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Infrastructure, buildings, environment, communications

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ENVIRONMENTAL

Gerald J. Rider Jr., P.E.
New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Hazardous Site Control
625 Broadway
Albany, New York 12233-7015

Subject:
Northrop Grumman Corporation - Bethpage Facility Site #130003A, Plant 2 SVE System.
ARCADIS G&M, Inc. Project No. NY001348.0008.00001

Date:
25 June 2002

Contact:
Carlo San Giovanni

Extension:
(631) 391-5259

Dear Mr. Rider:

ARCADIS G&M, Inc. (ARCADIS) has prepared this letter on behalf of the Northrop Grumman Corporation (Northrop Grumman) to update you as to the current status and monitoring results for their Plant 2 Soil Vapor Extraction (SVE) system in Bethpage, New York, and to summarize our current plans for collecting soil samples to determine if system shut-down criteria have been reached.

As described in our letter to you of June 6, 2001, the SVE system was restarted (pulsed) on June 14, 2001 and is still running (after an approximate 6-month period when the system was not operated). SVE system influent and effluent extracted soil gas samples and groundwater samples (from Monitoring Well GM-32S, which is located within the SVE system shed and adjacent to the former Trichloroethylene [TCE] Storage tank) were collected after system restart, over a 117-day test period (slightly longer than the 90-day period proposed in the June letter), in accordance with the protocols set forth in the aforementioned letter. The intent of this testing period was to verify that influent volatile organic compound (VOC) concentrations were at an asymptotic concentration and that residual soil concentrations in the former TCE Storage tank area did not constitute a source of groundwater contamination. At the completion of the 117-day testing period, influent vapor total VOC concentrations were within the asymptotic level (approximately 1 to 3 ppmv, or 2 to 5 lbs/month) achieved during the previous four operational periods. Additionally, the analytical results of groundwater samples collected from Well GM-32S showed low concentrations (20 to 14 ppb) and a slight declining trend of TCE. In summary, the results of the 117-day testing period confirmed that the goals of the SVE system, i.e., to reduce the VOC concentrations in extracted soil gas (and therefore soil) in the vicinity of the former TCE Storage tank area to concentrations

that eliminate the area as a source of groundwater contamination were achieved. Analytical results for influent vapor and groundwater samples collected during the test period (and beyond) are summarized in Tables 1 and 2, respectively. Figure 1 is a concentration vs. time graph for extracted soil gas TCE concentrations since original startup; TCE was graphed because it is the most prevalent compound detected in the influent vapor samples.

Northrop Grumman had originally intended to follow-up the 117-day test period, described above, with the collection of soil samples to evaluate if system termination criteria (i.e., goal of soil cleanup objectives specified in TAGM 4046) had been achieved; however, funding was not available in late 2001 to conduct the soil sampling program so it was decided to continue operation of the SVE system with quarterly monitoring of influent and effluent soil gas (influent data are summarized in Table 1 and Figure 1) and to collect the soil samples in 2002. Northrop Grumman has recently authorized ARCADIS to proceed with the Soil Sampling Program. Details on the Soil Sampling Program scope and methodology were previously described in our June 6, 2001 letter and were approved by the New York State Department of Environmental Conservation (NYSDEC) in their letter of February 7, 2002. Because nearly one year has passed since the sampling plan was approved, we have briefly summarized the scope below.

The Soil Sampling Program will involve the drilling and collection of soil samples from two vertical profile borings (VPBs) located within the former TCE Storage tank area (as shown on Figure 2). VPBs will be drilled to the water table in each case, and soil samples will be collected continuously during the drilling of each VPB (either via Geoprobe direct push method or hollow stem auger drilling method). Soil samples collected will be screened for VOCs by conducting a headspace analysis using a photoionization detector (PID). Upon completion of the VPBs, the tabulated PID readings will be evaluated, and a soil sample interval(s) will be selected from each VPB for laboratory analysis from the depth interval with the highest PID reading(s). In the event that multiple, vertically separate intervals have elevated headspace concentrations, one sample representative of each zone of elevated PID readings will be selected for analysis up to a maximum of 3 samples per boring. In the event that PID readings are inconclusive, three soil samples from each VPB will be submitted for lab analysis from the three depths that correspond to intervals in the original soil borings (drilled during the Northrop Grumman Remedial Investigation) that exhibited elevated VOC concentrations (i.e., 0-2 ft bls, 8-10 ft bls, and 18-20 ft bls). Soil samples will be sealed in laboratory provided containers, packed in an ice filled cooler and transported to the lab. Strict chain-of-custody protocols will be

observed during the handling of the samples. Soil samples will be submitted to EcoTest Laboratories of Babylon, New York and analyzed by EPA Method 8260 for VOCs with a standard turnaround time.

