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NSA PANAMA CITY
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CONTAMINATION ASSESSMENT REPORT FOR SITE G300 NSA PANAMA CITY FL

8/4/1997

BROWN AND ROOT

CONTAMINATION ASSESSMENT REPORT FOR SITE G300

COASTAL SYSTEMS STATION PANAMA CITY, FLORIDA

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Brown & Root Environmental
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Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
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EXECUTIVE SUMMARY

Brown & Root Environmental (B&R Environmental) has completed a Contamination Assessment (CA) at the above-referenced facility in accordance with the requirements of Chapter 62-770, Florida Administrative Code (FAC). The assessment report was submitted to the Florida Department of Environmental Protection (FDEP) for approval.

B&R Environmental performed the following tasks during the CA:

- Reviewed available Navy documents to identify potential sources and receptors for petroleum hydrocarbons in the vicinity, to evaluate private potable wells in a 0.25-mile radius and public water supply wells within a 0.50-mile radius, to locate nearby surface water bodies, and to determine surface hydrology and drainage;
- Reviewed previously prepared Closure Assessment for Tank G300 to determine appropriate boring locations and monitoring well placements;
- Conducted site survey to identify utilities and to construct a site plan;
- Performed direct push investigation which included the installation of 15 soil borings for collecting soil and groundwater samples for field screening of total petroleum hydrocarbons - diesel range organics (TPH-DRO) using a gas chromatograph.
- Installed four shallow permanent monitoring wells to approximately 15 feet below land surface (bls) and installed four shallow piezometer wells to approximately 14 feet bls.
- Collected groundwater samples from the permanent monitoring wells for laboratory analysis of the Kerosene Analytical Group parameters;
- Collected three soil samples for laboratory analysis of the Kerosene Analytical Group parameters;
- Surveyed monitoring well top of casing elevations and collected depth to groundwater measurements to evaluate the groundwater flow direction and gradient;
- Performed slug testing on three monitoring wells to evaluate the hydraulic conductivity of the surficial aquifer; and

Laboratory analytical results for groundwater samples indicate that the dissolved hydrocarbon concentrations meet the criteria established for No Further Action (NFA), as established in the FDEP's, October 1990, "No Further Action and Monitoring Only Guidelines for Petroleum Contaminated Sites", for all constituents of the Kerosene Analytical Group.

Evaluation of soil assessment data indicates that "excessively contaminated" soil, as defined by Chapter 62-770.200, FAC, is present at the site. The areal extent of the excessively contaminated soil is limited to

a small area adjacent to the southwest corner of building 300, and extends approximately 3 to 4 feet below the building footer. The proximity to the building footer makes it impracticable to remove the soil without adversely impacting the structural integrity of the building.

Although the dissolved hydrocarbon concentrations meet the criteria established for NFA, the site does not qualify for NFA due to the presence of excessively contaminated soil. Since it is impracticable to remove the excessively contaminated soil, it is recommended that a Monitoring Only Program (MOP) be implemented at the site. The MOP should include 6 months of monitoring for Total Volatile Organics and Polynuclear Aromatic Hydrocarbons.

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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

A Contamination Assessment (CA) was conducted by Brown and Root Environmental (B&R Environmental) for the US Navy (Navy) Southern Division Naval Facilities Engineering Command under Contract Task Order 0008, for the Comprehensive Long-term Environmental Action Navy (CLEAN III), Contract Number N62467-94-D-0888. The CA was conducted at Site G300 located at the Coastal Systems Station (CSS) in Panama City, Florida. The Florida Department of Environmental Protection (FDEP) Facility Identification Number is 038518667.

The purpose of this CA was to determine the nature and extent of petroleum hydrocarbon impacted soil and groundwater in accordance with the requirements of Chapter 62-770, Florida Administrative Code (FAC). On September 16, 1996, a discharge of diesel fuel to the ground surface was identified near the vent lines of a 150-gallon day tank used to store diesel fuel for a generator in Building 300. The discharge was identified by an inspector from the FDEP who was at the facility to oversee the removal of a 2,500-gallon underground storage tank (UST), which supplied diesel fuel to the day tank. A Discharge Notification Form was submitted to the FDEP by the CSS Environmental Department on September 17, 1996 and is included in Appendix A.

An Initial Remedial Action (IRA) was conducted to remove "excessively contaminated soil," as defined by Chapter 62-770, FAC, near the vent line for the day tank, however, the IRA was abandoned on September 23, 1996 after it became apparent that the amount of "excessively contaminated soil" may have been the result of various day tank overfills since 1972. Correspondences from the CSS Environmental Department concerning IRA removal activities are included in Appendix A. The 2,500-gallon diesel UST which had supplied diesel fuel to the day tank was removed on September 17, 1997. A Tank Closure Assessment Report was completed for the removal of the diesel UST and is provided in Appendix B.

A CAR Summary Sheet, as required by Chapter 62-770, FAC is included in Appendix C.

1.2 SITE DESCRIPTION

1.2.1 Location

The CSS facility is located on the western shore of St. Andrew Bay in Panama City, Bay County, Florida. The facility is bounded by US Highway 98 to the north, St. Andrew Bay to the east, State Road 292B (Magnolia Beach Road) to the south, and State Road 292 (Thomas Drive) to the west as shown on Figure 1-1. Specifically, the CSS facility is located within Section 33 of Township 3 South, Range 15 West and Section 4 of Township 4 South, Range 15 West, as shown on United States Geological Survey (USGS) Panama City Beach, 7.5 Minute Series Quadrangle and presented as Figure 1-2.

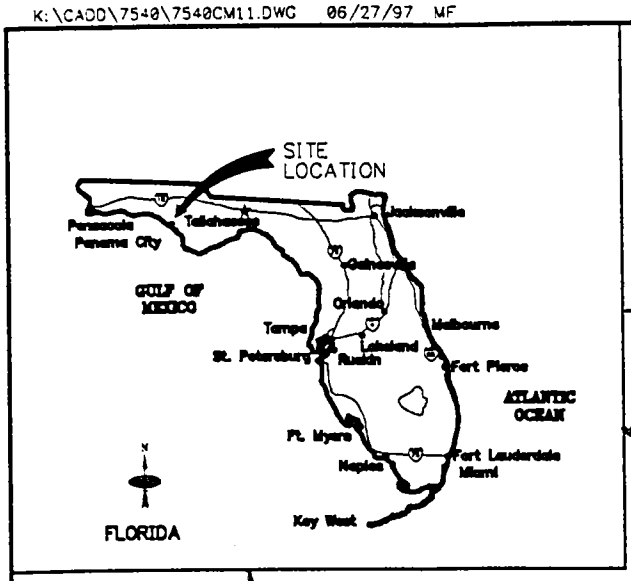
1.2.2 Topography and Drainage

The topography at the site is relatively flat with a ground surface which gently slopes towards the west. The site is located at an elevation of approximately 12 feet above National Geodetic Vertical Datum (NGVD). Locally, the ground surface grades toward Alligator Bayou located approximately 350 feet south of the former diesel underground storage tank (UST) system for Building 300. The altitude of the ground surface decreases by approximately 10 feet from Building 300 to Alligator Bayou.

The land surface at the area of the former diesel UST has a grass surface cover which allows rainfall to infiltrate into the subsurface. Precipitation run off drains toward a storm drain located approximately 60 feet northwest of the site. The nearest surface water body to the site is Alligator Bayou which is located approximately 350 feet south of the former diesel UST. Alligator Bayou is designated as a Class III surface water by the State of Florida, suitable for fish and wildlife propagation and water sports (ABB Environmental Services Inc., RCRA Facility Investigation (RFI) Report. 1995).

1.2.3 Regional Hydrogeology

The regional hydrogeology of CSS Panama City is described in the RFI Report (ABB Environmental Services, Inc., 1995). According to this report, surficial deposits at CSS are Pleistocene to Recent coastal plain sediments of marine and estuarine origin. They predominately consist of quartz sand, clayey sand, and gravel. These deposits vary in thickness from 70 to 100 feet in Bay County. The surficial aquifer is located within these deposits. Underlying the surficial deposits is the Intercoastal Formation of middle Miocene to late Pliocene. The Intercoastal Formation is composed of sand and poorly consolidated limestone interbedded with discontinuous clay and low permeability sandy limestone. This formation is



DEER POINT LAKE

WEST BAY

NORTH BAY

COASTAL SYSTEMS STATION

PANAMA CITY

PANAMA CITY BEACH

EAST BAY

ST. ANDREW BAY

TYNDALL A.F.B.

N

6600 0 13200

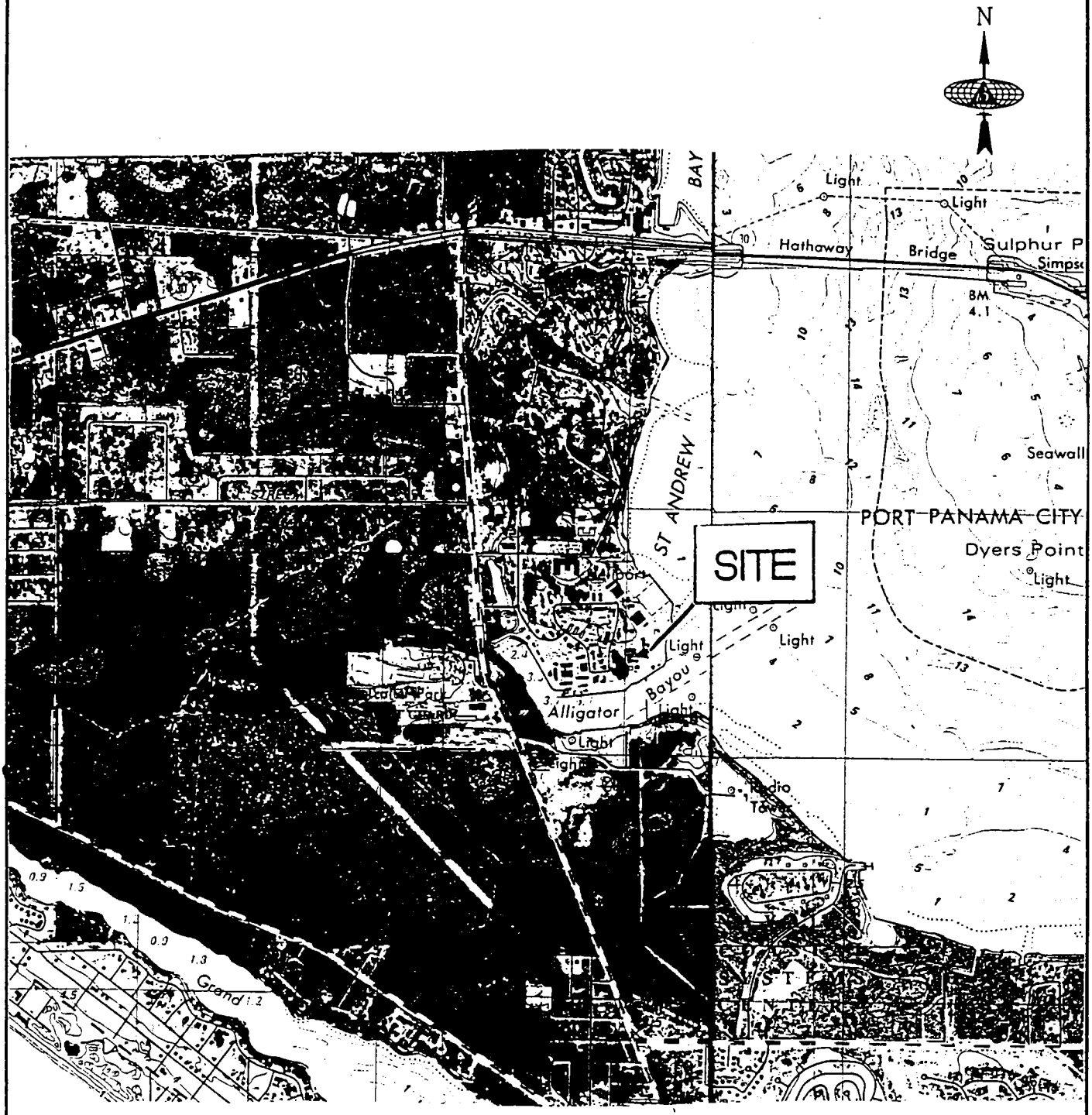
Scale 1" = 13200'

MODIFIED RCRA FACILITY INVESTIGATION REPORT
(ABB ENVIRONMENTAL SERVICES, INC. 1995)

SITE MANAGER: PEC	CHECKED BY: RMC
DRAWN BY: GMF	DRAWING DATE: 6/26/97
SURVEYED BY: -	SURVEY DATE: -
SCALE: 1"=2.5MILES	
CAD DWG. NO.: 7540CM11	PROJ. NO.: 7540

Brown & Root Environmental

FIGURE 1-1
SITE VICINITY MAP
SITE G300
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA



SCALE 1:24 000

1 .5 0 KILOMETERS 1 2
1000 0 METERS 1000 2000
1 .5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10 000
FEET

SITE MANAGER: PEC	CHECKED BY: RMC
DRAWN BY: GMF	DRAWING DATE: 6/26/97
SURVEYED BY: –	SURVEY DATE: –
SCALE: SCALE AS SHOWN	
CAD DWG. NO.: 7540CM12	PROJ. NO.: 7540

Brown & Root Environmental

FIGURE 1-2
SITE LOCATION
SITE G300
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

approximately 150 feet thick at CSS Panama City. The lower beds of the Intercoastal Formation are part of the Floridan aquifer system.

Groundwater at CSS occurs in two major aquifer systems: unconfined surficial aquifer and the Floridan aquifer system, which is under confined and artesian conditions. A third semi-confined aquifer exists in thin permeable sand and shell zones within the Intracoastal Formation, and is separated from the water table aquifer and from the Floridan aquifer system by interbedded low-permeability clay and limestone. The Intercoastal Formation does not produce enough water to be considered a significant water source. The Floridan aquifer is under confined and artesian conditions where low-permeable clays and limestone beds of the Intracoastal Formation separate the water table aquifer from the Floridan aquifer. The surficial aquifer is reported to have insufficient thickness to produce significant quantities of water and its quality is generally undesirable for human use (i.e., dissolved solids, acidity, and iron content). Low permeability clay lenses in the surficial aquifer and the Intercoastal Formation are discontinuous. The surficial aquifer may be hydraulically connected to the Floridan aquifer system through semiconfining strata of the Intercoastal Formation.

1.2.4 Land Use

Building 300 is located in the southeast area of the CSS property as shown on Figure 1-3. This area of the base is comprised of research facilities and various support activities for the Naval Experimental Dive Unit. No regulated underground storage tank systems are located at facilities adjacent to Building 300 (E.E. Jordan Company, Release Detection Program For Underground Storage Tanks, May, 1990).

1.2.5 Site Description

Site G300 contained one 2,500-gallon steel UST which stored diesel fuel. The UST supplied diesel fuel for an emergency generator located inside Building 300. The generator is located in the southwest corner of Building 300. A 150-gallon above ground day tank for the emergency generator is located inside the building. Fuel was pumped from the UST to the day tank as needed. A vent stack for the day tank extends outside the building. The vent pipe for the former UST was located immediately adjacent to the day tank vent. The UST was in service from approximately 1970 through 1996. The UST and product lines were removed on September 17, 1996, and an above ground tank was installed to store fuel for the emergency generator. The UST product line was cut, capped, and abandoned in place, where the line entered beneath structures. A site plan is shown as Figure 1-4.

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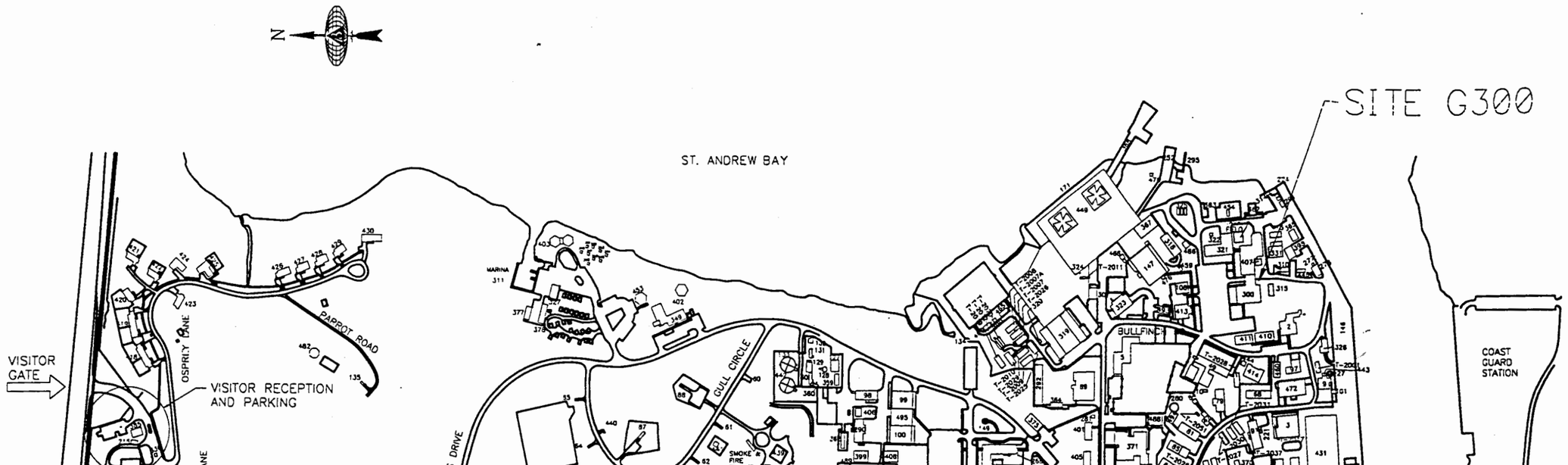

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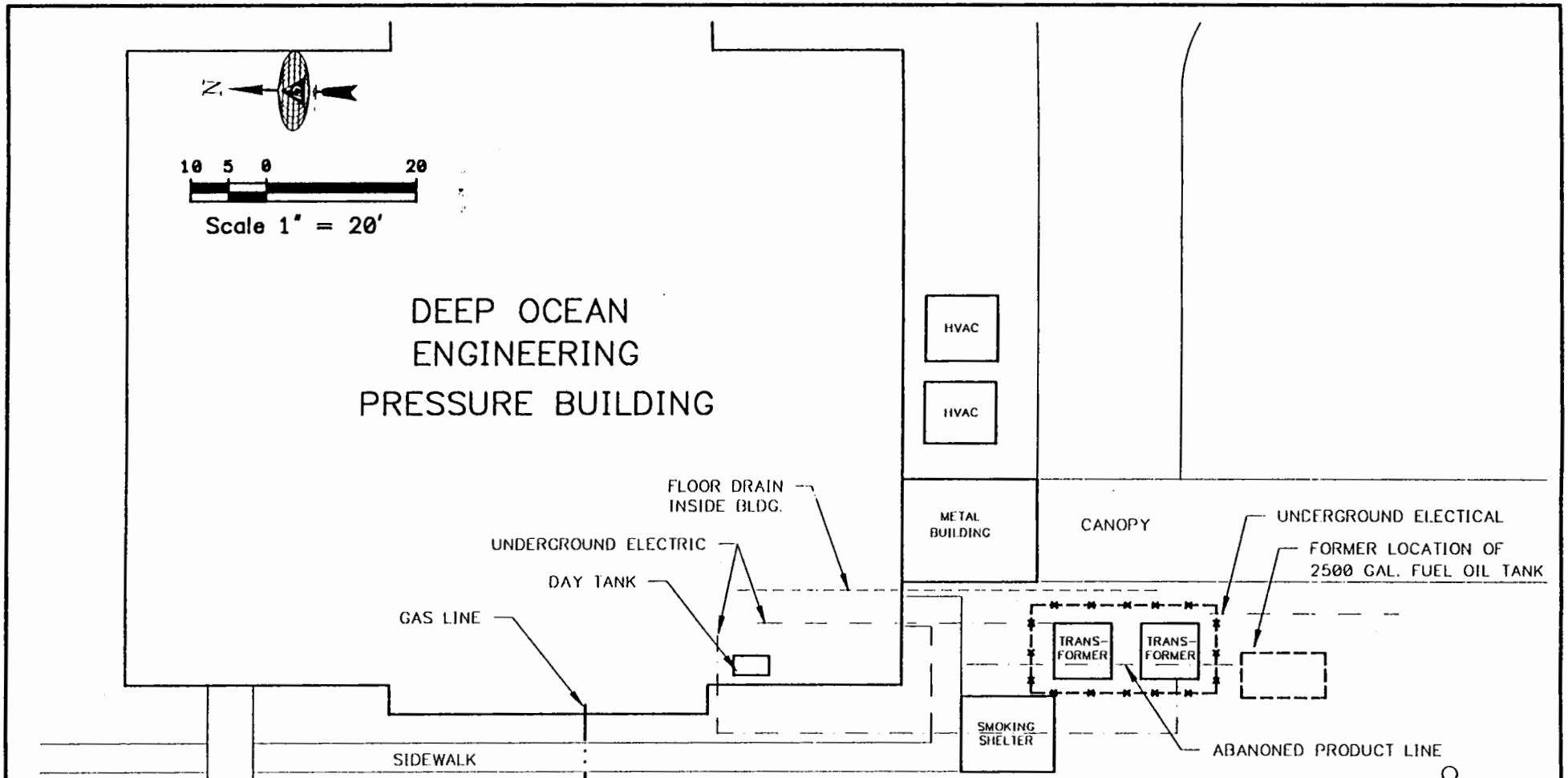

1.2.6 Potable Water Well Survey

The potable water supply information presented in this report was obtained from RFI completed for CSS (ABB Environmental Services Inc., 1995). According to this report, potable water for most of Panama City and Panama City Beach, including CSS, is supplied by surface water. Panama City Beach also uses groundwater from the Floridan aquifer system, as do private and domestic water systems throughout Bay County.

The CSS is provided potable water from the Bay County Water System, operated by the Bay County Public Utilities Department. The system draws surface water from Deer Point Lake, located 7 miles northeast of CSS. The utilization of county water in urban areas such as Panama City, has been reported at 83 to 95 percent.

Panama City Beach operates a public water system which uses a combination of groundwater withdrawal and surface water. The groundwater is obtained from 13 wells located in western Bay County and surface water is purchased from the county water system.

The RFI indicates that records from the Northwest Florida Water Management District list 42 permitted wells screened in the surficial aquifer system in the vicinity of CSS. These 42 wells are classified as "domestic" or other "public supply". The permitted wells are 2-inch and 4-inch-diameter wells with yields of generally less than 20 gallons per minute.

Four public water supply wells are located at CSS. The location of the wells are provided on Figure 1-5. These wells have 12-inch diameter casings and are completed at depths of 350 to 400 feet bls. Of the four wells, only PWS-1, located near the housing area at Building 394, adjacent to highway 98, is currently in use. It is used to provide water for air conditioning and heat pumps only and draws water from the Floridan aquifer system at approximately 400 feet bls. The remaining wells are inactive.

No private potable wells or public potable supply wells were identified in the RFI Report as being within a 1/4-mile and 1/2-mile radius of the site, respectively.

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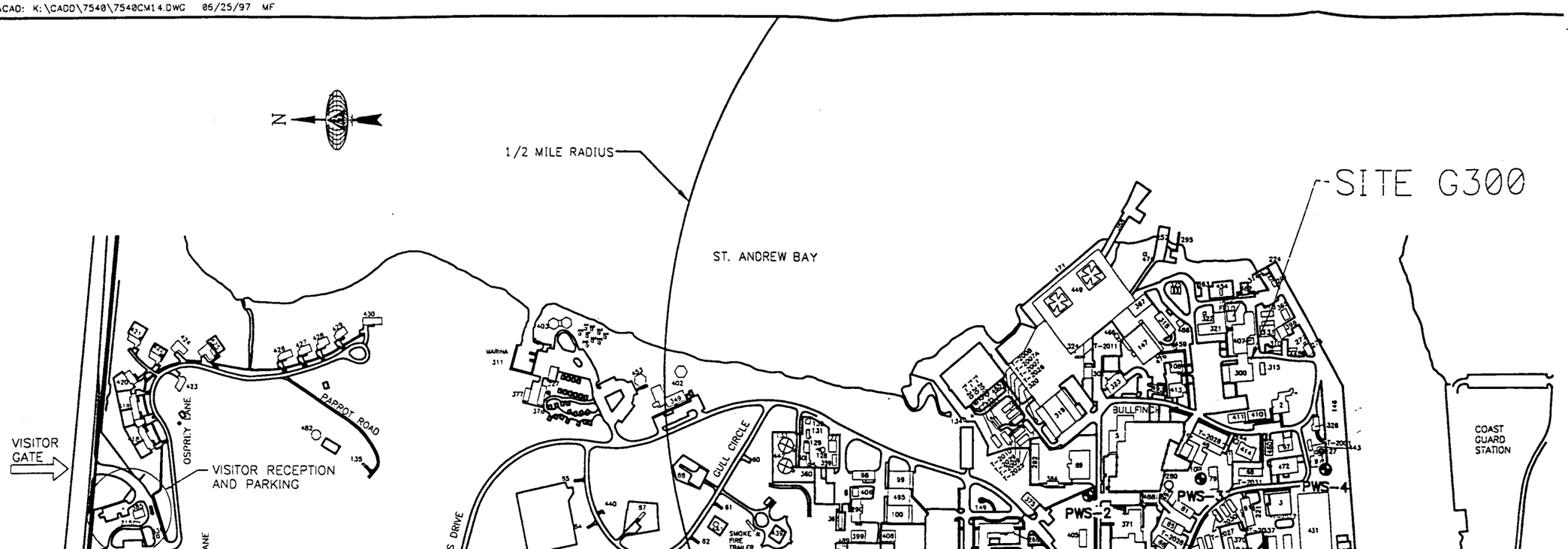

1.3 SITE HISTORY AND OPERATIONS

1.3.1 Site History

CSS is one of seven major research, test, and evaluation laboratories of the Space and Naval Warfare Systems Command. The site was first established in 1942 as a harbor for World War II convoy ships and as a liaison with a nearby shipyard. It later became an amphibious landing craft operations school. Research and development began in 1945 when the facility was renamed the US Navy Research Countermeasures Station. In 1952 a research and development program for the use of helicopters for mine countermeasures operations was implemented at the Base. The facility was redesignated as the Naval Coastal Systems Center in 1978 and again as Coastal Systems Station (CSS) in January 1992 (ABB Environmental Services, Inc. 1995).

The Navy Experimental Diving Unit Ocean Simulation Facility is located at Building 300. On September 7, 1996, the day tank used to store diesel fuel for an emergency generator located in the building, was overfilled during refueling of the day tank. The day tank, which has a float level and is equipped with a piping system which returns excess fuel to the source tank, could not accommodate the seven gallon per minute delivery rate of the emergency generator fuel pump, which was operated in the manual mode during the refueling of the tank. As a result, fuel was displaced into the day tank vent pipe, which extends outside Building 300, at the southwest corner of the building, approximately 10 feet above the top of the day tank. Eventually, fuel reached the end of the vent pipe, spilling to the ground at the southwest corner of Building 300 (Commanding Officer, Navy Experimental Diving Unit, 1996).

During the refueling of the tank, the pump was left unattended. Approximately one hour after the pump had been left unattended, a diesel fuel spill was discovered on the floor beneath the day tank and the pump was deactivated. Less than two quarts of diesel fuel had spilled on the floor and the spill was immediately cleaned up with absorbent pads. At the time, personnel were not aware a spill had occurred outside of Building 300. The spill outside the building was discovered on September 16, 1996, by a Florida State inspector who was at the site to inspect an unused underground storage tank which was being removed and noticed the smell at the site of the spill (Commanding Officer, Navy Experimental Diving Unit, 1996).

The Navy estimates approximately 132 gallons were spilled during the refueling of the day tank on September 7, 1996. This estimate is based on review of inventory records and fuel consumption rates for the outside diesel fuel tank from March 28, 1996 (Commanding Officer, Navy Experimental diving Unit, 1996).

1.3.2 Structural Integrity of Tanks and Lines

The UST G300 was unregulated, therefore no structural integrity testing of the tank and lines was performed on the diesel UST system. At the time the UST was removed in September 1996, the tank was observed to be in good condition. The structural integrity of the UST is described in the Tank Closure Assessment Report provided as Appendix C.

1.3.3 Initial Remedial Action

On September 20, 1996, Southern Earth Science Company of Panama City, Florida installed 17 soil borings to assess soil quality at the UST system tank field along the product line, and near the southwest corner of Building 300. Samples were collected from each of the borings for field screening with an organic vapor analyzer (OVA) The results of the field screening indicated "excessively contaminated soil," as defined by Chapter 62-770, FAC, at the southwest corner of Building 300. The soil contaminant plume was approximately 4 feet wide by 25 feet long and extended along the southwest corner of the building, sidewalk, and possibly under the building. In September 1997, an Initial Remedial Action (IRA) was performed to remove "excessively contaminated soil". During the IRA, soil excavation was halted after it became apparent the amount of "excessively contaminated soil" observed during the excavation, may have resulted from various generator day tank overfills. Figures showing the location of the soil borings and tables summarizing soil OVA sample intervals and vapor concentrations are included in the Fuel Spill Investigation Summary document provided in Appendix D.

1.3.4 Previous Investigations

During removal of the UST system, the US Navy Public Works Center (PWC) collected seven soil samples for hydrocarbon vapor screening using an organic vapor analyzer (OVA). The soil samples were collected at depths of 2 feet, 4 feet, and 8 feet bls from within the tank excavation. Soil vapor screening samples were collected from each side and the bottom of the tank excavation. Results of the soil screening identified no soil hydrocarbon vapors in soil samples collected from the vadose zone. The soil vapor sample locations and the depth of sample collection with corresponding OVA readings, are provided in Appendix C.

A temporary monitoring well was placed at the center of the UST excavation and groundwater samples were collected on March 25, 1997. Groundwater samples collected from the temporary monitoring well were analyzed using US Environmental Protection Agency (USEPA) Methods SW-846, 8260 and 8270. Results of the sampling reported no petroleum constituents above state target levels for storage tank

closure. Groundwater concentrations of chloroform, bromodichloromethane, and dibromochloromethane were reported at levels below the State of Florida Drinking Water Standards. The Storage Tank Closure Assessment Form is included in Appendix C.

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2.0 SUBSURFACE INVESTIGATION METHODS

2.1 QUALITY ASSURANCE

The site investigation was conducted in accordance with the Standard Operating Procedures prescribed by the FDEP Quality Assurance Section Document DER-001/92, and adopted by the B&R Environmental Comprehensive Quality Assurance Plan (CQAP) Number 870055G.

2.2 SOIL BORING PROCEDURES

2.2.1 Direct-Push Soil Borings

A soil hydrocarbon vapor assessment was conducted at the site by B&R Environmental on March 17 through March 21, 1997. Fifteen soil borings (SB-1 through SB-15) were advanced in the immediate area surrounding the former diesel UST system. Soil samples were collected from each boring for the purpose of organic vapor screening and for lithologic description. Soil borings were advanced using a Stratoprobe, truck mounted, direct-push, hydraulic soil probe. Soil samples were collected using two-foot long stainless steel split barrel samplers lined with plastic sleeves. Soil samples were collected at five foot intervals from the ground surface until the water table was encountered. At soil boring locations, SB-1, SB-2, SB-7, and SB-15, soil samples were collected continuously from the ground surface until the water table was encountered. Wet soils were present at depths ranging from approximately 8 to 9 feet bls. Soil boring locations and boring completion depths are summarized on Figure 2-1 and Table 2-1, respectively. Soil boring logs are provided in Appendix E.

Prior to the advancement of the soil probe at each boring location, the probe was decontaminated according to B&R Environmental's CQAP. Soil samples were visually inspected for evidence of oil staining. Soil vapor analysis was conducted on each soil sample collected from the vadose zone using an Organic Vapor Analyzer-Flame Ionization Detector (OVA-FID). Soil vapor analysis was performed in accordance with the headspace method prescribed by Chapter 62-770.200(2) FAC. This method of headspace screening is presented in detail in Appendix F. Headspace concentrations from soil vapor analysis are summarized in Table 2-1.

On April 23, 1997, B&R Environmental advanced three soil borings using a stainless steel, 3-inch, inside diameter (ID) hand-auger. The borings were advanced at locations SB01, SB04, and SB05 to collect soil samples for laboratory analysis to confirm the presence of petroleum-related compounds in the vadose zone soils. Sample locations and the depth of sample collection were based on the headspace readings obtained during the soil vapor analysis conducted during March 1997. Samples were collected at each boring location at a depth of 6 to 7 feet bls. Prior to advancing the hand-auger at each boring location, the hand-auger was decontaminated according to B&R Environmental's CQAP.

Decontamination of sampling equipment generated rinse water which was containerized in 55-gallon drums and will be removed for proper disposal by a Florida-licensed waste hauler.

2.2.2 Drilling and Soil Sampling Methods

On April 22, 1997, four borings, PCY-300-MW01, PCY-300-MW02, PCY-300-MW03, and PCY-300-MW04, were drilled by Gulf Atlantic Drilling under the supervision of a B&R Environmental geologist. These borings were advanced for the installation of groundwater monitoring wells. Soil grab samples collected during borehole advancement were used to characterize the site lithology and/or provide additional assessment data on soil vapor concentrations in the area. The location of the monitoring wells are shown on Figure 2-1. Soil boring logs are included in Appendix E.

Underground utilities were investigated at each boring location by advancing the soil boring with a post hole digger from 0 to 4 feet bls. The borings were continued with a truck-mounted drill rig, using 4 1/4-inch ID hollow-stem augers. Prior to the collection of the soil samples and well installations, the auger flights were decontaminated according to B&R Environmental's CQAP.

Soil vapor analysis was performed on soil grab samples in accordance with the headspace prescribed in Chapter 62-770.200(2) FAC This method of headspace screening is presented in detail in Appendix F. Hydrocarbon vapor concentrations from soil vapor analysis are summarized in Table 2-1.

Soil cuttings generated during the well installations were placed in a 55-gallon steel drums. A composite soil sample was collected from the drums and analyzed by USEPA Methods SW-846 8010 (volatile organic hydrocarbons, 8020 (volatile organic aromatics, 8100/FLPRO (polynuclear aromatic hydrocarbons and total recoverable petroleum hydrocarbons), total halides, and eight

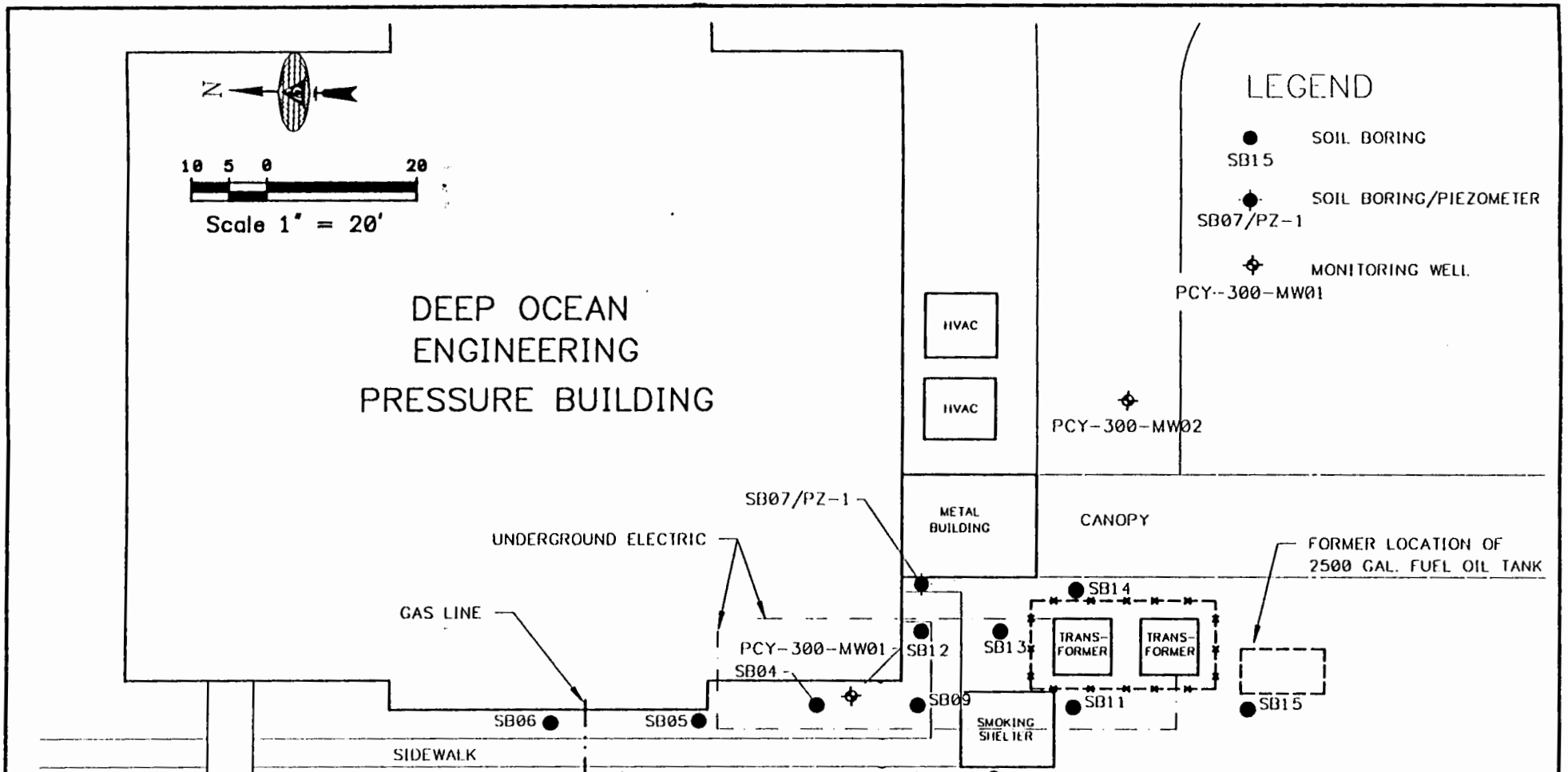
N
10 5 0 20
Scale 1" = 20'
DEEP OCEAN
ENGINEERING
PRESSURE BUILDING
HVAC
HVAC
METAL BUILDING
CANOPY
LEGEND
SOIL BORING
SB15
SOIL BORING/PIEZOMETER
SB07/PZ-1
MONITORING WELL
PCY-300-MW01
PCY-300-MW02
SB07/PZ-1
UNDERGROUND ELECTRIC
GAS LINE
FORMER LOCATION OF
2500 GAL. FUEL OIL TANK
SB14
SB13
TRANS-FORMER
TRANS-FORMER
PCY-300-MW01
SB12
SB04
SB09
SB11
SB15
SB06
SB05
SMOKING SHELTER
SIDEWALK

TABLE 2-1

SOIL VAPOR MEASUREMENTS
COASTAL SYSTEMS STATION
SITE G300
PANAMA CITY, FLORIDA
FDEP FACILITY NO. 038518667
PAGE 1 OF 2

Soil Boring No.	Date of Measurement	Sample Interval (feet bls)	Headspace Readings (ppm)		
			Total Organic Reading	Carbon Filtered Reading	Net Reading
SB01	03-18-97	1	ND	-	ND
		2	ND	-	ND
		4	ND	-	ND
		6	ND	-	ND
		8	ND	-	ND
SB02	03-18-97	1	ND	-	ND
		2	ND	-	ND
		4	ND	-	ND
		6	ND	-	ND
		8	ND	-	ND
SB03	03-18-97	0-1	ND	-	ND
		1-2	ND	-	ND
		5-6	ND	-	ND
		6-7	ND	-	ND
SB04	03-18-97	0-1	ND	-	ND
		1-2	ND	-	ND
		5-6	300	ND	300
		6-7	100	ND	100
SB05	03-18-97	0-1	ND	-	ND
		1-2	ND	-	ND
		5-6	110	ND	110
		6-7	50	ND	50
SB06	03-19-97	0-1	ND	-	ND
		1-2	ND	-	ND
		5-6	ND	-	ND
		6-7.	ND	-	ND
SB07	03-19-97	0-1	ND	-	ND
		1-2	ND	-	ND
		2-3	ND	-	ND
		3-4	ND	-	ND
		5-6	2	ND	2
		6-7	ND	-	ND
SB08	03-19-97	0-1	ND	-	ND
		1-2	ND	-	ND
		5-6	ND	-	ND
		6-7	ND	-	ND
SB09	03-19-97	5-6	40	ND	40
		6-7	100	ND	100

TABLE 2-1

SOIL VAPOR MEASUREMENTS
COASTAL SYSTEMS STATION
SITE G300
PANAMA CITY, FLORIDA
FDEP FACILITY NO. 038518667
PAGE 2 OF 2

SB10	03-19-97	0-1	ND	-	ND
		1-2	ND	-	ND
		5-6	ND	-	ND
		6-7	ND	-	ND
SB11	03-20-97	0-1	ND	-	ND
		1-2	ND	-	ND
		5-6	ND	-	ND
		6-7	ND	-	ND
SB12	03-20-97	5-6	ND	-	ND
		6-7	ND	-	ND
SB13	03-20-97	0-1	ND	-	ND
		1-2	ND	-	ND
		5-6	ND	-	ND
		6-7	ND	-	ND
		7-8	ND	-	ND
SB14	03-20-97	0-1	ND	-	ND
		1-2	ND	-	ND
		5-6	ND	-	ND
		6-7	ND	-	ND
SB15	03-20-97	0-1	ND	-	ND
		1-2	ND	-	ND
		3-4	ND	-	ND
		5-6	ND	-	ND
		7-8	ND	-	ND
PCY-300-MW02	04-22-97	2-3	ND	-	ND
		4-5	ND	-	ND
		6-7	ND	-	ND

Note
- = not analyzed
bls = below land surface
ppm = part per million equivalent methane
Wet soils encountered at approximately 6 to 7 feet bls.

RCRA metals. The soil will be removed for proper disposal by a Florida-licensed waste hauler. Pre-burn soil laboratory data sheets are included in Appendix G.

2.3 WELL CONSTRUCTION

2.3.1 Piezometer Construction

Piezometer wells were installed in conjunction with the soil boring procedures discussed above in Section 2.2.1. Soil borings SB-7, SB-8 and SB-10 were converted into piezometers PZ-1, PZ-2 and PZ-3, respectively. The piezometers were used to obtain water level measurements to determine relative groundwater elevations and flow direction. The piezometers were constructed of 1.25-inch ID, flush-threaded, schedule 40 PVC riser from 0 to 4 feet bls with 0.010-inch slotted screen interval from 4 to 14 feet bls. Native aquifer material was used as the filter media from 3 to 14 feet bls. A 1-foot layer of bentonite pellets was placed above the natural sand pack and hydrated. The remainder of the annulus was grouted to within 3-inches of the top of casing with a Type I Portland Cement/Bentonite slurry. The piezometers were secured with a locking water tight cap within an 8-inch diameter steel manhole. Well completion logs are provided in Appendix H.

2.3.2 Monitoring Well Construction

Monitoring wells were installed in conjunction with the soil boring procedures discussed above in Section 2.2.2. The wells were screened to intersect the water table. Monitoring well placements were selected to provide spatial coverage around the former diesel UST for groundwater sampling. Results of the sampling were used to evaluate if a dissolved hydrocarbon plume exists in the area of the former diesel UST system.

The monitoring wells were installed using a RAM 10 Deep Rock drill rig. Wells PCY-300-MW01 PCY-300-MW02, PCY-300-MW03, and PCY-300-MW04 were advanced using 4 1/4-inch ID hollow-stem augers. Each well was constructed of 2-inch ID, threaded, schedule 40 PVC solid riser and 0.010-inch slot well screen with silt trap and well bottom cap. Each well was installed to approximately 15 feet bls and was completed with a 10 foot screen section. Each annulus was filled to approximately 2 feet above the well screen with US Standard Sieve size 20/30 silica sand. A 6-inch layer of bentonite pellets was placed above the sand pack and hydrated. The remainder of the annulus was grouted to the surface. Each well is secured with a locking, water-tight cap

within a steel, 8-inch diameter steel manhole. The manhole was set within a 24-inch square concrete apron finished slightly above grade. Well completion logs are provided in Appendix H.

Each well was developed using a centrifugal pump. During well development, field measurements of pH, temperature, and specific conductance were monitored from the purge water generated. The wells were developed up to a maximum of one hour or until the field measurements became stable and the purge water clear. Water quality stabilization was determined using the following criteria: temperature +/-05^{o}C, pH +/-0.1 unit, and specific conductance +/-10 umhos/cm. The wells were developed under the supervision of a geologist. All development water was containerized for disposal.

2.4 LITHOLOGIC SAMPLING

Representative soil samples were collected during the soil vapor assessment to assess the shallow subsurface geologic conditions at the site. Samples used for lithologic description were collected from a stainless steel split spoon sampler lined with plastic sleeves. Grab samples from soil cuttings generated during monitoring well installations were also used for lithologic description. Soil boring logs are included as Appendix E.

2.5 SOIL VAPOR ANALYSIS

Headspace analysis was conducted on soil samples collected during the soil vapor assessment (direct push borings and monitor well installation borings) using an OVA-FID. The soil vapor analysis was performed according to the headspace method prescribed in Rule 62-770.200 (2) FAC Screened soil samples with corrected headspace levels in excess of 50 ppm are defined as "excessively contaminated soil" at diesel contaminated sites. The Headspace Methodology for Determining Soil Organic Vapor Concentrations is described in detail in Appendix F.

2.6 SOIL SAMPLING

Upon completion of each soil boring during the direct-push sampling investigation, a soil sample was retained from the sample interval which exhibited the highest OVA reading. The sample was placed in a 4-ounce glass jar and immediately provided to TEG for screening of TPH-DRO, by USEPA Modified Method SW-846 3550/8015. TEG provided an on-site mobile laboratory for screening purposes. Data reports for the field screening of TPH-DRO are included in Appendix I.

Soil samples for laboratory analysis were collected at SB01, SB04, and SB05 and analyzed by USEPA Methods 8010 (volatile organic halocarbons), 8020 (volatile organic aromatics), and 8100 (polynuclear aromatic hydrocarbons). Samples were also analyzed for total recoverable petroleum hydrocarbon (TRPH) by the FLPRO analytical method, and for lead by SW-846 7421. These samples were collected to confirm the presence of petroleum-related compounds. The laboratory data reports are included in Appendix J.

2.7 HYDROLOGIC INVESTIGATION

2.7.1 Water Level Measurements

The depths to groundwater in monitoring wells PCY-300-MW01, PCY-300-MW02, PCY-300-MW03, PCY-300-MW04, and piezometer wells PZ-1, PZ-2 and PZ-3 were collected on April 23, 1997. Measurements were collected from the north rim of the top of well casings using an electronic water level indicator. The water level measurements were collected to determine the depth to water in the surficial aquifer. The water level measurement field forms are provided in Appendix K.

The elevation of the north rim for each top of well casing was surveyed by B&R Environmental to the nearest 0.01 foot relative to an on-site datum. An arbitrary benchmark was established using the top of well casing for PZ-2. A relative elevation of 10.00 feet was assigned to the bench mark. An auto-level transit and surveying rod were used to survey the casing elevations. The relative elevation was calculated by subtracting the depth to water from the top of casing elevation.

2.7.2 Aquifer Characteristics

On April 2, 1997, B&R Environmental performed aquifer slug tests on monitoring wells PCY-300-MW02, PCY-300-MW03, and PCY-300-MW04. Each test was performed by displacing a volume of water with a "slug" and recording the recharge rate of the displaced water in the well. The recharge rate was recorded using an electronic data logger and pressure transducer. The Bouwer and Rice methodology for partially penetrating wells in unconfined aquifers was utilized to calculate hydraulic conductivity values for the three monitoring wells as described in Bouwer, 1989 and Bouwer and Rice, 1976. Calculations were performed using the Aqtesolv™ aquifer characterization program as described in Duffield and Rumbaugh, 1991. Slug test data and calculations used to determine hydraulic conductivity are included in Appendix L.

2.7.3 Groundwater Flow Velocity and Transmissivity

The horizontal groundwater gradient across the site was evaluated from water level measurements collected on April 23, 1997. The groundwater gradient was calculated by determining the perpendicular distance between groundwater contours developed from groundwater elevation data. Groundwater gradient calculations are included in Appendix M.

The groundwater flow gradient was determined using the following equation:

$$i = \frac{h_1 - h_2}{d}$$

where:

- i = the hydraulic gradient
- h_1 = the water elevation at point 1
- h_2 = the water elevation at point 2
- d = the distance between point 1 and point 2

Potential movement of groundwater at the site may be described in terms of transportation by natural flow in the saturated zone while assuming groundwater flow follows Darcy's Law. Darcy's Law may be expressed as:

$$V = \left(\frac{K}{n}\right) x\, i$$

where:

- V = average seepage velocity
- K = hydraulic conductivity
- n = effective porosity (assumed)
- i = average hydraulic gradient

Site specific transmissivity is calculated using the following equation:

$$T = Kb_e$$

where:

T = transmissivity
K = hydraulic conductivity
b_e = affected aquifer thickness

The groundwater seepage velocity and aquifer transmissivity calculations are included in Appendix M.

