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NAB LITTLE CREEK
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FINAL SITE CHECK REPORT FOR UNDERGROUND STORAGE TANKS REMOVED FROM SITE 3329 NAB LITTLE CREEK VA

4/21/1992

BAKER ENVIRONMENTAL, INC.

FINAL

SITE CHECK REPORT FOR THE UNDERGROUND STORAGE TANKS REMOVED FROM SITE 3329 AT THE NAVAL AMPHIBIOUS BASE LITTLE CREEK, VIRGINIA

CONTRACT TASK ORDER 0088

Prepared For:

NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION
Norfolk, Virginia

Under:

Contract N62470-89-D-4814

Prepared by:

BAKER ENVIRONMENTAL, INC.
Coraopolis, Pennsylvania

APRIL 21, 1992

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1.0 INTRODUCTION

Baker Environmental, Inc. (Baker) and Foster Wheeler Enviresponse, Inc. (FWEI), members of the Baker Team for the Navy CLEAN Program, conducted a Site Characterization at the Commissary Construction Site located at the Naval Amphibious Base (NAB) Little Creek in Virginia Beach, Virginia. Figure 1-1 identifies the location of the Commissary Construction Site. This work was performed under Contract N62470-89-D-4814, Contract Task Order (CTO) 0088.

During the demolition phase of the construction project, an outside contractor located, removed, and disposed of two underground storage tanks (USTs). Soils from both tank cavities were sampled and analyzed for total petroleum hydrocarbons (TPH). Analyses indicated that these soils contained TPH concentrations above the Virginia State Water Control Board (VSWCB) action level guideline of 100 milligrams per kilogram (mg/kg). Subsequently, the Baker Team, under CTO 0088, conducted a subsurface evaluation of the soils and groundwater in the vicinity of the former USTs.

On December 5 and 10, 1991, two USTs (3329-1 and 3329-2) were discovered adjacent to Building 3329, a former automotive hobby shop. The former USTs were discovered by Armada/Hoffler Construction Company of Chesapeake, Virginia during demolition activities. The USTs were installed prior to 1962 and were not previously inventoried. Armada/Hoffler removed and disposed of the tanks according to the VSWCB regulation VR 680-13-02.

UST 3329-1, a 550-gallon steel, waste-oil tank was located at the northeast corner of Building 3329. This UST contained over 225 gallons of product when this tank was removed from service. The integrity of this tank appeared to be sound and free from leaks. The surrounding soil appeared to be absent from stains and petroleum odors. Two post excavation soil samples were collected from the base of the tank excavation for analyses; a composite from the base of the tank excavation and a discrete sample collected from a depth of 12 inches below the base of the tank excavation. The soil samples were analyzed for TPH by Bionetics Analytical Laboratories of Hampton, Virginia using EPA Method 418.1. TPH was detected in the composite sample and the discrete sample at concentrations of 78 mg/kg and 940 mg/kg, respectively. The soil sample collected 12-inches below the base of the tank excavation was reanalyzed. The second analytical result for this sample contained TPH at 892 mg/kg.

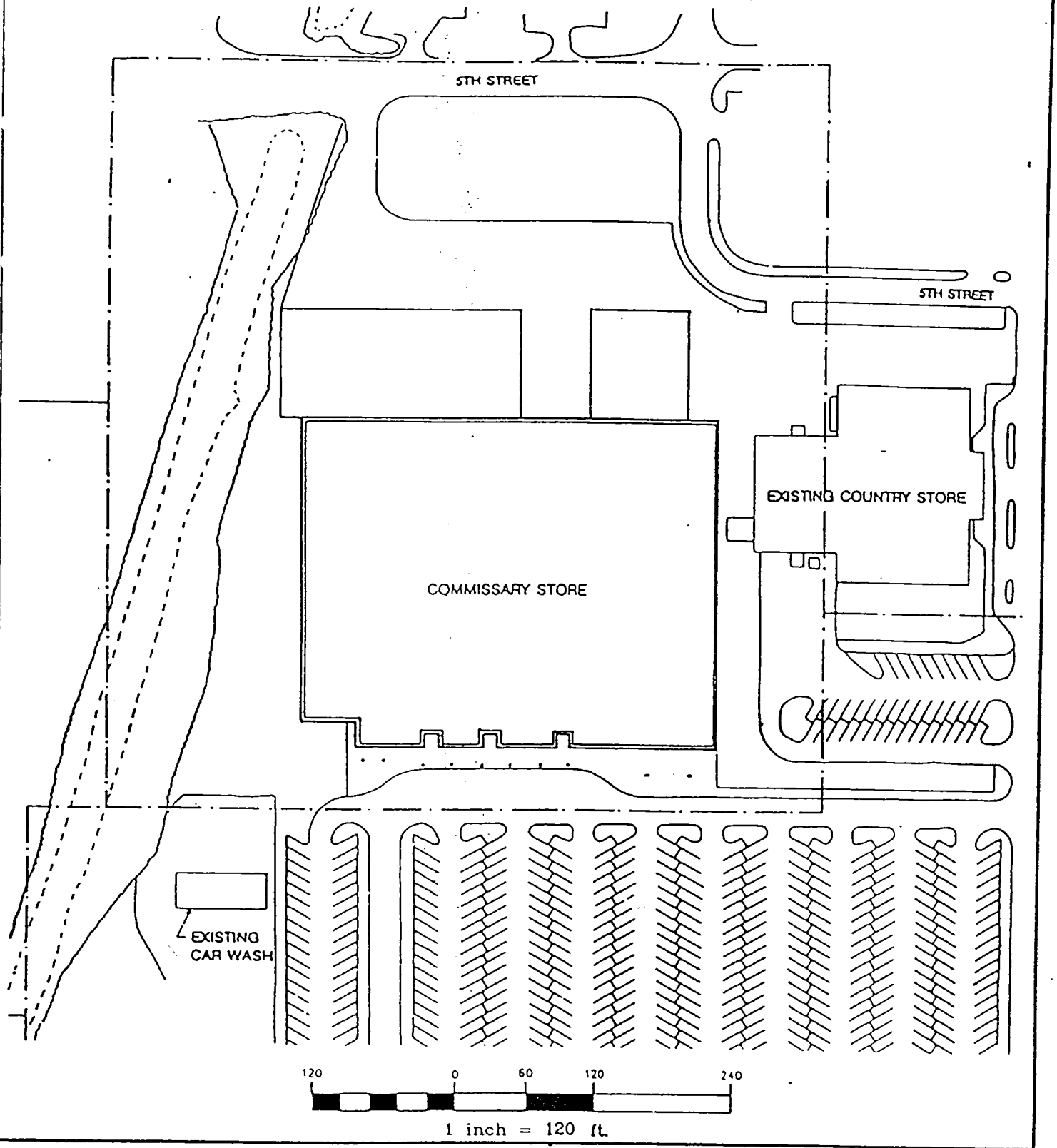


FIGURE 1-1
SITE LOCATION MAP

THE COMMISSARY CONSTRUCTION PROJECT
NAVAL AMPHIBIOUS BASE LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

UST 3329-2, a 100 - to 150-gallon, steel tank was located at the southeast corner of Building 3329. This UST appeared to contain #2 fuel oil. During excavation, the backhoe ruptured the tank, releasing approximately 10 gallons of product into the soil. The soil in the area of the spill was stained and released a strong petroleum odor. Petroleum contaminated soil was excavated to the water table, about 6 feet below the ground surface. The excavated soil were removed from the site for treatment/disposal. Two post excavation soil samples were collected from the base of the excavation and analyzed for TPH. TPH was detected in the two post excavation soil samples at concentrations of 1,360 mg/kg and 1,290 mg/kg. Excavated soil was sampled, analyzed, and transported to the NAB soil containment facility located on site.

The Initial Abatement Measures and Site Check Reports were submitted to Mr. Thomas Madigan of the Virginia State Water Control Board on January 10, 1992 as required by the Commonwealth of Virginia Regulation VR 680-13-02, Section 6.3.

2.0 PURPOSE AND OBJECTIVES

The objective of this task is to provide data and technical support to supplement the "Initial Abatement and Site Check Reports" submitted to the VSWCB on January 10, 1992 and provided in Appendix A. This work was performed under Contract N62470-89-D-4814, CTO 0088.

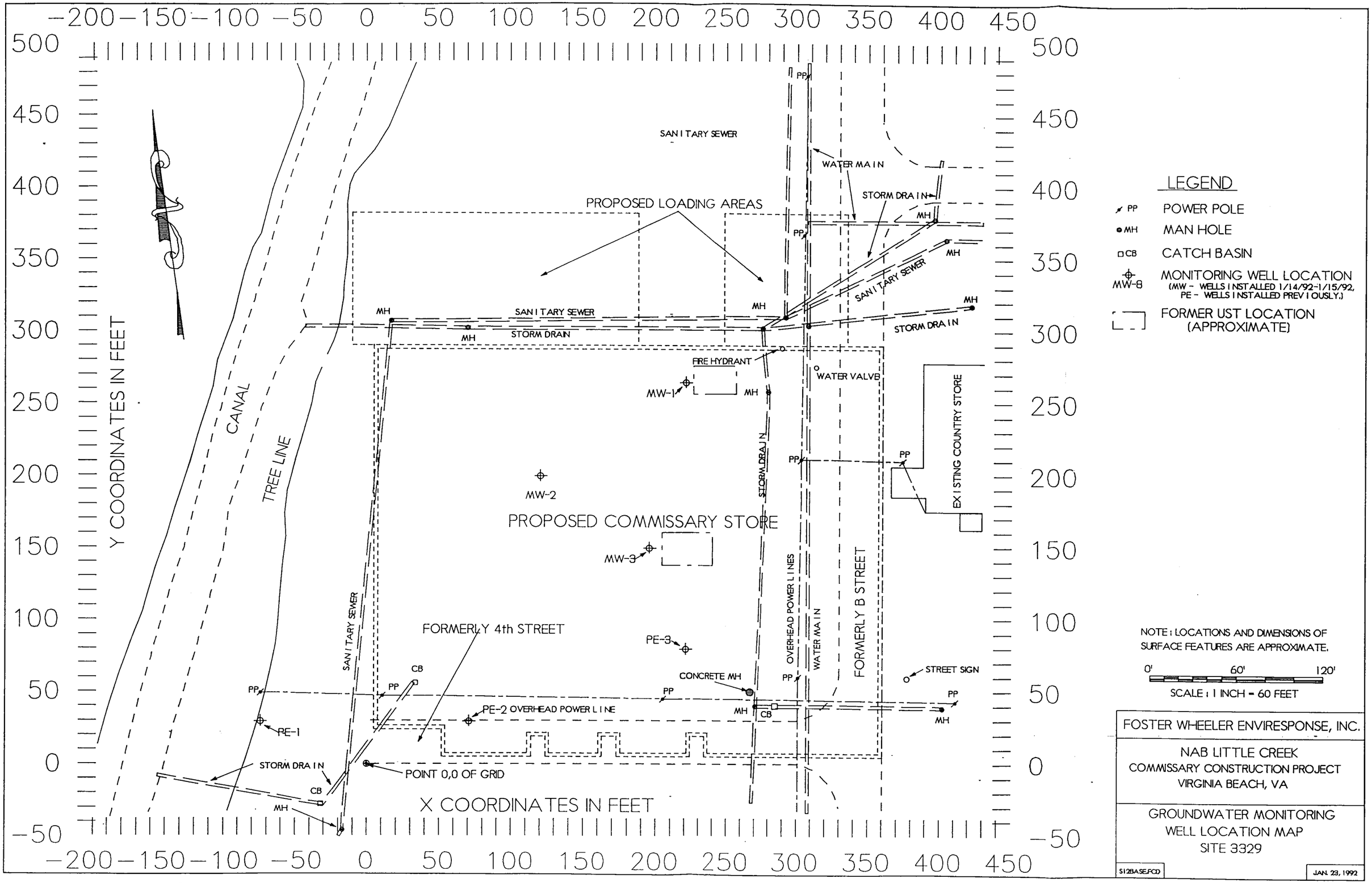
The purpose of this task was to collect additional data to further evaluate the former UST locations at Site 3329. The evaluation consisted of drilling, sampling and analysis, and a geophysical investigation to determine if additional USTs exist within the construction site. The borings/monitoring wells were installed to determine the absence or presence of constituents of concern that may have migrated from the former UST excavations into the adjacent soils and groundwater.

3.0 FIELD INVESTIGATION AND OBSERVATIONS

On January 14, 1992, the Baker Team personnel and Industrial Marine Services (IMS), a drilling contractor, mobilized to the site. Three boring locations were selected based on the review of available background information and discussions with NAB personnel. The borings were developed into groundwater monitoring wells. These borings were located west and generally downgradient in groundwater flow direction from the former USTs. Figure 3-1 identifies the approximate location of the former USTs and monitoring wells. One soil boring was placed adjacent to each preexisting UST excavation and the third was situated approximately 100 feet from the two former USTs. The NAB personnel marked the boring locations based on their understanding of the former tank locations.

