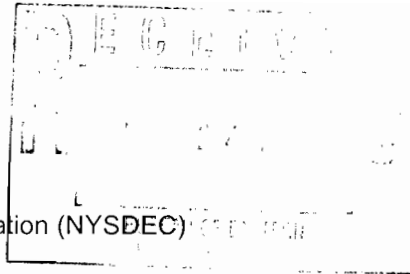




Infrastructure, environment, facilities

Mr. Steven Scharf, P.E.  
New York State Department of Environmental Conservation (NYSDEC)  
Division of Environmental Remediation  
625 Broadway  
Albany, New York 12233-7015



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Subject

Results of Third Quarter 2009 Groundwater Monitoring,  
Operable Unit 2, Northrop Grumman Systems Corporation (Northrop Grumman) and  
Naval Weapons Industrial Reserve Plant (NWIRP) Sites, Bethpage, New York.  
(NYSDEC Site #s 1-30-003A and B)

ENVIRONMENT

Dear Mr. Scharf:

On behalf of Northrop Grumman Systems Corporation (Northrop Grumman),  
ARCADIS is providing the New York State Department of Environmental  
Conservation (NYSDEC) with the validated results of groundwater monitoring  
performed in accordance with the approved groundwater monitoring plan (ARCADIS  
G&M, Inc. 2006) and the Public Water Supply Contingency Plan (PWSCP)  
(ARCADIS G&M, Inc. 2003) for the Third Quarter of 2009 for Operable Unit 2 (OU2).  
Table 1 provides OU2 remedial system performance operational data and water  
balance. Tables 2, 3, and 4 provide the analytical results of monitoring for this  
period. Figure 1 shows the site plan with well locations.

Date:

November 18, 2009

Contact:

David E. Stern

Phone:

(631) 391-5284

Email:

David.stern@arcadis-us.com

Please contact us if you have any questions or comments.

Our ref:

NY001492.0409.00004

Sincerely,

ARCADIS U.S., Inc.

David E. Stern  
Senior Hydrogeologist

Carlo San Giovanni  
Project Manager

Enclosures

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See Attached Distribution List

Imagine the result

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# ARCADIS

Table 1. Summary of Operational Data and Water Balance for the On-Site Portion of the OU2 Groundwater Remedy, Third Quarter 2009, Operable Unit 2, Northrop Grumman Corporation, Bethpage, New York.

Identification	Design Pumping/Recharge Rate (a) (gpm)	Current Actual Average Pumping/Recharge Rate (b) (gpm)	Design Total Pumpage/Recharge (MG)	Current Actual Total Pumpage/Recharge (MG)	Current Percent of Design Pumpage/Recharge	Current TCE Concentration (ug/L)	Current TVOC Concentration (c) (ug/L)	3rd Quarter 2009 Estimated VOC Mass Removed (d) (lbs)
<b>Remedial Wells</b>								
Well 1	800	836	107.1	111.8	104%	390	508	473
Well 3	700	706	93.7	94.4	101%	2500	2,814	2,212
Well 17	1,000	939	133.9	115.7	86%	250	292	281
Well 18	600	598	80.4	73.7	92%	100	124	76
Well 19	700	653	93.7	77.0	82%	200	235.6	151
<b>Rounded Totals:</b>	<b>3,800</b>	<b>3,732</b>	<b>509</b>	<b>473</b>	<b>93%</b>	<b>--</b>	<b>--</b>	<b>3,193</b>
<b>Recharge Basins (a)</b>								
<b>Treated Water Recharged to Aquifer</b>								
West Recharge Basins	0	1,084	0	145.2	--	--	--	--
South Recharge Basins	2,231	2,366	298.8	316.9	106%	--	--	--
<b>Rounded Totals:</b>	<b>2,231</b>	<b>3,450</b>	<b>299</b>	<b>462.1</b>	<b>155%</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>Treated Water Sent to Calpine</b>								
Calpine Demand	100-400	276	14-56	37.0	--	--	--	--
<b>Treatment Efficiencies</b>								
<b>Average SPDES Outfall TVOC Concentrations (ug/L) (f)</b>								
Tower 96 System Efficiency (e)		<b>100%</b>		<b>0.2</b>				
Tower 102 System Efficiency (e)		<b>99.9%</b>		<b>0.2</b>				

see footnotes on last page

Table 1. Summary of Operational Data and Water Balance for the On-Site Portion of the OU2 Groundwater Remedy, Third Quarter 2009, Operable Unit 2, Northrop Grumman Corporation, Bethpage, New York.

