ARCADIS Design & Consultancy for natural and built assets

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ENVIRONMENT

Subject:
July to December 2017 Semi-Annual Progress Report
Northrop Grumman Systems Corporation
Operable Unit 3 (OU3), NYSDEC Site ID # 1-30-003A,
Bethpage, New York

Date:
January 10, 2018

Contact:
David Stern

Phone:
631-391-5284

Email:
David.Stern@arcadis.com

Our ref:
NY001496.32TM.LARA5

Dear Jason:

In accordance with Section III of Administrative Order on Consent (AOC) Index # W1-0018-04-01, and the May 2011 Work Plan for Modification of AOC Progress Report (work plan), this letter report describes OU3 activities performed by Northrop Grumman Systems Corporation (Northrop Grumman) from July through December 2017. Activities planned for January through June 2018 are also summarized. In accordance with the approved work plan, these reports will be submitted to the NYSDEC on a semi-annual basis until it is determined that the reports are no longer necessary. The site plan showing well locations is provided on **Figure 1**.

OU3 ACTIVITIES CONDUCTED DURING JULY THROUGH DECEMBER 2017

Bethpage Park Soil Gas Containment System (Formerly Soil Gas IRM)

- Continued Operation, Maintenance, and Monitoring (OM&M) of the Bethpage Park Soil Gas Containment System (BPSGCS)

- Submitted BPSGCS Quarterly OM&M Reports (August and November 2017, respectively) to the NYSDEC

Bethpage Park Groundwater Containment System (Formerly Groundwater IRM)

- Continued OM&M of the Bethpage Park Groundwater Containment System (BPGWCS)
- Submitted BPGWCS Quarterly OM&M Reports (August and November 2017, respectively) to the NYSDEC

Other

- Performed quarterly monitoring rounds for Monitoring Wells MW109-3 and MW111-4 and monthly monitoring rounds for Monitoring Well MW116-5 from July through December 2017. Validated data obtained from the July through December 2017 period are provided in **Table 1**.

OU3 ACTIVITIES SCHEDULED DURING JANUARY THROUGH JUNE 2018

Bethpage Park Soil Gas Containment System

- Continue OM&M of the BPSGCS
- Submit OU3 BPSGCS Annual 2017 Report (March 2018) and First Quarter 2018 Report (May 2018) to the NYSDEC

Bethpage Park Groundwater Containment System

- Continue OM&M of the BPGWCS
- Submit OU3 BPGWCS Annual 2017 Report (March 2018) and First Quarter 2018 Report (May 2018) to the NYSDEC

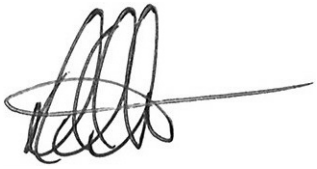
Other

- Perform quarterly monitoring rounds for Monitoring Wells MW109-3 and MW111-4 and monthly monitoring rounds for Monitoring Well MW116-5.

Feel free to call us if you have any questions.

Sincerely,

Arcadis of New York, Inc.



David E. Stern

Senior Scientist/Associate Project Manager

Copies:
S. Karpinski – NYSDOH
D. Hesler – NYSDEC
W. Parrish - NYSDEC
K. Smith, Northrop Grumman
E. Hannon, Northrop Grumman
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C. Henry, EMAGIN
C. Stein – USEPA
R. Alvey – USEPA
Bethpage Public Library – Public Repository
C. San Giovanni, Arcadis
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Enclosures:

