins, West Recharge Basins, Calpine, and the OXY Biosparge system. Treated water is continuously discharged to the south and west recharge basins during routine operation, and is available "on-demand" to both Calpine for use as make-up water, and the OXY Biosparge remediation system.

(10) Oxy has not reported any water usage for the OXY Biosparge system since May 2016.

(11) Storm water runoff volume is calculated by multiplying the adjusted tributary area and NOAA precipitation data for the reporting periods. The tributary area is adjusted by the runoff coefficient to exclude the infiltration volume from the total rainfall volume. The tributary area, runoff coefficient, and adjusted tributary area are from Dvirka and Bartilucci Consulting Engineers' Storm Water Permit Evaluation Report (January, 28, 2010). The NOAA precipitation data are calculated as a sum of NOAA daily precipitation data for the reporting period. NOAA precipitation data are retrieved from Station GHCND:USW00054787 - FARMINGDALE REPUBLIC AIRPORT, NY US for January, February and March 2020.

(12) Total Flow Volume to South Recharge Basins is estimated as a sum of flow volumes contributed by the effluent groundwater to South Recharge Basins and from storm water runoff to South Recharge Basins. Second Quarter 2020 calculated South Recharge Basin flow volumes is within historical operating volumes.

(13) Treatment System Efficiencies are calculated by dividing the difference between the remedial well flow weighted influent and effluent TVOC concentrations by the remedial well flow weighted influent concentration.

-- Not Applicable
µg/L micrograms per liter
gpm gallons per minute
lbs pounds
MG million gallons
NOAA National Oceanic and Atmospheric Administration
SCADA Supervisory Controls and Data Acquisition
SPDES State Pollution Discharge Elimination System
TCE trichloroethene
TVOC total volatile organic compounds
VOC volatile organic compounds

Table 2
Concentrations of Constituents in Remedial Wells and Treatment System Effluents
Second Quarter 2020 Reporting Period, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Constituents[1] (units in µg/L)	CAS#	Location ID: Sample ID: Sample Date:	WELL 1 WELL 1 5/13/2020	WELL 3R WELL 3R 5/13/2020	96 EFFLUENT 96 EFFLUENT 5/13/2020
Volatile Organic Compounds (VOCs)[2]					
1,1,1-Trichloroethane	00071-55-6		**0.24 J**	**0.62**	< 0.50
1,1,2,2-Tetrachloroethane	00079-34-5		< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	00079-00-5		< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	00075-34-3		**0.81 J**	**1.6**	< 1.0
1,1-Dichloroethene	00075-35-4		**2.0**	**3.5**	< 0.50
1,2-Dichloroethane	00107-06-2		< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	00078-87-5		**4.6**	< 1.0	< 1.0
2-Butanone (MEK)	00078-93-3		< 10	< 10	< 10
2-Hexanone (MBK)	00591-78-6		< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone (MIK)	00108-10-1		< 5.0	< 5.0	< 5.0
Acetone	00067-64-1		< 10	< 10	< 10
Benzene	00071-43-2		< 0.50	< 0.50	< 0.50
Bromodichloromethane	00075-27-4		< 1.0	< 1.0	< 1.0
Bromoform	00075-25-2		< 1.0	< 1.0	< 1.0
Bromomethane	00074-83-9		< 2.0	< 2.0	< 2.0
Carbon Disulfide	00075-15-0		< 2.0	< 2.0	< 2.0
Carbon Tetrachloride	00056-23-5		< 1.0	< 1.0	< 1.0
Chlorobenzene	00108-90-7		< 1.0	< 1.0	< 1.0
Chloroethane	00075-00-3		< 1.0	< 1.0	< 1.0
Chloroform	00067-66-3		**0.58**	< 0.50	< 0.50
Chloromethane	00074-87-3		< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	00156-59-2		**5.8**	**3.6**	< 0.50
cis-1,3-Dichloropropene	10061-01-5		< 1.0	< 1.0	< 1.0
Dibromochloromethane	00124-48-1		< 1.0	< 1.0	< 1.0
Ethylbenzene	00100-41-4		< 1.0	< 1.0	< 1.0
Dichloromethane	00075-09-2		< 0.50	< 0.50	< 0.50
Styrene	00100-42-5		< 1.0	< 1.0	< 1.0
Tetrachloroethene	00127-18-4		**15.8**	**28.0**	< 0.50
Toluene	00108-88-3		< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	00156-60-5		< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	10061-02-6		< 1.0	< 1.0	< 1.0
Trichloroethylene	00079-01-6		**647**	**226**	< 0.50
Trichlorotrifluoroethane (Freon 113)	00076-13-1		**3.5**	**2.2**	< 0.50
Vinyl Chloride	00075-01-4		< 0.50	**1.4**	< 0.50
Xylene-o	00095-47-6		< 1.0	< 1.0	< 1.0
Xylene-m,p	179601-23-1		< 1.0	< 1.0	< 1.0
Total VOCs[3]			**680**	**270**	**0**
1,4-Dioxane[2]			**9**	**12**	**11**

Notes and abbreviations on last page.

Table 2
Concentrations of Constituents in Remedial Wells and Treatment System Effluents
Second Quarter 2020 Reporting Period, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Constituents[1] (units in µg/L)	CAS#	Location ID: Sample ID: Sample Date:	WELL 17 WELL 17 5/13/2020	WELL 18 WELL 18 5/13/2020	WELL 19 WELL 19 5/13/2020	WELL 19 REP-051320-RA-1 5/13/2020	102 EFFLUENT 102 EFFLUENT 5/13/2020
Volatile Organic Compounds (VOCs)[2]							
1,1,1-Trichloroethane	00071-55-6		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	00079-34-5		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	00079-00-5		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	00075-34-3		**0.76 J**	**1.6**	**0.67 J**	**0.67 J**	< 1.0
1,1-Dichloroethene	00075-35-4		**0.80**	**2.6**	**0.94**	**1.3**	< 0.50
1,2-Dichloroethane	00107-06-2		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	00078-87-5		**0.63 J**	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	00078-93-3		< 10	< 10	< 10	< 10	< 10
2-Hexanone (MBK)	00591-78-6		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone (MIK)	00108-10-1		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	00067-64-1		< 10	< 10	< 10	< 10	< 10
Benzene	00071-43-2		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	00075-27-4		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	00075-25-2		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	00074-83-9		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	00075-15-0		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride	00056-23-5		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	00108-90-7		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	00075-00-3		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	00067-66-3		< 0.50	< 0.50	**0.37 J**	**0.37 J**	< 0.50
Chloromethane	00074-87-3		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	00156-59-2		**2.1**	**2.6**	**13.2**	**13.7**	< 0.50
cis-1,3-Dichloropropene	10061-01-5		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	00124-48-1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	00100-41-4		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane	00075-09-2		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene	00100-42-5		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	00127-18-4		**13.5**	**13.0**	**5.1**	**5.6**	< 0.50
Toluene	00108-88-3		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	00156-60-5		< 0.50	< 0.50	**0.37 J**	< 0.50	< 0.50
trans-1,3-Dichloropropene	10061-02-6		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	00079-01-6		**118**	**33.9**	**93.7**	**94.2**	< 0.50
Trichlorotrifluoroethane (Freon 113)	00076-13-1		**2.1**	< 0.50	**0.91**	**0.84**	< 0.50
Vinyl Chloride	00075-01-4		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylene-o	00095-47-6		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene-m,p	179601-23-1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total VOCs[3]			**140**	**54**	**120**	**120**	**0**
1,4-Dioxane[2]			**8.1**	**4.8**	**4.8**	**4.4**	**7.2**

Notes and abbreviations on last page.

Table 2
Concentrations of Constituents in Remedial Wells and Treatment System Effluents
Second Quarter 2020 Reporting Period, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Notes and Abbreviations:

(1) Results for the program are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016).

(2) VOC samples analyzed using USEPA Method 8260C. 1,4-dioxane samples analyzed using USEPA Method 8270D-SIM.

(3) Total VOC results rounded to two significant figures.

