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SITE ASSESSMENT PLAN FOR SITE 98 WITH TRANSMITTAL CSS PANAMA CITY FL
12/1/1998
BROWN AND ROOT ENVIRONMENTAL

7766-3.5-19



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TtNUS/TLH-98-099/7766/7.3.4

14 December, 1998

Project Number 7766

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Florida Department of Environmental Protection
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Reference: Clean Contract No. N62467-94-D0888
Contract Task Order No. 0047

Subject: Site Assessment Report for Site 98
Coastal Systems Station
Panama City, Florida

Dear Mr. Grabka:

On behalf of the Department of the Navy, Southern Division, Naval Facilities Engineering Command, (SOUTHDIV), Tetra Tech NUS, Inc. is pleased to submit for your review and approval, two copies of the Site Assessment Report (SAR) for Site 98, Coastal Systems Station.

If you have any questions regarding this assessment or require additional information, please contact me at (850) 656-5458.

Very truly yours,

Gerald F. Goode, P.G.
Task Order Manager

GG/gg

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Mr. A. Kendrick

Rev.0
12/14/98

Site Assessment Report

for

Site 98

at

Coastal Systems Station

Panama City, Florida



Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0047

December 1998

**SITE ASSESSMENT REPORT
FOR SITE 98**

**COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA**

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

**Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
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**CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0047**

DECEMBER 1998

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EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (TtNUS) has completed a Site Assessment (SA) at the above-referenced facility in accordance with the requirements of Chapter 62-770, Florida Administrative Code (F.A.C.). The assessment report was submitted to the Florida Department of Environmental Protection (FDEP) for approval.

TtNUS performed the following actions during the SA:

- 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 Site 98 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, collected soil and groundwater samples for field screening of total petroleum hydrocarbons using an organic vapor analyzer;
- Collected groundwater samples from direct push borings for mobile lab screening of DRO-TPH and GRO-TPH constituents;
- Installed shallow permanent monitoring wells to approximately 14 feet below land surface (bls) and a vertical delineation well to approximately 30 feet bls;
- Collected groundwater samples from the permanent monitoring wells for laboratory analysis of Gasoline and Kerosene Analytical Group parameters;
- Collected one soil sample for laboratory analysis of the Gasoline and 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; and
- Performed slug testing on monitoring wells to evaluate the hydraulic conductivity of the surficial aquifer.

Conclusion

Evaluation of soil assessment data indicates that no "excessively contaminated" or "contaminated" soil, as defined by Chapter 62-770.200, F.A.C., is present in vadose zone and

capillary fringe soils. Contaminated soils were removed during the excavation of the underground storage tank (UST).

Volatile organic parameters were detected in groundwater samples collected at the site included 1,1-dichloroethene, 1,1,1-trichloroethane, trichloroethene, and chloroethane. 1,1-dichloroethene. Only 1,1-dichloroethene detected at 11.7 micrograms per liter (ug/L) exceeded the primary drinking water standard maximum contaminant level (MCL) of 7 ug/L. The presence of these constituents is attributed to upgradient point sources for contamination (AOC1 and SWMU9). Groundwater analytical results indicate that dissolved hydrocarbon concentrations meet the criteria established for Monitoring Only for Natural Attenuation, as established in Chapter 62-770.690(e), F.A.C., for Gasoline and Kerosene Analytical Group parameters.

Recommendation

It is recommended that a Monitoring Only Plan for Natural Attenuation be implemented at the site. The Monitoring Only Plan should include one year of monitoring for benzene, toluene, xylenes, total petroleum hydrocarbons (TRPH) and 1,2-dibromoethane (EDB).

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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

A Site Assessment (SA) was conducted by Tetra Tech NUS, Inc. (TtNUS) for the US Navy (Navy) Southern Division Naval Facilities Engineering Command under Contract Task Order 0047, for the Comprehensive Long-term Environmental Action Navy (CLEAN III), Contract Number N62467-94-D-0888. The SA was conducted at Site 98 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 SA was to determine the nature and extent of petroleum hydrocarbon impacted soil and groundwater in accordance with the requirements of Chapter 62-770.600, Florida Administrative Code (F.A.C.). A Tank Closure Assessment, completed in August 1997 for the site's underground storage tank (UST) used to store diesel for on-site heating, identified a discharge of diesel fuel from the UST. A Petroleum Product Contamination Report Form completed by the Navy identified the source of the discharge as overfills and holes in the tank. The Closure Assessment, which includes the Petroleum Product Contamination Report, is provided in Appendix A.

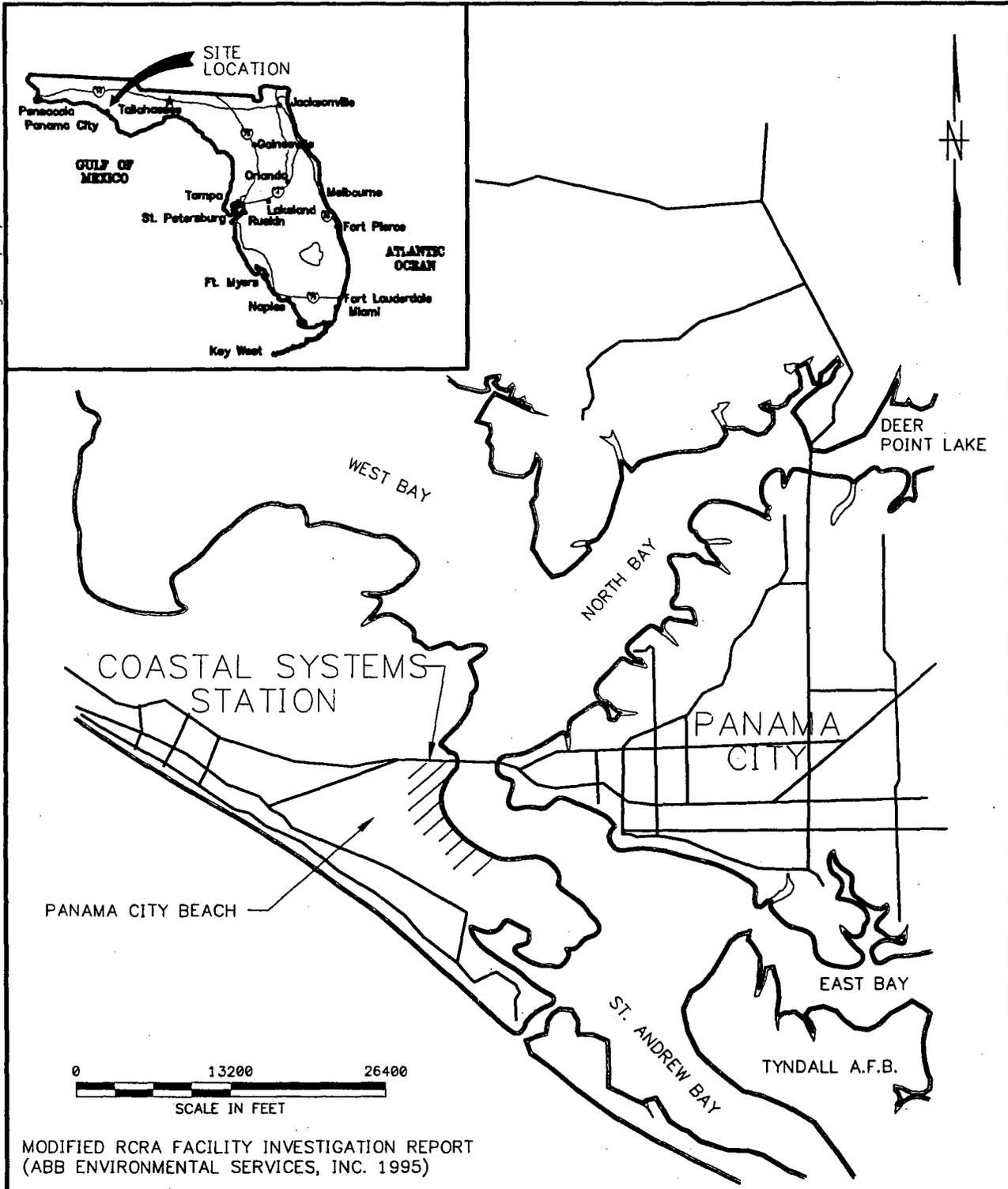
A Site Assessment Report (SAR) Summary Sheet, as required by Chapter 62-770, F.A.C. is included in Appendix B.

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.

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(ABB ENVIRONMENTAL SERVICES, INC. 1995)

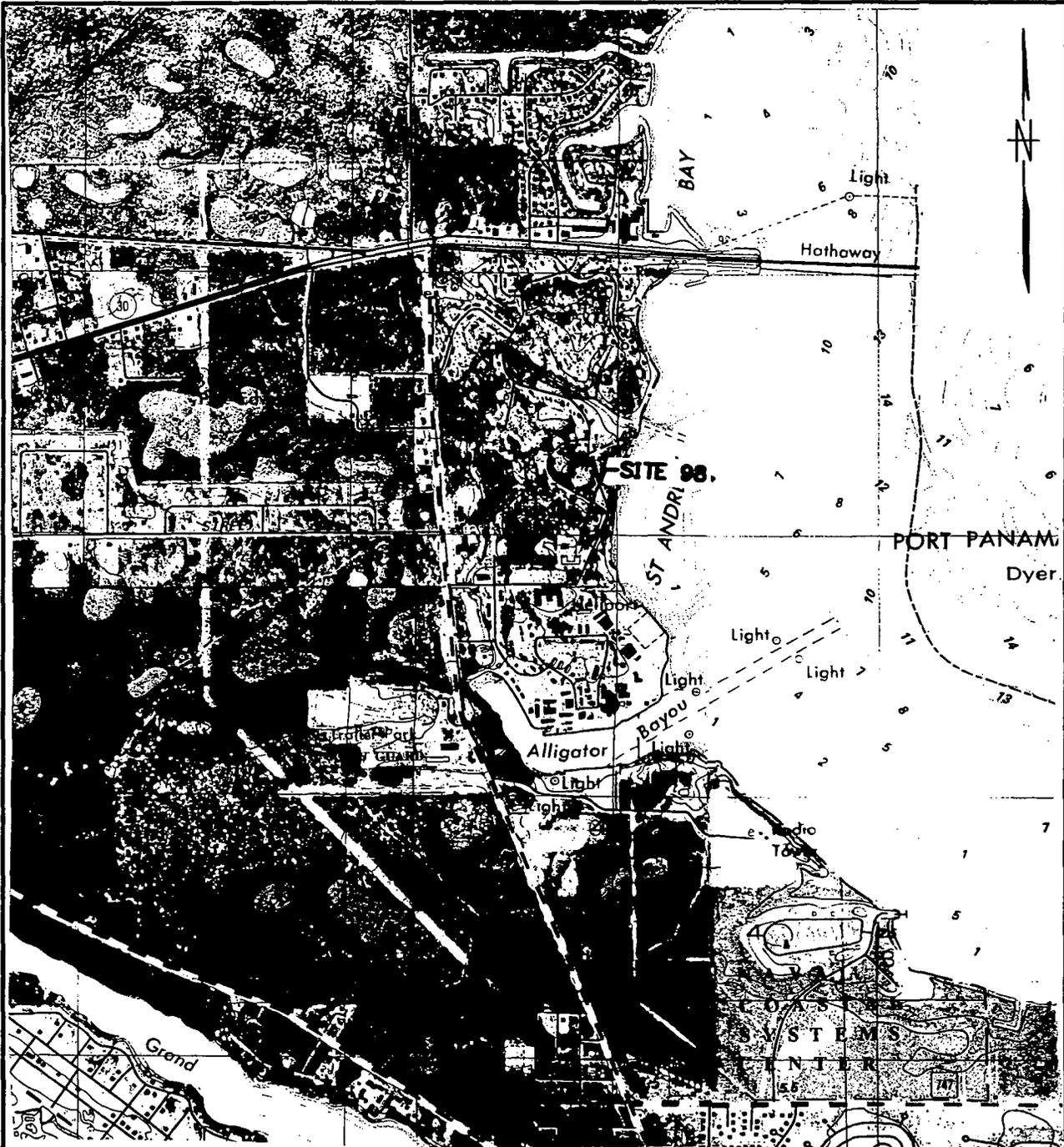
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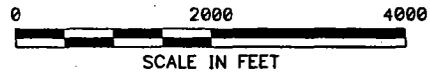
SITE VICINITY MAP
SITE 98
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

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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.

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SITE LOCATION
SITE 98
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

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1.2.2 Topography and Drainage

The topography at the site is relatively flat. The site is located at an elevation of approximately 11 feet above National Geodetic Vertical Datum (NGVD), 1929. Locally, the ground surface gradually grades toward St. Andrew Bay located approximately 450 feet east of the site.

The site is covered by a concrete surface cover providing a physical barrier to the infiltration of rainfall into the subsurface. West of the site, the area is covered by asphalt with a storm drain. The storm drain is located approximately 70 feet southwest of the former UST as shown on Figure 1-3. The nearest surface water body is St. Andrew Bay located approximately 450 feet east of the site. St. Andrew Bay 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).

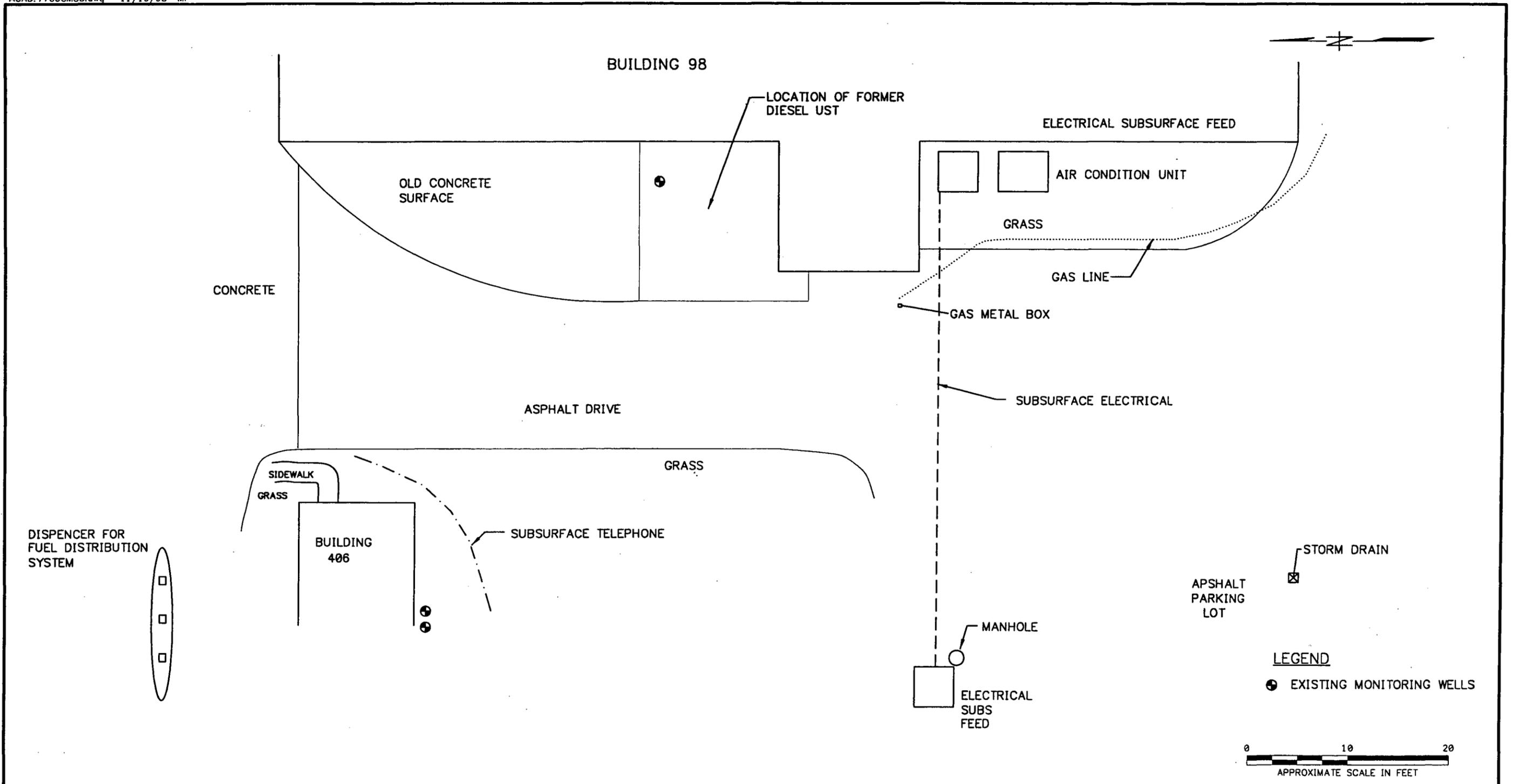
1.2.3 Regional Hydrogeology

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 (Holocene) 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.

Regionally, the Pliocene-age Jackson Bluff Formation underlies the Recent surficial deposits in parts of southwestern Bay County, but is absent in the vicinity of CSS. The Jackson Bluff Formation is composed of calcareous sandy clay and clayey shell marl.

The Intracoastal Formation underlies the surficial deposits at CSS. The Intercoastal Formation is middle Miocene to late Pliocene. The Intracoastal Formation is composed of sand and poorly consolidated limestone interbedded with discontinuous clay and low permeability sandy limestone. This formation is approximately 150 feet thick at CSS Panama City. The lower beds of the Intracoastal Formation are part of the Floridan aquifer system.

As described in the RFI, 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, aquifer discussed in the literature exists in a thin (10 to 25 feet in thickness) permeable



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SITE PLAN
 SITE 98
 COASTAL SYSTEMS STATION
 PANAMA CITY, FLORIDA

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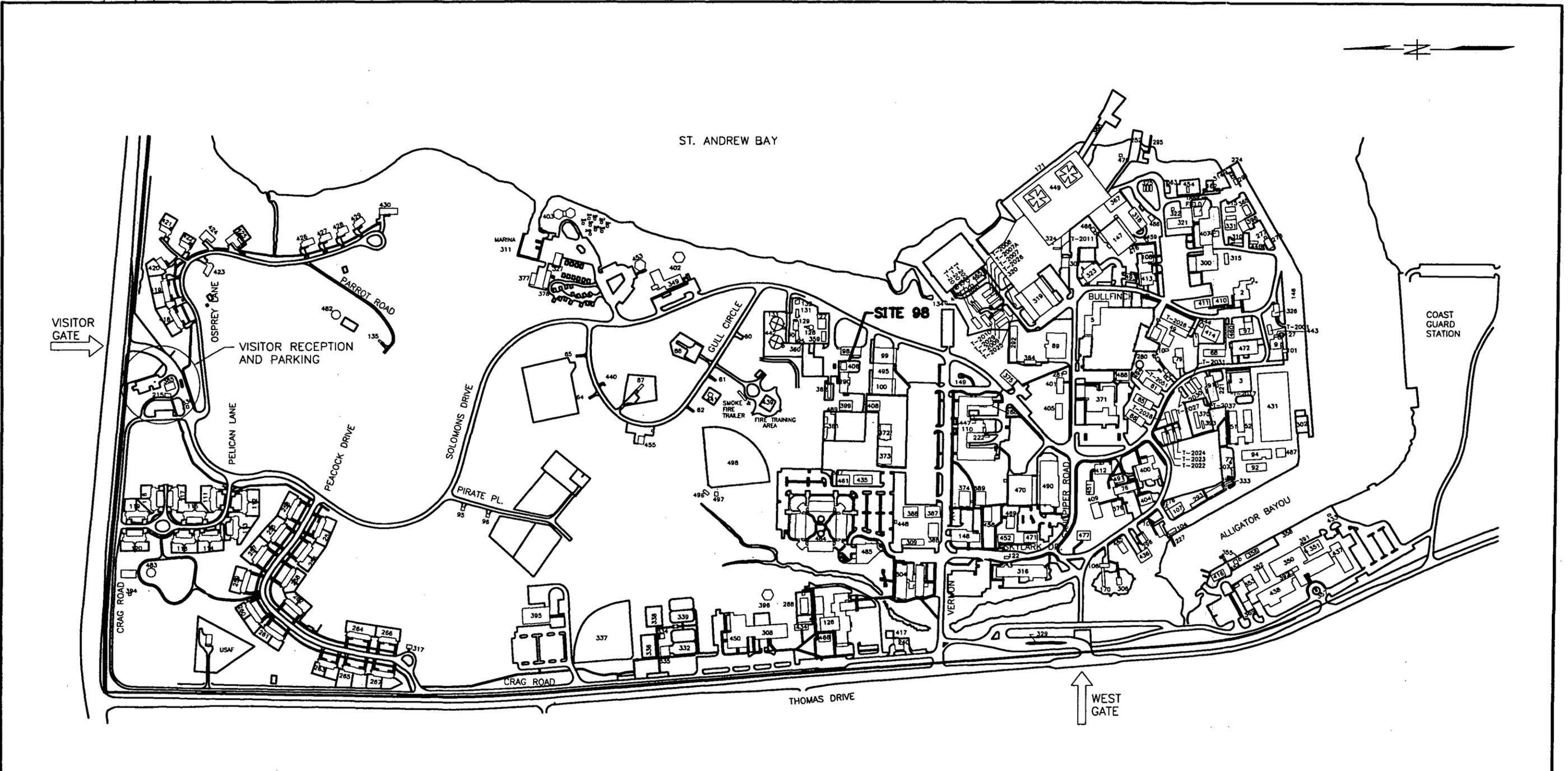
sand and shell zones within the Intracoastal Formation, and is separated from the water table aquifer from the Floridan aquifer system by interbedded low-permeability clay and limestone. Because the Jackson Bluff Formation is absent at CSS, and the low permeability clay lenses in the surficial aquifer and Intracoastal Formation are discontinuous, the surficial aquifer may be hydraulically connected to the Floridan aquifer system through the semiconfining strata of the Intracoastal Formation.

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). The semi-confined aquifer within the Intracoastal Formation does not produce enough water to be considered a significant water source. The Floridan aquifer is capable of yielding water at a rate between 250 and 500 gallons per minute to wells. The potable zone of the Floridan aquifer system is between 250 and 1,000 feet.

1.2.4 Land Use

Site 98 is located in the east central area of the CSS property as shown on Figure 1-4. This area of the base is comprised of research facilities and various support activities. Regulated underground storage tank systems for facilities located adjacent to Building 98 include Site 362 (E.E. Jordan Company, Release Detection Program for Underground Storage Tanks, May 1990). Site 362 is a fuel delivery system consisting of four 12,000-gallon fiberglass USTs. Site 362 currently is used to dispense diesel fuel, JP-5 fuel, and unleaded gasoline. An underground holding tank is used as part of a collection system to contain spills at the delivery system in the event of a surface spill. In December 1996, a Contamination Assessment Report was completed by Brown and Root Environmental in response to a release of unleaded gasoline at the UST fillport. "Excessively contaminated soil" as defined in Chapter 62-770.200(8), F.A.C. was removed from around the fillport. In March 1997, the FDEP issued a No Further Action for the site based on results from subsequent soil and groundwater testing.

Other sources for petroleum hydrocarbon contamination in the immediate study area consist of Solid Waste Management Unit 9 (SWMU-9) and Fire Fighting Training Area No. 1 Area of Concern 1 (AOC 1). Each of these facilities were used for Fire Fighting training where drums of flammable materials, including oily wastes, fuels (diesel, gasoline, and JP-5) and solvents may



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BASE SITE LOCATION MAP
 SITE 98
 COASTAL SYSTEMS STATION
 PANAMA CITY, FLORIDA

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have been disposed and poured on the ground and ignited (ABB Environmental Services, Inc., 1995). SWMU-9 is located approximately 500 feet northwest of Site 98 and AOC 1 is located approximately 300 feet to the west.

1.2.5 Site Description

Building 98 is the Navy Property Disposal Office. Adjacent to the building is Site 98, one 550-gallon unregulated steel UST used for storing diesel fuel for on-site heating. The UST was located on the west side of Building 98 and was in service from approximately 1952 through 1997. The UST was removed on August 8, 1997 and a Tank Closure Assessment was completed. The UST product line was cut, capped, and abandoned in place, where the line entered the building. A site plan is shown as Figure 1-3.

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 that 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 well locations 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.