During drilling operations, continuous soil sampling was conducted with a 2-foot split-spoon sampler from the ground surface to 6 feet below ground, the approximate depth of the groundwater table. Continuous air monitoring was conducted using a HNu photoionization detector during drilling activities. The borings were advanced to a depth of 15 feet and developed into groundwater monitoring wells. The monitoring wells were constructed of 2-inch diameter, PVC casing. The monitoring wells were developed by pumping the groundwater from the well into a 55gallon drum for approximately 30 minutes until the water was free of suspended sediments. Forty-eight hours after completion of well development activities, the 3 monitoring wells were purged by removing 3 to 4 well volumes from the casing. Thereafter, the 3 monitoring wells were sampled and analyzed along with 3 pre-existing on-site monitoring wells located south of the former USTs.

On January 15, 1992, a Baker Team geophysical survey crew mobilized on site to conduct a geophysical investigation to determine if any additional, unrecorded tanks were present at the site. Initially, the crew developed a grid system at 20-foot intervals. The Electromagnetic (EM-31) survey was used to detect the presence of subsurface metals, which were subsequently defined by the use of Ground Penetrating Radar (GPR).



FOSTER WHEELER ENVIRESPONSE, INC.

NAB LITTLE CREEK
COMMISSARY CONSTRUCTION PROJECT
VIRGINIA BEACH, VA

GROUNDWATER MONITORING
WELL LOCATION MAP
SITE 3329

S12BASE.FCD

JAN. 23, 1992

FIGURE 3-1

4.0 SAMPLING AND RESULTS

Nine soil samples and six groundwater samples were analyzed for the UST evaluation. In addition, two QA/QC soil samples and one QA/QC groundwater sample were collected. Sampling was conducted in accordance with the approved sampling plan.

Soil borings #1, #2, and #3 were designated COM-B-01, COM-B-02, and COM-B-03. Appendix B provides a copy of the soil boring logs. At each soil boring location, three 2-foot, split-spoon samples were collected to the depth of 6 feet.The sampling intervals were at 0-2 feet, 2-4 feet, and 4-6 feet below the ground surface. Sample COM-B-01-04, a duplicate sample of COM-B-01-03 was collected for QA/QC. HNu readings were not observed above background levels during field screening of the soil.

Groundwater samples were collected from the newly installed monitoring wells and the three pre-existing on-site wells. Prior to sampling, groundwater elevations were measured and are provided in Table 4-1. The new monitoring wells were designated by sample numbers COM-MW-1, COM-MW-2, and COM-MW-3, each corresponding to the soil boring location numbers. Table 4-2 provides a corresponding soil and groundwater sample key. Sample COM-MW-4 is a duplicate of COM-MW-3 and was collected for QA/QC. The preexisting wells were referred to by sample numbers COM-PE-1, COM-PE-2, and COM-PE-3.

Solutions Laboratories, Inc. of Chesapeake, Virginia and CEIMIC Corporation of Narraganesett, Rhode Island performed chemical analyses of the soil and groundwater samples. The samples were analyzed for TPH by EPA Method 8015 and benzene, toluene, ethylbenzene and xylene (BTEX) by EPA Method 8020. Selected discrete samples were collected and analyzed for Target Compound List, (TCL) volatile organics, semivolatile organics, pesticides/PCBs and Target Analyte List (TAL) metals. In addition, one composite soil sample was collected at each borehole and was subjected to the Toxicity Characteristic Leaching Procedure (TCLP) and analyzed for volatile organic compounds, semivolatile compounds, pesticides/PCB organics, and TCLP metals. Tables 4-3 and 4-4 provide the analytical results from the soil and groundwater sampling. The analytical results indicate that TPH and BTEX were not detected in any of the soil or groundwater samples. Appendix C provides Solutions Laboratories, Inc. analytical results. The presence of TCLP volatile organic compounds, TCLP semivolatile compounds, TCLP pesticides/PCB organics, and TCLP metals were not detected in the composite borehole samples. Table 4-5 provides the analytical results of the composite borehole samples. In addition, the presence of TCL volatile organics, TCL

TABLE 4-1

GROUNDWATER ELEVATION RESULTS
COMMISSARY CONSTRUCTION SITE
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JANUARY 16, 1992

GROUNDWATER MONITORING WELL NUMBER	MEASUREMENT DATE	TOP OF CASING ELEVATION ABOVE MSL (FEET)	DEPTH OF GROUNDWATER BELOW TOP OF CASING (FEET)	GROUNDWATER ELEVATION ABOVE MSL (FEET)
PE-1	1/16/92	13.62	6.99	6.63
PE-2	1/16/92	14.09	7.13	6.96
PE-3	1/16/92	13.28	6.34	6.94
MW-1	1/16/92	14.37	7.31	7.06
MW-2	1/16/92	15.47	8.40	7.07
MW-3	1/16/92	14.91	7.67	7.24

NOTE:
MSL indicates Mean Sea Level

TABLE 4-2

SOIL AND WATER SAMPLE LOCATION KEY
JANUARY 14 - 16, 1992
COMMISSARY CONSTRUCTION SITE
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA

SAMPLE TYPE	SAMPLE LOCATION					
	COM-B-01 (MW-1)	COM-B-02 (MW-2)	COM-B-03 (MW-3)	Pre-existing Well 1	Pre-existing Well 2	Pre-existing Well 3
Soil Samples for TPH and BTEX Analysis	COM-B-01-01-S COM-B-01-02-S COM-B-01-03-S COM-B-01-04-S*	COM-B-02-01-S COM-B-02-02-S COM-B-02-03-S	COM-B-03-01-S COM-B-03-02-S COM-B-03-03-S	N/A	N/A	N/A
Water Samples for TPH and BTEX Analysis	COM-MW-1	COM-MW-2	COM-MW-3 COM-MW-4**	COM-PE-1	COM-PE-2	COM-PE-3
Soil Samples for TCL VOA, BNA Pesticides/PCB and Metals	COM-B-01-02-SS	COM-B-02-02-SS COM-B-02-04-SS#	COM-B-03-02-SS	N/A	N/A	N/A
Soil Samples for TCL VOA and BNA	COM-B-01-03-SS	COM-B-02-03-SS	COM-B-03-03-SS	N/A	N/A	N/A
Soil Samples for TCLP VOA, BNA Pesticides/PCB and Metals	COM-B-01-BHC-S	COM-B-02-BHC-S	COM-B-03-BHC-S COM-B-04-BHC-S@	N/A	N/A	N/A

NOTES:
* indicates sample is the duplicate of COM-B-01-03-S
** Indicates sample is the duplicate of COM-MW-3
# Indicatee sample is the duplicate of COM-B-02-02-SS
@ Indicates sample is the duplicate of COM-B-03-BHC-S

TABLE 4-3

SOIL ANALYTICAL RESULTS
TOTAL PETROLEUM HYDROCARBONS AND BTEX
COMMISSARY CONSTRUCTION SITE
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JANUARY 14, 1992

SOIL BORING LOCATION	COM-B-01				COM-B-02			COM-B-03			TRIP BLANK
SAMPLE NUMBER	01-S	02-S	03-S	04-S	01-S	02-S	03-S	01-S	02-S	03-S	
SAMPLE DEPTH	0 - 2 ft.	2 - 4 ft.	4 - 6 ft.	(Dup.COM-B-01-03-S	0 - 2 ft.	2 - 4 ft.	4 - 6 ft.	0 - 2 ft.	2 - 4 ft.	4 - 6 ft.	
SAMPLE MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Water
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
BTEX ANALYSIS:											
Benzene											
Toluene											
Ethylbenzene											
Total Xylene			0.74 J	0.79 J					0.79 J		
Total BTEX			0.74	0.79					0.79		
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/l
TOTAL PETROLEUM HYDROCARBONS:			0.91 J								

NOTES:
Blank indicates compound was not detected
ug/kg indicates micrograms per kilogram
mg/kg indicates milligrams per kilogram
ug/l indicates micrograms per liter
J indicates concentration is estimated

TABLE 4-4

GROUNDWATER MONITORING ANALYTICAL RESULTS
TOTAL PETROLEUM HYDROCARBONS AND BTEX
COMMISSARY CONSTRUCTION SITE
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JANUARY 16, 1992

SAMPLE NUMBER GROUNDWATER MONITORING WELL NUMBER SAMPLE MATRIX UNITS	COM-PE-1 PE-1 Water mg/l	COM-PE-2 PE-2 Water mg/l	COM-PE-3 PE-3 Water mg/l	COM-MW-1 MW-1 Water mg/l	COM-MW-2 MW-2 Water mg/l	COM-MW-3 MW-3 Water mg/l
BTEX ANALYSIS: Benzene Toluene Ethylbenzene Total Xylene Total BTEX						
UNITS	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
TOTAL PETROLEUM HYDROCARBONS:	0.25				0.03 J	0.02 J

NOTES:
Blank indicates compound was not detected
mg/l indicates milligrams per liter
ug/l indicates micrograms per liter
J indicates concentration is estimated

TABLE 4-5

SOIL ANALYTICAL RESULTS
TCLP VOLATILE ORGANIC ANALYSIS
COMMISSARY CONSTRUCTION SITE
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JANUARY 14, 1992

SAMPLE NUMBER SOIL BORING LOCATION SAMPLE MATRIX UNITS	COM-B-01-BHC-S B-01 (MW-1) Soil ug/l	COM-B-02-BHC-S B-02 (MW-2) Soil ug/l	COM-B-03-BHC-S B-03 (MW-3) Soil ug/l	COM-B-04-BHC-S (Dup.COM-B-03-BHC-S) Soil ug/l
TCLP VOLATILE ORGANICS:				
Benzene				
Carbon Tetrachloride				
Chlorobenzene				
Chloroform				
1,2-Dichloroethane				
1,1-Dichloroehtylene				
Methylethylketone				
Tetrachloroethylene				
Trichloroethylene				
Vinyl Chloride				

NOTES:
Blank indicates compound was not detected
ug/l indicates micrograms per liter

TABLE 4-5 (CONTINUED)

SOIL ANALYTICAL RESULTS
TCLP SEMI-VOLATILE ORGANIC ANALYSIS
COMMISSARY CONSTRUCTION SITE
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JANUARY 14, 1992

SAMPLE NUMBER SOIL BORING LOCATION SAMPLE MATRIX UNITS	COM-B-01-BHC-S B-01 (MW-1) Soil ug/l	COM-B-02-BHC-S B-02 (MW-2) Soil ug/l	COM-B-03-BHC-S B-03 (MW-3) Soil ug/l	COM-B-04-BHC-S (Dup.COM-B-03-BHC-S) Soil ug/l
TCLP SEMI-VOLATILE ORGANICS:				
Pyridine				
2,4-Dinitrotolune				
Hexachlorobenzene				
Hexachloro-1,3-butadiene				
Hexachloroethane				
Nitrobenzene				
1,4-Dichlorobenzene				
Methylphenols (total)				
Pentachlorophenol				
2,4,5-Trichlorophenol				
2,4,6-Trichlorophenol				

NOTES:
Blank indicates compound was not detected
ug/l indicates micrograms per liter

TABLE 4-5 (CONTINUED)

SOIL ANALYTICAL RESULTS
ORGANOCHLORINE PESTICIDES ANALYSIS
COMMISSARY CONSTRUCTION SITE
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JANUARY 14, 1992

SAMPLE NUMBER SOIL BORING LOCATION SAMPLE MATRIX UNITS	COM-B-01-BHC-S B-01 (MW-1) Soil ug/l	COM-B-02-BHC-S B-02 (MW-2) Soil ug/l	COM-B-03-BHC-S B-03 (MW-3) Soil ug/l	COM-B-04-BHC-S (Dup.COM-B-03-BHC-S) Soil ug/l
ORGANOCHLORINE PESTICIDES:				
gamma-BHC (Lindane)				
Heptachlor				
Heptachlor Epoxide				
Endrin				
Methoxychlor				
Toxaphene				
Chlordane				

NOTES:
Blank indicates compound was not detected
ug/l indicates micrograms per liter

TABLE 4-5 (CONTINUED)

SOIL ANALYTICAL RESULTS
TCLP METALS ANALYSIS
COMMISSARY CONSTRUCTION SITE
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JANUARY 14, 1992

SAMPLE NUMBER SOIL BORING LOCATION SAMPLE MATRIX UNITS	COM-B-01-BHC-S B-01 (MW-1) Soil mg/l	COM-B-02-BHC-S B-02 (MW-2) Soil mg/l	COM-B-03-BHC-S B-03 (MW-3) Soil mg/l	COM-B-04-BHC-S (Dup.COM-B-03-BHC-S) Soil mg/l
TCLP METALS:				
Arsenic				
Barium	0.47	0.39	0.39	0.53
Cadmium				
Chromium	0.01		0.02	0.01
Lead				
Mercury				
Selenium				
Silver				

NOTES:
Blank indicates compound was not detected
mg/l indicates milligrams per liter

semivolatile organics, TCL pesticides/PCBs and TAL metals were not detected in the selected discrete samples collected. Table 4-6 provides analytical results of the selected discrete borehole samples.

The results of the geophysical investigation indicated the presence of subsurface objects such as utilities, sewer lines, and a few small metal objects. The results indicated that no additional USTs exist within the site perimeter. Figure 4-1 provides an Interpretation Map of the geophysical investigation.

