ARCADIS
Infrastructure, environment, buildings

ARCADIS of New York, Inc.
Two Huntington Quadrangle
Suite 1S10
Melville
New York 11747
Tel 631.249.7600
Fax 631.249.7610
www.arcadis-us.com

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

ENVIRONMENT

Subject:
Results of Third Quarter 2010 Groundwater Monitoring,
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:
November 9, 2010

Contact:
David Stern

Phone:
631-391-5284

Email:
david.stern@arcadis-us.cc

Our ref:
NY001496.0410.0004

Dear Mr. Scharf:

On behalf of Northrop Grumman Systems Corporation (Northrop Grumman), ARCADIS is providing the NYSDEC with the validated results of Operable Unit 2 (OU2) 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 2010. Table 1 provides OU2 remedial system performance operational data and water balance. Tables 2, 3 and 4 provide the validated analytical results of monitoring for this period. Figure 1 shows the site plan with well locations.

Please contact us if you have any questions or comments.

Sincerely,

ARCADIS of New York, Inc.

David E. Stern
Senior Hydrogeologist

Carlo San Giovanni
Project Manager

Enclosures

Copies:
See Attached Distribution List

Imagine the result

Copies:
John Cofman – Northrop Grumman
Kent Smith – Northrop Grumman
Ed Hannon – Northrop Grumman
Carol Henry, EMAGIN
Walter Parish – NYSDEC Region 1
Bill Spitz - NYSDEC Region 1
Steven Karpinski – New York State Department of Health
Michael Alarcon – Nassau County Department of Health
Joseph DeFranco – Nassau County Department of Health
Lora Fly – NAVFAC Midlant Environmental
David Brayack – TetraTech NUS, Inc.
Jeffrey Kogut – Glenn Springs Holdings, Inc.
Kevin Lumpe – Steel Equities
Thomas Taccone – USEPA
Matthew Russo – Town of Oyster Bay
Anthony J. Sabino
Frank Flood – Massapequa Water District
Matthew Snyder – Aqua New York
William Bier – South Farmingdale Water District
John Reinhardt – Town of Hempstead Water District
Michael Boufis – Bethpage Water District
Lois Lovisolo – Bethpage Public Library (Public Repository)
File

ARCADIS

Table 1. Summary of Operational Data and Water Balance for the On-Site Portion of the OU2 Groundwater Remedy, Third Quarter 2010, 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 2010 Estimated VOC Mass Removed [d] (lbs)
Remedial Wells			**Groundwater Removed from Aquifer**					
Well 1	800	875	111.7	110.0	98%	370	456	418
Well 3 [g]	700	706	97.8	28.1	29%	660	1,364	319
Well 17	1,000	991	139.7	129.9	93%	200	242	262
Well 18	600	628	83.8	82.3	98%	84	105	72
Well 19	700	691	97.8	90.0	92%	190	221	166
Rounded Totals[g]:	**3,800**	**3,891**	**531**	**440**	**83%**	**--**	**--**	**1,237**
Recharge Basins [a]			**Treated Water Recharged to Aquifer**					
West Recharge Basins	0	1,412	0	113	--	--	--	--
South Recharge Basins	2,231	2,277	311.6	299	96%	--	--	--
Rounded Totals:	**2,231**	**3,689**	**312**	**412**	**132%**	**--**	**--**	**--**
Treated Water Sent to Calpine[b]								
Calpine Demand	100-400	198	12.1-48.4	27.7	--	--	--	--

Treatment Efficiencies		**Average SPDES Outfall TVOC Concentrations (ug/L) [f]**
Tower 96 System Efficiency [e] :	**99.9%**	**0.92**
Tower 102 System Efficiency [e] :	**>99.9%**	**<0.50**

see footnotes on last page

ARCADIS

Table 1. Summary of Operational Data and Water Balance for the On-Site Portion of the OU2 Groundwater Remedy, Third Quarter 2010, 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, incidental irrigation use, and pipe loss), plus incidental runoff from precipitation. Current average recharge rates have been determined using the entire 97-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 2010, at the following percentages: Well-1 (90.0%), Well-3 (28.5%); Well-17 (93.8%), Well-18 (93.8%), and Well-19 (93.3%). The Actual Average Pumping Rates are for when the wells are pumping. Calpine Demand shown represents average usage over the quarterly period. The period that the system was off-line is not included.