1.3 SITE HISTORY AND OPERATIONS

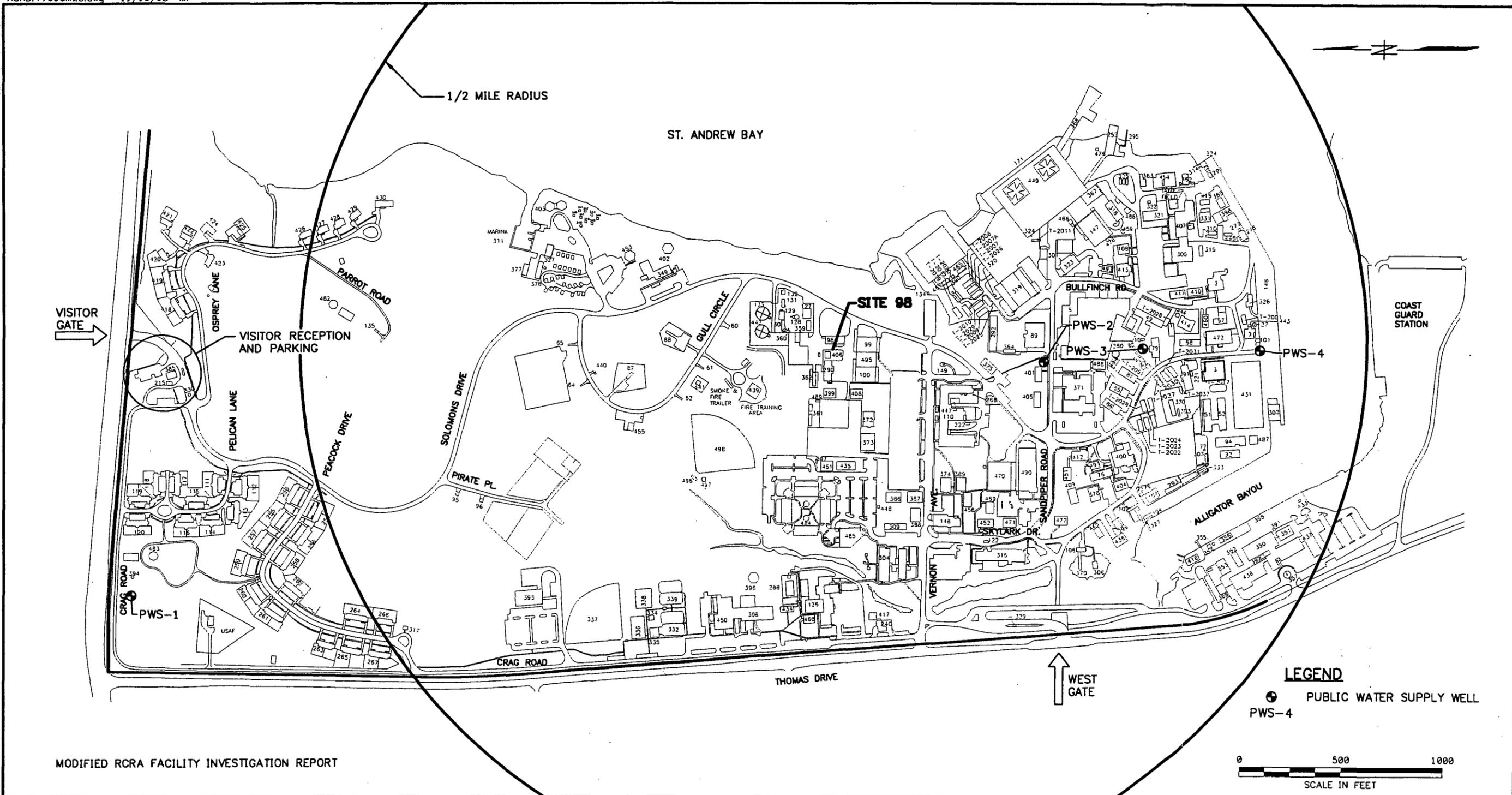
1.3.1 Site History

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).

CSS consists of two operational areas: the laboratory area, located north of Alligator Bayou, which is an inlet to St. Andrew Bay, and covers approximately 360 acres; and the ordnance area, located south of Alligator Bayou and is approximately 360 acres. The laboratory area consists of research facilities and various support activities and tenants. The site is located in the laboratory area and is Navy Property Disposal Office.

1.3.2 Structural Integrity of Tanks and Lines

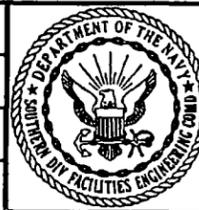
The UST at Building 98 was an unregulated tank and had no structural integrity testing performed on the tank prior to removal. Holes in the tank wall were reported at the time the UST was removed in August 1997. The structural integrity of the UST is described in the Tank Closure Assessment Report provided as Appendix A.



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LOCATION OF PUBLIC WATER SUPPLY WELLS
RCRA FACILITY INVESTIGATION REPORT
SITE 98
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

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1.3.3 Initial Remedial Action

On August 8, 1998, a Closure Assessment was performed by the US Navy, Public Works Center (PWC) Environmental Department of Pensacola, Florida for the site. Six soil borings were installed around the UST and soil samples were collected and screened for organic vapor concentrations using the headspace screening technique. The soil samples were collected at the limits of the excavation and underneath the middle of the UST. The results of the organic vapor field screening indicated "contaminated soil," as defined by Chapter 62-770.200, F.A.C., at the tank bed. Total hydrocarbon vapor concentrations in the soil samples ranged from non-detect to 45 parts per million (ppm). Contaminated soil was encountered during the excavation of the tank. The Tank Closure Assessment reported approximately 2 cubic yards of contaminated soil was removed during the excavation of the UST. The dimension of the excavation was approximately 8 feet wide, 10 feet long and 5 feet deep. The contaminated soil was removed horizontally until hydrocarbon levels in the surrounding soil were less than 50 ppm. A figure showing the location of the soil borings and a table summarizing soil organic vapor analysis (OVA) readings and sample intervals, are included in the Tank Closure Assessment provided in Appendix A.

1.3.4 Previous Investigations

During removal of the UST, the US Navy Public Works Center (PWC) installed a monitoring well adjacent to the tank excavation. The well was completed to allow the well screen to intersect the water table surface. On November 13, 1997, PWC sampled the well and had the groundwater analyzed for volatile content in accordance with Environmental Protection Agency (EPA) Method 8260, for poly aromatic hydrocarbons (PAHs) in accordance with EPA Method 8270, for ethylene dibromide (EDB) content in accordance with EPA Method 504, for lead content in accordance with EPA Method 239.2, and for total petroleum hydrocarbon (TRPH) content in accordance with the State of Florida, Petroleum Range Organics (FL-PRO) method. Analytical results indicate volatile constituents (benzene, ethylbenzene, toluene, and xylenes) EDB, TRPH, and naphthalene above the Groundwater Cleanup Target Levels established in Chapter 62-770.600, F.A.C. Volatile compounds (chlorobenzene, 1,1-dichloroethane, 1,1-dichloroethene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and trichloroethene) and PAH constituents (acenaphthene, fluorene, 1-methynaphthalene, 2-methynaphthalene, and phenanthrene) were also detected in the sample. The groundwater quality results from the Tank Closure Assessment are provided in Appendix A.

2.0 SUBSURFACE INVESTIGATION METHODS

2.1 QUALITY ASSURANCE

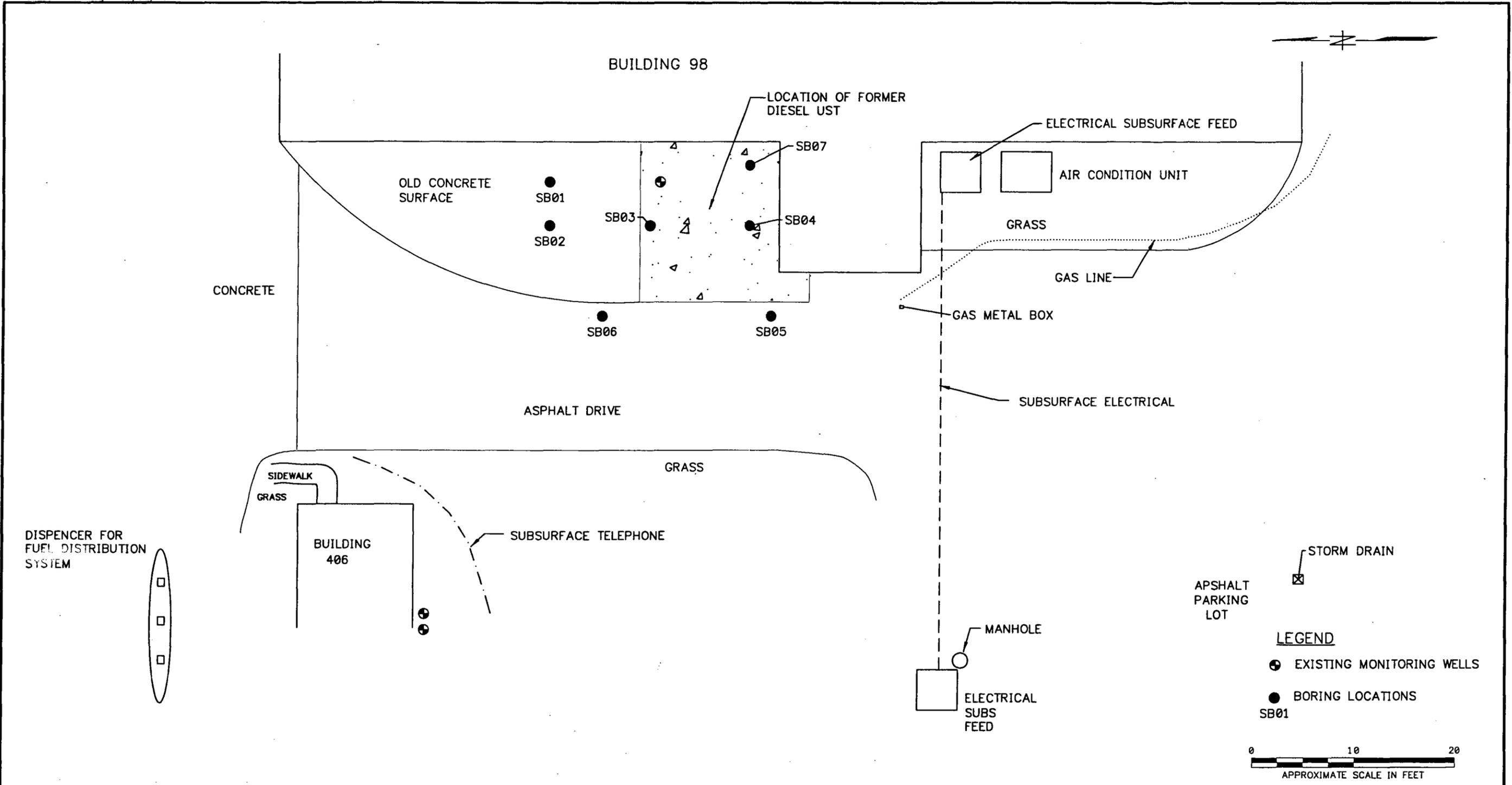
The site investigation was conducted in accordance with the Standard Operating Procedures prescribed by the FDEP Quality Assurance Section Document DER-001/92, and adopted by the TtNUS' Comprehensive Quality Assurance Plan (CQAP) Number 980038.

2.2 DIRECT-PUSH SOIL BORING PROCEDURES

TtNUS conducted a soil vapor assessment at the site on May 19, 1998. Seven soil borings (SB01 through SB07) were advanced in the immediate area surrounding the former diesel UST location. 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 advanced using three-foot long stainless steel split barrel samplers lined with plastic sleeves. The samples were collected at two-foot intervals from the ground surface until the water table was encountered. Grab soil samples were collected using a hand auger at SB07 since truck access was limited by the building. Wet soils were present at depths ranging from approximately 6 to 7 feet bls. Each boring was abandoned by filling the boring annulus with Type I Portland cement. Soil boring locations and the boring completion depths are summarized on Figure 2-1 and Table 2-1, respectively. Soil boring logs are provided in Appendix C.

Prior to the advancement of the soil probe at each boring location, the probe was decontaminated according to TtNUS'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 62-770.600(8) F.A.C. This method of headspace screening is presented in detail in Appendix D. Headspace concentrations from soil vapor analysis are summarized in Table 2-1.

Soil cuttings generated from the direct-push soil borings were placed in a 55-gallon steel drum. A composite soil sample was collected from the drum and analyzed by USEPA Methods SW-846 8021B (volatile organic hydrocarbons and volatile organic aromatics), 8310/FLPRO (polynuclear



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AS NOTED



SOIL BORING LOCATION MAP
SITE 98
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

CONTRACT NO. 7766	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 2-1	REV. 0

TABLE 2-1
SOIL VAPOR MEASUREMENTS
Coastal Systems Station Site 98
Panama City, Florida
FDEP FACILITY No. 038518667

Soil Boring No.	Date of Measurement	Sample Interval (feet bls)	Headspace Readings (ppm)		
			Total Organic Reading	Carbon Filtered Reading	Net Reading
SB01	05-19-98	2	ND	ND	ND
		4	ND	ND	ND
		6	ND	ND	ND
SB02	05-19-98	2	ND	ND	ND
		4	ND	ND	ND
		6	ND	ND	ND
SB03	05-19-98	2	ND	ND	ND
		4	ND	ND	ND
		6	ND	ND	ND
SB04	05-19-98	2	ND	ND	ND
		4	ND	ND	ND
		6	ND	ND	ND
SB05	05-19-98	2	ND	ND-	ND
		4	4	ND	4
		6	ND	ND	ND
SB06	05-19-98	2	ND	ND	ND
		4	ND	ND	ND
		6	ND	ND	ND
SB07	05-19-98	2	ND	ND	ND
		4	ND	ND	ND
		6	ND	ND	ND

bls below land surface
ppm part per million equivalent methane
ND not detected

Wet soils encountered at 7 feet bls.

aromatic hydrocarbons and total recoverable petroleum hydrocarbons), 9020M (total halides), and 6010A and 7471A (eight 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 E.

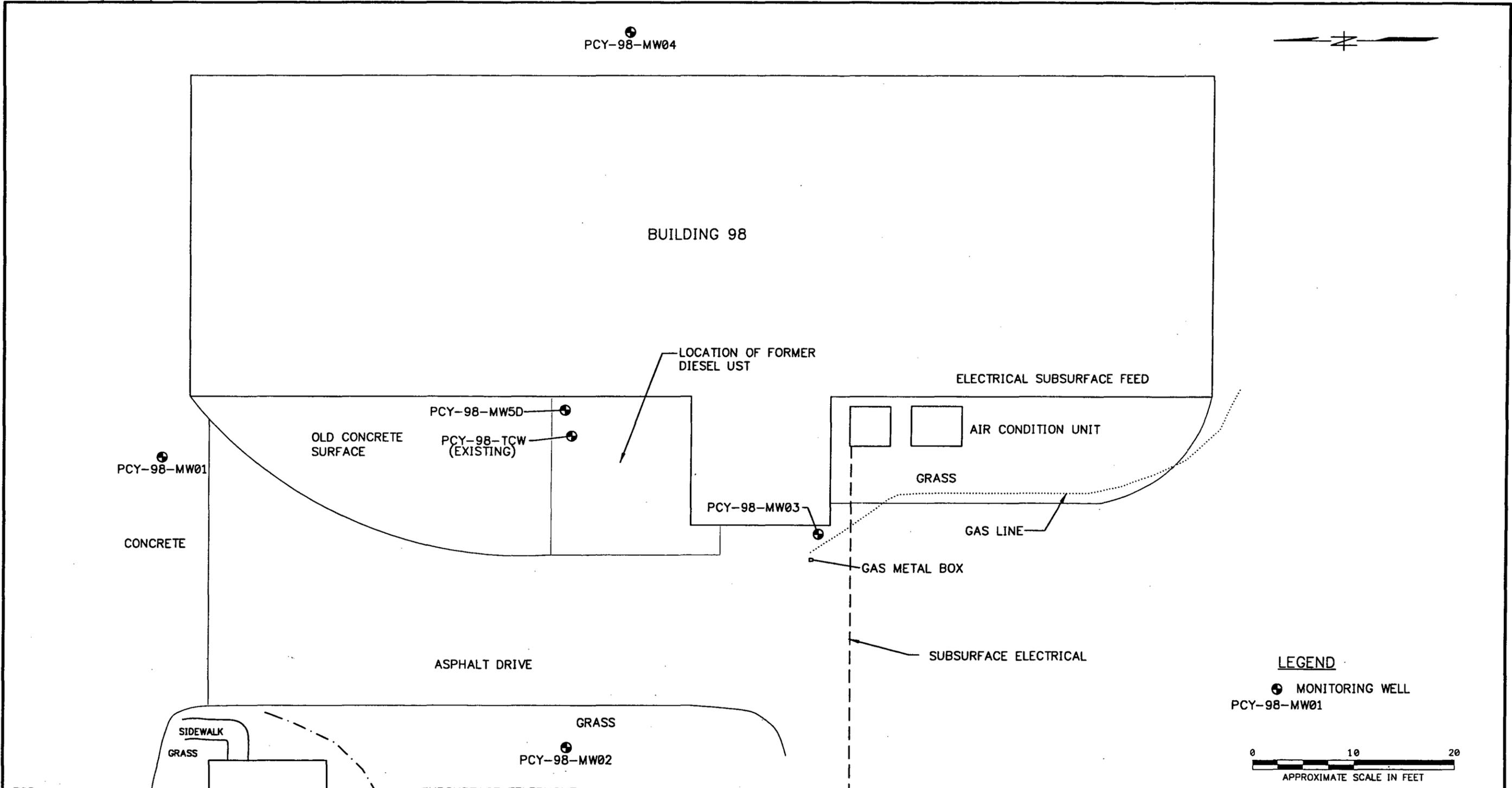
Rinsate water from the decontamination of sampling equipment was containerized in 55-gallon drums and will be removed for proper disposal by a Florida-licensed waste hauler.

2.3 MONITORING WELL CONSTRUCTION

On September 15 through September 16, 1998, five borings were drilled by Environmental Drilling Services under the supervision of a TtNUS geologist. The borings were advanced to facilitate monitoring well installations PCY-98-MW01, PCY-98-MW02, PCY-98-MW03, PCY-98-MW04, and PCY-98-MW5D. The locations of the monitoring wells are provided on Figure 2-2. Monitoring wells PCY-98-MW01 through PCY-98-MW04 were screened to intersect the water table. Monitoring well PCY-98-MW5D was installed as a vertical delineation well and contains a 5-foot screen interval. The screen interval for the vertical delineation well was placed at a depth approximately 20 feet into the water table. Monitoring well placements were selected based on groundwater field screening data and groundwater flow direction. The wells were located 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.

The monitoring wells were installed using a BK81 Mobile drill rig and 4 1/4-inch ID hollow-stem augers. Each well was constructed of 2-inch ID, threaded, schedule 40 polyvinyl chloride (PVC) solid riser and 0.010-inch slot well screen with silt trap and well bottom cap. The shallow monitoring wells were installed to approximately 14 feet bls and was completed with a 10 foot screen section. Each annulus was filled to approximately 1 foot above the well screen with US Standard Sieve size 20/30 silica sand. A 1.5-foot inch layer of bentonite pellets was placed above the sand pack and hydrated. The remainder of the annulus was grouted to the surface. The vertical delineation well was installed to approximately 30 feet bls and was completed with a 5 foot screen section. The annulus was filled to approximately 2.5 feet above the well screen with 20/30 silica sand. A 2-foot thick fine sand seal of US Standard Sieve size 30/65 was placed above the 20/30 silica sand. The remainder of the boring was tremie grouted to the surface.

Each well is secured with a locking, watertight 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



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MONITORING WELL LOCATION MAP
SITE 98
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

CONTRACT NO. 7766	
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APPROVED BY	DATE
DRAWING NO. FIGURE 2-2	REV. 0

completion logs are provided in Appendix F.

Each well was developed using a suction 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 $\pm 0.05^{\circ}\text{C}$, pH ± 0.1 unit, and specific conductance ± 10 umhos/cm. The wells were developed under the supervision of a geologist.

All development water and soil cuttings generated during monitoring well installations were containerized in 55-gallon steel drums and will be disposed of by a Florida licensed waste hauler.

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. Soil boring logs are included as Appendix C.

2.5 SOIL VAPOR ANALYSIS

Headspace analysis was conducted on soil samples collected during the soil vapor assessment using an OVA-FID. The soil vapor analysis was performed according to the headspace method prescribed in Chapter 62-770.200(8) F.A.C. 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 D.

2.6 SOIL SAMPLING

Each split spoon sample (plastic sleeve sampler) collected during the direct-push investigation was immediately capped after a portion of the sampler was removed for OVA field screening. Prior to capping the sample, the plastic sleeve was cut to remove the section of the sample sleeve where the soil had been removed for the OVA field screening. A plastic cap was inserted on the ends of the sample sleeve to prohibit headspace inside the sampler. The sample was immediately placed on ice. Based on OVA field screening data, grab samples with high, medium,

and low vapor concentrations were to be collected to confirm the screening results. However, since one sample from the OVA field screening exhibited vapor readings (low-level vapor readings) one representative grab sample was retained for laboratory analysis. The soil sample was analyzed for parameters in the Gasoline and Kerosene Analytical Groups as in accordance with Chapter 62-770.600(e), F.A.C. sampling requirements.

A soil sample for laboratory analysis was collected at boring SB05 at a depth of 5-7 feet bls and analyzed by SW-846 Method 8021B for volatile organic aromatics (BTEX and MTBE), SW-846 Method 8310 for polynuclear aromatic hydrocarbons (PAHs) and total recoverable petroleum hydrocarbon (TRPH) by the FLPRO analytical method. The sample was collected to confirm the presence of petroleum-related compounds. The laboratory data reports are included in Appendix G.

2.7 HYDROLOGIC INVESTIGATION

2.7.1 Water Level Measurements

The depths to groundwater in monitoring wells PCY-98-MW01, PCY-98-MW02, PCY-98-MW03, PCY-98-MW04, PCY-98-MW5D, and PCY-98-TCW were collected on September 22, 1998 and November 6, 1998. 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 H.

TtNUS surveyed the elevation of the north rim for each top of well casing to the nearest 0.01 foot relative to a benchmark datum established near the site. The benchmark was established using the top of well casing for PCY-13-9I located adjacent to the study area. The top of well casing for PCY-13-9I is 15.10 feet NGVD (ABB Environmental Services, Inc., 1995). An auto-level transit and surveying rod were used to survey the casing elevations. Surveying measurements are presented in Appendix I. The water table elevation was calculated by subtracting the depth to water from the top of casing elevation.

2.7.2 Aquifer Characteristics

On September 21, 1998, TtNUS performed aquifer slug tests on monitoring wells PCY-98-MW01, PCY-98-MW03, and PCY-98-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 J.

2.7.3 Groundwater Flow Velocity and Transmissivity

The horizontal groundwater gradient across the site was evaluated from water level measurements collected on September 22, 1998. 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 K.

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:

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

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 K.

2.7.4 Tidal Influence Survey

A tidal survey was conducted during the RFI to determine if the potentiometric surface at locations close to St. Andrew Bay 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. Monitoring Wells PCY-13-7S and PCY-13-5S were selected at AOC1 to evaluate the effects of tidal influence near St. Andrew Bay. PCY-13-7S and PCY-13-5S are located approximately 200 feet and 320 feet west of St. Andrew Bay, respectively. One monitoring well from each location was selected based on proximity to the bay or bayou, where tidal influence is a maximum, and the second was chosen at a distance inland, where tidal influence is reduced.

2.8 WATER SAMPLING

2.8.1 Free Product Sampling

Prior to groundwater sampling on September 22, 1998, and during the collection of water level measurements on November 6, 1998, each well was checked 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.

2.8.2 Groundwater Sampling Direct-Push Investigation

During the direct-push field investigation, groundwater samples were collected for field mobile lab screening at soil boring locations SB02, SB03, SB04, SB05, and SB06. At boring locations SB02, SB04, SB05, and SB06, the borings were advanced into the top of the saturated zone and groundwater samples were collected at 7 feet bls for mobile laboratory screening. These samples were collected to evaluate petroleum hydrocarbon concentrations in the upper portion of the surficial aquifer near the location of the former UST. At boring SB03 groundwater samples were collected at a depth of 30 feet bls, to evaluate the vertical migration of petroleum hydrocarbons. 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 new Teflon 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 and TPH-GRO 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 L.