2.7.4 Tidal Influence Survey

A tidal survey was conducted during the RFI to determine if the potentiometric surface at locations close to Alligator Bayou are influenced by tidal fluctuations. Continuous water level measurements were obtained from several selected monitoring wells for a period of 24 hours. Monitoring wells PCY-14-5 and PCY-1-3 were selected at SWMU 1 and Area of Concern (AOC) 2, to evaluate the effects of tidal influence near Alligator Bayou. Monitoring well PCY-14-5 is located 40 feet from the seawall at Alligator Bayou and was paired with PCY-1-3, located 200 feet from the Bayou.

2.8 WATER SAMPLING

2.8.1 Free Product Sampling

Prior to groundwater sampling on April 23, 1997, B&R Environmental personnel checked each well for free product using a clean disposable bailer. The bailer was used to extract a water sample from the top of the well's water column to visually inspect for free product. Free product was not encountered during the CA by B&R Environmental personnel.

2.8.2 Groundwater Sampling Direct-Push Investigation

During the direct-push field investigation, each soil boring was continued into the saturated zone to collect groundwater samples for mobile laboratory screening. The samples were collected using a detachable drive tip attached to a 24-inch long, retractable, stainless steel well screen encased in the lead probe tube. After the water sampler was advanced into the water bearing zone, the probe was withdrawn 24 inches to allow the retractable screen to open to the formation.

For groundwater recovery a length of Tygon tubing was inserted into the probe and connected to a peristaltic pump. Several screen volumes were then pumped from the probe in order to reduce the turbidity level. After sufficient purging, groundwater samples were collected by pumping directly into 40 ml vials. The samples were immediately taken to the on-site mobile laboratory for screening for TPH-DRO constituents. All purge water was placed in 55-gallon drums on-site for later characterization and disposal. The results of the mobile laboratory screening are presented in Appendix I.

2.8.3 Groundwater Sampling of Monitoring Wells

Groundwater sampling of monitoring wells was performed to determine the presence or absence of dissolved petroleum hydrocarbons in groundwater in the vicinity of the diesel UST system. Groundwater samples were collected by B&R Environmental personnel from well PCY-300-MW01, PCY-300-MW02, PCY-300-MW03, and PCY-300-MW04 on April 23, 1997. Groundwater samples collected from each monitoring well were analyzed using USEPA Method 239.2 for lead (unfiltered), USEPA Method 504.1 for gas chromatograph (GC) extractable volatile organics (1,2-dibromoethane or EDB), USEPA Method 601 for GC purgeable halocarbons, and USEPA Method 602 for GC purgeable aromatics (benzene, toluene, ethylbenzene, xylenes, and methyl-tert butyl ether), USEPA Method 8100 for GC PAHs, and Florida PRO for TRPH. The groundwater samples were collected using new tygon tubing and a peristaltic pump. Approximately five well volumes of groundwater were removed from each well using the peristaltic pump and tygon tubing. Temperature, pH, specific conductance measurements, and well purge volumes were recorded at the time of sample collection and are provided in Appendix K. Groundwater samples were placed on ice and shipped to Accutest Laboratories, Inc., in Orlando, Florida.

All sampling activities were performed in accordance with the procedures prescribed in the FDEP Quality Assurance Section's Standard Operating Procedures for Laboratory Operations and Sample Collection Activities, (DER-001/92), adopted by B&R Environmental's CQAP. In accordance with DER-001/92 section 4.4.2, sample preservation was accomplished by obtaining pre-preserved containers from a laboratory with a DER approved CQAP (Accutest Laboratories, Inc.). During the sampling events, quality control samples (e.g. equipment blanks) were prepared and submitted to the laboratory as required by the approved CQAP. Sampling activities were documented in a site-specific field logbook, and samples were transmitted under chain-of-custody protocols to the laboratory. Groundwater laboratory data sheets are included in Appendix N.

3.0 RESULTS OF INVESTIGATION

3.1 SITE HYDROGEOLOGY

3.1.1 Lithology

The site is underlain by sediments composed predominately of light gray to white to yellowish orange, fine grained sand, with little to no fines. This soil type extends to at least 15 feet bls, which was the maximum depth drilled during the contamination assessment investigation. Due to the homogeneity of the subsurface, no lithologic cross-section was constructed. Soil boring logs are included as Appendix E.

3.1.2 Aquifer Characteristics and Classification

Based on water level data collected from site monitoring wells on April 23, 1997, the depth to the shallow aquifer across the study area is approximately 7 to 9 feet bls. The groundwater level measurements are presented in Table 3-1. The water level measurement field forms are provided in Appendix K. The aquifer is classified as a G-II aquifer based on dissolved solids content typically associated with the surficial aquifer in the area of CSS.

Rising-head slug tests conducted at wells PCY-300-MW02, PCY-300-MW03, and PCY-300-MW04 were used to estimate the hydraulic conductivity of the surficial aquifer at Building 300. The geometric mean hydraulic conductivity for the surficial aquifer was estimated 10.24 ft/day as shown by the hydraulic conductivity calculations provided in Appendix L.

Using the groundwater flow gradient equation presented in Section 2.8.3, a hydraulic gradient of 0.01 feet/foot to the south-southeast was calculated from the data collected on April 23, 1997. The groundwater flow direction is depicted in Figure 3-1.

Lithologic data and available literature indicate the effective porosity of the soils comprising the surficial aquifer is approximately 0.30 (Heath, 1994).

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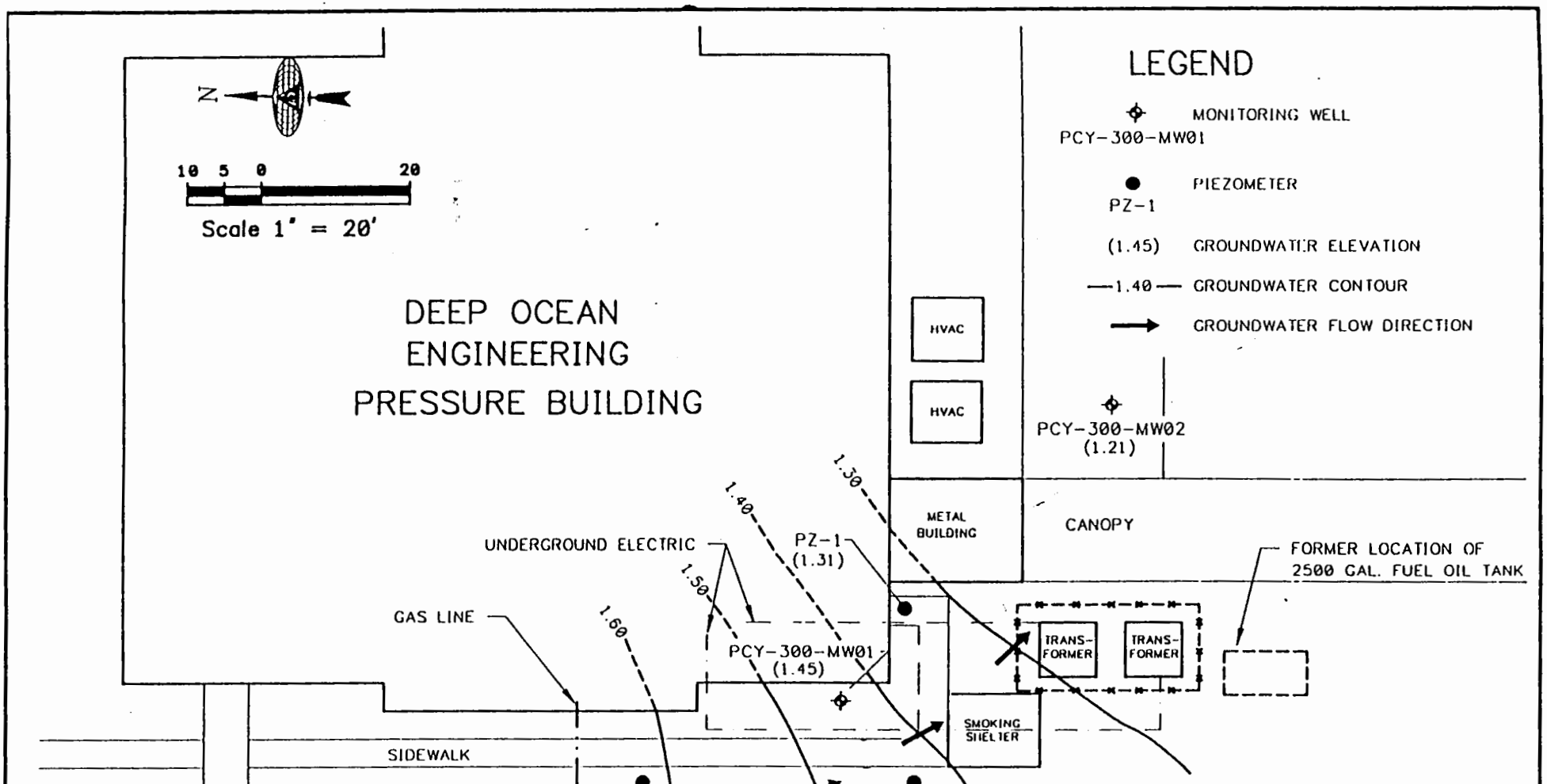
TABLE 3-1
DEPTH TO GROUNDWATER MEASUREMENTS
Site G300
Coastal Systems Station, Panama City, Florida
FDEP Facility No. 038518667

Monitoring Well ID	Date Collected	Top of Well Casing Elevation (feet AD)	Free Product Thickness (feet)	Depth to Water (feet below TOC)	Water Table Elevation (feet AD)	Well Screen Interval (feet bls)
PCY-300-MW01	04/23/97 04/24/97	10.28	0.00 0.00	8.83 8.85	1.45 1.43	5 to 15
PCY-300-MW02	04/23/97 04/24/97	10.00	0.00 0.00	8.79 8.83	1.21 1.17	5 to 15
PCY-300-MW03	04/23/97 04/24/97	10.30	0.00 0.00	8.94 8.94	1.36 1.36	5 to 15
PCY-300-MW04	04/23/97 04/24/97	8.91	0.00 0.00	7.28 7.29	1.63 1.62	5 to 15
PZ-1	03/21/97 4/23/97	10.44	0.00 0.00	8.73 9.13	1.71 1.31	4 to 14
PZ-2	03/21/97 4/23/97	10.00	0.00 0.00	8.37 8.38	1.63 1.62	4 to 14
PZ-3	03/21/97 4/23/97	10.17	0.00 0.00	8.64 8.75	1.53 1.42	4 to 14

Note

bls = below land surface
ID = identification
AD = arbitrary datum elevation (relative to the top of well casing for piezometer well PZ-2)
TOC = top of well casing


N
10 5 0 20
Scale 1" = 20'
DEEP OCEAN
ENGINEERING
PRESSURE BUILDING
HVAC
HVAC
METAL BUILDING
CANOPY
LEGEND
MONITORING WELL
PCY-300-MW01
PIEZOMETER
PZ-1
(1.45) GROUNDWATER ELEVATION
1.40 GROUNDWATER CONTOUR
GROUNDWATER FLOW DIRECTION
PCY-300-MW02
(1.21)
1.30
1.40
1.50
1.60
UNDERGROUND ELECTRIC
PZ-1
(1.31)
GAS LINE
PCY-300-MW01
(1.45)
FORMER LOCATION OF
2500 GAL. FUEL OIL TANK
TRANS-FORMER
TRANS-FORMER
SMOKING SHELTER
SIDEWALK

Using a hydraulic conductivity of 10.24 feet/day, the hydraulic gradient of 0.01 feet/foot, an inferred effective porosity value of 0.30, and Darcy's Equation as stated in Section 2.8.3, the groundwater seepage velocity across the site was calculated at 0.34 feet/day in a south-southeast direction. The transmissivity of the surficial aquifer was calculated at 4.9 X 10^{-2} ft^2/day. Groundwater gradient and transmissivity calculations are included in Appendix M.

3.1.3 Tidal Influence

Results of the tidal survey conducted previously at monitoring wells PCY-14-5 and PCY-1-3 indicate that at SWMU 1 and AOC 2, the distance in which significant tidal influence was observed, was less than 40 feet from Alligator Bayou, and less then 200 feet from the shoreline at St. Andrew Bay. The presence of a sea wall at the bayou may interfere with natural groundwater flow and impede tidal influence in the area near the bayou (ABB Environmental Services Inc., 1995). Building 300 is located approximately 500 feet east of SWMU 1 and AOC 2, 350 feet north of Alligator Bayou, and 400 feet west of St. Andrew Bay. Therefore, significant tidal influence is not expected at Site G300.

3.2 SOIL QUALITY

The vertical and horizontal extent of petroleum impacted soil in the vadose zone was assessed through soil vapor analysis performed during the direct-push investigation and monitoring well installation as described in Section 2.2.1 and 2.2.2 of this report. The highest soil vapor concentrations detected in vadose zone soils were 300 parts per million (ppm), 110 ppm, and 100 ppm, at boring locations SB-4, SB-5 and SB-9 respectively. These samples were collected at depths of six to seven feet bls. These data indicate that "excessively contaminated" soil (greater than 50 ppm OVA response as defined by Chapter 62-770.200, FAC) are present in the vicinity of borings SB-4, SB-5, and SB-9. Soil vapor screening results are presented in Table 2-1. Soil boring locations and vapor readings are depicted on Figure 3-2.

Analysis of soil samples for field screening of TPH-DRO constituents using a mobile laboratory indicated that petroleum-related compounds were present in the vadose zone soil. TPH-DRO concentrations were detected in soil samples from borings SB-4, SB-5, SB-9 and SB-13. The TPH-DRO concentrations ranged from 22.1 milligrams per kilogram (mg/kg) in SB-13 to 7280 mg/kg in SB-4. TPH-DRO concentrations in soil samples from the remaining borings were below method detection limits. The mobile laboratory results indicate a similar distribution of contaminants as the OVA results. The TPH-DRO concentrations are shown on Figure 3-3.

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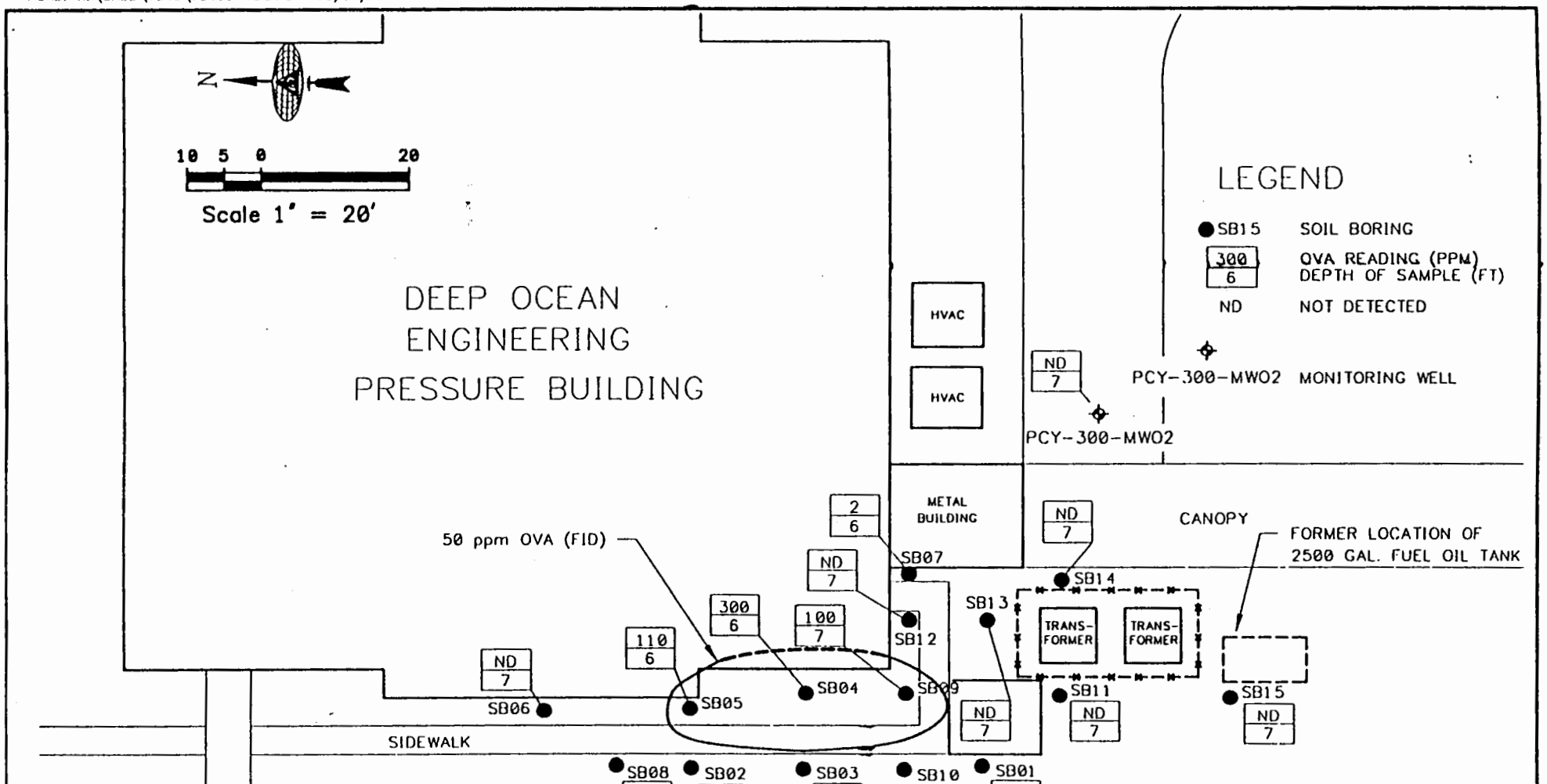

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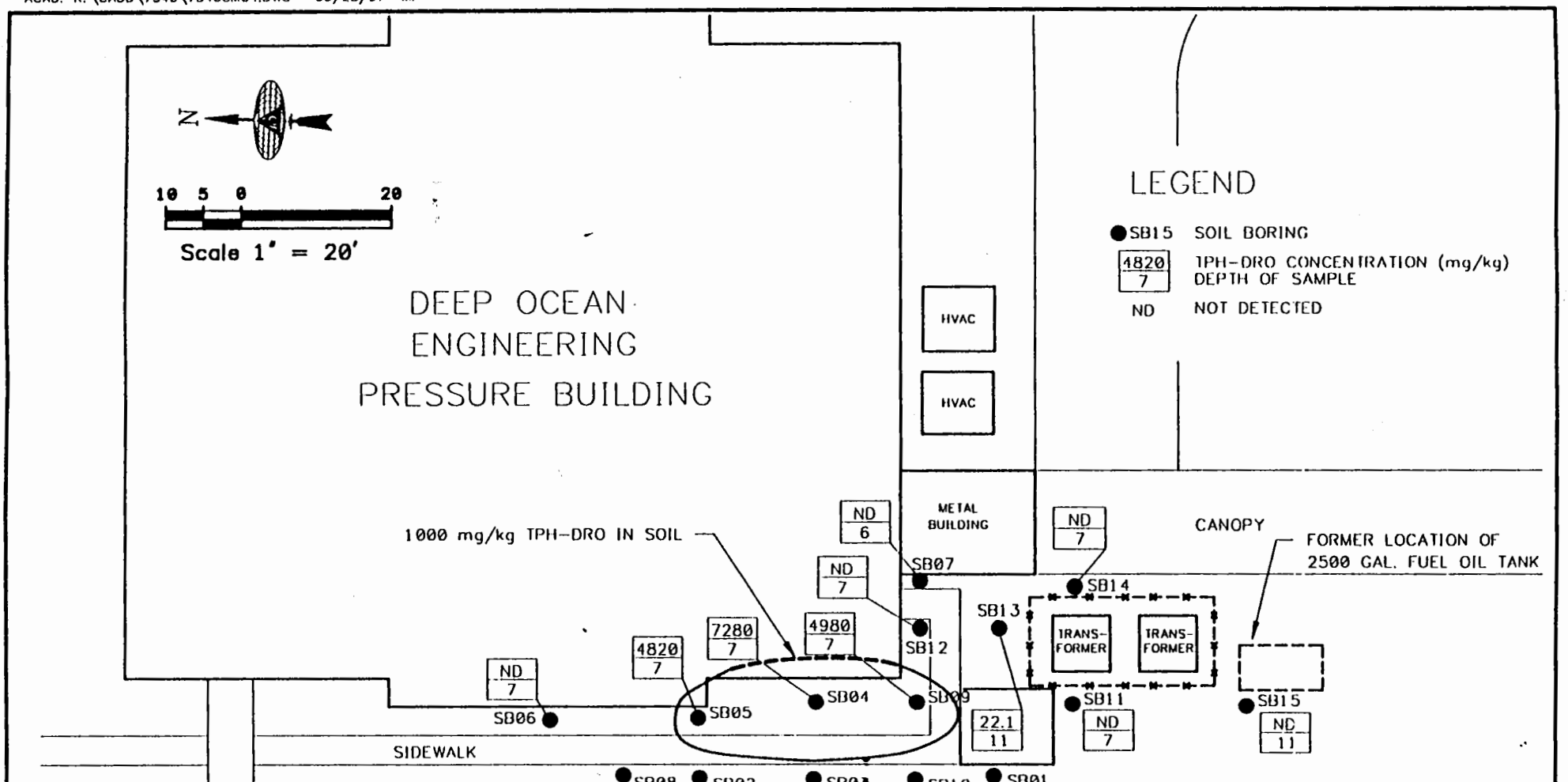

Soil samples collected for laboratory analysis at SB01, SB04, and SB05 identified petroleum compounds characteristic of diesel fuel in vadose zone soils adjacent to the southwest corner of Building 300. The highest concentrations of petroleum constituents were detected in soil samples SB04 and SB05. The soil sample at SB04 contained naphthalene, 1-methylnaphthalene and 2-methylnaphthalene at concentrations of 19,500 micrograms per kilogram (ug/kg), 55,600 ug/kg, and 63,300 ug/kg, respectively. TRPH concentrations were detected in samples at SB04 and SB05 at 5,390 mg/kg and 2,020 mg/kg respectively. Concentrations of ethylbenzene and xylene were reported in the samples from SB04 and SB05. The highest concentrations of ethylbenzene and xylene were detected in SB04 at 1,260 ug/kg and 4,320 ug/kg, respectively. Soil quality data is summarized on Table 3-2.

3.3 WATER QUALITY

Groundwater quality results from the mobile laboratory field screening reported TPH-DRO constituents in groundwater grab samples collected from soil boring locations SB-4, SB-9, SB-12, SB-12, SB-13 and SB-14. The TPH-DRO concentrations ranged from 875 µg/l in SB-13 to 17,400 µg/l in SB-9. TPH-DRO concentrations in groundwater samples from the remaining soil borings were below method detection limits. TPH-DRO concentrations in groundwater are presented in Figure 3-4.

Groundwater laboratory results from samples collected from monitoring wells on April 23, 1997 reported the following:

Concentrations of volatile organic aromatics (VOAs) were reported below laboratory detection limits in groundwater samples collected from PCY-300-MW03 and PCY-300-MW04. Benzene was detected at 8.2 ug/L and 1.8 ug/L in samples collected from PCY-300-MW01 and PCY-300-MW02, respectively. These concentrations are above the FDEP target level of 1 ug/L for benzene, established in Chapter 62-770, FAC. Total VOAs (the total sum of benzene, toluene,. ethylbenzene, and xylenes) concentrations were detected in samples from wells PCY-300-MW01 and PCY-300-MW02, at concentrations of 26 ug/L and 1.8 ug/L, respectively. These concentrations are below the FDEP target level of 50 ug/L for total VOAs. Benzene and total VOA groundwater concentrations are provided on Figure 3-5.

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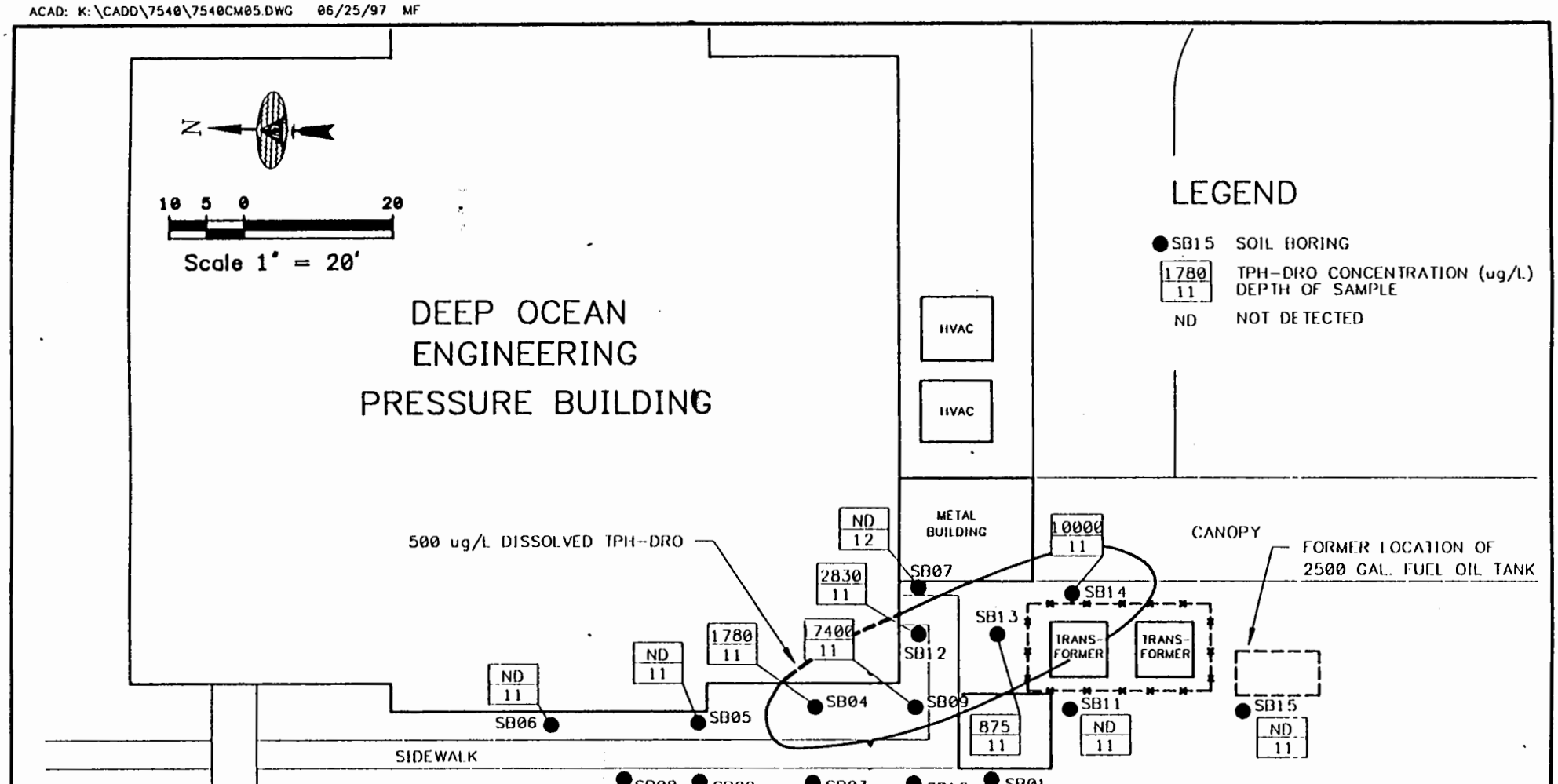
TABLE 3-2
SUMMARY OF SOIL QUALITY:
SELECTED PARAMETERS FROM THE KEROSENE
ANALYTICAL GROUP
Site G300
Coastal Systems Station, Panama City, Florida
FDEP ID No. 038518667

Sample Location	Date Sampled	Ethyl-benzene (µg/kg)	Xylenes (µg/kg)	TRPH (mg/kg)	DCE (µg/kg)	1-Methyl-naphthalene (µg/kg)	2-Methyl naphthalene (µg/kg)	Naphthalene (µg/kg)	Lead (mg/kg)
300-SB01-0607	04/23/97	<1.0	<3.0	11.0	<1.0	<340	<340	<340	26.6
300-SB04-0607	04/23/97	1260	4320	5390	<55	55600	63300	19500	2.2
300-SB05-0607	04/23/97	37.9	159	2020	<1.0	<7200	<7200	<7200	2.6
Equipment Blank	04/23/97	< 1.0^	<3.0^	< 0.50^^	2.5^	<10^	<10^	<10^	<0.0030^^
Trip Blank	04/17/97	< 1.0^	<3.0^	NA	2.2^	NA	NA	NA	NA

DCE 1,2-Dichloroethane
TRPH total petroluem hydrocarbons
NA not analyzed
^ concentrations reported in micrograms per liter
^^ concentrations reported in milligrams per liter

Elevated detection limits were used in the reporting of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene concentrations from sample 300-SB05-0607, due to matrix interference.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Scale 1" = 20'
DEEP OCEAN
ENGINEERING
PRESSURE BUILDING
HVAC
HVAC
METAL
BUILDING
CANOPY
500 ug/L DISSOLVED TPH-DRO
FORMER LOCATION OF
2500 GAL. FUEL OIL TANK
TRANS-
FORMER
TRANS-
FORMER
SIDEWALK
LEGEND
SB15 SOIL BORING
1780
11
TPH-DRO CONCENTRATION (ug/L)
DEPTH OF SAMPLE
ND NOT DETECTED
ND
12
SB07
10000
11
SB14
2830
11
SB13
7400
11
SB12
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SB05
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SB15
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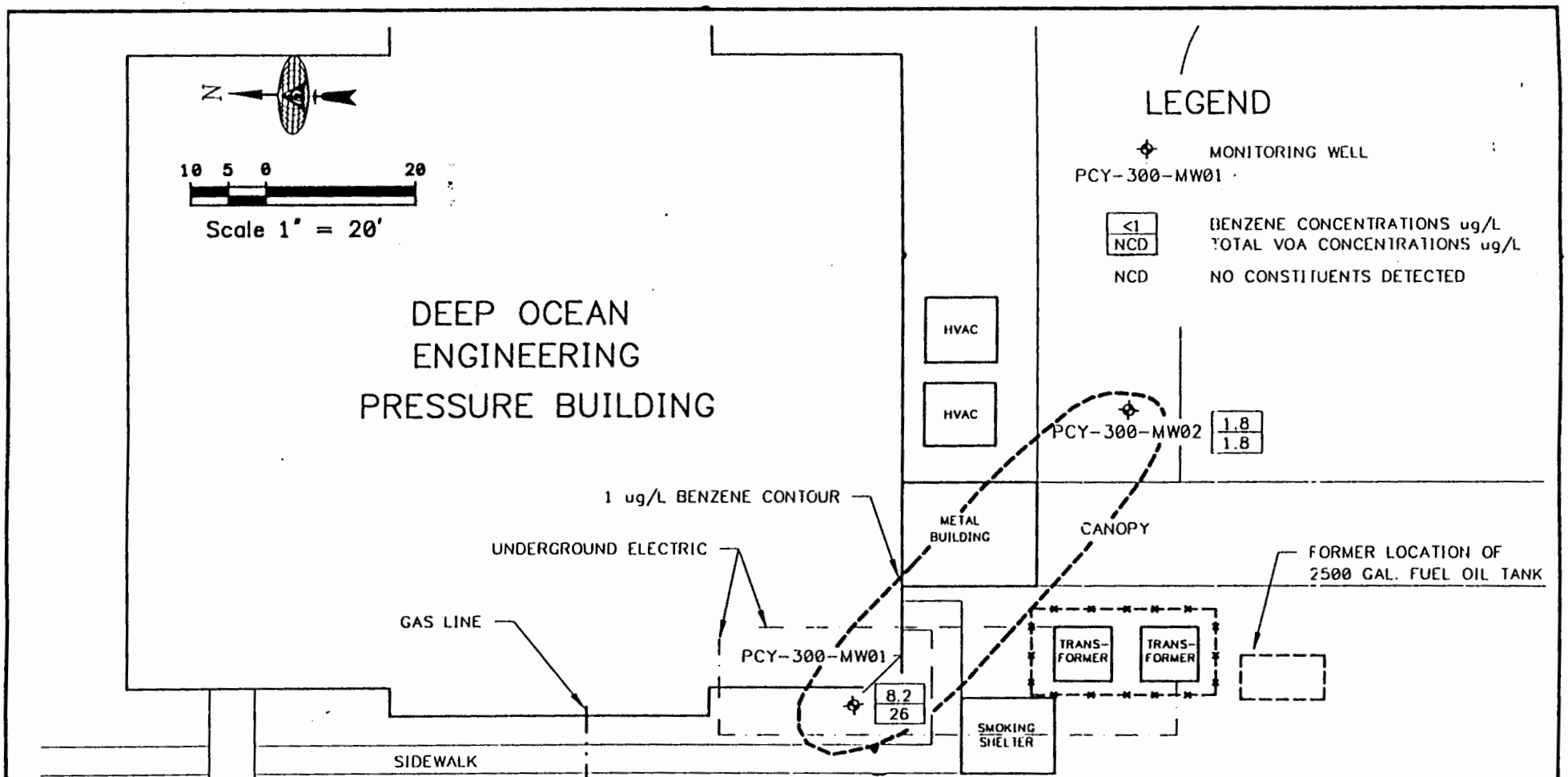
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DEEP OCEAN
ENGINEERING
PRESSURE BUILDING
HVAC
HVAC
METAL BUILDING
CANOPY
1 ug/L BENZENE CONTOUR
UNDERGROUND ELECTRIC
GAS LINE
FORMER LOCATION OF 2500 GAL. FUEL OIL TANK
TRANS-FORMER
TRANS-FORMER
PCY-300-MW01
8.2
26
PCY-300-MW02
1.8
1.8
SMOKING SHELTER
SIDEWALK
LEGEND
MONITORING WELL
PCY-300-MW01
<1
NCD
BENZENE CONCENTRATIONS ug/L
TOTAL VOA CONCENTRATIONS ug/L
NCD
NO CONSTITUENTS DETECTED

Low concentrations of 1,2-dichloroethane were reported in groundwater samples from PCY-300-MW01 and PCY-300-MW02, at concentrations of 2.1 ug/L and 1.7 ug/L, respectively. These concentrations are below the FDEP target level of 3.0 ug/L. Low levels of 1,2-dichloroethane were detected in the trip blank and equipment blank samples which may have attributed to the levels of 1,2-dichloroethane being detected in the groundwater samples. All other volatile organic halocarbon constituents were reported below laboratory detection limits in the remaining samples.

1,2-dibromoethane (EDB) was reported below laboratory detection limits in all samples analyzed.

Concentrations of total PAHs (excluding naphthalene and methylnaphthalenes) were below laboratory detection limits in samples from PCY-300-MW01 and PCY-300-MW02, and PCY-300-MW04. A naphthalene concentration of 33.6 ug/L was reported in the groundwater sample collected from PCY-300-MW01. 1-Methylnaphthalene and 2-methylnaphthalene were detected in PCY-300-MW01 at concentrations of 18 ug/L and 24.1 ug/L, respectively. The total naphthalene concentration (sum of naphthalene and methylnaphthalenes) of 75.5 ug/L is below the FDEP target level of 100 ug/L for total naphthalene. Naphthalene and total naphthalene groundwater concentrations are shown on Figure 3-6.

Groundwater samples from PCY-300-MW01 and PCY-300-MW02 detected TRPH concentrations at 3.95 mg/L and 0.846 mg/L, respectively. These concentrations are at levels below the TRPH target level of 5 mg/L. Groundwater TRPH concentrations are depicted on Figure 3-7.

Total lead was detected in groundwater samples from PCY-300-MW01 and PCY-300-MW02 at concentrations of 0.005 mg/L and 0.0094 mg/L, respectively. These concentrations are below the target level for lead established at 0.05 mg/L. Total lead groundwater concentrations are provided on Figure 3-8.

A summary of groundwater analytical results from the April 23, 1997 sampling event are presented in Table 3-3. Groundwater laboratory analytical results are provided as Appendix N. Field sampling forms are included in Appendix K.

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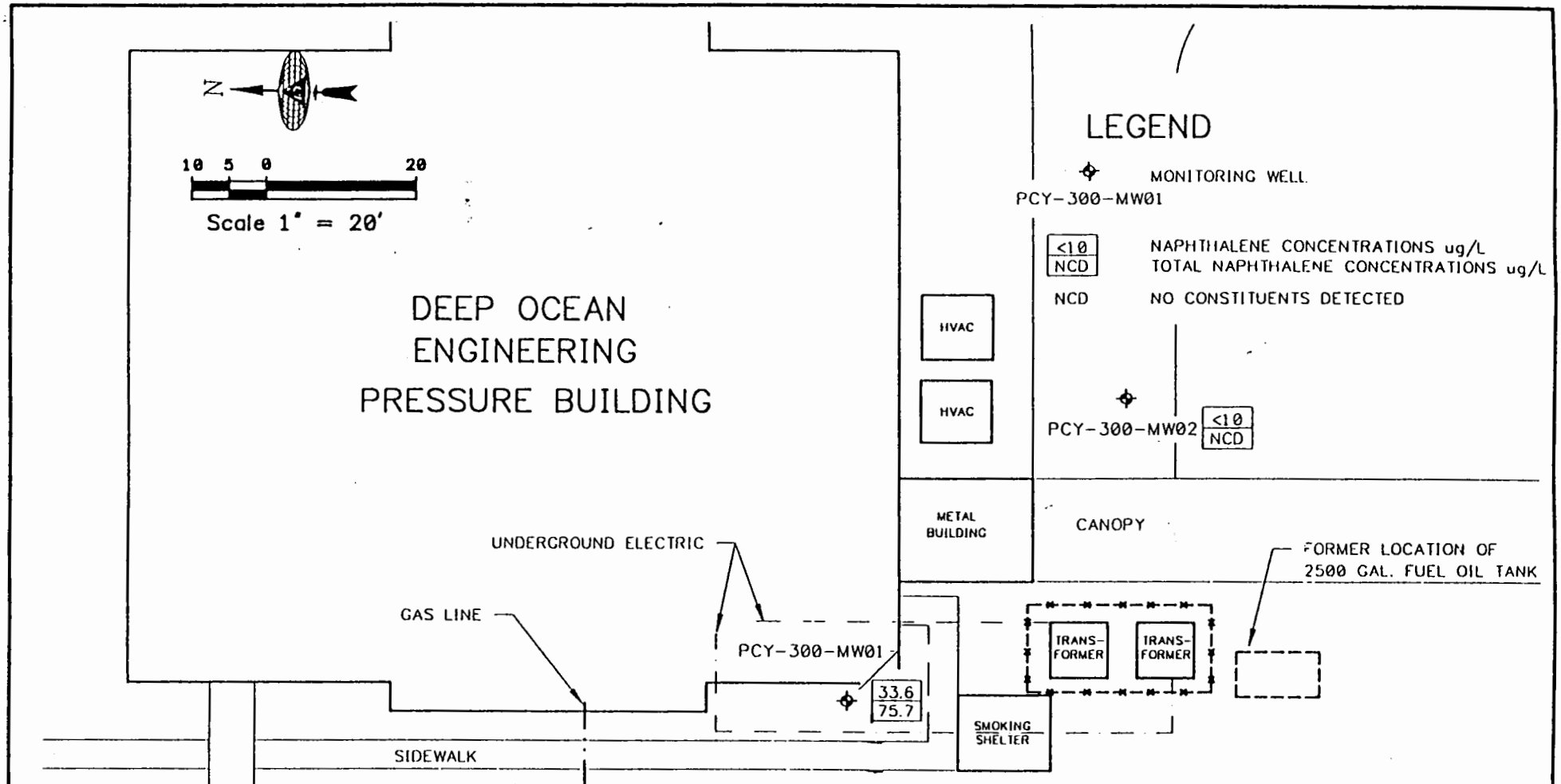
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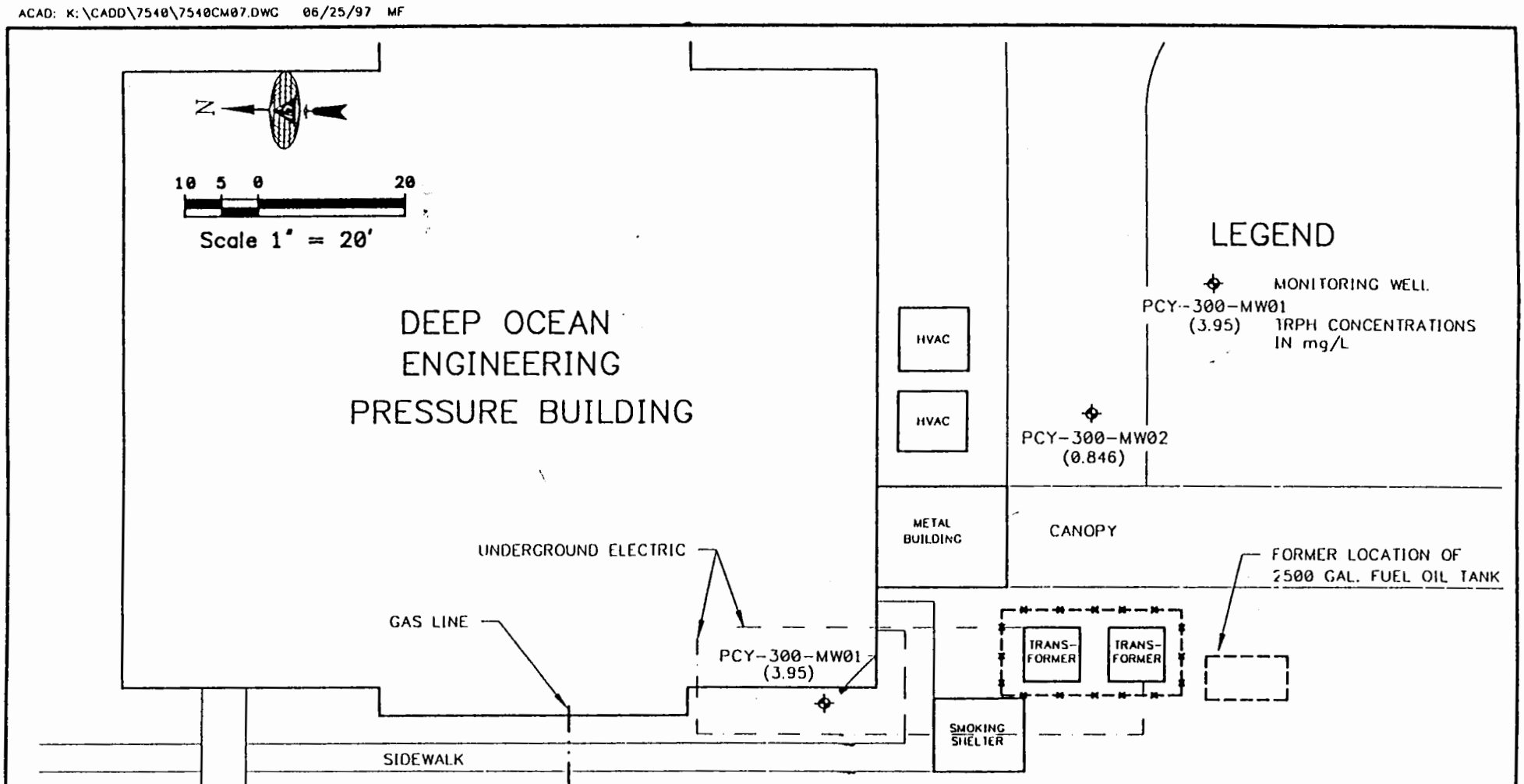
ENGINEERING
PRESSURE BUILDING
LEGEND
MONITORING WELL
PCY-300-MW01
<10
NCD
NAPHTHALENE CONCENTRATIONS ug/L
TOTAL NAPHTHALENE CONCENTRATIONS ug/L
NCD
NO CONSTITUENTS DETECTED
HVAC
HVAC
PCY-300-MW02
<10
NCD
METAL BUILDING
CANOPY
UNDERGROUND ELECTRIC
FORMER LOCATION OF
2500 GAL. FUEL OIL TANK
GAS LINE
PCY-300-MW01
33.6
75.7
TRANS-FORMER
TRANS-FORMER
SMOKING SHELTER
SIDEWALK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PRESSURE BUILDING
HVAC
HVAC
METAL BUILDING
CANOPY
UNDERGROUND ELECTRIC
GAS LINE
PCY-300-MW01
(3.95)
TRANS-FORMER
TRANS-FORMER
FORMER LOCATION OF
2500 GAL. FUEL OIL TANK
SMOKING SHELTER
SIDEWALK
LEGEND
MONITORING WELL
PCY-300-MW01
(3.95) TRPH CONCENTRATIONS
IN mg/L
PCY-300-MW02
(0.846)

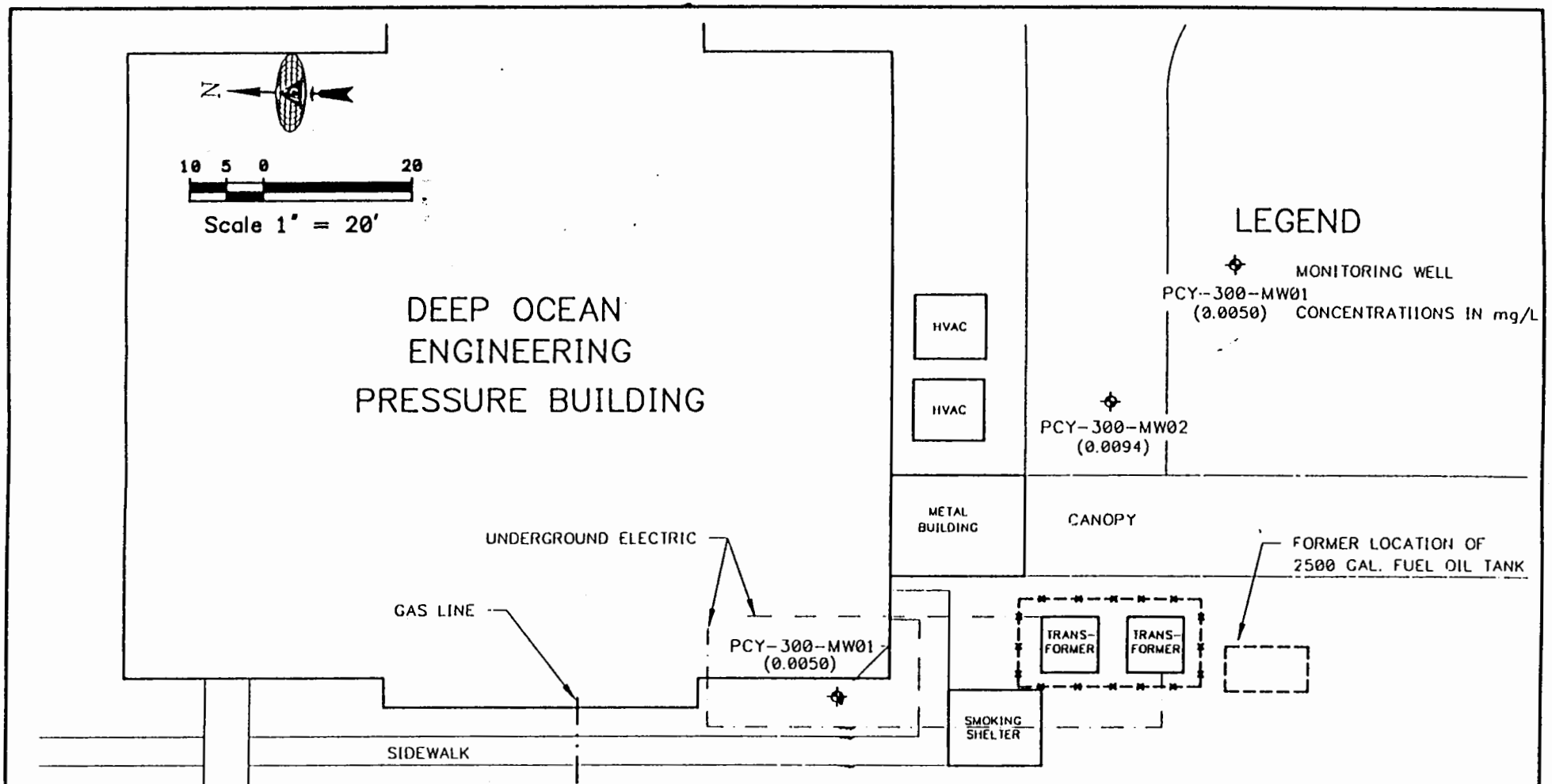

N
10 5 0 20
Scale 1" = 20'
DEEP OCEAN
ENGINEERING
PRESSURE BUILDING
HVAC
HVAC
METAL
BUILDING
CANOPY
LEGEND
MONITORING WELL
PCY-300-MW01
(0.0050) CONCENTRATIIONS IN mg/L
PCY-300-MW02
(0.0094)
UNDERGROUND ELECTRIC
FORMER LOCATION OF
2500 GAL. FUEL OIL TANK
GAS LINE
PCY-300-MW01
(0.0050)
TRANS-
FORMER
TRANS-
FORMER
SMOKING
SHELTER
SIDEWALK

TABLE 3-3
SUMMARY OF GROUNDWATER QUALITY:
SELECTED PARAMETERS FROM THE KEROSENE
ANALYTICAL GROUP
Site G300
Coastal Systems Station, Panama City, Florida
FDEP ID No. 038518667

Well ID	Date Sampled	Benzene (µg/L)	Total VOA (µg/L)	MTBE (µg/L)	DCE (µg/L)	EDB (µg/L)	Naphthalene (µg/L)	Total Naphthalenes (µg/L)	TRPH (mg/L)	Lead Unfiltered Samples (mg/L)
PCY-300-MW01	04/23/97	8.2	26	< 1.0	2.1	<0.02	33.6	75.7	3.95	0.0050
PCY-300-MW02	04/23/97	1.8	1.8	< 1.0	1.7	<0.02	<10	NCD	0.846	0.0094
PCY-300-MW03	04/23/97	<1.0	NCD	<1.0	<1.0	<0.02	<10	NCD	<0.50	<0.0030
PCY-300-MW04	04/23/97	<1.0	NCD	<1.0	2.2	<0.02	<10	NCD	<0.50	<0.0030
Equipment Blank	04/23/97	< 1.0	NCD	< 1.0	1.4	<0.02	<10	NCD	<0.50	<0.0030
Trip Blank	04/17/97	< 1.0	NCD	< 1.0	2.7	NA	NA	NA	NA	NA

NOTE
NA not analyzed
Total VOA total volatile organic aromatics = sum of benzene, toluene, ethylbenzene, and xylenes
MTBE methyl tert-butyl ether
DCE 1,2-Dichloroethane
EDB 1,2-Dibromoethane = ethylene dibromide
NCD no constituents detected
TRPH total petroluem hydrocarbons

4.0 DISCUSSION

"Excessively contaminated" soil, as defined by Chapter 62-770.200 FAC, was detected within the vadose zone by B&R Environmental during this CA. The "excessively contaminated soil" was identified at depths of 6 to 7 feet bls in an area adjacent to the day tank vent line which extends along the southwest corner of Building 300. These soils exhibited hydrocarbon staining, emitted diesel like odors, and generated headspace readings of greater than 50 ppm. Soil vapor analysis and TPH-DRO concentrations from the soil samples indicate the areal extent of "excessively contaminated soil" is limited to a small area south and southwest of the southwest corner of Building 300. The proximity of the building and the building's footers to the soil contamination makes it impractical to assess soil conditions beneath the building and/or remove the soil without adversely impacting the structural integrity of the building. "Excessively contaminated soil" at the southwest corner of the building was excavated to approximately 5 feet bls during the Tank Closure Assessment. This has minimized the amount of hydrocarbons available to leach from the soil matrix into the groundwater. Soil contamination, if present under the building, would be capped by the building foundation, restricting precipitation from percolating through the vadose zone soils, and would retard the leaching of petroleum hydrocarbons into the groundwater beneath the building. No hydrocarbon vapors were detected in soil samples collected during the Tank Closure Assessment for the 2,500 gallon diesel UST. The 2,500 gallon UST was located approximately 40 feet south of the southwest corner of Building 300. The absence of soil contamination near the former 2,500 gallon UST supports the overspill at the day tank vent line as being the point source for the diesel release. No free product was encountered during the CA.