(c) - The TVOC concentration for each well was calculated based on Third Quarter 2010 groundwater monitoring data (Table 2).

(d) - TVOC mass removed is based on the TVOC data given above and the following formula:

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

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

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

- 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.

(f) - 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 NG under separate cover.

(g) - Current "Percent of Design Pumpage" for Well 3 and therefore the "Rounded Totals" were less than normal during the Third Quarter due to well/pump maintenance.

--	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
NG	Northrop Grumman Systems 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 2010, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in ug/L)	Well: / Sample ID: / Date:	FW-03 / FW-03 / 8/6/2010	HN-24I / HN-24I / 8/6/2010	HN-40I / HN-40I / 7/15/2010	HN-40S / HN-40S / 7/15/2010	HN-42I / HN-42I / 7/15/2010	HN-42S / HN-42S / 7/15/2010	N-10624 / N-10624 / 8/10/2010	N-10627 / N-10627 / 8/10/2010	N-10631 / N-10631 / 8/10/2010
1,1,1-Trichloroethane		**0.36 J**	**3.3 J**	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane		< 5	**0.33 J**	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane		< 5	**3.7 J**	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene		< 5	**17**	< 5	< 5	< 5	< 5	< 5	< 5	< 5
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	< 50	< 50	< 50	**1.1 J**	< 50 B	< 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		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 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	**0.54 J**	< 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	**3.3 J**	< 5	**0.5 J**	< 5	< 5	< 5	< 5	< 5
Chloromethane		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
cis-1,2-dichloroethene		**0.54 J**	**1.8 J**	< 5	< 5	**2.2 J**	< 5	< 5	< 5	**0.44 J**
cis-1,3-dichloropropene		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)		< 5	**2.3 J**	< 5	< 5	< 5	< 5	< 5	< 5	< 5
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		**24**	**45**	**1.9 J**	< 5	< 5	< 5	< 5	< 5	< 5
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		**2.3 J**	**32**	**1.2 J**	< 5	**7.3**	< 5	< 5	**0.7 J**	**0.74 J**
Trichlorotrifluoroethane (Freon 113)		< 5	**2.7 J**	< 5	< 5	< 5	< 5	< 5	< 5	< 5
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
	Total VOC	**27.2**	**111.97**	**3.1**	**0.5**	**9.5**	0	**1.1**	**0.7**	**1.18**

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

Table 2. Concentrations of Volatile Organic Compounds Detected in Monitoring Wells and Groundwater Remedial Wells, Third Quarter 2010, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in ug/L)	Well: / Sample ID: / Date:	GM-13D / GM-13D / 8/4/2010	GM-15S / GM-15S / 7/28/2010	GM-15I / GM-15I / 7/28/2010	GM-15D / GM-15D / 7/13/2010	GM-15D2 / GM-15D2 / 7/13/2010	GM-17I / GM-17I / 7/29/2010	GM-17D / GM-17D / 7/29/2010	GM-18I / GM-18I / 8/11/2010	GM-18D / GM-18D / 7/30/2010
1,1,1-Trichloroethane		**3.8 J**	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane		**6.2 J**	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene		**13**	< 5	< 5	< 5	**1.1 J**	< 5	< 5	< 5	< 5
1,2-Dichloroethane		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
2-Butanone		< 100	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
2-Hexanone		< 100	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
4-methyl-2-pentanone		< 100	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Acetone		< 100	< 50	< 50 B	< 50	< 50	< 50	< 50 B	< 50	< 50
Benzene		< 1.4	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Bromoform		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Bromomethane		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon tetrachloride		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)		**2.8 J**	< 5	< 5	< 5	**1.2 J**	< 5	< 5	< 5	< 5
Chloroethane		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chloroform		< 10	< 5	< 5	**0.33 J**	**0.33 J**	< 5	< 5	< 5	< 5
Chloromethane		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
cis-1,2-dichloroethene		**26**	< 5	< 5	< 5	**0.39 J**	< 5	< 5	< 5	< 5
cis-1,3-dichloropropene		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Dibromochloromethane		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methylene Chloride		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Styrene		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene		**220**	< 5	< 5	**0.5 J**	**9.3**	< 5	< 5	< 5	< 5
Toluene		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,2-dichloroethene		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,3-dichloropropene		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trichloroethylene		**80**	**2.6 J**	**3.1 J**	**0.76 J**	**10**	< 5	**0.44 J**	**0.43 J**	**2 J**
Trichlorotrifluoroethane (Freon 113)		**3.5 J**	< 5	< 5	< 5	**1.3 J**	< 5	< 5	< 5	< 5
Vinyl Chloride		< 4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Xylene-o		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p		< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
	Total VOC	**355.3**	**2.6**	**3.1**	**1.59**	**23.62**	0	**0.44**	**0.43**	**2**

