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Infrastructure, environment, facilities

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

ENVIRONMENT

Subject:
Work Plan Addendum in Support of RI/FS and Soil Gas Interim Remedial Measure, Former Grumman Settling Ponds (Operable Unit 3, - Bethpage Community Park), Bethpage, New York.

Date:
May 2, 2007

Contact:
David Stern

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631-391-5284

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David.Stern@arcadis-us.com

Our ref:
NY001464.0707.00002

Dear Mr. Scharf:

On behalf of Northrop Grumman Systems Corporation (Northrop Grumman), ARCADIS has prepared this Work Plan Addendum to conduct additional sampling consistent with the Remedial Investigation (RI) / Feasibility Study (FS) currently underway at the Former Grumman Settling Ponds (Operable Unit 3 [OU3] – Bethpage Community Park [Park]), Bethpage, New York. Specifically, this Work Plan Addendum presents the rationale for the proposed collection and analysis of additional soil gas samples west of the Park. These samples will be collected in accordance with the objectives of the New York State Department of Environmental Conservation (NYSDEC)-approved RI/FS Work Plan and will assist in the planning and design of the Soil Gas Interim Remedial Measure (IRM) currently under development. Provided below is relevant background information in support of this plan, the technical work plan, and related schedule and logistical information.

Background

During Phase 2 of the RI and as part of the Soil Gas IRM Work Plan, ARCADIS collected soil gas samples from five locations at the SGP-11 cluster (i.e., SGP-11 and SGP-11A to SGP-11D) along the Northrop Grumman Plant 24 Access Road, west of the Park. Completed soil gas sampling locations are shown on Figure 1 and the results of soil gas sampling at the SGP-11 cluster are provided in Table 1. Consistent with the data originally collected at SGP-11, the additional SGP-11 samples (i.e., SGP-11A through D) also had reported detections of Trichloroethene (TCE).

Technical Work Plan

To support meeting OU3 RI objectives and assist in the design of the Soil Gas IRM, ARCADIS proposes to collect additional soil gas samples in the area west of the Park. As shown on Figure 1 and described and justified further in Table 2, a total of seven soil gas point locations (identified as SGP-12 to SGP-18) are proposed in an area west of the Park, on Northrop Grumman property, at locations west, north, and south of the SGP-11 cluster. All of the proposed soil gas samples will be collected and submitted to the analytical laboratory; however, analysis of the samples will be staggered, as follows:

- Soil gas samples collected from SGP-12, SGP-13, and SGP-14 will be analyzed first for the parameters described in Table 2.

- The analysis of the samples collected from SGP-15 will be contingent on the results of samples collected from SGP-13. Similarly, analysis of the soil gas samples collected from SGP-17 will be contingent on the results from samples from SGP-15. If samples from SGP-15 are not analyzed, then samples from SGP-17 will also not be analyzed.

- The analysis of the samples collected from SGP-16 will be contingent on the results of samples collected from SGP-14. Similarly, analysis of the soil gas samples collected from SGP-18 will be contingent on the results from samples from SGP-16. If samples from SGP-16 are not analyzed, then samples from SGP-18 will also not be analyzed.

The NYSDEC-approved RI/FS Work Plan, dated March 8, 2006, contains the detailed methodologies to be used for soil gas sampling and analysis and is incorporated herein by reference.

Soil gas data generated under this Work Plan Addendum will be validated in accordance with the RI/FS Work Plan and will be incorporated into the final RI Report.

Schedule and Logistics

ARCADIS expects that the proposed soil gas sampling will take approximately seven days to complete. Field work will be initiated in May 2007. The initial soil gas analytical data will be obtained on a one-week turnaround time.

Absent NYSDEC concerns or comments to the contrary by May 8, 2007, ARCADIS plans to implement this Work Plan Addendum. If you have questions or comments, please contact us.

Sincerely,

ARCADIS of New York, Inc.

