Comprehensive Long-Term Environmental Action Navy (CLEAN) for Pacific Division, Naval Facilities Engineering Command Pearl Harbor, Hawaii

CTO No. 0229

RED HILL BULK FUEL STORAGE FACILITY INVESTIGATION REPORT
VOLUME I OF III
(FINAL)

FOR
FLEET INDUSTRIAL SUPPLY CENTER
(FISC)
OAHU, HAWAII

HDOH FACILITY ID NO. UNASSIGNED
Facility ID: 9-102271
Release ID: 990051; 010011; 020028

AUGUST 2002

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Contract No. N62742-90-D-0019
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OAHU, HAWAII

HDOH Facility ID. No. UNASSIGNED

Prepared for:

Pacific Division
Naval Facilities Engineering Command
Pearl Harbor, Hawaii 96860

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AUGUST 2002

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LIST OF ACRONYMS

AMEC	AMEC Earth and Environmental, Inc.
AVGAS	Aviation Gasoline
bgs	Below Ground Surface
BBL	barrels
BTEX	Benzene, toluene, ethylbenzene, and xylene
C	Celsius
CLEAN	Comprehensive Long-Term Environmental Action Navy
cm/yr	centimeters per year
COC	Chain of Custody
CTO	Contract Task Order
DFM	Diesel Fuel Marine
DO	Diesel Oil
DOH	Department of Health
ECD	Electron Capture Detector
EPA	Environmental Protection Agency
FISC	Fleet Industrial Supply Center
F	Fahrenheit
gpm	Gallons per Minute
GC/FID	Gas Chromatography with Flame Ionization Detection
HAR	Hawaii Administrative Rules
IRIS	Integrated Risk Information System
JP-5	Jet Propulsion Fuel
LEL	Lower Explosive Level
LNAPL	Light Non-Aqueous Phase Liquid
LUST	Leaking Underground Storage Tank
MADEP	Mass. Department of Environmental Protection
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
mgd	Million Gallons per Day

msl	Mean Sea Level
mg/kg	Milligrams Per Kilogram
mg/L	Milligrams Per Liter
MOGAS	Mobile Gasoline
ND	Non Detect
NDS	Navy Distillate
NFSO	Navy Special Fuel Oil
No.	Number
NS	No Standard
O_2	Oxygen
OHSC	Onsite Health and Safety Coordinator
PACNAVFACENGCOM	Pacific Division, Naval Facilities Engineering Command
PAH	Polynuclear Aromatic Hydrocarbons
PAL	Preliminary Action Level
PID	Photoionization Detector
POE	Boring Point of Entry
PRG	Preliminary Remediation Goal
psi	Pounds Per Square Inch
PWC	Public Works Center
PVC	Polyvinyl Chloride
RBCA	Risk Based Corrective Action
SAI	Salisbury and Associates, Inc.
SVOC(s)	Semi-volatile Organic Compounds
SOP	Standard Operating Procedure
TGM	Technical Guidance Manual
TPH	Total Petroleum Hydrocarbons
µg/kg	Micrograms Per Kilogram
UCM	Unresolvable, Chromatographical Mass
USDA	United States Department of Agriculture
USGS	United States Geologic Survey
UST(s)	Underground Storage Tanks
VOC(s)	Volatile Organic Compounds

EXECUTIVE SUMMARY

AMEC Earth and Environmental, Inc. (AMEC) (formerly Ogden Environmental and Energy Services, Inc. (Ogden)) has completed the Phase II site characterization activities performed at the Fleet Industrial Supply Center (FISC), Pearl Harbor bulk storage facility located at Red Hill, Oahu Hawaii. AMEC has prepared this report as authorized by the Pacific Division, Naval Facilities Engineering Command (PACNAVFACENGCOM) under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N6742-90-D-0019, Contract Task Order (CTO), 0229. The engineering services were requested by PACNAVFACENGCOM to identify potential fuel product releases suspected at the facility, which was constructed in the early 1940's, and consist of 20 buried steel vertical tanks with a capacity of approximately 12.5 million gallons each.

In March 1998, the Navy authorized AMEC to proceed with engineering services. The site characterization is being conducted in two phases: Phase I - Research Activities and Phase II - Investigation Activities. The research activities were conducted during April 1998 and consisted of site reconnaissance and data gathering activities. The Phase II investigation activities were conducted in two tasks. The initial Phase II task was conducted from October 19 through November 1, 1998 and consisted of a limited investigation of two of the 20 underground storage tanks (USTs); and resulted in the preparation and submittal of the Initial Phase II Investigation Report. The Secondary Phase II investigation activities were completed during the period from October 7, 2000 through March 9, 2001. This task was to investigate the remaining 18 USTs and the basal aquifer; and to prepare and submit a Phase II Investigation Report. This report completes the AMEC scope of work for the Red Hill Bulk Storage Facility.

Six borings were advanced during the limited investigation (three borings at two tanks; Tank 9 and Tank 16). A total of 14 samples were collected during the initial investigation for offsite laboratory analysis (12 core samples, one duplicate core sample, and one fluid sample). All samples were analyzed for TPH by Method-D-Triregional, volatile organic carbons (VOCs) by Method 8260, and polynuclear aromatic hydrocarbons (PAHs) by

Method 8270. Laboratory evaluation confirmed the presence of petroleum contamination in the bedrock beneath Tank 16. Tank 9 did not exhibit petroleum contamination in the borings advanced.

A total of 20 borings were advanced during the completion of field activities. One angle boring was advanced at 18 tank locations (Tanks 1-8, 10-15, and 17-20); and two vertical borings (one shallow and one deep) were advanced in the lower access tunnel above the underlying basal aquifer. Monitoring wells were installed in each of the borings advanced during the completion of field activities. A total of 107 samples were collected during the completion of field activities for offsite laboratory analysis (87 core samples, 10 duplicate core sample, eight fluid samples, and two ground water samples). The fluid and ground water samples were obtained during drilling activities and during two monitoring events (March and August 2001). All samples were analyzed for TPH by Method 8015 modified, VOCs by Method 8260, semi-volatile organic carbons (SVOCs) by Method OLM03.2, PAHs by Method 8270, and TCLP metals by Method ILM0.40. In addition, four samples (two fluid and two core samples) were collected for fingerprinting analysis using gas chromatography with flame ionization detection (GC/FID) and an electron capture detector (ECD).

Hydrocarbon impacts were noted beneath the floor and at depth in some of the angle borings advanced beneath the USTs. Six borings (B-1, -2, -3, -6, -13, and -20) exhibited hydrocarbon impacts (i.e., sheen on drill water, hydrocarbon odor, and/or elevated Photoionization Detector (PID) measurements) beneath the concrete floor. A hydrocarbon odor and elevated PID readings were observed at depth in the angle borings located at 15 of the 20 tanks (Tanks 1, 3, 4, 5, 6, 7, 11, 12, 13, 14, 16, 17, 18, 19, and 20). The fingerprinting analysis confirmed that the sample obtained for analysis contains petroleum hydrocarbons, which probably originated from the tank.

The initial risk screening level assessment indicates that seven constituents were detected in core samples at concentrations of potential concern: ethylbenzene, methylene chloride, 2-methylnaphthalene, naphthalene, phenanthrene, TPH (C10-C28), and unknown hydrocarbon. Three constituents were detected in groundwater at concentrations of potential concern: bis(2-ethylhexyl)phthalate, lead, and TPH (C10-C28). The investigations also indicate the presence of LNAPL in several monitoring wells at the site.

Based on the preliminary risk screening, evaluations for the seven identified constituents of potential concern, it is recommended that a comprehensive risk assessment be completed to allow for an accurate assessment of current and potential future risk associated with the Red Hill Bulk Fuel Storage Facility. As part of the comprehensive risk assessment a site-specific exposure assessment will be completed. This exposure assessment will evaluate site data in conjunction with information on the exposure setting to identify potential migration pathways, potential receptor populations, and relevant exposure routes. It is anticipated that a significant portion of the exposure assessment will involve the use of fate and transport modeling to allow for an evaluation of the movement of constituents, LNAPL, and groundwater from the site to actual or potential points of exposure. Once the receptor populations, exposure routes, and exposure point concentrations have been identified, the potential risk associated with the site-related constituents will be quantified.

SECTION 1
INTRODUCTION

This document presents the findings of the Phase II site characterization performed at the Fleet Industrial Supply Center (FISC), Pearl Harbor bulk storage facility located at Red Hill, Oahu Hawaii. AMEC Earth and Environmental, Inc. (AMEC) has prepared this report as authorized by the Pacific Division, Naval Facilities Engineering Command (PACNAVFACENGCOM) under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N6742-90-D-0019, Contract Task Order (CTO), 0229. The engineering services were requested by PACNAVFACENGCOM to identify potential fuel product releases suspected at the facility that was constructed in the early 1940's and consist of 20 buried steel vertical tanks with a capacity of approximately 12.5 million gallons each.

1.1 SITE BACKGROUND AND HISTORY

The FISC Pearl Harbor bulk storage facility is located in Red Hill, Oahu, Hawaii. The location of this facility is presented in Figure 1-1, Site Location. Constructed in the early 1940's, the fuel farm consists of 20 field constructed, steel, vertical underground storage tanks (USTs), with capacities between 285,000 barrels (BBL) and 300,000 BBL. Each tank is approximately 250 feet (height) by 100 feet (width), with the upper dome of the tanks approximately 100 to 175 feet below ground surface (bgs). The bulk tanks were constructed in a parallel series of two rows sloping south by southwest towards Pearl Harbor (Figure 1-2, Site Plan). The tanks are connected by main upper and lower subsurface service tunnels, which contain light rail systems, water and electrical utilities, and fuel pipelines. In the lower tunnel, each parallel tank is connected by a short access, which branches off the main service tunnel and terminates into a face-wall under each tank. Individual tank ancillary piping exits from each face-wall to connect to the fuel transmission lines. The fuel pipelines run approximately 2.5 miles from the bulk tanks to a Pearl Harbor pump station. The pump station is used to pump fuel from fuel tanks in Pearl Harbor to the bulk storage facility.

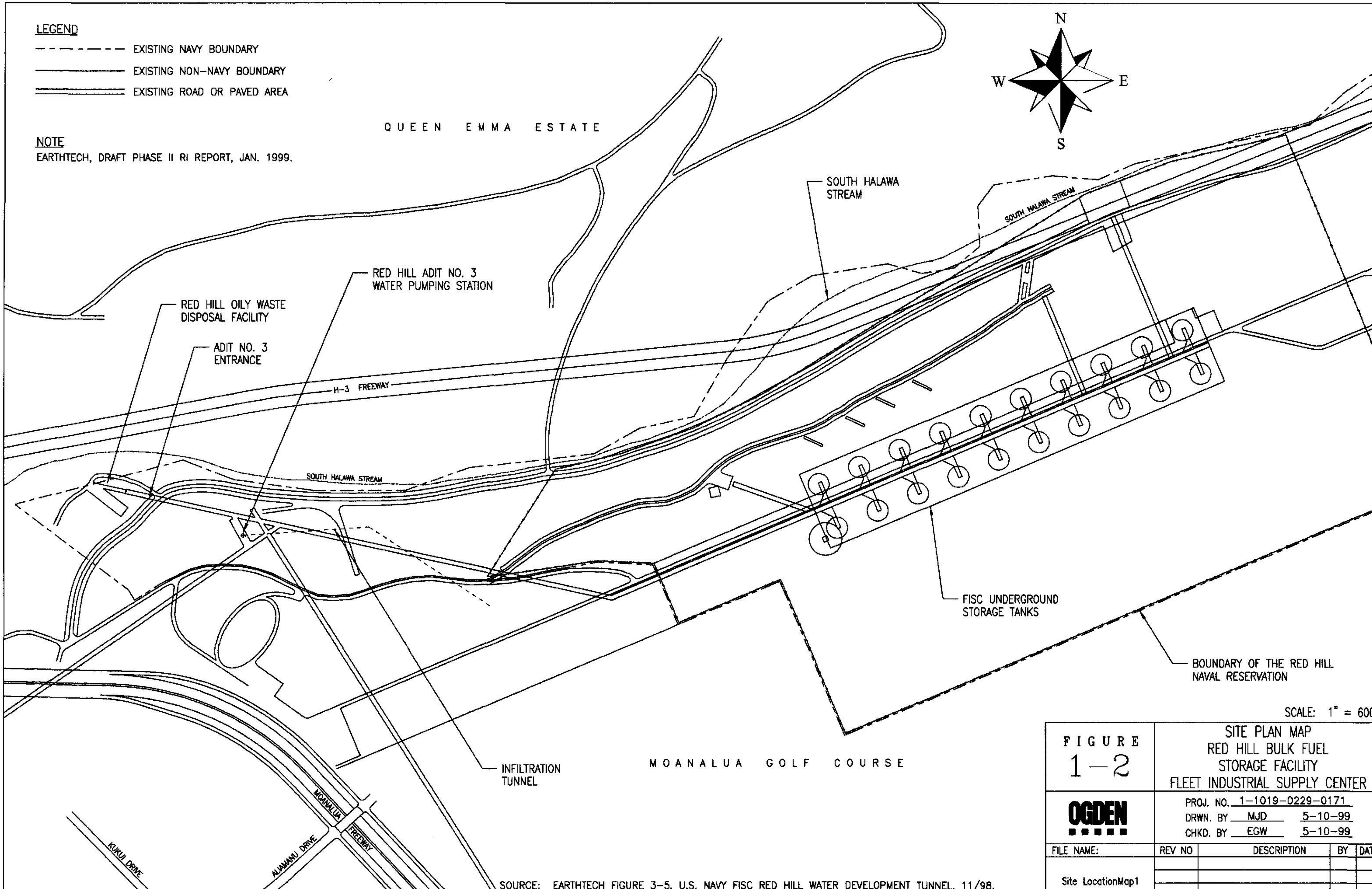


FIGURE 1-2

SITE PLAN MAP
RED HILL BULK FUEL STORAGE FACILITY
FLEET INDUSTRIAL SUPPLY CENTER

OGDEN

PROJ. NO. 1-1019-0229-0171
DRWN. BY MJD 5-10-99
CHKD. BY EGW 5-10-99

FILE NAME:	REV NO	DESCRIPTION	BY	DATE
Site LocationMap1				

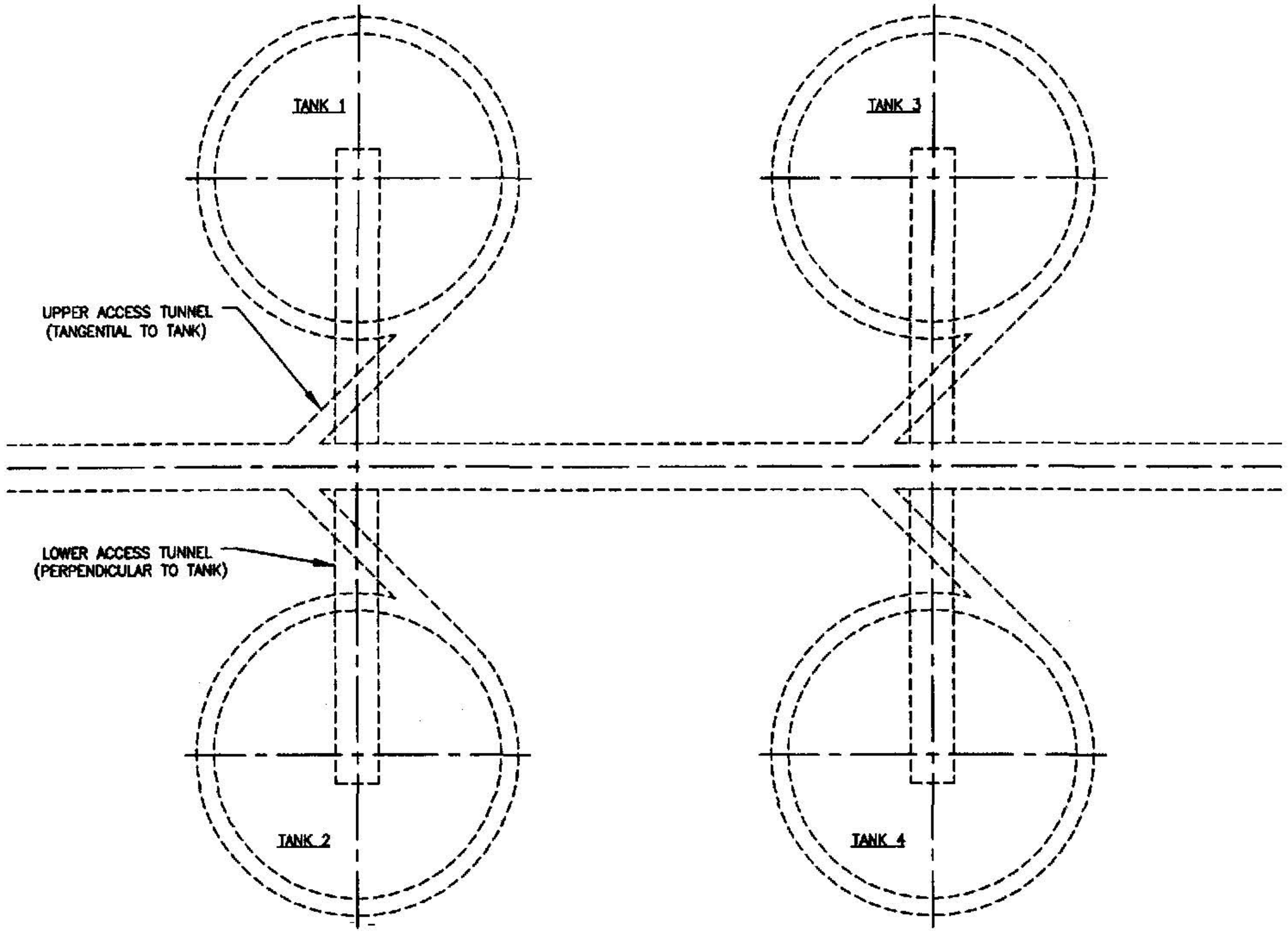
The Navy Public Works Center (PWC) operates a water pumping station down gradient of the bulk fuel storage facility within the lower tunnel system. The water pumping station is referred to as the Red Hill Adit Number (No.) 3 Water Pumping Station and its location is presented in Figure 1-2. The water pumping station pumps water from the basal aquifer beneath Red Hill to the Pearl Harbor water distribution system.

1.1.1 Bulk Fuel Storage Facility *Construction Summary*

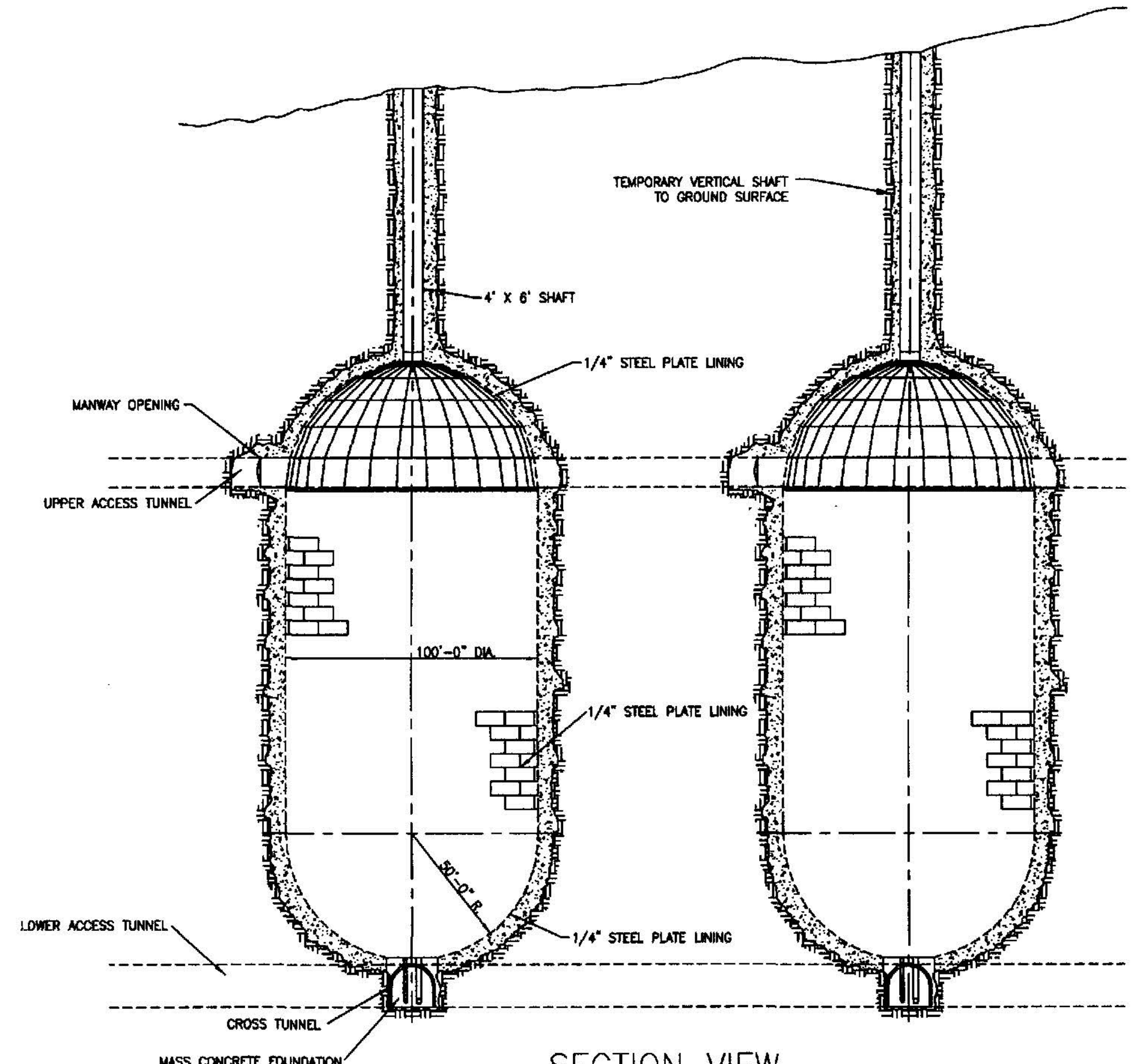
Based on interviews and plan file drawings a construction summary of the Bulk Fuel Storage Facility is presented in this section. A detailed construction description with numerous drawings was prepared by AMEC and presented in the report titled "Work Plan, Phase II Investigation, Fleet Industrial Supply Center, Bulk Fuel Storage Facility at Red Hill" dated December 1999.

Construction of the bulk fuel farm began with the surface of Red Hill being removed to allow for vertical construction. Each tank pit was blasted from the basalt, utilizing a central vertical tunnel and radial blast tubes. Once the tank pits were opened, the steel tank segments were field constructed and placed into the pits in sections. The construction started with the lower dome being built in place. Once the lower dome was in place, the lowest portion was encased in a concrete bed. This method was generally followed for an entire tank as it progressed to the upper dome. Upon completion of the tank, small diameter holes were drilled in the sides of the tank and through the concrete bed. A 10 to 1 grout mixture was injected into the surrounding bedrock at approximately 300 pounds of pressure per square inch (psi). This method was utilized to close all possible seams and blasting fractures that may have been created during construction. (Please refer to Figure 1-3, General Tank Layout).

A leak monitoring system, referred to as 'tell-tale', was installed during tank construction. The tell-tale consists of a system of angle-iron ledges welded to the exterior diameter of each tank shell. The tank shell was generally constructed using 5 by 12 foot steel plates. The angle iron was welded over the 12-foot horizontal joint between



PLAN VIEW
SCALE: 1" = 60'



SECTION VIEW
SCALE: 1" = 60'

FIGURE
1—3

GENERAL TANK LAYOUT
RED HILL BULK FUEL
STORAGE FACILITY
FLEET INDUSTRIAL SUPPLY CENTER

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CHKD. BY EGW 8-17-99

FILE NAME: DETAIL1&8

REV NO	DESCRIPTION	BY	DATE

plates forming a continuous ledge along the tank diameter. A series of tell-tale ledges was constructed every five vertical feet corresponding with the plate dimension. Should product be lost through the steel plating, it would drain along a 'ledge' until intersecting a drainpipe. Each ledge drained into a series of small diameter pipes (1¼ inch), which were vertically mounted within the interior of the tanks. Eleven vertical tell-tale pipes were spaced approximately every 28.5 feet extending to the tank bottom and connecting through 'jump pipes' to the exterior ledges at every five-foot interval. A twelfth, circular, tell-tale pipe was constructed at the tank bottom. Each of the pipes exited the lower tank shell and the face-wall in the lower tunnel to be monitored and/or drained. Suspect leaks had been detected through the telltale system over the lifetime of the tanks. However the thick concrete barrier surrounding each tank was constructed to prevent migration.

Due to the sensitive classification of the fuel farm as the primary fuel storage facility for Pearl Harbor, public access was limited and independent investigations to confirm any suspected releases were not conducted. The Red Hill facility was declassified in 1995. Facility records indicate that suspected or potential leaks may have occurred and have been repaired in several of the tanks. No record of a catastrophic release (such as most or all of a tank's contents being released) was found.

1.1.2 Historical Summary of Products Stored at the Bulk Fuel Storage Facility

The tanks historically have contained diesel oil (DO), Navy Special Fuel Oil (NSFO), Navy distillate (NDS), Diesel Fuel Marine (DFM), Aviation Gasoline (AVGAS), mobile gasoline (MOGAS), and Jet Propulsion Fuel (JP-5). Originally, Tanks 3 through 20 contained NSFO and Tanks 1 and 2 stored diesel oil. Over time, each tank has been converted to store a variety of different fuel types. Interviews with FISC personnel verified that the storage of NSFO in the Red Hill facilities was terminated during the mid- 1980's. Currently, the tanks contain JP-5 or DFM. Table 1-1 presents a historical record of petroleum storage in the tanks. No previous environmental studies have occurred at this site due to the sensitive nature and classification of the site. There has been no evidence of a catastrophic release of the tank contents at this site.

Table 1-1
Historical Summary of Products Stored at the Red Hill Bulk Fuel Storage Facility

Tank ID	Contents	Date	Tank ID	Contents	Date
1	Diesel Oil (DO)	10/26/42	7	NSFO	3/16/43
	JP-5	2/4/70		ND	5/4/71
2	DO	9/28/42		DFM	9/11/73
	JP-5	1962		Empty	4/25/95
3	Navy Special Fuel Oil (NSFO)	1/26/43	8	NSFO	3/2/43
	Navy Distillate (ND)	8/27/70		ND	5/21/71
	Diesel Fuel, Marine (DFM)	4/3/73		DFM	9/12/73
	JP-5	12/26/73		Empty	4/13/95
4	NSFO	11/15/42	9	NSFO	2/14/43
	ND	2/17/71		ND	6/23/72
	DFM	6/6/73		DFM	9/13/73
	JP-5	1/26/74		Empty	9/14/95
5	NSFO	12/19/42		JP-5	5/30/96
	Empty	4/6/70	10	NSFO	1/26/43
	ND	12/29/71		ND	6/29/72
	JP-5	10/74		DFM	9/1/73
6	NSFO	12/30/42		Empty	10/3/95
	Empty	3/29/70	11	NSFO	2/11/43
	ND	2/29/72		ND	6/29/72
	JP-5	10/74		DFM	10/73
	DFM	1/15/82	12	NSFO	3/19/43
	Empty	7/22/94		Empty	4/28/70
	JP-5	5/19/95		ND	5/26/72
	Empty	4/15/98		DFM	1/29/81

Table 1-1 (continued)
Historical Summary of Products Stored at the
Red Hill Bulk Fuel Storage Facility

Tank ID	Contents	Date	Tank ID	Contents	Date
12	Empty	8/24/94	16	Empty	11/4/98
	DFM	7/25/95	17	NSFO	5/23/43
13	NSFO	3/23/43		Empty	3/30/60
	DFM	4/21/76		AVGAS	12/11/64
	Empty	12/1/94		MOGAS	8/29/68
	JP-5	10/4/95		JP-5	1/15/69
14	NSFO	3/21/43	18	NSFO	6/13/42
	ND	3/13/73		Empty	3/30/60
	NSFO	10/25/73		JP-5 (for leak tests)	5/63
	ND	8/26/75		AVGAS	8/18/64
	DFM	4/12/81		Empty	10/30/68
	Empty	1/19/95		JP-5	1/10/69
	JP-5	4/29/96	19	NSFO	6/13/43
15	NSFO	4/29/43		Empty	3/30/60
	ND	10/27/72		JP-5	1/17/64
	DFM	9/14/73		Empty	10/85
	Empty	10/2/98	20	NSFO	7/20/43
16	NSFO	5/8/43		Empty	3/30/60
	ND	11/10/71		JP-5	6/14/64
	DFM	6/15/75		Empty	12/28/71
	Empty	5/25/94		JP-5	4/4/72
	JP-5	10/1/98	355[a]	Slop Oil	1966

[a] – The slop oil tank (Tank 355) was not included in this investigation.

1.2 AMEC Scope Of Work and Project History

In April 1996, the Navy and FISC personnel initially discussed the proposed site characterization objectives with AMEC. After a brief tour of the facility, a meeting was conducted to discuss potential approaches and difficulties in conducting an investigation within the lower tunnel area underlying the tanks. In March 1998, the Navy authorized AMEC to proceed with engineering services to identify any product release from the Red Hill bulk fuel storage facility. The site characterization was conducted in two phases: Phase I - Research Activities and Phase II - Investigation Activities. The Phase II investigation activities were conducted in two tasks. The initial Phase II task was to conduct a limited investigation of two of the 20 USTs; and to prepare and submit an Initial Phase II Investigation Report. The secondary task was to investigate the remaining 18 USTs and the basal aquifer; and to prepare and submit a Phase II Investigation Report. This report completes the AMEC scope of work for the Red Hill Bulk Fuel Storage Facility.

1.2.1 Phase I - Research Activities

During April 1998, AMEC personnel conducted Phase I site reconnaissance and data gathering activities. The Phase I requirements included "interviews and meetings with remedial-project-manager, facility and FISC representatives to determine the most cost effective method to accomplish the field work required to complete the site investigation". A significant amount of research was conducted within the lower tunnel and tank area to resolve unique technical requirements for subsurface tunnel drilling in an environmentally sensitive and potentially explosive location.

1.2.2 Limited Phase II - Investigation Activities

The Navy authorized AMEC to proceed with an initial Phase II site investigation in August 1998. The Phase II field activities, fully described in the report titled "Initial Phase II Site Characterization Report, Fleet Industrial Supply Center, Bulk Fuel Storage

Facility at Red Hill" (Ogden, 1999), were conducted from October 19 through November 1, 1998 by AMEC and subcontract personnel. A brief summary is provided below.

The objective of the initial Phase II investigation was to core bedrock immediately underlying Tanks 9 and 16 in an attempt to intercept any petroleum release that may have occurred. Historical leaking was suspected at Tank 16 due to the condition of the lower tunnel interior wall and the fluctuating fuel levels associated with Tank 16. Bedrock core and/or encountered soils, ground water, and petroleum product were sampled and evaluated for petroleum constituents. The drilling was accomplished by penetrating the lower tank face-wall or lower tunnel floor. The greatest limitation was identifying specific explosion proof, portable, drilling equipment that would accomplish horizontal/angular core drilling and meet the required weight and size restrictions to gain access, and operate throughout, the lower tunnel.

Once the drilling equipment was mobilized and set-up within the tunnel, AMEC advanced three borings under each tank. The three directed borings allowed for an assessment of a greater horizontal area under each tank versus a single centerline boring. In addition, the borings could be directed at a zero degree deflection from vertical through the face-wall (straight line) or downward at a slight angle through the tunnel floor. The primary focus of this drilling and sampling event was to confirm the absence or presence of any petroleum product. In addition the Navy requested that AMEC not penetrate the concrete and grout backfill surrounding the tank. Therefore, the borings were advanced through the tunnel floor at a slight downward angle directed under the tank.

1.2.3 Final Phase II - Investigation Activities

The Navy authorized AMEC to complete the Phase II field activities on December 21, 2000. AMEC personnel updated the existing Health & Safety Plan and prepared a Site Work Plan. The field investigation was conducted during the period from October 29, 2000 through March 9, 2001. This final task was to investigate the remaining 18 USTs and the basal aquifer; and to prepare and submit a final Phase II Investigation Report.

Unlike the initial Phase II investigation that advanced three borings at each tank area, only one angle boring was advanced at each tank area during this phase of the investigation. A total of 18 borings were converted to monitoring wells. At the tank locations investigated during the initial Phase II investigation (Tanks 9 and 16), the boring advanced directly beneath the tank was over drilled and converted to a monitoring well; the remaining two borings were abandoned with grout.

Two vertical borings were also advanced in the lower access tunnel to investigate the basal aquifer. One boring (V1D) was advanced to the basal aquifer and one boring (V2S) was advanced to investigate and monitor an area above the basal aquifer. The borings were converted into monitoring wells and monitored during the March and August 2001 monitoring events.

Core, fluid, and ground-water samples were obtained during these field activities for analysis. The analytical results and field observations are included within this report.

SECTION 2
PHYSICAL SETTING

This section summarizes the physical setting and characteristics of the Site. General aspects of the regional land use, demography, climatology, vegetation, sensitive species and habitats, topography, soils, geology, hydrology, water quality, and site history are presented. The findings of previous investigations pertinent to the Site are also presented.

The island of Oahu, part of the Hawaiian Island chain, lies at the northern margin of the tropics region. Oahu is the third largest island in the chain and has extensive areas of mountainous land. These areas consist of two mountain ridges, one along the eastern side of the island, and one along the western side of the island, where elevation rises to about 4,000 feet above mean sea level (msl). Most of the remainder of Oahu is less than 1,000 feet above msl (AMEC, 1999).

2.1 LAND USE

The FISC Red Hill Bulk Fuel Storage Facility property is located in the Halawa District of Honolulu, west of Halawa Heights. The Site is generally bordered by the Halawa Correctional Facilities to the northwest, the Customs Department Firing Range to the north, the United States Coast Guard Kai Kai Hale housing district and the State of Hawaii Animal Quarantine Yard to the west and the Moanahua Golf Course to the south. There are no public facilities or buildings on the FISC property, and no public access points. FISC monitors the access of all personnel into the facility (Ogden, 1999).

2.2 DEMOGRAPHY

Populated areas closest to the Red Hill facilities are Pearl City and Aiea to the west and Honolulu to south and east. Based on 1990 data, the populations for Pearl City and Aiea are 30,993 and 8,906, respectively, and the population of Honolulu is 365,272. Pearl Harbor lies to the southwest of the Red Hill facility, and the population of the military base is unlisted (Ogden, 1999).

2.3 CLIMATOLOGY

The prevailing northeast trade winds and the ocean currents cause the air and water of the region to be cooler than other areas of similar latitude. Ocean temperatures range from 75 to 85 degrees Fahrenheit (F) at Honolulu. Northeasterly winds persist most of the year and the northeastern, or windward, side of the island is commonly the wettest. Southerly winds blow for only a few days at a time during the winter months. Most of the severe storms on the island come from the south, as southerly winds pick up moisture from the open ocean before they arrive at the islands. Precipitation is at a maximum between 2,000 and 4,000 feet above msl on the island. October to April is the wet season, and May to September is the dry season. Small areas of northeast Oahu have annual precipitation greater than 300 inches per year; however, most of the island receives 20 to 75 inches of precipitation per year. Precipitation on the island is most commonly in the form of rain (Ogden, 1999).

2.4 VEGETATION COMMUNITIES

The aboveground portion of the Site is inhabited by (1) *Haole koa (Leucaena leucocephala)* scrub (2) disturbed habitat, and (3) vegetation communities in developed areas. *Haole koa* scrub grows throughout Oahu, primarily in areas that have been disturbed by grazing or human activities (Wagner et al., 1990). The scrub community on Red Hill is dominated by *Haole koa,* Guinea grass *(Panicum maximum),* and Chinese violet *(Asystasia gangetica)*. The disturbed habitat is comprised of weedy plant species that can withstand frequent disturbance by human activities or natural events. Many of the species in this community are similar to those found in nonnative grasslands; however, disturbed habitats have a greater percentage of non-grass species and are characterized by sparsely covered areas. Developed habitats are those with buildings, paved roads, or other manmade structures with a minimal amount of vegetation. Small areas of lawn and ornamental bushes are often planted in developed areas. Although this vegetation does support some wildlife species, the habitat is considered to be of very low quality and is primarily used by introduced, common urban species (AMEC, 1996).

2.5 SENSITIVE SPECIES AND HABITATS

It is not expected that any federal or state-listed threatened or endangered species would occur onsite. Habitats onsite are not considered sensitive and are dominated by introduced species that do not usually support native species. The state-listed Hawaiian short-eared owl *(Asio flammeus sandwichensis)* may occasionally forage onsite, but none was detected during the biological resource survey conducted by AMEC biologists at the nearby (approximately 0.6 miles east) Oily Waste Disposal Facility on February 17, 1995. This survey concluded that other sensitive wildlife species are not expected to occur on or adjacent to the Site because of a lack of appropriate habitat (Ogden, 1996).

2.6 TOPOGRAPHY

Topography is important in understanding weather patterns, surface water, and groundwater flow. Topographically, the island of Oahu is divided into four main areas: the Waianae Mountain Range, the Koolau Mountain Range, the Schofield Plateau, and the Coastal Plains, which form the northwest and south island margins. The Site is located on the lower portion of the southwestern wall of Halawa Valley, the easternmost Koolau stream valley emptying into Pearl Harbor. The valley was formed by the coalescence of two valley heads, drained by the North and South Halawa Streams, that merge on the Coastal Plain before emptying into Pearl Harbor (Ogden 1996). The elevation of the aboveground facilities of the Site is 500 to 600 feet above msl, and the tops of the bulk fuel storage tanks are approximately 100 to 200 feet directly below these facilities.

2.7 SOILS

Review of previous investigations performed in the vicinity of the Red Hill facility indicate that soils consisting of clayey gravels and clays are common to a depth of 10 feet bgs. Along the slopes and over much of the open area south of the Schofield Saddle, the basaltic bedrock is covered with 10 to 30 feet of Koolau residuum (Wentworth, 1945). The soils were derived from the weathering of the underlying basalt bedrock or were deposited as alluvium/colluvium. The younger alluvium/colluvium deposits were derived from the basement rock of fractured basalts and tuff. Beneath the surficial soils, alternating layers of clay and fractured basalts were encountered at depth.

2.8 GEOLOGY

Two distinct volcanic regions cover the island of Oahu: the Waianae and the Koolau. The Waianae region covers the western side of the island, and the Koolau basalts cover the central and eastern portions of the island. Red Hill is located on the southern edge of the Koolau region approximately 3 miles northeast of Pearl Harbor within an area referred to as Halawa Valley (Ogden, 1999). The Koolau formation consists almost entirely of the basaltic lava flows that erupted from a fissure line approaching 30 miles in length (Wentworth, 1951) and trending in a northwest rift zone.

During a period of volcanic quiescence of approximately 2 million years, valleys approaching 600 meters in depth were cut into the Koolau volcanic range and sediment accumulated in the valley floors. The erosion of the Koolau volcano resulted in the formation of a delta of sediment consisting of silt and sand. The delta increased in thickness as it approached the sea. The Site is located within the ridge that separates the Moanaluia and Halawa Valleys. The ridge drops steeply on either side with the aforementioned sediments deposited in the valley bottoms (Williams, 1998).

The two main aquifers located on Oahu are the Koolau basalt and the Waianae volcanic formation. The fresh ground-water system is referred to as basal ground water and is encountered at depths either at or just below msl. Fresh ground water on Oahu is primarily taken from the Koolau aquifer and totals approximately 334 million gallons per day (mgd) (Ogden, 1999).

At the Site, the potentiometric surface of the basal ground water is at approximately 16 feet above msl. However, the basal ground water aquifer is confined. The bottom of the upper confining layer is at or just below sea level. Therefore, water is not encountered while boring through the confining layer until at or just below sea level. But after penetrating the basal aquifer, the water in the boring rises to the full potentiometric surface, 16 feet above msl.

Both pahoehoe and a'a lava flows are present in the Koolau formation. Pahoehoe is smooth, fine-grained lava with a rope-like appearance. A'a lava is a jagged, blocky lava flow that contains clinker beds. These clinker beds are the more permeable feature of the a'a lava. According to Mink (1999), the a'a lava may act as a very localized confining layer to the basal system with unconfined conditions present just a few feet away. The a'a lava is more abundant in the lower flanks (Wentworth, 1951). Localized portions of basalt in the Halawa Valley are composed of thicker, massive a'a flows that demonstrate much less ground water transport due to the significantly lower number of porosity features (fractures and vesicles). The lack of these porosity features characterizes the lava flow as relatively impermeable to ground-water flow (EarthTech, 1999).

AMEC and EarthTech have conducted investigations at the former Oily Waste Disposal Pit to the west of the Site. These investigations revealed contamination in the subsurface soils and perched ground water beneath the site.

According to the EarthTech report, at approximately 20 feet above msl, the basalt bedrock appeared completely dry and massive, which was different from the highly fractured basalt preceding this unit. Basal ground water was encountered directly beneath this massive unit at an elevation of 1 to 2 feet below msl. Once the monitoring wells were installed, the potentiometric ground-water surface stabilized at an elevation of 16 feet above msl, which is indicative of the massive lower basalt acting as a localized, impermeable layer and, thus responsible for the confined ground-water conditions exhibited by the basal aquifer. However, Mink (1999) states that although the a'a lava can act as a local confining unit, it tends to be very limited in extent and, therefore, unconfined conditions can be encountered in close proximity.

Information in the Willbros Engineers report (1998) supports Mink's findings and states that the Site is bounded on each side by deep alluvial fills and the sedimentary caprock (marine and terrestrial sediments) in the down gradient direction. Willbros Engineers determined that near the ocean the basal aquifer is contained within the sedimentary caprock under unconfined conditions, but is underlain by a basal confined aquifer in horizontally extensive lavas. In the area of the lower tunnel and the Red Hill portion of the Harbor Tunnel, the basal aquifer is located in permeable basalt on which the tunnel and tanks are located (Willbros Engineers, 1998). This further supports Mink's theory that confined conditions are limited in extent. However, without additional site-specific geologic information, a conclusive statement cannot be made.

2.9 SURFACE WATER

Surface water amounts for the island are directly related to precipitation and topography. Runoff for the island is approximately one third of the average annual precipitation, but will vary depending upon slope of the area and the soil matrix. Streams on the island are generally small with steep gradients. These streams usually flow only immediately after a heavy rainfall. Some streams with low gradients are hydraulically connected to the ground water aquifers and flow year round. Runoff for the island can range between less than 10 inches to greater than 160 inches annually.

2.10 HYDROGEOLOGY

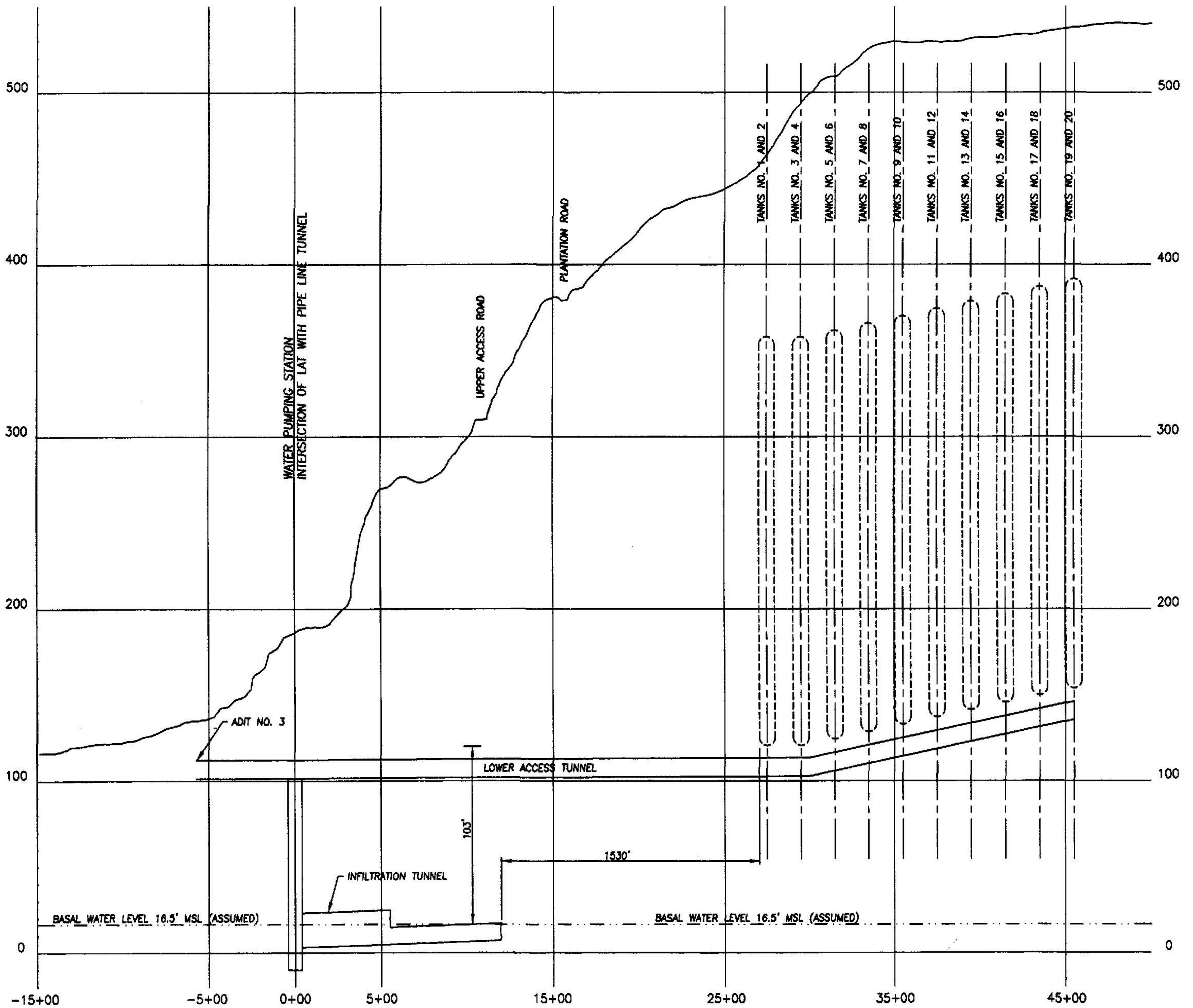
Until recently, ground-water quality on the islands of Hawaii has been of high quality. Realizing the importance of fresh potable drinking water, Hawaii has effectively used land management practices as a safeguard to protect ground-water quality. The entire state is maintained as near as possible to the natural conditions because the quality of ground water is the direct result of the environment through which the percolating water passes and the aquifer material in which it is stored (Mink, 1990).

The Koolau Aquifer Sector is divided into separate aquifer systems to better manage the ground-water resources. The boundaries between the systems are based on hydrogeological considerations (Mink, 1999). Based on review of the reports generated for the area, it appears that the Halawa Valley is an apparent boundary between two aquifer sectors in the area. It is the dividing line between the Waimalu system of the Pearl Harbor sector and the Moanalua system of the Honolulu aquifer district (Willbros Engineers, 1998). However, these basins are hydraulically connected to one another. The basal ground-water resources of the Honolulu district have always been treated as a separate entity from the Pearl Harbor district, but, in truth, ground water from the Moanalua basin flows towards and is hydraulically connected to the Pearl Harbor area. There does not appear to be a hydrogeological boundary beneath the Red Hill facility (Willbros Engineers, 1998). According to area literature, the entire region is characterized as the Koolau basal aquifer and is classified as irreplaceable with high vulnerability to contamination (Mink, 1990).

The ground-water flow in the Red Hill area is expected to be to the northwest toward Ai'ea and Kalauao Springs (Mink, 1999). The closest known ground water extraction point intersecting the basal aquifer is located in the Red Hill water supply tunnel in Adit #3. Approximately 8 to 12 mgd are withdrawn from this location and account for 10% of Honolulu's water supply (USGS, 1991). Figure 2-1 depicts the various aquifer systems.

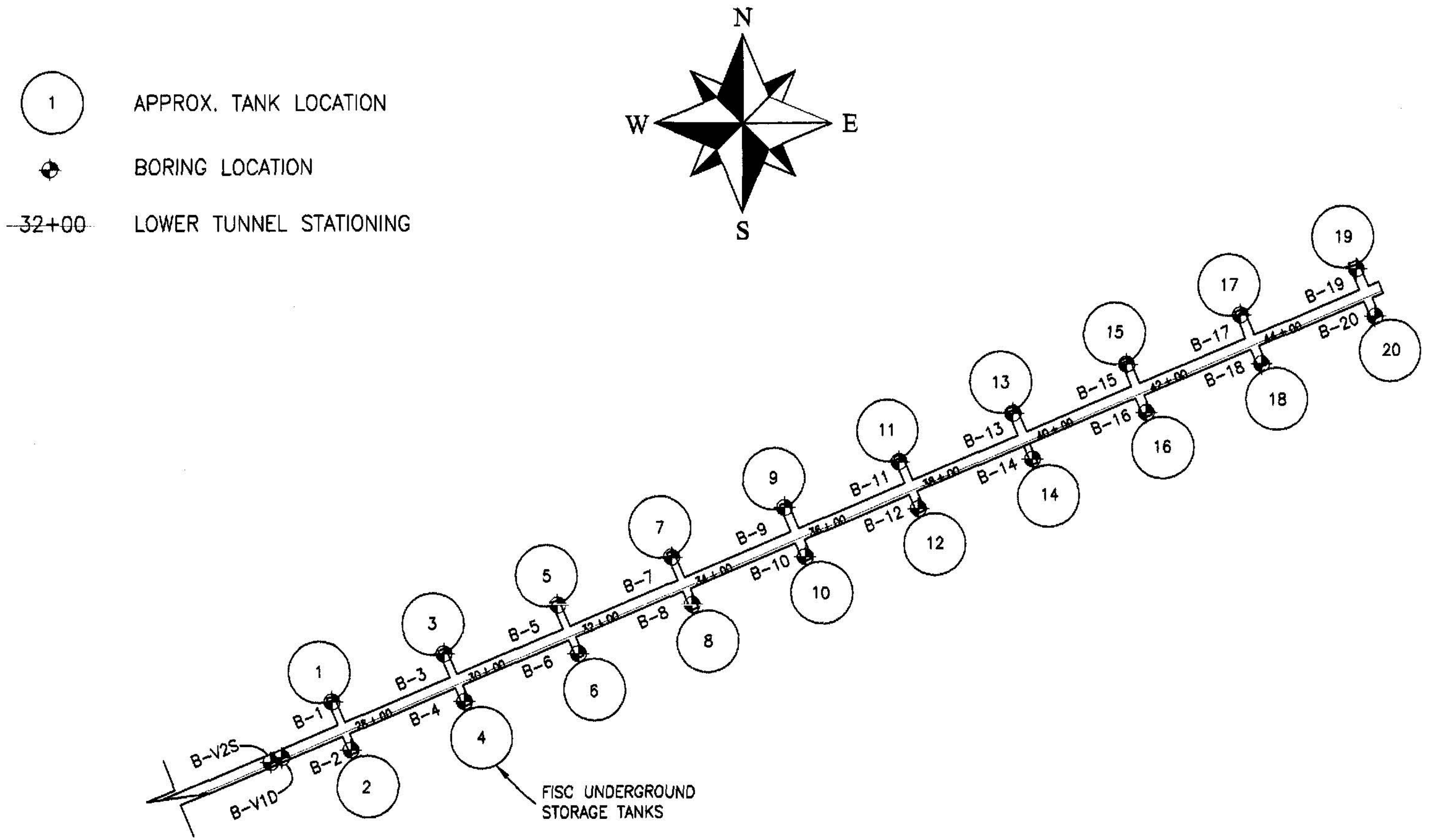
2.11 WATER QUALITY

The basal aquifer is tapped as a source of drinking water by the Navy PWC and supplies the drinking water for the Pearl Harbor Naval Complex. The pumping station is located within the lower tunnel system and approximately 0.5 miles to the west of the bulk fuel storage tanks. Regular testing of the basal aquifer is conducted through the PWC pump station by the PWC and by the Hawaii Department of Health (DOH) to ensure that the water is maintained within drinking water standards. The analytical program at the PWC pump station covers Volatile Organic Compounds (VOCs) and other petroleum constituents of concern. No indication of petroleum contamination has been detected in basal aquifer water samples collected during periodic monitoring at the PWC pump station. Figure 2-2 provides a profile of the tanks and infiltration tunnel.



SCALE: HORIZ. 1" = 500'
VERT. 1" = 60'

FIGURE 2-2	BULK FUEL TANK AND WATER TUNNEL PROFILE RED HILL BULK FUEL STORAGE FACILITY FLEET INDUSTRIAL SUPPLY CENTER			
OGDEN	PROJ. NO. 1-1019-0229-0171			
	DRWN. BY MJD 8-17-99			
	CHKD. BY GW 8-17-99			
FILE NAME:	REV NO	DESCRIPTION	BY	DATE
WaterProfileTunnel1				



SCALE: 1" = 200'

FIGURE 3-1	PLAN VIEW OF BORINGS RED HILL BULK FUEL STORAGE FACILITY FLEET INDUSTRIAL SUPPLY CENTER
OGDEN	PROJ. NO. 1-1019-0229 DRWN. BY APT 10/2/01 CHKD. BY

FILE NAME:	REV NO	DESCRIPTION	BY	DATE
figure3-1				

SECTION 3
PHASE II FIELD INVESTIGATION

3.1 MOBILIZATION

The AMEC project team mobilized to the FISC Red Hill bulk fuel farm on two occasions to implement the Phase II site characterization activities. Limited Phase II investigation activities were performed during the period of October 19, 1998 through November 1, 1998. The Phase II investigation was completed during the period of October 27, 2000 through March 9, 2001. The AMEC project teams typically consisted of a Drill Manager, a Geologist, and an Onsite Health and Safety Coordinator (OHSC). The subcontractor selected to perform the unique drilling and sampling for both field investigations was Salisbury and Associates, Incorporated (SAI) of Spokane, Washington. Salisbury personnel consisted of a Senior Driller and a Drill Helper.

Prior to commencement of field activities, meetings were conducted with FISC and PACNAVFACENGCOM personnel, and gate keys to the project area were issued to the Drilling Manager. Based on the Phase I planning, it was determined that the upper tunnel entrance, Adit 5, would be used by the AMEC team for both field events. Equipment was off loaded onto light rail cars and transported into the tunnel entrance to the facility elevator. An inventory of the equipment was performed before being moved into the tunnel. Equipment, including the drill rig components, was transported to the lower level via the elevator in several lifts. The elevator was utilized for movement to the lower tunnel, and was not altered or reconfigured, in accordance with the agreement between AMEC and FISC. Equipment was again loaded onto lower level rail cars and hand pushed to each tank area.

3.2 BORING LOCATIONS AND EQUIPMENT

3.2.1 Boring Locations

A total of 26 borings were advanced during the Phase II investigation. Six angle borings were advanced during the limited Phase II investigation; three borings each at Tank 9 and Tank 16. A total of 20 borings were advanced during the completion of the Phase II investigation; one angle boring at 18 tank locations (Tanks 1-8, 10-15, and 17-20); and two vertical borings (one shallow and one deep) in the lower access tunnel above the underlying basal aquifer. A plan view that shows the boring locations is provided in Figure 3-1. The completion of both the limited Phase II investigation and completion of the Phase II investigation were conducted under the conditions as outlined and described below.

- AMEC drill set-up would minimize impact to FISC equipment, and did not impede tunnel entry or exit and posed no threat to evacuation routes.
- The angle borings were located no closer than 5 feet from the face-wall underlying each tank and angled downward to avoid penetrating the concrete backfill surrounding the tank shell. AMEC selected 11 degrees as the downward deflection angle for borings advanced at Tank 9 and Tank 16; all other angle borings had a downward deflection of between 11 and 15 degrees.
- The angle borings were of adequate depth to reach the corresponding outer diameter tank shell distance based on the angle of each boring.
- A deep vertical boring was advanced to an adequate depth to reach the underlying basal aquifer. A deep monitoring well was installed to monitor the aquifer for fuel contamination. A shallow vertical boring was advanced to an area above the basal aquifer. A shallow monitoring well was installed to act as an indicator well for potential fuel migration towards the basal aquifer.

The work area at each tank location was approximately 15 feet in width, 9 feet in height, and 30 feet in length. Electricity and water were available at each tank location.

Each tunnel drainage system is covered with metal grating and extends the length of the tank side tunnels and main lower service tunnel. The drainage system discharges to a waste water treatment facility.

3.2.2 Boring Equipment

The drilling equipment utilized for this project consisted of a SAITECH EH5 portable hydraulic diamond tip core drill, a remote hydraulic pump system, an electrical converter, and a remote water supply assembly. The core drill was a conventional mobile system, utilizing a recovery tube capable of retrieving 1¼ inch diameter size rock core. This drill method was chosen based upon the shallow coring depths, and restricted tunnel height. The configuration of this rig allowed for the capacity to drill to a depth of 400 feet if needed.

The core drill was powered by a hydraulic motor, which fed a two-speed transmission and the drill head spindle. The drill rig motor is powered by the remote hydraulic system and the hydraulic system is powered by a 20-horsepower electric motor. The hydraulics for this unit consisted of an 18-gallons-per-minute (gpm), 3,000 psi load sensing hydraulic pump with a 5-gallon reservoir, which was cooled with a heat exchanger. The electrical converter powered the electric motor, for the hydraulic system. The electrical converter received all of the electric flow from the 440-volt outlet located in the lower tunnel.

Temporary placement and stabilization of the core rig was performed utilizing bolts and expanding bolt anchors inserted in the floor of the Red Hill facility. The core rig was adjusted to enter the tunnel floor at an agreed upon angle (11 degrees to 15 degrees, or vertical). The 6-foot steel casing was advanced into the tunnel floor to an approximate depth of 5-feet bgs, which left a stick up of approximately 1-foot. A stabilization plate was attached to the casing to prevent the casing from spinning during the drilling operations. The core recovery tube and drill rod were advanced down casing, and recovery activities were begun.

The drill rod was advanced utilizing a manual feed wheel. This allowed the driller to gauge resistance of the rock, and adjust techniques utilized, to maximize the performance of the drilling equipment on site. All drill rod was removed from the down hole location each time a core recovery sequence was completed. Manual removal was necessary based upon the angle that the drill rod was advanced.

3.3 UTILITIES

A geophysical survey of the Red Hill facility was not performed prior to drilling. All utilities throughout the fuel farm complex are contained in metal encased overhead harnesses. Verification of utilities was performed during the Phase I site research. Interviews provided information that no underground cables, pipes, or electrical and water supply lines existed below ground in the Red Hill facility.

3.4 BEDROCK CORING AND CORE SAMPLING METHODOLOGIES

3.4.1 Angle Borings

Angle borings were advanced at each area of the 20 tanks to increase the possibility of intercepting any released product while minimizing the vertical distance drilled into the geologic buffer beneath the tanks. Six angle borings were advanced around Tank 9 and Tank 16 (three borings at each tank) during the initial Phase II investigation. One angle boring was advanced at each of the remaining tanks (for a total of 18 additional angle borings) during the completion of the Phase II investigation field activities. A total of 24 angle borings were advanced during the investigation.

The six angle borings advanced during the initial investigation consisted of three borings (A, B, and C) around Tank 9 and Tank 16. The three borings at each tank were all advanced at the 11-degree down angle. Boring A, which was placed slightly off center to avoid contact with the interior tank elevator shaft, was advanced directly toward the tank at zero degrees from horizontal. Borings B and C were advanced at the toe of the tank tunnel sidewall by shifting the horizontal angle to the right 22 degrees and to the left 35 degrees, respectively. The borings were designated at Tank 9 as B09-A, -B, and -C and Tank 16 as B16-A, -B, and -C. Refer to Figure 3-2 for the Tank 9 and Tank 16 common set-up plan with completed boring section views, completion depths, and angles.

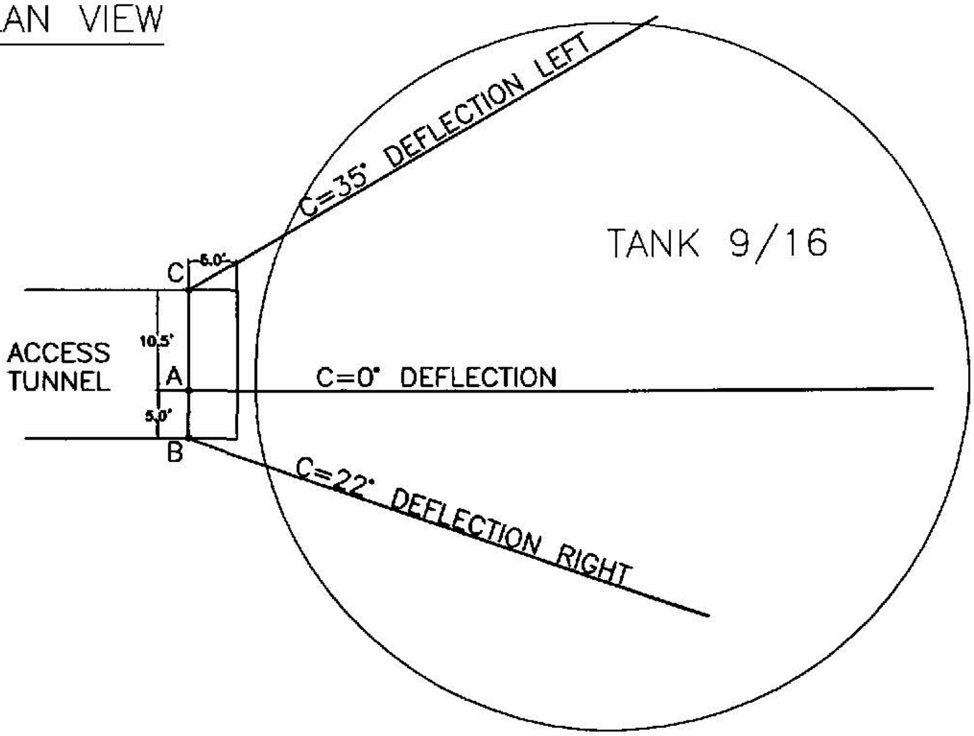
Upon review of the information provided in each set of borings located at Tank 9 and Tank 16, only one angle boring was planned at each of the additional tanks to complete the field investigation. Each angle borehole was advanced through the floor of the lower access cross tunnel at each tank. The core drill string entered the tunnel floor at an angle, which ranged from 13 to 15 degrees below horizontal, directed beneath the tank. The angle borehole was installed directly beneath the tank centerline. Examples of boring designations are B-01 for the boring located at Tank 1 and B-02 for the boring located at Tank 2.

As previously stated, the six foot steel casing for the angle borings was advanced to an approximate depth of 5 feet bgs; the attached stabilization plate prevented the casing from spinning during the drilling operations. The core recovery tube and drill rod were then advanced down the casing and recovery activities commenced. The boreholes were continually sampled for rock cores and fluids beginning from the top of the borehole in the lower access tunnel to a point approximately 20 feet beyond the vertical projection of the exterior tank wall.

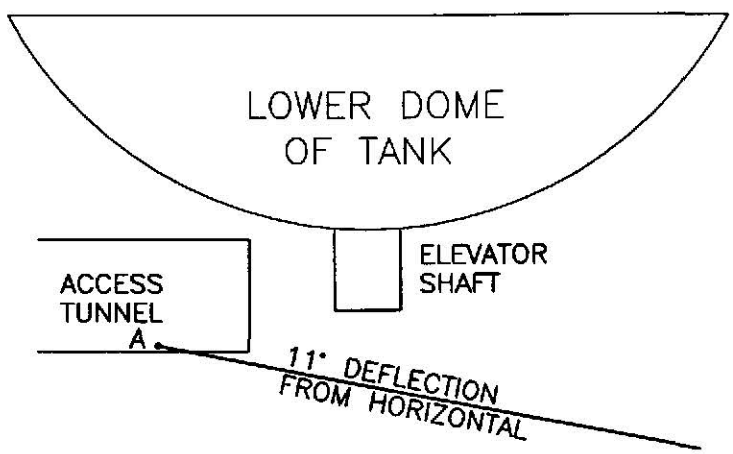
Angle boring construction can be summarized as follows:

- A six-foot schedule 80 steel casing was installed in each boring to help maintain drill rig stability.
- A one and a half to two inch polyvinyl chloride (PVC) casing and well screen was installed in the remaining portion of the boring only where required to keep the boring open or to isolate contaminated zones from zones beneath that are not contaminated.
- The wellhead is protected by a durable enclosure.