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

Table 2. Concentrations of Volatile Organic Compounds Detected in Monitoring Wells and Groundwater Remedial Wells, Third Quarter 2010, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in ug/L)	Well: / Sample ID: / Date:	GM-20I GM-20I 8/6/2010	GM-20D GM-20D 8/9/2010	GM-21I GM-21I 8/5/2010	GM-21S GM-21S 8/5/2010	GM-21D GM-21D 8/4/2010	GM-33D2 GM-33D2 8/11/2010	GM-34D GM-34D 7/19/2010	GM-34D2 GM-34D2 7/19/2010	GM-35D2 GM-35D2 8/12/2010	GM-38D GM-38D 9/21/2010
1,1,1-Trichloroethane		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	**1.6 J**
1,1,2,2-Tetrachloroethane		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
1,1,2-Trichloroethane		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
1,1-Dichloroethane		< 5	< 5	< 5	< 5	< 5	< 5	**0.9 J**	< 13	< 5	**2.6 J**
1,1-Dichloroethene		< 5	< 5	< 5	< 5	< 5	< 5	**5.9 J**	**1.9 J**	**0.39 J**	**2.7 J**
1,2-Dichloroethane		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
1,2-Dichloropropane		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
2-Butanone		< 50	< 50	< 50	< 50	< 50	< 50	< 130	< 130	< 50	< 250
2-Hexanone		< 50	< 50	< 50	< 50	< 50	< 50	< 130	< 130	< 50	< 250
4-methyl-2-pentanone		< 50	< 50	< 50	< 50	< 50	< 50	< 130	< 130	< 50	< 250
Acetone		< 50	< 50 B	< 50	< 50	< 50	< 50	< 130	< 130	< 50	< 250
Benzene		< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 1.8	< 1.8	< 0.7	< 3.5
Bromodichloromethane		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Bromoform		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Bromomethane		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Carbon Disulfide		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Carbon tetrachloride		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Chlorobenzene		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Chlorodifluoromethane (Freon 22)		< 5	< 5	< 5	< 5	< 5	< 5	**0.88 J**	< 13	**0.35 J**	< 25
Chloroethane		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Chloroform		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Chloromethane		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
cis-1,2-dichloroethene		< 5	< 5	**0.38 J**	< 5	< 5	**0.54 J**	**8 J**	**7 J**	**0.98 J**	< 25
cis-1,3-dichloropropene		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Dibromochloromethane		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Dichlorodifluoromethane (Freon 12)		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Ethylbenzene		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Methylene Chloride		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	**1.9 J**
Styrene		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Tetrachloroethene		< 5	< 5	< 5	< 5	< 5	**7.9**	**6.9 J**	**12 J**	**8.1**	**13 J**
Toluene		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
trans-1,2-dichloroethene		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
trans-1,3-dichloropropene		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Trichloroethylene		< 5	< 5	< 5	< 5	**1.2 J**	**42**	**400**	**300**	**160**	**520**
Trichlorotrifluoroethane (Freon 113)		< 5	< 5	< 5	< 5	< 5	**15**	**8.9 J**	**4 J**	**2.4 J**	**1.8 J**
Vinyl Chloride		< 2	< 2	< 2	< 2	< 2	< 2	< 5	< 5	< 2	< 10
Xylene-o		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Xylenes - m,p		< 5	< 5	< 5	< 5	< 5	< 5	< 13	< 13	< 5	< 25
Total VOC		0	0	**0.38**	0	**1.2**	**65.44**	**431.48**	**324.9**	**172.22**	**543.6**