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. TtNUS personnel collected groundwater samples from wells PCY-98-MW01, PCY-98-MW02, PCY-98-MW03, and PCY-98-MW04 on September 22, 1998. The groundwater samples were analyzed using USEPA Method 200.7 for lead (unfiltered), USEPA Method 504.1 for gas chromatograph (GC) extractable volatile organics (1,2-dibromoethane or EDB), USEPA SWS Method 846 8021B for GC purgeable halocarbons, and GC purgeable aromatics (benzene, toluene, ethylbenzene, xylenes, and methyl-tert butyl ether), USEPA SWS Method 846 8310 for GC PAHs, and FL PRO analytical method for TRPH. The groundwater samples were collected using new Teflon tubing and a peristaltic pump. Approximately five well volumes of groundwater were removed from each well using the peristaltic pump and Teflon tubing. Temperature, pH,

specific conductance measurements, and well purge volumes were recorded at the time of sample collection and are provided in Appendix H. 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 TtNUS' 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 M.

3.0 RESULTS OF INVESTIGATION

3.1 SITE HYDROGEOLOGY

3.1.1 Lithology

The site is underlain by sediments composed predominately of fine to medium grained sand with little to no fines. From near surface to approximately 8 feet bls, the sediments are generally orange and light brown sand. Underlying these sediments are black and dark gray sands to at least 30 feet bls, the maximum depth drilled during the site assessment investigation. A geologic cross-section location is provided as Figure 3-1. Cross-section A-A' is illustrated on Figure 3-2. Soil boring logs are included as Appendix C.

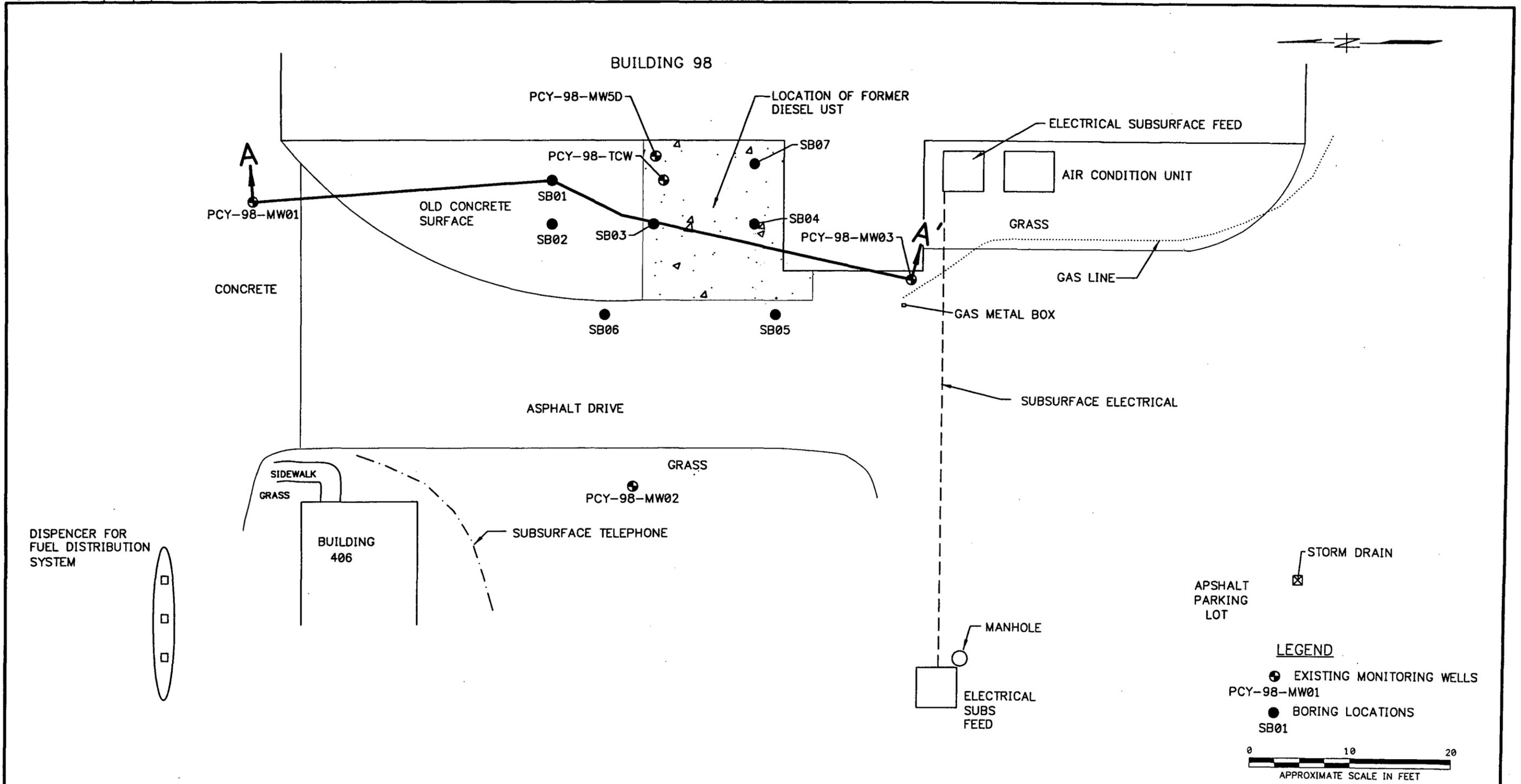
3.1.2 Aquifer Characteristics and Classification

Based on water level data collected from site monitoring wells on September 22, 1998 and November 6, 1998, the depth to the surficial aquifer across the study area is approximately 4 to 6 feet bls. The groundwater level measurements are presented in Table 3-1. The water level measurement field forms are provided in Appendix H. 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-98-MW01, PCY-98-MW03, and PCY-98-MW04 were used to estimate the hydraulic conductivity of the surficial aquifer at Building 98. The geometric mean hydraulic conductivity for the surficial aquifer was estimated 2.09 ft/day as shown by the hydraulic conductivity calculations provided in Appendix K.

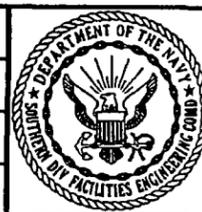
Using the groundwater flow gradient equation presented in Section 2.7.3, a hydraulic gradient of 0.008 feet/foot to the east was calculated from the data collected on September 22, 1998. This groundwater flow direction is consistent with the groundwater flow direction for water elevation measurements collected on November 6, 1998. The groundwater flow direction for September 22, 1998, and November 6, 1998, are provided on Figures 3-3 and 3-4, respectively.

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



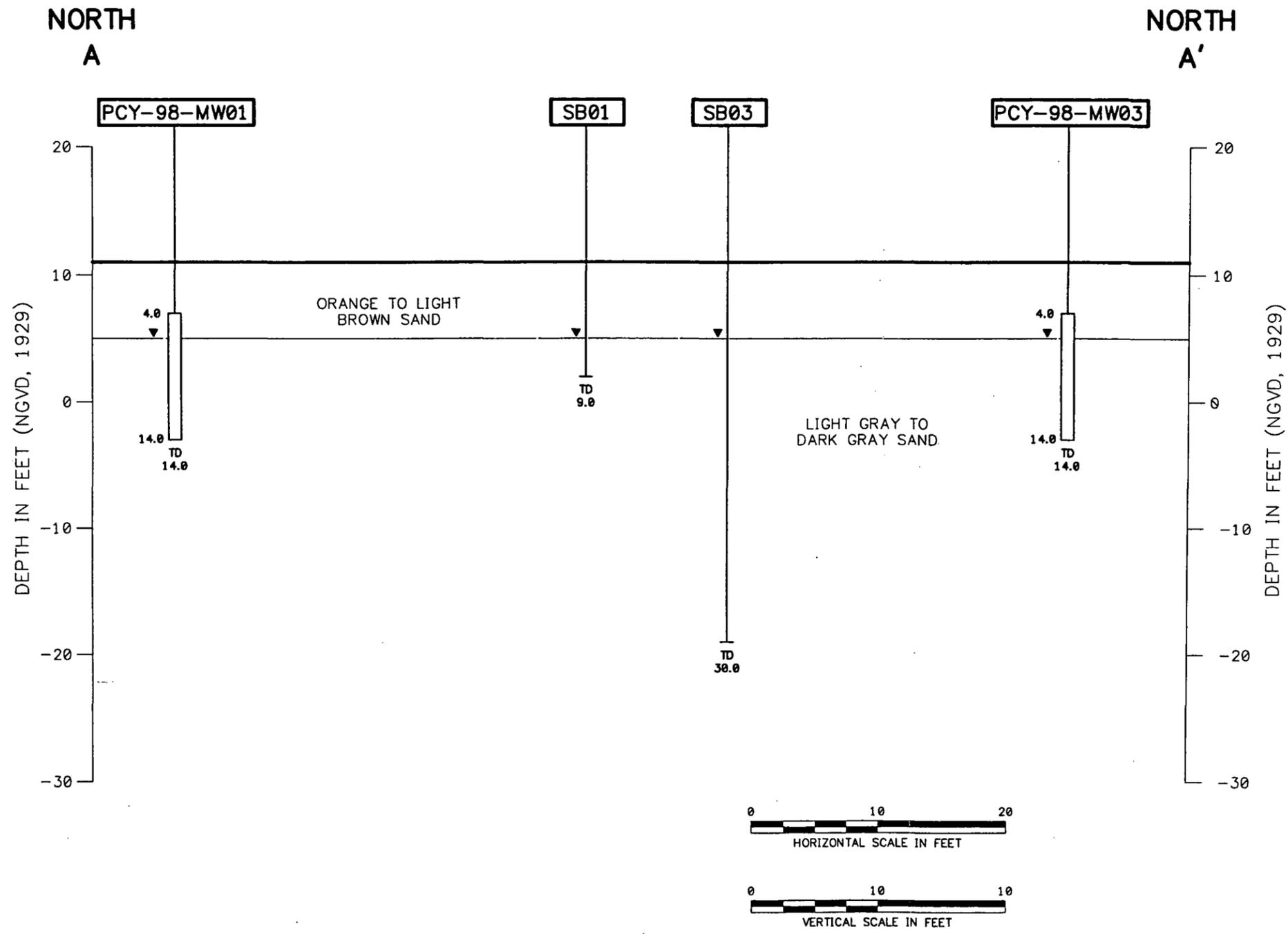
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DRAWN BY MF	DATE 11/16/98
CHECKED BY JG	DATE 11/16/98
COST/SCHED-AREA	
SCALE AS NOTED	



GEOLOGIC CROSS SECTION LOCATION A-A'
SITE 98
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

CONTRACT NO. 7766	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3-1	REV. 0



LEGEND

MONITORING WELL OR BORING NUMBER **PCY-98-MW01**

GROUND SURFACE

GROUND SURFACE

GROUNDWATER ELEVATION

LITHOLOGIC CONTACT (DASHED WHERE INFERRED)

TOP OF MONITORED INTERVAL (FT BGS) 4.0

BOTTOM OF MONITORED INTERVAL (FT BGS) 14.0

TOTAL DEPTH OF WELL OR BORING (FT BGS) TD 14.0

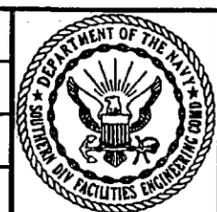
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY **MF** DATE **11/17/98**

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SCALE **AS NOTED**



**GEOLOGIC CROSS SECTION
A-A'
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA**

CONTRACT NO. 7766	
APPROVED BY _____	DATE _____
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DRAWING NO. FIGURE 3-2	REV. 0

**TABLE 3-1
DEPTH TO GROUNDWATER MEASUREMENTS
Site 98
Coastal Systems Station, Panama City, Florida
FDEP Facility No. 038518667**

Monitoring Well ID	Date Collected	Top of Well Casing Elevation (feet NGVD)	Free Product Thickness (feet)	Depth to Water (feet below TOC)	Water Table Elevation (feet NGVD)	Well Screen Interval (feet bls)
PCY-98-MW01	9/22/98	11.61	0.00	4.62	6.99	4 to 14
	11/6/98					
PCY-98-MW02	9/22/98	11.27	0.00	4.01	7.26	4 to 14
	11/6/98					
PCY-98-MW03	9/22/98	11.27	0.00	4.18	7.09	4 to 14
	11/6/98					
PCY-98-MW04	9/22/98	11.38	0.00	4.75	6.63	4 to 14
	11/6/98					
PCY-98-MW5D	9/22/98	11.57	0.00	5.85	5.72	25 to 30
	11/6/98					
PCY-98-TCW	9/22/98	11.55	0.00	4.56	6.99	3 to 13
	11/6/98					

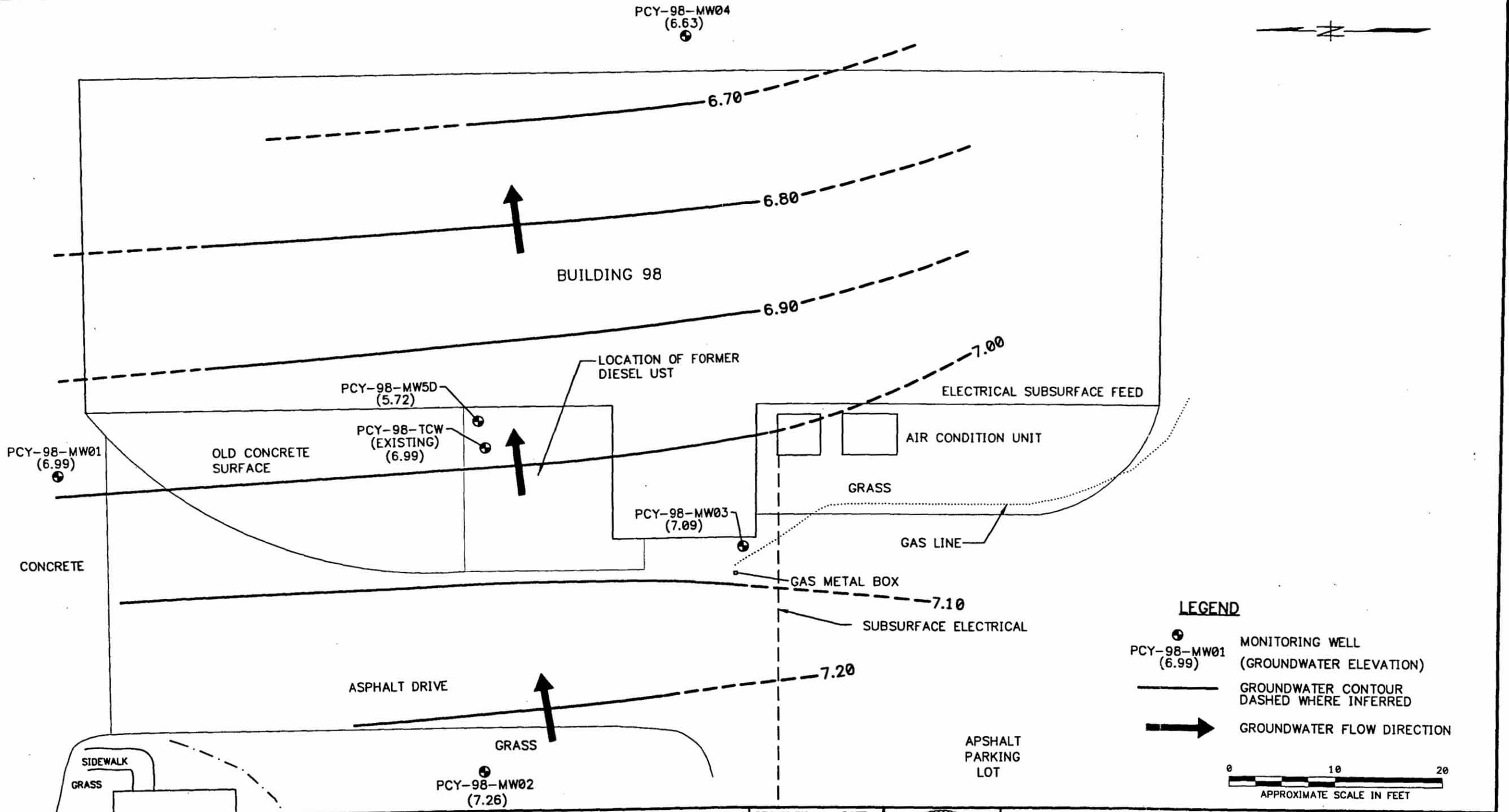
Note

bls = below land surface

ID = identification

NGVD = elevation relative to the National Geodetic Vertical Datum 1929

TOC = top of well casing



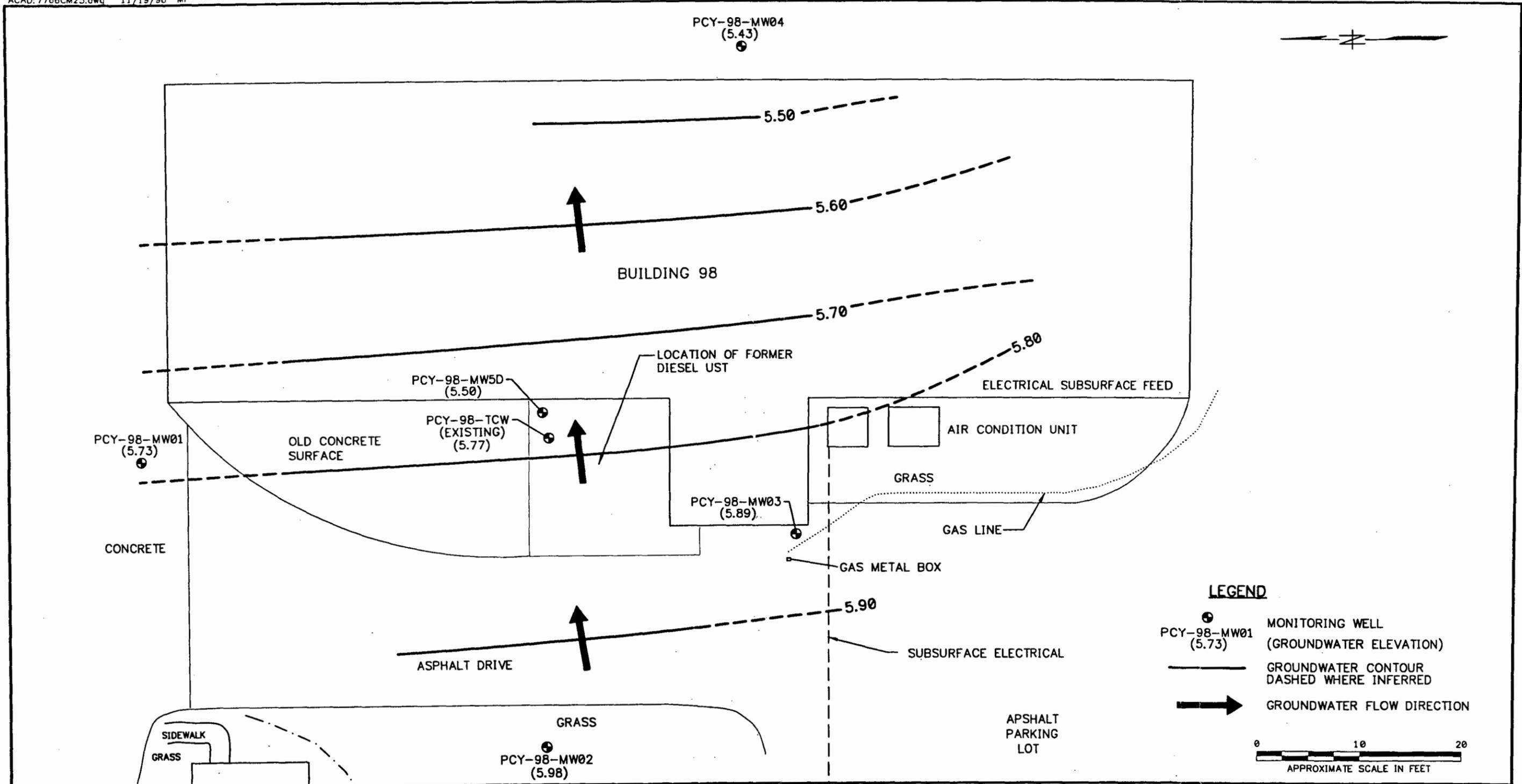
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

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 CHECKED BY JG 11/16/98
 COST/SCHED-AREA
 SCALE AS NOTED



GROUNDWATER ELEVATION CONTOUR MAP
 SEPTEMBER 22, 1998
 SITE 98
 COASTAL SYSTEMS STATION
 PANAMA CITY, FLORIDA

CONTRACT NO. 7766	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3-3	REV. 0



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY
MF 11/16/98
DATE

CHECKED BY
JG 11/16/98
DATE

COST/SCHED-AREA

SCALE
AS NOTED



GROUNDWATER ELEVATION CONTOUR MAP
NOVEMBER 6, 1998
SITE 98
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

CONTRACT NO. 7766	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3-4	REV. 0

Using a hydraulic conductivity of 2.09 feet/day, the hydraulic gradient of 0.008feet/foot, an inferred effective porosity value of 0.30, and Darcy's Equation as stated in Section 2.7.3, the groundwater seepage velocity across the site was calculated at 0.05 feet/day in a eastly direction. The transmissivity of the surficial aquifer was calculated at 1.19×10^2 ft²/day. Groundwater gradient and transmissivity calculations are included in Appendix K.

A component of vertical groundwater flow is evident at the site based on difference in the water elevations between PCY-98-TCW and PCY-98-MW5D. These monitoring wells were installed as a cluster and are screened over a different depth interval of the surficial aquifer. The difference in water elevations between the two wells on September 22, 1998 and November 6, 1998 was 1.27 feet and 0.27 feet, respectively.

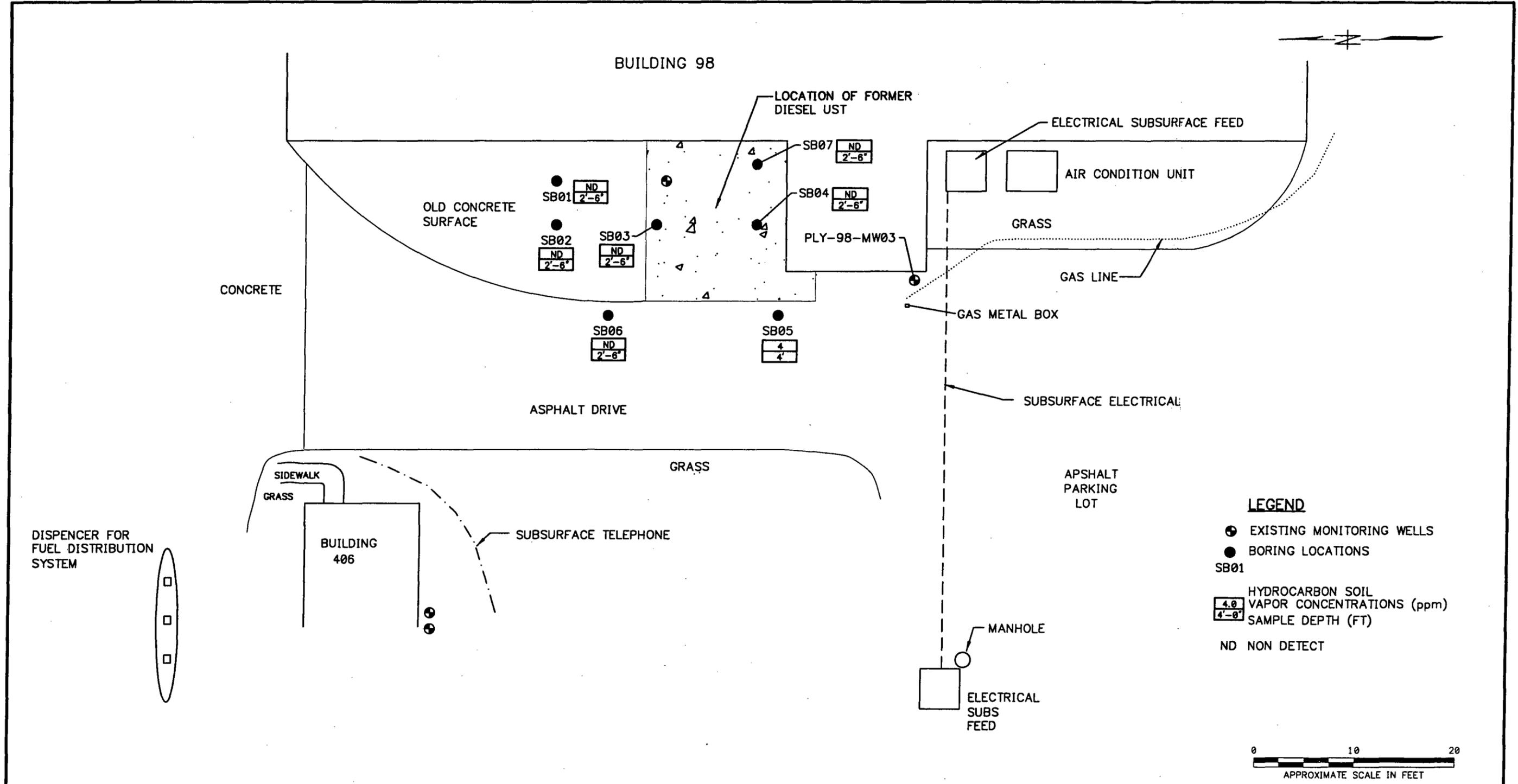
3.1.3 Tidal Influence

Results of the tidal survey indicated the influence on groundwater level due to tidal fluctuation is limited to a distance from the shoreline of less than 320 feet in the area of AOC1 on St. Andrew Bay, and less than 200 feet at SWMU1 and AOC2 on Alligator Bayou. The distance at which tidal influence would affect groundwater flow was identified at a distance less than 200 feet from the bay, and less than 40 feet on the bayou (ABB Environmental Services Inc., 1995). Since the site is located approximately 450 feet west of St. Andrew Bay, and approximately 2,200 feet north of Alligator Bayou, significant tidal influence is not expected at the site.