1.4 Bold value indicates a detection

< 1.0 Compound is not detected above its laboratory quantification limit

µg/L micrograms per liter

B Analyte found in associated method blank

J Constituent value is estimated

OU2 Operable Unit 2

REP Blind Replicate Sample

USEPA United States Environmental Protection Agency

VOC Volatile Organic Compound

Table 3A
Vapor Sample Analytical Results
Tower 96 Treatment System
Second Quarter 2020 Reporting Period, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Constituents (Units in µg/m^3)	Location ID: / Sample ID:	96 INFLUENT T96 INFLUENT (AA) 5/13/2020	96 MID-EFFLUENT T96 MIDTRAIN (AA) 5/13/2020	96 EFFLUENT T96 EFFLUENT (AA) 5/13/2020
Volatile Organic Compounds (VOCs)[1]	**CAS #**			
1,1,1-Trichloroethane	00071-55-6	**9.8 J**	< 11	**9.3**
1,1,2,2-Tetrachloroethane	00079-34-5	< 27	< 14	< 1.4
1,1,2-Trichloroethane	00079-00-5	< 22	< 11	< 1.1
1,1-Dichloroethane	00075-34-3	**27 J**	**16**	**19**
1,1-Dichloroethene	00075-35-4	**78.9**	**68.6**	**69.4**
1,2-Dichloroethane	00107-06-2	< 32	< 16	**1.1 J**
1,2-Dichloropropane	00078-87-5	**42**	**9.2 J**	**7.4**
Benzene	00071-43-2	< 26	< 13	**33.5**
Bromodichloromethane	00075-27-4	< 27	< 13	< 1.3
Bromoform	00075-25-2	< 17	< 8.3	< 0.83
Bromomethane	00074-83-9	< 31	< 16	< 1.6
Carbon Disulfide	00075-15-0	< 25	< 12	< 1.2
Carbon Tetrachloride	00056-23-5	< 10	< 5.0	**1.1**
Chlorobenzene	00108-90-7	< 37	< 18	< 1.8
Chloroethane	00075-00-3	< 21	**2.6 J**	**1.9**
Chloroform	00067-66-3	**10 J**	**5.9 J**	**8.3**
Chloromethane	00074-87-3	**3.5 J**	**5.0 J**	**2.7**
cis-1,2-Dichloroethene	00156-59-2	**105**	**61.9**	**85.2**
cis-1,3-Dichloropropene	10061-01-5	< 36	< 18	< 1.8
Dibromochloromethane	00124-48-1	< 34	< 17	< 1.7
Ethylbenzene	00100-41-4	< 35	< 17	< 1.7
Dichloromethane	00075-09-2	< 28	< 14	< 1.4
Styrene	00100-42-5	< 34	< 17	< 1.7
Tetrachloroethene	00127-18-4	**437**	**67.8**	**1.4**
Toluene	00108-88-3	< 30	< 15	**52.4**
trans-1,2-Dichloroethene	00156-60-5	< 32	< 16	**0.91 J**
trans-1,3-Dichloropropene	10061-02-6	< 36	< 18	< 1.8
Trichloroethylene	00079-01-6	**5,640**	**2,350**[3]	**4,330**[3]
Trichlorotrifluoroethane (Freon 113)	00076-13-1	**54**	**38**	**76**
Vinyl Chloride	00075-01-4	**20**	**19**	**17**
Xylene-o	00095-47-6	< 35	< 17	**0.23 J**
Xylene-m,p	179601-23-1	< 35	< 17	**0.34 J**
Total VOCs [2]		**6,427**	**2,644**	**4,717**

Notes and abbreviations on last page.

Table 3A
Vapor Sample Analytical Results,
Tower 96 Treatment System,
Second Quarter 2020, Operable Unit 2,
Northrop Grumman Systems Corporation
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

Notes and Abbreviations:

(1) Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15.

(2) Total VOCs represents the sum of individual concentrations of compounds detected rounded to the nearest whole number.

(3) The elevated T96 Mid-Train and Effluent vapor-phase contaminant concentrations, compared to prior quarterly sample events, are potentially related to a malfunctioning steam actuator valve noted at the regenerative vapor-phase granular activated carbon vessels (RVPGAC), which may have allowed regenerative steam and condensate to partially commingle with system vapor-phase effluent. It should be noted that no SGC or AGC air emission exceedance were noted associated with this sampling event, and the steam actuator valve has since been repaired. Arcadis will closely monitor contaminant concentrations during future sampling events.

27	Bold value indicates a detection
< 0.69	Compound is not detected above its laboratory quantification limit.
µg/m^3	micrograms per cubic meter
J	Compound detected below its reporting limit; value is estimated.
ELAP	Environmental Laboratory Approval Program
NYSDOH	New York State Department of Health
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

Table 3B
Vapor Sample Analytical Results
Tower 102 Treatment System
Second Quarter 2020 Reporting Period, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Constituents (Units in µg/m^3)	Location ID: / Sample ID:	102 INFLUENT T102 INFLUENT (AA) 5/13/2020	102 EFFLUENT T102 EFFLUENT (AA) 5/13/2020
Volatile Organic Compounds (VOCs)[1]	**CAS #**		
1,1,1-Trichloroethane	00071-55-6	**7.6**	**1.7**
1,1,2,2-Tetrachloroethane	00079-34-5	< 6.9	< 0.69
1,1,2-Trichloroethane	00079-00-5	< 5.5	< 0.55
1,1-Dichloroethane	00075-34-3	**25**	**44.5**
1,1-Dichloroethene	00075-35-4	**49.6**	**105**
1,2-Dichloroethane	00107-06-2	**2.8 J**	< 0.81
1,2-Dichloropropane	00078-87-5	< 9.2	< 0.92
Benzene	00071-43-2	**0.73 J**	< 0.64
Bromodichloromethane	00075-27-4	< 6.7	< 0.67
Bromoform	00075-25-2	< 4.1	< 0.41
Bromomethane	00074-83-9	< 7.8	< 0.78
Carbon Disulfide	00075-15-0	< 6.2	< 0.62
Carbon Tetrachloride	00056-23-5	**3.3**	**0.63**
Chlorobenzene	00108-90-7	< 9.2	< 0.92
Chloroethane	00075-00-3	< 5.3	< 0.53
Chloroform	00067-66-3	**7.8 J**	**8.3**
Chloromethane	00074-87-3	**1.8 J**	**1.0**
cis-1,2 Dichloroethene	00156-59-2	**207**	**126**
cis-1,3-Dichloropropene	10061-01-5	< 9.1	< 0.91
Dibromochloromethane	00124-48-1	< 8.5	< 0.85
Ethylbenzene	00100-41-4	< 8.7	**0.13 J**
Dichloromethane	00075-09-2	< 6.9	**1.0**
Styrene	00100-42-5	< 8.5	< 0.85
Tetrachloroethene	00127-18-4	**239**	**0.75**
Toluene	00108-88-3	< 7.5	**0.32 J**
trans-1,2-Dichloroethene	00156-60-5	**2.1 J**	**1.9**
trans-1,3-Dichloropropene	10061-02-6	< 9.1	< 0.91
Trichloroethylene	00079-01-6	**2,130**	**17**
Trichlorotrifluoroethane (Freon 113)	00076-13-1	**31**	**51**
Vinyl Chloride	00075-01-4	< 1.0	**0.31**
Xylene-o	00095-47-6	< 8.7	**0.083 J**
Xylene-m,p	179601-23-1	< 8.7	**0.43 J**
Total VOCs [2]		**2,708**	**360**

Notes and abbreviations on last page.

Table 3B
Vapor Sample Analytical Results
Tower 102 Treatment System,
Second Quarter 2020, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

Notes and Abbreviations:

(1) Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15.

(2) Total VOCs represents the sum of individual concentrations of compounds detected rounded to the nearest whole number.