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

Table 2. Concentrations of Volatile Organic Compounds Detected in Monitoring Wells and Groundwater Remedial Wells, Third Quarter 2010, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in ug/L)	Well: / Sample ID: / Date:	GM-38D2 GM-38D2 9/21/2010	GM-39D$_A$ GM-39DA 7/30/2010	GM-39D$_B$ GM-39DB 7/30/2010	GM-73D GM-73D 8/3/2010	GM-73D2 GM-73D2 8/3/2010	GM-73D2 (Rep) GM-73D 8/3/2010	GM-74D GM-74D 7/14/2010	GM-74D2 GM-74D2 7/14/2010	GM-75D2 GM-75D2 8/10/2010
1,1,1-Trichloroethane		**1.1 J**	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
1,1,2,2-Tetrachloroethane		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
1,1,2-Trichloroethane		**0.55 J**	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
1,1-Dichloroethane		**0.64 J**	< 5	< 5	< 5	**0.35 J**	**0.37 J**	< 5 J	**0.52 J**	< 5
1,1-Dichloroethene		< 5	< 5	< 5	< 5	**0.77 J**	**0.83 J**	< 5 J	**0.56 J**	**2 J**
1,2-Dichloroethane		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
1,2-Dichloropropane		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
2-Butanone		< 50	< 50	< 50	< 50	< 50	< 50 U	< 50 J	< 50	< 50
2-Hexanone		< 50	< 50	< 50	< 50	< 50	< 50 U	< 50 J	< 50	< 50
4-methyl-2-pentanone		< 50	< 50	< 50	< 50	< 50	< 50 U	< 50 J	< 50	< 50
Acetone		**1.6 J**	**0.9 J**	**1 J**	< 50 B	< 50	< 50 UB	< 50 J	< 50	< 50 B
Benzene		< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7 U	< 0.7 J	< 0.7	< 0.7
Bromodichloromethane		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Bromoform		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Bromomethane		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Carbon Disulfide		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Carbon tetrachloride		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Chlorobenzene		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Chlorodifluoromethane (Freon 22)		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	**0.55 J**	< 5
Chloroethane		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Chloroform		**4.6 J**	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Chloromethane		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
cis-1,2-dichloroethene		**0.59 J**	< 5	< 5	< 5	**0.49 J**	**0.4 J**	< 5 J	< 5	**0.45 J**
cis-1,3-dichloropropene		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Dibromochloromethane		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Dichlorodifluoromethane (Freon 12)		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Ethylbenzene		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Methylene Chloride		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Styrene		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Tetrachloroethene		< 5	< 5	**0.48 J**	< 5	**0.99 J**	**0.89 J**	**0.47 J**	**5.5**	**2.7 J**
Toluene		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
trans-1,2-dichloroethene		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
trans-1,3-dichloropropene		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Trichloroethylene		**52**	**5.5**	**66**	**5.6**	**53**	**52**	**2.3 J**	**6.6**	**120**
Trichlorotrifluoroethane (Freon 113)		**2 J**	< 5	< 5	< 5	< 5	< 5 U	**0.3 j**	**0.74 J**	**1.4 J**
Vinyl Chloride		< 2	< 2	< 2	< 2	< 2	< 2 U	< 2 J	< 2	< 2
Xylene-o		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
Xylenes - m,p		< 5	< 5	< 5	< 5	< 5	< 5 U	< 5 J	< 5	< 5
	Total VOC	**63.08**	**6.4**	**67.48**	**5.6**	**55.6**	**54.49**	**3.07**	**14.47**	**126.55**

