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NSB NEW LONDON
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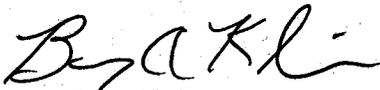
**MONTHLY OPERATIONS SUMMARY
FOR THE NAVAL EXCHANGE (NEX) AND DOLPHIN MART
AIR SPARGING/SOIL VAPOR EXTRACTION SYSTEMS
AND OT-8 PASSIVE FREE PRODUCT RECOVERY SYSTEM**

NEW LONDON SUBMARINE BASE
GROTON, CONNECTICUT

Month: April 1997

Prepared By:

Fluor Daniel GTI, Inc.
Prepared by:



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Lead Engineer

Foster Wheeler Environmental Corp.
Reviewed by:



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Environmental Site Technical Manager

OPERATIONAL SUMMARY

DOLPHIN MART AIR SPARGE/SVE SYSTEM

System Status - The remediation system at the site has been operating since June 29, 1996. As of April 24, 1997 thirteen (13) horizontal trenches (VET-1, VET-2, VET-3, VET-4, VET-5, VET-6, VET-7, VET-8, VET-9, VET-10, VET-11, VET-12, and VET-17) and seven (7) air sparge points (ASP-A, ASP-B, ASP-C, ASP-D, ASP-E, ASP-F, and ASP-G) were operating. VET-13 through VET-16 are not operating due to flooding of the lower section of the main trunk line. Air sparge points ASP-H through ASP-Q cannot be operated without VET-13 through VET-16 operating. The SVE system is currently extracting subsurface air at a flow rate of approximately 450 scfm. The air sparge system is currently injecting air at a flow rate of approximately 30 scfm. The Hersey air flow meters are scheduled for repair May 1, 1997. A site map has been included as **Figure 1**. The site visit forms for O&M conducted during the month of April, 1997 are included in **Attachment 1**. A weekly break-down of the monthly field activities has been included as **Attachment 2**.

Mass Removal - The total hydrocarbon mass removal rate, based on the SVE system influent sample collected April 17, 1997, was 0.025 lbs/hour. During the period from March 27, 1997 to April 17, 1997 approximately 14 lbs of hydrocarbons were extracted by the remediation system. The total hydrocarbon mass extracted by the remediation system, as of April 17, 1997, was approximately 1,243 lbs. The system database has been included in **Attachment 3**. Mass removal graphs have been included as **Figures 3A, 3B and 4**. Based on the hydrocarbon mass removal rate, no exceedance of CTDEP air quality guidelines was observed.

Carbon Usage - A summary of the historical vapor phase carbon usage at the site has been included as **Attachment 4**. The last carbon change at the site occurred August 27, 1996.

Discharge Monitoring Sampling - Discharge monitoring sampling was completed April 17, 1997. The Discharge Monitoring Report (DMR) will be generated following receipt of the laboratory analytical data. The DMR for samples collected February 26, 1997 was submitted April 3, 1997.

Monitoring Well Gauging - The site monitoring wells were gauged April 17, 1997. Depth to groundwater at the site ranged from 1.30 feet in WE-6 to 5.25 feet in HRP-10. Historical well gauging data has been included in **Attachment 5**.

Monitoring Well Sampling - Monitoring well sampling was completed on February 18, 1997. The Quarterly Groundwater Sampling report was issued March 13, 1997. The next quarterly sampling event is scheduled for May, 1997. The historical groundwater sampling results have been summarized in **Attachment 6**.

Additional Activities - None

NEX AIR SPARGE/SVE SYSTEM

System Status - The remediation system at the site has been operating since July 31, 1996. As of April 24, 1997, eight (8) horizontal trenches (VEA-8 through VEA-15) were operating. The remainder of the vapor extraction points are not operating due to high groundwater table elevations limiting the well effectiveness. The air sparge system was activated April 17, 1997. As of April 24, eleven (11) air sparge points (SPB-15 through SPB-25) were operating. The SVE system is currently extracting subsurface air at a flow rate of approximately 460 scfm (from the east system only). A site map has been included as **Figure 2**. The site visit forms for O&M conducted during the month of March, 1997 are included in **Attachment 1**. A weekly break-down of the monthly field activities has been included in **Attachment 2**.

Mass Removal - The total hydrocarbon mass removal rate, based on the SVE system influent sample collected April 17, 1997, was 0.037 lbs/hour. During the period from March 27, 1997 to April 17, 1997 approximately 10 lbs of hydrocarbons were extracted by the remediation system. The total hydrocarbon mass extracted by the remediation system, as of April 17, 1997, is approximately 1,270 lbs. The system database has been included in **Attachment 3**. Mass removal graphs have been included as **Figures 5A, 5B and 6**. Based on the hydrocarbon mass removal rate, no exceedance of CTDEP air quality guidelines was observed.

Carbon Usage - A summary of the historical vapor phase carbon usage at the site has been included as **Attachment 4**. The carbon units at the site were taken off-line September 4, 1996.

Discharge Monitoring Sampling - Discharge monitoring sampling was completed April 17, 1997. The Discharge Monitoring Report (DMR) will be generated following receipt of the laboratory analytical data. The DMR for samples collected February 26, 1997 was submitted April 3, 1997.

Monitoring Well Gauging - The site monitoring wells were last gauged on April 17, 1997. Depth to groundwater at the site ranged from 2.73 feet in ERM-5 to 7.91 feet in OBG-2. During the well gauging, light non-aqueous phase liquid (LNAPL) was detected in monitoring well OBG-9 at a thickness of 0.63 inches. Beginning in May, 1997, LNAPL will be bailed and placed in a labeled drum within the OT-8 drum storage enclosure. Historical well gauging data has been included in **Attachment 5**.

Monitoring Well Sampling - Monitoring well sampling was completed on February 18, 1997. The Quarterly Groundwater Sampling report was issued March 13, 1997. The next quarterly sampling event is scheduled for May, 1997. The historical groundwater sampling results have been summarized in **Attachment 6**.

Additional Activities - On April 15, an attempt was made to activate the air sparge system. During the first three hours, 495.4 gallons of water was extracted from the system. By the end the day on April 15, 1997, 1,291.3 gallons of water had been extracted by the SVE blowers. On April 24, 1997 the SVE system was activated using only those wells which had an exposed screen interval. The air sparge points within the influence of the activated SVE points were utilized. The system continued to shut down due to water accumulation within the moisture separators. The AS/SVE system is currently operating at the NEX site, but shuts down after several hours of operation due to water accumulation in the moisture traps. Following system shut down, manual restart of the system is required.

OT-8 PASSIVE FREE PRODUCT RECOVERY SYSTEM

System Status - The OT-8 passive free product recovery system was activated on September 28, 1996. During the month of April, the system remained deactivated due to a high groundwater table which prohibited system operation.

Product Recovery - As of April 24, 1997 a total of approximately 4 gallons of LNAPL have been recovered by the system. The fluctuating groundwater table around MW-7 may lead to smearing of the LNAPL. It is anticipated that during periods of extended lower water table elevations LNAPL recovery will resume. A copy of the well construction log for MW-7 has been included as Attachment 7. *Please note: The screen interval of MW-7 begins at five feet below grade.*

Monitoring Well Gauging - MW-7 was gauged on April 17, 1997. At that time the depth to LNAPL was 3.12 feet below grade and the depth to groundwater was 3.34 feet below grade. Historical gauging data for MW-7 is included in Attachment 5.

Additional Activities - None.

FIGURES

REVISIONS			
NO.	DESCRIPTION	PREP BY	DATE APPROVED

HIGHEST RECORDED GROUND WATER ELEVATIONS

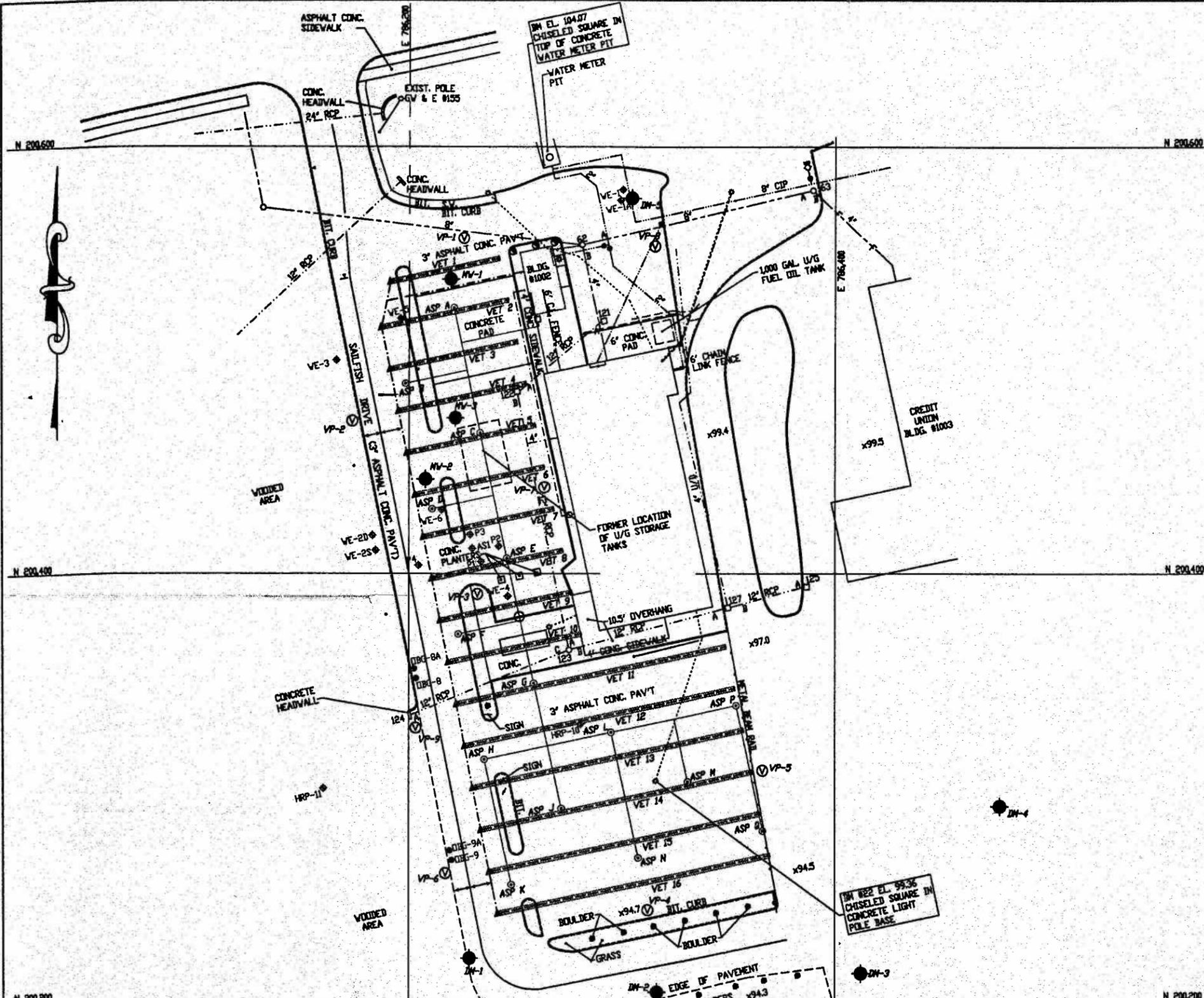
WELL NO.	GROUNDWATER ELEVATION
VE-1A	96.84
VE-2S	94.25
VE-2D	94.31
VE-3	93.93
VE-4	94.11
VE-5	95.40
VE-6	95.41
DBG-8A	93.70
DBG-9A	94.80
HRP-10	93.5 (ESTIMATED)
HRP-11	92.5 (ESTIMATED)

NOTE:
GROUND WATER DATA SHOWN ON PLANS ARE APPROXIMATELY AS SHOWN FOR BIDDING PURPOSES. ACTUAL WELL ELEVATIONS TO BE DETERMINED IN THE FIELD BY THE CONTRACTOR.