Tables

1 Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells

Figures

1 Site Plan

TABLES

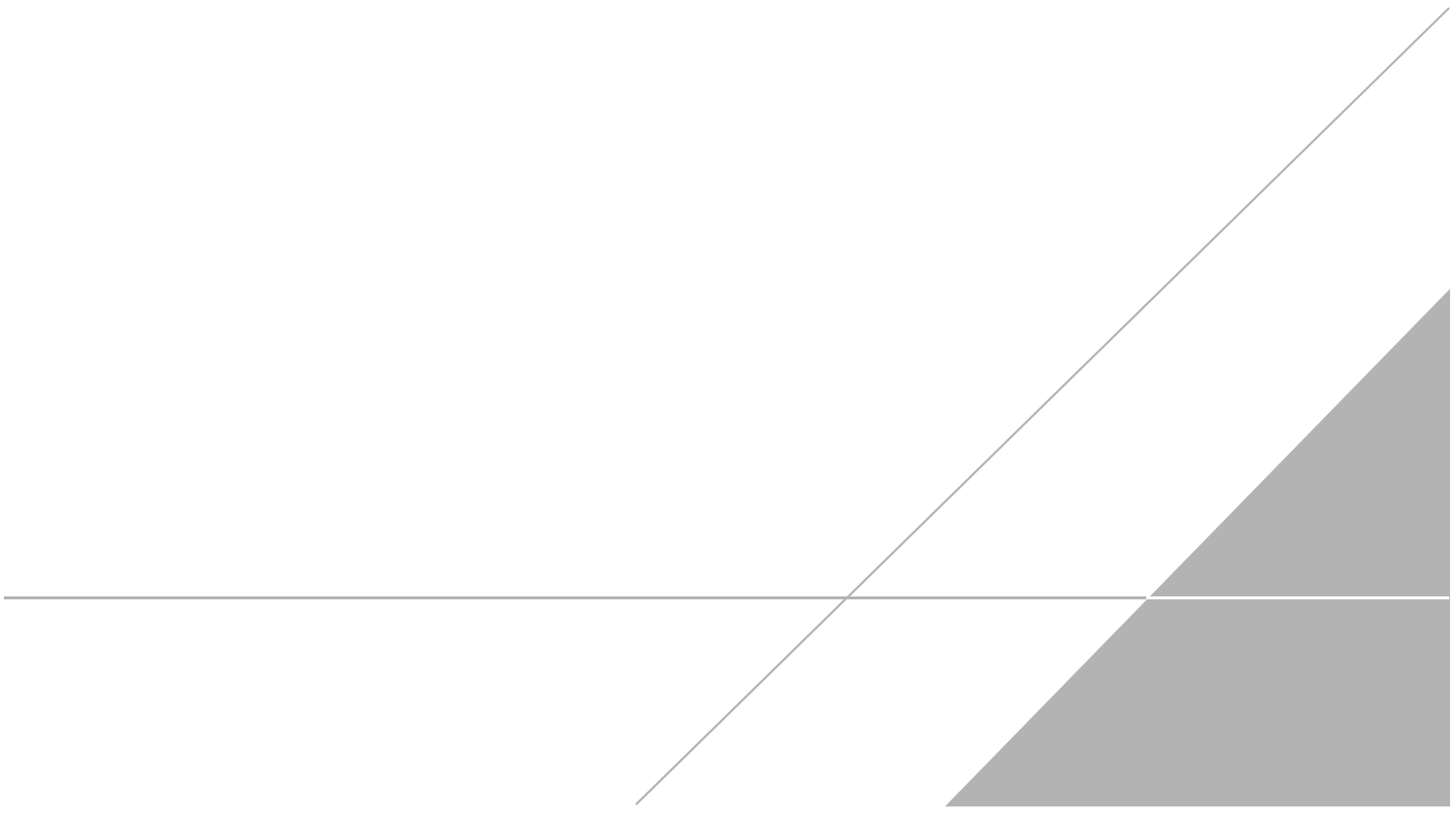

Table 1.
Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Northrop Grumman Systems Corporation, Bethpage, New York.