PLAN VIEW



SECTIONAL VIEW



FILE NAME: NAVY\0229\BORING DIAGRAM-T16

BORING	DISTANCE
B09-A	93.80'
B09-B	75.00'
B09-C	72.50'
B16-A	102.70'
B16-B	76.40'
B16-C	74.50'

NOT TO SCALE

FIGURE 3-2	LOCATION, ANGLE, AND DISTANCE OF BORINGS TANK 9 & 16 RED HILL BULK FUEL STORAGE			
OGDEN	PROJ. NO. 1-1019-0229-0171 DRWN. BY AMT 9-4-01 CHKD. BY MCH 9-4--01			
FILE NAME:	REV NO	DESCRIPTION	BY	DATE
BORING LOCATIONS				

3.4.2 Vertical Borings

Two vertical borings were advanced in the lower access tunnel above the underlying basal aquifer. One deep boring (V1D) was advanced to the basal aquifer and one shallow boring (V2S) was advanced to investigate and monitor an area above the basal aquifer. Isolation casing was used to isolate the potentially contaminated zone from the lower zones. After a contaminated zone was encountered, isolation casing was installed with grout and allowed to set in order to form an impenetrable seal. Subsequently, a smaller diameter casing was used to continue the boring process.

3.4.3 Borehole Logging

Logging of all core removed was performed by AMEC personnel. Core logs included recovery, descriptions of observed staining or saturation, general description of rock type, rock color (based on the Munsell rock color chart), hardness, physical description, and verification of sample points. Boring logs are presented in Appendix 1.

3.4.4 Core Samples

The procedure for sample collection assumed that rock cores would be the primary solid matrix, but allowed for encountering soil-filled areas throughout the bedrock column. However, soil was not encountered during the drilling operations underlying the fuel farm tanks and in the lower access tunnel. Therefore, the sampling program focused on the collection of core segments in key bedrock areas. Core samples were collected at varied depths, based upon any physical characteristics that may be attributed to petroleum contamination. These characteristics included discoloration, odor, evident staining, physical change, and seam/void filled zones.

The bedrock core sections were removed approximately every five feet. Rock core was placed into a logging tray for field observation by the Site Geologist. The core retrieved was logged as indicated in Section 3.4.3. As each 5-foot core segment was examined, core samples that met the criteria for collection were removed from the core length, measured for record keeping, and placed into a sterile Ziploc bag and stored on ice for shipment to the laboratory. A total of 87 core samples from borings were obtained for analysis (81 samples from angle borings and 6 samples from vertical borings). In addition, ten core samples were selected from angle borings for duplicate sampling. Table 3-1 summarizes the 81 core samples obtained from the angle borings (i.e., sample date, sample depth, and from which tank area the samples were obtained). Table 3-2 summarizes the six core samples obtained from the vertical borings. Sample date and sample depths are also included in Table 3-2. Samples collected had the location designations as well as a numerical attachment beginning with 1 and corresponding with the consecutive order of sample collection. The corresponding depth of each sample was recorded in the field notebooks, which are presented in Appendix 3.

3.4.5 Decontamination

New core collection tubes were utilized during the advancement of each of the three original Tank 16 bores. Upon completion of drilling activities, all tubes and drill rod were removed from the lower tunnel and taken to a pre-constructed decontamination pad, below the Adit 3 entrance. The drilling equipment was decontaminated for use in the Tank 9 borings. These tubes and drill rods were also used during the completion of the Phase II investigation. All materials were pressure steamed with water obtained from the Red Hill water supply lines and washed with isopropyl alcohol. Alconox and detergents were not used to decontaminate equipment, based upon requests by FISC personnel that detergents not be introduced into the runoff collection system utilized by the Red Hill facility. Decontamination activities were performed on the drill rod and drilling system prior to the equipment being removed from the Red Hill site.

Table 3-1
Summary of Core Samples Obtained from Angle Borings for Analysis During the Phase II Investigation

Tank No.	Sample Date	Sample I.D. No.	Sample Depth (ft, POE)
1	02/07/01	RH-BR-1-S01	2.00
	02/08/01	RH-BR-1-S02	8.00
	02/08/01	RH-BR-1-S03 †	59.60
	02/08/01	RH-BR-1-S04	61.35
	02/08/01	RH-BR-1-S05	129.20
2	02/05/01	RH-BR-2-S01	2.50
	02/06/01	RH-BR-2-S02	89.45
	02/06/01	RH-BR-2-S03	119.90
3	01/31/01	RH-BR-3-S01	2.00
	02/01/01	RH-BR-3-S02	46.35
	02/02/01	RH-BR-3-S03	125.20
4	01/29/01	RH-BR-4-S01	2.50
	01/29/01	RH-BR-4-S02	8.20
	01/31/01	RH-BR-4-S03 †	123.90
5	01/25/01	RH-BR-5-S01	9.15
	01/25/01	RH-BR-5-S02	14.70
	01/26/01	RH-BR-5-S03	55.25
	01/26/01	RH-BR-5-S04	113.30
	01/26/01	RH-BR-5-S05	115.30
6	01/19/01	RH-BR-6-S01	0.50
	01/19/01	RH-BR-6-S02	1.50
	01/22/01	RH-BR-6-S03 †	19.80
	01/22/01	RH-BR-6-S04	125.10

Table 3-1 (Continued)
Summary of Core Samples Obtained from Angle Borings
for Analysis During the Phase II Investigation

Tank No.	Sample Date	Sample I.D. No.	Sample Depth (ft, POE)
7	01/17/01	RH-BR-7-S01	0.50
	01/18/01	RH-BR-7-S02	25.90
	01/18/01	RH-BR-7-S03	92.40
	01/19/01	RH-BR-7-S04	105.95
	01/19/01	RH-BR-7-S05	111.20
8	01/15/01	RH-BR-8-S01	0.50
	01/16/01	RH-BR-8-S02	77.65
	01/16/01	RH-BR-8-S03	114.50
9	10/26/98	B09A-1	3.20
	10/27/98	B09A-2	97.10
	10/29/98	B09B-1	55.00
	10/29/98	B09B-2	74.60
	10/28/98	B09C-1	50.00
	10/28/98	B09C-2	66.00
10	01/10/01	RH-BR-10-S01	60.00
	01/10/01	RH-BR-10-S02	100.00
	01/10/01	RH-BR-10-S03	123.90
11	12/15/00	RH-BR-11-S01	4.50
	12/15/00	RH-BR-11-S02	11.30
	12/18/00	RH-BR-11-S03	67.10
	12/18/00	RH-BR-11-S04	85.00
	12/18/00	RH-BR-11-S05	95.00

Table 3-1 (Continued)
Summary of Core Samples Obtained from Angle Borings for Analysis During the Phase II Investigation

Tank No.	Sample Date	Sample I.D. No.	Sample Depth (ft, POE)
12	12/12/00	RH-BR-12-S01	8.00
	12/13/00	RH-BR-12-S02	33.50
	12/13/00	RH-BR-12-S03	61.00
	12/14/00	RH-BR-12-S04 †	104.30
	12/14/00	RH-BR-12-S05	121.90
13	12/11/00	RH-BR-13-S01 †	72.00
	12/11/00	RH-BR-13-S02	100.00
	12/11/00	RH-BR-13-S03	125.00
	12/12/00	RH-BR-11-S04	8.00
14	12/06/00	RH-BR-14-S01	35.00
	12/06/00	RH-BR-14-S02 †	60.50
	12/06/00	RH-BR-14-S03	75.00
	12/06/00	RH-BR-14-S04	95.50
	12/06/00	RH-BR-14-S05	116.00
15	12/04/00	RH-BR-15-S01 †	62.50
	12/04/00	RH-BR-15-S02	86.00
	12/04/00	RH-BR-15-S03	115.00
16	10/22/98	B16A-4 †	83.75
	10/22/98	B16A-5	101.83
	10/23/98	B16B-4	66.15
	10/23/98	B16B-5	75.58
	10/26/98	B16C-4	60.00
	10/26/98	B16C-5	67.00
17	11/10/00	RH-BR-17-S01	10.00
	11/10/00	RH-BR-17-S02 †	34.00
	11/10/00	RH-BR-17-S03	66.20

Table 3-1 (Continued)
Summary of Core Samples Obtained from Angle Borings for Analysis During the Phase II Investigation

Tank No.	Sample Date	Sample I.D. No.	Sample Depth (ft, POE)
18	11/06/00	RH-BR-18-S01	80.50
	11/06/00	RH-BR-18-S02	104.40
	11/06/00	RH-BR-18-S03 †	116.00
19	11/22/00	RH-BR-19-S01	43.00
	02/28/01	RH-BR-19-S02	62.70
	03/02/01	RH-BR-19-S03	93.20
	03/02/01	RH-BR-19-S04	118.00
20	03/02/01	RH-BR-20-S01	2.25
	03/03/01	RH-BR-20-S02	8.80
	03/03/01	RH-BR-20-S03	104.00

† - Duplicate
ft, POE – feet from boring point of entry

Table 3-2
Summary of Core Samples Obtained from Vertical Borings for Analysis During the Phase II Investigation

Vertical Well.	Sample Date	Sample I.D. No.	Sample Depth (ft, POE)
V1D (Deep)	02/16/01	RH-BR-V1D-S01	72.40
	02/19/01	RH-BR-V1D-S02	84.70
	02/20/01	RH-BR-V1D-S03	97.60
V2S (Shallow)	02/20/01	RH-BR-V2S-S01	10.00
	02/21/01	RH-BR-V2S-S02	21.50
	02/23/01	RH-BR-V2S-S03	43.00

ft, POE - feet from boring point of entry

3.5 GROUTING OF EXISTING BOREHOLES

Of the six boreholes advanced during the initial Phase II investigation, four (B09-B, B09-C, B16-B, and B-16C) were grouted in place. The remaining two (B09-A and B16-A) were over-drilled and converted into monitoring wells (see section 3.6).

3.6 MONITORING WELL INSTALLATION AND SAMPLING METHODOLOGIES

During the initial Phase II investigation, monitoring wells were not constructed in the angle borings. The angle borings generally maintained integrity and an open borehole grab sample was obtained for analysis. As stated above, two angle boreholes (B09-A and B16-A) were over-drilled and converted into monitoring wells during the completion Phase II fieldwork.

The monitoring wells installed during the completion of the Phase II field work in the angle and vertical borings were conducted in general accordance with AMEC's Standard Operating Procedure (SOP) I-C, *Well Construction and Development Procedures* and I-C-A, *Monitoring Well Installation* (Ogden, 1998). An installation summary of the monitoring wells installed during the Phase II field activities is provided in Table 3-3.

Since the primary purpose of the angle borings was to investigate the potential presence of product released from the 20 USTs, all except one boring (B-V1D) terminated well above the basal aquifer and ground water was not detected. The fluids observed in the monitoring wells are categorized into three types of fluid media. One type of fluid media is ground water, which is basal aquifer water. The second type of fluid media observed is light non-aqueous phase liquid (LNAPL), which is sometimes mixed with the drill water

Table 3-3
Summary of Monitoring Well Installation

Monitoring Well ID	Date Well Installed	Angle from Horizontal (degree)	Elevation at Ground Surface	Riser Stick-Up (ft, POE)[a]	Total Depth (ft, POE)[a]	Corrected Elevation of Well Total Depth (bgs)	Screened Interval (ft, POE)[a]	Depth of Fluid Detected (ft, POE)[a]
RH-MW-1	02/09/01	15	102.66	0.42	129.70	69.09	109.4-124.4	124.20[b]
RH-MW-2	02/07/01	15	102.31	0.44	124.00	70.22	104.7-119.7	ND
RH-MW-3	02/02/01	15	102.72	0.36	130.20	69.02	109.9-124.9	ND
RH-MW-4	01/31/01	15	102.62	0.36	129.10	69.21	108.8-123.8	ND
RH-MW-5	01/29/01	15	105.98	0.43	124.30	73.81	104-119	ND
RH-MW-6	01/24/01	15	105.68	0.30	126.60	72.92	106.3-121.3	ND
RH-MW-7	01/19/01	15	113.96	0.33	128.90	80.60	108.6-123.6	ND
RH-MW-8	01/17/01	15	113.67	0.42	127.20	80.75	107-122	ND
RH-MW-9	01/12/01	11	113.94	0.36	100.00	94.89	80-95	ND
RH-MW-10	01/10/01	15	113.71	0.39	130.70	79.88	110.7-125.7	ND
RH-MW-11	12/19/00	15	117.98	0.42	131.00	84.08	95.7-125.7	ND
RH-MW-12	12/14/00	15	117.71	0.37	133.60	83.13	108.3-128.3	ND
RH-MW-13	12/12/00	15	121.95	0.39	133.10	87.50	107.8-127.8	87.66

Table 3-3 (Continued)
Summary of Monitoring Well Installation

Monitoring Well ID	Date Well Installed	Angle from Horizontal (degree)	Elevation at Ground Surface	Riser Stick-Up (ft, POE)[a]	Total Depth (ft, POE)[a]	Corrected Elevation of Well Total Depth (bgs)	Screened Interval (ft, POE)[a]	Depth of Fluid Detected (ft, POE)[a]
RH-MW-14	12/07/00	15	121.75	0.33	136.00	0.00	110.7-130.7	86.73
RH-MW-15	12/05/00	13	125.88	0.36	126.40	0.00	106.4-121.4	ND
RH-MW-16	01/08/01	11	125.70	0.37	104.80	0.00	84.5-99.5	ND
RH-MW-17	11/07/00	13	129.75	0.27	124.20	0.00	104.2-119.2	103.92
RH-MW-18	11/21/00	13	129.58	0.33	126.00	0.00	106-121	ND
RH-MW-19	03/02/01	13	133.68	0.27	121.10	0.00	101.1-116.1	113.10[b]
RH-MW-20	03/05/01	15	133.54	0.39	127.70	0.00	107.5-122.5	ND
RH-MW-V1D	02/20/01	90	102.56	-0.11	100.00	2.56	89.8-99.8	86.10
RH-MW-V2S	02/23/01	90	102.56	-0.14	52.00	50.56	32-47	ND

[a] Measurements for the riser stick-up, total depth, screened interval, and depth to fluid are not angle corrected depth from ground surface measurements.
[b] The depth to fluid provided is an approximation; accurate measurements are not available in angle wells.
[c] Fluid measurements were obtained on 03/07/01.
bgs - below ground surface
ft, POE - feet from boring point of entry
ND - Not detected

introduced during field activities; henceforth referred to as LNAPL. The third type of fluid detected is LNAPL mixed with what may be infiltration water; henceforth referred to as infiltration fluid. Sampling of the fluid detected in the angle monitoring wells installed in the borings required obtaining a grab sample without well development. Table 3-4 summarizes the fluid type (i.e., ground water, LNAPL, and infiltration fluid), depth to fluid, and corrected fluid elevations observed in each well.

Table 3-4
Summary of Fluid Levels Detected in Monitoring Wells

Monitoring Well ID	Fluid Media	Elevation at Ground Surface	Date	Depth to Fluid Level (ft, POE)	Corrected Elevation of Fluid Level
RH-MW-1	LNAPL	102.66	03/07/01	124.20	70.52
			08/24/01	129.40	69.17
RH-MW-13	LNAPL	121.95	03/07/01	NFD	NA
			08/24/01	132.50	87.66
RH-MW-14	LNAPL	121.75	03/07/01	NFD	NA
			08/24/01	135.30	86.73
RH-MW-17	LNAPL	129.75	03/07/01	NFD	NA
			08/24/01	114.80	103.92
RH-MW-19	Infiltration Fluid	133.68	03/07/01	113.10	104.41
			08/24/01	110.52	108.81
RH-MW-V1D	GW	102.56	03/07/01	86.10	16.46
			08/24/01	86.28	16.28

LNAPL - Light phase non aqueous phase liquid (which may be mixed with drill fluid)
ft, POE - feet from boring point of entry
NA - Not applicable
NFD - No fluid detected

The two vertical wells were installed to sample the basal aquifer (RH-MW-V1D) and to monitor an area above the basal aquifer (RH-MW-V2S). While the basal aquifer well was completed in the ground water, the shallow well was completed above the water bearing zone and does not contain either ground water or product. Monitoring well sampling of the deep vertical well was performed in general accordance with Ogden SOP I-C-3, *Monitoring Well Sampling* (PACDIV, 1998).

3.6.1 Fluid Sampling Methodologies During Initial Phase II Investigation

The angle borings advanced during the initial Phase II investigation were not converted into monitoring wells. The sufficient integrity of the borings allowed open borehole sampling. The fluid detected in the angle boreholes was sampled and analyzed for petroleum product leachate. The primary objective for any leachate sampling was to confirm/verify the absence or presence of petroleum contamination not observed during the coring process.

Upon completion of the drilling activities, forced air was directed into the angle borings to assist in the removal of any remaining drilling fluid. A 3-foot length of PVC pipe was inserted into the borings and sealed in place with a thick grout mixture. A well cap was placed into the PVC once the grout mixture was dry, to keep foreign objects from entering the boring before leachate sampling activities could take place. The PVC stickup, from ground (floor) level, was approximately four inches.

AMEC proposed using an oil/water interface probe to measure any product or water present in the borings. However, due to the small diameter of the monitoring well and the well installation angle, measurements of product or water could not be conducted. In lieu of using an oil/water interface probe, AMEC personnel would insert a disposable bailer into the well, estimate depth to fluid, and visually inspect the fluid recovered. If sufficient fluid was recovered, a sample was collected and sent to the laboratory for analysis.

The aqueous samples were placed into two, one-liter brown amber bottles (with no preservatives) and two 40-milliliter vials (with hydrochloric acid (HCl) preservative) and sealed with Teflon lined caps.

3.6.2 Angle Monitoring Well Sampling Methodologies

Sampling of the fluid detected in the angle wells required advancing and retrieving a disposable Teflon bailer attached to a steel fish tape. Due to the lack of fluid in the angle monitoring wells, well development was not performed. All wells containing a sufficient volume of fluids were sampled. Individual fluid samples were decanted directly from a disposable bailer into U.S. Environmental Protection Agency (EPA)-approved containers.

All equipment used for sampling was decontaminated prior to and after use. Decontamination procedures include: (1) washing in potable water, (2) distilled water rinse, (3) pesticide grade isopropyl alcohol rinse, (4) a distilled water triple rinse, and (5) Spray DI rinse.

3.6.3 Vertical Monitoring Well Sampling Methodologies

As stated above, the two vertical monitoring wells were installed in the lower access tunnel. The deep well RH-MW-V1D was installed in boring B-V1D to sample the basal aquifer and the shallow well was installed in boring B-V2S to monitor an area above the basal aquifer. While the basal aquifer well (RH-MW-V1D) was completed in the groundwater, the shallow well (RH-MW-V2S) was completed above the water-bearing zone and does not contain either ground water or product. RH-MW-V1D was completed at approximately 100 feet bgs as a vertical well, while RH-MW-V2S was completed at a depth of approximately 52 feet bgs as a vertical well. RH-MW-V2S was completed above the water-bearing zone in order to avoid contamination of the deep aquifer by creating a possible "direct conduit" to the basal aquifer. Groundwater in RH-MW-V1D was measured at approximately 86 feet bgs, and since groundwater fluctuates from season to season, AMEC did not to drill RH-MW-V2S to a depth that would put the integrity of RH-MW-V1D in danger when the "wet" season brought a possible higher groundwater table.

Prior to sampling monitoring well RH-MW-V1D, the well was developed to remove any suspended sediment and reduce turbidity created by the well installation activities. Development was accomplished using a decontaminated Teflon bailer. The bailer surged the well and created a bi-directional ground-water flow to aid in the removal of the fine particulate matter from the well screen and filter pack, thus increasing development effectiveness. Following the surging, a minimum of ten volumes of water was purged from the well. Water removed during the development was containerized onsite in 55-gallon drums. See section 3.10 for further discussion of fluid disposal.

All equipment used for development was decontaminated prior to and after use. Decontamination procedures include: (1) washing in potable water, (2) distilled water rinse, (3) pesticide grade isopropyl alcohol rinse, (4) a distilled water triple rinse, and (5) Spray DI rinse.

Once development was completed, the ground water was purged until parameters stabilized, and sampled. A dedicated Teflon bailer was installed for obtaining ground water samples. Sampling was performed in accordance with AMEC SOP I-C-3. Ground water removed during the purging was containerized with the development water. Individual ground water samples were decanted directly from the disposable bailer into U.S. EPA-approved sample containers.

3.7 FIELD SCREENING

Retrieved core and core samples were screened in general accordance with AMEC CLEAN Program Procedures. Screening included visual observations, notation of odor, and headspace analysis. Random core samples from the angle and vertical borings were placed in a Ziploc bag, maintaining a small headspace and allowed to equilibrate for approximately 30 minutes. A Photovac 2020IS photoionization detector (PID) was used to obtain readings. The PID was calibrated daily with 100 ppm isobutylene. The PID tip was placed into the bag, maintaining as good a seal around the probe as possible. The maximum reading was recorded.

In addition to the headspace testing, the Onsite Health and Safety Coordinator monitored the boreholes with a variety of instruments. The site environment was monitored utilizing the PID and Oxygen (O2)/Lower Explosive Level (LEL) Meter. Drager (Hydrocarbon II) tubes were used during the initial Phase II field event to monitor for hydrocarbon vapors down-hole as each core barrel section was removed. Due to the redundancy of using both the PID and Drager tubes during the initial Phase II, the Drager tubes were not used during the completion of field activities.

3.8 SAMPLE HANDLING AND PREPARATION

The field logbook is the primary record of field activities. A bound field logbook with consecutively numbered pages was used for this purpose and maintained according to AMEC CLEAN Program Procedures. The logbook was identified with the name of the project, the CTO Field Manager responsible for maintenance of the logbook, and the beginning and ending dates of the entries. Entries were chronological and in sufficient detail to allow reconstruction of each day's events. Each entry or group of entries was signed and dated by the person making the entry. In addition to the field logbook, field log sheets were used to record boring data. Sample record keeping was performed in accordance with SOP I-E, *Record keeping, Sample Labeling, and Chain-of-Custody Procedures* (AMEC, 1998).

Sample handling was performed in accordance with SOP III-F, *Sample Handling, Storage and Shipping Procedures* (AMEC, 1998). Immediately following collection, a laboratory-supplied label was filled out in the field and placed on the sample container. The following information was on each label: project name and number, sample ID number, date of collection, sampler's initials, analyses to be performed on that sample, and sample preservatives added if appropriate.

AMEC personnel maintained sample custody through collection and transfer to the shipping company. After sample collection, each sample was placed in a cooler. From this point until the cooler was transferred to shipping personnel, the samples were always in a location visible to AMEC personnel; or located in a locked room or vehicle. Each sample was logged on the chain of custody (COC) form. The laboratory assumed custody responsibility upon receipt from the shipping company.

After sample collection, the samples were placed in an insulated cooler with "blue ice" or ice in double zip-lock bags. Sample containers were kept on the bottom and ice placed on top of the samples to keep them close to 4 degrees Celsius (C). Glass containers were wrapped with padding to prevent breakage during shipment.

Before shipment, two copies of the COC were placed in a zip-lock bag and taped to the inside lid of the cooler. Four COC seals were placed on a cooler and covered with clear tape. The covers of coolers were secured with strapping tape. Samples obtained during the initial Phase II investigation were shipped to Quanterra Incorporated in Sacramento, California for analysis. Samples obtained during the completion of the Phase II investigation were shipped to Accutest in Orlando, Florida.

3.9 FIELD QA/QC

The QC level selected for the Red Hill investigation for all analyses was the PACDIV Level D. Field QC was performed in accordance with SOP III-B, *Field QC Samples (Water, Soil)* (Ogden, 1998).

Specific field QA/QC requirements were followed during the entire sampling effort to ensure the integrity of samples and analytical results. Duplicates were collected at a frequency of 10 percent for the soil/core and water samples in accordance with Level D QC. Duplicate samples were analyzed for the same constituents as the regular samples. Trip blanks accompanied each cooler containing VOC samples, and were analyzed for the Contract Laboratory Program (CLP) VOCs. Laboratory equipment was maintained in accordance with the approved laboratory QA program and as specified by the analytical methods used. Sample labeling and handling are described in Section 3.8.

3.10 INVESTIGATION DERIVED WASTE (IDW)

The drilling fluid utilized during the drilling operation was tap water, obtained from the spigot in the lower tunnel. The drilling fluid was directed down the core barrel length through the casing. The drilling fluids that returned from the bottom of the casing were directed into a collection system constructed by AMEC and SAI personnel on site. The collection system allowed the fluids to settle in an undisturbed environment. The fluids were then allowed to run into the floor drains for disposal through the Red Hill Facility treatment basin. Any residual by-products (mud, fragments, etc...) were collected at the termination of each boring. Due to the hard rock conditions at Red Hill, minimal soil and IDW was encountered. Approximately twelve, 55-gallon drums and three 20-gallon drums of spoil material and PPE were collected from the 22 drilling locations. The drums were labeled and stored onsite. Philips Services Hawaii LTD. properly disposed of the drums on January 23, 2002.

Ground water and purge water was discharged into the Red Hill Facility treatment basin. Ground water and purge water collected by AMEC and SAI personnel were properly treated by this treatment facility.

SECTION 4
PHASE II INVESIGATION EVALUATION

This section summarizes the field and analytical data obtained during the Phase II investigation. The following text discusses and presents the analytical testing program, field observations, analytical soil and fluid data, and evaluates the chromatographs and fingerprinting data.

4.1 DESCRIPTION OF ANALYTICAL TESTING PROGRAM

The analytical testing program was designed to assess the extent of petroleum contamination and to further characterize the unknown petroleum hydrocarbon mixture identified in the initial Phase II site characterization conducted at the Red Hill Bulk Fuel Storage Facility. Samples were submitted to a Naval Facilities Engineering Service Center (NFESC)-approved laboratory. Core and fluid samples obtained during the initial Phase II field investigation (October through November 1998) were sent for analysis to Quanterra Incorporated (Quanterra) in Sacramento, California. The core and fluid samples obtained during the completion of the Phase II investigation (October 2000 to March 2001) were sent to Accutest Laboratories (Accutest) of Orlando, Florida. In addition, hydrocarbon fingerprinting was performed by Friedman & Bruya, Incorporated (Friedman & Bruya) in Seattle, Washington.

Samples were analyzed by EPA Method 8015 modified for extractable hydrocarbons; by EPA Contract Laboratory Program (CLP), Statement of Work (SOW) Methods for SVOCs and VOCs by GC/MS; and metals by EPA CLP SOW methodology for metals for comparability to previous sampling events.

The hydrocarbon fingerprinting analytical program required that analysis of samples include hydrocarbon fingerprinting by Gas Chromatography/Flame Ionization Detector (GC/FID); Chemical biomarker determination; Polynuclear Aromatic Hydrocarbons (PAHs) and alkyl-substituted homologs by Gas Chromatography/Mass Spectroscopy

(GC/MS) Select Ion Monitoring (SIM) to determine the source (or sources) of contamination, the possible age of the hydrocarbon product, and the extent of the weathering of the product identified as the contaminant.

Analytical methods and specific analyte lists are identified in Appendix 4.

4.1.1 Analysis of Subsurface Soil and Core Samples

Subsurface samples consisted primarily of solid bedrock core samples. The solid core samples and fractured or cobble samples were ground in the laboratory according to United States Department of Agriculture (USDA) method No.18 to attain a sample amenable to routine extraction and analysis of soils. The samples were analyzed for TPH as TPH-gasoline, TPH-diesel, TPH-kerosene, and TPH-motor oil by GC by EPA Method 8015 modified for extractable hydrocarbons; SVOCs by GC/MS CLP Method OLM03.2; and lead by CLP Method ILM04.0.

For the hydrocarbon fingerprint suite of analyses, each core sample was submitted to Friedman & Bruya, Inc. of Seattle, Washington. Samples were extracted for all fingerprinting analyses and the extracts held, pending the results of the GC/FID hydrocarbon fingerprint analysis. A determination of samples appropriate for the other fingerprint analyses were then made by the laboratory coordinator.

4.1.2 Analysis of Fluid Samples

Fluid samples consisted of both ground water (from RH-MW-V1D) and fluid samples. The term "fluid samples" refers to liquid samples that are not ground water or laboratory QA samples (i.e., trip blank). The fluid samples may be a combination of drill water, hydrocarbons, and infiltration water. The fluid samples were analyzed for TPH as TPH-gasoline, TPH-diesel, TPH-kerosene, and TPH-motor oil by GC by EPA Method 8015 modified for extractable hydrocarbons; SVOCs by GC/MS CLP Method OLM03.2; TCL metals by CLP Method ILM04.0; and VOCs by GC/MS CLP Method OLM03.2.

For the hydrocarbon fingerprint suite of analyses, each sample was submitted to the laboratory and extracted for all fingerprinting analyses. The extracts were held pending the results of the GC/FID hydrocarbon fingerprint analysis. A determination of samples appropriate for the fingerprint analyses were then made by the laboratory coordinator. In addition to the above, the fluid samples were field monitored for the secondary parameters of pH, temperature, and conductivity.

4.1.3 Analysis of Pure Product Samples

Pure product samples, to the extent they can be obtained from FISC or as they are encountered during the drilling process, were sent to Friedman & Bruya for hydrocarbon fingerprinting. The samples were diluted in the laboratory and analyzed for the complete hydrocarbon fingerprint suite of analysis. Attempts were made to characterize Navy Special Fuel Oil (NSFO), Aviation Gasoline (AVGAS), Jet Propulsion Fuel (JP-5), diesel oil, Navy Distillate (NDS), and Diesel Fuel Marine (DFM).

4.1.4 Laboratory QA/QC Requirements

The laboratories were required to follow all published method-specific QA/QC requirements. The laboratories were NFESC evaluated for EPA SW-846 and CLP Methods. The laboratories were also required to follow NFESC guidance. A summary of the minimum laboratory QA/QC requirements is presented in Table 3-2 of Appendix 4. Analyses of laboratory QC samples were performed in accordance with AMEC SOP III-A.

4.1.5 Data Validation

Data validation requirements are presented in Appendix 4.

4.2 PHYSICAL OBSERVATIONS OF PETROLEUM IMPACTS IN BORINGS

Physical observations were made at each boring locations. These observations include observing the presence of product beneath the concrete floor, noting the presence of product at depth, monitoring core with a PID, noting the presence of a hydrocarbon odor from the core, and observing any discoloration of the core. These observations are summarized in Table 4-1.

The material observed situated within 3-feet of the concrete floor was of special interest during field investigations. No evidence of hydrocarbon impacts were noted directly beneath the concrete floor in the angle borings located at 14 of the 20 tanks (Tanks 4, 5, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, and 19) and in the vertical borings (B-V1D and B-V2S), which are located in the lower access tunnel. In the angle borings located at six of the 20 tanks, evidence of hydrocarbon impacts was noted. A hydrocarbon odor and elevated PID readings were observed in the angle borings located at Tanks 1, 2, 3, 6 and 20. Sheen was observed on the drill water from the angle borings located at Tanks 1 and 13, while product was observed in the angle boring located at Tank 6.

No evidence of hydrocarbon impacts was noted at depth (greater than 2.0 feet bgs) in angle borings located at 4 of the 20 tanks (Tanks 8, 9, 10, and 15) and in the vertical borings (B-V1D and B-V2S). A hydrocarbon odor and elevated PID readings were observed at depth in the angle borings located at 15 of the 20 tanks (Tanks 1, 3, 4, 5, 6, 7, 11, 12, 13, 14, 16, 17, 18, 19, and 20).

Angle borings located at Tanks 8, 9, 10, and 15 as well as the vertical borings (B-V1D and B-V2S) located in the lower access tunnel did not contain physical evidence of hydrocarbon impacts during field activities.

Table 4-1
Summary of Boring Locations with Physical Indications of Petroleum Hydrocarbons Present

Boring Location ID	Depth in Boring of Evidence of PH Observed (ft, POE)	Elevated PID Measurement (ppm)	Sample Obtained for Analysis	Product Observed Beneath Concrete Floor (Yes/No)
B-01	2.0	330	X (S01)	Yes (Sheen)
	8.0	573	X (S02)	
	59.6	266	X (S03)	
	60.7	453	X (S04)	
	71.1	478	No	
B-02	89.45	74.7	X (S02)	No
B-03	2.0	214	X (S01)	No
	7.4	244.6	No	
	42.9	189.2	X (S02)	
B-04	7.0	294	No	No
	8.2	180	X (S02)	
	15.6	225	No	
B-05	7.6	72	X (S01)	No
	14.7	63.1	X (S02)	
	55.25	262	X (S03)	
	113.3	308	X (S04)	
B-06	0.5	78	X (S01 L)[a]	Yes
	0.5	78	X (S01 S)	
	1.5	74	X (S02)[a]	
	11.3	163	No	
	19.8	191	X (S03)	
	26.1	40	No	

Table 4-1 (continued)
Summary of Boring Locations with Physical Indications of Petroleum Hydrocarbons Present

Boring Location ID	Depth in Boring of Evidence of Product Observed (ft, POE)	Elevated PID Measurement (ppm)	Sample Obtained for Analysis	Product Observed Beneath Concrete Floor (Yes/No)
B-07	0.5	NM	X (S01)	No
	25.9	110	X (S02)	
	40.5	26.5	No	
	93.1	6.6	No	
	105.95	9.6	X (S04)	
	111.2	41	X (S05)	
B-08	NA	NM	X (S01)	No
B09A	3.2	NM	X (B09A-1)	No
B-10	NA	NM	No	No
B-11	4.5	14.1	X (S01)	No
	7.4	12	No	
	11.3	19.8	X (S02)	
	20.3	3.1	No	
	38.2	9.8	No	
	67.1	24.3	X (S03)	
	85.0	21.4	X (S04)	
	89.5	55.8	No	
	95.0	80.3	X (S05)	
B-12	8.0	0.3	X (S01)	No
	33.5	26	X (S02)	
	36.7	2.8	No	
	61.0	1.9	X (S03)	
	62.2	17.3	No	
	107.9	0.7	No	
	121.9	26.4	X (S05)	

Table 4-1 (continued)
Summary of Boring Locations with Physical Indications of Petroleum Hydrocarbons Present

Boring Location ID	Depth in Boring of Evidence of Product Observed (ft, POE)	Elevated PID Measurement (ppm)	Sample Obtained for Analysis	Product Observed Beneath Concrete Floor (Yes/No)
B-13	2.0	NM	No	Yes (Sheen)
	10.7	10.7	X (S04)	
B-14	95.5	19.7	X (S04)[a]	No
	101.4	9.1	No	
	116.0	2.0	X (S05)	
B-15	NA	NM	No	No
B16A	NA	NM	No	No
	83.75	NM	X (B16A-4)	
B-17	81.8	83.2	No	No
	90.3	95.1	No	
B-18	121.5	125.8	No	No
B-19	43.0	94.7	X (S01)	No
	51.4	131	No	
	60.3	154	No	
	62.7	175	X (S02)	
	67.8	167	No	
	79.9	334	No	
	93.2	630	X (S03)	
	109.3	350	No	
	118	406	X (S04)	

Table 4-1 (continued)
Summary of Boring Locations with Physical Indications of Petroleum Hydrocarbons Present

Boring Location ID	Depth in Boring of Evidence of Product Observed (ft, POE)	Elevated PID Measurement (ppm)	Sample Obtained for Analysis	Product Observed Beneath Concrete Floor (Yes/No)
B-20	2.25	75.1	X (S01)	No
	8.8	375	X (S02)	
	116.2	467	No	
	125.8	420	No	
B-V1D	NA	NM	No	No
B-V2S	NA	NM	No	No

[a] - Sample also obtained for fingerprinting analysis
ft, POE - feet from boring point of entry
NA - Not applicable
NM - Not measured
PH - Petroleum hydrocarbons
ppm - parts per million
X - Sample was obtained for analysis

4.3 Analytical Evaluation of Core Samples Above the Soil Tier I Action Levels

As stated in Section 3.4.4, 87 core samples and 10 duplicate samples were obtained for analysis from the borings completed during the Phase II field activities. Section 4.1.1, Analysis of Subsurface Soil and Core Samples, describes the analytical methodologies conducted on the core samples obtained. Appendix 2 presents the sample results. The sample results are presented in three tables within Appendix 2. Table 1 is comprised of 21 sub-tables which presents the detect as for the media (i.e., core, fluid, and ground water) sampled by area. There are 22 areas (i.e., 20 tanks and two vertical well locations), however samples collected at one of the 22 areas (Tank 10) were all below the detection limits for all media sampled. Therefore, a sub-table for Tank 10 is not present. Table 2 is a summary of all sample detections. This table allows for an easy comparison of constituents of concern for samples collected during this investigation. Table 3 presents all the results for the media sampled. This table includes the method detection limits (MDL) of the analytes not detected for the samples analyzed. The analytical data sheets for samples submitted to Quanterra are located in Appendix 6 and the analytical data sheets for samples submitted to Accutest are located in Appendix 7.

Table 4-2 provides the analytical results of the nine core samples with detected constituents that exceed the Hawaii DOH Tier I action levels for sites where a drinking water source is threatened and annual rainfall is less than 200 centimeters per year (cm/yr). The Tier I soil action level values, in milligrams per kilogram (mg/kg), were obtained from the "Hawaii UST Technical Guidance Manual" dated March 2000.

Constituent exceedances of the Tier I soil action level values of the 87 core samples analyzed were noted in the angle borings located at Tanks 1, 2, 6, 14, 16 (B16A and B16C), and 17. Core samples analyzed from the vertical borings did not exceed the Tier I action levels. The constituents detected above the Tier I action levels are ethylbenzene, methylene chloride (a common laboratory contaminant), naphthalene, hydrocarbons (TPH C10-C28), and an unknown hydrocarbon. The sample location with exceedances for the soil Tier I action levels are depicted in Figure 4-1 and Figure 4-2.

Constituents detected that do not have a Tier I soil standard available for evaluation are 2-methylnaphthalene, 4-methyl-2-pentanone, bis(2-ethylhexyl)phthalate, chrysene, dibenzofuran, fluorene, methyl ethyl ketone (MEK), phenanthrene, pyrene, and total xylene (reported as total xylene or as a total of the reported m,p-xylene and o-xylene).

Table 4-2
Summary of Analytical Results of Core Samples Which Exceed the Hawaii DOH Tier I Actions Levels for Soil

Sample ID	Sample Date	Corrected Sample Elevation (ft, msl)	Constituents Analyzed	Analytical Result (ppm)	Tier I Soil Action Level (mg/kg)
RH-BR-1-S01	02/07/01	102.14	TPH (C10-C28)	25300	5000
RH-BR-2-S02	02/06/01	79.16	Methylene Chloride	0.011	0.003
RH-BR-2-S03	2/6/2001	71.28	Methylene Chloride	0.0127	0.003
RH-BR-6-S01	01/19/01	105.55	TPH (C10-C28)	10200	5000
RH-BR-6-S02	01/19/01	105.29	TPH (C10-C28)	43100	5000
RH-BR-14-S04	12/06/00	97.03	Ethylbenzene	1.55	0.5
			TPH (C10-C28)	26200	5000
B16A-4	10/22/98	109.72	Naphthalene	43	41
			Unknown Hydrocarbon	11000	5000
B16-DUP	10/23/98	109.72	Unknown Hydrocarbon	6600	5000
B16C-4	10/26/98	127.00[a]	Naphthalene	47	41
			Unknown Hydrocarbon	9400	5000
RH-BR-17-S02	11/10/00	122.10	Methylene Chloride	0.0152	0.003
RH-BR-17-S03	11/10/00	114.77	Methylene Chloride	0.0108	0.003

[a] – Elevation of POE assumed to be 127'. Boring B16C is a horizontal boring with 0 horizontal deflection.
ft, msl - feet above mean sea level
ppm - parts per million
mg/kg - milligrams per kilogram
TPH - Total petroleum hydrocarbons

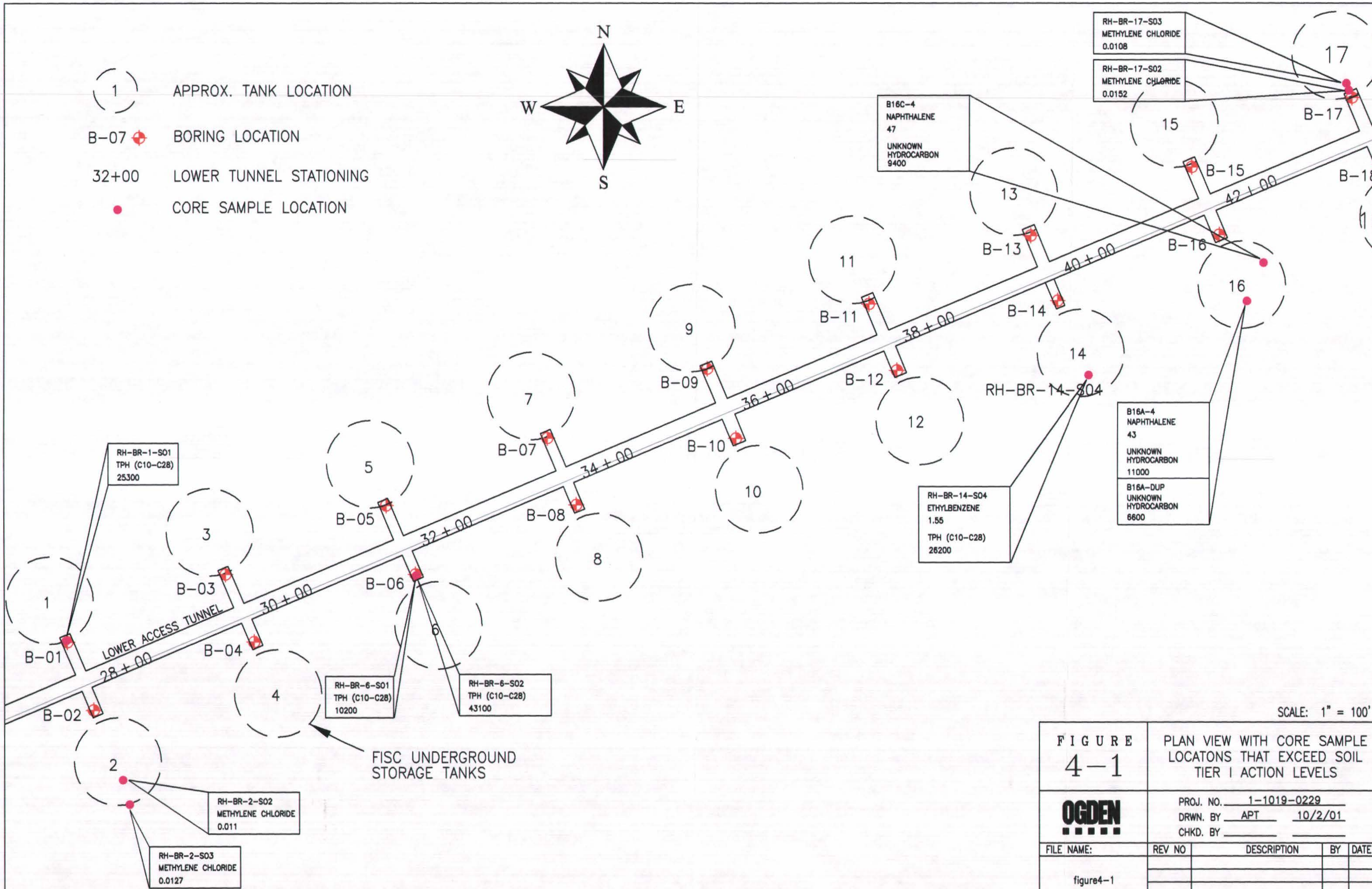
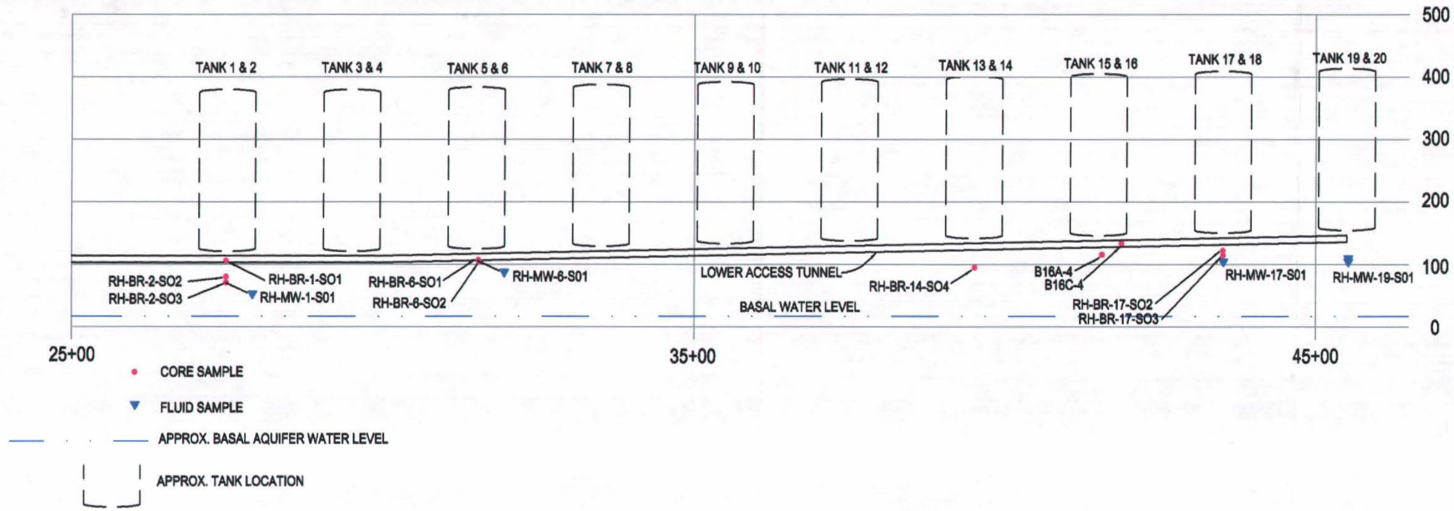


FIGURE 4-1 PLAN VIEW WITH CORE SAMPLE LOCATONS THAT EXCEED SOIL TIER I ACTION LEVELS



CORE SAMPLE RESULTS

SAMPLE ID	CONSTITUENTS WHICH EXCEED TIER I ACTION LEVELS	ANALYTICAL RESULTS (PPM)
RH-BR-1-S01	TPH (C10-C28)	25300
RH-BR-2-S02	METHYLENE CHLORIDE	0.011
RH-BR-2-S03	METHYLENE CHLORIDE	0.0127
RH-BR-6-S01	TPH (C10-C28)	10200
RH-BR-6-S02	TPH (C10-C28)	43100
RH-BR-14-S04	ETHYLBENZENE	1.55
	TPH (C10-C28)	26200
B16A-4	NAPHTHALENE	43
	UNKNOWN HYDROCARBON	11000
B16A-DUP	UNKNOWN HYDROCARBON	6600
B16C-4	NAPHTHALENE	47
	UNKNOWN HYDROCARBON	9400
RH-BR-17-S02	METHYLENE CHLORIDE	0.0152
RH-BR-17-S03	METHYLENE CHLORIDE	0.0108

FLUID SAMPLE RESULTS

SAMPLE ID	DATE SAMPLED	CONSTITUENTS ANALYZED	ANALYTICAL RESULTS (PPM)
RH-MW-1-S01	03/07/01	LEAD	0.0756
RH-MW-6-S01	01/19/01	LEAD	27.5
RH-MW-17-S01	08/27/01	LEAD	0.0720
RH-MW-19-S01	03/07/01	LEAD	0.0568
	08/27/01	LEAD	0.0666

FIGURE 4-2

CROSS SECTIONAL VIEW WITH SOIL AND FLUID SAMPLE LOCATIONS WHICH EXCEED THEIR RESPECTIVE TIER I ACTION LEVELS

OGDEN

PROJ. NO. 1-1019-0229
DRWN. BY BLB 10-16-01
CHKD. BY MCH 10-16-01

FILE NAME: FIGURE 4-2

REV NO	DESCRIPTION	BY	DATE

4.4 ANALYTICAL EVALUATION OF GROUND WATER SAMPLES ABOVE THE DRINKING WATER TIER I ACTION LEVELS

Two ground water monitoring events were conducted during the Phase II investigation. These events were conducted on March 7 and August 27, 2001. A total of two ground water samples were obtained for analysis from monitoring well MW-V1D. Well MW-V2S was dry; the angle wells installed during this investigation contained fluid and the analytical results of these wells are discussed in Section 4.5. Section 4.1.2, Analysis of Fluid Samples describes the analytical methodologies conducted on the fluid samples obtained. Appendix 2 presents the sample results. The sample results are presented in three ways within Appendix 2, which is described in detail in Section 4.3 above. The analytical data sheets for samples submitted to Accutest are located in Appendix 7.

Table 4-3 provides the analytical results of the ground water samples with detected constituents that exceed the Hawaii DOH Tier I action levels for sites where a drinking water source is threatened and annual rainfall is less than 200 cm/yr. The Tier I ground water action level values, in milligram per liter (mg/L), were obtained from the "Hawaii UST Technical Guidance Manual" dated March 2000. Table 4-3 also compares the analytical results of the samples that exceeds the Tier I action level values to EPA's National Primary Drinking Water Standard maximum contaminant levels (MCLs), which are the highest levels of contaminants that are allowed in drinking water.

Exceedances of the Tier I action level values were noted from each sample obtained during both sampling events. The constituent detected above the Tier I action level is lead. The lead detected was at the primary drinking water MCL of 0.015 mg/L during the March 2001 sampling event and below the MCL during the August 2001 sampling event. The ground water sample location with exceedances for the Tier I ground water action levels are depicted in Figure 4-2. Constituents detected that do not have a Tier I ground water standard available for evaluation are bis(2-ethylhexyl)phthalate (a common laboratory contaminant) and TPH (C10-C28).

Table 4-3
Summary of Analytical Results of Ground Water Samples Which Exceed Either the Hawaii DOH Tier I Actions Levels for Drinking Water or the National Primary Drinking Water MCLs

Sample ID	Sample Date	Constituents Analyzed	Analytical Result (ppm)	Tier I GW Action Level (mg/L)	Primary DW MCLs (mg/L)
RH-MW-V1D-S01	03/07/01	Lead	0.0150	0.0056	0.015
RH-MW-V1D-S01	08/27/01	Lead	0.0104	0.0056	0.015

DW - Drinking water
GW - Ground water
MCLs - Maximum contaminant level
mg/L - milligrams per liter
ppm - parts per million

4.5 Analytical Evaluation of Fluid Samples Above the Drinking Water Tier I Action Levels

If present, fluid samples were taken either during coring activities or after the monitoring wells were installed in the angle borings advanced beneath the 20 USTs. Eight fluid samples were obtained for analysis of which two were obtained during coring activities. The two samples obtained during coring activities are RH-MW-6-S01 *(from B-06)* and B16C (from B16-C). The fluid sample RH-MW-6-S01 was obtained directly under the concrete floor during coring activities and not from the monitoring well installed in B-06. The fluid sample B16C was obtained from the open core hole.

Two fluid monitoring events were conducted during the Phase II investigation in March and August 2001. These events were conducted in conjunction with the ground water monitoring events discussed above. During the March 2001 monitoring event, samples were obtained from angle monitoring wells MW-1 and MW-19. Fluid was not detected in the other angle monitoring wells. During the August 2001 monitoring event, fluid samples were collected from angle monitoring wells MW-1, -13, -17, and -19. While fluid was detected in MW-14, sufficient fluid volume was not available for analysis. Fluid was not detected in the other angle monitoring wells during the August 2001 event.

Section 4.1.2, Analysis of Fluid Samples, describes the analytical methodologies conducted on the eight fluid samples obtained. Appendix 2 presents the sample results. The sample results are presented in three ways within Appendix 2, which is described in detail in Section 4.3 above. The analytical data sheets for samples submitted to Accutest are located in Appendix 7.

Table 4-4 provides the analytical results of the fluid samples that exceed the Hawaii DOH Tier I action levels for sites where a drinking water source is threatened and annual rainfall is less than 200 cm/yr. Also presented in Table 4-4 is each sample elevation, which has been corrected for the depth to fluid measurement, obtained in an angle-monitoring well.

Exceedances of the Tier I action level values were noted from samples obtained during both sampling events. The constituent detected above the Tier I action level is lead. The fluid sample location with exceedances for the Tier I ground water action levels are depicted in Figure 4-2.

Constituents detected that do not have a Tier I ground water standard available for evaluation are 1,1-dichloroethylene, 2-methylnaphthalene, bis(2-ethylhexyl)phthalate, phenanthrene, TPH (C10-C28), and unknown hydrocarbon.

Table 4-4
Summary of Analytical Results of Fluid Samples Which Exceed the Hawaii DOH Tier I Actions Levels for Drinking Water

Sample ID	Sample Date	Corrected Sample Elevation[a] (ft, msl)	Constituents Analyzed	Analytical Result (ppm)	Tier I GW Action Level (mg/L)
RH-MW-1-S01	03/07/01	70.52	Lead	0.0756	0.0056
RH-MW-6-S01[b]	01/19/01	105.55	Lead	27.5	0.0056
RH-MW-17-S01	8/27/01	103.92	Lead	0.0720	0.0056
RH-MW-19-S01	03/07/01	104.41	Lead	0.0568	0.0056
	8/27/01	108.81	Lead	0.0666	0.0056

[a] - The sample elevation was measured on 8/24/01
[b] - The fluid sample was collected from beneath the concrete floor at B-06 during initial coring activities; not from the monitoring well installed after coring activities
Corrected sample elevation is the fluid elevation corrected for the boring/monitoring well angle
ft, msl - feet above mean sea level
GW - Ground water
mg/L - milligrams per liter
ppm - parts per million

4.6 CHROMATOGRAM EVALUATION

The FISC Fuels Laboratory at Pearl Harbor was contacted to obtain information on fuels historically stored in the fuel tanks on site. The Fuels Laboratory indicated that four fuels JP-5 Reference, F-76 Reference, Gas Oil SD-016, and NSFO were potentially stored in the tanks. Chromatograms of the four reference fuels and Fuel Oil Reclaimed Reference (mixture of JP-5, F76, Lube Oil and NSFO) that were processed by a simulated distillation analysis were compared to the chromatograms from the initial site investigation that were analyzed by Quanterra. The site samples compared were identified as B16A-4 at 11000 mg/kg analyzed at a 100X dilution, and B16C at 8100 mg/kg analyzed at a 20X dilution. The laboratory also provided examples of a standard diesel fuel and motor oil.

Sample No. B16A-4 was characterized by the laboratory as an unknown hydrocarbon in the n-C8 to n-C40 n-alkane range. It contained significant levels of hydrocarbons eluting at the beginning of a diesel fuel range with a second maxima past the range of a motor oil. This sample showed what appeared to be a distinct n-alkane pattern riding on top of the unresolvable, chromatographical mass (UCM). The second sample, B16C, started into the diesel range, tapering off through a motor oil range. This second sample appeared to have a less distinct n-alkane pattern and more mass in the UCM. It did not contain a second maxima. B16C appeared to be a more weathered hydrocarbon product.

4.7 FINGERPRINTING EVALUATION

Fingerprinting analysis was conducted on four samples to potentially characterize the samples against historic stored product from the specific tank. Fingerprinting is a term used to describe the product identification process, which is typically used to identify the types and sources of petroleum. This process involves analytical techniques using gas chromatography with flame ionization detection (GC/FID) and an electron capture detector (ECD). The GC/FID method separates compounds based approximately on boiling point (i.e., characterizing volatile and semi-volatile products). The ECD method is useful for detecting general chemical composition (i.e., characterizing additives, unrefined petroleum products, and non-petroleum products). The fingerprinting process also involves visual techniques for the identification and interpretation of the GC fingerprints, which is a qualitative practice. Fingerprinting becomes difficult when the initial signature of the released contaminant begins to lose its identity after "weathering" (chemical, physical, and biological signature-altering process) and mixing with pre-existing background contaminants.

Fingerprinting was conducted on two fluid samples and two core samples. Friedman & Bruya analyzed these samples and the analytical reports are presented in Appendix 5. The fluid samples were collected from the angle boring B-06 (located at Tank 6) and angle boring B-11 (located at Tank 11). The fluid sample [sample number RH-BR-6-S01 (L)] collected from boring B-06 was obtained during boring activities from beneath the concrete floor at a corrected elevation of 105.55 ft, msl. The fluid sample (sample number RH-MW-11) collected from B-11 was also obtained during boring activities. Evidence of the presence of petroleum hydrocarbons was observed from between 8.8 to 15.1 ft from the boring point of entry (POE). The boring was advanced to 20.3 ft, POE. After the boring was allowed to sit overnight, a petroleum and drill water mix was sampled from the angle boring. The sample corrected elevation for sample RH-MW-11 is conservatively estimated to be 112.73 ft, msl.

Of the two core samples collected for fingerprinting, one sample was collected from angle borings B-06 (located at Tank 6) and one sample was collected from B-14 (located at Tank 14). The core sample (sample number RH-BR-6-S02) collected from boring B-06 was obtained during boring activities at a corrected elevation of 105.29 ft, msl. The core sample (sample number RH-BR-14-S04) collected from boring B-14 was obtained during boring activities at a corrected elevation of 97.03 ft, msl.

Table 4-5 summarizes the samples collected for fingerprinting analysis. This table includes sample number, date, matrix, and depth sample was collected. Also presented in Table 4-5 are the GC petroleum hydrocarbon identification and characterization of the four samples. The identification presents Friedman & Bruya's assessment of the analytical results and which petroleum hydrocarbons the results are indicative of.

All four samples were indicative of a mixture of middle distillates. Sample RH-BR-6-S01 (L) displayed patterns and peaks indicative of kerosene or Jet A (airliner fuel). Samples RH-BR-6-S02, RH-MW-11, and RH-BR-14-S04 displayed patterns and peaks indicative of kerosene, JP-5, diesel fuel #2, and similar fuels. The hydrocarbon characterization presents Friedman & Bruya's assessment of the petroleum hydrocarbon degradation for each sample. Samples RH-BR-6-S01 (L) and RH-MW-11 were evaluated to consist of hydrocarbons that have undergone substantial biological degradation. Samples RH-BR-6-S02 and RH-BR-14-S04 were evaluated to consist of a mixture of hydrocarbons that are degraded fuels and undegraded fuels.

The fingerprinting assessment conducted by Friedman & Bruya and their findings, which are included in Appendix 5, is consistent with documented historical tank contents. Due

Table 4-5
Summary and Comparison of Samples Obtained for Fingerprinting Analysis

Tank Location	Sample ID	Sample Date	Matrix	Sample Depth (ft, POE)	F&B GC Petroleum Hydrocarbon Identification	F&B GC Petroleum Hydrocarbon Characterization	Historical Contents and Start Use Year
6	RH-BR-6-S01 (L)	01/18/01	Fluid	0.5	Indicative of a mixture of a degraded middle distillates such as kerosene or Jet A.	• Fuel has undergone substantial biological degradation • Lower level of degraded middle distillates (diesel fuel #2) may be present	NSFO - 1942 ND - 1972 JP-5 - 1974 DFM - 1982 JP-5 - 1995
	RH-BR-6-S02	01/19/01	Core	1.5	Indicative of a mixture of middle distillates, which may include kerosene, JP-5, diesel fuel #2 and similar fuels.	• Mixture of degraded and relatively undegraded fuels	
11	RH-MW-11	12/18/00	Fluid	20.3	Indicative of a mixture of middle distillates such as diesel fuel #2 or similar fuels.	• Fuel has undergone substantial biological degradation	NSFO - 1943 ND - 1972 DFM - 1973
14	RH-BR-14-S04	12/06/00	Core	95.5	Indicative of a mixture of middle distillates, which may include kerosene, JP-5, diesel fuel #2 and similar fuels.	• Mixture of degraded and relatively undegraded fuels	NSFO - 1943 ND - 1973 NSFO - 1973 ND - 1975 DFM - 1981 JP-5 - 1996

DFM - Diesel Fuel, Marine
F&B - Friedman & Bruya
GC - Gas chromatograph
JP-5 - Jet Fuel
ND - Navy Distillate
NSFO - Navy Special Fuel Oil

to the similarity in fuels stored in the tanks and the type of analysis conducted, further comparisons cannot be made.

4.8 SCREENING LEVEL RISK ASSESSMENT

4.8.1 Red Hill Risk Assessment Background

Contaminated sites can vary greatly with regard to the level of risk they may pose to human health and the environment. The Hawaii Department of Health (DOH) recognized this diversity and developed a tiered approach to site investigation, risk assessment, and remedial action selection. The DOH risk assessment framework presents a three-tiered approach to the evaluation of contaminated sites. The options range from the use of generic preliminary action levels (PALs) (Tier 1) that have been derived by DOH, to a full-scale risk assessment (Tier 3). With each tier, the conservative assumptions of the lower tiers tend to be replaced with more detailed site characterization data.

The purpose of a risk assessment is to evaluate the potential for risk to human health and the environment as a result of exposure to site-related constituents. The results of the risk assessment are used to determine whether there is a need for cleanup at a site and to assist in the selection of appropriate remedial alternatives.

The evaluation presented in Section 4.0 of this report indicates that chemical constituents are present in core, fluid, and groundwater samples at concentrations that exceed the Tier 1 action levels. A Tier 2 assessment, which is used to generate site-specific soil action cleanup levels, is not applicable given the lack of soil encountered at the Red Hill Bulk Fuel Storage Facility. Therefore, a Tier 3 risk assessment is considered to be appropriate for the site.

The DOH recommends that the first phase of a Tier 3 risk assessment be a screening-level assessment of site-related constituents based on reasonable maximum exposure assumptions. The purpose of the screen is to quickly identify which constituents, exposure pathways, and/or exposure scenarios clearly pose no risk to human health. If screening levels are exceeded, it does not indicate that risk is present at levels that exceed regulatory levels of concern; it only indicates that a specific constituent should be retained for further evaluation (DOH, 1997).

4.8.2 Initial Screening Level Risk Assessment

An initial screening-level risk assessment was performed for the Red Hill Bulk Fuel Storage Facility. This assessment was completed through the comparison of the maximum concentration of each constituent detected in core samples to the corresponding Tier 1 action level for soil, and to the Region IX Preliminary Remediation Goals (PRGs) for residential and industrial exposure to soil (see Table 4-6). The Tier 1 soil action levels and the Region IX PRGs are considered to represent acceptable concentrations of constituents in soil. The DOH developed the Tier 1 soil action levels to address concerns associated with soil leaching to groundwater, remobilization of free-phase product in impacted soils, and potential direct contact exposures to impacted soil. Region IX PRGs were developed based on the evaluation of residential and industrial worker direct contact exposures to impacted soil. Soil, however, was not encountered during the Phase II investigation at the site. Rather, bedrock core samples were collected to evaluate the extent of petroleum impact beneath the fuel tanks. Therefore, the screening-level assessment for the site is used not to eliminate possible exposure pathways and/or exposure scenarios, but rather as a qualitative tool to identify the constituents that are present at concentrations that may be of potential concern.

The screening-level assessment presented in Table 4-6 indicates that five constituents are present in core samples at levels that exceed the available Tier 1 soil action levels: ethylbenzene, methylene chloride, naphthalene, hydrocarbons (TPH (C10-C28), and unknown hydrocarbon. It should be noted that given the lack of additional information, TPH (C10-C28) was compared to the Tier 1 action level for TPH-middle distillates and the unknown hydrocarbon was compared to the Tier 1 action level for TPH-residual fuels.

Table 4-6
Evaluation of Constituents Detected in All Core Samples

Analyte	No. of Detections	No. of Analyses	Minimum Detected Concentration (mg/kg)	Maximum Detected Concentration (mg/kg)	Tier I Action Level for Soil[a] (mg/kg)	Region IX Residential PRG[b] (mg/kg)	Region IX Industrial PRG[b] (mg/kg)
2-Methylnaphthalene	16	84	0.25	57.8	**41**[c]	**56**[c]	190[c]
4-Methyl-2-pentanone (MIBK)	1	84	0.0067	0.0067	--[d]	790	2,900
Acetone	10	84	0.0215	0.0632	5.8	1,600	6,200
bis(2-Ethylhexyl)phthalate	35	84	0.12	0.942	--	35	180
Chrysene	1	97	6.3	6.3	--	62	290
Dibenzofuran	1	84	0.992	0.992	--	290	5,100
Ethylbenzene	10	97	0.002	1.55	**0.5**	230[e]	230[e]
Fluorene	6	97	0.72	12	--	2,600	33,000
Lead	14	84	0.55	293	400	400[f]	750[f]
m,p-xylene	4	13	0.059	0.31	23[g]	210[e,g]	210[e,g]
Methyl ethyl ketone (MEK)	3	84	0.0165	0.431	--	7,300	28,000
Methylene chloride	4	84	0.0108	0.0152	**0.003**	9	21
Naphthalene	13	97	0.266	47	**41**	56	190
o-xylene	4	13	0.071	0.22	23[g]	210[e,g]	210[e,g]
Phenanthrene	14	97	0.226	26	**11**[h]	2,300[h]	30,000[h]
Pyrene	5	97	8.45	22	--	2,300	5,400
Toluene	5	97	0.0029	0.17	16	520[e]	520[e]
TPH (C10-C28)	55	84	8.05	43,100	**5,000**	--	--
Unknown Hydrocarbon	13	13	2.3	11,000	**5,000**	--	--
Xylene (total)	13	97	0.0073	6.4	23[g]	210[e,g]	210[e,g]

[a] Tier 1 Action Levels for Soil for sites where a drinking water source is threatened and rainfall is less than or equal to 200 cm/year (SHDOH, 2000).
[b] Region IX Preliminary Remediation Goals (November 2000).
[c] Tier 1 soil action level and Region IX PRGs for naphthalene used as surrogates for 2-methylnaphthalene.
[d] Dashes (--) indicate a Tier 1 action level or Region IX PRG was not available for the referenced constituent.
[e] Soil saturation point as determined by Region IX.
[f] PRGs for lead based on EPA Models.
[g] Tier 1 soil action level for xylene and Region IX PRGs for xylenes used as surrogates for xylene (total), m,p-xylene, and o-xylene.
[h] Tier 1 soil action level and Region IX PRGs for fluoranthene used as surrogates for phenanthrene.