- (a) - Design remedial well pumping rates based on computer modeling (ARCADIS G& M, Inc. 2003c). Acceptable design recharge rates based on computer modeling (ARCADIS G&M, Inc. 2004b). Design pumping and recharge rates were modified in April, 2005. Recharge includes remedial well pumpage (minus Calpine demand, Oxy biosparge system demand, and pipe loss), plus incidental runoff from precipitation. Current average recharge rates have been determined using the entire 98-day span of time as opposed to current average pumping rates, which account for varying amounts of downtime, as indicated below.
- b) - OU2 wells were operational during the Third Quarter 2009, at the following percentages: Well-1 (99.9%), Well-3 (99.9%); Well-17 (92%), Well-18 (92%), and Well-19 (88%). The Actual Average Pumping Rates and rate of treated water sent to Calpine are for when the wells are pumping.
- (c) - The TVOC concentration for each well was calculated based on Third Quarter 2009 groundwater monitoring data (Table 2).
- (d) - TVOC mass removed is based on the TVOC data given above and the following formula:

$$\text{[TVOC concentration in ug/L] X (gallons pumped) X (3.785 L/gal) X (1 x 10}^{-6} \text{ g/ug) X (2.2 x 10}^{-3} \text{ lb/g)}$$

(e) Air Stripping Efficiency calculated from values above and in Table 2 using the following formula:

$$1 - \left[ \frac{\text{Average SPDES TVOC Concentration at Outfall}}{(\text{TVOC}_{\text{Well 1}} \times Q_{\text{Well 1}}) + (\text{TVOC}_{\text{Well 2}} \times Q_{\text{Well 2}}) \text{ etc...}} \right] \times (Q_{\text{Well 1}} + Q_{\text{Well 2}} \text{ etc..})$$

- (f) -When non-detectable levels of VOCs are found in the effluent, a value of zero is used to estimate the efficiency of the air stripper.
- Towers 102 and 96 outfalls are identified as Outfalls 005 and 006, respectively (commonly known as the South Recharge Basins and Plant 5 Recharge Basins, respectively). Complete SPDES reporting provided to NYSDEC by NGC under separate cover.

--	Not Available or Not Applicable	lb/g	pounds per gram
TVOC	Total Volatile Organic Compounds	lbs	pounds
g/ug	grams per microgram	MG	Million Gallons
gpm	gallons per minute	ug/L	micrograms per liter
L/gal	Liters per gallon	OU2	Operable Unit 2
SPDES	State Pollutant Discharge Elimination System	Q	Pumping Rate
NGC	Northrop Grumman Corporation	NYSDEC	New York State Department of Environmental Conservation

Table 2. Concentrations of Volatile Organic Compounds Detected in Monitoring Wells and Groundwater Remedial Wells, Third Quarter 2009, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in ug/L)	Well: N-10624 Sample ID: N-10624 Date: 8/21/2009	N-10627 N-10627 8/18/2009	N-10631 N-10631 8/18/2009	FW-03 FW-03 8/25/2009	GM-13D GM-13D 9/4/2009	GM-15SR GM-15SR 8/14/2009	GM-15I GM-15I 8/27/2009	GM-15D GM-15D 8/14/2009	GM-15D2 GM-15D2 8/14/2009
1,1,1-Trichloroethane	< 5	< 5	< 5	<b>0.35 J</b>	<b>4.1 J</b>	< 5	< 5 J	< 5	< 5
1,1,2,2-Tetrachloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
1,1,2-Trichloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
1,1-Dichloroethane	< 5	< 5	< 5	< 5	<b>6.3</b>	< 5	< 5 J	< 5	< 5
1,1-Dichloroethene	< 5	< 5	< 5	< 5	<b>14</b>	< 5	< 5 J	< 5	<b>0.92 J</b>
1,2-Dichloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
1,2-Dichloropropane	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
2-Butanone	< 50	< 50	< 50	< 50	< 50	< 50	< 50 J	< 50	< 50
2-Hexanone	< 50	< 50	< 50	< 50	< 50	< 50	< 50 J	< 50	< 50
4-methyl-2-pentanone	< 50	< 50	< 50	< 50	< 50	< 50	< 50 J	< 50	< 50
Acetone	< 50 B	< 50	< 50 B	< 50 B	< 50	< 50 B	<b>2.6 J</b>	< 50	< 50 B
Benzene	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7 J	< 0.7	< 0.7
Bromodichloromethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Bromoform	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Bromomethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Carbon Disulfide	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Carbon tetrachloride	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Chlorobenzene	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Chlorodifluoromethane (Freon 22)	< 5	< 5	< 5	< 5	<b>2.9 J</b>	< 5	< 5 J	< 5	<b>1.1 J</b>
Chloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Chloroform	< 5	< 5	< 5	< 5	<b>0.39 J</b>	< 5	< 5 J	<b>0.33 J</b>	<b>0.33 J</b>
Chloromethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	<b>0.49 J</b>	< 5
cis-1,2-dichloroethene	< 5	< 5	< 5	<b>0.41 J</b>	<b>29</b>	<b>0.5 J</b>	< 5 J	< 5	<b>0.38 J</b>
cis-1,3-dichloropropene	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Dichlorodifluoromethane (Freon 12)	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Ethylbenzene	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Methylene Chloride	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Styrene	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Tetrachloroethene	< 5	< 5	< 5	<b>57</b>	<b>240 D</b>	< 5	< 5 J	<b>0.6 J</b>	<b>11</b>
Toluene	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
trans-1,2-dichloroethene	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
trans-1,3-dichloropropene	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Trichloroethylene	< 5	<b>0.58 J</b>	<b>0.34 J</b>	<b>2.8 J</b>	<b>78</b>	<b>8</b>	<b>3.6 J</b>	<b>1.2 J</b>	<b>10</b>
Trichlorotrifluoroethane (Freon 113)	< 5	< 5	< 5	< 5	<b>3.3 J</b>	< 5	< 5 J	< 5	<b>1.1 J</b>
Vinyl Chloride	< 2	< 2	< 2	< 2	< 2	< 2	< 2 J	< 2	< 2
Xylene-o	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
Xylenes - m,p	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J	< 5	< 5
<b>Total VOCs</b>	<b>0</b>	<b>0.58</b>	<b>0.34</b>	<b>60.56</b>	<b>377.99</b>	<b>8.5</b>	<b>6.2</b>	<b>2.62</b>	<b>24.83</b>