TABLE 4-6

SOIL ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
COMMISSARY CONSTRUCTION SITE
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JANUARY 14, 1992

SAMPLE NUMBER SOIL BORING LOCATION SAMPLE MATRIX UNITS	COM-B-01-02-SS B-01 (MW-1) Soil µg/kg	COM-B-01-03-SS B-01 (MW-1) Soil µg/kg	COM-B-02-02-SS B-02 (MW-2) Soil µg/kg	COM-B-02-03-SS B-02 (MW-2) Soil µg/kg	COM-B-02-04-SS (Dup.COM-B-02-03-SS) Soil µg/kg	COM-B-03-02-SS B-03 (MW-3) Soil µg/kg	COM-B-03-03-SS B-03 (MW-3) Soil µg/kg	COM-B-03-ER Equipment Rinse Water ug/l	COM-B-03-ERD Distilled Blank Water ug/l	TRIP BLANK Water ug/l
VOLATILE ORGANIC COMPOUNDS:										
Chloromethane										
Bromomethane										
Vinyl Chloride										
Chloroethane										
Methylene Chloride								4 BJ	4 BJ	86 B
Acetone		11 BJ	24 B	8 BJ	21 B		5 BJ			
Carbon Disulfide										
1,1-Dichloroethene										
1,1-Dichloroethane										
1,2-Dichloroethene (total)										
Chloroform										
1,2-Dichloroethane										
2-Butanone										
1,1,1-Trichloroethane			1 BJ							
Carbon Tetrachloride										
Bromodichloromethane										
1,2-Dichloropropane										
cis-1,3-Dichloropropene										
Trichloroethene										
Dibromochloromethane										
1,1,2-Trichloroethane										
Benzene										
trans-1,3-Dichloropropene										
Bromoform										
4-Methyl-2-Pentanone										
2-Hexanone										
Tetrachloroethene										
1,1,2,2-Tetrachloroethane										
Toluene										
Chlorobenzene										
Ethylbenzene										
Styrene										
Xylene (total)										
TOTAL VOCs:		11	25	8	21		5	4	4	86
TOTAL TICs:										

NOTES:
Blank indicates compound was not detected
µg/l indicates micrograms per liter
µg/kg indicates micrograms per kilogram
B indicates compound was detected in lab blank
J indicates an estimated value
Dup. indicates duplicate of previous sample

TABLE 4-6 (CONTINUED)

SOIL ANALYTICAL RESULTS
BASE/NEUTRAL SEMI-VOLATILE ORGANIC COMPOUNDS
COMMISSARY CONSTRUCTION SITE
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JANUARY 14, 1992

SAMPLE NUMBER SOIL BORING LOCATION SAMPLE MATRIX UNITS	COM-B-01-02-SS B-01 (MW-1) Soil µg/kg	COM-B-01-03-SS B-01 (MW-1) Soil µg/kg	COM-B-02-02-SS B-02 (MW-2) Soil µg/kg	COM-B-02-03-SS B-02 (MW-2) Soil µg/kg	COM-B-02-04-SS (Dup.COM-B-02-03-SS) Soil µg/kg	COM-B-03-02-SS B-03 (MW-3) Soil µg/kg	COM-B-03-03-SS B-03 (MW-3) Soil µg/kg
BASE/NEUTRAL ORGANIC COMPOUNDS:							
2,4-Dinitrophenol							
4-Nitrophenol							
Dibenzofuran							
2,4-Dinitrotoluene							
Diethylphthalate							
4-Chlorophenyl-phenylether							
Fluorene							
4-Nitroaniline							
4,6-Dinitro-2-Methylphenol							
N-Nitrosodiphenylamine							
4-Bromophenyl-phenylether							
Hexachlorobenzene							
Pentachlorophenol							
Phenanthrene							
Anthracene							
Carbazole							
Di-n-Butylphthalate							
Fluoranthene							
Pyrene							
Butylbenzylphthalate							
3,3'-Dichlorobenzidine							
Benzo (a) Anthracene							
Chrysene							
bis (2-Ethylhexyl) Phthalate	350 J	77 J	320 J	90 J	310 J	120 J	150 J
Di-n-Octyl Phthalate							
Benzo (b) Fluoranthene							
Benzo (k) Fluoranthene							
Benzo (a) Pyrene							
Indeno (1,2,3-cd) Pyrene							
Dibenz (a,h) Anthracene							
Benzo (g,h,i) Perylene							

NOTES:
Blank indicates compound was not detected
µg/kg indicates micrograms per kilogram
J indicates an estimated value
Dup. indicates duplicate of previous sample

TABLE 4-6 (CONTINUED)

SOIL ANALYTICAL RESULTS
BASE/NEUTRAL SEMI-VOLATILE ORGANIC COMPOUNDS
COMMISSARY CONSTRUCTION SITE
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JANUARY 14, 1992

SAMPLE NUMBER SOIL BORING LOCATION SAMPLE MATRIX UNITS	COM-B-01-02-SS B-01 (MW-1) Soil µg/kg	COM-B-01-03-SS B-01 (MW-1) Soil µg/kg	COM-B-02-02-SS B-02 (MW-2) Soil µg/kg	COM-B-02-03-SS B-02 (MW-2) Soil µg/kg	COM-B-02-04-SS (Dup.COM-B-02-03-SS) Soil µg/kg	COM-B-03-02-SS B-03 (MW-3) Soil µg/kg	COM-B-03-03-SS B-03 (MW-3) Soil µg/kg
BASE/NEUTRAL ORGANIC COMPOUNDS (CONTINUED):							
Phenol							
bis (2-Chloroethyl) Ether							
2-Chlorophenol							
1,3-Dichlorobenzene							
1,4-Dichlorobenzene							
1,2-Dichlorobenzene							
2-Methylphenol							
2,2'-oxybis (1-Chloropropane)							
4-Methylphenol							
N-Nitroso-Di-n-Propylamine							
Hexachloroethane							
Nitrobenzene							
Isophorone							
2-Nitrophenol							
2,4-Dimethylphenol							
bis (2-Chloroethoxy) Methane							
2,4-Dichlorophenol							
1,2,4-Trichlorophenol							
Naphthalene							
4-Chloroaniline							
Hexachlorobutadiene							
4-Chloro-3-Methylphenol							
2-Methylnaphthalene							
Hexachlorocyclopentadiene							
2,4,6-Trichlorophenol							
2,4,5-Trichlorophenol							
2-Chloronaphthalene							
2-Nitroaniline							
Dimethyl Phthalate							
Acenaphthylene							
2,6-Dinitrotoluene							
3-Nitroaniline							
Acenaphthene							
TOTAL BASE/NEUTRAL ORGANIC COMPOUNDS:	350	77	320	90	310	120	150
TOTAL BASE/NEUTRAL ORGANIC COMPOUNDS (1):							
TOTAL TICs:	34,734 ABJN	24,763 ABJN	35,588 ABJN	51,230 ABJN	34,520 ABJN	31,570 ABJN	26,920 ABJN

NOTES:
Blank indicates compound was not detected
µg/kg indicates micrograms per kilogram
A indicates the TIC is a suspected aldol-condensation product
B indicates analyte found in blank as well as in sample
J indicates an estimated value
N indicates spiked sample recovery not within control limits
Dup. indicates duplicate of previous sample
(1) Indicates total does not include Dimethyl Phthalate, Di-n-butyl phthalate, and bis (2-Ethylhexyl) Phthalate

TABLE 4-6 (CONTINUED)

SOIL ANALYTICAL RESULTS
TOTAL METALS ANALYSIS
COMMISSARY CONSTRUCTION SITE
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JANUARY 14, 1992

SAMPLE NUMBER SOIL BORING LOCATION SAMPLE MATRIX UNITS	COM-B-01-02-SS B-01 (MW-1) Soil ug/kg		COM-B-02-02-SS B-02 (MW-2) Soil ug/kg		COM-B-02-04-SS (Dup.COM-B-02-02-SS) Soil ug/kg		COM-B-03-02-SS B-03 (MW-3) Soil ug/kg	
TOTAL METALS:								
Aluminum	15,300.00		14,300.00		1,870.00		9,950.00	
Antimony								
Arsenic	2.90		2.50		0.55	B	1.80	B
Barium	49.80		50.90		7.60	B	30.60	B
Beryllium	0.65	B	0.61	B	0.66	B	0.58	B
Cadmium					1.30			
Calcium	251.00	B	661.00	B	27.90	B	60.00	B
Chromium	17.00		14.90		3.40		11.90	
Cobalt			2.20	B				
Copper	5.40		6.30		1.80	B	4.10	B
Iron	11,300.00	E	10,700.00	E	1,070.00	E	8,350.00	E
Lead	9.70		8.70		1.20		7.80	
Magnesium	987.00	B	936.00	B	145.00	B	491.00	B
Manganese	31.30		41.50		3.80		10.90	
Mercury								
Nickel	10.20		9.20		5.10	B	6.00	B
Potassium	510.00	B	488.00	B	147.00	B	356.00	B
Selenium								
Silver			0.29	B				
Sodium	403.00	B	366.00	B	44.50	B	303.00	B
Thallium	0.21	B					0.21	B
Vanadium	21.30		17.60		2.30	B	14.40	
Zinc	16.30		16.80		2.50	B	8.60	

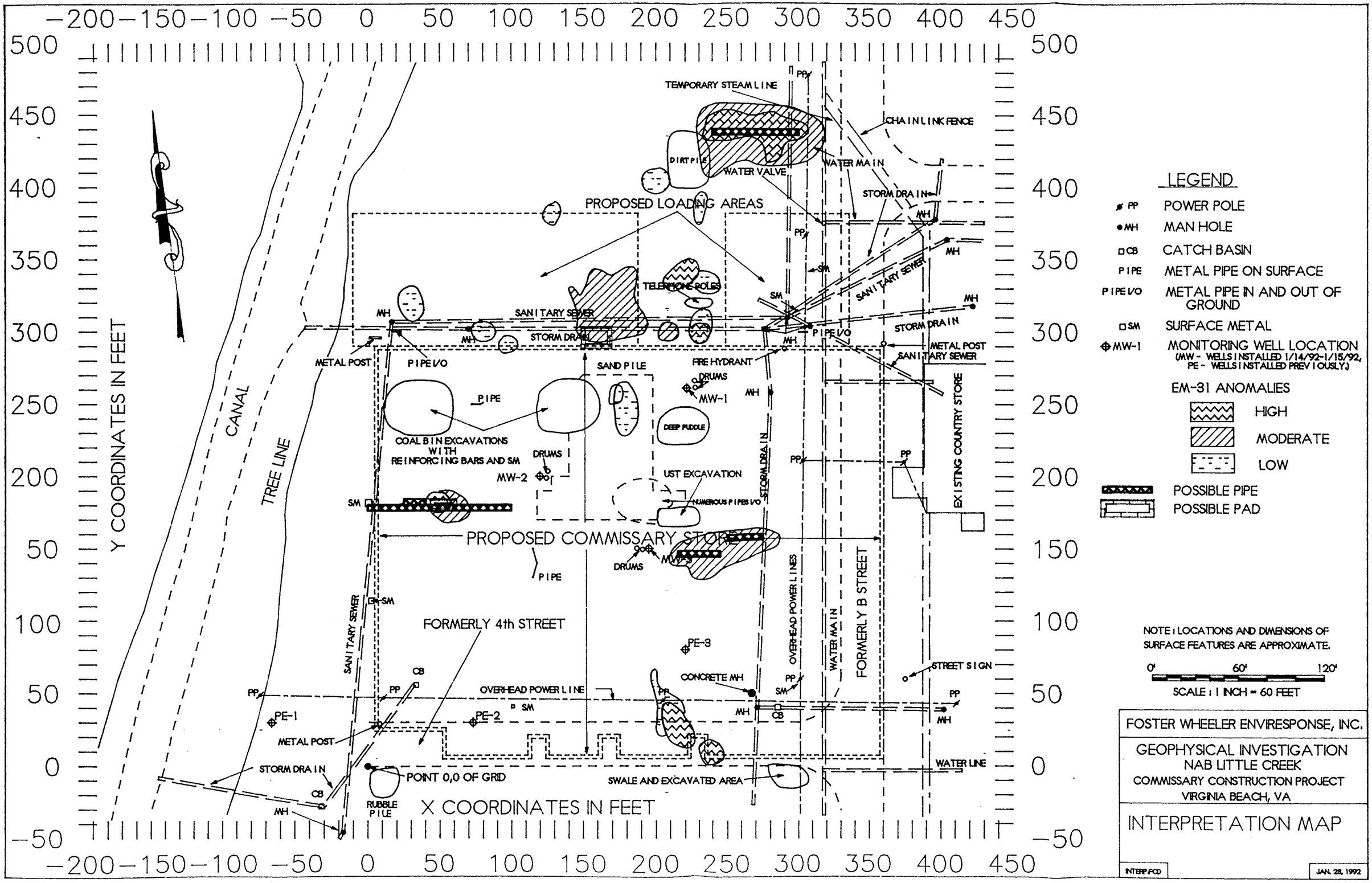
NOTES:
Blank indicates compound was not detected
ug/kg indicates micrograms per kilogram
B indicates compound was detected in lab blank
E indicates value is estimated due to matrix interference

TABLE 4-6 (CONTINUED)

SOIL ANALYTICAL RESULTS
PESTICIDE ORGANICS ANALYSIS
COMMISSARY CONSTRUCTION SITE
NAVAL AMPHIBIOUS BASE - LITTLE CREEK
VIRGINIA BEACH, VIRGINIA
JANUARY 14, 1992

SAMPLE NUMBER SOIL BORING LOCATION SAMPLE MATRIX UNITS	COM-B-01-02-SS B-01 (MW-1) Soil ug/kg	COM-B-02-02-SS B-02 (MW-2) Soil ug/kg	COM-B-02-04-SS (Dup.COM-B-02-02-SS) Soil ug/kg	COM-B-03-02-SS B-03 (MW-3) Soil ug/kg
PESTICIDE ORGANICS:				
alpha-BHC				
beta-BHC				
delta-BHC				
gamma-BHC (Lindane)				
Heptachlor				
Aldrin				
Heptachlor epoxide				
Endosulfan I				
Dieldrin				
4,4'-DDE				
Endrin				
Endosulfan II				
4,4'-DDD				
Endosulfan sulfate				
4,4'-DDT				
Methoxychlor				
Endrin ketone				
Endrin aldehyde				
alpha-Chlodane				
gamma-Chlodane				
Toxaphene				
Aroclor-1016				
Aroclor-1221				
Aroclor-1232				
Aroclor-1242				
Aroclor-1248				
Aroclor-1254				
Aroclor-1260				

NOTES:
Blank indicates compound was not detected
ug/kg indicates micrograms per kilogram



LEGEND

- PP — POWER POLE
- MH — MAN HOLE
- CB — CATCH BASIN
- PIPE — METAL PIPE ON SURFACE
- PIPE I/O — METAL PIPE IN AND OUT OF GROUND
- SM — SURFACE METAL
- MW-1 — MONITORING WELL LOCATION (MW - WELLS INSTALLED 1/14/92-1/15/92, PE - WELLS INSTALLED PREVIOUSLY)

EM-31 ANOMALIES

- HIGH
- MODERATE
- LOW
- POSSIBLE PIPE
- POSSIBLE PAD

NOTE: LOCATIONS AND DIMENSIONS OF SURFACE FEATURES ARE APPROXIMATE.