Laboratory analysis of groundwater samples collected during the CA indicate dissolved hydrocarbon concentrations above FDEP target levels for benzene are present in the groundwater at the site. The highest benzene concentration of 8.2 ug/L was detected in source well PCY-300-MW01. Benzene was reported at a concentration of 1.8 ug/L in downgradient delineation well PCY-300-MW02, slightly above the FDEP target level of 1 ug/L. Benzene was reported at non-detectable levels in groundwater samples analyzed from the remaining perimeter wells. Naphthalene above the method detection limit was only detected in the source well PCY-300-MW01. Naphthalene and total naphthalenes were reported at non-detectable levels in groundwater samples from the remaining perimeter wells. The dissolved hydrocarbon plume appears to be oblate in shape and approximately 50 feet long by 20 feet wide. The plume is delineated by monitoring wells PCY-300-MW02, PCY-300-MW03 and PCY-300-MW04. Based on

petroleum hydrocarbon concentrations detected in monitoring wells downgradient from the site, Alligator Bayou does not appear to be threatened by the levels of hydrocarbons detected at the site.

The predominant soil type of the surficial aquifer is sand. No vertical delineation wells were installed due to the initial response activities to remove "excessively contaminated" soil at the time the surface spill was detected and the relatively low concentrations of dissolved hydrocarbons detected in the groundwater during the CA investigation.

Depth to water in the surficial aquifer was determined to be approximately 8 feet bls. No subsurface utilities were identified within the area of the dissolved hydrocarbon plume which could potentially intersect the water table and provide a preferential pathway for the migration of dissolved hydrocarbons. Subsurface gas, telephone, electric, and sewer lines were identified in the area however these utilities are typically completed at depths of 4 feet bls. The direction of groundwater flow for the surficial aquifer is toward the south-southeast toward Alligator Bayou. The groundwater flow velocity was calculated at 0.34 feet/day. The total dissolved solids content in the surficial aquifer in the area of CSS qualifies the aquifer as a G-II aquifer (Chapter 62-3.403 FAC).

The effects of tidal influence on the groundwater flow direction at the site is negligible. A sea wall constructed at Alligator Bayou restricts the natural flow of groundwater in the area and limits the effects of tidal influence. Alligator Bayou acts as the natural discharge point for the surficial aquifer downgradient of the site. However, the seawall does create a vertical component of groundwater flow as groundwater which normally discharges to the bayou tries to flow under and/or along the seawall.

No well fields and surface water intakes which supply drinking water to the local area are located within a 0.50-mile radius of the site. No domestic water wells were identified within 0.25-mile of the site. Surface water bodies and freshwater aquifers utilized in the study area are not likely to be threatened by the levels of hydrocarbons detected at the site.

5.0 CONCLUSIONS AND RECOMMENDATION

The results of the CA at CSS Building 300 suggest the following:

- Groundwater in the surficial aquifer at the site has a G-II classification;
- Private potable water wells were not identified within 0.25-mile radius of the site. Municipal well fields were not identified within a 0.50-mile radius of the site;
- During the CA "excessively contaminated" soil was encountered at 6 to 7 feet bls adjacent to the northwest corner of Building 300 near the day tank vent line.
- Given the close proximity of the excessively contaminated soil to Building 300, removal of the soil is impractical due to the potential impact on the structural integrity of the building; and
- Free product was not encountered at the site.

Analysis of groundwater samples from site monitoring wells show naphthalene being detected in groundwater above the State Target Level of 10 ug/L in monitor well PCY-300-MW01 and total naphthalene in the well at a concentration below the State Target Level of 100 ug/L. Naphthalene and total naphthalene were detected in PCY-300-MW01 at concentrations of 22.6 ug/L and 75.7 ug/L respectively. Well PCY-300-MW01 was the only well where concentrations of naphthalenes were detected in groundwater samples.

The remaining Kerosene Analytical Group parameters analyzed from groundwater samples were at non-detectable concentrations and/or at concentrations below FDEP target levels. Kerosene and Gasoline Analytical Group groundwater concentration criteria for No Further Action (NFA) criteria for G-II aquifer without wells is presented in Table 5-1 (FDEP, 1990).

Laboratory analytical results for groundwater samples indicate that the dissolved hydrocarbon concentrations meet the criteria established for No Further Action (NFA), as established in the FDEP's, October 1990, "No Further Action and Monitoring Only Guidelines for Petroleum Contaminated Sites", for all constituents of the Kerosene Analytical Group.

Evaluation of soil assessment data indicates that "excessively contaminated" soil, as defined by Chapter 62-770.200, FAC, is present at the site. The areal extent of the excessively contaminated soil is limited to a small area adjacent to the southwest corner of building 300, and

extends approximately 3 to 4 feet below the building footer. The proximity to the building footer makes it impracticable to remove the soil without adversely impacting the structural integrity of the building.

Although the dissolved hydrocarbon concentrations meet the criteria established for NFA, the site does not qualify for NFA due to the presence of excessively contaminated soil. Since it is impracticable to remove the excessively contaminated soil, it is recommended that a Monitoring Only Program (MOP) be implemented at the site. The MOP should include 6 months of monitoring for Total Volatile Organics and Polynuclear Aromatic Hydrocarbons using the following wells.

Monitoring Well	Rationale
PCY-300-MW01	Source well in area of highest dissolved hydrocarbons
PCY-300-MW02	Downgradient area of dissolved hydrocarbons
PCY-300-MW04	Upgradient of the area of dissolved hydrocarbons

If the dissolved hydrocarbon concentrations remain at or below NFA levels for two consecutive quarterly sampling events the site should be considered for NFA status.

TABLE 5-1
MAXIMUM ACCEPTABLE GROUNDWATER CONSTITUENT LEVELS
Site G300
Coastal Systems Station, Panama City, Florida
FDEP Facility No. 038518667

Analyte or Analytical Method	Highest Ground Water Constituent Level in Site Monitoring Wells	No Further Action		Monitoring Only			
		G-II Aquifer (with wells)	G-II Aquifer (without wells)	G-II Aquifer with wells		G-II Aquifer without wells	
				source	perimeter	source	perimeter
Total BTEX	26	50	50	500	50	1000	50
Benzene	8.2	1	50	250	1	500	50
TRPH	3.95^	5^	5^	50^	5^	100^	5^
Lead	9.4	50	50	500	50	1^	50
EDB	<0.02	0.02	0.02	0.02	0.02	0.4	0.02
Total Naphs	75.7	100	100	1000	100	2000	100
EPA 610	<10	DL	DL	10xDL	DL	20xDL	DL
EPA 601	2.1	3.0	3.0	10xDW-SRLs	DW-SRLs	20xDW-SRLs	DW-SRLs
Arsenic	NA	50	50	500	50	1^	50
Cadmium	NA	10	10	100	10	200	10
Chromium	NA	50	50	500	50	1^	50
EPA 624	NA	DW-SRLs	DW-SRLs	10xDL-SRLs	DW-SRLs	20xDW-SRLs	DW-SRLs
EPA 625	NA	DW-SRLs	DW-SRLs	10xDL-SRLs	DW-SRLs	20xDW-SRLs	DW-SRLs

Note
All data in µg/L unless otherwise noted
^ data in mg/L
Source: monitoring wells near suspected hydrocarbon source

6.0 REFERENCES

ABB Environmental Services, Inc., 1995, RCRA Facility Investigation, Coastal Systems Station Panama City, Florida.

Bouwer, H 1989. The Bouwer and Rice Slug Test - an Update. Groundwater, v. 27,pp. 304-309.

Bouwer, H. and R.C. Rice. 1976, A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Complete or Partially Penetrating Wells. Water Resources, V. 12, pp. 423-428.

Commanding Officer, Navy Experimental Diving Unit, Summary of the Command Investigation of the Building 300 Fuel Spill of 7 Sep 96, October 31, 1996.

Duffield, G.M., and Rumbaugh, J.O. 1991. AQTESOLV, Aquifer Test Solver, Ver. 1.

E.C. Jordan Company, 1990, Release Detection Program For Underground Storage Tanks, Naval Coastal Systems Center, Panama City, Florida.

Florida Department of Environmental Protection, October 1990. *No Further Action and Monitoring Only Guidelines for Petroleum Contaminated Sites.* Guidance document issued by Bureau of Waste Cleanup, Technical Review Section.

U.S. Geological Survey. Panama City, FLA., Quadrangle 1982. 7.5 minute series, Topographic Quadrangle Maps of Florida: scale 1:24,000.

U.S. Geological Survey. Panama City Beach, FLA., Quadrangle 1982. 7.5 minute series, Topographic Quadrangle Maps of Florida: scale 1:24,000.

APPENDIX A

DISCHARGE NOTIFICATION FORM AND FDEP CORRESPONDENCE

Florida Department of Environmental Regulation
Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Discharge Reporting Form
Form No.
Effective Date: December 31, 1990
DER Application No.
Page 1 of 2

Discharge Reporting Form

Use this form to notify the Department of Environmental Regulation of:

1. Results of tank tightness testing that exceed allowable tolerances within ten days of receipt of test result.
2. Petroleum discharges exceeding 25 gallons on pervious surfaces as described in Section 17-761.460 F.A.C. within one working day of disco
3. Hazardous substance (CERCLA regulated) discharges exceeding applicable reportable quantities established in 17-761.460(2) F.A.C., w one working day of the discovery.
4. Within one working day of discovery of suspected releases confirmed by: (a) released regulated substances or pollutants discover the surrounding area, (b) unusual and unexplained storage system operating conditions, (c) monitoring results from a leak detection me or from a tank closure assessment that indicate a release may have occurred, or (d) manual tank gauging results for tanks of 550 ga or less, exceeding ten gallons per weekly test or five gallons averaged over four consecutive weekly tests.

Mail to the DER District Office in your area listed on the reverse side of this form

PLEASE PRINT OR TYPE

Complete all applicable blanks

1. DER Facility ID Number: 038518667 2. Tank Number: G300R1 3. Date: 9/17/96
4. Facility Name: COASTAL SYSTEMS STATION

Facility Owner or Operator: U.S. NAVY

Facility Address: 6703 W. Hwy 98 PANAMA CITY FL 32407-7001

Telephone Number: (904) 235-5859 County: BAY

Mailing Address: NAVAL SURFACE WARFARE CENTER COASTAL SYSTEMS STATION, CODE 051E

5. Date of receipt of test results or discovery: 9/17/96 month/day
6. Method of initial discovery. (circle one only)
   - A. Liquid detector (automatic or manual)
   - B. Vapor detector (automatic or manual)
   - C. Tightness test (underground tanks only).
   - D. Emptying and Inspection.
   - E. Inventory control.
   - (F) Vapor or visible signs of a discharge in the vi
   - G. Closure: _____ (ex
   - H. Other: _____
7. Estimated number of gallons discharged: 100 - 150 GALLONS
8. What part of storage system has leaked? (circle all that apply) A. Dispenser OVERFILL B. Pipe C. Fitting D. Tank E. Unk
9. Type of regulated substance discharged. (circle one)
   - A. leaded gasoline
   - B. unleaded gasoline
   - C. gasohol
   - D. vehicular diesel
   - F. aviation gas
   - G. jet fuel
   - L. used/waste oil
   - (M) diesel
   - Q. new/lube oil
   - V. hazardous substance includes pesticides, amm chlorine and derivatives (write in name of Chemical Ab Service CAS number) _____
   - Z. other (write in name) _____
10. Cause of leak. (circle all that apply)
    - A. Unknown
    - B. Split
    - C. Loose connection
    - D. Corrosion
    - E. Puncture
    - F. Installation failure
    - G. Spill _____
    - (H) Overfill
    - I. Other (specify) _____
11. Type of financial responsibility. (circle one)
    - A. Third party insurance provided by the state insurance contractor
    - B. Self-insurance pursuant to Chapter 17-769.500 F.A.C.
    - (C) Not applicable (FEDERAL FACILITY)
    - D. None
12. To the best of my knowledge and belief all information submitted on this form is true, accurate, and complete.

Michael D. Clayton ENVIR. ENGINEER — Printed Name of Owner, Operator or Authorized Representative

Michael D. Clayton — Signature of Owner, Operator or Authorized Represent

Author: McDonald_Arturo at PC-IRM1
Date: 9/26/96 5:29 PM
Priority: Normal
Receipt Requested
TO: Ericson_E@pns1.dep.state.fl.us at -INTERNET
CC: Cross_Mike at PC-IRM5, Oster_Bill at PC-IRM5, Clayton_Mike at PC-IRM4, NJUgolini@efdsouth.navfac.navy.mil at -INTERNET, Snow_Rick_CDR at PC-IRM2, Moody_T@pns1.dep.state.fl.us at -INTERNET
Subject: Initial Remedial Action follow-up report

Dear Mr. Ericson:

This is a follow-up to our letter of September 23, 1996 (faxed on 9/20/96) regarding the initial remedial action in the vicinity of our AST #G300R1.

This initial remedial action was abandoned on 9/23/96 after it became apparent that the amount of excessively contaminated soil was not the result of just the discharge discovered and reported on 9/17/96. We believe that this contamination resulted from various generator day-tank overfills since 1972.

It is our intent at this time to fill the hole with clean backfill and to initiate a Contamination Assessment Report in accordance with F.A.C. Rule 62-770.

If you require additional information at this time, please call me at (904) 234-4743 or Mike Cross at (904) 234-4744. I will be out of the office until Monday, 10/7/96.

Author: Eric Ericson PEN 904/444-8360 <ERICSON_E@pns1.dep.state.fl.us> at -INTERNET
Date: 9/27/96 9:03 AM
Priority: Normal
TO: McDonald_Arturo at PC-IRM1
CC: NUZIE_E@dep.state.fl.us at -INTERNET, PINKOVSKY_D@epic.dep.state.fl.us at -INTERNET,
MOODY_T@pns1.dep.state.fl.us at -INTERNET
Subject: Re: Initial Remedial Action - Coastal Systems Station

Regarding the Discharge Reporting Form which reported a 9/17/96 discovery of contamination at Coastal Systems Station (DEP #03/8518667 and Navy Tank #G300R1), this office referred the initial investigation of the discovery to the Bay County Public Health Unit (BCPHU). The BCPHU is under contract with the DEP to investigate initial discoveries of contamination as well as perform annual inspections of all regulated pollutant storage tanks in Bay County, Florida.

Mr. Drew Pinkovsky or his associate from the BCPHU will perform an inspection of this discovery and a letter to perform a Florida Chapter 62-770 Remedial Action should be sent by his office. From that point on, our Federal Facilities Coordinator, Mr. Eric Nuzie will become your point of contact related to submittals and reviews of Chapter 62-770 technical documents. In the Pensacola DEP District Office, we are concerned about what happens in our District, but we feel that it would be most appropriate if you eliminated us, the "middleman" from your technical document submittals.

Although you will be submitting the Chapter 770 cleanup documents to Mr. Nuzie, if it is possible, will you please send copies of your letters of transmittals to Mr. Nuzie to us at our District Office? Sending the District Office copies of the letters of transmittals is not required, but it will help us monitor your progress.

If we can help, please feel free to call.

Drew Pinkovsky - Bay County Public Health Unit - (904) 872-4815
Eric Nuzie - FDEP Federal Facilities Coordinator - (904) 488-3935
Eric Ericson - FDEP Northwest District - (904) 444-8360

Thanks,

Eric Ericson, Supervisor
Storage Tank Section

APPENDIX B

CAR SUMMARY SHEET

CONTAMINATION ASSESSMENT REPORT SUMMARY SHEET

Facility Name: Coastal Systems Station, Site G300 Reimbursement Site: ☐

Location: Panama City, Florida State Contract Site: ☐

EDI #: _____ FAC I.D.# 038518667 Other: Non-Prog. ☑

Date Reviewed: _____ Local Government: _____

(1) Source of Spill: Day tank vent line Date of Spill: 07 Sep 96

(2) Type of Product:

Gasoline Group	Gallons Lost	Kerosene Group	Gallons Lost
☐ Leaded		☐ Kerosene	
☐ Unleaded Regular		☑ Diesel	≈ 132 gal
☐ Unleaded Premium		☐ JP-4 Jet Fuel	
☐ Gasohol		☐ Jet A Fuel	
☐ Undetermined		☐ Unknown	

(3) Description of IRA: IRA soil excavation started adjacent to building but discontinued due to potential impact to structural integrity of building.

☐ Free product Removal: _____ (gals)
☑ Soil Removal: unknown (cubic yds)
☐ Soil Incineration: _____ (cubic yds)

(4) Free Product still present (yes/no) No Maximum apparent product thickness: N/A (feet)

(5) Maximum Groundwater contamination levels (ppb): Total VOA: 26 benzene: 8.2 EDB: < 0.020
lead: 9.4 MTBE: <1.0 other: TRPH & NAPs

(6) Brief lithologic description: Light gray to white to yellowish orange, fine grained sand to 15 bls at which point borings terminated. clayey sand and sandy clay w/ abundant shell fragments, no significant lithologic variations across site.

(7) Areal and vertical extent of soils contamination defined (yes/no) yes

Highest current soil concentration (OVA: 300 ppm) or (EPA method 5030/8020: 4320 ppb)

(8) Lower aquifer contaminated? (yes/no) - Depth of vertical contamination: No vertical extent well installed

(9) Date of last complete round of groundwater sampling: 4/23/97 Date of last soil sampling: 4/23/97

(10) QAPP approved? (yes/no) Date: 6/16/96

(11) Direction (e.g. NNW) of surficial groundwater flow: SSE (Figure 3-1 on page 3-3)

(12) Average depth to groundwater: 8 (ft)

(13) Observed range of seasonal groundwater fluctuations: @ 1 (ft) (Based on water level data collected during the CAR investigation)

(14) Estimated rate of groundwater flow: 0.34 (ft/day)

(15) Hydraulic gradient across site: 0.01 (ft/ft)

(16) Aquifer characteristics:

	Values	Units	Method
Hydraulic conductivity	10.24	ft/day	Bouwer & Rice, 1976
Storage coefficient	-	ft/ft	-
Aquifer thickness	48	ft	Effective aquifer thickness taken as depth from surficial aquifer to top of Intracoastal Formation (literature)
Effective soil porosity	30	%	Literature
Transmissivity	368	gal/day/ft	T = Kb

(17) Other remarks: None

APPENDIX C

TANK CLOSURE ASSESSMENT REPORT

CLOSURE ASSESSMENT
UNDERGROUND STORAGE TANK
BUILDING 300

NAVAL SURFACE WARFARE CENTER
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

Unit Identification Code: N61331

Prepared by:

Navy Public Works Center
Environmental Department
310 John Tower Road
Pensacola, Florida, 32508

Prepared for:

Commanding Officer, Coastal Systems Station
Dahlgren Division, Naval Surface Warfare Center
6703 West Highway 98
Panama City, Florida 32407-7001

Mr Mike Clayton, Code 051EMC, Environmental Engineer

April 1997

TABLE OF CONTENTS

Closure Assessment Report
Underground Storage Tank
Building 300
Coastal Systems Station
Panama City, Florida

GLOSSARY

FAC	Florida Administrative Code
OVA	Organic Vapor Analyzer
AST	Aboveground Storage Tank
UST	Underground Storage Tank
USEPA	U.S. Environmental Protection Agency

CLOSURE ASSESSMENT REPORT
UNDERGROUND STORAGE TANK
BUILDING 300

1.0 Facility

Building 300
Naval Surface Warfare Center
Coastal Systems Station
Panama City, Bay County, Florida

2.0 Operator

Commanding Officer, Coastal Systems Station
Dahlgren Division, Naval Surface Warfare Center
6703 West Highway 98, Code 051 EMC
Panama City, Florida 32407-7001

3.0 Site Location

See Figure 1.

4.0 Date of Closure

17 September 1996

5.0 Tank Status

There was one 2500 gallon underground storage tank (UST) removed from the southwest corner of Building 300 by the Public Works Center (PWC) as depicted by Figure 2. The UST was emptied prior to commencement of work by the Coastal Systems Station (CSS). The UST was completely decontaminated and rendered unuseable by PWC. The UST was properly disposed as scrap metal.

6.0 Tank Contents

Diesel

7.0 Tank Condition

The UST was in good condition at the time of removal.

8.0 Tank Area

The size of the excavation, was approximately twelve (12) feet wide by twenty (20) feet long and eight (8) feet deep. The excavation was filled with clean fill and compacted to grade.

9.0 Soil Screening

- Seven (7) soil samples were collected for headspace screening with an organic vapor analyzer (OVA). The samples were extracted at each side and underneath the UST is depicted by Figure 2.

- The soil screening was conducted in accordance with the headspace screening criteria in Chapter 62-770 FAC and PWC's Comprehensive Quality Assurance Plan.

10.0 Groundwater Analysis

A temporary groundwater monitoring well was placed at the center of the UST excavation, the well was developed and groundwater samples were collected on 25 March 1997. The samples were transported to the PWC Laboratory in Pensacola, Florida. The samples were analyzed using U.S. Environmental Protection Agency (EPA) Methods 8260 and 8270.

11.0 Conclusions

There were no indications of petroleum contamination noted above the state target levels for storage tank closures.

There were low levels of Chloroform, Bromodichloromethane, and Dibromochloromethane. The levels were below the State of Florida Drinking Water Standards (62-550.310 (2)(a)). There may be a leak in the local water supply or water treatment systems.

12.0 Recommendations

No further action.

13.0 Closure Assessment

Performed by the Public Works Center (PWC) Pensacola, Florida.

14.0 Project Manager

Mr. Paul R. Semmes, P.E.

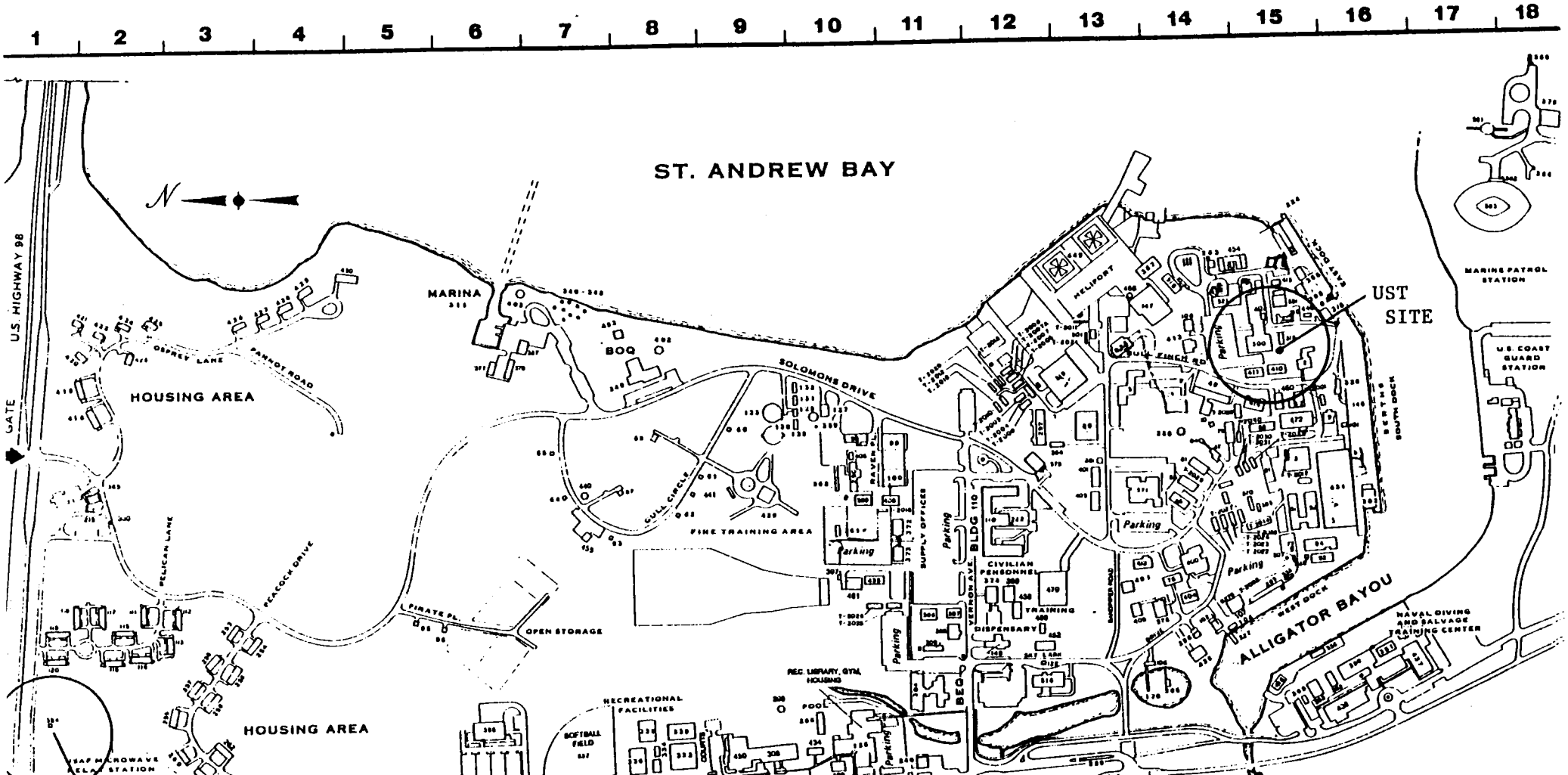
15.0 Project Number

1395003

16.0 Report Date

21 April 1997

Figures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ST. ANDREW BAY
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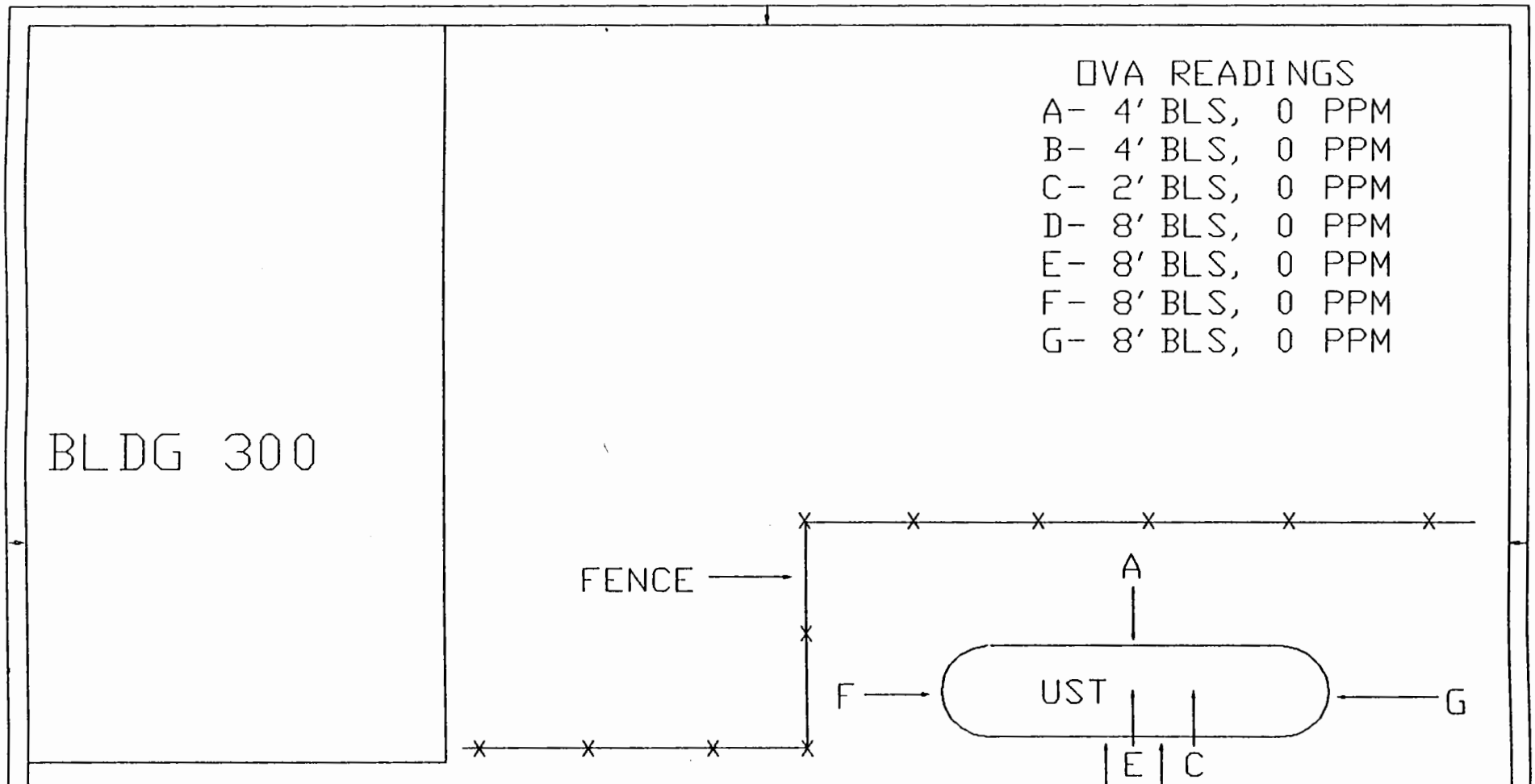
BOQ
SOLOMONS DRIVE
HOUSING AREA
OSPREY LANE
PANNOT ROAD
PELICAN LANE
PEACOCK DRIVE
PINATE PL.
OPEN STORAGE
HOUSING AREA
GULL CIRCLE
FIRE TRAINING AREA
HELIPORT
UST
SITE
SUPPLY OFFICES
BLDG 110
VERMONT AVE.
CIVILIAN PERSONNEL
TRAINING
DISPENSARY
BEQ
Parking
RAVEN
MAHONEY ROAD
REC. LIBRARY, GYM, HOUSING
POOL
RECREATIONAL FACILITIES
SOFTBALL FIELD
COURTS
ALLIGATOR BAYOU
NAVAL DIVING AND SALVAGE TRAINING CENTER
MARINE PATROL STATION
U.S. COAST GUARD STATION
EAST DOCK
WEST DOCK
BERTHS
SOUTH DOCK


OVA READINGS
A- 4' BLS, 0 PPM
B- 4' BLS, 0 PPM
C- 2' BLS, 0 PPM
D- 8' BLS, 0 PPM
E- 8' BLS, 0 PPM
F- 8' BLS, 0 PPM
G- 8' BLS, 0 PPM
BLDG 300
FENCE
A
F
UST
G
E
C

Attachments

APPLICATION FOR CLOSURE OF POLLUTANT STORAGE TANK SYSTEM

Provide the facility information requested below.

FDEP Facility # 03/8518667 Facility Name U. S. Navy

Facility Location Naval Surface Warfare Center, Coastal Systems Station

Property Owner Commanding Officer, NSWCCSS (Code CP2F)

Property Owner Address 6703 West Highway 98, Panama City, FL 32407-7001

Phone (904) 235-5859

Method of Tank Closure Removal

Pollutant Storage Systems Specialty Contractor (PSSSC) who will be on site supervising closure activities. Attach copy of PSSSC license.

Individual Licensed as PSSSC N/A PSSSC # N/A

Firm U.S. Navy - Public Works Center (PWC)

Address 310 John Tower Road, Pensacola, FL 32508

Indicate the firm (s) that will degas, remove, and transport the tank(s), and the method of degassification.

Degassification Method Air Eduction (API 1604-4.2.5)

Firm Removing Tanks U.S. Navy - Public Works Center (PWC)

Contact Mr. Paul Semmes, P.E. Phone (904) 293-0635

Firm Transporting Tanks U. S. Navy - Public Works Center (PWC)

Contact Mr. Paul Semmes, P.E. Phone (904) 293-0635

Firm Receiving Tanks for Ultimate Disposal U.S. Navy - DRMO

Contact Ms. Gayle Brown Phone (904) 452-3459

Indicate the laboratory that will conduct groundwater analysis.

Contracted Laboratory U.S. Navy - PWC Phone (904) 452-4728

Contact Mr. Joe Moore FDEP QA/QC 920121G

Indicate firm(s) transporting and disposing of contaminated soils.

Firm Transporting Soils N/A

Contact _____ Phone _____

Firm Remediating/Disposing Soils _____

Contact _____ Phone _____

Disposal/Remediation Method _____

Indicate the firm(s) that will transport and ultimately dispose of residual product and sludge from the tanks.

Firm Transporting Residual Product and Sludge U.S. Navy - PWC

Contact Mr. Jerry Levins Phone (904) 452-8237

Firm Receiving/Disposal Residual Product and Sludge DRMO

Contact Ms. Gayle Brown Phone (904) 452-3459

Indicate the firm and names of personnel that will conduct field sampling.

Contracted Firm U.S. Navy - Public Works Center (PWC)

Contact Mr. Paul Semmes, P.E. Phone (904) 293-0635

Person (s) Sampling Mr. Paul Semmes, P.E.

Equipment used for soil screening (Specific Make and Model) Organic Vapor Analyzer (OVA) Thermo Environmental (680 HVM) equipped w/Flame Ionization Detector (FID).

Florida Department of Environmental Protection
Twin Towers Office Bldg. ● 2600 Blair Stone Road ● Tallahassee, Florida 32399-2400

DEP Form # 62-761.900(5)
Underground Storage Tank Installation
Form Title Removal Form for Certified Contractors
Effective Date December 10, 1990
DEP Application No. _____
(Filled in by DEP)

Underground Storage Tank Installation and Removal Form For Certified Contractors

'ollutant Storage Systems Contractor as defined in Section 489.105, Florida Statutes (certified contractors as defined in Section 2-761.200, Florida Administrative Code) shall use this form to certify that the installation, replacement or removal of the storage tank system(s) ɔcated at the address listed below was performed in accordance with Department Reference Standards.

General Facility Information

1. DEP Facility Identification No.: 03/8518667
2. Facility Name: US NAVY - NSWC, CSS Telephone: (904) 235-5859
3. Street Address (physical location): 6703 WEST HIGHWAY 98, PANAMA CITY, FLORIDA 32407 - 7001
4. Owner Name: COMMANDING-OFFICER,NSWC,CSS Telephone: (904) 235-5859
5. Owner Address: CO, NSWC,SS (CODE CP25) 6703 WEST HIGHWAY 98, PANAMA CITY, FL 32407
6. Number of Tanks: a. Installed at this time 0 b. Removed at this time 1
7. Tank(s) Manufactured by: UNKNOWN
8. Date Work Initiated: 17 SEPTEMBER 1996 9. Date Work Completed: 17 SEPTEMBER 1996

Underground Pollutant Tank Installation Checklist

Please certify the completion of the following installation requirements by placing an (X) in the appropriate box.

1. The tanks and piping are corrosion resistant and approved for use by State and Federal Laws. ☐
2. Excavation, backfill and compaction completed in accordance with NFPA (National Fire Protection Association) 30(96), API (American Petroleum Institute) 1615, PEI (Petroleum Equipment Institute) RP100-94 and the manufacturers' specifications. ☐
3. Tanks and piping pretested and installed in accordance with NFPA 30(96), API 1615, PEI/RP100-94 and the manufacturers' specifications. ☐
4. Steel tanks and piping are cathodically protected in accordance with NFPA 30(96), API 1632, UL (Underwriters Laboratory) 1746, STI (Steel Tank Institute) R892-89 and the manufacturers' specifications. ☐
5. Tanks and piping tested for tightness after installation in accordance with NFPA 30(96) and PEI RP100-94. ☐
6. Monitoring well(s) or other leak detection devices installed and tested in accordance with Section 62-761.640, Florida Administrative Code (F.A.C.) ☐
7. Spill and overfill protection devices installed in accordance with Section 62-761.500, F.A.C. ☐
8. Secondary containment installed for tanks and piping as applicable in accordance with Section 62-761.500, F.A.C. ☐

Please Note: The numbers following the abbreviations (e.g. API 1615) are publication or specification numbers issued by these institutions.

derground Pollutant Tank Removal Checklist

1. Closure assessment performed in accordance with Section 62-761.800, F.A.C. ☒
2. Underground tank removed and disposed of as specified in API 1604 in accordance with Section 62-761.800, F.A.C. ☒

DEP Form # 62-761.900(5)
Underground Storage Tank Installation
Form Title Removal Form for Certified Contractors
Effective Date December 10, 1990
DEP Application No.
(Filled in by DEP)

Certification

I herby certify and attest that I am familiar with the facility that is registered with the Florida Department of Environmental Protection; that to the best of my knowledge and belief, the tank installation, replacement or removal at this facility was conducted in accordance with Chapter 489 and Section 376.303, Florida Statutes and Chapter 62-761, Florida Administrative Code (and its adopted reference sources form publications and standards of the National Fire Protection Association (NFPA), the American Petroleum Institute (API), the National Association of Corrosion Engineers (NACE), American Society for Testing and Materials (ASTM); Petroleum Equipment Institute (PEI); Steel Tank Institute (STI); Underwriters Laboratory (UL); and the tank and integral piping manufacturers' specifications; and that the operations on the checklist were performed accordingly.

US NAVY - PUBLIC WORKS CENTER, PENSACOLA, FL
(Type or Print)
Certified Pollutant Tank Contractor Name

NA
PSSSC Number

Pollutant Storage Systems Contractor License Number (PSSC)

Certified Tank Contractor Signature

3/28/97
Date

PAUL R SEMMES, PE
ENVIRONMENTAL ENGINEER

28 MAR 97
Date

(Type or Print)
Field Supervisor Name

Field Supervisor Signature

3/29/97
Date

The owner or operator of the facility must register the tanks with the Department upon completion of the installation. The installer must submit this form no more than 30 days after the completion of installation to the Department of Environmental Protection at the address printed at the top of page one.

Florida Department of Environmental Protection
Twin Towers Office Bldg. ● 2600 Blair Stone Road ● Tallahassee, Florida 32399-2400

Form Title: Closure Assessment Form
Effective Date: December 10, 1990
DEP Application No. _____ (Filled in by DEP)

Closure Assessment Form

of storage tank systems that are replacing, removing or closing in place storage tanks shall use this form to demonstrate that a storage closure assessment was performed in accordance with Rule 62-761.800(3) or 62-762.800(3), Florida Administrative Code.

Please Print or Type
Complete All Applicable Blanks

1. Date 21 FEBRUARY 1997
2. DEP Facility ID Number: 03/8518667 3. County BAY
4. Facility Name: US NAVY - NAVAL SURFACE WARFARE CENTER, COASTAL SYSTEMS STATION
5. Facility Owner: COMMANDING OFFICER, NSWC CSS, CODE CP2F
6. Facility Address: BUILDING 300, COASTAL SYSTEMS STATION
7. Mailing Address: 6703 WEST HIGHWAY 98, PANAMA CITY, FLORIDA 32407-7001
8. Telephone Number: (904) 235-5859 9. Facility Operator: MR MIKE CLAYTON
10. Are the Storage Tank(s): (Circle one or both) A. Aboveground or (B.) Underground
11. Type of Product(s) Stored: DIESEL
12. Were the Tank(s): (Circle one) A. Replaced (B.) Removed C. Closed in Place D. Upgraded (aboveground tanks only)
Number of Tanks closed: ONE 14. Age of Tanks: _____

Facility Assessment Information

Yes	No	Not Applicable	
☐	☒		1. Was a Discharge Reporting Form submitted to the Department? If yes, When: _____ Where: _____
☒	☐		2. Is the depth to ground water less than 20 feet?
☐	☒	☐	3. Are monitoring wells present around the storage system? If yes, please specify ☐ Vapor Monitoring ☐ Water Monitoring
☐	☒	☐	4. Is there free product present in the monitoring wells or within the excavation?
☐	☐	☒	5. Were the petroleum hydrocarbon vapor levels in the soil greater than 500 parts per million for gasoline? Specify sample type: ☐ Vapor Monitoring wells ☐ Soil sample(s)
☐	☒	☐	6. Were the petroleum hydrocarbon vapor levels in the soils greater than 50 parts per million for diesel/kerosene? Specify sample type: ☐ Vapor Monitoring wells ☒ Soil sample(s)
☐	☒	☐	7. Were the analytical laboratory results of the ground water sample(s) greater than the allowable state target levels? (See target levels on reverse side of this form and supply laboratory data sheet(s).
☐	☐	☒	8. If a used oil storage system, did a visual inspection detect any discolored soil indicating a release?
☐	☒	☐	9. Are any potable wells located within 1/4 of a mile radius of the facility?
☒	☐	☐	10. Is there a surface water body within 1/4 mile radius of the site? If yes, indicate distance: 300 ft.
	☐	☐	11. A detailed drawing or sketch of the facility that includes the storage system location, monitoring wells, buildings, storm drains, sample locations, and dispenser locations must accompany this form.
	☐	☒	12. If a facility has a pollutant storage tank system that has both gasoline and kerosine/diesel stored on site, both EPA method 602 and EPA method 610 must be performed on the ground water samples.

DEP Form # 62-761.900(4)
Form Title: Closure Assessment Form
Effective Date: December 18, 1990
DEP Application No. _____
(Filled in by DEP)

13. Amount of soils removed and receipt of proper disposal.
14. If yes is answered to any one of questions 5-9, a Discharge Reporting Form 62-761.900(1) indicating a suspected release shall be submitted to the Department within one working day.
15. A copy of this form and any attachments must be submitted to the Department's district office in your area and to the county within 60 days of completion of tank removal or filling a tank with an inert material.

Signature of Owner — Date: 4/30/97

Signature of Person Performing Assessment — Date: 2/21/97

PAUL R SEMMES, PE
ENVIRONMENTAL ENGINEER

Title of Person Performing Assessment

State Ground Water Target Levels That Affect A Pollutant Storage Tank System Closure Assessment

1. For Gasoline (EPA Method 602 or equivalent):

   a. Benzene 1 ug/l

   b. Total VOA 50 ug/l
   -Benzene
   -Toluene
   -Total Xylenes
   -Ethylbenzene

   c. *tert*-butyl methyl ether (MTBE) 50 ug/l

2. For kerosene/diesel (EPA Method 610 or equivalent):

   a. Polycyclic Aromatic Hydrocarbons (PAH)
   (Best achievable detection limit, 10 ug/l maximum)

Summary of OVA Readings

Closure Assessment Report
Underground Storage Tank
Building 300
Coastal Systems Station
Panama City, Florida

Hand Auger Sample No.	Depth (Feet)	Unfiltered (ppm)	Filtered (ppm)
SS-1	4	<1	<1
SS-2	4	<1	<1
SS-3	2	<1	<1
SS-4	8	<1	<1
SS-5	8	<1	<1
SS-6	8	<1	<1
SS-7	8	<1	<1

Readings for unfiltered samples are total hydrocarbon readings including methane; readings for filtered samples are methane only.

Notes: ppm = parts per million.

Navy Public Works Center
Environmental Laboratory

Bldg. 3887, Code 920
NAS Pensacola, FL 32508
Phone (904) 452-4728/3642
DSN 922-4728/3642
FAX (904) 452-2799/2387

Client: NPWC Environmental
Address: Bldg. 3887, Code 910
NAS Pensacola,FL 32508
Phone #: 452-3180
Contact: Paul Semmes

Analytical Report

Total Volatiles by Method 8260

Lab Report Number: 71246
Sample Date: 03/25/97
Received Date: 03/27/97
Sample Site: Eglin, Tyndall, or CSS-P.C.
Job Order No.: 181 5004

LAB Sample ID#	1- 71246
Sample Name / Location	Bldg. 300 MW
Collector's Name	S. Dueitt, R. Spencer
Date & Time Collected	03/25/97 @ 1043
Sample Type (composite or grab)	Grab
Analyst	J. Moore
Date of Extraction / Initials	03/27/97 JM
Date of Analysis	03/27/97
Sample Matrix	GW
Dilution	X 1

Compound Name	1- 71246	units	Det. Limit	Flags
Benzene	BDL	ug/L	1	
Bromobenzene	BDL	ug/L	1	
Bromochloromethane	BDL	ug/L	1	
Bromodichloromethane	6	ug/L	1	
Bromoform	BDL	ug/L	2	
Bromomethane	BDL	ug/L	3	
n-Butylbenzene	BDL	ug/L	1	
sec-Butylbenzene	BDL	ug/L	1	
tert-Butylbenzene	BDL	ug/L	2	
Carbon Tetrachloride	BDL	ug/L	1	
Chlorobenzene	BDL	ug/L	1	
Chloroethane	BDL	ug/L	1	
Chloroform	22	ug/L	1	
Chloromethane	BDL	ug/L	1	
2-Chlorotoluene *	BDL	ug/L	1	
4-Chlorotoluene *	BDL	ug/L	1	
Dibromochloromethane	1	ug/L	1	
1,2-Dibromo-3-chloropropane *	BDL	ug/L	5	
1,2-Dibromoethane	BDL	ug/L	1	
Dibromomethane	BDL	ug/L	1	
1,2-Dichlorobenzene	BDL	ug/L	1	
1,3-Dichlorobenzene	BDL	ug/L	1	
1,4-Dichlorobenzene	BDL	ug/L	1	
Dichlorodifluoromethane	BDL	ug/L	1	
1,1-Dichloroethane	BDL	ug/L	1	
1,2-Dichloroethane	BDL	ug/L	1	
1,1-Dichloroethene	BDL	ug/L	1	
cis-1,2-Dichloroethene	BDL	ug/L	1	
trans-1,2-Dichloroethene	BDL	ug/L	1	
1,2-Dichloropropane	BDL	ug/L	1	
1,3-Dichloropropane	BDL	ug/L	1	
2,2-Dichloropropane	BDL	ug/L	1	
1,1-Dichloropropene	BDL	ug/L	1	
Ethylbenzene	BDL	ug/L	1	
Ethyl ether *	BDL	ug/L	1	
Hexachlorobutadiene	BDL	ug/L	2	
2-Hexanone *	BDL	ug/L	1	
Isopropylbenzene	BDL	ug/L	1	
p-Isopropyltoluene	BDL	ug/L	1	

Navy Public Works Center
Environmental Laboratory

Bldg. 3887, Code 920
NAS Pensacola, FL 32508
Phone (904) 452-4728/3642
DSN 922-4728/3642
FAX (904) 452-2799/2387

Client: NPWC Environmental
Address: Bldg. 3887, Code 910
NAS Pensacola,FL 32508
Phone #: 452-3180
Contact: Paul Semmes

Analytical Report

Total Volatiles by Method 8260

Lab Report Number: 71246
Sample Date: 03/25/97
Received Date: 03/27/97
Sample Site: Eglin, Tyndall, or CSS-P.C.
Job Order No.: 181 5004

Compound Name	1- 71246	units	Det. Limit	Flags
Methylene Chloride	BDL	ug/L	1	
Methyl ethyl ketone (MEK) *	BDL	ug/L	2	
Methyl isobutyl ketone (MIBK) *	BDL	ug/L	1	
Methyl-tert-butyl ether (MTBE)	BDL	ug/L	1	
Naphthalene	BDL	ug/L	1	
n-Propylbenzene	BDL	ug/L	1	
Styrene	BDL	ug/L	1	
1,1,1,2-Tetrachloroethane	BDL	ug/L	1	
1,1,2,2-Tetrachloroethane	BDL	ug/L	1	
Tetrachloroethene	BDL	ug/L	1	
Toluene	BDL	ug/L	1	
1,2,3-Trichlorobenzene	BDL	ug/L	1	
1,2,4-Trichlorobenzene	BDL	ug/L	1	
1,1,1-Trichloroethane	BDL	ug/L	1	
1,1,2-Trichloroethane	BDL	ug/L	1	
Trichloroethene	BDL	ug/L	1	
Trichlorofluoromethane	BDL	ug/L	1	
1,1,2-Trichloro-1,2,2-Trifluoroethane *	BDL	ug/L	1	
1,2,3-Trichloropropane	BDL	ug/L	1	
1,2,4-Trimethylbenzene	BDL	ug/L	1	
1,3,5-Trimethylbenzene	BDL	ug/L	1	
Vinyl Chloride	BDL	ug/L	1	
m,p-Xylene	BDL	ug/L	1	
Xylene	BDL	ug/L	1	

SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
1,2-Dichloroethane-d4	75-133	103
Toluene-d8	86-119	100
Bromofluorobenzene	85-116	102

Explanation of Flags:

COMMENTS :

BDL = Below Detection Limit. ug/L = microgram per Liter. ug/Kg = microgram per Kilogram. * = FL HRS certification pending.