At the completion of the Soil Sampling Program, a letter report will be prepared and submitted to the NYSDEC that summarizes the VPB and soil analytical results. The data presented in the soil sampling report will be used in conjunction with the SVE system monitoring and groundwater data summarized in this letter to support recommendations for either continued operation of the SVE system or for termination of SVE system operation and initiation of postclosure monitoring, leading to permanent closure of the system. It is Northrop Grumman's intent to begin this work as soon as possible. As requested in the NYSDEC letter dated February 7, 2000, we will provide NYSDEC two weeks prior notice before drilling of any VPBs to provide NYSDEC the opportunity to collect duplicate samples. If you have any questions please do not hesitate to contact us.

Sincerely,

ARCADIS G&M, Inc.

Carlo San Giovanni
Project Manager

Michael Wolfert
Project Director

Enclosure

Copies:
Larry Leskovian, Northrop Grumman
John Cofman, Northrop Grumman

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Table 1. Mass Loading Rates for Plant 2 SVE System, Northrop Grumman Corporation, Bethpage, New York.

Parameters	Molecular Weight	Sample ID: / Date Sampled: / Units:	INFLUENT-1 10/26/00 (ppmv)	INFLUENT-1 10/26/00 (Lbs/Hr)	INFLUENT-2 10/26/00 (ppmv)	INFLUENT-2 10/26/00 (Lbs/Hr)	INFLUENT-2 12/4/00 (ppmv)	INFLUENT-2 12/4/00 (Lbs/Hr)	INFLUENT-1 6/14/01 (ppmv)	INFLUENT-1 6/14/01 (Lbs/Hr)	INFLUENT-2 6/14/01 (ppmv)	INFLUENT-2 6/14/01 (Lbs/Hr)
Chloroform	119.38		0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
1,1,1-Trichloroethene	133.41		0.012	0.0000	0.009	0.0000	0.007	0.0000	0	0.0000	0	0.0000
Trichloroethylene	131.39		6.271	0.0156	6.571	0.0164	1.528	0.0038	4.9	0.0122	4.7	0.0117
Tetrachloroethylene	165.83		0.006	0.0000	0.007	0.0000	0.000	0.0000	0.000	0.0000	0.006	0.0000
TOTAL VOCs:			**6.289**		**6.587**		**1.535**		**4.9**		**4.706**	
Emissions Rate (Lbs/Hr):				0.0157		0.0164		0.0038		0.0122		0.0117
Emissions Rate (Lbs/mo.):				11.2904395		11.8256676		2.75515954		8.79435525		8.44899324
Emissions Rate (Lbs/yr.):				137.367014		143.878956		33.5211077		106.997989		102.796084

ppmv Parts per million by volume.
Lbs/Hr Pounds per hour.
Emissions Rate = Pumping Rate (120cfm) x Soil Gas Concentration (ppmv) x Molecular weight of contaminant (lb/lb mole) x 1.581 x 10^-7

Note:
The numbering sequence refers to the series of influent air samples collected during the most recent pulses of the SVE system, with INFLUENT-1 in each case referring to the first influent air sample collected during the pulse-on, with the following numbers representing the subsequent sereis of samples collected in chronological order during the pulse operation. One sample INFLUENT-2 (dated 12/4/2000) was mislabeled in the field and should have been labeled as the third sample collected in that pulse (i.e., INFLUENT-3) .
Numbering restarted on June 14, 2001 with the final pulse-on of the system with five total samples collected during that timeframe.

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Table 1. Mass Loading Rates for Plant 2 SVE System, Northrop Grumman Corporation, Bethpage, New York.

