Mr. Jason Pelton
Project Manager
New York State Department of Environmental Conservation (NYSDEC)
Remedial Bureau D
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Albany, New York 12233-7015

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ENVIRONMENT

Subject:
January to June 2018 Semi-Annual Progress Report
Northrop Grumman Systems Corporation
Operable Unit 3 (OU3), NYSDEC Site ID # 1-30-003A,
Bethpage, New York

Date:
July 10, 2018

Contact:
David Stern

Phone:
631.391.5284

Email:
david.stern@arcadis.com

Our ref:
NY001496.35TM.RPTB6

Dear Mr. Pelton:

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 January through June 2018. Activities planned for July through December 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 JANUARY THROUGH JUNE 2018

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 the BPSGCS 2017 Annual and First Quarter 2018 OM&M Reports (March and May 2018, respectively) to the NYSDEC

- The BPSGCS shut down for approximately four days in May 2018 due to PSEGLI schedule service to the site electrical switchgear.

Bethpage Park Groundwater Containment System (Formerly Groundwater IRM)

- Continued OM&M of the Bethpage Park Groundwater Containment System (BPGWCS)
- Submitted BPGWCS 2017 Annual and First Quarter 2018 Quarterly OM&M Reports (March and May 2018, respectively) to the NYSDEC
- Significant shutdown instances this period are summarized below. In each instance the system was fully restored following shutdown.
    - April 2018 – Four days of downtime were recorded due to lost internet connectivity and air stripper mass flowmeter malfunction.
    - June 2018 – Four days of downtime were recorded due to power surge from PSEGLI scheduled service that resulted in replacement of PLC

Other

- Performed quarterly monitoring rounds for Monitoring Wells MW109-3 and MW111-4 and monthly monitoring rounds for Monitoring Well MW116-5 from January through June 2018. Validated analytical results obtained from the January through June 2018 period are provided in **Table 1**.
- As requested by NYSDEC (correspondence dated April 10, 2018), prepared work plan for 1,4-dioxane and Per- and Polyfluoroalkyl Substances (PFAS) sampling at select monitoring wells as a single event. The May 7, 2018 work plan was subsequently approved by NYSDEC (correspondence dated June 8, 2018). Also prepared the wells for PFAS sampling by removing dedicated sampling equipment not compatible with PFAS sampling from the wells.

OU3 ACTIVITIES SCHEDULED DURING JULY THROUGH DECEMBER 2018

Bethpage Park Soil Gas Containment System

- Continue OM&M of the BPSGCS
- Submitted the BPGWCS Second and Third Quarter 2018 Reports (August and November 2018, respectively) to the NYSDEC

Bethpage Park Groundwater Containment System

- Continue OM&M of the BPGWCS
- Submit OU3 BPGWCS Second and Third Quarter 2018 Reports (August and November 2018, respectively) to the NYSDEC

- Perform annual monitoring round for BPGWCS system in August 2018

Other

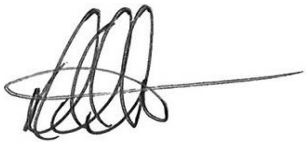
- Perform quarterly monitoring rounds for Monitoring Wells MW109-3 and MW111-4 and monthly monitoring rounds for Monitoring Well MW116-5.

- Perform sampling of selected OU3 monitoring wells in accordance with the NYSDEC-approved Work Plan.

Feel free to call us if you have any questions.

Sincerely,

Arcadis of New York, Inc.