It is a common risk assessment practice to use surrogates similar in structure and/or toxicity to represent constituents for which USEPA-approved toxicity information is not available. This approach is taken to prevent the possible elimination of constituents that have the potential to contribute significantly to the overall risk associated with exposure to an environmental medium of interest. If Tier 1 soil action levels for naphthalene and fluoranthene are used as surrogates for 2-methylnaphthalene and phenanthrene, respectively, these two constituents are also considered to be present at levels that require further evaluation.

Only one constituent, 2-methylnaphthalene (with naphthalene used as a surrogate), is present at a concentration that exceeds the corresponding Region IX PRGs based on direct contact exposure scenarios. The fact that constituents are present at concentrations that exceed the initial screening levels does not indicate that risk is present at levels that exceed regulatory levels of concern; it only indicates that these constituents should be retained for further evaluation. The constituents to be evaluated further include: ethylbenzene, methylene chloride, 2-methylnaphthalene, naphthalene, phenanthrene, TPH (C10-C28) and unknown hydrocarbon.

Due to the site-specific hydrogeological characteristics, only two groundwater samples were collected during the Phase II site investigations. As a screening-level assessment, the constituents detected in these groundwater samples were compared to the Tier 1 action levels for groundwater and Region IX PRGs for tap water. In addition, the concentrations were also compared to federal maximum contaminant levels (MCLs), which are enforceable standards for drinking water supplies (see Table 4-7). This screening-level assessment of groundwater indicates that lead is present at concentrations that exceed the Tier 1 action level for groundwater but are less than or equivalent to the federal MCL for drinking water supplies. Bis(2-ethylhexyl)phthalate is present at concentrations that exceed the Region IX PRG for tap water and the maximum concentration of bis(2-ethylhexyl)phthalate also exceeds the federal MCL for drinking water. A standard for TPH (C10-C28) in groundwater has not currently been promulgated in the State of Hawaii, and a Region IX PRG or federal MCL is not

Table 4-7
Evaluation of Constituents Detected in Groundwater

Analyte	No. of Detections	No. of Analyses	Minimum Detected Concentration (mg/kg)	Maximum Detected Concentration (mg/kg)	Tier I Action Level for Soil[a] (mg/kg)	Region IX Residential PRG[b] (mg/kg)	Region IX Industrial PRG[b] (mg/kg)
bis(2-Ethylhexyl)phthalate	2	2	0.0058	0.0109	--[d]	0.0048	0.006
Lead	2	2	0.0104	0.015	0.0056	--	0.015[c]
TPH (C10-C28)	2	2	0.883	1.07	--	--	--

[a] Tier 1 Action Levels for Groundwater for sites where a drinking water source is threatened and rainfall is less than or equal to 200 cm/year (SHDOH, 2000).
[b] Region IX Preliminary Remediation Goals (November 2000).
[c] National Primary Drinking Water Standards.
[d] Dashes (--) indicate a Tier 1 action level or Region IX PRG was not available.
[e] Action level at the tap.

available for this compound. Therefore, based on this evaluation, all three constituents detected in groundwater will be retained for further evaluation.

The second phase of a Tier 3 risk assessment is a detailed risk assessment based on realistic point estimates. Only the constituents that are not eliminated in the screening-level assessment are carried forward into this second phase. In this phase, a detailed quantitative risk assessment is performed which evaluates an average or median individual risk (i.e., central tendency) and a high-end risk (i.e., reasonable maximum exposure). An in-depth exposure assessment is also performed during this phase to evaluate potential human exposure to site-related constituents that have been identified of concern. The exposure assessment is conducted to identify the pathways by which human receptors are potentially exposed and to estimate the magnitude, frequency, and duration of exposure. The process involves four steps: (1) characterization of the exposure setting; (2) identification of potentially exposed populations; (3) identification of potential exposure pathways; and (4) quantification of potential exposure. The exposure assessment evaluates all potential exposure pathways; however, those that are incomplete or irrelevant may be dismissed if the rationale for elimination of a pathway is documented. Risk estimates are generated for those exposure pathways that are considered complete or that may potentially become complete in the future.

At this point in time, a detailed exposure assessment has not been completed. However to provide a preliminary evaluation of the magnitude of risk associated with the site-related petroleum impact, the DOH Tier 3 Direct Exposure Risk Assessment Model was utilized to evaluate risk to general receptor populations. These evaluations were performed for four receptor populations: a residential population, a general occupational worker population, a utility worker population, and a construction worker population. These receptor populations were evaluated using standard exposure parameters where available and model defaults. Professional judgment was used to determine preliminary exposure frequency and exposure duration values for the construction worker population (130 days per year for 1 year) and the utility worker population (5 days per year for 25 years). Potential exposure was assumed to occur through incidental ingestion, dermal contact, and inhalation pathways.

Preliminary risk estimates were calculated using the maximum concentration for each constituent retained as the result of the screening-level assessment for the bedrock core samples. These estimates result in an overestimation of risk for a Tier 3 assessment, as risk should be estimated using an average and a reasonable maximum exposure concentration, not the maximum exposure concentration.

TPH compounds (C10-C28 and unknown hydrocarbon) were preliminarily evaluated assuming 100 percent C_{11}-C_{22} aromatics pursuant to Massachusetts Department of Environmental Protection (MADEP) policy for unknown hydrocarbons in soil. Since these compounds were assumed to be represented by the same carbon fraction range (i.e., C_{11}-C_{22} aromatics), only the maximum detection of TPH (C10-C28) (the higher of the two compounds) was quantitatively evaluated in this preliminary assessment.

Toxicity information was updated using the USEPA's Integrated Risk Information System (IRIS) and information presented in the Region IX Preliminary Goals (PRGs) table for all constituents except TPH. Toxicity information for TPH was obtained from the MADEP's guidance entitled "Characterizing Risks posed by Petroleum Contaminated Sites: Implementation of the MADEP VPH/EPH Approach" (2001). Toxicity information for naphthalene and fluoranthene was used as surrogate information for 2-methylnaphthalene and phenanthrene, respectively, to allow for the quantitative evaluation of the potential contribution of these constituents to the overall risk associated with core samples at the site.

Physical-chemical information was obtained from the following sources for the noted compounds: Ethylbenzene and naphthalene - DETIER3 Spreadsheets; Methylene chloride - Region IX PRG support; 2-methylnaphthalene and phenanthrene - Texas Natural Resource Conservation Commission, Chapter 350 – Risk Reduction Program; and TPH - MADEP's "Characterizing Risks posed by Petroleum Contaminated Sites: Implementation of the MADEP VPH/EPH Approach" (2001).

The results of this preliminary evaluation were compared to DOH's regulatory levels of concern. The DOH, as noted in the Hawaii Administrative Rules (HAR), Title 11

(Department of Health) Chapter 451 (State Contingency Plan), Subchapter 3 (Hazardous Substance Response) (11-451-3) and Chapter 281 (Underground Storage Tanks) Subchapter 7 (Release Response Action) (11-281-7), has adopted federal criteria as the regulatory levels of concern. U. S. EPA's acceptable (by policy) incremental carcinogenic risk range is 10^{-6} to 10^{-4}, with 10^{-6} representing the point of departure for determining remediation goals for alternatives when applicable or relevant and appropriate requirements (ARARs) are not available or are not sufficiently protective. U. S. EPA considers a hazard index (i.e., the sum of risk estimates for noncarcinogenic compounds) as "acceptable" if it is less than unity (i.e., 1.0) (National Oil and Hazardous Substances Pollution Contingency Plan, 1990). It should be noted, however, that in conversations with the DOH, it is clear that the regulatory level of concern for carcinogenic risk estimates is 10^{-6} for residential land use scenarios and 10^{-5} for industrial land use scenarios. The regulatory level of concern for noncarcinogenic risk estimates is 1.0 for all land use scenarios.

Based on the initial screening-level assessment, only one compound, methylene chloride, was retained that was evaluated as a potential carcinogen. All preliminary carcinogenic risk estimates associated with this constituent were below the DOH's point of departure of 1×10^{-6}. Caution must be used in indicating that there is no concern with regard to potential carcinogenic risk, however, since the preliminary risk evaluations are based on generic receptor populations and exposure routes. An exposure assessment completed in conjunction with a comprehensive risk assessment may indicate that additional exposure routes require evaluation.

The preliminary hazard indices for the residential, general occupational, and construction worker populations all exceeded 1.0, with approximately 80 percent of the hazard indices associated with the contribution of TPH to the total risk estimate. The preliminary hazard index for the utility worker was below DOH's acceptable level of 1.0.

Based on the preliminary risk evaluations, the primary concern at the site is the potential for exposure to *noncarcinogenic* compounds, with TPH identified as the primary constituent of concern.

SECTION 5
CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The Navy has completed the Phase II Site characterization activities performed at the Fleet Industrial Supply Center (FISC), Pearl Harbor bulk storage facility located at Red Hill, Oahu, Hawaii. Conducted during two distinct field phases, 20 borings/corings were established underlying each of the fuel tanks sampled and converted to monitoring wells for ground-water observations. Two vertical wells were also constructed in the lower access tunnel above the underlying basal aquifer. A total of 97 core samples (including duplicates), eight fluid samples, and two ground-water samples were obtained and were analyzed for TPH by Method 8015 modified, VOCs by Method 8260, semi-volatile organic carbons (SVOCs) by Method OLM03.2, PAHs by Method 8270, and TCLP metals by Method ILM0.40. In addition, four samples (two fluid and two core samples) were collected for fingerprinting analysis using gas chromatography with flame ionization detection (GC/FID) and an electron capture detector (ECD).

Hydrocarbon impacts were noted beneath the floor and at depth in some of the angle borings advanced beneath the USTs. Six borings (B-1, -2, -3, -6, -13, and -20) exhibited hydrocarbon impacts (i.e., sheen on drill water, hydrocarbon odor, and/or elevated PID measurements) beneath the concrete floor. A hydrocarbon odor and elevated PID readings were observed at depth in the angle borings located at 15 of the 20 tanks (Tanks 1, 3, 4, 5, 6, 7, 11, 12, 13, 14, 16, 17, 18, 19, and 20). The fingerprinting analysis confirmed that the sample obtained for analysis contains petroleum hydrocarbons, which probably originated from the tanks.

The initial screening level risk assessment indicates that seven constituents were detected in core samples at concentrations of potential concern: ethylbenzene, methylene chloride, 2-methylnaphthalene, naphthalene, phenanthrene, TPH (C10-C28), and unknown hydrocarbon. Three constituents were detected in ground water at concentrations of potential concern: bis(2-ethylhexyl)phthalate, lead, and TPH (C10-

C28). Recent investigations also indicate the presence of LNAPL in several monitoring wells at the site.

Preliminary risk evaluations were performed on the seven constituents of potential concern in the core samples. These preliminary risk evaluations addressed potential exposure to four generic receptor populations: a residential population, a general occupational worker population, a construction worker population, and a utility worker population. These populations were evaluated for potential exposure through incidental ingestion, dermal contact, and inhalation pathways. The preliminary risk estimates indicate that all preliminary carcinogenic risk estimates were below the DOH's point of departure of 1×10^{-6}. The preliminary hazard indices for the residential, general occupational, and construction worker populations all exceeded 1.0; the preliminary hazard index for the utility worker population was below the DOH's acceptable level of 1.0. The preliminary risk evaluations indicate that the primary concern at the site is the potential for exposure to noncarcinogenic compounds, with TPH identified as the primary constituent of concern.

5.2 RECOMMENDATIONS

Based on the preliminary risk evaluations, it is recommended that a comprehensive risk assessment be completed to allow for an accurate assessment of current and potential future risk associated with the Red Hill Bulk Fuel Storage Facility.

As part of the comprehensive risk assessment, a site-specific exposure assessment will be completed. This exposure assessment will evaluate site data in conjunction with information on the exposure setting to identify potential migration pathways, potential receptor populations, and relevant exposure routes. It is anticipated that a significant portion of the exposure assessment will involve the use of fate and transport modeling to allow for an evaluation of the movement of constituents, LNAPL, and ground water from the site to actual or potential points of exposure. Once the receptor populations, exposure routes and exposure point concentrations have been identified, then the potential risk associated with the site-related constituents will be quantified.

It should be noted that additional methods of estimating potential risk might be considered appropriate once the potential migration pathways, receptor populations, and exposure routes have been identified in the exposure assessment. When this detailed site information is available, a comprehensive risk assessment using current U.S. EPA methods and approaches may be considered appropriate and may replace the use of the DOH's Tier 3 Direct Exposure Risk Assessment Model.

Many of the receptor populations and/or exposure pathways addressed in the preliminary risk evaluation will likely be considered irrelevant or incomplete in the comprehensive risk assessment. In addition, other pathways not currently evaluated (e.g., volatilization to indoor air, discharge to surface water bodies, potential ingestion of ground water in the future) may be considered potentially complete exposure pathways under future site conditions. It is possible that additional sampling may be necessary to obtain data relevant to new exposure pathways identified during the comprehensive risk assessment, e.g., down gradient ground-water data, surface water data, etc.

The comprehensive risk assessment will also provide the opportunity to re-evaluate the use of naphthalene and fluoranthene as surrogates to represent 2-methylnaphthalene and phenanthrene. This approach is considered appropriate for the preliminary risk evaluations as it prevents the premature elimination of these constituents during the screening-level assessment. In addition, this approach allows for the quantitative evaluation of the potential contribution of these constituents to the overall risk associated with exposure to core samples at the site. However, the use of surrogates will be re-evaluated during the comprehensive risk assessment, and if the surrogate toxicity factors are deemed inappropriate for use at that time, the constituents may be qualitatively evaluated in the risk evaluations. Or, if these constituents are determined to be critical components in the evaluation of risk associated with the site, then relevant toxicological studies may be reviewed to determine whether toxicity factors, i.e., reference doses can be developed specifically for these constituents.

The comprehensive risk assessment will provide an accurate evaluation of potential risk associated with current and potential future exposure to site-related constituents. The results of the risk assessment will be used to determine whether there is a need for cleanup and to assist in the selection of appropriate remedial alternatives. Given the unique characteristics of the site, it is possible the risk assessment will conclude that there is no current or future potential for risk at or above the regulatory levels of concern. This determination cannot be made, however, until the detailed evaluations associated with the comprehensive risk assessment are completed.

LNAPL, pursuant to HAR 11-281-76, should be removed to the maximum extent practicable. While the product detected at depth by this investigation is not of a recoverable volume and was typically only observed as a sheen, additional monitoring of the wells should be conducted with any recoverable encountered product removed. LNAPL identified underlying the concrete lower access tunnel floor is most likely from long-term normal operation and maintenance activities. An evaluation of the feasibly of removing any potentially recoverable LNAPL from this distinct zone is recommended.

It is clear, based upon the site investigations conducted to-date that petroleum product releases have occurred at the site. Recent investigations indicate that LNAPL, which has typically only been observed as a sheen on observed waters, is present in several monitoring wells at the site. There are no screening levels available for LNAPL, and the evaluation of potential exposure to LNAPL (which is becoming a common risk assessment practice) does not lend itself to a preliminary risk evaluations. Therefore, a comprehensive risk assessment should be completed to evaluate the potential for exposure to LNAPL including its potential off-site transport to a future point of exposure.

As an aspect of this recommended risk assessment, a 3-D visualation of all data (detects and non-detects) should be prepared to better gain a spatial understanding of known impacted zones of rock in relation to the basal aquifer and the above positioned tanks. Develop a conceptual geologic model of Red Hill that will assist in better understanding potential and preferential pathways for petroleum hydrocarbons to potentially migrate to the basal aquifer. Evaluate available modeling programs and determine suitability to Red Hill. Potentially applicable and available models include: Frac3dvs, napsac, BIOF&T 2-

D/3-D, MARS 2-D/3-D, and/or SWIFT2000. Based on data requirements and applicability, use selected modeling program to better validate risk assessment assumptions and understandings. Deep well (V1D) lead analysis results should be further investigated to determine source and significance. Aspects of this study would evaluate potential relation to background concentration, analyze lead speciation (organic lead, organic lead degradation products), and compare filtered and unfiltered sample results. These efforts would help build a better understanding of the dynamics of the petroleum hydrocarbon impacted rock and its potential to affect the basal aquifer.

SECTION 6
REFERENCES

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Appendix 1

BORING LOGS

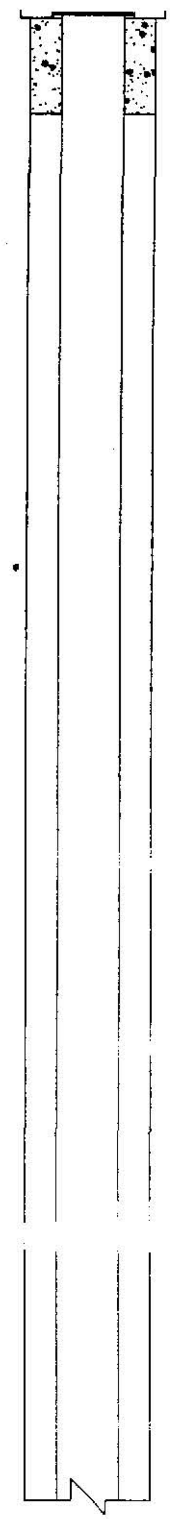
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-01
Project No. CTO 0229

LOCATION: Tank 1	ELEVATION: 102.66		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 02/08/01	LOGGED BY: Gary Gleason	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: 124.20
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
102.66 — 0	1	300		80	Concrete 0-2' over fine coarse sand, slightly fine gravel and silt; odor
102.01	2	103.7	RH-BR-1-S01	29	Concrete fragments with metal and core 2.5-3.7'; odor
101.70					Small vesicles; 10YR 2/2
100.77					
100.38	3	573	RH-BR-1-S02	80	Concrete 7.3-7.35'; small to medium vesicles 7.36-8.8'; strong odor; 10YR 2/2
— 10	4	185		100	Small to medium vesicles; odor; 10YR 2/2 to 3/1
99.61	5	235.5		103	Small to medium vesicles; no odor; 10YR 3/1
98.62	6	204.8		100	Small vesicles; no odor; 10YR 2/2 to 2/1
97.90 — 20	7	38.9		100	Small vesicles; grout seams 20-22.9'; no odor; 10YR 2/1 to 5YR 3/2
96.60	8	301		100	Small vesicles; grout seams 24.05-26'; no odor; 10YR 2/2 to 5YR 3/3
95.93	9	NM		90	Small to medium vesicles; no odor; 10YR 2/2
94.58 — 30	10	147.1		113	Small to medium vesicles; grout seams throughout; no odor; 10 YR 3/1 to 5YR 3/2
93.39	11	164.3		102	Small to medium vesicles; grout seams throughout; no odor; 5YR 3/2 to 10YR 3/1
92.23 — 40	12	76.2		106	Small to large vesicles; grout seams 40-40.4 and 42.25-43.95'; no odor; 10YR 3/1 to 2/1
90.94	13	48.7		94	Small to large vesicles; grout seams 45.3-46.1, 47.3-48.95, and 49.05 -49.8'; no odor; 10YR 3/1 to 5YR 3/2
89.56 — 50	14	116		102	Small to medium vesicles; no odor; 5YR 3/2 to 10YR 3/1
88.27	15	266		100	Small to large vesicles; odor; 10YR 3/1
86.95 — 60	16	453	RH-BR-1-S03 RH-BR-1-D09 RH-BR-1-S04	100	Small to large vesicles; strong odor; 10YR 3/1
85.63	17	192		98	Small to large vesicles; grout seams 67.3-67.45'; strong odor; 10YR 3/1
84.26 — 70	18	478		102	Small to large vesicles; strong odor; 10YR 3/1
82.96	19	NM		87	Small to large vesicles; odor; 10YR 3/1

WELL CONSTRUCTION



This information pertains only to this boring and sh[illegible]ot be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

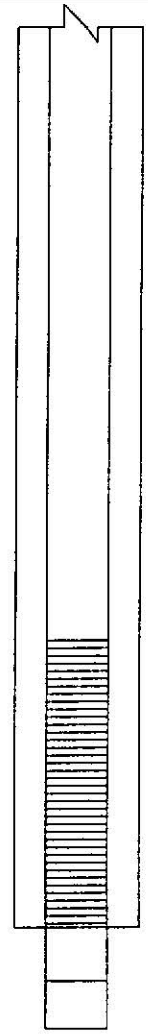
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-01
Project No. CTO 0229

LOCATION: Tank 1	ELEVATION: 102.66		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 02/08/01	LOGGED BY: Gary Gleason	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: 124.20
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
81.62 / 80	20	48.5		102	Small to medium vesicles; no odor; 10YR 3/1
80.45	21	NM		94	Small to large vesicles; grout seams 87.35-87.95'; no odor; 5YR 3/2 to 10YR 3/1
79.13 / 90	22	59.2		111	Small to medium vesicles; grout seams 90.9-92.45 and 93.1-93.35'; no odor; 10YR 3/1 to 5YR 3/2
77.92	23	43		86	Small to medium vesicles; no odor; 10YR 3/1
76.55 / 100	24	43.7		95	Small to large vesicles; silty clay in fractures 104.2-104.8'; no odor; 10YR 3/1
75.35	25	115.3		111	Small to large vesicles; no odor; 10YR 3/1
74.14 / 110	26	222.7		79	Small to medium vesicles; silty clay in vesicles; no odor; 10YR 3/1
72.84	27	151.7		119	Small to large vesicles; silty clay in some vesicles; no odor; 10YR 3/1
71.73 / 120	28	118.5		100	Small to large vesicles; silty clay noted in few vesicles and most fractures; no odor; 10YR 3/1
70.44	29	542		98	Small to medium vesicles; silty clay in fractures and vesicles; no odor; 10YR 3/1
69.09 / 130			RH-BR-1-S05		B-01 terminated at 129.7'
140					
150					

WELL CONSTRUCTION



This information pertains only to this boring and sh ot be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-02
Project No. CTO 0229

LOCATION: Tank 2	ELEVATION: 102.31		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 02/05/01	LOGGED BY: Gary Gleason	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
102.31 / 0	1	135		100	Concrete 0-2' over fine coarse sand, slightly fine gravel and silt; slight odor
101.66	2	71.8	RH-BR-2-S01	88	Concrete and wood fragments 2.5-3.3', concrete 3.3-4.5, small and large vesicles 4.6- 6.3'; no odor; 10YR 3/1
100.55 / 100.40	3	105		83	Small to medium vesicles; no odor; 10YR 2/2
99.93	4	131.9		106	Small to large vesicles; grout seam 8.4-8.6'; no odor; 10YR 2/2
10	5	NM		97	Small to medium vesicles; grout seams at 9.4, 9.5, and 12.5'; no odor; 10YR 2/2
99.05	6	60		104	Small to medium vesicles; grout seams throughout; no odor; 5YR 3/2 to 10YR 2/2
97.78	7	45.3		103	Small to medium vesicles; grout seams throughout; no odor; 5YR 3/2; 10YR 2/2
97.03 / 20	8	10		100	Small to medium vesicles; grout seams 20.4-20.95, 21.8, 22.1-22.6, and 22.9'; no odor; 5YR 3/2 to 10YR 2/2
96.38	9	171		108	Small to medium vesicles; grout seams 23.55-23.9 and 25.35-25.65'; no odor; 10YR 3/1
95.45	10	59.1		98	Primarily small to large vesicles; grout seams 29.2-31.7'; no odor; 10YR 3/1 to 2/2
30 / 94.08	11	115.2		100	Small to medium vesicles; grout seams 31.8-33.6'; no odor; 10YR 2/1 to 2/2 to 5YR 3/2
92.73	12	28.3		102	Small to medium vesicles; no odor; 10YR 2/2 to 5YR 3/2
40 / 91.41 / 91.39	13	NM		100	Small vesicles; no odor; 10YR 2/1 to 3/1
	14	85.1		100	Small to medium vesicles; grout seams 44.15-44.25, 44.65-45.8, and 46.3-46.65'; no odor; 10YR 3/1 to 5YR 3/2
90.04	15	2.3		100	Small vesicles; grout seams 49.1-50.05 and 51.15-51.6'; no odor; 10YR 2/2 to 5YR 3/2
50 / 88.95	16	57		100	Small to medium vesicles; no odor; 10YR 2/2 to 3/1
87.71	17	80		100	Small vesicles; grout seams 56.4-56.55 and 61.2-61.6'; no odor; 10YR 3/1 to 2/2
60 / 86.37	18	53.3		100	Small vesicles; grout seams 62.45 and 66.4-66.5'; no odor; 10YR 3/1 to 2/2
85.10	19	23		98	Small to medium vesicles; grout seams 66.85-67.75, 68, 68.8-69.65, and 71.6-70.5'; no odor; 10YR 2/2 to 3/1
70 / 83.73 / 82.41	20	28.3		102	Small to medium vesicles; grout seams 73.05, 73.7-74.25, 74.4-74.85, 75.4, 76.05, and 76.15-76'; no odor; 10YR 2/2 to 3/1

WELL CONSTRUCTION

Corrected elevations are provided for angle borings.

This information pertains only to this boring and s... not be interpreted as being indicitive of the site.

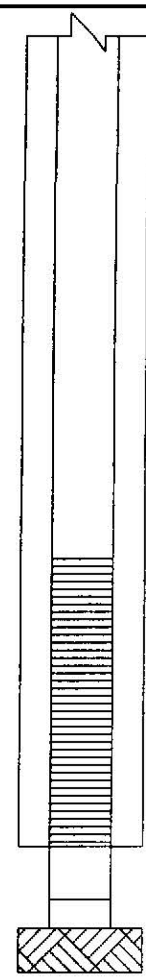
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-02
Project No. CTO 0229

LOCATION: Tank 2	ELEVATION: 102.31
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 02/05/01 — LOGGED BY: Gary Gleason
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER> FIRST: NA — COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 2

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
	21	34.1		94	Small to medium vesicles; grout seams 76.9-77.55, 78.8- 79.8, 80.15-80.45, and 81-81.2'; no odor; 10YR 3/1 to 5YR 3/2
81.09	22	30.4		100	Small to medium vesicles; grout seams 82-82.5'; no odor; 5YR 3/2 to 10YR 2/2
79.74	23	74.7	RH-BR-2-S02	100	Small to large vesicles; slight odor; 10YR 3/1 to 2/2
78.42	24	34.0		102	Small to medium vesicles; grout seams throughout; no odor; 10YR 3/1 to 2/2
77.10	25	41.3		82	Small to medium vesicles; grout seams 97.4-98.1'; no odor; 10YR 3/1 to 5YR 3/2
75.81	26	29.8		100	Small vesicles; no odor; 5YR 3/2 to 10YR 3/1
75.47	27	58.1		108	Small to primarily medium vesicles; no odor; 10YR 3/1
74.51	28	23.0		96	Small to medium vesicles; no odor; 10YR 3/1 to 5YR 3/2
73.22	29	32.0		88	Small to medium vesicles; no odor; 10YR 3/1 to 5YR 3/2
71.98	30	36.1		143	Small to medium vesicles; no odor; 10YR 3/1 to 5YR 3/2
71.80	31	21.2		87	Small to medium vesicle; no odor; 10YR 3/1 to 5YR 3/ 2
71.02	32	56.3	RH-BR-2-S03	80	Small to medium vesicles; no odor; 5YR 3/2 to 10YR 3/1
69.62					B-02 terminated at 126.3'

WELL CONSTRUCTION



This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-03
Project No. CTO 0229

LOCATION: Tank 3	ELEVATION: 102.72		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 01/31/01	LOGGED BY: Gary Gleason	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)		Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION	WELL CONSTRUCTION
102.72	0	1	214		59		Concrete 0-1.6' over fine to coarse sand with slight fine gravel and silt; slight odor	
102.02		2	65	RH-BR-3-S01	43		Sand 2.7-3.3'; concrete 3.3-7.4'; partially filled cavity 6.0-7.4'; no odor	
100.81		3	244.6		140		Small to medium vesicles; slight odor; 10YR 3/1	
100.68		4	151.2		106		Primarily small to medium vesicles; slight odor; 10YR 3/1	
100.21		5	346		100		Small to medium vesicles; no odor; 10YR 3/2	
100.03	10	6	228		73		Small to medium vesicles; grout seams 10.4 and 11.25-12'; no odor; 10YR 2/2	
99.07		7	240.7		126		Small to large vesicles; grout seams throughout; no odor; 10YR 2/2	
98.09	20	8	327		100		Small to large vesicles; grout seams 17.9-20.5, 21.1-21.35, and 21.9-22.2'; no odor; 10YR 2/2 to 3/1	
96.79		9	51.2		109		Small to medium vesicles; grout seams 23.15 and 24.8-27.6'; no odor; 10YR 3/1 to 2/2	
95.58	30	10	82.6		104		Primarily small to medium vesicles; grout seams though out; no odor; 10YR 2/2	
94.28		11	62.9		94		Small to medium vesicles; grout seams 33, 34-35.45, and 37.5-36.75'; no odor; 5YR 3/2 to 10YR 2/2	
92.94	40	12	84.3		98		Small to medium vesicles; grout seams 37.8-38.7 and 40.1-41.35'; no odor; 10YR 2/2 to 5YR 3/2	
91.62		13	189.2		100		Primarily small to medium vesicles; grout seams 43.45, 44.1, and 44.5'; slight odor; 10YR 2/2	
90.48	50	14	82.9	RH-BR-3-S02	100		Small to medium vesicles; grout seams 47.45-47.7, 49.3- 49.5, 49.75-49.95, and 51.4-51.55'; no odor; 10YR 2/2 to 5YR 3/2	
89.13		15	40.1		100		Small to medium vesicles; grout seams 52.5, 54, 55.55-55.7, and 57-57.5'; no odor; 5YR 3/2	
87.79		16	9.9		74		Small to medium vesicles; grout seams 59.4-60.2'; no odor; 5YR 3/2 to 10YR 3/1	
86.91	60	17	66.7		96		Small to medium vesicles; grout seams 61.1-62.3, 63-63.5, 64.3, 65.2, 65.6, and 66.1-66.5'; no odor; 10YR 3/1 to 2/2	
85.51		18	71.4		98		Small to medium vesicles; grout seams 67.1-71'; no odor; 5YR 3/2 to 10YR 3/1	
84.32	70	19	15.6		102		Small to medium vesicles; grout seams 71-71.7, 74.15, and 75.5'; no odor; 5YR 3/2 to 10YR 3/1	
83.18		20	50.1		94		Small to medium vesicles; grout seams 75.5-75.85	

Corrected elevations are provided for angle borings.

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

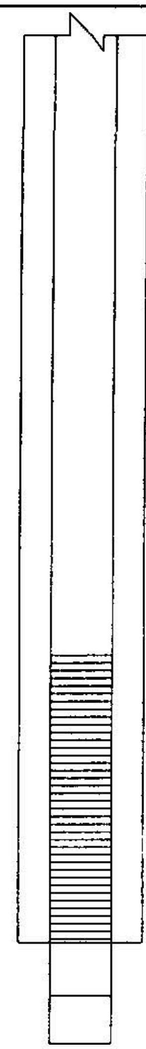
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-03
Project No. CTO 0229

LOCATION: Tank 3	ELEVATION: 102.72		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 01/31/01	LOGGED BY: Gary Gleason	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION
						and 78.15'; no odor; 5YR 3/2 to 10YR 2/2
81.86 / 80	21	2.6		102		Small to medium vesicles; grout seam 83.3'; no odor; 10YR 2/2
80.54	22	50.8		100		Small to medium vesicles; grout seam 88.95'; no odor; 10YR 3/1 to 5YR 3/2
79.19 / 90	23	72.9		104		Small to medium vesicles; grout seams 93.5-93.6 and 93.8'; no odor; 5YR 3/2
77.87	24	8.7		93		Small to medium vesicles; grout seams 97-97.25'; no odor; 5YR 3/2 to 10YR 2/2
76.68 / 100	25	NM		47		Small to large vesicles; grout seams 101.1-102 and 102.5-102.6'; no odor; 10YR 2/2 to 5YR 3/2
75.18	26	4.4		107		Small to large vesicles; grout seams 106.1-106.6 and 109.4-110.6'; no odor; 5YR 3/2 to 10YR 2/2
74.09 / 110						
73.76	27	38.1		93		Small to large vesicles; grout seams throughout; no odor; 10YR 2/2
	28	16.1		100		Small to large vesicles; grout seams 111.9-114.85'; no odor; 5YR 3/2 to 10YR 2/2
72.46	29	3.0		85		Small to medium vesicles; no odor; 5YR 3/2 to 10YR 3/1
71.77 / 120	30	7.8		50		Small to medium vesicles; grout seam 120.3'; no odor; 10YR 3/1 to 5YR 3/2
70.32	31	33.3	RH-BR-3-S03	34		Small to medium vesicles; grout seam 125.65'; no odor; 10YR 3/1 to 5YR
69.02 / 130						B-03 terminated at 130.2'
140						
150						

WELL CONSTRUCTION



Corrected elevations are provided for angle borings.

PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-04
Project No. CTO 0229

LOCATION: Tank 4	ELEVATION: 102.62		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 01/29/01	LOGGED BY: Gary Gleason	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)		Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION	WELL CONSTRUCTION
102.62	0	1	5.6		100		Concrete over fine to coarse sand with slight fine gravel and silt; no odor	
101.97		2	95	RH-BR-4-S01	44		Concrete 2.5-3.8'; small to medium vesicles 3.8-7'; odor; 10YR 2/2	
100.81								
100.50		3	294		83		Fine to coarse sand with slight fine gravel, rock fragments, and silt; odor; 10YR 3/1	
		4	180	RH-BR-4-S02	100		Small to medium vesicles; odor; 10YR 3/1	
99.72	10	5	103		89		Small to medium vesicles; slight odor; 10YR 3/1 to 5YR 3/2	
98.58								
98.43		6	225		100		Small to medium vesicles; odor; 10YR 3/1 to 5YR 3/2	
		7	48		100		Small to large vesicles; grout seams 19.9-20.15, 18.5, and 17.95'; no odor; 5YR 3/2 to 10YR 3/1	
97.11	20	8	308		95		Small to large vesicles; grout seams 24.95-25.5'; no odor; 10YR 3/1	
95.97		9	308		106		Small to primarily large vesicles; grout seams 25.4-27.8'; no odor; 10YR 3/1	
94.73	30	10	NM		100		Small to primarily large vesicles; grout seams 30.05-30.15, 30.55, and 33.25-33.35'; no odor; 10YR 3/1	
93.38		11	191		100		Small to primarily large vesicles; grout seams 36.55, 38.05-38.15, 39.85-40, and 40.5'; no odor; 10YR 3/1	
92.14	40	12	465		100		Small to medium vesicles; grout seams 40.5-40.8'; no odor; 10YR 3/1	
90.82		13	465		98		Small to large vesicles; grout seams 47.05, 48.05-48.7, and 50.4'; no odor; 10YR 3/1 to 5YR 3/2	
89.45	50	14	120.1		100		Small to medium vesicles; grout seams 51.9-52.1 and 54.7'; no odor; 10YR 2/2	
88.13		15	47.1		100		Small to medium vesicles; grout seams 59.35-59.5 and 59.95'; no odor; 10YR 2/2	
86.81	60	16	465		81		Small to medium vesicles; no odor; 5YR 3/2 to 10YR 2/2	
85.43		17	37.5		121		Small to medium vesicles; grout seams 68.85, 69.75-69.9, 69.97, and 70.7'; no odor; 10YR 2/2 to 5YR 3/2	
84.32	70	18	46.5		100		Small to medium vesicles; grout seams 71.15, 72.65-71.55, and 75.9-73.75'; no odor; 5YR 3/2 to 10YR 2/2	
82.98		19	51.7		100		Small to medium vesicles; grout seams 75.9-78.3 and	

Corrected elevations are provided for angle borings.

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

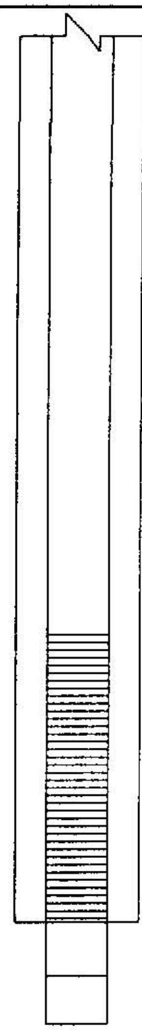
Boring/Monitoring Well No. B-04
Project No. CTO 0229

LOCATION: Tank 4	ELEVATION: 102.62		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 01/29/01	LOGGED BY: Gary Gleason	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
					79.45-80'; no odor; 10YR 2/2
81.66	20	66.1		98	Small to medium vesicles; *grout seams 83.9-83.95* and 84. 45'; no odor; 10YR 3/2 to 5YR 3/2
80.28	21	14.2		140	Small to medium vesicles; no odor; 5YR 3/2 to 10YR 2/2
79.92	22	112.2		100	Small to medium vesicles; grout seams 87.7-89.8, 90.95- 91.45, 91.9, and 92.7'; no odor; 10YR 2/2 to 3/1
78.60	23	NM		27	Small to medium vesicles; no odor; 10YR 3/1
78.34	24	41.7		98	Small to large vesicles with primarily medium vesicles; 93.85-93.95, 94.3-94.5, and 96.1'; no odor; 10YR 3/1 to 2/2
77.18	25	50.7		104	Small to medium vesicles; grout seam 99.8'; no odor; 10YR 3/1 to 5YR 3/2
75.88	26	53.2		98	Small to medium vesicles; no odor; 10YR 2/2 to 3/1
74.51	27	74.3		70	Small to large vesicles; no odor; 10YR 3/1 to 2/2
73.22	28	96.4		100	Small to large vesicles; grout seams 113.6-114.15'; no odor; 10YR 3/1
71.87	29	45.4		100	Primarily small to medium vesicles; grout seam 122.35'; no odor; 10YR 3/1
70.55	30	91.6	**RH-BR-4-S03** **RH-BR-4-D08**	100	Small vesicles; no odor; 10YR 3/1
69.21					B-04 terminated at 129.1'

Boring length scale (ft): 80, 90, 100, 110, 120, 130, 140, 150

WELL CONSTRUCTION



This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

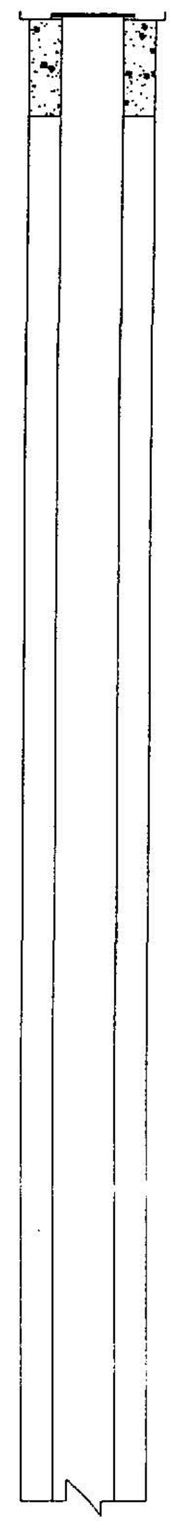
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-05
Project No. CTO 0229

LOCATION: Tank 5	ELEVATION: 105.98
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 01/24/01 — LOGGED BY: Gary Gleason
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER> FIRST: NA — COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 2

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
105.98 — 0	1	19.5		67	Concrete 0-2' over fine to coarse sand with slighty fine gravel and rock fragments; no odor
105.20	2	46		28	Concrete 3.0 to 3.9' over small to medium vesicles; no odor; 10YR 2/2 to 5YR 3/2
104.01 — 10	3	72	RH-BR-5-S01	100	Small to large vesicles; grout seams 7.6-8.9, 9.15-10.3, 10.9-11.35, and 12.25'; slight odor; 10YR 2/2
102.80	4	63.1	RH-BR-5-S02	98	Small to primarily large vesicles; grout seams 13.4-14, 14.3-14.7, and 15.5-15.7'; odor; 10YR 2/2
101.43 — 20	5	46		104	Small to primarily large vesicles; grout seams 20.95-22.25'; slight odor; 10YR 2/2 to 3/1
100.13	6	14.3		109	Small to large vesicles with primarily medium vesicles; no odor; 10YR 3/1
99.85	7	142.8		98	Small to large vesicles; grout seams 26.7-26.9'; no odor; 10YR 3/1 to 5YR 3/2
98.47 — 30	8	14.2		100	Small to medium vesicles; grout seams 30.15-30.6'; no odor; 5YR 3/2
98.06	9	23.3		98	Small to large vesicles; grout seams 34.15-34.4'; no odor; 5YR 3/2 to 10YR 2/2
96.90	10	75.6		104	Large to small vesicles; no odor; 10YR 2/2 to 5YR 3/2
95.60 — 40	11	55		91	Small to medium vesicles; grout seams 42.45-43.3 and 43.75-44.2'; no odor; 5YR 3/2 to 10YR 2/1
94.44	12	14.9		100	Small to primarily large vesicles; grout seams 49.45-50'; no odor; 10YR 2/1 to 3/1
93.04 — 50	13	52		108	Small to primarily large vesicles; no odor; 10YR 3/1
91.80	14	262	RH-BR-5-S03	92	Few small to primarily large vesicles; no odor; 10YR 3/1
90.43 — 60	15	308		104	Few small to primarily large vesicles; no odor; 10YR 3/1
89.16	16	308		100	Small to large vesicles; grout seams 67.35-68.8'; no odor; 10YR 3/1 to 5YR 3/2
87.81 — 70	17	68		67	Small to primarily large vesicles; no odor; 5YR 3/2 to 10YR 2/2
86.41 86.21	18	26		325	Small to large vesicles; no odor; 10YR 2/2 to 5YR 3/2

WELL CONSTRUCTION



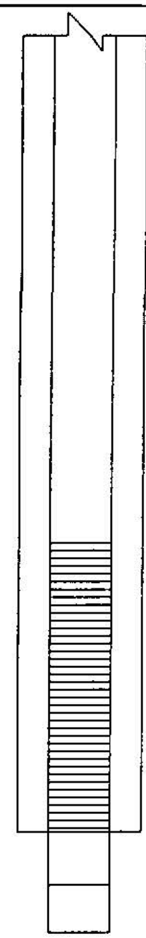
Corrected elevations are provided for angle borings.

PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-05
Project No. CTO 0229

LOCATION: Tank 5	ELEVATION: 105.98		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 01/24/01	LOGGED BY: Gary Gleason	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION	WELL CONSTRUCTION
85.79	19	8.5		100		Small to medium vesicles; no odor; 5YR 3/2	
80	20	36		92		Small to very large vesicles; no odor; 5YR 3/2 to 10YR 3/1	
84.45	21	78		106		Small to large vesicles; grout seams 83.2-83.45 and 86.75-86.9'; no odor; 10YR 3/1	
83.15 / 90	22	12		77		Five small to primarily large vesicles; grout seams 90.4-90.5'; no odor; 10YR 3/1	
81.81	23	35.9		134		Few small to primarily large vesicles; grout seam 94.25'; no odor; 10YR 3/1 to 2/2	
80.82	24	12		108		Small to large vesicles; grout seams 97.05 and 97.2'; no odor; 10YR 3/1	
79.81 / 100	25	31		82		Primarily small to medium vesicles; grout seams 102.9 and 103-103.25'; no odor; 10YR 3/1 to 5YR 3/2 to 10YR 2/2	
78.39	26	21		38		Small to medium vesicles; grout seams 106.9-107 and 107. 75'; no odor; 10YR 2/2 to 5YR 3/2	
77.10 / 110							
77.04	27	9		100		Small to medium vesicles; no odor; 5YR 3/2	
76.47	28	308	RH-BR-5-S04	100		Small vesicles; no odor; 5YR 3/2	
	29	173	RH-BR-5-S05	100		Small to medium vesicles; no odor; 10YR 2/2 to 3/1	
75.13							
120	30	104		94		Small to medium vesicles; no odor; 10YR 2/2 to 5YR 3/2	
73.81							
						B-05 terminated at 124.3'	
130							
140							
150							

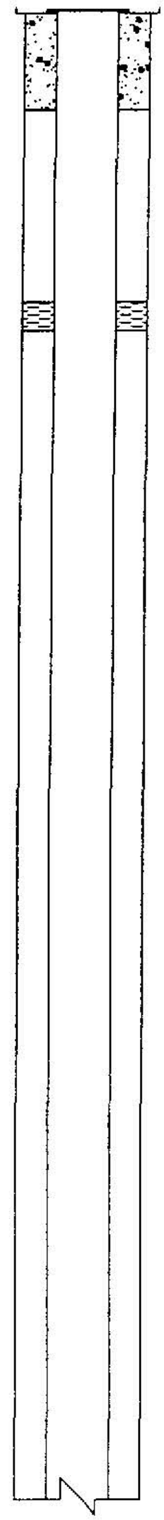


This information pertains only to this boring and sh[illegible] not be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

PROJECT: Red Hill Bulk Storage Facility **CLIENT:** PACNAVFACENGCOM		**Boring/Monitoring Well No.** B-06 **Project No.** CTO 0229	
LOCATION: Tank 6		ELEVATION: 105.68	
DRILLER: Salisbury & Associates, Inc.		DATE DRILLED: 01/19/01	LOGGED BY: Gary Gleason
DRILL RIG: SAITECH EH5, Portable Core Drill		DEPTH TO WATER>	FIRST: NA / COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION	WELL CONSTRUCTION
105.68 — 0	1	78	RH-BR-6-S01(L)	100		Concrete 0-0.5'; strong odor	
105.16			RH-BR-6-S01(S)				
	2	132	RH-BR-6-S02	20		Concrete over fine to coarse sand with fine gravel; strong odor; product present	
103.87							
103.45	3	0.6		81		Concrete 7-7.5'; primarily small to medium vesicles 7.5- 8.6'; odor; 10 YR 2/1 to 5YR 3/2	
	4	0		89			
102.76 — 10	5	163		100		Small to medium vesicles; no odor; 5YR 3/2 to 10YR 2/1	
101.41						Small to medium vesicles; slight odor; 5YR 3/2 to 10YR 2/2	
101.38	6	47		400		Small to medium vesicles; no odor; 10YR 2/2	
100.63	7	191		93		Small to medium vesicles; odor; 5YR 3/2 to 10YR 2/1	
— 20	8	121	RH-BR-6-S03	100		Small to medium vesicles; no odor; 5YR 3/2 to 10YR 2/1	
100.06	9	21	RH-BR-6-D07	98		*Small to primarily medium vesicles; grout seams 24.95-24.45'; no odor; 10YR 2/1 to 2/2*	
98.92	10	40		98		Small to medium vesicles; grout seams 26.15-27.6, 29, and 30.05'; strong odor; 10YR 2/2 to 2/1	
97.68 — 30	11	65		70		Small to primarily large vesicles; odor; 10YR 2/1	
96.03	12	42		98		Small to large vesicles; grout seams 37.3-38.05 and 40.9-41.45'; slight odor; 10YR 2/2	
— 40							
94.65	13	66.7		105		Primarily small to medium vesicles; grout seams 42.95-46.9'; odor; 10YR 2/2	
93.54	14	40		96		Small to medium vesicles; grout seams 46.9-47.25'; odor; 10YR 2/2 to 5YR 3/2	
— 50							
92.14	15	65		100		Small to medium vesicles; grout seams 52.7-53, 53.55-53.85, and 56.9-57.1'; odor; 10YR 2/2 to 2/1	
90.80	16	26		98		Small to medium vesicles; grout seams 57.9-59.5, 59.9, and 60.65'; no odor; 5YR 3/2 to 10YR 2/2	
— 60							
89.40	17	16		98		Small to large vesicles; grout seams 63.35, 65.4-65.9, 66.1-66.35, and 68.1'; no odor; 10YR 2/2	
88.03	18	25		102		Small to large vesicles; grout seams 68.7 and 71.1-71.3'; no odor; 10YR 2/2	
— 70							
86.79	19	25		83		Medium to primarily large vesicles; no odor; 10YR 2/2	
85.57							



Corrected elevations are provided for angle borings.

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PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

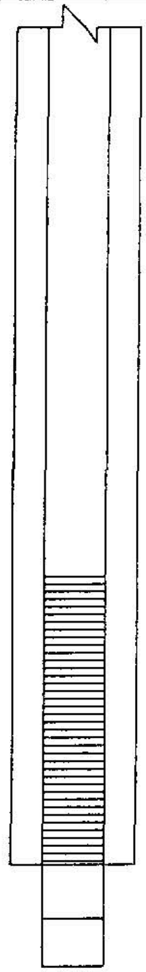
Boring/Monitoring Well No. B-06
Project No. CTO 0229

LOCATION: Tank 6	ELEVATION: 105.68		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 01/19/01	LOGGED BY: Gary Gleason	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
	20	0.3		120	Small to large vesicles; no odor; 10YR 2/2 to 2/1
84.43	21	16.8		102	Small to medium vesicles; grout seams 82-82.3'; no odor; 10YR 2/1 to 5YR 3/2
83.14	22	30.1		92	Small to medium vesicles; grout seams 88.2-90.4, 91.05- 91.55, and 91.8'; no odor; 5YR 3/2 to 10YR 2/1
81.82	23	10.1		111	Small to medium vesicles; grout seam 91.75'; no odor; 10YR 2/1 to 5YR 3/2
80.60	24	3		98	Small to large vesicles; no odor; 5YR 3/2 to 10YR 3/1
79.23	25	0.9		106	Small to large vesicles; no odor; no odor; 10YR 3/1
77.96	26	17.8		100	Small to large vesicles; no odor; 10YR 3/1 to 5YR 3/2
76.61	27	12.2		95	Primarily small to medium vesicles; no odor; 5YR 3/2 to 10YR 2/1
75.19	28	3.3		21	Small vesicles; no odor; 5YR 3/2
73.82	29	0		68	Small to medium vesicles; no odor; 5YR 3/2 to 10YR 2/2
73.17 / 72.91	30	15	RH-BR-6-S04	250	Small to medium vesicles; no odor; 10YR 2/2
	31	10		100	
					B-06 terminated at 126.6'

Boring length scale (ft): 80, 90, 100, 110, 120, 130, 140, 150

WELL CONSTRUCTION



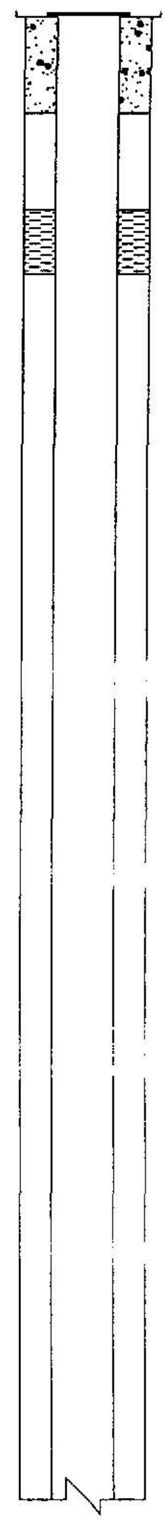
This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

PROJECT: Red Hill Bulk Storage Facility		**Boring/Monitoring Well No.** B-07	
CLIENT: PACNAVFACENGCOM		**Project No.** CTO 0229	
LOCATION: Tank 7		ELEVATION: 113.96	
DRILLER: Salisbury & Associates, Inc.		DATE DRILLED: 01/17/01	LOGGED BY: Gary Gleason
DRILL RIG: SAITECH EH5, Portable Core Drill		DEPTH TO WATER>	FIRST: NA / COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION
113.96 — 0	1	1.8	RH-BR-7-S01	100		Concrete 0-0.5'; over fine to coarse sand with fine gravel 0.5-2'; odor
113.44	2	0.7		36		Basalt; slight odor
111.71	3	NM		47		
— 10	4	NM		65		Small to medium vesicles; slight odor; 5YR 3/2
110.52						
110.41	5	0		100		Primarily small to medium vesicles; no odor; 5YR 3/2
	6	0		97		Small to medium vesicles; grout seams 16.3-17.2'; no odor; 10YR 2/2
109.41	7	0		106		Small to medium vesicles; grout seams throughout; no odor; 10YR 2/2
— 20						
108.09	8	NM		84		Small to large vesicles; grout seams 22.7-24.4 and 25.1-25.4'; no odor; 10YR 2/1
107.26	9	110	RH-BR-7-S02	81		Small to large vesicles; grout seams 25.9-27.45, 28, 28.95, and 29.9-30.7'; odor; 10YR 2/1
— 30						
105.65	10	57		124		Small to medium vesicles; grout seams throughout; odor; 10YR 2/1
104.80	11	0		100		Small to large vesicles; grout seams 35.7, 35.8-36.4, and 38.75'; no odor; 10YR 2/1 to 3/1
103.48 — 40	12	26.5		102		Small to large vesicles; odor; 10YR 3/1
102.13	13	12.2		100		Medium to primarily large vesicles; no odor; 10YR 3/1
100.79 — 50	14	0.6		102		Small to large vesicles; no odor; 10YR 3/1
99.47	15	0		100		Small to medium vesicles; grout seams 59.95-60.95'; no odor; 10YR 3/1 to 2/1 to 2/2
98.09 — 60	16	0		96		Small to large vesicles; no odor; 10YR 2/2
96.72	17	0		104		Small to large vesicles; no odor; 10YR 3/1 to 2/1 to 2/2
— 70						
95.43	18	0.2		95		Small to medium vesicles; no odor; 10YR 2/2
94.89	19	0.3		102		Small to medium vesicles; grout seams 76.65-76.9 and 77.5'; no odor; 10YR 2/2

WELL CONSTRUCTION



Corrected elevations are provided for angle borings.

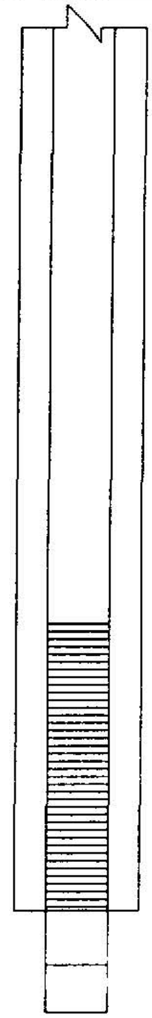
This information pertains only to this boring and should not be interpreted as being indicitive of the site.

PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-07
Project No. CTO 0229

LOCATION: Tank 7	ELEVATION: 113.96		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 01/17/01	LOGGED BY: Gary Gleason	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION	WELL CONSTRUCTION
93.59 / 80	20	0.3		98		Small to medium vesicles; grout seams 79.3, 81-81.6, and 82'; no odor; 10YR 2/2	
92.53	21	0.4		102		Small to large vesicles; grout seams 83.9-84.5, 85.45, 85.2-85.35, 87, and 87.8'; no odor; 10YR 2/2 to 3/1	
91.24 / 90	22	0.6		98		Small to large vesicles; grout seams 89.55, 91.1-91.5, and 91.8-92'; no odor; 10YR 3/1 to 2/2	
89.86	23	6.6	RH-BR-7-S03	100		Small to large vesicles; odor; 5YR 3/2	
88.52 / 100	24	0		98		Small to medium vesicles; grout seams 98.45-99.15, 99.3- 99.7, 100.7, 100.9-101, 101.45-101.5, and 102.35-102.7'; no odor; 10YR 2/2 to 2/1	
87.35	25	9.6		100		Small to medium vesicles; grout seams 102.5-103.45, 103. 85-105.2, and 105.5-107'; odor; 10YR 2/1	
86.06 / 110	26	41	RH-BR-7-S04	104		Small to large vesicles; grout seams 111.6-112.8'; odor; 10YR 2/1	
84.77	27	15.2	RH-BR-7-S05	100		Small to medium vesicles; grout seams 112.8-114, 114.15- 114.9, 115.6-116, and 116.3-118'; odor; 10YR 2/1 to 2/2	
83.42	28	15.4		100		Small to medium vesicles; grout seams 118-119.4'; odor; 10YR 2/2	
82.90 / 120	29	36.9		100		Small to medium vesicles; grout seams 120.4-121, 121.25- 122.1, 122.25-122.85, 123.2, and 123.8-125.7'; odor; 10YR 2/1	
81.56	30	26		68		Small to medium vesicles; grout seams 125.2-127.05; odor; 10YR 2/1 to 2/2	
80.60 / 130						B-07 terminated at 128.9'	
140							
150							

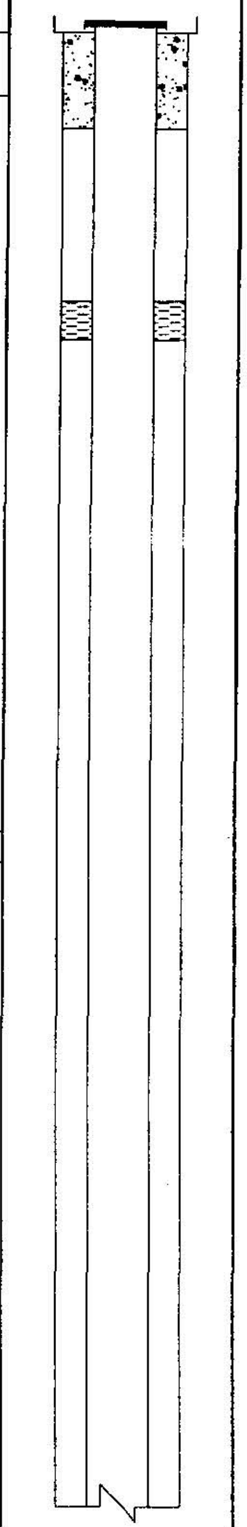


Corrected elevations are provided for angle borings.

PROJECT: Red Hill Bulk Storage Facility	**Boring/Monitoring Well No.** B-08
CLIENT: PACNAVFACENGCOM	**Project No.** CTO 0229
LOCATION: Tank 8	ELEVATION: 113.67
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 01/15/01 — LOGGED BY: Gary Gleason
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER> FIRST: NA — COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION
113.67 — 0						
113.13	1	2.5	RH-BR-8-S01	100		Concrete 0-0.5'; over fine to coarse sand with slight fine gravel 0.5-2.1'; odor
112.56	2	3.4		59		Basalt; odor
	3	NM		82		Small to medium vesicles; no odor; 5YR 3/2
111.52						
110.93 — 10	4	NM		100		Small to primarily medium vesicles; no odor; 5YR 3/2
	5	0		96		Small to medium vesicles; no odor; 5YR 3/2
109.53	6	NM		100		Primarily small to medium vesicles; grout seams 16.7-17. 9 and 18.75'; no odor; 5YR 3/2
108.80 — 20	7	NM		92		Small to primarily large vesicles; grout seams 18.8, 20.2, and 21.15-22.1'; no odor; 10YR 2/2
107.51	8	0		124		Small to primarily large vesicles; no odor; 10YR 2/2
106.35 — 30	9	0		100		Small to primarily large vesicles; no odor; 10YR 2/2
104.97	10	0		100		Small to large vesicles with primarily medium vesicles; no odor; 10YR 2/2
103.68						
103.20 — 40	11	0		100		Small to medium vesicles; clinker zone from 40.45-41.25'; 5YR 3/2
						Clinker zone
102.33	12	0		96		Small to medium vesicles; no odor; 5YR 3/2
100.96 — 50	13	0		100		Medium to large vesicles; grout seams 50.6-50.9 and 53.5'; no odor; 5YR 3/2
99.64	14	0		100		Medium to large vesicles; grout seams 56.85 and 59.2-59.3'; no odor; 10YR 2/2
98.32 — 60	15	0		100		Small to medium vesicles; grout seams 59-62.2, 63.3, and 63.95'; no odor; 10YR 2/2
96.98	16	0		98		Primarily small to large vesicles; grout seam 69.5'; no odor; 5YR 3/2
95.60 — 70	17	0		102		Medium to large vesicles; no odor; 10YR 2/2
94.28	18	0		87		Small to large vesicles; no odor; 5YR 3/2

WELL CONSTRUCTION



This information pertains only to this boring and sh[illegible] not be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

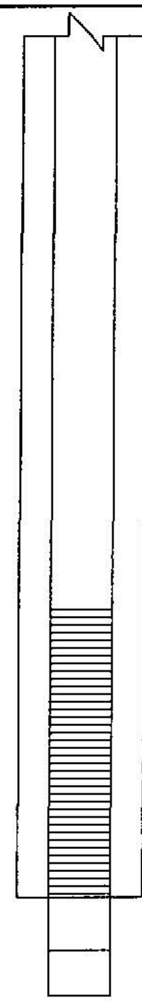
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-08
Project No. CTO 0229

LOCATION: Tank 8	ELEVATION: 113.67		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 01/15/01	LOGGED BY: Gary Gleason	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION
93.17			RH-BR-8-S02			
80 / 92.45	19	0		94		Small to medium vesicles; grout seams 80.8-81.55'; no odor; 5YR 3/2
	20	0		100		Primarily small to medium vesicles; grout seams 83.25-83.35 and 86.3-86.6'; no odor; 5YR 3/2
91.26	21	0		96		Primarily small to medium vesicles; grout seams 87.5-90'; no odor; 5YR 3/2
90 / 89.91	22	0		102		Small to large vesicles; no odor; 10YR 3/1
88.75	23	0		98		Small to primarily large vesicles; no odor; 10YR 3/1 to 5YR 3/2
100 / 87.37	24	0		102		Small to large vesicles; no odor; 5YR 3/2 to 10YR 3/1
86.03	25	0		100		Small to medium vesicles; no odor; 10YR 3/1
110 / 84.66	26	0		98		Small to medium vesicles; no odor; 10YR 3/1
			RH-BR-8-S03			
83.31	27	0		102		Small to medium vesicles; grout seams 119.45-119.95'; no odor; 10YR 3/1 to 5YR 3/2
120 / 81.99	28	0		100		Small to medium vesicles; grout seams 122.4-123.05'; no odor; 5YR 3/2 to 10YR 3/1
80.75						
						B-08 terminated at 127.2'
130						
140						
150						

WELL CONSTRUCTION



This information pertains only to this boring and s... not be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

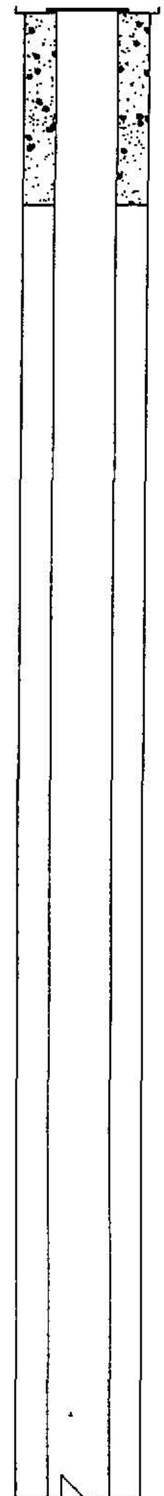
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B09A
Project No. CTO 0229

LOCATION: Tank 09	ELEVATION: 113.94		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 10/26/98	LOGGED BY: Fermin Esquibell	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 11	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
113.94 — 0	1			57	Concrete 0-2.5' over fine to coarse sand with fine gravel and silt 2.5-3.2'; basalt 3.2'
113.27	2		B09A-1	94	Basalt; medium gray
	3			96	
111.86 — 10	4			104	Basalt; medium dark gray; grout seams 18.3-19.3'
110.01 — 20	5			100	Basalt; medium dark gray; grout seams 20.9-22.0 and 23.3-25.6'
108.12 — 30	6			103	Basalt; medium gray; grout seams 29-33 and 33.6-34.7'
106.23 — 40	7			95	Basalt; dark gray
104.27 — 50	8			101	Basalt; greenish black from 50 to 50.7 '
102.40 — 60	9			87	Basalt; medium gray; grout seam 61.5'
	10			71	
— 70	11			97	
99.42	12			117	Basalt; 5YR 2/1

WELL CONSTRUCTION



Corrected elevations are provided for angle borings.