Parameters	Molecular Weight	Sample ID:	INFLUENT-3		INFLUENT-4		INFLUENT-5		SVE-INFLUENT		SVE-INFLUENT	
		Date Sampled:	6/15/01		7/26/01		8/23/01		10/8/01		4/12/02	
		Units:	(ppmv)	(Lbs/Hr)	(ppmv)	(Lbs/Hr)	(ppmv)	(Lbs/Hr)	(ppmv)	(Lbs/Hr)	(ppmv)	(Lbs/Hr)
Chloroform	119.38		0	0.0000	0	0.0000	0	0.0000	0	0.0000	0	0.0000
1,1,1-Trichloroethene	133.41		0	0.0000	0	0.0000	0.007	0.0000	0.006	0.0000	0	0.0000
Trichloroethylene	131.39		5.6	0.0140	2	0.0050	1.7	0.0042	1.1	0.0027	3.0	0.0075
Tetrachloroethylene	165.83		0.006	0.0000	0.006	0.0000	0.000	0.0000	0.000	0.0000	0	0.0000
TOTAL VOCs:			**5.606**		**2.006**		**1.707**		**1.106**		**3.0**	
Emissions Rate (Lbs/Hr):				0.0140		0.0050		0.0043		0.0028		0.0075
Emissions Rate (Lbs/mo.):				10.064283		3.60312402		3.06385936		1.98517717		5.38429913
Emissions Rate (Lbs/yr.):				122.448776		43.8380089		37.2769555		24.1529889		65.5089728

ppmv Parts per million by volume.
Lbs/Hr Pounds per hour.
Emissions Rate = Pumping Rate (120cfm) x Soil Gas Concentration (ppmv) x Molecular weight of contaminant (lb/lb mole) x 1.581 x 10^-7

Note:
The numbering sequence refers to the series of influent air samples collected during the most recent pulses of the SVE system, with INFLUENT-1 in each case referring to the first influent air sample collected during the pulse-on, with the following numbers representing the subsequent sereis of samples collected in chronological order during the pulse operation. One sample INFLUENT-2 (dated 12/4/2000) was mislabeled in the field and should have been labeled as the third sample collected in that pulse (i.e., INFLUENT-3) .
Numbering restarted on June 14, 2001 with the final pulse-on of the system with five total samples collected during that timeframe.

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Table 2. Concentrations of Volatile Organic Compounds in Groundwater Samples, Plant 2 SVE Area, Northrop Grumman Corporation, Bethpage, New York.

Constituent (units in ug/L)	NYSDEC Standards Criteria and Guidance Values(1)	Site ID: / Sample ID: / Sample Date:	GM-32S GM-32S 6/22/01		GM-32S GM-32S 7/31/01		GM-32S GM-32S 8/29/01		GM-32S GM-32S 10/13/01	
Chloromethane	5		< 10		< 10		< 10		< 10	
Bromomethane	5		< 10		< 10		< 10		< 10	
Vinyl Chloride	2		< 0.20		< 0.20		< 0.20	J	< 0.20	
Chloroethane	5		< 10		< 10		< 10		< 10	
Methylene Chloride	5		**3**	**JB**	< 10		< 10	J	**1**	**JB**
Acetone	50		< 10		< 10		< 10		< 10	
Carbon Disulfide	50		< 10		< 10		< 10		< 10	
1,1-Dichloroethene	5		< 10		< 10		< 10		< 10	
1,1-Dichloroethane	5		< 10		< 10		< 10		< 10	
1,2-Dichloroethene (total)	5		< 10		< 10		< 10		< 10	
Chloroform	7		< 10		< 10		< 10		< 10	
1,2-Dichloroethane	5		< 10		< 10		< 10		< 10	
2-Butanone	50		< 10		< 10		< 10		< 10	
1,1,1-Trichloroethane	5		< 10		< 10		< 10		< 10	
Carbon Tetrachloride	5		< 10		< 10		< 10		< 10	
Bromodichloromethane	50		< 10		< 10		< 10		< 10	
1,2-Dichloropropane	5		< 10		< 10		< 10		< 10	
cis-1,3-Dichloropropene	5		< 10		< 10		< 10		< 10	
Trichloroethene	5		**20**		**15**		**15**		**14**	
Dibromochloromethane	5		< 10		< 10		< 10		< 10	
1,1,2-Trichloroethane	5		< 10		< 10		< 10		< 10	
Benzene	0.7		< 10		< 10		< 10		< 10	
trans-1,3-Dichloropropene	5		< 10		< 10		< 10		< 10	
Bromoform	50		< 10		< 10		< 10		< 10	
4-Methyl-2-Pentanone	50		< 10		< 10		< 10		< 10	
2-Hexanone	50		< 10		< 10		< 10		< 10	
Tetrachloroethene	5		< 10		< 10		< 10		< 10	
1,1,2,2-Tetrachloroethane	5		< 10		< 10		< 10		< 10	
Toluene	5		< 10		< 10		< 10		< 10	
Chlorobenzene	5		< 10		< 10		< 10		< 10	
Ethylbenzene	5		< 10		< 10		< 10		< 10	
Styrene	5		< 10		< 10		< 10		< 10	
Xylene (total)	5		< 10		< 10		< 10		< 10	
Vinyl Acetate	--		< 10		< 10		< 10		< 10	
2-Chloroethylvinylether	--		< 10		< 10		< 10		< 10	
1,1,2-Trichlorotrifluoroethane	--		< 10		< 10		< 10		< 10	
Sum of Constituents			**23**		**15**		**15**		**15**	