David E. Stern, PG
Senior Hydrogeologist/Associate Project Manager

Copies:
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Enclosures:

Table

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

Figure

1 Site Plan Showing OU3 Well Locations

TABLE

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

ARCADIS Design & Consultancy for natural and built assets

Constituents (units in ug/L)	Location ID: Sample Date:	MW-109-3 2/14/2018	MW-109-3 5/10/2018		MW-111-4 2/14/2018	MW-111-4 5/10/2018
1,1,1-Trichloroethane		<1.0	<1.0		**1.2**	**1.1 J**
1,1,2,2-Tetrachloroethane		<1.0	<1.0		<1.0	<4.0
1,1,2-Trichloroethane		<1.0	<1.0		**0.97 J**	<4.0
1,1-Dichloroethane		**3**	**3**		**8.6**	**9.1**
1,1-Dichloroethene		**0.93 J**	**0.88 J**		**5.7**	**5.5**
1,2-Dichloroethane		**0.90 J**	**1.1**		**3.4**	**3.6 J**
1,2-Dichloropropane		<1.0	**0.42 J**		**0.91 J**	<4.0
1,3-Butadiene		<5.0	<5.0		<5.0	<20
1-chloro-1,1-difluoroethane		<5.0	<5.0		<5.0	<20
2-Butanone		<10	<10		<10	<40
2-Hexanone		<5.0	<5.0		<5.0	<20
4-methyl-2-pentanone		<5.0	<5.0		<5.0	<20
Acetone		<10	<10		<10	<40 b
Benzene		<0.50	<0.50		<0.50	<2.0
Bromodichloromethane		<1.0	<1.0		<1.0	<4.0
Bromoform		<1.0	<1.0		<1.0	<4.0
Bromomethane		<2.0	<2.0		<2.0	<8.0
Carbon Disulfide		<2.0	<2.0		<2.0	<8.0
Carbon Tetrachloride		<1.0	<1.0		<1.0	<4.0
Chlorobenzene		<1.0	<1.0		<1.0	<4.0
Chlorodifluoromethane (Freon 22)		<5.0	**3.2 J**		<5.0	<20
Chloroethane		<1.0	<1.0		<1.0	<4.0
Chloroform		**4.7**	**5.2**		**2.7**	**3.2 J**
Chloromethane		<1.0	<1.0		<1.0	<4.0
cis-1,2-dichloroethene		**166**	**203**		**733**	**791**
cis-1,3-dichloropropene		<1.0	<1.0		<1.0	<4.0
Dibromochloromethane		<1.0	<1.0		<1.0	<4.0
Dichlorodifluoromethane (Freon 12)		<2.0	<2.0		<2.0	<8.0
Ethylbenzene		<1.0	<1.0		<1.0	<4.0
Methyl tert-Butyl Ether		--	--		--	--
Methylene Chloride		<2.0	<2.0		<2.0	<8.0
Styrene		<1.0	<1.0		<1.0	<4.0
Tetrachloroethene		**1.9**	**1.8**		**10.9**	**9.6**
Toluene		<1.0	<1.0		<1.0	<4.0
trans-1,2-dichloroethene		**0.93 J**	**1.3**		**3**	**4.7**
trans-1,3-dichloropropene		<1.0	<1.0		<1.0	<4.0
Trichloroethylene		**230**	**312**		**1540**	**1420**
Trichlorofluoromethane (CFC-11)		--	--		--	--
Trichlorotrifluoroethane (Freon 113)		<5.0	<5.0		<5.0	<20
Vinyl Chloride		<1.0	<1.0		<1.0	<4.0
Xylene-o		<1.0	<1.0		<1.0	<4.0
Xylene-m,p		<1.0	<1.0		<1.0	<4.0
TVOCs		**410**	**530**		**2,300**	**2,200**
1,4-Dioxane		**8.85**	**6.94**		**40.9 J**	**31.2 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.