2.4	bold value indicates a detection
< 0.67	Compound is not detected above its laboratory quantification limit.
µg/m^3	micrograms per cubic meter
J	Compound detected below its reporting limit; value is estimated.
ELAP	Environmental Laboratory Approval Program
NYSDOH	New York State Department of Health
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

Table 4A
Summary of AERMOD Air Quality Impact Analysis
Tower 96 Treatment System,
Second Quarter 2020 Reporting Period, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

Constituent	CAS#	T96 Effluent (ug/m^3)	Emission Rate[1]			Scaled Impact - Hourly [2] (ug/m^3)	Scaled Impact - Annual [2] (ug/m^3)	SGC [3] (ug/m^3)	AGC[3] (ug/m^3)	%SGC	% AGC
		5/13/2020	lb/yr	lb/hr	g/s						
1,1,1 - Trichloroethane	00071-55-6	**9.3**	1.47	1.68E-04	2.12E-05	3.14E-03	9.22E-05	9,000	5000	0.00%	0.00%
1,1 - Dichloroethane	00075-34-3	**19**	3.01	3.44E-04	4.33E-05	6.42E-03	1.88E-04	--	0.63	--	0.03%
1,2 - Dichloroethane	00107-06-2	**1.1**	0.17	1.99E-05	2.51E-06	3.71E-04	1.09E-05	--	0.04	--	0.03%
1,1 - Dichloroethene	00075-35-4	**69.4**	11.01	1.26E-03	1.58E-04	2.34E-02	6.88E-04	--	200	--	0.00%
Tetrachloroethene	00127-18-4	**1.4**	0.22	2.53E-05	3.19E-06	4.73E-04	1.39E-05	300	4.0	0.00%	0.00%
Trichloroethene[4]	00079-01-6	**4,330**	687	7.84E-02	9.88E-03	1.46E+00	4.29E-02	20	0.20	7.31%	21.46%
Vinyl Chloride[4]	00075-01-4	**17**	2.70	3.08E-04	3.88E-05	5.74E-03	1.68E-04	180,000	0.11	0.00%	0.15%
cis 1,2-Dichloroethene	00156-59-2	**85.2**	13.51	1.54E-03	1.94E-04	2.88E-02	8.44E-04	--	63	--	0.00%
trans 1,2-Dichloroethene	00156-60-5	**0.91**	0.14	1.65E-05	2.08E-06	3.07E-04	9.02E-06	--	63	--	0.00%
Benzene[4]	00071-43-2	**33.5**	5.31	6.06E-04	7.64E-05	1.13E-02	3.32E-04	1,300	0.13	0.00%	0.26%
Toluene	00108-88-3	**52.4**	8.31	9.49E-04	1.20E-04	1.77E-02	5.19E-04	37,000	5000	0.00%	0.00%
Total Xylene	00095-47-6	**0.57**	0.09	1.03E-05	1.30E-06	1.92E-04	5.63E-06	37000	5,000		
Xylene-O	00095-47-6	**0.23**	0.04	4.15E-06	5.23E-07	7.75E-05	2.27E-06	22000	100		yes
Xylenes - m,p	00095-47-6	**0.34**	0.05	6.15E-06	7.76E-07	1.15E-04	3.37E-06	22000	100.00		0.00%
1,2-Dichloropropane	00078-87-5	**7.4**	1.17	1.34E-04	1.69E-05	2.50E-03	7.33E-05	--	4.00	--	0.00%
Carbon Tetrachloride	00056-23-5	**1.1**	0.17	1.99E-05	2.50E-06	3.70E-04	1.09E-05	1900	0.17	0.00%	0.01%
Chloroethane	00075-00-3	**1.9**	0.30	3.44E-05	4.33E-06	6.42E-04	1.88E-05	--	10000	--	0.00%
Chloroform	00067-66-3	**8.3**	1.32	1.50E-04	1.89E-05	2.80E-03	8.23E-05	150	14.70	0.00%	0.00%
Chloromethane	00074-87-3	**2.7**	0.43	4.89E-05	6.16E-06	9.12E-04	2.68E-05	22,000	90	0.00%	0.00%
Trichlorotrifluoroethane (Freon 113)	00076-13-1	**76**	12.05	1.38E-03	1.73E-04	2.57E-02	7.53E-04	960,000	180000	0.00%	0.00%

Notes and Abbreviations on next page

Table 4A
Summary of AERMOD Air Quality Impact Analysis
Tower 96 Treatment System,
Second Quarter 2020 Reporting Period, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

Notes and Abbreviations:

(1) Emission rate calculated based on effluent concentration and a stack air flow rate of 4,800 cfm. The stack air flow rate (in acfm) is taken from the actual stack air flow rate on 5/13/20. Effluent temperature used in the model was 92°F from direct read in-line gauge.
Trichloroethene (lb/hr) = (720 ug/m^3) x (4,756 ft^3/min) x (1 m^3/35 ft^3) x (60 min/hr) x (0.000001 g/1 ug) x (0.0022 lb/g)
lb/yr = lb/hr x 8,760 hrs/yr
g/s = lb/hr x 1 hr/3,600 sec x 453.59 g/1 lb

(2) Ambient impact based on AERMOD modeling using normalized rate of 1 g/s is scaled to the actual emission rate of the pollutant. Modeling was performed using the representative meteorological data from the nearest station (Farmingdale, NY) for the years 2011 through 2015, and a stack which is 55 feet high and 20 inches in diameter. The maximum impact from all the years was used for the calculations.
Scaled hourly impact (ug/m^3) = AERMOD predicted hourly ambient impact at 1 g/s ([ug/m^3]/[g/s]) x Actual emission rate (g/s)
Scaled annual impact (ug/m^3) = AERMOD predicted annual ambient impact at 1 g/s ([ug/m^3]/[g/s]) x Actual emission rate (g/s)

AERMOD Normalized Ambient Impact at 1 g/s	
Hourly ([ug/m^3]/[g/s])	Annual ([ug/m^3]/[g/s])
148.05	4.35

(3) Short-term and annual guideline concentrations for air toxic pollutants specified in the NYSDEC DAR-1 AGC/SGC tables revised August 10, 2016.
(4) Vinyl Chloride, Trichloroethene, and Benzene potential emission rates are less than 0.1 lb/hr and therefore below the trigger emissions for degree of air cleaning requirement (6 CRR-NY 212-2.3).

AGC	Annual Guideline Concentration	**9.3**	bold value indicates a detection
CAS #	Chemical Abstracts Service Registry Number	--	
CRR-NY	New York Codes, Rules and Regulations	acfm	actual cubic feet per minute
DAR-1	Division of Air Resources-1	µg/m^3	micrograms per cubic meter
NYSDEC	New York State Department of Environmental Conservation	g/s	grams per second
SGC	Short-term Guideline Concentration	lb/yr	pounds per year
		lb/hr	pounds per hour

Table 4B
Summary of AERMOD Air Quality Impact Analysis
Tower 102 Treatment System,
Second Quarter 2020 Reporting Period, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