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Constituents (units in ug/L)	Location ID: Sample Date:	MW-109-3 8/16/2017	MW-109-3 11/21/2017		MW-111-4 8/16/2017	MW-111-4 11/21/2017
1,1,1-Trichloroethane		<1.0	<1.0		<5.0	**1.4**
1,1,2,2-Tetrachloroethane		<1.0	<1.0		<5.0	<1.0
1,1,2-Trichloroethane		<1.0	<1.0		<5.0	**0.78 J**
1,1-Dichloroethane		**3.2**	**2.6**		**11.2**	**8.7**
1,1-Dichloroethene		**0.89 J**	**0.73 J**		**4.7 J**	**6**
1,2-Dichloroethane		**0.79 J**	**0.69 J**		**5.3**	**3.4**
1,2-Dichloropropane		<1.0	<1.0		<5.0	**0.94 J**
2-Butanone		<10	<10		<50	<10
2-Hexanone		<5.0	<5.0		<25	<5.0
4-methyl-2-pentanone		<5.0	<5.0		<25	<5.0
Acetone		<10	<10		<50	<10
Benzene		<0.50	<0.50		<2.5	<0.50
Bromodichloromethane		<1.0	<1.0		<5.0	<1.0
Bromoform		<1.0	<1.0		<5.0	<1.0
Bromomethane		<2.0	<2.0		<10	<2.0
Carbon Disulfide		<2.0	<2.0		<10	<2.0
Carbon Tetrachloride		<1.0	<1.0		<5.0	<1.0
Chlorobenzene		<1.0	<1.0		<5.0	<1.0
Chlorodifluoromethane (Freon 22)		**2.1 J**	<5.0		<25	<5.0
Chloroethane		<1.0	<1.0		<5.0	<1.0
Chloroform		**5.3**	**4.1**		**3.5 J**	**2.5**
Chloromethane		<1.0	<1.0		<5.0	<1.0
cis-1,2-dichloroethene		**227**	**198**		**810**	**658**
cis-1,3-dichloropropene		<1.0	<1.0		<5.0	<1.0
Dibromochloromethane		<1.0	<1.0		<5.0	<1.0
Dichlorodifluoromethane (Freon 12)		<2.0	<2.0		<10	<2.0
Ethylbenzene		<1.0	<1.0		<5.0	<1.0
Methylene Chloride		<2.0	<2.0		<10	<2.0
Styrene		<1.0	<1.0		<5.0	<1.0
Tetrachloroethene		**2**	**1.7**		**9.4**	**11.7**
Toluene		<1.0	<1.0		<5.0	<1.0
trans-1,2-dichloroethene		**1.2**	**2.9**		**22.7**	**8.1**
trans-1,3-dichloropropene		<1.0	<1.0		<5.0	<1.0
Trichloroethylene		**299**	**305**		**1420**	**1640**
Trichlorotrifluoroethane (Freon 113)		<5.0	<5.0		<25	<5.0
Vinyl Chloride		<1.0	<1.0		<5.0	<1.0
Xylene-o		<1.0	<1.0		<5.0	<1.0
Xylenes - m,p		<1.0	<1.0		<5.0	<1.0
TVOCs		**540**	**510**		**2,300**	**2,300**
1,4-Dioxane		**4.54**	**6.26**		**35.1**	**44.6**

Notes and Abbreviations on last page.

Table 1.
Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Northrop Grumman Systems Corporation, Bethpage, New York.