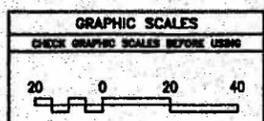
SOIL VAPOR EXTRACTION TRENCH PIPE ELEVATIONS - DOLPHIN MART

TRENCH NO.	INV. ELEV. 6" VAPOR COLLECTION PIPE	INV. ELEV. 2" PIPE @ WEST END OF TRENCH	INV. ELEV. 2" PIPE @ EAST END OF TRENCH
VET 1	94.64	99.41	99.46
VET 2	94.64	98.80	98.85
VET 3	94.48	98.19	98.24
VET 4	94.32	97.50	97.62
VET 5	94.16	96.78	97.30
VET 6	94.00	96.20	97.20
VET 7	93.84	95.65	97.00
VET 8	93.68	95.13	96.80
VET 9	93.52	94.62	96.60
VET 10	93.36	93.52	96.40
VET 11	93.20	93.37	95.80
VET 12	93.04	93.23	95.22
VET 13	92.88	93.09	94.64
VET 14	92.72	92.95	94.04
VET 15	92.56	92.80	93.56
VET 16	92.40	92.66	93.08

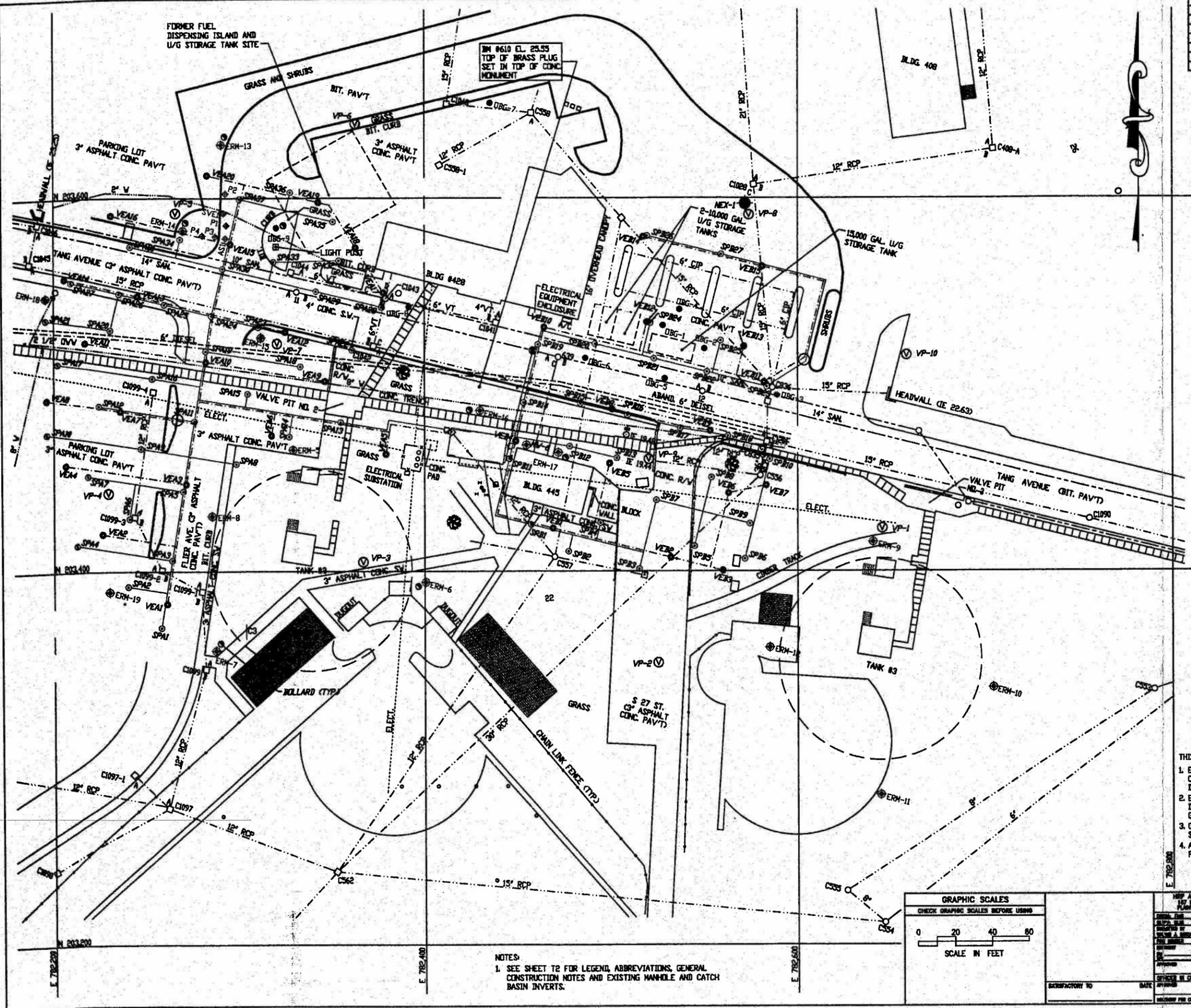
NOTES:
1. SEE SHEET T2 FOR LEGEND, ABBREVIATIONS, GENERAL CONSTRUCTION NOTES AND EXISTING MANHOLE AND CATCH BASIN INVERTS.



THIS MAP WAS PREPARED FROM MAPS LISTED BELOW:
 1. NAUTILUS PARK, GROTON, CONN. EXISTING UTILITIES MAPS PREPARED BY CILLIDAN ENGINEERING CO., INC. SCALE 1"=40' DATE 3/25/83 NAVFAC DRAWING NOS. 2,064,332, 2,064,333 AND 2,064,374.
 2. MONITOR WELL LOCATION AND GROUND WATER CONTOUR MAP OF JANUARY 21, 1992 DOLPHIN MART SITE US SUBBASE, GROTON, CT. PREPARED BY DDM-NORTHEAST SCALE 1"=20' APRIL, 1992.
 3. UTILITY DATA FROM AS-BUILT DRAWINGS AND UTILITY MAPS EXACT LOCATIONS MUST BE VERIFIED IN FIELD.
 4. ALL TOPOGRAPHIC FEATURES AND INVERTS SHOWN HEREIN SHALL BE FIELD VERIFIED.



NEW ASSOCIATES, INC. 107 WEST BROADWAY HARTFORD, CT 06103	DEPARTMENT OF THE NAVY NAVAL SURFACE FORCE NAVAL SUBMARINE BASE NEW LONDON, CONNECTICUT	CIVIL ENGINEERING REMEDIATION OF CONTAMINATED SOIL/GROUND WATER FIGURE 1 - SITE PLAN DOLPHIN MART
PROJECT NO. 80091 SHEET NO. 2166440 DATE	SHEET NO. 2166440 SHEET NO. C2-1	SHEET NO. 2166440 SHEET NO. C2-1



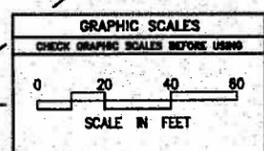
REVISIONS			
NO.	DESCRIPTION	PREP'D BY	DATE

HIGHEST RECORDED GROUND WATER ELEVATION			
WELL NO.	GROUND WATER EL.	WELL NO.	GROUND WATER EL.
DBG-1	16.73	ERN-18	16.97
DBG-2	17.09	ERN-19	16.06
DBG-4	16.63	ERN-1	17.09
DBG-5	16.85	ERN-2	16.31
DBG-6	16.76	ERN-3	14.76
DBG-7	18.40	ERN-4	16.86
DBG-9	17.96	ERN-5	17.78
DBG-9	17.63	ERN-6	16.79
ERN-10	18.68	ERN-7	15.81
ERN-11	17.84	ERN-8	17.14
ERN-12	16.69	ERN-9	17.00
ERN-13	17.58		
ERN-14	17.46		
ERN-15	17.59		
ERN-16	17.71		
ERN-17	16.91		

NOTE:
GROUND WATER DATA SHOWN ON PLANS ARE APPROXIMATELY AS SHOWN FOR BIDDING PURPOSES. ACTUAL WELL ELEVATIONS TO BE DETERMINED IN FIELD BY CONTRACTOR.

- THIS MAP WAS PREPARED FROM MAPS LISTED BELOW:
- EXISTING TOPOGRAPHY FROM MAP BY JAMES S. MINGES & ASSOCIATES, CARLSON & SWEATT FARMINGTON, CT & NEW YORK, N.Y. DATED 31 DEC. 1974.
 - EXISTING UTILITIES FROM 40 SCALE UTILITY MAPS SUPPLIED BY THE DEPARTMENT OF PUBLIC WORKS, NAVAL SUBMARINE BASE, NEW LONDON, GROTON, CT.
 - GROUND WATER ANALYTICAL RESULTS, JANUARY, 1992 NEX STATION SITE US SUBBASE, GROTON, CT PREPARED FOR ERN-PHC.
 - ALL TOPOGRAPHIC FEATURES AND INVERTS SHOWN HEREIN SHALL BE FIELD VERIFIED.

NOTES:
1. SEE SHEET T2 FOR LEGEND, ABBREVIATIONS, GENERAL CONSTRUCTION NOTES AND EXISTING MANHOLE AND CATCH BASIN INVERTS.