ug/L Micrograms per liter  
D Constituent identified at a secondary dilution  
J  
B  
**Bold** Constituent detected  
VOCs Volatile Organic Compounds

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Table 2. Concentrations of Volatile Organic Compounds Detected in Monitoring Wells and Groundwater Remedial Wells, Third Quarter 2009, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in ug/L)	Well:	GM-17I	GM-17D	GM-18I	GM-18D	GM-20I	GM-20D	GM-21S	GM-21I	GM-21D
	Sample ID:	GM-17I	GM-17D	GM-18I	GM-18D	GM-20I	GM-20D	GM-21S	GM-21I	GM-21D
	Date:	8/12/2009	8/12/2009	8/24/2009	8/13/2009	8/28/2009	8/28/2009	8/19/2009	8/13/2009	8/12/2009
1,1,1-Trichloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
2-Butanone	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
2-Hexanone	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
4-methyl-2-pentanone	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Acetone	< 50	<b>5.5 J</b>	< 50 B	< 50	<b>1.4 J</b>	<b>2.7 J</b>	< 50	< 50	< 50	<b>5.7 J</b>
Benzene	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Bromoform	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Bromomethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon tetrachloride	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chloroform	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chloromethane	< 5	< 5	< 5	<b>0.41 J</b>	< 5	< 5	<b>0.4 J</b>	< 5	< 5	< 5
cis-1,2-dichloroethene	< 5	< 5	< 5	<b>0.46 J</b>	< 5	< 5	< 5	< 5	< 5	< 5
cis-1,3-dichloropropene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methylene Chloride	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Styrene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Toluene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,2-dichloroethene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,3-dichloropropene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trichloroethylene	<b>0.59 J</b>	<b>0.47 J</b>	<b>0.55 J</b>	<b>1 J</b>	< 5	< 5	< 5	< 5	< 5	<b>0.53 J</b>
Trichlorotrifluoroethane (Freon 113)	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Xylene-o	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
<b>Total VOCs</b>	<b>0.59</b>	<b>5.97</b>	<b>0.55</b>	<b>1.87</b>	<b>1.4</b>	<b>2.7</b>	<b>0.4</b>	<b>0</b>	<b>6.23</b>	

ug/L Micrograms per liter  
D Constituent identified at a secondary dilution  
J  
B  
**Bold** Constituent detected  
VOCs Volatile Organic Compounds