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

Table 2. Concentrations of Volatile Organic Compounds Detected in Monitoring Wells and Groundwater Remedial Wells, Third Quarter 2010, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in ug/L)	Well: / Sample ID: / Date:	GM-78S GM-78S 7/16/2010	GM-78I GM-78I 7/16/2010	GM-79I GM-79I 7/16/2010	GM-79D GM-79D 7/16/2010	GM-79D (REP) GM-79D 7/16/2010	WELL 1 WELL 1 8/30/2010	WELL 3 WELL 3 8/30/2010	96 EFFLUENT 96 EFF. 8/30/2010
1,1,1-Trichloroethane		< 5	< 5	< 5	< 5 J	< 5 U	< 13	**1.6 J**	< 5
1,1,2,2-Tetrachloroethane		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
1,1,2-Trichloroethane		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
1,1-Dichloroethane		< 5	< 5	< 5	< 5 J	< 5 U	**1 J**	**2.1 J**	< 5
1,1-Dichloroethene		< 5	< 5	< 5	< 5 J	**0.33 J**	**2.3 J**	**7.5 J**	< 5
1,2-Dichloroethane		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
1,2-Dichloropropane		< 5	< 5	< 5	< 5 J	< 5 U	**5.1 J**	< 25	< 5
2-Butanone		< 50	< 50	< 50	< 50 J	< 50 U	< 130	< 250	< 50
2-Hexanone		< 50	< 50	< 50	< 50 J	< 50 U	< 130	< 250	< 50
4-methyl-2-pentanone		< 50	< 50	< 50	< 50 J	< 50 U	< 130	< 250	< 50
Acetone		< 50	< 50	< 50	< 50 J	< 50 U	**2.3 J**	**4.9 J**	< 50
Benzene		< 0.7	< 0.7	< 0.7	< 0.7 J	< 0.7 U	< 1.8	< 3.5	< 0.7
Bromodichloromethane		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Bromoform		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Bromomethane		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Carbon Disulfide		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Carbon tetrachloride		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Chlorobenzene		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Chlorodifluoromethane (Freon 22)		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Chloroethane		< 5	< 5	< 5	< 5 J	< 5 U	< 13	**16 J**	< 5
Chloroform		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Chloromethane		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
cis-1,2-dichloroethene		< 5	< 5	< 5	**0.39 J**	**0.38 J**	**4.3 J**	**24 J**	< 5
cis-1,3-dichloropropene		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Dibromochloromethane		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Dichlorodifluoromethane (Freon 12)		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Ethylbenzene		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Methylene Chloride		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Styrene		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Tetrachloroethene		< 5	< 5	< 5	**0.79 J**	**0.77 J**	**67**	**93**	< 5
Toluene		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
trans-1,2-dichloroethene		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
trans-1,3-dichloropropene		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Trichloroethylene		**0.33 J**	< 5	< 5	**35**	**35**	**370**	**660**	**0.46 J**
Trichlorotrifluoroethane (Freon 113)		< 5	< 5	< 5	**0.65 J**	**0.58 J**	**4.3 J**	**5 J**	< 5
Vinyl Chloride		< 2	< 2	< 2	< 2 J	< 2 U	< 5	**550**	< 2
Xylene-o		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
Xylenes - m,p		< 5	< 5	< 5	< 5 J	< 5 U	< 13	< 25	< 5
	Total VOC	**0.33**	0	0	**36.83**	**37.06**	**456.3**	**1364.1**	**0.46**

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

Table 2. Concentrations of Volatile Organic Compounds Detected in Monitoring Wells and Groundwater Remedial Wells, Third Quarter 2010, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in ug/L)	Well: / Sample ID: / Date:	WELL 17 / WELL 17 / 8/30/2010	WELL 18 / WELL 18 / 8/30/2010	WELL 19 / WELL 19 / 8/30/2010	102 EFFLUENT / 102 EFF. / 8/30/2010
1,1,1-Trichloroethane		**0.56 J**	**1.2 J**	**0.64 J**	< 5
1,1,2,2-Tetrachloroethane		< 5	< 5	< 5	< 5
1,1,2-Trichloroethane		< 5	< 5	< 5	< 5
1,1-Dichloroethane		**1.1 J**	**1.1 J**	**0.91 J**	< 5
1,1-Dichloroethene		**2.3 J**	**4.2 J**	**1.3 J**	< 5
1,2-Dichloroethane		< 5	< 5	**0.57 J**	< 5
1,2-Dichloropropane		< 5	< 5	< 5	< 5
2-Butanone		< 50	< 50	< 50	< 50
2-Hexanone		< 50	< 50	< 50	< 50
4-methyl-2-pentanone		< 50	< 50	< 50	< 50
Acetone		< 50	< 50	< 50	< 50
Benzene		< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane		< 5	< 5	< 5	< 5
Bromoform		< 5	< 5	< 5	< 5
Bromomethane		< 5	< 5	< 5	< 5
Carbon Disulfide		< 5	< 5	< 5	< 5
Carbon tetrachloride		< 5	< 5	< 5	< 5
Chlorobenzene		< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)		< 5	**0.33 J**	**0.46 J**	< 5
Chloroethane		< 5	< 5	< 5	< 5
Chloroform		< 5	< 5	**0.58 J**	< 5
Chloromethane		< 5	< 5	< 5	< 5
cis-1,2-dichloroethene		**4.2 J**	**1.8 J**	**19**	< 5
cis-1,3-dichloropropene		< 5	< 5	< 5	< 5
Dibromochloromethane		< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12		< 5	< 5	< 5	< 5
Ethylbenzene		< 5	< 5	< 5	< 5
Methylene Chloride		< 5	< 5	< 5	< 5
Styrene		< 5	< 5	< 5	< 5
Tetrachloroethene		**26**	**11**	**7**	< 5
Toluene		< 5	< 5	< 5	< 5
trans-1,2-dichloroethene		< 5	< 5	< 5	< 5
trans-1,3-dichloropropene		< 5	< 5	< 5	< 5
Trichloroethylene		**200 D**	**84**	**190 J**	< 5
Trichlorotrifluoroethane (Freon 113		**7.4**	**1.6 J**	**0.74 J**	< 5
Vinyl Chloride		< 2	< 2	< 2	< 2
Xylene-o		< 5	< 5	< 5	< 5
Xylenes - m,p		< 5	< 5	< 5	< 5
	Total VOC	**241.56**	**105.23**	**221.2**	0

