SITE INVESTIGATION

NAS NAVAL EXCHANGE
GAS STATION
ALAMEDA, CALIFORNIA

Prepared by:

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CONTENTS

LIST OF FIGURES

LIST OF TABLES

SECTION ONE
INTRODUCTION

The following report describes the purpose, background, field methods, analyses and results of an investigation performed by ERM-West for the U.S. Navy. The investigation was performed at the NAS Naval Exchange (NEX), Alameda, California (Figure 1-1), during the weeks of January 26 and February 2, 1987. The objectives of this investigation were to characterize the soil and groundwater at the Naval Exchange gas station and to identify and assess contamination by petroleum hydrocarbons. Recommendations are provided for additional investigation and site remediation.

BACKGROUND

The soil and groundwater investigation at the Navy Exchange was initiated at the request of the Western Division Naval Facilities Engineering Command, following the detection of petroleum product in an excavation adjacent to the Navy Exchange gas station. The station currently uses three of four underground gasoline storage tanks. There are also two abandoned underground gasoline storage tanks that were formerly used by the station. In addition, an underground waste oil tank and an underground solvent tank are located at this facility. The placement of these tanks is illustrated on Figure 1-2.

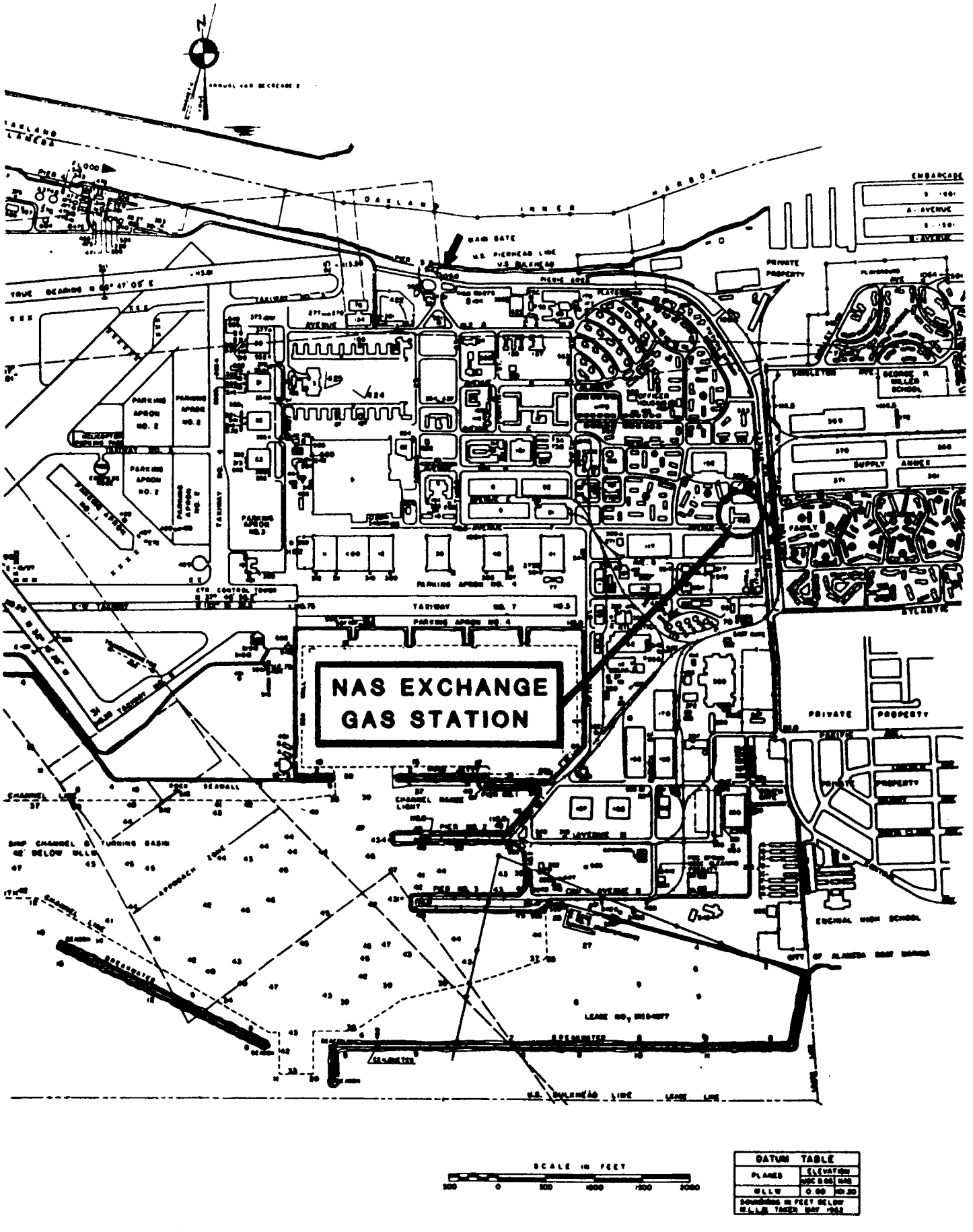


FIGURE 1-1. Site Location Alameda Naval Air Station.

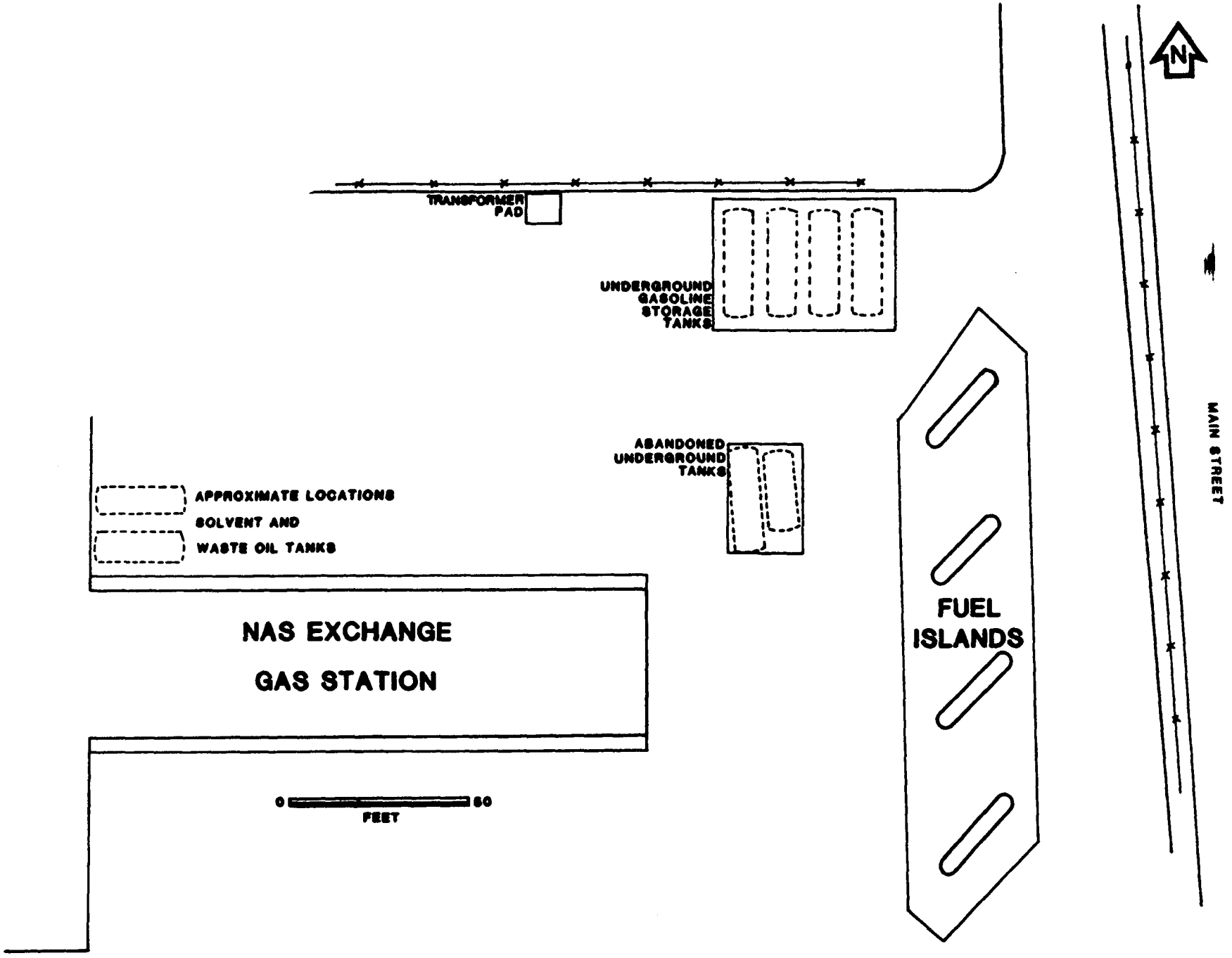


FIGURE 1-2. Locations of Underground Tanks.

PROJECT GOALS

The goals of this investigation were:

1) To install between 12 and 18 borings at the facility to characterize subsurface soils;

2) To collect subsurface soil samples from the borings for analysis of total petroleum hydrocarbon (THC) and benzene, toluene, and xylene (BTX);

3) To install monitoring wells in a maximum of six borings to collect samples of shallow groundwater for BTX analysis;

4) To collect surface and shallow soil samples from selected locations adjacent to a concrete pad on which a transformer was formerly located and to analyze the soil for PCBs; and

5) To interpret the results of the investigation and to provide recommendations for further investigation and site remediation.

REPORT FORMAT

Section Two of this report describes the field investigation that included installation of borings and wells, and collection of samples. Section Two also outlines decontamination and safety protocol.

Section Three presents the results of the field investigation and the laboratory analyses for total petroleum hydrocarbons; benzene, toluene and xylenes; and PCBs. In addition, interpretations of these data are presented. Conclusions and recommendations are presented in Section Four.

SECTION TWO
SUMMARY OF FIELD INVESTIGATION

Seventeen borings were installed at the Naval Exchange gas station during the weeks of January 26 and February 2, 1987. Soil samples were collected from all borings. Three of the borings were subsequently completed as groundwater monitoring wells from which water samples were collected. This section summarizes the safety, decontamination, well installation and sampling methods employed during the field operations at the gas station.

SAFETY PRECAUTIONS

Routine, on-site safety precautions were observed at all times during boring and well installation. These included full body coverage with disposable tyvek suits, steel-toe PVC boots, and vinyl gloves. A first aid kit and an eye wash bottle were available during field work. Prior to project initiation, all on-site personnel were informed as to the potential hazards involved with the investigation. All work was performed at the site without incident.

DECONTAMINATION

Prior to initiating drilling each boring, all drilling and sampling equipment was steam cleaned. All Shelby tubes and brass tubes for sample collection were steam cleaned prior to use, and clean Teflon film and plastic caps were used to seal the exposed ends of soil samples.

The bailer used for well sampling was steam cleaned at the beginning of the job and cleaned with Alconox between wells. A triple rinse with deionized water followed washing, and the rope on the bailer was replaced after each well.

BORING AND WELL INSTALLATION

Seventeen boring locations were selected at the gas station to characterize the subsurface soils and determine the occurence of contamination in the area. After collecting soil samples, three borings were completed as wells to monitor shallow groundwater. The locations of the borings and wells are illustrated on Figure 2-1.

Boring Installation

The locations of the 17 borings at the gas station were selected to characterize the occurrence of soil contamination around the solvent and waste-oil tanks, the abandoned gas tanks, and the operational gas tanks. Borings were located immediately adjacent to the tanks and at a distance away from the tanks in the downgradient direction of groundwater flow.

Borings B1 through B4 surround the concrete slab over the abandoned underground gasoline tanks. Several attempted borings were aborted around this cap near locations B2 and B3. Near location B2, the boring was terminated at a depth of about 2 feet when a 2-inch pipe was encountered. Free product flowed with groundwater into this boring from below the concrete footing. Gasoline accumulated on the groundwater to a thickness of about 2 inches. This product was

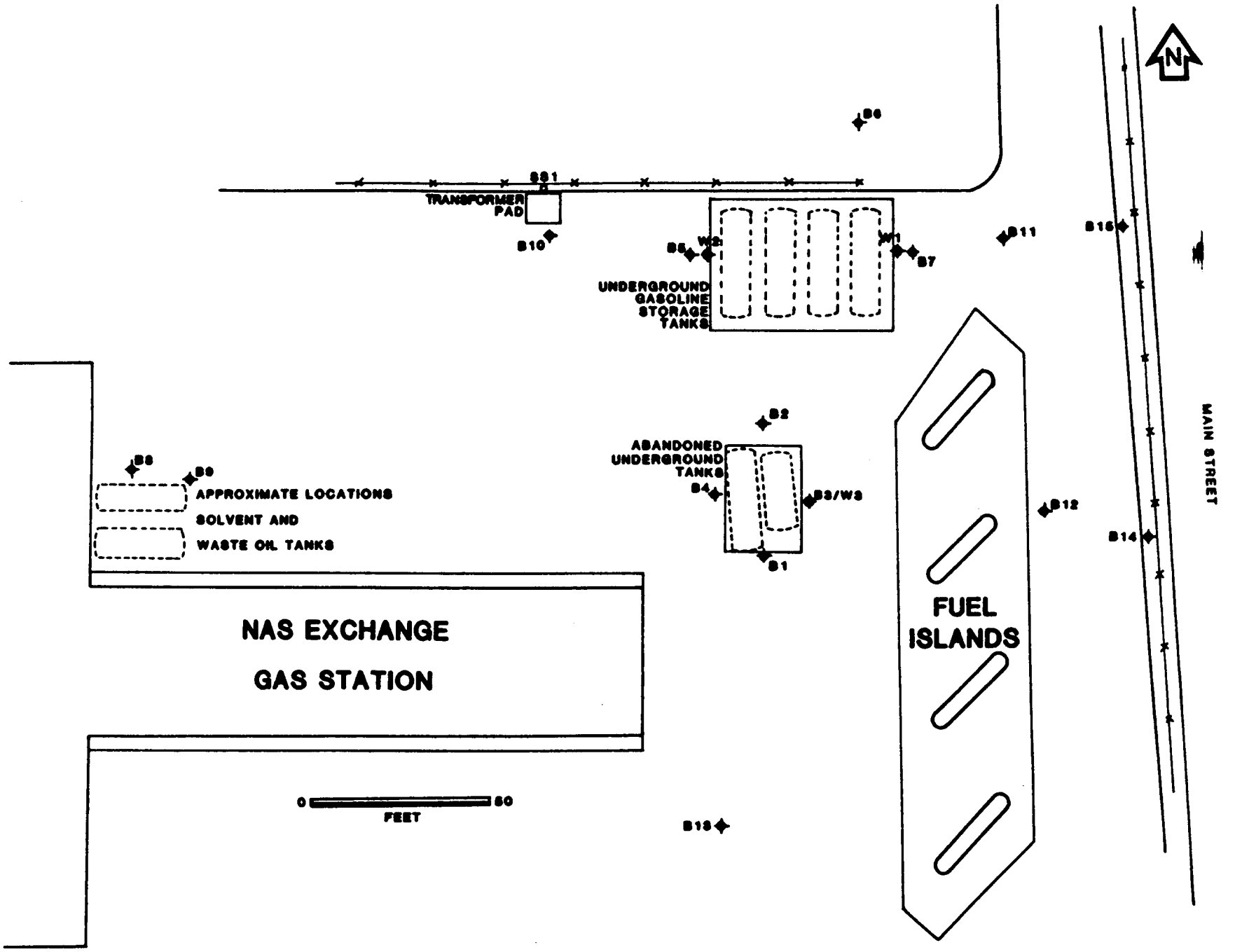


FIGURE 2-1. Well and Boring Locations.

pumped from the hole prior to backfilling with sand and cement. Product was not detected in boring B2, which was located approximately three feet away.