This information pertains only to this boring and s[illegible] not be interpreted as being indicitive of the site.

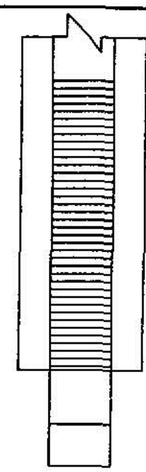
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B09A
Project No. CTO 0229

LOCATION: Tank 09	ELEVATION: 113.94		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 10/26/98	LOGGED BY: Fermin Esquibell	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 11	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION
98.87 / 80	13			107		Basalt; grayish black; grout seam 83-83.2'
97.76	14			100		Basalt; grayish black; grout seam 84.8'
96.73 / 90	15			89		Basalt; grayish black
95.83	16			106		Basalt; dark gray
			B09A-2			
94.86 / 100						Original B09A terminated at 98.3'; re-drilled and new boring terminates at 100'
110						
120						
130						
140						
150						

WELL CONSTRUCTION



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Corrected elevations are provided for angle borings.

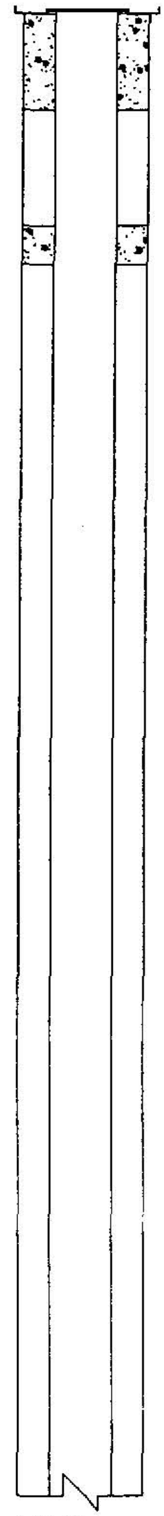
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-10
Project No. CTO 0229

LOCATION: Tank 10	ELEVATION: 113.71		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 1/8/01	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
113.71 — 0	1			64	Concrete 0-2' over fine to coarse sand with fine gravel and silt 2-2.5; basalt 2.5'; no odor
112.26					
111.85	2	0		87	Medium vesicles; no odor; 10YR 2/2
111.46	3	0		100	Medium vesicles; no odor; 5YR 3/2
10	4	0		89	Large vesicles; grout seams 9.3, 9.7, and 10.7-11.7'; no odor; 10YR 2/2
110.29					
109.96	5	0		100	Large vesicles; no odor; 10YR 2/2
109.65	6	0		108	Large vesicles; no odor; 10YR 2/2
109.34	7	0		108	Large vesicles; no odor; 10YR 2/2
	8	0		97	Large vesicles; grout seam 17.0'; no odor; 10YR 2/2
108.53					
108.20 — 20	9	0		92	Medium vesicles; no odor; 10YR 2/2
	10	0		102	Medium vesicles; no odor; 10YR 2/2
107.08					
106.93	11	0		100	Small vesicles; grout seam 26.1'; no odor; 10YR 2/2
	12	0		98	Small vesicles; no odor; 10YR 2/2
105.82 — 30					
105.40	13	0		100	Large vesicles; no odor; 10YR 2/2
	14	0		100	Medium vesicles; grout seam 36.3-37.1'; no odor; 10YR 2/2
104.11					
	15	0		102	Medium vesicles; grout seam 37.1-41.2'; no odor; 5YR 3/2
40					
102.84					
	16	0		100	Large vesicles; no odor; 10YR 2/2
101.55					
	17	0		100	Medium vesicles; grout seams 47.6-49.0 and 51.5'; no odor; 10YR 2/2
50					
100.30					
	18	0		100	Large vesicles; grout seam 54.2';no odor; 10YR 2/2
98.96					
	19	0		100	Medium vesicles; grout seam 59'; no odor; 10YR 2/2
60			RH-BR-10-S01		
97.77					
97.40	20	0		100	Medium vesicles; grout seam 66.3'; clinker zone 63-64.7'; no odor; 10YR 2/2
					Clinker zone
96.52					
	21	0		106	Large vesicles; grout seam 66.4-68'; no odor; 10YR 2/2
95.31 — 70					
	22	0		116	Medium vesicles; grout seam 73.7-75.2'; no odor; 10YR 2/2
94.14					
	23	0		87	Medium vesicles; grout seam 75.6-77.7'; no odor;

WELL CONSTRUCTION



Corrected elevations are provided for angle borings.

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

PROJECT: Red Hill Bulk Storage Facility	**Boring/Monitoring Well No.** B-10
CLIENT: PACNAVFACENGCOM	**Project No.** CTO 0229
LOCATION: Tank 10	ELEVATION: 113.71
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 1/8/01 — LOGGED BY: Lance Williams
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER> FIRST: NA — COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2

Corrected Elevation/	Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
						10YR 2/2
92.80	80	24	0		102	Medium vesicles; grout steam 81.4-83.6'; no odor; 10YR 2/2
91.53		25	0		100	Large vesicles; no odor; 10YR 2/2
90.18	90	26	0		102	Large vesicles; no odor; 10YR 2/2
88.92		27	0		100	Large vesicles; no odor; 10YR 2/2
87.54	100	28	0	RH-BR-10-S01	86	Medium vesicles; no odor; 10YR 2/2
86.09		29	0		94	Medium vesicles; no odor; 10YR 2/2
84.77	110					
84.61		30	0		95	Medium vesicles; grout seam 112-112.6'; clinker zone 112.45-114.25'; no odor; 10YR 2/2
83.95						Clinker zone
83.64		31	0		100	Clinker zone Large vesicles; grout seams 116.4-116.8 and 117.35'; clinker zone 115-130.7'; no odor; 10YR 2/2
82.32	120	32	0	RH-BR-10-S03	92	Small to medium vesicles; clinker zone 122.5-123.1'; no odor; 10YR 2/2
80.97		33	0		10	Medium vesicles; no odor; 10YR 2/2
79.88	130					BR-10 terminated at 130.7'
	140					
	150					

WELL CONSTRUCTION

Corrected elevations are provided for angle borings.

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

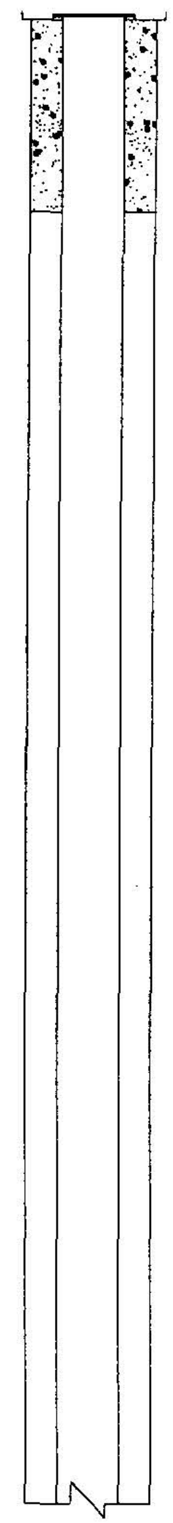
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-11
Project No. CTO 0229

LOCATION: Tank 11	ELEVATION: 117.98		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 12/15/00	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Depth	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
117.98	0	1	NM		53	Concrete 0-2' over fine to coarse sand with fine gravel and silt 2-2.5'; basalt 2.5'; slight odor
116.95		2	14.1	RH-BR-11-S01	100	Basalt; strong odor
116.56		3	NM		60	Concrete and wood recovered; strong odor
116.43		4	NM		114	Concrete and wood recovered; strong odor
116.07		5	12.0		14	Wood recovered; slight odor
115.70	10	6	17.0		100	Medium vesicles; strong odor; 10YR 2/2
115.52		7	19.4	RH-BR-11-S02	100	Medium vesicles; sheen on rock; strong odor; 10YR 2/2
115.31		8	19.8		104	Medium vesicles; strong odor; 10YR 2/2
114.07		9	2.7		100	Medium vesicles; no odor; 10YR 2/2
112.73	20	10	3.1	RH-MW-11 (FP)	95	Large vesicles; slight odor; 10YR 2/2
111.67		11	4.0		100	Medium vesicles; no odor; 10YR 2/2 to 5YR 3/2
110.32	30	12	2.3		45	Large vesicles; no odor; 5YR 3/2
108.09	40	13	9.8		102	Medium vesicles; slight odor; 10YR 2/2
106.77		14	0.0		98	Medium vesicles; slight odor; 10YR 2/2
105.43	50	15	0.5		100	Small vesicles; no odor; 10YR 2/2
104.11		16	0.2		102	Medium vesicles; no odor; 10YR 2/2
102.79	60	17	0.2		72	Medium vesicles; no odor; 10YR 2/2
101.75		18	24.3		96	Large vesicles; strong odor; 5YR 3/2
	70			RH-BR-11-S03		
99.01		20	3.9		90	Medium vesicles; no odor; 5YR 3/2
98.23		21	2.8		100	Large vesicles; no odor; 10YR 2/2

WELL CONSTRUCTION



Corrected elevations are provided for angle borings.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

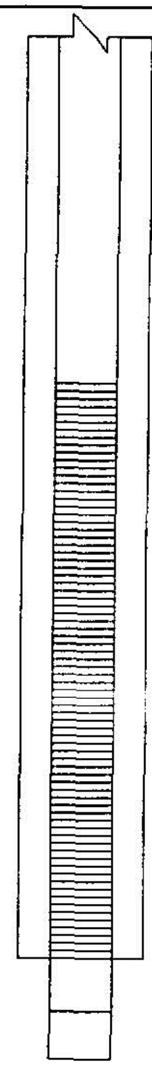
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-11
Project No. CTO 0229

LOCATION: Tank 11	ELEVATION: 117.98		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 12/15/00	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION
80						
96.91						
	22	21.4		39		Medium vesicles; grout seam 86.5'; strong odor; 10YR 2/2
95.46			RH-BR-11-S04			
	23			20		Medium vesicles; no odor; 10YR 2/2
94.82						
90	24	55.8		96		Large vesicles; grout seams 90.2, 91.4, and 94.8'; strong odor; 10YR 2/2
93.42						
	25	80.3	RH-BR-11-S05	93		Large vesicles; strong odor; 10YR 2/2
92.59						
92.28	19	7.9		100		Large vesicles; strong odor; 5YR 3/2
100	26	3.5		106		Large vesicles; grout seam 101.1'; no odor; 10YR 2/2
91.06						
	27	1.6		93		Medium vesicles; no odor; 10YR 2/2
89.67						
110	28			104		Large vesicles; no odor; 10YR 2/2
88.35						
	29	0.5		43		Small vesicles; no odor; 10YR 2/2
120						
86.53						
	30					Medium vesicles; no odor; 10YR 2/2
84.85						
	31			17		Small vesicles; no odor; 10YR 2/2
84.07						
130						B-11 terminated at 131.0'
140						
150						

WELL CONSTRUCTION



This information pertains only to this boring and sh not be interpreted as being indictive of the site.

Corrected elevations are provided for angle borings.

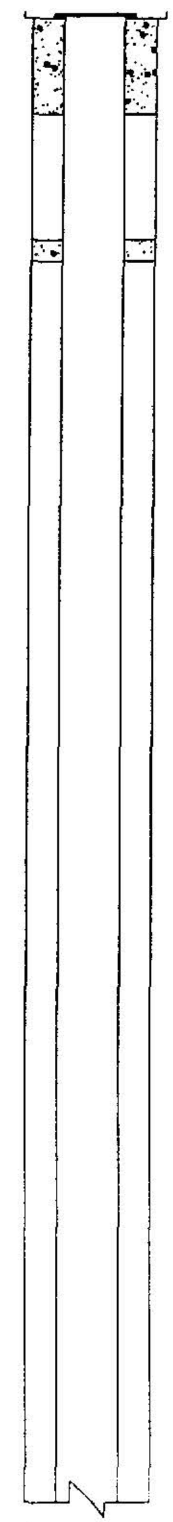
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-12
Project No. CTO 0229

LOCATION: Tank 12	ELEVATION: 117.71		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 12/12/00	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 2		

Corrected Elevation/ Boring Length (ft)		Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
117.71	0	1	NM		100	Concrete 0-2' over fine to coarse sand with fine gravel and silt 2-2.5'; basalt 2.5'; no odor
116.52						
116.05		2	1.6		56	Medium vesicles; slight odor; 10YR 2/2
115.74		3	0.6		92	Small vesicles; strong odor; 10YR 2/2
115.43		4	0.3	RH-BR-12-S01	100	Medium vesicles; slight odor; 10YR 2/2
	10	5	1.0		100	Small vesicles; no odor; 10YR 2/2
114.45		6	1.3		89	Grout seam 16.8-17.0'; no odor; 10YR 2/2
113.31		7	1.2		102	Small vesicles; grout seam 17.0-18.2'; no odor; 10YR 2/2
112.04	20	8	1.5		96	Small vesicles; grout seam 22.9-26.9'; no odor; 10YR 2/2
110.75		9	1.3		106	Small vesicles; grout seam throughout; no odor; 10YR 2/2
109.51	30	10	26.0	RH-BR-12-S02	102	Small vesicles; strong odor; 10YR 2/2
108.21		11	2.8		100	Small vesicles; grout seam throughout; strong odor; 10YR 2/2
106.92	40	12	2.2		102	Large vesicles; grout seam 46'; slight odor; 10YR 2/2
105.65		13	1.8		100	Medium vesicles; grout seam 47.8 and 49.5-50.4'; slight odor; 10YR 2/2
104.33	50	14			96	Small vesicles; no odor; 10YR 2/2
102.96		15	1.9		100	Medium vesicles; strong odor; 10YR 2/2
101.92	60					
101.61				RH-BR-12-S03		Clinker zone 61-62'
		16	17.3		98	Grout seam 65'; slight odor; 10YR 2/2
100.24		17	1.0		100	Small vesicles; no odor; 10YR 2/2
	70					
98.87		18	0.1		90	Medium vesicles; no odor; 10YR 2/2
97.86		19	0.1		100	Small vesicles; no odor; 10YR 2/2

WELL CONSTRUCTION



Corrected elevations are provided for angle borings.

This information pertains only to this boring and sh[illegible]ot be interpreted as being indicitive of the site.

PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

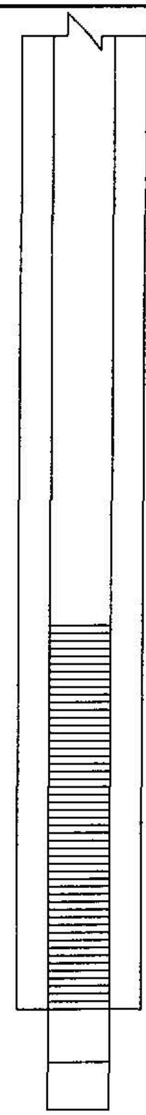
Boring/Monitoring Well No. B-12
Project No. CTO 0229

LOCATION: Tank 12	ELEVATION: 117.71		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 12/12/00	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION
97.55	20	2.2		102		Small vesicles; no odor; 10YR 2/2
96.23	21	0.0		92		Medium vesicles; no odor; 10YR 2/2
94.88	22	NM		100		Medium vesicles; no odor; 10YR 2/2
93.64	23	0.1		111		Medium vesicles; no odor; 10YR 2/2
92.42	24	0.0		100		Medium vesicles; no odor; 10YR 2/2
91.18	25	0.0	RH-BR-12-S04 RH-BR-12-D06	100		Large vesicles; no odor; 10YR 2/2
89.78	26	0.7		102		Medium vesicles; slight odor; 10YR 2/2
88.46	27	1.9		102		Large vesicles; odor; 10YR 2/2
87.12	28	26.4	RH-BR-12-S05	96		Medium vesicles; slight odor; 10YR 2/2
85.72	29	1.9		100		Medium vesicles; no odor; 10YR 2/2
84.50	30	0.8		100		Small vesicles; no odor; 10YR 2/2
83.13						B-12 terminated at 133.6'

Boring length scale (ft): 80, 90, 100, 110, 120, 130, 140, 150

WELL CONSTRUCTION



Corrected elevations are provided for angle borings.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

This information pertains only to this boring and sho[illegible]ot be interpreted as being indicative of the site.

PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-13
Project No. CTO 0229

LOCATION: Tank 13	ELEVATION: 121.95
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 12/8/00 — LOGGED BY: Lance Williams
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER> FIRST: NA — COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 2

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
121.95 (0)	1	NM		100	Concrete 0-2' over fine to coarse sand with fine gravel and silt 2-2.5; basalt 2.5'; odor; sheen on drill water
120.92					
120.50	2	179.2		4	Small vesicles; strong odor; 10YR 5/3
119.98	3	83.2		73	Small vesicles; strong odor; 10YR 3/1
119.88	4	92.9	RH-BR-13-S04	100	Large vesicles; strong odor; 10YR 2/2
119.72 (10)	5	10.7		100	Sample was obtained from adjacent boring
		4.4			*Large vesicles; no odor; 10YR 2/2*
118.46	6	6.4		100	Medium vesicles; no odor; 10YR 2/2
117.84	7	6.7		68	Large vesicles; no odor; 10YR 2/2
116.77 (20)					Lava tube 20-22.8'
115.84	8	5.7		91	Large vesicles; no odor; 10YR 2/2
114.50 (30)	9	7.0		100	Medium vesicles; no odor; 10YR 2/2
113.20	10	7.4		100	Large vesicles; no odor; 10YR 2/2
111.91 (40)	11	6.8		104	Large vesicles; no odor; 10YR 2/2
110.72	12	3.3		64	Large vesicles; no odor; 10YR 2/2
109.81	13	4.4		113	Medium vesicles; no odor; 10YR 2/2
108.67 (50)	14	2.3		102	Medium vesicles; no odor; 10YR 2/2
107.35	15	5.9		93	Small vesicles; no odor; 5YR 2.5/2
105.96 (60)	16	7.1		100	Small vesicles; no odor; 5YR 2.5/2
104.97	17	5.5		102	Medium vesicles; no odor; 10YR 2/2
103.65 (70)	18	5.3	RH-BR-13-S01 RH-BR-13-D05	94	Medium vesicles; no odor; 10YR 2/2
102.25	19	6.8		100	Medium vesicles; no odor; 10YR 2/2

WELL CONSTRUCTION

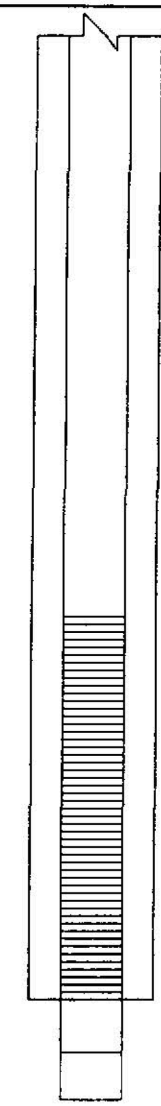
Corrected elevations are provided for angle borings.

PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-13
Project No. CTO 0229

LOCATION: Tank 13	ELEVATION: 121.95		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 12/8/00	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION	WELL CONSTRUCTION
100.93 / 80	20	7.0		84		Small vesicles; no odor; 10YR 2/2 to 5YR 2.5/2	
99.33	21	5.8		98		Small vesicles; no odor; 10YR 2/2	
97.96 / 90	22	7.8		102		Medium vesicles; no odor; 10YR 2/2	
96.66	23	5.5	RH-BR-13-S02	96		Small vesicles; no odor; 10YR 2/2	
95.29 / 100	24	6.8		100		Medium vesicles; no odor; 5YR 2.5/2	
93.95	25	6.7		104		Large vesicles; no odor; 10YR 2/2	
92.65 / 110	26	5.7		94		Medium vesicles; no odor; 10YR 2/2	
91.41	27	5.0		100		Small vesicles; no odor; 10YR 2/2	
90.09 / 120	28	5.1	RH-BR-13-S03	104		Small vesicles; no odor; 10YR 2/2	
88.80	29	1.9		100		Small vesicles; no odor; 10YR 2/2	
87.50 / 130							
140						*B-13 terminated at 133.1'*	
150							



This information pertains only to this boring and sh[illegible]t be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-14
Project No. CTO 0229

LOCATION: Tank 14	ELEVATION: 121.75		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 12/05/00	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION	WELL CONSTRUCTION
121.75 — 0	1			13		Concrete 0-2' over fine to coarse sand with fine gravel and silt 2-2.5'; basalt 2.5'	
	2			75			
119.60	3	0.0		95		Medium vesicles; 10YR 3/1	
119.11 — 10	4	0.0		100		Medium vesicles; grout seam 13.2'; 10YR 3/1 to 2/2	
117.76	5	0.0		100		Medium vesicles; 10YR 3/1	
116.50 — 20	6	0.0		102		Medium vesicles; grout seams 23.4-25'; 10YR 2/2	
115.18	7	2.0		98		Small vesicles; grout seams 26.7-28.3 and 30.4'; 10YR 2/2	
113.80 — 30	8	6.2		98		Medium vesicles; grout seams 31.5-33.5 and 34.9'; 10YR 3/2	
112.43	9	9.8	RH-BR-14-S01	102		Large vesicles; grout seams throughout; 10YR 3/2	
111.11 — 40	10	10.8		102		Medium vesicles; 10YR 3/1	
109.82	11	4.7		100		Medium vesicles; 10YR 3/1	
108.52 — 50	12	2.0		100		Grout seam 55.7'; 10YR 2/2	
107.20	13	2.0		100		Small vesicles; grout seam 57.1'; 10YR 3/2	
105.86 — 60	14	1.6	RH-BR-14-S02 RH-BR-14-D04	92		Small vesicles; 10YR 2/2	
104.51	15	0.6		113		Medium vesicles; grout seam 67.2, 68, 68.7, and 69.7-70.8'; 10YR 2/1	
103.35 — 70	16	NM		100		Medium vesicles; grout seam 72'; 10YR 3/2	
102.03	17	1.6	RH-BR-14-S03	98		Large vesicles; 10YR 2/2	

Corrected elevations are provided for angle borings.

PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-14
Project No. CTO 0229

LOCATION: Tank 14		ELEVATION: 121.75	
DRILLER: Salisbury & Associates, Inc.		DATE DRILLED: 12/05/00	LOGGED BY: Lance Williams
DRILL RIG: SAITECH EH5, Portable Core Drill		DEPTH TO WATER>	FIRST: NA / COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
100.66 (80)	18	2.0		102	Medium vesicles; 10YR 2/2
99.49	19	19.8		100	Medium vesicles; grout seam 90.2-91.2'; 10YR 2/2
98.15 (90)	20	19.7		100	Small vesicles; grout seams throughout; 10YR 2/2; heavy staining on core
96.83	21	44.4	RH-BR-14-S04	100	Large vesicles; grout seam 100.4'; 10YR 2/2
95.51 (100)	22	9.1		100	Small vesicles; hydrocarbon odor and stain; 10YR 2/2
94.16	23	3.9		100	Medium vesicles; grout seam 109.3-110.7'; hydrocarbon odor and stain; 10YR 2/2
92.81 (110)	24	2.0		100	Small vesicles; hydrocarbon odor and stain; 10YR 2/2
91.47	25	NA	RH-BR-14-S05	102	Medium vesicles; hydrocarbon odor and sheen; 10YR 2/2
90.20 (120)	26	2.0		96	Large vesicles; hydrocarbon odor and sheen; 10YR 2/2
88.83 / 88.60	27	2.0		85	Large vesicles; hydrocarbon odor and sheen; 10YR 2/2
(130)					Lava tube 128.1-129.2'
87.22	28	68.4		100	Medium vesicles; 10YR 2/2
86.55					B-14 terminated at 136.0'
(140)					
(150)					

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Corrected elevations are provided for angle borings.

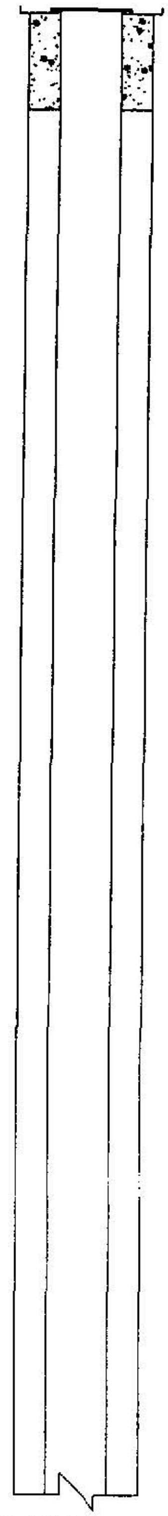
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-15
Project No. CTO 0229

LOCATION: Tank 15	ELEVATION: 125.88		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 12/02/00	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 13	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Depth	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
125.88	0	1	NM		51	Concrete 0-2' over fine to coarse sand with fine gravel and silt 2-2.5'; basalt 2.5'
		2			30	
124.13		3			120	
123.68		4	0		100	Medium vesicles; 10YR 2/2
	10	5	0.2		100	Medium vesicles; 10YR 2/2
123.00						
122.75		6	0		100	Clinker zone 12.8-13.9; 10YR 2/2
		7	0		93	Medium vesicles; grout seam 15.3-15.9'; 5YR 3/2
121.85						
121.49		8	1.0		69	Small vesicles; 5YR 3/2
	20	9	1.2		98	Small vesicles; 5YR 3/2
120.55		10	0.4		95	Medium vesicles; 10YR 2/2
119.60		11	1.6		96	Medium vesicle; 10YR 2/2
	30					
18.39						
117.89		12	1.2		95	Medium vesicles; 10YR 2/2
		13	1.4		94	Large vesicles; 10YR 2/2
116.79	40	14	1.2		100	Medium vesicles; 10YR 2/2
115.65		15	1.2		106	Medium vesicles; 10YR 2/2
114.52	50	16	0.2		98	Small vesicles; 10YR 2/2
113.51		17	1.2		100	Small vesicles; 10YR 2/2
112.14	60	18	1.0		70	Small vesicles; 10YR 2/2
				RH-BR-15-S01 RH-BR-15-D03		
111.15		19			96	Medium vesicles; 10YR 2/2
109.98	70	20	1.4		100	Medium vesicles; grout seam 75.4-75.9'; 10YR 2/2
08.81		21	0.9		100	Medium vesicles; grout seam 75.9-77'; 10YR 2/2

WELL CONSTRUCTION



Corrected elevations are provided for angle borings.

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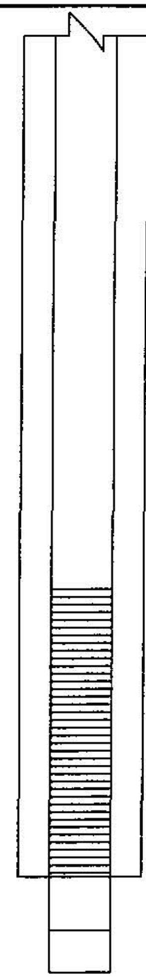
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-15
Project No. CTO 0229

LOCATION: Tank 15	ELEVATION: 125.88		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 12/02/00	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 13	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION	WELL CONSTRUCTION
107.64	22	1.2		100		Medium vesicles; 10YR 2/2	
106.49	23	1.2	RH-BR-15-S02	104		Small vesicles; 10YR 2/2	
105.27	24	0.9		100		Medium vesicles; 10YR 2/2	
104.24	25	1.2		100		Small vesicles; 5YR 2.5/1	
103.09	26	1.4		100		Small vesicles; 5YR 2.5/1	
101.95	27	1.0		100		Small vesicles; 5YR 2.5/1	
100.75	28	1.2		100		Small vesicles; 5YR 2.5/1	
99.58	29	1.2	RH-BR-15-S03	100		Small vesicles; 5YR 2.5/1	
98.41	30	0.6		100		Medium vesicles; 5YR 2.5/1	
97.45							
						B-15 terminated at 126.4'	

Boring length scale: 80, 90, 100, 110, 120, 130, 140, 150



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Corrected elevations are provided for angle borings.

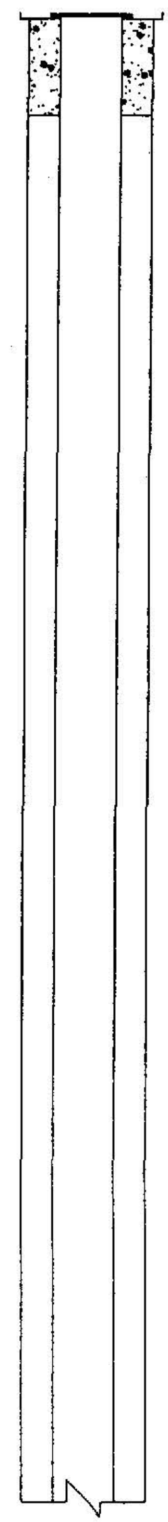
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B16A
Project No. CTO 0229

LOCATION: Tank 16A	ELEVATION: 125.70		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 10/21/98	LOGGED BY: Fermin Esquibell	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 11	WELL DIAMETER (inch): 2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION
125.70 / 0	1			69		Concrete 0-2' over grout 2-3.8'; basalt 3.8'; medium gray
125.32	2			86		Grout
124.98						Basalt; medium gray
124.25	3			103		Basalt; very dark gray
123.30 (10)	4			108		Basalt; gray
121.45 (20)	5			104		Basalt; grayish black
119.56 (30)	6			90		Basalt; medium gray
117.65 (40)	7			104		Basalt; dark, greenish gray
115.70 (50)	8			93		Basalt; dark, reddish brown
113.76 (60)	9			88		Basalt; medium dark gray
(70)	10			103		
110.91						

WELL CONSTRUCTION



Corrected elevations are provided for angle borings.

This information pertains only to this boring and sh[illegible]ot be interpreted as being indictive of the site.

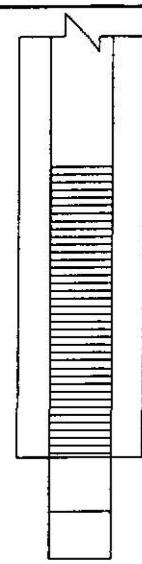
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B16A
Project No. CTO 0229

LOCATION: Tank 16A	ELEVATION: 125.70		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 10/21/98	LOGGED BY: Fermin Esquibell	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 11	WELL DIAMETER (inch): 2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION
80	11			102		Grout seam 81-81.8'
109.72			BR16A-4 B16A-DUP			Basalt; brownish black; grout seam 84-85.6'
109.05	12			89		Basalt; medium dark gray
90						
107.62	13			100		Basalt; medium gray
106.81	14			91		Basalt; dusky, yellowish brown
100			BR16A-5			
105.70						
						B16A terminated at 104.8'
110						
120						
130						
140						
150						

WELL CONSTRUCTION



This information pertains only to this boring and sh[illegible]ot be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

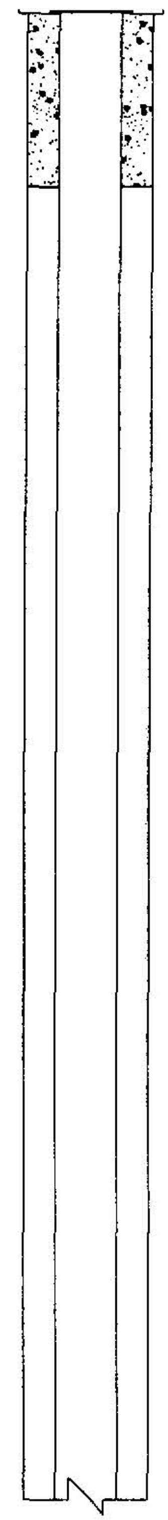
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-17
Project No. CTO 0229

LOCATION: Tank 17	ELEVATION: 129.75		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 11/07/00	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 13	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)		Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
129.75	0	1	11.2		40	Concrete 0-2' over fine to coarse sand with fine gravel and silt 2-2.5'; basalt 2.5'
129.19						Basalt
128.11		2	17.4		96	Medium vesicles; 10YR 2/1
	10			RH-BR-17-S01		
127.03		3	10.7		100	Medium vesicles; 5YR 2.5/2
125.99		4	10.1		98	Medium vesicles; 10YR 3/2
	20					
124.78		5	10.7		102	Medium vesicles; 10YR 3/1
123.65		6	10.1		100	Medium vesicles; 10YR 3/2
	30					
122.53		7	10.4		100	Medium vesicles; 10YR 3/1
				RH-BR-17-S02 RH-BR-17-D02		
121.40		8	9.8		100	Medium vesicles; 5YR 3/2
	40					
120.28		9	10.7		78	Medium vesicles; 5YR 3/2
119.16		10	10.3		100	Medium vesicles; 10YR 3/1
	50					
118.03		11	10.6		100	Medium vesicles; 10YR 3/1
116.91		12	10.5		100	Medium vesicles; grout seam 59.1'; 5YR 2.5/1
	60					
115.78		13	10.7		100	Medium vesicles; 10YR 2/1
114.86		14	10.6	RH-BR-17-S03	100	Medium vesicles; 5YR 2.5/1
113.98	70	15	10.7		100	Medium vesicles; grout seam 72.8'; 5YR 3/1
112.92		16	NM		100	Medium vesicles; 5YR 3/1
112.81		17	10.3		98	Medium vesicles; 10YR 2/2

WELL CONSTRUCTION



Corrected elevations are provided for angle borings.

This information pertains only to this boring and sh[illegible]ot be interpreted as being indicitive of the site.

PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-17
Project No. CTO 0229

LOCATION: Tank 17	ELEVATION: 129.75	
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 11/07/00	LOGGED BY: Lance Williams
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA / COMPL.: NA
BORING ANGLE: 13	WELL DIAMETER (inch): 1 1/2	

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION	WELL CONSTRUCTION
112.09	18	10.7		100		Medium vesicles; 10YR 3/1	
111.35 / 80							
110.97	19	83.2		100		Medium vesicles; 10YR 3/1	
110.61	20	10.7		81		Medium vesicles; 10YR 3/1	
	21	7.7		100		Medium vesicles; 10YR 3/1	
109.44 / 90	22	95.1		100		Medium vesicles; 10YR 3/1	
108.25	23	14.1		100		Medium vesicles; 10YR 2/2	
107.08 / 100	24	11.5		90		Large vesicles; 10YR 2/1	
105.93							
105.86	25	NM		267		Large vesicles; 10YR 2/1	
	26	7.0		104		Large vesicles; 10YR 2/1	
104.74 / 110	27	7.0		100		Large vesicles; 10YR 2/2	
103.95							
103.79	28	NM		100		Clinker zone; 10YR 2/1	
103.50	29	7.8		100		Clinker zone; 10YR 2/1	
103.21	30			77		Clinker zone; 10YR 2/1	
102.78	31			61		Clinker zone; 10YR 2/1	
120	32	NM		121		Large vesicles; 10YR 2/1	
101.81							
						B-17 terminated at 124.2'	
130							
140							
150							

This information pertains only to this boring and sh ot be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

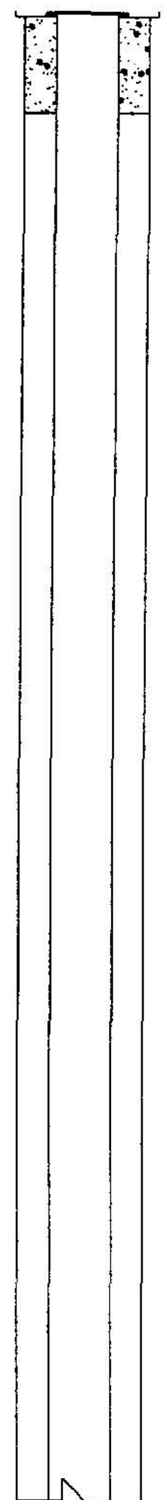
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-18
Project No. CTO 0229

LOCATION: Tank 18	ELEVATION: 129.58		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 11/02/00	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 13	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION
129.58 — 0	1			70		Concrete 0-2.7'; over fine to coarse sand with fine gravel and silt 2-2.5'; basalt 2.5'; 5YR 2.5/2; no odor
128.97						Sand
128.03	2	10.1		33		Basalt; no odor; 5YR 2.5/2
	3			111		
127.17 — 10	4	12.3		98		Basalt; no odor; 5YR 2.5/2
125.98	5	10.7		102		Basalt; no odor; 10YR 2/1
124.83 — 20	6	10.8		100		Grout seams 21.9, 22.1, and 22.8'; no odor; 10YR 2/1
123.66	7	18.1		100		Basalt; no odor; 10YR 2/1
122.52 — 30	8	10.8		102		Basalt; no odor; 10YR 2/1 to 5YR 3/2
121.39	9	10.7		102		Basalt; no odor; 5YR 3/2
120.22 — 40	10	10.6		100		Basalt; slight odor; 5YR 3/2
119.08	11	12.3		100		Basalt; no odor; 5YR 3/2
117.91 — 50	12	10.4		100		Basalt; no odor; 5YR 3/2
116.74	13	10.5		94		Basalt; no odor; 5YR 3/2 to 10YR 2/1
115.59 — 60	14	10.7		106		Basalt; no odor; 10YR 2/1
114.49	15	11.3		100		Basalt; no odor; 10YR 2/1
113.32 — 70	16	10.7		93		Basalt; no odor; 10YR 2/2
112.33	17	8.6		93		Basalt; no odor; 10YR 2/1

WELL CONSTRUCTION



This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-18
Project No. CTO 0229

LOCATION: Tank 18	ELEVATION: 129.58		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 11/02/00	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 13	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	Graphic Log	SOIL DESCRIPTION	WELL CONSTRUCTION
111.22 (80)	18	9.4	RH-BR-18-S01	98		Grout seam 86.5'; no odor; 10YR 3/2	
110.03	19	12.4		116		Small vesicles; no odor; 10YR 3/2	
109.47 (90)	20	9.2		104		Small vesicles; no odor; 10YR 3/1	
108.35	21	10.4		100		Small vesicles; no odor; 10YR 3/1	
107.24	22	10.4		150		Small vesicles; no odor; 10YR 3/1	
107.15 (100)	23	10.7		100		Small vesicles; no odor; 10YR 3/2	
105.98	24	9.8	RH-BR-18-S02	100		Large vesicles; grout seam 106.6'; no odor; 10YR 3/2	
104.79 (110)	25	10.3		100		Large vesicles; no odor; 5YR 3/1	
103.71 103.60	26	10.7	RH-BR-18-S03 RH-BR-18-D01	87		Clinker Zone Large vesicles; no odor; 10YR 3/2	
102.25 (120)	27	125.8		111		Large vesicles; no odor; 10YR 3/2	
101.24						B-18 terminated at 126'	
(130)							
(140)							
(150)							

Corrected elevations are provided for angle borings.

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

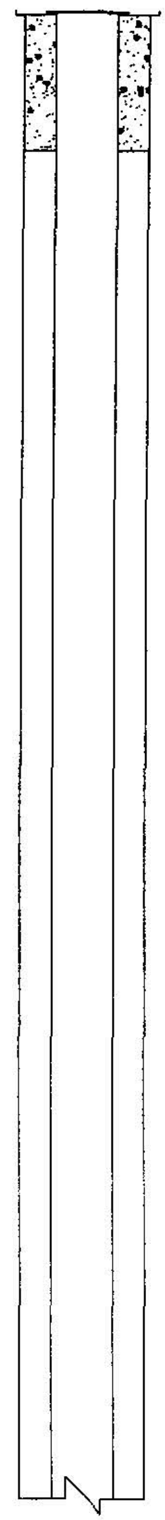
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-19
Project No. CTO 0229

LOCATION: Tank 19	ELEVATION: 133.68		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 11/22/00	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: 113.1'
BORING ANGLE: 13	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)		Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
133.68	0					Concrete 0-2' over fine to coarse sand with fine gravel and silt 2-2.5; basalt 2.5'; 10YR 3/2; clinker zone 0-51.4'
133.12						
132.22						Clinker zone
132.11		2			160	Small vesicles; 10YR 2/2; clinker zone
131.59		3			30	Clinker zone; 10YR 2/2
	10	4	13.5		55	Clinker zone; 10YR 2/2
130.94						
		5	14.0		42	Clinker zone; 10YR 2/2
130.40						
		6	10.4		104	Medium vesicles; 10YR 3/1; clinker zone
129.83						
		7	10.6		100	Clinker zone; 10YR 2/2
	20					
128.64						
		8	10.4		100	Clinker zone; 5YR 3/4
127.97						
		9	8.9		52	Clinker zone; 5YR 3/4
127.36						
		10	10.1		85	Large vesicles; clinker zone; 10YR 3/2
	30					
126.28						
125.99		11	NM		77	Clinker zone; 5YR 3/4
125.60		12	10.0		82	Clinker zone; 5YR 3/4
125.38		13	10.7		133	Clinker zone; 5YR 3/4
		14	7.7		76	Clinker zone; 5YR 3/4
124.66	40					
		15	94.7		97	Clinker zone; odor; 5YR 3/4
124.01						
123.78				RH-BR-19-S01		Clinker zone
		16	47.8		100	Medium vesicles; 10YR 3/2; clinker zone end 45.0'; odor
123.04						
122.79		17	10.7		109	Medium vesicles; 10YR 3/2; clinker zone
122.61		18	NM		100	Medium vesicles; 10YR 3/2; clinker zone
122.25	50	19	50.4		87	Medium vesicles; 10YR 3/2; clinker zone
122.12		20	8.3		100	Medium vesicles; 10YR 3/2; clinker zone
121.85		21	131		100	Small vesicles; slight odor; 10YR 2/2
121.29		22	111		100	Small vesicles; slight odor; 10YR 2/2
		23	0.0		100	Small vesicles; no odor; 10YR 2/1
120.12	60					
		24	154		100	Small vesicles; slight odor; 10YR 2/2
119.60						
		25	175	RH-BR-19-S02	90	Medium vesicles; strong odor; 10YR 2/2
118.43						
		26	167		104	Medium vesicles; no odor; 10YR 2/2
	70					
117.26						
		27	200		81	Small vesicles; no odor; 10YR 2/2
116.34						

WELL CONSTRUCTION



This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

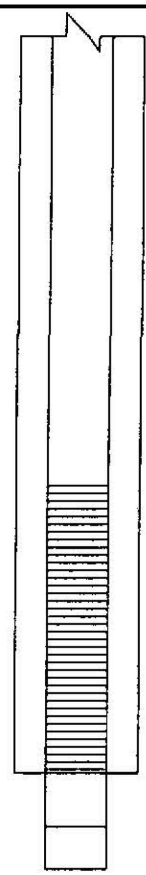
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-19
Project No. CTO 0229

LOCATION: Tank 19	ELEVATION: 133.68		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 11/22/00	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: 113.1'
BORING ANGLE: 13	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
115.71	28	25		75	Medium vesicles; no odor; 10YR 2/2
80	29	334		102	Small vesicles; no odor; 10YR 2/2
114.56	30	189		100	Large vesicles; no odor; 10YR 2/2
113.39 / 90	31	630		104	Large vesicles; no odor; 10YR 2/2
112.87 / 112.33	32	667	RH-BR-19-S03	117	Medium vesicles; no odor; 10YR 2/2
111.97	33			69	Large vesicles; no odor; 10YR 2/2
111.41	34			88	Small vesicles; no odor; 10YR 2/2
110.94 / 100	35	NM		102	Large vesicles; no odor; 10YR 2/2
	36	NM		100	Large vesicles; no odor; 10YR 2/2
109.09 / 110	37	350		102	Large vesicles; no odor; 10YR 2/2
107.99	38	582		121	Large vesicles; no odor; 10YR 2/2
107.45	39	406	RH-BR-19-S04	104	Large vesicles; no odor; 10YR 2/2
106.44 / 120					
					BR-19 terminated at 121.1'
130					
140					
150					

WELL CONSTRUCTION



This information pertains only to this boring and sh ot be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

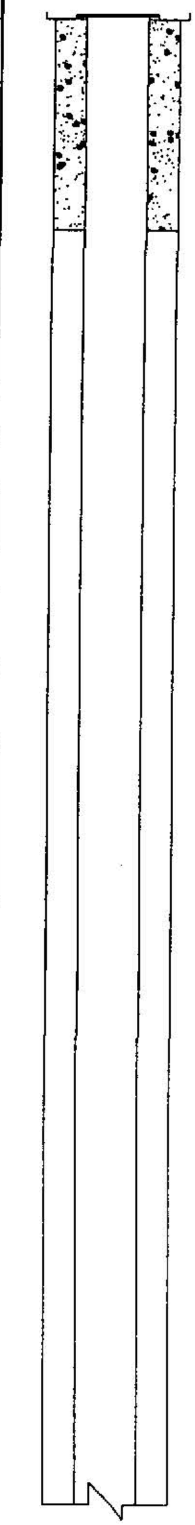
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-20
Project No. CTO 0229

LOCATION: Tank 20	ELEVATION: 133.54		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 3/2/01	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
133.54 — 0	1	75.1		84	Concrete 0-2' over fine to coarse sand with fine gravel and silt 2-2.5'; basalt 2.5'; strong odor
132.89	2		RH-BR-20-S01	24	Medium vesicles; no odor; 10YR 2/2
131.60	3	375		40	Small vesicles; strong odor; 10YR 2/2
— 10	4		RH-BR-20-S02	85	
130.56	5			100	Small vesicles; no odor; 10YR 2/2
129.43	6			109	Medium vesicles; no odor; 10YR 2/2
128.26 — 20					
127.92	7			177	Small vesicles; no odor; 5YR 3/2
	8			84	Small vesicles; grout seam 22.7-25.2'; no odor; 5YR 3/2 to 10YR 2/2
126.32	9			98	Small vesicles; no odor; 10YR 2/2 to 5YR 3/2
— 30					
124.95	10			111	Small vesicles; no odor; 10YR 2/2
124.25	11			90	Medium vesicles; no odor; 10YR 2/2
122.90 — 40	12			113	Medium vesicles; no odor; 10YR 2/2
121.71					
121.35	13			100	Small vesicles; no odor; 5YR 3/2
	14			100	Small vesicles; no odor; 10YR 2/2
120.50 — 50	15			96	Large vesicles; grout seam 52.3'; no odor; 10YR 2/2
119.10	16			98	Medium vesicles; grout seam 58'; no odor; 10YR 2/2
117.75 — 60	17			90	Large vesicles; grout seams 61.3-64.3 and 65.5'; no odor; 10YR 2/2
116.46	18			111	Medium vesicles; no odor; 10YR 2/2
115.24 — 70					
115.01	19			52	Small vesicles; no odor; 5YR 2/2
					Clinker zone 71.6-73.6'
114.15	20			98	Small vesicles; grout seam 75.0-79.1'; no odor; 10YR 2/2

WELL CONSTRUCTION



Corrected elevations are provided for angle borings.

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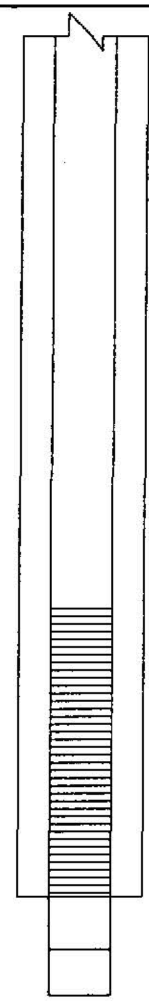
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-20
Project No. CTO 0229

LOCATION: Tank 20	ELEVATION: 133.54		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 3/2/01	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 15	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
113.04					
80	21			62	Small vesicles; grout seam 79.4'; no odor; 10YR 2/2
112.42					
	22			66	Small vesicles; grout seam 81.7-81.9'; no odor; 10YR 2/2
111.44					
	23			100	Small vesicles; no odor; 5YR 3/2
110.40					
90	24			103	Small vesicles; no odor; 5YR 3/2
109.65					
	25			96	Small vesicles; no odor; 10YR 2/2
108.95					
108.54	26			69	Small vesicles; no odor; 10YR 2/2
	27			31	Small vesicles; no odor; 10YR 2/2
107.87					
107.48 / 100	28			73	Small vesicles; no odor; 10YR 2/2
107.30	29			100	Small vesicles; no odor; 10YR 2/2
	30			32	Small vesicles; no odor; 5YR 3/2
106.65					
	31	NM	RH-BR-20-S03	50	Small vesicles; no odor; 5YR 3/2
106.03					
	32	NM		97	Large vesicles; no odor; 10YR 2/2
105.25					
04.76 / 110	33			53	Small vesicles; no odor; 10YR 2/2
	34			29	Small vesicles; no odor; 10YR 2/2
103.88					
103.67	35			125	Small vesicles; no odor; 10YR 2/2
103.47	36	467		112	Small vesicles; no odor; 10YR 2/2
	37			80	Medium vesicles; no odor; 10YR 2/2
102.30 / 120					
	38	629		75	Large vesicles; no odor; 10YR 2/2
100.98					
	39	420		147	Large vesicles; no odor; 10YR 2/2
100.49					
					BR-20 terminated at 127.7'
130					
140					
150					

WELL CONSTRUCTION



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Corrected elevations are provided for angle borings.

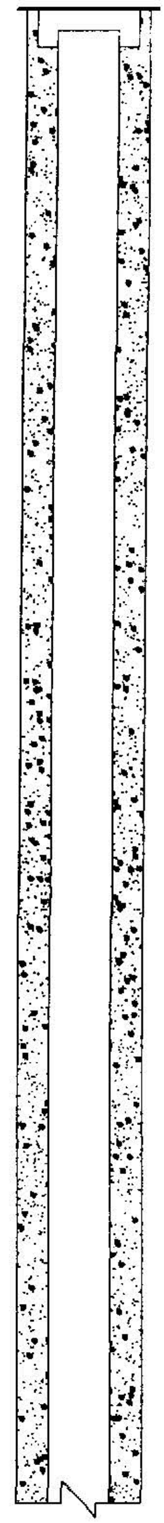
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-V1D
Project No. CTO 0229

LOCATION: V1D - Basal Aquifer	ELEVATION: 102.56		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 2/13/01	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: 86.0	COMPL.: 86.1
BORING ANGLE: 90	WELL DIAMETER (inch): 1"		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
102.56 / 0	1	NM		100	Concrete 0-2' over fine to coarse sand with fine gravel and silt 2-2.5; basalt 2.5'; no odor
102.06	2	172 NM		83	Small to large vesicles; no odor; 10YR 3/1
98.56	3	NM 99.2		71	Small to medium vesicles; no odor; 10YR 3/1 to 2/1
95.36	4	NM		0	Small vesicles; no odor; 5YR 3/2 to 10YR 2/2
94.16	5	NM		33	Small to medium vesicles; no odor; 5YR 3/2 to 10YR 2/2
93.66	6			100	Small to large vesicles; no odor; 10YR 2/2
91.76 / 10	7	124		105	Small to large vesicles; no odor; 10YR 2/2 to 3/2
	8			93	
86.06	9	NM		96	Primarily small to medium vesicles; no odor; 10YR 2/2
81.66 / 20	10	NM		100	Small to primarily large vesicles; no odor; 10YR 2/2 to 5YR 3/2 to 10YR 3/1
76.26	11	3.2		100	Small to large vesicles; no odor; 10YR 3/1 to 5YR 3/2
71.26 / 30	12	10.8		100	Small to medium vesicles; no odor; 5YR 3/2 to 10YR 3/1
66.16	13	NM		102	Small to large vesicles; no odor; 5YR 3/2 to 10YR 3/1
60.96 / 40	14	NM		100	Small to large vesicles; no odor; 10YR 2/2 to 5YR 3/2
57.26	15	NM		98	Small to medium vesicles; no odor; 10YR 2/2 to 5YR 3/2
56.91					Void
53.06 / 50	16	NM		98	Small to medium vesicles; no odor; 10YR 2/2 to 5YR 3/2
48.06	17	1.0		89	Small to medium vesicles; no odor; 10YR 2/2 to 5YR 3/2
43.36 / 60	18	6.9		100	Small to large vesicles; no odor; 10YR 3/1 to 2/2 to 5YR 3/2
38.36	19	1.8		83	Small to large vesicles; no odor; 10YR 2/5 to 5YR 3/2
34.26 / 70	20	0.0		92	Small to medium vesicles; no odor; 10YR 2/1 to 2/2 tp 5YR 3/2
29.16	21	0.0	RH-BR-V1D-S01	102	Small vesicles; no odor; 10YR 2/1

WELL CONSTRUCTION



Corrected elevations are provided for angle borings.

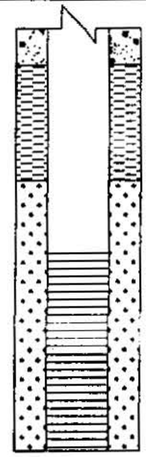
This information pertains only to this boring and should not be interpreted as being indicitive of the site.

PROJECT: Red Hill Bulk Storage Facility	Boring/Monitoring Well No. B-V1D
CLIENT: PACNAVFACENGCOM	Project No. CTO 0229

LOCATION: V1D - Basal Aquifer	ELEVATION: 102.56		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 2/13/01	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: 86.0	COMPL.: 86.1
BORING ANGLE: 90	WELL DIAMETER (inch): 1"		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
24.06 / 80	22	0		100	Medium vesicles; no odor; 10YR 2/2
18.86	23	0.0	RH-BR-V1D-S02	106	Medium vesicles; no odor; 10YR 2/2
15.66	24	0.0		96	Large vesicles; no odor; 10YR 2/1
90					
10.16 / 9.56	25	0.0		86	Small vesicles; no odor; 10YR 2/2
6.56					Clinker zone 93-100'
4.96	26	0.0		56	Medium vesicles; clinker zone; no odor; 10YR 2/1
4.96	27	0.0	RH-BR-V1D-S03	50	Medium vesicles; clinker zone; no odor; 10YR 2/2
2.56 / 100					Clinker zone
					B-V1D terminated at 100.0'
110					
120					
130					
140					
150					

WELL CONSTRUCTION



This information pertains only to this boring and s[illegible] not be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

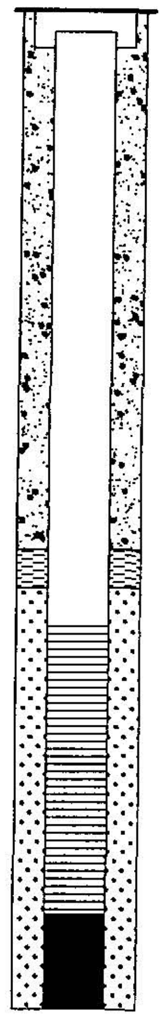
PROJECT: Red Hill Bulk Storage Facility
CLIENT: PACNAVFACENGCOM

Boring/Monitoring Well No. B-V2S
Project No. CTO 0229

LOCATION: V2S - Monitor Above Basal Aquifer	ELEVATION: 102.56		
DRILLER: Salisbury & Associates, Inc.	DATE DRILLED: 2/20/01	LOGGED BY: Lance Williams	
DRILL RIG: SAITECH EH5, Portable Core Drill	DEPTH TO WATER>	FIRST: NA	COMPL.: NA
BORING ANGLE: 90	WELL DIAMETER (inch): 1 1/2		

Corrected Elevation/ Boring Length (ft)	Core Run Number	PID Reading (ppm)	Sample Number	Core Recovery %	SOIL DESCRIPTION
102.56 (0)					
101.06	1	0.0		33	Concrete 0-2' over fine to coarse sand with fine gravel
99.16	2	0		100	and silt 2-2.5'; basalt 2.5'; no odor
	3	0.0		95	Medium vesicles; no odor; 10YR 2/2
97.06		0.0			Small vesicles; no odor; 10YR 2/2
95.36	4	0.0		112	Small vesicles; no odor; 10YR 2/2
	5	0.0		92	Medium vesicles; no odor; 10YR 2/2
91.46 (10)			RH-BR-V2S-S01		
89.16	6	0.0		100	Medium vesicles; no odor; 10YR 2/2
	7	0.0		91	Medium vesicles; no odor; 5YR 3/2
84.17					
(20)	8	0.0		90	Large vesicles; no odor; 10YR 2/2
			RH-BR-V2S-S02		
77.86					
75.16	9	0.0		100	Large vesicles; no odor; 10YR 2/2
	10	0.0		93	Small vesicles; no odor; 10YR 2/1 to 5YR 3/2
72.26 (30)					
70.56					Clinker zone
	11	0.0		83	Small vesicles; no odor; 5YR 3/2
67.06					
	12	0.0		89	Medium vesicles; no odor; 10YR 2/2
62.36 (40)					
	13	0.0		94	Small vesicles; no odor; 10YR 2/2
58.96					
	14	0.0	RH-BR-V2S-S03	96	Small vesicles; no odor; 5YR 3/2
54.06					
(50)	15	NM		NA	Small vesicles; no odor; 5YR 3/2
50.56					
					B-V2S terminated at 52.0'
(60)					
(70)					

WELL CONSTRUCTION



This information pertains only to this boring and sh[illegible]ot be interpreted as being indicitive of the site.

Corrected elevations are provided for angle borings.