0' 60' 120'

SCALE: 1 INCH = 60 FEET

FOSTER WHEELER ENVIRESPONSE, INC.

GEOPHYSICAL INVESTIGATION
NAB LITTLE CREEK
COMMISSARY CONSTRUCTION PROJECT
VIRGINIA BEACH, VA

INTERPRETATION MAP

INTERP.FCD

JAN. 28, 1992

FIGURE 4-1

5.0 CONCLUSIONS

The results of the investigation conducted by the Baker Team indicate that the soils and groundwater samples collected in proximity to the location of the two former USTs at Site 3329 did not detect concentrations of TPH and BTEX. The presence of TCLP volatile organic compounds, TCLP semivolatile compounds, TCLP pesticides/PCB, TCLP metals, TCL volatile organics, TCL semivolatile organics, TCL pesticides/PCB, and TAL metals were not detected in the selected samples collected.

Although soil samples collected from the tank excavation during initial abatement activities revealed elevated TPH concentrations, the site check performed by the Baker Team revealed no evidence of contamination in soils or groundwater in the investigation area.

Appendix A
Initial Abatement and Site Check Reports

RECEIVED
FEB 13 1992

DEPARTMENT OF THE NAVY
NAVAL AMPHIBIOUS BASE, LITTLE CREEK
NORFOLK, VIRGINIA 23521-5000

11010
Ser N492:SMS/0102
10 JAN 1992

State Water Control Board
Tidewater Regional Office
Attn: Mr. Tom Madigan
287 Pembroke Office Park
Suite 310 Pembroke No. 2
Virginia Beach, VA 23462-2955

Post-it™ brand fax transmittal memo 7671	# of pages ▸ 11
To Doug Locy	From Anne M
Co. FWE7	Co. NAB
Dept.	Phone # 804 363 4846
Fax # (614) 438-7549	Fax # 804 464 7060

Dear Mr. Madigan:

As discussed in a January 2, 1992 telephone conversation with Ms. Stephanie Spore of NAB Little Creek, enclosures (1) and (2) provide Initial Abatement and Site Check Report for site 3329, Naval Amphibious Base, Little Creek, Norfolk, Virginia. For your information, enclosure (3) is a copy of the notification forms for underground storage tanks 3329-1 and 3329-2 sent to your Richmond, VA headquarters. Per the January 2, 1992 telephone conversation, the adjacent underground storage tank sites 3329-1 and 3329-2 will be treated as one site (3329). NAB Little Creek has requested funding and technical assistance from the Atlantic Division, Naval Facilities Engineering Command, to conduct site check activities and complete a Site Characterization Report for site 3329. Upon completion, this assessment will be forwarded to the State Water Control Board (SWCB). My point of contact is Ms. Anne Marple at 363-4846.

Sincerely,

W. L. NIVEN
By direction

Encl:
(1) Initial Abatement and Site Check Report for UST 3329-1, NAB, Little Creek, Norfolk, VA
(2) Initial Abatement and Site Chook Report for UST 3329-2, NAB, Little Creek, Norfolk, VA
(3) Notification Forms

Copy to:
Commander, Atlantic Division
Naval Facilities Engineering Command
Norfolk, VA 23511-6287

INITIAL ABATEMENT AND SITE CHECK REPORT

FOR UST 3329-1

AT SITE 3329

NAVAL AMPHIBIOUS BASE, LCREEK

JANUARY 2, 1992

RECEIVED
FEB 13 1992

INITIAL ABATEMENT MEASURES AND SITE CHECK REPORT

SITE 3329 - UST # 3329-1

INTRODUCTION:

Underground storage tank 3329-1, a 550 gallon waste oil tank, was discovered and removed by an outside contractor for a military construction project on December 5, 1991. The tank was intact upon removal with no apparent holes, scratches or staining from potential leaks. The soil under the tank and in the tank bed had no odor nor discoloration. The tank had waste oil inside it which was pumped out and disposed of properly. There was no apparent reason to suspect that the tank had leaked since it was intact and there were no odors nor discoloration observed in the soil nor on the tank. A composite soil sample was taken from the tank bed surface and a core soil sample was taken approximately 12 inches below the tank bed with a decontaminated hand auger to measure total petroleum hydrocarbons (TPH). There was no odor nor discoloration in either of the samples and the adjacent soil. The soil samples were refrigerated and picked up for testing by Bionetics Analytical Laboratories Division of Hampton, VA. Bionetics then sent the samples to their subcontractor, Marine Chemists for analysis. Unofficial laboratory results were received by the NAVPHIBASE LCREEK Underground Storage Tank Program Manager on December 18, 1991. The testing method used was EPA 418.1 and the detection limit was 10 PPM, mg/kg.

The unofficial soil sample analysis results indicated 78 ppm for the composite soil sample taken from the tank bed surface and 940 ppm for the core soil sample taken approximately 12 inches below the tank bed. Since the soil sample had no odor nor discoloration and the tank was a intact waste oil tank, an error in the lab analysis was suspected and the sample was retested by the subcontracting laboratory. The retest results were received by the NAVPHIBASE LCREEK Underground Storage Tank Program Manager on January 2, 1992. The retest results for the core soil sample taken approximately 12 inches below the tank bed indicated contamination with a reading of 892 PPM. This contamination and all the laboratory results were reported on January 2, 1992 (within twenty four (24) hours) to Mr. Tom Madigan of the State Water Control Board. This report identifies the initial abatement measures and site check actions taken by NAVPHIBASE LCREEK as required by the Commonwealth of Virginia regulation, VR 680-13-02, Section 6.3.

INITIAL ABATEMENT MEASURES AND SITE CHECK ACTIONS:

PRODUCT REMOVAL:

When the tank was discovered, it was more than half full. Product was removed from the tank by an NAB LCREEK waste oil truck and disposed of properly. The tank was removed and disposed of by the military construction project contractor. Any potential sources of contamination (tank and product) were removed, thus eliminating potential releases of product to the environment.

INSPECTION OF RELEASE:

This suspected release was an underground release. Visual inspection of the site did not identify free product, soil, nor ground water contamination.

FIRE AND SAFETY HAZARDS:

No safety hazards were identified before, during, nor after the tank removal.

CONTAMINATED SOIL HAZARDS:

During excavation the hazards posed by exposure to personnel from contaminated soils were remedied by securing each area with barriers and siltation fences. The site is an active open air construction site of approximately 4.5 acres so it was not deemed necessary to "gas free" the site. All areas will remain properly secured until the site is filled and graded.

MEASUREMENT FOR RELEASE:

After the tank removal, soil samples were taken as described in the Introduction. Soil contamination was found at site 3329, as evidenced by the final TPH readings of 78 PPM and 892 PPM. NAB LCREEK has requested funding and technical assistance from the Atlantic Division, Naval Facilities Engineering Command, to conduct site check activities and complete a Site Characterization report.

FREE PRODUCT INVESTIGATION:

Free Product has not been identified to date at UST site 3329-1. The contractor will identify, if necessary, the future free product removal methods.

PROPOSED ACTION:

NAB LCREEK has requested funding and technical assistance from the Atlantic Division, Naval Facilities Engineering Command, to conduct site check activities and complete a Site Characterization Report. This assessment will be forwarded to the State Water Control Board (SWCB) as soon as possible. Upon SWCB approval of the Site Characterization for Site 3329, NAB LCREEK will pursue clean-up of the site.

INITIAL ABATEMENT AND SITE CHECK REPORT

FOR UST 3329-2

AT SITE 3329

NAVAL AMPHIBIOUS BASE, LCREEK

JANUARY 2, 1992

RECEIVED
FEB 13 1992

INITIAL ABATEMENT MEASURES AND SITE CHECK REPORT

SITE 3329 - UST # 3329-2

INTRODUCTION:

Underground storage tank 3329-2 was discovered and removed by an outside contractor for a military construction project on December 10, 1991. The underground storage tank 3329-2 of approximately 100-150 gallon capacity was discovered during construction activities associated with building the new commissary on base. Some of the tank contents (approximately 10 gallons) were released to the soil when the tank was discovered by the backhoe operator. When the tank was removed, a previously existing hole was observed on the bottom of the tank. The soil surrounding the tank showed visible stains and a strong fuel odor was detected. The fuel appeared to be very old Number 2 fuel. The contents of the tank, the backhoe bucket, and the initial excavation were pumped until free of spilled product. The recovered product will be transported to Craney Island for treatment. Surrounding soils were excavated down to the water table (approximately 6-7 feet) to remove all traces of fuel odor and visible staining. The contaminated soil was relocated to the soil containment facility on the base. Soil samples were collected from the bottom of the larger excavation which removed the contaminated soil. The soil samples were refrigerated and picked up for testing by Bionetics Analytical Laboratories Division of Hampton, VA. Bionetics then sent the samples to their subcontractor, Marine Chemists for analysis. Laboratory results were received by the NAVPHIBASE LCREEK Environmental Protection Specialist on January 6, 1992. The testing method used was EPA 418.1 and the detection limit was 10 PPM, mg/kg.

The soil sample analysis results were 1360 mg/kg and 1290 mg/kg PPM for the samples taken from the excavation bed bottom and 2.65% (approximately 26,500 PPM). This soil was removed during excavation activities and relocated to the soil containment facility on base. PPM for the sample taken from the side of the excavation. As indicated above, the release was reported immediately on December 10, 1991 to Mr. Tom Madigan of the State Water Control Board. This contamination and all the laboratory results were reported on January 6, 1992 (within twenty four (24) hours) to Mr. Tom Madigan of the State Water Control Board. This report identifies the initial abatement measures and site check actions taken by NAVPHIBASE LCREEK as required by the Commonwealth of Virginia regulation, VR 680-13-02, Section 6.3.

INITIAL ABATEMENT MEASURES AND SITE CHECK ACTIONS:

PRODUCT REMOVAL:

The contents of the tank, the backhoe bucket, and the initial excavation were pumped until free of spilled product. The recovered product will be transported to Craney Island for treatment. Surrounding soils were excavated down to the water table (approximately 6-7 feet) to remove all traces of fuel odor and visible staining. The contaminated soil was relocated to the soil containment facility on the base. The tank was removed and disposed of by the military construction project contractor. Any potential sources of contamination (tank, contaminated soil and product) were removed, thus eliminating potential releases of product to the environment.

INSPECTION OF RELEASE:

This suspected release was predominately an underground release. Some of the tank contents (approximately 10 gallons) were released to the soil when the tank was discovered by the backhoe operator. When the tank was removed, a previously existing hole was observed on the bottom of the tank. The soil surrounding the tank showed visible stains and a strong fuel odor was detected. The fuel appeared to be very old Number 2 fuel.

FIRE AND SAFETY HAZARDS:

No safety hazards were identified before, during, nor after the tank removal.

CONTAMINATED SOIL HAZARDS:

During excavation the hazards posed by exposure to personnel from contaminated soils were remedied by securing each area with barriers and siltation fences. The site is an active open air construction site of approximately 4.5 acres so it was not deemed necessary to "gas free" the site. All areas at the construction site will remain properly secured until the site is filled and graded. The contaminated soil is being stored at the soil containment facility on the base.

MEASUREMENT FOR RELEASE:

After the tank removal, soil samples were taken as described in the Introduction. Soil contamination was found at UST site 3329-2, as evidenced by the TPH readings of 1360 PPM and 1290 PPM. NAB LCREEK has requested funding and technical assistance from the Atlantic Division, Naval Facilities Engineering Command, to conduct site check activities and complete a Site Characterization report.