MAP ASSOCIATES, INC. 107 NEW BRIDGE AVENUE PLAINFIELD, NJ 07060 PHONE: 908-859-1111 FAX: 908-859-1112	DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND PLANNING & DESIGN NORTHERN DIVISION NEW LONDON, CONNECTICUT REMEDIATION OF CONTAMINATED SOIL/GROUND WATER FIGURE 2 - SITE PLAN NAVAL EXCHANGE (NEX)	DRAWING NO. F 80091	DRAWING NO. 2166439	SHEET NO. C1-1
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Figure 3A- Mass Removal Rate
Dolphin Mart Site, New London Naval Submarine Base, Groton, CT

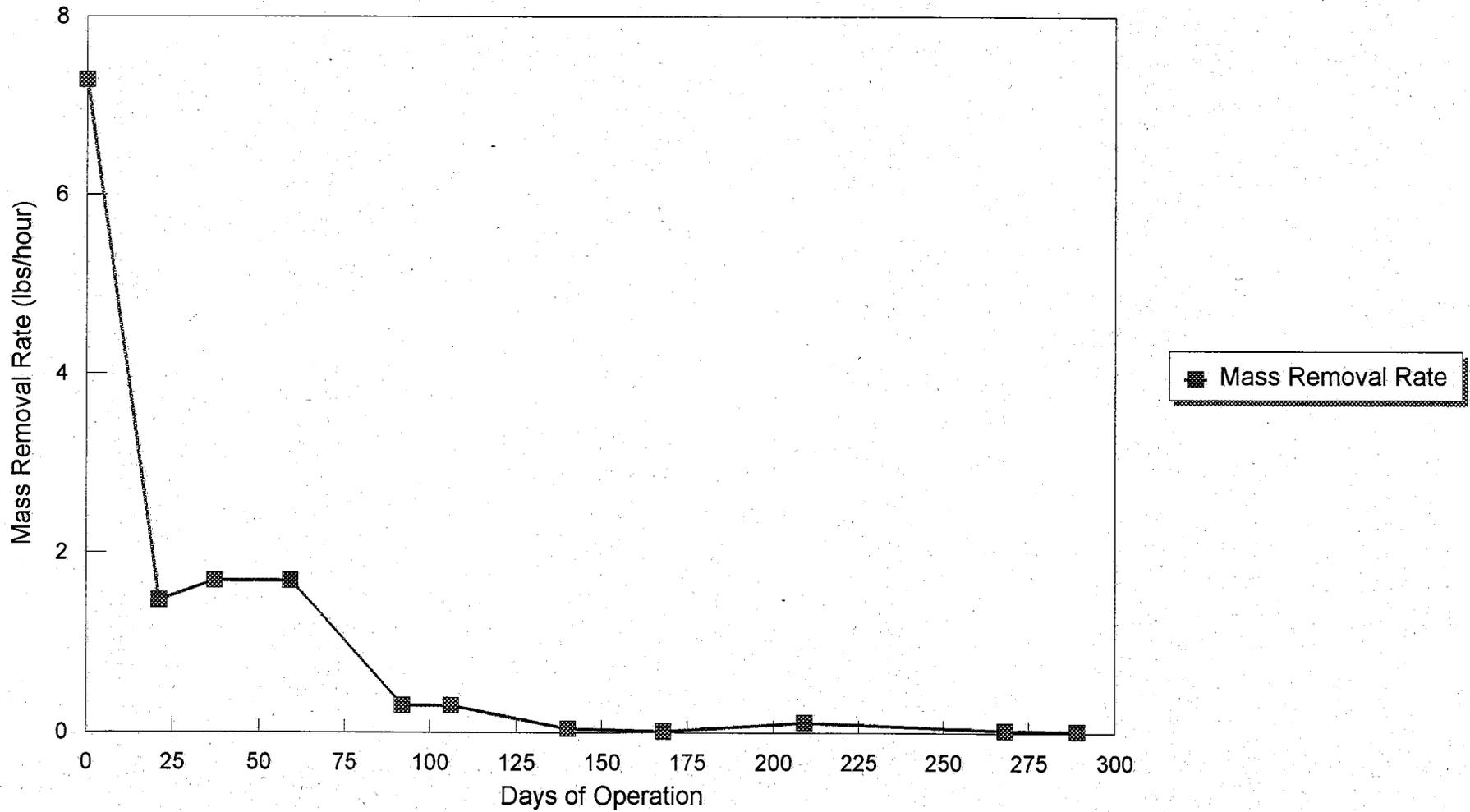


Figure 3B- Mass Removal Rate