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Table 2. Concentrations of Volatile Organic Compounds Detected in Monitoring Wells and Groundwater Remedial Wells, Third Quarter 2009, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in ug/L)	Well:	GM-33D2	GM-34D	GM-34D2	GM-35D2	GM-38D	GM-38D2	GM-39D <sub>A</sub>	GM-39D <sub>B</sub>	GM-73D
	Sample ID:	GM-33D2	GM-34D	GM-34D2	GM-35D2	GM-38D	GM-38D2	GM-39A	GM-39DB	GM-73D
	Date:	8/18/2009	8/31/2009	8/31/2009	8/27/2009	9/3/2009	9/3/2009	8/10/2009	8/10/2009	8/10/2009
1,1,1-Trichloroethane	< 5	< 13	< 10	< 5 J	< 50	<b>1.4 J</b>	< 5	< 5	< 5	
1,1,2,2-Tetrachloroethane	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
1,1,2-Trichloroethane	< 5	< 13	< 10	< 5 J	< 50	<b>0.8 J</b>	< 5	< 5	< 5	
1,1-Dichloroethane	< 5	<b>0.93 J</b>	< 10	< 5 J	<b>7.1 J</b>	<b>1.1 J</b>	< 5	< 5	< 5	
1,1-Dichloroethene	< 5	<b>9.9 J</b>	<b>2 J</b>	<b>0.74 J</b>	<b>5.2 J</b>	<b>1 J</b>	< 5	< 5	< 5	
1,2-Dichloroethane	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
1,2-Dichloropropane	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
2-Butanone	< 50	< 130	< 100	< 50 J	< 500	< 130	< 50	< 50	< 50	
2-Hexanone	< 50	< 130	< 100	< 50 J	< 500	< 130	< 50	< 50	< 50	
4-methyl-2-pentanone	< 50	< 130	< 100	< 50 J	< 500	< 130	< 50	< 50	< 50	
Acetone	< 50	< 130	< 100 B	<b>11 J</b>	< 500	< 130	< 50	< 50 B	< 50 B	
Benzene	< 0.7	< 1.8	< 1.4	< 0.7 J	< 7	< 1.8	< 0.7	< 0.7	< 0.7	
Bromodichloromethane	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Bromoform	< 5	< 13	< 10	< 5 J	< 50	< 13	<b>0.57 J</b>	< 5	< 5	
Bromomethane	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Carbon Disulfide	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Carbon tetrachloride	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Chlorobenzene	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Chlorodifluoromethane (Freon 22)	< 5	<b>1.1 J</b>	< 10	<b>0.63 J</b>	< 50	< 13	< 5	< 5	< 5	
Chloroethane	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Chloroform	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Chloromethane	< 5	< 13	< 10	< 5 JB	< 50	< 13	< 5	< 5	< 5	
cis-1,2-dichloroethene	<b>0.66 J</b>	<b>8.1 J</b>	<b>6.6 J</b>	<b>1.8 J</b>	< 50	<b>1.8 J</b>	< 5	< 5	< 5	
cis-1,3-dichloropropene	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Dichlorodifluoromethane (Freon 12)	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Ethylbenzene	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Methylene Chloride	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Styrene	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Tetrachloroethene	<b>9.3</b>	<b>6.9 J</b>	<b>9.4 J</b>	<b>8.2</b>	<b>10 J</b>	< 13	< 5	<b>0.34 J</b>	< 5	
Toluene	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
trans-1,2-dichloroethene	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
trans-1,3-dichloropropene	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Trichloroethylene	<b>57</b>	<b>640 D</b>	<b>290</b>	<b>200 D</b>	<b>1000</b>	<b>320</b>	<b>6.5</b>	<b>52</b>	<b>4.6 J</b>	
Trichlorotrifluoroethane (Freon 113)	<b>23</b>	<b>13 J</b>	<b>4.2 J</b>	<b>4 J</b>	< 50	<b>2.4 J</b>	< 5	< 5	< 5	
Vinyl Chloride	< 2	< 5	< 4	< 2 J	< 20	< 5	< 2	< 2	< 2	
Xylene-o	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
Xylenes - m,p	< 5	< 13	< 10	< 5 J	< 50	< 13	< 5	< 5	< 5	
<b>Total VOCs</b>	<b>89.96</b>	<b>679.93</b>	<b>312.2</b>	<b>226.37</b>	<b>1022.3</b>	<b>328.5</b>	<b>7.07</b>	<b>52.34</b>	<b>4.6</b>	

ug/L Micrograms per liter  
D Constituent identified at a secondary dilution  
J  
B  
**Bold** Constituent detected  
VOCs Volatile Organic Compounds