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 as described in Section 2.2. of this report. The highest soil vapor concentration was 4 parts per million (ppm) detected at 4 feet bls at boring SB05. The soil vapor concentration data indicate that no "excessively contaminated" soil (greater than 50 ppm OVA response as defined by Chapter 62-770.200, F.A.C.) or "contaminated soil" (greater than 10 ppm) was identified in the soil borings conducted in the immediate vicinity of the former UST. Soil vapor screening results are presented in Table 2-1. Soil boring locations and vapor readings are depicted on Figure 3-5.

Soil sample SB05-SS-0405 was collected at boring SB05 at a depth of 4 to 5 feet bls to confirm petroleum concentrations at the location where the highest vapor concentration was detected. At a sample interval of 4 to 5 feet bls, the sample was collected at the capillary fringe and into the



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE		SOIL HYDROCARBON VAPOR CONCENTRATION MAP MAY 15, 1998 SITE 98 COASTAL SYSTEMS STATION PANAMA CITY, FLORIDA	CONTRACT NO. 7766			
							MF	11/17/98			APPROVED BY	DATE		
							JG	11/17/98			APPROVED BY	DATE		
							SCALE	AS NOTED			DRAWING NO.	REV.		
											FIGURE 3-5	0		

water table. The laboratory results of the soil sample reported all petroleum constituents below the laboratory detection limits. Soil quality data is summarized on Table 3-2. Soil laboratory data sheets are included in Appendix G.

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 SB02, SB03, SB04 SB05, and SB06. The TPH-DRO concentrations ranged from 7.48 milligrams per liter (mg/L) at SB05 to 2960 mg/L at SB02. A TPH-GRO concentration of 90 mg/L was detected in the sample collected from SB05. TPH-GRO concentrations in groundwater samples from the remaining soil borings were below method detection limits. TPH-DRO and TPH-GRO concentrations in groundwater are summarized in Table 3-3 and are illustrated on Figure 3-6.

Groundwater laboratory results from samples collected from monitoring wells on September 22, 1998 reported the following:

Benzene concentrations were detected in the groundwater samples collected from PCY-98-MW01, PCY-98-MW02, PCY-98-MW04 and PCY-98-TCW. The benzene concentrations ranged from 1.1 ug/L in PCY-98-MW01, to 2.1 ug/L in PCY-98-MW04. These concentrations are above the 1 ug/L benzene Groundwater Cleanup Target Level for Resource Protection/Recovery established in Chapter 62-770.600, F.A.C. (FDEP Groundwater Cleanup Target Level). The areal distribution of dissolved benzene is provided on Figure 3-7.

Toluene was reported in the groundwater samples collected from PCY-98-TCW, PCY-98-MW02, and PCY-98-MW04. Toluene concentrations in these wells ranged from 17.1 ug/L to 60.1 ug/L. The FDEP Groundwater Target Cleanup Level is 40 ug/L. The areal distribution of dissolved toluene is presented on Figure 3-8.

Ethylbenzene was reported in the groundwater samples collected from PCY-98-MW01, PCY-98-MW02, PCY-98-MW04, and PCY-98-TCW. The ethylbenzene concentrations in these wells ranged from 5.1 ug/L to 27.8 ug/L. These concentrations are below the 30 ug/L ethylbenzene FDEP Groundwater Cleanup Target Level.

Total xylenes were detected in the groundwater from samples collected from PCY-98-MW01, PCY-98-MW02, PCY-98-MW04, and PCY-98-TCW. The total xylenes concentrations in these

**TABLE 3-2
SUMMARY OF SOIL QUALITY:
SELECTED PARAMETERS FROM THE KEROSENE
ANALYTICAL GROUP
Site 98
Navy Coastal Systems Station, Panama City, Florida
FDEP ID No. 038518667**

Soil Boring Location	Date Sampled	Sample Depth (feet bls)	Total VOA (µg/kg)	TPH (mg/kg)	Chrysene (µg/kg)	Fluor-anth (µg/kg)	Naph (µg/kg)	Benzo(a) anth (µg/kg)	Benzo(a) pyrene (µg/kg)	Benzo(b) fluoran (µg/kg)	Benzo (k) fluor (µg/kg)	Benzo (ghi) (µg/kg)	Indeno (1,2,3,-cd) (µg/kg)	Phenan-threne (ug/kg)	Pyrene (µg/kg)
SSB05	5-19-98	5-7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

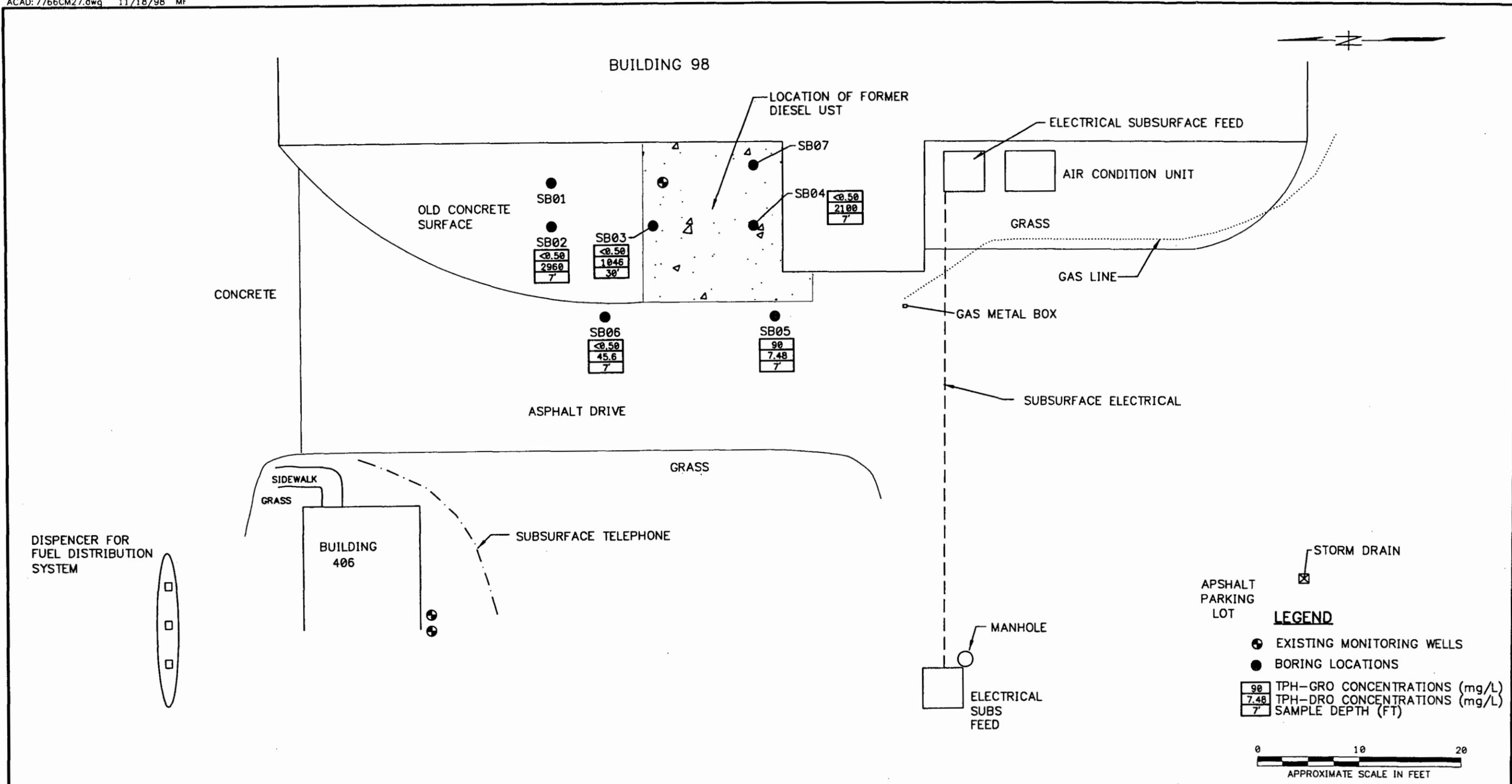
Total VOA sum of benzene, toluene, ethylbenzene and xylenes concentrations
 TPH total recoverable petroluem hydrocarbons
 Fluor fluorene
 Fluor-anth fluoranthene
 Napth naphthalene
 Benzo (a) anth benzo(a)anthracene
 Benzo (b) fluoran benzo(b)fluoranthene
 Benzo (k) fluor benzo(k)fluoranthene
 Benzo (g,h,i) benzo(g,h,i)perylene
 Indeno (i,2,3-c,d) indeno(1,2,3-cd)pyrene

ug/kg concentrations reported in micrograms per kilogram
 mg/kg concentrations reported in milligrams per kilogram

TABLE 3-3
SUMMARY OF FIELD SCREENING GROUNDWATER ANALYSIS
Navy Coastal Systems Station
Site 98
Panama City, Florida
FDEP FACILITY No. 038518667

Soil Boring Location	Sample Identification	Sample Date	Sample Depth (feet bls)	TPH-GRO (mg/L)	TPH-DRO (mg/L)
SB02	98-GWSB02-7	5-19-98	7	<0.50	2960
SB03	98-GWSB03-30	5-19-98	30	<0.50	1046
SB04	98-GWSB04-7	5-19-98	7	<0.50	2100
SB05	98-GWSB05-7	5-19-98	7	90	7.48
SB06	98-GWSB06-7	5-19-98	7	<0.50	45.6

bls = below land surface
mg/L = milligrams per liter
Practical Qualitative Limits



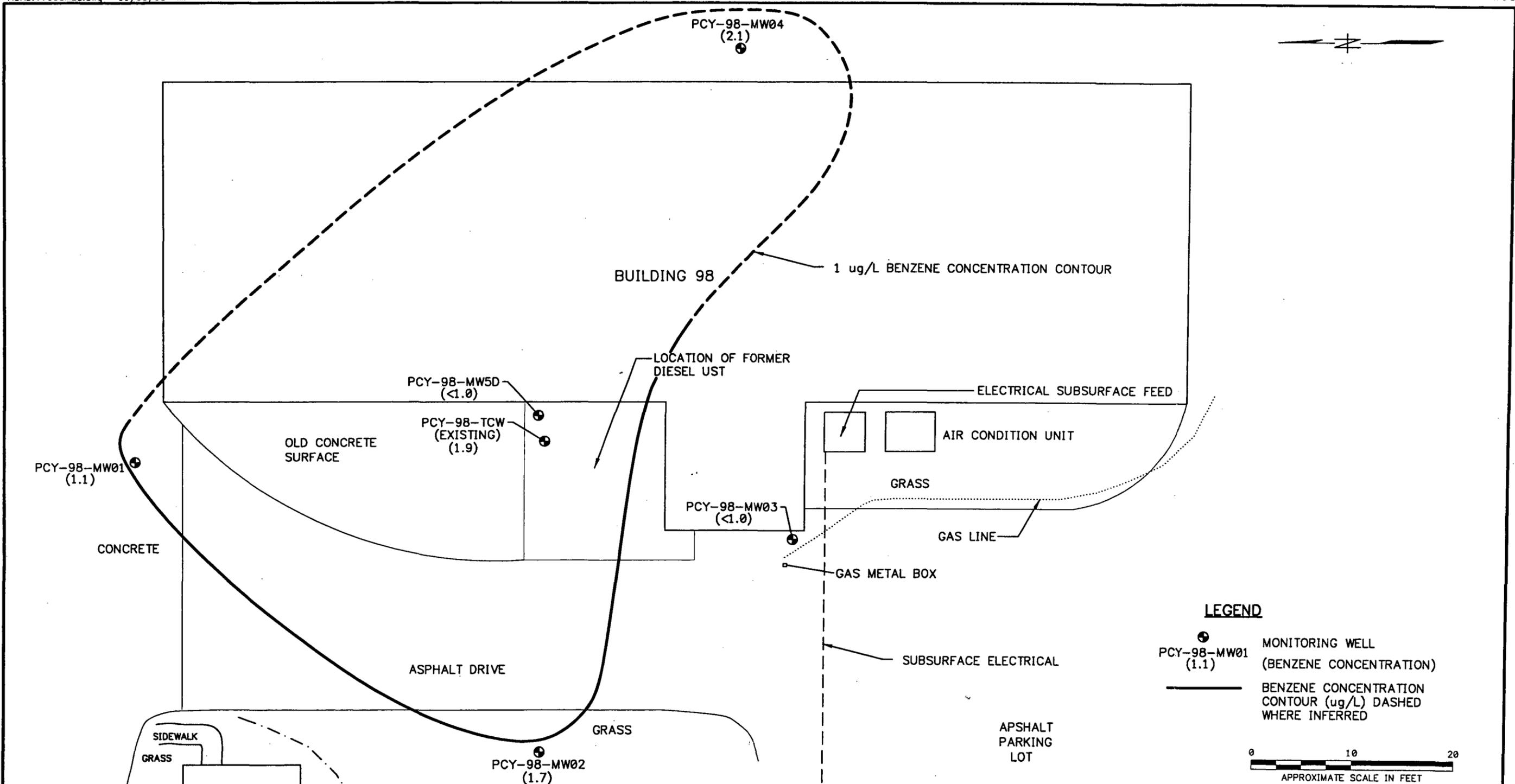
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY MF 11/17/98
 DATE 11/17/98
 CHECKED BY JG 11/17/98
 DATE 11/17/98
 COST/SCHED-AREA
 SCALE AS NOTED

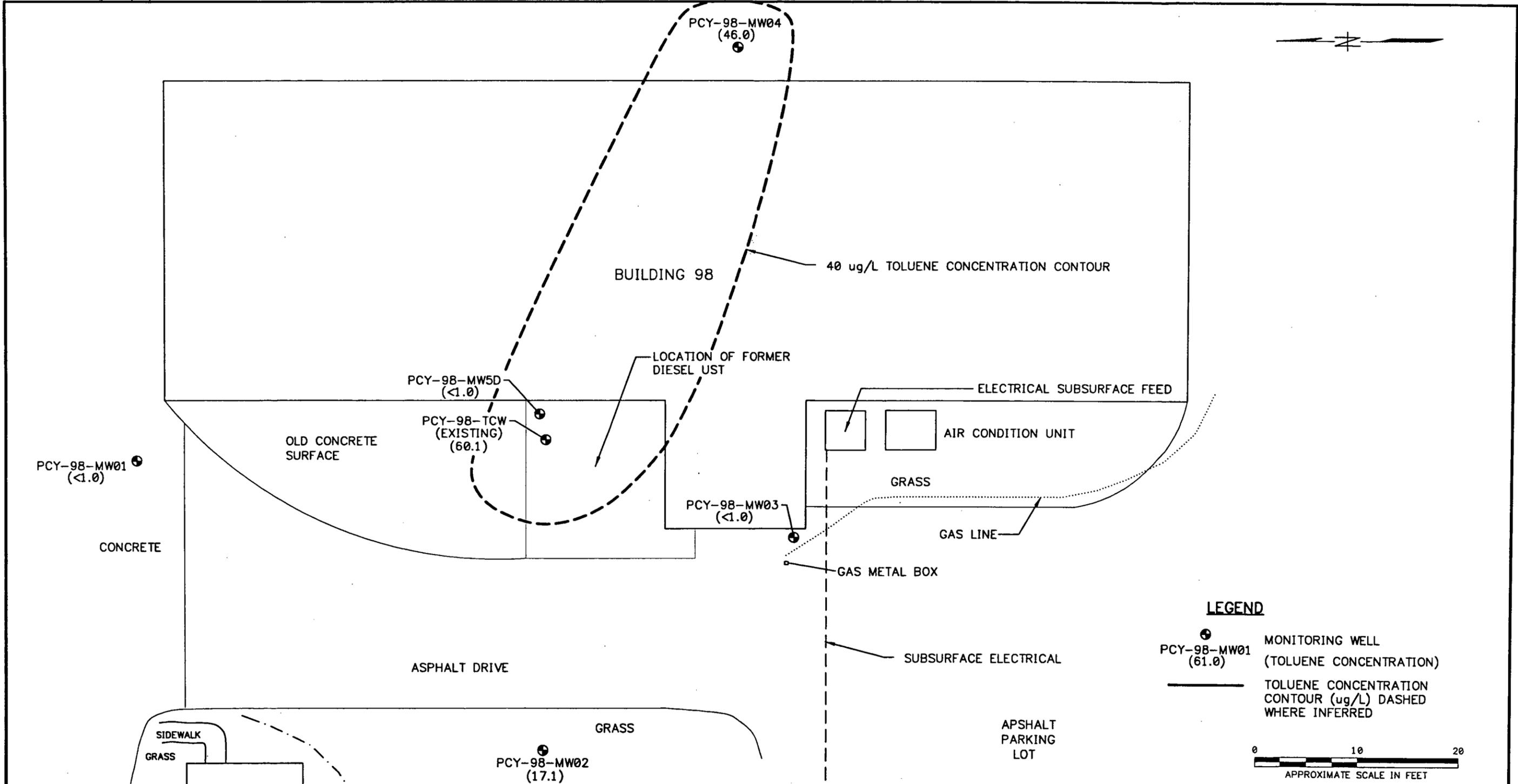


GROUNDWATER FIELD SCREENING CONCENTRATIONS
 (TPH-DRO AND TPH-GRO)
 MAY 15, 1998
 SITE 98
 COASTAL SYSTEMS STATION
 PANAMA CITY, FLORIDA

CONTRACT NO. 7766	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3-6	REV. 0

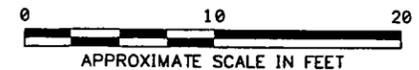


NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE		BENZENE CONCENTRATIONS IN GROUNDWATER		CONTRACT NO. 7766	
							MF	11/17/98		SEMPTEMBER 22, 1998		APPROVED BY	DATE
							JG	11/17/98		SITE 98		APPROVED BY	DATE
										COASTAL SYSTEMS STATION		DRAWING NO. FIGURE 3-7	REV. 0
							SCALE AS NOTED		PANAMA CITY, FLORIDA				



LEGEND

- MONITORING WELL
PCY-98-MW01 (61.0) (TOLUENE CONCENTRATION)
- TOLUENE CONCENTRATION CONTOUR (ug/L) DASHED WHERE INFERRED



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE		TOLUENE CONCENTRATIONS IN GROUNDWATER		CONTRACT NO.	
							MF	11/17/98		SEPTEMBER 22, 1998		7766	
							JG	11/17/98		SITE 98		APPROVED BY	DATE
										COASTAL SYSTEMS STATION		APPROVED BY	DATE
									PANAMA CITY, FLORIDA		DRAWING NO.	REV.	
											FIGURE 3-8	0	

wells ranged from 8.4 ug/L in PCY-98-MW01, to 94.0 ug/L in PCY-98-TCW. The FDEP Groundwater Cleanup Target Level for total xylenes is 20 ug/L. The areal distribution of dissolved total xylenes is provided on Figure 3-9.

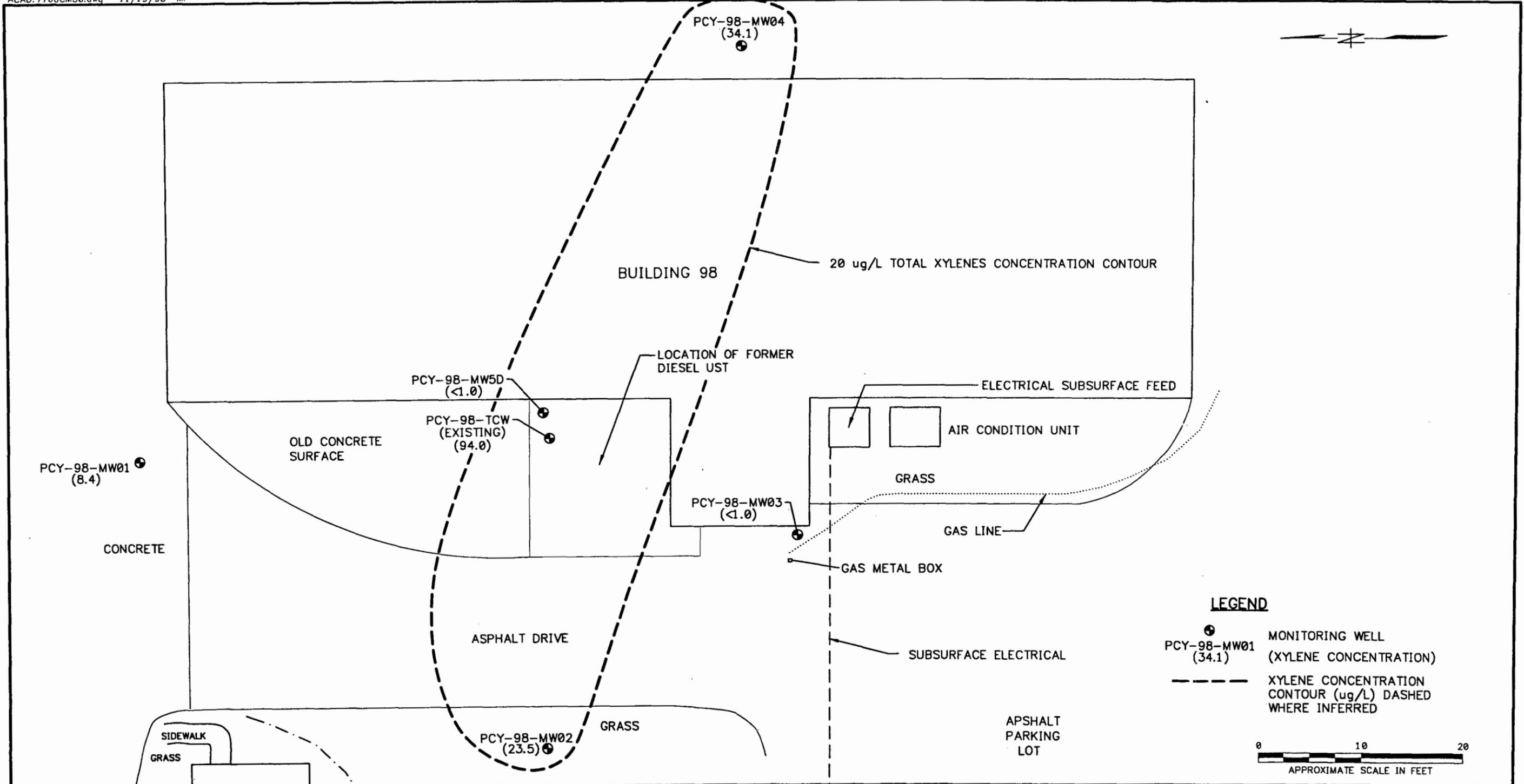
Volatile organics 1,1-dichloroethane, 1,1-dichloroethene, 1,1,1-trichloroethane, trichloroethene, and chloroethane were detected in the groundwater samples. 1,1-Dichloroethane was detected in the groundwater samples collected from PCY-98-MW01, PCY-98-MW02, PCY-98-MW04, PCY-98-MW5D, and PCY-98-TCW at concentrations ranging from 7.7 ug/L in PCY-98-MW02, to 58 ug/L in PCY-98-MW04. 1,1-Dichloroethane is a systemic toxicant with a guidance concentration of 700 ug/L. The concentrations of 1,1-dichloroethane detected at the site are below the guidance concentration.