Dolphin Mart Site, New London Naval Submarine Base, Groton, CT

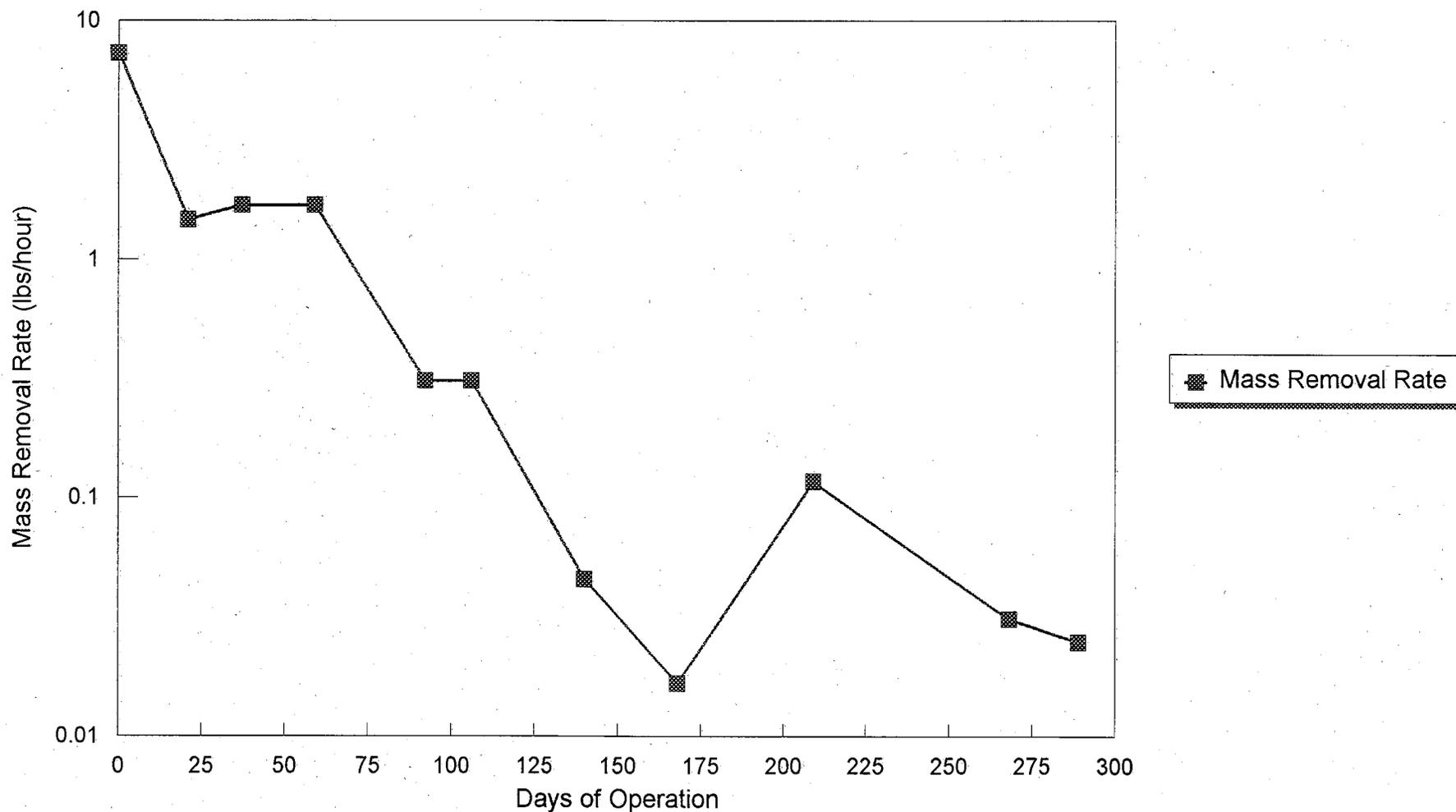


Figure 4 - Cumulative Mass Removed versus Time

Dolphin Mart Site, New London Naval Submarine Base, Groton, CT

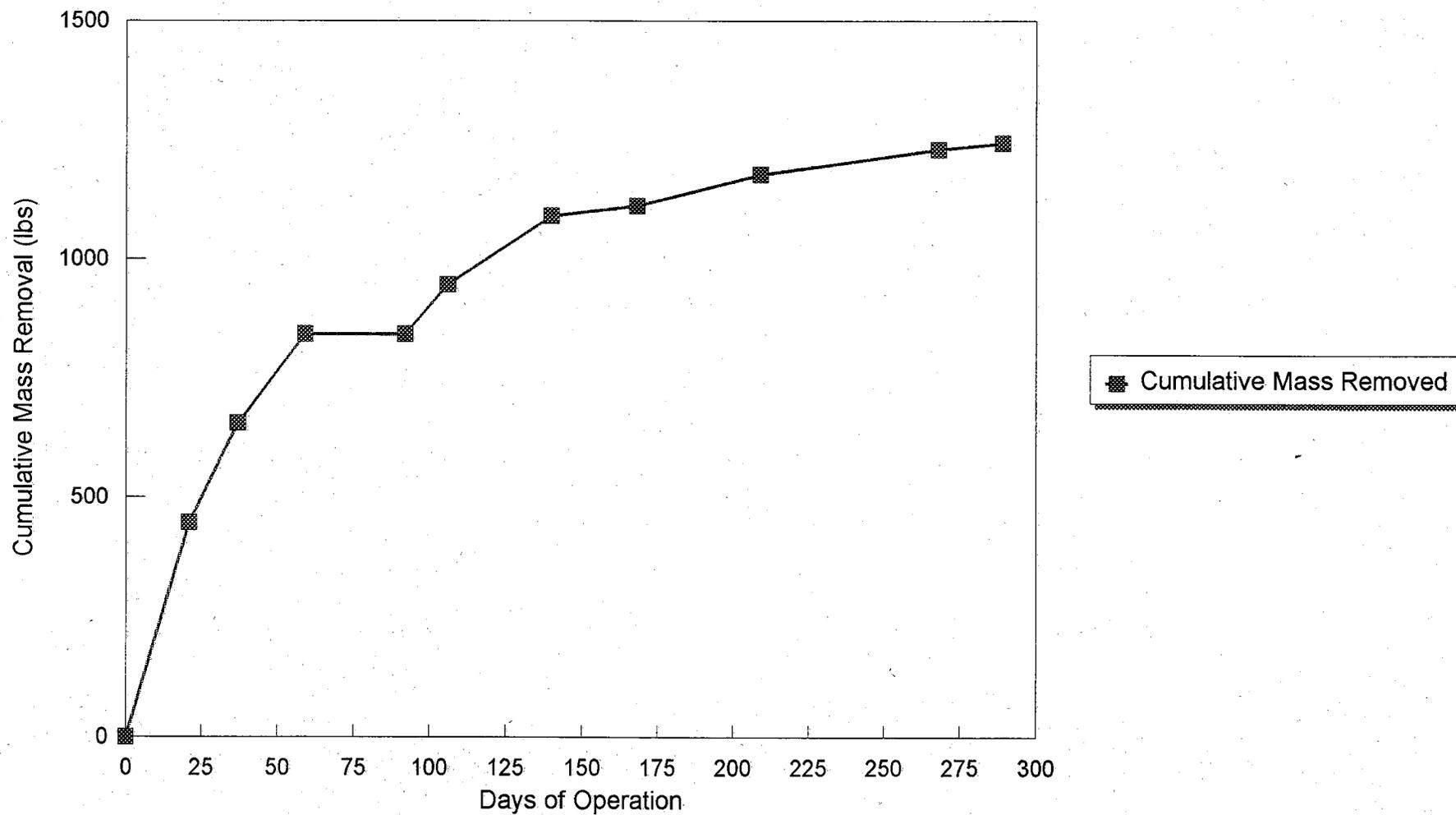
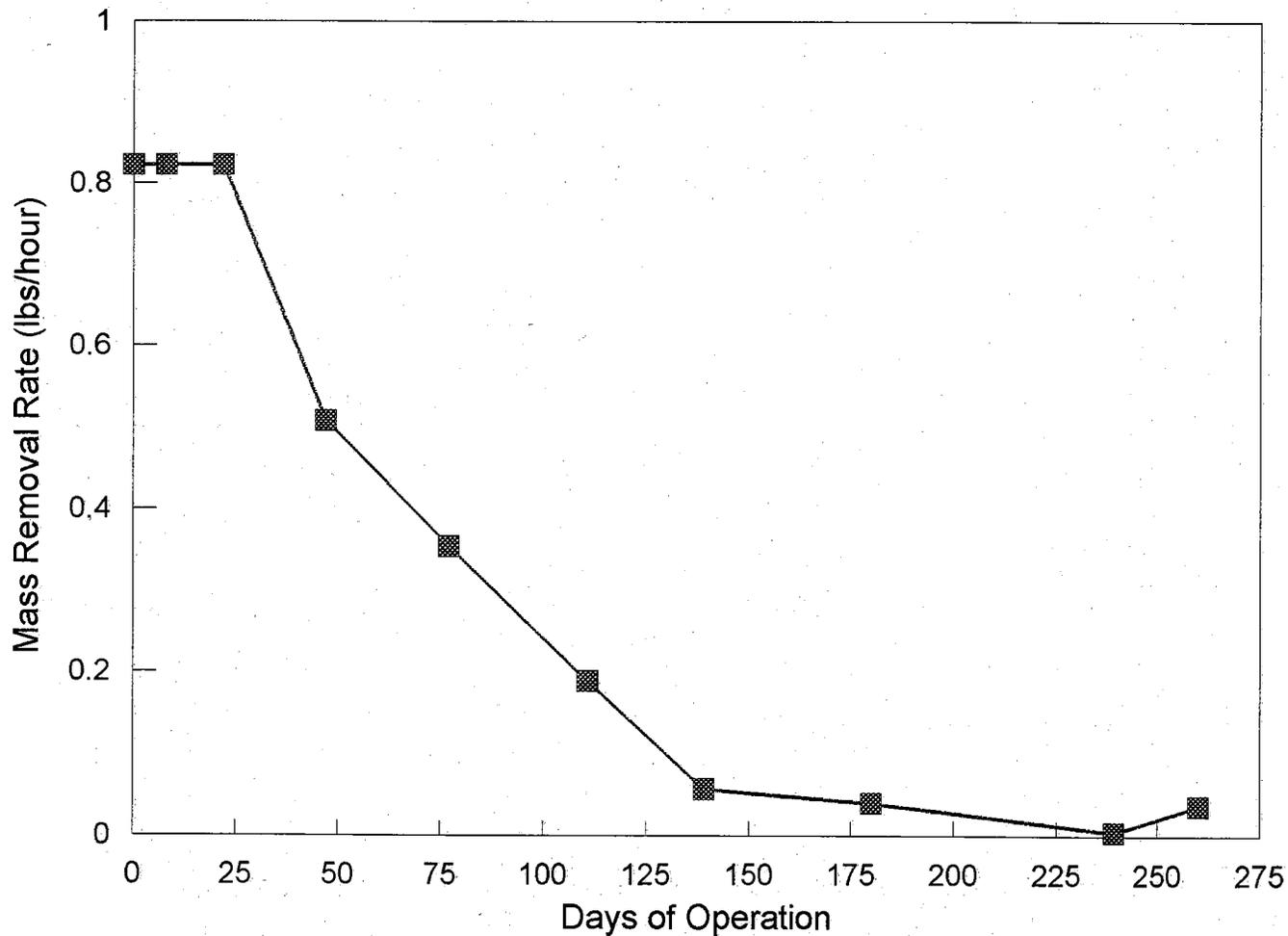


Figure 5A - Mass Removal Rate

NEX Site, New London Naval Submarine Base, Groton, CT



■ Mass Removal Rate

Figure 5B - Mass Removal Rate

NEX Site, New London Naval Submarine Base, Groton, CT

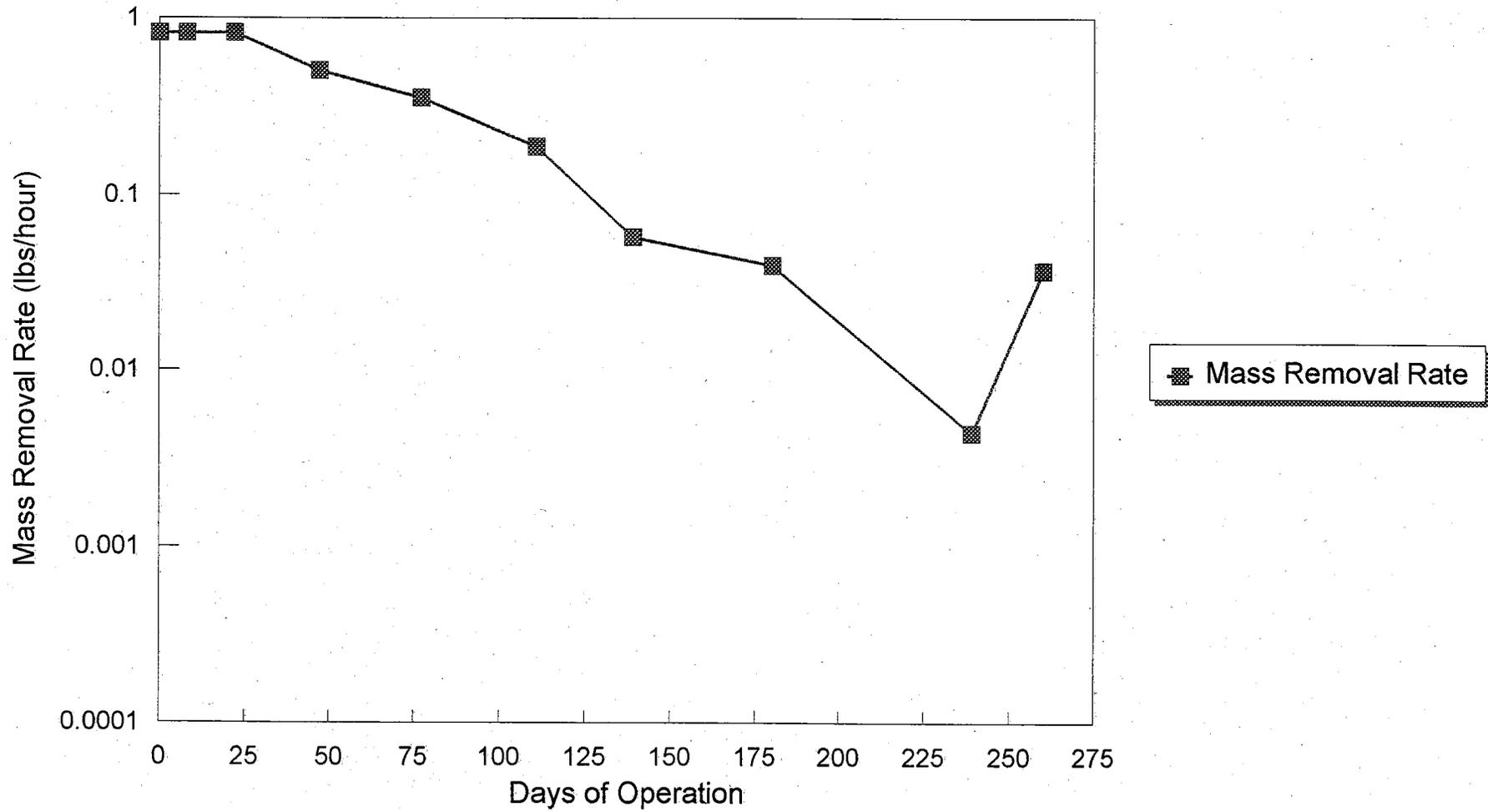
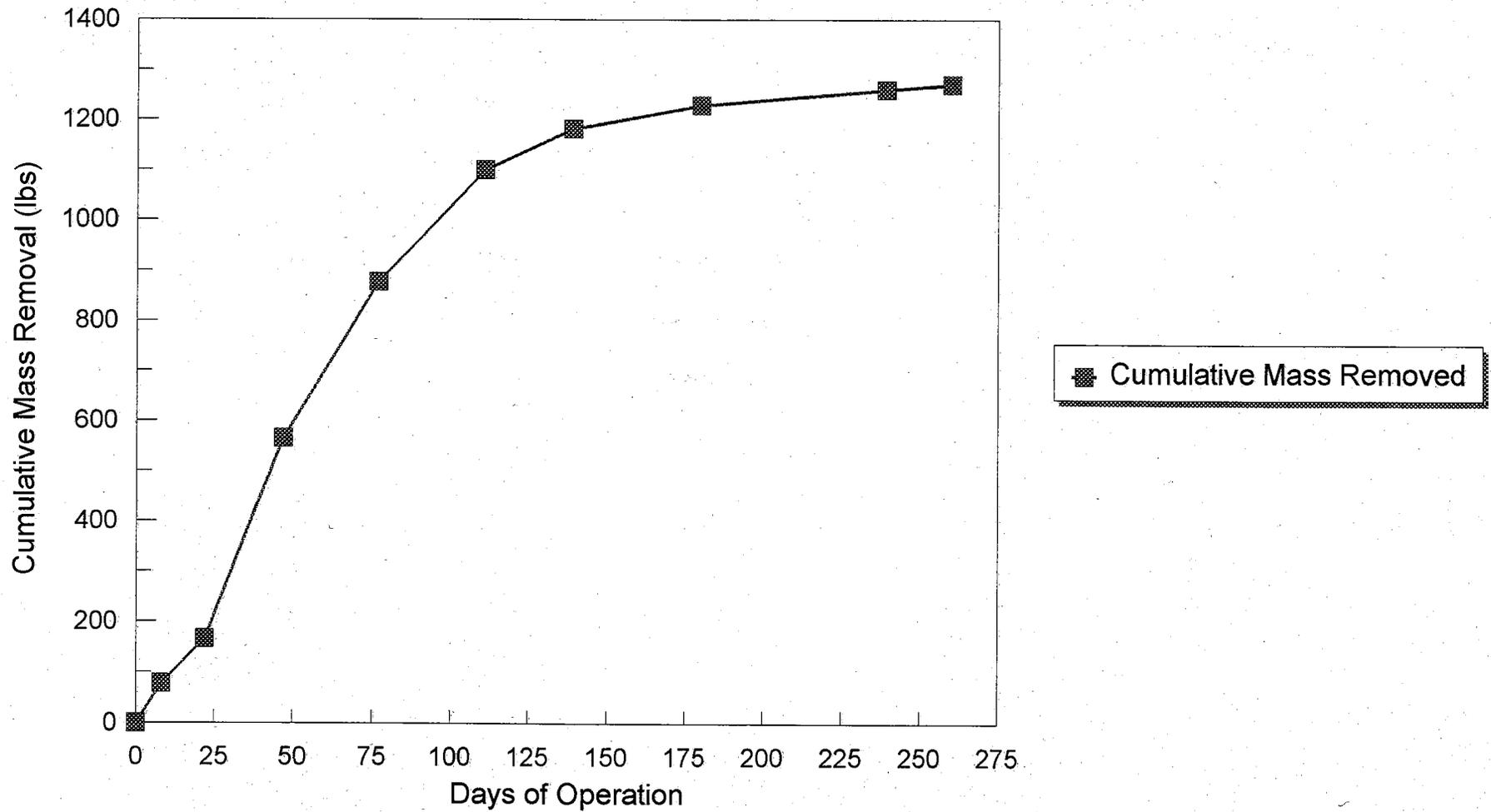