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

Table 3. Concentrations of Metals in Monitoring Wells and Groundwater Remedial Wells,
Third Quarter 2010, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

CONSTITUENT (Units in mg/L)	Well: / Sample ID: / Date:	GM-15S / GM-15S / 7/28/2010	GM-78I / GM-78I / 7/16/2010	GM-78S / GM-78S / 7/16/2010	MW-01GF / MW-01GF / 8/12/2010	MW-02GF / MW-02GF / 8/12/2010	N-10631 / N-10631 / 8/10/2010	PT1 MW-04 / PT1 MW-04 / 7/28/2010	PT1 MW-05 / PT1 MW-05 / 7/28/2010	PT1 MW-06 / PT1 MW-06 / 7/28/2010
Cadmium		--	< 5	< 5	< 5	< 5	**5.1**	--	--	--
Cadmium (Dissolved)		--	< 5	< 5	< 5	< 5	< 5	--	--	--
Chromium		**875**	< 10	< 10	< 10	< 10	**27**	< 10	**667**	**220**
Chromium (Dissolved)		**850**	< 10	< 10	< 10	< 10	**13**	--	--	--

Bold Constituent detected
mg/L Milligrams per liter
-- Not analyzed

ARCADIS

Table 4. Concentrations of Site-Related Volatile Organic Compounds Detected in Outpost Wells, Third Quarter 2010, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

	Well:	BPOW 1-1 [3]	BPOW 1-2 [3]	BPOW 1-3 [3]	BPOW 3-1	BPOW 3-2	BPOW 4-1	BPOW 4-2
CONSTITUENT	**Sample ID:**	BPOW 1-1	BPOW 1-2	BPOW 1-3	BPOW 3-1	BPOW 3-2	BPOW 4-1	BPOW 4-2
(Units in ug/L)	**Date:**	7/20/2010	7/20/2010	7/20/2010	7/21/2010	7/21/2010	7/22/2010	7/22/2010
1,1,1-Trichloroethane		**0.27 J**	< 0.5 U	**2.9**	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1,2,2-Tetrachloroethane		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1,2-Trichloroethane		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1-Dichloroethane		< 0.5 U	< 0.5 U	**1.2**	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1-Dichloroethene		< 0.5 U	< 0.5 U	**2.3**	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dichloroethane		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Carbon Tetrachloride		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chlorobenzene		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chloroform		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
cis-1,2-Dichloroethene		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Trichlorotrifluoroethane (Freon 113)		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	**0.55**	**0.21 J**
Tetrachloroethene		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
trans-1,2-Dichloroethene		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
		0.86	< 0.5 U	**1.1**	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Total Site-Related VOCs [1] :		**1.13**	0	**7.5**	0	0	**0.55**	**0.21**
TVOC Trigger Value [2] :		**0.6**	**0.6**	**0.6**	**1.5**	**1.5**	**1.5**	**1.5**