Three borings were attempted near location B3 before a successful boring was completed. Augering was aborted in the first three attempts due to buried pipes. Product seeped slowly into the borings with groundwater from beneath the concrete cap but did not generate measurable accumulations. These holes were backfilled with sand and cement. The boring at location B3 was converted to a well (W3) to monitor groundwater conditions adjacent to the abandoned tanks.

Borings B5, B6 and B7 were placed on three sides of the underground tanks currently used for gasoline storage. Borings B10 through B15 and the borings for wells W1 and W2 were placed to further define the distribution of detected petroleum product.

Borings B8 and B9 were installed adjacent to the waste oil and solvent tanks. Although constrained by the exchange building on two sides, the selected locations were placed away from the tanks in the apparent downgradient direction of shallow groundwater flow.

All 17 borings were installed using hollow-stem continuous-flight augers. Soils from the borings were logged as they were removed from the ground. Soil lithology was classified according to the Unified Soil Classification System. Drill logs are presented in Appendix A.

Borings that were not completed as wells were backfilled with a mixture of clean cuttings, sand, and bentonite. The borings were sealed at the surface with 12 to 18 inches of concrete. All

contaminated cuttings were placed in 55-gallon drums and stored on site.

Well Installation

Wells were installed adjacent to the abandoned and active underground gasoline storage tanks. Wells W1 and W2 were placed on the east and west sides of the active tanks, respectively. These locations are downgradient (W1) and upgradient (W2) of the tanks. Well W3 was installed on the east side, and downgradient of the two abandoned underground tanks. These well locations were selected to provide an opportunity to monitor of shallow groundwater near the underground tanks.

Borings for the three wells were made with hollow-stem, continuous-flight augers. The wells were constructed with 2-inch diameter, schedule 40, PVC pipe. All three wells were installed at a total depth of 10 feet and terminated in bay mud. Slotted casing was installed from a depth of 2 feet to a depth of 10 feet. Solid casing extended from the ground surface to a depth of 2 feet. The top of casing elevations were surveyed following well construction. Elevations were determined relative to the NAS (1976) datum of 101.28 feet above mean-low-low-water. Additional details of well construction and development are presented in Appendix A.

SAMPLING

Soil samples were collected from each 5-foot interval during boring installation. Water samples were collected after the wells were developed. At the time of water sample collection, water level measurements were also obtained.

Soil Sampling

Soil samples were collected in pre-cleaned, 2-inch by 30-inch steel Shelby tubes or 2-inch by 6-inch brass tubes inside a 18-inch long split-spoon sampler. The tubes were pushed ahead of the augers to insure the collection of relatively undisturbed samples. Once extracted from the ground, the Shelby tubes were cut to 6-inch lengths. Six-inch sections of brass or Shelby tubes were logged, and the section selected for analysis was sealed with Teflon film and plastic caps. The samples were labeled with the well number, depth, date, time, job number and sampler's initials to maintain positive identification. Samples were stored on ice in Zip-loc plastic bags.

Additional soil samples were collected from location SS1 adjacent to the transformer pad. A sample was collected with a shovel (cleaned between samples) at the ground surface and at a depth of 1.5 feet. These samples were contained in glass mason jars.

All samples collected were stored on ice before being shipped to Anlab Analytical Laboratory in Sacramento, California. Shipped samples were accompanied by chain-of-custody forms. Copies of these forms are included in Appendix B.

Water Sample

Following well development, water samples were collected from each well after purging 3 to 5 well volumes. Samples were collected using a pre-cleaned Teflon bailer. Samples were contained in 40 milliliter VOA vials and stored on ice prior to and during shipment.

All sample bottles were labeled with the well number, the time, date, sampler's initials, and job number. Samples were accompanied to the lab (Anlab, Sacramento) by chain-of-custody forms (Appendix B).

SECTION THREE
SUMMARY OF ANALYSES

This section presents the results of investigating and logging subsurface soils at the Naval Exchange gas station. In addition, the results of analyses performed on soil and water samples from the site are presented. This is followed by a discussion of the results.

RESULTS OF FIELD INVESTIGATION

The field investigation at the gas station included logging soils from each of the seventeen boring locations, monitoring soils for volatile organic vapors, and obtaining water-level measurements.

Subsurface Soils

Soils encountered below the Naval Exchange gas station were similar in all seventeen borings. Typically, the borings revealed about 1 foot of coarse aggregate below surface asphalt. This was underlain by sand and silty or clayey sand with shell fragments. The sand was found to overlay soft, sticky organic clay that usually smelled strongly of hydrogen sulfide.

The sand and silty or clayey sand is of marine origin. This sand probably represents spoils dredged from shipping channels around Alameda Island. These sands were most likely used as fill in low-lying areas of the island and as backfill around the underground

tanks. The organic clay below the sand is typical of naturally occurring mud that accumulated in San Francisco Bay. These bay muds underlie much of Alameda Island.

As illustrated on the bore logs (Appendix A), the primary variable encountered in the borings was the depth to the sand/bay mud contact. Bay mud was frequently encountered at a depth of about 5 feet, although mud was not detected in borings B1 and B4 at their maximum depths of 17 feet. These borings appear to penetrate backfill around the underground tanks.

Sandy soils from all borings except B6 and B10 had detectable odors of petroleum at depths less than five feet. Particularly strong petroleum odors emanated from borings around the abandoned and operating gasoline storage tanks, as well as borings B11, B12, B14, and B15 near the fuel islands.

A photo ionization detector (PID) (Hnu Model PI 101) was utilized to detect the concentration of organic vapors in soil samples. The meter is calibrated to a benzene standard, and therefore registers the concentration of vapors in benzene equivalents.

The absolute value of PID measurements of organic vapor concentrations in the borings and in cuttings and samples from the borings varied. The pattern generated from these readings, however, indicates a higher concentration of volatile organics just below the ground surface and decreasing concentrations with depth (Table 3-1). The higher PID readings were generated in shallow, saturated sand, while low and non-detected readings were encountered in bay mud.

TABLE 3-1

FIELD MEASUREMENTS OF ORGANIC VAPORS IN SOIL

BORING	Concentrations (PPM) Depth (Feet)			
	0-2	2-5	5-10	>10
B1	--	40	3	ND
B2	30	ND	--	--
B3	100	--	20	--
B4	--	--	50	20
B5	300	200	ND	--
B6	ND	ND	--	--
B7	100	100	ND	ND
B8	60	ND	--	ND
B9	--	--	--	--
B10	--	--	--	--
B11	--	--	--	--
B12	--	--	--	--
B13	60	80	ND	--
B14	300	--	ND	--
B15	400	500	ND	--
W1	170	500	ND	--
W2	--	130	ND	--

NOTE: ND = Not Detected

Measurements taken with an Hnu PID.
Concentrations expressed in Benzene equivalents.

These data and observations from drilling suggest that petroleum-related contaminants are floating on the shallow water table and are not migrating below the sand/bay mud contact.

Groundwater

Both the organic clays and portions of the imported sand fill below the gas station were water-saturated. Active groundwater movement appeared to be restricted to the sand, however. The sands were permeable and porous, and most of the groundwater that entered the open borings came from this sandy unit.

An oily sheen was detected on groundwater entering borings B5 and B7. As mentioned previously, free product was also present at locations B3 and the aborted boring near B2. Water collected from the three wells had a barely detectable odor of petroleum at the time of sampling.

The elevation of the water table at the site varied over time, presumably due to tidal influence. The calculated direction of groundwater flow is toward the east, as illustrated on Figure 3-1. The calculated gradient is 0.008 ft./ft.

RESULTS OF LAB ANALYSES

Laboratory analyses were performed on soil and groundwater samples collected from the site during this investigation. Soils were analyzed for total petroleum hydrocarbon (THC) and benzene, toluene and xylene (BTX). Water samples were analyzed for BTX. Two additional soil samples were analyzed for PCBs.

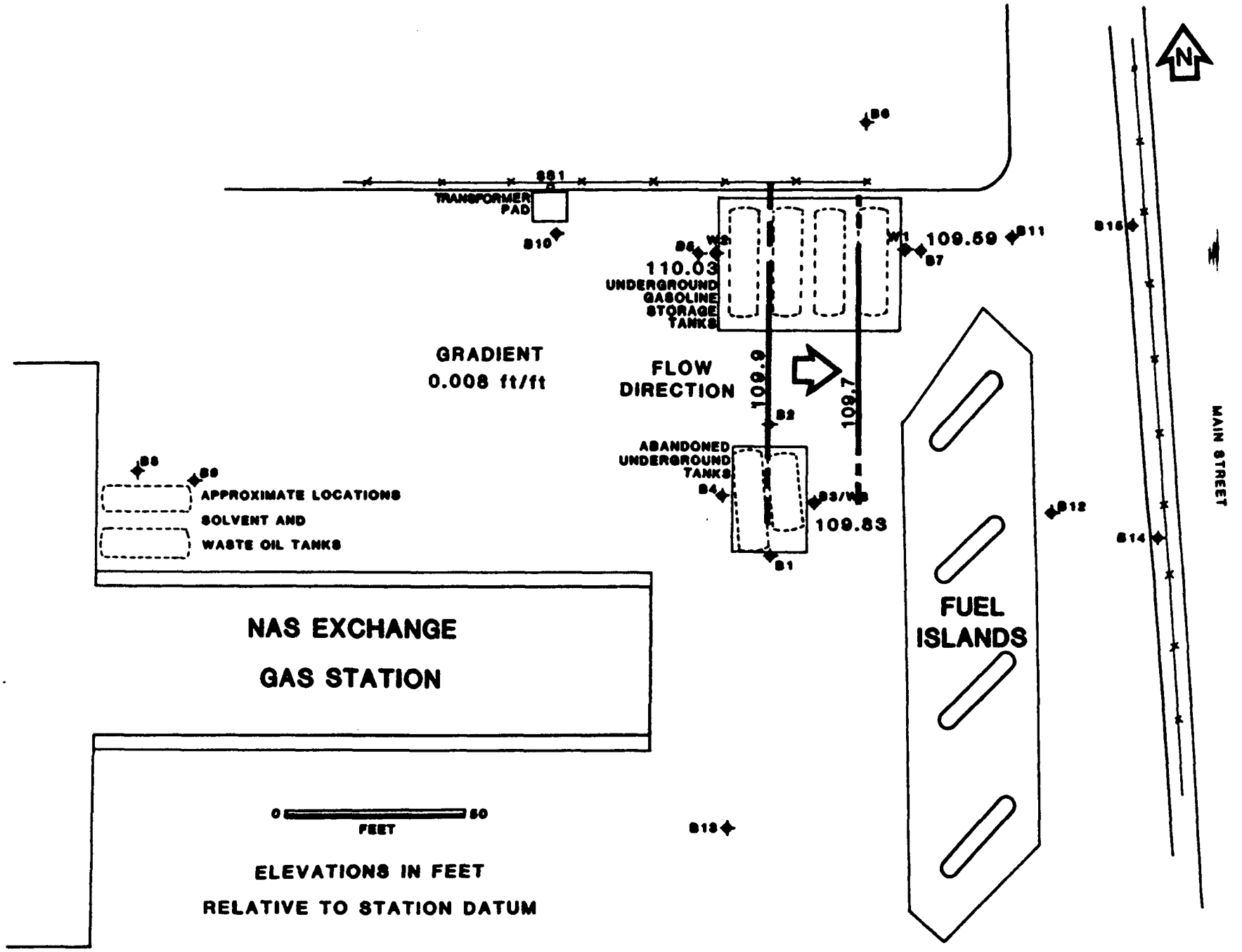


FIGURE 3-1. Calculated Direction of Shallow Groundwater Flow.

Although standards have not been established for the concentrations of petroleum hydrocarbons in soil, guidelines established by the Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), indicate that at concentrations below 100 ppm, soils can be left in place. Above 1,000 ppm, contaminated soils may be required to be excavated as they are considered a threat to waters of the State.

Soil Analyses

The results of soil analyses for total petroleum hydrocarbons and benzene, toluene and xylene are summarized in Tables 3-2 and 3-3, respectively. These data indicate that soil contamination by petroleum hydrocarbons and BTX occurs within the area of investigation. The spatial occurrence of contamination can be defined by depth and aerial extent.

The depth of contamination appears to be limited to the upper 5 feet of soil due to soil composition and permeability. Analyzed bay mud samples contained low or non-detectable concentrations of BTX and THC, and shallow, sandy soils contained higher concentrations of these constituents. The low permeability of the bay mud and the high organic content appears to attenuate the migration of contaminants. In addition, the permeable sand overlying the bay mud is saturated with groundwater and thereby physically isolates the petroleum products within the uppermost portion of this zone. The lower density of the hydrocarbons and the high water table minimize vertical migration.

The aerial distribution of petroleum contamination appears to be concentrated around the underground gasoline tanks and the north end of the fuel islands. Concentrations below 100 ppm THC were detected

TABLE 3-2

RESULTS OF SOIL ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

Sample/Depth (Feet)	Total Petroleum Hydrocarbons (PPM)
B1 5.5 -6.0	30
B1 10.0-10.5	ND
B2 7.0- 7.5	ND
B3 6.0- 6.5	ND
B4 6.0- 6.5	48
B4 12.0-12.5	ND
B5 7.0- 7.5	ND
B6 7.0- 7.5	ND
B7 7.0- 7.5	ND
B8 5.5-6.0	ND
B9 2.0-2.5	78
B10 4.0-4.5	76
B11 1.0-1.5	520
B11 4.0-4.5	2000
B12 1.0-1.5	90
B13 2.0-2.5	82
B14 3.0-3.5	42
B15 1.0-1.5	940
W1 4.5-5.0	81
W2 2.0-2.5	14000

NOTE: ND = Not Detected.
Detection limit is 10 ppm.

TABLE 3-3

RESULTS OF SOIL ANALYSIS FOR BENZENE, TOLUENE, AND XYLENES

Sample/Depth (feet)		Constituent (PPM)		
		Benzene	Toluene	Xylenes
B1	5.5-6.0	1.1	2.6	ND
B2	7.0-7.5	0.72	0.19	ND
B3	6.0-6.5	1.5	3.2	ND
B4	6.0-6.5	0.58	1.8	0.33
B5	7.0-7.5	0.60	0.19	ND
B6	7.0-7.5	0.77	ND	ND
B7	7.0-7.5	0.92	0.14	ND
B8	5.5-6.0	1.2	ND	ND
B9	2.0-2.5	0.11	ND	ND
B10	4.0-4.5	0.10	ND	ND
B11	1.0-1.5	2.3	12	25
B12	1.0-1.5	1.1	3.6	3.3
B13	2.0-2.5	ND	ND	ND
B14	3.0-3.5	0.34	2.2	1.4
B15	1.0-1.5	2.1	2.8	22
W1	4.5-5.0	0.32	0.11	2.9
W2	2.0-2.5	54	650	1200

NOTE: ND = Not Detected
Detection limit is 0.05 ppm

at locations B6, B8, B9, B10, B13 and B14, thereby defining the extent of contamination to the north, west and south of the underground gasoline tanks. Within these limits, the estimated area of contamination extends from the underground gasoline tanks to the east, in the direction of groundwater flow. This area is illustrated on Figure 3-2. Contamination in excess of 100 ppm THC was not detected near the waste oil and solvent tanks. These tanks are not therefore considered significant sources of subsurface contamination.

Three probable sources for petroleum contamination have been identified. The first of these sources is the pair of abandoned underground tanks. Free product was visible in borings adjacent to the concrete cap over the tanks. The slab apparently has a 2-foot (approximately) footing that extends downward from the edges. This construction creates an inverted cup over the tanks, and free product floating on the shallow water table is trapped under the concrete. The presence of product beneath the cap is confirmed by the seepage of product into the aborted boring near B2. This seems to be the most likely source of petroleum detected in soil and groundwater.

The second possible source of petroleum contamination is the set of currently used gasoline storage tanks. The THC concentration in soil at W2 (west side of the tanks) is 14,000 parts per million, and high concentrations (500 ppm) of organic vapors were detected in sandy soil at W1. This contamination may reflect a source of petroleum from these tanks. Precision tank testing has identified apparent leaks in these operating storage tanks.

The third, and less likely source and contamination is spillage and run-off from the fuel islands. Unpaved excavations currently allow any surface spills and runoff to percolate into the shallow groundwater below the gas station. Spills are not likely to be

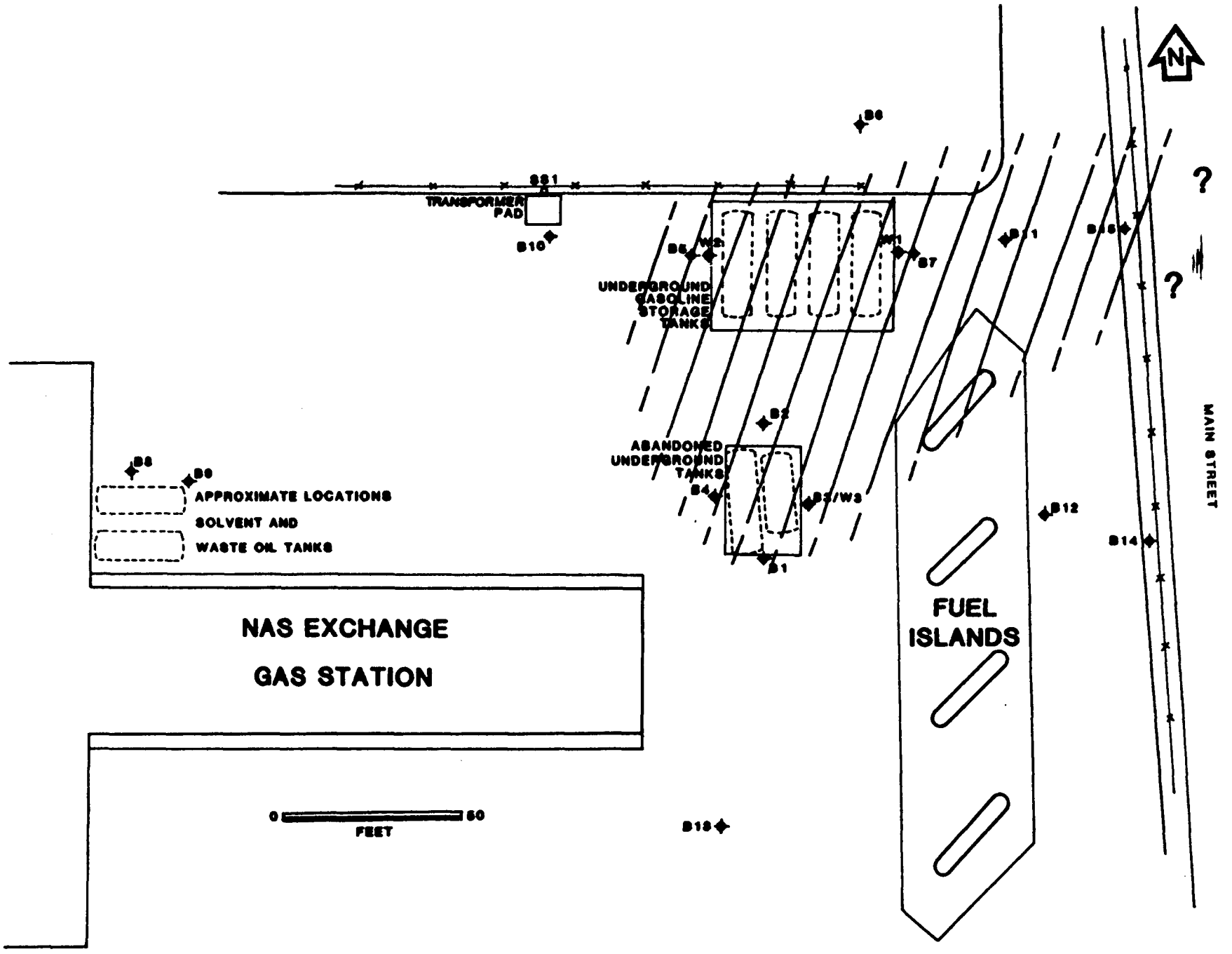


FIGURE 3-2. Estimated Zone of Soil Contamination.

groundwater below the gas station. Spills are not likely to be the single source for the subsurface contamination detected on the site, but may exacerbate existing problems.

Additional soil samples were collected on the north side of a concrete pad on which a transformer was formerly located. Samples were collected at the surface and at a depth of 1.5 feet. The results of PCB analysis on the soils are presented in Table 3-4. PCB leakage from the transformer has apparently occurred, although the concentration of contamination does not approach the 50 ppm action level for PCBs. Further action at this location does not appear to be warranted.

Water Analyses

Water samples from wells W1, W2, and W3 were analyzed for BTX. The results of these analyses are presented in Table 3-5.

The high concentrations of benzene, toluene and xylene in groundwater adjacent to the underground tanks indicate that significant quantities of gasoline have come in contact with groundwater. The concentration of benzene at W3 approaches the saturation concentration of benzene in water (40,000 ppb).

Although the prevailing direction of groundwater flow was determined to be toward the east, the gradient is shallow and tidal fluctuations may reverse or redirect flow. Despite this, the similar magnitude of the concentrations at the three wells suggests there may be equally significant sources of hydrocarbons at the in-use and abandoned underground tanks.

TABLE 3-4

RESULTS OF SOIL ANALYSIS FOR PCBs

	Constituent (PPM)	
Sample	PCB 1254	PCB 1260
Surface	1.6	1.9
1.5 Feet	<1	0.20

TABLE 3-5

RESULTS OF WATER ANALYSIS FOR BENZENE, TOLUENE, AND XYLENES

	Constituent (PPB)		
Sample	Benzene	Toluene	Xylenes
W1	14,000	22,000	8,700
W2	8,300	15,000	12,000
W3	31,000	8,200	5,000

SECTION FOUR
CONCLUSIONS AND RECOMMENDATIONS

The investigation of soil and groundwater at the Naval Exchange gas station revealed subsurface soils of permeable sand overlying less permeable bay mud. Significant concentrations of total petroleum hydrocarbons and benzene, toluene and xylene were detected in soil near the abandoned and in-use underground gasoline storage tanks. The contamination appears to extend away from the underground tank area toward the east in the downgradient direction of groundwater flow. Groundwater from three wells adjacent to the tanks contained high concentrations of benzene, toluene and xylene.

One source of petroleum contamination at the site is the pair of abandoned gasoline tanks. Free product was observed in two locations flowing from below the concrete cap over the tanks, and the inverted cup shape of the cap may be trapping additional product. The most likely source of the majority of petroleum product is the set of in-use gasoline storage tanks. High concentrations of total petroleum hydrocarbons, organic vapors, and benzene, toluene and xylene were detected in soil from borings adjacent to the tanks. In addition the recently completed precision tank testing indicated significant leakage in these tanks.

PCBs were detected in soil samples from a former transformer location. Concentrations were well below action levels and the PCBs warrant no further attention.

Based on the preceding conclusions, recommendations for the Naval Exchange gas station are as follows:

- Remove the concrete cap, abandoned subsurface gasoline storage tanks, and accumulated free product from the abandoned tank area.

- Excavate soil around the abandoned tanks and the west end of the in-use tanks with petroleum hydrocarbon concentration greater than 1,000 ppm to prevent or minimize continued discharge to groundwater.

- Identify and repair apparent leaks in the currently active storage tanks and pipe lines.

- Evaluate methods for recovering free product and contaminated groundwater.

- Install a recovery system to physically remove and treat contaminated groundwater.

- Install two groundwater monitoring wells downgradient of the known plume of contamination.

- Continue groundwater monitoring through existing and additional wells.

APPENDIX A
WELL COMPLETION AND
WELL LOGS

WELL COMPLETION

The three wells were completed with a sand pack from the bottom of the boring to approximately the top of the perforated casing. A bentonite seal was placed above the sand using either pelletized or powdered bentonite. The remaining annular space was filled with concrete. The wells were completed with flush-mounted, water-tight cover boxes.

Following installation, the wells were developed to remove mud from the casing, sand pack, and boring walls. Between 20 and 25 gallons of water were pumped from each well during development. Water was pumped from the wells until it flowed sediment-free.

DRILL LOGS

Information on the types of soil encountered while drilling and the depths at which these soils were found is contained in the drilling logs. The drilling logs are based upon information from drill cuttings, actual soil samples, and changes in drilling characteristics. A description of key terms used in the logs is presented below.

Soil Boring Designation. Each drilling site is designated by a unique number.

Depth. Measured in feet below ground surface.

Recovery. Approximate amount of soil recovered in sampler for given sample interval.

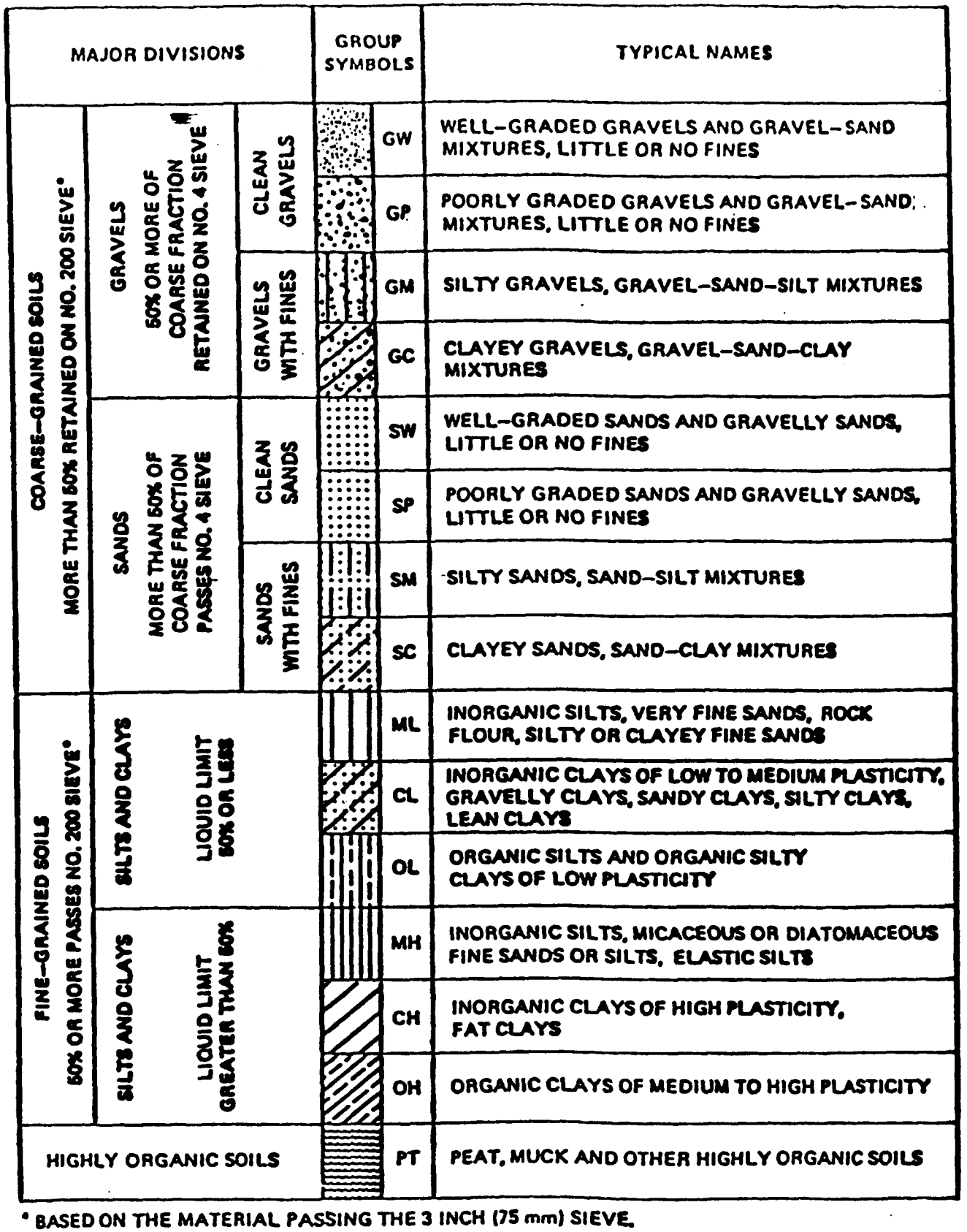
Sample Interval. Soil samples collected are marked by "X". Soil samples retained for analyses are marked by a sample number.

Description. The texture, color, and moisture content of soils were described, plus any other significant observations.

USCS Soil Type. Soils were classified visually in the field according to the Unified Soil Classification System (USCS) using ASTM Method D2488-69. The USCS system is presented in the table on the following page.

"BOH". Bottom of hole indicating total depth in feet below land surface.

▼ Standing water in boring at time of drilling.



* BASED ON THE MATERIAL PASSING THE 3 INCH (75 mm) SIEVE.

UNIFIED SOIL CLASSIFICATION SYSTEM

Environmental Resources Management

Drilling Log

Project USNAVY - ALAMEDA Owner USNAVY

Location ALAMEDA GAS STATION Job/WO Number 40011

Boring/~~Well~~ Number B1 Total Depth 17 Diameter 6 3/4"

Surface Elevation _____ Water Level: Initial 3.5' 24-hrs. _____

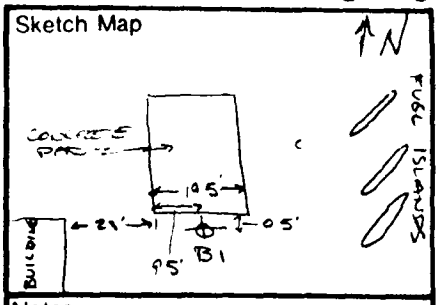
Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company KLEINFELDER Drilling Method HOLLOWSTEM

Driller DOUG/JERRY Log By BLB Date Drilled 1/29/86

Sketch Map



Notes

CFB ASSIST

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
1				DRILL TO 5 FEET. THROUGH ASPHALT + 1' ROADBED AGGREGATE
2				CUTTINGS: SAND, MED TO FINE GRAINED. GREY, WET
3				STRONG ODOR PETROLEUM.
4				WATER ON DRILL STEM AT ABOUT
5			9:12 AM	▼ 3.5 FEET.
6	PUSHED CALIF MOD 24" REC 12"		5.5-6.0	SAND, GREY, WITH SILT. RUNNY, LOOSE, WET.
7				SMELL OF PETROLEUM. NO VISIBLE PRODUCT.
8				HNU ~40 ppm
9				DRILLED TO 10 FEET
10	PUSHED CALIF MOD 24", REC 6"		9:40 AM	THROUGH:
11			10.0-10.5	CUTTINGS- SAND, MED TO FINE, SHELL FRAGS,
12				SOME SILT. GREY. WET, RUNNY. FAINT ODOR
13				PETROLEUM. HNU 2.3 ppm
				SAND, MED TO FINE GR. GREY. WET. NO ODOR
				DRILLED TO 15 FEET THROUGH
				SAND, WET, SLOPPY, SILTY. GREY.
				NO PETROL. ODOR. FAINT ODOR H_2S

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner USN

Location USN ALAMEDA GAS STA - W.O. Number 40011

Boring Well Number B1 Total Depth 17 Diameter

Surface Elevation Water Level: Initial 24-hrs

Screen: Dia. Length Slot Size

Casing: Dia. Length Type

Drilling Company KLEINFELDER Drilling Method

Driller DOUG/JERRY Log By BLB Date Drilled 1/29/87

Sketch Map

See p1

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
14			10 SA	CUTTINGS TO 15 FEET DESCRIBED ABOVE
15	PUSHED CAL INS. 24", 0 DEG		14.5-15.0'	MUD - CLAY WITH SILT, GREY, WET, MILD SMELL H_2S, MILD SMELL PETROLEUM SAMPLE OFF AUGER. HNU: NO REGISTER NO RECOVERY - SOIL TOO RUNNY. GREY SILTY SAND WITH CLAY ON OUTSIDE OF SAMPLER. WET. HOLE CAVED TO 3.5'
16				
17				BOTT 17.1'
18				HOLE COLLAPSED TO ~3' BACKFILLED WITH SAND & BENTONITE PLUGGED WITH CEMENT (~6")

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner USNAVY

Location ALAMEDA GAS STATION WO. Number 10011

Boring Well Number B2 Total Depth 17.5' Diameter 6 3/4"

Surface Elevation ____ Water Level: Initial ____ 24-hrs. ____

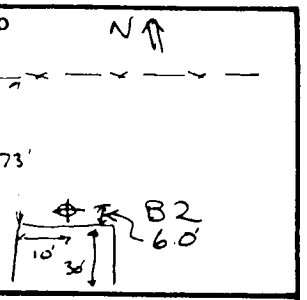
Screen: Dia. ____ Length ____ Slot Size ____

Casing: Dia. ____ Length ____ Type ____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG / JERRY Log By BLB Date Drilled 4/29/87

Sketch Map



Notes

CFB PBDIST

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
1				Drilled slowly to 5 feet thru asphalt & gravel. Cuttings: SAND, WELL SORTED, MED GRAIN, GREY. CLAY, CLEAN, SMOOTH, GREY STICKY. BOTH WITH STRONG SMELL PETROLEUM HNU: 20-30 ppm FIRST ATTEMPT CLOSER TO CONCRETE HIT PIPE. PRODUCT ENTERED THE HOLE FROM BELOW CONCRETE CURB. see next page. CUTTINGS SAME AS ABOVE
2				
3				
4				
5				
6	PUSHED 5.0' SHELBY 30", REC 30			CLAY, SMOOTH, SOFT, STICKY, GREY. NO ODOR
7			1145A	
8			7.0-7.5	CLAY, SOFT, MINOR SILT. GREY. NO ODOR, MOIST
9				CLAY, ORGANIC RICH, PLANT PARTS, SCATTERED PEBS. MILD SMELL H_2S, NO SMELL PETROLEUM.
10				DRILLED TO 10 FEET. SOFT CLAY IN CUTTINGS
11	PUSHED 5.0' SHELBY 30", REC 18"		12:00 P	
12			11.0-11.5'	CLAY, ORGANIC. SOFT, PLANT PARTS; MILD SMELL H_2S GREY, STICKY, MOIST.
13				DRILLED TO 15 FEET.

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner USNAVY

Location ALAMEDA ~~WO~~ Job Number 40011

Well Number B2 Total Depth 15 Diameter 6 3/4"

Surface Elevation _____ Water Level: Initial _____ 24-hrs. _____

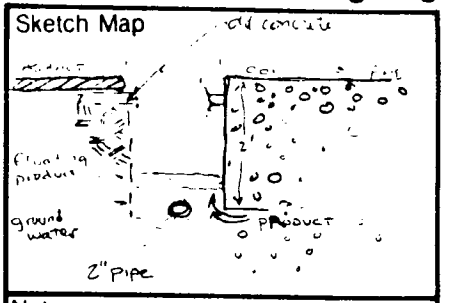
Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG/JERRY Log By BLB Date Drilled 4/29/87

Sketch Map



Notes
DIAGRAM OF FIRST HOLE AT LOCATION B2. HOLE ABANDONED, FILLED WITH SAND & GROUT, CAPPED W/ CEMENT

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
14				CUTTINGS- CLAY, GREY, ORGANIC. SOFT, STICKY, MOIST
15	PUSHED 30" SHELBY 30" REC: 30"			
16				CLAY, ORGANIC. AS BELOW
17			12:10P	CLAY, ORGANIC; SOFT, STICKY, GREY; MODERATE SMELL H_2S
18			17.0-17.5	B.O.H. 17.5 FEET
				AFTER 5 HRS, WATER AT ~14 FEET NO FLOATING PRODUCT
				BACKFILLED HOLE WITH SAND & BENTONITE. SOME COLLAPSE OF HOLE TOWARD BOTTOM PLUGGED TOP WITH 6" CONCRETE

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner USNAVY

Location ALAMEDA ~~W.O.~~ Number 40011

~~Well~~ Boring Number B3 Total Depth 17.5 Diameter 6 3/4"

Surface Elevation ____ Water Level: Initial ____ 24-hrs. ____

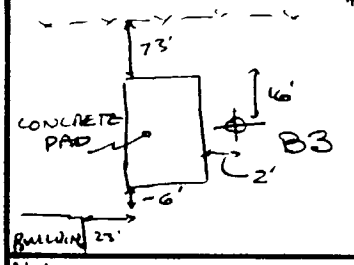
Screen: Dia. ____ Length ____ Slot Size ____

Casing: Dia. ____ Length ____ Type ____

Drilling Company KLEINFELDER Drilling Method HOLLOWSTEM

Driller DOUG / JERRY Log By BOB Date Drilled 1/29/87

Sketch Map



Notes

CFB ASSIST

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
1				FIRST THREE ATTEMPTS HIT PIPES. ASPHALT AT SURFACE
				CONCRETE PAD AT 6"
				CUTTINGS: COARSE SAND & GRAVEL MOIST W/ PRODUCT
2				STRONG ODOR. HNU 100 ppm IN CUTTINGS
				TO FIVE FEET
3				
4				
5				
6	PUSHED 30" SHELBY 30", REC 18"		3:00	** SAND, WELL SORTED, MED GRAINED. MINOR SILT, GREY
			6.0-6.5	WET. SOFT. NO ODOR. HNU 20± ppm
7				
8				
9				CUTTINGS - SLOPPY SILT W/ CLAY. SOME SAND
10		?		
11				
12	PUSHED 30" SHELBY 30", REC 30"		3:10P	CLAY, ORGANIC. SOFT, STICKY, SMOOTH, CLEAN. NO ODOR OF
			12.0-12.5	PETROLEUM. SLIGHT ODOR H_2S
13				

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner USNAVY

Location ALAMEDA CA 5TH ~~AVE~~ Job Number 40011

Well Number B3 Total Depth 17.5 Diameter 6 3/4

Surface Elevation _____ Water Level: Initial _____ 24-hrs. _____

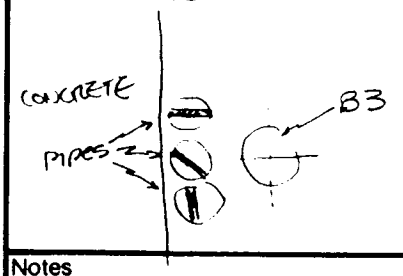
Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG/JERRY Log By BLB Date Drilled 1/29/87

Sketch Map DETAIL



Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
14				AUGERED TO 15 FEET
15	PUSHED 30" SHELBY			CUTTINGS: MUCKY CLAYEY FINE SAND. DK GREY SLIGHT ODOR PETROLEUM.
16				SILTY CLAY AS BELOW
17			3:30	SILTY CLAY, ORGANIC, WET, DK GREY, STICKY STRONG ODOR H_2S, NO ODOR PETROLEUM
18			17.0-17.5	
				TD BOH. 17.5 FEET
				AFTER 2 HRS, WATER AT ~ 2.5 FEET FLOATING HYDROCARBONS PRESENT
				HOLE CAVED TO ~5', COVERED HOLE AND COMPLETED AS A WELL ON 2/3/87.

Environmental Resources Management

Drilling Log

Project ALAMEDA USN Owner USNAVY

Location ALAMEDA GAS STA. SOR W.O. Number 40011

Boring Well Number B4 Total Depth 17.5 Diameter 6 3/4"

Surface Elevation ____ Water Level: Initial ____ 24-hrs. ____

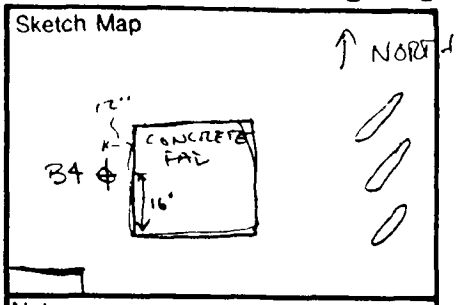
Screen: Dia. ____ Length ____ Slot Size ____

Casing: Dia. ____ Length ____ Type ____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM AUGER

Driller DOUG/JERRY Log By BOB Date Drilled 1/30/87

Sketch Map



Notes
see earlier logs for site measurements.

CPB ASSIST

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
1				ASPHALT & COARSE GRAVEL AT SURFACE. CUTTINGS SMELL STRONGLY OF PETROL
2				
3				
4				CUTTINGS- GREY SAND & SILT, WET
5				
6	PUSHED 30" SHELBY 30" REC IN 18"		9:00	SILTY SAND; WET; GREY; PETROL ODOR. HNU 50 PPM
7			6.0-7.5	FAINT ODOR PETROL. HNU 15 ppm SANDY CLAY TO CLAYEY SAND. GREY. WET. SAND- MED TO FINE GRAINED, CLAY- STICKY, SMOOTH
8				
9				AUGERED TO 10 FEET CUTTINGS: SAND & SILTY SAND. WET, SLIGHT ODOR PETROL.
10	PUSHED 30" SHELBY 30", REC:			
11				
12			9:20A	SAND, MED TO FINE GRAINED; SOME SILT & CLAY.
13			12.0-12.5	NO ODOR PETROL. WET

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner USNAVY

Location ALAMEDA Job/Site Number 40011

Well Number B4 Total Depth 17.5 Diameter 6 3/4

Surface Elevation _____ Water Level: Initial _____ 24-hrs _____

Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG / JERRY Log By BLB Date Drilled 1/30/87

Sketch Map

SEE P 1

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
14				AUGERED TO 15 FEET. CUTTINGS SLOPPY SAND, GREY, NO ODOR.
15	PUSHED 30" SHELBY 70", REC 30"			FROM BOTTOM OF AUGER: CLAY. SMOOTH, SOFT. MILD ODOR PETROL
16				
17			P:30	CLAY. SMOOTH, SOFT. STICKY. ODOR OF H_2S AND PETROLEUM; HNU 20ppm
18			17.5	LIGHT PETROLEUM FILM ON WATER DRAINING FROM CUTTINGS

BOH 17.5 FEET

HOLE CAVED TO ~5 FEET.
BACKFILLED WITH SAND & BENTONITE
PLUGGED WITH 6" CEMENT

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner USNAVY

Location ALAMEDA GAS STA. WD. Number 40011

Boring Well Number B5 Total Depth 17.5' Diameter 6 3/4

Surface Elevation _____ Water Level: Initial _____ 24-hrs. _____

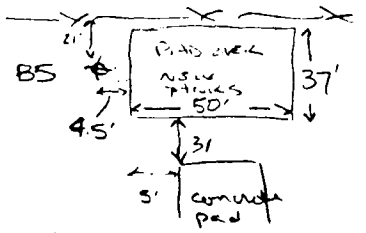
Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG/JERRY Log By BLB Date Drilled 1/30/87

Sketch Map



Notes

CFB ASSIST

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
0				ASPHALT. AUGER TO 5 FEET
1				CUTTINGS. SAND, MED TO FINE, SOME GRAVEL
2				WET, PETROLEUM PRESENT.
3				STRONG ODOR, HNU: 300 ppm
4				SAND, SAME AS ABOVE. STRONG ODOR
5				PETROLEUM. HNU: ~200 ppm
6				SAND, MED TO FINE GR, POORLY SORTED. GREY. WET
7			10:10A	CLAY, ORGANIC, GREY, SMOOTH, SOFT. NO ODOR
8			7.0-7.5'	CLAY. ORGANIC, GREY W/ BLACK MOTTLES.
9				NO ODOR. SMOOTH, STICKY.
10				AUGERED TO 10 FEET
11				CUTTINGS: CLAY., AS ABOVE
12			10:20A	
13			12.0-12.5	CLAY, SMOOTH, SOFT, WET. ORGANIC. STRONG SMELL H_2S. PLANT PARTS.

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner USNAVY

Location ALAMEDA ~~W.O.~~ Job Number 40011

Well Number B5 Total Depth 17.5 Diameter 6 3/4"

Surface Elevation _____ Water Level: Initial _____ 24-hrs _____

Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company KLEINFELDER Drilling Method _____

Driller DOUG/JERRY Log By BLB Date Drilled 1/30/87

Sketch Map

See p1

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
14				AUGER TO 15 FEET
				CUTTINGS: CLAY
15				
16	PUSHED SHELBY 30" REC 30"			
17			10:30	CLAY. SMOOTH, STICKY, SOFT. WET. STRONG H_2S
			17.0-17.5	PLANT PARTS. GREY.
18				BOTH 17.5 FEET
				REMOVE AUGERS: WATER AT ~2 FEET
				CAVING IN HOLE TO 2 FEET.
				HOLE CAVED TO ~5 FEET.
				BACKFILLED WITH SAND & BENTONITE
				PLUGGED WITH CONCRETE (~6-8")

Environmental Resources Management

Drilling Log

Project ALAMEDA USN Owner US NAVY

Location ALAMEDA Job/W.O. Number 40011

Well Number B6 Total Depth 16 Diameter 6 3/4

Surface Elevation ____ Water Level: Initial ____ 24-hrs. ____

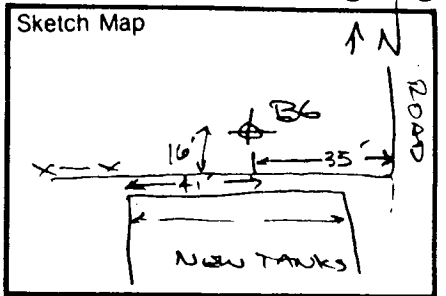
Screen: Dia. ____ Length ____ Slot Size ____

Casing: Dia. ____ Length ____ Type ____

Drilling Company KLEINFELDER Drilling Method HOLLOWSTEM

Driller DOUG JERRY Log By BLB Date Drilled 1/30/87

Sketch Map



Notes

CPB ASSIST

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
1				AUGERED TO 5 FEET. SURFACE: UNVEGETATED SAND + GRAVEL. CUTTINGS: SAND + GRAVEL
2				CLAY. GREY. NO ODOR.
3				HNU: NO REGISTER
4				
5	PUSHED SHELBY 30" REC. 30"			
6				
7			11:20 7.0-7.5	STICKY SOME SAND SCATTERED. CLAY, GREY, MOIST. ORGANIC PARTS, H_2S ODOR. NO PETROLEUM ODOR
8				
9				CUTTINGS: CLAY, AS ABOVE.
10				WET. GREY.
11	PUSHED SHELBY 30" REC.			
12			11:30A 12.0-12.5	CLAY, ORGANIC, GREY. SMOOTH, SOFT, STICKY. STRONG ODOR H_2S. NO ODOR PETROLEUM.
13				

Environmental Resources Management

Drilling Log

Project ALAMEDA USN Owner USN

Location ALAMEDA ~~WD~~ Number 40011

Well Number B6 Total Depth 17.5 Diameter 6 3/4"

Surface Elevation _____ Water Level: Initial _____ 24-hrs _____

Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG/JERRY Log By BLB Date Drilled 4/30/87

Sketch Map

SEE P.1

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
14				AUGER TO 15 FEET. CUTTINGS CLAY, GREY, ORGANIC; WET, SLOPPY.
15	PUSHED 30" SHELBY. REC 30"			NO PETROL. ODOR
16				
17			11:45	CLAY GREY, ORGANIC. SMOOTH STICKY. STRONG H_2S ODOR WET.
18			17.0-17.5	NO PETROL ODOR
				BOH 17.5 FEET

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner USNAVY

Location ALAMEDA CA SITE ~~Job~~ W.O. Number 40011

~~Boring~~ Well Number B7 Total Depth 15 Diameter 6 3/4

Surface Elevation _____ Water Level: Initial _____ 24-hrs _____

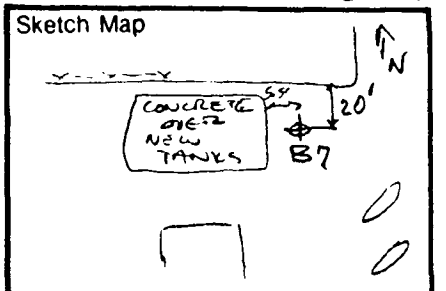
Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG / JERRY Log By BLB Date Drilled 1/30/87

Sketch Map



Notes

UFB ASSIST

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
0				ASPHALT AT SURFACE
1				AUGER TO 5 FEET
2				SAND AND GRAVEL BELOW ASPHALT
3				SAND & CLAY FROM 1 to 2 FEET
4				STRONG ODOR PETROLEUM AT SURFACE
5	PUSHED 30" SHELBY 30", REC			H/NU 100 ppm in top 6-8 inches
6				50 ppm at ~12 inches
7			2:15	DECREASES BELOW THAT
8			7.0-7.5	SAND WET AT 12 inches
9				1-5 FEET - SAND W/CLAY. WET.
10				CLAY, ORGANIC, GREY. NO ODOR
11	PUSHED 30" SHELBY 30", REC 30"			STICKY, SOFT.
12			2:20	AUGER TO 10 FEET
13			12.0-12.5	CUTTINGS - SOME CLAY. GREY, PETROL. ODOR
				H/NU 100 ppm.
				CLAY, ORGANIC. GREY. STRONG ODOR H_2S
				NO DETECTION H/NU. NO PETROL. ODOR.

Environmental Resources Management

Drilling Log

Project ALAMEDA Owner USNAVY

Location ALAMEDA GAS STA. Log No. Number 40011

Well Number B7 Total Depth 17.5 Diameter 6 3/4"

Surface Elevation ____ Water Level: Initial ____ 24-hrs. ____

Screen: Dia. ____ Length ____ Slot Size ____

Casing: Dia. ____ Length ____ Type ____

Drilling Company KLEINFELDER Drilling Method HOLLOWSTEM

Driller DOUG / JERRY Log By BLB Date Drilled 4/30/87

Sketch Map

see p 1

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
14				CUTTINGS FROM 10-15 FEET STRONG ODOR MAY PICKUP PETROL FROM SURFACE. HNU 100-150 ppm
15	PUSHED BY SHELBY 30", REC 20"			
16				
17			2:30	CLAY, ORGANIC, GREY; SMOOTH, SOFT, PLANT PARTS. H_2S ODOR. NO PETROL ODOR, HNU: 0
18			17.0-17.5	HOLE CAVED TO ~3 FEET. LARGE CAVITY FROM 1-3 FEET. SANDY CLAY TO CLAYY SAND
				BOH 17.5
				BACKFILLED WITH SAND & BENTONITE CAPPED WITH CONCRETE

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner USN

Location ALAMEDA W.O. Number 40011

Boring ~~Well~~ Number BB Total Depth 19.5 Diameter 6 3/4

Surface Elevation _____ Water Level: Initial _____ 24-hrs _____

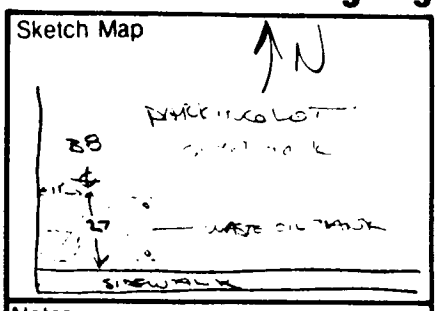
Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company KLEINFELDER Drilling Method HOLLOWSTEM

Driller DOUG/JERRY Log By BLB Date Drilled 1/30/87

Sketch Map



Notes

CFB Assays

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
0				ASPHALT AT SURFACE
1				SAND + GRAVEL - YELLOW BROWN. OLD PETROL ODOR, +NU 50-60 ppm.
2				CUTTINGS: CLAY, GREY. BALLS. NO ODOR
3				
4				CLAY - GREY, STICKY.
5			3:10	
6			5.5-6.0	CLAY, SOFT, STICKY, GREY. ORGANIC. NO ODOR OF H_2S OR PETROLEUM. WET
7	PUSHED 50" SHELBY 36", REC 12"			
8				AUGERED TO 10 FEET
9				CUTTINGS CLAY, STICKY, ORGANIC. WET.
10				
11	PUSHED 30" SHELBY 30", REC 30"			
12			3:15	CLAY, ORGANIC; GREY; SOFT, MOIST, STICKY. STRONG ODOR H_2S
			12.0-12.5	
13				

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner US NAVY

Location ALAMEDA GAS STA. ~~W.O.~~ Job Number 40011

~~Well~~ Boring Number 38 Total Depth 17.5 Diameter 6 3/4"

Surface Elevation ____ Water Level: Initial ____ 24-hrs. ____

Screen: Dia. ____ Length ____ Slot Size ____

Casing: Dia. ____ Length ____ Type ____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG/JERRY Log By BLB Date Drilled 1/30/87

Sketch Map

See P1

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
14				CUTTINGS: CLAY, SOFT, STICKY. GREY. ORGANICS. H_2S ODOR
15				
16	PUSHED 30" SHELBY 30", REC: 30"			
17			3:30	CLAY; ORGANIC, GREY; SOFT; MOIST; STICKY. H_2S ODOR - STRONG. NO ODOR PETROLEUM
18			T.D. 17.5	BACKFILLED W/ SAND & BENTONITE CAPPED WITH CONCRETE

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner US NAVY

Location ALAMEDA CA SSN: ~~WD~~ Number 40011

~~Boring~~ Well Number B9 Total Depth 12.5' Diameter 6 3/4"

Surface Elevation _____ Water Level: Initial _____ 24-hrs. _____

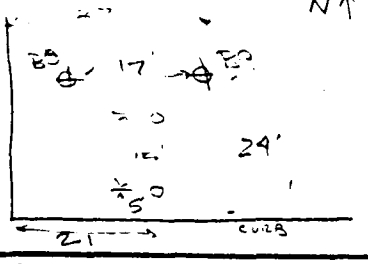
Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG/JERRY Log By BOB Date Drilled 2/2/87

Sketch Map



Notes
ASSISTED BY
C. BERKSTRESSER

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				BEGAN DRILLING 9:00A COMPLETE - 10:00A
1				2" ASPHALT, BLACK WITH CLAY. YELLOW BROWN MOIST, LOOSE.
				2-2' GRAVELLY SAND. LIGHT ODOR PETROLEUM IN TOP 6-12", ODOR DECREASED W/ DEPTH
2			9:20	PUSHED 30" SHELBY. REC 6".
				GRAVELLY SAND, YELLOW BROWN, MOIST, LOOSE. NO ODOR
3			2.0-2.5	
				SAND, YELLOW BROWN, MED TO COARSE GR., WITH GRAVEL
4				SOME LARGE ROCKS ENCOUNTERED.
				REC: 0
5				PUSHED 30" SHELBY. SAMPLE FELL OUT OF TUBE
				SAND, MED TO FINE GR., GREY, WET. RUNNY, LOOSE.
6				SOME CLAY AND GRAVEL. STRONG ODOR OLD PETROLEUM.
				PUSHED 30" SHELBY.
7				REC: 30"
				CLAY, MINOR SAND. GREY, SOFT, STICKY. WET. MILD SMELL H_2S.
8				
9			9:35	
			9.0-9.5	CLAY, ORGANIC, PLANT PARTS. GREY, DENSE, WET, STICKY
10				MILD ODOR H_2S
				PUSHED 30" SHELBY
11				REC: 30"
				CLAY, ORGANIC. GREY, WET, STICKY. H_2S ODOR.
12			9:45	
			12.0-12.5	CLAY, ORGANIC, GREY, MILD ODOR H_2S. WET, STICKY,
13				DENSE. NO ODOR PETROLEUM.
				BOH 12.5 BACKFILL W/ SAND & BENT CAP W/ CEMENT

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner US NAVY

Location ALAMEDA GASSTA Job Number 40011

Boring Number B10 Total Depth 12.5 Diameter 6 3/4"

Surface Elevation ____ Water Level: Initial ____ 24-hrs. ____

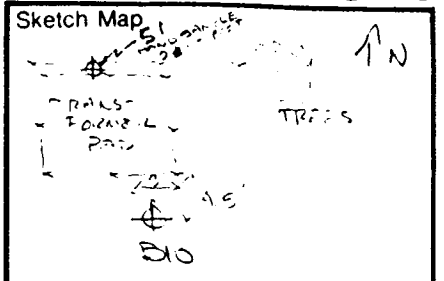
Screen: Dia. ____ Length ____ Slot Size ____

Casing: Dia. ____ Length ____ Type ____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG/JERRY Log By BLB Date Drilled 2/2/87

Sketch Map



Notes

CTO ASSIST

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				START: 10:00A COMPLETE 11:00A
0				ASPHALT, 2"
1				COARSE GRAVEL, ANGULAR, SOME SAND
				SAND, MED GR, YELLOW BROWN, GRVR PRESENT WET
2				PUSHED 30" SHELBY, REC 30"
				SAND MED TO FINE GR., CO2ET. SHELL FRAGS
3				WET, LOOSE
				SAND, WET, NO ODOR, LIGHT OIL FILM ON
4			10:20	WATER FROM CUTTINGS.
				SAND, MED TO FINE, SOME CLAY, WET, NO ODOR
5			4.0-4.5	PUSHED 30" SHELBY REC 18" LOOSE, GREY BROWN
6			10:25	CLAY, GREY BLACK ORGANIC. WET MILD ODOR H_2S
			6.0-6.5	SOME SAND
7				PUSHED 30" SHELBY, REC 30"
8				CLAY, ORGANIC
9			10:35	CLAY, GREY BLACK, ORGANIC. H_2S ODOR, WET
			9.0-9.5	PLANT FRAGMENTS.
10				PUSHED 30" SHELBY, REC 30"
11				CLAY, ORGANIC
12			10:45	CLAY, ORGANIC. GREY, H_2S ODOR, SOFT, STICKY, WET
			12-12.5	BOH 12.5 BACKFILLED W/ SAND + BENTONITE
13				CAPPED W/ CEMENT

Environmental Resources Management **Drilling Log**

Project USN ALAMEDA Owner US NAVY

Location ALAMEDA NAS STA ~~Job~~ W.O. Number 40011

~~Well~~ Boring Number B11 Total Depth 10.0 Diameter 6 3/4"

Surface Elevation ____ Water Level: Initial ____ 24-hrs. ____

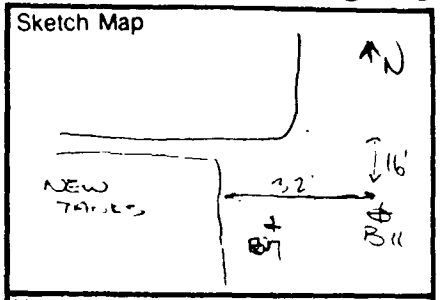
Screen: Dia. ____ Length ____ Slot Size ____

Casing: Dia. ____ Length ____ Type ____

Drilling Company KLEINFELDER Drilling Method HOLLOWSTEM

Driller DOUG/JERRY Log By BLB Date Drilled 4/6/87

Sketch Map



Notes

CFB ASSIST

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				BEGAN 11:00 AM COMPLETE 12:15
				ASPHALT, 2". COARSE ANGULAR GRAVEL, 6"
1			11:20	PUSHED 30" SHELBY TUBE, REC 6"
				SAND, GREY, MED GR, SHELL FRAGMENTS WET, STRONG ODOR GASOLINE
2			1.0-1.5	SAND, GREY, MED TO FINE GRAINED. SHELL FRAGMENTS. VERY STRONG PETROLEUM ODOR- LIKE GASOLINE
3				
4			11:30	PUSHED SHELBY TUBE RECOVERED 4"
				SAND, MED TO FINE GR. WET, SHELL FRAGS, SOFT,
5			4.0-4.5	MILD ODOR GASOLINE. GREY.
6				
7				PUSHED SHELBY TUBE, REC 30"
				CLAY. GREY, ORGANIC. H_2S ODOR. WET, STICKY
8				CLAY, ORGANIC. SAME AS BELOW
9			11:35	CLAY, ORGANIC. GREY. STICKY, WET. H_2S ODOR
				PLANT PARTS.
10			9.0-9.5	
				BOH 10.0'
				BACKFILL WITH SAND & BENTONITE CAP W/ CEMENT

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner US NAVY

Location ALAMEDA GAS STA #28 WO. Number 40011

BORING Well Number B12 Total Depth 10.0' Diameter 6 3/4

Surface Elevation _____ Water Level: Initial _____ 24-hrs. _____

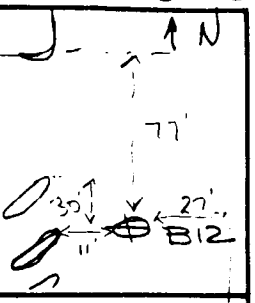
Screen: Dia. _____ Length _____ Slot Size _____

Casing: Dia. _____ Length _____ Type _____

Drilling Company KLEINFELDER Drilling Method HOLLOWSTEM

Driller DOUG BERRY Log By BOB Date Drilled 2/2/87

Sketch Map



Notes

CPB ASSIST

RAIN

Description/Soil Classification
(Color, Texture, Structures)

START: 1:15 P COMPLETE 2:00 P

Depth (Feet)	Graphic Log	Well Construction	Sample Number
1			1:20
2			1.0-1.5
3			
4			
			1:30
5			4.5-5.0
6			
7			
			1:40
8			7.5-8.0
9			
10			
11			
12			
13			

ASPHALT - 2".

GRAVEL - COARSE WITH SAND AND CLAY, BLUEGREY, MOIST STRONG ODOR GASOLINE

PUSHED SHELBY REC 6" SANDY GRAVEL. SILT + CLAY. BLUEGREY ODOR OF GASOLINE.

OIL FILM ON WATER WASHED OFF CUTTINGS

GRAVEL, SANDY + CLAYEY. SMALL GRAVEL + COARSE SAND. STRONG PETROLEUM ODOR

PUSHED 30" SHELBY. REC 12"

SAND + GRAVEL, BLUEGREY. STRONG SMELL DETROL

CLAY ORGANIC - GREY, SAND (MED → FINE) IN CRACKS

CLAY - SMOOTH, STICKY, MOIST. MILD ODOR H_2S

PUSHED 30" SHELBY REC. 12"

CLAY, GREY, ORGANIC. STICKY. MOIST. H_2S ODOR

CLAY, GREY, ORGANIC

CLAY, ORGANIC. BLACK & GREY. MILD SMELL H_2S

TOH 10'

WATER SEEPING INTO HOLE FROM ~3' IN SAND

NO STANDING WATER AT COMPLETION

BACKFILLED WITH SAND & BENTONITE

CAPPED WITH CONCRETE

Environmental Resources Management **Drilling Log**

Project USN ALAMEDA Owner US NAVY

Location ALAMEDA MSSTA ~~WO~~ Number 10011

BORING Well Number B13 Total Depth 10.0 Diameter 6 3/4"

Surface Elevation ____ Water Level: Initial ____ 24-hrs. ____

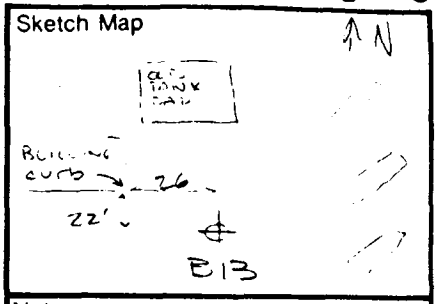
Screen: Dia. ____ Length ____ Slot Size ____

Casing: Dia. ____ Length ____ Type ____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG / JERRY Log By BLR Date Drilled 2/3/87

Sketch Map



Notes

CFB ASSET

Depth (Feet)	Graphic Log	Well Construction	Sample Number
1			
2			B:25A (2.0-2.5)
3			
4			
5			B:30A (5.0-5.5)
6			
7			
8			
9			B:35A (9.0-9.5)
10			
11			
12			
13			

SUNNY.

Description/Soil Classification
(Color, Texture, Structures)

START 8:15A COMPLETE 8:45A

ASPHALT, 2" GRAVEL, COARSE, GREY-GREEN. WITH SILT & CLAY MODERATE ODOR PETROLEUM, MOIST. HNU 50-60ppm

PUSHED SHELBY REC 18"

CONTACT SAND/GRAVEL.

SAND, MED. WELL SORTED, MED & FINE GRAINED SOME SILT. GREY-GREEN MILD ODOR PETROLEUM. HNU 80ppm

PUSHED 30" SHELBY REC 18"

CONTACT SAND / CLAY.

CLAY. ORGANIC, BLACK W/ PLANT PARTS.

CLAY, ORGANIC. SOME SAND. BLACK. MILD ODOR H_2S STICKY, MOIST

PUSHED 30" SHELBY. REC. 30"

CLAY, ORGANIC, WET, STICKY. H_2S ODOR

CLAY ORGANIC, PLANT FRAGMENTS WET. STRONG ODOR H_2S STICKY.

EOH 10'

BACKFILLED WITH SAND & BENT.

CAPPED WITH CONCRETE

Environmental Resources Management

Drilling Log

Project VSN ALAMEDA Owner US NAVY

Location ALAM-D.2 ~~W.O.~~ Job Number 40011

~~Well~~ Boring Number B14 Total Depth 10.0 Diameter 6 3/4"

Surface Elevation ____ Water Level: Initial ____ 24-hrs. ____

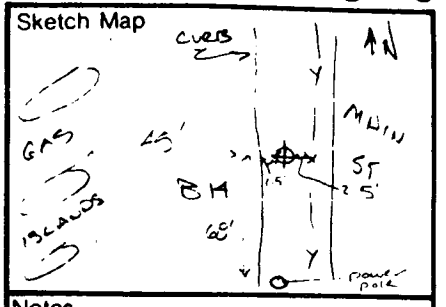
Screen: Dia. ____ Length ____ Slot Size ____

Casing: Dia. ____ Length ____ Type ____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG/JERRY Log By BLB Date Drilled 2/3/87

Sketch Map



Notes

CPT ASSIST

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				START 9:00 A COMPLETE 9:20 A
0				TOPSOIL, GRASS, LOOSE SOIL. PETROL ODOR. HNU 120 ppm
1				PUSHED 30" SHELBY REC. 30"
2				SAND, BROWN, LOOSE. STRONG PETROL. ODOR. HNU: 200-300 ppm
3			9:05 3.0-3.5	CONTACT CLAY/SAND.
4				CLAY, ORGANIC. PLANT PARTS, MOIST, STICKY, DENSE. BLACK & GREY. MOTTLED. MILD ODOR H_2S
5				PUSHED 30" SHELBY. REC. 30"
6			9:10A	
7			6.0-6.5	CLAY. ORGANIC, GREY BLACK.
8				PUSHED 30" SHELBY, REC 30"
9			9:15A	CLAY. ORGANIC, GREY
10			9.0-9.5	CLAY. ORGANIC, GREY. SMOOTH, STICKY, SOFT. MILD H_2S ODOR
11				BOH 10.0'
12				BACKFILLED WITH SAND + BENTONITE CAPPED WITH CEMENT
13				

Environmental Resources Management

Drilling Log

Project USNAL ALAMEDA Owner US NAVY

Location ALAMEDA GAS STA W.O. Number 4001

Boring Well Number B15 Total Depth 10.0 Diameter 6 3/4"

Surface Elevation ____ Water Level: Initial ____ 24-hrs ____

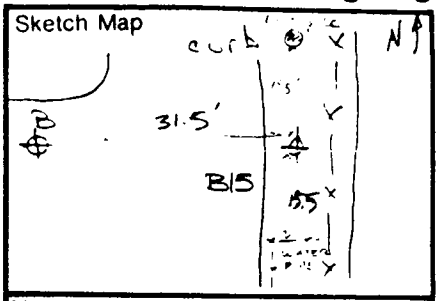
Screen: Dia. ____ Length ____ Slot Size ____

Casing: Dia. ____ Length ____ Type ____

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG/JERRY Log By BOB Date Drilled 2/3/87

Sketch Map



Notes

CFB ASSIST

Depth (Feet)	Graphic Log	Well Construction	Sample Number
0			
1			9:35
2			1.0-1.5
3			
4			
5			
6			9:45
7			6.0-6.5
8			9:50
9			7.5-8.0
10			
11			
12			
13			

SUNNY W/ CLOUDS

Description/Soil Classification
(Color, Texture, Structures)

START 9:30A COMPLETE: 10:00A

ASPHALT - 2" COARSE GRAVEL WITH SILT & SAND

STRONG PETRO. ODOR IN GRAVEL. HNU 150-170ppm

PUSHED 30" SHELBY
REC: 6" SAND, GREY MED-FINE GR. STRONG ODOR PETROLEUM. HNU 300-400 ppm

SAND, GREY, MED-FINE GRAINED. STRONG ODOR PETRO HNU. 500 ppm. SAND MOIST - PRODUCT?

(SAND CAVED IN)

PUSHED 30" SHELBY. REC: 30"

← SAND/CLAY CONTACT

CLAY, AS BELOW.

CLAY, ORGANIC, GREY. SMOOTH, STICKY. MILD ODOR H_2S

PUSHED 30" SHELBY. RECOVER: 12"

CLAY, ORGANIC. GREY MOIST, SOFT, SMOOTH. NO ODOR

CLAY, ORGANIC GREY, SOFT, MOIST. NO ODOR

BOH 10.0'

BACKFILLED WITH SAND & BENTONITE
CAPPED WITH CONCRETE

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner USNAVY

Location ALAMEDA GASSTA Job W.O. Number 40011

Well Number W1 Total Depth 10 Diameter 2"

Surface Elevation ____ Water Level: Initial ____ 24-hrs. ____

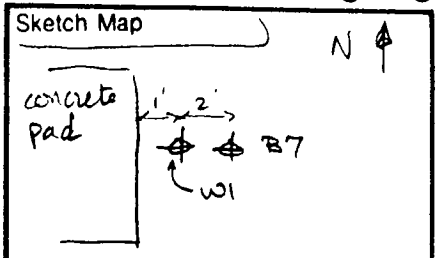
Screen: Dia. 2" Length 8.0' Slot Size ____

Casing: Dia. 2" Length 2.0' Type PVC SCH. 40

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG / JERRY Log By BLB Date Drilled 2/3/87

Sketch Map



Notes

CFB ASSIST

Depth (Feet)	Graphic Log	Well Construction	Sample Number
1		CEMENT / BENTONITE / SOLID PVC / SAND PACK	
2			
3			
4			
5		SLOTTED PVC SCH 40	11:15 A 4.5-5.0
6			
7			
8			
9			
10			

Description/Soil Classification
(Color, Texture, Structures)

START: 11:00 A COMPLETE: 12:50 P

ASPHALT 2" COARSE GRAVEL, WITH SAND & SILT, SOME CLAY.

PUSHED 30" SHELBY TUBE, REC: 0] PETROL. ODOR. HNU: 170 ppm

TWICE LOST SAMPLE.

ON TUBE: SAND & CLAY, WET. PETROL. ODOR

PUSHED 30" SHELBY REC:

SAND - GREY WITH SILT. WET. STRONG ODOR. HNU: 500ppm

← CONTACT SAND/CLAY

CLAY, AS BELOW.

CLAY, GREY, ORGANIC, SOFT, SMOOTH. NO ODOR

CLAY, GREY, ORGANIC. SOME PLANT PARTS. SMOOTH. SOFT. STICKY. MILD ODOR H_2S

TOH 10.0'

WL: HELD 2.00
WET 0.71
WL 1.29
12:45 P 2/3

SAND (2 BAGS) 10' → 2'

(25 lbs) BENTONITE 2' → 1.5'

CEMENT 1.5' → 0.5'

WELL TOP SET IN CONCRETE CHRISTY BOX (AT GRADE)

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner US NAVY

Location ALAMEDA GAS STA W.O. Number 40011

Well Number W 2 Total Depth 10 Diameter 6 3/4"

Surface Elevation ____ Water Level: Initial ____ 24-hrs. ____

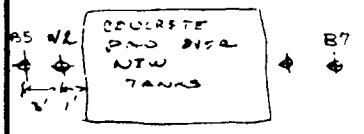
Screen: Dia. ____ Length 8' Slot Size ____

Casing: Dia. ____ Length 2' Type ____

Drilling Company KLEINFELDER Drilling Method HOLLOWSTEM

Driller DOUG/JERRY Log By BLB Date Drilled 2/3/87

Sketch Map



Notes

CEB ASSIST

Description/Soil Classification
(Color, Texture, Structures)

BEGIN 1:20 P COMPLETE 2:15P

ASPHALT 2", COARSE GRAVEL TO ~ 1 FOOT

PUSHED 30" SHELBY, REC 18"

SAND

SAND, MED TO FINE GR WET, PETROL ODOR HNU 130 ppm
GREY - BROWN

SAND, GREY. MED TO FINE GR. WET. PETROL. ODOR.

PUSHED 30" SHELBY REC 30"

← SAND/CLAY CONTACT

CLAY. ORGANIC, WET, GREY. SLIGHT ODOR H_2S

CLAY

EOH 10.0'

SAND 2 BAGS 10' - 2'
BENTONITE (25 lbs) 2' - 1.5'
CEMENT 1.5' - 0.5'

Environmental Resources Management

Drilling Log

Project USN ALAMEDA Owner US NAVY

Location ALAMEDA NAVSTA ~~JOB~~ W.O. Number 40011

Well Number W3 Total Depth 10' Diameter 6 3/4

Surface Elevation _____ Water Level: Initial _____ 24-hrs _____

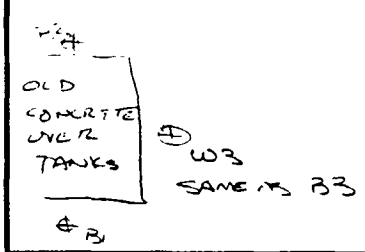
Screen: Dia. 2" Length 8' Slot Size _____

Casing: Dia. 2" Length 2' Type PVC SCHED 40

Drilling Company KLEINFELDER Drilling Method HOLLOW STEM

Driller DOUG / JERRY Log By PAB Date Drilled 2/3/87

Sketch Map



Notes
WELL INTO BORING B3
NO SAMPLES TAKEN 2/3

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				SUNNY, WARM
				START 12:30 P COMPLETE: 1:15 P
				FOR COMPLETE BORING LOG REFER TO LOG OF B3, 1/29/87
				2 BAGS SAND 10' → 2'
				BENTONITE 2' - 1.5'
				CEMENT 1.5' - 0.5'

APPENDIX B

CHAIN-OF-CUSTODY FORMS

Anlab
ANALYTICAL LABORATORY

1914 S STREET
SACRAMENTO, CA 95814
(916) 447-2947

SAMPLE RECEIVING FORM

FIRM ERM-Wes
NAME Ben Leslie-Bole
ADDRESS
PHONE 415-946-0455
ANALYSIS REQUESTED BY
Contract

№ 111(…).1
ORDER NO.
SAMPLE DATE 1-29-87 & 1-30-87
SAMPLED BY Client
DATE RECEIVED 1-30-87
TIME RECEIVED 6:50pm
RECEIVED BY ARC
WORK SHEET BY

I.D. No.	STATION DESCRIPTION U.S. Navy #40011-	TIME SAMPLED	BTX *	THC *	GRAB	COMPOSITE	WATER	WASTE WATER	SOIL	TUBE	PLASTIC	GLASS	ACID RINSED	SOL. RINSED	STERILE	ANLAB	CUSTOMER	NONE	TEMP	HNO 3	$Na_2S_2O_3$		DELIVERED	MAIL
					SAM. TYPE						CONTAINER							PRESERV/TRANS.						
1	B1 5.5-6.0'	0920	\	\	X				X	X							X		X				X	
2	B1 10-10.5'	0940		\																				
3	B1 14.5-15'	1005																						
4	B2 7-7.5'	1145	\	\																				
5	B2 11-11.5'	1200																						
6	B2 17-17.5'	1210																						
7	B3 6-6.5'	1500	\	\																				
8	B3 12-12.5'	1510																						
9	B3 17-17.5'	1530																						
10	B4 6-6.5'	0900	\	\																				
11	B4 12-12.5'	0920	\	\																				
12	B4 17-17.5'	0930			↓				↓	↓							↓		↓				↓	

ANALYSIS CODE

UNIT ANALYSIS PRICE

CONTACTED:
CONTACTED BY:
DATE/TIME CONTACTED

REMARKS: * Samples to be analyzed to be determined on monday.

COMMENTS: Analyses req[illegible]
Ben Leslie-Bole 2/3/[illegible]

Anlab

ANALYTICAL LABORATORY

1914 S STREET
SACRAMENTO, CA 95814
(916) 447-2947

SAMPLE RECEIVING FORM

FIRM ERM-West

NAME

ADDRESS

PHONE

ANALYSIS REQUESTED BY

ORDER NO. 111941

SAMPLE DATE

SAMPLED BY

DATE RECEIVED

TIME RECEIVED

RECEIVED BY

WORK SHEET BY

I.D. NO.	STATION DESCRIPTION	TIME SAMPLED	BTX *	THC *
3	B5 7-7.5'	1010		
4	B5 12-12.5'	1020		
5	B5 17-17.5'	1030		
	B6 7-7.5'	1120		
	B6 12-12.5'	1130		
	B6 17-17.5'	1145		
	B7 7-7.5'	1415		
	B7 12-12.5'	1420		
	B7 17-17.5'	1430		
	B8 5.5-6'	1510		
	B8 12-12.5'	1515		
	B8 17-17.5'	1530		

SAM. TYPE					CONTAINER							PRESERV/TRANS.						
GRAB	COMPOSITE	WATER	WASTE WATER	SOIL	PLASTIC	GLASS	ACID RINSED	SOL. RINSED	STERILE	ANLAB	CUSTOMER	NONE	TEMP	HNO 3	$Na_2S_2O_3$		DELIVERED	MAIL

ANALYSIS CODE

UNIT ANALYSIS PRICE

CONTACTED:

CONTACTED BY:

DATE/TIME CONTACTED

REMARKS: * Samples to be determined for analysis on monday.

COMMENTS:

FIELD SAMPLING DATA AND CHAIN OF CUSTODY 11191 P.1 of 3

RM-West
Environmental Resource Management

1777 Botelho Drive
Suite 260
Walnut Creek, California 94596-5022
(415) 946-0455

Client: USNavy Project Location: Alameda CA

Sampler(s): CFBerkstresser/Benleslie-Bole Project No./Phase: 40011

Date: Jan 29, 1987 No. of Samples Collected:

Weather: patchy clouds, moderate temp., light wind

Sample Location	Sample ID#	Time	Sample Type: Water Comp.	Water Grab	Soil Comp.	Soil Grab	Volume	No. of Contrs./ Cntnr. Type	Preservative	Iced (Y/N)	Sampling Method	Analys
B1 *	5.5-6.0	920A				X		1-6" Shelby	None	Y	Pushed Shelby tube	THC, BTX
B1 *	10.0-10.5	940A								Y		THC
B-1	14.5-15.0	1005A								Y		
B-2 *	7.0-7.5	1145A								Y		THC, BTX
B-2	11.0-11.5	1200								Y		
B-2	17.0-17.5	1210P								Y		

Field Notes (Results of field measurements, well purging data, unusual conditions, etc.):

CUSTODY RECORD — Signature, Date/Time

Relinquished: Charles F Berkstresser 1-30-87 650P
Received: Arlene Putnam 6:50 1-30-87
Relinquished:
Received:
Relinquished:
Received:
Relinquished:
Received:
Relinquished:
Received:
Relinquished:
Received:

Name and Address of Receiving Laboratory

AnLab
1914 "S" St
Sacramento CA 95814
(916) 447-2946

FIELD DATA PLUS DRAFT CHAIN OF CUSTODY 111941 p.2 of 5

RM-West
Environmental Resource Management

1777 Botelho Drive
Suite 260
Walnut Creek, California 94596-5022
(415) 946-0455

Client: USNavy Project Location: Alameda, CA

Samplor(s): CF Berkstresser/Bev Leslie-Bole Project No./Phase: 40011

Date: Jan 29, 1987 No. of Samples Collected: 9 on 1-29-87 (24 total)

Weather:

Sample Location	Sample ID#	Time	Sample Type: Water Comp.	Water Grab	Soil Comp.	Soil Grab	Volume	No. of Contrs./ Cntnr. Type	Preservative	Iced (Y/N)	Sampling Method	Analys
B-3*	6.0-6.5	300 p				X		1 6" Shelby	None	Y	Pushed Shelby Tube	THC BTX
B-3	12.0-12.5	3:00 p								Y		
B-3	17.0-17.5	3:30 p								Y		

Field Notes (Results of field measurements, well purging data, unusual conditions, etc.):

CUSTODY RECORD

	Signature	Date/Time
Relinquished:	Charles F Berkstresser	1-30-87 650P
Received:	Arline Putnam	6:50 1-30-87
Relinquished:		
Received:		
Relinquished:		
Received:		
Relinquished:		
Received:		
Relinquished:		
Received:		
Relinquished:		
Received:		

Name and Address of Receiving Laboratory:

AnLab
1914 S St
Sacramento CA 95814
(916) 447-2946

111941

CHAIN OF CUSTODY AND SAMPLE IDENTIFICATION RECORD

ERM-West
Environmental
Resources
Management

1777 Botelho Drive
Suite 260
Walnut Creek, CA 94596
(415) 946-0455

Client: US NAVY
Sampler (s): [illegible signatures]
Date: 1/30/87
Weather: PTY CLOUDY, SUNNY, BREEZY, COOL

Job Location: ALAMEDA
Job No: 40011
No. of Samples Collected:
page 3 of 5

Sample ID #	Time	Water Comp.	Water Grab	Soil Comp.	Soil Grab	Volume	No. of Contnrs. Contnr. Type	Preser-vative	Iced (Y/N)	Sampling Method	Analyses
B-4 * 6.0-6.5	9:00 A				X	6"x2"	1 STEEL SHELBY TUBE	NO	YES	PUSHED SHELBY	THC, BTX
B-4 * 12.0-12.5	9:20										THC
B-4 17.0-17.5	9:30										BTX
B-5 * 7.0-7.5	1010 A										AND THC, BTX
B-5 12.0-12.5	1020 A										TOTAL
B-5 17.0-17.5	1030 A										PET
B-6 * 7.0-7.5	1120 A										HYDROCARB * BTX THC

Comments:
* WILL CALL TO IDENTIFY SAMPLES TO RUN

Custody Record
Signature, Date/Time
Relinquished: [signature] 1-30-87 650P
Received: [signature] 1-30-87 650P
Relinquished:
Received:
Relinquished:
Received:
Relinquished:
Received:

Name and Address of Receiving Laboratory
ANLAB
1914 S Street
Sacramento CA
95814
916-447-2946

11174/

CHAIN OF CUSTODY AND SAMPLE IDENTIFICATION RECORD

ERM-West
Environmental
Resources
Management

1777 Botelho Drive
Suite 260
Walnut Creek, CA 94596
(415) 946-0455

Client: US NAVY
Sampler (S): CF Berkstresser / Peg Leslie Bolr
Date: 1-30-87
Weather:

Job Location: ALAMEDA
Job No: 40911
No. of Samples Collected:

page 4 of 5

Sample ID #	Time	Sample Type Water Comp.	Water Grab	Soil Comp.	Soil Grab	Volume	No. of Contnrs. Contnr. Type	Preservative	Iced (Y/N)	Sampling Method	Analyses
B-6 12.0-12.5	1130 A				X	6"x2"	1-6"Shelby	None	Y	pushed shelby	
B-6 17.0-17.5	1145 A								Y		
B-7 * 7.0-7.5	215 P								Y		THC, BTX
B-7 12.0-12.5	220 P								Y		
B-7 17.0-17.5	230 P								Y		
B-8* 5.5-6.0	310 P								Y		THC, BTX
B-8 12.0-12.5	315 P								Y		

Comments:

Custody Record
Signature, Date/Time
Relinquished: CF Berkstresser 1-30-87 650P
Received: Arlene Putnam 1-30-87 650P
Relinquished:
Received:
Relinquished:
Received:
Relinquished:
Received:

Name and Address of Receiving Laboratory
ANLAB
1914 S Street
Sacramento CA
95814
916-447-2946

11194

CHAIN OF CUSTODY AND SAMPLE IDENTIFICATION RECORD

ERM-West
Environmental
Resources
Management

1777 Botelho Drive
Suite 260
Walnut Creek, CA 94596
(415) 946-0455

Client: US NAVY
Sampler (s): CF Beckstrasser / Pam Leslie Bale
Date: 1-30-87
Weather:

Job Location: ALAMEDA
Job No: 40511
No. of Samples Collected: 15 on 1-30-87 // 24 total

Sample ID #	Time	Sample Type Water Comp.	Water Grab	Soil Comp.	Soil Grab	Volume	No. of Contnrs. Contnr. Type	Preservative	Iced (Y/N)	Sampling Method	Analyses
BB 17.0-17.5	330 P				X	6"x2"	1 steel shelby	None	Y	Pushed shelby	

Comments:

Custody Record
Signature, Date/Time
Relinquished: CF Beckstrasser 1-30-87 650p
Received: Arlene Putnam 1-30-87 650p
Relinquished:
Received:
Relinquished:
Received:
Relinquished:
Received:

Name and Address of Receiving Laboratory
ANLAB
1914 S Street
Sacramento CA
95814
916-447-2946

Anlab
ANALYTICAL LABORATORY

1914 S STREET
SACRAMENTO, CA 95814
(916) 447-2947

SAMPLE RECEIVING FORM

FIRM LFM - WCST
NAME Brad LESLIE - DOLG
ADDRESS 1777 BOTELHO DR. STE 260
WALNUT CREEK, CA. 94596
PHONE 415-946-0455
ANALYSIS REQUESTED BY

ORDER NO. No 111954
SAMPLE DATE 2/2/87 1 2/4/87
SAMPLED BY CLIENT
DATE RECEIVED 2/4/87
TIME RECEIVED 1630
RECEIVED BY
WORK SHEET BY

I.D. No.	STATION DESCRIPTION	TIME SAMPLED	THC w/ full closure	BTX	PCB
	Proj # 40011				
1	B7 7:20 2 2.5				
2	B7 [illegible] 7 7.5		*	*	
3	B9 [illegible] 12 12.5		*	*	
4	B10 1:20 4-4.5				
5	B10 [illegible] 7-7.5		*	*	
6	B10 [illegible] 9-9.5		*	*	
7	B10 [illegible] 12-12.5		*	*	
8	SS1 [illegible]				
9	SS2 [illegible] surface 1.5'				
10	B11 1:20 1-1.5				
11	B11 11:30 4 4.5				
12	B11 11:35 9 9.5		*	*	

SAM. TYPE						CONTAINER							PRESERV/TRANS.						
GRAB	COMPOSITE	WATER	WASTE WATER	SOIL	TLAC	PLASTIC	GLASS	ACID RINSED	SOL. RINSED	STERILE	ANLAB	CUSTOMER	NONE	TEMP	HNO_3	NaS_2O_3	DELIVERED	MAIL	

ANALYSIS CODE
UNIT ANALYSIS PRICE

CONTACTED:
CONTACTED BY:
DATE/TIME CONTACTED

REMARKS: * HOLD.

COMMENTS:

Anlab

ANALYTICAL LABORATORY

1914 S STREET
SACRAMENTO, CA 95814
(916) 447-2947

SAMPLE RECEIVING FORM

FIRM ERM-West-

NAME

ADDRESS

PHONE

ANALYSIS REQUESTED BY

ORDER NO. 111984

SAMPLE DATE

SAMPLED BY

DATE RECEIVED

TIME RECEIVED

RECEIVED BY

WORK SHEET BY

	STATION DESCRIPTION	TIME SAMPLED	THC	BTX	PCB
1	B-12	1120 PM 1-1.5			
2	B-12	1130 PM 4.5-5.0	*	*	
3	B12	1140 PM 7.5-8.0	*	*	
4	B13	B12S A 2.0-2.5			
5	B13	B13 0A 5.0-5.5	*	*	
6	B13	835 A 9-9.5	*	*	
7	B14	905 A 2-2.5			
8	B14	9:10	6-6.5	*	*
9	B14	9:15	9-9.5	*	*
10	B15	9:35	1-1.5		
11	B15	9:45	6-6.5	*	*
12	B15	9:50	7.5-8	*	*
	ANALYSIS CODE				
	UNIT ANALYSIS PRICE				

	SAM. TYPE						CONTAINER							PRESERV/TRANS.						
	GRAB	COMPOSITE	WATER	WASTE WATER	SOIL	TUBE	PLASTIC	GLASS	ACID RINSED	SOL. RINSED	STERILE	ANLAB	CUSTOMER	NONE	TEMP	HNO_3	$Na_2S_2O_3$		DELIVERED	MAIL
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				

CONTACTED:

CONTACTED BY:

DATE/TIME CONTACTED

REMARKS

COMMENTS:

Anlab

ANALYTICAL LABORATORY

1914 S STREET
SACRAMENTO, CA 95814
(916) 447-2947

SAMPLE RECEIVING FORM

FIRM ERM West
NAME
ADDRESS
PHONE
ANALYSIS REQUESTED BY

ORDER NO. 111284
SAMPLE DATE
SAMPLED BY
DATE RECEIVED
TIME RECEIVED
RECEIVED BY
WORK SHEET BY

STATION DESCRIPTION	TIME SAMPLED	THC	BTX	PCB	SAM. TYPE: GRAB	COMPOSITE	WATER	WASTE WATER	SOIL	VOA	CONTAINER: PLASTIC	GLASS	ACID RINSED	SOL. RINSED	STERILE	ANLAB	CUSTOMER	PRESERV/TRANS.: NONE	TEMP	HNO_3	NaS_2O_3		DELIVERED	MAIL
W1 11:15 4.5-5.0		/	/						/															
W2 1:30P 2-2.5		/	/						/															
W2 1:45P 7-7.5		*	*						/															
W1 11:45A			*							/	/													
W2 11:55A			*							/	/													
W3 12:15A			*							/	/													

ANALYSIS CODE

UNIT ANALYSIS PRICE

CONTACTED:
CONTACTED BY:
DATE/TIME CONTACTED

REMARKS:

COMMENTS:

CHAIN OF CUSTODY AND SAMPLE IDENTIFICATION RECORD

30 samples total

ERM-West
Environmental
Resources
Management

1777 Botelho Drive
Suite 260
Walnut Creek, CA 94596
(415) 946-0455

Client: US NAVY
Sampler (s): CF Berkstresser
Date: 2-2-87
Weather: Raining, cold

Job Location: ALAMEDA
Job No: 40011
No. of Samples Collected: 7 (15 on)

page 1 of 6

Sample ID #	Time	Sample Type Water Comp.	Water Grab	Soil Comp.	Soil Grab	Volume	No. of Contnrs. Contnr. Type	Preservative	Iced (Y/N)	Sampling Method	Analyses
B-8 2.0-2.5	9:20				X	2"x6" tube	1- Shelby	No	Y		THC BTX
B-9 9.0-9.5	9:35								Y		HOLD
B-9 12.0-12.5	9:45								Y		HOLD
B-10 4.0-4.5	10:20								Y		THC BTX
B-10 7.0-7.5	1025								Y		HOLD
B-10 9.0-9.5	1035								Y		HOLD
B-10 12.0-12.5	1045								Y		HOLD

Comments:
THC = TOTAL PETROLEUM HYDROCARBONS

Custody Record
Signature, Date/Time
Relinquished: CF Berkstresser
Received: [illegible] 2/2/87 1840
Relinquished:
Received:
Relinquished:
Received:
Relinquished:
Received:

Name and Address of Receiving Laboratory
ANLAB
1914 S Street
Sacramento CA
95814
916-447-2946

1119.

CHAIN OF CUSTODY AND SAMPLE IDENTIFICATION RECORD

ERM-West
Environmental
Resources
Management

1777 Botelho Drive
Suite 260
Walnut Creek, CA 94596
(415) 946-0455

Client: US NAVY
Sampler (s): CF Berkstresser
Date: 2-2-87
Weather: Raining, cold

Job Location: ALAMEDA
Job No: 40011
No. of Samples Collected: _____

page 3 of 6

Sample ID #	Time	Sample Type Water Comp.	Water Grab	Soil Comp.	Soil Grab	Volume	No. of Contnrs. Contnr. Type	Preservative	Iced (Y/N)	Sampling Method	Analyses
B-12 7.5-8.0	1;40 P				X	2"x6" shelby	one shelby tube	No	Y	Pushed Shelby tube	HOLD

Comments: _____

Custody Record
Signature, Date/Time
Relinquished: Charles F Berkstresser /
Received: [illegible] 2/4/87 1840
Relinquished: _____
Received: _____
Relinquished: _____
Received: _____
Relinquished: _____
Received: _____

Name and Address of Receiving Laboratory
ANLAB
1914 S Street
Sacramento CA
95814
916-447-2946

* 111964

CHAIN OF CUSTODY AND SAMPLE IDENTIFICATION RECORD

ERM-West
Environmental
Resources
Management

Client: US Navy
Sampler (s): CF Berkstresser
Date: 2-3-87
Weather: ptly cldy to clear, cool

Job Location: Alameda
Job No: 40011
No. of Samples Collected: _____

page 4 of 6

1777 Botelho Drive
Suite 260
Walnut Creek, CA 94596
(415) 946-0455

Sample ID #	Time	Sample Type Water Comp.	Water Grab	Soil Comp.	Soil Grab	Volume	No. of Contnrs. Contnr. Type	Preser-vative	Iced (Y/N)	Sampling Method	Analyses
B-13 2.0-2.5	825 A				X	2"x6" Shelby	one shelby	No	Y	Pushed shelby tube	BTX THC
B-13 5.0-5.5	830 A								Y		HOLD
B-13 9.0-9.5	835								Y		HOLD
B-14 3.0-3.5	905 A								Y		THC BTX
B-14 6.0-6.5	910 A								Y		HOLD
B-14 9.0-9.5	915 A								Y		HOLD
B-15 1.0-1.5	935 A								Y		THC BTX

Comments: _____

Custody Record
Signature, Date/Time
Relinquished: CF Berkstresser
Received: Neil Ch Chemist 2/4/87 1845
Relinquished: _____
Received: _____
Relinquished: _____
Received: _____
Relinquished: _____
Received: _____

Name and Address of Receiving Laboratory

111784

CHAIN OF CUSTODY AND SAMPLE IDENTIFICATION RECORD

ERM-West
Environmental
Resources
Management

1777 Botelho Drive
Suite 260
Walnut Creek, CA 94596
(415) 946-0455

Client: US Navy
Sampler (s): CF Berkstresser
Date: 2-3-87
Weather: ptly cldy to clear, cool

Job Location: Alameda
Job No: 40011
No. of Samples Collected: _____

Sample ID #	Time	Sample Type Water Comp.	Water Grab	Soil Comp.	Soil Grab	Volume	No. of Contnrs. Contnr. Type	Preservative	Iced (Y/N)	Sampling Method	Analyses
B-15 6.0-6.5	9:45 A				X	2" x 8" Shelby	one 2" Shelby	None	Y	Pushed Shelby tube	HOLD
B-15 7.5-8.0	9:50 A				↓		↓	↓	↓	↓	HOLD
W-1 4.5-5.0	11:15 A				↓		↓	↓	↓	↓	THC BTX
W-2 2.0-2.5	1:30 P				↓		↓	↓	↓	↓	THC BTX
W-2 7.0-7.5	1:45 P				↓		↓	↓	↓	↓	HOLD

Comments: _____

Custody Record
Signature, Date/Time
Relinquished: CF Berkstresser
Received: Air Cal Express 2/4/87 1500
Relinquished: _____
Received: _____
Relinquished: _____
Received: _____
Relinquished: _____
Received: _____

Name and Address of Receiving Laboratory

CHAIN OF CUSTODY AND SAMPLE IDENTIFICATION RECORD

ERM-West
Environmental
Resources
Management

1777 Botelho Drive
Suite 260
Walnut Creek, CA 94596
(415) 946-0455

Client: USNavy
Sampler (s): C F Berkstresser
Date: 2-4-87
Weather: Clear, warm

Job Location: Alameda
Job No: 40011
No. of Samples Collected: 3

Sample ID #	Time	Sample Type Water Comp.	Water Grab	Soil Comp.	Soil Grab	Volume	No. of Contnrs. Contnr. Type	Preservative	Iced (Y/N)	Sampling Method	Analyses
W-1	1145A		X			3 VOA's	3 VOA's	NaThiosl	Y	Bailer	BTX
W-2	1155A		↓			↓		↓	↓		↓
W-3	1215		↓			↓		↓	↓		↓

Comments: W-1; slightly turbid, No obvious odor of product
W-2 sl. turbid; faint odor of product
W-3 v. sl. turbid; faint odor of product

Custody Record
Signature, Date/Time
Relinquished: Charles F Berkstresser 2-4-87 1640
Received: Lee de Celeste 2/4/87 1640
Relinquished:
Received:
Relinquished:
Received:
Relinquished:
Received:

Name and Address of Receiving Laboratory
AnLab

APPENDIX C
LAB REPORTS

Anlab
ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

March 5, 1987
Date Sampled: 2/2/87 & 2/3/87
Date Sample Received: 2/4/87
Report # 111984

ERM-WEST
1777 Botelho Drive, Suite 260
Walnut Creek, CA 94596

ATTN: Ben Leslie-Bole

Project #40011

Sample Description/ Anlab ID #	Total Petroleum Hydrocarbons By EPA #8015 Modified. FID mg/kg*
B9 9:20 2-2.5 ID #111984-1	78
B10 10:20 4-4.5 ID #111984-4	76
B11 11:20 1-1.5 ID #111984-10	520
B11 11:30 4-4.5 ID #111984-11	2000
B12 1:20 pm 1-1.5 ID #111984-13	90
B13 8:25 A 2.0-2.5 ID #111984-16	82
B14 905A 3-3.5 ID #111984-19	42
B15 9:35 1-1.5 ID #111984-22	940
W1 11:15 4.5-5.0 ID #111984-25	81
W2 1:30P 2-2.5 ID #111984-26	14000

*Based on gasoline.

Data Certified by _____ Report Approved By _____

Anlab ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL
1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

ERM-WEST FILE #
WALNUT CREEK, CA

March 4, 1987
Date Sampled: 1/29/87 & 1/30/87
Date Sample Received: 1/30/87
Report # 111941

ERM-WEST
1777 Botelho Drive
Suite 260
Walnut Creek, CA 94596

ATTN: Ben Leslie-Bole

Project: U.S. Navy #40011

Sample Description/ Anlab ID #	Total Petroleum Hydrocarbons By EPA #8015 Modified, FID, mg/kg*
B1 5.5-6.0' 111941-1	30
B1 10-10.5' 111941-2	<10
B2 7-7.5' 111941-4	<10
B3 6-6.5' 111941-7	<10
B4 6-6.5' 111941-10	48
B4 12-12.5' 111941-11	<10
B5 7-7.5' 111941-13	<10
B6 7-7.5' 111941-16	<10
B7 7-7.5' 111941-19	<10
B8 5.5-6' 111941-22	<10

*Based on Gasoline.

Data Certified By Roger Elliott Report Approved By [illegible]

Anlab
ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole | Report #: 111941 | Page 2 of 9

Sample Description: B1 5.5-6.0' | Anlab ID #: 111941-1 | Units: mg/kg

Date sampled: 1/29/87 & 1/30/87 Date received: 1/30/87

Project: U.S. Navy #40011

COMPOUND	CONCENTRATION
Benzene	1.1
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	2.6
Xylenes	<0.05

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

Data Certified by _____ Report Approved by _____

Anlab
ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole | Report #: 111941 | Page 3 of 9

Sample Description: B2 7-7.5' | Anlab ID #: 111941-4 | Units: mg/kg

Date sampled: 1/29/87 & 1/30/87 Date received: 1/30/87

Project: U.S. Navy #40011

COMPOUND	CONCENTRATION
Benzene	0.72
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	0.19
Xylenes	<0.05

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

Data Certified by _____ Report Approved by _____

Anlab
ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole | Report #: 111941 | Page 4 of 9

Sample Description: B3 6-6.5' | Anlab ID #: 111941-7 | Units: mg/kg

Date sampled: 1/29/87 & 1/30/87 Date received: 1/30/87

Project: U.S. Navy #40011

COMPOUND	CONCENTRATION
Benzene	1.5
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	3.2
Xylenes	<0.05

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

Data Certified by _____ Report Approved by _____

Anlab
ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole Report #: 111941

Sample Description: B4 6-6.5' Anlab ID #: 111941-10 Units: mg/kg

Date sampled: 1/29/87 & 1/30/87 Date received: 1/30/87

Project: U.S. Navy #40011

COMPOUND	CONCENTRATION
Benzene	0.58
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	1.8
Xylenes	0.33

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

Data Certified by _____ Report Approved by _____

Anlab
ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole | Report #: 111941 | Page 6 of 9

Sample Description: B5 7-7.5' | Anlab ID #: 111941-13 | Units: mg/kg

Date sampled: 1/29/87 & 1/30/87 Date received: 1/30/87

Project: U.S. Navy #40011

COMPOUND	CONCENTRATION
Benzene	0.60
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	0.19
Xylenes	<0.05

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

Data Certified by _____ Report Approved by _____

Anlab
ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole | Report #: 111941 |

Sample Description: B6 7-7.5' | Anlab ID #: 111941-16 | Units: mg/kg

Date sampled: 1/29/87 & 1/30/87 Date received: 1/30/87

Project: U.S. Navy #40011

COMPOUND	CONCENTRATION
Benzene	0.77
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	<0.05
Xylenes	<0.05

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

Data Certified by _____ Report Approved by _____

Anlab
ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole | Report #: 111941 | Page 8 of 9

Sample Description: B7 7-7.5' | Anlab ID #: 111941-19 | Units: mg/kg

Date sampled: 1/29/87 & 1/30/87 | Date received: 1/30/87

Project: U.S. Navy #40011

COMPOUND	CONCENTRATION
Benzene	0.92
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	0.14
Xylenes	<0.05

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

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Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole | Report #: 111941 | Page 9 of 9

Sample Description: B8 5.5-6' | Anlab ID #: 111941-22 | Units: mg/kg

Date sampled: 1/29/87 & 1/30/87 Date received: 1/30/87

Project: U.S. Navy #40011

COMPOUND	CONCENTRATION
Benzene	1.2
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	<0.05
Xylenes	<0.05

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

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Purgable Aromatics
EPA #602

Client: ERM-West-Ben Leslie-Bole

Report #: 111984 Page

Sample Description: B9 9:20 2-2.5

Anlab ID #111984-1 Units: mg/kg

Sample Date 2/2/87 & 2/3/87

COMPOUND	CONCENTRATION
Benzene	0.11
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	<0.05
Xylenes	<0.05

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

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Purgable Aromatics
EPA #602

Client: ERM-WEST -BEN LESLIE-BOLE

Report #: 111984 Page

Sample Description: B10 10:20 4-4.5

Anlab ID #111984-4 Units: MG/KG

Sample Date 2/2/87 & 2/3/87

COMPOUND	CONCENTRATION
Benzene	0.10
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	<0.05
Xylenes	<0.05

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

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Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole Report #: 111984 Page

Sample Description: B11 11:20 1-1.5 Anlab ID #: 111984-10 Units: mg/kg

Date sampled: 2/2/87 & 2/3/87 Date received: 2/4/87
Project #40011

COMPOUND	CONCENTRATION
Benzene	2.3
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	12
Xylenes	25

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

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Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole Report #: 111984 Page

Sample Description: B-12 1:20 pm 1-1.5 Anlab ID #: 111984-13 Units: mg/kg

Date sampled: 2/2/87 & 2/3/87 Date received: 2/4/87
Project #40011

COMPOUND	CONCENTRATION
Benzene	1.1
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	3.6
Xylenes	3.3

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

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Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole Report #: 111984 Page

Sample Description: B13 8:25A 2.0-2.5 Anlab ID #: 111984-16 Units: mg/kg

Date sampled: 2/2/87 & 2/3/87 Date received: 2/4/87
Project #40011

COMPOUND	CONCENTRATION
Benzene	<0.05
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	<0.05
Xylenes	<0.05

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

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Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole Report #: 111984 Page

Sample Description: B14 9:05A 3-3.5 Anlab ID #: 111984-19 Units: mg/kg

Date sampled: 2/2/87 & 2/3/87 Date received: 2/4/87
Project #40011

COMPOUND	CONCENTRATION
Benzene	0.34
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	2.2
Xylenes	1.4

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

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Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole Report #: 111984 Page

Sample Description: B15 9:35 1-1.5 Anlab ID #: 111984-22 Units: mg/kg

Date sampled: 2/2/87 & 2/3/87 Date received: 2/4/87
Project #40011

COMPOUND	CONCENTRATION
Benzene	2.1
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	2.8
Xylenes	22

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

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Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole Report #: 111984 Page

Sample Description: W1 11:15 4.5-5.0 Anlab ID #: 111984-25 Units: mg/kg

Date sampled: 2/2/87 & 2/3/87 Date received: 2/4/87
Project #40011

COMPOUND	CONCENTRATION
Benzene	0.32
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	0.11
Xylenes	2.9

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

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Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole Report #: 111984 Page

Sample Description: W2 I:30P 2-2.5 Anlab ID #: 111984-26 Units: mg/kg

Date sampled: 2/2/87 & 2/3/87 Date received: 2/4/87
Project #40011

COMPOUND	CONCENTRATION
Benzene	54
Chlorobenzene	<0.05
1,2 - Dichlorobenzene	<0.05
1,3 - Dichlorobenzene	<0.05
1,4 - Dichlorobenzene	<0.05
Ethylbenzene	<0.05
Toluene	650
Xylenes	1200

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

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Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole Report #: 111984 Page

Sample Description: W1 11:45A Anlab ID #: 111984-28 Units: ug/l

Date sampled: 2/2/87 & 2/3/87 Date received: 2/4/87
Project #40011

COMPOUND	CONCENTRATION
Benzene	14000
Chlorobenzene	<0.5
1,2 - Dichlorobenzene	<0.5
1,3 - Dichlorobenzene	<0.5
1,4 - Dichlorobenzene	<0.5
Ethylbenzene	<0.5
Toluene	22000
Xylenes	8700

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

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Purgable Aromatics
EPA #602

Client: ERM-WEST - Ben Leslie-Bole Report #: 111984 Page

Sample Description: W3 12:15A Anlab ID #: 111984-30 Units: ug/l

Date sampled: 2/2/87 & 2/3/87 Date received: 2/4/87
Project #40011

COMPOUND	CONCENTRATION
Benzene	31000
Chlorobenzene	<0.5
1,2 - Dichlorobenzene	<0.5
1,3 - Dichlorobenzene	<0.5
1,4 - Dichlorobenzene	<0.5
Ethylbenzene	<0.5
Toluene	8200
Xylenes	5000

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed
n/d = none detected as specified in the EPA method

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Chlorinated Pesticides and PCB's
Organic Priority Pollutants
EPA #608

Client: ERM-WEST - Ben Leslie-Bole Report #: 111984 Page:

Sample Description: SS1 10:50 Surface Anlab ID# 111984-8 Units mg/kg

Date sampled: 2/2/87 & 2/3/87 Date sample rec'd: 2/4/87
Project #40011

Storet #	Compound	Concentration
39330	Aldrin	NA
39337	alpha-BHC	NA
39338	beta-BHC	NA
34259	delta-BHC	NA
39340	gamma-BHC	NA
39350	Chlordane	NA
39310	4,4'-DDD	NA
39320	4,4'-DDE	NA
39300	4,4'-DDT	NA
39380	Dieldrin	NA
39361	Endosulfan I	NA
34356	Endosulfan II	NA
39351	Endosulfan sulfate	NA
39390	Endrin	NA
34366	Endrin aldehyde	NA
39410	Heptachlor	NA
39420	Heptachlor epoxide	NA
39400	Toxaphene	NA
34671	PCB 1016	<1
39488	PCB 1221	<1
39492	PCB 1232	<1
39496	PCB 1242	<1
39500	PCB 1248	<1
39504	PCB 1254	1.6
39508	PCB 1260	1.9

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed

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Chlorinated Pesticides and PCB's
Organic Priority Pollutants
EPA #608

Client: ERM-WEST - Ben Leslie-Bole Report #: 111984 Page:

Sample Description: SS1 11:00 Surface 1.5' Anlab ID# 111984-9 Units mg/kg

Date sampled: 2/2/87 & 2/3/87 Date sample rec'd: 2/4/87
Project #40011

Storet #	Compound	Concentration
39330	Aldrin	NA
39337	alpha-BHC	NA
39338	beta-BHC	NA
34259	delta-BHC	NA
39340	gamma-BHC	NA
39350	Chlordane	NA
39310	4,4'-DDD	NA
39320	4,4'-DDE	NA
39300	4,4'-DDT	NA
39380	Dieldrin	NA
39361	Endosulfan I	NA
34356	Endosulfan II	NA
39351	Endosulfan sulfate	NA
39390	Endrin	NA
34366	Endrin aldehyde	NA
39410	Heptachlor	NA
39420	Heptachlor epoxide	NA
39400	Toxaphene	NA
34671	PCB 1016	<1
39488	PCB 1221	<1
39492	PCB 1232	<1
39496	PCB 1242	<1
39500	PCB 1248	<1
39504	PCB 1254	<1
39508	PCB 1260	0.20

OTHER COMPOUNDS DETECTED OR REQUESTED	CONCENTRATION

n/a = not analyzed

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