ARCADIS Design & Consultancy for natural and built assets

Constituents (units in ug/L)	Location ID: Sample Date:	MW-116-5 1/22/2018	MW-116-5 2/15/2018	MW-116-5 3/15/2018	MW-116-5 4/3/2018	MW-116-5 5/11/2018	MW-116-5 6/12/2018
1,1,1-Trichloroethane		**2.3 J**	<10	**2.5 J**	<5.0	**2.6 J**	**2.8**
1,1,2,2-Tetrachloroethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane		**2.2 J**	<10	**3.0 J**	**3.2 J**	**3.5 J**	**3.1**
1,1-Dichloroethane		**5.8**	**6.4 J**	**7.1**	**7.4**	**7.1**	**7.7**
1,1-Dichloroethene		**9.1**	**9.6 J**	**9.9**	**11.6**	**9.8**	**11.0**
1,2-Dichloroethane		**18.6**	**19**	**19.4**	**21.4**	**19.8**	**21.0**
1,2-Dichloropropane		**5.1**	**4.5 J**	**5.7**	**6.9**	**5.9**	**6.4**
1,3-Butadiene		<25	<50	<25	<25	<25	<25
1-chloro-1,1-difluoroethane		<25	<50	<25	<25	<25	<25
2-Butanone		<50	<100	<50	<50	<50	<50
2-Hexanone		<25	<50	<25	<25	<25	<25
4-methyl-2-pentanone		<25	<50	<25	<25	<25	<25
Acetone		<50	<100	<50	<50	<50	<50
Benzene		<2.5	<5.0	**1.3 J**	<2.5	<2.5	<2.5
Bromodichloromethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0
Bromoform		<5.0	<10	<5.0	<5.0	<5.0	<5.0
Bromomethane		<10	<20	<10	<10	<10	<10
Carbon Disulfide		<10	<20	<10	<10	<10	<10
Carbon Tetrachloride		**2.3 J**	<10	**2.6**	**2.4 J**	**2.6 J**	**3.0**
Chlorobenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0
Chlorodifluoromethane (Freon 22)		<25	<50	<25	<25	<25	<25
Chloroethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0
Chloroform		**16.7**	**19.6**	**18.9**	**21.0**	**19.6**	**20.6**
Chloromethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0
cis-1,2-dichloroethene		**327**	**383**	**385**	**431**	**433**	**346**
cis-1,3-dichloropropene		<5.0	<10	<5.0	<5.0	<5.0	<5.0
Dibromochloromethane		<5.0	<10	<5.0	<5.0	<5.0	<5.0
Dichlorodifluoromethane (Freon 12)		<10	<20	<10	<10	<10	<10
Ethylbenzene		<5.0	<10	<5.0	<5.0	<5.0	<5.0
Methyl tert-Butyl Ether		--	--	--	--	--	--
Methylene Chloride		<10	<20	<10	<10	<10	<10
Styrene		<5.0	<10	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene		<5.0	<10	<5.0	<5.0	2.7 J	2.5
Toluene		<5.0	<10	<5.0	<5.0	<5.0	<5.0
trans-1,2-dichloroethene		<5.0	<10	**2.8 J**	**2.6 J**	**3.0 J**	**2.6**
trans-1,3-dichloropropene		<5.0	<10	<5.0	<5.0	<5.0	<5.0
Trichloroethylene		**1930**	**2110**	**2210**	**2420**	**2670**	**2230**
Trichlorofluoromethane (CFC-11)		--	--	--	--	--	--
Trichlorotrifluoroethane (Freon 113)		<25	<50	<25	<25	<25	<25
Vinyl Chloride		<5.0	<10	<5.0	<5.0	<5.0	<5.0
Xylene-o		<5.0	<10	<5.0	<5.0	<5.0	<5.0
Xylene-m,p		<5.0	<10	<5.0	<5.0	<5.0	<5.0
TVOCs		**2,300**	**2,600**	**2,700**	**2,900**	**3,200**	**2,700**
1,4-Dioxane		**71.3 J**	**63.7**	**69.6**	**52.6**	**95.1**	

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.

ARCADIS Design & Consultancy for natural and built assets

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 5
PLANT 10
PLANT 12
PLANT 12A
PLANT 25
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

ARCADIS Design & Consultancy for natural and built assets

FIGURE 1