1,1-Dichloroethene was detected in PCY-98-MW01, PCY-98-MW02, PCY-98-MW04, PCY-98-MW5D, and PCY-98-TCW at concentrations ranging from 1.2 ug/L in PCY-98-MW5D, to 11.7 ug/L in PCY-98-MW04. The FDEP has designated 1,1-Dichloroethene to have a primary drinking water standard with a maximum contaminant level (MCL) of 7 ug/L. The 1,1-dichloroethene concentration in PCY-98-MW04 exceeded the MCL. Concentrations of 1,1-dichloroethene were reported below the MCL in all other groundwater samples.

Groundwater analytical samples for PCY-98-MW04 contained 1,1,1-trichloroethane (3.2 ug/L), trichloroethene (1.8 ug/L), and chloroethane (31.5 ug/L). 1,1,1-Trichloroethane and trichloroethene have primary drinking water standards with MCLs of 200 ug/L and 3 ug/L, respectively. The concentrations of 1,1,1-trichloroethane and trichloroethene are below the FDEP MCLs established by the FDEP for these parameters. Chloroethane is classified as a systemic toxicant with a FDEP guidance concentration of 140 ug/L. Chloroethane is below the FDEP guidance concentration.

EDB was detected in the groundwater samples collected from PCY-98-MW02 (0.050 ug/L) and PCY-98-TCW (0.033 ug/L). The FDEP Groundwater Cleanup Target Level for EDB is 0.020 ug/L. The areal distribution of dissolved EDB is shown on Figure 3-10.

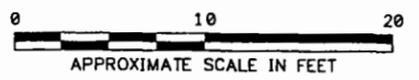
Groundwater TRPH concentrations were reported in all monitoring wells except PCY-98-MW5D. The detected TRPH concentrations ranged from 0.888 mg/L in PCY-98-MW01, to 10.7 mg/L in PCY-98-TCW. The 10.7 mg/L concentration is above the FDEP Groundwater Target Cleanup Level established at 5 mg/L for TRPH. The areal distribution of dissolved TRPH is shown on Figure 3-11.



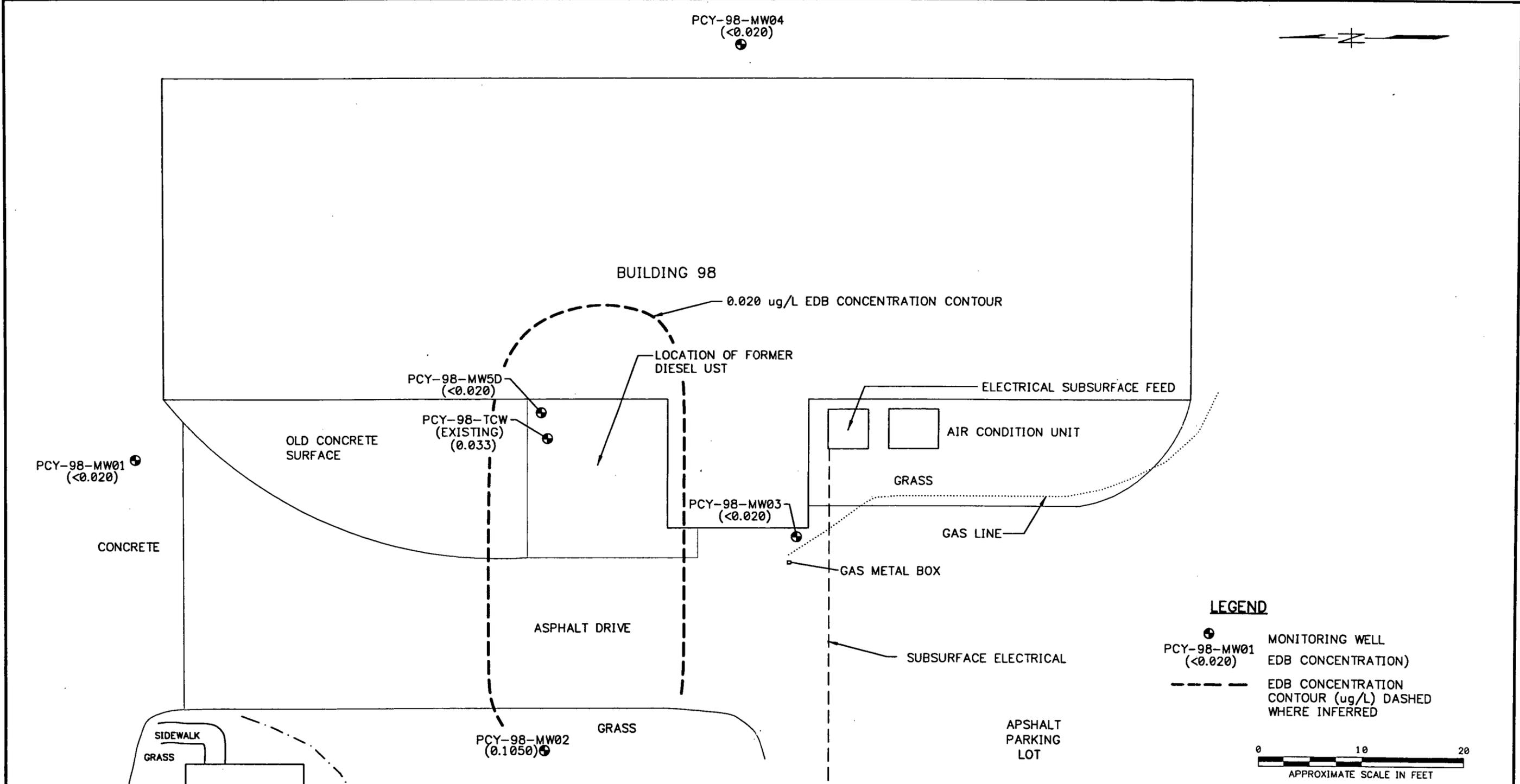
LEGEND

● PCY-98-MW01 (34.1) MONITORING WELL (XYLENE CONCENTRATION)

--- XYLENE CONCENTRATION CONTOUR (ug/L) DASHED WHERE INFERRED

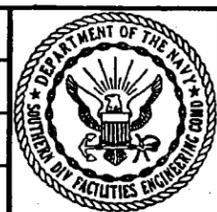


NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY MF 11/17/98	DATE 11/17/98		TOTAL XYLENES CONCENTRATIONS IN GROUNDWATER, SEPTEMBER 22, 1998 SITE 98 COASTAL SYSTEMS STATION PANAMA CITY, FLORIDA	CONTRACT NO. 7766			
							CHECKED BY JG 11/17/98				APPROVED BY	DATE	APPROVED BY	DATE
							COST/SCHED-AREA							
							SCALE AS NOTED						DRAWING NO. FIGURE 3-9	REV. 0



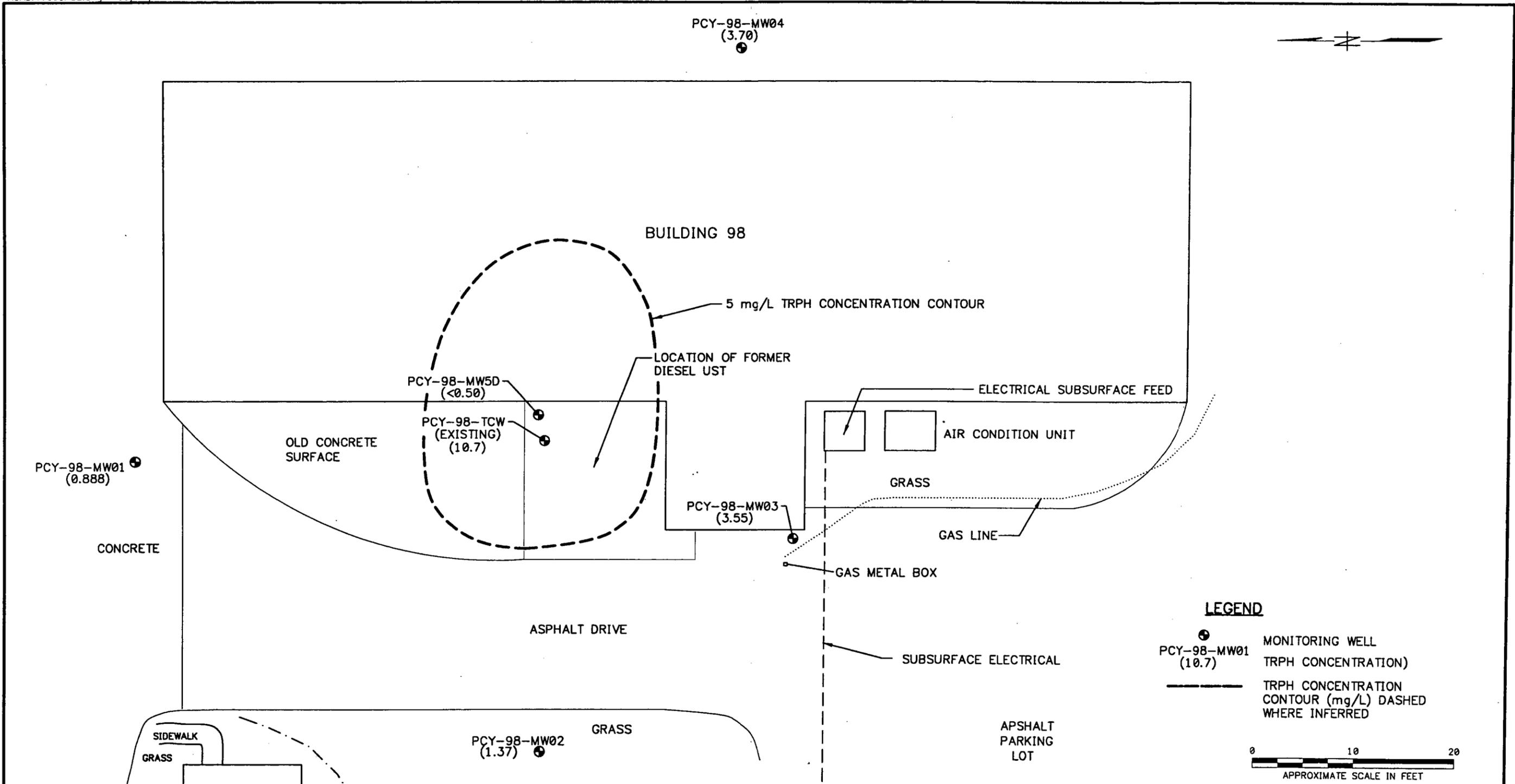
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DATE
MF 11/17/98
CHECKED BY DATE
JG 11/17/98
COST/SCHED-AREA
SCALE
AS NOTED



EDB CONCENTRATIONS IN GROUNDWATER
SEPTEMBER 22, 1998
SITE 98
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

CONTRACT NO. 7766	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3-10	REV. 0



LEGEND

- PCY-98-MW01 (10.7) MONITORING WELL TRPH CONCENTRATION)
- TRPH CONCENTRATION CONTOUR (mg/L) DASHED WHERE INFERRED

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DATE
MF 11/17/98
CHECKED BY DATE
JG 11/17/98
COST/SCHED-AREA
SCALE
AS NOTED



TRPH CONCENTRATIONS IN GROUNDWATER
SEMPTEMBER 22, 1998
SITE 98
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

CONTRACT NO. 7766	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3-11	REV. 0

1,2-Dichloroethane was detected in the groundwater samples from PCY-98-MW02 at a concentration of 1.7 ug/L. This concentration is below the FDEP Groundwater Target Cleanup Level of 3.0 ug/L.

Phenanthrene was detected at 5.05 ug/L in PCY-98-TCW and fluorene was reported at a concentration of 2.95 ug/L in PCY-98-MW02. These concentrations are below the FDEP Groundwater Target Cleanup Levels of 210 ug/L phenanthrene, and 280 ug/L fluorene.

Naphthalene was detected at 3.55 ug/L in PCY-98-MW03, 10.4 ug/L in PCY-98-MW04, and 17.8 ug/L in PCY-98-TCW. These concentrations are below the FDEP Groundwater Target Cleanup Level of 20 ug/L. Concentrations of 1-methynaphthalene and 2-methynaphthalene was detected in PCY-98-MW04 and PCY-98-TCW. 1-Methynaphthalene was detected at 6.19 ug/L in PCY-98-MW04, and at 18.4 ug/L in PCY-98-TCW. 2-Methynaphthalene was detected at 5.81 ug/L and 22.8 ug/L in PCY-98-MW04 and PCY-98-TCW, respectively.

Total lead was detected in all monitoring well except PCY-98-MW01. The total lead concentrations ranged from 4 ug/L in PCY-98-MW03, to 15 ug/L in PCY-98-MW5D. Concentrations of total lead in the groundwater samples were at or below the FDEP Target Cleanup Level of 15 ug/L.

A summary of the groundwater analytical results (Gasoline and Kerosene Analytical Group parameters) from the September 22, 1998 sampling event is presented in Table 3-4. Groundwater field sampling forms are provided in Appendix H, and the groundwater laboratory data sheets are included in Appendix M.

No free product was detected in the groundwater during the SA sampling.

**TABLE 3-4
SUMMARY OF GROUNDWATER QUALITY:
SELECT PARAMETERS FOR GASOLINE AND KEROSENE ANALYTICAL GROUPS
Site 98
Coastal Systems Station, Panama City, Florida
FDEP ID No. 038518667**

Well ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethyl benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	DCE (µg/L)	EDB (µg/L)	TRPH (mg/L)	PHE NAN (µg/L)	FLU (µg/L)	NAP (µg/L)	Lead (mg/L)
PCY-98-MW01	9/22/98	1.1	<1.0	5.1	8.4	<1.0	<1.0	<0.020	0.888	<1.0	<1.0	<1.0	<0.0030
PCY-98-MW02	9/22/98	1.7	17.1	10.9	23.5	<1.0	1.7	0.050	1.37	<1.0	2.95	<1.0	0.0054
PCY-98-MW03	9/22/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.020	3.55	<1.0	<1.0	3.55	0.0044
PCY-98-MW04	9/22/98	2.1	46.0	10.4	34.1	<1.0	<1.0	<0.020	3.70	<1.1	<1.1	10.4	0.0050
PCY-98-MW5D	9/22/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.020	<0.50	<1.0	<1.0	<1.0	0.0152
PCY-98-TCW	9/22/98	1.9	60.1	27.8	94.0	<1.0	<1.0	0.033	10.7	5.05	<1.0	17.8	0.0104
Duplicate	9/22/98	1.8	56.9	25.8	88.2	<1.0	<1.0	0.031	8.16	<1.1	<1.1	5.43	0.0109
Equipment Blank	9/22/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.020	<0.50	<1.0	<1.0	<1.0	<0.0030

NOTE:

MTBE methyl tert-butyl ether
DCE 1,2-Dichloroethane
EDB 1,2-Dibromoethane = ethylene dibromide
TRPH total petroleum hydrocarbons (sample analyzed by Florida Pro Method)
PHENAN phenanthrene
FLU fluorene
NAP naphthalene

4.0 DISCUSSION

In August 1997, approximately 2 cubic yards of contaminated soil was removed during the excavation of the diesel UST for site 98. Depth to groundwater measurements collected from the Tank Closure Assessment well (PCY-98-TCW) during the SA, identified the top of the surficial aquifer being encountered at approximately 4 to 6 feet bls. The excavation of soils to a depth of 5 feet bls removed the contaminated soils in the vadose and capillary fringe at the source of the release. The removal of contaminated soils at the source was substantiated during May 1998 when TtNUS conducted a soil vapor survey in the area of the former UST. Low-level hydrocarbon vapor concentrations were only detected at one of the boring locations. The laboratory analysis of a soil sample collected from the subsurface interval which exhibited the highest vapor concentrations, reported Gasoline and Kerosene Analytical Group parameters, as described in Chapter 62-770.600, F.A.C., being below laboratory detection limits. However, since the tank was located adjacent to the west side of Building 98, the potential exists for soil contamination to be present beneath the building. The soil contamination, if present under the building, would be capped by the building foundation, thus restricting rainfall precipitation from percolating through the vadose zone soils. The building foundation would act as a physical barrier to retard the leaching of petroleum hydrocarbons into the groundwater beneath the building from rainfall percolation. The area of the former UST location is also covered by a concrete surface, which would restrict infiltration of rainwater through the soil. No free product was encountered during the SA investigation.

Groundwater monitoring wells (PCY-98-MW01 through PCY-98-MW04) were installed around the former UST location at a distance of approximately 40 feet. These wells were used to evaluate the horizontal extent of petroleum constituents. The Tank Closure Assessment well (PCY-98-TCW) was used to monitor groundwater quality at the source of the release and is located at the former UST tank bed. The vertical extent of petroleum hydrocarbons in the groundwater was assessed by groundwater quality collected from vertical delineation well (PCY-98-MW5D), installed near the source of the release.

Laboratory analysis of groundwater samples collected during the SA indicates dissolved hydrocarbon concentrations above FDEP Target Cleanup Levels for benzene; toluene, total xylenes, EDB, and TRPH are present in the groundwater at the site. Although these constituents are above the FDEP Target Cleanup Levels, concentrations of these constituents have

decreased from the reported concentrations detected in the groundwater sample collected from PCY-98-TCW during the Tank Closure Assessment in November 1997.

The September 22, 1998 groundwater quality data defines the horizontal extent of dissolved benzene, total xylenes, and toluene using water quality from upgradient (PCY-98-MW02) and side gradient (PCY-98-MW01 and PCY-98-MW03) wells from the former UST. Concentrations of benzene (2.1 ug/L), toluene 46.0 ug/L), and total xylenes (34.1 ug/L) in downgradient well PCY-98-MW04 are at levels above FDEP Target Cleanup levels. The dissolved concentrations detected in the downgradient perimeter show a significant decrease in concentrations at a distance of approximately 40 feet from the concentrations reported in the source well (PCY-98-TCW). Total xylenes were reported in upgradient well PCY-98-MW02 at a concentration slightly above FDEP Target Cleanup Level.

Dissolved TRPH at the 5 mg/L concentration is delineated based on the groundwater quality data collected from upgradient well PCY-98-MW02, side gradient wells (PCY-98-MW01 and PCY-98-MW03), and downgradient well (PCY098-MW04). Concentrations in these wells indicate the 5 mg/l TRPH contour is limited to an area of approximately 10 to 20 feet around the former UST. Source well PCY-98-TCW reported the highest concentration of TRPH at 10.7 mg/L.

Dissolved EDB was below detection limits in groundwater samples collected from side gradient monitoring wells (PCY-98-MW01 and PCY-98-MW03) but was detected in the upgradient well (PCY-98-MW02 at 0.050 ug/L) and in the source well (PCY-98-TCW at 0.033 ug/L).

Since several volatile organic compounds (1,1-dichlorethane, 1,1,1-trichlorethane, trichloroethene, and chloroethane), were detected in the groundwater samples at the site (volatile organics in the upgradient, downgradient, and vertical delineation wells), it is possible a dissolved plume from either AOC1 or SWMU9 has commingled with the hydrocarbon plume associated with the site. Additionally a higher concentration of EDB is reported in upgradient monitoring well PCY-98-MW02 (0.050 ug/L) than in the source monitoring well PCY-98-TCW (0.033 ug/L). Total xylenes were also reported in the upgradient well (PCY-98-MW02) at concentration of 23.5 ug/L, above the FDEP Groundwater Target Cleanup Level.

Petroleum hydrocarbons were not detected in groundwater samples collected from the vertical delineation well (PCY-98-MW5D) screened from 25 to 30 feet bls. Since the depth to the top of the surficial aquifer is approximately 4 to 6 feet bls, the vertical extent of petroleum hydrocarbons

is estimated to be within the top 20 feet of the surficial aquifer. The vertical delineation wells is located at the UST tank bed near the source of the release.

The predominant soil type of the surficial aquifer is sand. Depth to water in the surficial aquifer was determined to be approximately 4.5 to 6 feet bls. No subsurface utilities were identified within 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 were identified upgradient of the source area and/or are typically completed at depths within 4 feet bls.

A downward component of groundwater flow exists at the site. This is evident in the variance in the groundwater elevations between shallow well PCY-98-TCW and vertical delineation well PCY-98-MW5D. The direction of groundwater flow for the surficial aquifer is toward the east. The groundwater flow velocity was calculated at 0.05 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 are negligible. The site is located approximately 450 feet from St. Andrews Bay. St. Andrews bay is the nearest surface water body and acts as the natural discharge point for the surficial aquifer downgradient of the site

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 SA at CSS Building 98 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 SA no "excessively contaminated" or contaminated soil was encountered in vadose zone soils;
- Free product was not encountered at the site
- Dissolved hydrocarbons were detected at levels near or below the FDEP Groundwater Target Cleanup Levels; and
- Dissolved hydrocarbons and volatile organics from other source areas (i.e., AOC1 and SWMU9) may have impacted the site.

Based on the findings from this investigation, it is proposed the site be considered for Monitoring Only for Natural Attenuation. This proposal is based on the following conditions:

- The current and projected land use of the area affected by dissolved petroleum constituents will continue to be operated as a United States Naval Base. Since dissolved hydrocarbons are located several feet below land surface and the surficial aquifer is not used as a water source at CSS, exposure to the population is considered to be a minimal exposure risk.
- The "affected area" is isolated from the population by the construction of physical barriers. These physical barriers include a concrete ground cover surface cap over the former UST location, and Building 98 which is located adjacent to, and downgradient of the former UST. Building 98 provides a surface cap over the study area.
- During the tank closure and SA investigation, no free product was detected in any excavation, borings, monitoring wells, surface water, sewer lines or subsurface conduits. No fire or explosion hazard exists as a result of the release of petroleum constituents.
- Approximately 2 cubic yards of soil contamination was removed during the Tank Closure Assessment.

- No contaminated soil was encountered during the SA investigation as substantiated from hydrocarbon vapor readings and a soil analysis performed on subsurface soils.
- Comparison of water quality data collected from the source well (tank closure well: PCY-98-TCW) on November 13, 1997 during the Tank Closure Assessment, with the water quality data collected from the well on September 22, 1998, shows a significant decrease in petroleum hydrocarbon concentrations. This overall decrease is reflected in the reduction of benzene, toluene, total xylenes, and EDB in the groundwater at the source well. A comparison of the data shows benzene decreased in concentration from 17 ug/L to 1.9 ug/L. Toluene decreased from a concentration of 510 ug/L to 60.1 ug/L. Total xylenes decreased in concentration from 280 ug/L to 94 ug/L, and EDB decreased from 2.3 ug/L to 0.033 ug/L.
- Its anticipated the site can achieve the applicable No Further Action criteria in Chapter 62-770.680, F.A.C. as a result of natural attenuation as observed from the relatively low concentrations of dissolved hydrocarbons detected at the site, and the historical reduction of dissolved hydrocarbons in groundwater quality from PCY-98-TCW.

Monitoring Only Plan

The monitoring program proposed for this site shall consist of the following parameters.

- Three monitoring wells shall be utilized to access dissolved hydrocarbon concentrations in the area of Site 98. These wells shall include PCY-13-4S (downgradient and proposed point of compliance well), PCY-98-TCW (source well and area of maximum concentration of petroleum products) and PCY-98-MW02 (upgradient well). It is proposed that shallow well PCY-13-4S be used as a point of compliance well since the well is located approximately 40 feet east of monitoring well PCY-98-MW04, and is located approximately 300 feet west of St. Andrew Bay. Well PCY-13-4S was installed during the RFI study and contains a 10-foot screen section set at 14 feet bls (ABB Environmental Services Inc., 1995). It is also proposed that upgradient well PCY-98-MW02 be sampled to monitor petroleum hydrocarbon concentrations. If petroleum concentrations in PCY-98-MW02 are shown to increase, the site should be included as part of the Corrective Measures Study being performed for Sites ACO1 and SWMU1.
- Groundwater samples collected during each monitoring event shall be analyzed by EPA Method 8021 (benzene, toluene, ethylbenzene, total xylenes and MTBE) EPA Method 504

(EDB), and Florida Pro (TRPH). During the groundwater sampling event, a complete round of water level measurements shall be collected from the site monitoring wells. If analyses of the groundwater samples exceed the action levels presented below, the wells shall be resample no later than 30 days after the initial positive result is known. The Monitoring Only reports will be submitted to the FDEP within 60 days of sample collection.