FEB 13 1992

FREE PRODUCT INVESTIGATION:

Some of the tank contents (approximately 10 gallons) were released to the soil when the tank was discovered by the backhoe operator. The contents of the tank, the backhoe bucket, and the initial excavation were pumped until free of spilled product. The recovered product will be transported to Craney Island for treatment. The contractor will identify, if necessary, the future free product removal methods.

PROPOSED ACTION:

NAB LCREEK has requested funding and technical assistance from the Atlantic Division, Naval Facilities Engineering Command, to conduct site check activities and complete a Site Characterization Report. This assessment will be forwarded to the State Water Control Board (SWCB) as soon as possible. Upon SWCB approval of the Site Characterization for Site 3329, NAB LCREEK will pursue clean-up of the site.

N492

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FEB 13 1992

DEPARTMENT OF THE NAVY
NAVAL AMPHIBIOUS BASE, LITTLE CREEK
NORFOLK, VIRGINIA 23521-5000

11010
Ser N492:SMS/6908
23 DEC 1991

State Water Control Board
211 North Hamilton Street
Richmond, VA 23230

Dear Sir:

As required by section 9002 of the Resource Conservation and Recovery Act, enclosure (1) is forwarded for your use. The notification form identifies two underground storage tanks discovered and removed by an outside contractor for a military construction project. Upon removal of the tanks, soil samples were collected and will be forwarded as soon as possible as part of the UST closure reports. The tanks were out of use since at least 1962 and were not previously inventoried. My point of contact for further information is Ms. Stephanie Spore at A/V 864-4847 or Commercial (804) 363-4847.

Sincerely,

W. L. Hi...
By direction

Encl:
(1) Notification Form
For Removed Underground
Storage Tanks

Encl (1)

[Notificati]on for Underground Storage Tanks

[US]T Program
Virginia Water Control Board
2111 North Hamilton Street
Richmond, Virginia 23230

STATE USE ONLY
I.D. Number
Date Received FEB 1[8] 1992

GENERAL INFORMATION

Notification is required by Federal law for all underground tanks that have been [us]ed to store regulated substances since January 1, 1974, that are in the ground as of [M]ay 8, 1986, or that are brought into use after May 8, 1986. The information requested [is] required by Section 9002 of the Resource Conservation and Recovery Act, (RCRA), [as a]mended.

The primary purpose of this notification program is to locate and evaluate under[gr]ound tanks that store or have stored petroleum or hazardous substances. It is [ex]pected that the information you provide will be based on reasonably available [re]cords, or, in the absence of such records, your knowledge, belief, or recollection.

Who Must Notify? Section 9002 of RCRA, as amended, requires that, unless [ex]empted, owners of underground tanks that store regulated substances must notify [des]ignated State or local agencies of the existence of their tanks. Owner means—
(a) in the case of an underground storage tank in use on November 8, 1984, or brought into use after that date, any person who owns an underground storage tank used for the storage, use, or dispensing of regulated substances, and
(b) in the case of any underground storage tank in use before November 8, 1984, but no longer in use on that date, any person who owned such tank immediately before the discontinuation of its use.

What Tanks Are Included? Underground storage tank is defined as any one or combination of tanks that (1) is used to contain an accumulation of "regulated substances," and (2) whose volume (including connected underground piping) is 10% or more beneath the ground. Some examples are underground tanks storing: 1. gasoline, used oil, or diesel fuel, and 2. industrial solvents, pesticides, herbicides or fumigants.

What Tanks Are Excluded? Tanks removed from the ground are not subject to notification. Other tanks excluded from notification are:
1. farm or residential tanks of 1,100 gallons or less capacity used for storing motor fuel for noncommercial purposes;
2. tanks used for storing heating oil for consumptive use on the premises where stored;
[3.] septic tanks;
4. pipeline facilities (including gathering lines) regulated under the Natural Gas Pipeline Safety Act of 1968, or the Hazardous Liquid Pipeline Safety Act of 1979, or which is an intrastate pipeline facility regulated under State laws;
5. surface impoundments, pits, ponds, or lagoons;
6. storm water or waste water collection systems;
7. flow-through process tanks;
8. liquid traps or associated gathering lines directly related to oil or gas production and gathering operations;
9. storage tanks situated in an underground area (such as a basement, cellar, mineworking, drift, shaft, or tunnel) if the storage tank is situated upon or above the surface of the floor.

What Substances Are Covered? The notification requirements apply to underground storage tanks that contain regulated substances. This includes any substance defined as hazardous in section 101 (14) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), with the exception of those substances regulated as hazardous waste under Subtitle C of RCRA. It also includes petroleum, e.g., crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute).

Where To Notify? Completed notification forms should be sent to the address given at the top of this page.

When To Notify? 1. Owners of underground storage tanks in use or that have been taken out of operation after January 1, 1974, but still in the ground, must notify by May 8, 1986. 2. Owners who bring underground storage tanks into use after May 8, 1986, must notify within 30 days of bringing the tanks into use.

Penalties: Any owner who knowingly fails to notify or submits false information shall be subject to a civil penalty not to exceed $10,000 for each tank for which notification is not given or for which false information is submitted.

INSTRUCTIONS

Please type or print in ink all items except "signature" in Section V. This form must by completed for [ea]ch location containing underground storage tanks. If more than 5 tanks are owned at this location, [phot]ocopy the reverse side, and staple continuation sheets to this form.

Indicate number of continuation sheets attached [ ]

I. OWNERSHIP OF TANK(S)

Owner Name (Corporation, Individual, Public Agency, or Other Entity)
Commanding Officer

Street Address
Naval Amphibious Base

County
Little Creek

City: Norfolk State: VA ZIP Code: 23521-5000

Area Code Phone Number

Type of Owner (Mark all that apply ☒)
☒ Current ☐ State or Local Gov't ☐ Private or Corporate
☐ Former ☒ Federal Gov't (GSA facility I.D. no. N61414) ☐ Ownership uncertain

II. LOCATION OF TANK(S)

(If same as Section 1, mark box here ☒)

Facility Name or Company Site Identifier, as applicable
see attached sheets

Street Address or State Road, as applicable

County

City (nearest) State ZIP Code

Indicate number of tanks at this location [ ]

Mark box here if tank(s) are located on land within an Indian reservation or on other Indian trust lands ☐

III. CONTACT PERSON AT TANK LOCATION

Name (If same as Section I, mark box here ☐) Job Title Area Code Phone Number
Stephanie Spore, Environmental Engineer (804) 363-4847

IV. TYPE OF NOTIFICATION

☐ Mark box here only if this is an amended or subsequent notification for this location.

V. CERTIFICATION (Read and sign after completing Section VI)

[I cer]tify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached-

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FEB 13 1992

Name (from Section I) NAB LCREEK Location (from Section II) 3329 Page No. 1 of 123 Pages

VI. DESCRIPTION OF UNDERGROUND STORAGE TANKS (Complete for each tank at this location)

Tank Identification No. (e.g., ABC-123), or Arbitrarily Assigned Sequential Number (e.g., 1,2,3...)	Tank No. 3329-1	Tank No. 3329-2	Tank No.	Tank No.	Tank No.
1. Status of Tank (Mark all that apply ☒) — Currently in Use					
Temporarily Out of Use					
Permanently Out of Use	XX	XX			
Brought into Use after 5/8/86					
2. Estimated Age (Years)	over 35 yr	over 35 yr			
3. Estimated Total Capacity (Gallons)	550	100			
4. Material of Construction (Mark one ☒) — Steel	XX	XX			
Concrete					
Fiberglass Reinforced Plastic					
Unknown					
Other, Please Specify					
5. Internal Protection (Mark all that apply ☒) — Cathodic Protection					
Interior Lining (e.g., epoxy resins)					
None					
Unknown	XX	XX			
Other, Please Specify					
6. External Protection (Mark all that apply ☒) — Cathodic Protection					
Painted (e.g., asphaltic)		XX			
Fiberglass Reinforced Plastic Coated					
None					
Unknown	XX				
Other, Please Specify					
7. Piping (Mark all that apply ☒) — Bare Steel					
Galvanized Steel					
Fiberglass Reinforced Plastic					
Cathodically Protected					
Unknown	XX	XX			
Other, Please Specify					
8. Substance Currently or Last Stored in Greatest Quantity by Volume (Mark all that apply ☒) — a. Empty					
b. Petroleum — Diesel					
Kerosene					
Gasoline (including alcohol blends)					
Used Oil	XX				
Other, Please Specify					
c. Hazardous Substance					
Please Indicate Name of Principal CERCLA Substance OR Chemical Abstract Service (CAS) No.					
Mark box ☒ if tank stores a mixture of substances					
d. Unknown		XX			
9. Additional Information (for tanks permanently taken out of service)	since at least	since at least			
a. Estimated date last used (mo/yr)	~~1962~~	~~1962~~	/	/	/
b. Estimated quantity of substance remaining (gal.)					

Appendix B
Soil Boring Logs

FOSTER WHEELER ENVIRESPONSE, INC.
TEST BORING LOG

BORING NO.: COM-B-1 (MW-1)
PROJECT NO./NAME: CTO-0088/NAVY CLEAN
GEOLOGIST/OFFICE: M. Schmidt/Livingston

DATE: 1/14/92
LOCATION: directly W. of Country Store (App. 400')
DRILLING CONTRACTOR: Industrial Marine
DRILLER: Willis Griffin

DRILLING EQUIPMENT/METHOD: Hollow Stem Auger SIZE/TYPE OF BIT: 4 1/4" ID
SAMPLE METHOD: Spilt Spoon - 2" ID START/FINISH DATE: 1/14/92 - 1/14/92
WELL INSTALLED? YES √ NO___ SCREEN: 2" PVC - 0.01 SLOT LENGTH 10' 5 TO 15 FEET
GROUNDWATER DEPTH: Approximately 6½'

REMARKS: Located at 220', 265' on the geophysical grid

DEPTH (FT)	SAMPLE NO. AND TYPE	RECOVERY (FT)	PENETRATION RESISTANCE BLOWS/6"	SAMPLE DESCRIPTION	PID READING
0-2	COM-B-01-01	1029 1.4'	6-8-4-5	Top 4" - top soil Bottom - CLAY with trace of gravel and wood, no odor	0
2-4	COM-B-01-02	1042 1.5'	2-3-3-4	Top 2" - grey clayey with trace of gravel grading into sandy CLAY, brown, no odor	0
4-6	COM-B-01-03	1057 1.1'	2-3-3-5	Top 2" - grey clayey with trace of gravel and wood. M-C SAND, brown, bottom 4" wet, no odor	0
6-8	COM-B-01-04	1105 1.7'	2-3-2-5	2" dark grey CLAY with trace of gravel grading into silty SAND grading into alternating bands of C and M sand, wet, no odor	0
8-10	COM-B-01-05	1116 1.7'	2-3-4-5	Top 4" - C SAND, next 4" grey sandy CLAY layer, then M-C SAND, wet, no odor	0
10-12	COM-B-01-06	1128 1.9'	3-2-1-3	Top 6" - M-C SAND Mid 6" - C SAND Bottom - M SAND wet, no odor	0
12-14	COM-B-01-07	1142 1.9'	2-3-4-4	Top 6' - M-C SAND grading into M-F SAND, wet, no odor	0

TD = 15 Feet

FOSTER WHEELER ENVIRESPONSE, INC.
TEST BORING LOG

BORING NO.: COM-B-2 (MW-2)
PROJECT NO./NAME: CTO-0088/NAVY CLEAN
GEOLOGIST/OFFICE: M. Schmidt/Livingston

DATE: 1/14/92
LOCATION: Approximately 75' SW of B-1
DRILLING CONTRACTOR: Industrial Marine
DRILLER: Willis Griffin

DRILLING EQUIPMENT/METHOD: Hollow Stem Auger SIZE/TYPE OF BIT: 4 1/4" ID
SAMPLE METHOD: Spilt Spoon - 2" ID START/FINISH DATE: 1/14/92 - 1/14/92
WELL INSTALLED? YES √ NO ___ SCREEN: 2" PVC - 0.01 SLOT LENGTH 10' 5 TO 15 FEET
GROUNDWATER DEPTH: Approximately 6½'

REMARKS: Located at 120', 200' on the geophysical grid

DEPTH (FT)	SAMPLE NO. AND TYPE	RECOVERY (FT)	PENETRATION RESISTANCE BLOWS/6"	SAMPLE DESCRIPTION	PID READING
0-2	COM-B-02-01	1341 2.0'	6-4-4-2	Top 1" - grey/black top soil, then dark CLAY layer with traces of charred wood and coal. Bottom 1" - dark grey to brown CLAY, very slight odor	0
2-4	COM-B-02-02	1349 1.5'	1-2-3-4	Top 3" - black/grey CLAY (staining) with slight odor. Bottom - brown CLAY with trace of gravel grading into silty CLAY, brown, no odor	0
4-6	COM-B-02-03	1407 1.4'	2-4-8-12	Top 3" - grey/black CLAY with a trace of coal, very slight odor, then brown silty SAND with 2" C SAND layer. Bottom 7" well-sorted M-F SAND, damp, no odor	0
6-8	COM-B-02-04	1412 1.5'	2-6-8-12	Top 4" black CLAY with trace of gravel and very slight odor grading into M-C SAND with ½" red stained lens 2" from bottom, Bottom 6" wet.	0
8-10	COM-B-02-05	1422 1.7'	2-6-6-9	Light brown silty F SAND with trace of gravel, no odor, wet	0
10-12	COM-B-02-06	1434 1.3'	1/12"-3-5	Silty F SAND grading into M SAND with 4" layer of M-C SAND followed by M SAND, wet	0
12-14	COM-B-02-07	1442 2.0'	2-2-4-7	M-F well-sorted SAND, wet, no odor	0

TD = 15 Feet

FOSTER WHEELER ENVIRESPONSE, INC.
TEST BORING LOG

BORING NO.: COM-B-3 (MW-3)
PROJECT NO./NAME: CTO-0088/NAVY CLEAN
GEOLOGIST/OFFICE: M. Schmidt/Livingston

DATE: 1/14/92
LOCATION: Approximately 110' SW of MW-1
DRILLING CONTRACTOR: Industrial Marine
DRILLER: Willis Griffin

DRILLING EQUIPMENT/METHOD: Hollow Stem Auger
SIZE/TYPE OF BIT: 4 1/4" ID
SAMPLE METHOD: Spilt Spoon - 2" ID
START/FINISH DATE: 1/14/92 - 1/15/92
WELL INSTALLED? YES √ NO
SCREEN: 2" PVC - 0.01 SLOT
LENGTH 10'
5 TO 15 FEET
GROUNDWATER DEPTH: Approximately 6½'

REMARKS: Auger plugged-up late 1/14/91. Redrilled early 1/15/92. Located at 195', 150' on the geophysical grid.