Constituent	CAS#	T102 Effluent (ug/m^3)	Emission Rate[1]			Scaled Impact - Hourly [2] (ug/m^3)	Scaled Impact - Annual [2] (ug/m^3)	SGC [3] (ug/m^3)	AGC[3] (ug/m^3)	%SGC	% AGC
		5/13/2020	lb/yr	lb/hr	g/s						
1,1,1 - Trichloroethane	00071-55-6	**1.7**	0.43	4.93E-05	6.21E-06	2.16E-03	1.42E-05	9,000	5,000	0.00%	0.00%
1,1 - Dichloroethane	00075-34-3	**44.5**	11.29	1.29E-03	1.62E-04	5.67E-02	3.71E-04	--	0.63	--	0.06%
1,1 - Dichloroethene	00075-35-4	**105**	26.65	3.04E-03	3.83E-04	1.34E-01	8.76E-04	--	200	--	0.00%
Tetrachloroethene	00127-18-4	**0.75**	0.19	2.17E-05	2.74E-06	9.55E-04	6.26E-06	300	4	0.00%	0.00%
Trichloroethene[4]	00079-01-6	**17**	4.31	4.93E-04	6.21E-05	2.16E-02	1.42E-04	20	0.20	0.11%	0.07%
Vinyl Chloride[4]	00075-01-4	**0.31**	0.08	8.98E-06	1.13E-06	3.95E-04	2.59E-06	180,000	0.11	0.00%	0.00%
cis-1,2-Dichloroethene	00156-59-2	**126**	31.98	3.65E-03	4.60E-04	1.60E-01	1.05E-03	--	63	--	0.00%
trans-1,2-Dichloroethene	00156-60-5	**1.90**	0.48	5.50E-05	6.94E-06	2.42E-03	1.58E-05	--	63	--	0.00%
Toluene	00108-88-3	**0.32**	0.08	9.27E-06	1.17E-06	4.08E-04	2.67E-06	37000	5000	0.00%	0.00%
Total Xylene	00095-47-6	**0.513**	0.13	1.49E-05	1.87E-06	6.53E-04	4.28E-06	37000	5000	0.00%	0.00%
Xylene-O	00095-47-6	**0.083**	0.02	2.40E-06	3.03E-07	1.06E-04	6.92E-07	22000	100		0.00%
Xylenes - m,p	00095-47-6	**0.43**	0.11	1.25E-05	1.57E-06	5.48E-04	3.59E-06	22,000	100	0.00%	0.00%
Carbon Tetrachloride	00056-23-5	**0.63**	0.16	1.83E-05	2.30E-06	8.02E-04	5.25E-06	1,900	0.17	0.00%	0.00%
Chloroform	00067-66-3	**8.3**	2.11	2.40E-04	3.03E-05	1.06E-02	6.92E-05	150	14.7	0.01%	0.00%
Chloromethane	00074-87-3	**1.0**	0.25	2.90E-05	3.65E-06	1.27E-03	8.34E-06	22,000	90	0.00%	0.00%
Dichloromethane	00075-09-2	**1.0**	0.25	2.90E-05	3.65E-06	1.27E-03	8.34E-06	14,000	60	0.00%	0.00%
Ethylbenzene	00100-41-4	**0.13**	0.03	3.77E-06	4.75E-07	1.66E-04	1.08E-06	--	1,000	--	0.00%
Trichlorotrifluoroethane (Freon 113)	00076-13-1	**51**	12.94	1.48E-03	1.86E-04	6.49E-02	4.25E-04	960,000	180,000	0.00%	0.00%

Notes and Abbreviations on next page

Table 4B
Summary of AERMOD Air Quality Impact Analysis
Tower 102 Treatment System,
Second Quarter 2020 Reporting Period, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

Notes and Abbreviations:

(1) Emission rate calculated based on effluent concentration and a stack air flow rate of 7,682 cfm. The stack air flow rate (in acfm) is taken from the actual stack air flow rate on 5/13/2020. Effluent temperature used in the model was 80°F from direct read in-line gauge.

Trichloroethene (lb/hr) = (21 ug/m^3) x (7,832 ft^3/min) x (1 m^3/35 ft^3) x (60 min/hr) x (0.000001 g/1 ug) x (0.0022 lb/g)

lb/yr = lb/hr x 8,760 hrs/yr

g/s = lb/hr x 1 hr/3,600 sec x 453.59 g/1 lb

(2) Ambient impact based on AERMOD modeling using normalized rate of 1 g/s is scaled to the actual emission rate of the pollutant. Modeling was performed using the representative meteorological data from the nearest station (Farmingdale, NY) for the years 2011 through 2015, and a stack which is 69.52 feet high and 24 inches in diameter. The maximum impact from all the years was used for the calculations.

Scaled hourly impact (ug/m^3) = AERMOD predicted hourly ambient impact at 1 g/s ([ug/m^3]/[g/s]) x Actual emission rate (g/s)

Scaled annual impact (ug/m^3) = AERMOD predicted annual ambient impact at 1 g/s ([ug/m^3]/[g/s]) x Actual emission rate (g/s)

AERMOD Normalized Ambient Impact at 1 g/s	
Hourly ([ug/m^3]/[g/s])	Annual ([ug/m^3]/[g/s])
348.85	2.29

(3) Short-term and annual guideline concentrations for air toxic pollutants specified in the NYSDEC DAR-1 AGC/SGC tables revised August 10, 2016.

(4) Vinyl Chloride and Trichloroethene potential emission rates are less than 0.1 lb/hr and therefore below the trigger emissions for degree of air cleaning requirement (6 CRR-NY 212-2.3).

AGC	Annual Guideline Concentration	**1.7**	bold value indicates a detection
CAS #	Chemical Abstracts Service Registry Number	--	None Specified
CRR-NY	New York Codes, Rules and Regulations	µg/m^3	micrograms per cubic meter
DAR-1	Division of Air Resources-1	acfm	actual cubic feet per minute
NYSDEC	New York State Department of Environmental Conservation	g/s	grams per second
SGC	Short-term Guideline Concentration	lb/yr	pounds per year
		lb/hr	pounds per hour

Table 5A
Summary of TCE Mass Removal,
Tower 96 Treatment System,
Second Quarter 2020 Reporting Period, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York[1]

Date	TCE Concentration (µg/m^3)				TCE Mass Emission[2]	Percent of Allowable TCE Emissions[3]
	T96 INFLUENT	T96 MIDTRAIN	T96 SUP MIDTRAIN	T96 EFFLUENT[7]	(lbs)	12 Month Rolling Average[6]
06/13/19	24,449	2,627	NS	3,490	179	54.2%
10/03/19 [4,5]	21,977	306	NS	57	2.8	48.0%
12/23/19	13,400	2,990	NS	79	2.8	42.7%
03/26/20	9,240	3,130	NS	296	12.1	26.8%
05/13/20 [8]	5,640	2,350	NS	4,330	89.7	21.6%

Notes and Abbreviations:

(1) Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15.

(2) TCE Mass Emission calculated based on the exhaust air flow rate on the day of sampling and the period of time elapsed since the day of the preceding sampling event.

TCE (lb) = TCE Concentration [µg/m^3] x Days x Flow Rate [ft^3/min] x (1 m^3/35 ft^3) x (60 min/hr) x (24 hr/day) x (0.000001 g/1 ug) x (0.0022 lb/g)

(3) Percent of allowable TCE emissions to date is a time-weighted annual rolling average based on the 500 lb/year emission limit specified in the CRR-NY 212-2.2 Table 2. High Toxicity Air Contaminant List, revised April 1, 2017.

(4) Carbon changeout for Tower 96 supplemental beds was completed on September 20, 2019.

(5) Third Quarter 2019 Vapor Sampling was conducted for both systems on October 3, 2019, after T96 system was brought back on-line after a condensate pump replacement.

(6) Data and footnotes provided outside of the Second Quarter 2020 reporting period are included for 12 Month Rolling Average calculations.

(7) T96 Effluent concentrations for 6/13/19 and 10/3/19 were revised slighly due to typographical error in previous reporting. Typographical error did not impact 12 Month Rolling Average calculations.

(8) The elevated T96 Mid-Train and Effluent vapor-phase contaminant concentrations, compared to prior quarterly sample events are potentially related to a malfunctioning steam actuator valve noted at the regenerative vapor-phase granular activated carbon vessels (RVPGAC), which may have allowed regenerative steam and condensate to partially commingle with system vapor-phase effluent. It should be noted that no SGC or AGC air emission exceedance were noted associated with this sampling event, and the steam actuator valve has since been repaired.

µg/m^3	micrograms per cubic meter
lbs	pounds
CRR-NY	Codes, Rules and Regulations of the State of New York
ELAP	Environmental Laboratory Approval Program
NS	Not Sampled
NYSDOH	New York State Department of Health
SUP	Supplemental
TCE	Trichloroethylene
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

Table 5B
Summary of TCE Mass Removal,
Tower 102 Treatment System,
Second Quarter 2020 Reporting Period, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York[1]

Date	TCE Concentration (µg/m^3)		TCE Mass Emission[2]	Percent of Allowable TCE Emissions[3]
	T102 INFLUENT	T102 EFFLUENT	(lbs)	12 Month Rolling Average[5]
06/13/19	1,990	34	2.9	1.0%
10/03/19 [4]	1,670	17	1.3	1.2%
12/27/19	3,400	35	2.1	1.3%
03/26/20	3,340	8	0.5	1.2%
05/13/20	2,130	17	0.6	1.0%

Notes and Abbreviations:

(1) Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15.