The action levels and sampling frequency proposed for this Monitoring Only Program are based on the parameter groundwater concentrations detected at the site for Chemicals of Concern. The Chemicals of Concern and Natural Attenuation Default Source Concentrations issued by the FDEP are presented in Appendix N. The action levels and sampling frequency proposed for this Monitoring Only Program include the following:

<u>Contaminate well:</u>	<u>Parameter and Action Levels</u>	<u>Frequency</u>
PCY-98-TCW:	Benzene 100 ug/L, Toluene 400 ug/L, Xylene 200 ug/L, TRPH 50 mg/L and EDB 2 ug/L	Quarterly

Downgradient well and Point of Compliance Well

PCY-13-4S:	Benzene 1 ug/L, Toluene 40 ug/L, Xylene 30 ug/L, TRPH 5 mg/L and EDB 0.020	Quarterly
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Upgradient Well

PCY-98-MW02	Benzene, Toluene, Xylenes, TRPH and EDB (No Action Levels)	Quarterly
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6.0 REFERENCES

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Chapter 62-770 Petroleum Contamination Site Cleanup Criteria, September 23, 1998

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APPENDIX A

CLOSURE ASSESSMENT REPORT

CLOSURE ASSESSMENT REPORT
UNDERGROUND STORAGE TANK
BUILDING 98

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 CP2S, Environmental Engineer

December 1997

CLOSURE ASSESSMENT REPORT
UNDERGROUND STORAGE TANK
BUILDING 98

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 CP2S, Environmental Engineer

December 1997

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Naval Surface Warfare Center
Coastal Systems Station
Panama City, Florida

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FIGURES

Figure 1: Vicinity Map
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GLOSSARY

AST	Aboveground Storage Tank
CSS	Coastal Systems Station, Panama City, Florida
DRMO	US Navy, Defense Reutilization and Marketing Organization
EPA	Environmental Protection Agency
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
OVA	Organic Vapor Analyzer
PWC	US Navy, Public Works Center, Pensacola, Florida
UST	Underground Storage Tank

CLOSURE ASSESSMENT REPORT
UNDERGROUND STORAGE TANK
BUILDING 98

1.0 Facility

Building 98, 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 CP2S
Panama City, Florida 32407-7001

3.0 Site Location

The Coastal Systems Station is located along St Andrew Bay in Panama City, Florida (Figure 1).

4.0 Date of Closure

8 August 1997

5.0 Project Description

The US Navy Public Works Center (PWC), Pensacola, Florida was tasked by the Coastal Systems Station (CSS), Panama City to close a 560 gallon underground storage tank (UST) system located on the west side of Building 98, CSS Panama City (Figure 2). The UST was removed, cleaned and rendered unuseable by PWC. Photographs of the removal are provided as Attachment A. The UST was properly disposed by the US Navy, Defense Reutilization and Marketing Organization (DRMO), Pensacola, Florida (Attachment B).

The Application for Closure of Pollutant Storage Tank System, Underground Storage Tank Installation and Removal Form, Closure Assessment Form, and Decontamination Certification are provided in Attachments C, D, E, and F respectively.

6.0 Tank Contents

The UST was used to store diesel for on-site heating. The contents were emptied by CSS prior to commencement of work.

The rinsate from the UST cleaning operations was disposed at the Fire Training Facility, Building 99, CSS, Panama City. The petroleum constituents were separated from the water and incinerated.

7.0 Tank Condition

The UST was cylindrically shaped and constructed of steel. The UST was in good condition at the time of removal.

8.0 Excavation Area

The excavation was made approximately eight (8) feet wide, ten (10) feet long and five (5) feet deep. The excavation was filled with clean fill, compacted to grade, and paved with concrete.

Contaminated soil was encountered during the excavation process (Attachment G). Approximately 2 cubic yards of contaminated soil was removed. The contaminated soil was removed horizontally until the hydrocarbon levels in the surrounding soil were less than 50 parts per million (ppm). The contaminated soil was removed vertically until groundwater was encountered. The contaminated soil was stockpiled and is planned to be properly disposed by Southern Waste Systems, Inc (SWS) within six months.

9.0 Soil Screening

Six (6) soil borings were installed around the UST using a manually operated hollow stem auger. The soil samples were collected and screened for organic vapor concentrations using the headspace screening technique. The soil samples were extracted at the limits of the excavation and underneath the middle of the UST. The soil boring locations and screening results are provided in Attachment E.

The soil screening was conducted in accordance with the headspace screening criteria in Chapter 62-770 FAC and PWC's Comprehensive Quality Assurance Plan using an organic vapor analyzer (OVA). The OVA was manufactured by Thermo Environmental Instruments, Inc (Model 680 HVM) and equipped with a flame ionization detector (FID).

10.0 Groundwater Analysis

A temporary groundwater monitoring well was installed on 5 November 1997 by GFA International, Inc (GFA), Sarasota, Florida. The well was constructed with a 2" diameter by 13 foot long, Schedule 40 polyvinyl chloride (PVC) riser. The riser was equipped with a ten foot long by 0.010 inch slotted screen. The well consisted of a course silica sand filter and a bentonite seal. The top of the well was encased with concrete and equipped with a lock and a steel cover. The well location, well construction diagram, and groundwater laboratory analyses are provided in Attachment E.

The well was sampled by PWC on 13 November 1997. These samples were transported to the PWC Laboratory in Pensacola, Florida and analyzed for volatile content in accordance with Environmental Protection Agency (EPA) Method 8260, for poly aromatic hydrocarbons (PAH's) in accordance with EPA Method 8270, for ethylene dibromide content in accordance with EPA Method 504, for lead content in accordance with EPA Method 239.2, and for total petroleum hydrocarbon content in accordance with the State of Florida, Petroleum Range Organics (FL-PRO) method.

11.0 Findings and Conclusions

The site is contaminated. The contaminated soil above the groundwater level was removed but the groundwater analysis yielded high levels of petroleum contamination.

12.0 Recommendations

A Contamination Assessment Report (CAR) should be prepared for this site.

13.0 Closure Assessment

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

14.0 Project Manager

Paul R. Semmes, P.E.

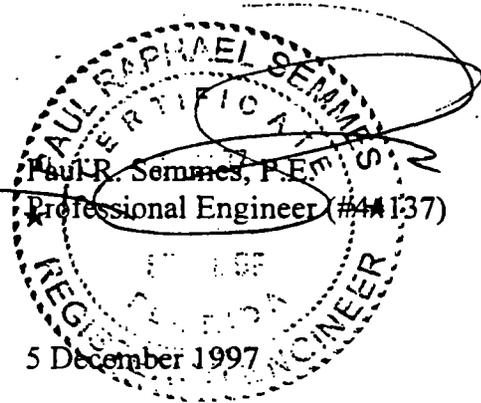
15.0 Project Number

1396004

16.0 Report Date

5 December 1997

The engineering evaluations and professional opinions rendered in this Closure Assessment Report that describes the work associated with the storage tank removal at the Coastal Systems Station, Panama City, Florida were conducted or developed in accordance with the commonly accepted procedures consistent with applicable standards of practice. If conditions are determined to exist differently than those described, the undersigned professional engineer should be notified to evaluate the effects of any additional information on the design described in this report.

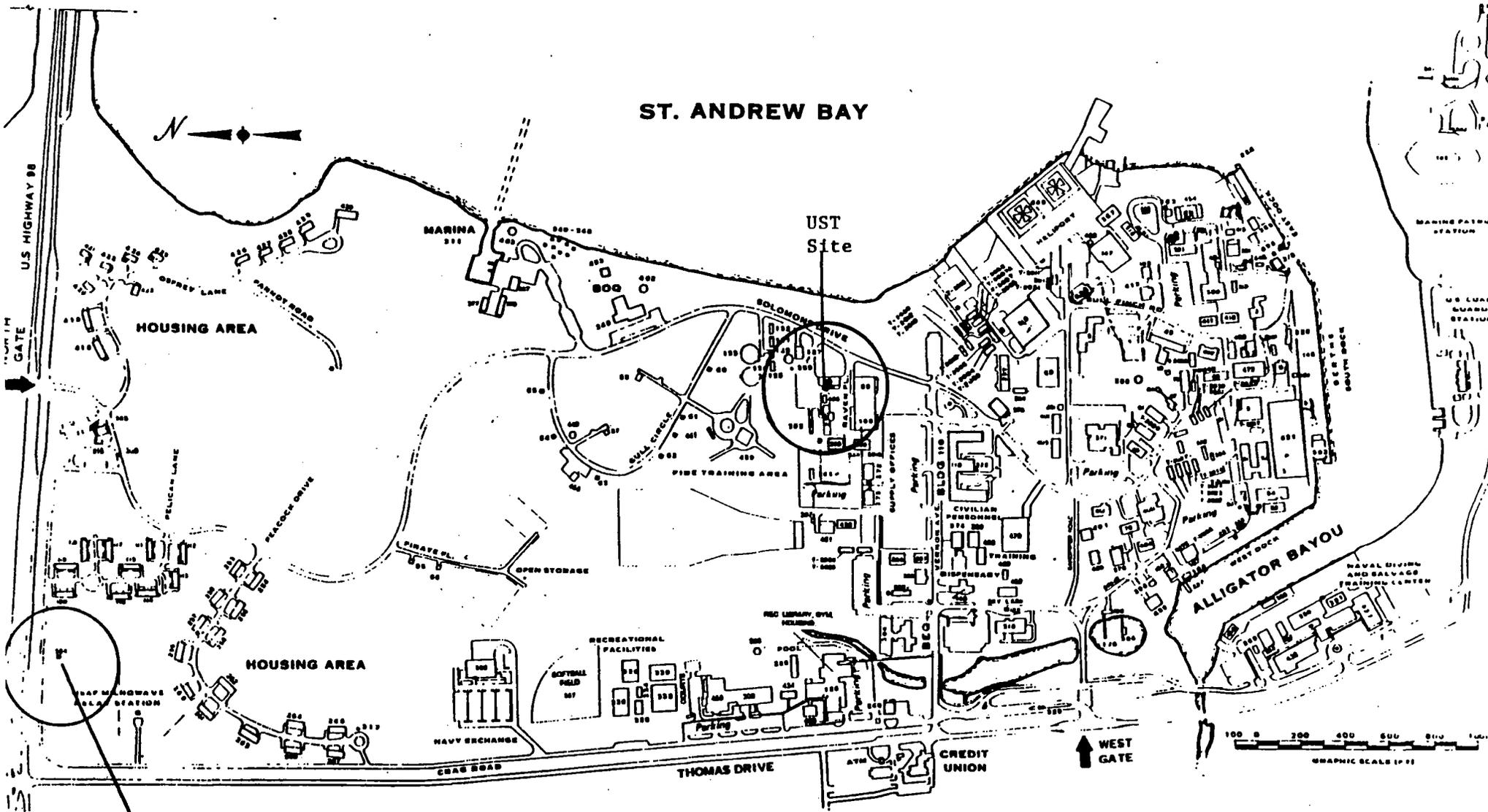


PAUL RAPHAEL SEMMES
REGISTERED PROFESSIONAL ENGINEER
STATE OF FLORIDA
5 December 1997
Paul R. Semmes, P.E.
Professional Engineer (#44137)

FIGURES

FIGURE 1
Vicinity Map

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18



Potable Well

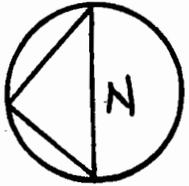
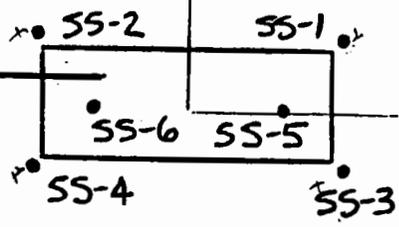
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

FIGURE 2
Site Map

BUILDING 98

MONITORING WELL •

UNDERGROUND STORAGE TANK



ATTACHMENTS

ATTACHMENT A
Photographs



ATTACHMENT B
Disposal Document
Scrap Metal

STOCK NUMBER	QUANTITY	DOCUMENT NUMBER	SUPPLEMENTARY ADDRESS	FUND	DISTRIBUTION	PROJECT	PRIORITY	REQ'D DEL DATE	UNIT PRICE		
FSC	NIIN	REQUISITIONER	DATE	SERIAL	SUPPLY	ADDRESS	SIGNAL	RI	DOLLARS	CYS.	
NAVY PWC	SHIP TO	DRMO	MARK FOR	PROJECT	TOTAL PRICE						
170024567	FL 9170024567	SCRAP	D	E	I						
2-2170	B	452-4334	C	D	E						
LOCATION	TYPE OF CARGO	UNIT PACK	UNIT WEIGHT	UNIT CUBE	U F C	N M F C	FREIGHT RATE	DOCUMENT DATE	MAT COMB	QUANTITY	
G	H	I	J	K	L	M	N	O	P	Q	
FREIGHT CLASSIFICATION NOMENCLATURE	NAVAL SYSTEMS CMD										
USED TANKS - PANAMA CITY, FLORIDA	V										
ITEM NOMENCLATURE	X	FUEL STORAGE TANKS	Y								
BY AND DATE	TYPE OF CONTAINER(S)	TOTAL WEIGHT	RECEIVED BY AND DATE	INSPECTED BY AND DATE							
	2	3 4060	7 <i>Bacon</i> 8/28/97	8							
BY AND DATE	NO. OF CONTAINER(S)	TOTAL CUBE	WAREHOUSED BY AND DATE	WAREHOUSE LOCATION							
	5	6	9	10							
BB	CC	DD	EE	GG							
PORTATION ADDRESS	DATE SHIPPED	12	FF	GG							
PORTATION CHARGEABLE TO	14	LOADING, A.W.B. OR RECEIVER'S SIGNATURE (AND DATE)	15	RECEIVER'S DOCUMENT NUMBER							
340-1	1 MAR 74	EDITION OF JAN:64 MAY BE USED UNIL EXHAUSTED	DOD SINGLE LINE ITEM RELEASE/RECEIPT DOCUMENT	2							

STOCK NUMBER	QUANTITY	DOCUMENT NUMBER	SUPPLEMENTARY ADDRESS	FUND	DISTRIBUTION	PROJECT	PRIORITY	REQ'D DEL DATE	UNIT PRICE		
FSC	NIIN	REQUISITIONER	DATE	SERIAL	SUPPLY	ADDRESS	SIGNAL	RI	DOLLARS	CYS.	
NAVY PWC	SHIP TO	DRMO	MARK FOR	PROJECT	TOTAL PRICE						
70024567	FL 9170024567	SCRAP	D	E	I						
-2170	B	452-4334	C	D	E						
LOCATION	TYPE OF CARGO	UNIT PACK	UNIT WEIGHT	UNIT CUBE	U F C	N M F C	FREIGHT RATE	DOCUMENT DATE	MAT COMB	QUANTITY	
G	H	I	J	K	L	M	N	O	P	Q	
FREIGHT CLASSIFICATION NOMENCLATURE	NAVAL SYSTEMS CMD										
USED TANKS - PANAMA CITY, FLORIDA	V										
ITEM NOMENCLATURE	X	FUEL STORAGE TANKS	Y								
BY AND DATE	TYPE OF CONTAINER(S)	TOTAL WEIGHT	RECEIVED BY AND DATE	INSPECTED BY AND DATE							
	1	2 4220	3 <i>Bacon</i> 8/25/97	4							
BY AND DATE	NO. OF CONTAINER(S)	TOTAL CUBE	WAREHOUSED BY AND DATE	WAREHOUSE LOCATION							
	1	6	9	10							
BB	CC	DD	EE	GG							
PORTATION ADDRESS	DATE SHIPPED	12	FF	GG							
PORTATION CHARGEABLE TO	14	LOADING, A.W.B. OR RECEIVER'S SIGNATURE (AND DATE)	15	RECEIVER'S DOCUMENT NUMBER							
1 MAR 74	EDITION OF JAN:64 MAY BE USED UNIL EXHAUSTED	DOD SINGLE LINE ITEM RELEASE/RECEIPT DOCUMENT	2								

ATTACHMENT C
Application for Closure of
Pollutant Storage Tank System

APPLICATION FOR CLOSURE OF POLLUTANT STORAGE TANK SYSTEM

Provide the facility information requested below.

FDEP Facility # N/A Facility Name NSWC - CSS

Facility Location Building 98

Property Owner Commanding Officer, Coastal Systems Station (Code P25)

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

Phone (850) 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 (850) 452-4315

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

Contact Mr. Paul Semmes, P.E. Phone (850) 452-4315

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

Contact Mr. Gayle Brown Phone (850) 452-3459

Indicate the laboratory that will conduct groundwater analysis.

Contracted Laboratory U.S. Navy - PWC Phone (850) 452-3180

Contact Mr. Joe Moore FDEP QA/QC 920121G

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

Firm Transporting Soils Southern Waste Systems, Inc.

Contact Ms. Candace Esparza Phone (850)234-8428

Firm Remediating/Disposing Soils Southern Waste Systems, Inc.

Contact Ms. Candace Esparza Phone (850) 234-8428

Disposal/Remediation Method Landfill

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

Firm Transporting Residual Product and Sludge Southern Waste Systems, Inc.

(850) 234-8428

Contact Ms. Candace Esparza Phone (850) 234-8428

Firm Receiving/Disposal Residual Product and Sludge Southern Waste Systems, Inc.

(850) 234-8428

Contact Ms. Candace Esparza Phone (850) 234-8428

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 (850) 452-4315

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).

ATTACHMENT D
Underground Storage Tank
Installation and Removal Form



Underground Storage Tank Installation and Removal Form
For Certified Contractors

Pollutant Storage System Specialty Contractors as defined in Section 489.113, Florida Statutes (Certified contractors as defined in Section 17-761.200 Florida Administrative Code) shall use this form to certify that the installation, replacement or removal of the storage tank system(s) located at the address listed below was performed in accordance with Department Reference Standards.

General Facility Information

- 1. DER Facility Identification No.: N/A
2. Facility Name: NSWC Coastal Systems Station Telephone: (850) 235-5859
3. Street Address (physical location): Building 98
4. Owner Name: CO, Coastal Systems Station Telephone: (850) 235-5859
5. Owner Address: 6703 West Highway 98, Panama City, Florida 32407-7001
6. Number of Tanks: a. Installed at this time None b. Removed at this time One
7. Tank(s) Manufactured by: Unknown
8. Date Work Initiated: 8/8/97 9. Date Work Completed: 8/8/97

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(87), API (American Petroleum Institute) 1615, PEI (Petroleum Equipment Institute) RP100-87 and the manufacturers' specifications.
3. Tanks and piping pretested and installed in accordance with NFPA 30(87), API 1615, PEI/RP100(87) and the manufacturers' specifications.
4. Steel tanks and piping are cathodically protected in accordance with NFPA 30(87), API 1632, UL (Underwriters Laboratory) 1746, STI (Steel Tank Institute) R892-89 and the manufacturer's specifications.
5. Tanks and piping tested for tightness after installation in accordance with NFPA 30(87) and PEI/RP100-87.
6. Monitoring well(s) or other leak detection devices installed and tested in accordance with Section 17-761.640, Florida Administrative Code (F.A.C.).
7. Spill and overflow protection devices installed in accordance with Section 17-761.500, F.A.C.
8. Secondary containment installed for tanks and piping as applicable in accordance with Section 17-761.500, F.A.C.

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

Underground Pollutant Tank Removal Checklist

- 1. Closure assessment performed in accordance with Section 17-761.800, F.A.C.
2. Underground tank removed and disposed of as specified in API 1604 in accordance with Section 17-761.800, F.A.C.

ATTACHMENT E
Closure Assessment Form
Soil & Groundwater Analyses



Form Title: Closure Assessment Form
Effective Date: December 18, 1990
DEP Application No. _____
(Filed in by DEP)

Closure Assessment Form

Owners of storage tank systems that are replacing, removing or closing in place storage tanks shall use this form to demonstrate that a storage tank 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 12/5/97
2. DEP Facility ID Number: N/A 3. County Bay
4. Facility Name: NSWC Coastal Systems Station
5. Facility Owner: Commanding Officer, Coastal Systems Station
6. Facility Address: Building 98
7. Mailing Address: 6703 West Highway 98, Panama City, Florida 32407-7001
8. Telephone Number: (850) 235-5859 9. Facility Operator: 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: 45

Facility Assessment Information

- | Yes | No | Not Applicable | |
|-------------------------------------|-------------------------------------|-------------------------------------|---|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | | 1. Was a Discharge Reporting Form submitted to the Department?
If yes, When: _____ Where: _____ |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | | 2. Is the depth to ground water less than 20 feet? |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Are monitoring wells present around the storage system?
If yes, please specify <input type="checkbox"/> Vapor Monitoring <input checked="" type="checkbox"/> Water Monitoring |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Is there free product present in the monitoring wells or within the excavation? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 5. Were the petroleum hydrocarbon vapor levels in the soil greater than 500 parts per million for gasoline?
Specify sample type: <input type="checkbox"/> Vapor Monitoring wells <input type="checkbox"/> Soil sample(s) |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 6. Were the petroleum hydrocarbon vapor levels in the soils greater than 50 parts per million for diesel/kerosene?
Specify sample type: <input type="checkbox"/> Vapor Monitoring wells <input checked="" type="checkbox"/> Soil sample(s) |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 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).) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 8. If a used oil storage system, did a visual inspection detect any discolored soil indicating a release? |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 9. Are any potable wells located within 1/4 of a mile radius of the facility? |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 10. Is there a surface water body within 1/4 mile radius of the site? If yes, indicate distance: <u>1000'</u> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 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. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 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. |

Summary of OVA Readings

Closure Assessment Report Underground Storage Tank, Building 98 Naval Surface Warfare Center Coastal Systems Station Panama City, Florida

Hand Auger Sample No.	Depth (Feet)	Unfiltered (ppm)	Filtered (ppm)	Total Hydrocarbon Readings (ppm)
SS-1	5	7	5	2
SS-2	5	<1	<1	0
SS-3	5	79	42	37
SS-4	5	60	15	45
SS-5	6	17	4	13
SS-6	6	4	2	2

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 440
NAS Pensacola, FL 32508
Phone (850) 452-3180/3642
DSN 922-3180/3642
FAX (850) 452-2799/2387

Client: NPWC Engineering
Address: Bldg. 458, Code 400
NAS Pensacola, FL 32508
Phone #: (850) 452-4315
Contact: Paul Semmes

Analytical Report

601/602 Volatiles by Method 8260

Lab Report Number: 74947
Sample Date: 11/13/97
Received Date: 11/13/97
Sample Site: Panama City
Job Order No.: 139 6004

LAB Sample ID#	1- 74947			
Sample Name / Location	NAVCSS MW# 88			
Collector's Name	P. Keane			
Date & Time Collected	11/13/97 @ 1340			
Sample Type (composite or grab)	Grab			
Analyst	M. Chambers			
Date of Extraction / Initials	11/14/97 MC			
Date of Analysis	11/14/97			
Sample Matrix	GW			
Dilution	X 1			
Compound Name	1- 74947	units	Det. Limit	Flags
Benzene	17	ug/L	1	
Bromodichloromethane	BDL	ug/L	1	
Bromoform	BDL	ug/L	2	
Bromomethane	BDL	ug/L	3	
Carbon Tetrachloride	17	ug/L	1	
Chlorobenzene	BDL	ug/L	1	
Chloroethane	BDL	ug/L	1	
2-Chloroethylvinyl ether	BDL	ug/L	1	
Chloroform	BDL	ug/L	1	
Chloromethane	BDL	ug/L	1	
Dibromochloromethane	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	630	ug/L	10	
1,2-Dichloroethane	BDL	ug/L	1	
1,1-Dichloroethene	91	ug/L	1	
trans-1,2-Dichloroethene	BDL	ug/L	1	
1,2-Dichloropropane	BDL	ug/L	1	
cis-1,3-Dichloropropene	BDL	ug/L	1	
trans-1,3-Dichloropropene	BDL	ug/L	1	
Ethylbenzene	90	ug/L	1	
Methylene Chloride	BDL	ug/L	1	
Methyl-tert-butyl ether (MTBE)	BDL	ug/L	1	
1,1,2,2-Tetrachloroethane	BDL	ug/L	1	
Tetrachloroethene	BDL	ug/L	1	
Toluene	510	ug/L	10	
1,1,1-Trichloroethane	130	ug/L	1	
1,1,2-Trichloroethane	3	ug/L	1	
Trichloroethene	2	ug/L	1	
Trichlorofluoromethane	BDL	ug/L	1	
Vinyl Chloride	BDL	ug/L	1	
Xylenes (Total)	280	ug/L	1	