SVE	Soil Vapor Extraction
(1)	New York State Department of Environmental Conservation (NYSDEC) Standards, Criteria, and Guidance Values (SCGs) included in the Final Groundwater Feasibility Study, (ARCADIS Geraghty & Miller, Inc. 2000).
ug/L	Micrograms per liter.
J	Estimated value.
	Bold type indicates a detection
B	Consitituent detected in associated blank sample.
	Constituent exceeds associated SCG value.
--	No standard available.

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Table 2. Concentrations of Volatile Organic Compounds in Groundwater Samples, Plant 2 SVE Area, Northrop Grumman Corporation, Bethpage, New York.

Constituent (units in ug/L)	NYSDEC Standards Criteria and Guidance Values(1)	Site ID: / Sample ID: / Sample Date:	TRIP BLANK TB061401 6/14/01		TRIP BLANK TB072601 7/26/01		TRIP BLANK TB082301 8/23/01		EQ. BLANK FB082301 6/14/01	
Chloromethane	5		< 10		< 10		< 10		< 10	
Bromomethane	5		< 10		< 10		< 10		< 10	
Vinyl Chloride	2		< 0.20		< 0.20		< 0.20	J	< 0.20	J
Chloroethane	5		< 10		< 10		< 10		< 10	
Methylene Chloride	5		**3**	**JB**	**1**	**JB**	**2**	**J**	**2**	**JB**
Acetone	50		< 10		< 10		< 10	J	< 10	J
Carbon Disulfide	50		< 10		< 10		< 10		< 10	
1,1-Dichloroethene	5		< 10		< 10		< 10		< 10	
1,1-Dichloroethane	5		< 10		< 10		< 10		< 10	
1,2-Dichloroethene (total)	5		< 10		< 10		< 10		< 10	
Chloroform	7		< 10		< 10		< 10		< 10	
1,2-Dichloroethane	5		< 10		< 10		< 10		< 10	
2-Butanone	50		< 10		< 10		< 10		< 10	
1,1,1-Trichloroethane	5		< 10		< 10		< 10		< 10	
Carbon Tetrachloride	5		< 10		< 10		< 10		< 10	
Bromodichloromethane	50		< 10		< 10		< 10		< 10	
1,2-Dichloropropane	5		< 10		< 10		< 10		< 10	
cis-1,3-Dichloropropene	5		< 10		< 10		< 10		< 10	
Trichloroethene	5		< 10		< 10		< 10		< 10	
Dibromochloromethane	5		< 10		< 10		< 10		< 10	
1,1,2-Trichloroethane	5		< 10		< 10		< 10		< 10	
Benzene	0.7		< 10		< 10		< 10		< 10	
trans-1,3-Dichloropropene	5		< 10		< 10		< 10		< 10	
Bromoform	50		< 10		< 10		< 10		< 10	
4-Methyl-2-Pentanone	50		< 10		< 10		< 10		< 10	
2-Hexanone	50		< 10		< 10		< 10	J	< 10	
Tetrachloroethene	5		< 10		< 10		< 10		< 10	
1,1,2,2-Tetrachloroethane	5		< 10		< 10		< 10		< 10	
Toluene	5		< 10		< 10		< 10		< 10	
Chlorobenzene	5		< 10		< 10		< 10		< 10	
Ethylbenzene	5		< 10		< 10		< 10		< 10	
Styrene	5		< 10		< 10		< 10		< 10	
Xylene (total)	5		< 10		< 10		< 10		< 10	
Vinyl Acetate	--		< 10		< 10		< 10		< 10	
2-Chloroethylvinylether	--		< 10		< 10		< 10		< 10	
1,1,2-Trichlorotrifluoroethane	--		< 10		< 10		< 10		< 10	
Sum of Constituents			**3**		**1**		**2**		**2**	