(2) TCE Mass Emission calculated based on the exhaust air flow rate on the day of sampling and the period of time elapsed since the day of the preceding sampling event.

TCE (lb) = TCE Concentration [µg/m^3] x Days x Flow Rate [ft^3/min] x (1 m^3/35 ft^3) x (60 min/hr) x (24 hr/day) x (0.000001 g/1 ug) x (0.0022 lb/g)

(3) Percent of allowable TCE emissions to date is a time-weighted annual rolling average based on the 500 lb/year emission limit specified in the CRR-NY 212-2.2 Table 2. High Toxicity Air Contaminant List, revised April 1, 2017.

(4) Third Quarter 2019 Vapor Sampling was conducted for both systems on October 3, 2019, after T96 system was brought back on-line after a condensate pump replacement.

(5) Data and footnotes provided outside of the Second Quarter 2020 reporting period are included for 12 Month Rolling Average calculations.

µg/m^3	micrograms per cubic meter
lbs	pounds
ELAP	Environmental Laboratory Approval Program
NYSDOH	New York State Department of Health
T102	Tower 102
TCE	Trichloroethene
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

Table 6
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Monitoring Wells, Second Quarter 2020, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Constituent (units in µg/L)	Well ID: Sample ID: Date:	FW-03 FW-03 5/6/2020	GM-13D GM-13D 5/12/2020	GM-15SR GM-15SR 5/22/2020	GM-15I GM-15I 5/22/2020	GM-15D GM-15D 5/22/2020
Volatile Organic Compounds (VOCs)[1, 2]						
1,1,1-Trichloroethane		**0.59 J**	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	**2.6**	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	**1.7**	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	**2.9**	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m&p-Xylenes		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		**1.1**	**32.7**	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		**1.6**	**14.5**	**3.8**	**1.9**	< 1.0
Vinyl chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total VOCs [3]		**3.3**	**54**	**3.8**	**1.9**	0.0
1,4 Dioxane [1,2]		< 0.24	**2.8**	< 0.23	< 0.23	< 0.24

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Table 6
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Monitoring Wells, Second Quarter 2020, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Constituent (units in µg/L)	Well ID: Sample ID: Date:	GM-15D2 GM-15D2 5/22/2020	GM-17I GM-17I 5/8/2020	GM-17D GM-17D 5/8/2020	GM-18I GM-18I 5/6/2020	GM-18D GM-18D 5/6/2020
Volatile Organic Compounds (VOCs)[1, 2]						
1,1,1-Trichloroethane		< 1.0	< 0.50	< 0.50	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)		< 5.0	< 0.50	< 0.50	< 5.0	< 5.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 0.50	< 0.50	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 0.50	< 0.50	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 0.50	< 0.50	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane		< 2.0	< 0.50	< 0.50	< 2.0	< 2.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m&p-Xylenes		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		**3.3**	< 0.50	< 0.50	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 0.50	< 0.50	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		**7.5**	**0.47 J**	< 0.50	< 1.0	**0.55 J**
Vinyl chloride		< 1.0	< 0.50	< 0.50	< 1.0	< 1.0
Total VOCs [3]		**11**	**0.47**	0.0	0.0	**0.55**
1,4 Dioxane [1,2]		**3.7**	< 9.0 B	< 8.0 B	**9.0**	**12**

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Table 6
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Monitoring Wells, Second Quarter 2020, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Constituent (units in µg/L)	Well ID: Sample ID: Date:	GM-20I GM-20I 5/5/2020	GM-20D GM-20D 5/4/2020	GM-21S GM-21S 5/27/2020	GM-21I GM-21I 5/27/2020	GM-21D GM-21D 5/5/2020
Volatile Organic Compounds (VOCs)[1, 2]						
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10 J	< 10
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10 J	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m&p-Xylenes		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	**0.59 J**
Vinyl chloride		< 1.0 J	< 1.0	< 1.0 J	< 1.0	< 1.0 J
Total VOCs [3]		0.0	0.0	0.0	0.0	**0.59**
1,4 Dioxane [1,2]		**6.0**	**7.1**	**5.2**	**5.3**	**4.8**

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Table 6
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Monitoring Wells, Second Quarter 2020, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Constituent (units in µg/L)	Well ID: Sample ID: Date:	GM-21D2 GM-21D2 5/27/2020	GM-33D2 GM-33D2 5/19/2020	GM-34D GM-34D 5/21/2020	GM-34D REP052120BW1 5/21/2020	GM-34D2 GM-34D2 5/21/2020
Volatile Organic Compounds (VOCs)[1, 2]						
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	**0.80 J**	**0.80 J**	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10 J	< 10	< 10	< 10	< 10
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10 J	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	**4.2**	**4.4**	**0.81 J**
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m&p-Xylenes		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		**1.0**	< 1.0	**6.8**	**6.8**	**8.2**
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		**6.6**	**8.8**	**179**	**179**	**81.2**
Vinyl chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total VOCs [3]		**7.6**	**8.8**	**191**	**190**	**90**
1,4 Dioxane [1,2]		**4.8**	**12**	**13**	**13**	**9.2**

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Table 6
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Monitoring Wells, Second Quarter 2020, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Constituent (units in µg/L)	Well ID: Sample ID: Date:	GM-35D2 GM-35D2 5/18/2020	GM-36D GM-36D 5/4/2020	GM-36D2 GM-36D2 6/16/2020	GM-37D GM-37D 5/18/2020	GM-37D2 GM-37D2 5/18/2020
Volatile Organic Compounds (VOCs)[1, 2]						
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	**0.98 J**	< 1.0	**1.0**
1,1-Dichloroethene		< 1.0	< 1.0	**0.83 J**	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m&p-Xylenes		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		**3.5**	< 1.0	< 1.0	< 1.0	**1.2**
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		**20.6**	< 1.0	**3.2**	**10.1**	**2.1**
Vinyl chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total VOCs [3]		**24**	0.0	**5.0**	**10**	**4.3**
1,4 Dioxane [1,2]		**8.6**	**1.2**	**0.76**	**0.58**	**1.1**

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Table 6
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Monitoring Wells, Second Quarter 2020, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Constituent (units in µg/L)	Well ID: Sample ID: Date:	GM-38D GM-38D 5/11/2020	GM-38D2 GM-38D2 5/11/2020	GM-39DA GM-39DA 4/30/2020	GM-39DB GM-39DB 4/30/2020	GM-70D2 GM-70D2 5/18/2020
Volatile Organic Compounds (VOCs)[1, 2]						
1,1,1-Trichloroethane		< 1.0	**0.95 J**	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	**6.8**	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	**1.6**	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		**0.92 J**	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	**1.4**	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		**0.74 J**	**8.7**	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m&p-Xylenes		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		**2.9**	< 1.0	< 1.0	< 1.0	**2.2**
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		**131**	**16.2**	**1.7**	**49.1**	**6.4**
Vinyl chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total VOCs [3]		**140**	**36**	**1.7**	**49**	**8.6**
1,4 Dioxane [1,2]		**4.3**	**4.4**	**5.6**	**4.7**	**7.3**

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Table 6
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Monitoring Wells, Second Quarter 2020, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Constituent (units in µg/L)	Well ID: Sample ID: Date:	GM-71D2 GM-71D2 5/20/2020	GM-73D GM-73D 5/7/2020	GM-73D2 GM-73D2 5/7/2020	GM-73D3 GM-73D3 5/7/2020	GM-74I GM-74I 5/7/2020
Volatile Organic Compounds (VOCs)[1, 2]						
1,1,1-Trichloroethane		**0.88 J**	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)		< 5.0	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		**2.7**	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		**1.2**	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane		< 2.0	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m&p-Xylenes		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 0.50	**1.0**	**1.8**	< 0.50
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		**8.8**	**9.5**	**27.1**	**2.3**	< 0.50
Vinyl chloride		< 1.0	< 0.50	< 0.50	< 0.50	< 0.50
Total VOCs [3]		**14**	**9.5**	**28**	**4.1**	0.0
1,4 Dioxane [1,2]		**2.4**	**2.9**	**2.7**	**1.3**	**6.9**