DEPTH (FT)	SAMPLE NO. AND TYPE	RECOVERY (FT)	PENETRATION RESISTANCE BLOWS/6"	SAMPLE DESCRIPTION	PID READING
0-2	COM-B-03-01	1521 1.5'	5-5-4-7	Top 4" - dark brown CLAY with trace of gravel grading into brown silty CLAY, no odor	0
2-4	COM-B-03-02	1530 1.6'	5-8-8-8	Light brown to grey silty F SAND with trace of gravel, no odor	0
4-6	COM-B-03-03	1539 1.7'	3-5-5-5	Top 3" - silty F SAND, 3" black CLAY lens, 3" F SAND, 2" M-C SAND lens, bottom -M-F SAND, no odor, wet	0
6-8	COM-B-03-04	1548 1.7'	4-6-8-6	Top 3" - M-F SAND with trace of gravel, 3" red stained lens, F SAND, brown, no odor, bottom 1" wet.	0
8-10	COM-B-03-05	1555 1.7'	3-3-3-4	Brown F SAND grading into grey F SAND, bottom 4"-M-C SAND, no odor, wet	0
10-12	COM-B-03-06	1608 1.9'	1-1-5-7	F SAND grading into M-C SAND, wet, no odor	0
12-14	COM-B-03-07	1615 2.0'	2-3-6-8	M-C SAND, trace of fines, no odor, wet	0

TD = 15 Feet

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

Project Navy Clean-CTO-0088 Well MW-1

Location Norfolk Amphibious Base-Little Creek

Town/City Virginia Beach Site Commissary Const. Site

County _____ State Virginia

Permit No. N/A

Land-Surface Elevation and Datum _____feet

Installation Date (s) January 14, 1992

Drilling Method Hollow Stem Auger - 4 1/4" ID

Drilling Contractor Industrial Marine Services

Drilling Fluid None

Development Technique(s) and Dates(s) 1/14/92

Purging - Well cavitated 0 times

Water Removed During Development 42 gallons

Static Depth to Water 7.17' feet below ground level

Pumping Depth to Water 7.31' feet below ground level

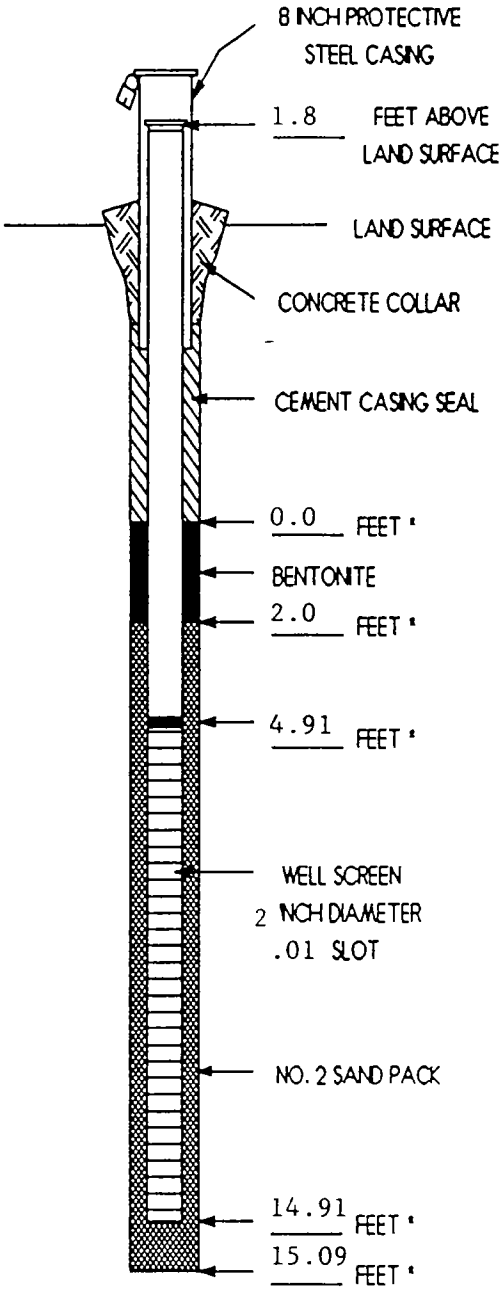
Total Pumping Duration 36 minutes

Yield <1.0 gpm

Well Purpose Monitoring Well for Virginia Site Characterization.

Remarks Located directly W. of Country Store, at 220', 265' on the geophysical grid. No concrete pad added due to temporary nature of the well.

Geologist/# M. Schmidt



* DEPTH BELOW LAND SURFACE

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

Project Navy Clean-CTO-0088 Well MW-2

Location Norfolk Amphibious Base-Little Creek

Town/City Virginia Beach Site Commissary of Const. Site

County _____ State Virginia

Permit No. N/A

Land-Surface Elevation and Datum _____feet

Installation Date (s) January 14, 1992

Drilling Method Hollow Stem Auger - 4 1/4" ID

Drilling Contractor Industrial Marine Services

Drilling Fluid None

Development Technique(s) and Dates(s) 1/14/92

Purging - Well cavitated 0 times

Water Removed During Development 40 gallons

Static Depth to Water 8.34' feet below ground level

Pumping Depth to Water 8.34' feet below ground level

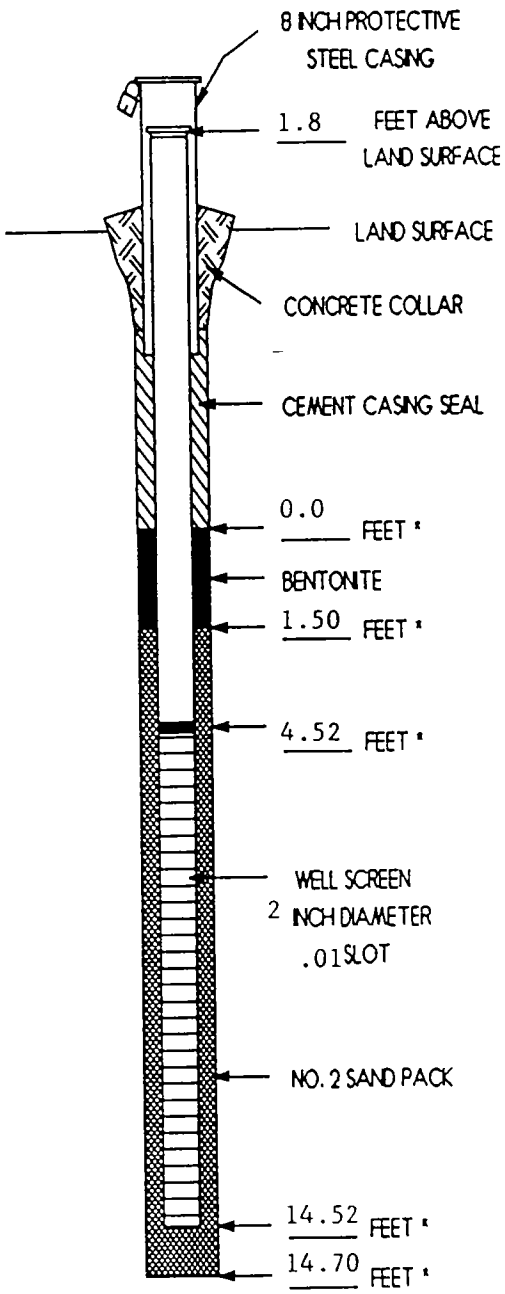
Total Pumping Duration 33 minutes

Yield <1.0 gpm

Well Purpose Monitoring Well for Virginia Site Characterization.

Remarks Located about 75' SW of MW-1, at 120', 200' on the geophysical grid. No concrete pad added due to temporary nature of the well.

Geologist/# M. Schmidt



* DEPTH BELOW LAND SURFACE

WELL CONSTRUCTION LOG
(UNCONSOLIDATED)

Project Navy Clean-CTO-0088 Well MW-3

Location Norfolk Amphibious Base-Little Creek

Town/City Virginia Beach Site _____

County _____ State Virginia

Permit No. N/A

Land-Surface Elevation and Datum _____feet

Installation Date (s) January 15, 1992

Drilling Method Hollow Stem Auger - 4 1/4" ID

Drilling Contractor Industrial Marine Services

Drilling Fluid None

Development Technique(s) and Dates(s) 1/15/92

Purging - Well cavitated 0 times

Water Removed During Development 40 gallons

Static Depth to Water 7.67' feet below ground level

Pumping Depth to Water 7.79' feet below ground level

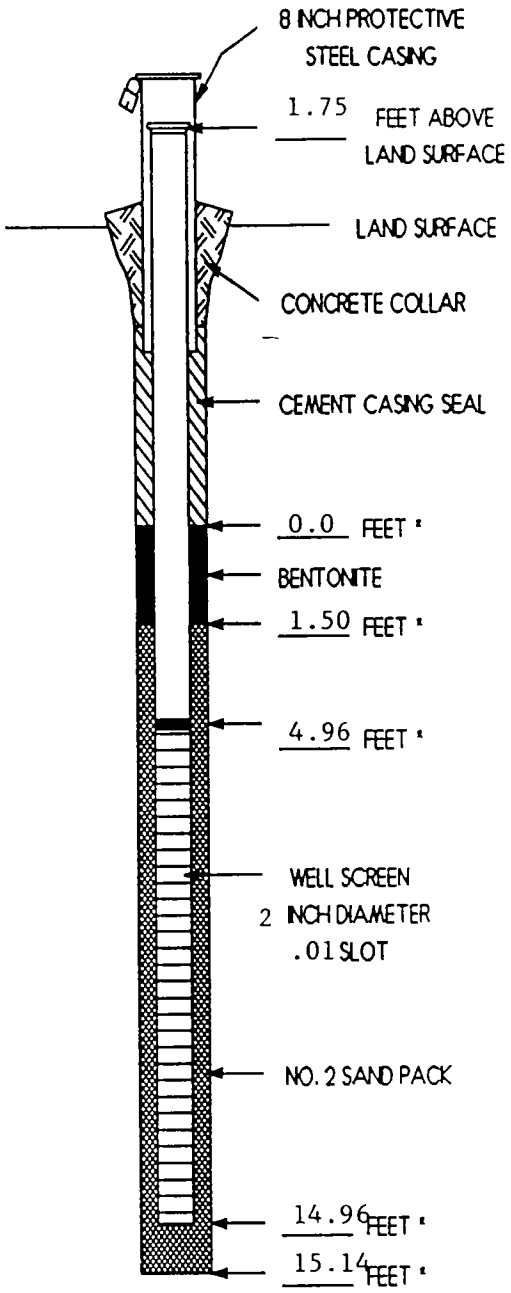
Total Pumping Duration 53 minutes

Yield <1.0 gpm

Well Purpose Monitoring Well for Virginia Site Characterization.

Remarks Located about 110' SW of MW-1, at 195', 150' on the geophysical grid. No concrete pad added due to temporary nature of the well.

Geologist/# M. Schmidt



* DEPTH BELOW LAND SURFACE

Appendix C
Analytical Laboratory Results

SAMPLE DATA SUMMARY PACKAGE

Table of Contents

NARRATIVE

Laboratory: Solutions Laboratories, Inc.

Date Sample received by Solutions: 01/16/92

Project Name: Baker Environmental, Little Creek Commissary-
19008-64-SVZ

Contract Number: 19001-43-SRN-3
Navy CLEAN Program

Results of the Following samples are included in this data package:

Sample ID	Lab No.	Matrix	Analysis
COM-PE-1 thru COM-PE-3 COM-MW-1 thru COM-MW-4 COM-B0102 thru COM-B0303	01161992-010	Soil/Water	TPH-GC, BTEX

Organics

All samples were analyzed following EPA Modified 8015 Method for Total Petroleum Hydrocarbons, and EPA 8020 for soils and waters.

Official holding times were met for all analyses.