Approved by : Jerry Dees, Laboratory Director

Date: 4/9/97
Report Generated

End of Report

Navy Public Works Center
Environmental Laboratory

Bldg. 3887, Code 920
NAS Pensacola, FL 32508 - 6500
Phone (904) 452-4728/3642
DSN 922-4728/3642

Client: NPWC Environmental
Address: Bldg. 3887, Code 910
NAS Pensacola,FL 32508
Phone #: 452-3180
Contact: Paul Semmes

Analytical Report

610 PAH's by Method 8270

Lab Report Number: 71246
Sample Date: 03/25/97
Received Date: 03/27/97
Sample Site: Eglin, Tyndall, or CSS-P.C.
Job Order No.: 181 5004

LAB Sample ID#	1- 71246
Sample Name / Location	Bldg. 300 MW
Collector's Name	S. Dueitt, R. Spencer
Date & Time Collected	03/25/97 @ 1043
Sample Type (composite or grab)	Grab
Analyst	M. Chambers
Date of Extraction / Initials	03/31/97 JJ
Date of Analysis	04/02/97
Sample Matrix	GW
Dilution	X 1

Compound Name	1- 71246	units	Det. Limit	Flags
Acenaphthene	BDL	ug/L	2	
Acenaphthylene	BDL	ug/L	2	
Anthracene	BDL	ug/L	2	
Benzo(a)anthracene	BDL	ug/L	2	
Benzo(a)pyrene	BDL	ug/L	2	
Benzo(b)fluoranthene	BDL	ug/L	2	
Benzo(g,h,i)perylene	BDL	ug/L	2	
Benzo(k)fluoranthene	BDL	ug/L	3	
Chrysene	BDL	ug/L	2	
Dibenz(a,h)anthracene	BDL	ug/L	2	
luoranthene	BDL	ug/L	2	
luorene	BDL	ug/L	2	
Indeno(1,2,3-cd)pyrene	BDL	ug/L	2	
1-Methylnaphthalene *	BDL	ug/L	2	
2-Methylnaphthalene	BDL	ug/L	3	
Naphthalene	BDL	ug/L	2	
Phenanthrene	BDL	ug/L	2	
Pyrene	BDL	ug/L	2	

SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
Nitrobenzene- d5	35-114	72
2-Fluorobiphenyl	43-116	80
Terphenyl -d14	33-141	93

COMMENTS :

BDL = Below Detection Limit. ug/L = microgram per Liter. ug/Kg = microgram per Kilogram. * = FL HRS certification pending.

Approved by : Jerry Deee, Laboratory Director

Date: 4/9/97
Report Generated

End of Report

CERTIFICATE
OF
DECONTAMINATION

It is hereby certified that the following Storage Tanks have been decontaminated by PWC Pensacola AST/UST Storage System Tank Team:

BLDG 300
NAVAL SURFACE WARFARE CENTER,
COASTAL SYSTEM STATION
PANAMA CITY, FLORIDA

The Storage Tanks listed above have been triple rinsed and cleaned in accordance with **40 CFR 261.7(b)(3)(i)** and have been rendered unuseable.

Signature

Paul R Semmes, PE
Environmental Engineer
Title

4/8/97
Date

APPENDIX D

FUEL SPILL INVESTIGATION REPORT

A14

DEPARTMENT OF THE NAVY
NAVY EXPERIMENTAL DIVING UNIT
321 BULLFINCH ROAD
PANAMA CITY, FLORIDA 32407-7015

IN REPLY REFER TO:
5102
Ser 01/ 444
31 Oct 96

From: Commanding Officer, Navy Experimental Diving Unit
To: Safety and Environmental Office, Coastal Systems Station, Panama City

Subj: FUEL SPILL INVESTIGATION SUMMARY

Encl: (1) Summary of the Command Investigation of the Building 300 Fuel Spill of 7 Sep 96

1. Enclosure (1) is forwarded as requested.

J. R. WILKINS III

Summary of the Command Investigation of the Building 300 Fuel Spill of 7 September 96

Attachment: Southern Earth Sciences Soil Core Sample Data Sheets

The following is a summary of the Command Investigation which determined the cause and estimated the extent of a diesel fuel spill that occurred 07 September 96 outside the NEDU Ocean Simulation Facility (OSF), Building 300. The extent of the spill was estimated using Emergency Diesel Generator (EDG) Operation Logs and fuel consumption data from the EDG manufacturer.

Findings of Fact

On 7 September 96, a Navy sailor standing watch at NEDU started the EDG day tank refueling pump in the manual mode. The tank has a float level that indicates the fuel level. The sailor left the pump running unattended for approximately one hour, and the day tank was filled beyond capacity.

While the day tank is equipped with a piping system that returns excess fuel to the source tank, because that piping is the same internal diameter as the supply piping, it could not accommodate the seven gallon per minute delivery rate of the EDG day tank fuel pump. As a result, fuel was displaced into the day tank vent pipe, which extends outside the OSF, at the Southwest corner the building, approximately 10 feet above the top of the day tank. Eventually, fuel reached the end of the vent pipe, spilling to the ground at the Southwest corner of the OSF.

During a security check approximately one hour after leaving the pump unattended, the sailor discovered a diesel fuel spill on the floor in the OSF machinery spaces, at the base of the day tank. Realizing he'd left the pump running, he immediately shut it off. The spill was less than two quarts, and the sailor immediately took affirmative steps to clean it up, using a mop and absorbent pads. At that time, he was not aware that the spill had occurred outside the OSF.

The outside spill was discovered on 16 Sep 96, by a Florida State inspector, who was at NEDU to inspect an unused underground fuel tank that was being removed, and noticed the smell at the site of the spill. A crew was assigned to excavate the area of the spill, in an attempt to remove all fuel contaminated-soil. Soil was removed to about four feet below the surface, placed in a large dumpster, and covered with plastic sheeting until it could be properly disposed.

Subsequently, NEDU commissioned Southern Earth Science Co., Panama City, FL, to characterize the impact of the spill on the soil surrounding the OSF; the results of that study were provided to NEDU 20 Sep 96. Soil core samples were taken in the immediate area of the spill, and along the walls extending from the corner (see

enclosure). These samples strongly suggest a long history of repeated diesel fuel spills in the vicinity from other sources, as high concentrations of diesel fuel were found 10 feet deep, as far as approximately 8 feet from the corner along the South wall, and 24 feet from the corner along the West wall.

The outside diesel fuel tank has a capacity of 750 gallons. The last time it was filled prior to this incident was on 28 Mar 96. Since then, the EDG had been run a total of approximately 34.1 hours. The published EDG fuel consumption rates were used to characterize fuel consumption, based on the average electrical load the EDG was sustaining during each recording period. Based on this analysis, approximately 522 gallons had been consumed by running the EDG since 28 Mar 96.

On 24 Sep 96, the outside EDG tank was refilled, taking 654 gallons to fill it to capacity, suggesting the outside tank still held approximately 95 gallons of fuel. This accounts for a total of approximately 617 gallons of diesel fuel, leaving approximately 132 gallons unaccounted for, and presumed spilled outside the OSF in the vicinity of the vent pipe during this incident.

MIKE CROSS

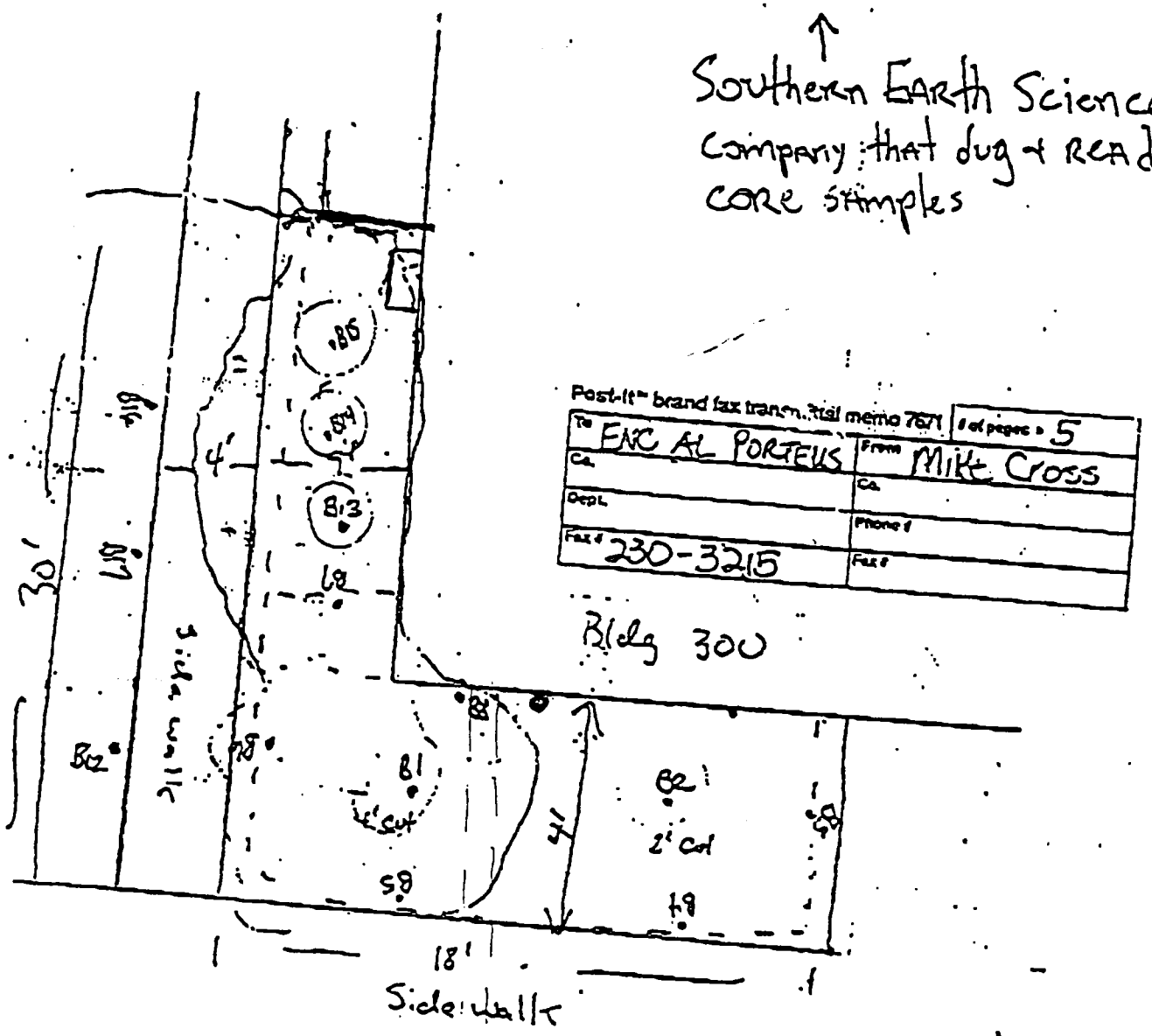
Keith Sibley
761-4773

↑

Southern EARTH Science
Company that dug & READ
CORE samples

Post-it™ brand fax transm. 7671 | # of pages ▸ 5

To	ENC AL PORTELLS	From	Mike Cross
Co.		Co.	
Dept.		Phone #	
Fax #	230-3215	Fax #	



FIELD OVA DATA

SITE NEDU JOB NO.

DATE 9-20-96 TECH.

BORING #	DEPTH (FEET)	SOIL CLASSIFICATION	W/O FILTER (PPM)	WITH FILTER (PPM)	CORR. READING (PPM)
B-1	4'	Bottom -	100.0	1.0	99.0 odor
4' cut	7'	-	860.0	200.0	660.0 St odor
	10'	-	>1000	800.0	>200.0 odor
	13'	-	>1000	>1000.0	? odor
B-2	2'	Bottom	24.0	Ø	24.0 Sl odor
	5'		5.4	Ø	5.4 Sl odor
2' cut	7'		5.8	Ø	5.8 Sl odor
	10'		920.0	900.0	20.0 Sl odor
	18'		>1000	>1000.0	Sl odor
B-3	1'	East Wall	3.0	Ø	3.0 No odor.
B-4	1'	South Wall	32.0	3.0	29.0 Sl odor
B-5	3'	South Wall	3.0	Ø	3.0 Sl odor
B-6	2'	West Wall	100.0	Ø	100.0 odor

FIELD OVA DATA

SITE NEDU JOB NO.

DATE 9-20-96 TECH.

BORING #	DEPTH (FEET)	SOIL CLASSIFICATION	W/O FILTER (PPM)	WITH FILTER (PPM)	CORR. READING (PPM)
B-8	6" In	North Wall	7.0	0	7.0 Sl odor
	3' In	North Wall	1.0	0	1.0
B-9	9'		1.0	0	1.0
	6.5'		0		
	10'		>1000.0	71000.0	? Sl odor
B-10	3'		90.0	10.0	80.0 odor
	7'		22.0	0	22.0 Sl odor
	8'		100.0	0	100.0 odor
B-11	1'		50	0	50 NO odor
	3'		0		0
	7'		0		0
	9'		0		0
B-12	1		1.0	0	1.0
	3'		0		0
	0	H Rubble			

FEH CO

FIELD OVA DATA

SITE NEDU

JOB NO.

DATE 7-2-96

TECH.

BORING #	DEPTH (FEET)	SOIL CLASSIFICATION	W/O FILTER (PPM)	WITH FILTER (PPM)	CORR. READING (PPM)
* B-13	1 ^		.2	Ø	.2
	3'		340.0	20.0	320.0 Sl odor
	7'		>1000.0	300.0	>700.0 Strong
*	10'		>1000.0	500.0	>500.0 Strong
B-14	1'		.1	Ø	.1 no odor
	3'		120.0	Ø	120.0 Sl odor
	7		760.0	220.0	540.0 Sl odor
*	10		>1000.0	>1000	Strong odor
B-15	1		Ø		Ø
	3		7.0	Ø	7.0 Sl odor
	7		280.0	50.0	230.0 Sl odor
	10		>1000.0	>1000.0	— Strong
B-16	1		Ø		Ø
	3		Ø		Ø
	7		Ø		Ø
	10		Ø		Ø
B					

FIELD OVA DATA

SITE NEOU

JOB NO.

DATE 9-20-96

TECH.

BORING #	DEPTH (FEET)	SOIL CLASSIFICATION	W/O FILTER (PPM)	WITH FILTER (PPM)	CORR. READING (PPM)	
B17	1'		0		0	
	3'		0		0	
	7'		0		0	
	9'		.3	0	.3	No odor
		Mike Cross				
		Lisa Ker				

APPENDIX E

SOIL BORING LOGS

SHEET 1 OF 2

See Boring location Figure

PROJECT: CTO 0027	BORING NO.: SB01
JOB NO.: 7540	TOTAL DEPTH: 12'
PROJ. MGR: Paul Calligan	LOGGED BY: G. Goode
DRILLING CONTRACTOR: TEG	EDITED BY:
DRILL RIG TYPE: Strataprobe Unit	
DRILLERS NAME: Jason Angelin	
SAMPLING METHODS: Split Spoon	
DRILLING TECHNIQUE: Direct Push	
HAMMER WT: NA	DROP: —
STARTED TIME: 11:25	DATE: 3/18/97
COMPLETED TIME: 12:10	DATE: 3/18/97
BORING DEPTH (ft.) 12'	BOREHOLE DIA.: 2 1/4"
CASING DEPTH (ft.) NA	
WATER DEPTH (ft.) @ 8'	
TIME:	
DATE:	
BACKFILLED TIME: 12:10 DATE: 3/18/97 BY: —	
TOP OF CASING ELEV.: —	DATUM:
AMOUNT OF FREE PROCUCT: —	
RISE/FALL OF WATER TABLE: —	TIME INTERVAL:

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6-IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION
0-1	SS	NA	24	12		None	ND	-	ND	0		
1-2			24	12	Dry		ND	-	ND	1		
2-3	SS			12						2		Sand, light gray, fine grained, no fines, dry
3-4			24	12	Dry		ND	-	ND	3	SP	
4-5	SS			12						4		Sand, white, fine grained very clean, no fines, dry
5-6			24	12	Dry		ND	-	ND	5		
6-7	SS			12						6		Sand, yellowish orange, fine grained little to no fines, dry
7-8			24	12	moist		ND	-	ND	7	SP	
8-9	SS			12	saturated					8		Sand, yellowish orange, very fine to fine grained, some fines moist
9-10			24	12			NA	NA	NA	9		
										10		

SHEET 2 OF 2

PROJECT: CTO 0027 | NO. 7540 | BORING NO. SB01

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT
10-11	Bliss Sampler	NA	24	NA	Saturated	Strong	NA	NA	NA
11-12							NA	NA	NA

DEPTH	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION :
1	SP	Sand, light gray, very fine to fine grained, little Fines, Saturated
2	E.O.B	
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

SHEET 1 OF 1

See Boring Location Figure

PROJECT: CTO 0027	BORING NO.: SB02
JOB NO.: 7540	TOTAL DEPTH: 12'
PROJ. MGR: Paul Calligan	LOGGED BY: G. Goode
DRILLING CONTRACTOR: TEG	EDITED BY:
DRILL RIG TYPE: Strataprobe	
DRILLERS NAME: Jason Angelin	
SAMPLING METHODS: Split Spoon	
DRILLING TECHNIQUE: Direct Push	
HAMMER WT: NA	DROP: —
STARTED TIME: 12:30	DATE: 3/18/97
COMPLETED TIME: 13:30	DATE: 3/18/97
BORING DEPTH (ft.): 12'	BOREHOLE DIA.: 2 1/4"
CASING DEPTH (ft.): NA	
WATER DEPTH (ft.): @ 8'	
TIME:	
DATE:	
BACKFILLED TIME: 13:30 DATE: 3/18/97 BY: TEG	
TOP OF CASING ELEV.: —	DATUM: —
AMOUNT OF FREE PROCUCT: —	
RISE/FALL OF WATER TABLE: —	TIME INTERVAL: —

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION
0-1	SS	NA	24	12		None	ND	-	ND	0		
1-2			24	12	Dry		ND	-	ND	1	SP	Sand, light gray, fine grained, occasional roots and dark organic matter, little fines, dry
2-3				12						2		
3-4	SS		24	12	Dry		ND	-	ND	3		
4-5	SS		24	12						4	SP	Sand, white, fine grained, very clean, no fines, dry
5-6				12	Dry		ND	-	ND	5		
6-7	SS			12						6	SP	Sand, yellowish Orange, fine to medium grained, some non plastic fines, dry
7-8			24	12	moist		ND	-	ND	7		
8-9	SS		24	12	Saturated					8		Sand, light brown very fine to fine grained, little fines, moist
9-10				12			NA	NA	NA	9		
										10		

SHEET 2 OF 2

PROJECT: CTO 0027 | NO. 7540 | BORING NO. SB02

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION :
10-11	Grab Sample	NA	24	NA	Saturated	none	NA	NA	NA	1	SP	Sand, light gray, very fine to fine grained, little Fines, Saturated
11-12							NA	NA	NA	2	E.O.B.	
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										10		
										11		
										12		
										13		
										14		
										15		
										16		
										17		
										18		
										19		
										20		

SHEET 1 OF 2

See Boring location Figure

PROJECT: CTO 0027	BORING NO.: SB03
	TOTAL DEPTH: 12'
JOB NO.: 7540	LOGGED BY: G. Goode
PROJ. MGR: Paul Culligan	EDITED BY:
DRILLING CONTRACTOR: TEG	
DRILL RIG TYPE: Stratoprobe	
DRILLERS NAME: Jason Angelin	
SAMPLING METHODS: Split Spoon	
DRILLING TECHNIQUE: Direct Push	
HAMMER WT: ~~14.20~~ N.A. NA	DROP: -
STARTED TIME: 14:20	DATE: 3/18/97
COMPLETED TIME: 14:50	DATE: 3/18/97
BORING DEPTH (ft.): 12'	BOREHOLE DIA.: 2 1/4"
CASING DEPTH (ft.): NA	
WATER DEPTH (ft.): @ 8'	
TIME:	
DATE:	
BACKFILLED TIME: 14:50 DATE: 3/18/97 BY: TEG	
TOP OF CASING ELEV.: -	DATUM: -
AMOUNT OF FREE PROCUCT: -	
RISE/FALL OF WATER TABLE: - TIME INTERVAL: -	

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)
0-1	SS	NA	24	12	Dry	none	ND	-	ND
1-2	↓	↓	↓	12	↓	↓	ND	-	ND
2-3									
3-4									
4-5									
5-6	SS	NA	24	12	Dry	none	ND	-	ND
6-7	↓	↓	↓	12	↓	↓	ND	-	ND
7-8									
8-9									
9-10									

DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION:
0		
1	SP	Sand, light brown to yellowish Orange, fine grained, trace of organics, no fines dry
2		
3		Sand light gray, fine grained, little to no fines, dry
4		
5		
6	SP	Sand, light gray, fine grained, little to no fines, some organic matter and roots, dry
7		
8		
9		
10		

SHEET 2 OF 2

PROJECT: CTO 007 | NO. 7540 | BORING NO. SB03

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS CODE	
10-11	SS	NA	↑	12"	saturated	none	NA	NA	NA	1	SP	Sand light gray very fine to fine grained sand, little fines, saturated
11-12	↓		← 24	12"		↓	NA	NA	NA	2	E.O.B.	
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										10		
										11		
										12		
										13		
										14		
										15		
										16		
										17		
										18		
										19		
										20		

SOIL//SEDIMENT DESCRIPTION, GRAIN SIZE, COLOR, ANGULARITY, DENSITY/CONSISTANCY

SHEET 1 OF 2

See Boring Location Figure

PROJECT: CTO 0027		BORING NO.: SB04	
		TOTAL DEPTH: 12'	
JOB NO.: 7540		LOGGED BY: G. Goode	
PROJ. MGR: Paul Calligan		EDITED BY:	
DRILLING CONTRACTOR: TEG			
DRILL RIG TYPE: Strataprobe			
DRILLERS NAME: Jason Angolin			
SAMPLING METHODS: Split Spoon			
DRILLING TECHNIQUE: Direct Push			
HAMMER WT: NA		DROP: —	
STARTED TIME: 15:10		DATE: 3/18/97	
COMPLETED TIME: 16:05		DATE: 3/18/97	
BORING DEPTH (ft.)	12'	BOREHOLE DIA.:	2¼"
CASING DEPTH (ft.)	NA		
WATER DEPTH (ft.)	@ 8'		
TIME:			
DATE:			
BACKFILLED TIME: 16:05 DATE: 3/18/97 BY: TEG			
TOP OF CASING ELEV.: —		DATUM: —	
AMOUNT OF FREE PROCUCT: —			
RISE/FALL OF WATER TABLE: —		TIME INTERVAL: —	

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6-IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION:
0-1	↑ SS	NA	↓ 24	12	Dry	None	ND	-	ND	0		
1-2	↓	↓	↓	12	↓	↓	ND	-	ND	1		Humus, dark brown, organic rich
2-3										2	SP	Sand, brown, very fine to fine grained, low plastic fines, some organics, dry
3-4										3		
4-5										4		
5-6	↑ SS	NA	↑	12	Dry	Diesel odor	300	ND	300	5		
6-7	↓	↓	↓ 24	12	↓	↓	100	ND	100	6	SP	Sand, greenish grey, fine grained, stained with diesel fuel (diesel fuel like odor) little fines
7-8										7		Sand, white, very fine grained stained
8-9										8	SP	greenish gray with diesel fuel (diesel like odor) dry
9-10										9		
										10		

SHEET 2 OF 2

PROJECT: 670027 | NO. 7540 | BORING NO. SB04

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD'	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT
10-11	SS	NA	24	12	Saturated	Slight Diesel	NA	NA	NA
11-12	↓	↓	↓	12	Saturated	Slight Diesel	NA	NA	NA

DEPTH	USCS CODE
1	SP
2	End of Boring
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Sand, dark gray very fine to fine grained, some non plastic fines, slight diesel odor, saturated

SOIL//SEDIMENT DESCRIPTION, GRAIN SIZE, COLOR, ANGULARITY, DENSITY/CONSISTANCY

SHEET 1 OF 2

See Boring location Figure

PROJECT: CTO 0027	BORING NO.: SB05
	TOTAL DEPTH: 12'
JOB NO.: 7540	LOGGED BY: G. Goode
PROJ. MGR: Paul Calligan	EDITED BY:
DRILLING CONTRACTOR: TEG	
DRILL RIG TYPE: Strataprobe	
DRILLERS NAME: Jason Angolin	
SAMPLING METHODS: Hand Auger (grab) / split spoon	
DRILLING TECHNIQUE: Direct Push	
HAMMER WT: NA	DROP: —
STARTED TIME: 16:10	DATE: 3/18/97
COMPLETED TIME: 17:35	DATE: 3/18/97
BORING DEPTH (ft.) 12'	BOREHOLE DIA.: 2 3/4"
CASING DEPTH (ft.) NA	
WATER DEPTH (ft.) @ 8'	
TIME:	
DATE:	
BACKFILLED TIME: 17:35 DATE: 3/18/97 BY: TEG	
TOP OF CASING ELEV.:	DATUM:
AMOUNT OF FREE PROCUCT:	
RISE/FALL OF WATER TABLE:	TIME INTERVAL:

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE
0-1	HA	NA	NA	NA	Dry	None	ND	-	ND	0	
1-2	HA	↓	↓	↓	↓	↓	ND	-	ND	1	
2-3										2	SP
3-4										3	
4-5										4	
5-6	SS	NA	24"	12"	Dry	Diesel	110	ND	110	5	
6-7	↓	↓	↓	12	Dry	↓	50	ND	50	6	SP
7-8										7	
8-9										8	
9-10										9	
										10	

LITHOLOGIC DESCRIPTION:

Humus, dark brown, organic rich

Sand, brown, very fine to fine grained, some non plastic fines, with organic matter, dry

Sand, light gray, fine grained, little to no fines (diesel like odor), dry

SHEET 2 OF 2

PROJECT: CTO0027 | NO. 7540 | BORING NO. SB05

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS CODE	
10-11	SS	NA	↑	12	Saturated	Diesel	NA	NA	NA	1	SP	Sand, dark gray very fine to fine grained, some non plastic fines, slight diesel odor, saturated
11-12	↓	↓	24 ↓	12	Saturated	Diesel	↓	↓	↓	2	E.O.B	
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										10		
										11		
										12		
										13		
										14		
										15		
										16		
										17		
										18		
										19		
										20		

SOIL/SEDIMENT DESCRIPTION, GRAIN SIZE, COLOR, ANGULARITY, DENSITY/CONSISTANCY

SHEET 1 OF 2

See Boring location Figure

PROJECT: CTO 0027	BORING NO.: SB06
	TOTAL DEPTH: 12'
JOB NO.: 7540	LOGGED BY: G. Goode
PROJ. MGR: Paul Callison	EDITED BY:
DRILLING CONTRACTOR: TEG	
DRILL RIG TYPE: Strataprobe	
DRILLERS NAME: Jason Angolin	
SAMPLING METHODS: Hand Auger (grab) Split Spoon	
DRILLING TECHNIQUE: Direct Push	
HAMMER WT: NA	DROP: —
STARTED TIME: 7:25	DATE: 3/19/97
COMPLETED TIME: 8:15	DATE: 3/19/97
BORING DEPTH (ft.) 12'	BOREHOLE DIA.: 2 1/4"
CASING DEPTH (ft.) NA	
WATER DEPTH (ft.) @ 8'	
TIME:	
DATE:	
BACKFILLED TIME: 8:15 DATE: 3/19/97 BY: TEG	
TOP OF CASING ELEV.: —	DATUM: —
AMOUNT OF FREE PROCUCT: —	
RISE/FALL OF WATER TABLE: — TIME INTERVAL:	

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION:
0-1	HA	NA	NA	NA	Dry	None	ND	-	ND	0		Humus, dark brown, organic matter
1-2	HA	↓	↓	↓	↓	↓	ND	-	ND	1	SP	Sand, light gray, very fine to fine grained little to no fines, occasional root fragments, dry
2-3										2		
3-4										3		
4-5										4		
5-6	↑	NA	↑	12	Dry	None	ND	-	ND	5		
6-7	5ft ↓	↓	24" ↓	12	Dry	None	ND	-	ND	6	SP	Sand, light gray, very fine to fine grained some non plastic fines, dry
7-8										7		Sand as above with roots and organic matter
8-9										8		
9-10										9		
										10		

SHEET 2 OF 2

PROJECT: CTO 0027 | NO. 7546 | BORING NO. SB06

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS CODE
10-11	SS	NA	↑	12	Saturated	None	NA	NA	NA	0	
11-12	↓	↓	24	12	Saturated	↓	↓	↓	↓	1	
			↓							2	S.A.B
										3	
										4	
										5	
										6	
										7	
										8	
										9	
										10	
										11	
										12	
										13	
										14	
										15	
										16	
										17	
										18	
										19	
										20	

Sand light gray, very fine to fine grained, non plastic fines, saturated

SOIL//SEDIMENT DESCRIPTION, GRAIN SIZE, COLOR, ANGULARITY, DENSITY/CONSISTANCY

SHEET 1 OF 2

PZ-1

See Boring Location Figure

PROJECT: CTO 0027	BORING NO.: SB07
	TOTAL DEPTH: 14'
JOB NO.: 7540	LOGGED BY: G Goode
PROJ. MGR: Paul Collison	EDITED BY:
DRILLING CONTRACTOR: TEG	
DRILL RIG TYPE: Power Wagon	
DRILLERS NAME: Jason Angelin	
SAMPLING METHODS: Hand Auger (Grab) Split Spoon	
DRILLING TECHNIQUE: Hand Auger & Direct Push	
HAMMER WT: NA	DROP: —
STARTED TIME: 8:40	DATE: 3/19/97
COMPLETED TIME: 12:00	DATE: 3/21/97
BORING DEPTH (ft.) 14'	BOREHOLE DIA.: 3"
CASING DEPTH (ft.) NA	
WATER DEPTH (ft.) @8'	
TIME:	
DATE:	
BACKFILLED TIME: Converted to well location DATE: BY:	
TOP OF CASING ELEV.: 10.44	DATUM: Arbitrary
AMOUNT OF FREE PROCUCT: —	
RISE/FALL OF WATER TABLE: —	TIME INTERVAL: —

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION:
0-1	HA	NA	NA	NA	Dry	None	ND	-	ND	0-1	SP	Sand light gray, very fine to fine grained, little to no fines, dry
1-2							ND	-	ND	1-2		
2-3							ND	-	ND	2-3		
3-4							ND	-	ND	3-4		
4-5	↑	NA	↑	12	Dry	None				4-5	SP	Sand, white, very fine to fine grained, very clean, no fines, dry
5-6	SS		SS	12			2	ND	2	5-6		Sand, light gray, very fine to fine grained, little to no fines, dry
6-7	SS		SS	12			ND	-	ND	6-7		
7-8	SS		SS	12	Moist		NA	NA	NA	7-8		
8-9	HA	NA	NA	NA	Dry	None				8-9		
9-10					Saturated					9-10		

SHEET 2 OF 2

PROJECT: CTO 0027 | NO. 7540 | BORING NO. SB07

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT
10-11	HA	NA	NA	NA	Saturated	none	NA	NA	NA
11-12	↓	↓	↓	↓	↓	↓	↓	↓	↓
12-13	↑	NA	↑	12	Saturated	none	NA	NA	NA
13-14	SS	↓	24	12	Saturated	↓	↓	↓	↓

DEPTH	USCS OR ASTM CODE
1	SP
2	
3	
4	E.O.B.
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

LITHOLOGIC DESCRIPTION :

Sand, light gray, very fine to fine grained, some non plastic fines, Saturated

SHEET 1 OF 2

PZ-2

See Boring location Figure

PROJECT: CTO 0027		BORING NO.: SB08	
		TOTAL DEPTH: 14'	
JOB NO.: 7540		LOGGED BY: G. Goode	
PROJ. MGR: Paul Colligan		EDITED BY:	
DRILLING CONTRACTOR: TEG			
DRILL RIG TYPE: Strataprobe			
DRILLERS NAME: Jason Angelin			
SAMPLING METHODS: Split Spoon			
DRILLING TECHNIQUE: Direct Push			
HAMMER WT: NA		DROP: —	
STARTED TIME: 13:15		DATE: 3/19/97	
COMPLETED TIME:		DATE:	
BORING DEPTH (ft.)	14'	BOREHOLE DIA.:	2 1/4"
CASING DEPTH (ft.)	NA		
WATER DEPTH (ft.)	@ 8'		
TIME:			
DATE:			
BACKFILLED TIME: (Converted to well location)	DATE:	BY:	
TOP OF CASING ELEV.: 10.00		DATUM: Arbitrary	
AMOUNT OF FREE PROCUCT: —			
RISE/FALL OF WATER TABLE: —		TIME INTERVAL: —	

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION
0-1	↑	NA	→	12	Dry	None	ND	-	ND	0		
1-2	SS ↓	↓	24 ↓	12	Dry	None	ND	-	ND	1	SP	Sand, light gray, fine grained, some organic roots, no fines, dry
2-3										2		
3-4										3		
4-5										4		
5-6	↑ SS	NA	↑	12	Dry	None	ND	-	ND	5		
6-7	↓	↓	24 ↓	12	Dry	None	ND	-	ND	6	SP	Sand, light gray, very fine to fine grained, some non plastic fines, dry
7-8										7		
8-9										8		
9-10										9		
										10		

SHEET 2 OF 2

PROJECT: CT00007 | NO. 7540 | BORING NO. SB08

DEPTH	TYPE	BLOWS	DRIVEN	RECV'D	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS CODE
10-11	↑	NA	→	12	Saturated	None	NA	NA	NA	1	SP
11-12	SS ↓		2Y →	12						2	
12-13	↑ SS ↓		2Y →	12						3	
13-14	↓	↓	↓	12	↓	↓	↓	↓	↓	4	E.O.B
										5	
										6	
										7	
										8	
										9	
										10	
										11	
										12	
										13	
										14	
										15	
										16	
										17	
										18	
										19	
										20	

Sand, light grey, poorly fine to fine grained, Fines of low plasticity, Saturated

SOIL//SEDIMENT DESCRIPTION, GRAIN SIZE, COLOR, ANGULARITY, DENSITY/CONSISTANCY

SHEET 1 OF 1

See Boring Location Figure

PROJECT: CTO 0027	BORING NO.: SB09
	TOTAL DEPTH: 12'
JOB NO.: 7540	LOGGED BY: G. Goode
PROJ. MGR: Paul Calligan	EDITED BY:
DRILLING CONTRACTOR: TEG	
DRILL RIG TYPE: NA	
DRILLERS NAME: Jason Angelin	
SAMPLING METHODS: Grab	
DRILLING TECHNIQUE: Hand Auger	
HAMMER WT: NA	DROP: —
STARTED TIME: 15:15	DATE: 3/19/97
COMPLETED TIME: 16:00	DATE: 3/19/97
BORING DEPTH (ft.) 12'	BOREHOLE DIA.: 3"
CASING DEPTH (ft.) NA	
WATER DEPTH (ft.) @ 8'	
TIME:	
DATE:	
BACKFILLED TIME: 16:00 DATE: 3/19/97 BY: TEG	
TOP OF CASING ELEV.: —	DATUM: —
AMOUNT OF FREE PROCUCT: —	
RISE/FALL OF WATER TABLE: —	TIME INTERVAL:

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION:
0-1										0		Open Trench
1-2										1		
2-3										2		
3-4										3		
4-5										4		
5-6	HA	NA	NA	NA	Dry	Slight odor	40	NO	40	5	SP	Sand, light to dark gray, very fine to fine grained, (diesel like odor with greenish/yellowish stains (diesel) non plastic fines, dry
6-7					Dry		100	NO	100	6		
7-8					Moist		NA	NA	NA	7		
8-9					Saturated					8		Sand, as above, Saturated at @ 8'
9-10										9		
										10		

SHEET 2 OF 2

PROJECT: CTO 0027 | NO. 7540 | BORING NO. SB09

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION :
10-11	HA	NA	NA	NA	Saturated	Fuel odor	NA	NA	NA	1		Sand, dark gray, very fine to fine grained, some non plastic fines, saturated
11-12	↓	↓	↓	↓	↓	↓	↓	↓	↓	2	SaB	
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										10		
										11		
										12		
										13		
										14		
										15		
										16		
										17		
										18		
										19		
										20		

SHEET 1 OF 2

PZ-3

See Boring location Figure

PROJECT: CTO 0027	BORING NO.: SB1D
	TOTAL DEPTH: 14'
JOB NO.: 7540	LOGGED BY: G. Goode
PROJ. MGR: Paul Calligan	EDITED BY:
DRILLING CONTRACTOR: TEG	
DRILL RIG TYPE: Stratoprobe	
DRILLERS NAME: Jason Angelin	
SAMPLING METHODS: Split Spoon	
DRILLING TECHNIQUE: Direct Push	
HAMMER WT: NA	DROP: —
STARTED TIME: 16:15	DATE: 3/19/97
COMPLETED TIME: 12:00	DATE: 3/21/97
BORING DEPTH (ft.) 14'	BOREHOLE DIA.. 2 1/4"
CASING DEPTH (ft.) NA	
WATER DEPTH (ft.) @ 8'	
TIME:	
DATE:	
BACKFILLED TIME: (converted to well) DATE:	BY:
TOP OF CASING ELEV.: 10.17	DATUM: Arbitrary
AMOUNT OF FREE PROCUCT: —	
RISE/FALL OF WATER TABLE: —	TIME INTERVAL: —

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION
0-1	↑ 5S	NA	↑ 2Y	12	Dry	None	ND	-	ND	0		
1-2	↓	↓	↓	12	Dry	None	ND	-	ND	1	SP	Sand, dark brown, very fine to fine grained, little or no fines, organic root fragments, dry
2-3										2	SP	Sand, light gray, fine grained, no fines, dry
3-4										3		
4-5										4		
5-6	↑	NA	↑	12	Dry	None	ND	-	ND	5		
6-7	5S ↓	↓	2Y ↓	12	Dry	None	ND	-	ND	6	SP	Sand yellowish orange, fine grained, little to no fines, dry
7-8										7		
8-9										8		
9-10										9		
										10		

SHEET 2 OF 2

PROJECT: CTO 0027 | NO. 7540 | BORING NO. SB10

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD'	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS CODE	SOIL/SEDIMENT DESCRIPTION, GRAIN SIZE, COLOR, ANGULARITY, DENSITY/CONSISTANCY
10-11	SS	NA	2'	12	Saturated	None	NA	NA	NA	1		Sand, light gray, very fine grained, little fines, Saturated
11-12				12						2		
12-13	SS			12	Saturated					3		
13-14				12						4	E.O.B.	Sand, dark brown, with black bands approx ½ inch thick, some nonplastic fines, Saturated
										5		
										6		
										7		
										8		
										9		
										10		
										11		
										12		
										13		
										14		
										15		
										16		
										17		
										18		
										19		
										20		

SHEET 1 OF 2

See Boring location Figure

PROJECT: CTO 0027	BORING NO.: SB11
	TOTAL DEPTH: 12'
JOB NO.: 7540	LOGGED BY:
PROJ. MGR: Paul Collisea	EDITED BY:
DRILLING CONTRACTOR: TEG	
DRILL RIG TYPE: Strata probe	
DRILLERS NAME: Jason Angelin	
SAMPLING METHODS: Split spoon	
DRILLING TECHNIQUE: Direct Push	
HAMMER WT: NA	DROP: —
STARTED TIME: 7:25	DATE: 3/20/97
COMPLETED TIME: 8:10	DATE: 3/20/97
BORING DEPTH (ft.) 12'	BOREHOLE DIA.: 2 1/4"
CASING DEPTH (ft.) NA	
WATER DEPTH (ft.) @ 8'	
TIME:	
DATE:	
BACKFILLED TIME: 8:10 DATE: 3/20/97 BY: TEG	
TOP OF CASING ELEV.: —	DATUM: —
AMOUNT OF FREE PROCUCT: —	
RISE/FALL OF WATER TABLE: — TIME INTERVAL: —	

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6-IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION:
0-1	SS	NA	24	12	Dry	None	NO	-	NO	0		
1-2	↓	↓	↓	12	Dry	None	NO	-	NO	1	SP	Sand, light gray, fine grained, no fines, dry
2-3										2		
3-4										3		
4-5'										4		
5-6	SS	NA	24	12	Dry	None	NO	-	NO	5		
6-7	↓	↓	↓	12	Dry	None	NO	-	NO	6	SP	Sand, yellowish orange fine grained, no fines, dry
7-8										7		
8-9										8		
9-10										9		
										10		

SHEET 2 OF 2

PROJECT: 270 0027 NO. 7570 BORING NO. SB11

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS CODE	
10-11	SS	NA	1ft	12	Saturated	None	NA	NA	NA	1		Sand, light gray, very fine to fine grained, little fines (nonplastic), saturated
11-12	SS	NA	2ft	12	Saturated	None	NA	NA	NA	2	E.o.B.	Sand, dark brown with black bands, very fine to fine grained, saturated
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										10		
										11		
										12		
										13		
										14		
										15		
										16		
										17		
										18		
										19		
										20		

SOIL//SEDIMENT DESCRIPTION, GRAIN SIZE, COLOR, ANGULARITY, DENSITY/CONSISTANCY

SHEET 1 OF 2

See Boring location Figure

PROJECT: CTO 0027	BORING NO.: SB12
JOB NO.: 7540	TOTAL DEPTH: 12'
PROJ. MGR: Paul Callijan	LOGGED BY: G. Goode
DRILLING CONTRACTOR: TEG	EDITED BY:
DRILL RIG TYPE: Hand Auger	
DRILLERS NAME: Jason Anglia	
SAMPLING METHODS: Grab	
DRILLING TECHNIQUE: Hand Auger	
HAMMER WT: NA	DROP: —
STARTED TIME: 8:40	DATE: 3/20/97
COMPLETED TIME: 8:55	DATE: 3/20/97
BORING DEPTH (ft.) 12'	BOREHOLE DIA.: 3"
CASING DEPTH (ft.) NA	
WATER DEPTH (ft.) @ 8'	
TIME:	
DATE:	
BACKFILLED TIME: 8:55 DATE: 3/20/97 BY: TEG	
TOP OF CASING ELEV.: —	DATUM: —
AMOUNT OF FREE PROCUCT: —	
RISE/FALL OF WATER TABLE: — TIME INTERVAL: —	

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION:
0-1										0		
1-2										1		Open Trench
2-3										2		
3-4										3		
4-5										4		
5-6	HA	NA	NA	NA	Dry	none	ND	-	ND	5		
6-7					Dry	Mild	ND	-	ND	6	SP	Sand, light gray, very fine to fine grained, no fines, dry
7-8					moist		ND	-	ND	7		
8-9					Saturated	Diesel like	NA	NA	NA	8		Sand (as above)
9-10						diesel odor				9		
										10		

SHEET 2 OF 2

PROJECT: CTO 0027 | NO. 7540 | BORING NO. SB12

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION :
10-11	HA	NA	NA	NA	Saturated	None	NA	NA	NA	1	SP	Sand, as above, saturated
11-12	↓	↓	↓	↓	↓	↓	↓	↓	↓	2	E.O.B	
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										0		
										1		
										2		
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										0		

SHEET 1 OF 2

See Boring location Figure

PROJECT: CTO 0027	BORING NO.: SB13
	TOTAL DEPTH: 12'
JOB NO.: 7540	LOGGED BY: G. Goode
PROJ. MGR: Paul Callegan	EDITED BY:
DRILLING CONTRACTOR: TEG	
DRILL RIG TYPE: Hand Auger	
DRILLERS NAME: Jason Angelin	
SAMPLING METHODS: Hand Auger (Grab)	
DRILLING TECHNIQUE: Hand Auger	
HAMMER WT: NA	DROP: —
STARTED TIME: 9:00	DATE: 3/20/97
COMPLETED TIME: 9:20	DATE: 3/20/97
BORING DEPTH (ft): 12'	BOREHOLE DIA.: 3"
CASING DEPTH (ft): NA	
WATER DEPTH (ft): @ 8'	
TIME:	
DATE:	
BACKFILLED TIME: 9:20 DATE: 3/20/97 BY: TEG	
TOP OF CASING ELEV.: —	DATUM: —
AMOUNT OF FREE PROCUCT: —	
RISE/FALL OF WATER TABLE: — TIME INTERVAL: —	

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION
0-1	HA	NA	NA	NA	Dry	None	ND	-	ND	0-1	SP	Sand light grey, very fine to fine grained, no fines, dry
1-2	HA	NA	NA	NA	Dry	None	ND	-	ND	1-2		
2-3							NA	NA	NA	2-3		
3-4										3-4		
4-5										4-5		
5-6	HA	NA	NA	NA	PM	None	ND	-	ND	5-6	SP	Sand light grey, very fine to fine grained, some non plastic fines, dry
6-7					PM		ND	-	ND	6-7		
7-8					moist		ND	-	ND	7-8		Moist at 8'
8-9	HA	NA	NA	NA	Saturated	None	NA	NA	NA	8-9		
9-10										9-10		

SHEET 2 OF 2

PROJECT: CTO 0027 | NO. 7540 | BORING NO. SB13

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION :
10-11	HA	NA	NA	NA	Saturated	None	NA	NA	NA	1		Sand, light grey, fine grained Saturated
11-12	↓	↓	↓	↓	↓	↓	↓	↓	↓	2		
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										10		
										11		
										12		
										13		
										14		
										15		
										16		
										17		
										18		
										19		
										20		

SHEET 1 OF 2

See Boring Location Figure

PROJECT: CTO 0027	BORING NO.: SB14
	TOTAL DEPTH: 12'
JOB NO.: 7540	LOGGED BY: C. Goode
PROJ. MGR: Paul Culligan	EDITED BY:
DRILLING CONTRACTOR: TEG	
DRILL RIG TYPE: Hand Auger	
DRILLERS NAME: Jason Angelin	
SAMPLING METHODS: Grab	
DRILLING TECHNIQUE: Hand Auger	
HAMMER WT: NA	DROP: —
STARTED TIME: 9:20	DATE: 3/20/17
COMPLETED TIME: 9:45	DATE: 3/20/17
BORING DEPTH (ft.) 12'	BOREHOLE DIA.: 3"
CASING DEPTH (ft.) NA	
WATER DEPTH (ft.) @ 8'	
TIME:	
DATE:	
BACKFILLED TIME: 9:45 DATE: 3/20/17 BY: TEG	
TOP OF CASING ELEV.:	DATUM:
AMOUNT OF FREE PROCUCT:	
RISE/FALL OF WATER TABLE:	TIME INTERVAL:

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	USCS OR ASTM CODE
0-1	HA	NA	NA	NA	Dry	None	ND	-	ND	SP
1-2	HA	NA	NA	NA	Dry	None	ND	-	ND	
2-3							NA	NA	NA	
3-4										
4-5										
5-6	HA	NA	NA	NA	DM	None	ND	-	ND	SP
6-7					Dry	None	ND	-	ND	
7-8					Moist	None	ND	-	ND	
8-9	HA	NA	NA	NA	Saturated	None	NA	NA	NA	
9-10										

LITHOLOGIC DESCRIPTION:

Sand, light brown, very fine to fine grained, no fines, dry

Sand, yellowish Orange, very fine to fine grained some nonplastic fines, dry

Sand, light brown very fine to fine grained, no fines, dry

Moist.