Figure 6 - Cumulative Mass Removed versus Time

NEX Site, New London Naval Submarine Base, Groton, CT



ATTACHMENT 1
SITE VISIT FORMS

OPERATIONAL DATA FORM
Air Sparging/Soil Vapor Extraction System
Naval Exchange
Naval Submarine Base -Groton, CT
Project #83001-9999

Date: 4.17.97
 Time: 14:00
 Technician: WCO / JKR

AIR COMPRESSOR SYSTEM

Flow Rate	SCFM	Total Flow	SCFM
Air Compressor C-1		Air Compressor C-2	
Pressure _____ psi		Pressure _____ psi	
Temperature _____ °F		Temperature _____ °F	
Flow Control Valve Setting _____		Flow Control Valve Setting _____	
Bleed Valve _____		Bleed Valve _____	
Radiator <u>ON/OFF</u>		Radiator <u>ON/OFF</u>	

SOIL VAPOR EXTRACTION SYSTEM

Eastern Flow Rate	<u>460</u> SCFM	Total Flow	<u>34038300</u> SCFM
Western Flow Rate	<u>261</u> SCFM	Total Flow	<u>12356679</u> SCFM
Vacuum Pump V-1	<u>off</u>	Vacuum Pump V-2	<u>-5.5</u> °Hg
Vacuum _____ °Hg		Vacuum _____ °F	<u>196</u>
Temperature _____ °F		Particulate Filter _____	
Particulate Filter _____		Flow Control Valve Setting _____	<u>100</u>
Flow Control Valve Setting _____		Bleed Air Valve Setting _____	<u>0</u>
Bleed Air Valve Setting _____		Liquid Level _____	
Liquid Level _____		Vacuum Pump V-4	<u>-6</u> °Hg
Vacuum Pump V-3	<u>-5 1/2</u> °Hg	Vacuum _____ °F	<u>156</u>
Vacuum _____ °F	<u>100</u>	Temperature _____	
Temperature _____ °F		Particulate Filter _____	
Particulate Filter _____		Flow Control Valve Setting _____	<u>100</u>
Flow Control Valve Setting _____	<u>100</u>	Bleed Air Valve Setting _____	<u>40</u>
Bleed Air Valve Setting _____	<u>1070</u>	Liquid Level _____	
Liquid Level _____			

ACTIVATED CARBON ADSORPTION SYSTEM

Carbon Adsorber A/B	<u>11.6</u> ppm	Carbon Adsorber C/D	<u>6.5</u> ppm
Inf. VOC Level _____	<u>12.2</u> psi in H ₂ O	Inf. VOC Level _____	<u>6.8</u> ppm in H ₂ O
Inf. Pressure _____		Inf. Pressure _____	
Mid. VOC Level _____	<u>16.1</u> ppm	Mid. VOC Level _____	
Mid. Pressure _____	<u>5.6</u> psi in H ₂ O	Mid. Pressure _____	
Eff. VOC Level _____	<u>9.8</u> ppm	Eff. VOC Level _____	
Change out Date _____		Change out Date _____	

WATER TREATMENT

Flowmeter Reading 34596 Gallons

COMMENTS

OPERATIONAL DATA FORM
Air Sparging/Soil Vapor Extraction System
Dolphin Mart
Naval Submarine Base -Groton, CT
Project #83001-9999

Date: 4.17.97
 Time: _____
 Technician: JK JR.

AIR COMPRESSOR SYSTEM

Flow Rate	SCFM	Total Flow	SCFM
Air Compressor C-1		Air Compressor C-2	
Pressure <u>10</u> psi		Pressure _____ psi	
Temperature <u>130</u> °F		Temperature _____ °F	
Flow Control Valve Setting <u>100 %</u>		Flow Control Valve Setting _____	
Bleed Valve <u>50 %</u>		Bleed Valve _____	
Radiator <input checked="" type="radio"/> ON <input type="radio"/> OFF		Radiator <input type="checkbox"/> ON <input type="checkbox"/> OFF	

SOIL VAPOR EXTRACTION SYSTEM

Flow Rate	SCFM	Total Flow	SCFM
Vacuum Pump V-1		Vacuum Pump V-2	
Vacuum <u>2.5</u> °Hg		Vacuum <u>1.5</u> °Hg	
Temperature <u>136</u> °F		Temperature <u>130</u> °F	
Particulate Filter <u>OK</u>		Particulate Filter <u>OK</u>	
Flow Control Valve Setting <u>100 %</u>		Flow Control Valve Setting <u>100 %</u>	
Bleed Air Valve Setting <u>25 %</u>		Bleed Air Valve Setting <u>25 %</u>	
Liquid Level _____		Liquid Level _____	
Vacuum Pump V-3		Vacuum Pump V-4	
Vacuum _____ °Hg		Vacuum _____ °Hg	
Temperature _____ °F		Temperature _____ °F	
Particulate Filter _____		Particulate Filter _____	
Flow Control Valve Setting _____		Flow Control Valve Setting _____	
Bleed Air Valve Setting _____		Bleed Air Valve Setting _____	
Liquid Level _____		Liquid Level _____	

ACTIVATED CARBON ADSORPTION SYSTEM

Carbon Adsorber A/B		Carbon Adsorber C/D	
Inf. VOC Level _____ ppm		Inf. VOC Level <u>4.68.7</u> ppm	
Inf Pressure _____ psi		Inf Pressure <u>65</u> psi	
Mid. VOC Level _____ ppm		Mid. VOC Level <u>10.6</u> ppm	
Mid Pressure _____ psi		Mid Pressure <u>7.3</u> psi	
Eff. VOC Level _____ ppm		Eff. VOC Level _____ ppm	
Change out Date _____		Change out Date <u>8-22-96</u>	

WATER TREATMENT

Flowmeter Reading _____ Gallons

COMMENTS

29993

OPERATIONAL DATA FORM
Air Sparging/Soil Vapor Extraction System
Dolphin Mart
Naval Submarine Base - Groton, CT
Project #83001-9999

Date: 4-24-97
 Time: 8:30 Am
 Technician: CSG/DAL

AIR COMPRESSOR SYSTEM

Flow Rate	<u>14-15</u>	SCFM	Total Flow	<u>458247.</u>	SCFM
Air Compressor C-1 Pressure <u>9.5</u> psi Temperature <u>138.</u> °F Flow Control Valve Setting <u>100% OPEN</u> Bleed Valve <u>90%</u> Radiator <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF			 Air Compressor C-2 Pressure _____ psi Temperature _____ °F Flow Control Valve Setting _____ Bleed Valve _____ Radiator <input type="checkbox"/> ON <input type="checkbox"/> OFF 		

SOIL VAPOR EXTRACTION SYSTEM

Flow Rate		SCFM	Total Flow		SCFM
Vacuum Pump V-1 Vacuum <u>3"</u> Hg Temperature <u>138.</u> °F Particulate Filter <u>NA</u> Flow Control Valve Setting <u>100% OPEN</u> Bleed Air Valve Setting <u>90%</u> Liquid Level <u>DRAINED</u>			Vacuum Pump V-2 Vacuum <u>2"</u> Hg Temperature <u>132.</u> °F Particulate Filter <u>NA</u> Flow Control Valve Setting <u>100% OPEN</u> Bleed Air Valve Setting <u>50%</u> Liquid Level <u>DRAINED</u>		
 Vacuum Pump V-3 Vacuum _____ Hg Temperature _____ °F Particulate Filter _____ Flow Control Valve Setting _____ Bleed Air Valve Setting _____ Liquid Level _____ 			 Vacuum Pump V-4 Vacuum _____ Hg Temperature _____ °F Particulate Filter _____ Flow Control Valve Setting _____ Bleed Air Valve Setting _____ Liquid Level _____ 		

ACTIVATED CARBON ADSORPTION SYSTEM

 Carbon Adsorber A/B Inf. VOC Level _____ ppm Inf Pressure _____ psi Mid. VOC Level _____ ppm Mid Pressure _____ psi Eff. VOC Level _____ ppm Change out Date _____ 			Carbon Adsorber C/D Inf. VOC Level <u>2.9</u> ppm * Inf Pressure <u>22.</u> psi Mid. VOC Level <u>3.2</u> ppm Mid Pressure <u>10.0</u> psi Eff. VOC Level <u>3.4</u> ppm Change out Date _____		
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WATER TREATMENT

Flowmeter Reading 2979.3 Gallons @ 8:40 Am.

COMMENTS

* PID # 1 USED.

ATTACHMENT 2
MONTHLY FIELD ACTIVITY SUMMARY

Field Activity Summary

April 1997

**New London Naval Submarine Base
Groton, Connecticut**

Week Ending	Site	Period	Field Activities¹	Comments
4/13/97	Dolphin Mart	Monthly Monitoring	Conducted Monthly monitoring. Completed DMR sampling.	SVE/air sparge system operating normally.
	NEX		Activated air sparge system. Conducted Monthly monitoring.	High water caused SVE system and air sparge system to shut down.
	OT-8		Conducted Monthly monitoring.	Product recovery system inactive due to high water table.
4/25/97	Dolphin Mart	Monthly Monitoring	No field activities.	SVE/air sparge system operating normally.
	NEX		Activated air sparge system.	High water caused SVE system and air sparge system to shut down.
	OT-8		No field activities.	Product recovery system deactivated due to high water table.

Note: ¹ Monthly operation and maintenance tasks include well gauging and system monitoring.