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Table 2. Concentrations of Volatile Organic Compounds Detected in Monitoring Wells and Groundwater Remedial Wells, Third Quarter 2009, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in ug/L)	Well: GM-73D2	GM-74I	GM-74D	GM-75D2	GM-78S	GM-78I	GM-79I	GM-79D	HN-24I
	Sample ID: GM-73D2	GM-74I	GM-74D	GM-75D2	GM-78S	GM-78I	GM-79I	GM-79D	HN-24I
	Date: 8/10/2009	8/10/2009	8/10/2009	8/21/2009	8/17/2009	8/17/2009	8/17/2009	8/17/2009	8/25/2009
1,1,1-Trichloroethane	<b>0.52 J</b>	< 5	< 5	< 5	< 5	< 5	< 5	< 5	<b>1.8 J</b>
1,1,2,2-Tetrachloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	<b>0.93 J</b>	< 5	< 5	< 5	< 5	< 5	< 5	< 5	<b>2.3 J</b>
1,1-Dichloroethene	<b>1.5 J</b>	< 5	< 5	<b>1.2 J</b>	< 5	< 5	< 5	< 5	<b>8.2</b>
1,2-Dichloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
2-Butanone	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
2-Hexanone	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
4-methyl-2-pentanone	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Acetone	< 50	< 50 B	< 50 B	< 50 B	< 50	< 50 B	< 50 B	< 50	< 50 B
Benzene	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Bromoform	<b>0.68 J</b>	< 5	< 5	< 5	<b>0.89 J</b>	< 5	< 5	<b>0.96 J</b>	< 5
Bromomethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon tetrachloride	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chloroform	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	<b>1.6 J</b>
Chloromethane	< 5	< 5	< 5	< 5	< 5 B	< 5	< 5	< 5	< 5
cis-1,2-dichloroethene	<b>1 J</b>	< 5	< 5	<b>0.33 J</b>	< 5	< 5	< 5	<b>0.4 J</b>	<b>1.2 J</b>
cis-1,3-dichloropropene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	< 5	< 5	< 5	< 5	< 5 B	< 5	< 5	< 5	<b>1 J</b>
Ethylbenzene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methylene Chloride	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Styrene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	<b>0.76 J</b>	< 5	<b>0.53 J</b>	<b>2.7 J</b>	< 5	< 5	< 5	<b>0.9 J</b>	<b>14</b>
Toluene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,2-dichloroethene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,3-dichloropropene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trichloroethylene	<b>69</b>	< 5	<b>3.3 J</b>	<b>120</b>	< 5	< 5	< 5	<b>38</b>	<b>22</b>
Trichlorotrifluoroethane (Freon 113)	<b>0.48 J</b>	< 5	< 5	<b>0.79 J</b>	< 5	< 5	< 5	<b>0.59 J</b>	<b>2.3 J</b>
Vinyl Chloride	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Xylene-o	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
<b>Total VOCs</b>	<b>74.87</b>	<b>0</b>	<b>3.83</b>	<b>125.02</b>	<b>0.89</b>	<b>0</b>	<b>0</b>	<b>40.85</b>	<b>54.4</b>

ug/L Micrograms per liter  
D Constituent identified at a secondary dilution  
J  
B  
**Bold** Constituent detected  
VOCs Volatile Organic Compounds



Table 2. Concentrations of Volatile Organic Compounds Detected in Monitoring Wells and Groundwater Remedial Wells, Third Quarter 2009, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in ug/L)	Well:	HN-40I	HN-40S	HN-42I	HN-42S	WELL 1	WELL 3	TOWER 102 EFFLUENT
	Sample ID:	HN-40I	HN-40S	HN-42I	HN-42S	WELL 1	WELL 3	TOWER 102 EFFLUENT
	Date:	8/24/2009	8/24/2009	8/20/2009	8/20/2009	8/10/2009	8/10/2009	8/10/2009
1,1,1-Trichloroethane	< 5	< 5	< 5	< 5	<b>0.83 J</b>	< 100	< 5	
1,1,2,2-Tetrachloroethane	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
1,1,2-Trichloroethane	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
1,1-Dichloroethane	< 5	< 5	< 5	< 5	<b>1.4 J</b>	< 100	< 5	
1,1-Dichloroethene	< 5	< 5	< 5	< 5	<b>2.4 J</b>	<b>13 J</b>	< 5	
1,2-Dichloroethane	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
1,2-Dichloropropane	< 5	< 5	< 5	< 5	<b>4.6 J</b>	< 100	< 5	
2-Butanone	< 50	< 50	< 50	< 50	< 130	< 1000	< 50	
2-Hexanone	< 50	< 50	< 50	< 50	< 130	< 1000	< 50	
4-methyl-2-pentanone	< 50	< 50	< 50	< 50	< 130	< 1000	< 50	
Acetone	< 50 B	< 50 B	< 50 B	< 50 B	< 130 B	< 1000	< 50 B	
Benzene	< 0.7	< 0.7	< 0.7	< 0.7	< 1.8	< 14	< 0.7	
Bromodichloromethane	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Bromoform	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Bromomethane	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Carbon Disulfide	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Carbon tetrachloride	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Chlorobenzene	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Chlorodifluoromethane (Freon 22)	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Chloroethane	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Chloroform	<b>0.73 J</b>	<b>0.43 J</b>	< 5	< 5	< 13	< 100	< 5	
Chloromethane	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
cis-1,2-dichloroethene	< 5	< 5	<b>6.7</b>	< 5	<b>4.7 J</b>	<b>16 J</b>	< 5	
cis-1,3-dichloropropene	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Dichlorodifluoromethane (Freon 12)	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Ethylbenzene	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Methylene Chloride	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Styrene	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Tetrachloroethene	< 5	< 5	<b>0.31 J</b>	< 5	<b>100</b>	<b>73 J</b>	< 5	
Toluene	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
trans-1,2-dichloroethene	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
trans-1,3-dichloropropene	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Trichloroethylene	< 5	< 5	<b>19</b>	< 5	<b>390</b>	<b>2500</b>	< 5	
Trichlorotrifluoroethane (Freon 113)	< 5	< 5	< 5	< 5	<b>4.5 J</b>	<b>12 J</b>	< 5	
Vinyl Chloride	< 2	< 2	< 2	< 2	< 5	<b>200</b>	< 2	
Xylene-o	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
Xylenes - m,p	< 5	< 5	< 5	< 5	< 13	< 100	< 5	
<b>Total VOCs</b>	<b>0.73</b>	<b>0.43</b>	<b>26.01</b>	<b>0</b>	<b>508.43</b>	<b>2814</b>	<b>0</b>	