RELEASE OF THE DATA CONTAINED IN THIS HARDCOPY DATA PACKAGE HAS BEEN AUTHORIZED BY THE LABORATORY MANAGER OR HIS DESIGNEE, AS VERIFIED BY THE FOLLOWING SIGNATURE:

Dorothy S. Small DATE: Feb. 1, 1992

DOROTHY S. SMALL Febuary 1, 1992

2. Chain-of-Custody Reports

01161992-010

CHAIN OF CUSTODY

Original chain of Custody goes to Laboratory

Page 2 of 2

Proj. #	Project name: Little Creek Commissary								
Samplers (Please print): Michael Schmidt/Warren Cromartie									
Date	Time	Comp.	Grab	Sample Identification	Type of container	Number of containers	TPH	BTEX	Remarks
1/14/92	1028		X	COM-B-01-01-S 08A1	8oz	1	X	X	
	1042		X	-02-S 09A1	"	1	X	X	Soils
	1057		X	-03-S 10A1	"	1	X	X	
	1350		X	-04-S 11A1	"	1	X	X	
	1341		X	COM-B-02-01-S 12A1	"	1	X	X	
	1349		X	-02-S 13A1	"	1	X	X	
	1407		X	-03-S 14A1	"	1	X	X	
	1521		X	COM-B-03-01-S 15A1	"	1	X	X	
	1530		X	-02-S 16A1	"	1	X	X	
	1539		X	-03-S 17A1	"	1	X	X	
				Trip Blanks 18A1, A2	40ml	2		X	water

Relinquished by (Signature)	Date/Time	Received by (Signature)	Date/Time
[illegible]	1/16/92 1145	[illegible]	1/16/92 11:45
		Dorothy S Small	1430 1/16/92
Dorothy S Small	1/16/92 1630	[illegible]	

Remarks: Send results to: phone 614-438-2611
Doug Lacy
Foster Wheeler Enviresponse
100 East Wilson Bridge Rd.
Worthington, OH 43085

~~CEIMIC Corporation 10 Dean Knauss Drive,~~ Narragansett, RI 02882 (401) 782-8900 FAX (401) 782-8905

BAKER ENVIRONMENTAL

0116199 2 - 010

CHAIN OF CUSTODY

Original chain of Custody goes to Laboratory

Page 1 of 2

Proj. #:

Project name: Little Creek Commissary

Samplers (Please print): Michael Schmidt / Warren Cromartie

Date	Time	Comp.	Grab	Sample Identification	Type of container	Number of containers	TPH	BTEX	Remarks
1/16/92	0947		X	COM-PE-1 01A1	40ml	1	X		water
↓	0947		X	-1 01A2	↓	1		X	↓
	0950		X	COM-PE-2 02A1		1	X		
	0950		X	-2 02A2		1		X	
	1010		X	COM-PE-3 03A1		1	X		
	1010		X	-3 03A2		1		X	
	1030		X	COM-MW-1 04A1		1	X		
	1030		X	-1 04A2		1		X	
	1009		X	COM-MW-2 05A1		1	X		
	1009		X	-2 05A2		1		X	
	1027		X	COM-MW-3 06A1		1	X		
	1027		X	-3 06A2		1		X	
	1100		X	COM-MW-4 07A1		1	X		
↓	1100		X	-4 07A2	↓	1		X	↓

Relinquished by (Signature)	Date/Time	Received by (Signature)	Date/Time
Michael Schmidt	1/16/92 1145	[signature]	1/16/92 1145
		Dorothy S. Small	1430 1/16/92
Dorothy S. Small	1/16/92 1630	John Tarlino	

Remarks: Send results to: phone 614-438-2611
Doug Lacy
Foster Wheeler Enviresponse
100 East Wilson Bridge Rd.
Worthington, OH 43085

~~CEIMIC Corporation 10 Dean Knauss Drive, Narragansett, RI 02882 (401) 782-8900 FAX (401) 782-8905~~

Baker Environmental - Fax Results ATTN: Peter Rossis (412) 269-2002

Fax Results to Foster Wheeler (614) 438-7549

SOLUTIONS LABORATORIES, INC.
814 B GREENBRIER CIRCLE
CHESAPEAKE, VA 23320
(T) (804) 420-0467
(F) (804) 420-4204

CHAIN-OF-CUSTODY REPORT

SOLUTIONS LOG #: 01161992-010

COMPANY NAME: BAKER ENVIRONMENTAL
PROJECT MANAGER: DAVE MANROSE
BILLING ADDRESS: AIRPORT OFFICE PARK, BLDG 3
CORAOPOLIS, PA 15108
TELEPHONE #: (412) 269-6000
FAX #: (412) 269-2002
P.O.#:

DATE/TIME RECEIVED: 1/16/92 1630
SAMPLER: M SCHMIDT & W CROMARLIE

SAMPLE ID	FIELD SAMPLE ID	SAMPLED DATE	SAMPLED TIME	# OF CONT.	CONTAINER	LOCATION	PRESERV.	MATRIX
01A1,A2	COM-PE-1	01/16/92	0947	2	40 ML VOA	LITT. CRK COMM.	4 oC	WATER
02A1,A2	COM-PE-2	01/16/92	0950	2	40 ML VOA	LITT. CRK COMM.	4 oC	WATER
03A1,A2	COM-PE-3	01/16/92	1010	2	40 ML VOA	LITT. CRK COMM.	4 oC	WATER
04A1,A2	COM-MW-1	01/16/92	1030	2	40 ML VOA	LITT. CRK COMM.	4 oC	WATER
05A1,A2	COM-MW-2	01/16/92	1009	2	40 ML VOA	LITT. CRK COMM.	4 oC	WATER
06A1,A2	COM-MW-3	01/16/92	1027	2	40 ML VOA	LITT. CRK COMM.	4 oC	WATER
07A1,A2	COM-MW-4	01/16/92	1100	2	40 ML VOA	LITT. CRK COMM.	4 oC	WATER
08A1	COM-B-01-01-S	01/14/92	1028	1	8 OZ GL	LITT. CRK COMM.	4 oC	SOIL
09A1	COM-B-01-02-S	01/14/92	1042	1	8 OZ GL	LITT. CRK COMM.	4 oC	SOIL
10A1	COM-B-01-03-S	01/14/92	1057	1	8 OZ GL	LITT. CRK COMM.	4 oC	SOIL
11A1	COM-B-01-04-S	01/14/92	1150	1	8 OZ GL	LITT. CRK COMM.	4 oC	SOIL
12A1	COM-B-02-01-S	01/14/92	1341	1	8 OZ GL	LITT. CRK COMM.	4 oC	SOIL
13A1	COM-B-02-02-S	01/14/92	1349	1	8 OZ GL	LITT. CRK COMM.	4 oC	SOIL
14A1	COM-B-02-03-S	01/14/92	1407	1	8 OZ GL	LITT. CRK COMM.	4 oC	SOIL
15A1	COM-B-03-01-S	01/14/92	1521	1	8 OZ GL	LITT. CRK COMM.	4 oC	SOIL
16A1	COM-B-03-02-S	01/14/92	1530	1	8 OZ GL	LITT. CRK COMM.	4 oC	SOIL
17A1	COM-B-03-03-S	01/14/92	1539	1	8 OZ GL	LITT. CRK COMM.	4 oC	SOIL
18A1,A2	TRIP BLANK	UNKNOWN	UNKNOWN	2	40 ML VOA	LITT. CRK COMM.	4 oC	WATER

SAMPLE ID	ANALYSIS TO BE PERFORMED	DUE DATE
01-17 A1'S	TPH 8015	1/20/92
01-07 A2'S, 08-17 A1'S, 18A1-A2	BTEX 8020	1/20/92

CONDITION OF SAMPLE: GOOD

RECEIVED BY: J FEROLINO

RELINQUISHED BY: D SMALL

3. Results of Analysis

3.a. Soils & Waters-Organic

SOLUTIONS LABORATORIES, INC.
814-B GREENBRIER CIRCLE
CHESAPEAKE, VA 23320
(T) (804) 420-0467
(F) (804) 420-4204

REPORT OF ANALYSIS

DATE: JANUARY 19, 1992

BAKER ENVIRONMENTAL INC.
AIRPORT OFFICE PARK, BLDG.
420 ROUSER ROAD
CORAOPOLIS, PA 15108

PROJECT NAME: LITTLE CREEK COMMISSARY
PROJECT NUMBER: 19008-64-SVZ

SOL LOG: 01161992-010
MATRIX: WATER/SOIL

METHOD MODIFIED 8015

CLIENT NO:	COM-PE-1	COM-PE-2	COM-PE-3	COM-MW-1	COM-MW-2
LAB NO:	01A1	02A1	03A1	04A1	05A1
SAMPLE DATE:	01/16/92	01/16/92	01/16/92	01/16/92	01/16/92
RECEIVED DATE:	01/16/92	01/16/92	01/16/92	01/16/92	01/16/92
DATE EXTRACTED:	01/18/92	01/18/92	01/18/92	01/18/92	01/18/92
ANALYSIS DATE:	01/18/92	01/18/92	01/18/92	01/18/92	01/18/92
INSTRUMENT ID:	HP/FID	HP/FID	HP/FID	HP/FID	HP/FID
DILUTION FACTOR:	1	1	1	1	1
MATRIX:	WATER	WATER	WATER	WATER	WATER
UNITS:	mg/L	mg/L	mg/L	mg/L	mg/L
ANALYSIS					
TOTAL PETROLEUM HYDROCARBONS	0.25	0.075 U	0.075 U	0.075 U	0.075 U
TYPE	NON-DISTINCT	N/A	N/A	N/A	N/A

See Appendix B for Glossary of Report and Data Definitions

DATE: JANUARY 19, 1992

BAKER ENVIRONMENTAL INC.
AIRPORT OFFICE PARK, BLDG.
420 ROUSER ROAD
CORAOPOLIS, PA 15108

PROJECT NAME: LITTLE CREEK COMMISSARY
PROJECT NUMBER: 19008-64-SVZ

SOL LOG: 01161992-010
MATRIX: WATER/SOIL

METHOD MODIFIED 8015

CLIENT NO:	COM-MW-3	COM-MW-4	COM-B0101	COM-B0102	COM-B0103
LAB NO:	06A1	07A1	08A1	09A1	10A1
SAMPLE DATE:	01/16/92	01/16/92	01/14/92	01/14/92	01/14/92
RECEIVED DATE:	01/16/92	01/16/92	01/16/92	01/16/92	01/16/92
DATE EXTRACTED:	01/18/92	01/18/92	01/18/92	01/18/92	01/18/92
ANALYSIS DATE:	01/18/92	01/18/92	01/18/92	01/18/92	01/18/92
INSTRUMENT ID:	HP/FID	HP/FID	HP/FID	HP/FID	HP/FID
DILUTION FACTOR:	1	1	38	38	38
MATRIX:	WATER	WATER	SOIL	SOIL	SOIL
UNITS:	mg/L	mg/L	mg/KG	mg/KG	mg/KG
ANALYSIS					
TOTAL PETROLEUM HYDROCARBONS	0.03 J	0.02 J	2.85 U	2.85 U	0.91 J
TYPE	NON-DISTINCT	NOT DISTINCT	N/A	N/A	N/A

DATE: JANUARY 19, 1992

BAKER ENVIRONMENTAL INC.
AIRPORT OFFICE PARK, BLDG.
420 ROUSER ROAD
CORAOPOLIS, PA 15108

PROJECT NAME: LITTLE CREEK COMMISSARY
PROJECT NUMBER: 19008-64-SVZ

SOL LOG: 01161992-010
MATRIX: WATER/SOIL

METHOD MODIFIED 8015

CLIENT NO:	COM-B0104	COM-B0201	COM-B0202	COM-B0203	COM-B0301
LAB NO:	11A1	12A1	13A1	14A1	15A1
SAMPLE DATE:	01/14/92	01/14/92	01/14/92	01/14/92	01/14/92
RECEIVED DATE:	01/16/92	01/16/92	01/16/92	01/16/92	01/16/92
DATE EXTRACTED:	01/18/92	01/18/92	01/18/92	01/18/92	01/18/92
ANALYSIS DATE:	01/18/92	01/18/92	01/18/92	01/18/92	01/18/92
INSTRUMENT ID:	HP/FID	HP/FID	HP/FID	HP/FID	HP/FID
DILUTION FACTOR:	38	38	38	38	38
MATRIX:	SOIL	SOIL	SOIL	SOIL	SOIL
UNITS:	mg/KG	mg/KG	mg/KG	mg/KG	mg/KG
ANALYSIS					
TOTAL PETROLEUM HYDROCARBONS	2.85 U	2.85 U	2.85 U	2.85 U	2.85 U
TYPE	N/A	N/A	N/A	N/A	N/A

DATE: JANUARY 19, 1992

BAKER ENVIRONMENTAL INC.
AIRPORT OFFICE PARK, BLDG.
420 ROUSER ROAD
CORAOPOLIS, PA 15108

PROJECT NAME: LITTLE CREEK COMMISSARY
PROJECT NUMBER: 19008-64-SVZ

SOL LOG: 01161992-010
MATRIX: WATER/SOIL

METHOD MODIFIED 8015

CLIENT NO:	COM-B0302	COM-B0303
LAB NO:	16A1	17A1
SAMPLE DATE:	01/14/92	01/14/92
RECEIVED DATE:	01/16/92	01/16/92
DATE EXTRACTED:	01/18/92	01/18/92
ANALYSIS DATE:	01/18/92	01/18/92
INSTRUMENT ID:	HP/FID	HP/FID
DILUTION FACTOR:	38	38
MATRIX:	SOIL	SOIL
UNITS:	mg/KG	mg/KG