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Constituents (units in ug/L)	Location ID: Sample Date:	MW-116-5 7/12/2017	MW-116-5 8/14/2017	MW-116-5 9/21/2017	MW-116-5 10/20/2017	MW-116-5 11/20/2017
1,1,1-Trichloroethane		**1.8 J**	**2.1 J**	**1.5 J**	**2.0 J**	**1.8 J**
1,1,2,2-Tetrachloroethane		<5.0	<5.0	<5.0	<5.0	<2.0
1,1,2-Trichloroethane		**1.9 J**	**2.4 J**	**2.0 J**	**2.3 J**	**1.9 J**
1,1-Dichloroethane		**5**	**5.5**	**4.0 J**	**4.3 J**	**3.7**
1,1-Dichloroethene		**6.8**	**7.4**	**5.9**	**6.7**	**7.1**
1,2-Dichloroethane		**16**	**16.6**	**14.5**	**14.7**	**12.5**
1,2-Dichloropropane		**4.7 J**	**5**	**3.7 J**	**4.0 J**	<2.0
2-Butanone		<50	<50	<50	<50	<20
2-Hexanone		<25	<25	<25	<25	<10
4-methyl-2-pentanone		<25	<25	<25	<25	<10
Acetone		<50	<50	<50	<50	<20
Benzene		<2.5	<2.5	<2.5	<2.5	<1.0
Bromodichloromethane		<5.0	<5.0	<5.0	<5.0	<2.0
Bromoform		<5.0	<5.0	<5.0	<5.0	<2.0
Bromomethane		<10	<10	<1.0	<1.0	<4.0
Carbon Disulfide		<10	<10	<10	<10	<4.0
Carbon Tetrachloride		<5.0	**2.1 J**	**1.9 J**	**2.0 J**	**2.2**
Chlorobenzene		<5.0	<5.0	<5.0	<5.0	<2.0
Chlorodifluoromethane (Freon 22)		<25	<25	<25	<25	<10
Chloroethane		<5.0	<5.0	<5.0	<5.0	<2.0
Chloroform		**15.6**	**16.8**	**15.5**	<5.0	**13.3**
Chloromethane		<5.0	<5.0	<5.0	<5.0	<2.0
cis-1,2-dichloroethene		**284**	**321**	**263**	**261**	**253**
cis-1,3-dichloropropene		<5.0	<5.0	<5.0	<5.0	<2.0
Dibromochloromethane		<5.0	<5.0	<5.0	<5.0	<2.0
Dichlorodifluoromethane (Freon 12)		<10	<10	<1.0	<1.0	<4.0
Ethylbenzene		<5.0	<5.0	<5.0	<5.0	<2.0
Methylene Chloride		<10	<10	<10	<10	<4.0
Styrene		<5.0	<5.0	<5.0	<5.0	<2.0
Tetrachloroethene		<5.0	<5.0	<5.0	<5.0	**1.4 J**
Toluene		<5.0	<5.0	<5.0	<5.0	<2.0
trans-1,2-dichloroethene		<5.0	**5.9**	<5.0	<5.0	**1.6 J**
trans-1,3-dichloropropene		<5.0	<5.0	<5.0	<5.0	<2.0
Trichloroethylene		**1670**	**2320**	**1500**	**1650**	**1650**
Trichlorotrifluoroethane (Freon 113)		<25	<25	<25	<25	<10
Vinyl Chloride		<5.0	<5.0	<5.0	<5.0	<2.0
Xylene-o		<5.0	<5.0	<5.0	<5.0	<2.0
Xylenes - m,p		<5.0	<5.0	<5.0	<5.0	<2.0
TVOCs		**2,000**	**2,700**	**1,800**	**1,900**	**1,900**
1,4-Dioxane		**34.1**	**35.4**	**33.1**	**37.1**	**41.8 J**

Notes and Abbreviations on last page.

Table 1.
Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Northrop Grumman Systems Corporation, Bethpage, New York.

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Constituents (units in ug/L)	Location ID: Sample Date:	MW-116-5 12/8/2017
1,1,1-Trichloroethane		**1.5 J**
1,1,2,2-Tetrachloroethane		<5.0
1,1,2-Trichloroethane		**1.5 J**
1,1-Dichloroethane		**3.5 J**
1,1-Dichloroethene		**5.6**
1,2-Dichloroethane		**13.6**
1,2-Dichloropropane		**3.8 J**
2-Butanone		<50
2-Hexanone		<25
4-methyl-2-pentanone		<25
Acetone		<50
Benzene		<2.5
Bromodichloromethane		<5.0
Bromoform		<5.0
Bromomethane		<10
Carbon Disulfide		<10
Carbon Tetrachloride		**1.7 J**
Chlorobenzene		<5.0
Chlorodifluoromethane (Freon 22)		<25
Chloroethane		<5.0
Chloroform		**12.7**
Chloromethane		<5.0
cis-1,2-dichloroethene		**234**
cis-1,3-dichloropropene		<5.0
Dibromochloromethane		<5.0
Dichlorodifluoromethane (Freon 12)		<10
Ethylbenzene		<5.0
Methylene Chloride		<10
Styrene		<5.0
Tetrachloroethene		<5.0
Toluene		<5.0
trans-1,2-dichloroethene		**2.7 J**
trans-1,3-dichloropropene		<5.0
Trichloroethylene		**1640**
Trichlorotrifluoroethane (Freon 113)		<25
Vinyl Chloride		<5.0
Xylene-o		<5.0
Xylenes - m,p		<5.0
TVOCs		**1,900**
1,4-Dioxane		**46.4 J**

Notes and Abbreviations on last page.