Appendix 2

ANALYTICAL RESULTS TABLES

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 1
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	1,1-Dichloroethylene	2-Methylnaphthalene	bis(2-Ethylhexyl)phthalate	Ethylbenzene	Lead	Naphthalene	TPH (C10-C28)	Xylene (total)
TANK- 1	RH-BR-1-S01	REG	2	2/7/01	CORE	--	--	--	--	293	--	$\boxed{25300}$	--
TANK- 1	RH-BR-1-D09	DUP	59.6	2/8/01	CORE	--	5.02	--	--	--	1.23	890	--
TANK- 1	RH-BR-1-S02	REG	8	2/8/01	CORE	--	0.25	0.162	--	--	--	1500	--
TANK- 1	RH-BR-1-S03	REG	59.6	2/8/01	CORE	--	10.2	--	--	--	3.72	2330	0.436
TANK- 1	RH-BR-1-S04	REG	61.35	2/8/01	CORE	--	39.8	--	0.49	--	16.3	3300	4.81
TANK- 1	RH-BR-1-S05	REG	129.2	2/9/01	CORE	--	--	0.132	--	--	--	27.7	--
TANK- 1	RH-MW-1-S01	REG	124.2	3/7/01	DFLNAPL	0.00065	--	--	--	$\boxed{0.0756}$	--	1.88	--
TANK- 1	RH-MW-1-S01	REG	129.4	8/27/01	DFLNAPL	0.0013	--	--	--	--	--	1.3	--

Abbreviations:
-- Parameter not detected
REG - Regular sample
DUP - Duplicate sample
DFLNAPL - Drill fluid/LNAPL (light non-aquious phase liquid) mixture
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry
$\boxed{25300}$ - Analytical result exceeds the Hawaii DOH Tier I Action Level

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 2
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	Methylene chloride	TPH (C10-C28)
TANK- 2	RH-BR-2-S01	REG	2.5	2/5/2001	CORE	--	910
TANK- 2	RH-BR-2-S02	REG	89.45	2/6/2001	CORE	*0.011*	22.2
TANK- 2	RH-BR-2-S03	REG	119.9	2/6/2001	CORE	*0.0127*	--

Abbreviations:
-- Parameter not detected
REG - Regular sample
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry
0.011 - Analytical result exceeds the Hawaii DOH Tier I Action Level

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 3
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	Acetone	bis(2-Ethylhexyl)phthalate	Lead	TPH (C10-C28)
TANK- 3	RH-BR-3-S01	REG	2	1/31/01	CORE	0.0412	0.159	14.5	386
TANK- 3	RH-BR-3-S02	REG	46.35	2/1/01	CORE	--	--	--	774
TANK- 3	RH-BR-3-S03	REG	125.2	2/2/01	CORE	--	--	--	28.9

Abbreviations:
-- Parameter not detected
REG - Regular sample
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 4
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	2-Methylnaphthalene	Acetone	Lead	TPH (C10-C28)
TANK- 4	RH-BR-4-S01	REG	2.5	1/29/01	CORE	0.392	0.045	84.5	238
TANK- 4	RH-BR-4-S02	REG	8.2	1/29/01	CORE	--	--	--	1330
TANK- 4	RH-BR-4-D08	DUP	123.9	1/31/01	CORE	--	--	--	14.5
TANK- 4	RH-BR-4-S03	REG	123.9	1/31/01	CORE	--	--	--	49.8

Abbreviations:
-- Parameter not detected
REG - Regular sample
DUP - Duplicate sample
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 5
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	2-Methylnaphthalene	Acetone	bis(2-Ethylhexyl)phthalate	Lead	Methyl ethyl ketone	Naphthalene	Phenanthrene	TPH (C10-C28)
TANK- 5	RH-BR-5-S01	REG	9.15	1/25/01	CORE	1.85	--	--	--	0.29	0.266	0.226	503
TANK- 5	RH-BR-5-S02	REG	14.7	1/25/01	CORE	--	0.0234	0.251	24	--	--	--	11.8
TANK- 5	RH-BR-5-S03	REG	55.25	1/26/01	CORE	--	--	0.178	--	--	--	--	--
TANK- 5	RH-BR-5-S04	REG	113.3	1/26/01	CORE	--	--	0.435	2.1	--	--	--	12.4
TANK- 5	RH-BR-5-S05	REG	115.3	1/26/01	CORE	--	--	0.214	--	--	--	--	--

Abbreviations:
-- Parameter not detected
REG - Regular sample
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 6
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	2-Methylnaphthalene	bis(2-Ethylhexyl)phthalate	Lead	Phenanthrene	Pyrene	TPH (C10-C28)
TANK- 6	RH-BR-6-S01	REG	0.5	1/19/01	CORE	18.9	--	11.3	10.9	--	***10200***
TANK- 6	RH-BR-6-S02	REG	6	1/19/01	CORE	--	--	11.2	--	8.45	***43100***
TANK- 6	RH-MW-6-S01	REG	0.5	1/19/01	DFLNAPL	36.8	--	***27.5***	--	--	29500
TANK- 6	RH-BR-6-D07	DUP	19.8	1/22/01	CORE	--	0.456	--	--	--	--
TANK- 6	RH-BR-6-S03	REG	19.8	1/22/01	CORE	--	0.265	--	--	--	8.83
TANK- 6	RH-BR-6-S04	REG	125.1	1/24/01	CORE	--	0.375	--	--	--	--

Abbreviations:
-- Parameter not detected
REG - Regular sample
DUP - Duplicate sample
DFLNAPL - Drill fluid/LNAPL (light non-aquious phase liquid) mixture
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry
$\boxed{10200}$ - Analytical result exceeds the Hawaii DOH Tier I Action Level

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 7
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	2-Methylnaphthalene	Acetone	bis(2-Ethylhexyl)phthalate	Ethylbenzene	Lead	Methyl ethyl ketone	Naphthalene	TPH (C10-C28)	Xylene (total)
TANK- 7	RH-BR-7-S01	REG	0.5	1/17/01	CORE	--	0.0295	--	--	17.6	--	--	631	--
TANK- 7	RH-BR-7-S02	REG	25.9	1/18/01	CORE	19.1	--	--	0.122	--	0.431	7.09	2420	1.23
TANK- 7	RH-BR-7-S03	REG	92.4	1/18/01	CORE	--	0.04	--	--	--	--	--	24.4	--
TANK- 7	RH-BR-7-S04	REG	105.95	1/19/01	CORE	--	--	0.291	--	--	--	--	22.3	--
TANK- 7	RH-BR-7-S05	REG	111.2	1/19/01	CORE	--	--	0.18	--	--	--	--	208	--

Abbreviations:
-- Parameter not detected
REG - Regular sample
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 8
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	bis(2-Ethylhexyl)phthalate	Lead	TPH (C10-C28)
TANK- 8	RH-BR-8-S01	REG	0.5	1/15/01	CORE	0.189	47.1	1030
TANK- 8	RH-BR-8-S03	REG	114.5	1/16/01	CORE	0.123	--	--

Abbreviations:
-- Parameter not detected
REG - Regular sample
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 9
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	Unknown Hydrocarbon
TANK- 9	B09A-1	REG	3.2	10/26/98	CORE	600
TANK- 9	B09A-2	REG	97.1	10/27/98	CORE	3.5
TANK- 9	B09B-1	REG	55	10/29/98	CORE	48
TANK- 9	B09B-2	REG	74.6	10/29/98	CORE	2.3
TANK- 9	B09C-1	REG	50	10/28/98	CORE	6.9
TANK- 9	B09C-2	REG	66	10/28/98	CORE	3.1

Abbreviations:
-- Parameter not detected
REG - Regular sample
ppm - parts per million
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 11
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	2-Methylnaphthalene	4-Methyl-2-pentanone	Acetone	bis(2-Ethylhexyl)phthalate	Dibenzofuran	Ethylbenzene	Fluorene	Lead	Methyl ethyl ketone	Naphthalene	Phenanthrene	Toluene	TPH (C10-C28)	Xylene (total)
TANK-11	RH-BR-11-S01	REG	4.5	12/15/00	CORE	1.56	–	0.0632	0.286	–	–	–	4.7	0.0165	–	0.534	–	1690	0.0084
TANK-11	RH-BR-11-S02	REG	11.3	12/15/00	CORE	6.11	–	0.0243	–	0.992	0.002	1.14	–	–	0.776	2.09	–	3130	–
TANK-11	RH-BR-11-S03	REG	67.1	12/18/00	CORE	–	0.0067	0.0215	–	–	–	–	–	–	–	–	–	1440	–
TANK-11	RH-BR-11-S04	REG	85	12/18/00	CORE	1.78	–	–	–	–	–	–	–	–	–	0.926	–	2320	0.0073
TANK-11	RH-BR-11-S05	REG	95	12/18/00	CORE	6.81	–	–	–	–	0.0194	0.72	–	–	1.09	1.5	0.0086	2910	0.298

Abbreviations:
– Parameter not detected
REG - Regular sample
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 11
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	2-Methylnaphthalene	4-Methyl-2-pentanone	Acetone	bis(2-Ethylhexyl)phthalate	Dibenzofuran	Ethylbenzene	Fluorene	Lead	Methyl ethyl ketone	Naphthalene	Phenanthrene	Toluene	TPH (C10-C28)	Xylene (total)
TANK-11	RH-BR-11-S01	REG	4.5	12/15/00	CORE	1.56	--	0.0632	0.286	--	--	--	4.7	0.0165	--	0.534	--	1690	0.0084
TANK-11	RH-BR-11-S02	REG	11.3	12/15/00	CORE	6.11	--	0.0243	--	0.992	0.002	1.14	--	--	0.776	2.09	--	3130	--
TANK-11	RH-BR-11-S03	REG	67.1	12/18/00	CORE	--	0.0067	0.0215	--	--	--	--	--	--	--	--	--	1440	--
TANK-11	RH-BR-11-S04	REG	85	12/18/00	CORE	1.78	--	--	--	--	--	--	--	--	--	0.926	--	2320	0.0073
TANK-11	RH-BR-11-S05	REG	95	12/18/00	CORE	6.81	--	--	--	--	0.0194	0.72	--	--	1.09	1.5	0.0086	2910	0.298

Abbreviations:
-- Parameter not detected
REG - Regular sample
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 12
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	2-Methylnaphthalene	bis(2-Ethylhexyl)phthalate	Ethylbenzene	Phenanthrene	TPH (C10-C28)	Xylene (total)
TANK-12	RH-BR-12-S01	REG	8	12/12/00	CORE	--	0.169	--	--	31.7	--
TANK-12	RH-BR-12-S02	REG	33.5	12/13/00	CORE	--	--	--	--	232	--
TANK-12	RH-BR-12-S03	REG	61	12/13/00	CORE	--	0.199	--	--	780	--
TANK-12	RH-BR-12-D06	DUP	104.3	12/14/00	CORE	--	0.12	--	--	19.6	--
TANK-12	RH-BR-12-S04	REG	104.3	12/14/00	CORE	--	0.125	--	--	77.1	--
TANK-12	RH-BR-12-S05	REG	121.9	12/14/00	CORE	3.38	--	0.002	0.798	1710	0.018

Abbreviations:
-- Parameter not detected
REG - Regular sample
DUP - Duplicate sample
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 13
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	1,1-Dichloroethylene	Acetone	bis(2-Ethylhexyl)phthalate	Lead	TPH (C10-C28)
TANK-13	RH-BR-13-D05	DUP	72	12/11/00	CORE	--	--	0.566	--	26.1
TANK-13	RH-BR-13-S01	REG	72	12/11/00	CORE	--	--	0.178	--	20.3
TANK-13	RH-BR-13-S02	REG	100	12/11/00	CORE	--	--	0.342	--	31.9
TANK-13	RH-BR-13-S03	REG	125	12/11/00	CORE	--	--	0.416	--	32.6
TANK-13	RH-BR-13-S04	REG	8	12/12/00	CORE	--	0.0216	0.942	6.8	2160
TANK-13	RH-MW-13-S01	REG	132.5	8/27/01	DFLNAPL	0.0021	--	--	--	2.39

Abbreviations:
-- Parameter not detected
REG - Regular sample
DUP - Duplicate sample
DFLNAPL - Drill fluid/LNAPL (light non-aquious phase liquid) mixture
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 14
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	2-Methylnaphthalene	bis(2-Ethylhexyl)phthalate	Ethylbenzene	Naphthalene	Phenanthrene	Toluene	TPH (C10-C28)	Xylene (total)
TANK-14	RH-BR-14-D04	DUP	60.5	12/6/00	CORE	--	--	--	--	--	--	2090	--
TANK-14	RH-BR-14-S01	REG	35	12/6/00	CORE	--	--	--	--	--	--	581	--
TANK-14	RH-BR-14-S02	REG	60.5	12/6/00	CORE	--	--	--	--	--	--	2810	--
TANK-14	RH-BR-14-S03	REG	75	12/6/00	CORE	--	0.146	--	--	--	--	292	--
TANK-14	RH-BR-14-S04	REG	95.5	12/6/00	CORE	57.8	--	$\boxed{\mathit{1.55}}$	11.4	12.8	0.17	$\boxed{\mathit{26200}}$	6.4
TANK-14	RH-BR-14-S05	REG	116	12/6/00	CORE	3.06	--	--	--	0.974	--	851	--

Abbreviations:

-- Parameter not detected

REG - Regular sample

DUP - Duplicate sample

ppm - parts per million

TPH - Total petroleum hydrocarbon

ft, poe - feet from point of entry

$\boxed{\mathit{1.55}}$ - Analytical result exceeds the Hawaii DOH Tier I Action Level

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 15
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	Acetone	bis(2-Ethylhexyl)phthalate	TPH (C10-C28)
TANK-15	RH-BR-15-D03	DUP	62.5	12/4/00	CORE	--	0.291	--
TANK-15	RH-BR-15-S01	REG	62.5	12/4/00	CORE	--	0.206	8.05
TANK-15	RH-BR-15-S02	REG	86	12/4/00	CORE	--	0.176	--
TANK-15	RH-BR-15-S03	REG	115	12/4/00	CORE	0.0257	0.191	10.7

Abbreviations:
-- Parameter not detected
REG - Regular sample
DUP - Duplicate sample
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 16
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	Chrysene	Ethylbenzene	Fluorene	m,p xylene	Naphthalene	o-xylene	Phenanthrene	Pyrene	Toluene	Unknown Hydrocarbon	Xylene (total)
TANK-16	B16A-4	REG	83.75	10/22/98	CORE	--	0.24	10	0.31	43	0.22	23	22	--	11000	0.53
TANK-16	B16A-5	REG	101.83	10/22/98	CORE	--	--	4.7	--	--	--	4.4	20	--	2800	--
TANK-16	B16-DUP	DUP	83.75	10/23/98	CORE	--	--	6.4	0.085	14	0.071	14	13	--	6600	0.156
TANK-16	B16B-4	REG	66.15	10/23/98	CORE	--	--	--	--	--	--	--	--	--	6.4	--
TANK-16	B16B-5	REG	75.58	10/23/98	CORE	--	--	--	--	--	--	--	--	--	29	--
TANK-16	B16C-4	REG	60	10/26/98	CORE	6.3	0.16	12	0.059	47	0.082	26	11	--	9400	0.141
TANK-16	B16C-5	REG	67	10/26/98	CORE	--	0.054	--	0.19	8.2	0.13	6.5	--	0.048	4500	0.32
TANK-16	B16C	REG	103.6	10/28/98	DFLNAPL	--	--	--	--	--	--	0.011	--	--	8.1	0.031

Abbreviations:
-- Parameter not detected
REG - Regular sample
DUP - Duplicate sample
DFLNAPL - Drill fluid/LNAPL (light non-aquious phase liquid) mixture
ppm - parts per million
ft, poe - feet from point of entry
$\boxed{43}$ - Analytical result exceeds the Hawaii DOH Tier I Action Level

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 17
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	bis(2-Ethylhexyl)phthalate	Lead	Methylene chloride	Toluene	TPH (C10-C28)
TANK-17	RH-BR-17-D02	DUP	34	11/10/00	CORE	0.133	--	--	0.0029	--
TANK-17	RH-BR-17-S01	REG	10	11/10/00	CORE	--	--	--	--	861
TANK-17	RH-BR-17-S02	REG	34	11/10/00	CORE	0.294	--	0.0152	--	--
TANK-17	RH-BR-17-S03	REG	66.2	11/10/00	CORE	0.224	--	0.0108	--	--
TANK-17	RH-MW-17-S01	REG	114.8	8/27/01	DFLNAPL	--	*0.072*	--	--	--

Abbreviations:

-- Parameter not detected
REG - Regular sample
DUP - Duplicate sample
DFLNAPL - Drill fluid/LNAPL (light non-aquious phase liquid) mixture
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry
0.072 - Analytical result exceeds the Hawaii DOH Tier I Action Level

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 18
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	bis(2-Ethylhexyl)phthalate	Lead	Toluene
TANK-18	RH-BR-18-D01	DUP	116	11/6/00	CORE	--	--	0.0177
TANK-18	RH-BR-18-S02	REG	104.4	11/6/00	CORE	0.93	0.55	--
TANK-18	RH-BR-18-S03	REG	116	11/6/00	CORE	0.419	--	--

Abbreviations:
-- Parameter not detected
REG - Regular sample
DUP - Duplicate sample
ppm - parts per million
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 19
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	1,1-Dichloroethylene	2-Methylnaphthalene	bis(2-Ethylhexyl)phthalate	Ethylbenzene	Lead	Naphthalene	TPH (C10-C28)	Xylene (total)
TANK-19	RH-BR-19-S01	REG	43	11/22/00	CORE	--	4.31	0.174	0.174	--	0.682	1620	0.267
TANK-19	RH-MW-19-S01	REG	113.1	3/7/01	INFILTWAT	0.0014	--	0.0073	--	$\boxed{0.0568}$	--	0.312	--
TANK-19	RH-MW-19-S01	REG	110.52	8/27/01	INFILTWAT	0.0015	--	0.0078	--	$\boxed{0.067}$	--	--	--

Abbreviations:
-- Parameter not detected
REG - Regular sample
INFILTWAT - Infiltration Water
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry
$\boxed{0.0568}$ - Analytical result exceeds the Hawaii DOH Tier I Action Level

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 20
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	Lead	TPH (C10-C28)
TANK-20	RH-BR-20-S01	REG	0.5	3/2/01	CORE	9.8	975
TANK-20	RH-BR-20-S02	REG	8.8	3/3/01	CORE	--	794

Abbreviations:
-- Parameter not detected
REG - Regular sample
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Tank 20
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	Lead	TPH (C10-C28)
TANK-20	RH-BR-20-S01	REG	0.5	3/2/01	CORE	9.8	975
TANK-20	RH-BR-20-S02	REG	8.8	3/3/01	CORE	--	794

Abbreviations:
-- Parameter not detected
REG - Regular sample
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 1. All Detects for Media Sampled by Area (ppm) - Vertical Well - V1D
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	bis(2-Ethylhexyl)phthalate	Lead	TPH (C10-C28)
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.1	3/7/01	GW	0.0058	***0.015***	0.883
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.28	8/27/01	GW	0.0109	***0.0104***	1.07

Abbreviations:
REG - Regular sample
GW - Groundwater
ppm - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry
0.015 - Analytical result exceeds the Hawaii DOH Tier I Action Level

Table 1. All Detects for Media Sampled by Area (ppm) - Vertical Well - V2S
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

Location	Sample No	Type	Sample Depth (ft, poe)	Sample Date	Media	Lead
VERTICAL WELL-S	RH-BR-V2S-S03	REG	43	2/23/01	CORE	4.1

Abbreviations:
REG - Regular sample
ppm - parts per million
ft, poe - feet from point of entry

Notes:
No detected parameters were above the Hawaii DOH Tier 1 Action Levels

Table 2. All Sample Detects Summary (ppm)
Navy Clean CTO-229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (ft, pos)	SAMPLE DATE	MEDIA	1,1-Dichloroethylene	2-Methylnaphthalene	4-Methyl-2-pentanone	Acetone	bis(2-Ethylhexyl)phthalate	Chrysene	Dibenzofuran	Ethylbenzene	Fluorene	Lead	m,p xylene	Methyl ethyl ketone	Methylene chloride	Naphthalene	o-xylene	Phenanthrene	Pyrene	Toluene	TPH (C10-C28)	Unknown Hydrocarbon	Xylene (total)
TANK- 1	RH-BR-1-D09	DUP	59.6	2/8/01	CORE	--	5.02	--	--	--	--	--	--	--	--	--	--	--	1.23	--	--	--	--	890	--	--
TANK- 1	RH-BR-1-S01	REG	2	2/7/01	CORE	--	--	--	--	--	--	--	--	--	293	--	--	--	--	--	--	--	--	**25300**	--	--
TANK- 1	RH-BR-1-S02	REG	8	2/8/01	CORE	--	0.25	--	--	0.162	--	--	--	--	--	--	--	--	--	--	--	--	--	1500	--	--
TANK- 1	RH-BR-1-S03	REG	59.6	2/8/01	CORE	--	10.2	--	--	--	--	--	--	--	--	--	--	--	3.72	--	--	--	--	2330	--	0.436
TANK- 1	RH-BR-1-S04	REG	61.35	2/8/01	CORE	--	39.8	--	--	--	--	--	0.49	--	--	--	--	--	16.3	--	--	--	--	3300	--	4.81
TANK- 1	RH-BR-1-S05	REG	129.2	2/9/01	CORE	--	--	--	--	0.132	--	--	--	--	--	--	--	--	--	--	--	--	--	27.7	--	--
TANK- 1	RH-MW-1-S01	REG	124.2	3/7/01	DFLNAPL	0.00065	--	--	--	--	--	--	--	--	**0.0756**	--	--	--	--	--	--	--	--	1.88	--	--
TANK- 1	RH-MW-1-S01	REG	129.4	8/27/01	DFLNAPL	0.0013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.3	--	--
TANK- 2	RH-BR-2-S01	REG	2.5	2/5/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	910	--	--
TANK- 2	RH-BR-2-S02	REG	89.45	2/6/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	**0.011**	--	--	--	--	--	22.2	--	--
TANK- 2	RH-BR-2-S03	REG	119.9	2/6/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	**0.0127**	--	--	--	--	--	--	--	--
TANK- 3	RH-BR-3-S01	REG	2	1/31/01	CORE	--	--	--	0.0412	0.159	--	--	--	--	14.5	--	--	--	--	--	--	--	--	386	--	--
TANK- 3	RH-BR-3-S02	REG	46.35	2/1/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	774	--	--
TANK- 3	RH-BR-3-S03	REG	125.2	2/2/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	26.9	--	--
TANK- 4	RH-BR-4-D08	DUP	123.9	1/31/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.5	--	--
TANK- 4	RH-BR-4-S01	REG	2.5	1/29/01	CORE	--	0.392	--	0.045	--	--	--	--	--	84.5	--	--	--	--	--	--	--	--	238	--	--
TANK- 4	RH-BR-4-S02	REG	8.2	1/29/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1330	--	--
TANK- 4	RH-BR-4-S03	REG	123.9	1/31/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	49.8	--	--
TANK- 5	RH-BR-5-S01	REG	9.15	1/25/01	CORE	--	1.85	--	--	--	--	--	--	--	--	--	0.29	--	0.266	--	0.226	--	--	503	--	--
TANK- 5	RH-BR-5-S02	REG	14.7	1/25/01	CORE	--	--	--	0.0234	0.251	--	--	--	--	24	--	--	--	--	--	--	--	--	11.8	--	--
TANK- 5	RH-BR-5-S03	REG	55.25	1/26/01	CORE	--	--	--	--	0.178	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK- 5	RH-BR-5-S04	REG	113.3	1/26/01	CORE	--	--	--	--	0.435	--	--	--	--	2.1	--	--	--	--	--	--	--	--	12.4	--	--
TANK- 5	RH-BR-5-S05	REG	115.3	1/26/01	CORE	--	--	--	--	0.214	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK- 6	RH-BR-6-D07	DUP	19.8	1/22/01	CORE	--	--	--	--	0.456	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK- 6	RH-BR-6-S01	REG	0.5	1/19/01	CORE	--	18.9	--	--	--	--	--	--	--	11.3	--	--	--	--	--	10.9	--	--	**10200**	--	--
TANK- 6	RH-BR-6-S02	REG	6	1/19/01	CORE	--	--	--	--	--	--	--	--	--	11.2	--	--	--	--	--	--	8.45	--	**43100**	--	--
TANK- 6	RH-BR-6-S03	REG	19.8	1/22/01	CORE	--	--	--	--	0.265	--	--	--	--	--	--	--	--	--	--	--	--	--	8.83	--	--
TANK- 6	RH-BR-6-S04	REG	125.1	1/24/01	CORE	--	--	--	--	0.375	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK- 6	RH-MW-6-S01	REG	0.5	1/19/01	DFLNAPL	--	36.8	--	--	--	--	--	--	--	**27.5**	--	--	--	--	--	--	--	--	29500	--	--
TANK- 7	RH-BR-7-S01	REG	0.5	1/17/01	CORE	--	--	--	0.0295	--	--	--	--	--	17.6	--	--	--	--	--	--	--	--	631	--	--
TANK- 7	RH-BR-7-S02	REG	25.9	1/18/01	CORE	--	19.1	--	--	--	--	--	0.122	--	--	--	0.431	--	7.09	--	--	--	--	2420	--	1.23
TANK- 7	RH-BR-7-S03	REG	92.4	1/18/01	CORE	--	--	--	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24.4	--	--
TANK- 7	RH-BR-7-S04	REG	105.95	1/19/01	CORE	--	--	--	--	0.291	--	--	--	--	--	--	--	--	--	--	--	--	--	22.3	--	--
TANK- 7	RH-BR-7-S05	REG	111.2	1/19/01	CORE	--	--	--	--	0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	208	--	--

Table 2. All Sample Detects Summary (ppm)
Navy Clean CTO-229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (ft, poe)	SAMPLE DATE	MEDIA	1,1-Dichloroethylene	2-Methylnaphthalene	4-Methyl-2-pentanone	Acetone	bis(2-Ethylhexyl)phthalate	Chrysene	Dibenzofuran	Ethylbenzene	Fluorene	Lead	m,p xylene	Methyl ethyl ketone	Methylene chloride	Naphthalene	o-xylene	Phenanthrene	Pyrene	Toluene	TPH (C10-C28)	Unknown Hydrocarbon	Xylene (total)
TANK- 8	RH-BR-8-S01	REG	0.5	1/15/01	CORE	--	--	--	--	0.189	--	--	--	--	47.1	--	--	--	--	--	--	--	--	1030	--	--
TANK- 8	RH-BR-8-S03	REG	114.5	1/16/01	CORE	--	--	--	--	0.123	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK- 9	B09A-1	REG	3.2	10/26/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	600	--
TANK- 9	B09A-2	REG	97.1	10/27/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.5	--
TANK- 9	B09B-1	REG	55	10/29/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	48	--
TANK- 9	B09B-2	REG	74.6	10/29/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.3	--
TANK- 9	B09C-1	REG	50	10/28/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.9	--
TANK- 9	B09C-2	REG	66	10/28/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.1	--
TANK-11	RH-BR-11-S01	REG	4.5	12/15/00	CORE	--	1.56	--	0.0632	0.286	--	--	--	--	4.7	--	0.0165	--	--	--	0.534	--	--	1690	--	0.0084
TANK-11	RH-BR-11-S02	REG	11.3	12/15/00	CORE	--	6.11	--	0.0243	--	--	0.992	0.002	1.14	--	--	--	--	0.776	--	2.09	--	--	3130	--	--
TANK-11	RH-BR-11-S03	REG	67.1	12/18/00	CORE	--	--	0.0067	0.0215	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1440	--	--
TANK-11	RH-BR-11-S04	REG	85	12/18/00	CORE	--	1.78	--	--	--	--	--	--	--	--	--	--	--	--	--	0.926	--	--	2320	--	0.0073
TANK-11	RH-BR-11-S05	REG	95	12/18/00	CORE	--	6.81	--	--	--	--	--	0.0194	0.72	--	--	--	--	1.09	--	1.5	--	0.0086	2910	--	0.298
TANK-12	RH-BR-12-D06	DUP	104.3	12/14/00	CORE	--	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	19.6	--	--
TANK-12	RH-BR-12-S01	REG	8	12/12/00	CORE	--	--	--	--	0.169	--	--	--	--	--	--	--	--	--	--	--	--	--	31.7	--	--
TANK-12	RH-BR-12-S02	REG	33.5	12/13/00	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	232	--	--
TANK-12	RH-BR-12-S03	REG	61	12/13/00	CORE	--	--	--	--	0.199	--	--	--	--	--	--	--	--	--	--	--	--	--	780	--	--
TANK-12	RH-BR-12-S04	REG	104.3	12/14/00	CORE	--	--	--	--	0.125	--	--	--	--	--	--	--	--	--	--	--	--	--	77.1	--	--
TANK-12	RH-BR-12-S05	REG	121.9	12/14/00	CORE	--	3.38	--	--	--	--	--	0.002	--	--	--	--	--	--	--	0.798	--	--	1710	--	0.018
TANK-13	RH-BR-13-D05	DUP	72	12/11/00	CORE	--	--	--	--	0.566	--	--	--	--	--	--	--	--	--	--	--	--	--	26.1	--	--
TANK-13	RH-BR-13-S01	REG	72	12/11/00	CORE	--	--	--	--	0.178	--	--	--	--	--	--	--	--	--	--	--	--	--	20.3	--	--
TANK-13	RH-BR-13-S02	REG	100	12/11/00	CORE	--	--	--	--	0.342	--	--	--	--	--	--	--	--	--	--	--	--	--	31.9	--	--
TANK-13	RH-BR-13-S03	REG	125	12/11/00	CORE	--	--	--	--	0.416	--	--	--	--	--	--	--	--	--	--	--	--	--	32.6	--	--
TANK-13	RH-BR-13-S04	REG	8	12/12/00	CORE	--	--	--	0.0216	0.942	--	--	--	--	6.8	--	--	--	--	--	--	--	--	2160	--	--
TANK-13	RH-MW-13-S01	REG	132.5	8/27/01	DFLNAPL	0.0021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.39	--	--
TANK-14	RH-BR-14-D04	DUP	60.5	12/6/00	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2090	--	--
TANK-14	RH-BR-14-S01	REG	35	12/6/00	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	581	--	--
TANK-14	RH-BR-14-S02	REG	60.5	12/6/00	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2810	--	--
TANK-14	RH-BR-14-S03	REG	75	12/6/00	CORE	--	--	--	--	0.146	--	--	--	--	--	--	--	--	--	--	--	--	--	292	--	--
TANK-14	RH-BR-14-S04	REG	95.5	12/6/00	CORE	--	57.8	--	--	--	--	--	***1.55***	--	--	--	--	--	11.4	--	12.8	--	0.17	***26200***	--	6.4
TANK-14	RH-BR-14-S05	REG	116	12/6/00	CORE	--	3.06	--	--	--	--	--	--	--	--	--	--	--	--	--	0.974	--	--	851	--	--
TANK-15	RH-BR-15-D03	DUP	62.5	12/4/00	CORE	--	--	--	--	0.291	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK-15	RH-BR-15-S01	REG	62.5	12/4/00	CORE	--	--	--	--	0.206	--	--	--	--	--	--	--	--	--	--	--	--	--	8.05	--	--
TANK-15	RH-BR-15-S02	REG	86	12/4/00	CORE	--	--	--	--	0.176	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK-15	RH-BR-15-S03	REG	115	12/4/00	CORE	--	--	--	0.0257	0.191	--	--	--	--	--	--	--	--	--	--	--	--	--	10.7	--	--
TANK-16	B16-DUP	DUP	83.75	10/23/98	CORE	--	--	--	--	--	--	--	--	6.4	--	0.085	--	--	14	0.071	14	13	--	--	***6600***	0.156
TANK-16	B16A-4	REG	83.75	10/22/98	CORE	--	--	--	--	--	--	--	0.24	10	--	0.31	--	--	***43***	0.22	23	22	--	--	***11000***	0.53
TANK-16	B16A-5	REG	101.83	10/22/98	CORE	--	--	--	--	--	--	--	--	4.7	--	--	--	--	--	--	4.4	20	--	--	2800	--

Table 2. All Sample Detects Summary (ppm)
Navy Clean CTO-229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (ft, poe)	SAMPLE DATE	MEDIA	1,1-Dichloroethylene	2-Methylnaphthalene	4-Methyl-2-pentanone	Acetone	bis(2-Ethylhexyl)phthalate	Chrysene	Dibenzofuran	Ethylbenzene	Fluorene	Lead	m,p xylene	Methyl ethyl ketone	Methylene chloride	Naphthalene	o-xylene	Phenanthrene	Pyrene	Toluene	TPH (C10-C28)	Unknown Hydrocarbon	Xylene (total)
TANK-16	B16B-4	REG	66.15	10/23/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.4	--
TANK-16	B16B-5	REG	75.58	10/23/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	29	--
TANK-16	B16C	REG	103.6	10/28/98	DFLNAPL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.011		--	--	8.1	0.031
TANK-16	B16C-4	REG	60	10/26/98	CORE	--	--	--	--	--	6.3	--	0.16	12	--	0.059	--	--	**47**	0.082	26	11	--	--	**9400**	0.141
TANK-16	B16C-5	REG	67	10/26/98	CORE	--	--	--	--	--	--	--	0.054	--	--	0.19	--	--	8.2	0.13	6.5	--	0.048	--	4500	0.32
TANK-17	RH-BR-17-D02	DUP	34	11/10/00	CORE	--	--	--	--	0.133	--	--	--	--	--	--	--	--	--	--	--	--	0.0029	--	--	--
TANK-17	RH-BR-17-S01	REG	10	11/10/00	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	861	--	--
TANK-17	RH-BR-17-S02	REG	34	11/10/00	CORE	--	--	--	--	0.294	--	--	--	--	--	--	--	**0.0152**	--	--	--	--	--	--	--	--
TANK-17	RH-BR-17-S03	REG	66.2	11/10/00	CORE	--	--	--	--	0.224	--	--	--	--	--	--	--	**0.0108**	--	--	--	--	--	--	--	--
TANK-17	RH-MW-17-S01	REG	114.8	8/27/01	DFLNAPL	--	--	--	--	--	--	--	--	--	**0.072**	--	--	--	--	--	--	--	--	--	--	--
TANK-18	RH-BR-18-D01	DUP	116	11/6/00	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0177	--	--	--
TANK-18	RH-BR-18-S02	REG	104.4	11/6/00	CORE	--	--	--	--	0.93	--	--	--	--	0.55	--	--	--	--	--	--	--	--	--	--	--
TANK-18	RH-BR-18-S03	REG	116	11/6/00	CORE	--	--	--	--	0.419	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK-19	RH-BR-19-S01	REG	43	11/22/00	CORE	--	4.31	--	--	0.174	--	--	0.174	--	--	--	--	--	0.682	--	--	--	--	1620	--	0.267
TANK-19	RH-MW-19-S01	REG	110.52	8/27/01	INFILTWAT	0.0015	--	--	--	0.0078	--	--	--	--	**0.0666**	--	--	--	--	--	--	--	--	--	--	--
TANK-19	RH-MW-19-S01	REG	113.1	3/7/01	INFILTWAT	0.0014	--	--	--	0.0073	--	--	--	--	**0.0568**	--	--	--	--	--	--	--	--	0.312	--	--
TANK-20	RH-BR-20-S01	REG	0.5	3/2/01	CORE	--	--	--	--	--	--	--	--	--	9.8	--	--	--	--	--	--	--	--	975	--	--
TANK-20	RH-BR-20-S02	REG	8.8	3/3/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	794	--	--
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.1	3/7/01	GW	--	--	--	--	0.0058	--	--	--	--	**0.015**	--	--	--	--	--	--	--	--	0.883	--	--
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.28	8/27/01	GW	--	--	--	--	0.0109	--	--	--	--	**0.0104**	--	--	--	--	--	--	--	--	1.07	--	--
VERTICAL WELL-S	RH-BR-V2S-S03	REG	43	2/23/01	CORE	--	--	--	--	--	--	--	--	--	4.1	--	--	--	--	--	--	--	--	--	--	--

Abbreviations:

-- Parameter not detected
REG - Regular sample
DUP - Duplicate sample
GW - Groundwater
PPM - parts per million

DFLNAPL - Drill fluid/LNAPL (light non-aquious phase liquid) mixture
INFILTWAT - Infiltration Water
25300 - Analytical result exceeds the Hawaii DOH Tier I Action Level
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Table 2. All Sample Detects Summary (ppm)
Navy Clean CTO-229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (ft, poe)	SAMPLE DATE	MEDIA	1,1-Dichloroethylene	2-Methylnaphthalene	4-Methyl-2-pentanone	Acetone	bis(2-Ethylhexyl)phthalate	Chrysene	Dibenzofuran	Ethylbenzene	Fluorene	Lead	m,p xylene	Methyl ethyl ketone	Methylene chloride	Naphthalene	o-xylene	Phenanthrene	Pyrene	Toluene	TPH (C10-C28)	Unknown Hydrocarbon	Xylene (total)
TANK- 1	RH-BR-1-D09	DUP	59.6	2/8/01	CORE	--	5.02	--	--	--	--	--	--	--	--	--	--	--	1.23	--	--	--	--	890	--	--
TANK- 1	RH-BR-1-S01	REG	2	2/7/01	CORE	--	--	--	--	--	--	--	--	--	293	--	--	--	--	--	--	--	--	***25300***	--	--
TANK- 1	RH-BR-1-S02	REG	8	2/8/01	CORE	--	0.25	--	--	0.162	--	--	--	--	--	--	--	--	--	--	--	--	--	1500	--	--
TANK- 1	RH-BR-1-S03	REG	59.6	2/8/01	CORE	--	10.2	--	--	--	--	--	--	--	--	--	--	--	3.72	--	--	--	--	2330	--	0.436
TANK- 1	RH-BR-1-S04	REG	61.35	2/8/01	CORE	--	39.8	--	--	--	--	--	0.49	--	--	--	--	--	16.3	--	--	--	--	3300	--	4.81
TANK- 1	RH-BR-1-S05	REG	129.2	2/9/01	CORE	--	--	--	--	0.132	--	--	--	--	--	--	--	--	--	--	--	--	--	27.7	--	--
TANK- 1	RH-MW-1-S01	REG	124.2	3/7/01	DFLNAPL	0.00065	--	--	--	--	--	--	--	--	***0.0756***	--	--	--	--	--	--	--	--	1.88	--	--
TANK- 1	RH-MW-1-S01	REG	129.4	8/27/01	DFLNAPL	0.0013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.3	--	--
TANK- 2	RH-BR-2-S01	REG	2.5	2/5/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	910	--	--
TANK- 2	RH-BR-2-S02	REG	89.45	2/6/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	***0.011***	--	--	--	--	--	22.2	--	--
TANK- 2	RH-BR-2-S03	REG	119.9	2/6/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	***0.0127***	--	--	--	--	--	--	--	--
TANK- 3	RH-BR-3-S01	REG	2	1/31/01	CORE	--	--	--	0.0412	0.159	--	--	--	--	14.5	--	--	--	--	--	--	--	--	386	--	--
TANK- 3	RH-BR-3-S02	REG	46.35	2/1/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	774	--	--
TANK- 3	RH-BR-3-S03	REG	125.2	2/2/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28.9	--	--
TANK- 4	RH-BR-4-D08	DUP	123.9	1/31/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.5	--	--
TANK- 4	RH-BR-4-S01	REG	2.5	1/29/01	CORE	--	0.392	--	0.045	--	--	--	--	--	84.5	--	--	--	--	--	--	--	--	238	--	--
TANK- 4	RH-BR-4-S02	REG	8.2	1/29/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1330	--	--
TANK- 4	RH-BR-4-S03	REG	123.9	1/31/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	49.8	--	--
TANK- 5	RH-BR-5-S01	REG	9.15	1/25/01	CORE	--	1.85	--	--	--	--	--	--	--	--	--	0.29	--	0.266	--	0.226	--	--	503	--	--
TANK- 5	RH-BR-5-S02	REG	14.7	1/25/01	CORE	--	--	--	0.0234	0.251	--	--	--	--	24	--	--	--	--	--	--	--	--	11.8	--	--
TANK- 5	RH-BR-5-S03	REG	55.25	1/26/01	CORE	--	--	--	--	0.178	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK- 5	RH-BR-5-S04	REG	113.3	1/26/01	CORE	--	--	--	--	0.435	--	--	--	--	2.1	--	--	--	--	--	--	--	--	12.4	--	--
TANK- 5	RH-BR-5-S05	REG	115.3	1/26/01	CORE	--	--	--	--	0.214	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK- 6	RH-BR-6-D07	DUP	19.8	1/22/01	CORE	--	--	--	--	0.456	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK- 6	RH-BR-6-S01	REG	0.5	1/19/01	CORE	--	18.9	--	--	--	--	--	--	--	11.3	--	--	--	--	--	10.9	--	--	***10200***	--	--
TANK- 6	RH-BR-6-S02	REG	6	1/19/01	CORE	--	--	--	--	--	--	--	--	--	11.2	--	--	--	--	--	--	8.45	--	***43100***	--	--
TANK- 6	RH-BR-6-S03	REG	19.8	1/22/01	CORE	--	--	--	--	0.265	--	--	--	--	--	--	--	--	--	--	--	--	--	8.83	--	--
TANK- 6	RH-BR-6-S04	REG	125.1	1/24/01	CORE	--	--	--	--	0.375	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK- 6	RH-MW-6-S01	REG	0.5	1/19/01	DFLNAPL	--	36.8	--	--	--	--	--	--	--	***27.5***	--	--	--	--	--	--	--	--	29500	--	--
TANK- 7	RH-BR-7-S01	REG	0.5	1/17/01	CORE	--	--	--	0.0295	--	--	--	--	--	17.6	--	--	--	--	--	--	--	--	631	--	--
TANK- 7	RH-BR-7-S02	REG	25.9	1/18/01	CORE	--	19.1	--	--	--	--	--	0.122	--	--	--	0.431	--	7.09	--	--	--	--	2420	--	1.23
TANK- 7	RH-BR-7-S03	REG	92.4	1/18/01	CORE	--	--	--	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24.4	--	--
TANK- 7	RH-BR-7-S04	REG	105.95	1/19/01	CORE	--	--	--	--	0.291	--	--	--	--	--	--	--	--	--	--	--	--	--	22.3	--	--
TANK- 7	RH-BR-7-S05	REG	111.2	1/19/01	CORE	--	--	--	--	0.18	--	--	--	--	--	--	--	--	--	--	--	--	--	208	--	--

Table 2. All Sample Detects Summary (ppm)
Navy Clean CTO-229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (ft, poe)	SAMPLE DATE	MEDIA	1,1-Dichloroethylene	2-Methylnaphthalene	4-Methyl-2-pentanone	Acetone	bis(2-Ethylhexyl)phthalate	Chrysene	Dibenzofuran	Ethylbenzene	Fluorene	Lead	m,p xylene	Methyl ethyl ketone	Methylene chloride	Naphthalene	o-xylene	Phenanthrene	Pyrene	Toluene	TPH (C10-C28)	Unknown Hydrocarbon	Xylene (total)
TANK- 8	RH-BR-8-S01	REG	0.5	1/15/01	CORE	--	--	--	--	0.189	--	--	--	--	47.1	--	--	--	--	--	--	--	--	1030	--	--
TANK- 8	RH-BR-8-S03	REG	114.5	1/16/01	CORE	--	--	--	--	0.123	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK- 9	B09A-1	REG	3.2	10/26/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	600	--
TANK- 9	B09A-2	REG	97.1	10/27/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.5	--
TANK- 9	B09B-1	REG	55	10/29/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	48	--
TANK- 9	B09B-2	REG	74.6	10/29/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.3	--
TANK- 9	B09C-1	REG	50	10/28/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.9	--
TANK- 9	B09C-2	REG	66	10/28/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.1	--
TANK-11	RH-BR-11-S01	REG	4.5	12/15/00	CORE	--	1.56	--	0.0632	0.286	--	--	--	--	4.7	--	0.0165	--	--	--	0.534	--	--	1690	--	0.0084
TANK-11	RH-BR-11-S02	REG	11.3	12/15/00	CORE	--	6.11	--	0.0243	--	--	0.992	0.002	1.14	--	--	--	--	0.776	--	2.09	--	--	3130	--	--
TANK-11	RH-BR-11-S03	REG	67.1	12/18/00	CORE	--	--	0.0067	0.0215	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1440	--	--
TANK-11	RH-BR-11-S04	REG	85	12/18/00	CORE	--	1.78	--	--	--	--	--	--	--	--	--	--	--	--	--	0.926	--	--	2320	--	0.0073
TANK-11	RH-BR-11-S05	REG	95	12/18/00	CORE	--	6.81	--	--	--	--	--	0.0194	0.72	--	--	--	--	1.09	--	1.5	--	0.0086	2910	--	0.298
TANK-12	RH-BR-12-D06	DUP	104.3	12/14/00	CORE	--	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--	--	19.6	--	--
TANK-12	RH-BR-12-S01	REG	8	12/12/00	CORE	--	--	--	--	0.169	--	--	--	--	--	--	--	--	--	--	--	--	--	31.7	--	--
TANK-12	RH-BR-12-S02	REG	33.5	12/13/00	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	232	--	--
TANK-12	RH-BR-12-S03	REG	61	12/13/00	CORE	--	--	--	--	0.199	--	--	--	--	--	--	--	--	--	--	--	--	--	780	--	--
TANK-12	RH-BR-12-S04	REG	104.3	12/14/00	CORE	--	--	--	--	0.125	--	--	--	--	--	--	--	--	--	--	--	--	--	77.1	--	--
TANK-12	RH-BR-12-S05	REG	121.9	12/14/00	CORE	--	3.38	--	--	--	--	--	0.002	--	--	--	--	--	--	--	0.798	--	--	1710	--	0.018
TANK-13	RH-BR-13-D05	DUP	72	12/11/00	CORE	--	--	--	--	0.566	--	--	--	--	--	--	--	--	--	--	--	--	--	26.1	--	--
TANK-13	RH-BR-13-S01	REG	72	12/11/00	CORE	--	--	--	--	0.178	--	--	--	--	--	--	--	--	--	--	--	--	--	20.3	--	--
TANK-13	RH-BR-13-S02	REG	100	12/11/00	CORE	--	--	--	--	0.342	--	--	--	--	--	--	--	--	--	--	--	--	--	31.9	--	--
TANK-13	RH-BR-13-S03	REG	125	12/11/00	CORE	--	--	--	--	0.416	--	--	--	--	--	--	--	--	--	--	--	--	--	32.6	--	--
TANK-13	RH-BR-13-S04	REG	8	12/12/00	CORE	--	--	--	0.0216	0.942	--	--	--	--	6.8	--	--	--	--	--	--	--	--	2160	--	--
TANK-13	RH-MW-13-S01	REG	132.5	8/27/01	DFLNAPL	0.0021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.39	--	--
TANK-14	RH-BR-14-D04	DUP	60.5	12/6/00	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2090	--	--
TANK-14	RH-BR-14-S01	REG	35	12/6/00	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	581	--	--
TANK-14	RH-BR-14-S02	REG	60.5	12/6/00	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2810	--	--
TANK-14	RH-BR-14-S03	REG	75	12/6/00	CORE	--	--	--	--	0.146	--	--	--	--	--	--	--	--	--	--	--	--	--	292	--	--
TANK-14	RH-BR-14-S04	REG	95.5	12/6/00	CORE	--	57.8	--	--	--	--	--	***1.55***	--	--	--	--	--	11.4	--	12.8	--	0.17	***26200***	--	6.4
TANK-14	RH-BR-14-S05	REG	116	12/6/00	CORE	--	3.06	--	--	--	--	--	--	--	--	--	--	--	--	--	0.974	--	--	851	--	--
TANK-15	RH-BR-15-D03	DUP	62.5	12/4/00	CORE	--	--	--	--	0.291	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK-15	RH-BR-15-S01	REG	62.5	12/4/00	CORE	--	--	--	--	0.206	--	--	--	--	--	--	--	--	--	--	--	--	--	8.05	--	--
TANK-15	RH-BR-15-S02	REG	86	12/4/00	CORE	--	--	--	--	0.176	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2. All Sample Detects Summary (ppm)
Navy Clean CTO-229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (ft, poe)	SAMPLE DATE	MEDIA	1,1-Dichloroethylene	2-Methylnaphthalene	4-Methyl-2-pentanone	Acetone	bis(2-Ethylhexyl)phthalate	Chrysene	Dibenzofuran	Ethylbenzene	Fluorene	Lead	m,p xylene	Methyl ethyl ketone	Methylene chloride	Naphthalene	o-xylene	Phenanthrene	Pyrene	Toluene	TPH (C10-C28)	Unknown Hydrocarbon	Xylene (total)
TANK-15	RH-BR-15-S03	REG	115	12/4/00	CORE	--	--	--	0.0257	0.191	--	--	--	--	--	--	--	--	--	--	--	--	--	10.7	--	--
TANK-16	B16-DUP	DUP	83.75	10/23/98	CORE	--	--	--	--	--	--	--	--	6.4	--	0.085	--	--	14	0.071	14	13	--	--	***6600***	0.156
TANK-16	B16A-4	REG	83.75	10/22/98	CORE	--	--	--	--	--	--	--	0.24	10	--	0.31	--	--	***43***	0.22	23	22	--	--	***11000***	0.53
TANK-16	B16A-5	REG	101.83	10/22/98	CORE	--	--	--	--	--	--	--	--	4.7	--	--	--	--	--	--	4.4	20	--	--	2800	--
TANK-16	B16B-4	REG	66.15	10/23/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.4	--
TANK-16	B16B-5	REG	75.58	10/23/98	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	29	--
TANK-16	B16C	REG	103.6	10/28/98	DFLNAPL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.011		--	--	8.1	0.031
TANK-16	B16C-4	REG	60	10/26/98	CORE	--	--	--	--	--	6.3	--	0.16	12	--	0.059	--	--	***47***	0.082	26	11	--	--	***9400***	0.141
TANK-16	B16C-5	REG	67	10/26/98	CORE	--	--	--	--	--	--	--	0.054	--	--	0.19	--	--	8.2	0.13	6.5	--	0.048	--	4500	0.32
TANK-17	RH-BR-17-D02	DUP	34	11/10/00	CORE	--	--	--	--	0.133	--	--	--	--	--	--	--	--	--	--	--	--	0.0029	--	--	--
TANK-17	RH-BR-17-S01	REG	10	11/10/00	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	861	--	--
TANK-17	RH-BR-17-S02	REG	34	11/10/00	CORE	--	--	--	--	0.294	--	--	--	--	--	--	--	0.0152	--	--	--	--	--	--	--	--
TANK-17	RH-BR-17-S03	REG	66.2	11/10/00	CORE	--	--	--	--	0.224	--	--	--	--	--	--	--	0.0108	--	--	--	--	--	--	--	--
TANK-17	RH-MW-17-S01	REG	114.8	8/27/01	DFLNAPL	--	--	--	--	--	--	--	--	--	***0.072***	--	--	--	--	--	--	--	--	--	--	--
TANK-18	RH-BR-18-D01	DUP	116	11/6/00	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0177	--	--	--
TANK-18	RH-BR-18-S02	REG	104.4	11/6/00	CORE	--	--	--	--	0.93	--	--	--	--	0.55	--	--	--	--	--	--	--	--	--	--	--
TANK-18	RH-BR-18-S03	REG	116	11/6/00	CORE	--	--	--	--	0.419	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TANK-19	RH-BR-19-S01	REG	43	11/22/00	CORE	--	4.31	--	--	0.174	--	--	0.174	--	--	--	--	--	0.682	--	--	--	--	1620	--	0.267
TANK-19	RH-MW-19-S01	REG	110.52	8/27/01	INFILTWAT	0.0015	--	--	--	0.0078	--	--	--	--	***0.0666***	--	--	--	--	--	--	--	--	--	--	--
TANK-19	RH-MW-19-S01	REG	113.1	3/7/01	INFILTWAT	0.0014	--	--	--	0.0073	--	--	--	--	***0.0568***	--	--	--	--	--	--	--	--	0.312	--	--
TANK-20	RH-BR-20-S01	REG	0.5	3/2/01	CORE	--	--	--	--	--	--	--	--	--	9.8	--	--	--	--	--	--	--	--	975	--	--
TANK-20	RH-BR-20-S02	REG	8.8	3/3/01	CORE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	794	--	--
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.1	3/7/01	GW	--	--	--	--	0.0058	--	--	--	--	***0.015***	--	--	--	--	--	--	--	--	0.883	--	--
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.28	8/27/01	GW	--	--	--	--	0.0109	--	--	--	--	***0.0104***	--	--	--	--	--	--	--	--	1.07	--	--
VERTICAL WELL-S	RH-BR-V2S-S03	REG	43	2/23/01	CORE	--	--	--	--	--	--	--	--	--	4.1	--	--	--	--	--	--	--	--	--	--	--

Abbreviations:

-- Parmeter not detected
REG - Regular sample
DUP - Duplicate sample
GW - Groundwater
PPM - parts per million

DFLNAPL - Drill fluid/LNAPL (light non-aquious phase liquid) mixture
INFILTWAT - Infiltration Water
25300 - Analytical result exceeds the Hawaii DOH Tier I Action Level
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Table 3. All Results by Media Sampled (ppm)
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (FT, POE)	SAMPLE DATE	MEDIA	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethylene	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,2-Dichloropropane	1,3-Dichlorobenzene	1,4-Dichlorobenzene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2-Chloronaphthalene	2-Chlorophenol	2-Hexanone	2-Methylnaphthalene	2-Methylphenol	2-Nitroaniline	2-Nitrophenol	3&4-Methylphenol
TANK- 1	RH-BR-1-D09	DUP	59.6	2/8/01	CORE	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 1.4	< 1.4	< 0.24	< 0.24	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.4	< 3.4	< 1.4	< 1.4	< 1.4	< 1.4	< 0.48	5.02	< 1.4	< 1.4	< 1.4	< 1.4
TANK- 1	RH-BR-1-S01	REG	2	2/7/01	CORE	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 18	< 18	< 0.34	< 0.34	< 18	< 18	< 18	< 18	< 18	< 46	< 46	< 18	< 18	< 18	< 18	< 0.68	< 18	< 18	< 18	< 18	< 18
TANK- 1	RH-BR-1-S02	REG	8	2/8/01	CORE	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.34	< 0.34	< 0.26	< 0.26	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.86	< 0.86	< 0.34	< 0.34	< 0.34	< 0.34	< 0.52	0.25	< 0.34	< 0.34	< 0.34	< 0.34
TANK- 1	RH-BR-1-S03	REG	59.6	2/8/01	CORE	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 1.4	< 1.4	< 0.25	< 0.25	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.5	< 3.5	< 1.4	< 1.4	< 1.4	< 1.4	< 0.5	10.2	< 1.4	< 1.4	< 1.4	< 1.4
TANK- 1	RH-BR-1-S04	REG	61.35	2/8/01	CORE	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 7.5	< 7.5	< 0.27	< 0.27	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 19	< 19	< 7.5	< 7.5	< 7.5	< 7.5	< 0.53	39.8	< 7.5	< 7.5	< 7.5	< 7.5
TANK- 1	RH-BR-1-S05	REG	129.2	2/9/01	CORE	< 0.0058	< 0.0058	< 0.0058	< 0.0058	< 0.0058	< 0.39	< 0.39	< 0.0058	< 0.0058	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.98	< 0.98	< 0.39	< 0.39	< 0.39	< 0.39	< 0.012	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39
TANK- 1	RH-MW-1-S01	REG	124.2	3/7/01	DFLNAPL	< 0.002	< 0.002	< 0.002	< 0.002	0.00065	< 0.006	< 0.006	< 0.002	< 0.002	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.03	< 0.03	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006
TANK- 1	RH-MW-1-S01	REG	129.4	8/27/01	DFLNAPL	< 0.002	< 0.002	< 0.002	< 0.002	0.0013			< 0.002	< 0.002												< 0.01					
TANK- 1	TRIP BLANK	TB		2/8/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK- 2	RH-BR-2-S01	REG	2.5	2/5/01	CORE	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.38	< 0.38	< 0.27	< 0.27	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.94	< 0.94	< 0.38	< 0.38	< 0.38	< 0.38	< 0.55	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK- 2	RH-BR-2-S02	REG	89.45	2/6/01	CORE	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.36	< 0.36	< 0.0053	< 0.0053	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	< 0.011	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 2	RH-BR-2-S03	REG	119.9	2/6/01	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.36	< 0.36	< 0.0052	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	< 0.01	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 2	TRIP BLANK	TB		2/5/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK- 3	RH-BR-3-S01	REG	2	1/31/01	CORE	< 0.0064	< 0.0064	< 0.0064	< 0.0064	< 0.0064	< 0.45	< 0.45	< 0.0064	< 0.0064	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 1.1	< 1.1	< 0.45	< 0.45	< 0.45	< 0.45	< 0.013	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45
TANK- 3	RH-BR-3-S02	REG	46.35	2/1/01	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 1.4	< 1.4	< 0.0052	< 0.0052	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 0.01	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
TANK- 3	RH-BR-3-S03	REG	125.2	2/2/01	CORE	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.36	< 0.36	< 0.0054	< 0.0054	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	< 0.011	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 3	TRIP BLANK	TB		2/2/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK- 4	RH-BR-4-D08	DUP	123.9	1/31/01	CORE	< 0.0057	< 0.0057	< 0.0057	< 0.0057	< 0.0057	< 0.38	< 0.38	< 0.0057	< 0.0057	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.95	< 0.95	< 0.38	< 0.38	< 0.38	< 0.38	< 0.011	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK- 4	RH-BR-4-S01	REG	2.6	1/29/01	CORE	< 0.0074	< 0.0074	< 0.0074	< 0.0074	< 0.0074	< 0.5	< 0.5	< 0.0074	< 0.0074	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1.3	< 1.3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.015	0.392	< 0.5	< 0.5	< 0.5	< 0.5
TANK- 4	RH-BR-4-S02	REG	8.2	1/29/01	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 1.5	< 1.5	< 0.0052	< 0.0052	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 3.7	< 3.7	< 1.5	< 1.5	< 1.5	< 1.5	< 0.01	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
TANK- 4	RH-BR-4-S03	REG	123.9	1/31/01	CORE	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.38	< 0.38	< 0.0054	< 0.0054	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.95	< 0.95	< 0.38	< 0.38	< 0.38	< 0.38	< 0.011	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK- 4	TRIP BLANK	TB		1/29/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK- 5	RH-BR-5-S01	REG	9.15	1/25/01	CORE	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.36	< 0.36	< 0.26	< 0.26	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.89	< 0.89	< 0.36	< 0.36	< 0.36	< 0.36	< 0.52	1.85	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 5	RH-BR-5-S02	REG	14.7	1/25/01	CORE	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.36	< 0.36	< 0.0053	< 0.0053	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	< 0.011	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 5	RH-BR-5-S03	REG	55.25	1/26/01	CORE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.34	< 0.34	< 0.005	< 0.005	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.86	< 0.86	< 0.34	< 0.34	< 0.34	< 0.34	< 0.01	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
TANK- 5	RH-BR-5-S04	REG	113.3	1/26/01	CORE	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.36	< 0.36	< 0.0053	< 0.0053	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	< 0.011	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 5	RH-BR-5-S05	REG	115.3	1/26/01	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK- 5	TRIP BLANK	TB		1/26/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK- 6	RH-BR-6-D07	DUP	19.8	1/22/01	CORE	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.37	< 0.37	< 0.0054	< 0.0054	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.92	< 0.92	< 0.37	< 0.37	< 0.37	< 0.37	< 0.011	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
TANK- 6	RH-BR-6-S01	REG	0.5	1/19/01	CORE	< 0.29	< 0.29	< 0.29	< 0.29	< 0.29	< 20	< 20	< 0.29	< 0.29	< 20	< 20	< 20	< 20	< 20	< 51	< 51	< 20	< 20	< 20	< 20	< 0.59	18.9	< 20	< 20	< 20	< 20
TANK- 6	RH-BR-6-S02	REG	6	1/19/01	CORE	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 24	< 24	< 0.34	< 0.34	< 24	< 24	< 24	< 24	< 24	< 60	< 60	< 24	< 24	< 24	< 24	< 0.69	< 24	< 24	< 24	< 24	< 24
TANK- 6	RH-BR-6-S03	REG	19.8	1/22/01	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK- 6	RH-BR-6-S04	REG	125.1	1/24/01	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK- 6	RH-MW-6-S01	REG	0.5	1/19/01	DFLNAPL	< 25	< 25	< 25	< 25	< 25	< 100	< 100	< 25	< 25	< 100	< 100	< 100	< 100	< 100	< 250	< 250	< 100	< 100	< 100	< 100	< 50	36.8	< 100	< 100	< 100	< 100
TANK- 6	TRIP BLANK	TB		1/19/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK- 7	RH-BR-7-S01	REG	0.5	1/17/01	CORE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.42	< 0.42	< 0.006	< 0.006	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 1	< 1	< 0.42	< 0.42	< 0.42	< 0.42	< 0.012	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42
TANK- 7	RH-BR-7-S02	REG	25.9	1/18/01	CORE	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 3.6	< 3.6	< 0.27	< 0.27	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 8.9	< 8.9	< 3.6	< 3.6	< 3.6	< 3.6	< 0.54	19.1	< 3.6	< 3.6	< 3.6	< 3.6
TANK- 7	RH-BR-7-S03	REG	92.4	1/18/01	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.87	< 0.87	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK- 7	RH-BR-7-S04	REG	105.95	1/19/01	CORE	< 0.0058	< 0.0058	< 0.0058	< 0.0058	< 0.0058	< 0.39	< 0.39	< 0.0058	< 0.0058	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.96	< 0.96	< 0.39	< 0.39	< 0.39	< 0.39	< 0.012	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39
TANK- 7	RH-BR-7-S05	REG	111.2	1/19/01	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK- 7	TRIP BLANK	TB		1/18/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK- 8	RH-BR-8-S01	REG	0.5	1/15/01	CORE	< 0.0056	< 0.0056	< 0.0056	< 0.0056	< 0.0056	< 0.37	< 0.37	< 0.0056	< 0.0056	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.92	< 0.92	< 0.37	< 0.37	< 0.37	< 0.37	< 0.011	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
TANK- 8	RH-BR-8-S02	REG	77.65	1/16/01	CORE	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.36	< 0.36	< 0.0055	< 0.0055	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.89	< 0.89	< 0.36	< 0.36	< 0.36	< 0.36	< 0.011	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 8	RH-BR-8-S03	REG	114.5	1/16/01	CORE	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.35	< 0.35	< 0.0054	< 0.0054	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	< 0.011	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK- 8	TRIP BLANK	TB		1/16/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK- 9	B09A-1	REG	3.2	10/26/98	CORE																										
TANK- 9	B09A-2	REG	97.1	10/27/98	CORE																										
TANK- 9	B09B-1	REG	55	10/29/98	CORE																										

Table 3. All Results by Media Sampled (ppm)
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (FT, POE)	SAMPLE DATE	MEDIA	3,3'-Dichlorobenzidine	3-Nitroaniline	4,6-Dinitro-o-cresol	4-Bromophenyl phenyl ether	4-Chloro-3-methyl phenol	4-Chloroaniline	4-Chlorophenyl phenyl ether	4-Methyl-2-pentanone	4-Nitroaniline	4-Nitrophenol	Acenaphthene	Acenaphthylene	Acetone	Anthracene	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Benzyl Alcohol	bis(2-Chloroethoxy)methane	bis(2-Chloroethyl)ether	bis(2-Chloroisopropyl)ether	bis(2-Ethylhexyl)phthalate	Bromodichloromethane	Bromoform	Butyl benzyl phthalate
TANK-1	RH-BR-1-D09	DUP	59.6	2/8/01	CORE	< 2.7	< 1.4	< 2.7	< 1.4	< 1.4	< 1.4	< 1.4	< 0.48	< 1.4	< 3.4	< 1.4	< 1.4	< 2.4	< 1.4	< 0.24	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 0.24	< 0.24	< 1.4
TANK-1	RH-BR-1-S01	REG	2	2/7/01	CORE	< 37	< 18	< 37	< 18	< 18	< 18	< 18	< 0.68	< 18	< 46	< 18	< 18	< 3.4	< 18	< 0.34	< 18	< 18	< 18	< 18	< 18	< 46	< 18	< 18	< 18	< 18	< 18	< 0.34	< 0.34	< 18
TANK-1	RH-BR-1-S02	REG	6	2/8/01	CORE	< 0.69	< 0.34	< 0.69	< 0.34	< 0.34	< 0.34	< 0.34	< 0.52	< 0.34	< 0.86	< 0.34	< 0.34	< 2.6	< 0.34	< 0.26	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.86	< 0.34	< 0.34	< 0.34	< 0.34	0.162	< 0.26	< 0.26	< 0.34
TANK-1	RH-BR-1-S03	REG	59.6	2/8/01	CORE	< 2.8	< 1.4	< 2.8	< 1.4	< 1.4	< 1.4	< 1.4	< 0.5	< 1.4	< 3.5	< 1.4	< 1.4	< 2.5	< 1.4	< 0.25	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 0.25	< 0.25	< 1.4
TANK-1	RH-BR-1-S04	REG	61.35	2/8/01	CORE	< 15	< 7.5	< 15	< 7.5	< 7.5	< 7.5	< 7.5	< 0.53	< 7.5	< 19	< 7.5	< 7.5	< 2.7	< 7.5	< 0.27	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 19	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 0.27	< 0.27	< 7.5
TANK-1	RH-BR-1-S05	REG	129.2	2/9/01	CORE	< 0.78	< 0.39	< 0.78	< 0.39	< 0.39	< 0.39	< 0.39	< 0.012	< 0.39	< 0.98	< 0.39	< 0.39	< 0.058	< 0.39	< 0.0058	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.98	< 0.39	< 0.39	< 0.39	< 0.39	0.132	< 0.0058	< 0.0058	< 0.39
TANK-1	RH-MW-1-S01	REG	124.2	3/7/01	DFLNAPL	< 0.012	< 0.006	< 0.012	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.03	< 0.006	< 0.006	< 0.05	< 0.006	< 0.001	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.03	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.002	< 0.002	< 0.006
TANK-1	RH-MW-1-S01	REG	129.4	8/27/01	DFLNAPL								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-1	TRIP BLANK	TB		2/8/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-2	RH-BR-2-S01	REG	2.5	2/5/01	CORE	< 0.75	< 0.38	< 0.75	< 0.38	< 0.38	< 0.38	< 0.38	< 0.55	< 0.38	< 0.94	< 0.38	< 0.38	< 2.7	< 0.38	< 0.27	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.94	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.27	< 0.27	< 0.38
TANK-2	RH-BR-2-S02	REG	89.45	2/6/01	CORE	< 0.72	< 0.36	< 0.72	< 0.36	< 0.36	< 0.36	< 0.36	< 0.011	< 0.36	< 0.9	< 0.36	< 0.36	< 0.053	< 0.36	< 0.0053	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0053	< 0.0053	< 0.36
TANK-2	RH-BR-2-S03	REG	119.9	2/6/01	CORE	< 0.72	< 0.36	< 0.72	< 0.36	< 0.36	< 0.36	< 0.36	< 0.01	< 0.36	< 0.9	< 0.36	< 0.36	< 0.052	< 0.36	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0052	< 0.0052	< 0.36
TANK-2	TRIP BLANK	TB		2/5/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-3	RH-BR-3-S01	REG	2	1/31/01	CORE	< 0.91	< 0.45	< 0.91	< 0.45	< 0.45	< 0.45	< 0.45	< 0.013	< 0.45	< 1.1	< 0.45	< 0.45	0.0412	< 0.45	< 0.0064	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 1.1	< 0.45	< 0.45	< 0.45	< 0.45	0.159	< 0.0064	< 0.0064	< 0.45
TANK-3	RH-BR-3-S02	REG	46.35	2/1/01	CORE	< 2.9	< 1.4	< 2.9	< 1.4	< 1.4	< 1.4	< 1.4	< 0.01	< 1.4	< 3.6	< 1.4	< 1.4	< 0.052	< 1.4	< 0.0052	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 0.0052	< 0.0052	< 1.4
TANK-3	RH-BR-3-S03	REG	125.2	2/2/01	CORE	< 0.72	< 0.36	< 0.72	< 0.36	< 0.36	< 0.36	< 0.36	< 0.011	< 0.36	< 0.9	< 0.36	< 0.36	< 0.054	< 0.36	< 0.0054	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0054	< 0.0054	< 0.36
TANK-3	TRIP BLANK	TB		2/2/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-4	RH-BR-4-D08	DUP	123.9	1/31/01	CORE	< 0.76	< 0.38	< 0.76	< 0.38	< 0.38	< 0.38	< 0.38	< 0.011	< 0.38	< 0.95	< 0.38	< 0.38	< 0.057	< 0.38	< 0.0057	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.95	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.0057	< 0.0057	< 0.38
TANK-4	RH-BR-4-S01	REG	2.5	1/29/01	CORE	< 1	< 0.5	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.015	< 0.5	< 1.3	< 0.5	< 0.5	0.045	< 0.5	< 0.0074	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1.3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.0074	< 0.0074	< 0.5
TANK-4	RH-BR-4-S02	REG	8.2	1/29/01	CORE	< 3	< 1.5	< 3	< 1.5	< 1.5	< 1.5	< 1.5	< 0.01	< 1.5	< 3.7	< 1.5	< 1.5	< 0.052	< 1.5	< 0.0052	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 3.7	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 0.0052	< 0.0052	< 1.5
TANK-4	RH-BR-4-S03	REG	123.9	1/31/01	CORE	< 0.76	< 0.38	< 0.76	< 0.38	< 0.38	< 0.38	< 0.38	< 0.011	< 0.38	< 0.95	< 0.38	< 0.38	< 0.054	< 0.38	< 0.0054	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.95	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.0054	< 0.0054	< 0.38
TANK-4	TRIP BLANK	TB		1/29/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-5	RH-BR-5-S01	REG	8.15	1/25/01	CORE	< 0.71	< 0.36	< 0.71	< 0.36	< 0.36	< 0.36	< 0.36	< 0.52	< 0.36	< 0.89	< 0.36	< 0.36	< 2.6	< 0.36	< 0.26	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.89	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.26	< 0.26	< 0.36
TANK-5	RH-BR-5-S02	REG	14.7	1/25/01	CORE	< 0.72	< 0.36	< 0.72	< 0.36	< 0.36	< 0.36	< 0.36	< 0.011	< 0.36	< 0.9	< 0.36	< 0.36	0.0234	< 0.36	< 0.0053	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	0.251	< 0.0053	< 0.0053	< 0.36
TANK-5	RH-BR-5-S03	REG	55.25	1/26/01	CORE	< 0.69	< 0.34	< 0.69	< 0.34	< 0.34	< 0.34	< 0.34	< 0.01	< 0.34	< 0.86	< 0.34	< 0.34	< 0.05	< 0.34	< 0.005	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.86	< 0.34	< 0.34	< 0.34	< 0.34	0.178	< 0.005	< 0.005	< 0.34
TANK-5	RH-BR-5-S04	REG	113.3	1/26/01	CORE	< 0.72	< 0.36	< 0.72	< 0.36	< 0.36	< 0.36	< 0.36	< 0.011	< 0.36	< 0.9	< 0.36	< 0.36	< 0.053	< 0.36	< 0.0053	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	0.435	< 0.0053	< 0.0053	< 0.36
TANK-5	RH-BR-5-S05	REG	115.3	1/26/01	CORE	< 0.71	< 0.35	< 0.71	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.88	< 0.35	< 0.35	< 0.052	< 0.35	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	0.214	< 0.0052	< 0.0052	< 0.35
TANK-5	TRIP BLANK	TB		1/26/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-6	RH-BR-6-D07	DUP	19.8	1/22/01	CORE	< 0.73	< 0.37	< 0.73	< 0.37	< 0.37	< 0.37	< 0.37	< 0.011	< 0.37	< 0.92	< 0.37	< 0.37	< 0.054	< 0.37	< 0.0054	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.92	< 0.37	< 0.37	< 0.37	< 0.37	0.456	< 0.0054	< 0.0054	< 0.37
TANK-6	RH-BR-6-S01	REG	0.5	1/19/01	CORE	< 41	< 20	< 41	< 20	< 20	< 20	< 20	< 0.59	< 20	< 51	< 20	< 20	< 2.9	< 20	< 0.29	< 20	< 20	< 20	< 20	< 20	< 51	< 20	< 20	< 20	< 20	< 20	< 0.29	< 0.29	< 20
TANK-6	RH-BR-6-S02	REG	6	1/19/01	CORE	< 48	< 24	< 48	< 24	< 24	< 24	< 24	< 0.69	< 24	< 60	< 24	< 24	< 3.4	< 24	< 0.34	< 24	< 24	< 24	< 24	< 24	< 60	< 24	< 24	< 24	< 24	< 24	< 0.34	< 0.34	< 24
TANK-6	RH-BR-6-S03	REG	19.8	1/22/01	CORE	< 0.7	< 0.35	< 0.7	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.88	< 0.35	< 0.35	< 0.052	< 0.35	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	0.265	< 0.0052	< 0.0052	< 0.35
TANK-6	RH-BR-6-S04	REG	125.1	1/24/01	CORE	< 0.71	< 0.35	< 0.71	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.88	< 0.35	< 0.35	< 0.052	< 0.35	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	0.375	< 0.0052	< 0.0052	< 0.35
TANK-6	RH-MW-6-S01	REG	0.5	1/19/01	DFLNAPL	< 200	< 100	< 200	< 100	< 100	< 100	< 100	< 50	< 100	< 250	< 100	< 100	< 250	< 100	< 25	< 100	< 100	< 100	< 100	< 100	< 250	< 100	< 100	< 100	< 100	< 100	< 25	< 25	< 100
TANK-6	TRIP BLANK	TB		1/19/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-7	RH-BR-7-S01	REG	0.5	1/17/01	CORE	< 0.83	< 0.42	< 0.83	< 0.42	< 0.42	< 0.42	< 0.42	< 0.012	< 0.42	< 1	< 0.42	< 0.42	0.0295	< 0.42	< 0.006	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 1	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.006	< 0.006	< 0.42
TANK-7	RH-BR-7-S02	REG	25.9	1/18/01	CORE	< 7.1	< 3.6	< 7.1	< 3.6	< 3.6	< 3.6	< 3.6	< 0.54	< 3.6	< 8.9	< 3.6	< 3.6	< 2.7	< 3.6	< 0.27	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 8.9	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 0.27	< 0.27	< 3.6
TANK-7	RH-BR-7-S03	REG	92.4	1/18/01	CORE	< 0.7	< 0.35	< 0.7	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.87	< 0.35	< 0.35	0.04	< 0.35	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.87	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.0052	< 0.0052	< 0.35
TANK-7	RH-BR-7-S04	REG	105.95	1/19/01	CORE	< 0.77	< 0.39	< 0.77	< 0.39	< 0.39	< 0.39	< 0.39	< 0.012	< 0.39	< 0.96	< 0.39	< 0.39	< 0.058	< 0.39	< 0.0058	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.96	< 0.39	< 0.39	< 0.39	< 0.39	0.291	< 0.0058	< 0.0058	< 0.39
TANK-7	RH-BR-7-S05	REG	111.2	1/19/01	CORE	< 0.7	< 0.35	< 0.7	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.88	< 0.35	< 0.35	< 0.052	< 0.35	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	0.18	< 0.0052	< 0.0052	< 0.35
TANK-7	TRIP BLANK	TB		1/18/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-8	RH-BR-8-S01	REG	0.5	1/15/01	CORE	< 0.74	< 0.37	< 0.74	< 0.37	< 0.37	< 0.37	< 0.37	< 0.011	< 0.37	< 0.92	< 0.37	< 0.37	< 0.056	< 0.37	< 0.0056	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.92	< 0.37	< 0.37	< 0.37	< 0.37	0.189	< 0.0056	< 0.0056	< 0.37
TANK-8	RH-BR-8-S02	REG	77.65	1/16/01	CORE	< 0.71	< 0.36	< 0.71	< 0.36	< 0.36	< 0.36	< 0.36	< 0.011	< 0.36	< 0.89	< 0.36	< 0.36	< 0.055	< 0.36	< 0.0055	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.89	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0055	< 0.0055	< 0.36
TANK-8	RH-BR-8-S03	REG	114.5	1/16/01	CORE	< 0.7	< 0.35	< 0.7	< 0.35	< 0.35	< 0.35	< 0.35	< 0.011	< 0.35	< 0.88	< 0.35	< 0.35	< 0.054	< 0.35	< 0.0054	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	0.123	< 0.0054	< 0.0054	< 0.35
TANK-8	TRIP BLANK	TB		1/16/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-9	B09A-1	REG	3.2	10/26/98	CORE											< 0.33	< 0.33		< 0.33	< 0.005	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33									
TANK-9	B09A-2	REG	97.1	10/27/98	CORE											< 0.33	< 0.33		< 0.33	< 0.005	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33									
TANK-9	B09B-1	REG	55	10/29/98	CORE											< 0.33	< 0.33		< 0.33	< 0.005	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33									