See notes on last page

Table 6
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Monitoring Wells, Second Quarter 2020, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Constituent (units in µg/L)	Well ID: Sample ID: Date:	GM-74D GM-74D 5/7/2020	GM-74D2 GM-74D2 5/7/2020	GM-74D3 GM-74D3 5/7/2020	GM-75D2 GM-75D2 5/19/2020	GM-78S GM-78S 5/20/2020
Volatile Organic Compounds (VOCs)[1, 2]						
1,1,1-Trichloroethane		< 0.50	< 0.50	< 0.50	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)		< 0.50	< 0.50	< 0.50	< 5.0	< 5.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	**0.60 J**	< 1.0	< 1.0	**1.6**
1,1-Dichloroethene		< 0.50	< 0.50	< 0.50	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 0.50	< 0.50	< 0.50	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 1.0	**1.3**
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane		< 0.50	< 0.50	< 0.50	< 2.0	< 2.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m&p-Xylenes		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 0.50	**2.0**	**4.1**	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		**1.1**	**5.6**	**4.2**	**16.6**	**5.0**
Vinyl chloride		< 0.50	< 0.50	< 0.50	< 1.0	< 1.0
Total VOCs [3]		**1.1**	**8.2**	**8.3**	**17**	**7.9**
1,4 Dioxane [1,2]		**6.6**	**3.2**	**2.2**	**7.5**	**3.1**

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Table 6
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Monitoring Wells, Second Quarter 2020, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Constituent (units in µg/L)	Well ID: Sample ID: Date:	GM-78I GM-78I 5/20/2020	GM-78D GM-78D 5/20/2020	GM-78D2 GM-78D2 5/20/2020	GM-79I GM-79I 5/11/2020	GM-79D GM-79D 5/11/2020
Volatile Organic Compounds (VOCs)[1, 2]						
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		**1.1**	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		**0.93 J**	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m&p-Xylenes		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		**3.4**	**0.77 J**	**0.76 J**	< 1.0	**21.2**
Vinyl chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total VOCs [3]		**5.4**	**0.77**	**0.76**	0.0	**21**
1,4 Dioxane [1,2]		**4.0**	**10**	**10**	**4.9**	**5.3**

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Table 6
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Monitoring Wells, Second Quarter 2020, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Constituent (units in µg/L)	Well ID: Sample ID: Date:	HN-24I HN-24I 5/27/2020	HN-40S HN-40S 5/26/2020	HN-40I HN-40I 5/26/2020	HN-42S HN-42S 5/26/2020	HN-42I HN-42I 5/26/2020
Volatile Organic Compounds (VOCs)[1, 2]						
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		**1.4**	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		**0.64 J**	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10 J	< 10	< 10	< 10	< 10
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10 J	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		**0.53 J**	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m&p-Xylenes		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		**2.5**	< 1.0	**3.4**	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		**6.3**	< 1.0	**3.8**	< 1.0	< 1.0
Vinyl chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total VOCs [3]		**11**	0.0	**7.2**	0.0	0.0
1,4 Dioxane [1,2]		**0.67**	< 0.24	**0.18 J**	**< 0.23**	**0.41**

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Table 6
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Monitoring Wells, Second Quarter 2020, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Constituent (units in µg/L)	Well ID: Sample ID: Date:	MW-3-1 MW-3-1 5/8/2020	MW-3-1 REP050820ARH1 5/8/2020	N-10624 N-10624 5/19/2020	N-10627 N-10627 5/19/2020	N-10631 N-10631 5/19/2020
Volatile Organic Compounds (VOCs)[1, 2]						
1,1,1-Trichloroethane		**0.55**	**0.58**	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)		**0.58**	**0.58**	< 5.0	< 5.0	< 5.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		**4.9**	**4.8**	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		**1.8**	**1.9**	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		**0.45 J**	**0.48 J**	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		**4.7**	**5.1**	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane		< 0.50	< 0.50	< 2.0	< 2.0	< 2.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m&p-Xylenes		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		**25.5**	**24.7**	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 0.50	< 0.50	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		**74.2**	**76.0**	< 1.0	< 1.0	< 1.0
Vinyl chloride		**0.36 J**	**0.43 J**	< 1.0	< 1.0	< 1.0
Total VOCs [3]		**110**	**110**	0.0	0.0	0.0
1,4 Dioxane [1,2]		< 0.23 BJ	< 0.23 J	**4.2**	**4.1**	**2.4**

See notes on last page

Table 6
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Monitoring Wells, Second Quarter 2020, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

Notes and Abbreviations:

(1) Samples were analyzed for VOCs using USEPA Method 8260C; samples were analyzed for 1,4-Dioxane using USEPA Method 8270D -SIM.

(2) Results for the program are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016).

(3) Total VOCs rounded to two significant figures.

Bold Constituent detected

B Contamination found in associated blank

D Concentration is based on a diluted sample analysis

J Constituent value is estimated

REP Blind Replicate Sample

µg/L Micrograms per liter

VOCs Volatile Organic Compounds

<1.0 Compound not detected above its laboratory quanitfication limit

Table 7
Concentrations of Metals and 1,4-Dioxane in Monitoring Wells[1]
Second Quarter 2020, Operable Unit 2
Northrop Grumman Systems Corporation
Bethpage, New York.

Constituent (units in µg/L)	Well ID: Sample ID: Date:	GM-15SR GM-15SR 5/22/2020	GM-78I GM-78I 5/20/2020	GM-78I GM-78I 7/22/2020	GM-78S GM-78S 5/20/2020	MW-01GF MW-01GF 5/6/2020	MW-02GF MW-02GF 5/6/2020	N-10631 N-10631 5/19/2020	PLT1 MW-04 PLT1 MW-04 5/5/2020	PLT1 MW-05 PLT1 MW-05 5/5/2020	PLT1 MW-05 REP050520ARH1 5/5/2020	PLT1 MW-06 PLT1 MW-06 5/5/2020
Metals [2]												
Cadmium (Total)		--	--	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	**--**	--	--	--
Cadmium (Dissolved)		--	--	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	**--**	--	--	--
Chromium (Total)		**525**	--	< 10	< 10	< 10	**227**	**11.8**	**< 10**	**621**	**626**	**174**
Chromium (Dissolved)		**472**	--	< 10	< 10	< 10	**233**	< 10	**< 10**	**648**	**646**	**173**
1,4-Dioxane [3]		< 0.23	**4.0**	**--**	**3.1**	**7.2**	**10**	**2.4**	< 0.23	< 0.23	< 0.24	< 0.23

Notes and Abbreviations:

(1) Results for the program are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016).
(2) Samples analyzed for total unfiltered and dissolved filtered cadium and chromium using USEPA Method 6010C.
(3) Samples were analyzed for 1,4-dioxane using USEPA Method 8270D-SIM.
REP Blind Replicate sample
µg/L Micrograms per liter
-- Not analyzed
<3.0 Compound not detected above its laboratory quanitfication limit

Table 8

Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Outpost Wells [1]
Second Quarter 2020, Operable Unit 2,
Northrop Grumman Systems Corporation
Bethpage,New York

Constituents (units in ug/L)	Well ID: / Sample ID: / Sample Date:	BPOW 1-1 / BPOW 1-1 / 4/20/2020	BPOW 1-2 / BPOW 1-2 / 4/22/2020	BPOW 1-3 / BPOW 1-3 / 4/20/2020	BPOW 1-4 / BPOW 1-4 / 4/22/2020	BPOW 1-5 / BPOW 1-5 / 4/20/2020	BPOW 1-6 / BPOW 1-6 / 4/22/2020	BPOW 2-1 / BPOW 2-1 / 4/21/2020	BPOW 2-2 / BPOW 2-2 / 4/21/2020	BPOW 2-3 / BPOW 2-3 / 4/21/2020	BPOW 3-1 / BPOW 3-1 / 4/23/2020	BPOW 3-2 / BPOW 3-2 / 4/23/2020
Volatile Organic Constituents [2, 4]												
1,1,1-Trichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (MEK)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Acetone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromomethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Disulfide		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Tetrachloride		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chlorobenzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chlorodibromomethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dichloromethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m&p-Xylenes		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methyl N-Butyl Ketone (2-Hexanone)		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
o-Xylene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene (Monomer)		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichloroethene		**0.85**	**0.42 J**	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Vinyl chloride		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TVOCs [4]		**0.85**	**0.42**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
1,4 Dioxane [2,3]		< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	**0.559**	**0.513**	**3.04**	**0.541**	**2.66**

See notes and abbreviations on last page.