SVE	Soil Vapor Extraction
(1)	New York State Department of Environmental Conservation (NYSDEC) Standards, Criteria, and Guidance Values (SCGs) included in the Final Groundwater Feasibility Study, (ARCADIS Geraghty & Miller, Inc. 2000).
ug/L	Micrograms per liter.
J	Estimated value.
	Bold type indicates a detection
B	Consitituent detected in associated blank sample.
EQ	Equipment
	Constituent exceeds associated SCG value.
--	No standard available.

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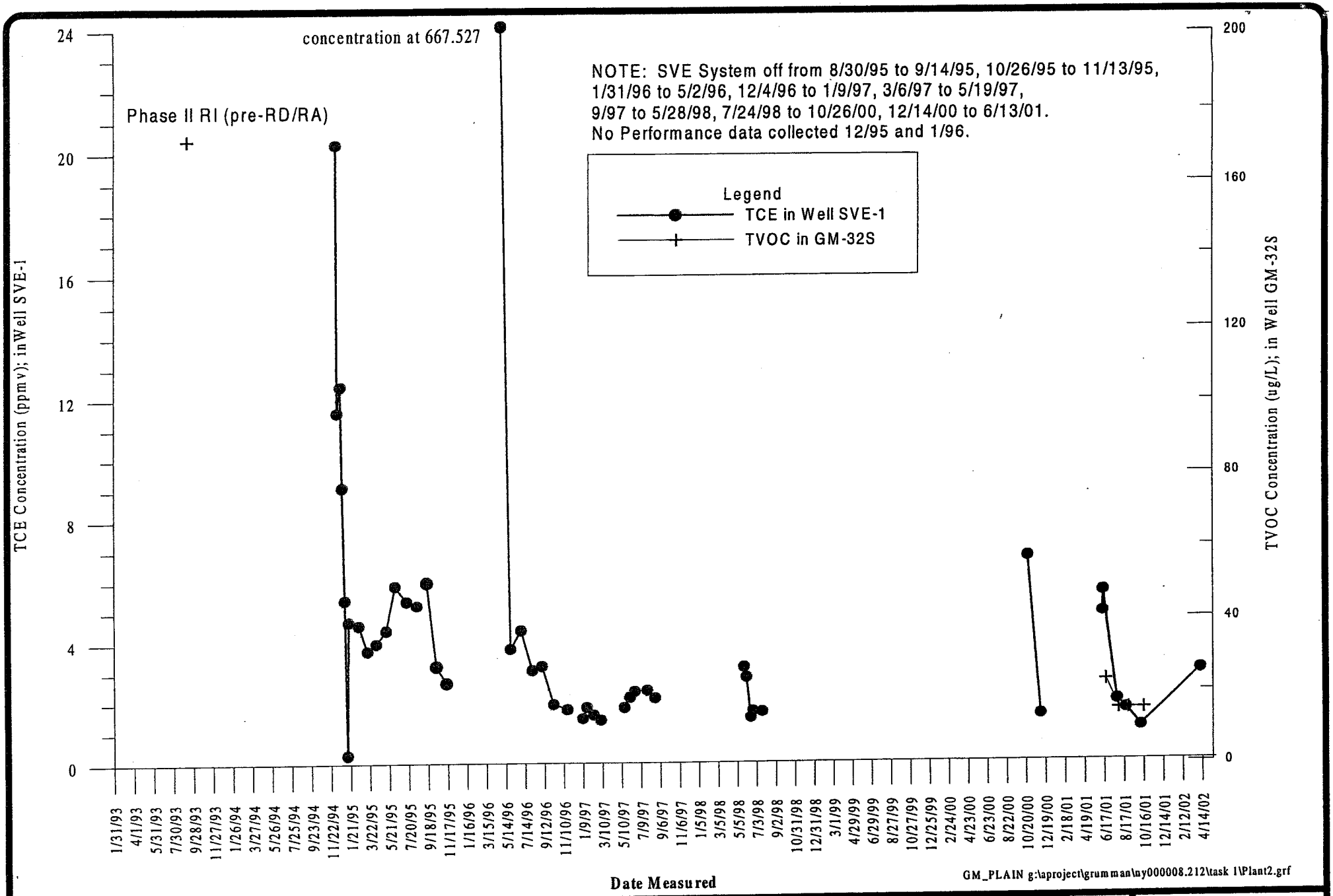
Table 2. Concentrations of Volatile Organic Compounds in Groundwater Samples, Plant 2 SVE Area, Northrop Grumman Corporation, Bethpage, New York.

