ARCADIS GERAGHTY & MILLER

ARCADIS Geraghty & Miller, Inc.
88 Duryea Road
Melville
New York 11747
Tel 516 249 7600
Fax 516 249 7610

ENVIRONMENTAL

Mark Hill
Project Engineer
Northrop Grumman Corporation
Mail Stop D08-001
609 South Oyster Bay Road
Bethpage, New York 11747

Subject:
Results of Dry Well Investigation at Parcel J1, Northrop Grumman Corporation, Bethpage, New York.
ARCADIS Geraghty & Miller Project No. NY000008.0171.00001

Melville,
13 July 1999

Contact:
Robert Porsche

Extension:
516.391.5233

Dear Mark:

In accordance with our proposal of June 2, 1999, ARCADIS Geraghty & Miller has completed its investigation of Dry Well 1 (DW-1) located on Parcel J1 of the Northrop Grumman Corporation's (NGC) Bethpage, New York facility. Although the proposed scope of work was for the investigation of two dry wells (DW-1 and DW-2), DW-2 could not be located. Based on a site walk by NGC and ARCADIS Geraghty & Miller personnel, it appeared that DW-2 had been previously backfilled and abandoned. As a result, the project scope was limited to the investigation of DW-1. This letter summarizes the method used for sample collection and screening, presents the analytical data, and recommends that no further remedial or investigative action be taken at DW-1, based on the analytical data summarized below.

Methodology

Sample Collection

On June 7, 1999 continuous split spoon soil samples were collected from 14 feet below grade (ft bg) to 30 ft bg (from the dry well invert, to a depth 16 ft below the invert) at DW-1 utilizing a large bore sampler driven by a Geoprobe drilling rig. The blind sampling probe was driven to a depth above the desired sampling elevation, opened, and driven through the sample interval, collecting a 22" long by 1 1/16" diameter sample. Prior to the collection of each sample, the sampler was cleaned with Alconox, rinsed with distilled water, air dried and fitted with a new acetate liner.

Sample Screening

Each sample was temporarily bagged and labeled to indicate sample depth. Samples was field screened for volatile organic compounds (VOCs) with a photoionization

detector (PID) to determine the zone of highest VOC concentration, and the approximate vertical extent of contamination. The attached sample / core log indicates the lithology of the samples, and the concentration of VOCs detected by the PID. The PID concentrations presented on the log include 3-5 ppm emitted by the ZipLock bags used to screen the samples. Samples were field screened by conducting head space analyses of bagged samples from each sample interval. Peak VOC concentrations were detected by the PID in the 20-22 ft bg sample. VOC concentrations in samples collected from the 26-28 and 28-30 ft bg intervals were comparable to the background value of 3-5 ppm detected in an unused ZipLock bag.

Analytical Results

Based upon a review of the PID readings, and the lack of any apparent staining (with the exception of the 14-16 ft sample), samples from the 14-16, 20-22, and 26-28 ft bg intervals were submitted to Columbia Analytical Services of Rochester, NY for analysis of VOCs, Total and TCLP Semivolatile organic compounds (SVOCs) and the eight Resource Conservation and Recovery Act (RCRA) Metals by EPA Methods 8260, 8270, and 6010/7471, respectively. Analytical results of the VOC, Total SVOC, TCLP SVOC, and the eight RCRA Metals are presented in Tables 1-4, respectively.

Analytical results were compared to the New York State Department of Environmental Conservation (NYSDEC) Spill Technology and Remediation Series (STARS) Memo #1. STARS Human Health Guidance Values were used to evaluate VOC and Total SVOC concentrations with respect to the protection of human health concerns. STARS TCLP Extraction Guidance Values were used to evaluate the concentrations of SVOCs in leachate derived from the soil samples, for the purpose of demonstrating groundwater quality protection. NYSDEC Technical and Administrative Guidance Memorandum (TAGM 4046), Revised January 24, 1994 was used to evaluate metals concentrations detected in soils with respect to Recommended Soil Cleanup Objectives, and Eastern USA Background levels.

In several cases STARS Human Health Guidance Values are below Practical Quantitation Levels (Method Detection Limits [MDLs]). According to STARS, when Guidance Values or standards are below MDLs, achieving the MDL will be considered acceptable for meeting the Guidance Value or standard.

No detectable concentrations of VOCs, Total SVOCs or TCLP SVOCs were reported for any of the samples submitted for laboratory analysis. As described above, VOC, Total SVOC and TLCP SVOC reported less-than concentrations are considered to have met applicable Guidance Values; the analytical data demonstrates both protection of human health, and groundwater quality.

Although detectable concentrations of metals were reported, none of the concentrations exceed allowable Site Background Levels or Recommended Cleanup Objectives, as defined in TAGM 4046. Based upon this comparison, no cleanup of soils within DW-1 is necessary due to metals impacts.