Table 8
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Outpost Wells [1]
Second Quarter 2020, Operable Unit 2,
Northrop Grumman Systems Corporation
Bethpage,New York

Constituents (units in ug/L)	Well ID: / Sample ID: / Sample Date:	BPOW 3-3 / BPOW 3-3 / 4/21/2020	BPOW 3-4 / BPOW 3-4 / 4/21/2020	BPOW 4-1R / BPOW 4-1R / 4/23/2020	BPOW 4-1R / REP042320BW1 / 4/23/2020	BPOW 4-2R / BPOW 4-2R / 4/22/2020
Volatile Organic Constituents [2, 4]						
1,1,1-Trichloroethane		< 0.50	**0.34 J**	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane		< 0.50	< 0.50	< 0.50 J	< 0.50	< 0.50
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)		**0.34 J**	**3.7**	**36.5**	**37.7**	**28.1**
1,1,2-Trichloroethane		< 0.50	**1.2**	< 0.50	< 0.50	< 0.50
1,1-Dichloroethane		< 0.50	**0.48 J**	< 0.50	< 0.50	< 0.50
1,1-Dichloroethene		< 0.50	**3.7**	**0.77**	**0.77**	**0.59**
1,2-Dichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (MEK)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Acetone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform		< 0.50	< 0.50	< 0.50 J	< 0.50	< 0.50
Bromomethane		< 0.50	< 0.50	< 0.50 J	< 0.50	< 0.50
Carbon Disulfide		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Tetrachloride		< 0.50	**2.0**	**0.34 J**	**0.35 J**	**0.28 J**
Chlorobenzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chlorodibromomethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform		< 0.50	**0.87**	< 0.50	< 0.50	< 0.50
Chloromethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,2-Dichloroethene		< 0.50	**1.9**	**0.31 J**	**0.31 J**	**0.21 J**
cis-1,3-Dichloropropene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dichloromethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m&p-Xylenes		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methyl N-Butyl Ketone (2-Hexanone)		< 2.0	< 2.0	< 2.0 J	< 2.0	< 2.0
o-Xylene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene (Monomer)		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene		< 0.50	< 0.50	< 0.50	< 0.50	**0.67**
Toluene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichloroethene		< 0.50	**171 D**	**1.4**	**1.4**	**2.8**
Vinyl chloride		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TVOCs [4]		**0.34**	**hav**	**39**	**41**	**33**
1,4 Dioxane [2,3]		**7.33**	**5.87**	**3.43**	**3.14**	**2.14**

See notes and abbreviations on last page.

Table 8
Concentrations of Volatile Organic Compounds and 1,4 Dioxane in Outpost Wells [(1)]
Second Quarter 2020, Operable Unit 2,
Northrop Grumman Systems Corporation
Bethpage,New York

Notes and Abbreviations:

(1)	These outpost wells have been recently repurposed for use as plume monitoring wells per the June 2015 Groundwater Monitoring Plan Addendum (ARCADIS of New York, Inc., 2015) as conditionally approved by the NYSDEC (August 25, 2015). Therefore, TVOC trigger levels that may have been previously established are no longer shown
(2)	Samples were analyzed for VOCs using USEPA Method 524.2; samples were analyzed for 1,4-Dioxane using USEPA Method 522
(3)	Results for the program are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016)
(4)	TVOCs are rounded to two significant figures
Bold	Value indicates constituent detected
REP	Blind Replicate Sample
TVOCs	Total Volatile Organic Compounds
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
µg/L	micrograms per liter
<0.5	Compound not detected above its laboratory quantification limit.
D	Result was reported from the diluted run
J	Value is estimated concentration

FIGURES

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\BIM\OneDrive - ARCADIS\BIM 360 Docs\NORTHROP GRUMMAN\OU2 ONCT OM&M PROGRAM\2019\01-DWG\NGC-ONCT-ONSITE-GW-REMEDY.dwg LAYOUT: 1 SAVED: 3/26/2019 5:14 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 3/26/2019 5:17 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----
X-LI-NY_R2&ST
X-1496X01

FORMER RUCO POLYMER SITE

NWIRP SITE (FORMER NAVY SITE)

BETHPAGE COMMUNITY PARK

BETHPAGE HIGH SCHOOL

OU-2 ON-SITE GROUNDWATER REMEDY TREATMENT SYSTEMS

OU2 MAIN FACILITY REMEDIAL SYSTEM (TOWER 96)

OU2 MAIN FACILITY REMEDIAL SYSTEM (TOWER 102)

OU2 OUTFALL 006

OU2 OUTFALL 005

SOUTH BASINS

HWD 10208

HWD 8779

BWD 8768

BWD 8767

BWD 9591

FW-03

HN-24I HN-24S

HN-42S HN-42I

HN-40S HN-40I

GM-13D

GM-16I GM-16SR

MW-3-1

WELL 3R

WELL 3

GM-17SR GM-17I GM-17D

10597

MW-1GF

GM-32S

PLANT 2

WELL 1

GM-39DA GM-39DB

MW-2GF

GM-18S GM-18I GM-18D

GM-73D3 GM-73D2 GM-73D

GM-33D2 10631

WELL-17

10600

GM-78S GM-78I GM-78D GM-78D2

MW-3R

GM-20I GM-20D

GM-21D2 10633

9921

GM-75D2 10624

10627

GM-21S GM-21I GM-21D

10634

GM-19S GM-19I

MW-5 MW-6 MW-4

GM-74I GM-74D GM-74D2 GM-74D3

WELL-18

WELL-19

GM-15SR GM-15I GM-15D GM-15D2

GM-79I GM-79D

10628

GM-71D2

GM-70D2

GM-35D2

GM-36D GM-36D2

N-10821

GM-37D GM-37D2

BWD 6915 6916

BWD 8941 3876

GM-38D GM-38D2

BWD 8004

GM-34D GM-34D2

TOH(LWD) 7076

BPOW 4-2R

BPOW 4-1R

TOH(LWD) 5303

BPOW 3-3 BPOW 3-4

BPOW 3-2 BPOW 3-1

NYAW 9338 NYAW 8480

BPOW 2-2 BPOW 2-3 BPOW 2-1

SFWD 6150

BPOW 1-4 BPOW 1-5 BPOW 1-6 BPOW 1-3 BPOW 1-1 BPOW 1-2

SFWD 7377 SFWD 5148 SFWD 4043

HAYPATH ROAD

FARMERS AVENUE

(PLAINVIEW ROAD)

BROADWAY

GRUMMAN ROAD

LONG ISLAND RAILROAD

CENTRAL AVENUE

BLOOMINGDALE ROAD

NORTH WANTAGH AVE.