ANALYSIS

TOTAL PETROLEUM HYDROCARBONS	2.85 U	2.85 U
TYPE	N/A	N/A

SOLUTIONS LABORATORIES, INC.
814-B GREENBRIER CIRCLE
CHESAPEAKE, VA 23320
(T) (804) 420-0467
(F) (804) 420-4204

REPORT OF ANALYSIS

DATE: JANUARY 19, 1992

BAKER ENVIRONMENTAL INC.
AIRPORT OFFICE PARK, BLDG.
420 ROUSER ROAD
CORAOPOLIS, PA 15108

PROJECT NAME: LITTLE CREEK COMMISSARY
PROJECT NUMBER: 19008-64-SVZ

SOL LOG: 01161992-010
MATRIX: WATER/SOIL

METHOD 8020-BTEX

CLIENT NO:	COM-PE-1	COM-PE-2	COM-PE-3	COM-MW-1	COM-MW-2
LAB NO:	01A2	02A2	03A2	04A2	05A2
SAMPLE DATE:	01/16/92	01/16/92	01/16/92	01/16/92	01/16/92
RECEIVED DATE:	01/16/92	01/16/92	01/16/92	01/16/92	01/16/92
DATE EXTRACTED:	N/A	N/A	N/A	N/A	N/A
ANALYSIS DATE:	01/18/92	01/18/92	01/18/92	01/18/92	01/18/92
INSTRUMENT ID:	HP/P&T	HP/P&T	HP/P&T	HP/P&T	HP/P&T
DILUTION FACTOR:	1	1	1	1	1
MATRIX:	WATER	WATER	WATER	WATER	WATER
UNITS:	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUNDS					
BENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
ETHYL BENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TOTAL XYLENES	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U

DATE: JANUARY 19, 1992

BAKER ENVIRONMENTAL INC.
AIRPORT OFFICE PARK, BLDG.
420 ROUSER ROAD
CORAOPOLIS, PA 15108

PROJECT NAME: LITTLE CREEK COMMISSARY
PROJECT NUMBER: 19008-64-SVZ

SOL LOG: 01161992-010
MATRIX: WATER/SOIL

METHOD 8020-BTEX

CLIENT NO:	COM-MW-3	COM-MW-4	COM-B0101	COM-B0102	COM-B0103
LAB NO:	06A2	07A2	08A1	09A1	10A1
SAMPLE DATE:	01/16/92	01/16/92	01/14/92	01/14/92	01/14/92
RECEIVED DATE:	01/16/92	01/16/92	01/16/92	01/16/92	01/16/92
DATE EXTRACTED:	N/A	N/A	N/A	N/A	N/A
ANALYSIS DATE:	01/18/92	01/19/92	01/19/92	01/19/92	01/19/92
INSTRUMENT ID:	HP/P&T	HP/P&T	HP/P&T	HP/P&T	HP/P&T
DILUTION FACTOR:	1	1	1	1	1
MATRIX:	WATER	WATER	SOIL	SOIL	SOIL
UNITS:	ug/L	ug/L	ug/KG	ug/KG	ug/KG
COMPOUNDS					
BENZENE	0.2 U	0.2 U	2.0 U	2.0 U	2.0 U
TOLUENE	0.2 U	0.2 U	2.0 U	2.0 U	2.0 U
ETHYL BENZENE	0.2 U	0.2 U	2.0 U	2.0 U	2.0 U
TOTAL XYLENES	0.4 U	0.4 U	4.0 U	4.0 U	0.74 J

DATE: JANUARY 19, 1992

BAKER ENVIRONMENTAL INC.
AIRPORT OFFICE PARK, BLDG.
420 ROUSER ROAD
CORAOPOLIS, PA 15108

PROJECT NAME: LITTLE CREEK COMMISSARY
PROJECT NUMBER: 19008-64-SVZ

SOL LOG: 01161992-010
MATRIX: WATER/SOIL

METHOD 8020-BTEX

CLIENT NO:	COM-B0104	COM-B0201	COM-B0202	COM-B0203	COM-B0301
LAB NO:	11A1	12A1	13A1	14A1	15A1
SAMPLE DATE:	01/14/92	01/14/92	01/14/92	01/14/92	01/14/92
RECEIVED DATE:	01/16/92	01/16/92	01/16/92	01/16/92	01/16/92
DATE EXTRACTED:	N/A	N/A	N/A	N/A	N/A
ANALYSIS DATE:	01/19/92	01/19/92	01/19/92	01/19/92	01/19/92
INSTRUMENT ID:	HP/P&T	HP/P&T	HP/P&T	HP/P&T	HP/P&T
DILUTION FACTOR:	1	1.01	1	1	1.01
MATRIX:	SOIL	SOIL	SOIL	SOIL	SOIL
UNITS:	ug/KG	ug/KG	ug/KG	ug/KG	ug/KG
COMPOUNDS					
BENZENE	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
TOLUENE	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
ETHYL BENZENE	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
TOTAL XYLENES	0.79 J	4.0 U	4.0 U	4.0 U	4.0 U

DATE: JANUARY 19, 1992

BAKER ENVIRONMENTAL INC.
AIRPORT OFFICE PARK, BLDG.
420 ROUSER ROAD
CORAOPOLIS, PA 15108

PROJECT NAME: LITTLE CREEK COMMISSARY
PROJECT NUMBER: 19008-64-SVZ

SOL LOG: 01161992-010
MATRIX: WATER/SOIL

METHOD 8020-BTEX

CLIENT NO:	COM-B0302	COM-B0303	TRIP BLANK
LAB NO:	16A1	17A1	18A1
SAMPLE DATE:	01/14/92	01/14/92	N/A
RECEIVED DATE:	01/16/92	01/16/92	01/16/92
DATE EXTRACTED:	N/A	N/A	N/A
ANALYSIS DATE:	01/18/92	01/18/92	01/18/92
INSTRUMENT ID:	HP/P&T	HP/P&T	HP/P&T
DILUTION FACTOR:	1	1	1
MATRIX:	SOIL	SOIL	WATER
UNITS:	ug/KG	ug/KG	ug/L
COMPOUNDS			
BENZENE	2.0 U	2.0 U	0.2 U
TOLUENE	2.0 U	2.0 U	0.2 U
ETHYL BENZENE	2.0 U	2.0 U	0.2 U
TOTAL XYLENES	0.79 J	4.0 U	0.4 U

4. Appendix A- QC Report

5. Appendix B- Glossary of Report and Data Information

SOIL VOLITALE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

LAB NAME: SOLUTIONS LABORATORIES, INC.

SAMPLE NUMBER: 01161992-010-04A2

LAB CODE: SOL

MATRIX SPIKE SAMPLE NO: 121691-61-5

UNITS: ug/L

COMPOUND	SPIKE ADDED	SAMPLE CON	MS CON	MS % REC	QC LIMIT
ETHYL BENZENE	6.72	0.20 U	4.55	67.71	66-142
TOLUENE	6.91	0.20 U	6.97	92.18	59-139
CHLOROBENZENE	8.18	0.20 U	6.63	81.05	70-120

COMPOUND	SPIKE ADDED	MSD CON	MSD % REC	% RPD	QC LIMIT	
ETHYL BENZENE	6.72	4.806	71.52	5.47	21	66-14
TOLUENE	6.91	6.922	101.17	0.69	21	59-139
CHLOROBENZENE	8.18	6.810	83.25	2.68	21	70-120

VOLATILE METHOD BLANK SUMMARY

LAB NAME: SOLUTIONS LABORATORIES, INC

LAB CODS: SOL

DATE ANALYZED: 01-18-92 TIME ANALYZED: 1101

MATRIX: WATER

INSTRUMENT: H.P/P&T

SAMPLE ID	LAB ID	LAB FILE ID	TIME ANALYZED
COM-PE-1	01161992-010-01	01161992-010	1141
COM-PE-2	01161992-010-02	01161992-010	1232
COM-PE-3	01161992-010-03	01161992-010	1314
COM-PE-4	01161992-010-04	01161992-010	1402
COM-MW-2	01161992-010-05	01161992-010	1441
COM-MW-3	01161992-010-06	01161992-010	1519
COM-MW-4	01161992-010-07	01161992-010	1829
TRIP BLANK	01161992-010-18	01161992-010	1631

VOLATILE METHOD BLANK SUMMARY

LAB NAME: SOLUTIONS LABORATORIES, INC

LAB CODS: SOL

DATE ANALYZED: 01-18-92, 01/19/92 TIME ANALYZED: 2327

MATRIX: SOIL

INSTRUMENT: H.P/P&T

SAMPLE ID	LAB ID	LAB FILE ID	TIME ANALYZED
COM-B0101	01161992-010-08	01161992-010	0013
COM-B0102	01161992-010-09	01161992-010	0052
COM-B0103	01161992-010-10	01161992-010	0130
COM-B0104	01161992-010-11	01161992-010	0208
COM-B0201	01161992-010-12	01161992-010	0253
COM-B0202	01161992-010-13	01161992-010	0348
COM-B0203	01161992-010-14	01161992-010	0435

VOLATILE METHOD BLANK SUMMARY

LAB NAME: SOLUTIONS LABORATORIES, INC

LAB CODS: SOL

DATE ANALYZED: 01/19/92 TIME ANALYZED: 1222

MATRIX: SOIL

INSTRUMENT: H.P/P&T

SAMPLE ID	LAB ID	LAB FILE ID	TIME ANALYZED
COM-B0301	01161992-010-15	01161992-010	0013
COM-B0302	01161992-010-16	01161992-010	0052
COM-B0303	01161992-010-17	01161992-010	0130

APPENDIX B- GLOSSARY OF RESULTS AND DATA DEFINITIONS

GLOSSARY OF SYMBOLS AND ABBREVIATIONS

1. < - "Less than". The number following the sign is the smallest amount which can be detected using this specific test.

2. > - "Greater than". The number following the sign is the highest amount which can be detected using this specific test.

3. °C and °F -"degrees of temperature", Celsius and Fahrenheit respectively.

4. % - "percent of part per hundred". When followed by the designation "by weight" it means grams per hundred grams. If followed by the designation "by volume" it refers to volume per unit volume, eg, milliliters per hundred milliliters.

5. **g** -"gram(s)". The unit weight used in the metric system. One gram equals about 1/28th of an ounce.

6. **kg** - "kilogram(s)". One kilogram is 1000 grams.

7. **L** -"liter(s)". The unit of volume used in the metric system.

8. **lb** - pound(s).

9. **m3** - "cubic meter(s)". Usually used as a volume unit in air analyses.

10. **MF** - "Membrane Filtration". Method used for certain bacteriological tests in which results indicate colony counts after sample has been filtered through a 0.45 um filter.

11. **mg** - "milligram(s)". One milligram is 1/1000 of a gram.

12. **mg/L** - "milligrams per liter". Equals "parts per million" for aqueous liquids.

13. **ml** - "milliliter(s)". One milliliter is 1/1000 of a liter.

14. **MPN** - "Most Probable Number". Analytical method used for certain bacteriological tests in which bacteria are calculated from a statistical formula related to the bacterial count observed in a series of dilutions of the sample.

15. **ND** - "none detected". Usually used when the limits of detection of the method have not been definitely established.

16. **NTU** - "Nephelometric Turbidity Units".

17. **ppb** - "parts per Billion". One ppm is 1/1000 of a ppm.

18. **ppm** - "parts per million". One ppm is equivalent to one microgram per gram (ug/g), or one gram per million grams (g/kg). For aqueous liquids **ppm** equates to milligrams per liter(mg/L), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas (ul/L).

19. **TNTC** - "Too numerous to count". Indicates in certain bacteriological tests that the test has run "off scale".

20. **ug** - "microgram(s)". One-millionth of a gram.

21. **ug/g** - "microgram per gram". Equals "parts per million" (ppm) for solids and sludges.

GLOSSARY OF SYMBOLS AND ABBREVIATIONS-continued

22. **ul** - "microliter(s)". One microliter is 1/1000 of a milliliter or one-millionth of a liter.

23. **ul/L** - "Microliter of gas per liter". Equals "part per million" (ppm) for gases or vapors.

24. **umhos/cm** - "micromhos/cm". Used in reporting specific conduction of solutions.

25. **N/R** - "Not requested".

26. **MGD** - "Million gallons per year".

DATA QUALIFIERS

INORGANIC CHEMICAL DATA

B	Reported value is <CRDL, but >IDL
U	Compound was analyzed for, but not detected
E	Value is estimated due to matrix interferences
M	Duplicate injection precision criteria not met
N	Spiked sample recovery not within control limits
S	Reported value was determined by the Method of Standard Additions (MSA)
W	Post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is <50% of spike absorbance
*	Duplicate analysis was not within control limits
+	Correction coefficient for MSA was <0.995

ORGANIC CHEMICAL DATA

U	Compound was analyzed for, but not detected
J	Value is estimated, either for a tentatively identified compound (TIC) or when a compound is present (spectral identification criteria are met, but the value is <CRQL)
C	Pesticide results were confirmed by GC/MS
B	Analyte found in associated blank as well as in sample
E	Concentration exceeds calibration range of GC/MS instrument
D	Compound identified in an analysis at a secondary dilution factor
A	The TIC is a suspected aldol-condensation product
X	Additional flags defined separately