Constituent (units in ug/L)	NYSDEC Standards Criteria and Guidance Values(1)	Site ID: / Sample ID: / Sample Date:	EQ. BLANK FB072601 7/26/01			EQ. BLANK FB082301 8/23/01		
Chloromethane	5		<	10		<	10	
Bromomethane	5		<	10		<	10	
Vinyl Chloride	2		<	0.20		<	0.20	J
Chloroethane	5		<	10		<	10	
Methylene Chloride	5			1	JB		1	J
Acetone	50		<	10		<	10	J
Carbon Disulfide	50		<	10		<	10	
1,1-Dichloroethene	5		<	10		<	10	
1,1-Dichloroethane	5		<	10		<	10	
1,2-Dichloroethene (total)	5		<	10		<	10	
Chloroform	7		<	10		<	10	
1,2-Dichloroethane	5		<	10		<	10	
2-Butanone	50		<	10		<	10	
1,1,1-Trichloroethane	5		<	10		<	10	
Carbon Tetrachloride	5		<	10		<	10	
Bromodichloromethane	50		<	10		<	10	
1,2-Dichloropropane	5		<	10		<	10	
cis-1,3-Dichloropropene	5		<	10		<	10	
Trichloroethene	5		<	10		<	10	
Dibromochloromethane	5		<	10		<	10	
1,1,2-Trichloroethane	5		<	10		<	10	
Benzene	0.7		<	10		<	10	
trans-1,3-Dichloropropene	5		<	10		<	10	
Bromoform	50		<	10		<	10	
4-Methyl-2-Pentanone	50		<	10		<	10	
2-Hexanone	50		<	10		<	10	J
Tetrachloroethene	5		<	10		<	10	
1,1,2,2-Tetrachloroethane	5		<	10		<	10	
Toluene	5		<	10		<	10	
Chlorobenzene	5		<	10		<	10	
Ethylbenzene	5		<	10		<	10	
Styrene	5		<	10		<	10	
Xylene (total)	5		<	10		<	10	
Vinyl Acetate	--		<	10		<	10	
2-Chloroethylvinylether	--		<	10		<	10	
1,1,2-Trichlorotrifluoroethane	--		<	10		<	10	
Sum of Constituents				1			1	

SVE	Soil Vapor Extraction
(1)	New York State Department of Environmental Conservation (NYSDEC) Standards, Criteria, and Guidance Values (SCGs) included in the Final Groundwater Feasibility Study, (ARCADIS Geraghty & Miller, Inc. 2000).
ug/L	Micrograms per liter.
J	Estimated value.
	Bold type indicates a detection
B	Consitituent detected in associated blank sample.
	Constituent exceeds associated SCG value.
--	No standard available.