SHEET 2 OF 2

PROJECT: CTO 0027 | NO. 7590 | BORING NO. SB14

LITHOLOGIC DESCRIPTION :

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS OR ASTM CODE
10-11	NA	NA	NA	NA	Saturated	wet	NA	NA	NA	1	
11-12	↓	↓	↓	↓	↓	↓	↓	↓	↓	2	E.O.B.
										3	
										4	
										5	
										6	
										7	
										8	
										9	
										10	
										11	
										12	
										13	
										14	
										15	
										16	
										17	
										18	
										19	
										20	

Sand, as above

SHEET 1 OF 2

See Boring location Figure

PROJECT: CTO 0027	BORING NO.: SB15
	TOTAL DEPTH: 12'
JOB NO.: 7540	LOGGED BY: G. Goode
PROJ. MGR: Paul Collison	EDITED BY:
DRILLING CONTRACTOR: TEG	
DRILL RIG TYPE: Strataprobe	
DRILLERS NAME:	
SAMPLING METHODS: Split spoon	
DRILLING TECHNIQUE: Direct Push	
HAMMER WT: N/A	DROP: —
STARTED TIME: 16:00	DATE: 3/20/17
COMPLETED TIME: 16:45	DATE: 3/20/17
BORING DEPTH (ft.) 12'	BOREHOLE DIA.: 2 1/4"
CASING DEPTH (ft.) NA	
WATER DEPTH (ft.) @ 8'	
TIME:	
DATE:	
BACKFILLED TIME: 16:45 DATE: 3/20/17 BY: TEG	
TOP OF CASING ELEV.: —	DATUM: —
AMOUNT OF FREE PROCUCT: —	
RISE/FALL OF WATER TABLE: —	TIME INTERVAL: —

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION:
0-1	↑	NA	↑ 24	12	Dry		ND	-	ND	0		
1-2	SS ↓		↓	12			ND	-	ND	1	SP	Sand, dark brown, very fine to fine grained, organics and root fragments, dry
2-3	↑		↑	12						2		
3-4	SS ↓		↓	12			ND	-	ND	3	SP	Sand, yellowish orange, very fine to fine grained, no fines, dry
4-5	↑ SS		↑	12						4		Sand, light brown, fine grained, little to no fines dry
5-6	↓		↓	12			ND	-	ND	5		
6-7	↑ SS		↑	12						6		
7-8	↓		↓	12			ND	-	ND	7		
8-9	↑ SS		↑	12						8		
9-10	↓		↓	12						9	SP	Sand, white, very fine grained, some non plastic fines moist
										10		

PROJECT: CTO 0027

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION
10-11	SS	NA	24	12	Saturated	None	NA	NA	NA	1		Sand, as above,
11-12				12						2	CAR.	
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										10		
										11		
										12		
										13		
										14		
										15		
										16		
										17		
										18		
										19		
										20		

SHEET 1 OF 2

PC4-300-

See Boring location Figure

PROJECT: CTO 0027		BORING NO.: MW01	
JOB NO.: 7540		TOTAL DEPTH: 15.5'	
PROJ. MGR: Paul Calligan		LOGGED BY: G. Goode	
DRILLING CONTRACTOR: Gulf Atlantic Drilling		EDITED BY: ✓	
DRILL RIG TYPE: RAM 10 C Deep Rock			
DRILLERS NAME: William Lindsey			
SAMPLING METHODS: (Blind Drilled TO COMPLETION)			
DRILLING TECHNIQUE: Hollow Stem Augers 7 1/4" ID			
HAMMER WT: NA		DROP: —	
STARTED TIME: 9:30 am		DATE: 4/22/97	
COMPLETED TIME:		DATE:	
BORING DEPTH (ft)	15.5'	BOREHOLE DIA.:	8"
CASING DEPTH (ft)	NA		
WATER DEPTH (ft)	—		
TIME:	—		
DATE:	—		
BACKFILLED TIME:	DATE:	BY:	
TOP OF CASING ELEV.:		DATUM:	
AMOUNT OF FREE PRODUCT:			
RISE/FALL OF WATER TABLE:		TIME INTERVAL:	

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE
	NA	NA	NA	NA	—					0	
	NA				Dry					1	
	NA									2	
	NA									3	
	NA									4	
Drilled	NA									5	
	NA				moist	Diesel odor	—	—	—	6	
Blind										7	
					Saturated					8	
										9	
										10	

LITHOLOGIC DESCRIPTION:

Due to the close proximity to boring SB04 the boring was blind drilled to completion.

Auger cuttings indicate fine grained sand to 15' b/s.

NOTE: Diesel like odor evident in soils at 5 to 7' b/s.

PROJECT: CTO 0027

LITHOLOGIC DESCRIPTION

USCS OR ASTM CODE

DEPTH

0 9 8 7 6 5 4 3 2 1 0 9 8 7 6 15 14 13 12 11

DEPTH

Blind Drilled

TYPE	NA
BLOWS	NA
DRIVEN	NA
REC'V'D	NA
MOISTURE	Soaked
ODOR	1
UNFILTER	1
FILTERED	1
CORRECT	1

E.O.B

SHEET 1 OF 2

PC4-300-

See Boring location Figure

PROJECT: CTO 0027	BORING NO.: MW02
JOB NO.: 7540	TOTAL DEPTH: 15.5'
PROJ. MGR: Paul Calligan	LOGGED BY: G. Goode
DRILLING CONTRACTOR: Gulf Atlantic Drilling	EDITED BY:
DRILL RIG TYPE: RAM 10 (Deep Rock)	
DRILLERS NAME: William Lindsey	
SAMPLING METHODS: Blind Drilled TO Completion	
DRILLING TECHNIQUE: Hollow Stem Auger 4 1/4" ID	
HAMMER WT: NA	DROP: —
STARTED TIME:	DATE: 4/22/97
COMPLETED TIME:	DATE:
BORING DEPTH (ft.): 15.5'	BOREHOLE DIA.: 8"
CASING DEPTH (ft.): NA	
WATER DEPTH (ft.): —	
TIME:	
DATE:	
BACKFILLED TIME: DATE: BY:	
TOP OF CASING ELEV.:	DATUM:
AMOUNT OF FREE PROCUCT:	
RISE/FALL OF WATER TABLE: TIME INTERVAL:	

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION
HA	—	NA	NA	NA	—	None	1			0		0 to 8" Concrete
										1		8" to 1' Shell and Fine grained Sand (Fill)
HA	1				—					2		
HA	Grab				Dry		ND	—	ND	3		Sand, light grey, Fine to medium grained, very clean, dry
HA	1				—					4		
HA	Grab				Dry		ND	—	ND	5		Sand, light grey, Fine to medium grained dry
HA	—									6		
HA	Grab				Moist		ND	—	ND	7		Sand, at above moist at 6' b/s
					—		NA	NA	NA	8		Borehole blind drilled to completion due to close proximity to SB14
Blind Drill					Saturated					9		
										10		Fine grained Sand to 15.5' b/s.

SHEET 2 OF ~

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS OR ASTM CODE
↓	NA	NA	NA	NA	-	None	NR	-	NR	11	
	↓	↓	↓	↓	↓	↓	↓	↓	↓	12	
↓ Bit. / Pt. ↓					↓ Saturated					13	
										14	
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	15	
										6	
										7	
										8	
										9	
										0	
										1	
										2	
										3	
										4	
										5	
										6	
										7	
										8	
										9	
										0	

PROJECT: CTO 0027 NO. 7540 BORING NO. PL4-300 - MW2

LITHOLOGIC DESCRIPTION :

Dark, Dk (organic rich) fine grained @ 14'6in.

E.O.B

SHEET 1 OF 2

PCY-300 -

See Boring Location Figure

PROJECT: CTO 0027	BORING NO.: MW 03
	TOTAL DEPTH: 15.5'
JOB NO.: 7540	LOGGED BY: G. Goodine
PROJ. MGR: Paul Culligan	EDITED BY:
DRILLING CONTRACTOR: GW Atlantic Drilling	
DRILL RIG TYPE: RAM 10 (Deep Rock)	
DRILLERS NAME: William Lindsey	
SAMPLING METHODS: (Blind Drilled TO Completion)	
DRILLING TECHNIQUE: Hollow Stem Auger 4¼" ID	
HAMMER WT: NA	DROP: —
STARTED TIME: 12:15	DATE: 4/22/97
COMPLETED TIME:	DATE:
BORING DEPTH (ft.): 15.5'	BOREHOLE DIA.: 8"
CASING DEPTH (ft.): NA	
WATER DEPTH (ft.): —	
TIME: —	
DATE: —	
BACKFILLED TIME: DATE: BY:	
TOP OF CASING ELEV.:	DATUM:
AMOUNT OF FREE PRODUCT:	
RISE/FALL OF WATER TABLE: TIME INTERVAL:	

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE
NA	NA	NA	NA	NA		wood	—	—	—	0	
NA					DM					1	
NA										2	
NA										3	
NA										4	
										5	
					moist					6	
Blind Drill					saturated					7	
										8	
										9	
										10	

LITHOLOGIC DESCRIPTION:

Due to close proximity to ~~SB01~~ the boring was blind drilled to completion

Auger cuttings indicate fine grained sand to 15' bls.

SHEET 2 OF 2

PROJECT: CTO 0027 NO. 7540 PCY-300-
BORING NO. MW03

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH	USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION :
—	NA	NA	NA	NA	—	None	/	\	/	1		
Bind Drilled					Saturated					2		
										3		
										4		
										5		E.O.B
										6		
										7		
										8		
										9		
										0		
										1		
										2		
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										0		

SHEET 1 OF 2

PLY-300-MW04

See Boring location Figure

PROJECT: CTO 0027	BORING NO.: MW04
	TOTAL DEPTH: 15.5'
JOB NO.: 7540	LOGGED BY: C. Conde
PROJ. MGR: Paul Calligan	EDITED BY:
DRILLING CONTRACTOR: Gulf Atlantic Drilling	
DRILL RIG TYPE: RAM 10 (Deep Rock	
DRILLERS NAME: William Lindsey	
SAMPLING METHODS: Blind Drill To Completion	
DRILLING TECHNIQUE: Hollow Stem Auger	
HAMMER WT: NA	DROP:
STARTED TIME: 14:30	DATE: 4/22/97
COMPLETED TIME:	DATE:
BORING DEPTH (ft.) 15.5'	BOREHOLE DIA.: 8"
CASING DEPTH (ft.) NA	
WATER DEPTH (ft.) —	
TIME:	
DATE:	
BACKFILLED TIME: DATE:	BY:
TOP OF CASING ELEV.:	DATUM:
AMOUNT OF FREE PRODUCT:	
RISE/FALL OF WATER TABLE:	TIME INTERVAL:

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS OR ASTM CODE
NA	NA	NA	NA	NA	—	—	NA	—	—	0	
14A										1	
14A					Dry	mod				2	
14A										3	
14A					Dry	mod				4	
										5	
										6	
										7	
Blind Drill						mod				8	
					Saturated					9	
										10	

LITHOLOGIC DESCRIPTION:

Due to close proximity to SB02 the boring was blind drilled to completion.

Auger cuttings indicate fine grained sand to 15.5' b/s.

PROJECT: CTO 0027

LITHOLOGIC DESCRIPTION

USCS OR ASTM CODE

DEPTH

0 9 8 7 6 5 4 3 2 1 0 9 8 7 6 5 15 14 13 12 11

E.O.B

DEPTH

Blind Drilled

TYPE — NR

BLOWS — NR

DRIVEN — NA

REC'V'D — NA

MOISTURE — Saturated

ODOR — NNN

UNFILTER — 1

FILTERED — 1

CORRECT — 1

APPENDIX F

HEADSPACE METHODOLOGY FOR DETERMINING SOIL ORGANIC VAPOR CONCENTRATIONS

HEADSPACE METHODOLOGY FOR DETERMINING SOIL ORGANIC VAPOR CONCENTRATION

Soil headspace readings where obtained utilizing the following method which conforms to the requirements of Rule 62-770.200(2), FAC.

Two 16 ounce glass soil jars were half-filled with soil sample (duplicate samples). The soil jars were then sealed utilizing "mason jar" type open top screw on caps with foil in place of the conventional solid jar tops. The soil samples were allowed to equilibrate to ambient temperature which was within the FDEP temperature range.

The samples were tested with a Foxboro Century 128, an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID). Prior to each days activities, the OVA was field calibrated with 100 ppm methane in air, in accordance with the manufacturers specifications. Sample testing was performed by inserting the OVA probe through the foil sample cover and recording the highest OVA reading. Following collection of this OVA reading, the OVA was fitted with a granular activated carbon filter probe. The OVA was then used to test the headspace above the duplicate sample. Carbon absorbs petroleum hydrocarbons and thus the filtered reading is assumed to represent naturally occurring organic vapors.

Upon completion of the screening exercise, the carbon filtered result was subtracted from the un-filtered result, to obtain a net petroleum vapor value. In accordance with Rule 17(62)-770.200(2), FAC, and Guidelines for Assessment and Remediation of Petroleum Contaminated Soil (May 1994) corrected headspace levels in excess of 50 ppm is defined as excessively contaminated soil for diesel contaminated soil. Corrected headspace levels in excess of 10 ppm but less than 50 ppm are considered as contaminated, though not excessively contaminated.

APPENDIX G

PRE-BURN SOIL LABORATORY DATA SHEETS

ACCUTEST.

05/09/97

Technical Report for

Brown & Root Environmental

Site G300 CTO 0027

7540

Accutest Job Number: F580

Report to:

C/O Paul Calligan
Brown & Root Environmental
1311 Executive Center Dr. Ste: 220
Tallahassee, FL 32301

ATTN: Arnold Lamb - QA Officer

Total number of pages in report: 10

RECEIVED
MAY 13 1997

Harry Behzadi, Ph.D.
Laboratory Director

ACCUTEST.

Sample Summary

Brown & Root Environmental

Date: 05/09/97
Job No: F580

Site G300 CTO 0027
Project No: 7540

Sample Number	Collected Date	Time By	Received	Matrix Code	Matrix Type	Client Sample ID
F580-1	04/23/97	13:00 GG	04/25/97	SO	Soil	PREABURN SOIL

ACCUTEST.

Report of Analysis

Client Sample ID:	PREABURN SOIL		
Lab Sample ID:	F580-1	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	EPA 8100	**Percent Solids:**	92.2
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01472.D	1	04/28/97	NF	04/28/97	OP85	GIJ69
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	360	ug/kg	
208-96-8	Acenaphthylene	ND	360	ug/kg	
120-12-7	Anthracene	ND	360	ug/kg	
56-55-3	Benzo(a)anthracene	ND	360	ug/kg	
50-32-8	Benzo(a)pyrene	ND	360	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	360	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	360	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	360	ug/kg	
218-01-9	Chrysene	ND	360	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	360	ug/kg	
206-44-0	Fluoranthene	ND	360	ug/kg	
86-73-7	Fluorene	ND	360	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	360	ug/kg	
91-20-3	Naphthalene	ND	360	ug/kg	
90-12-0	1-Methylnaphthalene	ND	360	ug/kg	
91-57-6	2-Methylnaphthalene	ND	360	ug/kg	
85-01-8	Phenanthrene	ND	360	ug/kg	
129-00-0	Pyrene	ND	360	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	82%		35-120%
84-15-1	o-Terphenyl	76%		35-120%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	PREABURN SOIL		
Lab Sample ID:	F580-1	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	FLORIDA-PRO	**Percent Solids:**	92.2
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01581.D	2	05/02/97	NF	05/01/97	OP74	GIJ73
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	65.1	18	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	58%		40-140%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	PREABURN SOIL		
Lab Sample ID:	F580-1	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	SW846 8010/8020	**Percent Solids:**	92.2
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002068.D	1	04/30/97	AW	n/a	n/a	GEF53
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.1	ug/kg	
75-25-2	Bromoform	ND	1.1	ug/kg	
75-27-4	Bromodichloromethane	ND	1.1	ug/kg	
74-83-9	Bromomethane	ND	1.1	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.1	ug/kg	
108-90-7	Chlorobenzene	ND	1.1	ug/kg	
75-00-3	Chloroethane	ND	1.1	ug/kg	
67-66-3	Chloroform	ND	1.1	ug/kg	
74-87-3	Chloromethane	ND	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.1	ug/kg	
124-48-1	Dibromochloromethane	ND	1.1	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	1.1	ug/kg	
75-34-3	1,1-Dichloroethane	ND	1.1	ug/kg	
107-06-2	1,2-Dichloroethane	ND	1.1	ug/kg	
75-35-4	1,1-Dichloroethene	ND	1.1	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	1.1	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.1	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.1	ug/kg	
100-41-4	Ethylbenzene	ND	1.1	ug/kg	
75-09-2	Methylene chloride	ND	5.5	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	1.1	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.1	ug/kg	
127-18-4	Tetrachloroethene	ND	1.1	ug/kg	
108-88-3	Toluene	ND	1.1	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.1	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.1	ug/kg	
79-01-6	Trichloroethene	ND	1.1	ug/kg	
75-69-4	Trichlorofluoromethane	ND	1.1	ug/kg	
75-01-4	Vinyl chloride	ND	1.1	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	1.1	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	1.1	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	1.1	ug/kg	
1330-20-7	Xylenes (total)	ND	3.3	ug/kg	
156-69-4	cis-1,2-Dichloroethene	ND	1.1	ug/kg	
540-59-0	1,2-Dichloroethene (total)	ND	4.4	ug/kg	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	PREABURN SOIL		
Lab Sample ID:	F580-1	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	SW846 8010/8020	**Percent Solids:**	92.2
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002068.D	1	04/30/97	AW	n/a	n/a	GEF53
Run #2							

VOA PPL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	107%		50-150%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	PREABURN SOIL		
Lab Sample ID:	F580-1	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
		Percent Solids:	92.2
Project:	Site G300 CTO 0027		

General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Solids, Percent	92.2		%	1	04/30/97 JK	EPA 160.3 M
Total Organic Halides	<10	10	mg/kg	1	05/06/97 SUB	SW846 9020 M

RDL = Reported Detection Limit

ACCUTEST.

Report of Analysis

Client Sample ID:	PREABURN SOIL		
Lab Sample ID:	F580-1	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
		Percent Solids:	92.2
Project:	Site G300 CTO 0027		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Arsenic	<0.54	0.54	mg/kg	1	05/01/97	05/05/97	JK	SW846 7060
Barium	<22	22	mg/kg	1	05/01/97	05/05/97	JK	SW846 6010A
Cadmium	<1.1	1.1	mg/kg	1	05/01/97	05/05/97	JK	SW846 6010A
Chromium	<1.1	1.1	mg/kg	1	05/01/97	05/05/97	JK	SW846 6010A
Lead	<54	54	mg/kg	1	04/30/97	05/08/97	JK	SW846 6010A
Mercury	<0.54	0.54	mg/kg	1	05/05/97	05/06/97	JK	SW846 7471A
Selenium	<54	54	mg/kg	1	04/30/97	05/08/97	JK	SW846 6010A
Silver	<1.1	1.1	mg/kg	1	05/01/97	05/05/97	JK	SW846 6010A

RDL = Reported Detection Limit

CHAIN OF CUSTODY

ACCUTEST®
4405 VINELAND ROAD • SUITE C-15
ORLANDO, FL 32811
TEL: 407-425-6700 • FAX: 407-425-0707

ACCUTEST JOB #:

ACCUTEST QUOTE #:

CLIENT INFORMATION

ALSE

NAME

ADDRESS

CITY, STATE ZIP

SEND REPORT TO:

PHONE #

FACILITY INFORMATION

Tok # 580

PROJECT NAME: Round 4 Perf ~~Conf~~

LOCATION: (Tallahassee)

PROJECT NO.

FAX #

ANALYTICAL INFORMATION

MATRIX CODES

DW - DRINKING WATER
GW - GROUND WATER
WW - WASTE WATER
SO - SOIL
SL - SLUDGE
OI - OIL
LIQ - OTHER LIQUID
SOL - OTHER SOLID

LAB USE ONLY

ACCUTEST SAMPLE #	FIELD ID / POINT OF COLLECTION	COLLECTION DATE	COLLECTION TIME	SAMPLED BY:	MATRIX	# OF BOTTLES	PRESERVATION HCl	NaOH	HNO3	H2SO4	NONE	TOX
	T580-1	4/[illegible]/9[illegible]	[illegible]	GC	SO	1					Y	X

Brown & Root Environmental
455 FAIRWAY DRIVE, SUITE 200
DEERFIELD BEACH, FLORIDA 33441
(305) 570-5885 (305) 570-5974 (FAX)

SITE MANAGER: Paul Calligan
PROJECT NAME: Site 6300 CTO 0027
BRE PROJECT NO.: 7540 CODE: —
P.O. NO.: 2049-7540-P97159

SHIPPED TO: ACCUTEST LABORATORIES SOUTHEAST, INC. Orlando, FL
ATTN: Harry Behzadi
(LABORATORY NAME, CITY)

CHAIN OF CUSTODY RECORD

LABORATORY ANALYSIS

SAMPLED BY (PRINT): Gerald F. Goode
SAMPLER SIGNATURE: Gerald F. Goode

☒ STANDARD TAT ☐ RUSH
☐ 24 HR. ☐ 48 HR. ☐ 72 HR. ☐ 7 DAYS
RESULTS DUE DATE: _____

LAB NO.	DATE	TIME	SAMPLE IDENTIFICATION	SAMPLE TYPE COMP.	SAMPLE TYPE GRAB	MATRIX	PRES. TYPE	PARAMETERS 8 RCRA metals	TCLP	8100/PRO	8010	8020					NUMBER OF CONTAINERS	COMMENTS:
F5880-1	4/23/97	13:00	Prebuen Soil	X		S		1	1	1	2	2					7	Samples Iced
			The Prebuen Soil is a composite															
			sample collected from drummed															
			soil cuttings.															
TOTAL NUMBER OF CONTAINERS								1	1	1	2	2					7	

EMPTY BOTTLES RELINQUISHED BY (SIGNATURE) | SEAL INTACT? | DATE:
EMPTY BOTTLES RECEIVED BY (SIGNATURE) | SEAL INTACT? | DATE: 4/23/97

APPENDIX H

WELL COMPLETION LOGS

ATTACHMENT C-5A
EXAMPLE OVERBURDEN MONITORING WELL SHEET (FLUSHMOUNT)

Site 300

BORING NO.: _____

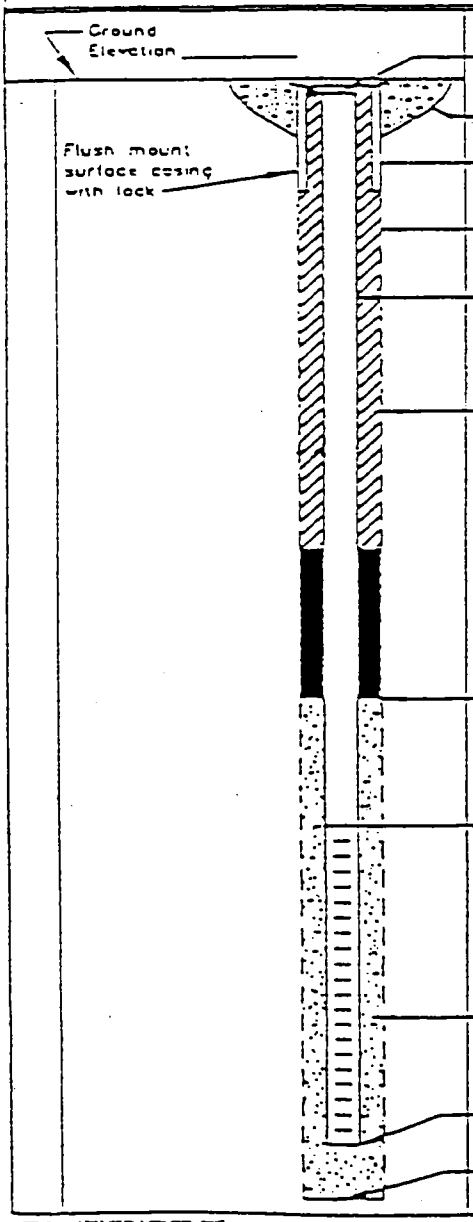
MONITORING WELL SHEET

Site 300

PROJECT 7540 C.O. CTO 0027
PROJECT NO. 7540
ELEVATION G/L
FIELD GEOLOGIST John G Webster PE

LOCATION Coastal Storm Station
BORING PCS-300-MW01
DATE 4/22/97

DRILLER William Lindsey
DRILLING METHOD Hollow Stem Auger 4¼" (ID)
DEVELOPMENT METHOD Submersible Pump



ELEVATION TOP OF RISER: _____
TYPE OF SURFACE SEAL: _____
TYPE OF PROTECTIVE CASING: 8 inch man hole - Steel
I.D. OF PROTECTIVE CASING: _____
DIAMETER OF HOLE: 4.25 ID Auger - 8 inch bore hole
TYPE OF RISER PIPE: PVC
RISER PIPE I.D.: 2" 5'
TYPE OF BACKFILL/SEAL: ½ inch Bentonite Tablets
6" Sodium Bentonite (CETCO)
DEPTH/ELEVATION TOP OF SAND: ~3'
DEPTH/ELEVATION TOP OF SCREEN: 5'
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: .010 x 10'
TYPE OF SAND PACK: 20/30 - 6 bags
DIAMETER OF HOLE IN BEDROCK: 4.25 ID Augers - 8 inch bore hole
DEPTH/ELEVATION BOTTOM OF SCREEN: 15'
DEPTH/ELEVATION BOTTOM OF SAND: 15.5'
DEPTH/ELEVATION BOTTOM OF HOLE: 15.5'
BACKFILL MATERIAL BELOW SAND: _____

NOTE: UNLESS OTHERWISE NOTED

ATTACHMENT C-5A
EXAMPLE OVERBURDEN MONITORING WELL SHEET (FLUSHMOUNT)

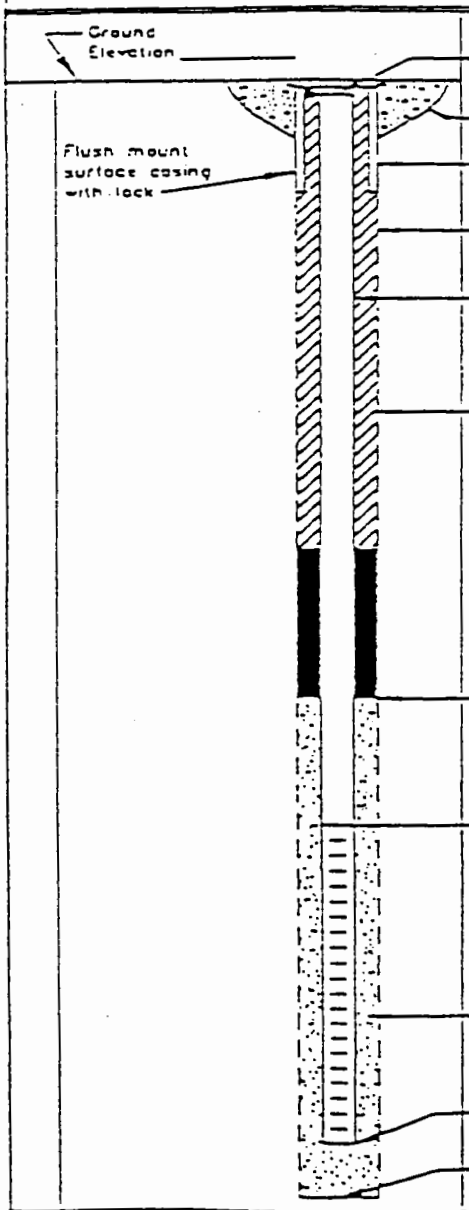
BORING NO.: _____

MONITORING WELL SHEET

Site 300

PROJECT CTO 0027 | LOCATION Coastal System Station
PROJECT NO. 7540 | BORING PCV-300-MW-02
ELEVATION G/L | DATE 4/22/97
FIELD GEOLOGIST John G Webster

DRILLER William Lindsey
DRILLING METHOD Hollow stem Auger 4¼
DEVELOPMENT METHOD Submersible Pump



ELEVATION TOP OF RISER: _____
TYPE OF SURFACE SEAL: _____
TYPE OF PROTECTIVE CASING: Steel
I.D. OF PROTECTIVE CASING: Man Hole
DIAMETER OF HOLE: 4.25 ID Augers - 8 inch bore hole
TYPE OF RISER PIPE: PVC
RISER PIPE I.D.: 2 "SI"
TYPE OF BACKFILL/SEAL: ½ inch Bentonite Tablets
6" above filter pack - Sodium Bentonite
DEPTH/ELEVATION TOP OF SAND: 3',
DEPTH/ELEVATION TOP OF SCREEN: 5',
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: .010 x 10'
TYPE OF SAND PACK: 20/30 6 bags
DIAMETER OF HOLE IN BEDROCK: 4.25 ID Augers - 8 inch bore hole
DEPTH/ELEVATION BOTTOM OF SCREEN: 15',
DEPTH/ELEVATION BOTTOM OF SAND: 15.5',
DEPTH/ELEVATION BOTTOM OF HOLE: 15.5',
BACKFILL MATERIAL BELOW SAND: _____

ATTACHMENT C-5A
EXAMPLE OVERBURDEN MONITORING WELL SHEET (FLUSHMOUNT)

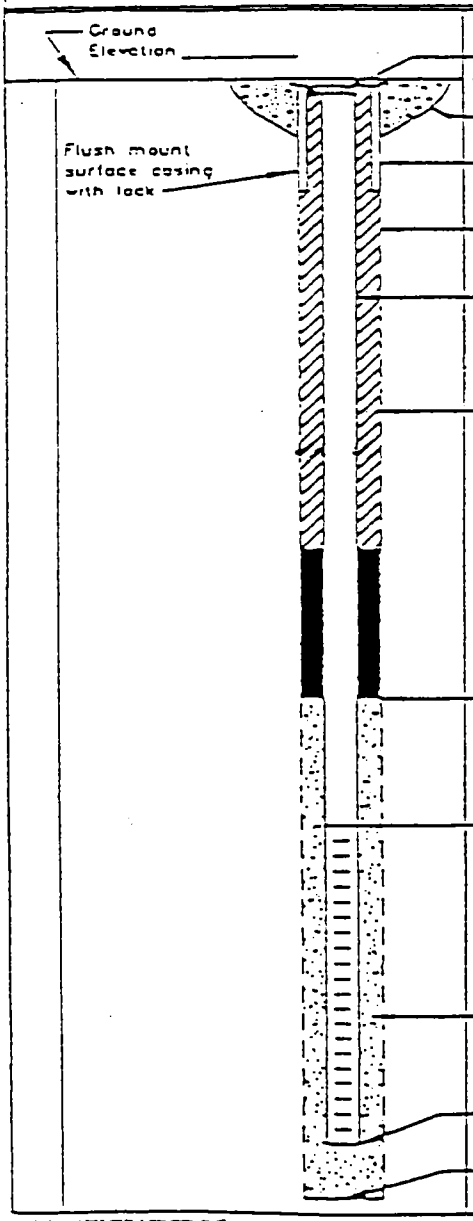
Site 300

BORING NO.: _____

MONITORING WELL SHEET

PROJECT CTO 0027 — LOCATION Coastal System Station
PROJECT NO. 7540 — BORING PCV-300-MW-02sr
ELEVATION G/L — DATE 4/22/97
FIELD GEOLOGIST John C. Webster PE

DRILLER William Lindsey
DRILLING METHOD Hollow stem Auger 4¼ ID
DEVELOPMENT METHOD Submersible Pump



ELEVATION TOP OF RISER: _____
TYPE OF SURFACE SEAL: _____
TYPE OF PROTECTIVE CASING: Steel
I.D. OF PROTECTIVE CASING: 8"
DIAMETER OF HOLE: 4.25 ID augers - 8 inch bore hole
TYPE OF RISER PIPE: PVC
RISER PIPE I.D.: 2 5'
TYPE OF BACKFILL/SEAL: ½ inch Bentonite Tablets
6" above filter pack - Sodium Bentonite
DEPTH/ELEVATION TOP OF SAND: 3',
DEPTH/ELEVATION TOP OF SCREEN: 5',
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: .010 x 10
TYPE OF SAND PACK: 20/30 - 6 bags
DIAMETER OF HOLE IN BEDROCK: 4.25 ID Augers - 8 inch bore hole
DEPTH/ELEVATION BOTTOM OF SCREEN: 15',
DEPTH/ELEVATION BOTTOM OF SAND: 16',
DEPTH/ELEVATION BOTTOM OF HOLE: 16',
BACKFILL MATERIAL BELOW SAND: _____

ATTACHMENT C-5A
EXAMPLE OVERBURDEN MONITORING WELL SHEET (FLUSHMOUNT)

Site 300

BORING NO.: _____

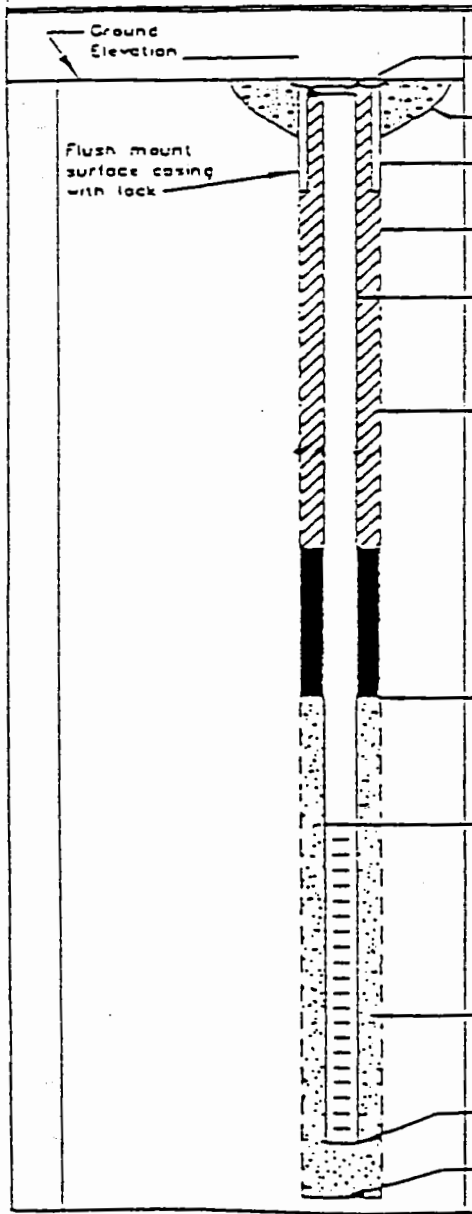
MONITORING WELL SHEET

Site 300

PROJECT CTO 0027
PROJECT NO. 7540
ELEVATION G/L
FIELD GEOLOGIST John G Webster

LOCATION Coastal System Station
BORING PCY-300-MW-04
DATE 4/22/97

DRILLER William Lindsey
DRILLING METHOD Hollow stem Auger 4 1/4
DEVELOPMENT METHOD Submersible pump



ELEVATION TOP OF RISER: _____

TYPE OF SURFACE SEAL: _____

TYPE OF PROTECTIVE CASING: Steel-manhole

I.D. OF PROTECTIVE CASING: 8

DIAMETER OF HOLE: 4.25 Auger - 8 inch bore hole

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2 5'

TYPE OF BACKFILL/SEAL: 1/2 inch Bentonite Tablets
6" above filterpack - Sodium Bentonite

DEPTH/ELEVATION TOP OF SAND: 3'

DEPTH/ELEVATION TOP OF SCREEN: 5'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: .010 x 10'

TYPE OF SAND PACK: 20/30 - 6 bags

DIAMETER OF HOLE IN BEDROCK: 4.75 Augers - 8 inch bore hole

DEPTH/ELEVATION BOTTOM OF SCREEN: 15'

DEPTH/ELEVATION BOTTOM OF SAND: 15.5'

DEPTH/ELEVATION BOTTOM OF HOLE: 15.5'

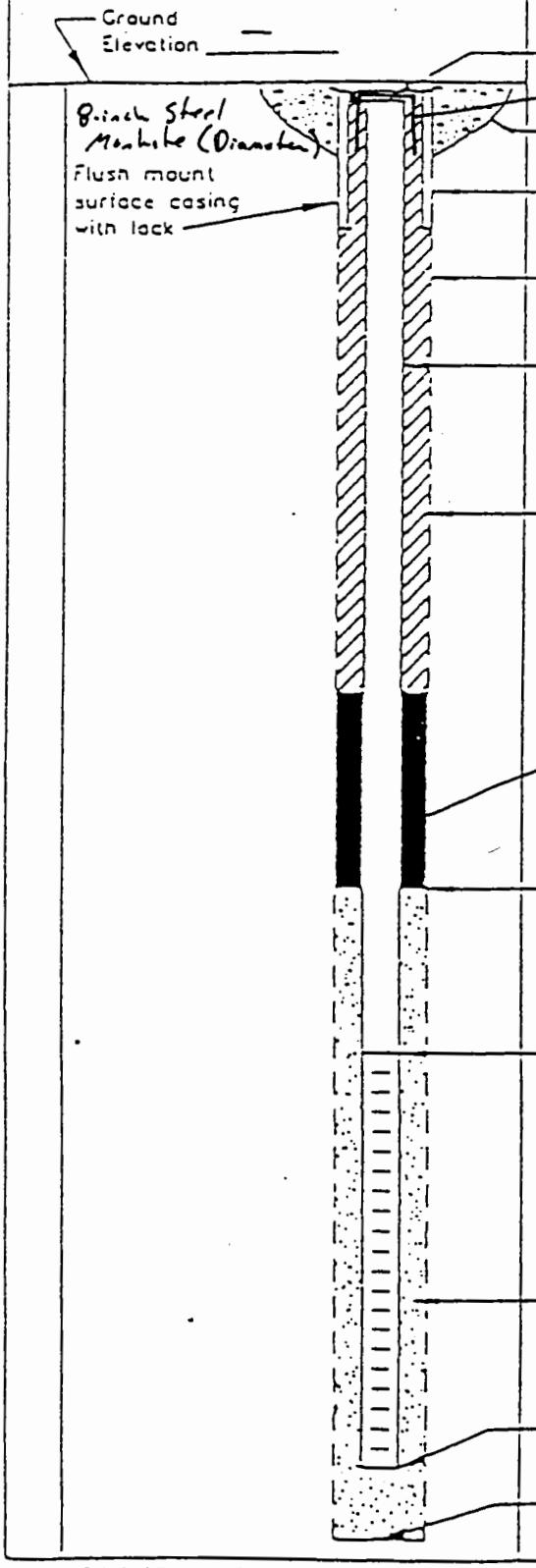
BACKFILL MATERIAL BELOW SAND: _____

BORING NO.: SB07
PZ-1

MONITORING WELL SHEET

PROJECT CTO 0027 | LOCATION G-300
PROJECT NO. 7540 | BORING SB07
ELEVATION Relative | DATE 3/19/97 to 3/21/97
FIELD GEOLOGIST Gerald Goode

DRILLER Jason Anglin
DRILLING METHOD Hand-Auger
DEVELOPMENT METHOD Peristaltic Pump

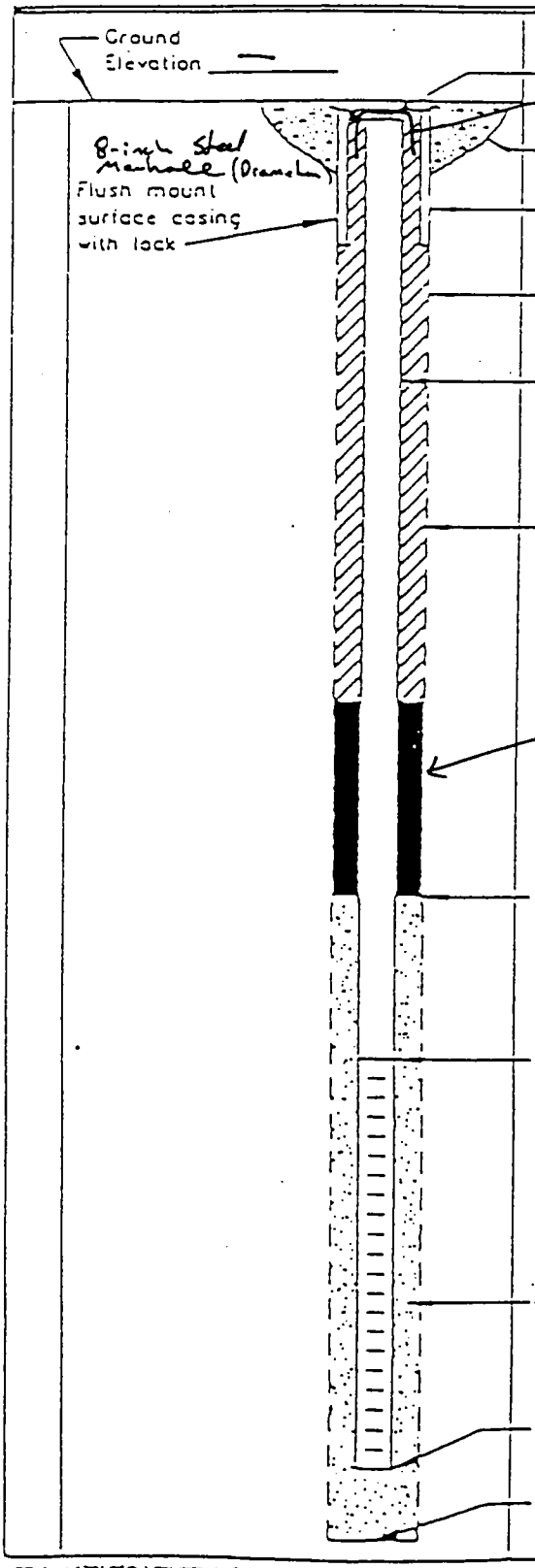


ELEVATION TOP OF RISER: 10.44'
2-inch dia PVC well cap sleeve
TYPE OF SURFACE SEAL: Portland Cement
TYPE OF PROTECTIVE CASING: —
I.D. OF PROTECTIVE CASING: —
DIAMETER OF HOLE: @ 3"
TYPE OF RISER PIPE: Sch. 40 Threaded PVC
RISER PIPE O.D.: 1 1/4" Rubber O-Rings
TYPE OF BACKFILL/SEAL: Portland Cement
DEPTH/ELEVATION TOP OF SAND: 3' / 7.44'
DEPTH/ELEVATION TOP OF SCREEN: 4' / 6.44'
TYPE OF SCREEN: Sch. 40 PVC 1 1/4" OD (Threaded/Rubber O-Rings
SLOT SIZE x LENGTH: 0.010" Slot w/10' screen
TYPE OF SAND PACK: Natural Sand Pack to 3' bls
DIAMETER OF HOLE IN BEDROCK: NA
DEPTH/ELEVATION BOTTOM OF SCREEN: 14' / -3.56'
DEPTH/ELEVATION BOTTOM OF SAND: 14' / -3.56
DEPTH/ELEVATION BOTTOM OF HOLE: 14' / -3.56
BACKFILL MATERIAL BELOW SAND: —

BORING NO.: SB08
PZ-2

MONITORING WELL SHEET

PROJECT CTO 0027 | LOCATION G-300 | DRILLER Jason Anglin
PROJECT NO. 7540 | BORING SB08 | DRILLING METHOD Direct Push
ELEVATION Relative | DATE 3/19/97 to 3/21/97 | DEVELOPMENT METHOD Peristaltic Pump
FIELD GEOLOGIST Gerald Goode



(Bench Mark)

ELEVATION TOP OF RISER: 10.00 Arbitrary datum point.
2-inch dia PVC well cap sleeve
TYPE OF SURFACE SEAL: Portland Cement
TYPE OF PROTECTIVE CASING: —
I.D. OF PROTECTIVE CASING: —
DIAMETER OF HOLE: ø 2¼"
TYPE OF RISER PIPE: Sch. 40 Threaded PVC
RISER PIPE O.D.: 1¼"
Rubber O-ring seal
TYPE OF BACKFILL/SEAL: Portland Cement

Bentonite pellets 2 to 3' bls (hydrated)

DEPTH/ELEVATION TOP OF SAND: 3' / 7.00
natural Sand pack to 8.2' bls

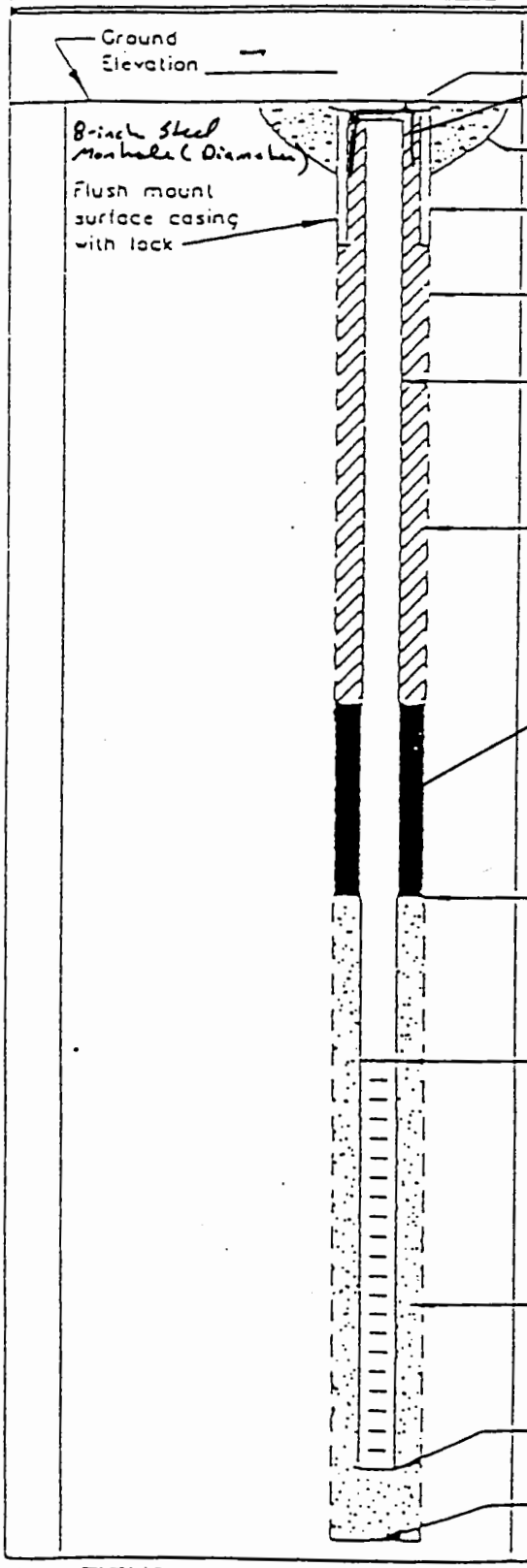
DEPTH/ELEVATION TOP OF SCREEN: 4' / 6.00
TYPE OF SCREEN: Sch. 40 PVC 1¼" OD (Threaded/Rubber O-Ring)
SLOT SIZE x LENGTH: 0.010" slot w/10' Screen

TYPE OF SAND PACK: 20/30 Silica Sand
DIAMETER OF HOLE IN BEDROCK: ~4
DEPTH/ELEVATION BOTTOM OF SCREEN: 14 / -4.0
DEPTH/ELEVATION BOTTOM OF SAND: 14 / -4.0
DEPTH/ELEVATION BOTTOM OF HOLE: 14 / -4.0
BACKFILL MATERIAL BELOW SAND: —

BORING NO.: SB10
"PZ-3

MONITORING WELL SHEET

PROJECT CTO 0027 | LOCATION G-300 | DRILLER Jason Anglin
PROJECT NO. 7540 | BORING SB10 | DRILLING METHOD Direct Push
ELEVATION Relative | DATE 3/19/97 to 3/21/97 | DEVELOPMENT METHOD Peristaltic Pump
FIELD GEOLOGIST Gerald Goode



ELEVATION TOP OF RISER: 10.17
2-inch dia pvc Bell Cap Sleeve
TYPE OF SURFACE SEAL: Portland Cement
TYPE OF PROTECTIVE CASING: —
I.D. OF PROTECTIVE CASING: —
DIAMETER OF HOLE: 2¼"
TYPE OF RISER PIPE: Sch. 40 Threaded PVC
RISER PIPE I.D.: 1¼"
Rubber O-ring Seal
TYPE OF BACKFILL/SEAL: Portland Cement
DEPTH/ELEVATION TOP OF SAND: 3' / 7.17
Natural Sand Pack to 8.4' b/s
DEPTH/ELEVATION TOP OF SCREEN: 4' / 6.17
TYPE OF SCREEN: Sch 40 PVC 1¼" OD Threaded / Rubber O-Rings
SLOT SIZE x LENGTH: 0.010" slot w/10' screen
TYPE OF SAND PACK: 20/30 Silica Sand
DIAMETER OF HOLE IN BEDROCK: N/A
DEPTH/ELEVATION BOTTOM OF SCREEN: 14 / -3.83
DEPTH/ELEVATION BOTTOM OF SAND: 14 / -3.83
DEPTH/ELEVATION BOTTOM OF HOLE: 14 / -3.83
BACKFILL MATERIAL BELOW SAND: —

APPENDIX I

FIELD SCREENING TPH-DRO
DATA SHEETS FOR GROUNDWATER AND SOIL

DATA REPORT

BROWN & ROOT ENVIRONMENTAL
1311 EXECUTIVE CENTER DRIVE - ELLIS BUILDING, SUITE 220
TALLAHASSEE, FL 32301

CSS, PANAMA CITY, FL - SITE G-300
PROJECT NO. CTO 0027 (7540)

TEG PROJECT # 1-97178-A1

TPH-DRO ANALYSIS OF WATER (EPA METHOD 3510/8015 Mod.)