ug/L Micrograms per liter  
D Constituent identified at a secondary dilution  
J  
B  
**Bold** Constituent detected  
VOCs Volatile Organic Compounds

Table 2. Concentrations of Volatile Organic Compounds Detected in Monitoring Wells and Groundwater Remedial Wells, Third Quarter 2009, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in ug/L)	Well:	WELL 17	WELL 18	WELL 19	TOWER 96 EFFLUENT
	Sample ID:	WELL 17	WELL 18	WELL 19	TOWER 96 EFFLUENT
	Date:	8/10/2009	8/10/2009	8/10/2009	8/10/2009
1,1,1-Trichloroethane	< 10	<b>1.7 J</b>	<b>0.7 J</b>	< 5	
1,1,2,2-Tetrachloroethane	< 10	< 5	< 5	< 5	
1,1,2-Trichloroethane	< 10	< 5	< 5	< 5	
1,1-Dichloroethane	<b>1.1 J</b>	<b>1.3 J</b>	<b>1 J</b>	< 5	
1,1-Dichloroethene	<b>2.3 J</b>	<b>4.4 J</b>	<b>1.5 J</b>	< 5	
1,2-Dichloroethane	< 10	< 5	<b>0.73 J</b>	< 5	
1,2-Dichloropropane	< 10	< 5	< 5	< 5	
2-Butanone	< 100	< 50	< 50	< 50	
2-Hexanone	< 100	< 50	< 50	< 50	
4-methyl-2-pentanone	< 100	< 50	< 50	< 50	
Acetone	< 100 B	< 50 B	< 50 B	< 50 B	
Benzene	< 1.4	< 0.7	< 0.7	< 0.7	
Bromodichloromethane	< 10	< 5	< 5	< 5	
Bromoform	< 10	< 5	< 5	< 5	
Bromomethane	< 10	< 5	< 5	< 5	
Carbon Disulfide	< 10	< 5	< 5	< 5	
Carbon tetrachloride	< 10	< 5	< 5	< 5	
Chlorobenzene	< 10	< 5	< 5	< 5	
Chlorodifluoromethane (Freon 22)	< 10	<b>0.42 J</b>	<b>0.47 J</b>	< 5	
Chloroethane	< 10	< 5	< 5	< 5	
Chloroform	< 10	< 5	<b>0.77 J</b>	< 5	
Chloromethane	< 10	< 5	< 5	< 5	
cis-1,2-dichloroethene	<b>3.8 J</b>	<b>1.8 J</b>	<b>21</b>	< 5	
cis-1,3-dichloropropene	< 10	< 5	< 5	< 5	
Dichlorodifluoromethane (Freon 12)	< 10	< 5	< 5	< 5	
Ethylbenzene	< 10	< 5	< 5	< 5	
Methylene Chloride	< 10	< 5	< 5	< 5	
Styrene	< 10	< 5	< 5	< 5	
Tetrachloroethene	<b>26</b>	<b>12</b>	<b>8.4</b>	< 5	
Toluene	< 10	< 5	< 5	< 5	
trans-1,2-dichloroethene	< 10	< 5	< 5	< 5	
trans-1,3-dichloropropene	< 10	< 5	< 5	< 5	
Trichloroethylene	<b>250</b>	<b>100</b>	<b>200 D</b>	<b>1.6 J</b>	
Trichlorotrifluoroethane (Freon 113)	<b>8.5 J</b>	<b>1.9 J</b>	<b>1 J</b>	< 5	
Vinyl Chloride	< 4	< 2	< 2	< 2	
Xylene-o	< 10	< 5	< 5	< 5	
Xylenes - m,p	< 10	< 5	< 5	< 5	
<b>Total VOCs</b>	<b>291.7</b>	<b>123.52</b>	<b>235.57</b>	<b>1.6</b>	

ug/L Micrograms per liter  
D Constituent identified at a secondary dilution  
J Constituent value is estimated  
B Constituent detected in associated blank  
**Bold** Constituent detected  
VOCs Volatile Organic Compounds