David E. Stern
Senior Hydrogeologist

Carlo San Giovanni
Project Manager

Enclosures

Copies:
John Cofman, Northrop Grumman Corporation
Larry Leskovjan, Northrop Grumman Corporation
Nadine Weinberg, ARCADIS
Mike Wolfert, ARCADIS

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Table 1. Concentrations of Volatile Organic Compounds in Soil Gas,
Northrop Grumman, Former Settling Ponds (OU3 - Bethpage Community Park), Bethpage, New York

CONSTITUENT (ug/m3)	Site ID:	SGP-11	SGP-11A	SGP-11A	SGP-11A	SGP-11B	
	Sample ID:	7 - 7.5	7.5-8	19.5-20	39.5-40	7.5-8	
	Sample Date:	5/5/2006	3/21/2007	3/21/2007	3/23/2007	3/20/2007	
	Depth:	7-7.5	7.5-8	19.5-20	39.5-40	7.5-8	
Volatile Organic Compounds							
1,1,1-Trichloroethane		**980**	**440**	**500**	**500**	**370**	
1,1,2,2-Tetrachloroethane		<110	<28	<64	<67	<64	
1,1,2-Trichloroethane		<87	<28	<64	<67	<64	
1,1-Dichloroethane		<65	<28	**77**	**190**	**15**	
1,1-Dichloroethene		<63	<28	<64	<67	<64	
1,2-Dichloroethane		<65	<28	<64	<67	<64	
1,2-Dichloroethene		**370**	--	--	--	--	
1,2-Dichloropropane		<74	<28	<64	<67	<64	
1,3-Butadiene		<88	<28	<64	<67	**29**	
2-Butanone (MEK)		<120	<28	<64	<67	**16**	
2-Hexanone		<160	<28	<64	<67	<64	
4-Methyl-2-pentanone		<160	<28	<64	<67	<64	
Acetone		<950	<280	<640	<670	**75**	M
Benzene		<51	<28	<64	<67	**15**	
Bromodichloromethane		<110	<28	<64	<67	<64	
Bromoform		<170	<28	<64	<67	<64	
Bromomethane		<62	<28	<64	<67	<64	
Carbon Disulfide		**180**	<28	<64	<67	**15**	
Carbon Tetrachloride		<100	<28	<64	<67	<64	
Chlorobenzene		<74	<28	<64	<67	<64	
Chlorodifluoromethane		<140	--	--	--	--	
Chloroethane		<110	<28	<64	<67	<64	
Chloroform		<78	<28	<64	<67	**15**	
Chloromethane		<83	<28	<64	<67	<64	
cis-1,2-Dichloroethene		**370**	**150**	**790**	**2,000**	**95**	
cis-1,3-Dichloropropene		<73	<28	<64	<67	<64	
Dibromochloromethane		<140	<28	<64	<67	<64	
Dichlorodifluoromethane		<200	--	--	--	--	
Ethylbenzene		<69	<28	<64	<67	<64	
Freon 113		<120	<28	<64	<67	<64	
m,p-Xylenes		<170	<28	<64	<67	<64	
Methylene chloride		<140	<28	<64	<67	<64	
o-Xylene		<69	<28	<64	<67	<64	
Styrene		<68	<28	<64	<67	<64	
Tetrachloroethene		<110	**70**	**160**	**270**	**69**	
Toluene		<60	<28	<64	<67	**17**	
trans-1,2-Dichloroethene		<63	<28	<64	**68**	**7.3**	
trans-1,3-Dichloropropene		<73	<28	<64	<67	<64	
Trichloroethene		**11000**	**5,500**	**9,800**	**17,000**	**2,300**	
Trichlorotrifluoroethane		<41	<28	<64	<67	**6.6**	
Vinyl Chloride		<69	<64	<67	<64	<61	
Xylene (total)		<28	--	--	--	--	
Total VOCs		**12,900**	**6,160**	**11,327**	**20,028**	**3,045**	

Bold	Detected compound.
ug/m3	micrograms per meter cubed
M	matrix interfence, value maybe biased high
--	Not Analyzed; chlorodifluoromethane reported as a tentatively identified compound.