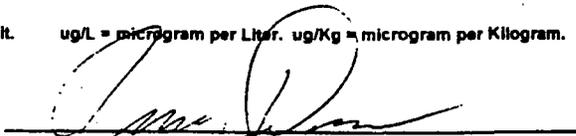
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
1,2-Dichloroethane-d4	75-133	121
Toluene-d8	86-119	104
Bromofluorobenzene	85-116	107

COMMENTS :

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

Approved by :



Jerry Deas, Laboratory Director

Date: 12/2/97

Report Generated

**Navy Public Works Center
Environmental Laboratory**

Analytical Report

610 PAH's by Method 8270

Bldg. 3887, Code 440
NAS Pensacola, FL 32508
Phone (850) 452-3180/3642
DSN 922-3180/3642
FAX (850) 452-2799/2387

Client: NPWC Engineering
Address: Bldg. 458, Code 400
NAS Pensacola, FL 32508
Phone #: (850) 452-4315
Contact: Paul Semmes

Lab Report Number: 74947
Sample Date: 11/13/97
Received Date: 11/13/97
Sample Site: Panama City
Job Order No.: 139 6004

LAB Sample ID#	1- 74947			
Sample Name / Location	NAVCSS MW # 98			
Collector's Name	P. Keane			
Date & Time Collected	11/13/97 @ 1340			
Sample Type (composites or grab)	Grab			
Analyst	J. Moore			
Date of Extraction / Initials	11/17/97 JJ			
Date of Analysis	11/21/97			
Sample Matrix	GW			
Dilution	X 1			
Compound Name	1- 74947	units	Det. Limit	Flags
Acenaphthene	3	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	
Fluoranthene	BDL	ug/L	2	
Fluorene	6	ug/L	2	
Indeno(1,2,3-cd)pyrene	BDL	ug/L	2	
1-Methylnaphthalene *	37	ug/L	2	
2-Methylnaphthalene	47	ug/L	3	
Naphthalene	48	ug/L	2	
Phenanthrene	3	ug/L	2	
Pyrene	BDL	ug/L	2	

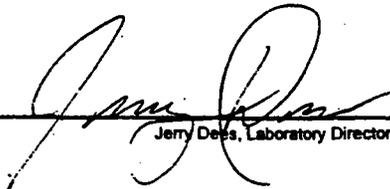
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
Nitrobenzene- d5	35-114	87
2-Fluorobiphenyl	43-116	91
Terphenyl -d14	33-141	70

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: 12/2/97

Report Generated

**Navy Public Works Center
Environmental Laboratory**

Bldg. 3887, Code 440
NAS Pensacola, FL 32508
Phone (850) 452-3180/3642
DSN 922-3180/3642
FAX (850) 452-2799/2387

Client: NPWC Engineering
Address: Bldg.458, Code 400
NAS Pensacola, FL 32508
Phone #: (850) 452-4315
Contact: Paul Semmes

Analytical Report

Ethylene Dibromide by Method 504

Lab Report Number: 74947
Sample Date: 11/13/97
Received Date: 11/13/97
Sample Site: Panama City
Job Order No.: 139 6004

LAB Sample ID#	1- 74947			
Sample Name / Location	NAVCSS MW# 98			
Collector's Name	BH/PK			
Date & Time Collected	11/13/97 @ 1340			
Sample Type (composite or grab)	Grab			
Analyst	M. Chambers			
Date of Extraction / Initials	11/20/97 MC			
Date of Analysis	11/21/97			
Sample Matrix	GW			
Dilution	X 5			
Compound Name	1- 74947	units	Det. Limit	Flags
Ethylene Dibromide	2.3	ug/L	0.1	

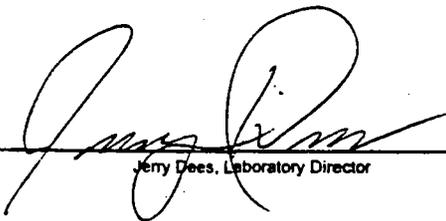
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
Tetra-Chloro-m-Xylene	54-140	90

COMMENTS :

BDL = Below Detection Limit ug/L = microgram per Liter. ug/Kg = microgram per Kilogram.

Approved by :



Jerry Dees, Laboratory Director

Date:

12/2/97

Report Generated

Navy Public Works Center

Environmental Laboratory

Bldg. 3887, Code 440
 NAS Pensacola, FL 32508
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 DSN 922-3180/3642
 FAX (850) 452-2799/2387

Client: NPWC Engineering
 Address: Bldg. 458, Code 400
 NAS Pensacola, FL 32508
 Phone #: (850) 452-4315
 Contact: Paul Semmes

Analytical Report

Petroleum Range Organics by FLPRO

Lab Report Number: 74947
 Sample Date: 11/13/97
 Received Date: 11/13/97
 Sample Site: Panama City
 Job Order No.: 139 6004

LAB Sample ID#	1- 74947			
Sample Name / Location	NAVCSS MW # 98			
Collector's Name	BH/PK			
Date & Time Collected	11/13/97 @ 1340			
Sample Type (composite or grab)	Grab			
Analyst	J. Moore			
Date of extraction / Initials	11/17/97 JJ			
Date of Analysis	11/25/97			
Sample Matrix	GW			
Dilution	x 5			
Parameter	1- 74947	units	Det. Limit	Flags
Petroleum Range Organics by FLPRO	7.6	mg/L	1.25	

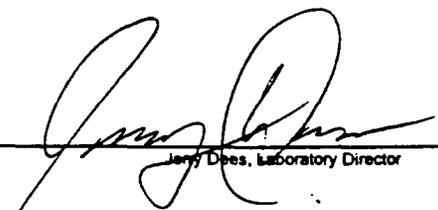
SURROGATE SPIKE RECOVERIES

	Acceptance Limits	Percent Recovery
ortho-Terphenyl	82-142 *	74
Nonatriacontane (C-39)	42-193 *	78

COMMENTS : * = Suggested surrogate recovery limits listed in the method. In-house laboratory limits are in the process of being determined.

BDL = Below Detection Limit. mg/L = milligram per Liter. mg/Kg = milligram per Kilogram.

Approved by :


 Jerry Dees, Laboratory Director

Date: 12/2/97

**Navy Public Works Center
Environmental Laboratory**

Bldg. 3887, Code 440
NAS Pensacola, FL 32508
Phone (850) 452-3180/3642
DSN 922-3180/3642
FAX (850) 452-2799/2387

Client: NPWC Engineering
Address: Bldg.458, Code 400
NAS Pensacola, FL 32508
Phone #: (850) 452-4315
Contact: Paul Semmes

Analytical Report

Total Lead by Method 239.2

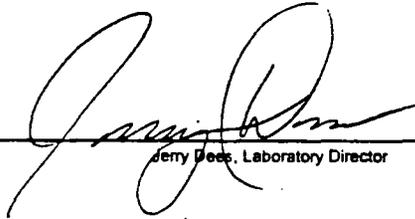
Lab Report Number: 74947
Sample Date: 11/13/97
Received Date: 11/13/97
Sample Site: Panama City
Job Order No.: 139 6004

LAB Sample ID#	1- 74947			
Sample Name / Location	NAVCSS MW # 98			
Collector's Name	P. Keane			
Date & Time Collected	11/13/97 @ 1340			
Sample Type (composite or grab)	Grab			
Analyst	B. Nelson			
Date of Analysis	11/17/97			
Sample Matrix	GW			
Dilution	X 1			
Element Name	1- 74947	units	Det. Limit	Flags
Lead	BDL	mg/L	0.003	

COMMENTS :

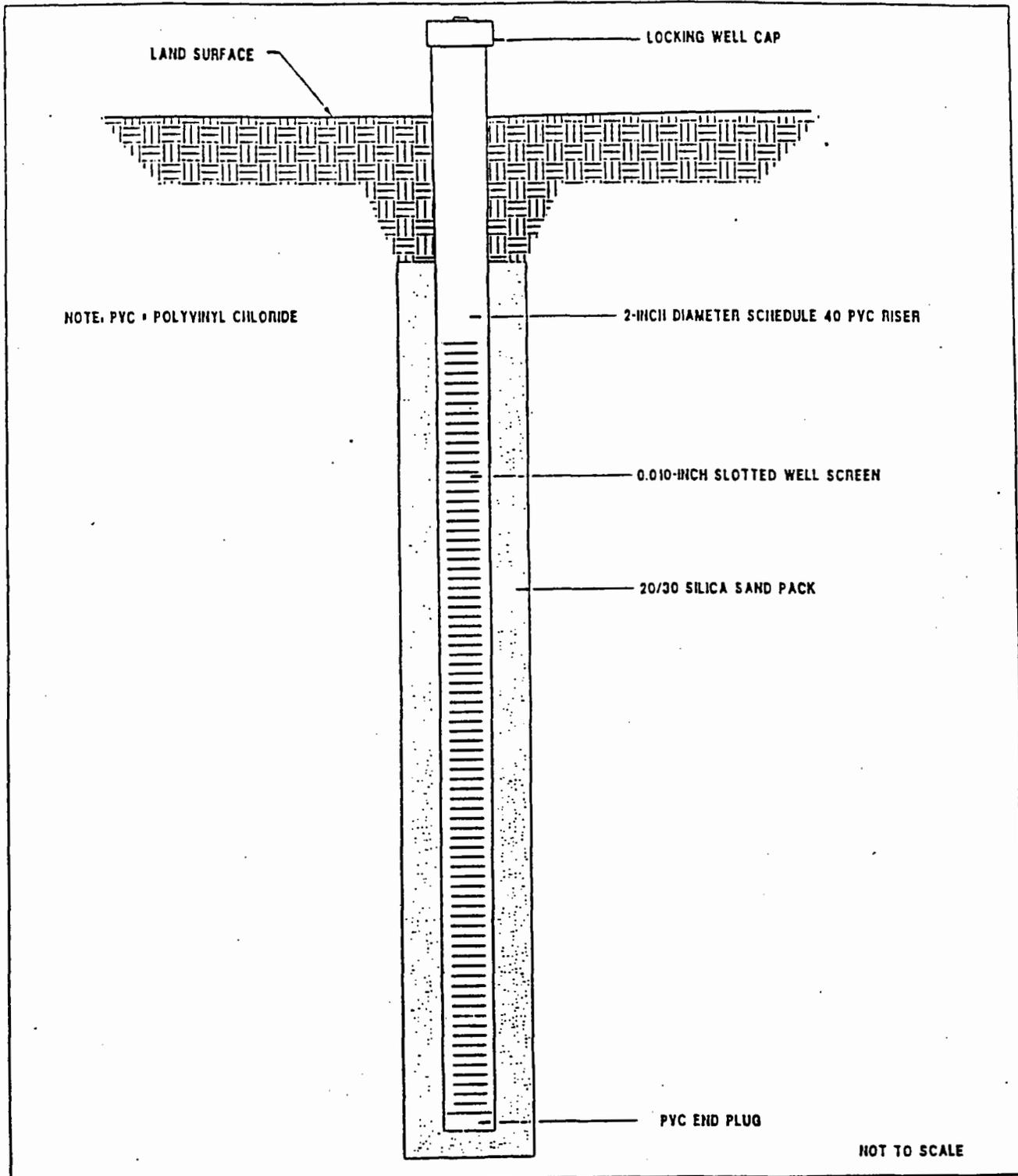
BDL = Below Detection Limit. mg/L = milligram per Liter. mg/Kg = milligram per Kilogram.

Approved by :


Jerry Dees, Laboratory Director

Date:

12/2/97
Report Generated



TYPICAL TEMPORARY MONITORING WELL
INSTALLATION DETAIL

ATTACHMENT F
Decontamination Certification

CERTIFICATE OF DECONTAMINATION

It is hereby certified that the following Storage Tanks located at the Naval Surface Warfare Center, Coastal Systems Station, Panama City, Florida have been decontaminated by the Navy Public Works Center (PWC), Pensacola, Florida:

Bldg 92	Bldg 110	Bldg 300	Bldg 371
Bldg 94 (TANK #52)	Bldg 129	Bldg 321 (TANK #322)	
Bldg 98	Bldg 146 (TANK #172)	Bldg 363	

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 unusable.


Signature
Paul R Semmes, PE
Environmental Engineer
Title
REGISTERED ENGINEER
FLORIDA
12/5/97
Date

ATTACHMENT G
Petroleum or Petroleum Product
Contamination Report



Florida Department of Environmental Regulation
 This Report Only • 2600 East Shore Road • Tallahassee, Florida 32309-2000

DATE: _____
 FACILITY NAME: _____
 FACILITY ADDRESS: _____
 COUNTY: _____

**Petroleum or Petroleum Product
 Contamination Report Form**

DER Facility ID: 038518667
 Facility Name: NSWC Coastal Systems Station
 Facility Address: 6703 West Hwy 98
Panama City, FL 32407-7001

County: Bay
 Other Name for this Site: Building #98 (Property Disposal Office) Heating Oil Tank
(550 GL) installed 1952.

Contact Person's Name: Mike Clayton
 Contact Person's Phone No.: (850) 235-5859
 Contact Person's Address: Coastal Systems Station, Code CP2SMC
6703 West Hwy 98, Panama City, FL 32407-7001

Date of Discovery: August 8, 1997
 Type of Product Discharged: Heating Oil (Diesel)
 Estimated Amount of Product Lost: Unknown
 How did Discharge occur? (Tank leak, Pipe leak, Truck Accident, Explosion, etc.) Overfill and holes in tank.

What has been done to prevent a further Discharge? Tank has been removed along with contaminated
soil down to the groundwater. Ground water analysis will dictate further
Contamination Assessment requirements.

To the best of my knowledge, all information on this form is true, accurate, and complete.

[Signature]
 Signature of Owner, Authorized Representative, Operator

U.S. Navy
 Print Name of Owner or Operator
 Date 8/26/97

Submit this form to the appropriate district office at the address below

KEEP A COPY OF THIS FORM FOR YOUR RECORDS.

APPENDIX B

SAR SUMMARY SHEET

SITE ASSESSMENT REPORT SUMMARY SHEET

Facility Name: Coastal Systems Station, Site 98 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: Diesel UST Date of Spill: Unknown

(2) Type of Product:	Gasoline Group	Gallons Lost	Kerosene Group	Gallons Lost
<input type="checkbox"/> Leaded	_____	_____	<input type="checkbox"/> Kerosene	_____
<input type="checkbox"/> Unleaded Regular	_____	_____	<input checked="" type="checkbox"/> Diesel	<u>~ Unknown</u>
<input type="checkbox"/> Unleaded Premium	_____	_____	<input type="checkbox"/> JP-4 Jet Fuel	_____
<input type="checkbox"/> Gasohol	_____	_____	<input type="checkbox"/> Jet A Fuel	_____
<input type="checkbox"/> Undetermined	_____	_____	<input type="checkbox"/> Unknown	_____

(3) Description of IRA: IRA soil excavation at tank bed. Soils excavated to top of water table Free product Removal: _____ (gals)
 Soil Removal: 2 (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: 183.8 benzene: 2.1 EDB: 0.050
 lead: 15.2 MTBE: <1.0 other: TRPH, NAPs, Vol. Organics

(6) Brief lithologic description: Orange to light brown sand, fine to medium grained to approximately 8 feet bls. Unit underlain by black and gray sands fine to medium grained sands to 30 feet. No significant lithologic variations across site.

(7) Areal and vertical extent of soils contamination defined (yes/no) Yes except beneath Building 98
 Highest current soil concentration (OVA): 4 (ppm) Gasoline and Kerosene Analytica Paramters: BDL (ppb)

(8) Lower aquifer contaminated? (yes/no) No Depth of vertical contamination: 14 to 20 ft bls

(9) Date of last complete round of groundwater sampling: 9/22/98 Date of last soil sampling: 9/22/98

(10) QAPP approved? (yes/no) Date: 8/24/98

(11) Direction (e.g. NNW) of surficial groundwater flow: east (Fig. 3-3 Section 3)

(12) Average depth to groundwater: 4 to 6 (ft)

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

(14) Estimated rate of groundwater flow: 0.05 (ft/day)

(15) Hydraulic gradient across site: 0.008 (ft/ft)

(16) Aquifer characteristics:	Values	Units	Method
Hydraulic conductivity	<u>2.09</u>	<u>ft/day</u>	<u>Bouwer & Rice, 1976</u>
Storage coefficient	<u>-</u>	<u>ft/ft</u>	<u>-</u>
Aquifer thickness	<u>57</u>	<u>ft</u>	<u>Effective aquifer thickness taken as depth from surficial aquifer to top of Intracoastal Formation (literature)</u>
Effective soil porosity	<u>30</u>	<u>%</u>	<u>Literature</u>

Transmissivity

890

gal/day/ft

T = Kb

(17) Other remarks:

AOC1 and SWMU9 are located upgradient of Site 98. Dissolved plume(s) from these facilities have impacted the site.

APPENDIX C

SOIL BORING LOGS



SOUTHNAVFAC

LOG OF BORING SB01

PROJECT NO: 7766	PROJECT NAME: CTO D047 Site 98
PROJECT LOCATION: Navy Coastal System Station	DATE DRILLED: 5/19/98
DRILLING COMPANY: JEG	SURFACE ELEVATION: Feet
DRILLING METHOD: Direct Push	BORING DIAMETER: Inches 2.5
DRILLING RIG: Stratopack	GEOLOGIST: Gerald Goode

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)			GRAPHIC LOG Penetration	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample Filtered	B. Zone	Borehole				
0-1	SS-1	DP	no/wd	4		6	60	concrete surface @ 8" thick, underlain by sand, white, fine grained, clean, dry	
1-5	SS-2		no/wd	2		4	100 SP	Sand, Orange, fine to medium grained, trace of fines, dry	
5-10	SS-3		no/wd E.O.B.	2		4	900 SP	Sand, light brown, fine to medium grained, trace of fines, saturated at 6' bls. (at 8' bls sand black, fuel like odor)	



SOUTHNAVFAC

LOG OF BORING SBO2

Page 1 of 1

PROJECT NO: 7766

PROJECT NAME: CTD 0047 Side 98

PROJECT LOCATION: Navy Coastal Systems Station

DATE DRILLED: 5/19/98

DRILLING COMPANY: TEG

SURFACE ELEVATION: Feet

DRILLING METHOD: Direct Push

BORING DIAMETER: Inches 2.5

DRILLING RIG: Strataprobe

GEOLOGIST: Gerald Goode

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)			USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			B. Zone	Borehole	Drill B. Z.			
0-5	SS-1	DP	no data	10	10	70	Concrete 8" thick. Sand, white, fine grained, clean, dry	
5-10	SS-2		no data	10	10	100	SP Sand, orange fine to medium grained, trace of fines, dry	
10-15	SS-3		no data	10	10	100	SP Sand, light gray, fine to medium grained, moist Saturated at 7' bls	
15-20			O.B.				8 to 9' Sand, black, (Fuel stained ? - fuel like odor)	



PROJECT NO: 7766

PROJECT NAME: CTO 0047 Site 98

PROJECT LOCATION: Navy Coastal Systems Station

DATE DRILLED: 5/19/98

DRILLING COMPANY: TEG

SURFACE ELEVATION: Feet

DRILLING METHOD: Direct Push

BORING DIAMETER: Inches 2.6

DRILLING RIG: Strada probe

GEOLOGIST: Gerald Goode

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample #/ft	B. Zone	Borehole	Drill B. Z.			
5	SS-1	↑	no/no	6		6	70 SW	Concrete 8" thick Sand, white, fine grained, clean, dry	
	SS-2	↑	no/no	6		6	SP	Sand, orange fine to medium grained, trace of fines, low dry	
	SS-3	*	no/no	6		6	SP	wet at 7' b/s Sand, dark gray to black (8 to 9' b/s), fuel like odor, wet	
10	SS-4	*				100			
	SS-5	*				100			
	SS-6	↑				100	SP	Sand, dark gray, fine to medium grained, trace of fines, saturated	
20	SS-7	↑				100			
	SS-8	*				100			
25	SS-9	*		10		100			
	SS-10	*				100			
30		↓				100			



SOUTHNAVFAC

LOG OF BORING SB04

Page 1 of 1

PROJECT NO: 7766
 PROJECT LOCATION: Navy Coastal Systems Station
 DRILLING COMPANY: TEG
 DRILLING METHOD: Disc Cut Push
 DRILLING RIG: Shasta probe

PROJECT NAME: CTO 0047 Site 98
 DATE DRILLED: 5/19/98
 SURFACE ELEVATION: Feet
 BORING DIAMETER: Inches 2.5
 GEOLOGIST: Gerald Good

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (dpm)			% GRAPHIC LOG RECOVERY	USCS/RGD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Unfiltered Sample Filtered	B. Zone	Borehole				
0									
0.5	SS-1		wp/wa			80	Concrete 8" thick,		
1.5	SS-2		wp/wa			80	Sand, white, fine grained, clean dry		
2.5	SS-3		wp/wa			80	Sand Orange, fine to medium grained, trace of fines, dry		
3.5						80	Sand, light gray, fine to medium grained moist		
7.0							Subsided at 7' bls, Sand, black, fuel like odor 8 to 9' bls		



SOUTHNAVFAC

LOG OF BORING SB05

Page 1 of 1

PROJECT NO: 7766	PROJECT NAME: CTD 0047 Side 9B
PROJECT LOCATION: Navy Coastal Systems Station	DATE DRILLED: 5/19/98
DRILLING COMPANY: TEG	SURFACE ELEVATION: Feet
DRILLING METHOD: Direct Push	BORING DIAMETER: Inches 2.5
DRILLING RIG: Strada probe	GEOLOGIST: Gerald Goode

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				% GRAVIMETRIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
5	SS-1 SS-2	AP	no/pa				50 SP	Asphalt 1 inch thick.		
5	SS-2		no/pa				80 SP	Sand, orange fine to medium grained, trace of fines, dry		
10	SS-3		no/pa				100 SP	Sand, brown to light gray, fine to medium grained, trace of fines, moist		
			E.O.B.					Saturated at 7' bls - dark gray sands		



PROJECT NO: 7766

PROJECT NAME: CTO 0047 Site 98

PROJECT LOCATION: Navy Coastal Systems Station

DATE DRILLED: 5/19/98

DRILLING COMPANY: TEG

SURFACE ELEVATION: Feet

DRILLING METHOD: Direct Push

BORING DIAMETER: Inches 2.5

DRILLING RIG: Strata Probe

GEOLOGIST: Gerald Goode

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)			GRAPHIC LOG Recovery	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Unfiltered Sample Filtered	B. Zone	Borehole				
0									
0	SS-1	ND ND	18		18	70		Asphalt 2" thick	
5	SS-2	ND ND	18		18	80	SP	Sand, black organic rich,	
5	SS-3	ND ND	18		18	80	SP	Sand, Orange, fine to medium grained, trace of fines, dry	
10		ND ND	18		18	80	SP	Sand, light brown, moist	
10									
15								Sand, dark brown, fine to medium grained, trace of fines saturated.	
20									
25									
30									
35									
40									



SOUTHNAVFAC

LOG OF BORING SB07

Page 1 of 1

PROJECT NO: 7766 PROJECT NAME: CTD 0047 Sid 98
 PROJECT LOCATION: Navy Coastal System Station DATE DRILLED: 5/19/98
 DRILLING COMPANY: TE6 SURFACE ELEVATION: Feet
 DRILLING METHOD: Hand-Auger BORING DIAMETER: Inches 2.5
 DRILLING RIG: — GEOLOGIST: Gerald Goode

DEPTH feet	SAMPLE NUMBER	BLOMS/FT.	PID (ppm)				GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
5	SS-1	Grab	nd/no					concrete 8" thick		
	SS-2	Grab	nd/no				SP	Sand, Orange, Fine to medium grained, trace of fines, dry		
	SS-3	Grab	nd/no				SP	Sand, light brown, Fine to medium grained, clean, wet at 7' bls		
			C.O.B.							