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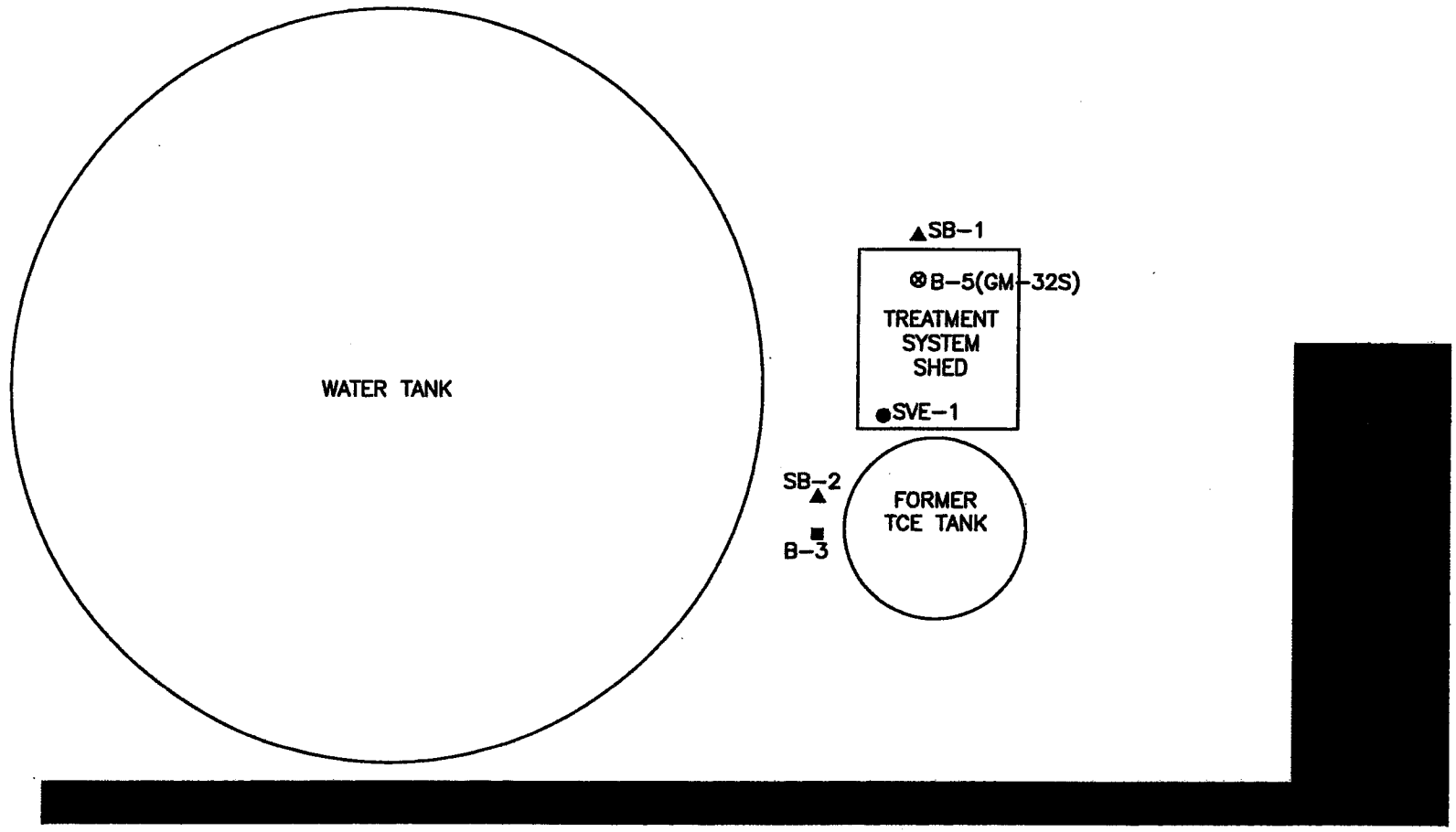
Concentration of Trichloroethene in Soil Gas and TVOC in Groundwater vs. Time, Northrop Grumman Corporation, Bethpage, New York.

FIGURE 1

LEGEND

- ● EXISTING SOIL VAPOR EXTRACTION WELL
- ⊗ PREVIOUSLY INSTALLED SOIL BORING/MONITORING WELL
- ▲ PROPOSED SOIL BORING LOCATION
- ■ PREVOIUSLY INSTALLED SOIL BORING



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0 10
SCALE IN FEET

ARCADIS GERAGHTY & MILLER

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	5/24/01	C. SANGIOVANNI	N. VALKENBERG
		LEAD DESIGN PROF.	CHECKED
			K. ZEGEL
		PROJECT NUMBER	DRAWING NUMBER
			2

PROPOSED SOIL BORING LOCATIONS

NORTHROP GRUMMAN
BETHPAGE, NEW YORK