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Table 1. Concentrations of Volatile Organic Compounds in Soil Gas,
Northrop Grumman, Former Settling Ponds (OU3 - Bethpage Community Park), Bethpage, New York

CONSTITUENT (ug/m3)	Site ID:	SGP-11C	SGP-11D	SGP-11D	SGP-11D
	Sample ID:	7-7.5	6.8-7.2	19.5-20	44.5-45
	Sample Date:	3/22/2007	3/23/2007	3/23/2007	3/22/2007
	Depth:	7-7.5	6.8-7.2	19.5-20	44.5-45
Volatile Organic Compounds					
1,1,1-Trichloroethane		**390**	**230**	**320**	**37**
1,1,2,2-Tetrachloroethane		<61	<9.5	<66	<1.2
1,1,2-Trichloroethane		<61	<9.5	<66	<1.2
1,1-Dichloroethane		<61	<9.5	<66	**3.3**
1,1-Dichloroethene		<61	<9.5	<66	<1.2
1,2-Dichloroethane		<61	<9.5	<66	<1.2
1,2-Dichloroethene		--	--	--	--
1,2-Dichloropropane		<61	<9.5	<66	<1.2
1,3-Butadiene		<61	<9.5	<66	**77**
2-Butanone (MEK)		<61	<9.5	<66	**120**
2-Hexanone		<61	<9.5	<66	**15**
4-Methyl-2-pentanone		<61	<9.5	<66	**4.4**
Acetone		<610	<95	<660	**490**
Benzene		<61	<9.5	<66	**46**
Bromodichloromethane		<61	<9.5	<66	<1.2
Bromoform		<61	<9.5	<66	<1.2
Bromomethane		<61	<9.5	<66	**1.5**
Carbon Disulfide		<61	<9.5	<66	**35**
Carbon Tetrachloride		<61	<9.5	<66	**1.8**
Chlorobenzene		<61	<9.5	<66	**2.7**
Chlorodifluoromethane		--	--	--	--
Chloroethane		<61	<9.5	<66	<1.2
Chloroform		<61	**22**	<66	**4.2**
Chloromethane		<61	<9.5	<66	**2**
cis-1,2-Dichloroethene		**630**	**30**	**840**	**94**
cis-1,3-Dichloropropene		<61	<9.5	<66	<1.2
Dibromochloromethane		<61	<9.5	<66	<1.2
Dichlorodifluoromethane		--	--	--	--
Ethylbenzene		<61	<9.5	<66	**14**
Freon 113		<61	<9.5	<66	**2.3**
m,p -Xylenes		<61	<9.5	<66	**43**
Methylene chloride		<61	<9.5	<66	<1.2
o-Xylene		<61	<9.5	<66	**19**
Styrene		<61	<9.5	<66	**3.2**
Tetrachloroethene		**89**	**23**	**110**	**8.1**
Toluene		<61	<9.5	<66	**65**
trans-1,2-Dichloroethene		<61	<9.5	<66	**4.3**
trans-1,3-Dichloropropene		<61	<9.5	<66	<1.2
Trichloroethene		**6,700**	**1,700**	**7,600**	**620**
Trichlorotrifluoroethane		<61	<9.5	<66	**1.7**
Vinyl Chloride		<9.5	<66	<1.2	<1.2
Xylene (total)		--	--	--	--
Total VOCs		**7,809**	**2,005**	**8,870**	**1,715**

Bold	Detected compound.
ug/m3	micrograms per meter cubed
M	matrix interfence, value maybe biased high
--	Not Analyzed; chlorodifluoromethane reported as a tentatively identified compound.