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

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

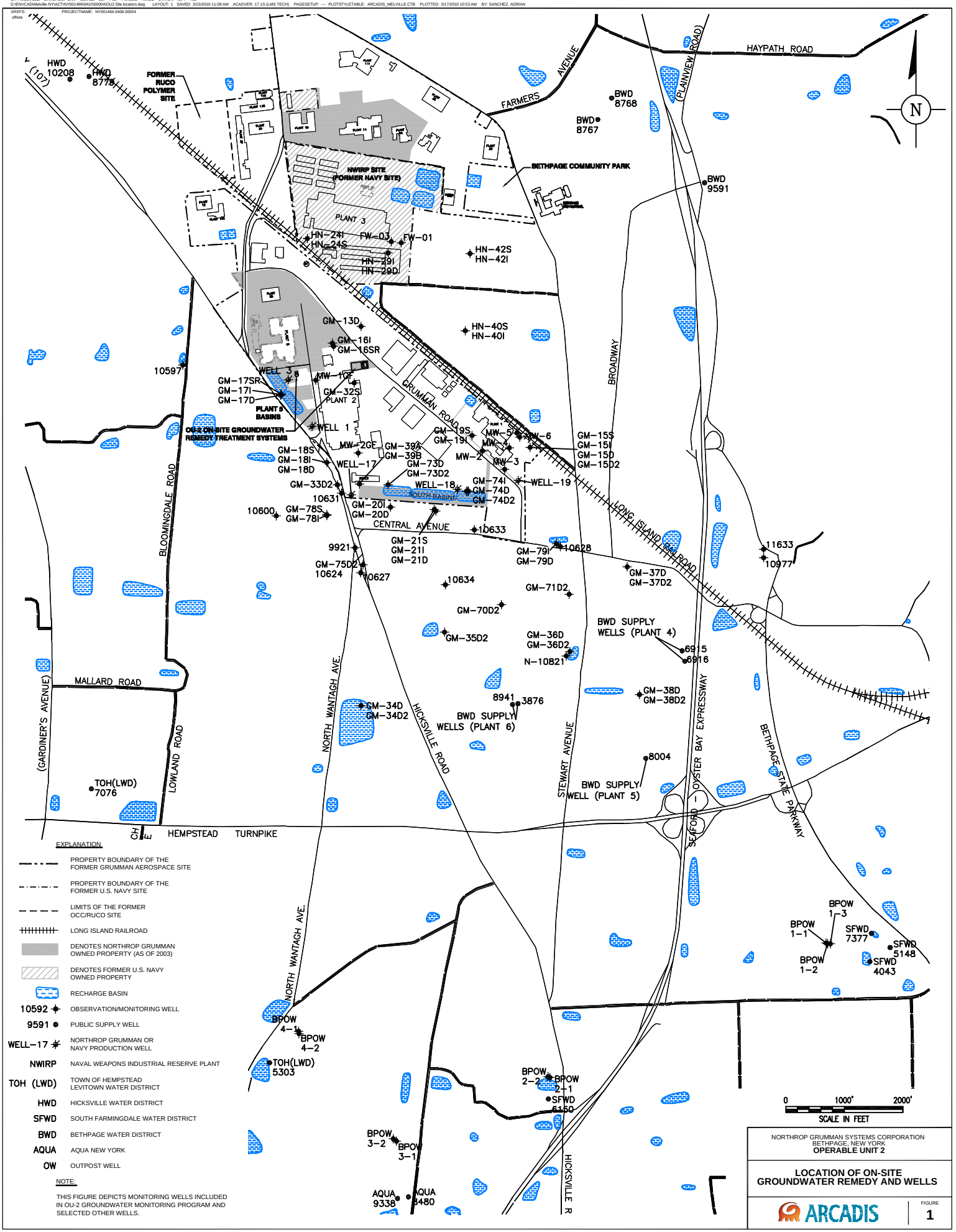
(2) TVOC Trigger Values were established in the PWSCP (ARCADIS G&M, Inc. 2003).

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

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 OCC/RUCO SITE
- LONG ISLAND RAILROAD
- DENOTES NORTHROP GRUMMAN OWNED PROPERTY (AS OF 2003)
- DENOTES FORMER U.S. NAVY OWNED PROPERTY
- RECHARGE BASIN
- 10592 — OBSERVATION/MONITORING WELL
- 9591 — 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.

NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OPERABLE UNIT 2

LOCATION OF ON-SITE GROUNDWATER REMEDY AND WELLS

ARCADIS

FIGURE 1