ATTACHMENT 3

AIR SPARGE/SVE SYSTEM DATABASES

**SYSTEM MONITORING DATA
SOIL VAPOR EXTRACTION/AIR SPARGE SYSTEM**

New London Naval Submarine Base
Dolphin Mart Site
Groton, CT

Date	Day of Operation	Air Sparge Flowrate (scfm)	Extraction Flowrate (scfm)	Extraction Flowrate (cfm)	Influent Concentration BTEX (ppmv)	Removal Rate BTEX (lb/hr)	Influent Concentration MTBE (ppmv)	Removal Rate MTBE (lb/hr)	Influent Concentration Aliphatics (ppmv)	Removal Rate Aliphatics (lb/hr)	Influent Concentration Aromatics (ppmv)	Removal Rate Aromatics (lb/hr)	Influent Concentration TVPH (mg/m3)	Influent Concentration TVPH (ppmv)	Removal Rate TVPH (lb/hr)	Total Mass Removal Rate (lbs/hr)	Period Mass Removed (lbs)	Cumulative Mass Removed (lbs)	Comments
07/02/96	0	25	450	512.26	24.00	0.187	33.00	0.232	1000.00	6.876	0.00	0.000	—	—	0.000	7.295	0.00	0.00	
07/23/96	21	20	449	511.12	11.40	0.091	0.00	0.000	200.00	1.375	0.00	0.000	—	—	0.000	1.467	446.86	446.86	system operated approx. 102 hrs between 7/2 and 7/23
08/08/96	37	32	454	516.81	18.00	0.142	—	0.000	210.00	1.444	12.00	0.102	—	—	0.000	1.687	209.75	656.61	system operated approx. 133 hrs between 7/23 and 8/8
08/30/96	59	0	450	512.26	18.00	0.142	—	0.000	210.00	1.444	12.00	0.102	—	—	0.000	1.687	187.31	843.92	system operated approx. 111 hrs between 8/8 and 8/30
10/02/96	92	30	448	509.98	2.30	0.019	0.00	0.000	—	0.000	—	0.000	NA	36.00	0.287	0.306	0.00	843.92	system not in operation from 8/30 to 10/2 due to flow meter problem
10/16/96	106	30	450	512.26	2.30	0.019	0.00	0.000	—	0.000	—	0.000	NA	36.00	0.287	0.306	102.81	946.74	system reactivated 10/2/96
11/19/96	140	30	450	512.26	0.38	0.003	0.00	0.000	—	0.000	—	0.000	22.00	5.29	0.042	0.045	143.33	1090.06	
12/17/96	168	30	450	512.26	0.12	0.001	0.00	0.000	—	0.000	—	0.000	8.20	1.97	0.016	0.017	20.84	1110.90	
01/27/97	209	30	450	512.26	1.35	0.011	0.00	0.000	—	0.000	—	0.000	55.00	13.23	0.106	0.117	65.56	1176.46	
03/27/97	268	30	450	512.26	0.00	0.000	0.00	0.000	—	0.000	—	0.000	0.00	3.90	0.031	0.031	104.53	1228.73	assume 50% up-time, blowers shutting down due to influent water
04/17/97	289	30	450	512.26	0.00	0.000	0.00	0.000	—	0.000	—	0.000	13.00	3.13	0.025	0.025	14.13	1242.86	

- Notes:
- 1) Aliphatics are weighted using a response factor of hexane. (MW = 86.2)
 - 2) Aromatics are weighted using a response factor of o-xylene. (MW=106.16)
 - 3) Analytical data for 8/30/96 is assumed based on results of sampling conducted 8/8/96. System was deactivated 8/30/96 due to flow meter failure.
 - 4) Flow rate of 10/16/96 through 1/27/97 is assumed. Air flow meter not in operation.
 - 5) Analytical data for 10/2 is assumed based on data from 10/16/96.
 - 6) Beginning 10/16/96 lab analysis was performed by Mitkem Laboratory. Prior to 10/16/96 air analysis performed by NEI/GTEL
 - 7) Mitkem results report total volatile petroleum hydrocarbons, not misc. aromatics and aliphatics.
Total Volatile Petroleum Hydrocarbons are weighted to molecular weight of 100.
 - 8) Laboratory results from 11/19/96 to present are reported in mg/m3.

**SYSTEM MONITORING DATA
SOIL VAPOR EXTRACTION/AIR SPARGE SYSTEM**

New London Naval Submarine Base
NEX Site
Groton, CT

Date	Day of Operation	Air Sparge Flowrate (scfm)	Extraction Flowrate (east side) (scfm)	Extraction Flowrate (west side) (scfm)	Extraction Flowrate (total) (scfm)	Extraction Flowrate (cfm)	Influent Concentration BTEX (ppmv)	Removal Rate BTEX (lb/hr)	Influent Concentration MTBE (ppmv)	Removal Rate MTBE (lb/hr)	Influent Concentration Aliphatics (ppmv)	Removal Rate Aliphatics (lb/hr)	Influent Concentration Aromatics (ppmv)	Removal Rate Aromatics (lb/hr)	Influent Concentration TVPH (ppmv)	Removal Rate TVPH (lb/hr)	Total Mass Removal Rate (lbs/hr)	Period Mass Removed (lbs)	Cumulative Mass Removed (lbs)	Comments
07/31/96	0	NA*	54	199	253	288.00	1.80	0.013	—	0.000	130.00	0.810	0.00	0.000	—	0.000	0.823	0.00	0.00	
08/08/96	8	NA*	85	185	270	307.35	1.80	0.013	—	0.000	130.00	0.810	0.00	0.000	—	0.000	0.823	78.21	78.21	system operated approx. 92 hrs between 7/31 and 8/8
08/22/96	22	NA*	85	185	270	307.35	1.80	0.013	—	0.000	130.00	0.810	0.00	0.000	—	0.000	0.823	88.09	166.30	24-hour per day system operation began 8/8
09/16/96	47	NA*	186	134	320	364.27	2.70	0.021	0.00	0.000	—	0.000	—	0.000	61.00	0.487	0.508	399.38	565.68	
10/16/96	77	NA*	186	134	320	364.27	2.50	0.020	0.00	0.000	—	0.000	—	0.000	42.00	0.335	0.355	310.76	876.44	
11/19/96	111	NA*	192	132	324	368.83	0.95	0.008	0.00	0.000	—	0.000	—	0.000	22.61	0.180	0.188	221.67	1098.10	
12/17/96	139	NA*	223	87	310	352.89	0.18	0.001	0.07	0.000	—	0.000	—	0.000	6.98	0.056	0.058	82.54	1180.65	
01/27/97	180	NA*	252	69	321	365.41	0.14	0.001	0.00	0.000	—	0.000	—	0.000	4.81	0.038	0.040	47.78	1228.42	
03/27/97	239	NA**	267	117	384	437.13	0.00	0.000	0.00	0.000	—	0.000	—	0.000	0.55	0.004	0.004	31.10	1259.52	
04/17/97	260	NA**	460	261	721	820.75	0.00	0.000	0.00	0.000	—	0.000	—	0.000	2.89	0.037	0.037	10.40	1269.92	

- Notes:
- * Air sparge compressor not activated due to elevated SVE influent concentrations.
 - ** Air sparge compressor not activated due to improperly sized pressure switch.
 - 1) Aliphatics are weighted using a response factor of hexane. (MW = 86.2)
 - 2) Aromatics are weighted using a response factor of o-xylene. (MW=106.16)
 - 3) Analytical data for 7/31/96 is assumed based on results of sampling conducted 8/8/96.
 - 4) Analytical data for 8/22/96 is assumed based on results of sampling conducted 8/8/96.
 - 5) Air flow rate from 10/16/96 assumed for 9/16/96, due to a broken flow meter
 - 6) Beginning 9/16/96 lab analysis was performed by Mitkem Laboratory. Prior to 9/16/96 air analysis performed by NEI/GTEL
 - 7) Mitkem results report total volatile petroleum hydrocarbons, not misc. aromatics and aliphatics.
Total Volatile Petroleum Hydrocarbons are weighted to molecular weight of 100.
 - 8) Laboratory results for 11/19/96 to present are reported in mg/m3.

ATTACHMENT 4
HISTORICAL CARBON USAGE SUMMARY

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#) ¹	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	Influent Conc. (ppmv, PGC)	Effluent Conc. (ppmv, PGC)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
2	7-2-96	17:05	66	8.1	230	50	452	25	15.75	Dolphin Mart Site
	7-3-96	8:50	375	289	380	320	448	33		
3	7-11-96	15:10	204.8	0	274	0.0	449	25	16.33	Dolphin Mart Site
	7-12-96	7:30	534	268	318	206	450	37		
4	7-12-96	9:55	588	15	NS	NS	450	30	21.33	Dolphin Mart Site. System deactivated 7/12/96 15:55 for weekend.
	7-15-96	18:10	366	0.0	NS	NS	449	16		
	7-16-96	9:30	149	77	250	88	442	24		
5	7-19-96	11:30	105	0	NS	NS	440	16	25.83	Approx. 1 hour test-only on 7/19/96.
	7-22-96	10:30	142	0	NS	NS	445	15		
	7-23-96	11:20	215	75	NS	NS	449	20		
6	7/24/96	9:45	96	0	NS	NS	450	16	40	Dolphin Mart Site. System down up to 8 hrs on 7/19/96 for electrical work.
	7/25/96	17:45	84.6	0	NS	NS	446	17		
	7/26/96	11:45	275	192	NS	NS	442	21		

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#)	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	Influent Conc. (ppmv, PGC)	Effluent Conc. (ppmv, PGC)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
7	8/1/96	6:20	83.9	0	NS	NS	447.7	20		Dolphin Mart Site. Carbon loading test shut down for weekend 8/2/96.
	8/2/96	15:30	68	0	NS	NS	451	33		
	8/5/96	16:00	102	0	NS	NS	456	29		
	8/6/96	17:45	77.8	5.2	NS	NS	450	33		
	8/7/96	20:00	100.3	12.0	NS	NS	452	22		
	8/8/96	9:15	122.6	74.2	NS	NS	453.5	32		
8	8/1/96	6:50	6.6	4.5	NS	NS	116	0		NEX Site. A/B Carbon Units.
	8/2/96	15:00	33	7.2	NS	NS	68.5	0		
	8/5/96	15:45	0	0	NS	NS	166	0		
	8/6/96	17:10	3.1	4.0	NS	NS	137	0		
	8/7/96	17:00	2.0	3.3	NS	NS	158	0		
	8/8/96	9:45	2.3	3.5	NS	NS	135	0		
	8/12/96	14:00	65.4	47.6	NS	NS	262	0		
									290	

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#)	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	Influent Conc. (ppmv, PGC)	Effluent Conc. (ppmv, PGC)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
9	8/1/96	6:50	44	8	NS	NS	116	0		NEX Site. C/D Carbon Units.
	8/2/96	15:00	46.5	9.1	NS	NS	68.5	0		
	8/5/96	15:45	100	15.8	NS	NS	166	0		
	8/6/96	17:10	60	24.0	NS	NS	137	0		
	8/7/96	17:00	50.6	34	NS	NS	158	0		
	8/8/96	9:45	54.4	44	NS	NS	135	0		
									189	
10	8/22/96	12:00	120	0.0	NS	NS	448	30		Dolphin Mart Site. C/D Carbon Units.
	8/24/96	12:30	141	55	NS	NS	445	35		
									116	