Table 3. All Results by Media Sampled (ppm)
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (FT, POE)	SAMPLE DATE	MEDIA	Carbazole	Carbon disulfide	Carbon tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chrysene	cis-1,2-Dichloroethylene	cis-1,3-Dichloropropene	Di-n-butyl phthalate	Di-n-octyl phthalate	Dibenzo(a,h)anthracene	Dibenzofuran	Dibromochloromethane	Diesel Fuel	Diethyl phthalate	Dimethyl phthalate	Ethylbenzene	Fluoranthene	Fluorene	Hexachlorobenzene	Hexachlorobutadiene	Hexachlorocyclopentadiene	Hexachloroethane	Indeno(1,2,3-cd)pyrene	Isophorone
TANK- 1	RH-BR-1-D09	DUP	59.6	2/8/01	CORE	< 1.4	< 0.48	< 0.24	< 0.24	< 0.24	< 0.24	< 1.4	< 0.24	< 0.24	< 1.4	< 1.4	< 1.4	< 1.4	< 0.24		< 1.4	< 1.4	< 0.24	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
TANK- 1	RH-BR-1-S01	REG	2	2/7/01	CORE	< 18	< 0.68	< 0.34	< 0.34	< 0.34	< 0.34	< 18	< 0.34	< 0.34	< 18	< 18	< 18	< 18	< 0.34		< 18	< 18	< 0.34	< 18	< 18	< 18	< 18	< 18	< 18	< 18	< 18
TANK- 1	RH-BR-1-S02	REG	8	2/8/01	CORE	< 0.34	< 0.52	< 0.26	< 0.26	< 0.26	< 0.26	< 0.34	< 0.26	< 0.26	< 0.34	< 0.34	< 0.34	< 0.34	< 0.26		< 0.34	< 0.34	< 0.26	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
TANK- 1	RH-BR-1-S03	REG	59.6	2/8/01	CORE	< 1.4	< 0.5	< 0.25	< 0.25	< 0.25	< 0.25	< 1.4	< 0.25	< 0.25	< 1.4	< 1.4	< 1.4	< 1.4	< 0.25		< 1.4	< 1.4	< 0.25	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
TANK- 1	RH-BR-1-S04	REG	61.35	2/8/01	CORE	< 7.5	< 0.53	< 0.27	< 0.27	< 0.27	< 0.27	< 7.5	< 0.27	< 0.27	< 7.5	< 7.5	< 7.5	< 7.5	< 0.27		< 7.5	< 7.5	0.49	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5
TANK- 1	RH-BR-1-S05	REG	129.2	2/9/01	CORE	< 0.39	< 0.012	< 0.0058	< 0.0058	< 0.0058	< 0.0058	< 0.39	< 0.0058	< 0.0058	< 0.39	< 0.39	< 0.39	< 0.39	< 0.0058		< 0.39	< 0.39	< 0.0058	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39
TANK- 1	RH-MW-1-S01	REG	124.2	3/7/01	DFLNAPL	< 0.006	< 0.01	< 0.002	< 0.002	< 0.005	< 0.002	< 0.006	< 0.002	< 0.002	< 0.006	< 0.006	< 0.006	< 0.006	< 0.002		< 0.006	< 0.006	< 0.002	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006
TANK- 1	RH-MW-1-S01	REG	129.4	8/27/01	DFLNAPL		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK- 1	TRIP BLANK	TB		2/8/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK- 2	RH-BR-2-S01	REG	2.5	2/5/01	CORE	< 0.38	< 0.55	< 0.27	< 0.27	< 0.27	< 0.27	< 0.38	< 0.27	< 0.27	< 0.38	< 0.38	< 0.38	< 0.38	< 0.27		< 0.38	< 0.38	< 0.27	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK- 2	RH-BR-2-S02	REG	89.45	2/6/01	CORE	< 0.36	< 0.011	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.36	< 0.0053	< 0.0053	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0053		< 0.36	< 0.36	< 0.0053	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 2	RH-BR-2-S03	REG	119.9	2/6/01	CORE	< 0.36	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.36	< 0.0052	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0052		< 0.36	< 0.36	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 2	TRIP BLANK	TB		2/5/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK- 3	RH-BR-3-S01	REG	2	1/31/01	CORE	< 0.45	< 0.013	< 0.0064	< 0.0064	< 0.0064	< 0.0064	< 0.45	< 0.0064	< 0.0064	< 0.45	< 0.45	< 0.45	< 0.45	< 0.0064		< 0.45	< 0.45	< 0.0064	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45
TANK- 3	RH-BR-3-S02	REG	46.35	2/1/01	CORE	< 1.4	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 1.4	< 0.0052	< 0.0052	< 1.4	< 1.4	< 1.4	< 1.4	< 0.0052		< 1.4	< 1.4	< 0.0052	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
TANK- 3	RH-BR-3-S03	REG	125.2	2/2/01	CORE	< 0.36	< 0.011	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.36	< 0.0054	< 0.0054	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0054		< 0.36	< 0.36	< 0.0054	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 3	TRIP BLANK	TB		2/2/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK- 4	RH-BR-4-D08	DUP	123.9	1/31/01	CORE	< 0.38	< 0.011	< 0.0057	< 0.0057	< 0.0057	< 0.0057	< 0.38	< 0.0057	< 0.0057	< 0.38	< 0.38	< 0.38	< 0.38	< 0.0057		< 0.38	< 0.38	< 0.0057	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK- 4	RH-BR-4-S01	REG	2.5	1/29/01	CORE	< 0.5	< 0.015	< 0.0074	< 0.0074	< 0.0074	< 0.0074	< 0.5	< 0.0074	< 0.0074	< 0.5	< 0.5	< 0.5	< 0.5	< 0.0074		< 0.5	< 0.5	< 0.0074	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
TANK- 4	RH-BR-4-S02	REG	8.2	1/29/01	CORE	< 1.5	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 1.5	< 0.0052	< 0.0052	< 1.5	< 1.5	< 1.5	< 1.5	< 0.0052		< 1.5	< 1.5	< 0.0052	< 1.6	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
TANK- 4	RH-BR-4-S03	REG	123.9	1/31/01	CORE	< 0.38	< 0.011	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.38	< 0.0054	< 0.0054	< 0.38	< 0.38	< 0.38	< 0.38	< 0.0054		< 0.38	< 0.38	< 0.0054	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK- 4	TRIP BLANK	TB		1/29/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK- 5	RH-BR-5-S01	REG	9.15	1/25/01	CORE	< 0.36	< 0.52	< 0.26	< 0.26	< 0.26	< 0.26	< 0.36	< 0.26	< 0.26	< 0.36	< 0.36	< 0.36	< 0.36	< 0.26		< 0.36	< 0.36	< 0.26	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 5	RH-BR-5-S02	REG	14.7	1/25/01	CORE	< 0.36	< 0.011	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.36	< 0.0053	< 0.0053	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0053		< 0.36	< 0.36	< 0.0053	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 5	RH-BR-5-S03	REG	55.25	1/26/01	CORE	< 0.34	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.34	< 0.005	< 0.005	< 0.34	< 0.34	< 0.34	< 0.34	< 0.005		< 0.34	< 0.34	< 0.005	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
TANK- 5	RH-BR-5-S04	REG	113.3	1/26/01	CORE	< 0.36	< 0.011	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.36	< 0.0053	< 0.0053	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0053		< 0.36	< 0.36	< 0.0053	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 5	RH-BR-5-S05	REG	115.3	1/26/01	CORE	< 0.35	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.35	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.0052		< 0.35	< 0.35	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK- 5	TRIP BLANK	TB		1/26/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK- 6	RH-BR-6-D07	DUP	19.8	1/22/01	CORE	< 0.37	< 0.011	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.37	< 0.0054	< 0.0054	< 0.37	< 0.37	< 0.37	< 0.37	< 0.0054		< 0.37	< 0.37	< 0.0054	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
TANK- 6	RH-BR-6-S01	REG	0.5	1/19/01	CORE	< 20	< 0.59	< 0.29	< 0.29	< 0.29	< 0.29	< 20	< 0.29	< 0.29	< 20	< 20	< 20	< 20	< 0.29		< 20	< 20	< 0.29	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TANK- 6	RH-BR-6-S02	REG	6	1/19/01	CORE	< 24	< 0.69	< 0.34	< 0.34	< 0.34	< 0.34	< 24	< 0.34	< 0.34	< 24	< 24	< 24	< 24	< 0.34		< 24	< 24	< 0.34	< 24	< 24	< 24	< 24	< 24	< 24	< 24	< 24
TANK- 6	RH-BR-6-S03	REG	19.8	1/22/01	CORE	< 0.35	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.35	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.0052		< 0.35	< 0.35	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK- 6	RH-BR-6-S04	REG	125.1	1/24/01	CORE	< 0.35	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.35	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.0052		< 0.35	< 0.35	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK- 6	RH-MW-6-S01	REG	0.5	1/19/01	DFLNAPL	< 100	< 50	< 25	< 25	< 25	< 25	< 100	< 25	< 25	< 100	< 100	< 100	< 100	< 25		< 100	< 100	< 25	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
TANK- 6	TRIP BLANK	TB		1/19/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK- 7	RH-BR-7-S01	REG	0.5	1/17/01	CORE	< 0.42	< 0.012	< 0.006	< 0.006	< 0.006	< 0.006	< 0.42	< 0.006	< 0.006	< 0.42	< 0.42	< 0.42	< 0.42	< 0.006		< 0.42	< 0.42	< 0.006	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42
TANK- 7	RH-BR-7-S02	REG	25.9	1/18/01	CORE	< 3.6	< 0.54	< 0.27	< 0.27	< 0.27	< 0.27	< 3.6	< 0.27	< 0.27	< 3.6	< 3.6	< 3.6	< 3.6	< 0.27		< 3.6	< 3.6	0.122	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6
TANK- 7	RH-BR-7-S03	REG	92.4	1/18/01	CORE	< 0.35	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.35	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.0052		< 0.35	< 0.35	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK- 7	RH-BR-7-S04	REG	105.95	1/19/01	CORE	< 0.39	< 0.012	< 0.0058	< 0.0058	< 0.0058	< 0.0058	< 0.39	< 0.0058	< 0.0058	< 0.39	< 0.39	< 0.39	< 0.39	< 0.0058		< 0.39	< 0.39	< 0.0058	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39
TANK- 7	RH-BR-7-S05	REG	111.2	1/19/01	CORE	< 0.35	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.35	< 0.0052	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.0052		< 0.35	< 0.35	< 0.0052	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK- 7	TRIP BLANK	TB		1/18/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK- 8	RH-BR-8-S01	REG	0.5	1/15/01	CORE	< 0.37	< 0.011	< 0.0056	< 0.0056	< 0.0056	< 0.0056	< 0.37	< 0.0056	< 0.0056	< 0.37	< 0.37	< 0.37	< 0.37	< 0.0056		< 0.37	< 0.37	< 0.0056	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
TANK- 8	RH-BR-8-S02	REG	77.65	1/16/01	CORE	< 0.36	< 0.011	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.36	< 0.0055	< 0.0055	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0055		< 0.36	< 0.36	< 0.0055	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK- 8	RH-BR-8-S03	REG	114.5	1/16/01	CORE	< 0.35	< 0.011	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.35	< 0.0054	< 0.0054	< 0.35	< 0.35	< 0.35	< 0.35	< 0.0054		< 0.35	< 0.35	< 0.0054	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK- 8	TRIP BLANK	TB		1/16/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK- 9	B09A-1	REG	3.2	10/26/98	CORE							< 0.33					< 0.33			< 10			< 0.005	< 0.33	< 0.33					< 0.33	
TANK- 9	B09A-2	REG	97.1	10/27/98	CORE							< 0.33					< 0.33			< 1			< 0.005	< 0.33	< 0.33					< 0.33	
TANK- 9	B09B-1	REG	55	10/29/98	CORE							< 0.33					< 0.33			< 5			< 0.005	< 0.33	< 0.33					< 0.33	

Table 3. All Results by Media Sampled (ppm)
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (FT, POE)	SAMPLE DATE	MEDIA	Lead	m,p xylene	Methyl bromide	Methyl chloride	Methyl ethyl ketone	Methylene chloride	Motor Oil (n-C19 through n-C36)	N-Nitroso-di-n-propylamine	N-Nitrosodiphenylamine	Naphthalene	Nitrobenzene	o-xylene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene	Solids, Percent	Styrene	Tetrachloroethylene	Toluene	TPH (C10-C28)	trans-1,2-Dichloroethylene	trans-1,3-Dichloropropene	Trichloroethylene	Unknown Hydrocarbon	Vinyl chloride	Xylene (total)
TANK- 1	RH-BR-1-D09	DUP	59.6	2/8/01	CORE	< 9.8		< 0.24	< 0.24	< 0.48	< 0.48		< 1.4	< 1.4	1.23	< 1.4		< 3.4	< 1.4	< 1.4	< 1.4	97	< 0.24	< 0.24	< 0.24	890	< 0.24	< 0.24	< 0.24		< 0.24	< 0.72
TANK- 1	RH-BR-1-S01	REG	2	2/7/01	CORE	293		< 0.34	< 0.34	< 0.68	< 0.68		< 18	< 18	< 18	< 18		< 46	< 18	< 18	< 18	72.9	< 0.34	< 0.34	< 0.34	25300	< 0.34	< 0.34	< 0.34		< 0.34	< 1
TANK- 1	RH-BR-1-S02	REG	8	2/8/01	CORE	< 10.4		< 0.26	< 0.26	< 0.52	< 0.52		< 0.34	< 0.34	< 0.34	< 0.34		< 0.86	< 0.34	< 0.34	< 0.34	96.4	< 0.26	< 0.26	< 0.26	1500	< 0.26	< 0.26	< 0.26		< 0.26	< 0.79
TANK- 1	RH-BR-1-S03	REG	59.6	2/8/01	CORE	< 10.4		< 0.25	< 0.25	< 0.5	< 0.5		< 1.4	< 1.4	3.72	< 1.4		< 3.5	< 1.4	< 1.4	< 1.4	95.3	< 0.25	< 0.25	< 0.25	2330	< 0.25	< 0.25	< 0.25		< 0.25	0.436
TANK- 1	RH-BR-1-S04	REG	61.35	2/8/01	CORE	< 11.2		< 0.27	< 0.27	< 0.53	< 0.53		< 7.5	< 7.5	16.3	< 7.5		< 19	< 7.5	< 7.5	< 7.5	88.3	< 0.27	< 0.27	< 0.27	3300	< 0.27	< 0.27	< 0.27		< 0.27	4.81
TANK- 1	RH-BR-1-S05	REG	129.2	2/9/01	CORE	< 11.5		< 0.0058	< 0.0058	< 0.012	< 0.012		< 0.39	< 0.39	< 0.39	< 0.39		< 0.98	< 0.39	< 0.39	< 0.39	85.2	< 0.0058	< 0.0058	< 0.0058	27.7	< 0.0058	< 0.0058	< 0.0058		< 0.0058	< 0.017
TANK- 1	RH-MW-1-S01	REG	124.2	3/7/01	DFLNAPL	0.0756		< 0.005	< 0.005	< 0.01	< 0.005		< 0.006	< 0.006	< 0.006	< 0.006		< 0.03	< 0.006	< 0.006	< 0.006		< 0.002	< 0.002	< 0.002	1.88	< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK- 1	RH-MW-1-S01	REG	129.4	8/27/01	DFLNAPL			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002	1.3	< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK- 1	TRIP BLANK	TB		2/8/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK- 2	RH-BR-2-S01	REG	2.5	2/5/01	CORE	< 10.5		< 0.27	< 0.27	< 0.55	< 0.55		< 0.38	< 0.38	< 0.38	< 0.38		< 0.94	< 0.38	< 0.38	< 0.38	88.6	< 0.27	< 0.27	< 0.27	910	< 0.27	< 0.27	< 0.27		< 0.27	< 0.82
TANK- 2	RH-BR-2-S02	REG	89.45	2/6/01	CORE	< 10.4		< 0.0053	< 0.0053	< 0.011	0.011		< 0.36	< 0.36	< 0.36	< 0.36		< 0.9	< 0.36	< 0.36	< 0.36	93	< 0.0053	< 0.0053	< 0.0053	22.2	< 0.0053	< 0.0053	< 0.0053		< 0.0053	< 0.016
TANK- 2	RH-BR-2-S03	REG	119.9	2/6/01	CORE	< 10.5		< 0.0052	< 0.0052	< 0.01	0.0127		< 0.36	< 0.36	< 0.36	< 0.36		< 0.9	< 0.36	< 0.36	< 0.36	92.1	< 0.0052	< 0.0052	< 0.0052	< 9	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.016
TANK- 2	TRIP BLANK	TB		2/5/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK- 3	RH-BR-3-S01	REG	2	1/31/01	CORE	14.5		< 0.0064	< 0.0064	< 0.013	< 0.013		< 0.45	< 0.45	< 0.45	< 0.45		< 1.1	< 0.45	< 0.45	< 0.45	73.4	< 0.0064	< 0.0064	< 0.0064	386	< 0.0064	< 0.0064	< 0.0064		< 0.0064	< 0.019
TANK- 3	RH-BR-3-S02	REG	46.35	2/1/01	CORE	< 10.6		< 0.0052	< 0.0052	< 0.01	< 0.01		< 1.4	< 1.4	< 1.4	< 1.4		< 3.6	< 1.4	< 1.4	< 1.4	91.6	< 0.0052	< 0.0052	< 0.0052	774	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.016
TANK- 3	RH-BR-3-S03	REG	125.2	2/2/01	CORE	< 10.5		< 0.0054	< 0.0054	< 0.011	< 0.011		< 0.36	< 0.36	< 0.36	< 0.36		< 0.9	< 0.36	< 0.36	< 0.36	92.1	< 0.0054	< 0.0054	< 0.0054	28.9	< 0.0054	< 0.0054	< 0.0054		< 0.0054	< 0.016
TANK- 3	TRIP BLANK	TB		2/2/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK- 4	RH-BR-4-D08	DUP	123.9	1/31/01	CORE	< 10.5		< 0.0057	< 0.0057	< 0.011	< 0.011		< 0.38	< 0.38	< 0.38	< 0.38		< 0.95	< 0.38	< 0.38	< 0.38	87.7	< 0.0057	< 0.0057	< 0.0057	14.5	< 0.0057	< 0.0057	< 0.0057		< 0.0057	< 0.017
TANK- 4	RH-BR-4-S01	REG	2.5	1/29/01	CORE	84.5		< 0.0074	< 0.0074	< 0.015	< 0.015		< 0.5	< 0.5	< 0.5	< 0.5		< 1.3	< 0.5	< 0.5	< 0.5	65.9	< 0.0074	< 0.0074	< 0.0074	238	< 0.0074	< 0.0074	< 0.0074		< 0.0074	< 0.022
TANK- 4	RH-BR-4-S02	REG	8.2	1/29/01	CORE	< 11		< 0.0052	< 0.0052	< 0.01	< 0.01		< 1.5	< 1.5	< 1.5	< 1.5		< 3.7	< 1.5	< 1.5	< 1.5	89.3	< 0.0052	< 0.0052	< 0.0052	1330	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.016
TANK- 4	RH-BR-4-S03	REG	123.9	1/31/01	CORE	< 10.8		< 0.0054	< 0.0054	< 0.011	< 0.011		< 0.38	< 0.38	< 0.38	< 0.38		< 0.95	< 0.38	< 0.38	< 0.38	87.5	< 0.0054	< 0.0054	< 0.0054	49.8	< 0.0054	< 0.0054	< 0.0054		< 0.0054	< 0.016
TANK- 4	TRIP BLANK	TB		1/29/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK- 5	RH-BR-5-S01	REG	9.15	1/25/01	CORE	< 13.5		< 0.26	< 0.26	0.29	< 0.52		< 0.36	< 0.36	0.266	< 0.36		< 0.89	0.226	< 0.36	< 0.36	93.5	< 0.26	< 0.26	< 0.26	503	< 0.26	< 0.26	< 0.26		< 0.26	< 0.77
TANK- 5	RH-BR-5-S02	REG	14.7	1/25/01	CORE	24		< 0.0053	< 0.0053	< 0.011	< 0.011		< 0.36	< 0.36	< 0.36	< 0.36		< 0.9	< 0.36	< 0.36	< 0.36	93.1	< 0.0053	< 0.0053	< 0.0053	11.8	< 0.0053	< 0.0053	< 0.0053		< 0.0053	< 0.016
TANK- 5	RH-BR-5-S03	REG	55.25	1/26/01	CORE	< 10.4		< 0.005	< 0.005	< 0.01	< 0.01		< 0.34	< 0.34	< 0.34	< 0.34		< 0.86	< 0.34	< 0.34	< 0.34	97.1	< 0.005	< 0.005	< 0.005	< 8.6	< 0.005	< 0.005	< 0.005		< 0.005	< 0.015
TANK- 5	RH-BR-5-S04	REG	113.3	1/26/01	CORE	2.1		< 0.0053	< 0.0053	< 0.011	< 0.011		< 0.36	< 0.36	< 0.36	< 0.36		< 0.9	< 0.36	< 0.36	< 0.36	92.8	< 0.0053	< 0.0053	< 0.0053	12.4	< 0.0053	< 0.0053	< 0.0053		< 0.0053	< 0.016
TANK- 5	RH-BR-5-S05	REG	115.3	1/26/01	CORE	< 10.7		< 0.0052	< 0.0052	< 0.01	< 0.01		< 0.35	< 0.35	< 0.35	< 0.35		< 0.88	< 0.35	< 0.35	< 0.35	94.4	< 0.0052	< 0.0052	< 0.0052	< 8.8	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.016
TANK- 5	TRIP BLANK	TB		1/26/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK- 6	RH-BR-6-D07	DUP	19.8	1/22/01	CORE	< 10.6		< 0.0054	< 0.0054	< 0.011	< 0.011		< 0.37	< 0.37	< 0.37	< 0.37		< 0.92	< 0.37	< 0.37	< 0.37	90.7	< 0.0054	< 0.0054	< 0.0054	< 9.2	< 0.0054	< 0.0054	< 0.0054		< 0.0054	< 0.016
TANK- 6	RH-BR-6-S01	REG	0.5	1/19/01	CORE	11.3		< 0.29	< 0.29	< 0.59	< 0.59		< 20	< 20	< 20	< 20		< 51	10.9	< 20	< 20	82	< 0.29	< 0.29	< 0.29	10200	< 0.29	< 0.29	< 0.29		< 0.29	< 0.88
TANK- 6	RH-BR-6-S02	REG	6	1/19/01	CORE	11.2		< 0.34	< 0.34	< 0.69	< 0.69		< 24	< 24	< 24	< 24		< 60	< 24	< 24	8.45	70	< 0.34	< 0.34	< 0.34	43100	< 0.34	< 0.34	< 0.34		< 0.34	< 1
TANK- 6	RH-BR-6-S03	REG	19.8	1/22/01	CORE	< 10.3		< 0.0052	< 0.0052	< 0.01	< 0.01		< 0.35	< 0.35	< 0.35	< 0.35		< 0.88	< 0.35	< 0.35	< 0.35	95.2	< 0.0052	< 0.0052	< 0.0052	8.83	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.016
TANK- 6	RH-BR-6-S04	REG	125.1	1/24/01	CORE	< 10.8		< 0.0052	< 0.0052	< 0.01	< 0.01		< 0.35	< 0.35	< 0.35	< 0.35		< 0.88	< 0.35	< 0.35	< 0.35	94.2	< 0.0052	< 0.0052	< 0.0052	< 8.8	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.016
TANK- 6	RH-MW-6-S01	REG	0.5	1/19/01	DFLNAPL	27.5		< 25	< 25	< 50	< 50		< 100	< 100	< 100	< 100		< 250	< 100	< 100	< 100	9.2	< 25	< 25	< 25	29500	< 25	< 25	< 25		< 25	< 76
TANK- 6	TRIP BLANK	TB		1/19/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK- 7	RH-BR-7-S01	REG	0.5	1/17/01	CORE	17.6		< 0.006	< 0.006	< 0.012	< 0.012		< 0.42	< 0.42	< 0.42	< 0.42		< 1	< 0.42	< 0.42	< 0.42	80	< 0.006	< 0.006	< 0.006	631	< 0.006	< 0.006	< 0.006		< 0.006	< 0.018
TANK- 7	RH-BR-7-S02	REG	25.9	1/18/01	CORE	< 10.6		< 0.27	< 0.27	0.431	< 0.54		< 3.6	< 3.6	7.09	< 3.6		< 8.9	< 3.6	< 3.6	< 3.6	93.3	< 0.27	< 0.27	< 0.27	2420	< 0.27	< 0.27	< 0.27		< 0.27	1.23
TANK- 7	RH-BR-7-S03	REG	92.4	1/18/01	CORE	< 10.8		< 0.0052	< 0.0052	< 0.01	< 0.01		< 0.35	< 0.35	< 0.35	< 0.35		< 0.87	< 0.35	< 0.35	< 0.35	95.6	< 0.0052	< 0.0052	< 0.0052	24.4	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.016
TANK- 7	RH-BR-7-S04	REG	105.95	1/19/01	CORE	< 11.5		< 0.0058	< 0.0058	< 0.012	< 0.012		< 0.39	< 0.39	< 0.39	< 0.39		< 0.96	< 0.39	< 0.39	< 0.39	86.3	< 0.0058	< 0.0058	< 0.0058	22.3	< 0.0058	< 0.0058	< 0.0058		< 0.0058	< 0.017
TANK- 7	RH-BR-7-S05	REG	111.2	1/19/01	CORE	< 10.5		< 0.0052	< 0.0052	< 0.01	< 0.01		< 0.35	< 0.35	< 0.35	< 0.35		< 0.88	< 0.35	< 0.35	< 0.35	95	< 0.0052	< 0.0052	< 0.0052	208	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.015
TANK- 7	TRIP BLANK	TB		1/18/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK- 8	RH-BR-8-S01	REG	0.5	1/15/01	CORE	47.1		< 0.0056	< 0.0056	< 0.011	< 0.011		< 0.37	< 0.37	< 0.37	< 0.37		< 0.92	< 0.37	< 0.37	< 0.37	90	< 0.0056	< 0.0056	< 0.0056	1030	< 0.0056	< 0.0056	< 0.0056		< 0.0056	< 0.017
TANK- 8	RH-BR-8-S02	REG	77.65	1/16/01	CORE	< 10.5		< 0.0055	< 0.0055	< 0.011	< 0.011		< 0.36	< 0.36	< 0.36	< 0.36		< 0.89	< 0.36	< 0.36	< 0.36	93.2	< 0.0055	< 0.0055	< 0.0055	< 8.9	< 0.0055	< 0.0055	< 0.0055		< 0.0055	< 0.016
TANK- 8	RH-BR-8-S03	REG	114.5	1/16/01	CORE	< 10.4		< 0.0054	< 0.0054	< 0.011	< 0.011		< 0.35	< 0.35	< 0.35	< 0.35		< 0.88	< 0.35	< 0.35	< 0.35	94.8	< 0.0054	< 0.0054	< 0.0054	< 8.8	< 0.0054	< 0.0054	< 0.0054		< 0.0054	< 0.016
TANK- 8	TRIP BLANK	TB		1/16/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK- 9	B09A-1	REG	3.2	10/26/98	CORE		< 0.005					< 50			< 0.33		< 0.005		< 0.33		< 0.33				< 0.005					600		< 0.005
TANK- 9	B09A-2	REG	97.1	10/27/98	CORE		< 0.005					< 5			< 0.33		< 0.005		< 0.33		< 0.33				< 0.005					3.5		< 0.005
TANK- 9	B09B-1	REG	55	10/29/98	CORE		< 0.005					< 25			< 0.33		< 0.005		< 0.33		< 0.33				< 0.005					48		< 0.005

Table 3. All Results by Media Sampled (ppm)
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (FT, POE)	SAMPLE DATE	MEDIA	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethylene	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,2-Dichloropropane	1,3-Dichlorobenzene	1,4-Dichlorobenzene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2-Chloronaphthalene	2-Chlorophenol	2-Hexanone	2-Methylnaphthalene	2-Methylphenol	2-Nitroaniline	2-Nitrophenol	3&4-Methylphenol
TANK- 9	B09B-2	REG	74.6	10/29/98	CORE																										
TANK- 9	B09C-1	REG	50	10/28/98	CORE																										
TANK- 9	B09C-2	REG	66	10/28/98	CORE																										
TANK-10	RH-BR-10-S01	REG	60	1/10/01	CORE	< 0.0048	< 0.0048	< 0.0048	< 0.0048	< 0.0048	< 0.37	< 0.37	< 0.0048	< 0.0048	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.92	< 0.92	< 0.37	< 0.37	< 0.37	< 0.37	< 0.0095	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
TANK-10	RH-BR-10-S02	REG	100	1/10/01	CORE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.35	< 0.35	< 0.005	< 0.005	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK-10	RH-BR-10-S03	REG	123.9	1/10/01	CORE	< 0.0048	< 0.0048	< 0.0048	< 0.0048	< 0.0048	< 0.36	< 0.36	< 0.0048	< 0.0048	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.89	< 0.89	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0097	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK-10	TRIP BLANK	TB	123.9	1/10/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK-11	RH-BR-11-S01	REG	4.5	12/15/00	CORE	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.87	< 0.87	< 0.0055	< 0.0055	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 2.2	< 2.2	< 0.87	< 0.87	< 0.87	< 0.87	< 0.011	1.56	< 0.87	< 0.87	< 0.87	< 0.87
TANK-11	RH-BR-11-S02	REG	11.3	12/15/00	CORE	< 0.0045	< 0.0045	< 0.0045	< 0.0045	< 0.0045	< 1.4	< 1.4	< 0.0045	< 0.0045	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 0.009	6.11	< 1.4	< 1.4	< 1.4	< 1.4
TANK-11	RH-BR-11-S03	REG	67.1	12/18/00	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 1.4	< 1.4	< 0.0052	< 0.0052	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 0.01	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
TANK-11	RH-BR-11-S04	REG	85	12/18/00	CORE	< 0.0047	< 0.0047	< 0.0047	< 0.0047	< 0.0047	< 1.4	< 1.4	< 0.0047	< 0.0047	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 0.0094	1.76	< 1.4	< 1.4	< 1.4	< 1.4
TANK-11	RH-BR-11-S05	REG	95	12/18/00	CORE	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 1.5	< 1.5	< 0.0055	< 0.0055	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 3.8	< 3.8	< 1.5	< 1.5	< 1.5	< 1.5	< 0.011	6.81	< 1.5	< 1.5	< 1.5	< 1.5
TANK-11	TRIP BLANK	TB		12/18/00	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK-12	RH-BR-12-D06	DUP	104.3	12/14/00	CORE	< 0.0048	< 0.0048	< 0.0048	< 0.0048	< 0.0048	< 0.35	< 0.35	< 0.0048	< 0.0048	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.87	< 0.87	< 0.35	< 0.35	< 0.35	< 0.35	< 0.0097	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK-12	RH-BR-12-S01	REG	8	12/12/00	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.37	< 0.37	< 0.0052	< 0.0052	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.93	< 0.93	< 0.37	< 0.37	< 0.37	< 0.37	< 0.01	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
TANK-12	RH-BR-12-S02	REG	33.5	12/13/00	CORE	< 0.0056	< 0.0056	< 0.0056	< 0.0056	< 0.0056	< 0.38	< 0.38	< 0.0056	< 0.0056	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.96	< 0.96	< 0.38	< 0.38	< 0.38	< 0.38	< 0.011	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK-12	RH-BR-12-S03	REG	61	12/13/00	CORE	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.35	< 0.35	< 0.0053	< 0.0053	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	< 0.011	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK-12	RH-BR-12-S04	REG	104.3	12/14/00	CORE	< 0.0048	< 0.0048	< 0.0048	< 0.0048	< 0.0048	< 0.34	< 0.34	< 0.0048	< 0.0048	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.86	< 0.86	< 0.34	< 0.34	< 0.34	< 0.34	< 0.0097	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
TANK-12	RH-BR-12-S05	REG	121.9	12/14/00	CORE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 1.4	< 1.4	< 0.005	< 0.005	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 0.01	3.38	< 1.4	< 1.4	< 1.4	< 1.4
TANK-12	TRIP BLANK	TB		12/13/00	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK-13	RH-BR-13-D05	DUP	72	12/11/00	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.36	< 0.36	< 0.0052	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.89	< 0.89	< 0.36	< 0.36	< 0.36	< 0.36	< 0.01	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK-13	RH-BR-13-S01	REG	72	12/11/00	CORE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.35	< 0.35	< 0.005	< 0.005	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.87	< 0.87	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK-13	RH-BR-13-S02	REG	100	12/11/00	CORE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.38	< 0.38	< 0.006	< 0.006	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.96	< 0.96	< 0.38	< 0.38	< 0.38	< 0.38	< 0.012	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK-13	RH-BR-13-S03	REG	125	12/11/00	CORE	< 0.0058	< 0.0058	< 0.0058	< 0.0058	< 0.0058	< 0.4	< 0.4	< 0.0058	< 0.0058	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 1	< 1	< 0.4	< 0.4	< 0.4	< 0.4	< 0.012	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
TANK-13	RH-BR-13-S04	REG	8	12/12/00	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 1.5	< 1.5	< 0.0052	< 0.0052	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 3.8	< 3.8	< 1.5	< 1.5	< 1.5	< 1.5	< 0.01	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
TANK-13	RH-MW-13-S01	REG	132.5	8/27/01	DFLNAPL	< 0.002	< 0.002	< 0.002	< 0.002	0.0021			< 0.002	< 0.002												< 0.01					
TANK-13	TRIP BLANK	TB		12/11/00	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK-14	RH-BR-14-D04	DUP	60.5	12/6/00	CORE	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 3.7	< 3.7	< 0.25	< 0.25	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 9.3	< 9.3	< 3.7	< 3.7	< 3.7	< 3.7	< 0.5	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7
TANK-14	RH-BR-14-S01	REG	35	12/6/00	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 1.4	< 1.4	< 0.0052	< 0.0052	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 0.01	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
TANK-14	RH-BR-14-S02	REG	60.5	12/6/00	CORE	< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 1.4	< 1.4	< 0.24	< 0.24	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 0.48	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
TANK-14	RH-BR-14-S03	REG	75	12/6/00	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.36	< 0.36	< 0.0052	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	< 0.01	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK-14	RH-BR-14-S04	REG	95.5	12/6/00	CORE	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 42	< 42	< 0.3	< 0.3	< 42	< 42	< 42	< 42	< 42	< 100	< 100	< 42	< 42	< 42	< 42	< 0.6	57.8	< 42	< 42	< 42	< 42
TANK-14	RH-BR-14-S05	REG	116	12/6/00	CORE	< 0.28	< 0.28	< 0.28	< 0.28	< 0.28	< 1.5	< 1.5	< 0.28	< 0.28	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 3.8	< 3.8	< 1.5	< 1.5	< 1.5	< 1.5	< 0.56	3.06	< 1.5	< 1.5	< 1.5	< 1.5
TANK-14	TRIP BLANK	TB		12/6/00	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK-15	RH-BR-15-D03	DUP	62.5	12/4/00	CORE	< 0.0058	< 0.0058	< 0.0058	< 0.0058	< 0.0058	< 0.39	< 0.39	< 0.0058	< 0.0058	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.98	< 0.98	< 0.39	< 0.39	< 0.39	< 0.39	< 0.012	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39
TANK-15	RH-BR-15-S01	REG	62.5	12/4/00	CORE	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.39	< 0.39	< 0.006	< 0.006	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.98	< 0.98	< 0.39	< 0.39	< 0.39	< 0.39	< 0.012	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39
TANK-15	RH-BR-15-S02	REG	86	12/4/00	CORE	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.38	< 0.38	< 0.0054	< 0.0054	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.95	< 0.95	< 0.38	< 0.38	< 0.38	< 0.38	< 0.011	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK-15	RH-BR-15-S03	REG	115	12/4/00	CORE	< 0.0059	< 0.0059	< 0.0059	< 0.0059	< 0.0059	< 0.4	< 0.4	< 0.0059	< 0.0059	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.99	< 0.99	< 0.4	< 0.4	< 0.4	< 0.4	< 0.012	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
TANK-15	TRIP BLANK	TB		12/4/00	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK-16	B16-DUP	DUP	83.75	10/23/98	CORE																										

Table 3. All Results by Media Sampled (ppm)
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (FT, POE)	SAMPLE DATE	MEDIA	3,3'-Dichlorobenzidine	3-Nitroaniline	4,6-Dinitro-o-cresol	4-Bromophenyl phenyl ether	4-Chloro-3-methyl phenol	4-Chloroaniline	4-Chlorophenyl phenyl ether	4-Methyl-2-pentanone	4-Nitroaniline	4-Nitrophenol	Acenaphthene	Acenaphthylene	Acetone	Anthracene	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Benzyl Alcohol	bis(2-Chloroethoxy)methane	bis(2-Chloroethyl)ether	bis(2-Chloroisopropyl)ether	bis(2-Ethylhexyl)phthalate	Bromodichloromethane	Bromoform	Butyl benzyl phthalate
TANK- 9	B09B-2	REG	74.6	10/29/98	CORE											< 0.33	< 0.33		< 0.33	< 0.005	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33									
TANK- 9	B09C-1	REG	50	10/28/98	CORE											< 0.33	< 0.33		< 0.33	< 0.005	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33									
TANK- 9	B09C-2	REG	66	10/28/98	CORE											< 0.33	< 0.33		< 0.33	< 0.005	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33									
TANK-10	RH-BR-10-S01	REG	60	1/10/01	CORE	< 0.73	< 0.37	< 0.73	< 0.37	< 0.37	< 0.37	< 0.37	< 0.0095	< 0.37	< 0.92	< 0.37	< 0.37	< 0.048	< 0.37	< 0.0048	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.92	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.0048	< 0.0048	< 0.37
TANK-10	RH-BR-10-S02	REG	100	1/10/01	CORE	< 0.71	< 0.35	< 0.71	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.88	< 0.35	< 0.35	< 0.05	< 0.35	< 0.005	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.005	< 0.005	< 0.35
TANK-10	RH-BR-10-S03	REG	123.9	1/10/01	CORE	< 0.71	< 0.36	< 0.71	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0097	< 0.36	< 0.89	< 0.36	< 0.36	< 0.048	< 0.36	< 0.0048	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.89	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0048	< 0.0048	< 0.36
TANK-10	TRIP BLANK	TB	123.9	1/10/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-11	RH-BR-11-S01	REG	4.5	12/15/00	CORE	< 1.7	< 0.87	< 1.7	< 0.87	< 0.87	< 0.87	< 0.87	< 0.011	< 0.87	< 2.2	< 0.87	< 0.87	0.0632	< 0.87	< 0.0055	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 2.2	< 0.87	< 0.87	< 0.87	< 0.87	0.286	< 0.0055	< 0.0055	< 0.87
TANK-11	RH-BR-11-S02	REG	11.3	12/15/00	CORE	< 2.9	< 1.4	< 2.9	< 1.4	< 1.4	< 1.4	< 1.4	< 0.009	< 1.4	< 3.6	< 1.4	< 1.4	0.0243	< 1.4	< 0.0045	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 0.0045	< 0.0045	< 1.4
TANK-11	RH-BR-11-S03	REG	67.1	12/18/00	CORE	< 2.9	< 1.4	< 2.9	< 1.4	< 1.4	< 1.4	< 1.4	0.0067	< 1.4	< 3.6	< 1.4	< 1.4	0.0215	< 1.4	< 0.0052	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 0.0052	< 0.0052	< 1.4
TANK-11	RH-BR-11-S04	REG	85	12/18/00	CORE	< 2.9	< 1.4	< 2.9	< 1.4	< 1.4	< 1.4	< 1.4	< 0.0094	< 1.4	< 3.6	< 1.4	< 1.4	< 0.047	< 1.4	< 0.0047	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 0.0047	< 0.0047	< 1.4
TANK-11	RH-BR-11-S05	REG	95	12/18/00	CORE	< 3.1	< 1.5	< 3.1	< 1.5	< 1.5	< 1.5	< 1.5	< 0.011	< 1.5	< 3.8	< 1.5	< 1.5	< 0.055	< 1.5	< 0.0055	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 3.8	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 0.0055	< 0.0055	< 1.5
TANK-11	TRIP BLANK	TB		12/18/00	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-12	RH-BR-12-D06	DUP	104.3	12/14/00	CORE	< 0.7	< 0.35	< 0.7	< 0.35	< 0.35	< 0.35	< 0.35	< 0.0097	< 0.35	< 0.87	< 0.35	< 0.35	< 0.048	< 0.35	< 0.0048	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.87	< 0.35	< 0.35	< 0.35	< 0.35	0.12	< 0.0048	< 0.0048	< 0.35
TANK-12	RH-BR-12-S01	REG	8	12/12/00	CORE	< 0.74	< 0.37	< 0.74	< 0.37	< 0.37	< 0.37	< 0.37	< 0.01	< 0.37	< 0.93	< 0.37	< 0.37	< 0.052	< 0.37	< 0.0052	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.93	< 0.37	< 0.37	< 0.37	< 0.37	0.169	< 0.0052	< 0.0052	< 0.37
TANK-12	RH-BR-12-S02	REG	33.5	12/13/00	CORE	< 0.76	< 0.38	< 0.76	< 0.38	< 0.38	< 0.38	< 0.38	< 0.011	< 0.38	< 0.96	< 0.38	< 0.38	< 0.056	< 0.38	< 0.0056	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.96	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.0056	< 0.0056	< 0.38
TANK-12	RH-BR-12-S03	REG	61	12/13/00	CORE	< 0.7	< 0.35	< 0.7	< 0.35	< 0.35	< 0.35	< 0.35	< 0.011	< 0.35	< 0.88	< 0.35	< 0.35	< 0.053	< 0.35	< 0.0053	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	0.199	< 0.0053	< 0.0053	< 0.35
TANK-12	RH-BR-12-S04	REG	104.3	12/14/00	CORE	< 0.68	< 0.34	< 0.68	< 0.34	< 0.34	< 0.34	< 0.34	< 0.0097	< 0.34	< 0.86	< 0.34	< 0.34	< 0.048	< 0.34	< 0.0048	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.86	< 0.34	< 0.34	< 0.34	< 0.34	0.125	< 0.0048	< 0.0048	< 0.34
TANK-12	RH-BR-12-S05	REG	121.9	12/14/00	CORE	< 2.9	< 1.4	< 2.9	< 1.4	< 1.4	< 1.4	< 1.4	< 0.01	< 1.4	< 3.6	< 1.4	< 1.4	< 0.05	< 1.4	< 0.005	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 0.005	< 0.005	< 1.4
TANK-12	TRIP BLANK	TB		12/13/00	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-13	RH-BR-13-D05	DUP	72	12/11/00	CORE	< 0.71	< 0.36	< 0.71	< 0.36	< 0.36	< 0.36	< 0.36	< 0.01	< 0.36	< 0.89	< 0.36	< 0.36	< 0.052	< 0.36	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.89	< 0.36	< 0.36	< 0.36	< 0.36	0.566	< 0.0052	< 0.0052	< 0.36
TANK-13	RH-BR-13-S01	REG	72	12/11/00	CORE	< 0.7	< 0.35	< 0.7	< 0.35	< 0.35	< 0.35	< 0.35	< 0.01	< 0.35	< 0.87	< 0.35	< 0.35	< 0.05	< 0.35	< 0.005	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.87	< 0.35	< 0.35	< 0.35	< 0.35	0.178	< 0.005	< 0.005	< 0.35
TANK-13	RH-BR-13-S02	REG	100	12/11/00	CORE	< 0.77	< 0.38	< 0.77	< 0.38	< 0.38	< 0.38	< 0.38	< 0.012	< 0.38	< 0.96	< 0.38	< 0.38	< 0.06	< 0.38	< 0.006	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.96	< 0.38	< 0.38	< 0.38	< 0.38	0.342	< 0.006	< 0.006	< 0.38
TANK-13	RH-BR-13-S03	REG	125	12/11/00	CORE	< 0.8	< 0.4	< 0.8	< 0.4	< 0.4	< 0.4	< 0.4	< 0.012	< 0.4	< 1	< 0.4	< 0.4	< 0.058	< 0.4	< 0.0058	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 1	< 0.4	< 0.4	< 0.4	< 0.4	0.416	< 0.0058	< 0.0058	< 0.4
TANK-13	RH-BR-13-S04	REG	8	12/12/00	CORE	< 3.1	< 1.5	< 3.1	< 1.5	< 1.5	< 1.5	< 1.5	< 0.01	< 1.5	< 3.8	< 1.5	< 1.5	0.0216	< 1.5	< 0.0052	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 3.8	< 1.5	< 1.5	< 1.5	< 1.5	0.942	< 0.0052	< 0.0052	< 1.5
TANK-13	RH-MW-13-S01	REG	132.5	8/27/01	DFLNAPL								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-13	TRIP BLANK	TB		12/11/00	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-14	RH-BR-14-D04	DUP	60.5	12/6/00	CORE	< 7.5	< 3.7	< 7.5	< 3.7	< 3.7	< 3.7	< 3.7	< 0.5	< 3.7	< 9.3	< 3.7	< 3.7	< 2.5	< 3.7	< 0.25	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 9.3	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 0.25	< 0.25	< 3.7
TANK-14	RH-BR-14-S01	REG	35	12/6/00	CORE	< 2.9	< 1.4	< 2.9	< 1.4	< 1.4	< 1.4	< 1.4	< 0.01	< 1.4	< 3.6	< 1.4	< 1.4	< 0.052	< 1.4	< 0.0052	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 0.0052	< 0.0052	< 1.4
TANK-14	RH-BR-14-S02	REG	60.5	12/6/00	CORE	< 2.8	< 1.4	< 2.8	< 1.4	< 1.4	< 1.4	< 1.4	< 0.48	< 1.4	< 3.6	< 1.4	< 1.4	< 2.4	< 1.4	< 0.24	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 3.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 0.24	< 0.24	< 1.4
TANK-14	RH-BR-14-S03	REG	75	12/6/00	CORE	< 0.72	< 0.36	< 0.72	< 0.36	< 0.36	< 0.36	< 0.36	< 0.01	< 0.36	< 0.9	< 0.36	< 0.36	< 0.052	< 0.36	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	0.146	< 0.0052	< 0.0052	< 0.36
TANK-14	RH-BR-14-S04	REG	95.5	12/6/00	CORE	< 83	< 42	< 83	< 42	< 42	< 42	< 42	< 0.6	< 42	< 100	< 42	< 42	< 3	< 42	< 0.3	< 42	< 42	< 42	< 42	< 42	< 100	< 42	< 42	< 42	< 42	< 42	< 0.3	< 0.3	< 42
TANK-14	RH-BR-14-S05	REG	116	12/6/00	CORE	< 3	< 1.5	< 3	< 1.5	< 1.5	< 1.5	< 1.5	< 0.56	< 1.5	< 3.8	< 1.5	< 1.5	< 2.8	< 1.5	< 0.28	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 3.8	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 0.28	< 0.28	< 1.5
TANK-14	TRIP BLANK	TB		12/6/00	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-15	RH-BR-15-D03	DUP	62.5	12/4/00	CORE	< 0.79	< 0.39	< 0.79	< 0.39	< 0.39	< 0.39	< 0.39	< 0.012	< 0.39	< 0.98	< 0.39	< 0.39	< 0.058	< 0.39	< 0.0058	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.98	< 0.39	< 0.39	< 0.39	< 0.39	0.291	< 0.0058	< 0.0058	< 0.39
TANK-15	RH-BR-15-S01	REG	62.5	12/4/00	CORE	< 0.79	< 0.39	< 0.79	< 0.39	< 0.39	< 0.39	< 0.39	< 0.012	< 0.39	< 0.98	< 0.39	< 0.39	< 0.06	< 0.39	< 0.006	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.98	< 0.39	< 0.39	< 0.39	< 0.39	0.206	< 0.006	< 0.006	< 0.39
TANK-15	RH-BR-15-S02	REG	86	12/4/00	CORE	< 0.76	< 0.38	< 0.76	< 0.38	< 0.38	< 0.38	< 0.38	< 0.011	< 0.38	< 0.95	< 0.38	< 0.38	< 0.054	< 0.38	< 0.0054	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.95	< 0.38	< 0.38	< 0.38	< 0.38	0.176	< 0.0054	< 0.0054	< 0.38
TANK-15	RH-BR-15-S03	REG	115	12/4/00	CORE	< 0.79	< 0.4	< 0.79	< 0.4	< 0.4	< 0.4	< 0.4	< 0.012	< 0.4	< 0.99	< 0.4	< 0.4	0.0257	< 0.4	< 0.0059	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.99	< 0.4	< 0.4	< 0.4	< 0.4	0.191	< 0.0059	< 0.0059	< 0.4
TANK-15	TRIP BLANK	TB		12/4/00	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-16	B16-DUP	DUP	83.75	10/23/98	CORE											< 5	< 5		< 5	< 0.025	< 5	< 5	< 5	< 5	< 5									

Table 3. All Results by Media Sampled (ppm)
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (FT, POE)	SAMPLE DATE	MEDIA	Carbazole	Carbon disulfide	Carbon tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chrysene	cis-1,2-Dichloroethylene	cis-1,3-Dichloropropene	Di-n-butyl phthalate	Di-n-octyl phthalate	Dibenzo(a,h)anthracene	Dibenzofuran	Dibromochloromethane	Diesel Fuel	Diethyl phthalate	Dimethyl phthalate	Ethylbenzene	Fluoranthene	Fluorene	Hexachlorobenzene	Hexachlorobutadiene	Hexachlorocyclopentadiene	Hexachloroethane	Indeno(1,2,3-cd)pyrene	Isophorone
TANK- 9	B09B-2	REG	74.6	10/29/98	CORE							< 0.33					< 0.33			< 1			< 0.005	< 0.33	< 0.33					< 0.33	
TANK- 9	B09C-1	REG	50	10/28/98	CORE							< 0.33					< 0.33			< 1			< 0.005	< 0.33	< 0.33					< 0.33	
TANK- 9	B09C-2	REG	66	10/28/98	CORE							< 0.33					< 0.33			< 1			< 0.005	< 0.33	< 0.33					< 0.33	
TANK-10	RH-BR-10-S01	REG	60	1/10/01	CORE	< 0.37	< 0.0095	< 0.0048	< 0.0048	< 0.0048	< 0.0048	< 0.37	< 0.0048	< 0.0048	< 0.37	< 0.37	< 0.37	< 0.37	< 0.0048		< 0.37	< 0.37	< 0.0048	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
TANK-10	RH-BR-10-S02	REG	100	1/10/01	CORE	< 0.35	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.35	< 0.005	< 0.005	< 0.35	< 0.35	< 0.35	< 0.35	< 0.005		< 0.35	< 0.35	< 0.005	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK-10	RH-BR-10-S03	REG	123.9	1/10/01	CORE	< 0.36	< 0.0097	< 0.0048	< 0.0048	< 0.0048	< 0.0048	< 0.36	< 0.0048	< 0.0048	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0048		< 0.36	< 0.36	< 0.0048	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK-10	TRIP BLANK	TB	123.9	1/10/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK-11	RH-BR-11-S01	REG	4.5	12/15/00	CORE	< 0.87	< 0.011	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.87	< 0.0055	< 0.0055	< 0.87	< 0.87	< 0.87	< 0.87	< 0.0055		< 0.87	< 0.87	< 0.0055	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87	< 0.87
TANK-11	RH-BR-11-S02	REG	11.3	12/15/00	CORE	< 1.4	< 0.009	< 0.0045	< 0.0045	< 0.0045	< 0.0045	< 1.4	< 0.0045	< 0.0045	< 1.4	< 1.4	< 1.4	0.992	< 0.0045		< 1.4	< 1.4	0.002	< 1.4	1.14	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
TANK-11	RH-BR-11-S03	REG	67.1	12/18/00	CORE	< 1.4	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 1.4	< 0.0052	< 0.0052	< 1.4	< 1.4	< 1.4	< 1.4	< 0.0052		< 1.4	< 1.4	< 0.0052	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
TANK-11	RH-BR-11-S04	REG	85	12/18/00	CORE	< 1.4	< 0.0094	< 0.0047	< 0.0047	< 0.0047	< 0.0047	< 1.4	< 0.0047	< 0.0047	< 1.4	< 1.4	< 1.4	< 1.4	< 0.0047		< 1.4	< 1.4	< 0.0047	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
TANK-11	RH-BR-11-S05	REG	95	12/18/00	CORE	< 1.5	< 0.011	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 1.5	< 0.0055	< 0.0055	< 1.5	< 1.5	< 1.5	< 1.5	< 0.0055		< 1.5	< 1.5	0.0194	< 1.5	0.72	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
TANK-11	TRIP BLANK	TB		12/18/00	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK-12	RH-BR-12-D06	DUP	104.3	12/14/00	CORE	< 0.35	< 0.0097	< 0.0048	< 0.0048	< 0.0048	< 0.0048	< 0.35	< 0.0048	< 0.0048	< 0.35	< 0.35	< 0.35	< 0.35	< 0.0048		< 0.35	< 0.35	< 0.0048	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK-12	RH-BR-12-S01	REG	8	12/12/00	CORE	< 0.37	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.37	< 0.0052	< 0.0052	< 0.37	< 0.37	< 0.37	< 0.37	< 0.0052		< 0.37	< 0.37	< 0.0052	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
TANK-12	RH-BR-12-S02	REG	33.5	12/13/00	CORE	< 0.38	< 0.011	< 0.0056	< 0.0056	< 0.0056	< 0.0056	< 0.38	< 0.0056	< 0.0056	< 0.38	< 0.38	< 0.38	< 0.38	< 0.0056		< 0.38	< 0.38	< 0.0056	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK-12	RH-BR-12-S03	REG	61	12/13/00	CORE	< 0.35	< 0.011	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.35	< 0.0053	< 0.0053	< 0.35	< 0.35	< 0.35	< 0.35	< 0.0053		< 0.35	< 0.35	< 0.0053	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK-12	RH-BR-12-S04	REG	104.3	12/14/00	CORE	< 0.34	< 0.0097	< 0.0048	< 0.0048	< 0.0048	< 0.0048	< 0.34	< 0.0048	< 0.0048	< 0.34	< 0.34	< 0.34	< 0.34	< 0.0048		< 0.34	< 0.34	< 0.0048	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
TANK-12	RH-BR-12-S05	REG	121.9	12/14/00	CORE	< 1.4	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 1.4	< 0.005	< 0.005	< 1.4	< 1.4	< 1.4	< 1.4	< 0.005		< 1.4	< 1.4	0.002	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
TANK-12	TRIP BLANK	TB		12/13/00	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK-13	RH-BR-13-D05	DUP	72	12/11/00	CORE	< 0.36	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.36	< 0.0052	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0052		< 0.36	< 0.36	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK-13	RH-BR-13-S01	REG	72	12/11/00	CORE	< 0.35	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.35	< 0.005	< 0.005	< 0.35	< 0.35	< 0.35	< 0.35	< 0.005		< 0.35	< 0.35	< 0.005	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
TANK-13	RH-BR-13-S02	REG	100	12/11/00	CORE	< 0.38	< 0.012	< 0.006	< 0.006	< 0.006	< 0.006	< 0.38	< 0.006	< 0.006	< 0.38	< 0.38	< 0.38	< 0.38	< 0.006		< 0.38	< 0.38	< 0.006	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK-13	RH-BR-13-S03	REG	125	12/11/00	CORE	< 0.4	< 0.012	< 0.0058	< 0.0058	< 0.0058	< 0.0058	< 0.4	< 0.0058	< 0.0058	< 0.4	< 0.4	< 0.4	< 0.4	< 0.0058		< 0.4	< 0.4	< 0.0058	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
TANK-13	RH-BR-13-S04	REG	8	12/12/00	CORE	< 1.5	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 1.5	< 0.0052	< 0.0052	< 1.5	< 1.5	< 1.5	< 1.5	< 0.0052		< 1.5	< 1.5	< 0.0052	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
TANK-13	RH-MW-13-S01	REG	132.5	8/27/01	DFLNAPL		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK-13	TRIP BLANK	TB		12/11/00	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK-14	RH-BR-14-D04	DUP	60.5	12/6/00	CORE	< 3.7	< 0.5	< 0.25	< 0.25	< 0.25	< 0.25	< 3.7	< 0.25	< 0.25	< 3.7	< 3.7	< 3.7	< 3.7	< 0.25		< 3.7	< 3.7	< 0.25	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7
TANK-14	RH-BR-14-S01	REG	35	12/6/00	CORE	< 1.4	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 1.4	< 0.0052	< 0.0052	< 1.4	< 1.4	< 1.4	< 1.4	< 0.0052		< 1.4	< 1.4	< 0.0052	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
TANK-14	RH-BR-14-S02	REG	60.5	12/6/00	CORE	< 1.4	< 0.48	< 0.24	< 0.24	< 0.24	< 0.24	< 1.4	< 0.24	< 0.24	< 1.4	< 1.4	< 1.4	< 1.4	< 0.24		< 1.4	< 1.4	< 0.24	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
TANK-14	RH-BR-14-S03	REG	75	12/6/00	CORE	< 0.36	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.36	< 0.0052	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0052		< 0.36	< 0.36	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK-14	RH-BR-14-S04	REG	95.5	12/6/00	CORE	< 42	< 0.6	< 0.3	< 0.3	< 0.3	< 0.3	< 42	< 0.3	< 0.3	< 42	< 42	< 42	< 42	< 0.3		< 42	< 42	1.55	< 42	< 42	< 42	< 42	< 42	< 42	< 42	< 42
TANK-14	RH-BR-14-S05	REG	116	12/6/00	CORE	< 1.5	< 0.56	< 0.28	< 0.28	< 0.28	< 0.28	< 1.5	< 0.28	< 0.28	< 1.5	< 1.5	< 1.5	< 1.5	< 0.28		< 1.5	< 1.5	< 0.28	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
TANK-14	TRIP BLANK	TB		12/6/00	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK-15	RH-BR-15-D03	DUP	62.5	12/4/00	CORE	< 0.39	< 0.012	< 0.0058	< 0.0058	< 0.0058	< 0.0058	< 0.39	< 0.0058	< 0.0058	< 0.39	< 0.39	< 0.39	< 0.39	< 0.0058		< 0.39	< 0.39	< 0.0058	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39
TANK-15	RH-BR-15-S01	REG	62.5	12/4/00	CORE	< 0.39	< 0.012	< 0.006	< 0.006	< 0.006	< 0.006	< 0.39	< 0.006	< 0.006	< 0.39	< 0.39	< 0.39	< 0.39	< 0.006		< 0.39	< 0.39	< 0.006	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39	< 0.39
TANK-15	RH-BR-15-S02	REG	86	12/4/00	CORE	< 0.38	< 0.011	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.38	< 0.0054	< 0.0054	< 0.38	< 0.38	< 0.38	< 0.38	< 0.0054		< 0.38	< 0.38	< 0.0054	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK-15	RH-BR-15-S03	REG	115	12/4/00	CORE	< 0.4	< 0.012	< 0.0059	< 0.0059	< 0.0059	< 0.0059	< 0.4	< 0.0059	< 0.0059	< 0.4	< 0.4	< 0.4	< 0.4	< 0.0059		< 0.4	< 0.4	< 0.0059	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
TANK-15	TRIP BLANK	TB		12/4/00	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK-16	B16-DUP	DUP	83.75	10/23/98	CORE							< 5					< 5			< 170			< 0.025	< 5	6.4					< 5	