DATA REPORTED IN MILLIGRAMS PER LITER (PPM)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	TPH-DRO (mg/L)	Surrogate Recovery (%)	Data Qualifiers	PQL
METHOD BLANK	—	3/18/97	ND	108		0.50
G300-SB01-GW-1012	3/18/97	3/18/97	ND	104		0.50
G300-SB02-GW-1012	3/18/97	3/18/97	ND	94.5		0.50
G300-SB03-GW-1012	3/18/97	3/18/97	ND	105		0.50
G300-SB04-GW-1012	3/18/97	3/18/97	1.78	96.9		0.50
						0.50
METHOD BLANK	—	3/19/97	ND	107		0.50
G300-SB05-GW-1012	3/18/97	3/19/97	ND	101		0.50
G300-SB06-GW-1012	3/19/97	3/19/97	ND	97.6		0.50
G300-SB07-GW-1214	3/19/97	3/19/97	ND	85.1		0.50
G300-SB08-GW-1012	3/19/97	3/19/97	ND	92.3		0.50
G300-SB09-GW-1011	3/19/97	3/19/97	17.4	106		0.50
						0.50
METHOD BLANK	—	3/20/97	ND	107		0.50
G300-SB09-GW-1011 DUP	3/19/97	3/20/97	15.5	95.1		0.50
G300-SB10-GW-1011	3/19/97	3/20/97	ND	98.4		0.50
G300-SB11-GW-1012	3/20/97	3/20/97	ND	85.1		0.50
G300-SB12-GW-1012	3/20/97	3/20/97	2.83	87.0		0.50
G300-SB13-GW-1012	3/20/97	3/20/97	0.875	108		0.50
G300-SB14-GW-1012	3/20/97	3/20/97	10.0	95.1		0.50
G300-SB15-GW-1012	3/20/97	3/21/97	ND	MI		0.50

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)
ANALYSIS PERFORMED IN TEG'S CERTIFIED MOBILE LABORATORY
ANALYSIS PERFORMED BY: MATTHEW STEERE
DATA REVIEWED BY: JONATHAN R. MILLER, RHSP

DATA QUALIFIERS

MI = MATRIX INTERFERENCE
DO = SURROGATE SPIKE DILUTED OUT
D = SAMPLE VALUE OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY
E = ESTIMATED CONCENTRATION(S)

197178A2.XLS

QA/QC DATA REPORT

BROWN & ROOT ENVIRONMENTAL
1311 EXECUTIVE CENTER DRIVE - ELLIS BUILDING, SUITE 220
TALLAHASSEE, FL 32301

CSS, PANAMA CITY, FL - SITE G-300
PROJECT NO. CTO 0027 (7540)

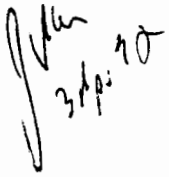
TEG PROJECT # 1-97178-A1

TPH-DRO ANALYSIS OF WATER (EPA METHOD 3510/8015 Mod.)

DATE ANALYZED: 2/6/97

	TPH-DRO (mg/L)
MATRIX SPIKE	
SPIKED CONC.	5.00
MEASURED CONC.	5.27
% RECOVERY	105.4%
MATRIX SPIKE DUPLICATE	
SPIKED CONC.	5.00
MEASURED CONC.	4.97
% RECOVERY	99.4%
RELATIVE PERCENT DIFFERENCE (RPD)	5.9%

ANALYSIS PERFORMED IN TEG'S CERTIFIED MOBILE LABORATORY
ANALYSIS PERFORMED BY: MATTHEW STEERE
DATA REVIEWED BY: JONATHAN R. MILLER, RHSP



197178A2.XLS

DATA REPORT

BROWN & ROOT ENVIRONMENTAL
1311 EXECUTIVE CENTER DRIVE - ELLIS BUILDING, SUITE 220
TALLAHASSEE, FL 32301

CSS, PANAMA CITY, FL - SITE G-300
PROJECT NO. CTO 0027 (7540)

TEG PROJECT # 1-97178-A1

TPH-DRO ANALYSIS OF SOIL (EPA METHOD 3550/8015 Mod.)

DATA REPORTED IN MILLIGRAMS PER KILOGRAM (PPM)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	TPH-DRO (mg/kg)	Surrogate Recovery (%)	Data Qualifiers	PQL
METHOD BLANK	—	3/18/97	ND	122		10
G300-SB01-SS-0810	3/18/97	3/18/97	ND	117		10
G300-SB02-SS-0607	3/18/97	3/18/97	ND	121		10
G300-SB03-SS-0607	3/18/97	3/18/97	ND	119		10
METHOD BLANK	—	3/19/97	ND	118		10
G300-SB04-SS-0507	3/18/97	3/19/97	7280	DO	D	40
G300-SB04-SS-0507 DUP	3/18/97	3/19/97	7240	DO	D	40
G300-SB05-SS-0507	3/18/97	3/19/97	4820	121		10
G300-SB06-SS-0507	3/19/97	3/19/97	ND	108		10
G300-SB07-SS-0406	3/19/97	3/19/97	ND	126		10
G300-SB08-SS-0507	3/19/97	3/19/97	ND	117		10
G300-SB09-SS-0607	3/19/97	3/19/97	4980	87.2		10
METHOD BLANK	—	3/20/97	ND	94.8		10
G300-SB10-SS-0507	3/19/97	3/20/97	ND	91.0		10
G300-SB11-SS-0507	3/20/97	3/20/97	ND	87.2		10
G300-SB12-SS-0507	3/20/97	3/20/97	ND	102		10
G300-SB13-SS-0507	3/20/97	3/20/97	22.1	98.6		10
G300-SB14-SS-0507	3/20/97	3/20/97	ND	103		10
G300-SB15-SS-0507	3/20/97	3/21/97	ND	752		10

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)
ANALYSIS PERFORMED IN TEG'S CERTIFIED MOBILE LABORATORY
ANALYSIS PERFORMED BY: MATTHEW STEERE
DATA REVIEWED BY: JONATHAN R. MILLER, RHSP

DATA QUALIFIERS

MI = MATRIX INTERFERENCE
DO = SURROGATE SPIKE DILUTED OUT
D = SAMPLE VALUE OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY
E = ESTIMATED CONCENTRATION(S)

197178A1.XLS

QA/QC DATA REPORT

BROWN & ROOT ENVIRONMENTAL
1311 EXECUTIVE CENTER DRIVE - ELLIS BUILDING, SUITE 220
TALLAHASSEE, FL 32301

CSS, PANAMA CITY, FL - SITE G-300
PROJECT NO. CTO 0027 (7540)

TEG PROJECT # 1-97178-A1

TPH-DRO ANALYSIS OF SOIL (EPA METHOD 3550/8015 Mod.)

DATE ANALYZED: 3/17/97

	TPH-DRO (mg/kg)
MATRIX SPIKE	
SPIKED CONC.	500
MEASURED CONC.	464
% RECOVERY	92.8%
MATRIX SPIKE DUPLICATE	
SPIKED CONC.	500
MEASURED CONC.	482
% RECOVERY	96.4%
RELATIVE PERCENT DIFFERENCE (RPD)	3.8%

ANALYSIS PERFORMED IN TEG'S CERTIFIED MOBILE LABORATORY
ANALYSIS PERFORMED BY: MATTHEW STEERE
DATA REVIEWED BY: JONATHAN R. MILLER, RHSP

3/19/97

197178A1.XLS

3600-C KENNESAW N. IND. PKWY KENNESAW, GA 30144 770-919-0805 FAX 770-919-0806

teg

TRANSGLOBAL ENVIRONMENTAL GEOCHEMISTRY, INC.

CHAIN-OF-CUSTODY RECORD

CLIENT: Brown & Root Environmental

ADDRESS: 1311 Executive Center Drive Ellis Building, Suite 220

CITY: Tallahassee STATE: FL ZIP: 32301

PHONE: (904) 656-4455 FAX: (904) 656-7855

CLIENT PROJECT #: [illegible] PROJECT MANAGER: Paul Tollinson

DATE: March 12, 1997 PAGE 1 OF

TEG PROJECT #: 1-7105.A1

LOCATION: Tyndall, Panama City

COLLECTOR: [illegible] DATE OF COLLECTION: 3/11/97

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES: VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (g & d)	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
GW-1012	10-12'		H2O	2-VOAs						✓												
GW-1012	10-12'		H2O	2-VOAs						✓												
GW-1012	10-12'		H2O	2-VOAs						✓												
GW-1012	10-12'		H2O	2-VOAs						✓												
GW-1012	10-12'		H2O	2-VOAs						✓												
GW-1012	10-12'		H2O	2-VOAs						✓												
GW-1012	10-12'		H2O	2-VOAs						✓												
GW-1012	10-12'		H2O	2-VOAs						✓												
GW-1012	10-12'		H2O	2-VOAs						✓												

Relinquished by: [illegible] Date: 3/11/97 Time: 1700

Received by: [illegible] Date: 3/11/97 Time: 1700

Relinquished by: [illegible] Date: 3/12/97 Time: 1000

Received by: [illegible] Date: 3/12/97 Time: 1000

teg

TRANSGLOBAL ENVIRONMENTAL GEOCHEMISTRY

CHAIN-OF-CUSTODY RECORD

P.O. #: _____

CLIENT: Brown & Root Environmental

ADDRESS: 1311 Executive Center Drive Ellis Bldg. , Suite 220 Tallahassee , FL

PHONE: (904) 656-5498 FAX: (904) 656-7403

CLIENT PROJECT #: CTO 0027 (7540) PROJECT MANAGER: Paul Cullerton

DATE: March 19, 1997 PAGE _____ OF _____

TEG PROJECT #: 1-97178-A1

LOCATION: CSS , Panama City , FL

COLLECTOR: _____ DATE OF COLLECTION: 3/19/97

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES: VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (g & d)	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
G300-SB06 SS-0507	5-7		Soil	1-4oz.						✓												
G300-SB06 GW-1012	10-12'		H2O	2-VOAs						✓												
G300-SB07 SS-0406	4-6'		Soil	1-4oz.						✓												
G300-SB07 GW-1214	12-14'		H2O	2-VOAs						✓												
G300-SB08 SS-0507	5-7'		Soil	1-4oz.						✓												
G300-SB08 GW-1012	10-12'		H2O	2-VOAs						✓												
G300-SB09 SS-0607	6-7'		Soil	1-4oz.						✓												
G300-SB09 GW-1011	10-11'		H2O	~~2-VOAs~~ ~~1-4oz~~						✓												
G300-SB10 SS-0507	5-7'		Soil	1-4oz						✓												
G300-SB10 GW-1011	10-11'		H2O	2-VOAs						✓												

teg

TRANSGLOBAL ENVIRONMENTAL GEOCHEMISTRY

CHAIN-OF-CUSTODY RECORD

P.O. #: _____

CLIENT: Brown & Root Environmental — Tallahassee, FL

ADDRESS: 1311 Executive Center Drive Ellis Bldg., Suite 220

PHONE: (904) 656-5498 FAX: (904) 656-7403

CLIENT PROJECT #: CTO 0022 (7540) PROJECT MANAGER: Paul Calligan

DATE: March 20, 1997 PAGE 1 OF 1

TEG PROJECT #: 1-97178-A1

LOCATION: C55 Panama City, FL

COLLECTOR: _____ DATE OF COLLECTION: 3/20/97

Sample Number	Depth	Time	Sample Type	Container Type	VOA 601/8010	VOA 602/8020	VOA 624/8240	Semi Vol 625/8270	TPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (g & d)	PNA 610/8100	PEST/PCBs 8080	HEX CHROME	ORGANIC LEAD	TOTAL LEAD	pH	ASBESTOS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
G300-SB11 SS-0507	5-7'		Soil	1-4 oz						✓												
G300-SB11 GW-1012	10-12'		H2O	2-VOAs						✓												
G300-SB12 SS-0507	5-7'		Soil	1-4oz.						✓												
G300-SB13 SS-0507	5-7'		Soil	1-4oz.						✓												
G300-SB11 SS-0507	5-7'		Soil	1-4oz						✓												
G300-SB13 GW-1012	10-12'		H2O	2-VOAs						✓												
G300-SB12 GW-1012	10-12'		H2O	2-VOAs						✓												
G300-SB14 GW-1012	10-12'		H2O	2-VOAs						✓												
G300-SB15 SS-0507	5-7'		Soil	1-4oz						✓												
G300-SB15 GW-1012	10-12'		H2O	2-VOAs																		

APPENDIX J

SOIL LABORATORY DATA SHEETS

ACCUTEST.

05/09/97

Technical Report for

Brown & Root Environmental

Site G300 CTO 0027

7540

Accutest Job Number: F581

Report to:

C/O Paul Calligan
Brown & Root Environmental
1311 Executive Center Dr. Ste: 220
Tallahassee, FL 32301

ATTN: Arnold Lamb - QA Officer

Total number of pages in report: 26

Harry Behzadi, Ph.D.
Laboratory Director

ACCUTEST.

Sample Summary

Brown & Root Environmental

Date: 05/09/97
Job No: F581

Site G300 CTO 0027
Project No: 7540

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
F581-1	04/23/97	16:00	GG	04/25/97	SO	Soil	300-SB01-0607
F581-2	04/23/97	16:20	GG	04/25/97	AQ	Field Blank Water	300-SB01-0607B
F581-3	04/23/97	16:45	GG	04/25/97	SO	Soil	300-SB-05-0607
F581-4	04/23/97	17:00	GG	04/25/97	SO	Soil	300-SB-04-0607
F581-5	04/17/97	16:00	GG	04/25/97	AQ	Trip Blank Water	TRIP BLANK

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB01-0607		
Lab Sample ID:	F581-1	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	EPA 8100	**Percent Solids:**	97.7
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01473.D	1	04/28/97	NF	04/28/97	OP85	GIJ69
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	340	ug/kg	
208-96-8	Acenaphthylene	ND	340	ug/kg	
120-12-7	Anthracene	ND	340	ug/kg	
56-55-3	Benzo(a)anthracene	ND	340	ug/kg	
50-32-8	Benzo(a)pyrene	ND	340	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	340	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	340	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	340	ug/kg	
218-01-9	Chrysene	ND	340	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	340	ug/kg	
206-44-0	Fluoranthene	ND	340	ug/kg	
86-73-7	Fluorene	ND	340	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	340	ug/kg	
91-20-3	Naphthalene	ND	340	ug/kg	
90-12-0	1-Methylnaphthalene	ND	340	ug/kg	
91-57-6	2-Methylnaphthalene	ND	340	ug/kg	
85-01-8	Phenanthrene	ND	340	ug/kg	
129-00-0	Pyrene	ND	340	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	65%		35-120%
84-15-1	o-Terphenyl	74%		35-120%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB01-O6O7		
Lab Sample ID:	F581-1	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	FLORIDA-PRO	**Percent Solids:**	97.7
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01578.D	1	05/02/97	NF	05/01/97	OP74	GIJ73
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	11.0	8.5	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	66%		40-140%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB01-O6O7		
Lab Sample ID:	F581-1	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	SW846 8010/8020	**Percent Solids:**	97.7
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002016.D	1	04/25/97	AW	n/a	n/a	GEF51
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/kg	
75-25-2	Bromoform	ND	1.0	ug/kg	
75-27-4	Bromodichloromethane	ND	1.0	ug/kg	
74-83-9	Bromomethane	ND	1.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.0	ug/kg	
108-90-7	Chlorobenzene	ND	1.0	ug/kg	
75-00-3	Chloroethane	ND	1.0	ug/kg	
67-66-3	Chloroform	ND	1.0	ug/kg	
74-87-3	Chloromethane	ND	1.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/kg	
124-48-1	Dibromochloromethane	ND	1.0	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	1.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	1.0	ug/kg	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/kg	
100-41-4	Ethylbenzene	ND	1.0	ug/kg	
75-09-2	Methylene chloride	ND	5.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/kg	
127-18-4	Tetrachloroethene	ND	1.0	ug/kg	
108-88-3	Toluene	ND	1.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/kg	
79-01-6	Trichloroethene	ND	1.0	ug/kg	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/kg	
75-01-4	Vinyl chloride	ND	1.0	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ug/kg	
1330-20-7	Xylenes (total)	ND	3.0	ug/kg	
156-69-4	cis-1,2-Dichloroethene	ND	1.0	ug/kg	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB01-O6O7		
Lab Sample ID:	F581-1	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	SW846 8010/8020	**Percent Solids:**	97.7
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002016.D	1	04/25/97	AW	n/a	n/a	GEF51
Run #2							

VOA PPL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	73%		50-150%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB01-O6O7		
Lab Sample ID:	F581-1	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
		Percent Solids:	97.7
Project:	Site G300 CTO 0027		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Lead	26.6	3.1	mg/kg	10	05/05/97	05/09/97	JK	SW846 7421

RDL = Reported Detection Limit

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB01-0607B		
Lab Sample ID:	F581-2	**Date Sampled:**	04/23/97
Matrix:	AQ - Field Blank Water	**Date Received:**	04/25/97
Method:	EPA 8100	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01451.D	1	04/25/97	NF	04/25/97	OP83	GIJ68
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	10	ug/l	
208-96-8	Acenaphthylene	ND	10	ug/l	
120-12-7	Anthracene	ND	10	ug/l	
56-55-3	Benzo(a)anthracene	ND	10	ug/l	
50-32-8	Benzo(a)pyrene	ND	10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	10	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	10	ug/l	
218-01-9	Chrysene	ND	10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	10	ug/l	
206-44-0	Fluoranthene	ND	10	ug/l	
86-73-7	Fluorene	ND	10	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	10	ug/l	
91-20-3	Naphthalene	ND	10	ug/l	
90-12-0	1-Methylnaphthalene	ND	10	ug/l	
91-57-6	2-Methylnaphthalene	ND	10	ug/l	
85-01-8	Phenanthrene	ND	10	ug/l	
129-00-0	Pyrene	ND	10	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	78%		26-116%
84-15-1	o-Terphenyl	94%		26-125%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB01-0607B		
Lab Sample ID:	F581-2	**Date Sampled:**	04/23/97
Matrix:	AQ - Field Blank Water	**Date Received:**	04/25/97
Method:	FLORIDA-PRO	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01594.D	1	05/02/97	NF	04/30/97	OP89	GIJ73
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	ND	0.50	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	69%		40-140%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB01-0607B		
Lab Sample ID:	F581-2	**Date Sampled:**	04/23/97
Matrix:	AQ - Field Blank Water	**Date Received:**	04/25/97
Method:	EPA 8010/8020	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002015.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
75-25-2	Bromoform	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
74-83-9	Bromomethane	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	ug/l	
108-90-7	Chlorobenzene	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	2.5	1.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/l	
127-18-4	Tetrachloroethene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/l	
79-01-6	Trichloroethene	ND	1.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l	
75-01-4	Vinyl chloride	ND	1.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
156-69-4	cis-1,2-Dichloroethene	ND	1.0	ug/l	
540-59-0	1,2-Dichloroethene (total)	ND	2.0	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB01-0607B		
Lab Sample ID:	F581-2	**Date Sampled:**	04/23/97
Matrix:	AQ - Field Blank Water	**Date Received:**	04/25/97
Method:	EPA 8010/8020	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002015.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	100%		75-125%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB01-0607B		
Lab Sample ID:	F581-2	**Date Sampled:**	04/23/97
Matrix:	AQ - Field Blank Water	**Date Received:**	04/25/97
		Percent Solids:	n/a
Project:	Site G300 CTO 0027		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Lead	<0.0030	0.0030	mg/l	1	05/02/97	05/08/97 JK	EPA 239.2

RDL = Reported Detection Limit

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB-05-0607		
Lab Sample ID:	F581-3	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	EPA 8100	**Percent Solids:**	93.2
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	I01477.D	20	04/29/97	NF	04/28/97	OP85	GIJ69
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	7200	ug/kg	
208-96-8	Acenaphthylene	ND	7200	ug/kg	
120-12-7	Anthracene	ND	7200	ug/kg	
56-55-3	Benzo(a)anthracene	ND	7200	ug/kg	
50-32-8	Benzo(a)pyrene	ND	7200	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	7200	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	7200	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	7200	ug/kg	
218-01-9	Chrysene	ND	7200	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	7200	ug/kg	
206-44-0	Fluoranthene	ND	7200	ug/kg	
86-73-7	Fluorene	ND	7200	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	7200	ug/kg	
91-20-3	Naphthalene	ND	7200	ug/kg	
90-12-0	1-Methylnaphthalene	ND	7200	ug/kg	
91-57-6	2-Methylnaphthalene	ND	7200	ug/kg	
85-01-8	Phenanthrene	ND	7200	ug/kg	
129-00-0	Pyrene	ND	7200	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	0% [b]		35-120%
84-15-1	o-Terphenyl	0% [b]		35-120%

(a) Elevated detection limit due to matrix inteference.
(b) Outside control limits due to dilution.

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB-05-0607		
Lab Sample ID:	F581-3	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	FLORIDA-PRO	**Percent Solids:**	93.2
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01579.D	40	05/02/97	NF	05/01/97	OP74	GIJ73
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	2020	360	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	0% a		40-140%

(a) Outside control limits due to dilution.

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB-05-0607		
Lab Sample ID:	F581-3	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	SW846 8010/8020	**Percent Solids:**	93.2
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EF002019.D	10	04/25/97	AW	n/a	n/a	GEF51
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	11	ug/kg	
75-25-2	Bromoform	ND	11	ug/kg	
75-27-4	Bromodichloromethane	ND	11	ug/kg	
74-83-9	Bromomethane	ND	11	ug/kg	
56-23-5	Carbon tetrachloride	ND	11	ug/kg	
108-90-7	Chlorobenzene	ND	11	ug/kg	
75-00-3	Chloroethane	ND	11	ug/kg	
67-66-3	Chloroform	ND	11	ug/kg	
74-87-3	Chloromethane	ND	11	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	11	ug/kg	
124-48-1	Dibromochloromethane	ND	11	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	11	ug/kg	
75-34-3	1,1-Dichloroethane	ND	11	ug/kg	
107-06-2	1,2-Dichloroethane	ND	11	ug/kg	
75-35-4	1,1-Dichloroethene	ND	11	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	11	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	11	ug/kg	
78-87-5	1,2-Dichloropropane	ND	11	ug/kg	
100-41-4	Ethylbenzene [b]	37.9	11	ug/kg	
75-09-2	Methylene chloride	ND	55	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	11	ug/kg	
127-18-4	Tetrachloroethene	ND	11	ug/kg	
108-88-3	Toluene	ND	11	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	11	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	11	ug/kg	
79-01-6	Trichloroethene	ND	11	ug/kg	
75-69-4	Trichlorofluoromethane	ND	11	ug/kg	
75-01-4	Vinyl chloride	ND	11	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	11	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	11	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	11	ug/kg	
1330-20-7	Xylenes (total) [b]	159	33	ug/kg	
156-69-4	cis-1,2-Dichloroethene	ND	11	ug/kg	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB-05-0607		
Lab Sample ID:	F581-3	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	SW846 8010/8020	**Percent Solids:**	93.2
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EF002019.D	10	04/25/97	AW	n/a	n/a	GEF51
Run #2							

VOA PPL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	130%		50-150%

(a) Dilution required due to matrix interference.
(b) Confirmed by reanalysis on second column

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB-05-0607		
Lab Sample ID:	F581-3	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
		Percent Solids:	93.2
Project:	Site G300 CTO 0027		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Lead	2.6	0.32	mg/kg	1	05/05/97	05/06/97	JK	SW846 7421

RDL = Reported Detection Limit

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB-04-0607		
Lab Sample ID:	F581-4	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	EPA 8100	**Percent Solids:**	92.4
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	I01559.D	80	05/01/97	NF	04/28/97	OP85	GIJ72
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	30000	ug/kg	
208-96-8	Acenaphthylene	ND	30000	ug/kg	
120-12-7	Anthracene	ND	30000	ug/kg	
56-55-3	Benzo(a)anthracene	ND	30000	ug/kg	
50-32-8	Benzo(a)pyrene	ND	30000	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	30000	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	30000	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	30000	ug/kg	
218-01-9	Chrysene	ND	30000	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	30000	ug/kg	
206-44-0	Fluoranthene	ND	30000	ug/kg	
86-73-7	Fluorene	ND	30000	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	30000	ug/kg	
91-20-3	Naphthalene	19500	30000	ug/kg	J
90-12-0	1-Methylnaphthalene	55600	30000	ug/kg	
91-57-6	2-Methylnaphthalene	63300	30000	ug/kg	
85-01-8	Phenanthrene	ND	30000	ug/kg	
129-00-0	Pyrene	ND	30000	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	0% [b]		35-120%
84-15-1	o-Terphenyl	0% [b]		35-120%

(a) All hits confirmed by dual column analysis.
(b) Outside control limits due to dilution.

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB-04-0607		
Lab Sample ID:	F581-4	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	FLORIDA-PRO	**Percent Solids:**	92.4
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01580.D	100	05/02/97	NF	05/01/97	OP74	GIJ73
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	5390	930	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	0% a		40-140%

(a) Outside control limits due to dilution.

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB-04-0607		
Lab Sample ID:	F581-4	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	SW846 8010/8020	**Percent Solids:**	92.4
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EF002020.D	50	04/25/97	AW	n/a	n/a	GEF51
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	55	ug/kg	
75-25-2	Bromoform	ND	55	ug/kg	
75-27-4	Bromodichloromethane	ND	55	ug/kg	
74-83-9	Bromomethane	ND	55	ug/kg	
56-23-5	Carbon tetrachloride	ND	55	ug/kg	
108-90-7	Chlorobenzene	ND	55	ug/kg	
75-00-3	Chloroethane	ND	55	ug/kg	
67-66-3	Chloroform	ND	55	ug/kg	
74-87-3	Chloromethane	ND	55	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	55	ug/kg	
124-48-1	Dibromochloromethane	ND	55	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	55	ug/kg	
75-34-3	1,1-Dichloroethane	ND	55	ug/kg	
107-06-2	1,2-Dichloroethane	ND	55	ug/kg	
75-35-4	1,1-Dichloroethene	ND	55	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	55	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	55	ug/kg	
78-87-5	1,2-Dichloropropane	ND	55	ug/kg	
100-41-4	Ethylbenzene [b]	1260	55	ug/kg	
75-09-2	Methylene chloride	ND	280	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	55	ug/kg	
127-18-4	Tetrachloroethene	ND	55	ug/kg	
108-88-3	Toluene	ND	55	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	55	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	55	ug/kg	
79-01-6	Trichloroethene	ND	55	ug/kg	
75-69-4	Trichlorofluoromethane	ND	55	ug/kg	
75-01-4	Vinyl chloride	ND	55	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	55	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	55	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	55	ug/kg	
1330-20-7	Xylenes (total) [b]	4320	160	ug/kg	
156-69-4	cis-1,2-Dichloroethene	ND	55	ug/kg	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB-04-0607		
Lab Sample ID:	F581-4	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
Method:	SW846 8010/8020	**Percent Solids:**	92.4
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EF002020.D	50	04/25/97	AW	n/a	n/a	GEF51
Run #2							

VOA PPL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	97%		50-150%

(a) Dilution required due to matrix interference.
(b) Confirmed by reanalysis on second column

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-SB-04-0607		
Lab Sample ID:	F581-4	**Date Sampled:**	04/23/97
Matrix:	SO - Soil	**Date Received:**	04/25/97
		Percent Solids:	92.4
Project:	Site G300 CTO 0027		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Lead	2.2	0.32	mg/kg	1	05/05/97	05/06/97 JK	SW846 7421

RDL = Reported Detection Limit

ACCUTEST.

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	F581-5	**Date Sampled:**	04/17/97
Matrix:	AQ - Trip Blank Water	**Date Received:**	04/25/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002014.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
75-25-2	Bromoform	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
74-83-9	Bromomethane	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	ug/l	
108-90-7	Chlorobenzene	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	2.2	1.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/l	
127-18-4	Tetrachloroethene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/l	
79-01-6	Trichloroethene	ND	1.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l	
75-01-4	Vinyl chloride	ND	1.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
156-69-4	cis-1,2-Dichloroethene	ND	1.0	ug/l	
540-59-0	1,2-Dichloroethene (total)	ND	2.0	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	F581-5	**Date Sampled:**	04/17/97
Matrix:	AQ - Trip Blank Water	**Date Received:**	04/25/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002014.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	100%		75-125 %

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

..environmental
...Fairway Drive Suite 200
Deerfield Beach, Florida 33441
TELEPHONE (305) 570-5885 FAX: (305) 570-5974

SITE MANAGER: Paul Calligen
PROJECT NAME: Site G 300 CTO 0027
BRE PROJECT NO.: 7540 CODE: —
P.O. NO.: 2049-7540-P97159

SHIPPED TO: Sonic Orlando,
ATTN: Harry Ben.
(LABORATORY NAME)

CHAIN OF CUSTODY RECORD

LABORATORY ANALYSIS

SAMPLED BY (PRINT): John G Webster & Gerald F. Goode
SAMPLER SIGNATURE: John G Webster, Gerald F. Goode

LAB NO.	DATE	TIME	SAMPLE IDENTIFICATION	SAMPLE TYPE COMP.	SAMPLE TYPE GRAB	MATRIX	PRES. TYPE	PARAMETERS 8100/TPHOAnd	8010	8020	Pb	Trip Blank						NUMBER OF CONTAINERS	COMMENTS:
F581-1	4/22/97	1600	300-SB01-0607			S		1	2	2	1							6	Simplex Ind
-2	4/23/97	1620	300-SB01-0607B			W		1	~~2~~	2	1							5	
-3	4/23/97	1645	300-SB05-0607			S		1	2	2	1							6	
-4	4/22/97	1700	300-SB04-0607			S		1	2	2	1							6	
-5	4/17/97	1600	Trip Blank			W						2						2	
																			NOTE: Sample 300-SB01-0607B (Blank) Pb rinsate bottle contained 1% HNO_3
			TOTAL NUMBER OF CONTAINERS					4	7	8	4	2						35	5

☒ STANDARD TAT ☐ RUSH
☐ 24 HR. ☐ 48 HR. ☐ 72 HR. ☐ 7 DAYS
RESULTS DUE DATE: _____

QA/QC Data

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW01-001		
Lab Sample ID:	F582-3	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 504.1	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB01846.D	1	04/25/97	NF	n/a	n/a	GAB66
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
106-93-4	1,2-Dibromoethane	ND	0.020	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW01-001		
Lab Sample ID:	F582-3	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
		Percent Solids:	n/a
Project:	Site G300 CTO 0027		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Lead	0.0050	0.0030	mg/l	1	05/02/97	05/08/97 JK	EPA 239.2

RDL = Reported Detection Limit

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW03-001B		
Lab Sample ID:	F582-4	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 8100	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01449.D	1	04/25/97	NF	04/25/97	OP83	GIJ68
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	10	ug/l	
208-96-8	Acenaphthylene	ND	10	ug/l	
120-12-7	Anthracene	ND	10	ug/l	
56-55-3	Benzo(a)anthracene	ND	10	ug/l	
50-32-8	Benzo(a)pyrene	ND	10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	10	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	10	ug/l	
218-01-9	Chrysene	ND	10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	10	ug/l	
206-44-0	Fluoranthene	ND	10	ug/l	
86-73-7	Fluorene	ND	10	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	10	ug/l	
91-20-3	Naphthalene	ND	10	ug/l	
90-12-0	1-Methylnaphthalene	ND	10	ug/l	
91-57-6	2-Methylnaphthalene	ND	10	ug/l	
85-01-8	Phenanthrene	ND	10	ug/l	
129-00-0	Pyrene	ND	10	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	85%		26-116%
84-15-1	o-Terphenyl	110%		26-125%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW03-001B		
Lab Sample ID:	F582-4	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	FLORIDA-PRO	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01593.D	1	05/02/97	NF	04/30/97	OP89	GIJ73
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	ND	0.50	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	81%		40-140%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW03-001B		
Lab Sample ID:	F582-4	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002009.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
75-25-2	Bromoform	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
74-83-9	Bromomethane	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	ug/l	
108-90-7	Chlorobenzene	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	1.4	1.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/l	
127-18-4	Tetrachloroethene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/l	
79-01-6	Trichloroethene	ND	1.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l	
75-01-4	Vinyl chloride	ND	1.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
156-69-4	cis-1,2-Dichloroethene	ND	1.0	ug/l	
540-59-0	1,2-Dichloroethene (total)	ND	2.0	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW03-001B		
Lab Sample ID:	F582-4	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002009.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	106%		75-125%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW03-001B		
Lab Sample ID:	F582-4	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 504.1	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB01847.D	1	04/25/97	NF	n/a	n/a	GAB66
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
106-93-4	1,2-Dibromoethane	ND	0.020	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW03-001B		
Lab Sample ID:	F582-4	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
		Percent Solids:	n/a
Project:	Site G300 CTO 0027		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Lead	<0.0030	0.0030	mg/l	1	05/02/97	05/08/97	JK	EPA 239.2

RDL = Reported Detection Limit

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW02-001		
Lab Sample ID:	F582-5	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 8100	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01450.D	1	04/25/97	NF	04/25/97	OP83	GIJ68
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	10	ug/l	
208-96-8	Acenaphthylene	ND	10	ug/l	
120-12-7	Anthracene	ND	10	ug/l	
56-55-3	Benzo(a)anthracene	ND	10	ug/l	
50-32-8	Benzo(a)pyrene	ND	10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	10	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	10	ug/l	
218-01-9	Chrysene	ND	10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	10	ug/l	
206-44-0	Fluoranthene	ND	10	ug/l	
86-73-7	Fluorene	ND	10	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	10	ug/l	
91-20-3	Naphthalene	ND	10	ug/l	
90-12-0	1-Methylnaphthalene	ND	10	ug/l	
91-57-6	2-Methylnaphthalene	ND	10	ug/l	
85-01-8	Phenanthrene	ND	10	ug/l	
129-00-0	Pyrene	ND	10	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	67%		26-116%
84-15-1	o-Terphenyl	94%		26-125%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW02-001		
Lab Sample ID:	F582-5	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	FLORIDA-PRO	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01587.D	1	05/02/97	NF	04/30/97	OP89	GIJ73
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	0.846	0.50	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	89%		40-140%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW02-001		
Lab Sample ID:	F582-5	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002010.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene [a]	1.8	1.0	ug/l	
75-25-2	Bromoform	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
74-83-9	Bromomethane	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	ug/l	
108-90-7	Chlorobenzene	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane [a]	1.7	1.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/l	
127-18-4	Tetrachloroethene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/l	
79-01-6	Trichloroethene	ND	1.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l	
75-01-4	Vinyl chloride	ND	1.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
156-69-4	cis-1,2-Dichloroethene	ND	1.0	ug/l	
540-59-0	1,2-Dichloroethene (total)	ND	2.0	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW02-001		
Lab Sample ID:	F582-5	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002010.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	108%		75-125%

(a) Confimred by reanalysis on MS

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW02-001		
Lab Sample ID:	F582-5	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 504.1	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB01848.D	1	04/25/97	NF	n/a	n/a	GAB66
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
106-93-4	1,2-Dibromoethane	ND	0.020	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW02-001		
Lab Sample ID:	F582-5	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
		Percent Solids:	n/a
Project:	Site G300 CTO 0027		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Lead	0.0094	0.0030	mg/l	1	05/02/97	05/08/97	JK	EPA 239.2

RDL = Reported Detection Limit

ACCUTEST.

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	F582-6	**Date Sampled:**	04/17/97
Matrix:	AQ - Trip Blank Water	**Date Received:**	04/25/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002012.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
75-25-2	Bromoform	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
74-83-9	Bromomethane	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	ug/l	
108-90-7	Chlorobenzene	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	2.7	1.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/l	
127-18-4	Tetrachloroethene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/l	
79-01-6	Trichloroethene	ND	1.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l	
75-01-4	Vinyl chloride	ND	1.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
156-69-4	cis-1,2-Dichloroethene	ND	1.0	ug/l	
540-59-0	1,2-Dichloroethene (total)	ND	2.0	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	F582-6	**Date Sampled:**	04/17/97
Matrix:	AQ - Trip Blank Water	**Date Received:**	04/25/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002012.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	106%		75-125%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

Brown & Root Environmental

REPORT TO ADDRESS: 455 Fairway Drive Suite 200
Deerfield Beach, Florida 33441
TELEPHONE: (305) 570-5985 FAX: (305) 570-5974

SITE MANAGER: Paul Cylligen
PROJECT NAME: Site G300 CTO 0027
BRE PROJECT NO.: 7540 CODE: —
P.O. NO.: 2049-7540-P97159

SHIPPED TO: AccuTest Laboratories Southeast, Inc. Orlando, FL
Attn: Harry Behzadi
(LABORATORY NAME, CITY)

PAGE 1 OF 1

CHAIN OF CUSTODY RECORD

LABORATORY ANALYSIS

SAMPLED BY (PRINT): John G Webster & Gerald F. Goode
SAMPLER SIGNATURE: John G Webster Gerald Goode

☒ STANDARD TAT ☐ RUSH
☐ 24 HR. ☐ 48 HR. ☐ 72 HR. ☐ 7 DAYS
RESULTS DUE DATE: _____

LAB NO.	DATE	TIME	SAMPLE IDENTIFICATION	SAMPLE TYPE COMP.	SAMPLE TYPE GRAB	MATRIX	PRES. TYPE / PARAMETERS: FL PRO	HNO3 610	None 601	HCl 602	HCl 504	None Pb	H2SO4 Trip Blank			NUMBER OF CONTAINERS	COMMENTS:
F582-1	4/23/97	1145	300-MW03-001			W	1	1	2	2	2	1				9	Samples Iced
-2	4/23/97	1330	300-MW04-001			W	1	1	2	2	2	1				9	
-3	4/23/97	1445	300-MW01-001			W	1	1	2	2	2	1				9	
-4	4/23/97	1230	300-MW03-001B			W	1	1	2	2	2	1				9	
-5	4/23/97	1530	300-MW02-001			W	1	1	2	2	2	1				9	
-6	4/17/97	1600	Trip Blank			W							2			2	
TOTAL NUMBER OF CONTAINERS							5	5	10	10	10	5	2			47	

SHIPPER TO BE PAID BY (SIGNATURE) | SEAL INTACT? | DATE | ENTRY POINT | RECEIVED BY (SIGNATURE) | SEAL INTACT? | DATE

QA/QC Data

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: F582
Account: BRFLTALL - Brown & Root Environmental
Project: BRFLTALL453 - Site G300 CTO 0027

QC Batch ID: MP332
Matrix Type: AQUEOUS

Methods: EPA 206.2, EPA 239.2
Units: mg/l

Prep Date: 05/02/97

Metal	RDL	IDL	MB raw	final
Arsenic	0.0050	.001	anr	
Lead	0.0030	.001	-0.00054	<0.0030

Associated samples MP332: F582-1, F582-2, F582-3, F582-4, F582-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F582
Account: BRFLTALL - Brown & Root Environmental
Project: BRFLTALL453 - Site G300 CTO 0027

QC Batch ID: MP332
Matrix Type: AQUEOUS

Methods: EPA 206.2, EPA 239.2
Units: mg/l

Prep Date: 05/02/97 05/02/97

Metal	F589-1 Original	MS	Spikelot MPFLPUR	% Rec	QC Limits	F589-1 Original	DUP	RPD	QC Limits
Arsenic	anr								
Lead	0.0070	0.032	0.020	125.0N	74-123	0.0070	0.0073	0.0	0-12

Associated samples MP332: F582-1, F582-2, F582-3, F582-4, F582-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: F582
Account: BRFLTALL - Brown & Root Environmental
Project: BRFLTALL453 - Site G300 CTO 0027

QC Batch ID: MP332
Matrix Type: AQUEOUS

Methods: EPA 206.2, EPA 239.2
Units: mg/l

Prep Date: 05/02/97

Metal	BSP Result	Spikelot MPFLFUR	% Rec	QC Limits
Arsenic	anr			
Lead	0.022	0.020	110.0	80-120

Associated samples MP332: F582-1, F582-2, F582-3, F582-4, F582-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

Blank Spike Summary
Job Number: F582
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP83-BS	I01405.D	1	04/22/97	NF	04/22/97	OP83	GLJ66

The QC reported here applies to the following samples: **Method:** EPA 610

F582-1, F582-2, F582-3, F582-4, F582-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
83-32-9	Acenaphthene	50	48.9	98	27-113
208-96-8	Acenaphthylene	50	46.6	93	27-111
120-12-7	Anthracene	50	46.0	92	27-124
56-55-3	Benzo(a)anthracene	50	52.8	106	28-124
50-32-8	Benzo(a)pyrene	50	46.8	94	38-111
205-99-2	Benzo(b)fluoranthene	50	44.5	89	27-121
191-24-2	Benzo(g,h,i)perylene	50	53.7	107	27-115
207-08-9	Benzo(k)fluoranthene	50	44.7	89	25-123
218-01-9	Chrysene	50	53.6	107	29-131
53-70-3	Dibenzo(a,h)anthracene	50	53.0	106	22-114
206-44-0	Fluoranthene	50	46.9	94	28-123
86-73-7	Fluorene	50	47.7	95	28-118
193-39-5	Indeno(1,2,3-cd)pyrene	50	52.8	106	25-119
91-20-3	Naphthalene	50	42.0	84	28-109
90-12-0	1-Methylnaphthalene	50	43.1	86	25-115
91-57-6	2-Methylnaphthalene	50	45.7	91	25-115
85-01-8	Phenanthrene	50	45.8	92	28-121
129-00-0	Pyrene	50	47.4	95	28-122

CAS No.	Surrogate Recoveries	BSP	Limits
321-60-8	2-Fluorobiphenyl	97%	26-116%
84-15-1	o-Terphenyl	100%	26-116%

Blank Spike Summary
Job Number: F582
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP89-BS	I01590.D	1	05/02/97	NF	04/30/97	OP89	GLJ73

The QC reported here applies to the following samples: **Method:** FLORIDA-PRO

F582-1, F582-2, F582-3, F582-4, F582-5

CAS No.	Compound	Spike mg/l	BSP mg/l	BSP %	Limits
	TPH (C8-C40)	2	2.00	100	

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	89%	40-140%

Method Blank Summary
Job Number: F582
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP83-MB2	I01442.D	1	04/25/97	NF	04/25/97	OP83	GIJ68

The QC reported here applies to the following samples: **Method:** EPA 610

F582-1, F582-2, F582-3, F582-4, F582-5

CAS No.	Compound	Result	RDL	Units Q
83-32-9	Acenaphthene	ND	10	ug/l
208-96-8	Acenaphthylene	ND	10	ug/l
120-12-7	Anthracene	ND	10	ug/l
56-55-3	Benzo(a)anthracene	ND	10	ug/l
50-32-8	Benzo(a)pyrene	ND	10	ug/l
205-99-2	Benzo(b)fluoranthene	ND	10	ug/l
191-24-2	Benzo(g,h,i)perylene	ND	10	ug/l
207-08-9	Benzo(k)fluoranthene	ND	10	ug/l
218-01-9	Chrysene	ND	10	ug/l
53-70-3	Dibenzo(a,h)anthracene	ND	10	ug/l
206-44-0	Fluoranthene	ND	10	ug/l
86-73-7	Fluorene	ND	10	ug/l
193-39-5	Indeno(1,2,3-cd)pyrene	ND	10	ug/l
91-20-3	Naphthalene	ND	10	ug/l
90-12-0	1-Methylnaphthalene	ND	10	ug/l
91-57-6	2-Methylnaphthalene	ND	10	ug/l
85-01-8	Phenanthrene	ND	10	ug/l
129-00-0	Pyrene	ND	10	ug/l

CAS No.	Surrogate Recoveries		Limits
321-60-8	2-Fluorobiphenyl	59%	26-116%
84-15-1	o-Terphenyl	98%	26-116%

Method Blank Summary
Job Number: F582
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP89-MB	I01582.D	1	05/02/97	NF	04/30/97	OP89	GLJ73

The QC reported here applies to the following samples: **Method:** FLORIDA-PRO

F582-1, F582-2, F582-3, F582-4, F582-5

CAS No.	Compound	Result	RDL	Units Q
	TPH (C8-C40)	ND	0.50	mg/l

CAS No.	Surrogate Recoveries		Limits
84-15-1	o-Terphenyl	73%	40-140%

Matrix Spike/Matrix Spike Duplicate Summary
Job Number: F582
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP83-MS	I01403.D	1	04/22/97	NF	04/22/97	OP83	GLJ66
OP83-MSD	I01404.D	1	04/22/97	NF	04/22/97	OP83	GLJ66
F567-1	I01397.D	1	04/22/97	NF	04/22/97	OP83	GLJ66

The QC reported here applies to the following samples: **Method:** EPA 610

F582-1, F582-2, F582-3, F582-4, F582-5

CAS No.	Compound	F567-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		50	45.5	91	45.0	90	1	27-113/22
208-96-8	Acenaphthylene	ND		50	43.6	87	42.4	85	3	27-111/21
120-12-7	Anthracene	ND		50	42.2	84	43.3	87	2	27-124/24
56-55-3	Benzo(a)anthracene	ND		50	46.4	93	42.8	86	8	28-124/24
50-32-8	Benzo(a)pyrene	ND		50	42.6	85	42.2	84	1	38-111/22
205-99-2	Benzo(b)fluoranthene	ND		50	39.8	80	40.2	80	1	27-121/24
191-24-2	Benzo(g,h,i)perylene	ND		50	46.6	93	43.6	87	7	27-115/22
207-08-9	Benzo(k)fluoranthene	ND		50	39.8	80	40.7	81	2	25-123/25
218-01-9	Chrysene	ND		50	45.7	91	42.2	84	8	29-131/26
53-70-3	Dibenzo(a,h)anthracene	ND		50	45.4	91	43.0	86	5	22-114/23
206-44-0	Fluoranthene	ND		50	42.3	85	42.4	85	0	28-123/24
86-73-7	Fluorene	ND		50	43.5	87	43.1	86	1	28-118/23
193-39-5	Indeno(1,2,3-cd)pyrene	ND		50	45.7	91	43.1	86	6	25-119/23
91-20-3	Naphthalene	ND		50	41.1	82	39.0	78	5	28-109/20
90-12-0	1-Methylnaphthalene	ND		50	41.3	83	39.2	78	5	25-115/25
91-57-6	2-Methylnaphthalene	ND		50	43.9	88	41.6	83	5	25-115/25
85-01-8	Phenanthrene	ND		50	42.2	84	43.3	87	2	28-121/23
129-00-0	Pyrene	ND		50	42.8	86	42.6	85	0	28-122/24

CAS No.	Surrogate Recoveries	MS	MSD	F567-1	Limits
321-60-8	2-Fluorobiphenyl	87%	80%	76%	26-116%
84-15-1	o-Terphenyl	86%	87%	94%	26-116%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: F582
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP89-MS	I01588.D	1	05/02/97	NF	04/30/97	OP89	GLJ73
OP89-MSD	I01589.D	1	05/02/97	NF	04/30/97	OP89	GLJ73
F582-5	I01587.D	1	05/02/97	NF	04/30/97	OP89	GLJ73

The QC reported here applies to the following samples: **Method:** FLORIDA-PRO

F582-1, F582-2, F582-3, F582-4, F582-5

CAS No.	Compound	F582-5 mg/l	Q	Spike mg/l	MS mg/l	MS %	MSD mg/l	MSD %	RPD	Limits Rec/RPD
	TPH (C8-C40)	.846		2	2.99	107	2.78	97	7	

CAS No.	Surrogate Recoveries	MS	MSD	F582-5	Limits
84-15-1	o-Terphenyl	112%	108%	89%	40-140%

Blank Spike Summary
Job Number: F582
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAB66-BS	AB01839.D	1	04/25/97	NF	n/a	n/a	GAB66

The QC reported here applies to the following samples: **Method:** EPA 504.1

F582-1, F582-2, F582-3, F582-4, F582-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
106-93-4	1,2-Dibromoethane	0.25	0.26	104	70-130

Blank Spike Summary
Job Number: F582
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GEF50-BS	EF001982.D	1	04/23/97	AW	n/a	n/a	GEF50