Table 2. Summary of Proposed Western Area Soil Gas Samples, Soil Gas Phase 3 Remedial Investigation, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Activity	Proposed Sample ID	Proposed Sampling	Proposed Soil Gas Sampling Depths (ft bls) [3]	Proposed Soil Gas Analysis	Proposed Soil Sampling Intervals	Proposed Soil Analysis	General Rationale
Soil Gas Sampling [2]							
NGC property							
	SGP-12	Soil Gas, Soil	8	VOCs [1]	Continuous	Lithology	Delineate northern extent of VOCs near former Grumman Plant 24. Support design of North-South leg of Soil Gas IRM. Single sample proposed due to presence of low permeability zone and perched water at deeper depths at the location.
	SGP-13	Soil Gas, Soil	8, 20, 50	VOCs [1]	Continuous	Lithology	Depending on results, the data will be used to delineate northern/vertical extent of VOCs identified at SGP-11 cluster or gather additional information as to spatial distribution of VOCs west of Site. Support Soil Gas IRM design in area northeast of former Grumman Plant 24.
	SGP-14	Soil Gas, Soil	8, 20, 50	VOCs [1]	Continuous	Lithology	Delineate southern/vertical extent of VOCs identified at SGP-11 cluster and support Soil Gas IRM design.
	SGP-15	Soil Gas, Soil	8, 20, 50	VOCs [1]	Continuous	Lithology	Analyzed contingent on SGP-13 results. Data will be used to delineate northwestern/vertical extent of VOCs identified at SGP-11 cluster or gather additional information as to spatial distribution of VOCs west of Site and north of former Grumman Plant 24 and support Soil Gas IRM design.
	SGP-16	Soil Gas, Soil	8, 20, 50	VOCs [1]	Continuous	Lithology	Analyzed contingent on SGP-14 results. Dataata will be used to delineate western/vertical extent of VOCs identified at SGP-11 cluster or gather additional information as to spatial distribution of VOCs west of Site and south of former Grumman Plant 24. Support design of Soil Gas IRM.

see footnotes on last page

Table 2. Summary of Proposed Western Area Soil Gas Samples, Soil Gas Phase 3 Remedial Investigation, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

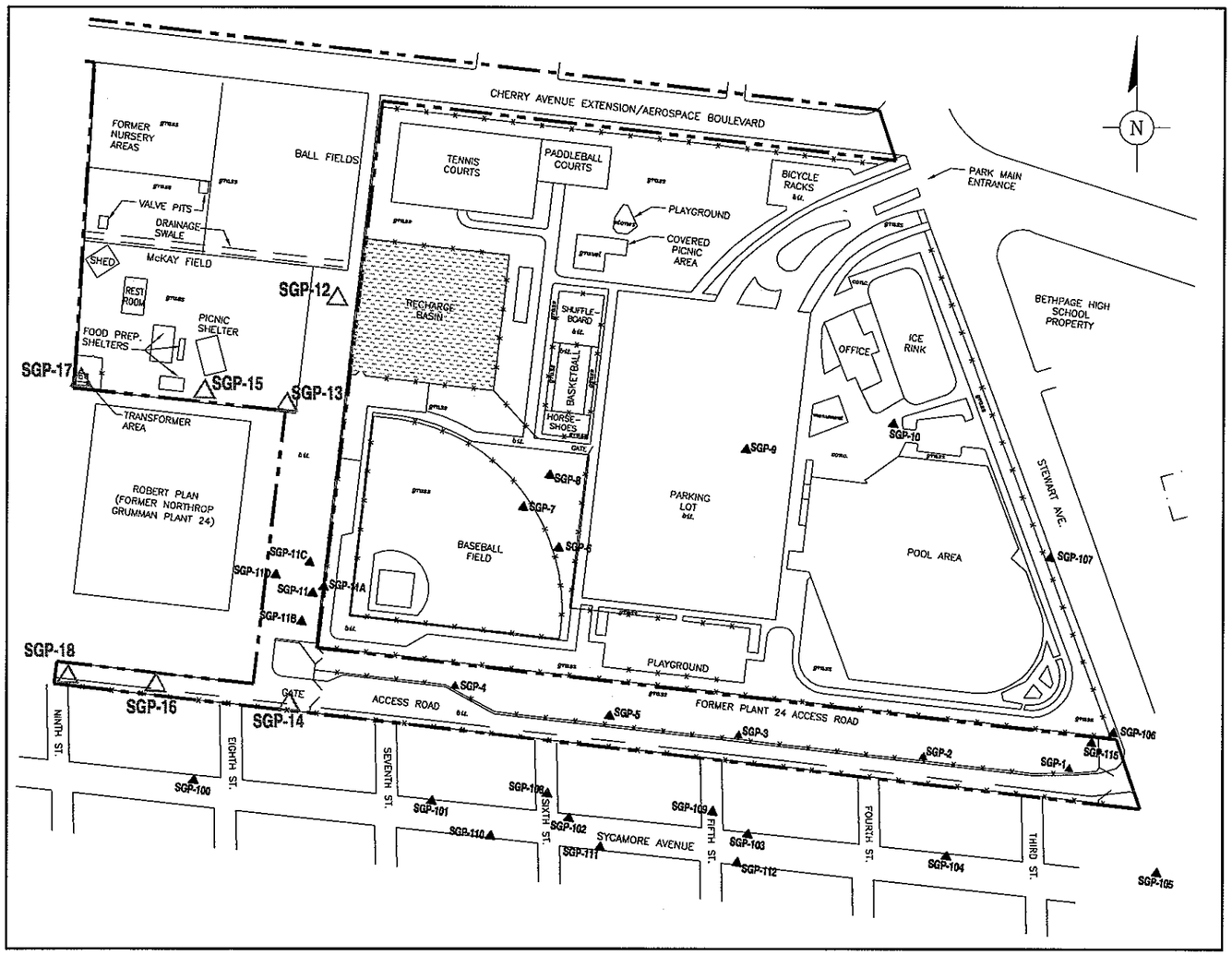
Activity	Proposed Sample ID	Proposed Sampling	Proposed Soil Gas Sampling Depths (ft bls) [3]	Proposed Soil Gas Analysis	Proposed Soil Sampling Intervals	Proposed Soil Analysis	General Rationale
Soil Gas Sampling [2]							
NGC property							
	SGP-17	Soil Gas, Soil	8, 20, 50	VOCs [1]	Continuous	Lithology	Analyzed contingent on SGP-15 results. Dataata will be used to delineate western/vertical extent of VOCs identified at SGP-11 cluster or gather additional information as to spatial distribution of VOCs west of Site and northwest of former Grumman Plant 24.
	SGP-18	Soil Gas, Soil	8, 20, 50	VOCs [1]	Continuous	Lithology	Analyzed contingent on SGP-16 results. Dataata will be used to delineate western/vertical extent of VOCs identified at SGP-11 cluster or gather additional information as to spatial distribution of VOCs west of Site and southwest of former Grumman Plant 24.