Conclusion and Recommendation

Based on the analytical data summarized above, ARCADIS Geraghty & Miller concludes that there is no VOC, SVOC or metals contamination in the soils beneath DW-1 on Parcel J1. As such, ARCADIS Geraghty & Miller recommends that no further action be taken.

If you have any questions or comments, please do not hesitate to call.

Sincerely,

ARCADIS Geraghty & Miller, Inc.

Robert Porsche
Project Scientist

Carlo San Giovanni
Project Manager

Michael F. Wolfert
Project Director

Enclosure

Table. 1 Analytical Results of VOC Analysis of Soil Samples collected from Parcel J1, Northrop Grumman Corporation, Bethpage, New York.

	Sample ID:		DW-1	DW-1	DW-1
	Sample Depth:		14-16'	20-22'	26-28'
	Date Analyzed:		6/9/99	6/9/99	6/9/99
Parameters units in ug/kg	Human Health Guidance Value (ppm)*	Practical Quantitation Level (ug/kg)			
Benzene	2.4×10^4	1	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	***	1	< 1.0	< 1.0	< 1.0
tert-butylbenzene	***	1	< 1.0	< 1.0	< 1.0
n-Butylbenzene	***	1	< 1.0	< 1.0	< 1.0
Methyl-tert-butylether	***	1	< 1.0	< 1.0	< 1.0
Ethybenzene	8.0×10^6	1	< 1.0	< 1.0	< 1.0
Isopropylbenzene	***	1	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	***	1	< 1.0	< 1.0	< 1.0
Naphthalene	3.0×10^5	1	< 1.0	< 1.0	< 1.0
n-Propylbenzene	***	1	< 1.0	< 1.0	< 1.0
Toluene	2.0×10^7	1	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	***	1	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	***	1	< 1.0	< 1.0	< 1.0
o-Xylene	2.0×10^8	2	< 2.1	< 2.0	< 2.0
m+p-Xylene	2.0×10^8	2	< 2.1	< 2.0	< 2.0

Analyzed by Columbia Analytical Services, Rochester, New York.

ug/kg micrograms per kilogram.

ppm parts per million.

* Human Health Guidance Values taken from STARS Table II.

*** No Guidance Value identified in EPA HEAST Report.

STARS NYSDEC Spill Technology and Remediation Series Memo #1, Petroleum Soil Guidance Policy, August 1992.

NYSDEC New York State Department of Envionmental Conservation.

< less than.

Table. 2 Analytical Results of Total SVOC Analysis of Soil Samples collected from Parcel J1, Northrop Grumman Corporation, Bethpage, New York.

Parameters units in ug/kg	Sample ID: / Sample Depth: / Date Analyzed:	Human Health Guidance Value (ppm)*	Practical Quantitation Level (ug/kg)	DW-1 14-16' 6/9/99	DW-1 20-22' 6/9/99	DW-1 26-28' 6/9/99
Acenaphthene		$2x10^8$	330	< 340	< 330	< 330
Anthracene		$2x10^7$	330	< 340	< 330	< 330
Benzo(a)anthracene		220	330	< 340	< 330	< 330
Benzo(a)pyrene		61	330	< 340	< 330	< 330
Benzo(b)fluoranthene		220	330	< 340	< 330	< 330
Benzo(g,h,i)perylene		***	330	< 340	< 330	< 330
Benzo(k)fluoranthene		220	330	< 340	< 330	< 330
Indeno(1,2,3-cd)pyrene		***	330	< 340	< 330	< 330
Chrysene		***	330	< 340	< 330	< 330
Dibenzo (a,h)anthracene		14	330	< 340	< 330	< 330
Fluoranthene		3.0×10^6	330	< 340	< 330	< 330
Fluorene		3.0×10^6	330	< 340	< 330	< 330
Naphthalene		3.0×10^5	200	< 210	< 200	< 200
Phenanthrene		***	330	< 340	< 330	< 330
Pyrene		$2x10^8$	330	< 340	< 330	< 330

Analyzed by Columbia Analytical Services, Rochester, New York.

ug/kg micrograms per kilogram.
ppm parts per million.
* Human Health Guidance Values taken from STARS Table II.
*** No Guidance Value identified in EPA HEAST Report.
STARS NYSDEC Spill Technology and Remediation Series Memo #1, Petroleum Soil Guidance Policy, August 1992.
NYSDEC New York State Department of Envionmental Conservation.
< less than.

Table. 3 Analytical Results of TCLP SVOC Analysis of Soil Samples collected from Parcel J1, Northrop Grumman Corporation, Bethpage, New York.