Table 1.
Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Northrop Grumman Systems Corporation Bethpage, New York.

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Notes and Abbreviations:

Results validated following protocols specified in March 2006 RI/FS Work Plan (ARCADIS G&M, Inc. 2006).

Samples analyzed for TCL VOCs using EPA Method 8260C.

Samples analyzed for 1,4-Dioxane using USEPA Method 522.

TVOCs are rounded to two significant figures.

Bold value indicates a detection.

RI/FS	Remedial Investigation/Feasibility Study
NYSDEC	New York State Department of Environmental Conservation
TCL	Target compound list
VOC	Volatile Organic Compound
TVOC	Total Volatile Organic Compounds
ug/L	Micrograms per liter
J	Value is estimated

FIGURES

CITY:SYRACUSE-NY DIV/GROUP:ENV DB:A.SANCHEZ LD:ALS PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
Z:\ENVCAD\SYRACUSE\ACT\NY001496\2016\LARA5\NY1496B01.dwg LAYOUT: 1 SAVED: 3/15/2017 1:01 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 3/15/2017 3:05 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----
Xr1496Xsp
Xr1496X01
XrBDR-EP

B24MW-2
BCPMW-1
B30MW-1
BCPMW-5-1
BCPMW-3
RW-2
BCPMW-6-1
BCPMW-2
RW-1
RW-3
BCPMW-6-2
B24MW-3
BCPMW-7-1
BCPMW-4-1
BCPMW-4-2
RW-4
FW-3
BCPMW-4-3
MW-201-1
MW-203-1
MW-200-1
MW-202-1
MW-108-1
MW-107-1
MW-100-1
MW-100-2
MW-100-3
MW-102-1
MW-109-3
MW-111-4
RW-21_MW-4
RW-21_MW-1
RW-21_MW-3-2
RW-21_MW-3-1
RW-21_MW-2
RW-21_MW-6
RW-21_MW-7
RW-21_MW-8
RW-21_MW-5-2
RW-21_MW-12-1
RW-21_MW-5-1
RW-21_MW-12-2
MW-116-5
RW-21_MW-11
RW-21_MW-9
RW-21_MW-16
MW-117-5
BWD 4-1 N-6915
BWD 4-2 N-6916
RW-21_MW-14
RW-21_MW-15
MW-118-5
RW-21_MW-13
BWD 5-1 N-8004

PLANT 3
PLANT 2
PLANT 1
PLANT 12
PLANT 12A
PLANT 10
PLANT 25
PLANT 5
PLANT 37
PLANT 30
BETHPAGE COMMUNITY PARK
BETHPAGE HIGH SCHOOL
BOCES
OU2 MAIN FACILITY REMEDIAL SYSTEM (TOWER 96)
OU2 MAIN FACILITY REMEDIAL SYSTEM (TOWER 102)
EXISTING OU2 TREATMENT SYSTEMS
PLANT 1 FUEL DEPOT AREA
GRUMMAN ROAD
BROADWAY
BLOOMINGDALE ROAD
CENTRAL AVENUE
LONG ISLAND RAILROAD
NORTH WANTAGH AVE.
HICKSVILLE ROAD
STEWART AVENUE
SEAFORD - OYSTER BAY EXPRESSWAY
BETHPAGE STATE PARKWAY
LOWLAND ROAD
HEMPSTEAD TURNPIKE
RANCH LANE
BOUNDARY AVENUE

EXPLANATION:

- FORMER NORTHROP GRUMMAN PROPERTY BOUNDARY
- FORMER OCCIDENTAL CHEMICAL CORPORATION PROPERTY BOUNDARY
- NORTHROP GRUMMAN PROPERTY
- FORMER NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
- MONITORING WELL
- REMEDIAL WELL
- INJECTION WELL
- PUBLIC SUPPLY WELL

NAVY AND BETHPAGE WELLS SHOWN FOR REFERENCE PURPOSES

0 500' 1000' 2000'
APPROXIMATE SCALE IN FEET

NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK

SITE PLAN SHOWING OU3 WELL LOCATIONS

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FIGURE 1