HICKSVILLE ROAD

STEWART AVENUE

SEAFORD - OYSTER BAY EXPRESSWAY

BETHPAGE STATE PARKWAY

MALLARD ROAD

(GARDINER'S AVENUE)

LOWLAND ROAD

PIKE

BOUNDARY AVENUE

(107)

PLANT 111, PLANT 116, PLANT 115, PLANT 21, PLANT 37, PLANT 15, PLANT 14, PLANT 26, PLANT 35, PLANT 30, PLANT 3, PLANT 10, PLANT 25, PLANT 5, PLANT 1

EXPLANATION

- PROPERTY BOUNDARY OF THE FORMER GRUMMAN AEROSPACE SITE
- PROPERTY BOUNDARY OF THE FORMER NAVY SITE
- PROPERTY BOUNDARY OF THE FORMER OXY/RUCO SITE
- LONG ISLAND RAILROAD
- DENOTES NORTHROP GRUMMAN OWNED PROPERTY (AS OF 2009)
- DENOTES NAVY OWNED PROPERTY (AS OF 2014)
- DENOTES FORMER NAVY OWNED PROPERTY
- RECHARGE BASIN
- 10592 OBSERVATION/MONITORING/OUTPOST WELL (1)
- 9591 PUBLIC SUPPLY WELL (2)
- WELL-17 NORTHROP GRUMMAN REMEDIAL WELL
- PART OF ON-SITE REMEDY
- NWIRP NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
- TOH (LWD) TOWN OF HEMPSTEAD LEVITOWN WATER DISTRICT
- HWD HICKSVILLE WATER DISTRICT
- SFWD SOUTH FARMINGDALE WATER DISTRICT
- BWD BETHPAGE WATER DISTRICT
- NYAW NEW YORK AMERICAN WATER

NOTE:

(1) THIS FIGURE DEPICTS OBSERVATION/MONITORING/OUTPOST WELLS INCLUDED IN THE OU-2 GROUNDWATER MONITORING PROGRAM.

(2) PUBLIC SUPPLY WELLS ARE NOT SAMPLED AS A PART OF THE OU2 GROUNDWATER MONITORING PROGRAM AND ARE ONLY FOR REFERENCE.

0 1000' 2000'

APPROXIMATE SCALE IN FEET

NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OPERABLE UNIT 2

LOCATIONS OF OF WELLS AND ON-SITE GROUNDWATER REMEDY

ARCADIS Design & Consultancy for natural and built assets

FIGURE 1

PLANT 25

PLANT 5

TOWER 102
TREATMENT
SYSTEM

WELL 3R

WEST RECHARGE BASINS
(OUTFALL 006)

TOWER 96
TREATMENT
SYSTEM

WELL 3

LONG ISLAND RAILROAD

GRUMMAN ROAD WEST

PLANT 2

PLANT 1

GRUMMAN ROAD EAST

WELL
1

AERATION BASIN

LIRR

WELL
17

SOUTH RECHARGE BASINS
(OUTFALL 005)

WELL 18

WELL
19

SUN–SITE

LEGEND:

- FORMER NORTHROP GRUMMAN PROPERTY LINE
- INFLUENT LINE
- BYPASS
- STORM DRAIN (EFFLUENT)
- NON POTABLE WATER DISTRIBUTION LINE (EFFLUENT)
- RAILROAD TRACKS
- FENCE
- WELL 18 — REMEDIAL WELL
- BASIN
- ONCT — ON–SITE CONTAMINANT

NOTES:

DRAWING IS NOT TO BE USED FOR DESIGN PURPOSES. LAYOUT OF PIPING IS FOR REPRESENTATION ONLY (LOCATIONS ARE APPROXIMATE).

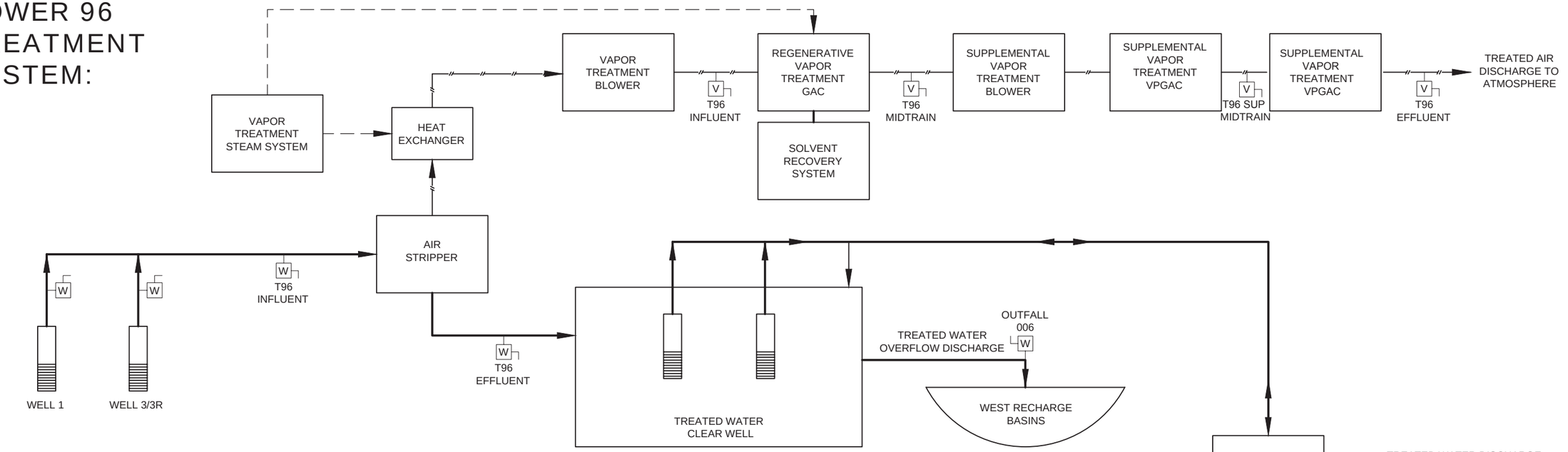
NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OPERABLE UNIT 2

ONCT GROUNDWATER EXTRACTION AND TREATMENT SYSTEM SITE PLAN

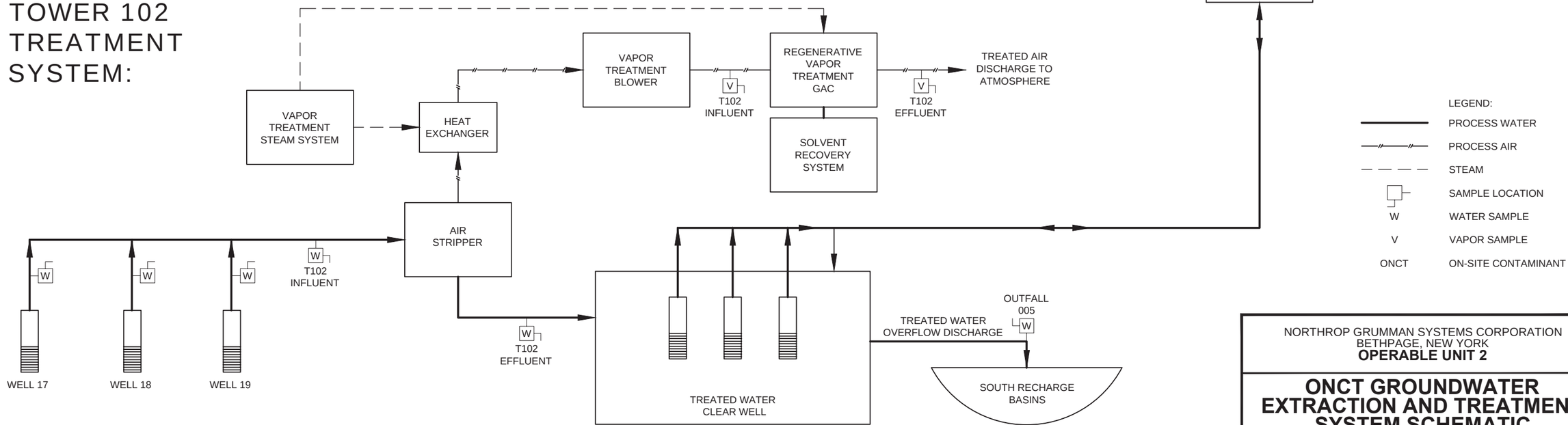
ARCADIS Design & Consultancy for natural and built assets

FIGURE
2

TOWER 96 TREATMENT SYSTEM:



TOWER 102 TREATMENT SYSTEM:



NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OPERABLE UNIT 2

ONCT GROUNDWATER EXTRACTION AND TREATMENT SYSTEM SCHEMATIC

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FIGURE 3