Parameters units in ug/L	Sample ID: / Sample Depth: / Date Analyzed:	TCLP Extraction Guidance Value (ppb)*	Practical Quantitation Level (ug/L)	DW-1 14-16' 6/10/99	DW-1 20-22' 6/10/99	DW-1 26-28' 6/10/99
Acenaphthene		20	5	< 5.0	< 5.0	< 5.0
Anthracene		50	5	< 5.0	< 5.0	< 5.0
Benzo(a)anthracene		0.002	5	< 5.0	< 5.0	< 5.0
Benzo(a)pyrene		0.002	5	< 5.0	< 5.0	< 5.0
Benzo(b)fluoranthene		0.002	5	< 5.0	< 5.0	< 5.0
Benzo(g,h,i)perylene		0.002	5	< 5.0	< 5.0	< 5.0
Benzo(k)fluoranthene		0.002	5	< 5.0	< 5.0	< 5.0
Indeno(1,2,3-cd)pyrene		0.002	5	< 5.0	< 5.0	< 5.0
Chrysene		0.002	5	< 5.0	< 5.0	< 5.0
Dibenzo (a,h)anthracene		50	5	< 5.0	< 5.0	< 5.0
Fluoranthene		50	5	< 5.0	< 5.0	< 5.0
Fluorene		50	5	< 5.0	< 5.0	< 5.0
Naphthalene		10	5	< 5.0	< 5.0	< 5.0
Phenanthrene		50	5	< 5.0	< 5.0	< 5.0
Pyrene		50	5	< 5.0	< 5.0	< 5.0

Analyzed by Columbia Analytical Services, Rochester, New York.

ug/L micrograms per Liter.

ppb parts per billion.

* Human Health Guidance Values taken from STARS Table II.

*** No Guidance Value identified in EPA HEAST Report.

STARS NYSDEC Spill Technology and Remediation Series Memo #1, Petroleum Soil Guidance Policy, August 1992.

NYSDEC New York State Department of Envionmental Conservation.

< less than.

Table. 4 Analytical Results of Metals Analysis of Soil Samples collected from Pacel J1, Northrop Grumman Corporation, Bethpage, New York.

Parameters units in mg/kg	Eastern USA Background (ppm)*	Rec. Soil Cleanup Objectve (ppm)*	Practical Quantitation Level (mg/kg)	Sample ID: DW-1 Sample Depth: 14-16' Date Analyzed: 6/7/99	DW-1 20-22' 6/7/99	DW-1 26-28' 6/7/99
Arsenic	3-12**	7.5 or SB	1.0	< 1.03	2.19	2.79
Barium	15-600	300 or SB	2.0	3.78	4.9	8.4
Cadmium	0.1-1	1 or SB	0.5	< 0.513	< 0.507	< 0.503
Chromium	1.5-40**	10 or SB	1.0	2.49	2.17	6.31
Lead	****	SB****	5.0	8.88	< 5.07	< 5.03
Mercury	0.001-0.2	0.1	0.005	< 0.0513	< 0.0507	< 0.0503
Selenium	0.1-3.9	2 or SB	0.5	< 0.513	< 0.507	< 0.503
Silver	N/A	SB	1.0	< 1.03	< 1.01	< 1.01

Analyzed by Columbia Analytical Services, Rochester, New York.

mg/kg	milligrams per kilogram.
ppm	parst per million.
SB	Site background.
*	Eastern USA Background and Recommended Soil Cleanup Objectives as defined in TAGM 4046, January 1994.
**	New York State background.
****	Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.
TAGM 4046	NYSDEC Technical and Administrative Guidance Memorandum of Soil Cleanup Objectives and Cleanup Goals.
NYSDEC	New York State Department of Envionmental Conservation.
<	less than.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well DW-1 Project/No. NY000008.0171.00001 Page 1 of 1

Site Location Reed I., Northrop Drummond Drilling Started 0930 Drilling Completed 1300

Total Depth Drilled 30 Feet Hole Diameter ____ inches Type of Sample/ Coring Device Large Bore Sample

Length and Diameter of Coring Device 1" x 27" Sampling Interval 2 feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used None Drilling Method Geoprobe

Drilling Contractor Zebra Environmental Corp. Driller Chris Helper Luke

Prepared By Robert Porsche Hammer Weight ____ Hammer Drop ____ ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	~~Time/Hydraulic Pressure or~~ Blows per 6 inches / PID	Sample/Core Description
14	16	1.5	13 ppm	6" Sand, Medium to fine, Black (apparently stained) no odor, some angular to subrounded pebbles
				12" Sand, medium to fine, Red-brown with some angular to subrounded pebbles
16	18	1.5	26 ppm	18" Sand, medium, light-brown, some pebbles
18	20	1	32.2 ppm	12" Sand, as above, some interbedded white fine sand.
20	22	1	35.3 ppm	12" Sand, fine to medium, light-brown, some pebbles
22	24	1.5	11.2	18" Sand, as above
26	28	0.5	7.7 ppm	6" Sand as above
28	30	0.5	3.8 ppm	6" Sand, as above
				PID: Background 0.0
				Zip lock bag 3-5 ppm
				Weather: Extremely humid, 90+°F

NGSC263271