Footnotes:

(1) Full TCL VOC analyte list via USEPA Method TO-15 (see RI/FS Work Plan)
(2) Based on NYSDEC approval obtained during the previous round of soil gas sampling, tracer gas (per NYSDOH guidance) will be performed on 10 percent of samples (2 samples). All soil gas points will be completed as temporary borings.
(3) Based on borehole stratigraphy, the sampling intervals may change.

Definitions:

ft bls	feet below land surface
VOC	Volatile Organic Compound
NGC	Northrop Grumman Systems Corporation
TCL	Target Compound List
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health



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SCALE IN FEET

LEGEND:

- NORTHROP GRUMMAN PROPERTY LINE
- FENCE
- LIMITS OF BETHPAGE HIGH SCHOOL MAIN BUILDING
- *bit.* BITUMINOUS PAVEMENT
- SGP-1 ▲ SOIL GAS POINT (SGP) (ARCADIS)
- SGP-113 △ PROPOSED SOIL GAS POINT (SGP) (ARCADIS)

NOTES:

1. SGP LOCATIONS PROPOSED FOR AREAS TO THE SOUTH AND EAST OF BETHPAGE COMMUNITY PARK DRILLED ON TOWN OF OYSTER BAY RIGHTS-OF-WAY.
2. ALL SGP LOCATIONS WILL BE PROPERLY ABANDONED AFTER COMPLETION OF SAMPLING.
3. PROPOSED LOCATIONS SUBJECT TO FIELD VERIFICATION.

NO.	ISSUED DATE	REVISION DESCRIPTION	BY/CKD
1	4-30-07	NYSDEC CORRESPONDENCE	DS

KEYPLAN

SEAL

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PROJECT TITLE

NORTHROP GRUMMAN
OPERABLE UNIT 3
REMEDIAL INVESTIGATION
BETHPAGE, NEW YORK

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
C. SAN GIOVANNI	M. WOLFERT		D. STERN
SHEET TITLE		TASK/PHASE NUMBER	DRAWN BY
LOCATION OF COMPLETED AND PROPOSED SOIL GAS SAMPLING LOCATIONS		001SG	A. SANCHEZ
		PROJECT NUMBER	FIGURE
		NY001464.0707	1