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#)	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	Influent Conc. (ppmv, PGC)	Effluent Conc. (ppmv, PGC)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
11	8/22/96	16:00	29	0.0	NS	NS	232	0		NEX Site. C/D Carbon Units. Carbon units taken off-line 9/4/96.
	8/27/96	9:20	36	12	NS	NS	228	0		
	8/30/96	14:40	26	24	NS	NS	108	0		
	9/4/96	16:00	49	NA	NS	NS	330	0		
	9/10/96	10:30	52.6	52.6	NS	NS	243	0		
	9/16/96	14:00	35	35	NS	NS	320	0		
	9/27/96	13:00	42.7	42.7	NS	NS	60	0		
	10/2/96	10:00	17	17	NS	NS	84	0		
	10/8/96	12:00	33.7	33.7	NS	NS	413	0		
	10/10/96	12:50	22.3	22.3	NS	NS	282	0		
	10/16/96	13:30	23.8	23.8	NS	NS	259	0		
	10/21/96	14:40	14.6	14.6	NS	NS	281	0		
	10/25/96	15:05	49.9	49.9	NS	NS	173	0		
	10/28/96	12:30	65.0	65.0	NS	NS	350	0		
	11/8/96	17:15	26.3	26.3	NS	NS	342	0		
	11/19/96	14:40	8.7	8.7	NS	NS	324	0		
	12/2/96	10:30	160	160	NS	NS	299	0		
	12/17/96	NA	5.0	5.0	NS	NS	310	0		
	1/13/97	14:20	8.2	8.2	NS	NS	322	0		
	1/27/97	17:10	15.0	15.0	NS	NS	322	0		
2/17/97	16:30	2.2	2.2	NS	NS	288	0			

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#)	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	Influent Conc. (ppmv, PGC)	Effluent Conc. (ppmv, PGC)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
11 con'd	2/19/97	17:30	0.0	0.0	NS	NS	NS	NS		
	3/27/97	15:15	4.0	4.0	NS	NS	NS	NS		
	4/17/97	14:00	9.8/6.5	9.8/6.5	NS	NS	721	NS		
									NA	

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#)	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	Influent Conc. (ppmv, PGC)	Effluent Conc. (ppmv, PGC)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
12	8/27/96	12:45	68	1.0	NS	NS	450	32		Dolphin Mart Site. C/D Carbon Units. Units still in service.
	10/2/96	12:50	47.5	13.7	NS	NS	458	30		
	10/8/96	13:10	27	6.5	NS	NS	467	28		
	10/16/96	13:00	18	5.4	NS	NS	NS	NS		
	10/25/96	16:00	23.1	27.5	NS	NS	NS	NS		
	10/28/96	11:30	27.3	13.3	NS	NS	NS	NS		
	11/8/96	11:10	10.3	5.6	NS	NS	NS	NS		
	11/19/96	14:10	2.5	0.0	NS	NS	NS	NS		
	12/2/96	14:15	4.0	9.0	NS	NS	NS	NS		
	12/17/96	NA	13.0	2.0	NS	NS	NS	NS		
	12/30/96	NA	12.0	12.0	NS	NS	NS	NS		
	1/13/97	13:50	5.0	5.0	NS	NS	NS	NS		
	1/27/97	15:00	12.0	8.0	NS	NS	NS	NS		
	2/13/97	NA	2.4	0.0	NS	NS	NS	15		
	2/19/97	13:45	2.6	1.1	NS	NS	NS	NS		
	3/27/97	10:40	20	1.8	NS	NS	NS	NS		
	4/17/97	NA	8.7	7.3	NS	NS	NS	NS		
									NA	

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#) ¹	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	Influent Conc. (ppmv, PGC)	Effluent Conc. (ppmv, PGC)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
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Notes: 1 The initial carbon breakthrough (not included in this table) occurred during OHM's start-up activities.
 2 AB/CD carbon units.
 ppmv = parts per million by volume
 PID = photoionization detector
 FID = flame ionization detector
 PGC = portable gas chromatograph
 NS = not sampled

ATTACHMENT 5
HISTORICAL WELL GAUGING DATA

**Well Gauging Data
Dolphin Mart Site
New London Naval Submarine Base
Groton, Connecticut**

Date	Depth to Water (ft)																	
	Well ID																	
	DM-1	DM-2	DM-3	DM-4	DM-5	HRP-10	HRP-11	MW-1	MW-2	MW-3	WE-1	WE-1A	WE-2S	WE-2D	WE-3	WE-4	WE-5	WE-6
07/02/96	6.37	NG	NG	NG	NG	4.65	NG	4.65	3.55	3.12	NG	NG	6.78	6.56	8.67	4.24	4.80	3.40
07/03/96	NG	NG	NG	NG	NG	5.19	NG	4.63	2.86	0.00	NG	NG	6.58	6.35	8.69	6.38	4.33	2.30
07/12/96	NG	NG	NG	NG	NG	5.81	NG	5.01	3.82	1.95	NG	NG	6.96	6.83	8.93	6.38	4.98	3.60
07/16/96	NG	NG	NG	NG	NG	4.33	NG	4.55	2.89	0.74	NG	NG	6.47	6.24	8.5	6.27	4.08	2.76
07/17/96	NG	NG	NG	NG	NG	2.73	NG	4.94	1.63	2.79	NG	NG	6.3	5.88	8.62	6.47	3.62	1.72
07/19/96	NG	NG	NG	NG	NG	4.38	NG	5.21	0.61	0.00	NG	NG	6.18	5.53	8.45	NG	3.19	1.08
07/22/96	NG	NG	NG	NG	NG	4.54	NG	4.82	1.95	1.17	NG	NG	6.45	6.42	8.64	3.68	3.73	1.96
07/23/96	NG	NG	NG	NG	NG	4.55	NG	4.75	3.33	0.00	NG	NG	6.7	6.33	8.72	8.72	4.49	2.40
07/24/96	NG	NG	NG	NG	NG	4.33	NG	5.22	1.18	0.00	NG	NG	6.31	5.67	8.45	3.38	3.33	1.49
07/25/96	NG	NG	NG	NG	NG	4.46	NG	5.31	NG	NG	NG	NG	NG	NG	NG	NG	NG	2.12
07/26/96	NG	NG	NG	NG	NG	4.43	NG	4.79	NG	NG	NG	NG	NG	NG	NG	NG	NG	2.95
08/01/96	NG	NG	NG	NG	NG	3.93	NG	4.96	2.2	1.28	NG	NG	6.39	6.09	8.55	3.22	4.06	1.15
08/02/96	NG	NG	NG	NG	NG	4.08	NG	5.24	1.82	1.31	NG	NG	6.3	5.73	8.56	2.96	3.76	0.86
08/05/96	NG	NG	NG	NG	NG	4.35	NG	5.08	NG	1.08	NG	NG	NG	NG	NG	NG	NG	1.28
09/04/96	NG	NG	NG	NG	NG	5.43	NG	6.07	4.59	DRY	NG	NG	7.39	7.51	9.73	5.11	6.23	4.59
10/02/96	NG	NG	NG	NG	NG	3.53	NG	5.43	NG	3.86	NG	NG	6.41	5.82	8.41	3.11	3.96	1.60
10/21/96	NG	NG	NG	NG	NG	3.98	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	2.43
11/19/96	1.90	NG	2.06	2.68	5.37	4.15	NG	3.85	3.00	DRY	NG	NG	6.46	5.89	8.32	3.53	3.87	2.90
12/17/96	2.53	NG	1.60	NG	3.67	NG	NG	2.53	2.17	NG	NG	NG	6.10	NG	7.92	2.17	2.96	2.10
01/27/97	1.91	NG	1.89	NG	4.26	3.29	NG	2.98	2.13	NG	NG	NG	6.24	5.73	7.94	3.08	3.26	1.53
02/18/97	1.93	NG	1.90	2.04	NG	4.04	NG	2.91	2.56	2.28	NG	NG	6.32	5.84	7.95	3.49	3.21	2.55
03/27/97	1.89	2.27	1.86	2.41	4.6	4.04	3.21	3.48	1.86	1.27	5.03	DRY	6.21	5.45	8.08	1.66	3.51	1.15
04/17/97	NG	NG	NG	NG	NG	5.25	NG	3.14	1.94	1.39	NG	NG	NG	NG	NG	3.00	3.18	1.30

Notes:
 NG = Not Gauged
 (1) Depth to Product/Depth to Water

Well Gauge Data
 NEX Site
 New London Naval Submarine Base
 Groton, Connecticut

Date	Depth to Water (ft)																								
	Well ID																								
	ERM-4	ERM-6	ERM-7	ERM-8	ERM-9	ERM-10	ERM-11	ERM-12	ERM-13	ERM-14	ERM-15	ERM-16	ERM-17	ERM-18	ERM-19	NEX-1	OBG-1	OBG-2	OBG-4	OBG-5	OBG-7	OBG-9	MW-4	MW-6	
09/16/96	3.82	5.14	5.27	NG	NG	NG	NG	8.38	7.01	6.89	4.30	8.51	5.62	3.65	5.28	NG	NG	NG	NG						
10/16/96	NG	4.82	4.75	NG	NG	NG	6.4	8.13	7.15	6.92	3.94	8.49	5.56	3.96	5.17	NG	NG	NG	NG						
11/18/96	3.72	4.64	4.93	NG	NG	NG	6.36	8.09	7.13	6.91/7.10 (1)	4.03	8.43	5.53	NG	5.19	NG	NG	NG	NG						
12/16/96	3.10	4.08	4.21	NG	NG	NG	5.02	7.83	6.55	6.35	NG	7.8	3.73	NG	4.23	NG	NG	NG	NG						
02/17/97	3.00	4.34	4.29	NG	NG	NG	4.89	7.65	6.03	5.89	NG	7.85	4.53	NG	4.18	NG	NG	NG	NG						
03/27/97	2.89	4.28	4.19	NG	NG	NG	5.19	7.63	5.98	5.82	NG	7.79	4.87	NG	4.06	5.81	8.12	7.95	7.75	7.95	5.61	5.54	4.91	4.49	
04/15/97	NG	NG	NG	NG	NG	NG	NG	NG	5.86	5.7	3.39	7.84	4.84	NG	NG	5.74	NG	7.92	7.75	NG	NG	5.54	NG	NG	
04/17/97	2.73	NG	NG	NG	NG	NG	NG	NG	NG	5.66	3.31	NG	4.67	NG	3.91	NG	NG	7.91	7.78	NG	NG	5.58	NG	NG	
04/24/97	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	7.74	NG	NG	NG	NG	NG	NG

Notes:

NG = Not Gauged

(1) Depth to Product/Depth to Water

**MW-7 Well Gauging Data
OT-8 Site
New London Naval Submarine Base
Groton, Connecticut**

Date	Depth to Product (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	LNAPL Recovered (gallons)	Cumulative LNAPL Recovered (gallons)
09/26/96	4.26	6.02	1.76	0.00	0.00
10/02/96	NS	NS	0.00	4.00	4.00
10/08/96	NS	NS	0.00	0.00	4.00
10/16/96	NS	NS	0.00	0.00	4.00
10/21/96	1.65	1.66	0.01	0.00	4.00
10/25/96	3.06	3.18	0.12	0.00	4.00
10/28/96	3.46	3.55	0.09	0.00	4.00
12/17/96	NA	0.00	0.00	0.00	4.00
01/13/97	7.76	7.86	0.10	0.00	4.00
01/27/97	NA	0.00	0.00	0.00	4.00
02/19/97	2.96	2.97	0.01	0.00	4.00
03/27/97	3.30	3.99	0.69	UNK*	4.00
04/17/97	3.12	3.34	0.22	0.00	4.00

Notes:

Gauging on 10/02/96 and 10/16/96 was with a clear bailer, to visually confirm product thickness.