# ARCADIS

Table 3. Concentrations of Total and Dissolved Cadmium and Chromium Detected in Monitoring Wells, Third Quarter 2009, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in mg/L)	Well: N-10631	GM-15SR	GM-78S	GM-78I	MW-1GF	MW-2GF	MW-04	MW-05	MW-06
Sample ID:	N-10631	GM-15SR	GM-78S	GM-78I	MW-01GF	MW-02GF	PT1 MW-04	PT1 MW-05	PT1 MW-06
Date:	8/18/2009	8/14/2009	8/17/2009	8/17/2009	8/31/2009	8/31/2009	8/19/2009	8/19/2009	8/19/2009
Cadmium	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	--	--	--
Cadmium (Dissolved)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	--	--	--
Chromium	<b>0.034</b>	<b>0.512</b>	< 0.01	< 0.01	< 0.01	<b>0.022</b>	< 0.01	<b>0.418</b>	<b>0.246</b>
Chromium (Dissolved)	<b>0.014</b>	<b>0.513</b>	< 0.01	< 0.01	< 0.01	<b>0.02</b>	< 0.01	<b>0.406</b>	<b>0.242</b>

ug/L Micrograms per liter  
**Bold** Constituent detected above IDL.  
 -- Not analyzed

# ARCADIS

Table 4. Concentrations of Site-Related Volatile Organic Compounds Detected in Outpost Wells, Third Quarter 2009, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in ug/L)	Well: BPOW 1-1 <sup>(3)</sup>		BPOW 1-2		BPOW 1-3 <sup>(3)</sup>		BPOW 3-1		BPOW 3-2		BPOW 4-1		BPOW 4-2	
	Sample ID:	Date:	Sample ID:	Date:	Sample ID:	Date:	Sample ID:	Date:	Sample ID:	Date:	Sample ID:	Date:	Sample ID:	Date:
1,1,1-Trichloroethane	1.1	8/6/2009	< 0.5	8/6/2009	< 0.5	8/6/2009	< 0.5	8/6/2009	< 0.5	8/5/2009	< 0.5	8/7/2009	< 0.5	8/7/2009
1,1,2,2-Tetrachloroethane	< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5	
1,1,2-Trichloroethane	< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5	
1,1-Dichloroethane	<b>0.42 J</b>		< 0.5		<b>1.8</b>		< 0.5		< 0.5		< 0.5		< 0.5	
1,1-Dichloroethene	< 0.5		< 0.5		<b>2.6</b>		< 0.5		< 0.5		< 0.5		< 0.5	
1,2-Dichloroethane	< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5	
Carbon Tetrachloride	< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5	
Chlorobenzene	< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5	
Chloroform	< 0.5		< 0.5		<b>0.22 J</b>		< 0.5		< 0.5		< 0.5		< 0.5	
cis-1,2-Dichloroethene	< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5	
Trichlorotrifluoroethane (Freon 113)	< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		<b>0.56</b>		< 0.5	
Tetrachloroethene	< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5	
trans-1,2-Dichloroethene	< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5		< 0.5	
Trichloroethene	<b>1.2</b>		< 0.5		<b>1.2</b>		< 0.5		< 0.5		< 0.5		< 0.5	
<b>Total Site-Related VOCs <sup>(1)</sup> :</b>	<b>2.72</b>		<b>0</b>		<b>9.82</b>		<b>0</b>		<b>0</b>		<b>0.56</b>		<b>0</b>	
<b>TVOC Trigger Value <sup>(2)</sup> :</b>	<b>0.6</b>		<b>0.6</b>		<b>0.6</b>		<b>1.5</b>		<b>1.5</b>		<b>1.5</b>		<b>1.5</b>	