Table 3. All Results by Media Sampled (ppm)
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (FT, POE)	SAMPLE DATE	MEDIA	Lead	m,p xylene	Methyl bromide	Methyl chloride	Methyl ethyl ketone	Methylene chloride	Motor Oil (n-C19 through n-C36)	N-Nitroso-di-n-propylamine	N-Nitrosodiphenylamine	Naphthalene	Nitrobenzene	o-xylene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene	Solids, Percent	Styrene	Tetrachloroethylene	Toluene	TPH (C10-C28)	trans-1,2-Dichloroethylene	trans-1,3-Dichloropropene	Trichloroethylene	Unknown Hydrocarbon	Vinyl chloride	Xylene (total)
TANK- 9	B09B-2	REG	74.6	10/29/98	CORE		< 0.005					< 5			< 0.33		< 0.005		< 0.33		< 0.33				< 0.005					2.3		< 0.005
TANK- 9	B09C-1	REG	50	10/28/98	CORE		< 0.005					< 5			< 0.33		< 0.005		< 0.33		< 0.33				< 0.005					6.9		< 0.005
TANK- 9	B09C-2	REG	66	10/28/98	CORE		< 0.005					< 5			< 0.33		< 0.005		< 0.33		< 0.33				< 0.005					3.1		< 0.005
TANK-10	RH-BR-10-S01	REG	60	1/10/01	CORE	< 11		< 0.0048	< 0.0048	< 0.0095	< 0.0095		< 0.37	< 0.37	< 0.37	< 0.37		< 0.92	< 0.37	< 0.37	< 0.37	90.8	< 0.0048	< 0.0048	< 0.0048	< 9.2	< 0.0048	< 0.0048	< 0.0048		< 0.0048	< 0.014
TANK-10	RH-BR-10-S02	REG	100	1/10/01	CORE	< 10.5		< 0.005	< 0.005	< 0.01	< 0.01		< 0.35	< 0.35	< 0.35	< 0.35		< 0.88	< 0.35	< 0.35	< 0.35	94.3	< 0.005	< 0.005	< 0.005	< 8.8	< 0.005	< 0.005	< 0.005		< 0.005	< 0.015
TANK-10	RH-BR-10-S03	REG	123.9	1/10/01	CORE	< 10.6		< 0.0048	< 0.0048	< 0.0097	< 0.0097		< 0.36	< 0.36	< 0.36	< 0.36		< 0.89	< 0.36	< 0.36	< 0.36	93.9	< 0.0048	< 0.0048	< 0.0048	< 8.9	< 0.0048	< 0.0048	< 0.0048		< 0.0048	< 0.014
TANK-10	TRIP BLANK	TB	123.9	1/10/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK-11	RH-BR-11-S01	REG	4.5	12/15/00	CORE	4.7		< 0.0055	< 0.0055	0.0165	< 0.011		< 0.87	< 0.87	< 0.87	< 0.87		< 2.2	0.534	< 0.87	< 0.87	76.5	< 0.0055	< 0.0055	< 0.0055	1690	< 0.0055	< 0.0055	< 0.0055		< 0.0055	0.0084
TANK-11	RH-BR-11-S02	REG	11.3	12/15/00	CORE	< 11		< 0.0045	< 0.0045	< 0.009	< 0.009		< 1.4	< 1.4	0.776	< 1.4		< 3.6	2.09	< 1.4	< 1.4	92.8	< 0.0045	< 0.0045	< 0.0045	3130	< 0.0045	< 0.0045	< 0.0045		< 0.0045	< 0.014
TANK-11	RH-BR-11-S03	REG	67.1	12/18/00	CORE	< 10.5		< 0.0052	< 0.0052	< 0.01	< 0.01		< 1.4	< 1.4	< 1.4	< 1.4		< 3.6	< 1.4	< 1.4	< 1.4	92.6	< 0.0052	< 0.0052	< 0.0052	1440	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.016
TANK-11	RH-BR-11-S04	REG	85	12/18/00	CORE	< 10.8		< 0.0047	< 0.0047	< 0.0094	< 0.0094		< 1.4	< 1.4	< 1.4	< 1.4		< 3.6	0.926	< 1.4	< 1.4	92.2	< 0.0047	< 0.0047	< 0.0047	2320	< 0.0047	< 0.0047	< 0.0047		< 0.0047	0.0073
TANK-11	RH-BR-11-S05	REG	95	12/18/00	CORE	< 11.8		< 0.0055	< 0.0055	< 0.011	< 0.011		< 1.5	< 1.5	1.09	< 1.5		< 3.8	1.5	< 1.5	< 1.5	86.7	< 0.0055	< 0.0055	0.0086	2910	< 0.0055	< 0.0055	< 0.0055		< 0.0055	0.298
TANK-11	TRIP BLANK	TB		12/18/00	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK-12	RH-BR-12-D06	DUP	104.3	12/14/00	CORE	< 11		< 0.0048	< 0.0048	< 0.0097	< 0.0097		< 0.35	< 0.35	< 0.35	< 0.35		< 0.87	< 0.35	< 0.35	< 0.35	95.4	< 0.0048	< 0.0048	< 0.0048	19.6	< 0.0048	< 0.0048	< 0.0048		< 0.0048	< 0.014
TANK-12	RH-BR-12-S01	REG	8	12/12/00	CORE	< 11		< 0.0052	< 0.0052	< 0.01	< 0.01		< 0.37	< 0.37	< 0.37	< 0.37		< 0.93	< 0.37	< 0.37	< 0.37	89.5	< 0.0052	< 0.0052	< 0.0052	31.7	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.016
TANK-12	RH-BR-12-S02	REG	33.5	12/13/00	CORE	< 11		< 0.0056	< 0.0056	< 0.011	< 0.011		< 0.38	< 0.38	< 0.38	< 0.38		< 0.96	< 0.38	< 0.38	< 0.38	87.1	< 0.0056	< 0.0056	< 0.0056	232	< 0.0056	< 0.0056	< 0.0056		< 0.0056	< 0.017
TANK-12	RH-BR-12-S03	REG	61	12/13/00	CORE	< 11		< 0.0053	< 0.0053	< 0.011	< 0.011		< 0.35	< 0.35	< 0.35	< 0.35		< 0.88	< 0.35	< 0.35	< 0.35	94.7	< 0.0053	< 0.0053	< 0.0053	780	< 0.0053	< 0.0053	< 0.0053		< 0.0053	< 0.016
TANK-12	RH-BR-12-S04	REG	104.3	12/14/00	CORE	< 10		< 0.0048	< 0.0048	< 0.0097	< 0.0097		< 0.34	< 0.34	< 0.34	< 0.34		< 0.86	< 0.34	< 0.34	< 0.34	97.3	< 0.0048	< 0.0048	< 0.0048	77.1	< 0.0048	< 0.0048	< 0.0048		< 0.0048	< 0.014
TANK-12	RH-BR-12-S05	REG	121.9	12/14/00	CORE	< 11		< 0.005	< 0.005	< 0.01	< 0.01		< 1.4	< 1.4	< 1.4	< 1.4		< 3.6	0.798	< 1.4	< 1.4	92.9	< 0.005	< 0.005	< 0.005	1710	< 0.005	< 0.005	< 0.005		< 0.005	0.018
TANK-12	TRIP BLANK	TB		12/13/00	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK-13	RH-BR-13-D05	DUP	72	12/11/00	CORE	< 10.4		< 0.0052	< 0.0052	< 0.01	< 0.01		< 0.36	< 0.36	< 0.36	< 0.36		< 0.89	< 0.36	< 0.36	< 0.36	93.3	< 0.0052	< 0.0052	< 0.0052	26.1	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.016
TANK-13	RH-BR-13-S01	REG	72	12/11/00	CORE	< 10.7		< 0.005	< 0.005	< 0.01	< 0.01		< 0.35	< 0.35	< 0.35	< 0.35		< 0.87	< 0.35	< 0.35	< 0.35	95.6	< 0.005	< 0.005	< 0.005	20.3	< 0.005	< 0.005	< 0.005		< 0.005	< 0.015
TANK-13	RH-BR-13-S02	REG	100	12/11/00	CORE	< 11.4		< 0.006	< 0.006	< 0.012	< 0.012		< 0.38	< 0.38	< 0.38	< 0.38		< 0.96	< 0.38	< 0.38	< 0.38	86.7	< 0.006	< 0.006	< 0.006	31.9	< 0.006	< 0.006	< 0.006		< 0.006	< 0.018
TANK-13	RH-BR-13-S03	REG	125	12/11/00	CORE	< 12		< 0.0058	< 0.0058	< 0.012	< 0.012		< 0.4	< 0.4	< 0.4	< 0.4		< 1	< 0.4	< 0.4	< 0.4	83.2	< 0.0058	< 0.0058	< 0.0058	32.6	< 0.0058	< 0.0058	< 0.0058		< 0.0058	< 0.017
TANK-13	RH-BR-13-S04	REG	8	12/12/00	CORE	6.8		< 0.0052	< 0.0052	< 0.01	< 0.01		< 1.5	< 1.5	< 1.5	< 1.5		< 3.8	< 1.5	< 1.5	< 1.5	87.3	< 0.0052	< 0.0052	< 0.0052	2160	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.016
TANK-13	RH-MW-13-S01	REG	132.5	8/27/01	DFLNAPL			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002	2.39	< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK-13	TRIP BLANK	TB		12/11/00	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK-14	RH-BR-14-D04	DUP	60.5	12/6/00	CORE	< 11.2		< 0.25	< 0.25	< 0.5	< 0.5		< 3.7	< 3.7	< 3.7	< 3.7		< 9.3	< 3.7	< 3.7	< 3.7	89.3	< 0.25	< 0.25	< 0.25	2090	< 0.25	< 0.25	< 0.25		< 0.25	< 0.75
TANK-14	RH-BR-14-S01	REG	35	12/6/00	CORE	< 10.6		< 0.0052	< 0.0052	< 0.01	< 0.01		< 1.4	< 1.4	< 1.4	< 1.4		< 3.6	< 1.4	< 1.4	< 1.4	92.7	< 0.0052	< 0.0052	< 0.0052	581	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.016
TANK-14	RH-BR-14-S02	REG	60.5	12/6/00	CORE	< 10.7		< 0.24	< 0.24	< 0.48	< 0.48		< 1.4	< 1.4	< 1.4	< 1.4		< 3.6	< 1.4	< 1.4	< 1.4	93.6	< 0.24	< 0.24	< 0.24	2810	< 0.24	< 0.24	< 0.24		< 0.24	< 0.72
TANK-14	RH-BR-14-S03	REG	75	12/6/00	CORE	< 10.5		< 0.0052	< 0.0052	< 0.01	< 0.01		< 0.36	< 0.36	< 0.36	< 0.36		< 0.9	< 0.36	< 0.36	< 0.36	92.6	< 0.0052	< 0.0052	< 0.0052	292	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.016
TANK-14	RH-BR-14-S04	REG	95.5	12/6/00	CORE	< 12.5		< 0.3	< 0.3	< 0.6	< 0.6		< 42	< 42	11.4	< 42		< 100	12.8	< 42	< 42	80.3	< 0.3	< 0.3	0.17	26200	< 0.3	< 0.3	< 0.3		< 0.3	6.4
TANK-14	RH-BR-14-S05	REG	116	12/6/00	CORE	< 11		< 0.28	< 0.28	< 0.56	< 0.56		< 1.5	< 1.5	< 1.5	< 1.5		< 3.8	0.974	< 1.5	< 1.5	88.2	< 0.28	< 0.28	< 0.28	851	< 0.28	< 0.28	< 0.28		< 0.28	< 0.84
TANK-14	TRIP BLANK	TB		12/6/00	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK-15	RH-BR-15-D03	DUP	62.5	12/4/00	CORE	< 0.12		< 0.0058	< 0.0058	< 0.012	< 0.012		< 0.39	< 0.39	< 0.39	< 0.39		< 0.98	< 0.39	< 0.39	< 0.39	84.7	< 0.0058	< 0.0058	< 0.0058	< 9.8	< 0.0058	< 0.0058	< 0.0058		< 0.0058	< 0.017
TANK-15	RH-BR-15-S01	REG	62.5	12/4/00	CORE	< 11.5		< 0.006	< 0.006	< 0.012	< 0.012		< 0.39	< 0.39	< 0.39	< 0.39		< 0.98	< 0.39	< 0.39	< 0.39	84.6	< 0.006	< 0.006	< 0.006	8.05	< 0.006	< 0.006	< 0.006		< 0.006	< 0.018
TANK-15	RH-BR-15-S02	REG	86	12/4/00	CORE	< 0.12		< 0.0054	< 0.0054	< 0.011	< 0.011		< 0.38	< 0.38	< 0.38	< 0.38		< 0.95	< 0.38	< 0.38	< 0.38	87.6	< 0.0054	< 0.0054	< 0.0054	< 9.5	< 0.0054	< 0.0054	< 0.0054		< 0.0054	< 0.016
TANK-15	RH-BR-15-S03	REG	115	12/4/00	CORE	< 0.12		< 0.0059	< 0.0059	< 0.012	< 0.012		< 0.4	< 0.4	< 0.4	< 0.4		< 0.99	< 0.4	< 0.4	< 0.4	84.1	< 0.0059	< 0.0059	< 0.0059	10.7	< 0.0059	< 0.0059	< 0.0059		< 0.0059	< 0.018
TANK-15	TRIP BLANK	TB		12/4/00	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK-16	B16-DUP	DUP	83.75	10/23/98	CORE		0.085					< 840			14		0.071		14		13				< 0.025					6600		0.156

Table 3. All Results by Media Sampled (ppm)
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (FT, POE)	SAMPLE DATE	MEDIA	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethylene	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,2-Dichloropropane	1,3-Dichlorobenzene	1,4-Dichlorobenzene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2-Chloronaphthalene	2-Chlorophenol	2-Hexanone	2-Methylnaphthalene	2-Methylphenol	2-Nitroaniline	2-Nitrophenol	3&4-Methylphenol
TANK-16	B16A-4	REG	83.75	10/22/98	CORE																										
TANK-16	B16A-5	REG	101.83	10/22/98	CORE																										
TANK-16	B16B-4	REG	66.15	10/23/98	CORE																										
TANK-16	B16B-5	REG	75.56	10/23/98	CORE																										
TANK-16	B16C	REG	103.6	10/28/98	DFLNAPL																										
TANK-16	B16C-4	REG	60	10/26/98	CORE																										
TANK-16	B16C-5	REG	67	10/26/98	CORE																										
TANK-17	RH-BR-17-D02	DUP	34	11/10/00	CORE	< 0.0064	< 0.0064	< 0.0064	< 0.0064	< 0.0064	< 0.42	< 0.42	< 0.0064	< 0.0064	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 1	< 1	< 0.42	< 0.42	< 0.42	< 0.42	< 0.013	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42
TANK-17	RH-BR-17-S01	REG	10	11/10/00	CORE	< 0.28	< 0.28	< 0.28	< 0.28	< 0.28	< 1.7	< 1.7	< 0.28	< 0.28	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 4.2	< 4.2	< 1.7	< 1.7	< 1.7	< 1.7	< 0.56	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7
TANK-17	RH-BR-17-S02	REG	34	11/10/00	CORE	< 0.0066	< 0.0066	< 0.0066	< 0.0066	< 0.0066	< 0.43	< 0.43	< 0.0066	< 0.0066	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 1.1	< 1.1	< 0.43	< 0.43	< 0.43	< 0.43	< 0.013	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43
TANK-17	RH-BR-17-S03	REG	66.2	11/10/00	CORE	< 0.0049	< 0.0049	< 0.0049	< 0.0049	< 0.0049	< 0.36	< 0.36	< 0.0049	< 0.0049	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0098	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK-17	RH-MW-17-S01	REG	114.8	8/27/01	DFLNAPL	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.025	< 0.025	< 0.005	< 0.005	< 0.005	< 0.005	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TANK-18	RH-BR-18-D01	DUP	116	11/6/00	CORE	< 0.0062	< 0.0062	< 0.0062	< 0.0062	< 0.0062	< 0.41	< 0.41	< 0.0062	< 0.0062	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 1	< 1	< 0.41	< 0.41	< 0.41	< 0.41	< 0.012	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41
TANK-18	RH-BR-18-S01	REG	80.5	11/6/00	CORE	< 0.0064	< 0.0064	< 0.0064	< 0.0064	< 0.0064	< 0.42	< 0.42	< 0.0064	< 0.0064	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 1	< 1	< 0.42	< 0.42	< 0.42	< 0.42	< 0.013	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42
TANK-18	RH-BR-18-S02	REG	104.4	11/6/00	CORE	< 0.0057	< 0.0057	< 0.0057	< 0.0057	< 0.0057	< 0.38	< 0.38	< 0.0057	< 0.0057	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.95	< 0.95	< 0.38	< 0.38	< 0.38	< 0.38	< 0.011	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK-18	RH-BR-18-S03	REG	116	11/6/00	CORE	< 0.0056	< 0.0056	< 0.0056	< 0.0056	< 0.0056	< 0.4	< 0.4	< 0.0056	< 0.0056	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.99	< 0.99	< 0.4	< 0.4	< 0.4	< 0.4	< 0.011	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
TANK-18	TRIP BLANK	TB		11/6/00	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
TANK-19	RH-BR-19-S01	REG	43	11/22/00	CORE	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.4	< 0.4	< 0.27	< 0.27	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.99	< 0.99	< 0.4	< 0.4	< 0.4	< 0.4	< 0.53	4.31	< 0.4	< 0.4	< 0.4	< 0.4
TANK-19	RH-BR-19-S02	REG	62.7	2/27/01	CORE	< 0.0051	< 0.0051	< 0.0051	< 0.0051	< 0.0051	< 0.36	< 0.36	< 0.0051	< 0.0051	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.89	< 0.89	< 0.36	< 0.36	< 0.36	< 0.36	< 0.01	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK-19	RH-BR-19-S03	REG	93.2	2/28/01	CORE	< 0.0064	< 0.0064	< 0.0064	< 0.0064	< 0.0064	< 0.34	< 0.34	< 0.0064	< 0.0064	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.86	< 0.86	< 0.34	< 0.34	< 0.34	< 0.34	< 0.013	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
TANK-19	RH-BR-19-S04	REG	118	3/2/01	CORE	< 0.0063	< 0.0063	< 0.0063	< 0.0063	< 0.0063	< 0.34	< 0.34	< 0.0063	< 0.0063	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.86	< 0.86	< 0.34	< 0.34	< 0.34	< 0.34	< 0.013	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
TANK-19	RH-MW-19-S01	REG	110.52	8/27/01	INFILTWAT	< 0.002	< 0.002	< 0.002	< 0.002	0.0015	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.025	< 0.025	< 0.005	< 0.005	< 0.005	< 0.005	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TANK-19	RH-MW-19-S01	REG	113.1	3/7/01	INFILTWAT	< 0.002	< 0.002	< 0.002	< 0.002	0.0014	< 0.006	< 0.006	< 0.002	< 0.002	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.03	< 0.03	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006
TANK-20	RH-BR-20-S01	REG	0.5	3/2/01	CORE	< 0.32	< 0.32	< 0.32	< 0.32	< 0.32	< 1.7	< 1.7	< 0.32	< 0.32	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 4.2	< 4.2	< 1.7	< 1.7	< 1.7	< 1.7	< 0.65	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7
TANK-20	RH-BR-20-S02	REG	8.8	3/3/01	CORE	< 0.32	< 0.32	< 0.32	< 0.32	< 0.32	< 0.45	< 0.45	< 0.32	< 0.32	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 1.1	< 1.1	< 0.45	< 0.45	< 0.45	< 0.45	< 0.63	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45
TANK-20	RH-BR-20-S03	REG	104	3/3/01	CORE	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.38	< 0.38	< 0.0054	< 0.0054	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.94	< 0.94	< 0.38	< 0.38	< 0.38	< 0.38	< 0.011	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
VERTICAL WELL-D	RH-BR-V1D-S01	REG	72.4	2/16/01	CORE	< 0.0057	< 0.0057	< 0.0057	< 0.0057	< 0.0057	< 0.4	< 0.4	< 0.0057	< 0.0057	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.99	< 0.99	< 0.4	< 0.4	< 0.4	< 0.4	< 0.011	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
VERTICAL WELL-D	RH-BR-V1D-S02	REG	84.7	2/19/01	CORE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.36	< 0.36	< 0.005	< 0.005	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	< 0.01	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
VERTICAL WELL-D	RH-BR-V1D-S03	REG	97.6	2/20/01	CORE	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.35	< 0.35	< 0.0053	< 0.0053	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	< 0.011	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.1	3/7/01	GW	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.0055	< 0.0055	< 0.002	< 0.002	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.028	< 0.028	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.01	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.28	8/27/01	GW	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.025	< 0.025	< 0.005	< 0.005	< 0.005	< 0.005	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
VERTICAL WELL-D	TRIP BLANK	TB		2/16/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
VERTICAL WELL-D	TRIP BLANK	TB		2/19/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
VERTICAL WELL-D	TRIP BLANK	TB		3/7/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
VERTICAL WELL-D	TRIP BLANK	TB		8/27/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					
VERTICAL WELL-S	RH-BR-V2S-S01	REG	10	2/20/01	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.34	< 0.34	< 0.0052	< 0.0052	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.86	< 0.86	< 0.34	< 0.34	< 0.34	< 0.34	< 0.01	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
VERTICAL WELL-S	RH-BR-V2S-S02	REG	21.5	2/21/01	CORE	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.37	< 0.37	< 0.0055	< 0.0055	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.93	< 0.93	< 0.37	< 0.37	< 0.37	< 0.37	< 0.011	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
VERTICAL WELL-S	RH-BR-V2S-S03	REG	43	2/23/01	CORE	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.36	< 0.36	< 0.0052	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.89	< 0.89	< 0.36	< 0.36	< 0.36	< 0.36	< 0.01	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
VERTICAL WELL-S	TRIP BLANK	TB		2/21/01	WAT	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.002	< 0.002												< 0.01					

Table 3. All Results by Media Sampled (ppm)
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (FT, POE)	SAMPLE DATE	MEDIA	3,3'-Dichlorobenzidine	3-Nitroaniline	4,6-Dinitro-o-cresol	4-Bromophenyl phenyl ether	4-Chloro-3-methyl phenol	4-Chloroaniline	4-Chlorophenyl phenyl ether	4-Methyl-2-pentanone	4-Nitroaniline	4-Nitrophenol	Acenaphthene	Acenaphthylene	Acetone	Anthracene	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Benzyl Alcohol	bis(2-Chloroethoxy)methane	bis(2-Chloroethyl)ether	bis(2-Chloroisopropyl)ether	bis(2-Ethylhexyl)phthalate	Bromodichloromethane	Bromoform	Butyl benzyl phthalate
TANK-16	B16A-4	REG	83.75	10/22/98	CORE											< 5	< 5		< 5	< 0.025	< 5	< 5	< 5	< 5	< 5									
TANK-16	B16A-5	REG	101.83	10/22/98	CORE											< 3.3	< 3.3		< 3.3	< 0.005	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3									
TANK-16	B16B-4	REG	66.15	10/23/98	CORE											< 0.33	< 0.33		< 0.33	< 0.005	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33									
TANK-16	B16B-5	REG	75.58	10/23/98	CORE											< 0.33	< 0.33		< 0.33	< 0.005	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33									
TANK-16	B16C	REG	103.6	10/28/98	DFLNAPL											< 0.01	< 0.01		< 0.01	< 0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01									
TANK-16	B16C-4	REG	60	10/26/98	CORE											< 5	< 5		< 5	< 0.025	< 5	< 5	< 5	< 5	< 5									
TANK-16	B16C-5	REG	67	10/26/98	CORE											< 5	< 5		< 5	< 0.005	< 5	< 5	< 5	< 5	< 5									
TANK-17	RH-BR-17-D02	DUP	34	11/10/00	CORE	< 0.84	< 0.42	< 0.84	< 0.42	< 0.42	< 0.42	< 0.42	< 0.013	< 0.42	< 1	< 0.42	< 0.42	< 0.064	< 0.42	< 0.0084	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 1	< 0.42	< 0.42	< 0.42	< 0.42	0.133	< 0.0064	< 0.0064	< 0.42
TANK-17	RH-BR-17-S01	REG	10	11/10/00	CORE	< 3.4	< 1.7	< 3.4	< 1.7	< 1.7	< 1.7	< 1.7	< 0.56	< 1.7	< 4.2	< 1.7	< 1.7	< 2.8	< 1.7	< 0.28	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 4.2	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 0.28	< 0.28	< 1.7
TANK-17	RH-BR-17-S02	REG	34	11/10/00	CORE	< 0.85	< 0.43	< 0.85	< 0.43	< 0.43	< 0.43	< 0.43	< 0.013	< 0.43	< 1.1	< 0.43	< 0.43	< 0.066	< 0.43	< 0.0066	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 1.1	< 0.43	< 0.43	< 0.43	< 0.43	0.294	< 0.0066	< 0.0066	< 0.43
TANK-17	RH-BR-17-S03	REG	66.2	11/10/00	CORE	< 0.72	< 0.36	< 0.72	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0098	< 0.36	< 0.9	< 0.36	< 0.36	< 0.049	< 0.36	< 0.0049	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	0.224	< 0.0049	< 0.0049	< 0.36
TANK-17	RH-MW-17-S01	REG	114.8	8/27/01	DFLNAPL	< 0.01	< 0.005	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.01	< 0.005	< 0.025	< 0.005	< 0.005	< 0.05	< 0.005	< 0.001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.025	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005
TANK-18	RH-BR-18-D01	DUP	116	11/6/00	CORE	< 0.81	< 0.41	< 0.81	< 0.41	< 0.41	< 0.41	< 0.41	< 0.012	< 0.41	< 1	< 0.41	< 0.41	< 0.062	< 0.41	< 0.0062	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 1	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.0062	< 0.0062	< 0.41
TANK-18	RH-BR-18-S01	REG	80.5	11/6/00	CORE	< 0.84	< 0.42	< 0.84	< 0.42	< 0.42	< 0.42	< 0.42	< 0.013	< 0.42	< 1	< 0.42	< 0.42	< 0.064	< 0.42	< 0.0064	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 1	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.0064	< 0.0064	< 0.42
TANK-18	RH-BR-18-S02	REG	104.4	11/6/00	CORE	< 0.76	< 0.38	< 0.76	< 0.38	< 0.38	< 0.38	< 0.38	< 0.011	< 0.38	< 0.95	< 0.38	< 0.38	< 0.057	< 0.38	< 0.0057	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.95	< 0.38	< 0.38	< 0.38	< 0.38	0.93	< 0.0057	< 0.0057	< 0.38
TANK-18	RH-BR-18-S03	REG	116	11/6/00	CORE	< 0.79	< 0.4	< 0.79	< 0.4	< 0.4	< 0.4	< 0.4	< 0.011	< 0.4	< 0.99	< 0.4	< 0.4	< 0.056	< 0.4	< 0.0056	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.99	< 0.4	< 0.4	< 0.4	< 0.4	0.419	< 0.0056	< 0.0056	< 0.4
TANK-18	TRIP BLANK	TB		11/6/00	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
TANK-19	RH-BR-19-S01	REG	43	11/22/00	CORE	< 0.79	< 0.4	< 0.79	< 0.4	< 0.4	< 0.4	< 0.4	< 0.53	< 0.4	< 0.99	< 0.4	< 0.4	< 2.7	< 0.4	< 0.27	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.99	< 0.4	< 0.4	< 0.4	< 0.4	0.174	< 0.27	< 0.27	< 0.4
TANK-19	RH-BR-19-S02	REG	62.7	2/27/01	CORE	< 0.71	< 0.36	< 0.71	< 0.36	< 0.36	< 0.36	< 0.36	< 0.01	< 0.36	< 0.89	< 0.36	< 0.36	< 0.051	< 0.36	< 0.0051	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.89	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0051	< 0.0051	< 0.36
TANK-19	RH-BR-19-S03	REG	93.2	2/28/01	CORE	< 0.69	< 0.34	< 0.69	< 0.34	< 0.34	< 0.34	< 0.34	< 0.013	< 0.34	< 0.86	< 0.34	< 0.34	< 0.064	< 0.34	< 0.0064	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.86	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.0064	< 0.0064	< 0.34
TANK-19	RH-BR-19-S04	REG	118	3/2/01	CORE	< 0.68	< 0.34	< 0.68	< 0.34	< 0.34	< 0.34	< 0.34	< 0.013	< 0.34	< 0.86	< 0.34	< 0.34	< 0.063	< 0.34	< 0.0063	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.86	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.0063	< 0.0063	< 0.34
TANK-19	RH-MW-19-S01	REG	110.52	8/27/01	INFILTWAT	< 0.01	< 0.005	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.01	< 0.005	< 0.025	< 0.005	< 0.005	< 0.05	< 0.005	< 0.001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.025	< 0.005	< 0.005	< 0.005	< 0.005	0.0078	< 0.002	< 0.002	< 0.005
TANK-19	RH-MW-19-S01	REG	113.1	3/7/01	INFILTWAT	< 0.012	< 0.006	< 0.012	< 0.006	< 0.006	< 0.006	< 0.006	< 0.01	< 0.006	< 0.03	< 0.006	< 0.006	< 0.05	< 0.006	< 0.001	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.03	< 0.006	< 0.006	< 0.006	< 0.006	0.0073	< 0.002	< 0.002	< 0.006
TANK-20	RH-BR-20-S01	REG	0.5	3/2/01	CORE	< 3.3	< 1.7	< 3.3	< 1.7	< 1.7	< 1.7	< 1.7	< 0.65	< 1.7	< 4.2	< 1.7	< 1.7	< 3.2	< 1.7	< 0.32	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 4.2	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 0.32	< 0.32	< 1.7
TANK-20	RH-BR-20-S02	REG	8.8	3/3/01	CORE	< 0.9	< 0.45	< 0.9	< 0.45	< 0.45	< 0.45	< 0.45	< 0.63	< 0.45	< 1.1	< 0.45	< 0.45	< 3.2	< 0.45	< 0.32	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 1.1	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.32	< 0.32	< 0.45
TANK-20	RH-BR-20-S03	REG	104	3/3/01	CORE	< 0.76	< 0.38	< 0.76	< 0.38	< 0.38	< 0.38	< 0.38	< 0.011	< 0.38	< 0.94	< 0.38	< 0.38	< 0.054	< 0.38	< 0.0054	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.94	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.0054	< 0.0054	< 0.38
VERTICAL WELL-D	RH-BR-V1D-S01	REG	72.4	2/16/01	CORE	< 0.79	< 0.4	< 0.79	< 0.4	< 0.4	< 0.4	< 0.4	< 0.011	< 0.4	< 0.99	< 0.4	< 0.4	< 0.057	< 0.4	< 0.0057	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.99	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.0057	< 0.0057	< 0.4
VERTICAL WELL-D	RH-BR-V1D-S02	REG	84.7	2/19/01	CORE	< 0.72	< 0.36	< 0.72	< 0.36	< 0.36	< 0.36	< 0.36	< 0.01	< 0.36	< 0.9	< 0.36	< 0.36	< 0.05	< 0.36	< 0.005	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.9	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.005	< 0.005	< 0.36
VERTICAL WELL-D	RH-BR-V1D-S03	REG	97.6	2/20/01	CORE	< 0.7	< 0.35	< 0.7	< 0.35	< 0.35	< 0.35	< 0.35	< 0.011	< 0.35	< 0.88	< 0.35	< 0.35	< 0.053	< 0.35	< 0.0053	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.88	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.0053	< 0.0053	< 0.35
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.1	3/7/01	GW	< 0.011	< 0.0055	< 0.011	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.01	< 0.0055	< 0.028	< 0.0055	< 0.0055	< 0.05	< 0.0055	< 0.001	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.028	< 0.0055	< 0.0055	< 0.0055	< 0.0055	0.0058	< 0.002	< 0.002	< 0.0055
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.28	8/27/01	GW	< 0.01	< 0.005	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.01	< 0.005	< 0.025	< 0.005	< 0.005	< 0.05	< 0.005	< 0.001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.025	< 0.005	< 0.005	< 0.005	< 0.005	0.0109	< 0.002	< 0.002	< 0.005
VERTICAL WELL-D	TRIP BLANK	TB		2/16/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
VERTICAL WELL-D	TRIP BLANK	TB		2/19/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
VERTICAL WELL-D	TRIP BLANK	TB		3/7/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
VERTICAL WELL-D	TRIP BLANK	TB		8/27/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	
VERTICAL WELL-S	RH-BR-V2S-S01	REG	10	2/20/01	CORE	< 0.69	< 0.34	< 0.69	< 0.34	< 0.34	< 0.34	< 0.34	< 0.01	< 0.34	< 0.86	< 0.34	< 0.34	< 0.052	< 0.34	< 0.0052	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.86	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.0052	< 0.0052	< 0.34
VERTICAL WELL-S	RH-BR-V2S-S02	REG	21.5	2/21/01	CORE	< 0.74	< 0.37	< 0.74	< 0.37	< 0.37	< 0.37	< 0.37	< 0.011	< 0.37	< 0.93	< 0.37	< 0.37	< 0.055	< 0.37	< 0.0055	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.93	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.0055	< 0.0055	< 0.37
VERTICAL WELL-S	RH-BR-V2S-S03	REG	43	2/23/01	CORE	< 0.71	< 0.36	< 0.71	< 0.36	< 0.36	< 0.36	< 0.36	< 0.01	< 0.36	< 0.89	< 0.36	< 0.36	< 0.052	< 0.36	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.89	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0052	< 0.0052	< 0.36
VERTICAL WELL-S	TRIP BLANK	TB		2/21/01	WAT								< 0.01					< 0.05		< 0.001												< 0.002	< 0.002	

Table 3. All Results by Media Sampled (ppm)
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (FT, POE)	SAMPLE DATE	MEDIA	Carbazole	Carbon disulfide	Carbon tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chrysene	cis-1,2-Dichloroethylene	cis-1,3-Dichloropropene	Di-n-butyl phthalate	Di-n-octyl phthalate	Dibenzo(a,h)anthracene	Dibenzofuran	Dibromochloromethane	Diesel Fuel	Diethyl phthalate	Dimethyl phthalate	Ethylbenzene	Fluoranthene	Fluorene	Hexachlorobenzene	Hexachlorobutadiene	Hexachlorocyclopentadiene	Hexachloroethane	Indeno(1,2,3-cd)pyrene	Isophorone
TANK-16	B16A-4	REG	83.75	10/22/98	CORE							< 5					< 5			< 170			0.24	< 5	10					< 5	
TANK-16	B16A-5	REG	101.83	10/22/98	CORE							< 3.3					< 3.3			< 170			< 0.005	< 3.3	4.7					< 3.3	
TANK-16	B16B-4	REG	66.15	10/23/98	CORE							< 0.33					< 0.33			< 1			< 0.005	< 0.33	< 0.33					< 0.33	
TANK-16	B16B-5	REG	75.58	10/23/98	CORE							< 0.33					< 0.33			< 1			< 0.005	< 0.33	< 0.33					< 0.33	
TANK-16	B16C	REG	103.8	10/28/98	DFLNAPL							< 0.01					< 0.01			< 1			< 0.025	< 0.01	< 0.01					< 0.01	
TANK-16	B16C-4	REG	60	10/26/98	CORE							6.3					< 5			< 200			0.16	< 5	12					< 5	
TANK-16	B16C-5	REG	67	10/26/98	CORE							< 5					< 5			< 170			0.054	< 5	< 5					< 5	
TANK-17	RH-BR-17-D02	DUP	34	11/10/00	CORE	< 0.42	< 0.013	< 0.0064	< 0.0064	< 0.0064	< 0.0064	< 0.42	< 0.0064	< 0.0064	< 0.42	< 0.42	< 0.42	< 0.42	< 0.0064		< 0.42	< 0.42	< 0.0064	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42
TANK-17	RH-BR-17-S01	REG	10	11/10/00	CORE	< 1.7	< 0.56	< 0.28	< 0.28	< 0.28	< 0.28	< 1.7	< 0.28	< 0.28	< 1.7	< 1.7	< 1.7	< 1.7	< 0.28		< 1.7	< 1.7	< 0.28	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7
TANK-17	RH-BR-17-S02	REG	34	11/10/00	CORE	< 0.43	< 0.013	< 0.0066	< 0.0066	< 0.0066	< 0.0066	< 0.43	< 0.0066	< 0.0066	< 0.43	< 0.43	< 0.43	< 0.43	< 0.0066		< 0.43	< 0.43	< 0.0066	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43	< 0.43
TANK-17	RH-BR-17-S03	REG	66.2	11/10/00	CORE	< 0.36	< 0.0098	< 0.0049	< 0.0049	< 0.0049	< 0.0049	< 0.36	< 0.0049	< 0.0049	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0049		< 0.36	< 0.36	< 0.0049	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK-17	RH-MW-17-S01	REG	114.8	8/27/01	DFLNAPL	< 0.005	< 0.01	< 0.002	< 0.002	< 0.005	< 0.002	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	< 0.005	< 0.002		< 0.005	< 0.005	< 0.002	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TANK-18	RH-BR-18-D01	DUP	116	11/6/00	CORE	< 0.41	< 0.012	< 0.0062	< 0.0062	< 0.0062	< 0.0062	< 0.41	< 0.0062	< 0.0062	< 0.41	< 0.41	< 0.41	< 0.41	< 0.0062		< 0.41	< 0.41	< 0.0062	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41	< 0.41
TANK-18	RH-BR-18-S01	REG	80.5	11/6/00	CORE	< 0.42	< 0.013	< 0.0064	< 0.0064	< 0.0064	< 0.0064	< 0.42	< 0.0064	< 0.0064	< 0.42	< 0.42	< 0.42	< 0.42	< 0.0064		< 0.42	< 0.42	< 0.0064	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42	< 0.42
TANK-18	RH-BR-18-S02	REG	104.4	11/6/00	CORE	< 0.38	< 0.011	< 0.0057	< 0.0057	< 0.0057	< 0.0057	< 0.38	< 0.0057	< 0.0057	< 0.38	< 0.38	< 0.38	< 0.38	< 0.0057		< 0.38	< 0.38	< 0.0057	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
TANK-18	RH-BR-18-S03	REG	116	11/6/00	CORE	< 0.4	< 0.011	< 0.0056	< 0.0056	< 0.0056	< 0.0056	< 0.4	< 0.0056	< 0.0056	< 0.4	< 0.4	< 0.4	< 0.4	< 0.0056		< 0.4	< 0.4	< 0.0056	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
TANK-18	TRIP BLANK	TB		11/6/00	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
TANK-19	RH-BR-19-S01	REG	43	11/22/00	CORE	< 0.4	< 0.53	< 0.27	< 0.27	< 0.27	< 0.27	< 0.4	< 0.27	< 0.27	< 0.4	< 0.4	< 0.4	< 0.4	< 0.27		< 0.4	< 0.4	0.174	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
TANK-19	RH-BR-19-S02	REG	62.7	2/27/01	CORE	< 0.36	< 0.01	< 0.0051	< 0.0051	< 0.0051	< 0.0051	< 0.36	< 0.0051	< 0.0051	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0051		< 0.36	< 0.36	< 0.0051	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
TANK-19	RH-BR-19-S03	REG	93.2	2/28/01	CORE	< 0.34	< 0.013	< 0.0064	< 0.0064	< 0.0064	< 0.0064	< 0.34	< 0.0064	< 0.0064	< 0.34	< 0.34	< 0.34	< 0.34	< 0.0064		< 0.34	< 0.34	< 0.0064	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
TANK-19	RH-BR-19-S04	REG	118	3/2/01	CORE	< 0.34	< 0.013	< 0.0063	< 0.0063	< 0.0063	< 0.0063	< 0.34	< 0.0063	< 0.0063	< 0.34	< 0.34	< 0.34	< 0.34	< 0.0063		< 0.34	< 0.34	< 0.0063	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
TANK-19	RH-MW-19-S01	REG	110.52	8/27/01	INFILTWAT	< 0.005	< 0.01	< 0.002	< 0.002	< 0.005	< 0.002	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	< 0.005	< 0.002		< 0.005	< 0.005	< 0.002	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TANK-19	RH-MW-19-S01	REG	113.1	3/7/01	INFILTWAT	< 0.006	< 0.01	< 0.002	< 0.002	< 0.005	< 0.002	< 0.006	< 0.002	< 0.002	< 0.006	< 0.006	< 0.006	< 0.006	< 0.002		< 0.006	< 0.006	< 0.002	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006
TANK-20	RH-BR-20-S01	REG	0.5	3/2/01	CORE	< 1.7	< 0.65	< 0.32	< 0.32	< 0.32	< 0.32	< 1.7	< 0.32	< 0.32	< 1.7	< 1.7	< 1.7	< 1.7	< 0.32		< 1.7	< 1.7	< 0.32	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7
TANK-20	RH-BR-20-S02	REG	8.8	3/3/01	CORE	< 0.45	< 0.63	< 0.32	< 0.32	< 0.32	< 0.32	< 0.45	< 0.32	< 0.32	< 0.45	< 0.45	< 0.45	< 0.45	< 0.32		< 0.45	< 0.45	< 0.32	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45	< 0.45
TANK-20	RH-BR-20-S03	REG	104	3/3/01	CORE	< 0.38	< 0.011	< 0.0054	< 0.0054	< 0.0054	< 0.0054	< 0.38	< 0.0054	< 0.0054	< 0.38	< 0.38	< 0.38	< 0.38	< 0.0054		< 0.38	< 0.38	< 0.0054	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38	< 0.38
VERTICAL WELL-D	RH-BR-V1D-S01	REG	72.4	2/16/01	CORE	< 0.4	< 0.011	< 0.0057	< 0.0057	< 0.0057	< 0.0057	< 0.4	< 0.0057	< 0.0057	< 0.4	< 0.4	< 0.4	< 0.4	< 0.0057		< 0.4	< 0.4	< 0.0057	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
VERTICAL WELL-D	RH-BR-V1D-S02	REG	84.7	2/19/01	CORE	< 0.36	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.36	< 0.005	< 0.005	< 0.36	< 0.36	< 0.36	< 0.36	< 0.005		< 0.36	< 0.36	< 0.005	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
VERTICAL WELL-D	RH-BR-V1D-S03	REG	97.6	2/20/01	CORE	< 0.35	< 0.011	< 0.0053	< 0.0053	< 0.0053	< 0.0053	< 0.35	< 0.0053	< 0.0053	< 0.35	< 0.35	< 0.35	< 0.35	< 0.0053		< 0.35	< 0.35	< 0.0053	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35	< 0.35
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.1	3/7/01	GW	< 0.0055	< 0.01	< 0.002	< 0.002	< 0.005	< 0.002	< 0.0055	< 0.002	< 0.002	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.002		< 0.0055	< 0.0055	< 0.002	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.0055
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.28	8/27/01	GW	< 0.005	< 0.01	< 0.002	< 0.002	< 0.005	< 0.002	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	< 0.005	< 0.002		< 0.005	< 0.005	< 0.002	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
VERTICAL WELL-D	TRIP BLANK	TB		2/16/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
VERTICAL WELL-D	TRIP BLANK	TB		2/19/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
VERTICAL WELL-D	TRIP BLANK	TB		3/7/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
VERTICAL WELL-D	TRIP BLANK	TB		8/27/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								
VERTICAL WELL-S	RH-BR-V2S-S01	REG	10	2/20/01	CORE	< 0.34	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.34	< 0.0052	< 0.0052	< 0.34	< 0.34	< 0.34	< 0.34	< 0.0052		< 0.34	< 0.34	< 0.0052	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34	< 0.34
VERTICAL WELL-S	RH-BR-V2S-S02	REG	21.5	2/21/01	CORE	< 0.37	< 0.011	< 0.0055	< 0.0055	< 0.0055	< 0.0055	< 0.37	< 0.0055	< 0.0055	< 0.37	< 0.37	< 0.37	< 0.37	< 0.0055		< 0.37	< 0.37	< 0.0055	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37	< 0.37
VERTICAL WELL-S	RH-BR-V2S-S03	REG	43	2/23/01	CORE	< 0.36	< 0.01	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.36	< 0.0052	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.0052		< 0.36	< 0.36	< 0.0052	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36	< 0.36
VERTICAL WELL-S	TRIP BLANK	TB		2/21/01	WAT		< 0.01	< 0.002	< 0.002	< 0.005	< 0.002		< 0.002	< 0.002					< 0.002				< 0.002								

Table 3. All Results by Media Sampled (ppm)
Navy Clean CTO-0229
Red Hill Bulk Fuel Storage Facility, Oahu, Hawaii

LOCATION	SAMPLE NO	TYPE	SAMPLE DEPTH (FT, POE)	SAMPLE DATE	MEDIA	Lead	m,p xylene	Methyl bromide	Methyl chloride	Methyl ethyl ketone	Methylene chloride	Motor Oil (n-C19 through n-C36)	N-Nitroso-di-n-propylamine	N-Nitrosodiphenylamine	Naphthalene	Nitrobenzene	o-xylene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene	Solids, Percent	Styrene	Tetrachloroethylene	Toluene	TPH (C10-C28)	trans-1,2-Dichloroethylene	trans-1,3-Dichloropropene	Trichloroethylene	Unknown Hydrocarbon	Vinyl chloride	Xylene (total)
TANK-16	B16A-4	REG	83.75	10/22/98	CORE		0.31					< 840			43		0.22		23		22				< 0.025					11000		0.53
TANK-16	B16A-5	REG	101.83	10/22/98	CORE		< 0.005					< 840			< 3.3		< 0.005		4.4		20				< 0.005					2800		< 0.005
TANK-16	B16B-4	REG	66.15	10/23/98	CORE		< 0.005					< 5			< 0.33		< 0.005		< 0.33		< 0.33				< 0.005					6.4		< 0.005
TANK-16	B16B-5	REG	75.58	10/23/98	CORE		< 0.005					< 5			< 0.33		< 0.005		< 0.33		< 0.33				< 0.005					29		< 0.005
TANK-16	B16C	REG	103.6	10/28/98	DFLNAPL							< 4			< 0.01				0.011		< 0.01				< 0.025					8.1		0.031
TANK-16	B16C-4	REG	60	10/26/98	CORE		0.059					< 1000			47		0.082		26		11				< 0.025					9400		0.141
TANK-16	B16C-5	REG	67	10/26/98	CORE		0.19					< 840			8.2		0.13		6.5		< 5				0.048					4500		0.32
TANK-17	RH-BR-17-D02	DUP	34	11/10/00	CORE	< 11.8		< 0.0064	< 0.0064	< 0.013	< 0.013		< 0.42	< 0.42	< 0.42	< 0.42		< 1	< 0.42	< 0.42	< 0.42	79.1	< 0.0064	< 0.0064	0.0029	< 10	< 0.0064	< 0.0064	< 0.0064		< 0.0064	< 0.019
TANK-17	RH-BR-17-S01	REG	10	11/10/00	CORE	< 11		< 0.28	< 0.28	< 0.56	< 0.56		< 1.7	< 1.7	< 1.7	< 1.7		< 4.2	< 1.7	< 1.7	< 1.7	78.7	< 0.28	< 0.28	< 0.28	861	< 0.28	< 0.28	< 0.28		< 0.28	< 0.84
TANK-17	RH-BR-17-S02	REG	34	11/10/00	CORE	< 11.6		< 0.0066	< 0.0066	< 0.013	0.0152		< 0.43	< 0.43	< 0.43	< 0.43		< 1.1	< 0.43	< 0.43	< 0.43	77.9	< 0.0066	< 0.0066	< 0.0066	< 11	< 0.0066	< 0.0066	< 0.0066		< 0.0066	< 0.02
TANK-17	RH-BR-17-S03	REG	66.2	11/10/00	CORE	< 9.8		< 0.0049	< 0.0049	< 0.0098	0.0108		< 0.36	< 0.36	< 0.36	< 0.36		< 0.9	< 0.36	< 0.36	< 0.36	92.4	< 0.0049	< 0.0049	< 0.0049	< 9	< 0.0049	< 0.0049	< 0.0049		< 0.0049	< 0.015
TANK-17	RH-MW-17-S01	REG	114.8	8/27/01	DFLNAPL	0.072		< 0.005	< 0.005	< 0.01	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005		< 0.025	< 0.005	< 0.005	< 0.005		< 0.002	< 0.002	< 0.002	< 0.28	< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK-18	RH-BR-18-D01	DUP	116	11/6/00	CORE	< 12.1		< 0.0062	< 0.0062	< 0.012	< 0.012		< 0.41	< 0.41	< 0.41	< 0.41		< 1	< 0.41	< 0.41	< 0.41	81.9	< 0.0062	< 0.0062	0.0177	< 10	< 0.0062	< 0.0062	< 0.0062		< 0.0062	< 0.018
TANK-18	RH-BR-18-S01	REG	80.5	11/6/00	CORE	< 11.4		< 0.0064	< 0.0064	< 0.013	< 0.013		< 0.42	< 0.42	< 0.42	< 0.42		< 1	< 0.42	< 0.42	< 0.42	79.5	< 0.0064	< 0.0064	< 0.0064	< 10	< 0.0064	< 0.0064	< 0.0064		< 0.0064	< 0.019
TANK-18	RH-BR-18-S02	REG	104.4	11/6/00	CORE	0.55		< 0.0057	< 0.0057	< 0.011	< 0.011		< 0.38	< 0.38	< 0.38	< 0.38		< 0.95	< 0.38	< 0.38	< 0.38	87.6	< 0.0057	< 0.0057	< 0.0057	< 9.5	< 0.0057	< 0.0057	< 0.0057		< 0.0057	< 0.017
TANK-18	RH-BR-18-S03	REG	116	11/6/00	CORE	< 11.1		< 0.0056	< 0.0056	< 0.011	< 0.011		< 0.4	< 0.4	< 0.4	< 0.4		< 0.99	< 0.4	< 0.4	< 0.4	84.3	< 0.0056	< 0.0056	< 0.0056	< 9.9	< 0.0056	< 0.0056	< 0.0056		< 0.0056	< 0.017
TANK-18	TRIP BLANK	TB		11/6/00	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK-19	RH-BR-19-S01	REG	43	11/22/00	CORE	< 11.5		< 0.27	< 0.27	< 0.53	< 0.53		< 0.4	< 0.4	0.682	< 0.4		< 0.99	< 0.4	< 0.4	< 0.4	84.3	< 0.27	< 0.27	< 0.27	1620	< 0.27	< 0.27	< 0.27		< 0.27	0.267
TANK-19	RH-BR-19-S02	REG	62.7	2/27/01	CORE	< 10.7		< 0.0051	< 0.0051	< 0.01	< 0.01		< 0.36	< 0.36	< 0.36	< 0.36		< 0.89	< 0.36	< 0.36	< 0.36	93.3	< 0.0051	< 0.0051	< 0.0051	< 8.9	< 0.0051	< 0.0051	< 0.0051		< 0.0051	< 0.015
TANK-19	RH-BR-19-S03	REG	93.2	2/28/01	CORE	< 10.4		< 0.0064	< 0.0064	< 0.013	< 0.013		< 0.34	< 0.34	< 0.34	< 0.34		< 0.86	< 0.34	< 0.34	< 0.34	96.4	< 0.0064	< 0.0064	< 0.0064	< 8.6	< 0.0064	< 0.0064	< 0.0064		< 0.0064	< 0.019
TANK-19	RH-BR-19-S04	REG	118	3/2/01	CORE	< 9.8		< 0.0063	< 0.0063	< 0.013	< 0.013		< 0.34	< 0.34	< 0.34	< 0.34		< 0.86	< 0.34	< 0.34	< 0.34	97.4	< 0.0063	< 0.0063	< 0.0063	< 8.6	< 0.0063	< 0.0063	< 0.0063		< 0.0063	< 0.019
TANK-19	RH-MW-19-S01	REG	110.52	8/27/01	INFILTWAT	0.0666		< 0.005	< 0.005	< 0.01	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005		< 0.025	< 0.005	< 0.005	< 0.005		< 0.002	< 0.002	< 0.002	< 0.25	< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK-19	RH-MW-19-S01	REG	113.1	3/7/01	INFILTWAT	0.0568		< 0.005	< 0.005	< 0.01	< 0.005		< 0.006	< 0.006	< 0.006	< 0.006		< 0.03	< 0.006	< 0.006	< 0.006		< 0.002	< 0.002	< 0.002	0.312	< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
TANK-20	RH-BR-20-S01	REG	0.5	3/2/01	CORE	9.8		< 0.32	< 0.32	< 0.65	< 0.65		< 1.7	< 1.7	< 1.7	< 1.7		< 4.2	< 1.7	< 1.7	< 1.7	80.1	< 0.32	< 0.32	< 0.32	975	< 0.32	< 0.32	< 0.32		< 0.32	< 0.98
TANK-20	RH-BR-20-S02	REG	8.8	3/3/01	CORE	< 13.9		< 0.32	< 0.32	< 0.63	< 0.63		< 0.45	< 0.45	< 0.45	< 0.45		< 1.1	< 0.45	< 0.45	< 0.45	74	< 0.32	< 0.32	< 0.32	794	< 0.32	< 0.32	< 0.32		< 0.32	< 0.95
TANK-20	RH-BR-20-S03	REG	104	3/3/01	CORE	< 11		< 0.0054	< 0.0054	< 0.011	< 0.011		< 0.38	< 0.38	< 0.38	< 0.38		< 0.94	< 0.38	< 0.38	< 0.38	88.1	< 0.0054	< 0.0054	< 0.0054	< 9.4	< 0.0054	< 0.0054	< 0.0054		< 0.0054	< 0.016
VERTICAL WELL-D	RH-BR-V1D-S01	REG	72.4	2/16/01	CORE	< 12.5		< 0.0057	< 0.0057	< 0.011	< 0.011		< 0.4	< 0.4	< 0.4	< 0.4		< 0.99	< 0.4	< 0.4	< 0.4	84.2	< 0.0057	< 0.0057	< 0.0057	< 9.9	< 0.0057	< 0.0057	< 0.0057		< 0.0057	< 0.017
VERTICAL WELL-D	RH-BR-V1D-S02	REG	84.7	2/19/01	CORE	< 10.5		< 0.005	< 0.005	< 0.01	< 0.01		< 0.36	< 0.36	< 0.36	< 0.36		< 0.9	< 0.36	< 0.36	< 0.36	92.7	< 0.005	< 0.005	< 0.005	< 9	< 0.005	< 0.005	< 0.005		< 0.005	< 0.015
VERTICAL WELL-D	RH-BR-V1D-S03	REG	97.6	2/20/01	CORE	< 10.4		< 0.0053	< 0.0053	< 0.011	< 0.011		< 0.35	< 0.35	< 0.35	< 0.35		< 0.88	< 0.35	< 0.35	< 0.35	94.7	< 0.0053	< 0.0053	< 0.0053	< 8.8	< 0.0053	< 0.0053	< 0.0053		< 0.0053	< 0.016
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.1	3/7/01	GW	0.015		< 0.005	< 0.005	< 0.01	< 0.005		< 0.0055	< 0.0055	< 0.0055	< 0.0055		< 0.028	< 0.0055	< 0.0055	< 0.0055		< 0.002	< 0.002	< 0.002	0.883	< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
VERTICAL WELL-D	RH-MW-V1D-S01	REG	86.28	8/27/01	GW	0.0104		< 0.005	< 0.005	< 0.01	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005		< 0.025	< 0.005	< 0.005	< 0.005		< 0.002	< 0.002	< 0.002	1.07	< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
VERTICAL WELL-D	TRIP BLANK	TB		2/16/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
VERTICAL WELL-D	TRIP BLANK	TB		2/19/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
VERTICAL WELL-D	TRIP BLANK	TB		3/7/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
VERTICAL WELL-D	TRIP BLANK	TB		8/27/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006
VERTICAL WELL-S	RH-BR-V2S-S01	REG	10	2/20/01	CORE	< 10.2		< 0.0052	< 0.0052	< 0.01	< 0.01		< 0.34	< 0.34	< 0.34	< 0.34		< 0.86	< 0.34	< 0.34	< 0.34	96.7	< 0.0052	< 0.0052	< 0.0052	< 8.6	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.015
VERTICAL WELL-S	RH-BR-V2S-S02	REG	21.5	2/21/01	CORE	< 11.1		< 0.0055	< 0.0055	< 0.011	< 0.011		< 0.37	< 0.37	< 0.37	< 0.37		< 0.93	< 0.37	< 0.37	< 0.37	89.4	< 0.0055	< 0.0055	< 0.0055	< 9.3	< 0.0055	< 0.0055	< 0.0055		< 0.0055	< 0.016
VERTICAL WELL-S	RH-BR-V2S-S03	REG	43	2/23/01	CORE	4.1		< 0.0052	< 0.0052	< 0.01	< 0.01		< 0.36	< 0.36	< 0.36	< 0.36		< 0.89	< 0.36	< 0.36	< 0.36	93.4	< 0.0052	< 0.0052	< 0.0052	< 8.9	< 0.0052	< 0.0052	< 0.0052		< 0.0052	< 0.015
VERTICAL WELL-S	TRIP BLANK	TB		2/21/01	WAT			< 0.005	< 0.005	< 0.01	< 0.005												< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002		< 0.001	< 0.006

Abbreviations:
REG - Regular sample
DUP - Duplicate sample
TB - Trip Blank
DFLNAPL - Drill fluid/LNAPL (light non-aquious phase liquid) mixture
INFILTWAT - Infiltration Water

GW - Groundwater
WAT - Water
PPM - parts per million
TPH - Total petroleum hydrocarbon
ft, poe - feet from point of entry

Notes:
1) None detects are shown with "<" followed by the laboratory reporting limit.
2) Blank fields indicate no laboratory analysis performed.

Appendix 3

FIELD NOTES

⊛ Continuation of Book 1 ⊛

1010 - Recover Pull 7 @ 50.7 22oct98
1012 - Dragon test @ 50.7 - Negative -
⊛ Basalt to this point looks good & clean. No odors or apparent saturated zones.
1030 - Equip check 21.0/0.0 C0.0 RIP.
1047 - Recover Pull 8 @ 60.5' 22oct98
1052 - Dragon test @ 60.5 - Negative -
1103 - Begin to push down again
1105 - Equip check 21.0/0.0 C0.0ppm
1130 - Equip check 21.0/0.0 C0.0ppm
1145 - Recover Pull 10 @ 69.2' 22oct98
1151 - Dragon test @ 69.2' - Negative -
1200 - Equip check 21.1/0.0 [PID has gone back to Pull 2. Iso is low. do not believe the pressure in can is letting PID calibrate right. Will try to find another Iso bottle.
⊛ Need to pick up cord for the Bailers. ⊛
1225 - Recover Pull 11 @ 76.1 22oct98
1235 - Dragon test @ 76.1 - Negative -
1253 - Recover Pull 12 @ 79.0 22oct98
⊛ No Dragon test

Pull	Rec	Depth	Rec	L	G
13	5.8	79.0-84.8	6.2		0.4
14	5.4	90.2	5.4		
15	4.7	94.9	4.2	0.5	
16	3.4	98.3	3.6		

Box 8 79.0 - 83.2
Box 9 83.2 - 92.1
Box 10 92.1 - 98.3

1305 - Began Push of #13 -
1307 - Equip check - 21.0/0.0
Took PID apart & cleaned the bulb. Recalibrated. Would not hold. (Fault 2) Span gas is too low. Will try to get a new bottle.
1335 Drager Test @ 84.8 Reading 3
LeL 0.0 O2 21.0
1356 pulled Rods Run #14 core Barrel Blocking off
No Drager Test
1430 Drager test 94.9 Negative
Pulled core Run #15
Lel 0.0 O2 21.0
14:50 got Rods on Bottom & Began coring Hole caving in
1455 Lel O2 Battery Dead
1515 Drager Tube 98.3 Negative
Unable to get Rods to Bottom of the hole. Hole caving in
Stopped hole @ 98.3 (B09A-Z)
1530 started moving Drill to B 9C
1610 Began Drilling on 9C
Reaming casing

BO9C

Run	Run	Depth	Rec	L	G
1	4.2'	0.0 - 4.2'	3.8	0.4'	—
2	5.3	4.2 - 9.5	4.9	0.4'	—
3	11.7	9.5 21.2	8.0'	3.7	—
4	9.9	21.2 - 31.1	10.2'		0.3'
5	9.9	31.1 - 41.0	9.9	—	—
6	10.2	41.0 - ~~51~~ 51.2	10.4		0.2
7	11.0	51.2 - 62.2	10.4	0.6	—
8	10.3	62.2 72.5	9.9	0.4	—
9	Bedrock				
10					
11					
12					
13					

VOID

BOX 1 - 0.0 - 10.6
BOX 2 10.6 - 23.3
BOX 3 23.3 - 33.1
BOX 4 33.1 42.3
BOX 5 42.3 - 51.6
BOX 6 51.6 61.5
BOX 7 61.5 72.5
BOX 8

Void from 62.2 - 63.2

1630 - begin push of core tube.
1645 - Recover Run 1 @ 4.2 27oct98
1650 - begin to push second run.
1655 - push casing to final point & stop push.
1700 - All personnel off site.
1710 - F. Eswill & C. Demos head to Pearl Harbor to drop off keys to Red Hill Location.
1725 - Arrive at Pearl Harbor. Drop keys off.
1730 - leave Pearl Harbor. Head to Kailua store to find some PVC, could not find Kailua Store. Head back to Kailua. Find True Value & buy PVC.
1815 - End of day.

All BO9C on left side of page 32

[illegible]

32

28 Oct 98 80°/Sunny PRR

0615 - Met Larry at car to head down to Pearl Harbor.
0655 - Arrive at Pearl & proceed to FIS building
0700 - Leave Pearl Harbor & head to gas station to get gas.
0705 - Fill up at Aloha gas.
0710 - Proceed to Red Hill
0720 - Arrive Red Hill. Call the security office & gain entrance.
0745 - Calibrate equipment
0755 - H&S meeting.
Larry D. Moses OGDEN
Travis Gleason SAI
Robert A. Sheldon SAI
[illegible] OGDEN
0802 - Begin push of second run on B09C - Bore.
0804 - Larry is gluing together the PVC for our water/product collect. We will be utilizing 100 ft of PVC to push the probe and the [illegible] to a depth that we can collect

(33)

21.2
9.5
11.7

15.3
2.6
12.7

39.1
7.8
23.3

enough material to analyze.
0811 - Recore Pull 2 @ 9.5' 28oct98
0822 - Hit Void. Clara take on Pull
3. (Top 12.7' Bottom 15.3').
Reached bottom & pushed through.
Will look at Void when we pull
core material.
0840 - Recore Pull 3 @ 21.2 28oct98
Adjustment to Void depth. Void
actually = 3.7 ft. longer amount
of grout in void. Seems to have
infiltrated and settled. Grout
has flat top.
0850 - Larry came to Tank 9 for
supplies. He let me know that
there was approximately 12 ft
of product in B16C. The other
two, B16A & B16B were
stone cold dry.
0855 - begin push of Pull 4
Dragon test @ 21.2 - Negative -
0912 - Recore Pull 4 @ 31.1 28oct98
0917 - Dragon test @ 31.1 - negative -
0925 - begin push of Pull 5
Larry back to get more gloves

(34)

0938 - Recover Pull 5 @ 41.0' 28 Oct 98
Equip check 21.1/0.0 Co.0ppm
0940 - Attempt Drager test.
F. Esquibel has Drager tube break, Tube is pushed into finger. Operation is stopped for approx 35 minutes while personnel stop bleeding & gather all rags & broken glass, to clean area of all blood.
0918 - begin operation again.
push down pull #6.
0939 - Recover Pull 6 @ 51.2 28 Oct 98
- No Drager test on fresh of hole -
0937 - Will collect Sample from pull 6 to analyse, B07C-1 @ 50.0'
10:15 Pull #6 No Drager Test
11:15 Pull #7 62.2 No Drager
Equip check 21.0/0.0
1205 - Pull #8 72.5
1209 - Drager Test @ 72.5 28 Oct 98
- Negative -
1215 - Collect Sample from Pull 8 @ 66.0 (4") B09C-2
Terminate B09C -

309B

Rull	Run	Depth	Rec	L	L
1	6.7	0.0 - 6.7	4.8	1.9'	-
2	9.9	6.7 - 16.6	9.7	0.2	-
3	4.4	16.6 - 21.0	3.6	0.8	-
4	10.2	21.0 - 31.2	10.2	-	-
5	9.8	31.2 - 41.0	9.7	0.1	-
6	9.4	41.0 - 50.4	10.2	-	0.8'
7	10.4	50.4 - 60.8	10.0	0.4'	
8	8.4	60.8 - 69.2	6.3	2.1	
9	5.7	69.2 - 74.9	~~[illegible]~~ 5.3	0.4	

Box 1	0.0 - 11.5
Box 2	11.5 - 22.0
Box 3	22.0 - 31.4
Box 4	31.4 - 41.4
Box 5	41.4 - 50.4
Box 6	50.4 - 60.8
Box 7	60.8 - ~~69.2~~ 72.6
Box 8	~~69.2~~ 72.6 - ~~69.2~~ 74.9

1220 - Begin to set up on B09B.

13:20 STARTed Drilling B9B

1325 Equipment Check LEL 0.0
O₂ 21.1

1335 - Recover Rull 1 @ 6.7' 28oct98
Only 2 inch of cementing on B
bored. Porous basalt below

1400 - Recover Rull 2 @ 16.6'
28 oct 98 Very dry. (Auth)

1425 Equip check 21.1/0.0

1430 - Recover Rull 3 @ 21.0' 28oct98

1445 - Equip check 21.0 /0.0

1515 - Recover Rull 4 @ 31.2 28oct98
- No Oxygen test.