The QC reported here applies to the following samples: **Method:** EPA 601/602

F582-1, F582-2, F582-3, F582-4, F582-5, F582-6

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
75-25-2	Bromoform	10	8.2	82	50-150
75-27-4	Bromodichloromethane	10	8.8	88	50-150
56-23-5	Carbon tetrachloride	10	9.0	90	50-150
108-90-7	Chlorobenzene	20	16.5	83	50-150
67-66-3	Chloroform	10	9.7	97	50-150
10061-01-5	cis-1,3-Dichloropropene	10	8.3	83	50-150
124-48-1	Dibromochloromethane	10	8.9	89	50-150
75-34-3	1,1-Dichloroethane	10	8.5	85	50-150
107-06-2	1,2-Dichloroethane	10	8.5	85	50-150
75-35-4	1,1-Dichloroethene	10	8.2	82	50-150
156-60-5	trans-1,2-Dichloroethene	10	8.2	82	50-150
10061-02-6	trans-1,3-Dichloropropene	10	9.2	92	50-150
78-87-5	1,2-Dichloropropane	10	8.8	88	50-150
75-09-2	Methylene chloride	10	9.2	92	50-150
79-34-5	1,1,2,2-Tetrachloroethane	10	8.2	82	50-150
127-18-4	Tetrachloroethene	10	8.7	87	50-150
71-55-6	1,1,1-Trichloroethane	10	8.3	83	50-150
79-00-5	1,1,2-Trichloroethane	10	9.0	90	50-150
79-01-6	Trichloroethene	10	7.9	79	50-150
541-73-1	1,3-Dichlorobenzene	20	16.4	82	50-150
106-46-7	1,4-Dichlorobenzene	20	16.9	84	50-150
95-50-1	1,2-Dichlorobenzene	20	16.5	82	50-150
540-59-0	1,2-Dichloroethene (total)	10	8.2	82	50-150

CAS No.	Surrogate Recoveries	BSP	Limits
460-00-4	4-Bromofluorobenzene	102%	75-125%

Method Blank Summary
Job Number: F582
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAB66-MB	AB01838.D	1	04/25/97	NF	n/a	n/a	GAB66

The QC reported here applies to the following samples: **Method:** EPA 504.1

F582-1, F582-2, F582-3, F582-4, F582-5

CAS No.	Compound	Result	RDL	Units Q
106-93-4	1,2-Dibromoethane	ND	0.020	ug/l

Method Blank Summary
Job Number: F582
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GEF50-MB3	EF001990.D	1	04/24/97	AW	n/a	n/a	GEF50

The QC reported here applies to the following samples: **Method:** EPA 601/602

F582-1, F582-2, F582-3, F582-4, F582-5, F582-6

CAS No.	Compound	Result	RDL	Units Q
75-25-2	Bromoform	ND	1.0	ug/l
75-27-4	Bromodichloromethane	ND	1.0	ug/l
74-83-9	Bromomethane	ND	1.0	ug/l
56-23-5	Carbon tetrachloride	ND	1.0	ug/l
108-90-7	Chlorobenzene	ND	1.0	ug/l
75-00-3	Chloroethane	ND	1.0	ug/l
67-66-3	Chloroform	ND	1.0	ug/l
74-87-3	Chloromethane	ND	1.0	ug/l
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l
124-48-1	Dibromochloromethane	ND	1.0	ug/l
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l
75-34-3	1,1-Dichloroethane	ND	1.0	ug/l
107-06-2	1,2-Dichloroethane	ND	1.0	ug/l
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l
75-09-2	Methylene chloride	ND	5.0	ug/l
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
127-18-4	Tetrachloroethene	ND	1.0	ug/l
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/l
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/l
79-01-6	Trichloroethene	ND	1.0	ug/l
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l
75-01-4	Vinyl chloride	ND	1.0	ug/l
541-73-1	1,3-Dichlorobenzene	ND	1.0	ug/l
106-46-7	1,4-Dichlorobenzene	ND	1.0	ug/l
95-50-1	1,2-Dichlorobenzene	ND	1.0	ug/l
156-69-4	cis-1,2-Dichloroethene	ND	1.0	ug/l
540-59-0	1,2-Dichloroethene (total)	ND	2.0	ug/l

CAS No.	Surrogate Recoveries		Limits
460-00-4	4-Bromofluorobenzene	99%	75-125%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: F582
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F563-2MS	AB01842.D	1	04/25/97	NF	n/a	n/a	GAB66
F563-2MSD	AB01843.D	1	04/25/97	NF	n/a	n/a	GAB66
F563-2	AB01841.D	1	04/25/97	NF	n/a	n/a	GAB66

The QC reported here applies to the following samples: **Method:** EPA 504.1

F582-1, F582-2, F582-3, F582-4, F582-5

CAS No.	Compound	F563-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
106-93-4	1,2-Dibromoethane	ND		0.25	0.25	100	0.26	104	4	74.4-121.6/

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: F582
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F573-3MS	EF001978.D	1	04/23/97	AW	n/a	n/a	GEF50
F573-3MSD	EF001980.D	1	04/23/97	AW	n/a	n/a	GEF50
F573-3	EF001977.D	1	04/23/97	AW	n/a	n/a	GEF50

The QC reported here applies to the following samples: **Method:** EPA 601/602

F582-1, F582-2, F582-3, F582-4, F582-5, F582-6

CAS No.	Compound	F573-3 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
75-25-2	Bromoform	ND		10	7.7	77	7.6	76	1	34-126/23
75-27-4	Bromodichloromethane	ND		10	8.4	84	8.2	82	2	54-120/17
56-23-5	Carbon tetrachloride	ND		10	9.0	90	9.6	96	6	48-124/19
108-90-7	Chlorobenzene	ND		30	24.4	81	25.5	85	4	74-129/14
67-66-3	Chloroform	ND		10	8.85	88	9.98	100	1	48-125/19
10061-01-5	cis-1,3-Dichloropropene	ND		10	7.6	76	8.2	82	8	55-119/16
124-48-1	Dibromochloromethane	ND		10	8.1	81	8.4	84	4	57-131/19
75-34-3	1,1-Dichloroethane	ND		10	8.0	80	9.1	91	13	51-136/21
107-06-2	1,2-Dichloroethane	ND		10	8.8	88	9.9	99	12	50-144/23
75-35-4	1,1-Dichloroethene	ND		10	8.2	82	9.1	91	10	72-148/19
156-60-5	trans-1,2-Dichloroethene	ND		10	8.2	82	9.2	92	11	60-128/17
10061-02-6	trans-1,3-Dichloropropene	ND		10	7.8	78	8.6	86	10	49-121/18
78-87-5	1,2-Dichloropropane	ND		10	8.3	83	9.0	90	8	57-121/16
75-09-2	Methylene chloride	ND		10	9.5	95	9.9	99	4	58-110/13
79-34-5	1,1,2,2-Tetrachloroethane	ND		10	8.0	80	8.9	89	11	25-135/28
127-18-4	Tetrachloroethene	ND		10	8.1	81	9.2	92	13	54-127/18
71-55-6	1,1,1-Trichloroethane	ND		10	8.3	83	9.4	94	12	63-112/12
79-00-5	1,1,2-Trichloroethane	ND		10	8.1	81	8.6	86	6	49-133/21
79-01-6	Trichloroethene	15.3		10	20.5	52	21.3	60	4	33-170/34
541-73-1	1,3-Dichlorobenzene	ND		30	24.3	81	25.9	86	6	70-125/14
106-46-7	1,4-Dichlorobenzene	ND		30	25.2	84	25.4	85	1	73-127/14
95-50-1	1,2-Dichlorobenzene	ND		30	24.4	81	25.1	84	3	71-131/15
156-69-4	cis-1,2-Dichloroethene	1.6		10	8.4	68	9.4	78	11	50-150/30
540-59-0	1,2-Dichloroethene (total)	1.6	J	20	16.6	83	18.6	93	11	50-150/30

CAS No.	Surrogate Recoveries	MS	MSD	F573-3	Limits
460-00-4	4-Bromofluorobenzene	88%	99%	96%	75-125%

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: F581
Account: BRFLTALL - Brown & Root Environmental
Project: BRFLTALL453 - Site G300 CTO 0027

QC Batch ID: MP332
Matrix Type: AQUEOUS

Methods: EPA 206.2, EPA 239.2
Units: mg/l

Prep Date: 05/02/97

Metal	RDL	IDL	MB raw	final
Arsenic	0.0050	.001	anr	
Lead	0.0030	.001	-0.00054	<0.0030

Associated samples MP332: F581-2

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

Client Sample ID:	MW-2		
Lab Sample ID:	F616-2	Date Sampled:	05/06/97
Matrix:	AQ - Ground Water	Date Received:	05/06/97
Method:	EPA 601/602	Percent Solids:	n/a
Project:			

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002183.D	1	05/08/97	AW	n/a	n/a	GEF54
Run #2							

VOA PPL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	107%		75-125%
98-08-8	aaa-Trifluorotoluene	95%		75-125%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blan
N = Indicates presumptive evidence of a compound

DRAFT Analysis Report - Not for Release
Comments:
COMMA Due Date: 05/13/97 V6012PPL

Client Sample ID:	MW-2		
Lab Sample ID:	F616-2	Date Sampled:	05/06/97
Matrix:	AQ - Ground Water	Date Received:	05/06/97
Method:	EPA 601/602	Percent Solids:	n/a
Project:			

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002183.D	1	05/08/97	AW	n/a	n/a	GEF54
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
75-25-2	Bromoform	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
74-83-9	Bromomethane	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	ug/l	
108-90-7	Chlorobenzene	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/l	
127-18-4	Tetrachloroethene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/l	
79-01-6	Trichloroethene	ND	1.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l	
75-01-4	Vinyl chloride	ND	1.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
156-69-4	cis-1,2-Dichloroethene	ND	1.0	ug/l	
540-59-0	1,2-Dichloroethene (total)	ND	2.0	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blan
N = Indicates presumptive evidence of a compound

Client Sample ID:	INFLUENT		
Lab Sample ID:	F617-2	**Date Sampled:**	05/06/97
Matrix:	AQ - Ground Water	**Date Received:**	05/06/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:			

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EF002179.D	500	05/08/97	AW	n/a	n/a	GEF54
Run #2							

VOA Halogenated List

CAS No.	Compound	Result	RDL	Units	Q

(a) Dilution required due to matrix interference.

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blan
N = Indicates presumptive evidence of a compound

DRAFT Analysis Report - Not for Release
Comments:
COMMA Due Date: 05/07/97 V601STD

Client Sample ID:	INFLUENT		
Lab Sample ID:	F617-2	Date Sampled:	05/06/97
Matrix:	AQ - Ground Water	Date Received:	05/06/97
Method:	EPA 601/602	Percent Solids:	n/a
Project:			

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EF002179.D	500	05/08/97	AW	n/a	n/a	GEF54
Run #2							

VOA Halogenated List

CAS No.	Compound	Result	RDL	Units	Q
75-25-2	Bromoform	ND	500	ug/l	
75-27-4	Bromodichloromethane	ND	500	ug/l	
74-83-9	Bromomethane	ND	500	ug/l	
56-23-5	Carbon tetrachloride	ND	500	ug/l	
108-90-7	Chlorobenzene	ND	500	ug/l	
75-00-3	Chloroethane	ND	500	ug/l	
67-66-3	Chloroform	ND	500	ug/l	
74-87-3	Chloromethane	ND	500	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	500	ug/l	
124-48-1	Dibromochloromethane	ND	500	ug/l	
75-71-8	Dichlorodifluoromethane	ND	500	ug/l	
75-34-3	1,1-Dichloroethane	ND	500	ug/l	
107-06-2	1,2-Dichloroethane	ND	500	ug/l	
75-35-4	1,1-Dichloroethene	ND	500	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	500	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	500	ug/l	
78-87-5	1,2-Dichloropropane	ND	500	ug/l	
75-09-2	Methylene chloride	ND	2500	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	500	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	500	ug/l	
127-18-4	Tetrachloroethene	ND	500	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	500	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	500	ug/l	
79-01-6	Trichloroethene	10600	500	ug/l	
75-69-4	Trichlorofluoromethane	ND	500	ug/l	
75-01-4	Vinyl chloride	ND	500	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	500	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	500	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	500	ug/l	
156-69-4	cis-1,2-Dichloroethene	ND	500	ug/l	
540-59-0	1,2-Dichloroethene (total)	ND	1000	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	96%		75-125%
98-08-8	aaa-Trifluorotoluene	96%		75-125%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blan
N = Indicates presumptive evidence of a compound

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F573-3MS	EF001978.D	1	04/23/97	AW	n/a	n/a	GEF50
F573-3MSD	EF001980.D	1	04/23/97	AW	n/a	n/a	GEF50
F573-3	EF001977.D	1	04/23/97	AW	n/a	n/a	GEF50

The QC reported here applies to the following samples: **Method:** EPA 601/602

F581-2, F581-5

CAS No.	Compound	F573-3 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
75-25-2	Bromoform	ND		10	7.7	77	7.6	76	1	34-126/23
75-27-4	Bromodichloromethane	ND		10	8.4	84	8.2	82	2	54-120/17
56-23-5	Carbon tetrachloride	ND		10	9.0	90	9.6	96	6	48-124/19
108-90-7	Chlorobenzene	ND		30	24.4	81	25.5	85	4	74-129/14
67-66-3	Chloroform	ND		10	8.85	88	9.98	100	1	48-125/19
10061-01-5	cis-1,3-Dichloropropene	ND		10	7.6	76	8.2	82	8	55-119/16
124-48-1	Dibromochloromethane	ND		10	8.1	81	8.4	84	4	57-131/19
75-34-3	1,1-Dichloroethane	ND		10	8.0	80	9.1	91	13	51-136/21
107-06-2	1,2-Dichloroethane	ND		10	8.8	88	9.9	99	12	50-144/23
75-35-4	1,1-Dichloroethene	ND		10	8.2	82	9.1	91	10	72-148/19
156-60-5	trans-1,2-Dichloroethene	ND		10	8.2	82	9.2	92	11	60-128/17
10061-02-6	trans-1,3-Dichloropropene	ND		10	7.8	78	8.6	86	10	49-121/18
78-87-5	1,2-Dichloropropane	ND		10	8.3	83	9.0	90	8	57-121/16
75-09-2	Methylene chloride	ND		10	9.5	95	9.9	99	4	58-110/13
79-34-5	1,1,2,2-Tetrachloroethane	ND		10	8.0	80	8.9	89	11	25-135/28
127-18-4	Tetrachloroethene	ND		10	8.1	81	9.2	92	13	54-127/18
71-55-6	1,1,1-Trichloroethane	ND		10	8.3	83	9.4	94	12	63-112/12
79-00-5	1,1,2-Trichloroethane	ND		10	8.1	81	8.6	86	6	49-133/21
79-01-6	Trichloroethene	15.3		10	20.5	52	21.3	60	4	33-170/34
541-73-1	1,3-Dichlorobenzene	ND		30	24.3	81	25.9	86	6	70-125/14
106-46-7	1,4-Dichlorobenzene	ND		30	25.2	84	25.4	85	1	73-127/14
95-50-1	1,2-Dichlorobenzene	ND		30	24.4	81	25.1	84	3	71-131/15
156-69-4	cis-1,2-Dichloroethene	1.6		10	8.4	68	9.4	78	11	50-150/30
540-59-0	1,2-Dichloroethene (total)	1.6	J	20	16.6	83	18.6	93	11	50-150/30

CAS No.	Surrogate Recoveries	MS	MSD	F573-3	Limits
460-00-4	4-Bromofluorobenzene	88%	99%	96%	75-125%

Matrix Spike/Matrix Spike Duplicate Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F542-5MS	EF001998.D	1	04/24/97	AW	n/a	n/a	GEF51
F542-5MSD	EF002000.D	1	04/24/97	AW	n/a	n/a	GEF51
F542-5	EF001996.D	1	04/24/97	AW	n/a	n/a	GEF51

The QC reported here applies to the following samples: **Method:** SW846 8010/8020

F581-1, F581-3, F581-4

CAS No.	Compound	F542-5 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		10	16.6	166*	16.1	161*	3	50-150/30
75-25-2	Bromoform	ND		10	9.6	96	9.0	90	6	50-150/30
75-27-4	Bromodichloromethane	ND		10	9.7	97	10	100	3	50-150/30
56-23-5	Carbon tetrachloride	ND		10	9.7	97	9.4	94	3	50-150/30
108-90-7	Chlorobenzene	ND		10	23.1	231*	23.0	230*	0	50-150/30
67-66-3	Chloroform	ND		10	15.1	151*	11.1	111	30	50-150/30
10061-01-5	cis-1,3-Dichloropropene	ND		10	7.8	78	7.5	75	4	50-150/30
124-48-1	Dibromochloromethane	ND		10	10.0	100	9.5	95	5	50-150/30
75-34-3	1,1-Dichloroethane	ND		10	10.4	104	10.0	100	4	50-150/30
107-06-2	1,2-Dichloroethane	ND		10	10.7	107	9.9	99	8	50-150/30
75-35-4	1,1-Dichloroethene	ND		10	10.4	104	9.9	99	5	50-150/3
156-60-5	trans-1,2-Dichloroethene	ND		10	8.2	82	7.6	76	8	50-150/30
10061-02-6	trans-1,3-Dichloropropene	ND		10	7.6	76	7.6	76	0	50-150/30
78-87-5	1,2-Dichloropropane	ND		10	10.1	101	9.7	97	4	50-150/30
100-41-4	Ethylbenzene	ND		10	15.7	157*	15.6	156*	1	50-150/30
75-09-2	Methylene chloride	ND		10	12.3	123	12.1	121	2	50-150/30
79-34-5	1,1,2,2-Tetrachloroethane	ND		10	10.8	108	9.3	93	15	50-150/30
127-18-4	Tetrachloroethene	ND		10	7.7	77	7.5	75	3	50-150/30
108-88-3	Toluene	ND		10	17.3	173*	16.5	165*	5	50-150/30
71-55-6	1,1,1-Trichloroethane	ND		10	10.5	105	9.8	98	7	50-150/30
79-00-5	1,1,2-Trichloroethane	ND		10	10.7	107	10.2	102	5	50-150/30
79-01-6	Trichloroethene	ND		10	8.0	80	7.9	79	1	50-150/30
541-73-1	1,3-Dichlorobenzene	ND		10	19.1	191*	20.7	207*	8	50-150/30
106-46-7	1,4-Dichlorobenzene	ND		10	19.0	190*	20.7	207*	8	50-150/30
95-50-1	1,2-Dichlorobenzene	ND		10	19.3	193*	20.8	208*	7	50-150/30
1330-20-7	Xylenes (total)	ND		30	48.1	160*	46.8	156*	3	50-150/30
156-69-4	cis-1,2-Dichloroethene	ND		30	8.1	27*	7.6	25*	6	50-150/30

CAS No.	Surrogate Recoveries	MS	MSD	F542-5	Limits
460-00-4	4-Bromofluorobenzene	94%	102%	98%	50-150%

Method Blank Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

	Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
(a)	GEF51-MB	EF002005.D	1	04/25/97	AW	n/a	n/a	GEF51

The QC reported here applies to the following samples: **Method:** SW846 8010/8020

F581-1, F581-3, F581-4

CAS No.	Surrogate Recoveries		Limits
74-97-5	Bromochloromethane	34.5ug/kg	-%
460-00-4	4-Bromofluorobenzene	117%	50-150%
460-00-4	4-Bromofluorobenzene	94%	50-150%

(a) SAMPLE NOT YET APPROVED BY LAB. DO NOT REPORT.

Method Blank Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

	Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
(a)	GEF51-MB	EF002005.D	1	04/25/97	AW	n/a	n/a	GEF51

The QC reported here applies to the following samples: **Method:** SW846 8010/8020

F581-1, F581-3, F581-4

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/kg	
75-25-2	Bromoform	ND	1.0	ug/kg	
75-27-4	Bromodichloromethane	ND	1.0	ug/kg	
74-83-9	Bromomethane	ND	1.0	ug/kg	
56-23-5	Carbon tetrachloride	ND	1.0	ug/kg	
108-90-7	Chlorobenzene	ND	1.0	ug/kg	
75-00-3	Chloroethane	ND	1.0	ug/kg	
67-66-3	Chloroform	ND	1.0	ug/kg	
74-87-3	Chloromethane	ND	1.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/kg	
124-48-1	Dibromochloromethane	ND	1.0	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	1.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	1.0	ug/kg	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/kg	
100-41-4	Ethylbenzene	ND	1.0	ug/kg	
75-09-2	Methylene chloride	4.2	5.0	ug/kg	J
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/kg	
127-18-4	Tetrachloroethene	ND	1.0	ug/kg	
108-88-3	Toluene	ND	1.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/kg	
79-01-6	Trichloroethene	ND	1.0	ug/kg	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/kg	
75-01-4	Vinyl chloride	ND	1.0	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ug/kg	
1330-20-7	Xylenes (total)	ND	3.0	ug/kg	
156-69-4	cis-1,2-Dichloroethene	ND	1.0	ug/kg	

Method Blank Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GEF50-MB3	EF001990.D	1	04/24/97	AW	n/a	n/a	GEF50

The QC reported here applies to the following samples: **Method:** EPA 601/602

F581-2, F581-5

CAS No.	Compound	Result	RDL	Units Q
75-25-2	Bromoform	ND	1.0	ug/l
75-27-4	Bromodichloromethane	ND	1.0	ug/l
74-83-9	Bromomethane	ND	1.0	ug/l
56-23-5	Carbon tetrachloride	ND	1.0	ug/l
108-90-7	Chlorobenzene	ND	1.0	ug/l
75-00-3	Chloroethane	ND	1.0	ug/l
67-66-3	Chloroform	ND	1.0	ug/l
74-87-3	Chloromethane	ND	1.0	ug/l
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l
124-48-1	Dibromochloromethane	ND	1.0	ug/l
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l
75-34-3	1,1-Dichloroethane	ND	1.0	ug/l
107-06-2	1,2-Dichloroethane	ND	1.0	ug/l
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l
75-09-2	Methylene chloride	ND	5.0	ug/l
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
127-18-4	Tetrachloroethene	ND	1.0	ug/l
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/l
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/l
79-01-6	Trichloroethene	ND	1.0	ug/l
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l
75-01-4	Vinyl chloride	ND	1.0	ug/l
541-73-1	1,3-Dichlorobenzene	ND	1.0	ug/l
106-46-7	1,4-Dichlorobenzene	ND	1.0	ug/l
95-50-1	1,2-Dichlorobenzene	ND	1.0	ug/l
156-69-4	cis-1,2-Dichloroethene	ND	1.0	ug/l
540-59-0	1,2-Dichloroethene (total)	ND	2.0	ug/l

CAS No.	Surrogate Recoveries		Limits
460-00-4	4-Bromofluorobenzene	99%	75-125%

Blank Spike Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GEF51-BS	EF001987.D	1	04/23/97	AW	n/a	n/a	GEF51

The QC reported here applies to the following samples: **Method:** SW846 8010/8020

F581-1, F581-3, F581-4

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
71-43-2	Benzene	10	8.7	87	50-150
75-25-2	Bromoform	10	9.1	91	50-150
75-27-4	Bromodichloromethane	10	10.0	100	50-150
56-23-5	Carbon tetrachloride	10	10.8	108	50-150
108-90-7	Chlorobenzene	10	18.6	186*	50-150
67-66-3	Chloroform	10	12.3	123	50-150
10061-01-5	cis-1,3-Dichloropropene	10	8.7	87	50-150
124-48-1	Dibromochloromethane	10	9.6	96	50-150
75-34-3	1,1-Dichloroethane	10	9.8	98	50-150
107-06-2	1,2-Dichloroethane	10	9.5	95	50-150
75-35-4	1,1-Dichloroethene	10	10.6	106	50-150
156-60-5	trans-1,2-Dichloroethene	10	8.8	88	50-150
10061-02-6	trans-1,3-Dichloropropene	10	8.3	83	50-150
78-87-5	1,2-Dichloropropane	10	10.2	102	50-150
100-41-4	Ethylbenzene	10	9.7	97	50-150
75-09-2	Methylene chloride	10	10.6	106	50-150
79-34-5	1,1,2,2-Tetrachloroethane	10	8.9	89	50-150
127-18-4	Tetrachloroethene	10	9.0	90	50-150
108-88-3	Toluene	10	9.5	95	50-150
71-55-6	1,1,1-Trichloroethane	10	10.3	103	50-150
79-00-5	1,1,2-Trichloroethane	10	9.7	97	50-150
79-01-6	Trichloroethene	10	9.8	98	50-150
541-73-1	1,3-Dichlorobenzene	10	18.4	184*	50-150
106-46-7	1,4-Dichlorobenzene	10	18.5	185*	50-150
95-50-1	1,2-Dichlorobenzene	10	17.8	178*	50-150
1330-20-7	Xylenes (total)	30	27.4	91	50-150

CAS No.	Surrogate Recoveries	BSP	Limits
460-00-4	4-Bromofluorobenzene	108%	50-150%

Blank Spike Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GEF50-BS	EF001982.D	1	04/23/97	AW	n/a	n/a	GEF50

The QC reported here applies to the following samples: **Method:** EPA 601/602

F581-2, F581-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
75-25-2	Bromoform	10	8.2	82	50-150
75-27-4	Bromodichloromethane	10	8.8	88	50-150
56-23-5	Carbon tetrachloride	10	9.0	90	50-150
108-90-7	Chlorobenzene	20	16.5	83	50-150
67-66-3	Chloroform	10	9.7	97	50-150
10061-01-5	cis-1,3-Dichloropropene	10	8.3	83	50-150
124-48-1	Dibromochloromethane	10	8.9	89	50-150
75-34-3	1,1-Dichloroethane	10	8.5	85	50-150
107-06-2	1,2-Dichloroethane	10	8.5	85	50-150
75-35-4	1,1-Dichloroethene	10	8.2	82	50-150
156-60-5	trans-1,2-Dichloroethene	10	8.2	82	50-150
10061-02-6	trans-1,3-Dichloropropene	10	9.2	92	50-150
78-87-5	1,2-Dichloropropane	10	8.8	88	50-150
75-09-2	Methylene chloride	10	9.2	92	50-150
79-34-5	1,1,2,2-Tetrachloroethane	10	8.2	82	50-150
127-18-4	Tetrachloroethene	10	8.7	87	50-150
71-55-6	1,1,1-Trichloroethane	10	8.3	83	50-150
79-00-5	1,1,2-Trichloroethane	10	9.0	90	50-150
79-01-6	Trichloroethene	10	7.9	79	50-150
541-73-1	1,3-Dichlorobenzene	20	16.4	82	50-150
106-46-7	1,4-Dichlorobenzene	20	16.9	84	50-150
95-50-1	1,2-Dichlorobenzene	20	16.5	82	50-150
540-59-0	1,2-Dichloroethene (total)	10	8.2	82	50-150

CAS No.	Surrogate Recoveries	BSP	Limits
460-00-4	4-Bromofluorobenzene	102%	75-125%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP89-MS	I01588.D	1	05/02/97	NF	04/30/97	OP89	GLJ73
OP89-MSD	I01589.D	1	05/02/97	NF	04/30/97	OP89	GLJ73
F582-5	I01587.D	1	05/02/97	NF	04/30/97	OP89	GLJ73

The QC reported here applies to the following samples: **Method:** FLORIDA-PRO

F581-2

CAS No.	Compound	F582-5 mg/l	Q	Spike mg/l	MS mg/l	MS %	MSD mg/l	MSD %	RPD	Limits Rec/RPD
	TPH (C8-C40)	.846		2	2.99	107	2.78	97	7	

CAS No.	Surrogate Recoveries	MS	MSD	F582-5	Limits
84-15-1	o-Terphenyl	112%	108%	89%	40-140%

Matrix Spike/Matrix Spike Duplicate Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP85-MS	I01474.D	1	04/29/97	NF	04/28/97	OP85	GLJ69
OP85-MSD	I01475.D	1	04/29/97	NF	04/28/97	OP85	GLJ69
F581-1	I01473.D	1	04/28/97	NF	04/28/97	OP85	GLJ69

The QC reported here applies to the following samples: **Method:** EPA 8100

F581-1, F581-3, F581-4

CAS No.	Compound	F581-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		848	636	75	621	73	2	32-99/17
208-96-8	Acenaphthylene	ND		848	616	73	601	71	2	26-90/16
120-12-7	Anthracene	ND		848	585	69	611	72	4	32-106/19
56-55-3	Benzo(a)anthracene	ND		848	633	75	634	75	0	35-127/23
50-32-8	Benzo(a)pyrene	ND		848	599	71	597	70	0	21-97/14
205-99-2	Benzo(b)fluoranthene	ND		848	666	78	651	77	2	40-130/23
191-24-2	Benzo(g,h,i)perylene	ND		848	621	73	668	79	7	36-141/26
207-08-9	Benzo(k)fluoranthene	ND		848	659	78	650	77	1	47-141/24
218-01-9	Chrysene	ND		848	634	75	634	75	0	37-120/23
53-70-3	Dibenzo(a,h)anthracene	ND		848	582	69	622	73	7	44-132/22
206-44-0	Fluoranthene	ND		848	668	79	687	81	3	33-125/23
86-73-7	Fluorene	ND		848	654	77	635	75	3	35-108/18
193-39-5	Indeno(1,2,3-cd)pyrene	ND		848	616	73	671	79	8	53-144/23
91-20-3	Naphthalene	ND		848	574	68	554	65	4	20-96/14
90-12-0	1-Methylnaphthalene	ND		848	568	67	550	65	3	35-120/25
91-57-6	2-Methylnaphthalene	ND		848	604	71	584	69	3	35-120/25
85-01-8	Phenanthrene	ND		848	627	74	658	78	5	37-117/20
129-00-0	Pyrene	ND		848	636	75	648	76	2	37-120/21

CAS No.	Surrogate Recoveries	MS	MSD	F581-1	Limits
321-60-8	2-Fluorobiphenyl	74%	71%	65%	35-120%
84-15-1	o-Terphenyl	75%	78%	74%	35-120%

Matrix Spike/Matrix Spike Duplicate Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP83-MS	I01403.D	1	04/22/97	NF	04/22/97	OP83	GLJ66
OP83-MSD	I01404.D	1	04/22/97	NF	04/22/97	OP83	GLJ66
F567-1	I01397.D	1	04/22/97	NF	04/22/97	OP83	GLJ66

The QC reported here applies to the following samples: **Method:** EPA 610

F581-2

CAS No.	Compound	F567-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		50	45.5	91	45.0	90	1	27-113/22
208-96-8	Acenaphthylene	ND		50	43.6	87	42.4	85	3	27-111/21
120-12-7	Anthracene	ND		50	42.2	84	43.3	87	2	27-124/24
56-55-3	Benzo(a)anthracene	ND		50	46.4	93	42.8	86	8	28-124/24
50-32-8	Benzo(a)pyrene	ND		50	42.6	85	42.2	84	1	38-111/22
205-99-2	Benzo(b)fluoranthene	ND		50	39.8	80	40.2	80	1	27-121/24
191-24-2	Benzo(g,h,i)perylene	ND		50	46.6	93	43.6	87	7	27-115/22
207-08-9	Benzo(k)fluoranthene	ND		50	39.8	80	40.7	81	2	25-123/25
218-01-9	Chrysene	ND		50	45.7	91	42.2	84	8	29-131/26
53-70-3	Dibenzo(a,h)anthracene	ND		50	45.4	91	43.0	86	5	22-114/23
206-44-0	Fluoranthene	ND		50	42.3	85	42.4	85	0	28-123/24
86-73-7	Fluorene	ND		50	43.5	87	43.1	86	1	28-118/23
193-39-5	Indeno(1,2,3-cd)pyrene	ND		50	45.7	91	43.1	86	6	25-119/23
91-20-3	Naphthalene	ND		50	41.1	82	39.0	78	5	28-109/20
90-12-0	1-Methylnaphthalene	ND		50	41.3	83	39.2	78	5	25-115/25
91-57-6	2-Methylnaphthalene	ND		50	43.9	88	41.6	83	5	25-115/25
85-01-8	Phenanthrene	ND		50	42.2	84	43.3	87	2	28-121/23
129-00-0	Pyrene	ND		50	42.8	86	42.6	85	0	28-122/24

CAS No.	Surrogate Recoveries	MS	MSD	F567-1	Limits
321-60-8	2-Fluorobiphenyl	87%	80%	76%	26-116%
84-15-1	o-Terphenyl	86%	87%	94%	26-116%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP74-MS	I01336.D	1	04/09/97	NF	04/07/97	OP74	GLJ62
OP74-MSD	I01337.D	1	04/09/97	NF	04/07/97	OP74	GLJ62
F503-1	I01335.D	1	04/09/97	NF	04/07/97	OP74	GLJ62

The QC reported here applies to the following samples: **Method:** FLORIDA-PRO

F581-1, F581-3, F581-4

CAS No.	Compound	F503-1 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH (C8-C40)	13.4		38.7	51.9	99	62.9	128	19	

CAS No.	Surrogate Recoveries	MS	MSD	F503-1	Limits
84-15-1	o-Terphenyl	62%	61%	53%	40-140%

Method Blank Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP89-MB	I01582.D	1	05/02/97	NF	04/30/97	OP89	GLJ73

The QC reported here applies to the following samples: **Method:** FLORIDA-PRO

F581-2

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	ND	0.50	mg/l	

CAS No.	Surrogate Recoveries		Limits
84-15-1	o-Terphenyl	73%	40-140%

Method Blank Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP85-MB	I01465.D	1	04/28/97	NF	04/28/97	OP85	GLJ69

The QC reported here applies to the following samples: **Method:** EPA 8100

F581-1, F581-3, F581-4

CAS No.	Compound	Result	RDL	Units Q
83-32-9	Acenaphthene	ND	330	ug/kg
208-96-8	Acenaphthylene	ND	330	ug/kg
120-12-7	Anthracene	ND	330	ug/kg
56-55-3	Benzo(a)anthracene	ND	330	ug/kg
50-32-8	Benzo(a)pyrene	ND	330	ug/kg
205-99-2	Benzo(b)fluoranthene	ND	330	ug/kg
191-24-2	Benzo(g,h,i)perylene	ND	330	ug/kg
207-08-9	Benzo(k)fluoranthene	ND	330	ug/kg
218-01-9	Chrysene	ND	330	ug/kg
53-70-3	Dibenzo(a,h)anthracene	ND	330	ug/kg
206-44-0	Fluoranthene	ND	330	ug/kg
86-73-7	Fluorene	ND	330	ug/kg
193-39-5	Indeno(1,2,3-cd)pyrene	ND	330	ug/kg
91-20-3	Naphthalene	ND	330	ug/kg
90-12-0	1-Methylnaphthalene	ND	330	ug/kg
91-57-6	2-Methylnaphthalene	ND	330	ug/kg
85-01-8	Phenanthrene	ND	330	ug/kg
129-00-0	Pyrene	ND	330	ug/kg

CAS No.	Surrogate Recoveries		Limits
321-60-8	2-Fluorobiphenyl	78%	35-120%
84-15-1	o-Terphenyl	87%	35-120%

Method Blank Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP83-MB2	I01442.D	1	04/25/97	NF	04/25/97	OP83	GLJ68

The QC reported here applies to the following samples: **Method:** EPA 610

F581-2

CAS No.	Compound	Result	RDL	Units Q
83-32-9	Acenaphthene	ND	10	ug/l
208-96-8	Acenaphthylene	ND	10	ug/l
120-12-7	Anthracene	ND	10	ug/l
56-55-3	Benzo(a)anthracene	ND	10	ug/l
50-32-8	Benzo(a)pyrene	ND	10	ug/l
205-99-2	Benzo(b)fluoranthene	ND	10	ug/l
191-24-2	Benzo(g,h,i)perylene	ND	10	ug/l
207-08-9	Benzo(k)fluoranthene	ND	10	ug/l
218-01-9	Chrysene	ND	10	ug/l
53-70-3	Dibenzo(a,h)anthracene	ND	10	ug/l
206-44-0	Fluoranthene	ND	10	ug/l
86-73-7	Fluorene	ND	10	ug/l
193-39-5	Indeno(1,2,3-cd)pyrene	ND	10	ug/l
91-20-3	Naphthalene	ND	10	ug/l
90-12-0	1-Methylnaphthalene	ND	10	ug/l
91-57-6	2-Methylnaphthalene	ND	10	ug/l
85-01-8	Phenanthrene	ND	10	ug/l
129-00-0	Pyrene	ND	10	ug/l

CAS No.	Surrogate Recoveries		Limits
321-60-8	2-Fluorobiphenyl	59%	26-116%
84-15-1	o-Terphenyl	98%	26-116%

Method Blank Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP74-MB2	I01576.D	1	05/02/97	NF	05/01/97	OP74	GLJ73

The QC reported here applies to the following samples: **Method:** FLORIDA-PRO

F581-1, F581-3, F581-4

CAS No.	Compound	Result	RDL	Units Q
	TPH (C8-C40)	ND	8.3	mg/kg

CAS No.	Surrogate Recoveries		Limits
84-15-1	o-Terphenyl	51%	40-140%

Blank Spike Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP89-BS	I01590.D	1	05/02/97	NF	04/30/97	OP89	GLJ73

The QC reported here applies to the following samples: **Method:** FLORIDA-PRO

F581-2

CAS No.	Compound	Spike mg/l	BSP mg/l	BSP %	Limits
	TPH (C8-C40)	2	2.00	100	

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	89%	40-140%

Blank Spike Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP85-BS	I01476.D	1	04/29/97	NF	04/28/97	OP85	GLJ69

The QC reported here applies to the following samples: **Method:** EPA 8100

F581-1, F581-3, F581-4

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
83-32-9	Acenaphthene	830	636	77	
208-96-8	Acenaphthylene	830	614	74	
120-12-7	Anthracene	830	619	74	
56-55-3	Benzo(a)anthracene	830	662	80	
50-32-8	Benzo(a)pyrene	830	584	70	
205-99-2	Benzo(b)fluoranthene	830	690	83	
191-24-2	Benzo(g,h,i)perylene	830	610	73	
207-08-9	Benzo(k)fluoranthene	830	675	81	
218-01-9	Chrysene	830	667	80	
53-70-3	Dibenzo(a,h)anthracene	830	623	75	
206-44-0	Fluoranthene	830	693	83	
86-73-7	Fluorene	830	674	81	
193-39-5	Indeno(1,2,3-cd)pyrene	830	627	76	
91-20-3	Naphthalene	830	555	67	
90-12-0	1-Methylnaphthalene	830	552	66	
91-57-6	2-Methylnaphthalene	830	600	72	
85-01-8	Phenanthrene	830	687	83	
129-00-0	Pyrene	830	690	83	

CAS No.	Surrogate Recoveries	BSP	Limits
321-60-8	2-Fluorobiphenyl	74%	35-120%
84-15-1	o-Terphenyl	86%	35-120%

Blank Spike Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP83-BS	I01405.D	1	04/22/97	NF	04/22/97	OP83	GLJ66

The QC reported here applies to the following samples: **Method:** EPA 610

F581-2

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
83-32-9	Acenaphthene	50	48.9	98	27-113
208-96-8	Acenaphthylene	50	46.6	93	27-111
120-12-7	Anthracene	50	46.0	92	27-124
56-55-3	Benzo(a)anthracene	50	52.8	106	28-124
50-32-8	Benzo(a)pyrene	50	46.8	94	38-111
205-99-2	Benzo(b)fluoranthene	50	44.5	89	27-121
191-24-2	Benzo(g,h,i)perylene	50	53.7	107	27-115
207-08-9	Benzo(k)fluoranthene	50	44.7	89	25-123
218-01-9	Chrysene	50	53.6	107	29-131
53-70-3	Dibenzo(a,h)anthracene	50	53.0	106	22-114
206-44-0	Fluoranthene	50	46.9	94	28-123
86-73-7	Fluorene	50	47.7	95	28-118
193-39-5	Indeno(1,2,3-cd)pyrene	50	52.8	106	25-119
91-20-3	Naphthalene	50	42.0	84	28-109
90-12-0	1-Methylnaphthalene	50	43.1	86	25-115
91-57-6	2-Methylnaphthalene	50	45.7	91	25-115
85-01-8	Phenanthrene	50	45.8	92	28-121
129-00-0	Pyrene	50	47.4	95	28-122

CAS No.	Surrogate Recoveries	BSP	Limits
321-60-8	2-Fluorobiphenyl	97%	26-116%
84-15-1	o-Terphenyl	100%	26-116%

Blank Spike Summary
Job Number: F581
Account: BRFLTALL Brown & Root Environmental
Project: Site G300 CTO 0027

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP74-BS	I01333.D	1	04/08/97	NF	04/07/97	OP74	GLJ62

The QC reported here applies to the following samples: **Method:** FLORIDA-PRO

F581-1, F581-3, F581-4

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH (C8-C40)	33.3	36.6	110	

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	81%	40-140%

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: F581
Account: BRFLTALL - Brown & Root Environmental
Project: BRFLTALL453 - Site G300 CTO 0027

QC Batch ID: MP340
Matrix Type: AQUEOUS

Methods: SW846 7060, SW846 7421
Units: mg/kg

Prep Date: 05/05/97

Metal	BSP Result	Spikelot MPFLPUR	% Rec	QC Limits
Arsenic	anr			
Lead				

Associated samples MP340: F581-1, F581-3, F581-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F581
Account: BRFLTALL - Brown & Root Environmental
Project: BRFLTALL453 - Site G300 CTO 0027

QC Batch ID: MP340
Matrix Type: AQUEOUS

Methods: SW846 7060, SW846 7421
Units: mg/kg

Prep Date:		05/05/97				05/05/97	
Metal	F606-1 Original DUP	RPD	QC Limits	F606-1 Original MS	Spikelot MPFLFUR	% Rec	QC Limits
Arsenic	anr						
Lead							

Associated samples MP340: F581-1, F581-3, F581-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: F581
Account: BRFLTALL - Brown & Root Environmental
Project: BRFLTALL453 - Site G300 CTO 0027

QC Batch ID: MP340
Matrix Type: AQUEOUS

Methods: SW846 7060, SW846 7421
Units: mg/kg

Prep Date: 05/05/97

Metal	RDL	IDL	MB raw	final
Arsenic	0.50	.1	anr	
Lead	0.32	.107		

Associated samples MP340: F581-1, F581-3, F581-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: F581
Account: BRFLTALL - Brown & Root Environmental
Project: BRFLTALL453 - Site G300 CTO 0027

QC Batch ID: MP332
Matrix Type: AQUEOUS

Methods: EPA 206.2, EPA 239.2
Units: mg/l

Prep Date: 05/02/97

Metal	BSP Result	Spikelot MPFLPUR	% Rec	QC Limits
Arsenic	anr			
Lead	0.022	0.020	110.0	80-120

Associated samples MP332: F581-2

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F581
Account: BRFLTALL - Brown & Root Environmental
Project: BRFLTALL453 - Site G300 CTO 0027

QC Batch ID: MP332
Matrix Type: AQUEOUS

Methods: EPA 206.2, EPA 239.2
Units: mg/l

Prep Date:				05/02/97				05/02/97	
Metal	F589-1 Original	MS	Spikelot MPFLFUR	% Rec	QC Limits	F589-1 Original	DUP	RPD	QC Limits
Arsenic	anr								
Lead	0.0070	0.032	0.020	125.0N	74-123	0.0070	0.0073	0.0	0-12

Associated samples MP332: F581-2

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

APPENDIX K

FIELD MEASUREMENTS AND SAMPLING FORMS

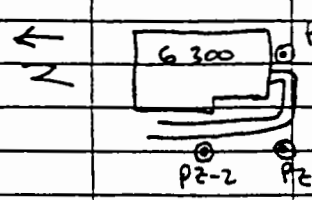
GROUNDWATER LEVEL MEASUREMENT SHEET

Page 1 of 1

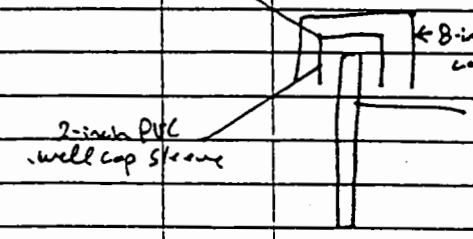
PROJECT NAME: CTO 0027
PROJECT NUMBER: 7540
PERSONNEL: Gerald Goode
DATE: 3/21/97
WEATHER CONDITIONS: overcast 70°F

LOCATION: Panama City
MEASURING DEVICE: Electronic water Probe
ADJUSTMENT FACTOR: NA
REMARKS: None

Well or Piezometer Number	Time	Elevation of Reference Point (Feet)	Water Level Indicator Reading (Feet)*	Groundwater Elevation (Feet)	Comments
PZ-1	8:40	10.44	8.73	1.71	None
PZ-2	8:30	10.00	8.37	1.63	None
PZ-3	8:35	10.17	8.64	1.53	None



Survey elevation point is north side of 2-inch PVC well cap sleeve. Depth to water referenced from this point.



*Measurements to nearest 0.01 feet.

Signature(s): Gerald Goode

ATTACHMENT C-1
EXAMPLE GROUNDWATER LEVEL MEASUREMENT SHEET

GROUNDWATER LEVEL MEASUREMENT SHEET

Page 1 of 1

PROJECT NAME: CT00027 LOCATION: 300
PROJECT NUMBER: 7540 MEASURING DEVICE: water level indicator
PERSONNEL: John Webster/Gerald Goode ADJUSTMENT FACTOR: _____
DATE: 4/23/97 REMARKS: _____
WEATHER CONDITIONS: overcast, slight breeze, 65°F

Well or Piezometer Number	Time	Elevation of Reference Point (Feet)*	Water Level Indicator Reading (Feet)*	Groundwater Elevation (Feet)	Comments	Total well depth (Feet)
PZ-1	0943	10.44	9.13	1.31		10.76
PZ-2	0949	10.00	8.38	1.62		13.61
PZ-3	0955	10.17	9.75	1.42		13.86
PCY-300-MW01	1028	10.28	8.83	1.45		14.92
PCY-300-MW02	1018	10.00	8.79	1.21		14.90
PCY-300-MW03	1013	10.30	8.94	1.36		14.1
PCY-300-MW04	1023	8.91	7.28	1.63		14.83

*Measurements to nearest 0.01 foot.

Signature(s): Gerald Goode

ATTACHMENT C-1
EXAMPLE GROUNDWATER LEVEL MEASUREMENT SHEET

GROUNDWATER LEVEL MEASUREMENT SHEET

Page 1 of 1

PROJECT NAME: CTO 0027
PROJECT NUMBER: 7540
PERSONNEL: John G Webster Gerald Goode
DATE: 4/24/97
WEATHER CONDITIONS: clear skies, slight breeze, 70°F
LOCATION: 300
MEASURING DEVICE: water level indicator
ADJUSTMENT FACTOR:
REMARKS:

Well or Piezometer Number	Time	Elevation of Reference Point (Feet)*	Water Level Indicator Reading (Feet)*	Groundwater Elevation (Feet)	Comments	Total well depth*
PCY-300-MW01	0810	10.28	8.85	1.43		14.90
PCY-300-MW02	0815	10.00	8.83	1.17		14.90
PCY-300-MW03	0800	10.30	8.94	1.36		14.90
PCY-300-MW04	0804	8.91	7.29	1.63		14.90

*Measurements to nearest 0.01 foot.

Signature(s): Gerald Goode

Brown & Root Environmental — SAMPLING LOG — Page 1 of 1

BRE Project No: 7540	Date: 3/11/98	Sampler(s): Stanley Hirsch
Client Site ID: GTO 0027	Facility Address: Fairmont City	
Weather: Overcast 70°F	Sampling Method: Teflon Bailer Y (N) Other NA	SOP Cleaning Y N

Comments: Well development: Purged 2 gallons from well using peristaltic pump and tygon tubing. Used new section of tygon tubing for development

GROUNDWATER SYSTEM PERFORMANCE AND QUALITY CONTROL SAMPLES

A	B	C	D	E	Sample ID	Time	Source	pH	Temp.	Sp. Cond.
							GWS Influent			
							GWS Effluent			
							Equipment Blank			
							Equipment Blank			
							Trip Blank			
							Duplicate ( )			
							Duplicate ( )			

TEST PARAMETERS

	Test Method	Container Type	Preserv. Type
A			
B			
C			
D			
E			

GROUNDWATER SAMPLES

Sample ID	Time	pH	Temp.	Sp. Cond.	TD	Csg Dia (in)	DTW	Purge Vol
PZ-1	9:50	7.01	19.5	174.7	10'	1"	8.73	2 gal
	10:00	6.97	19.7	170.3				
	10:10	7.01	19.5	165.7				

Water visually clear after development

Total depth of well measured at 10' 6 1/2".

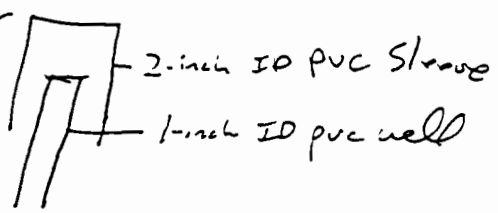
UNITS: TEMPERATURE = DEGREES CELSIUS/pH = STANDARD UNITS/SPECIFIC CONDUCTANCE = UMHOS/CM

WELL CASING VOLUMES (GALLONS/FT OF SATURATED CASING, FOR 5x PURGE) 1.25" = 0.32 / 2" = 0.32 / 4" = 3.27 / 6" = 7.35

NOTE: A 3x PURGE IS OK FOR: 4" = 1.96 / 6" = 4.41, PROVIDED 3 CONSISTENT REPEAT FIELD METER READINGS ARE OBSERVED

Depth to water measured from north side of top of sleeve (2-inch PVC

.10



SAMPLOG.XLS

Brown & Root Environmental — SAMPLING LOG — Page 1 of 1

BRE Project No: 7540 | Date: 3/21/97 | Sampler(s): Gerald Cook

Client Site ID: CTO 0027 | Facility Address:

Weather: Overcast 70° F | Sampling Method: Teflon Bailer Y (N) Other NA | SOP Cleaning (Y) N

Comments: well development: Purged 2 gallons from well using peristaltic pump and tygon tubing. Used new section of tygon tubing for development.