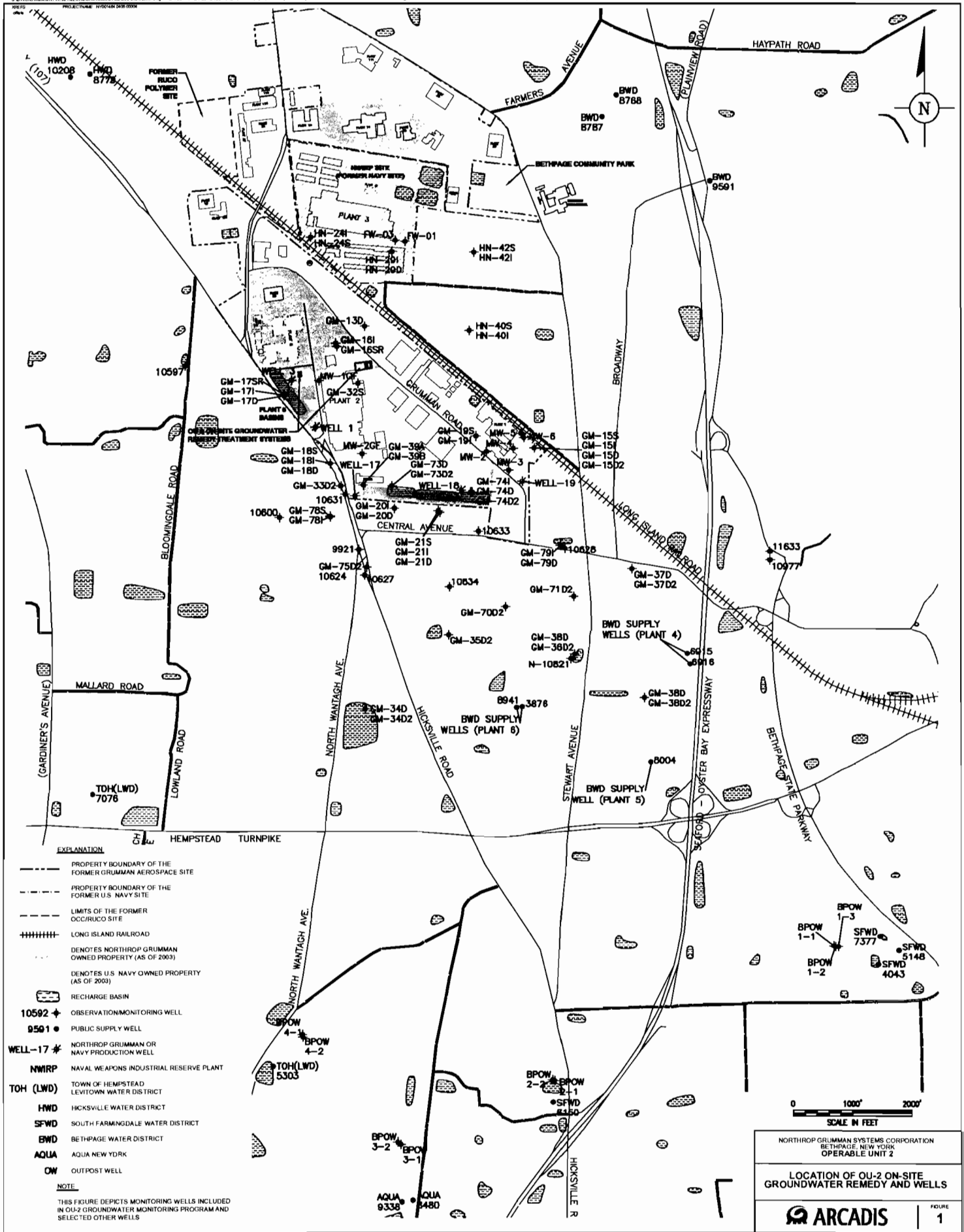
Note: Outpost wells OW2-1 and OW2-2 were not sampled by Northrop Grumman this round, due to ongoing NYSDEC investigation of non-site related VOCs (benzene and methyl tertiary butyl ether) detected in these wells.

<sup>(1)</sup> Site-related VOCs were established in the Public Water Supply Contingency Plan (PWSCP) (ARCADIS G&M, Inc. 2003).

<sup>(2)</sup> TVOC Trigger Values were established in the PWSCP (ARCADIS G&M, Inc. 2003).

<sup>(3)</sup> The TVOC Trigger Value for Cluster 1 was initially exceeded on April 23, 2004; confirmatory sampling and reporting was conducted as per the PWSCP (ARCADIS G&M, Inc. 2003).

ug/L Micrograms per liter  
**Bold** Constituent detected  
 TVOC Total Volatile Organic Compounds



**EXPLANATION**

- PROPERTY BOUNDARY OF THE FORMER GRUMMAN AEROSPACE SITE
- PROPERTY BOUNDARY OF THE FORMER U.S. NAVY SITE
- LIMITS OF THE FORMER OCCIRUCCO SITE
- +++++ LONG ISLAND RAILROAD
- ... DENOTES NORTHROP GRUMMAN OWNED PROPERTY (AS OF 2003)
- ... DENOTES U.S. NAVY OWNED PROPERTY (AS OF 2003)
- RECHARGE BASIN
- 10592 + OBSERVATION/MONITORING WELL
- 9501 • PUBLIC SUPPLY WELL
- WELL-17 \* NORTHROP GRUMMAN OR NAVY PRODUCTION WELL
- 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
- AQUA AQUA NEW YORK
- OW OUTPOST WELL

**NOTE**

THIS FIGURE DEPICTS MONITORING WELLS INCLUDED IN OU-2 GROUNDWATER MONITORING PROGRAM AND SELECTED OTHER WELLS

0 1000' 2000'  
 SCALE IN FEET

NORTHROP GRUMMAN SYSTEMS CORPORATION  
 BETHPAGE, NEW YORK  
 OPERABLE UNIT 2

LOCATION OF OU-2 ON-SITE  
 GROUNDWATER REMEDY AND WELLS

**ARCADIS** | FIGURE 1