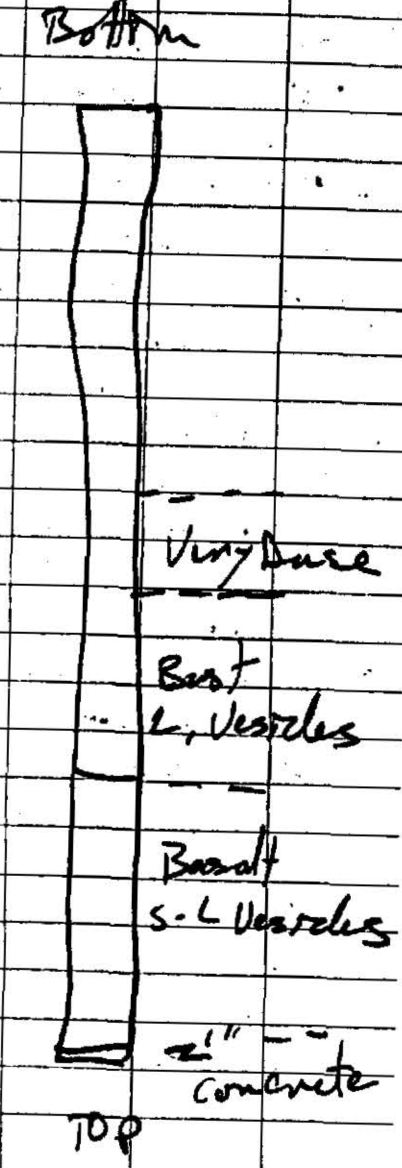
1521 - Begin push of Rull #5.
Will need more coreboxes in the
morning.

1545 - Recover Rull 5 @ 41.0' 28oct98

1600 - Begin push down of Rull 6

1624 - Recover Rull 6 @ 50.4 28oct98
Rock to this point looks
good. Last two runs have been
Very dense, no vesicles.

Bo9B



(1300 - LSL /or battery pack is dead. Holding charge for only 7-7.5 hrs)

↑ back to last page 36

1640 - Cease operations & begin to prepare to leave site for the day. All rest of samples will be added and shipped tomorrow. 2 samples from each of Bo9A - Bo9B - Bo9C will be added.

1655 - All personnel off site.

1715 - Drop keys off at the FISC office.

1720 - Leave Pearl Harbor & head back to Kailua. All operations (drilling) will be complete by 10:00 AM on 29 Oct 98.

[signature]

37

29 Oct 98 79°/sunny FRR

0615 - meet Larry at the car & proceed to Pearl Harbor.
0650 - Arrive at Pearl Harbor & head to FISC office to sign out keys.
0705 - Sign out keys & depart from the pearl Harbor area. proceed to Red Hill.
0711 - Meet Drillers at Red Hill lower gate. Proceed in.
0720 - Enter Adit 5 gate.
0730 - H&Safety Meeting -
We discuss watching for broken glass stemming from yesterday's incident.
[illegible] OGDEN
[illegible] SAI
Travis Gleason SAI
~~0750 - begin pushing rod~~
~~[illegible]~~ OGDEN
0750 - begin push at pull 7
0800 - Lel/O2 meter calibrated & sets PID at fault again

38

0815- Recover Pull 7 @ 60.8
290ct98
0821- Dragon test @ 60.8 - Negative
0830 - Collect Sample B0913 -1
@ 55.0' (9") 29oct98
0835- begin push of Pull 8
0850 - Recover Pull 8 @ 69.2'
29oct 98
0857- Dragon test at 69.2 - Negative -
- Possible Void at 1.9' into run.
May be soft rock. (Crumbly)
0904 - begin last push on B0913
0920 Pulled Core Run # 9 74.9
NO Dragon Test
Started Taking drill apart
Collect Sample B0913-2 @ 74.5
(4") 29oct98 0935
0950 - Close operations.
1000 - begin breakdown of equipment.
1420 - All equipment up at Adit 5
entrance.
1445 - Larry goes w/ Travis to decon
all tubes before being loaded.
Fenwick stays w/ Bob & watches
the equipment pack up.

#261 -Laura 1 hr

Travel Age

1-800-800-0591

Nov 4 TWA # 2

Nov 8 TWA # 696

New Flight Info -

Forum -

Larry -

9/6 374-4334 Called at by 11:00

Kendra DosAntolo

1630 - All equipment is packed up
1645 - All personnel off site. Call
Rito Grand Shack to have them
sign us out.
1700 - Drop off keys at FESC. Begin
for Home. (Samples dropped off)

[signature]

40

30 Oct 98 80°/Sunny #88

0700 - Met Larry at Cor & proceed to Pearl Harbor.

0745 - Arrive at Pearl Harbor. Proceed to FISC office to pick up the keys. Dry in the 440 bldg that FISC electricians lent us.

0800 - Met drillers at the 26 gate. Head in & begin to put all equipment out & pack for shipment. Core is packed into two cig crates & labeled for return to us from Salisbury.

1145 - All equipment is packed. All pulled out of site.

1150 F. Espiritu & Larry Dones head to the FIS office to turn in keys. At FISC office we talk to Jones Cannon. He will let all FISC know that we are completed & off site.

1230 - Head to OBBS (Aon). We talk to Mark Bigelow. Also leave equipment for Fritz Hoiland.

Sample Bottles will be kept MOBBS
Gov. Prop. until we return. Talk to
Steffey toma. She informs us
about FedEx drop times. (does not
know about cut off time) start to
call Fed Ex and labs. Samples
are in Waho & talk to (SD) FedEx
Joan, She assures me that
samples will be there on Sat. They
will put cooler in refrigeration
so samples will not be harmed.
Larry calls back to see if they
found samples & samples not
located. She (Joan) now tells
Larry they are marked for
refrigeration if cannot be dropped
off (1510)
1600 Drop phone off.
1630 Take equipment & Hazco supplies
to Fed Ex
1700 - Head to Kaneohe Dorm for
Day

1 Nov 98 JRE

1700 - Arrive at Airport, Drop off car, Check in

1730 - Head to Terminal.

1850 - Board plane. Proceed to St. Louis.

2 Nov 98 JRE

0645 - Arrive at St. Louis.

0836 - Start to Board for Nashville.

0845 - Arrive in Nashville.

End of Project

[signature]

Date	Description	Pages
18Oct98	Travel to Hawai'i (TWA)	1
19Oct98	Prep Day at Hon. office	2-4
20Oct98	Setup & Prep -	5-7
21Oct98	Drill B16A	8-11
22Oct98	Drill B16 A-B	12-16
23Oct98	Drill B16 B-C	17-22
26Oct98	Drill B16C, Move & Drill B09A	23-27
27Oct98	Drill B09A	28-29

B16-DuP

A4

(1)

18 Oct 98 65°/Sunny FBE

0900 - Meet Larry at Nashville Airport.
0930 - Begin to Board TWA flight to St. Louis.
1040 - Arrive St Louis.
1130 - Begin to Board TWA flight to Honolulu.
1540 - Arrive in Honolulu, Proceed to Hertz counter to pick up Rental Vehicle.
1630 - Leave Airport, Proceed to Kailua to get Keys to Rental House.
1710 - Arrive at Pats Rental to check In. Have house billed to OGDEN.
1735 - Proceed to House.
1745 - Arrive at house & settle In.

[signature]

(1)

19 Oct 98 89°/Sunny SEE

0645 · Met Larry at car & proceed to Honolulu Ogden office. (Got lost on the first try. Had to circle the down town area)

0750 · Arrive at the Honolulu office & check in with the secretary. We are set up in the conference room.

0825 · Mark Bigelow arrives and prepares to watch my calibration of the equipment.

0830 · Begin calibration of both pieces of equipment. Lel/O_2 calibration w/ Pentane 75%. Machine reads steady at 47%. Check the Lel w/ the counter-clock wise twist. The machine is calibrated to an Lel of 10 and O_2 at 19.5 & 23.0%. Set up PID and begin calibration. PID calibrates at 99.8 ppm against 100 ppm Isobutylene.

Mark OK's my knowledge of the equipment.

0915 - Larry begins to call around to find prices on pvc. the supplier has 1.5" pvc for almost double what the bid was for. He and Kurt will make a decision to pursue the purchase of this pipe or not.

0945 - Met Eric Hoiland & set up a time to go to the Gov. prop. warehouse at E-tech.

1030 - Larry and I set to go to find the Red Hill area. Load all the equipment in the car. proceed to Red Hill area and locate the upper and lower gates.

1330 - Meeting w/ Harry Hui and Glenn Yoshinaga. Army FISC personnel on site also. We discuss the option of putting all 3 bores at angles. Larry and I will stick to work plan and put the original bore down the center all 11° - 12°.

1445 - Meeting is over, Will start activities tomorrow.
1500 - proceed back to Honolulu office.
1530 - Arrive Honolulu office. Talk to Eric Howland. We will meet Brad (E-Tech) at the warehouse at 1605.
1545 - Proceed to E-tech Warehouse.
1630 - Brad from E-tech shows up on site. We are able to acquire all of the equipment that we need for this job.
1720 - Head back to houses.
1800 - Arrive back at Kailua. Got lost on 1st try.
1900 - Meet Drillers for Dinner. Discuss work plan & H&S plan. Everybody signs & understands plan.
2020 - leave Restaurant to prep for Next day.

[signature]

(9)

20 Oct 98 70°/Sunny FRE

0615: Meet w/Larry & start drive down to Harry Hui office.

0655: Arrive at visitor office & get one day pass. Proceed to Harry Hui office

0707: Arrive at Harry Hui office. We give Hui copy of Cert form so he will know who will be at site at all times. He introduces us to:

- Eric Lee
- Mel (Keyman)
- Glenn Yoshinaga

Mark Barrett (Security)

0800: We leave Harry Hui office & go back to the visitor building to get a 2 week temporary pass. We get pass.

0815: Head to Honolulu office to pick up the rest of our equipment & make some phone calls.

0910: Leave office to meet drillers at Hawaii freight office.

0920: Arrive at Dock & we head out to the site.

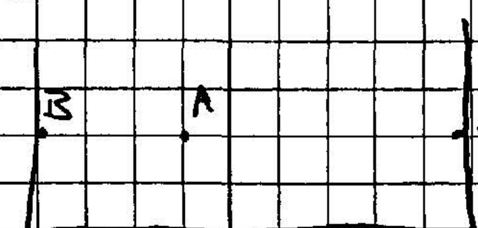
0940: Arrived at the lower Adit & gate. Keys we have do not work. Larry & I drive to Adit 3 Area to find Someone. No one there. We go back to Adit 5 & there is FISC personnel there. They take us to the upper Adit 5.

1015: start to unload truck at Adit 5. (Key #53)

1326: Equipment is unloaded. Rig is below ground. Fire alarm starts to go off at 1330! Do not know why this was set off. FISC personnel call to Pearl to get a Fire Dept. representative to come reset the alarm.

1335: returning to upper level to pull down drill rod & to move Steam cleaner to Adit 3 Area.

1455: All equipment is in the tunnel. (Refer to before pictures) See Drill guide below.



A, B, and C points, were locations agreed upon in meeting w/ Harry Ho; Drillers are setting Rig points to begin drilling. Will need to move & rebolt drill at each location.

(*) F. Esquivel ran initial sweep of area w/ O2/Lel & PID, all readings are normal.

1530: 440 plugs do not fit. Male/Female are different diameters. Salisbury will need to go to grainger to pick up new adapters. ALSO, need to drop off boom truck today to keep from incurring an extra day's cost.

1535: Bob (driller) off site to upper tunnel to make some phone calls to locate equipment

1556: Equipment all Secure & All personnel off site.

1635: Keys returned. All work done for day

[signature]

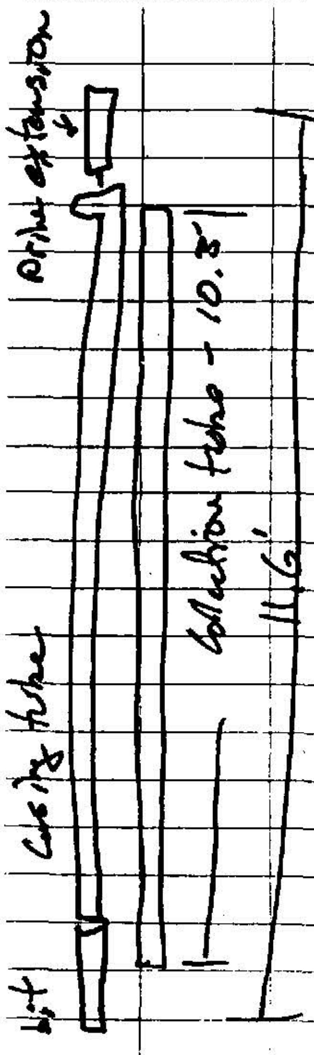
21 Oct 98 80°/Sunny FRB

0600: Talked to Bob (Salisbury). His office is trying to find an outlet plug for him, but are not having luck. Larry will talk to the maintenance guys when we get to Red Hill to see if we can get an old plug from them to use.
0615: Meet Larry & Head to Pearl Harbor to pick up keys from the FISC office.
0700: Arrive at Pearl Harbor. Larry is verifying the key #'s with the FISC list. We had trouble opening the lower gates. Our new way in is through the KAI'S KAI EE complex
0705: Spoke w/ Bob and let him know that we have an outlet plug.
0745: Arrive at drill site. Start to take equipment down.
(Tailgate meeting - 0800 - Signatures)
Larry Dmeany OGDEN
[signature] OGDEN
Jeanie Gleason Salisbury
[signature] SAF

8

0820: Instruments are calibrated.
O_2/LEL - Pentane 44% Alarm at 10
PID - Isobutyl - 100ppm
0850: Had safety discussion w/ FISC personnel and Drillers. Talked about how to shut off drill and equipment if there was an emergency. Had a method to follow. If not followed risk of shock.
0900 - Equipment check - 21.0/0.1 | 0.0ppm
0930 - Equipment check - 21.0/0.0 | 0.0ppm
Mark Garrett onsite (See Roster)
Harry Hui of Investorsite (See Roster)
Mike Tong
0957 - All personnel (Visitors) offsite
1000 - Equipment check 21.0/0.1 | 0.0ppm
1028 - Not getting juice from the 440 main. Mark Garrett is attempting to help us track down the problem or a new power source. Found Source.
1030 - Equip. check 21.0/0.1 | 0.0ppm
1100 - Equip check 21.1/0.0 | 0.0ppm
Core time w/ barrel length = 11.6'

(*) All drawings of measurements will be on the left pages.



	Pull	Run	Rec	Depth
-4"	1	0'-1.2'	10"	1.2'
+10"	2	1.2'-7.6'	5'6"	7.6
+2"	3	7.6-12.6	5'.2"	12.6
+9"	4	12.6'-22.3'	10.6'	22.3
+10"	5	22.3-32.2	10.4"	32.2
-1.0"	6	32.2-42.2	9.0"	42.2
+7"	7	42.2-52.4	10'.7"	52.4
-8"	8	52.4-62.6	9'.6"	62.6
	9		⊕	
	10			
	11			
	12			
	13			
	14			
	15			

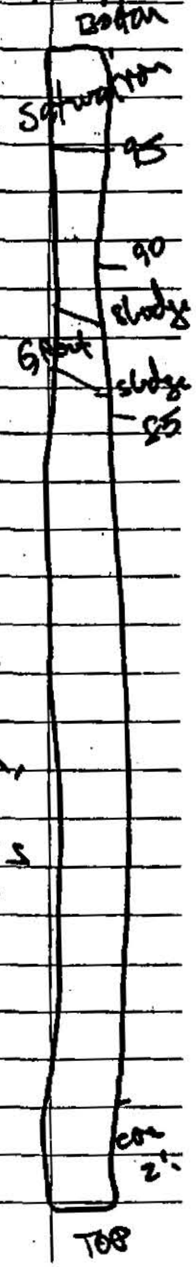
Need 4.4 3 feet to Term

1130 - Equip check 21.1 / 0.0 [0.0ppm
11:40 - Started to push down at
16A - Centerbore.
1130 - Casing is pushed in to 5' - Have to put a New reaming shell on. Will need to use an old reaming shell. - (Shell Manufacturer)
1200 - Equip check 21.0/0.0 [0.0ppm
1220 Collection of first Pull. Will denote collection by ⊙ Symbol & Time, also Pull #.
1230 - Equip check 21.0/0.0 [0.0ppm
1245 - False alarm on the Fire Alarm. Had to stop work to check In.
⊙ Pull 2 [illegible] 1257 21oct98
⊕ Collect Sample B16A-1 (4") 1310 - 21oct98 > 2000ppm
Ⓐ Drager test performed at 12.6' Depth - Negative -
1300 - Equip check 21.0/0.0 [0.0ppm
1315 ⊙ Pull 3 21oct98
11'6" total 1 foot of loss
1330 - Equip check 21.0/0.0 [0.0ppm
1350 Start to push down on Pull 4
Ⓐ Drager at 22.3' - Negative

(10)

B16A

Box 1 -0.0-11'
Box 2 11'-20'3"
Box 3 20'3"-29'9"
Box 4 29'9"-41'2"
Box 5 41'2"-51'0"
Box 6 51'0"-61,2'



Grat Seems
are Very noticeable,
multiple / Must
Note if they are fractures
or if they are Contact
planes.

① Pull 4 1410 21oct98 22.3'
1430 - Equip check 21.2/0.0 [0.0ppm
① Pull 5 1450 21oct98
④ Collect Sample B16A-2 1515
(3") 21 Oct98 (691 ppm)
Ⓐ Dragon tube not attained on tube for
pull 5. Boring had more than 5
minutes to air out, felt it would
not give accurate results.
1530 - begin to push down on #6 pull
Recheck Sample on PID to verify
readings (62.4 ppm)
1605 - Dragon test 42.2' - Negative -
① Pull 6 1600 - 21oct98
1605 - Equip check - 21.1/0.0 [0.0ppm
1625 - Equip check 21.2/0.0 [0.0ppm
1632 - ~~Start~~ Dragon test @ 52.4 -
① Pull 7 (1635) - 21oct98 - (237ppm)
④ Collect Sample B16A3 (3") 21oct98
1705 - Equip Check 21.2/0.0 [0.0ppm
1710 - Dragon test - Negative
① Pull 8 (1712) 21oct98
1718 - Shut down monitoring equipment.
1735 - All personnel off site

[signature]

(11)

Pull	Run	Depth	Rec	L	G
9	5.0	62'6"-67'10"	4'8"	-6"	
10	10.0	67'10-77.6	10.0"	~~[illegible]~~	+4"
11	10.0	77.6-87.3	9'10"		+1"
12	7.6"	87.3-94.9	6'8"	-10"	
13	4'3"	94.9-99.0	4'3"	—	—
14	5'8"	99.0"-104.8"	5'2"	-6"	
15					
16					
17					

Box 7 -	61.2" - 71.6"
Box 8	71.6" - 81.5"
Box 9	81.5" - 91.3"
Box 10	91.3" - 100.8"
Box 11	100.8" - 104.8"

22 Oct 98 82°/Sunny FRR

0615 - Meet Larry at Car & proceed to Pearl Harbor to pick up gate keys.

0700 - Arrive at Pearl Harbor, Larry signs keys out at FISC office.

0705 - leave Pearl Harbor to go to Red Hill site.

0715 - Arrive at Red Hill. Get Drillers in. Proceed to Adit 5 gate. We are setting up a water tank in tunnel 16 to put more water on the barrel.

H&S meeting:

[illegible] OGDEN

[illegible] SAI

[illegible] SAI

Sonny [illegible] OGDEN

0730 - Equip check 21.0/0.0 [0.0ppm

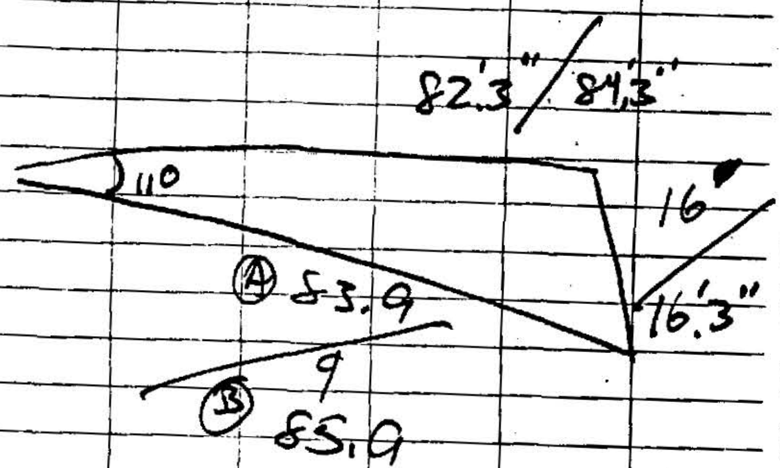
0755 - Equipment all setup. Ready to begin [illegible] down.

0830 - Equip check 21.0/0.0 [0.0ppm

0900 - Equip check 21.0/0.0 [0.0ppm

0930 - Equip check 21.0/0.0 [0.0ppm

FP at 83'9" & 85.'9"



⑦ Pull 9   0947   22 oct 98
1000 - Equip check 21.0/0.00 / 0.0ppm
1010 Drager test 77.6' - Negative
⑧ Pull 10   1006   22 oct 98
☒ Do not believe that the Drager tubes are working. Will continue to use
1030 - Equip check 21.0/0.0 / 0.0ppm
Ⓐ Drager test 87.3 - Negative
⑨ Pull 11 (1041) 22 oct 98
⑩ Collect Sample B16A-4 (3')
1050   22 oct 98   (Sludge)
(Drager tube had a slight discoloration but was not comparable to the color indicator.)
Ⓕ Samples Collected at 83'9" & 85'9"
[redacted] Shut down operations at 11:20 AM 22 oct 98 as agreed upon in WP. Spoke to Kurt at 11:25. He wants me to call him back at 1145 to see what He and Glenn toshinaga have agreed upon. Talked to Kurt. He said to Shutdown & do not do the side borings.
[redacted] Received a call from Harry Hui

⑬

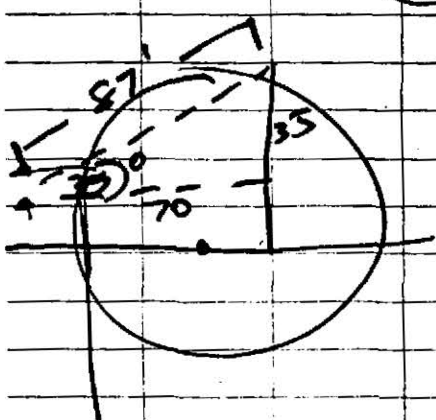
B16R

$(40 \times 75)^2 = 85$

$\sin\theta = \frac{A}{H}$ $\frac{\sin 22^\circ}{75} = H$ 80'

$(35.2.5)^2$ 9.3 B16C = 35°

75 C=85' 87'



at 1247, Harry Hui said we are to finish the center boring & to also do the side bores. I am having the Drill set back in and tubes put back in the bore. Will call Glenn Toshinaga back at 1345 to see if these are the right decisions or not. (We are giving some sample material from 83'.8" to Mark Garrett to have analyzed.

1315 - Prep to start to finish B16A. Will not use Drager from this point on.

Pull 12	(1335)	22 Oct 98
Pull 13	(1425)	22 Oct 98
Pull 14	(1450)	22 Oct 98

1300 - Equip check 21.0/0.0 [74.1 ppm closed off residual air measure.

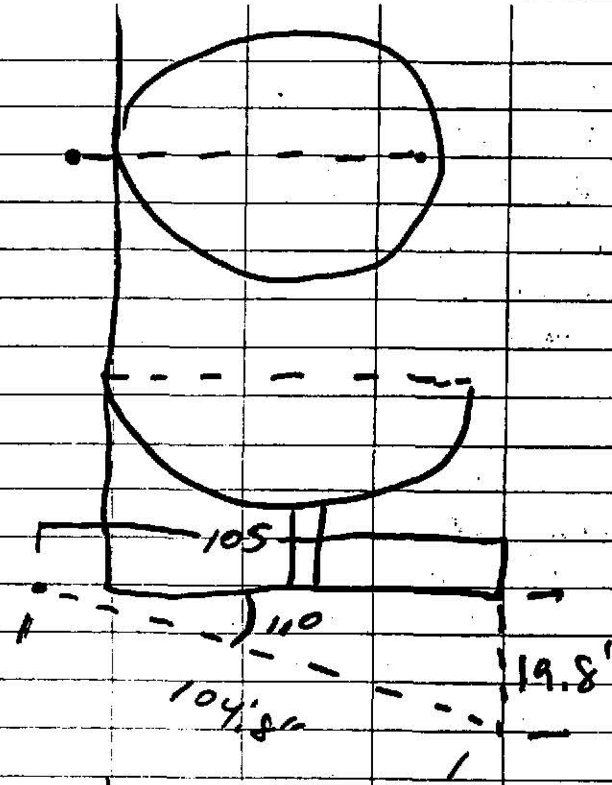
1320 - Equip check 21.0/0.0 [0.0 ppm Mark Garrett came to collect a partial sample from US between 1330 and 1415.

1420 - Equip check 21.1/0.0/0.0 ppm

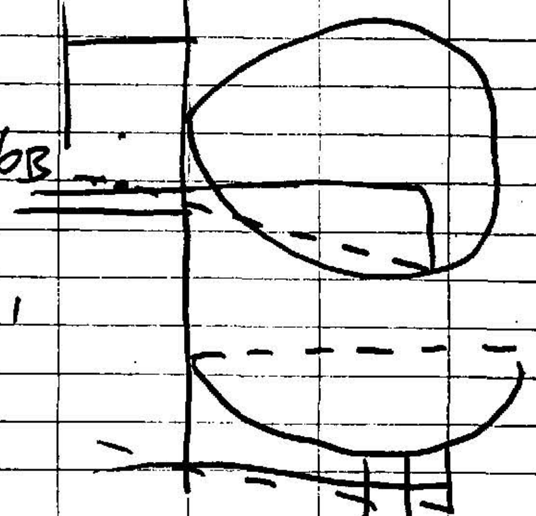
Spoke w/ Glenn Toshinaga @ 1510. He let me know that we

(14)

B16A

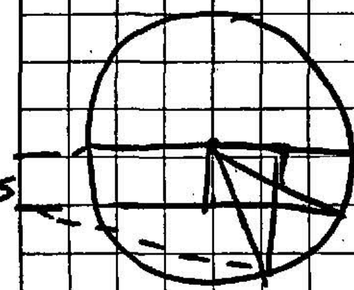


B16B



will put in the side boxes, based on Harry Hui's decision. Will have to contact Harry on the 23rd Oct to find out if we will do tank 6 or another tank.

← New calculation & figures



$\cos\delta \quad \frac{3.3}{8.5}$

$\delta = \tan^{-1}\left(\frac{3.3}{8.5}\right)$

$\delta = 22^{\circ}$

25'

B16B will be at 22° - 76' Depth

1530 - Equipment check 21.1 / 0.0 / 0.0 ppm

Collect Sample 5 (1540) 220098

1600 - Start hole for B16B & put down. Will begin to drill & attempt to recover 20 feet to 30 feet of core by end of day.

(15)

Pull	Run	Depth	Rec	L	G
1	3'6"	0.0"-3.6"	2'8"	-10"	"
2	5.0	3.6 8.6	7'10"	-2"	-
3	10.0	8.6 - 18.6	10.0	—	—
4	10.1	15.6 - 25.7	10.0	-1"	-
5	3'3"	28.7 - 31.10	3'1"	-2"	-
6	5'5"	31.10 37.3	5.0"	-5"	-
7	10.3"	37.3 47.6	10.0"	-3"	-
8	10.0"	47.6 57.6	10.1"	-	1"
9	10.1"	57.6 - 67.8	10.2"	—	2"
10	10.2"	67.8 77.10	10.4"	—	2"
11					
12					

Box 1 0.0 - ~~11.0~~"
Box 2 11.0 - 21.2"
Box 3 21.2 - 30.8"
Box 4 30.8 - ~~40~~.4"
Box 5 40.4 - 50.0"
Box 6 ~~50~~.0 - ~~60.0~~0"
Box 7 ~~60.0~~0 - 69.6"
Box 8 69.6" 77.10

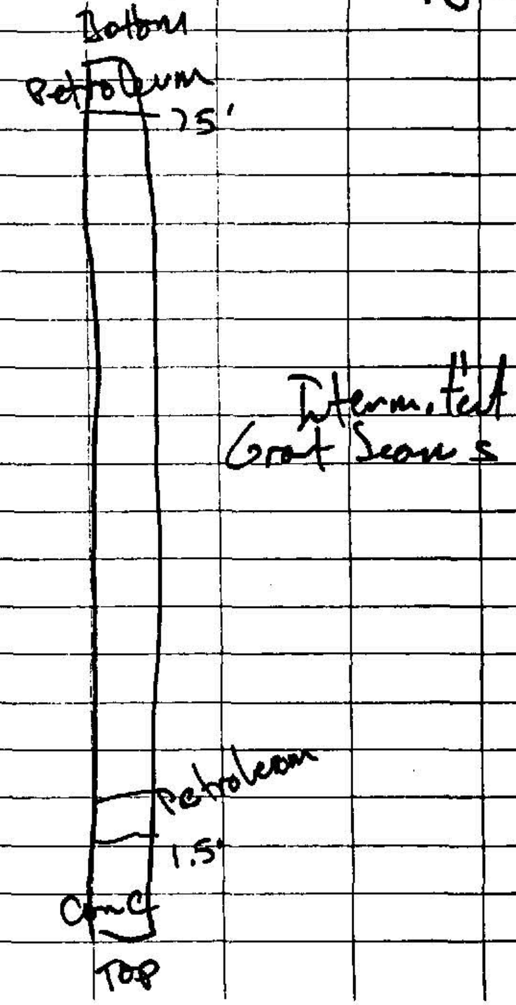
1600 - Equip Check 21.0/0.0 {0.0ppm
1630 - Equip check 21.0/0.0 {0.0ppm
1640 - Collect P-2 22oct98
1643 - Drager test - Positive, 24
Fuel odor on 2nd Run.
* Collect Sample B1613-1 1650
22oct98 (4")
1700 - All personnel off site.

1610 Pull 1 Collected [signature]
22Oct98

JG

All RW Boring for B16B

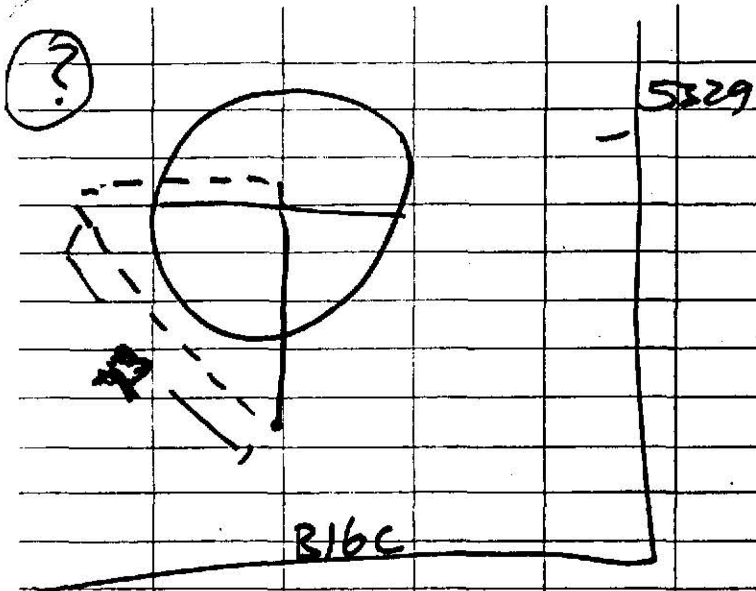
on left side of pg 16



23 Oct 98 85°/Sunny FPR

0615 – met Larry at car & we went to Pearl Harbor to pick up Keys from the FISC office.
0650 – Arrive at the FISC office & pick up Keys.
0659 – leave FISC office & head to Red Hill.
0710 – Arrive Red Hill & prep to Enter.
0718 – Enter Red Hill site Proceed to lower level.
0736 – H&S meeting:
Robert A. Shaw SAI
Gerry Dillon 06 DOSW
Louis Gleason SAI
J.R. Caul 06 DOSW
0746 – Begin push of RW #3
0730 – Equipment startup.
0800 – Equip check 21.0/0.0 [
0810 – RW 3 23 oct 98
0812 – Drager test @ – Negative –
0830 – Equip check 21.0/0.0 [0.0 ppm
@ Pull 4 Collected 0845 23 oct 98

(7)



0848 - Drager test @ 28.7 - Negative
0857 - Pull 5 Collected 23 Oct 98
0905 - Drager test @ 31.10 - Negative
0908 - Sample B16B-2 Collected 0.0 ppm
(2') at 29'8"
0917 - Pull 6 Collected @ 37.3"
0920 - Drager test @ 37.3 - Negative
0921 - Equip check 21.0/0.0 [0.0 ppm
0945. Pull 7 Collected @ 47.6 23 oct 98
0950 - Drager test @ 47.0 - Negative -
1010 - Pull 8 Collected @ 57.6 23 oct 98
1013 - Drager test @ 57.6 - Negative
1017 - Sample B16B-3 Collected @
57.3 (2') 23 oct 98 - 0.0 ppm
1030 · Equip check 21.0/0.0 [0.0 ppm
1036 - Pull 9 Collected @ 67.8 23 oct 98
1040 · Drager test @ 67.8 - positive - (16)
1053 - Sample B16B-4 Collected @
66.2' (3') 23 oct 98 - 205 ppm
1100 - Equip check 21.0/0.0 [0.0 ppm
1108 - Pull 10 Collected @ 77.10" 23 oct 98
1112 - Drager test at 77.10 - Negative -
1118 - Sample B16B-5 Collected @
75.7" (3') 23 oct 98 517 ppm
Terminate B16B @ 77.10

(8)

Pull	Run	Depth	Rec	L	G
1	4.0	0.0-4.0	3'6"	6"	—
2	4.6"	4.0-8.6"	4'8"	—	2"
3	10.1"	~~8.6~~ 8.6-18.7"	10 3"	—	3"
4	10.0	18.7" 28.7"	10.0	—	—
5	10'2"	28.7 38.9"	10.3"		1"
6	10'3"	38.9"-49.0"	10.0	3"	
7	3'9"	49.0-52.9	3.6	3"	
8	3'1"	52.9-55.10	2'.11"	2"	
9	10.0	55.10-65.10	10.0	—	—
10	10.1"	65.10-75.11	10'2"	—	2"

Box 1 - 0.0 - 10.2"
Box 2 10.2" - 20.0"
Box 3 20.0 29.9"
Box 4 29.9" - 39.7"
Box 5 39.7" 49.0
Box 6 49.0 - 60'10"
Box 7 60'.10" - 69.4"
Box 8 69'.4" - 75'.11"

1137 - Begin Setup on B/6C - Will have to go to top to talk to Kurt & Get supplies. (All Pulls and Boxes will be Noted on left side of page 19)

1140 - F. Esquibel leaves lower tunnel to call Kurt & Get more core boxes.

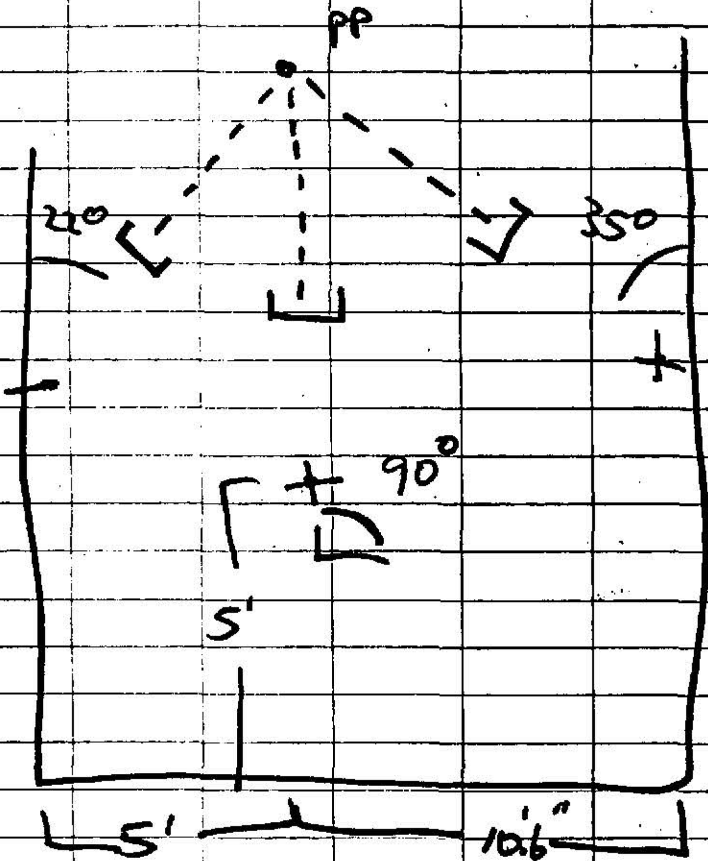
1145 - Up top. Call Kurt. No one is at office, I get an answering machine, leave message for Kurt to let him know what we are doing.

1210 - Back in lower tunnel. Bob, Travis, Larry all leave the site to go to Adit 3 Entrance to Decon the collection tubes.

1300-1306, Lt Comander ~~Buff~~ Berry on site. Wanted to note. So noted on Visitor Center.

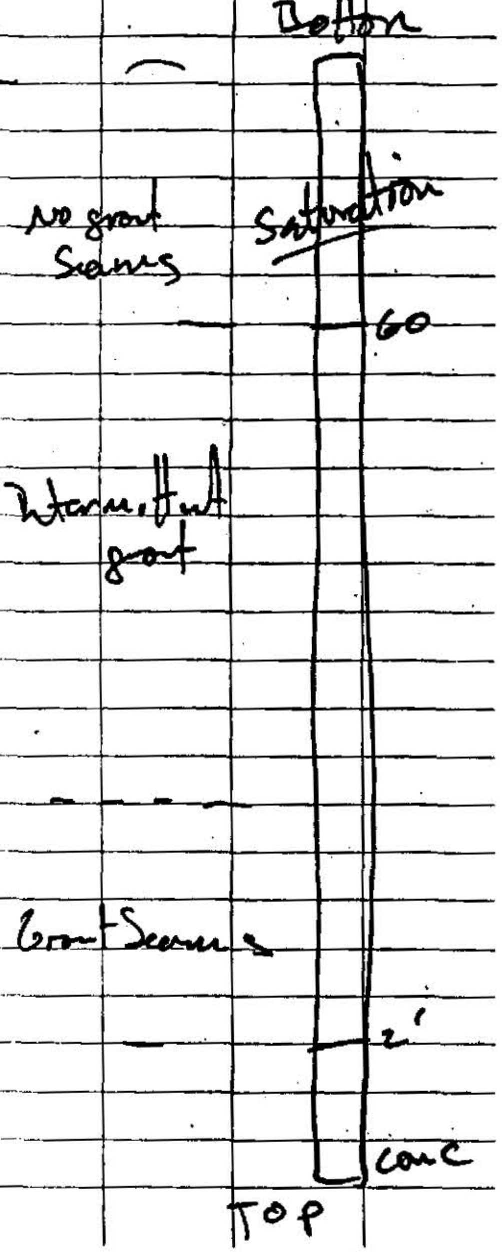
1325 - Larry, Bob & Travis back on site, Could not get steam cleaner to work, Had to wash all components by hand. Circuit breaker kept kicking off.

Drill position is off of a selected pivot point.



1330 - Equip check 21.0/0.0/0.0ppm
1335 - Begin pushdown of 316C
~~1350 - Collect Pull 1 @ 4.0' 23oct98~~
SR
1410 - Had to stop to replace two pieces of Rod casing. The threads welded together.
1412 - Larry Demoss offsite to pick up coolers from Hou. office.
1413 - Collect Pull 1 @ 4.0" 23oct98
1416 - Drager - Negative
1425 - Collect Pull 2 @ 8.6" 23oct98
1429 - Drager Negative
1430 - Equip check 21.0/0.0/42.1ppm
1445 - Collect P3 @ 18'7" 23oct98
1500 - Equip check 21.0/0.0/0.0ppm
PID will give variable readings during drilling. Venting from bore hole is most likely the cause.
→ Larry Demoss still offsite.
1510 - Collect Pull 4 @ 25.1" 23oct98
1515 - Drager test @ 25.7" - Neg -
1530 - Equip check 21.0/0.0/0.0ppm
→ Larry Demoss still off site.

B16C



1535 - Collect Pull 5 @ 38.9" 23 oct 98
1540 - Drager test @ 38.9 - Negative
1545 - Sample B16C-1 Collected at 38.6" (3") 23 oct 98 0.0ppm
1555 - Collect Pull 6 @ 49.0 23 oct 98
1600 - Drager test - Negative -
1605 Sample B16C-2 Collected @ 48.7" (3") 23 oct 98 0.0ppm
1620 - Collect Pull 7 @ 52.9" 23 oct 98
(*) No Drager test used to test pull 7. Will resume use of Drager tubes on pull 8.
1620 - Equip check 21.0/0.0 [0.0ppm
1621 - Collect Pull 8 @ 55.10' 23 oct 98
(*) Will not Collect Drager at Depth.
1635 - Drager test - Negative -
1640 - Collect Sample B16C-3 @ 55.7" (3") 23 oct 98, 0.0ppm
No odor or visible products in boring to depth. PID has random alarms. Believe to be from fuel being pumped into tanks. Have fuel hoses out in Tank 15 and Center track area.

(21)

1645 - Cease operations
1700 - All personnel off site

[illegible]

26 Oct 98 88°/Rain FRP

0615 - Meet Larry at the car & proceed to Pearl Harbor to pick up keys.
0650 - Arrive at Pearl Harbor. Pick up keys at the FISC office.
0655 - Leave Pearl Harbor to Head to Red Hill.
0715 - Meet Drillers at Red Hill & Proceed to Adit 5.
0734 - Enter Adit 5 & proceed to lower tunnel.
0740 - Sign in at Security office.
0750 - Calibrate Machines -
LEL / O_2 - steady at 34 / 75 ppm
PID - Spanned at 100.0 ppm Ico
0800 - H&S meeting
Robert Abell SRT
Travis Gleason SAI
Larry Dilkes OGDEN
[illegible] OGDEN
0805 - Begin Push of Pull #9. Will start at the 55' 10" mark.
0825 - Collect Pull 9 @ 65' 10"
Strong Odor

0830 - Collect Sample B16C-4 ②
60'00" (6") 26 Oct 98 >2000ppm
0835 - Dragon test - Negative
@ Mark Carrot on Site.
0858 - Collect RH 10 @ 75'11"
(Strong Odor) 23 Oct 98
0915 - Collect Sample B16C-5 ②
67'0" (4") 26 Oct 98 >2000ppm
0920 - Dragon test - Negative -
0930 - Equip Check 21.1/0.0 [78ppm
Vapors main from open boring.
0940 - F. Esquibel up top to Call
Kurt, let him know how things
are & to prep samples for Shipment.
1025 - F. Esquibel, back in lower
tunnel. Larry on phone to Mark
Carrot. He wants us to stop our move.
A meeting is called for 1400. He will
let us know where we are going to go to,
the decision is not to go to Tank 6.
They will be deciding to go to tank 8
or tank 4.
1030 - Continue to break down
equipment & prep for the move.

1145 - Breakdown is complete. We are moving all core & excess materials to the top.
1230 - Finished w/ the core movement. Up top, we contact Eric Heiland to find out about Bailers & 1" PVC. (Earth tech bailers) Larry offers to go to the Earth Tech warehouse to pick up Bailers & the water level meter from Honolulu (GIES) office.
1231 - Glenn Yoshinaga on site. We discussed Samples, Core, Grout and that we should make some recommendations to EISC on how we should do things. 1) Based on observations, I don't believe water or product will migrate. 2) Also, Glenn asked about sample changes, believe my sample containers is settled. Question between Glenn and Curt is "do we run a TCLP"?
1425 - Glenn Yoshinaga off site.
1440 - Still waiting for word on what Mark Garrett and the PJSC group want to do.

Measurements & Depths for the second boring set will be in 1/10's of a foot. First set of borings for B16 are in feet and inches.

1520 - Got the Word from James Gannon. We will be boring 3 holes at tank #9.

1523 - Begin to prep tank site. We will set hole & push down till 1830 tonight.

1610 - Larry Demoss back on site. He acquired the Water/oil interface probe from the Honolulu office. He also got the bailers from the E-tech Cor. Drop Warehouse.

1630 - Begin to set in the base for the drill rig.

1700 - System Setup. Making final checks & putting the pilot hole down.

1705 - Head to Security office. Mark Garret wants us to call him.

Mark Garret wants to talk on the 27th at 14:00pm

last 4-A 3-C
3-B

Pull	Run	Depth	Rec	L	G
1	3.5'	0.0 - 3.5'	2.0'	1.5'	—
2	4.8'	3.5 - 8.3	9.5'	0.3'	—
3	2.6'	8.3 - 10.9'	2.5'	0.1'	—
4	9.7'	10.9 - 20.6'	10.1'	—	0.4'
5	9.9'	20.6 - 30.5'	9.9	—	—
6	9.9'	30.5 - 40.4	10.2'	—	0.3
7	10.3'	40.4 - 50.7	9.8'	0.5'	—
8	9.8	50.7 60.5	9.9'	—	0.1'
9	4.5	60.5 - 65.0	3.9'	0.6'	—
10	4.2	65.0 - 69.2	3.0	1.2'	—
11	6.9	69.2 - 76.1	6.7	0.2'	—
12	2.9	76.1 - 79.0	3.4	0.5	—
13					

BOX 1	0.0 - 11.3
BOX 2	11.3 - 20.9
BOX 3	20.9 - 30.6
BOX 4	30.6 - 40.0'
BOX 5	40.0 - 50.7
BOX 6	50.7 - 60.9
BOX 7	60.9 - 74.0
BOX 8	74.0 -
BOX 9	
BOX 10	

1725 - Begin to push down the B09-A Boring.
1730 - Equipment set-up. low bat on both pieces of equipment.
1750 - Recover Pull 1 B09A @ 3.5'
1803 - Drager Test @ 3.5' - pos - 10
1805 - Equip check. Low bat has stopped O_2/LEL. PID at steady Pleat of low bat Warning.
1808 - Collect B09A-1 sample @ 3.2' 3/10 of foot collected 26 Oct 98
Sample B09A-1 collected at Concrete Basalt Interface. Apparent Fumes.
1820 - Recover Pull 2 @ 8.3' B09A
1825 - Drager test @ 8.3' - Pos - 24
1828 - All personnel off site.
1845 - Drop Keys off at FISC
1900 - Leave Pearl Harbor & Proceed Home.

[signature]

— 27 Oct 98 — Meeting Notes
& questions

— Lab (TA) 28 day —

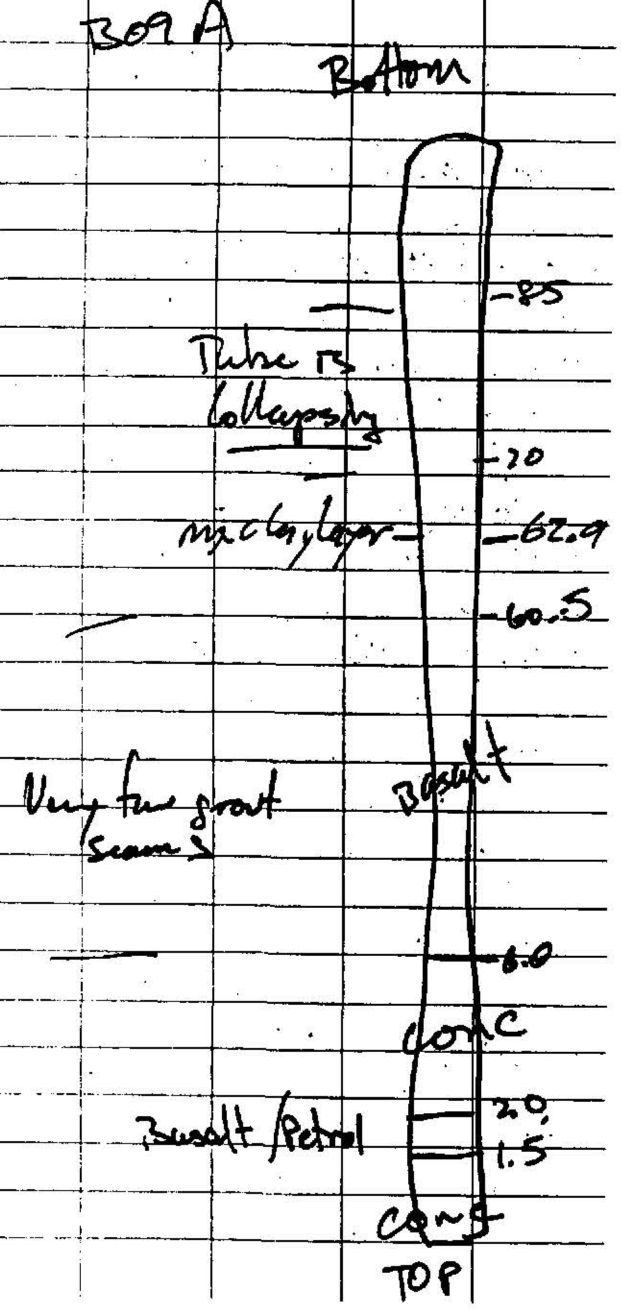
Spent tanks -
- all have had leaks -
⊕ Additional Sampling ?
They will contact people to
advise of potential leaks.

(Need to make sure Samples
are out tomorrow morning)

27 Oct 98 70°/Rain FZ8

0600 - Meet Larry at the Car & proceed
to Pearl Harbor
0640 - Arrive at the FISC building. Take
last 9A, 3B, 3C Coreboxes into
the conference room so FISC personnel
can look at them.
0653 - Leave the FISC building & proceed
to lower gate at Red Hill.
0704 - Arrive at Red Hill gate. Drillers
are right behind us.
0710 - Arrive at Adit 5 door. Prep to
go below & begin start up. Believe
we can finish B09A today.
0714 - Call Kurt. Not in office today.
I will send out the samples today.
0740 - Equipment Calibrated & Set.
0745 - H&S -
Jerry [illegible] OGDEN
[illegible] SAI
[illegible] SAI
0800 - F. Escovido went to top tunnel to
place samples in jars & to talk to
Mc [illegible] at Quanterra Labs.

28



0820 - Recover Rill ③ @ 10.9' B09A
27 Oct 98
⊕ No Drager at this level
0840 - Recover Rill 4 @ 20.6' B09A
27 Oct 98
0850 - Mark Garret came into lower tunnel to let me know some of the questions to be asked. Tried to call Kurt to ask how he wanted some of the answered. He was not in office today.
0908 - Recover Rill 5 @ 30.5' B09A 27 Oct 98
0911 - Drager test @ 30.5' - Neg -
0920 - Visitors on site / Not past yellow caution. Drill is in operation. Once drill has stopped I will allow them past. (left site before push was finished)
0925 - Equip check - 21.1/0.0 PID is wavering. Went to Fault 2 I re calibrated, believe the PID to be not excepting the calgas. Gas may be low in bottle.
0930 - Recover Rill 6 @ 40.4 B09A 27 Oct 98
0936 - Drager test @ 40.4 - Negative -
1000 - Equip check 21.0/0.0 PID has 0.0 / Do not believe to be set.

49-OTF 100-185
172.101-CH
474-6276 Mark Garrett

471-5860 Harry Hui
Eric Lee

471-2390 James Gannon

545-2462 OGDE - Honolulu

523-8879 Z-Tech

Mtg @ 1400 27 Oct 98 Wong
Wayne Yoshimura - Glenn Yoshidaga - Layton Sojander
James Gannon - Bron Knott - Buddy Hanna
Alex Konnan Timothy Lanyon
Questions -

DCI
1500-969-4922

Fu/Ex 4/13 330

ON #! NO!!!

10-26-00

L. DeMoss

LeFT Nashville Delta airlines
ARRived in OAHU AT 1400 Local
Time. GoT CAR And luggage
And Drove to house.

Larry DeMoss

10-27-00

Larry DeMoss

0800 picked up CAR PASS And
ID.

0830 Called Jim Gammon
AT 473-2390 NOT in
LeFT message

0945 Called Jim Gammon
NOT in. LeFT Message
Drove TO OGDEN Office
met with STEFFANY TOMA.
Picked up supplies That
had ARRived AT the office.
SeT up meeting with her
for monday AT 2:00 PM

1030 Called Jim Gammon
SeT up 12 oclock meeting
AT his office.

1150 AT Building 1757 for meeting

keys COAST Guard housing Adit 4&5
Key chain Link gate & Adit 6
Prison gate to Adit #6
DAN
John

EDG

JHV. AKAZAWA Electrical
Phone 473 4236

MARK GARRETT
Phone 473-0133

Went to tunnel and checked out Adit 6-5 and MOSAS AREA

10 29 00

Picked up Lance Williams at Airport. Took him to hotel.

Met with drill crew
Bob Sheldon
Harold

10.30

0700 Met with Bob. Talked over Job

0730 Left to pick up Lunch picked up Lance Drove to Office equipment That I shiped not in. Done to Fisc office Talked with J. Gammon Got keys to gate went to Adit 5 went into MOGAS Area Chuantor to diesel side not working. Went Back to office Met with S. Toma. Talke over Job. Took Lunch to Airport to get Car. Went to store picked up a cooler and work table

Lerry Dun

10.3 kw

Demoss Partly cloudy warm

0700 Met with Drill crew. The were going to xpress Trucking company to pick up Equipment

0730 I Arrived at Building 1757 to pick up Keys
R53A
R57A PRISON GATE
R59A
R60A

Moved Equipment into Lower Tunnel Through Adit #6. Hose on Door Broke at 1640. PWC person came out and door broke Called Red Hill control Room.

1740 Left S.T.O
Took Keys to 1757

11-1-00
DeMoss. L. Williams
0620 Arrive at FISC to get keys
0630 Got keys talked with Jim Gammon. Told him that Adit #6 door broken
0700 Went to Bykmart picked up a cooler for samples and oil dry for floor
0715 Met at prison gate
L. DeMoss - Lance Williams
S. Toma Bob Sheldon
Harold
Elevator at Adit 5 still down had to go to Adit 3 to sign in gate to Adit 3 locked, waited to get in.
0800 Carried in rods.
0840 Drill crew carried boom truck back
0930 Drill crew returned carried more equipment in.
1100 Talked with Shu A. Said all power 480 volt

11-1-00
Hooked up electrical. Plug in tank 17+18 area would not turn on. had to move cable to tank 19+20 area
Man from FISC came to fix electrical supply. Could not fix. Unable to start drilling. Will send Shu over tomorrow.
1641 Talked with Jim Gammon about lights + power. Set up drill.
1740 Left site
Turned in keys at 1757

Larry D Mar

11-2-00 L. DeMoss B. Sheldon
L. Williams H. Holmes

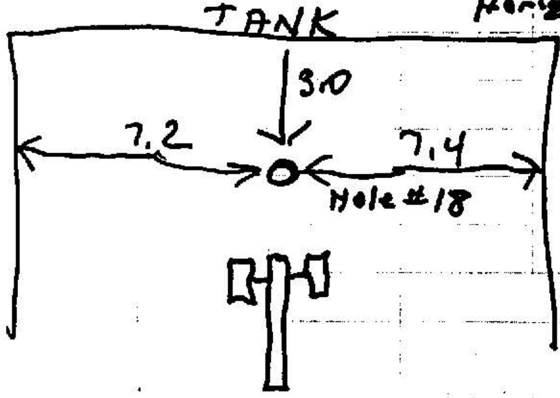
0630 Arrive at Fisc to get Keys
Picked up Keys to Adit 6
Prison gate and Adit 3.
Drove to Adit 3 to sign in. No
sign in sheet. Talked with
station operator

0700 At prison gate waiting on Drill crew
Drill crew went to get Hydralic motor

0815 Drill crew arrives

0835 Arrive in lower tunnel
Drill crew repairing Air compressor
Shu A. Fisc Electrician came by
And fixed lights. Breaker had
Triped

1015 Drill crew got compressor working
Set up Drill Rig at Tank
18. Drill set at 13° off
Horizonal



H CB 7.8
N CB 7.6
11-2-00

1100 Started Drilling
Reamed 5.0 ft of H casing in
Started coring @ 0

Pull	Depth	Ran	Rec	Loss Gain
1	6.6	6.6	4.6	2.0

Reamed H casing to 6 ft
Pulled casing out of the hole and
installed 6 feet of Schedule
80 steel casing. Grouted pipe
in with portland cement grout.
Let grout set 2 hours. Then
~~Began N~~ curing. 5.0 washed
inside of casing out

1640 Left site.
Droped off Keys at Fisc

11.3.00

L. DeMoss L. Williams S. Toma
Bob Sheldon H. Holmes

0630 Pickup keys AT FISC
0700 AT Adit #6
0710 Called INTO Gauge STATION Told us NOT TO pump until he oks. TAlked with Jim Gammon Told him of progress.
0720 SAFETY MEETING
0730 Drill crew cleaned Floor
0745 STARTed Drilling
0900 CoreBarrel broke. Seals wedged in Barrel.
1015 STARTed Drilling
1050 STOPed Drilling Bob called in
1135 STARTed Drilling
1715 STOPed Drilling for The day Secured Area pumped OUT SUMP
1730 LEFT Site
TUrned keys IN AT FISC

Pull	Depth	Ran	Rec	Loss	Gain
2	6.9	0.3	0.1	0.2	
	100% DNR				
3	10.7	3.8	4.2		0.4
4	16.0	5.3	5.2	0.1	
5	21.1	5.1	5.2	0.1	
6	26.3	5.2	5.2		
7	31.4	5.1	5.1	100% Drill end OF RUN	
8	36.4	5.0	5.1	0.1	
9	41.6	5.2	5.2		
10	46.7	5.1	5.1		
11	51.9	5.2	5.2		
12	57.1	5.2	5.2		
13	62.2	5.1	4.8	0.3	
Rods	chattering		having to ROTATE Slow		
14	67.1	4.9	5.2		0.3
15	72.3	5.2	5.2		
16	76.7	4.4	4.1	0.3	

11.6.00

L. Demoss L. Williams S. Toma
B. Sheldon H. Holmes

0620 Arrive at F1SC to get keys
0730 Arrive at Adit C.
Talked with Alex about
water in Elevator pit.
0800 Arrive at Tank 1P
0810 Jim Gammon called, gave
him update on Drilling
Bob S. Brought in Fan and
hooked it up. unable to get fan working
0930 Started Drilling
Drilling slow rods vibrating
Drill hole dry. Drill water lost
1250 Water swivel Broken, Leaking
Drill Rig Down.
1350 Started back Drilling
1625 called gauge station, need to
pump sump operator gave OK
1650 sump Dry cut pump off
called operator.
1735 Stoped Drilling
1750 Left site
Turned in keys

Pull	Depth	Ran	Rec	Loss	Gain
17	81.6	4.9	5.2		0.3
18	~~86.8~~ 86.9	5.3	5.2	0.1	
19	89.4	2.5	2.9		0.4
20	94.4	5.0	5.2		0.2
21	99.3	4.9	4.9		
22	99.7	0.4	0.6		0.2
23	104.9	5.2	5.2		
24	110.2	5.3	5.3		
25	115.5	5.3	5.3		
26	121.5	6.0	5.3	0.7	

Small open voids at end of run

11.7.00
L. Demoss L. Williams
B-Sheldon H. Holmes
0630 Arrive at FISC Pickup Keys
Put Daily work on Board
0650 Arrive at gate
0745 Arrive at Tunnel
~~Started Drilling~~ SLD
Working on Drill
0805 Started Drilling

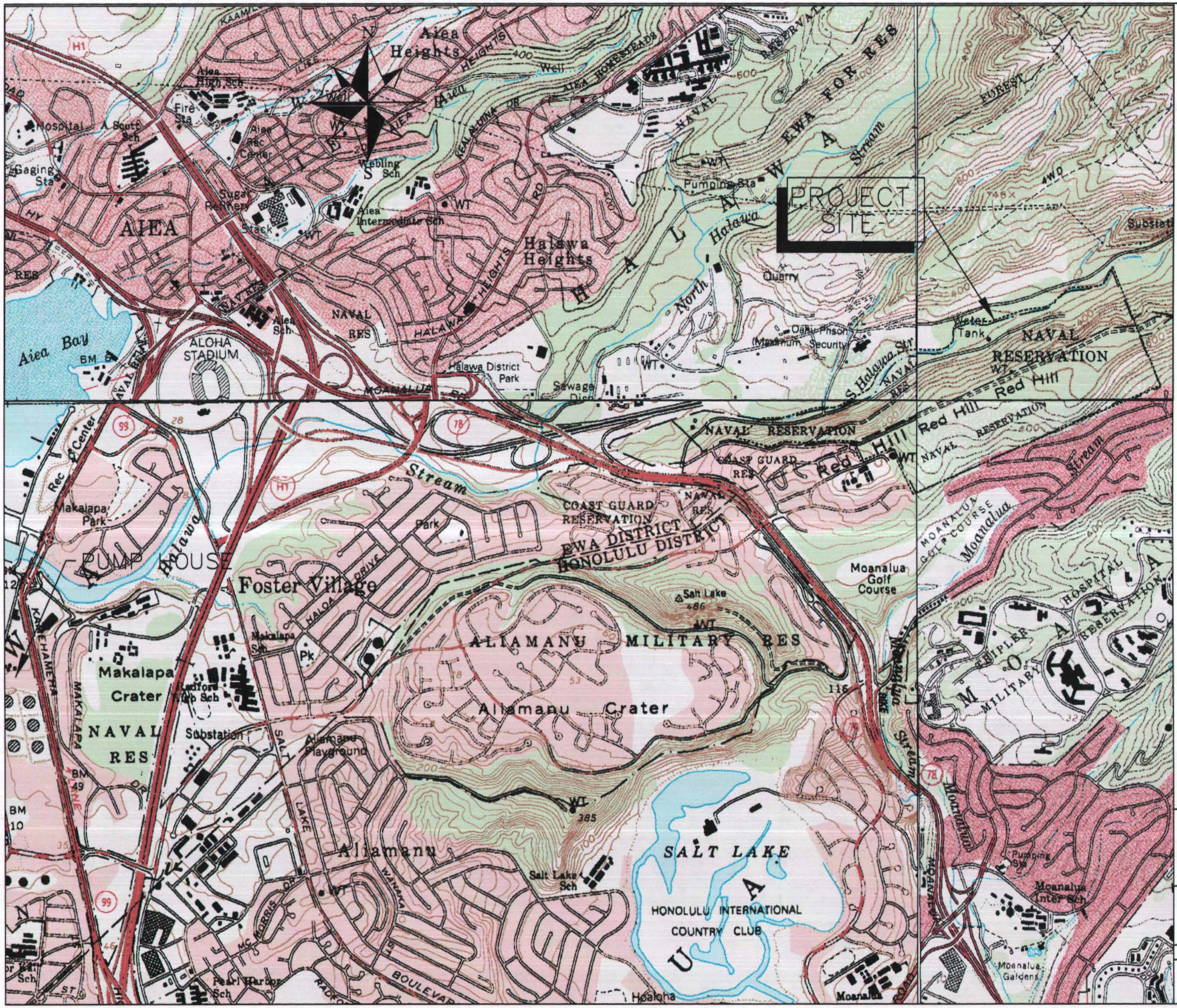
Pull	Depth	Ran	Rec	Loss	Gain
27	126.0	4.5	5.0		

Bottom of hole 126.0
100% DWL
Installed 1½" PVC well
15 feet screen
Pulled Rods.
1040 Move to TANK 17 and Bolted
Down Drill
1130 Started Reaming H Casing
Began H coring at 0.0
100% DWR

Stickup 10.4

Pull	Depth	Ran	Rec	Loss	Gain
1	7.3	7.3	2.9	4.4	

Intermitten Drill water Return
Soft 3.0-7.3
Pulled casing and Rods and
Grouted ~~to~~ 6 feet Sch 80 Steel
casing
1400 Elevator Down unable to
get out.
1505 Climbed out by Ladder
1530 Left site
Turned keys in at FISC



SCALE: 1" = 1500'

FIGURE 1-1

SITE LOCATION
RED HILL BULK FUEL
STORAGE FACILITY
FLEET INDUSTRIAL SUPPLY CENTER

OGDEN

PROJ. NO. 1-1019-0229-0171
DRWN. BY MJD 5-10-99
CHKD. BY EGW 5-10-99

FILE NAME:	REV NO	DESCRIPTION	BY	DATE
SectionLocation1				

LEGEND

———	AQUIFER SYSTEM BOUNDARY
—·—·—·	AQUIFER TYPE BOUNDARY
30201111	AQUIFER CODE
(11111)	STATUS CODE

NOTE

1. SOURCES: MINK & LAU (1990); DLNR (1998); USGS (1983)

SCALE: 1" = 2000'

FIGURE 2-1

AQUIFER SYSTEM AND TYPE BOUNDARIES
RED HILL BULK FUEL STORAGE FACILITY
FLEET INDUSTRIAL SUPPLY CENTER

OGDEN

PROJ. NO. 1-1019-0229-0171
DRWN. BY MJD 8-17-99
CHKD. BY EGW 8-17-99

FILE NAME:	REV NO	DESCRIPTION	BY	DATE
AquiferSystem1				