GROUNDWATER SYSTEM PERFORMANCE AND QUALITY CONTROL SAMPLES

A	B	C	D	E	Sample ID	Time	Source	pH	Temp.	Sp. Cond.
							GWS Influent			
							GWS Effluent			
							Equipment Blank			
							Equipment Blank			
							Trip Blank			
							Duplicate 1			
							Duplicate 1			

TEST PARAMETERS

	Test Method	Container Type	Preserv. Type
A			
B			
C			
D			
E			

GROUNDWATER SAMPLES

Sample ID	Time	Source	pH	Temp.	Sp. Cond.	TD	Csg Dia (in)	DTW	Purge Vol
PZ-2	8:45		6.95	21.3	560	14'	1"	8.37	2 gal
	8:55		6.97	19.7	320				
	9:05		6.99	19.4	290				

Water visually clear after development

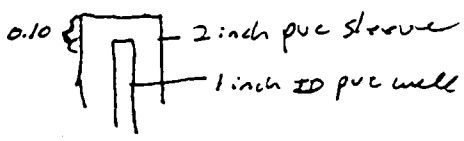
Total depth of well measured at 14' bls.

UNITS: TEMPERATURE = DEGREES CELSIUS/pH = STANDARD UNITS/SPECIFIC CONDUCTANCE = UMHOS/CM

WELL CASING VOLUMES (GALLONS/FT OF SATURATED CASING, FOR 5x PURGE) 1.25" = 0.32 / 2" = 0.32 / 4" = 3.27 / 6" = 7.35

NOTE: A 3x PURGE IS OK FOR: 4" = 1.96 / 6" = 4.41, PROVIDED 3 CONSISTENT REPEAT FIELD METER READINGS ARE OBSERVED

Depth to groundwater taken from north side of top of sleeve casing (2-inch pvc)



SAMPLOG.XLS

Brown & Root Environmental — SAMPLING LOG — Page 1 of 1

BRE Project No: 7540 | Date: | Sampler(s): Gerald Cootes

Client Site ID: CTO 0027 | Facility Address: Panama City, FL

Weather: Overcast 70°F | Sampling Method: Teflon Bailer Y (N) Other | SOP Cleaning (Y) N

Comments: Well development : Purged 2 gallons from well using peristaltic pump and tygon tubing. Used new section of tygon tubing

GROUNDWATER SYSTEM PERFORMANCE AND QUALITY CONTROL SAMPLES										TEST PARAMETERS			
A	B	C	D	E	Sample ID	Time	Source	pH	Temp.	Sp. Cond.		Test Method	Container Type	Preserv. Type
							GWS Influent				A			
							GWS Effluent				B			
							Equipment Blank				C			
							Equipment Blank				D			
							Trip Blank				E			
							Duplicate 1							
							Duplicate 1							

GROUNDWATER SAMPLES									TD	Csg Dia (in)	DTW	Purge Vol
					PZ-3	9:10		7.01	20.3	704	14'	1"	8.64	2 gal
						9:20		7.00	19.6	199.9				
						9:35		6.99	19.2	191				

Water visually clear after development

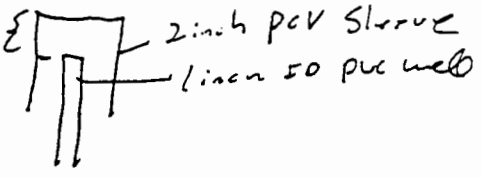
Total depth of well measured at 14' b/s

UNITS: TEMPERATURE = DEGREES CELSIUS/pH = STANDARD UNITS/SPECIFIC CONDUCTANCE = UMHOS/CM

WELL CASING VOLUMES (GALLONS/FT OF SATURATED CASING, FOR 5x PURGE) 1.25" = 0.32 / 2" = 0.82 / 4" = 3.27 / 6" = 7.35

NOTE: A 3x PURGE IS OK FOR: 4" = 1.96 / 6" = 4.41, PROVIDED 3 CONSISTENT REPEAT FIELD METER READINGS ARE OBSERVED

Depth to groundwater measured from north side of top of sleeve casing (2-inch pvc)



SAMPLOG.XLS

SAMPLING LOG

BRE Project No: 7540 | Date: 4/23/97 | Samplers(s):

Client Site ID: STO 0027 | Facility Address: Site 300 Coastal Systems Station

Weather: overcast 65°F | Sampling Method: Teflon Bailer Y (N) Other Peristaltic Pump & Tygon Tubing | SOP Cleaning (Y) N

Comments:

GROUNDWATER SYSTEM PERFORMANCE AND QUALITY CONTROL SAMPLES

A	B	C	D	E	Sample ID	Time	Source	pH	Temp.	Sp. Cond.
							GWS Influent			
							GWS Effluent			
							Equipment Blank			
							Equipment Blank			
							Trip Blank			
							Duplicate			
							Duplicate			

TEST PARAMETERS

	Test Method	Container Type	Preserv. Type
A			
B			
C			
D			
E			

GROUNDWATER SAMPLES

						TD	Csg Dia (in)	DTW	Purge Vol
	300 - MW01 - 001	1400				14.9	2	8.83	6 gallons
		1445		6.94	20.9	409			

UNITS: TEMPERATURE = DEGREES CELSIUS/oH = STANDARD UNITS/SPECIFIC CONDUCTANCE = UMHOS/CM

WELL CASING VOLUMES (GALLONS/FT OF SATURATED CASING, FOR 5x PURGE): 1.25" = 0.32 / 2" = 0.82 / 4" = 3.27 / 6" = 7.35

NOTE: A 3x PURGE IS OK FOR: 4" = 1.96 / 6" = 4.41 PROVIDED 3 CONSISTENT REPEAT FIELD METER READINGS ARE OBSERVED

SAMPLING LOG

Page 1 of 1

BRE Project No: 7540 | Date: 4/23/97 | Sampler(s): John Webster

Client Site ID: CTO 0027 | Facility Address: Site 300 Coastal Systems Station

Weather: Overcast 65°F | Sampling Method: Teflon Bailer Y (N) Other Peristaltic Pump & Tygon Tubing | SOP Cleaning (Y) N

Comments:

GROUNDWATER SYSTEM PERFORMANCE AND QUALITY CONTROL SAMPLES

A	B	C	D	E	Sample ID	Time	Source	pH	Temp.	Sp. Cond.
							GWS Influent			
							GWS Effluent			
							Equipment Blank			
							Equipment Blank			
							Trip Blank			
							Duplicate			
							Duplicate			

TEST PARAMETERS

	Test Method	Container Type	Preserv. Type
A			
B			
C			
D			
E			

GROUNDWATER SAMPLES

A	B	C	D	E	Sample ID	Time	Source	pH	Temp.	Sp. Cond.	TD	Csg Dia (in)	DTW	Purge Vol
					300-MW02-001	15:10					N.9	2"	8.79	6 gallons
						15:30		7.0	21.3	324				

UNITS: TEMPERATURE = DEGREES CELSIUS/C | pH = STANDARD UNITS/SPECIFIC CONDUCTANCE = UMHOS/CM

WELL CASING VOLUMES (GALLONS/FT OF SATURATED CASING, FOR 5x PURGE): 1.25" = 0.32 / 2" = 0.82 / 4" = 3.27 / 6" = 7.35

NOTE: A 3x PURGE IS OK FOR: 4" = 1.96 / 6" = 4.41 PROVIDED 3 CONSISTENT REPEAT FIELD METER READINGS ARE OBSERVED

SAMPLOG.XLS

SAMPLING LOG

BRE Project No: 7540 | Date: 4/23/97 | Samoler(s): John Webster

Client Site ID: CTO 0027 | Facility Address: Site 300

Weather: Overcast 65°F | Samoling Method: Teflon Bailer Y (N) Other Peristaltic Pump & Tygon Tubing | SOP Cleaning (Y) N

Comments:

GROUNDWATER SYSTEM PERFORMANCE AND QUALITY CONTROL SAMPLES											TEST PARAMETERS			
A	B	C	D	E	Sample ID	Time	Source	pH	Temp.	Sp. Cond.		Test Method	Container Type	Preserv. Type
							GWS Influent				A			
							GWS Effluent				B			
							Equipment Blank				C			
							Equipment Blank				D			
							Trip Blank				E			
							Duplicate							
							Duplicate							

GROUNDWATER SAMPLES											TD	Csg Dia (in)	DTW	Purge Vol
		300 - MW03-001		10:28							49	2"	8.83	
				14:45				6.71	19.8	205				6 gallons

UNITS: TEMPERATURE = DEGREES CELSIUS/pH = STANDARD UNITS/SPECIFIC CONDUCTANCE = UMHOS/CM

WELL CASING VOLUMES (GALLONS/FT OF SATURATED CASING, FOR 5x PURGE): 1.25" = 0.32 / 2" = 0.82 / 4" = 3.27 / 6" = 7.35

NOTE: A 3x PURGE IS OK FOR: 4" = 1.96 / 6" = 4.41 PROVIDED 3 CONSISTENT REPEAT FIELD METER READINGS ARE OBSERVED

SAMPLING LOG

Page 1 of 1

BRE Project No: 7540 | Date: 4/23/97 | Sampler(s): John Webster

Client Site ID: CTO 0027 | Facility Address: Site 300

Weather: Overcast 65°F | Sampling Method: Teflon Bailer Y (N) Other Peristaltic Pump & Tygon Tubing | SOP Cleaning (Y) N

Comments:

GROUNDWATER SYSTEM PERFORMANCE AND QUALITY CONTROL SAMPLES

A	B	C	D	E	Sample ID	Time	Source	pH	Temp.	Sp. Cond.
							GWS Influent			
							GWS Effluent			
							Equipment Blank			
							Equipment Blank			
							Trip Blank			
							Duplicate			
							Duplicate			

TEST PARAMETERS

	Test Method	Container Type	Preserv. Type
A			
B			
C			
D			
E			

GROUNDWATER SAMPLES

							TD	Csg Dia (in)	DTW	Purge Vol
		300- MW11-001					14.8	2"	7.28	7 gallons
			1330		7.17	20.2	246			

UNITS: TEMPERATURE = DEGREES CELSIUS/pH = STANDARD UNITS/SPECIFIC CONDUCTANCE = UMHOS/CM

WELL CASING VOLUMES (GALLONS/FT OF SATURATED CASING, FOR 3x PURGE): 1.25" = 0.22 / 2" = 0.32 / 4" = 3.27 / 6" = 7.35

NOTE: A 3x PURGE IS OK FOR: 4" = 1.96 / 6" = 4.41 PROVIDED 3 CONSISTENT REPEAT FIELD METER READINGS ARE OBSERVED

APPENDIX L

SLUG TEST DATA AND HYDRAULIC CONDUCTIVITY CALCULATIONS

HYDRAULIC CONDUCTIVITY GEOMETRIC MEAN

The Bouwer and Rice methodology for partially penetrating wells in unconfined aquifers was utilized to calculate hydraulic conductivity values for the three wells (Bouwer, 1989; Bouwer and Rice, 1976). Calculations were performed using the Aqtesolv™ aquifer characterization program (Duffield and Rumbaugh, 1991). The slug test data and Aqtesolv™ results are included in this appendix. Hydraulic conductivity (K) values in the aquifers immediately surrounding the monitoring wells were calculated to be:

PCY-300-MW02 = 0.005074 feet/min = 2.58 x 10^{-3} cm/sec
PCY-300-MW03 = 0.01451 feet/min = 7.37 x 10^{-3} cm/sec
PCY-300-MW04 = 0.004891 feet/min = 2.48 x 10^{-3} cm/sec

The average hydraulic conductivity was determined by calculating the geometric mean of the three values as follows:

$$= e\left[\frac{\ln x_1 + \ln x_2 \ldots + \ln x_n}{n}\right]$$

$$= e\left[\frac{\ln x_1 + \ln x_2 + \ln x_3}{3}\right]$$

$$= e\left[\frac{\ln(0.005074\ \text{ft/min}) + \ln(0.01451\ \text{ft/min}) + \ln(0.004891\ \text{ft/min})}{3}\right]$$

$$= e\left[\frac{-14.84\ \text{ft/min}}{3}\right]$$

$$= 0.007114\ \text{ft/min}$$

$$= 3.61 \times 10^{-3}\ \text{cm/sec}$$

$$= 10.24\ \text{ft/day}$$

SLUG TEST METHOD FOR UNCONFINED AQUIFERS

REFERENCE: Bouwer, H. and R. C. Rice, 1976. A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells, Water Resources Research, vol. 12, no. 3, pp. 423-428.

SOLUTION:

$$\ln s_o - \ln s_t = \frac{2 K L t}{r_c^2 \ln(r_e/r_w)}$$

where:

s_o = initial drawdown in well due to instantaneous removal of water from well [L]

s_t = drawdown in well at time t [L]

L = length of well screen [L]

r_c = radius of well casing [L]

$\ln(r_e/r_w)$ = empirical "shape factor" determined from tables provided in Bouwer and Rice (1976)

r_e = equivalent radius over which head loss occurs [L]

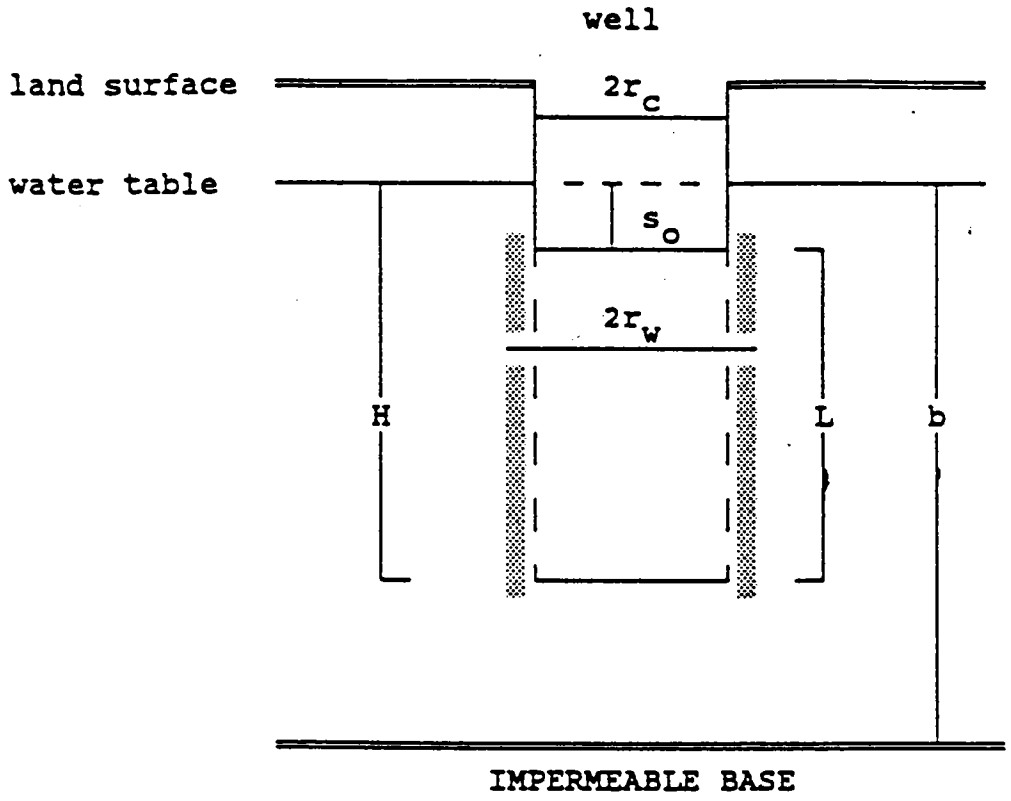
r_w = radius of well (including gravel pack) [L]

H = static height of water in well [L]

b = saturated thickness of aquifer

SLUG TEST METHOD FOR UNCONFINED AQUIFERS
(continued)

DEFINITION OF TERMS:



SE1000B
Environmental Logger
06/28 13:22

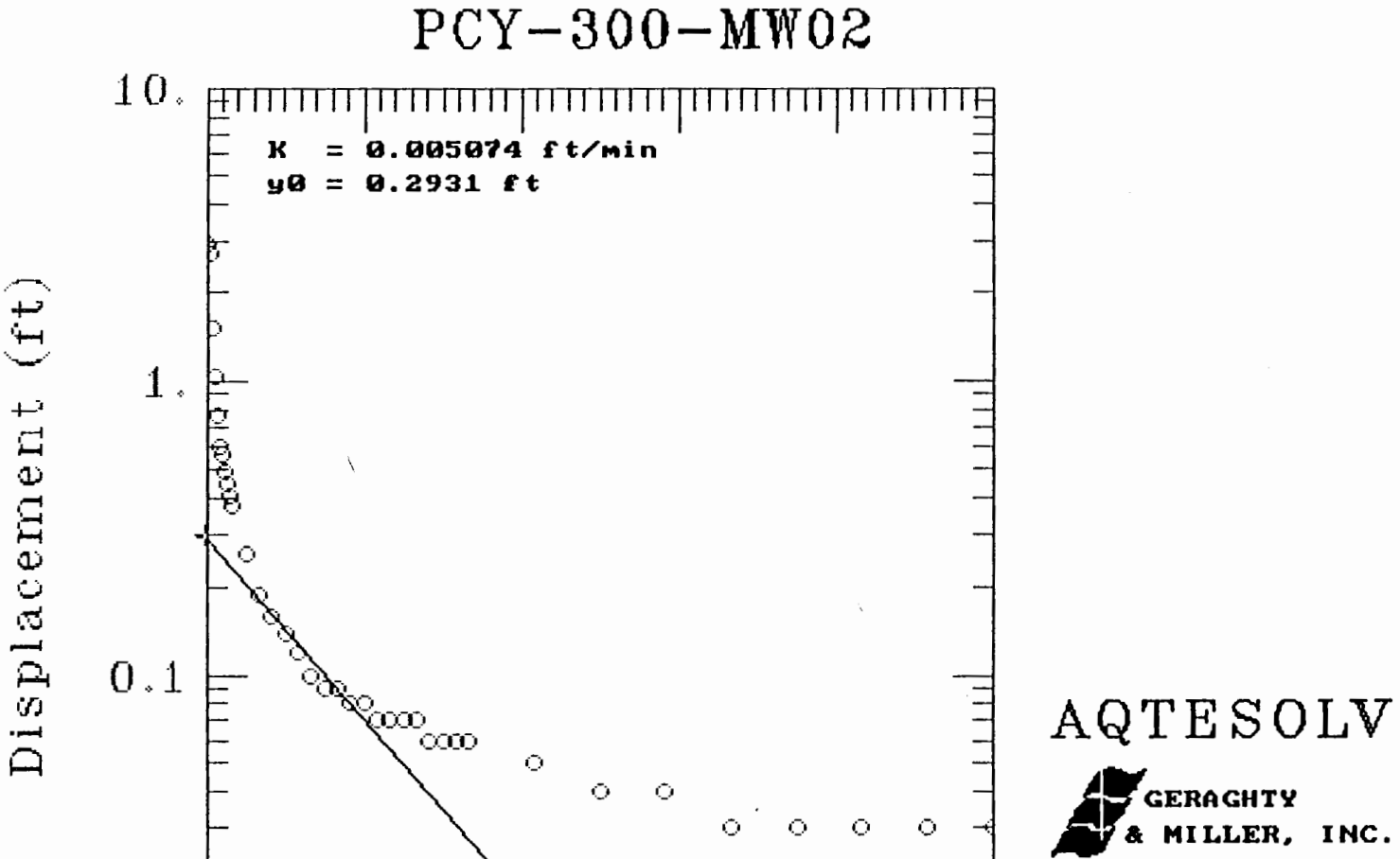
Unit# 00061 Test# 0
PCY-300-MW02

INPUT 1: Level (F) TOC

Reference	8.83
Scale factor	14.90
Offset	- 0.13

Step# 0 04/25 09:31

Elapsed Time	Value
0.0000	11.75
0.0033	11.54
0.0066	10.34
0.0099	9.86
0.0133	9.60
0.0166	9.43
0.0200	9.39
0.0233	9.32
0.0266	9.28
0.0300	9.24
0.0333	9.21
0.0500	9.09
0.0666	9.02
0.0833	8.99
0.1000	8.97
0.1166	8.95
0.1333	8.93
0.1500	8.92
0.1666	8.92
0.1833	8.91
0.2000	8.91
0.2166	8.90
0.2333	8.90
0.2500	8.90
0.2666	8.90
0.2833	8.89
0.3000	8.89
0.3166	8.89
0.3333	8.89
0.4167	8.88
0.5000	8.87
0.5833	8.87
0.6667	8.86
0.7500	8.86
0.8333	8.86
0.9167	8.86
1.0000	8.86
1.0833	8.86
1.1667	8.85
1.2500	8.85
1.3333	8.85
1.4166	8.85
1.5000	8.85
1.5833	8.85
1.6667	8.85
1.7500	8.85
1.8333	8.85
1.9167	8.85
2.0000	8.85
2.5000	8.85
3.0000	8.85
3.5000	8.84
4.0000	8.85
4.5000	8.85
5.0000	8.84
5.5000	8.84
6.0000	8.84
6.5000	8.84
7.0000	8.84
7.5000	8.84
8.0000	8.84
8.5000	8.85
9.0000	8.84
9.5000	8.85
10.0000	8.84
12.0000	8.84
14.0000	8.84
16.0000	8.84


PCY-300-MW02
10.
1.
0.1
Displacement (ft)
K = 0.005074 ft/min
y0 = 0.2931 ft
AQTESOLV
GERAGHTY
& MILLER, INC.

```
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
                          A Q T E S O L V   R E S U L T S
                                    Version  1.10
06/28/97
                                                                        16:03:01

================================================================================
                                  TEST DESCRIPTION
Data set........... G300MW02.DAT
Data set title.....    PCY-300-MW02

Knowns and Constants:
   No. of data points.................. 67
   Radius of well casing............... 0.083
   Radius of well...................... 0.333
   Aquifer saturated thickness......... 48
   Well screen length.................. 10
   Static height of water in well...... 8.83
   Log(Re/Rw).......................... 2.083
   A, B, C.............................  2.445,   0.398,   0.000

================================================================================
                                  ANALYTICAL METHOD
Bouwer-Rice (Unconfined Aquifer Slug Test)

================================================================================
                         RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

              Estimate
   K  =    1.7121E-004
   y0 =    0.0000E+000

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

TYPE CURVE DATA

        K  = 5.49772E-003
        y0 = 2.98104E-001

   Time       Drawdown       Time       Drawdown       Time       Drawdown
----------   ----------   ----------   ----------   ----------   ----------
0.000E+000   2.981E-001   1.000E+000   1.401E-004

TYPE CURVE DATA

        K  = 5.07411E-003
        y0 = 2.93066E-001

   Time       Drawdown       Time       Drawdown       Time       Drawdown
----------   ----------   ----------   ----------   ----------   ----------
0.000E+000   2.931E-001   1.000E+000   2.485E-004
```

SE1000B
Environmental Logger
06/28 13:18

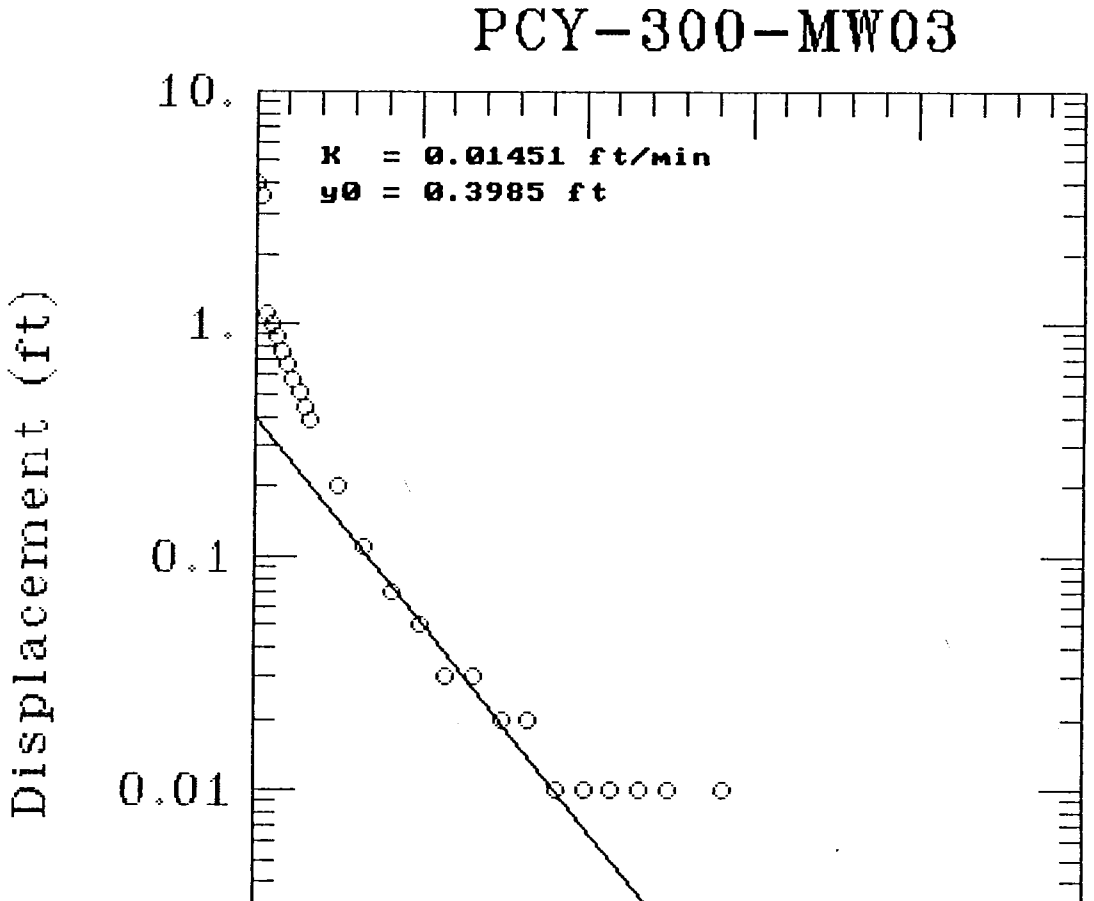
Unit# 00061 Test# 2
PCY-300-MW03

INPUT 1: Level (F) TOC

Reference 8.94
Scale factor 14.90
Offset - 0.13

Step# 0 04/25 10:32

Elapsed Time	Value
0.0000	12.92
0.0033	12.51
0.0066	10.06
0.0099	9.94
0.0133	9.83
0.0166	9.71
0.0200	9.61
0.0233	9.52
0.0266	9.45
0.0300	9.38
0.0333	9.33
0.0500	9.14
0.0666	9.05
0.0833	9.01
0.1000	8.99
0.1166	8.97
0.1333	8.97
0.1500	8.96
0.1666	8.96
0.1833	8.95
0.2000	8.95
0.2166	8.95
0.2333	8.95
0.2500	8.95
0.2666	8.94
0.2833	8.95
0.3000	8.94
0.3166	8.94
0.3333	8.94
0.4167	8.94
0.5000	8.94
0.5833	8.94
0.6667	8.93
0.7500	8.93
0.8333	8.94
0.9167	8.94
1.0000	8.94
1.0833	8.94
1.1667	8.94
1.2500	8.93
1.3333	8.93
1.4166	8.93
1.5000	8.93
1.5833	8.93
1.6667	8.93
1.7500	8.93
1.8333	8.93
1.9167	8.93
2.0000	8.93
2.5000	8.93
3.0000	8.93
3.5000	8.93
4.0000	8.93
4.5000	8.93
5.0000	8.93
5.5000	8.93
6.0000	8.93
6.5000	8.93
7.0000	8.93
7.5000	8.93
8.0000	8.93
8.5000	8.93
9.0000	8.92
9.5000	8.93
10.0000	8.92



AQTESOLV

GERAGHTY & MILLER, INC.

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                         A Q T E S O L V   R E S U L T S
                                  Version  1.10

06/28/97                                                                       16:29:48

==========================================================================================
                                 TEST DESCRIPTION

Data set........... G300MW03.DAT
Data set title.....    PCY-300-MW03

Knowns and Constants:
   No. of data points..................... 24
   Radius of well casing.................. 0.083
   Radius of well......................... 0.333
   Aquifer saturated thickness............ 48
   Well screen length..................... 10
   Static height of water in well......... 8.94
   Log(Re/Rw)............................. 2.088
   A, B, C................................  2.445,   0.398,   0.000

==========================================================================================
                                ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

==========================================================================================
                          RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

             Estimate
   K  =    1.4465E-002
   y0 =    0.0000E+000

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

TYPE CURVE DATA

       K  = 1.45114E-002
       y0 = 3.98452E-001

    Time       Drawdown        Time       Drawdown        Time       Drawdown
 ----------   ----------   ----------   ----------   ----------   ----------
0.000E+000   3.985E-001   5.000E-001   1.660E-005
```

SE1000B
Environmental Logger
06/28 13:20

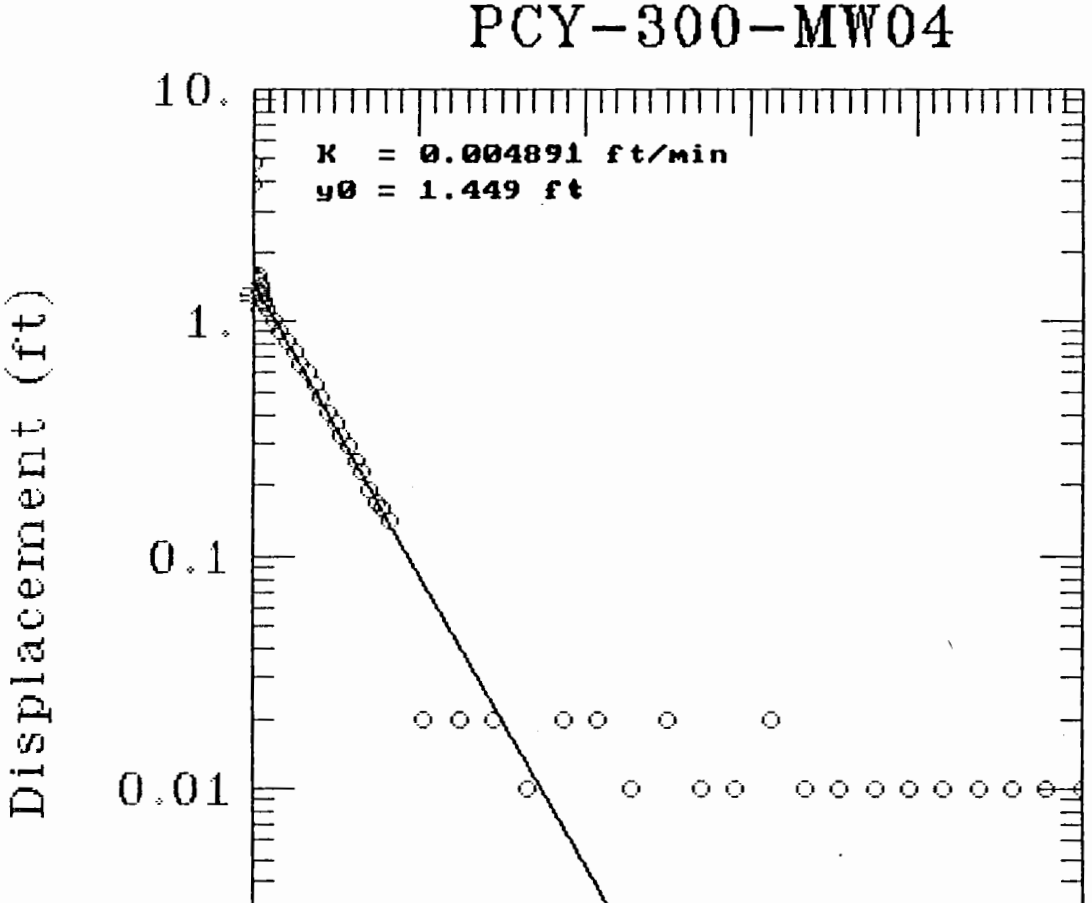
Unit# 00061 Test# 1
PCY-300-MW04

INPUT 1: Level (F) TOC

Reference 7.29
Scale factor 14.90
Offset - 0.13

Step# 0 04/25 10:06

Elapsed Time	Value
0.0000	12.14
0.0033	11.16
0.0066	8.69
0.0099	8.84
0.0133	8.87
0.0166	8.81
0.0200	8.73
0.0233	8.63
0.0266	8.53
0.0300	8.50
0.0333	8.44
0.0500	8.30
0.0666	8.20
0.0833	8.11
0.1000	8.03
0.1166	7.95
0.1333	7.89
0.1500	7.82
0.1666	7.76
0.1833	7.70
0.2000	7.66
0.2166	7.61
0.2333	7.58
0.2500	7.54
0.2666	7.52
0.2833	7.48
0.3000	7.46
0.3166	7.45
0.3333	7.43
0.4167	7.31
0.5000	7.31
0.5833	7.31
0.6667	7.30
0.7500	7.31
0.8333	7.31
0.9167	7.30
1.0000	7.31
1.0833	7.30
1.1667	7.30
1.2500	7.31
1.3333	7.30
1.4166	7.30
1.5000	7.30
1.5833	7.30
1.6667	7.30
1.7500	7.30
1.8333	7.30
1.9167	7.30
2.0000	7.30
2.5000	7.30
3.0000	7.30
3.5000	7.30
4.0000	7.30
4.5000	7.30
5.0000	7.30
5.5000	7.30
6.0000	7.30
6.5000	7.30
7.0000	7.30
7.5000	7.30
8.0000	7.30
8.5000	7.30
9.0000	7.30
9.5000	7.30
10.0000	7.30
12.0000	7.30
14.0000	7.30



AQTESOLV

GERAGHTY & MILLER, INC.

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                           A Q T E S O L V   R E S U L T S
                                     Version 1.10
06/28/97                                                                            16:22:06

==================================================================================
                                   TEST DESCRIPTION
Data set........... G300MW04.DAT
Data set title.....    PCY-300-MW04

Knowns and Constants:
   No. of data points................. 66
   Radius of well casing.............. 0.083
   Radius of well..................... 0.333
   Aquifer saturated thickness........ 48
   Well screen length................. 10
   Static height of water in well..... 7.29
   Log(Re/Rw)......................... 1.994
   A, B, C............................  2.445,  0.398,  0.000

==================================================================================
                                   ANALYTICAL METHOD
Bouwer-Rice (Unconfined Aquifer Slug Test)

==================================================================================
                           RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

              Estimate
   K  =    4.8639E-003
   y0 =    0.0000E+000

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>   >

TYPE CURVE DATA

     K  = 4.89120E-003
     y0 = 1.44856E+000

    Time        Drawdown       Time        Drawdown       Time        Drawdown
 ----------   ----------   ----------   ----------   ----------   ----------
 0.000E+000   1.449E+000   2.000E+000   9.457E-007
```

APPENDIX M

GROUNDWATER GRADIENT, GROUNDWATER FLOW, AND TRANSMISSIVITY CALCULATIONS

GROUNDWATER FLOW GRADIENT

The groundwater flow gradient was determined using the following equation:

$$i = \frac{h_1 - h_2}{d}$$

where:

i = the hydraulic gradient

h_1 = the water elevation at point 1

h_2 = the water elevation at point 2

d = the distance between point 1 and point 2

The distance and groundwater elevations were obtained from Figure 3-1.

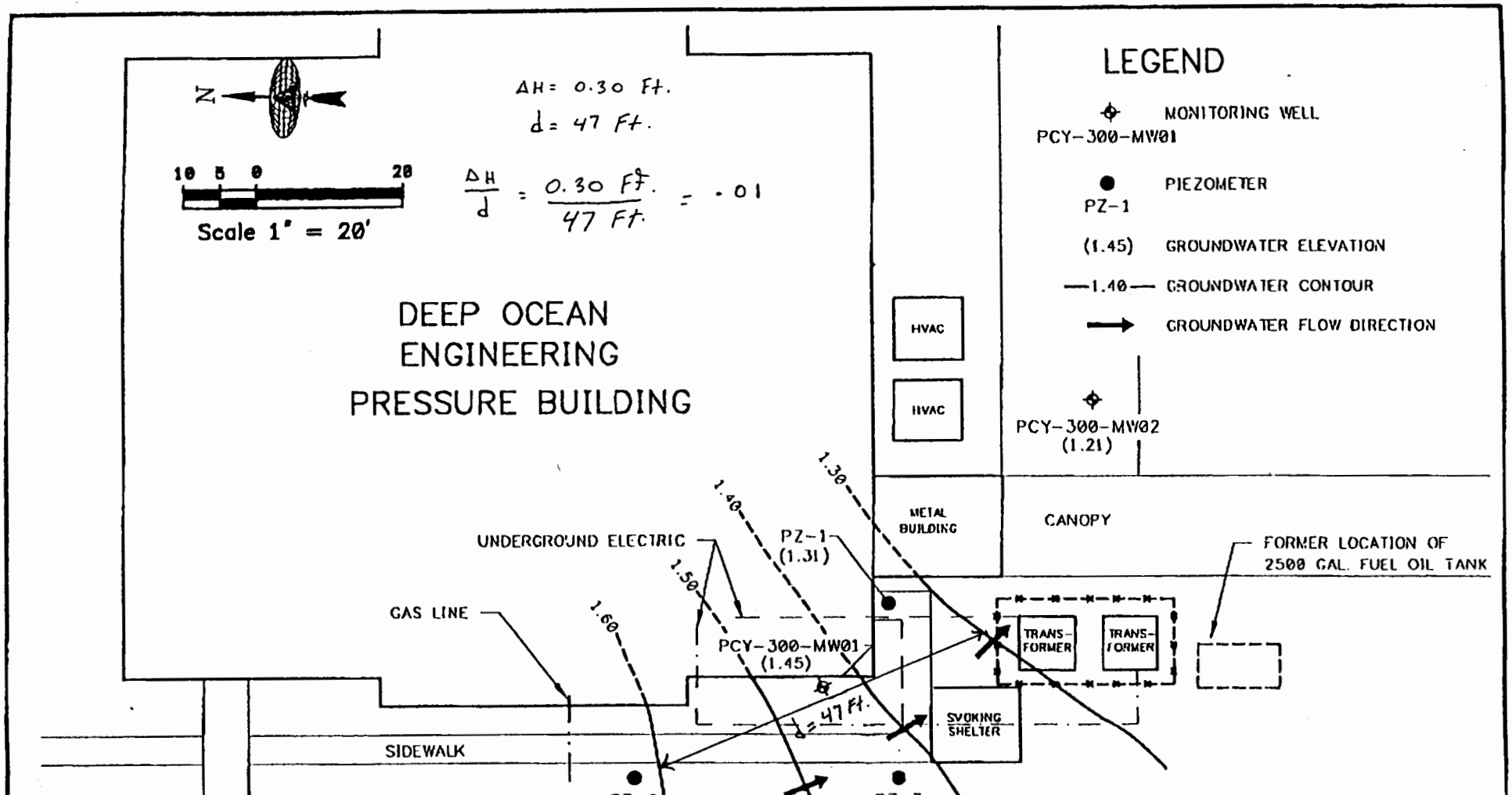
April 23, 1997

The gradient across the site was calculated after constructing groundwater contours from the April 23, 1997, depth to water data, determining the perpendicular distance between two of these contours, and utilizing the following calculation:

$$i = \frac{1.63 \text{ ft} - 1.30 \text{ ft}}{47 \text{ ft}}$$

$$i = \frac{0.33 \text{ ft}}{47 \text{ ft}}$$

$$i = 0.01 \text{ ft/ft}$$


N
10 5 0 20
Scale 1" = 20'
ΔH = 0.30 Ft.
d = 47 Ft.
ΔH/d = 0.30 Ft./47 Ft. = .01
DEEP OCEAN
ENGINEERING
PRESSURE BUILDING
LEGEND
MONITORING WELL
PCY-300-MW01
PIEZOMETER
PZ-1
(1.45) GROUNDWATER ELEVATION
1.40 GROUNDWATER CONTOUR
GROUNDWATER FLOW DIRECTION
PCY-300-MW02
(1.21)
HVAC
HVAC
METAL BUILDING
CANOPY
FORMER LOCATION OF
2500 GAL. FUEL OIL TANK
UNDERGROUND ELECTRIC
GAS LINE
PZ-1
(1.31)
PCY-300-MW01
(1.45)
1.30
1.40
1.50
1.60
TRANS-FORMER
TRANS-FORMER
SMOKING SHELTER
d = 47 Ft.
SIDEWALK

GROUNDWATER FLOW VELOCITY

Potential movement of groundwater at the site may be described in terms of transportation by natural flow system in the saturated zone, assuming groundwater flow follows Darcy's Law. Darcy's Law may be expressed as:

$$V = \left(\frac{K}{n}\right) x\, i$$

where:

V = average velocity

K = hydraulic conductivity = 10.24 ft/day

n = effective porosity (assumed) = 0.30

i = average hydraulic gradient = 0.01 ft/ft

therefore:

$$V = \left(\frac{10.24 \text{ ft/day}}{0.30}\right) x\, 0.01 \text{ ft/ft}$$

$$V = 0.34 \text{ ft/day}$$

TRANSMISSIVITY

Transmissivity can be determined by multiplying the hydraulic conductivity by the effective aquifer thickness (be). The effective aquifer thickness is defined as depth to the top of the water table to (approximately 8 feet bls) to the top of a limestone of the Intracoastal Formation (encountered at CSS at depths of 48 feet and 63 feet bls) The transmissivity was calculated as follows:

$$T = Kb_e$$

where:

T = transmissivity

K = hydraulic conductivity = 10.24 ft/day

b_e = affected aquifer thickness = 48 ft

therefore:

$T = 10.24 \text{ ft/day} \times 48 \text{ft}$

$T = 4.92 \times 10^2 \text{ ft}^2\text{/day} \times 7.48 \text{ gal/ft}^3$

$T = 3.68 \times 10^2 \text{ gal/day/ft}$

Note: Depth to Intracoastal Formation obtained from data presented in the RCRA Facility Investigation Report (ABB Environmental Services, Inc., 1995).

APPENDIX N
GROUNDWATER LABORATORY DATA SHEETS

ACCUTEST.

05/09/97

Technical Report for

Brown & Root Environmental

Site G300 CTO 0027

7540

Accutest Job Number: F582

Report to:

C/O Paul Calligan
Brown & Root Environmental
1311 Executive Center Dr. Ste: 220
Tallahassee, FL 32301

ATTN: Arnold Lamb - QA Officer

Total number of pages in report: 35

Harry Behzadi, Ph.D.
Laboratory Director

ACCUTEST.

Sample Summary

Brown & Root Environmental

Date: 05/12/97
Job No: F582

Site G300 CTO 0027
Project No: 7540

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
F582-1	04/23/97	11:45	GG	04/25/97	AQ	Ground Water	300-MW03-001
F582-2	04/23/97	13:30	GG	04/25/97	AQ	Ground Water	300-MW04-001
F582-3	04/23/97	14:45	GG	04/25/97	AQ	Ground Water	300-MW01-001
F582-4	04/23/97	12:30	GG	04/25/97	AQ	Ground Water	300-MW03-001B
F582-5	04/23/97	15:30	GG	04/25/97	AQ	Ground Water	300-MW02-001
F582-6	04/17/97	16:00	GG	04/25/97	AQ	Trip Blank Water	TRIP BLANK

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW03-001		
Lab Sample ID:	F582-1	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 8100	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01447.D	1	04/25/97	NF	04/25/97	OP83	GII68
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	10	ug/l	
208-96-8	Acenaphthylene	ND	10	ug/l	
120-12-7	Anthracene	ND	10	ug/l	
56-55-3	Benzo(a)anthracene	ND	10	ug/l	
50-32-8	Benzo(a)pyrene	ND	10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	10	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	10	ug/l	
218-01-9	Chrysene	ND	10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	10	ug/l	
206-44-0	Fluoranthene	ND	10	ug/l	
86-73-7	Fluorene	ND	10	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	10	ug/l	
91-20-3	Naphthalene	ND	10	ug/l	
90-12-0	1-Methylnaphthalene	ND	10	ug/l	
91-57-6	2-Methylnaphthalene	ND	10	ug/l	
85-01-8	Phenanthrene	ND	10	ug/l	
129-00-0	Pyrene	ND	10	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	74%		26-116%
84-15-1	o-Terphenyl	105%		26-125%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW03-001		
Lab Sample ID:	F582-1	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	FLORIDA-PRO	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01591.D	1	05/02/97	NF	04/30/97	OP89	GIJ73
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	ND	0.50	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	84%		40-140%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW03-001		
Lab Sample ID:	F582-1	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002006.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
75-25-2	Bromoform	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
74-83-9	Bromomethane	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	ug/l	
108-90-7	Chlorobenzene	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/l	
127-18-4	Tetrachloroethene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/l	
79-01-6	Trichloroethene	ND	1.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l	
75-01-4	Vinyl chloride	ND	1.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	2.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
156-69-4	cis-1,2-Dichloroethene	ND	1.0	ug/l	
540-59-0	1,2-Dichloroethene (total)	ND	2.0	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW03-001		
Lab Sample ID:	F582-1	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002006.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	93%		75-125%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW03-001		
Lab Sample ID:	F582-1	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 504.1	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB01844.D	1	04/25/97	NF	n/a	n/a	GAB66
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
106-93-4	1,2-Dibromoethane	ND	0.020	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW03-001		
Lab Sample ID:	F582-1	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
		Percent Solids:	n/a
Project:	Site G300 CTO 0027		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Lead	<0.0030	0.0030	mg/l	1	05/02/97	05/08/97	JK	EPA 239.2

RDL = Reported Detection Limit

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW04-001		
Lab Sample ID:	F582-2	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 8100	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01448.D	1	04/25/97	NF	04/25/97	OP83	GIJ68
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	10	ug/l	
208-96-8	Acenaphthylene	ND	10	ug/l	
120-12-7	Anthracene	ND	10	ug/l	
56-55-3	Benzo(a)anthracene	ND	10	ug/l	
50-32-8	Benzo(a)pyrene	ND	10	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	10	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	10	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	10	ug/l	
218-01-9	Chrysene	ND	10	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	10	ug/l	
206-44-0	Fluoranthene	ND	10	ug/l	
86-73-7	Fluorene	ND	10	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	10	ug/l	
91-20-3	Naphthalene	ND	10	ug/l	
90-12-0	1-Methylnaphthalene	ND	10	ug/l	
91-57-6	2-Methylnaphthalene	ND	10	ug/l	
85-01-8	Phenanthrene	ND	10	ug/l	
129-00-0	Pyrene	ND	10	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	67%		26-116%
84-15-1	o-Terphenyl	97%		26-125%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW04-001		
Lab Sample ID:	F582-2	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	FLORIDA-PRO	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	I01592.D	1	05/02/97	NF	04/30/97	OP89	GIJ73
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	ND	0.50	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	97%		40-140%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW04-001		
Lab Sample ID:	F582-2	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002007.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
75-25-2	Bromoform	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
74-83-9	Bromomethane	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	ug/l	
108-90-7	Chlorobenzene	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	2.2	1.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/l	
127-18-4	Tetrachloroethene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/l	
79-01-6	Trichloroethene	ND	1.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l	
75-01-4	Vinyl chloride	ND	1.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
156-69-4	cis-1,2-Dichloroethene	ND	1.0	ug/l	
540-59-0	1,2-Dichloroethene (total)	ND	2.0	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW04-001		
Lab Sample ID:	F582-2	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002007.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	94%		75-125%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW04-001		
Lab Sample ID:	F582-2	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 504.1	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB01845.D	1	04/25/97	NF	n/a	n/a	GAB66
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
106-93-4	1,2-Dibromoethane	ND	0.020	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	300-MW01-001		
Lab Sample ID:	F582-3	**Date Sampled:**	04/23/97
Matrix:	AQ - Ground Water	**Date Received:**	04/25/97
Method:	EPA 601/602	**Percent Solids:**	n/a
Project:	Site G300 CTO 0027		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF002008.D	1	04/25/97	AW	n/a	n/a	GEF50
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene [a]	8.2	1.0	ug/l	
75-25-2	Bromoform	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
74-83-9	Bromomethane	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	ug/l	
108-90-7	Chlorobenzene	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane [a]	2.1	1.0	ug/l	
75-35-4	1,1-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
100-41-4	Ethylbenzene [a]	11.1	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/l	
127-18-4	Tetrachloroethene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/l	
79-01-6	Trichloroethene	ND	1.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l	
75-01-4	Vinyl chloride	ND	1.0	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ug/l	
1330-20-7	Xylenes (total) [a]	6.7	3.0	ug/l	
156-69-4	cis-1,2-Dichloroethene	ND	1.0	ug/l	
540-59-0	1,2-Dichloroethene (total)	ND	2.0	ug/l	

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound