N00129.AR.001103
NSB NEW LONDON
5090.3a

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: March 1997

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Prepared by:

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grsubbas\wp\gr2.05

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 March 27, 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 currently inoperable, pending repair. A site map has been included as **Figure 1**. 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 as **Attachment 2**.

Mass Removal - The total hydrocarbon mass removal rate, based on the SVE system influent sample collected March 27, 1997, was 0.031 lbs/hour. During the period from January 27, 1997 to March 27, 1997 approximately 105 lbs of hydrocarbons were extracted by the remediation system. The total hydrocarbon mass extracted by the remediation system, as of March 27, 1997, was approximately 1,229 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 March 27, 1997. The Discharge Monitoring Report (DMR) will be generated following receipt of the laboratory analytical data. The DMR for samples collected January 27, 1997 was submitted March 26, 1997.

Monitoring Well Gauging - The site monitoring wells were gauged March 27, 1997. Depth to groundwater at the site ranged from 1.15 feet in WE-6 to 8.08 feet in WE-3. 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 March 27, 1997 an inventory of the monitoring point well locations and well head conditions was conducted. The locations of previously unidentified points were placed on the site plan. A summary of the well head inventory will be issued separately.

NEX AIR SPARGE/SVE SYSTEM

System Status - The remediation system at the site has been operating since July 31, 1996. As of February 26, 1997, twenty-one (21) horizontal trenches (VEA-13, VEA-14, VEA-15, VEA-16, VEA-18, VEA-20, VEB-1, VEB-2, VEB-3, VEB-4, VEB-5, VEB-6, VEB-7, VEB-8, VEB-9, VEB-10, VEB-11, VEB-12, VEB-13, VEB-14, and VEB-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 is not currently operating. An improperly sized pressure switch will be replaced and activation of the air sparge system is planned for April, 1997. The SVE system is currently extracting subsurface air at a flow rate of approximately 384 scfm (267 scfm from the east system and 117 scfm from the west system). 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 March 27, 1997, was 0.004 lbs/hour. During the period from January 27, 1997 to March 27, 1997 approximately 31 lbs of hydrocarbons were extracted by the remediation system. The total hydrocarbon mass extracted by the remediation system, as of March 27, 1997, is approximately 1,260 lbs (*Note: this includes a correction to previously entered data for 9/16/96*). 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 March 27, 1997. The Discharge Monitoring Report (DMR) will be generated following receipt of the laboratory analytical data. The DMR for samples collected January 27, 1997 was submitted March 26, 1997.

Monitoring Well Gauging - The site monitoring wells were last gauged on March 27, 1997. Depth to groundwater at the site ranged from 2.89 feet in ERM-5 to 8.12 feet in OBG-1. During the well gauging, liquid non-aqueous phase liquid (LNAPL) was detected in monitoring well OBG-9 at a thickness of 0.42 inches. 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 March 27, 1997 an inventory of the monitoring point well locations and well head conditions was conducted. The locations of previously unidentified points were placed on the site plan. A summary of the well head inventory will be issued separately.

OT-8 PASSIVE FREE PRODUCT RECOVERY SYSTEM

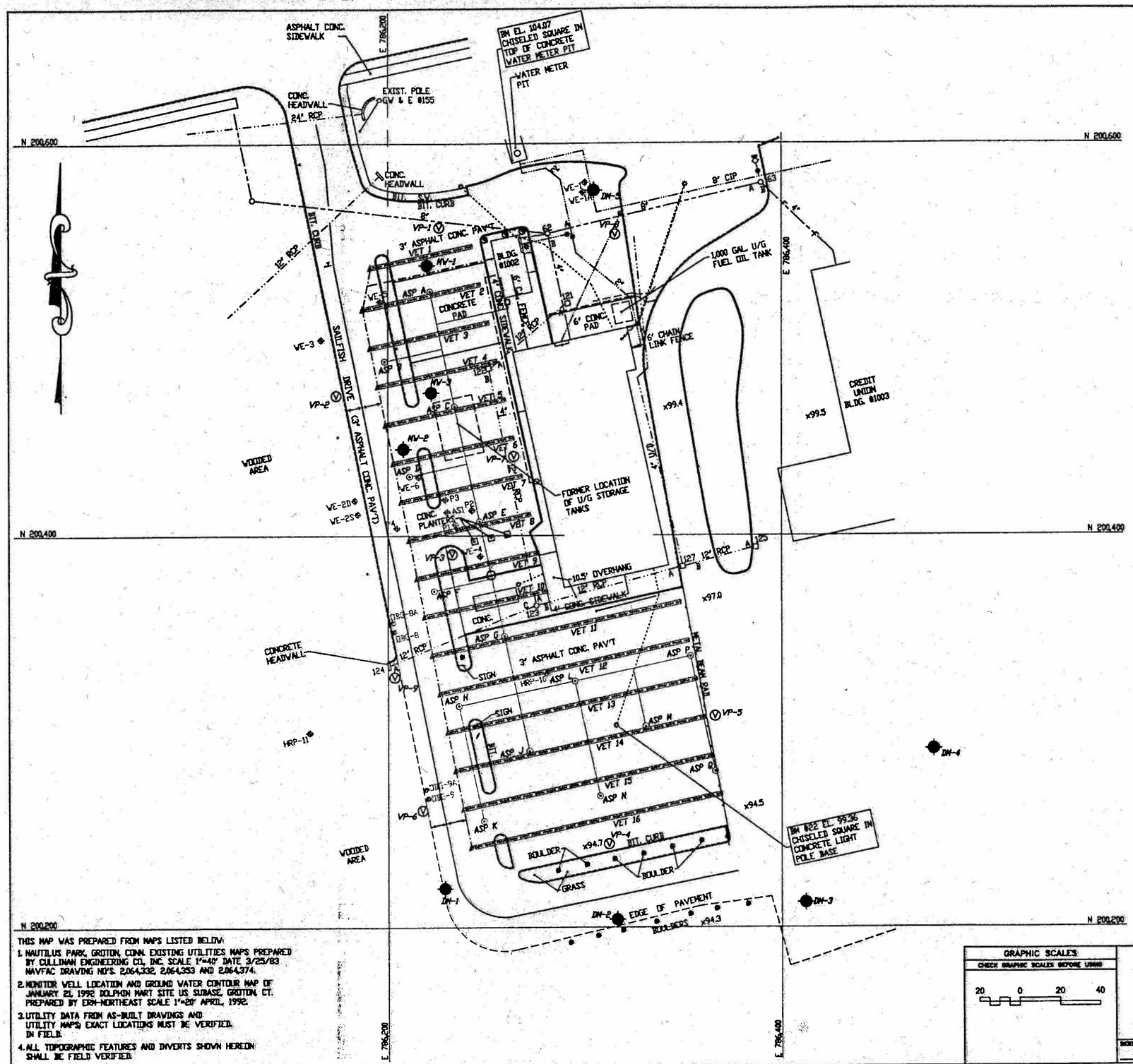
System Status - The OT-8 passive free product recovery system was activated on September 28, 1996. During the month of March, the system remained deactivated due to a high groundwater table which prohibited system operation. The system was briefly reactivated on March 27, 1997 to remove product which had accumulated within MW-7.

Product Recovery - While product was pumped from MW-7 on March 27, 1997, the volume was not sufficient to completely fill the product hose and discharge into the product storage drum. As of March 27, 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 may accumulate within the well and allow recovery to 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, therefore, product will not accumulate in the well until the water table drops below this level.*

Monitoring Well Gauging - MW-7 was gauged on March 27, 1997. At that time the depth to LNAPL was 3.30 feet below grade and the depth to groundwater was 3.99 feet below grade. Historical gauging data for MW-7 is included in **Attachment 5**.

Additional Activities - No out of scope activities were performed during March 1997.

FIGURES



REVISIONS				
LTR	DESCRIPTION	PREP'D BY	DATE	APPROVED

HIGHEST RECORDED GROUND WATER ELEVATIONS

WELL NO.	GROUNDWATER ELEVATION
WE-1A	96.84
WE-2S	94.25
WE-2D	94.31
WE-3	93.93
WE-4	94.11
WE-5	95.40
WE-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	93.82	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 CULLINAN ENGINEERING CO, INC. SCALE 1"=40' DATE 3/25/83 NAVFAC DRAWING NO'S. 2,064,332, 2,064,353 AND 2,064,374.
2. MONITOR WELL LOCATION AND GROUND WATER CONTOUR MAP OF JANUARY 21, 1992 DOLPHIN MART SITE US SUBASE, GROTON, CT. PREPARED BY ERM-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.

GRAPHIC SCALES
CHECK GRAPHIC SCALES BEFORE USING
20 0 20 40

MAP ASSOCIATES, INC.
167 NEW BRITAIN AVE.
PLAINVILLE, CT 06062

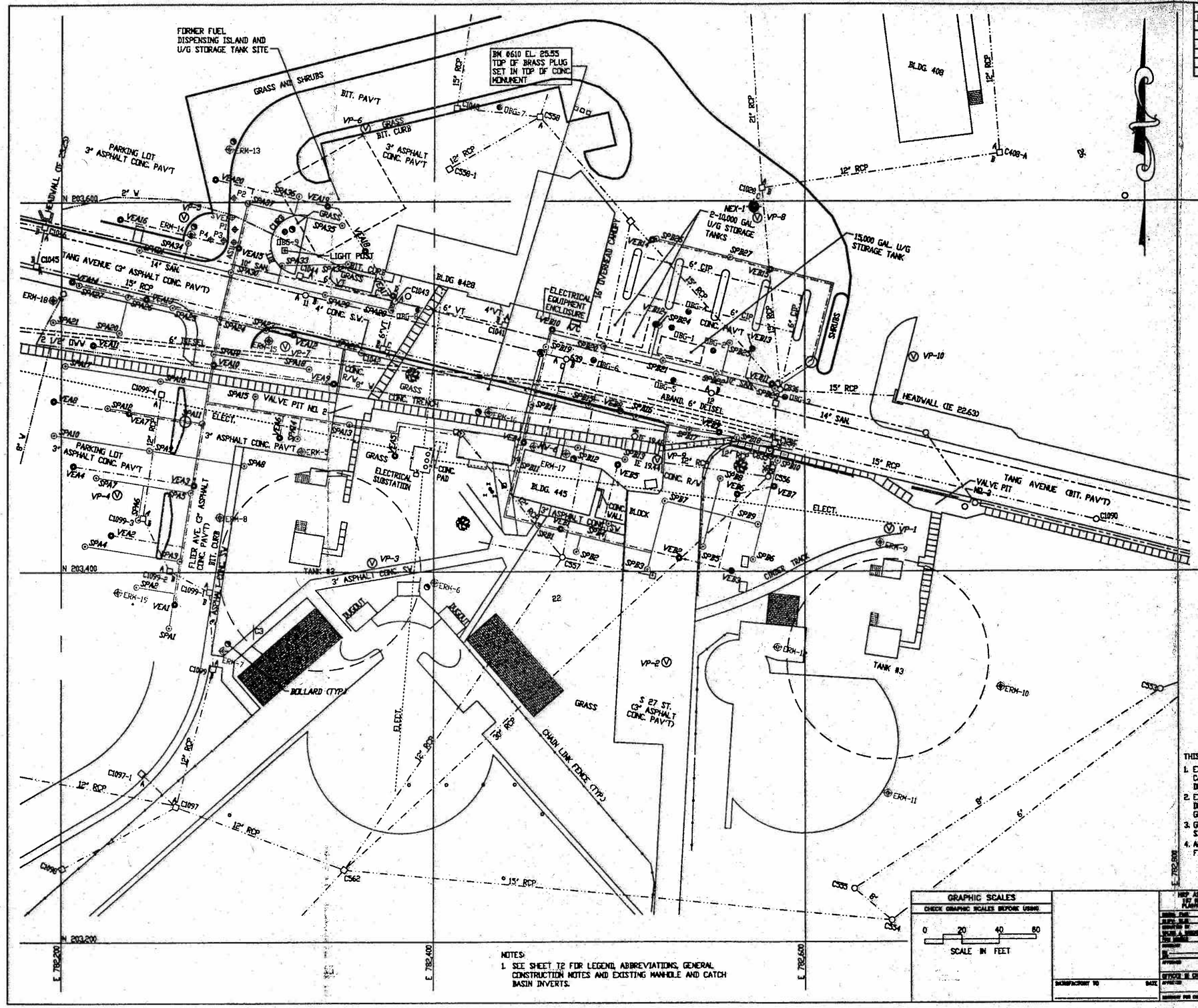
DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
DIVISION: NORTHERN DIVISION — PHILADELPHIA, PENNSYLVANIA
NAVAL SUBMARINE BASE — NEW LONDON, CONNECTICUT

REMEDIATION OF CONTAMINATED SOIL/GROUND WATER

FIGURE 1 - SITE PLAN
DOLPHIN MART

SIZE	CODE IDENT. NO.	NAVFAC DRAWING NO.	DWG. NO. REV.
F	80091	2166440	C2-1

CONTRL. CONTRS. NO. N62472-89-D-0000
SPEC. NO. 84-00-0000 SHEET 3 OF 34



REVISIONS				
LTR	DESCRIPTION	PREPD BY	DATE	APPROVED

HIGHEST RECORDED GROUND WATER ELEVATION

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

1. EXISTING TOPOGRAPHY FROM MAP BY JAMES S. HINGES & ASSOCIATES, CARLSON & SWEATT FARMINGTON, CT & NEW YORK, N.Y. DATED 31 DEC. 1974.
2. EXISTING UTILITIES FROM 40 SCALE UTILITY MAPS SUPPLIED BY THE DEPARTMENT OF PUBLIC WORKS, NAVAL SUBMARINE BASE, NEW LONDON, GROTON, CT.
3. GROUND WATER ANALYTICAL RESULTS, JANUARY, 1992 NEX STATION SITE US SUBBASE, GROTON, CT PREPARED FOR ERM-PNC.
4. ALL TOPOGRAPHIC FEATURES AND INVERTS SHOWN HEREON SHALL BE FIELD VERIFIED.

GRAPHIC SCALES
CHECK GRAPHIC SCALES BEFORE USING
0 20 40 80
SCALE IN FEET

NOTES:
1. SEE SHEET 72 FOR LEGEND, ABBREVIATIONS, GENERAL CONSTRUCTION NOTES AND EXISTING MANHOLE AND CATCH BASIN INVERTS.

HRP ASSOCIATES, INC.
127 NEW BRITAIN AVE.
PLAINVILLE, CT 06062

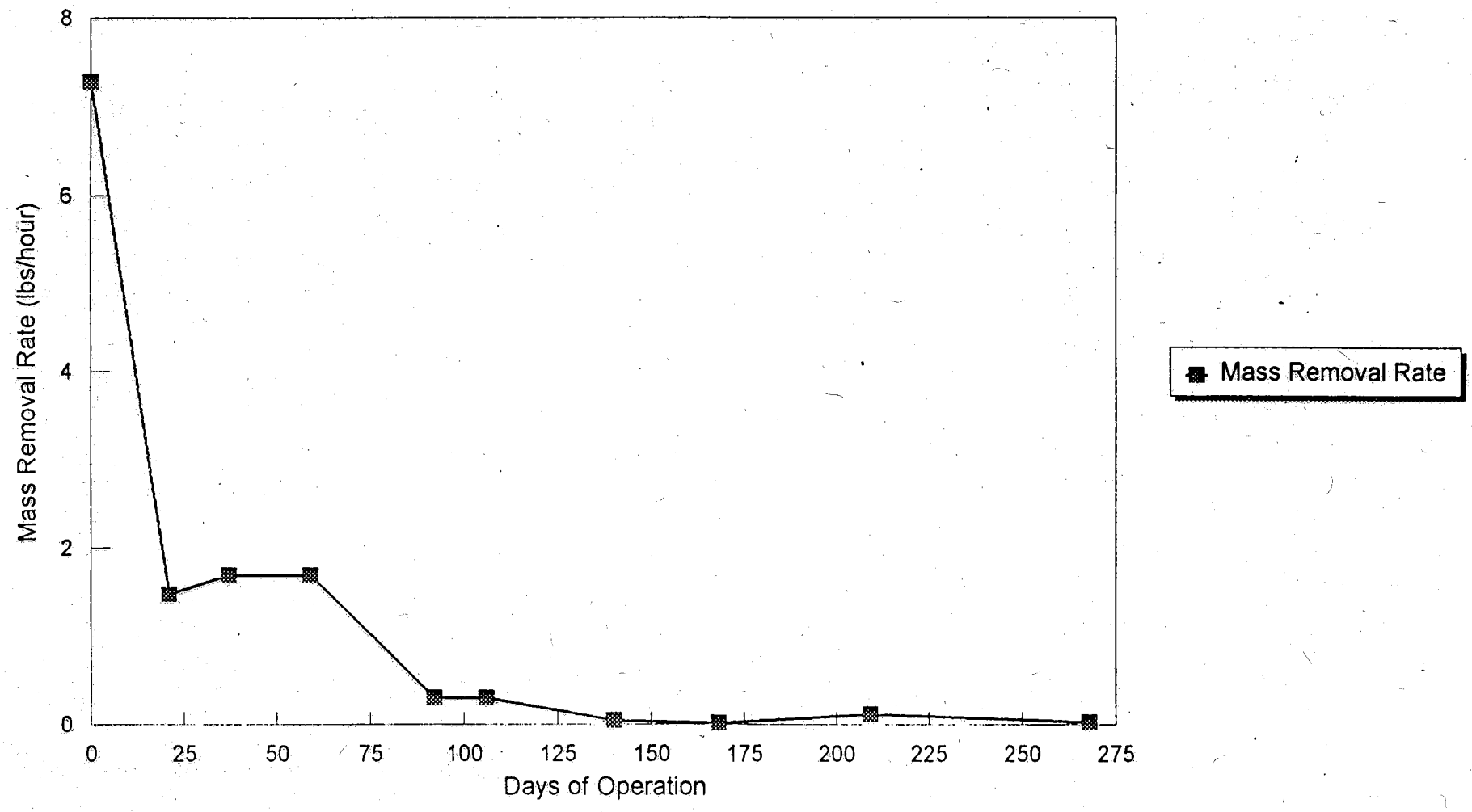
DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
LEITON — NORTHERN DIVISION — PENNSYLVANIA
NAVAL SUBMARINE BASE — NEW LONDON, CONNECTICUT
REMEDIATION OF CONTAMINATED SOIL/GROUND WATER
FIGURE 2 - SITE PLAN
NAVAL EXCHANGE (NEX)

SIZE	CODE IDENT. NO.	GRAPHIC DRAWING NO.	DR. NO. REV.
F	80091	2166439	C1-1

SPEC. NO. 84-08-0000 SHEET 4 OF 24

Figure 3A- Mass Removal Rate

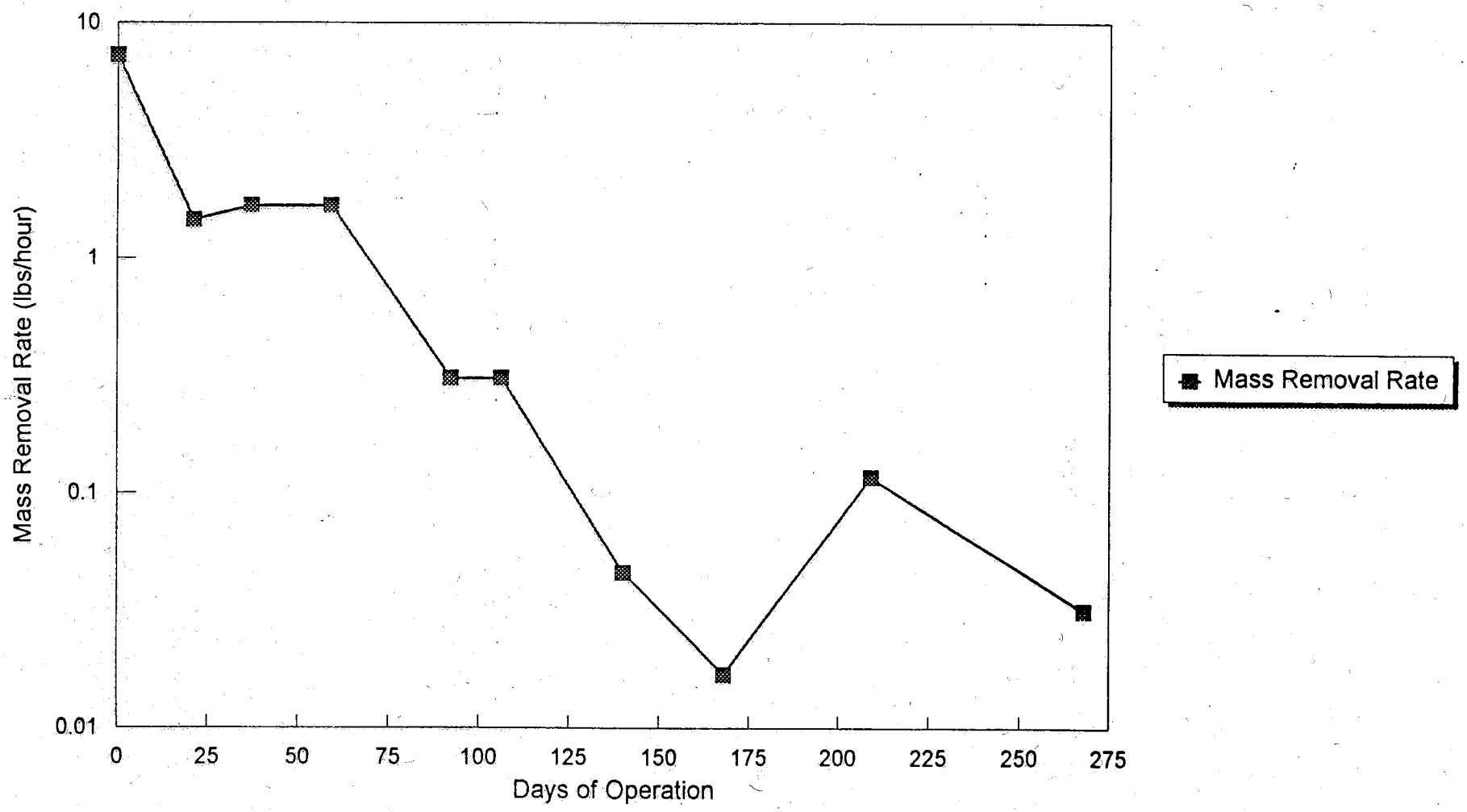
Dolphin Mart Site, New London Naval Submarine Base, Groton, CT



MASSREM.WK4

Figure 3B- Mass Removal Rate

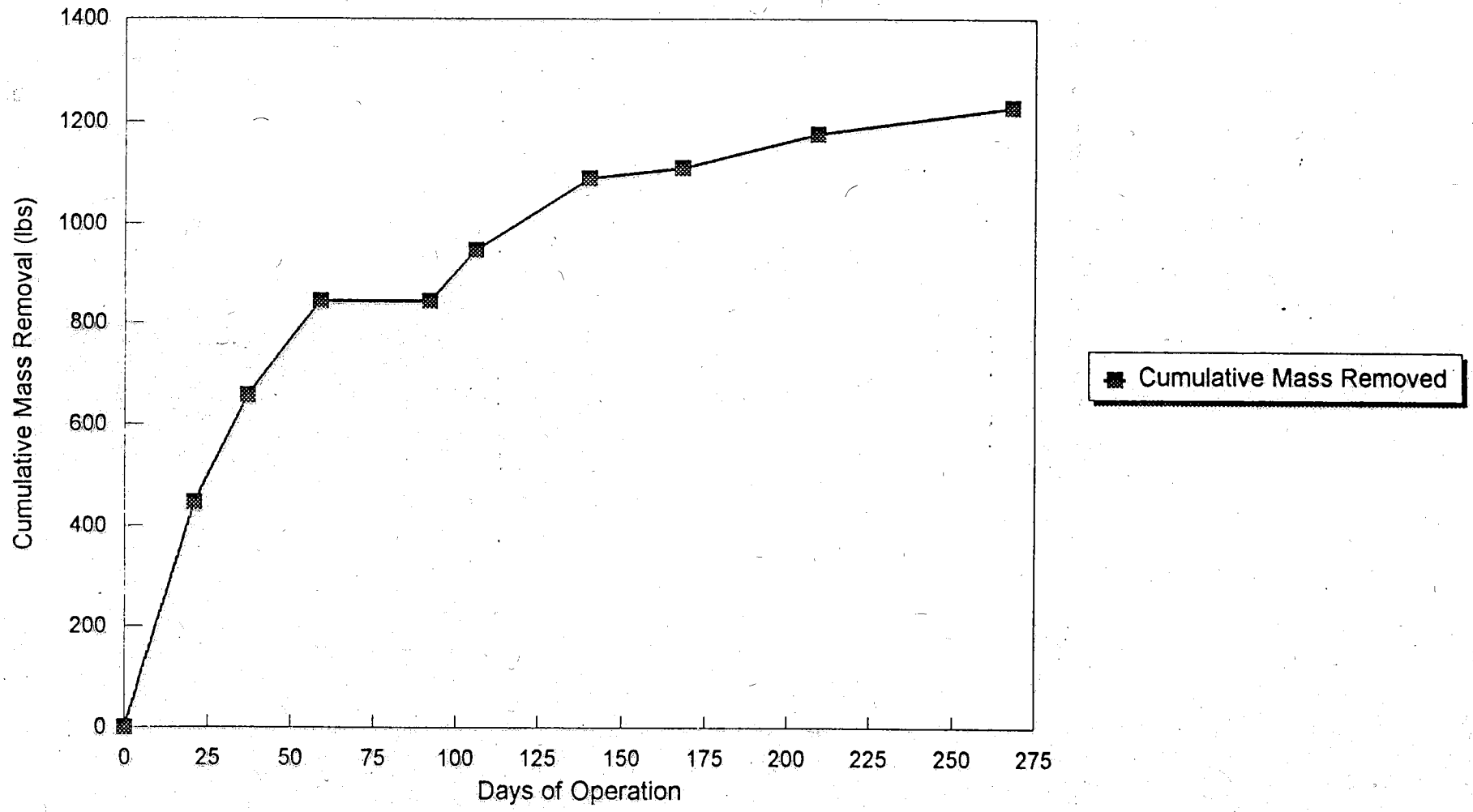
Dolphin Mart Site, New London Naval Submarine Base, Groton, CT



MASSREM.WK4

Figure 4 - Cumulative Mass Removed versus Time

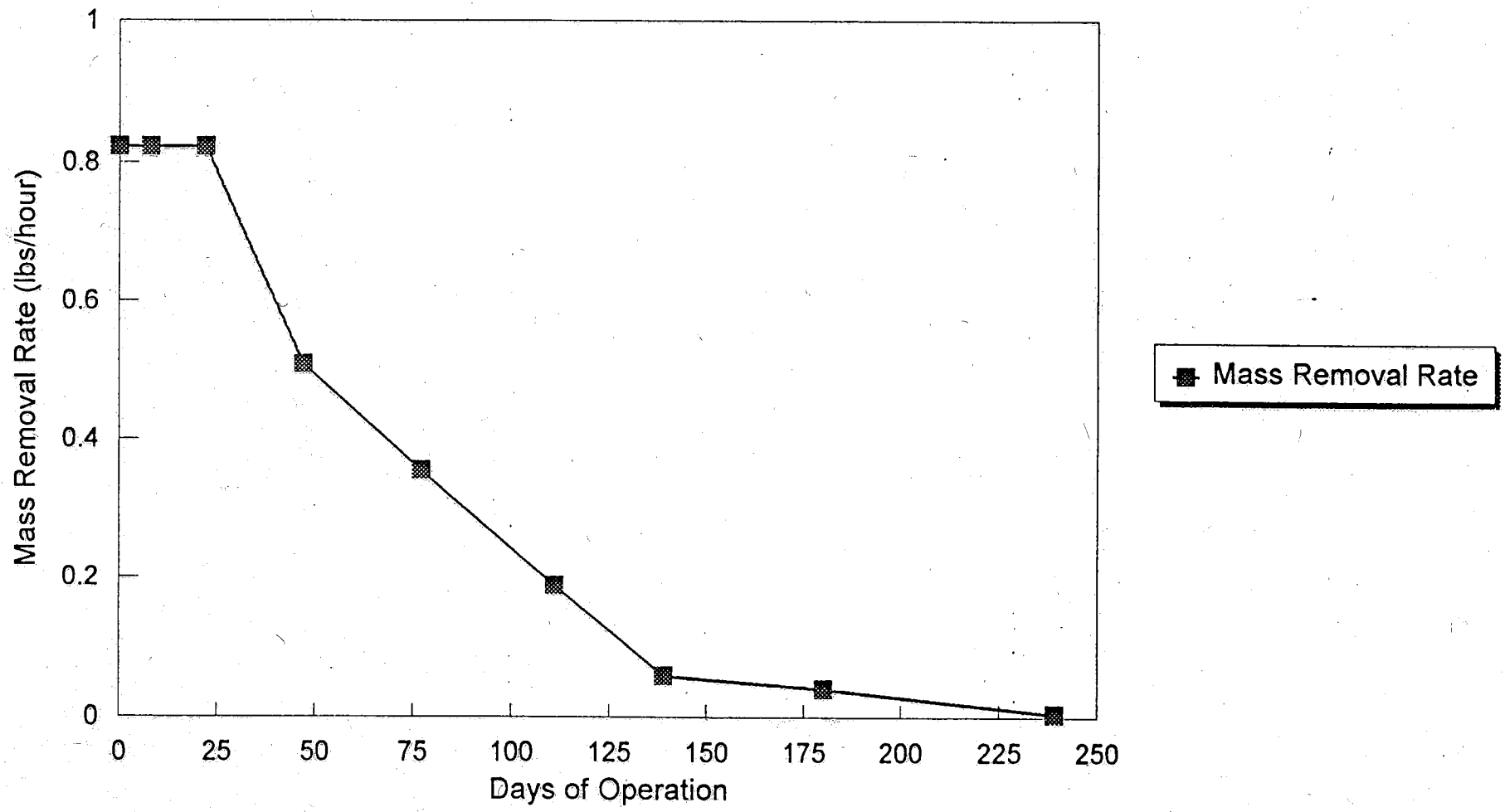
Dolphin Mart Site, New London Naval Submarine Base, Groton, CT



MASSREM.WK4

Figure 5A - Mass Removal Rate

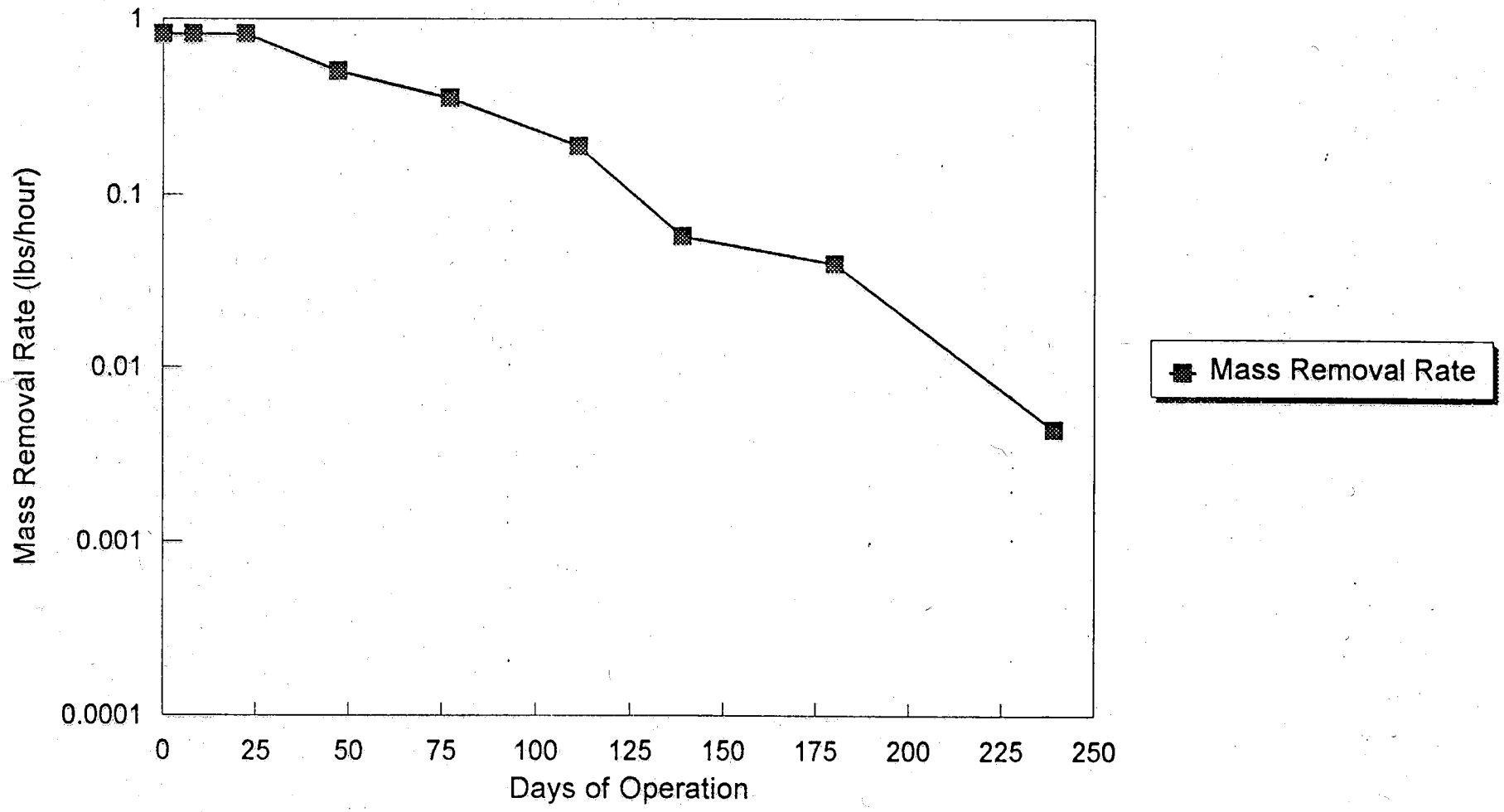
NEX Site, New London Naval Submarine Base, Groton, CT



MASSREM.WK4

Figure 5B - Mass Removal Rate

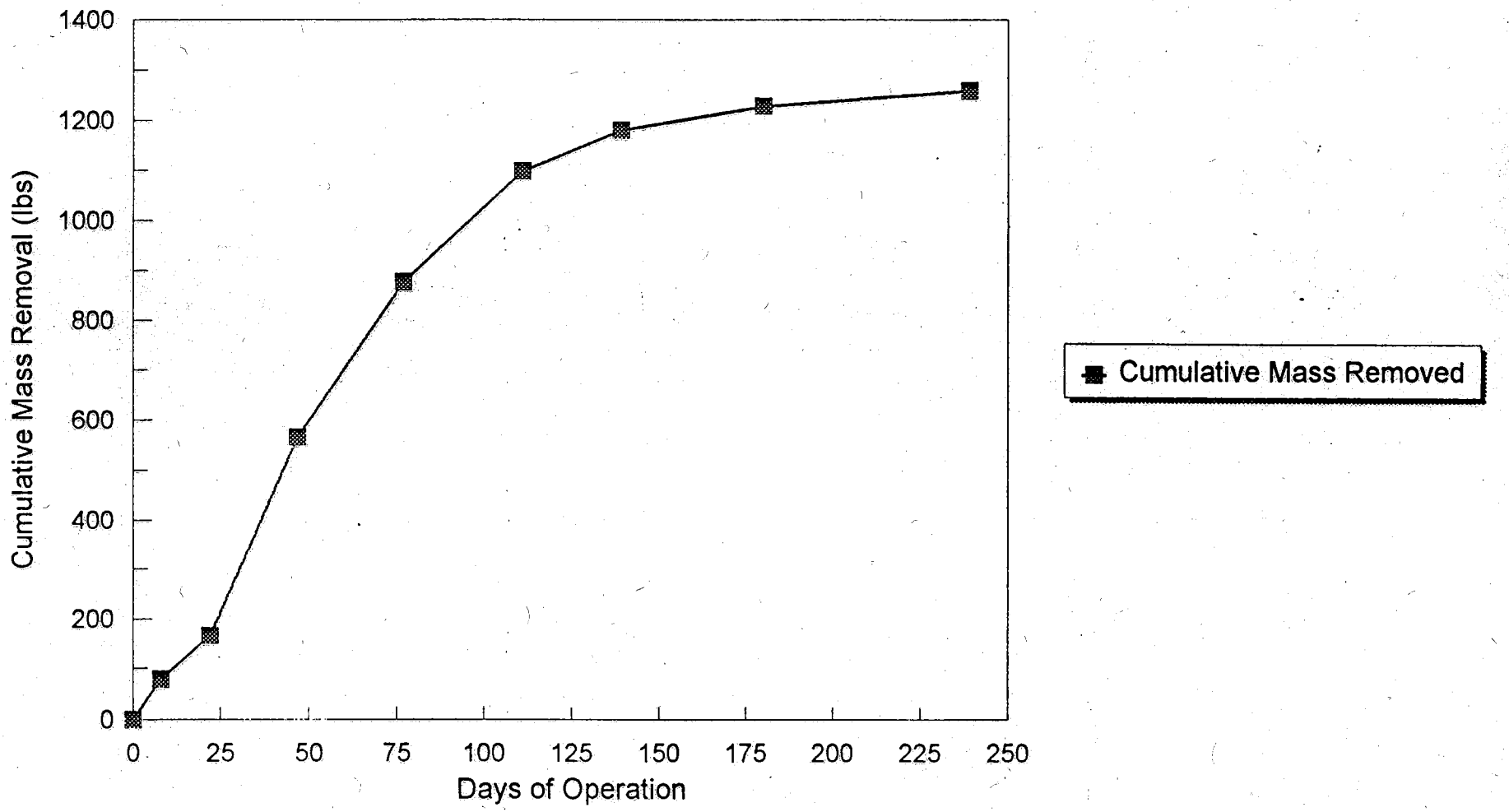
NEX Site, New London Naval Submarine Base, Groton, CT



MASSREM.WK4

Figure 6 - Cumulative Mass Removed versus Time

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



MASSREM.WK4

ATTACHMENT 1

SITE VISIT FORMS

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

Date: 3/27/97
Time: 10:40
Technician: WCD/J.K. JR.

AIR COMPRESSOR SYSTEM

Flow Rate SCFM | Total Flow SCFM

Air Compressor C-1

Pressure	11	psi
Temperature	158	°F
Flow Control Valve Setting	100	%
Bleed Valve	50	%
Radiator	ON / OFF	

Air Compressor C-2

Pressure		psi
Temperature		°F
Flow Control Valve Setting		
Bleed Valve		
Radiator	ON / OFF	

SOIL VAPOR EXTRACTION SYSTEM

Flow Rate SCFM | Total Flow SCFM

Vacuum Pump V-1

Vacuum	.5	"Hg
Temperature	116	°F
Particulate Filter	OK	
Flow Control Valve Setting	100	%
Bleed Air Valve Setting	25	%
Liquid Level	-	

Vacuum Pump V-2

Vacuum	1.5	"Hg
Temperature	116	°F
Particulate Filter	OK	
Flow Control Valve Setting	100	%
Bleed Air Valve Setting	25	%
Liquid Level	—	

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	20	ppm
Inf Pressure		psi
Mid. VOC Level	4	ppm
Mid Pressure	10	psi
Eff. VOC Level	1.8	ppm
Change out Date	8-22-96	

WATER TREATMENT

Flowmeter Reading _____ Gallons

COMMENTS

Sump prior to Dischargeing 2853.0

Sump After Dischargeing 2945.3

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

Date: 8/27/97
Time: 15:15
Technician: WCC/JK JP

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	ON / OFF	Radiator	ON / OFF

SOIL VAPOR EXTRACTION SYSTEM

Eastern Flow Rate 214-320	SCFM	Total Flow 31993690	SCFM
Western Flow Rate 62-172	SCFM	Total Flow 11623835	SCFM
Vacuum Pump V-1		**Vacuum Pump V-2**	
Vacuum	°Hg	Vacuum 3.5	°Hg
Temperature	°F	Temperature 126	°F
Particulate Filter OK		Particulate Filter OK	
Flow Control Valve Setting 100 %		Flow Control Valve Setting 100 %	
Bleed Air Valve Setting 25 %		Bleed Air Valve Setting 25 %	
Liquid Level		Liquid Level	
Vacuum Pump V-3		**Vacuum Pump V-4**	
Vacuum 3.0	°Hg	Vacuum 3.0	°Hg
Temperature 140	°F	Temperature 144	°F
Particulate Filter OK		Particulate Filter OK	
Flow Control Valve Setting 100 %		Flow Control Valve Setting 100 %	
Bleed Air Valve Setting 25 %		Bleed Air Valve Setting 25 %	
Liquid Level		Liquid Level	

ACTIVATED CARBON ADSORPTION SYSTEM

Carbon Adsorber A/B		**Carbon Adsorber C/D**	
Inf. VOC Level 1.4	ppm	Inf. VOC Level 4.0	ppm
Inf Pressure 42	psi	Inf Pressure	psi
Mid. VOC Level 1.4	ppm	Mid. VOC Level	ppm
Mid Pressure 8	psi	Mid Pressure	psi
Eff. VOC Level 1.2	ppm	Eff. VOC Level 4.0	ppm
Change out Date		Change out Date 822-96	

WATER TREATMENT

Flowmeter Reading _____ Gallons

COMMENTS

Flow meter before discharging 1596.0
Flow meter After discharging 1723.3

August 23, 1996

grsubbas\wp\gr1.11

NAVAL SUBMARINE BASE GROTON, CT. (NEX SITE)

Monitoring:		
Component:	**Frequency:**	**Record Data for/By:**
Carbon Adsorbers: A/B (Inf. / Eff.) C/D (Inf. / Eff.)	Monthly	Air Sample for: EPA T03 BTEX,MTBE Misc.aromatics/aliphatics
Water Sump: (EFF)	Prior to discharging	Flowmeter reading EPA 624+MTBE+xylenes (2-40ml. HCL) TPH EPA 418.1 (1-1 lt./H2S04 or HCL) Total Lead EPA 239.2 (1-500ml./HN03) PH (Field test) ~~Aquatic Toxicity (Minnows+Water Fleas)~~
Monitoring Wells: ERM-5 - ERM-19	Quarterly	EPA 8010 (3-40ml./HCL) EPA 8020 +MTBE (" ") TPH 418.1 (2-1lt.) TPH as gasoline,CG/FID hydrocarbon screen (" ") TPH as Diesel,GC/FID hydrocarbon screen (" ")

OPERATIONAL DATA FORM OT-5 MW-7 PRODUCT RECOVERY SYSTEM Naval Submarine Base, Groton, CT Project # 87260014 Task #140	Date: 3/27/97 Time: Technician: LWD/JKSR

Check compressor, pressure should be 80 psi.
Check air dryer panel, pressure should be 60 psi.
Drain moisture trap on panel dryer.
Gauge recovery tank: Total depth: 2.75
DTW: 1.23
DTP: 1.17
~~DTB 2.75~~

Additional comments: 3.30 product \ 4.03
3.99 water / MW 7 for OT8 System
2.5 gallons of product in recovery drum

ATTACHMENT 2

MONTHLY FIELD ACTIVITY SUMMARY

Field Activity Summary

March 1997

New London Naval Submarine Base
Groton, Connecticut

Week Ending	Site	Period	Field Activities[1]	Comments
3/28/97	Dolphin Mart	Monthly Monitoring	Conducted system monitoring . Conducted DMR and off-gas sampling. Conducted well head inventory.	Air sparge system found deactivated. (Reactivated 2/13/97). Replaced sump cover.
	NEX		Conducted system monitoring . Conducted DMR and off-gas sampling. Conducted well head inventory.	SVE system operating normally.
	OT-8		Conducted system monitoring . Conducted DMR and off-gas sampling.	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 (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 7/21
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	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	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	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	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	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	3.90	0.031	0.031	104.53	1228.73	assume 50% up-time, blowers shutting down due to influent water

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	

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		Dolphin Mart Site
	7-3-96	8:50	375	289	380	320	448	33		
									15.75	
3	7-11-96	15:10	204.8	0	274	0.0	449	25		Dolphin Mart Site
	7-12-96	7:30	534	268	318	206	450	37		
									16.33	
4	7-12-96	9:55	588	15	NS	NS	450	30		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		
									21.33	
5	7-19-96	11:30	105	0	NS	NS	440	16		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		
									25.83	
6	7/24/96	9:45	96	0	NS	NS	450	16		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		
									40	

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
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		
	8/8/98	9:15	122.6	74.2	NS	NS	453.5	32		
									48	
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 (#)[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
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 (#)[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
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 (#)[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
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		
									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
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		
									NA	

Notes:
1 The initial carbon breakthrough (not included in this table) occurred during OHM's start-up activities.
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

Notes:

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

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Wel[illegible]g Data
[illegible]te
New London Naval Submarine Base
Groton, Connecticut

Date	Depth to Water (ft) Well ID																							
	ERM-5	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-6	OBG-7	OBG-9	MW-4	MW-5
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	NG	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	NG	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	NG	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	NG	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	NG	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

Notes:

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

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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

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.

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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 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remedialton 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
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DRO=Diesel Range Organics, GRO=Gasoline Range Organics

GRUBBS/WP/GR1.59

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

(analytical results in µg/l)

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					
Remedialton 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

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(analytical results in µg/l)

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		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
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Naval Submarine Base, Groton, Ct.

(analytical results in µg/l)

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					
Remediailton 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
OBG-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
Bold numbers indicate an exceedance of State of CT Clean-up Standards
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Historical Groundwater Sampling Results
Dolphin Mart - March 1995/November 1996
Naval Submarine Base, Groton, Ct.

(analytical results in µg/l)

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					
Remediaiton 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
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DRO=Diesel Range Organics, GRO=Gasoline Range Organics

GRUBBS/WP/GR1.59

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

(analytical results in µg/l)

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

(analytical results in µg/l)

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

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Naval Submarine Base, Groton, Ct.

(analytical results in µg/l)

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
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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)
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(analytical results in µg/l)

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

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ATTACHMENT 7

MW-7 WELL CONSTRUCTION LOG

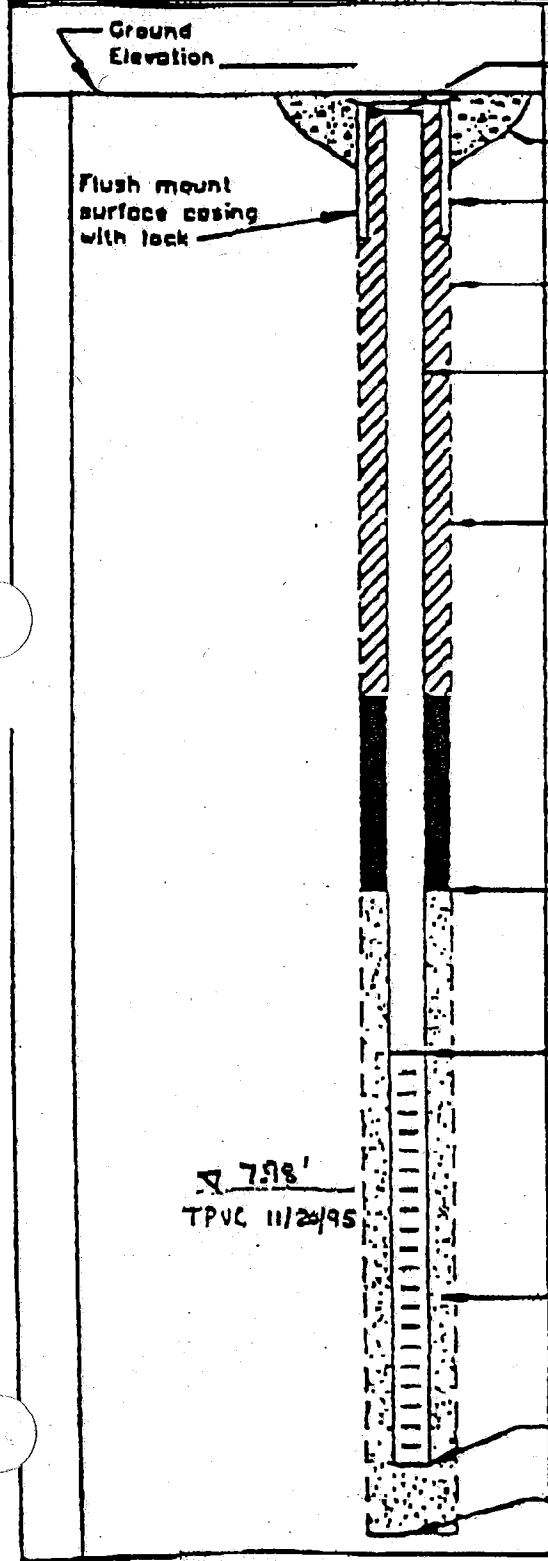
MONITORING WELL SHEET

TANK FARM WELLS

PROJECT NSB NLON
PROJECT NO. 4626
ELEVATION
FIELD GEOLOGIST CONTI

LOCATION GROTON, CT.
BORING HNUS-07
DATE 10-3-95

DRILLER SOILTEST, INC
DRILLING METHOD HSA
DEVELOPMENT METHOD PUMP



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: 15' ✓

DEPTH/ELEVATION BOTTOM OF SAND: 15' ✓

DEPTH/ELEVATION BOTTOM OF HOLE: 15' ✓

BACKFILL MATERIAL BELOW SAND: NA