The well and vault were flooded on 12/17/96

NA = Not Applicable

NG = Not Gauged

* Product was recovered, but the volume was insufficient to fill the product piping and discharge in to the product recovery drum.

ATTACHMENT 6

HISTORICAL GROUNDWATER SAMPLING RESULTS

Table 1
Historical Groundwater Sampling Results
Dolphin Mart - March 1995/November 1996
Naval Submarine Base, Groton, Ct.

(analytical results in µg/l)
page 1 of 5

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8016M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
DM-1	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	5/96	<1.0	<1.0	<1.0	<1.0	4.0	<473	NS	NS	NS
	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	5	1,000	<500
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
DM-2	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	5/96	<1.0	<1.0	<1.0	<1.0	4.0	<473	NS	NS	NS
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
DM-3	3/95	<1.0	<1.0	<1.0	<1.0	7.90	<473	NS	NS	NS
	5/96	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	7	<500	<500
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes: NS = Not sampled (NS results have been placed in grey)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
B = Analyte detected in method blank, D = Analyte concentration was obtained from a diluted analysis, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics

Table 1
Historical Groundwater Sampling Results
Dolphin Mart - March 1995/November 1996
Naval Submarine Base, Groton, Ct.

(analytical results in µg/l)
page 2 of 5

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
DM-4	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	5/96	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	5	600	<500
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
DM-5	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	5/96	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	6	<500	<500
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
WE-3	3/95	<1.0	<1.0	<1.0	<1.0	8.70	<473	NS	NS	NS
	5/96	2.0	<1.0	<1.0	<1.0	14.0	<473	NS	NS	NS
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	<1.0	<1.0	<1.0	<1.0	6	<500	6	<500	<500

Notes: NS = Not sampled (NS results have been placed in grey)
B = Analyte detected in method blank, **D** = Analyte concentration was obtained from a diluted analysis, **E** = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, **GRO**=Gasoline Range Organics

Table 1
Historical Groundwater Sampling Results
Dolphin Mart - March 1995/November 1996
Naval Submarine Base, Groton, Ct.

(analytical results in µg/l)
page 3 of 5

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
WE-4	3/95	267	29.8	392	712	<40	5,180	NS	NS	NS
	5/96	160	16	301	617	<40	3,680	NS	NS	NS
	11/96	41	1.0	100	2	19	<1,000	166	1,100	500
	2/97	21	<1	27	1	17	<500	66	500	700
WE-2S	3/95	37.9	24.2	60.3	126.4	21.3	725	NS	NS	NS
	5/96	50	22	101	144	<10	1,570	NS	NS	NS
	11/96	7	<1.0	9	4	14	<1,000	34	<500	<500
	2/97	5	<1.0	14	3	10	<500	32	500	600
HRP-10	3/95	304	35.2	257	1140	<50	6,080	NS	NS	NS
	5/96	125	21	54	329	<20	1,740	NS	NS	NS
	11/96	9	<1.0	65	<1.0	7	<1,000	81	600	<500
	2/97	<1.0	<1.0	<1.0	<1.0	3	<500	3	<500	<500

Notes: NS = Not sampled (NS results have been placed in grey)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
B = Analyte detected in method blank, D = Analyte concentration was obtained from a diluted analysis, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics

Table 1
Historical Groundwater Sampling Results
Dolphin Mart - March 1995/November 1996
Naval Submarine Base, Groton, Ct.

(analytical results in µg/l)
page 4 of 5

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
HRP-11	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	5/96	1.0	<1.0	<1.0	3.0	<2.0	<473	NS	NS	NS
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
OGB-8A	3/95	72	24.6	25.9	62.4	9.29	<473	NS	NS	NS
	5/96	12.0	<1.0	9.0	4.0	<2.0	<473	NS	NS	NS
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
OGB-9A	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	5/96	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes: NS = Not sampled (NS results have been placed in grey)
B = Analyte detected in method blank, **D** = Analyte concentration was obtained from a diluted analysis, **E** = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, **GRO**=Gasoline Range Organics

Table 1
Historical Groundwater Sampling Results
Dolphin Mart - March 1995/November 1996
Naval Submarine Base, Groton, Ct.

(analytical results in µg/l)
page 5 of 5

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
MW-1	11/96	3	<1.0	5	<1.0	<1.0	<1,000	11	1,000	<500
	2/97	<1.0	<1.0	4	<1.0	<1.0	<500	4	<500	600
MW-2	11/96	4	<1.0	14	<1.0	4	<1,000	28	1,200	<500
	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	1,000	1 B	1,200	1,200
MW-3	2/97	36	23	72	500	5	2,000	645 B	3,300	1,600
WE-5	11/96	240D	410D	720D	4,300E	27	9,000	5,697	12,000	8,900
	2/97	42D	10	89D	490D	6	2,000	637	2,000	1,200
WE-6	11/96	5	210D	71D	630D	<1.0	<1,000	916	2,000	1,400
	2/97	3	4	8	12	2	<500	29	800	700
WE-2B	11/96	1	<1.0	<1.0	<1.0	<1.0	<1,000	3	<500	<500
	2/97	2	<1.0	<1.0	<1.0	3	<500	5	<500	<500

Notes: NS = Not sampled (NS results have been placed in grey)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
B = Analyte detected in method blank, D = Analyte concentration was obtained from a diluted analysis, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics

Table 2
Historical Groundwater Sampling Results
NEX - March 1995/November 1996
Naval Submarine Base, Groton, Ct.

(analytical results in µg/l)
page 1 of 5

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
NEX-1	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	NS	7	35	<143
	5/96	<1.0	<1.0	<1.0	<1.0	<2.0	NS	8	<122	<143
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
ERM-5	3/95	967	431	390	1,340	<100	NS	3,295.1	430	8,250
	5/96	112	6	34	28	<10	NS	196	159	554
	11/96	370D	14	33	61D	<1.0	3,000	480	1,100	1,600
	2/97	1,100	1,100	580	1,600	<50	3,000	4,440 B	3,900	9,100
ERM-6	5/96	15	<1.0	<1.0	<1.0	<2.0	NS	35	63	<473
	11/96	610	230	770	2,400E	<40	5,000	4,054	500	7,800
	2/97	430D	21	300	1,000D	<10	2,000	1,763 B	2,200	4,800

Notes: NS = Not sampled (NS results have been placed in grey)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics

Table 2
Historical Groundwater Sampling Results
NEX - March 1995/November 1996
Naval Submarine Base, Groton, Ct.

(analytical results in µg/l)
page 2 of 5

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
ERM-7	5/96	5	<1.0	<1.0	<1.0	<2.0	NS	8	38	<473
	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	4	<500	<500
	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	1	<500	<500
ERM-8	3/95	109	11.5	272	157	<50	NS	665.4	464	2,350
	5/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
ERM-9	5/96	<1.0	<1.0	<1.0	<1.0	2	NS	4	3,310	<473
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes: NS = Not sampled (NS results have been placed in grey)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics

Table 2
Historical Groundwater Sampling Results
NEX - March 1995/November 1996
Naval Submarine Base, Groton, Ct.

(analytical results in µg/l)
page 3 of 5

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
ERM-11	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	3	<500	<500
	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	2	<500	<500
ERM-12	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	NS	1	27	<473
	5/96	1	2	7	14	<2.0	NS	61	4,300	1,390
	11/96	<1.0	2	<1.0	9	<1.0	3,000	16	7,300	6,700
	2/97	<1.0	1	2	9	<1.0	15,000	13	4,800	1,300
ERM-13	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	NS	534	50	<473
	5/96	<1.0	<1.0	<1.0	<1.0	<2.0	NS	9	<100	<473
	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	2	<500	<500
	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500

Notes: NS = Not sampled (NS results have been placed in grey)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics

Table 2
Historical Groundwater Sampling Results
NEX - March 1995/November 1996
Naval Submarine Base, Groton, Ct.

(analytical results in µg/l)
page 4 of 5

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
ERM-14	3/95	292	4,880	8,190	6,020	<2.0	NS	19,995	4,840	3,670
	5/96	305	5,670	1,250	8,350	<2.0	NS	22,543	7,290	3,890
	11/96	270	8,300D	1,700D	11,000D	<25	7,000	21,270	12,000	30,000
	2/97	140	4,500D	980	7,100	<100	60,000	12,840	20,000	20,000
ERM-15	11/96	280	760	330	1,100	<40	1,000	2,517	2,300	4,500
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
ERM-16	11/96	37	<2.0	13	16	30	<1,000	68	4,400	2,000
	2/97	56D	<1.0	16	34	27	6,000	136	11,000	1,400
ERM-17	11/96	10	<1.0	<1.0	<1.0	9	<1,000	11	600	600
	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	1,000	<1.0	500	<500

Notes: NS = Not sampled (NS results have been placed in grey)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics

Table 2
Historical Groundwater Sampling Results
NEX - March 1995/November 1996
Naval Submarine Base, Groton, Ct.

(analytical results in µg/l)
page 5 of 5

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
ERM-19	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	1	<500	<500
	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
MW-4	2/97	29	1	<1.0	3	<1.0	NS	33	NS	NS
MW-6	2/97	<1.0	9	<1.0	<1.0	<1.0	NS	9	NS	NS
OBG-4	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	NS	<1.0	NS	NS

Notes: NS = Not sampled (NS results have been placed in grey)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics

ATTACHMENT 7

MW-7 WELL CONSTRUCTION LOG



MONITORING WELL SHEET

TANK FARM WELLS

PROJECT <u>NSB NLON</u>	LOCATION <u>GROTON, CT.</u>	DRILLER <u>SOILTEST, INC</u>
PROJECT NO. <u>4626</u>	BORING <u>HN05-07</u>	DRILLING METHOD <u>HSA</u>
ELEVATION _____	DATE <u>10-3-95</u>	DEVELOPMENT METHOD <u>PUMP</u>
FIELD GEOLOGIST <u>CONTI</u>		

Ground Elevation _____

Flush mount surface casing with lock _____

ELEVATION TOP OF RISER: _____

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING: FLUSH MOUNT

I.D. OF PROTECTIVE CASING: 4"

DIAMETER OF HOLE: 8"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2" ϕ

TYPE OF BACKFILL/SEAL: CEMENT GROUT

DEPTH/ELEVATION TOP OF SAND: 3' /

DEPTH/ELEVATION TOP OF SCREEN: 5' /

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 SL x 10

TYPE OF SAND PACK: " 20-30 SAND

DIAMETER OF HOLE IN BEDROCK: NA

DEPTH/ELEVATION BOTTOM OF SCREEN: 13' /

DEPTH/ELEVATION BOTTOM OF SAND: 15' /

DEPTH/ELEVATION BOTTOM OF HOLE: 15' /

BACKFILL MATERIAL BELOW SAND: NA

7.98'
TPVC 11/20/95