SOUTHNAVFAC

LOG OF BORING

PCY-98-
MW01

Page 1 of 1

PROJECT NO: C70 0047 / 7766

PROJECT NAME: site 98

PROJECT LOCATION: Coastal System Station

DATE DRILLED: 9/15/98

DRILLING COMPANY: Environmental Drilling Services

SURFACE ELEVATION: Feet

DRILLING METHOD: 4 1/2" Hollow Stem Auger

BORING DIAMETER: Inches 8

DRILLING RIG: BK 81

GEOLOGIST: Gerald Gooder

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/RGD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
0										
5										
10										
15		41								
20										
25										
30										
35										
40										

Due to close proximity to DPT borings the well was blind drilled to completion.

Sand, light brown, fine to medium grained, wet at @ 6' bls

41 . 0 . B .



SOUTHNAVFAC

LOG OF BORING

PCY-98-MW02

Page (of)

PROJECT NO: *PTO 0047/7766*
 PROJECT LOCATION: *Coastal System Station*
 DRILLING COMPANY: *Environmental Drilling Services*
 DRILLING METHOD: *4 1/4" Hollow Stem Auger*
 DRILLING RIG: *BK81*

PROJECT NAME: *98*
 DATE DRILLED: *9/15/98*
 SURFACE ELEVATION: *Feet*
 BORING DIAMETER: *Inches 8*
 GEOLOGIST: *Gerald Coode*

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
0										
5								<p>Due to close proximity to DPT boring, the well was blind drilled to completion.</p> <p>Sand, light brown, fine to medium grained, buff brown to gray at water table @ 7' 6".</p>		
10										
15										
20										
25										
30										
35										
40										

E.O.B.



SOUTHNAVFAC

LOG OF BORING

PCY-98-
MW03

Page 1 of 1

PROJECT NO: CTO 0047 / 7766
 PROJECT LOCATION: Coastal Systems Station
 DRILLING COMPANY: Environmental Drilling Services
 DRILLING METHOD: Hollow Stem Auger 4 1/2" ID
 DRILLING RIG: (K8)

PROJECT NAME: Site 98
 DATE DRILLED: 9/15/98
 SURFACE ELEVATION: Feet
 BORING DIAMETER: Inches 8
 GEOLOGIST: Gerald Gooder

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
0										
5								Due to close proximity to PPT borings the well was blind drilled to completion. Sand light brown, fine to medium grain becoming block at water table @ 6' b/s.		
10										
15										
20										
25										
30										
35										
40										

E.O.S.

5



SOUTHNAVFAC

LOG OF BORING

04-98
mwo

PROJECT NO: CTD 0047 / 7766
 PROJECT LOCATION: Coastal Systems Station
 DRILLING COMPANY: Environmental Drilling Services
 DRILLING METHOD: 4 1/4 Hollow Stem Auger
 DRILLING RIG: BKB1

PROJECT NAME: S: L 98
 DATE DRILLED: 9/16/98
 SURFACE ELEVATION: Feet
 BORING DIAMETER: Inches 8
 GEOLOGIST: Gerald Good

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
0										
5								Due to close proximity to DPT borings the borings will be blind drilled to completion.		
10								Sand light brown, fine to medium grain underlain by sand, light gray, fine to medium grain, with @ 5' bls.		
15								encounter sand, black, fine to medium grained at @ 11' bls.		
20								E.O.B		
25										
30										
35										



SOUTHNAVFAC

LOG OF BORING

Pcy-98-
MWSO

PROJECT NO: *CTD 0047*
 PROJECT LOCATION: *Coastal Systems Station*
 DRILLING COMPANY: *Environmental Drilling Services*
 DRILLING METHOD: *Shallow Slam Auger w/ 4" ID*
 DRILLING RIG: *BK8*

PROJECT NAME: *Site 98*
 DATE DRILLED: *9/16/98*
 SURFACE ELEVATION: *Feet*
 BORING DIAMETER: *Inches 8*
 GEOLOGIST: *Gerald Goode*

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
0										
5										
10										
15										
20										
25										
30										
35										
40										

*Due to close proximity to DPT
 vertical assessment boring the
 well will be blind drilled
 to completion*

E.O.B



SOUTHNAVFAC

LOG OF BORING

Proj - 98-
MW 01

Page 1 of 1

PROJECT NO: C70 0047 / 7766	PROJECT NAME: site 98
PROJECT LOCATION: Coastal System Station	DATE DRILLED: 9/15/78
DRILLING COMPANY: Environmental Drilling Services	SURFACE ELEVATION: Feet
DRILLING METHOD: 4 1/2" Hollow Stem Auger	BORING DIAMETER: Inches 8
DRILLING RIG: BKB1	GEOLOGIST: Gerald Gooder

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
0										
5										
10										
15										
20										
25										
30										
35										

Due to close proximity to DPT borings the well was blind drilled to completion.

Sand, light brown, fine to medium grained, wet at @ 6' b/s

E.O.B.



SOUTHNAVFAC

LOG OF BORING

Ply-78
MWOZ

Page (of)

PROJECT NO: 1 TO 0047/7766
PROJECT LOCATION: Coastal Systems Station
DRILLING COMPANY: Environmental Drilling Services
DRILLING METHOD: 4 1/2" Hollow Stem Auger
DRILLING RIG: BK81

PROJECT NAME: 98
DATE DRILLED: 9/15/98
SURFACE ELEVATION: Feet
BORING DIAMETER: Inches 8
GEOLOGIST: Gerald Coode

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
0										
5								Due to close proximity to DPT boring, the well was blind drilled to completion.		
10								Sand, light brown, fine to medium grained, bank brown to gray at water table @ 7'6".		
15			E	O	B					
20										
25										
30										
35										
40										



SOUTHNAVFAC

LOG OF BORING

ply. 98.
MWO3

PROJECT NO: CTO 0047 / 7766	PROJECT NAME: Site 98
PROJECT LOCATION: Coastal Systems Station	DATE DRILLED: 9/15/98
DRILLING COMPANY: Environmental Drilling Services	SURFACE ELEVATION: Feet
DRILLING METHOD: Hollow Stem Auger 4 1/2" ID	BORING DIAMETER: Inches 8
DRILLING RIG: (K8)	GEOLOGIST: Gerald Gooder

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
0										
5										
10										
15										
20										
25										
30										
35										

Due to close proximity to PPT borings the well was blind drilled to completion. Soil light brown, fine to medium grained becoming block at water table @ 6' b/s.

E.O.S

5



SOUTHNAVFAC

LOG OF BORING

Plg-98
MWSP

PROJECT NO: <i>CTD 0047</i>	PROJECT NAME: <i>Site 98</i>
PROJECT LOCATION: <i>Coastal Systems Station</i>	DATE DRILLED: <i>9/16/98</i>
DRILLING COMPANY: <i>Environmental Drilling Services</i>	SURFACE ELEVATION: <i>Feet</i>
DRILLING METHOD: <i>Shallow Slam Auger 4 1/2 ID</i>	BORING DIAMETER: <i>Inches 8</i>
DRILLING RIG: <i>BK 81</i>	GEOLOGIST: <i>Gerald Good</i>

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
5								<p>Due to close proximity to DPT vertical assessment boring the well will be blind drilled to completion</p> <p>E.O.B</p>		
10										
20										
25										
30										
35										

APPENDIX D

HEADSPACE METHODOLOGY FOR DETERMINING SOIL ORGANIC VAPOR CONCENTRATIONS

HEADSPACE METHODOLOGY FOR DETERMINING SOIL ORGANIC VAPOR CONCENTRATION

Soil headspace readings were obtained utilizing the following method which conforms to the requirements of Chapter 62-770.200(8), F.A.C.

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 Chapter 62-770.200(2), corrected headspace levels in excess of 50 ppm is defined as excessively contaminated soil for diesel contaminated soil.

APPENDIX E

PRE-BURN SOIL LABORATORY DATA SHEETS



Report of Analysis

Client Sample ID: IDW-SOIL-DRUMB	Date Sampled: 05/28/98
Lab Sample ID: F2458-3	Date Received: 05/29/98
Matrix: SO - Soil	Percent Solids: 92.5
Method: EPA 8100	
Project: Site 307-CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	105980.D	2	06/03/98	NF	06/02/98	OP390	GIJ254
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	720	ug/kg	
208-96-8	Acenaphthylene	ND	720	ug/kg	
120-12-7	Anthracene	ND	720	ug/kg	
56-55-3	Benzo(a)anthracene	ND	720	ug/kg	
50-32-8	Benzo(a)pyrene	ND	720	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	720	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	720	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	720	ug/kg	
218-01-9	Chrysene	ND	720	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	720	ug/kg	
206-44-0	Fluoranthene	ND	720	ug/kg	
86-73-7	Fluorene	ND	720	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	720	ug/kg	
91-20-3	Naphthalene	ND	720	ug/kg	
90-12-0	1-Methylnaphthalene	ND	720	ug/kg	
91-57-6	2-Methylnaphthalene	ND	720	ug/kg	
85-01-8	Phenanthrene	ND	720	ug/kg	
129-00-0	Pyrene	ND	720	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	84%		35-125%
84-15-1	o-Terphenyl	90%		35-135%

(a) Elevated detection limits due to matrix interference.

<p>ND = Not detected</p> <p>RDL = Reported Detection Limit</p> <p>E = Indicates value exceeds calibration range</p>	<p>J = Indicates an estimated value</p> <p>B = Indicates analyte found in associated method blank</p> <p>N = Indicates presumptive evidence of a compound</p>
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Report of Analysis

Client Sample ID: IDW-SOIL-DRUMB	
Lab Sample ID: F2458-3	Date Sampled: 05/28/98
Matrix: SO - Soil	Date Received: 05/29/98
Method: FLORIDA-PRO	Percent Solids: 92.5
Project: Site 307-CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P00821.D	10	06/03/98	NF	06/01/98	OP388	GOP33
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	345	90	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	92%		40-140%	

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

Report of Analysis

Client Sample ID: IDW-SOIL-DRUMB	Date Sampled: 05/28/98
Lab Sample ID: F2458-3	Date Received: 05/29/98
Matrix: SO - Soil	Percent Solids: 92.5
Method: SW846 8021B	
Project: Site 307-CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	EF006294.D	100	06/08/98	RAW	n/a	n/a	GEF140
Run #2							

VOA PPL List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	210	ug/kg	
75-25-2	Bromoform	ND	210	ug/kg	
75-27-4	Bromodichloromethane	ND	210	ug/kg	
74-83-9	Bromomethane	ND	210	ug/kg	
56-23-5	Carbon tetrachloride	ND	210	ug/kg	
108-90-7	Chlorobenzene	ND	210	ug/kg	
75-00-3	Chloroethane	ND	210	ug/kg	
67-66-3	Chloroform	ND	210	ug/kg	
74-87-3	Chloromethane	ND	210	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	210	ug/kg	
124-48-1	Dibromochloromethane	ND	210	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	210	ug/kg	
75-34-3	1,1-Dichloroethane	ND	210	ug/kg	
107-06-2	1,2-Dichloroethane	ND	210	ug/kg	
75-35-4	1,1-Dichloroethene	ND	210	ug/kg	
156-60-5	trans-1,2-Dichloroethene	ND	210	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	210	ug/kg	
78-87-5	1,2-Dichloropropane	ND	210	ug/kg	
100-41-4	Ethylbenzene	ND	210	ug/kg	
75-09-2	Methylene chloride	ND	1000	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	210	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	210	ug/kg	
127-18-4	Tetrachloroethene	ND	210	ug/kg	
108-88-3	Toluene	ND	210	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	210	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	210	ug/kg	
79-01-6	Trichloroethene	ND	210	ug/kg	
75-69-4	Trichlorofluoromethane	ND	210	ug/kg	
75-01-4	Vinyl chloride	ND	210	ug/kg	
110-75-8	2-Chloroethyl vinyl ether	ND	210	ug/kg	
541-73-1	1,3-Dichlorobenzene	ND	210	ug/kg	
106-46-7	1,4-Dichlorobenzene	ND	210	ug/kg	
95-50-1	1,2-Dichlorobenzene	ND	210	ug/kg	
1330-20-7	Xylenes (total)	ND	630	ug/kg	
156-59-2	cis-1,2-Dichloroethene	ND	210	ug/kg	

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



Report of Analysis

Page 2 of 2

Client Sample ID: IDW-SOIL-DRUMB	Date Sampled: 05/28/98
Lab Sample ID: F2458-3	Date Received: 05/29/98
Matrix: SO - Soil	Percent Solids: 92.5
Method: SW846 8021B	
Project: Site 307-CSS, Panama City	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	EF006294.D	100	06/08/98	RAW	n/a	n/a	GEF140
Run #2							

VOA PPL List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
74-97-5	Bromochloromethane	80%		50-150%
75-29-6	2-Chloropropane	86%		50-150%
98-08-8	aaa-Trifluorotoluene	91%		50-150%
462-06-6	Fluorobenzene	87%		50-150%
625-98-9	1-Chloro-3-fluorobenzene	93%		50-150%
625-98-9	1-Chloro-3-fluorobenzene	96%		50-150%

(a) En Core sampler was not properly capped; results are considered minimum values.

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID: IDW-SOIL-DRUMB	Date Sampled: 05/28/98
Lab Sample ID: F2458-3	Date Received: 05/29/98
Matrix: SO - Soil	Percent Solids: 92.5
Project: Site 307-CSS, Panama City	

General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Solids, Percent	92.5		%	1	06/01/98 EP	EPA 160.3 M
Total Organic Halides	< 10	10	mg/kg	1	06/12/98 ANJ	SW846 9020 M

RDL = Reported Detection Limit



Report of Analysis

Client Sample ID: IDW-SOIL-DRUMB	
Lab Sample ID: F2458-3	Date Sampled: 05/28/98
Matrix: SO - Soil	Date Received: 05/29/98
	Percent Solids: 92.5
Project: Site 307-CSS, Panama City	

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Arsenic	<1.1	1.1	mg/kg	1	06/01/98	06/02/98 JK	SW846 6010A
Barium	<22	22	mg/kg	1	06/01/98	06/02/98 JK	SW846 6010A
Cadmium	<0.43	0.43	mg/kg	1	06/01/98	06/02/98 JK	SW846 6010A
Chromium	3.0	1.1	mg/kg	1	06/01/98	06/02/98 JK	SW846 6010A
Lead	20.3	11	mg/kg	1	06/01/98	06/02/98 JK	SW846 6010A
Mercury	<0.18	0.18	mg/kg	1	06/01/98	06/02/98 JK	SW846 7471A
Selenium	<11	11	mg/kg	1	06/01/98	06/02/98 JK	SW846 6010A
Silver	<1.1	1.1	mg/kg	1	06/01/98	06/02/98 JK	SW846 6010A

RDL = Reported Detection Limit

APPENDIX F

MONITORING WELL COMPLETION LOGS

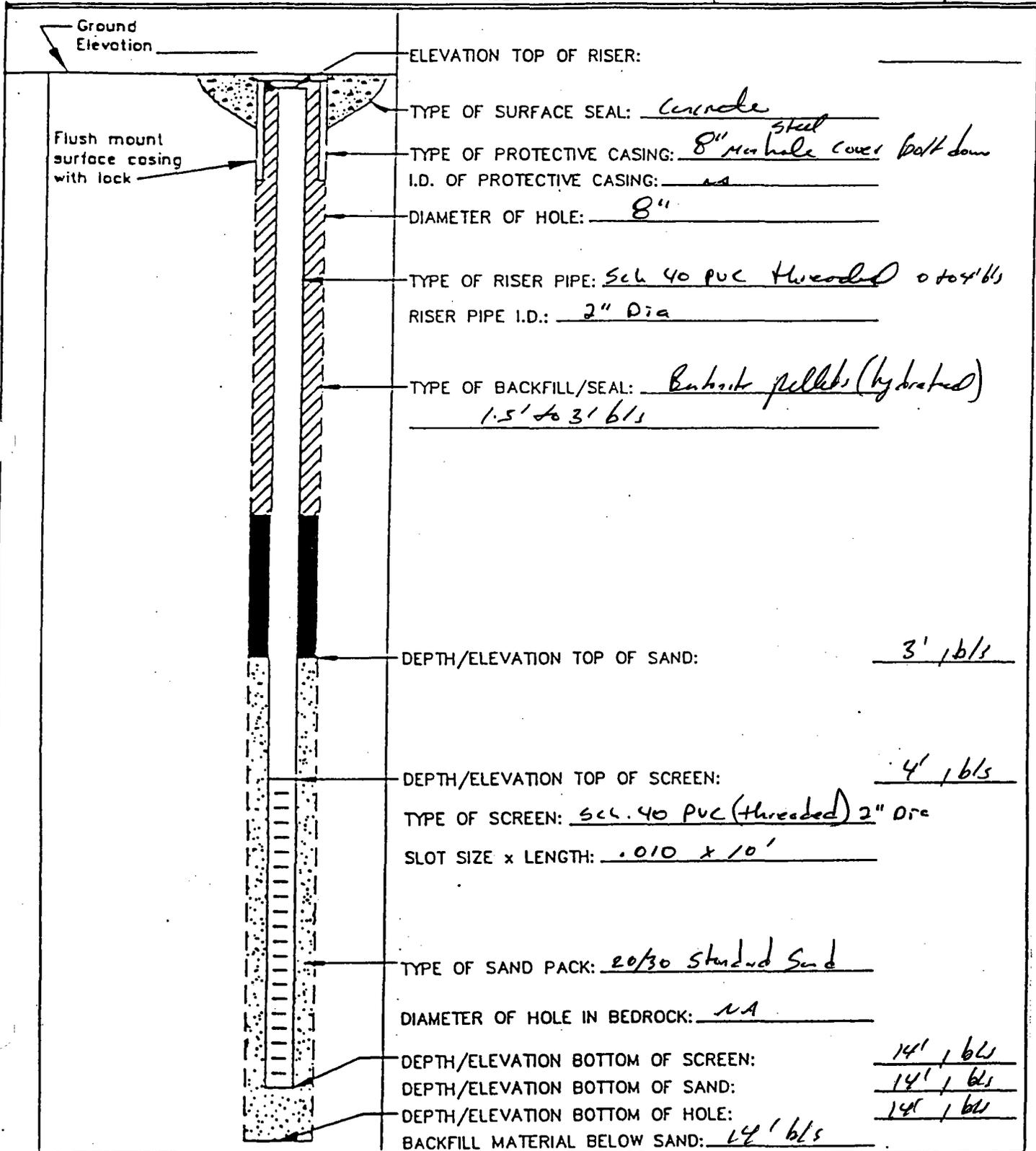


MONITORING WELL SHEET

Coastal System Station -

PROJECT CT00047 LOCATION Site 98
 PROJECT NO. 7766 BORING PCY-98-MW01
 ELEVATION _____ DATE 9/15/98
 FIELD GEOLOGIST Cerald Goode

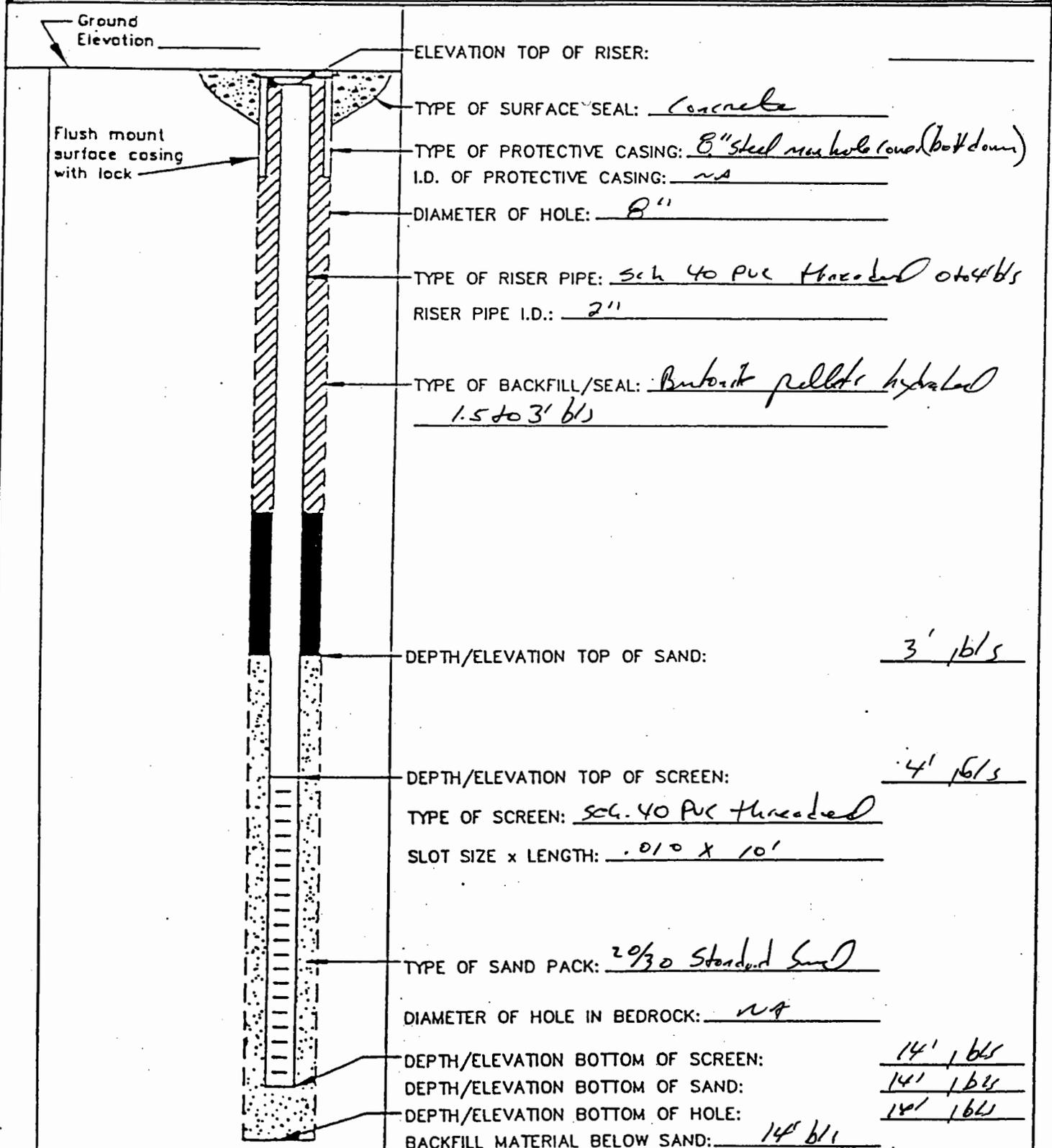
DRILLER Environmental Drilling Services
 DRILLING METHOD Hollow Stem Auger
 DEVELOPMENT METHOD Section Pump





MONITORING WELL SHEET

PROJECT <u>CTD 0047</u>	LOCATION <u>Coastal System Station side 9B</u>	DRILLER <u>Environmental Drilling Service</u>
PROJECT NO. <u>7766</u>	BORING <u>PLY-98-mw02</u>	DRILLING METHOD <u>Bottom Star Auger</u>
ELEVATION _____	DATE <u>9/15/98</u>	DEVELOPMENT METHOD <u>Suction Pump</u>
FIELD GEOLOGIST <u>Gerald Goode</u>		



ELEVATION TOP OF RISER: _____

TYPE OF SURFACE SEAL: Concrete

TYPE OF PROTECTIVE CASING: 8" steel rebar hole (over bolt down)

I.D. OF PROTECTIVE CASING: NA

DIAMETER OF HOLE: 8"

TYPE OF RISER PIPE: Sch 40 PVC threaded 0.465

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: Butonite pellets hydrated 1.5 to 3' b/s

DEPTH/ELEVATION TOP OF SAND: 3' 16/5

DEPTH/ELEVATION TOP OF SCREEN: 4' 16/5

TYPE OF SCREEN: sch. 40 PVC threaded

SLOT SIZE x LENGTH: .010 x 10'

TYPE OF SAND PACK: 20/30 Standard Sand

DIAMETER OF HOLE IN BEDROCK: NA

DEPTH/ELEVATION BOTTOM OF SCREEN: 14' 16/5

DEPTH/ELEVATION BOTTOM OF SAND: 14' 16/5

DEPTH/ELEVATION BOTTOM OF HOLE: 18' 16/5

BACKFILL MATERIAL BELOW SAND: 14' b/s



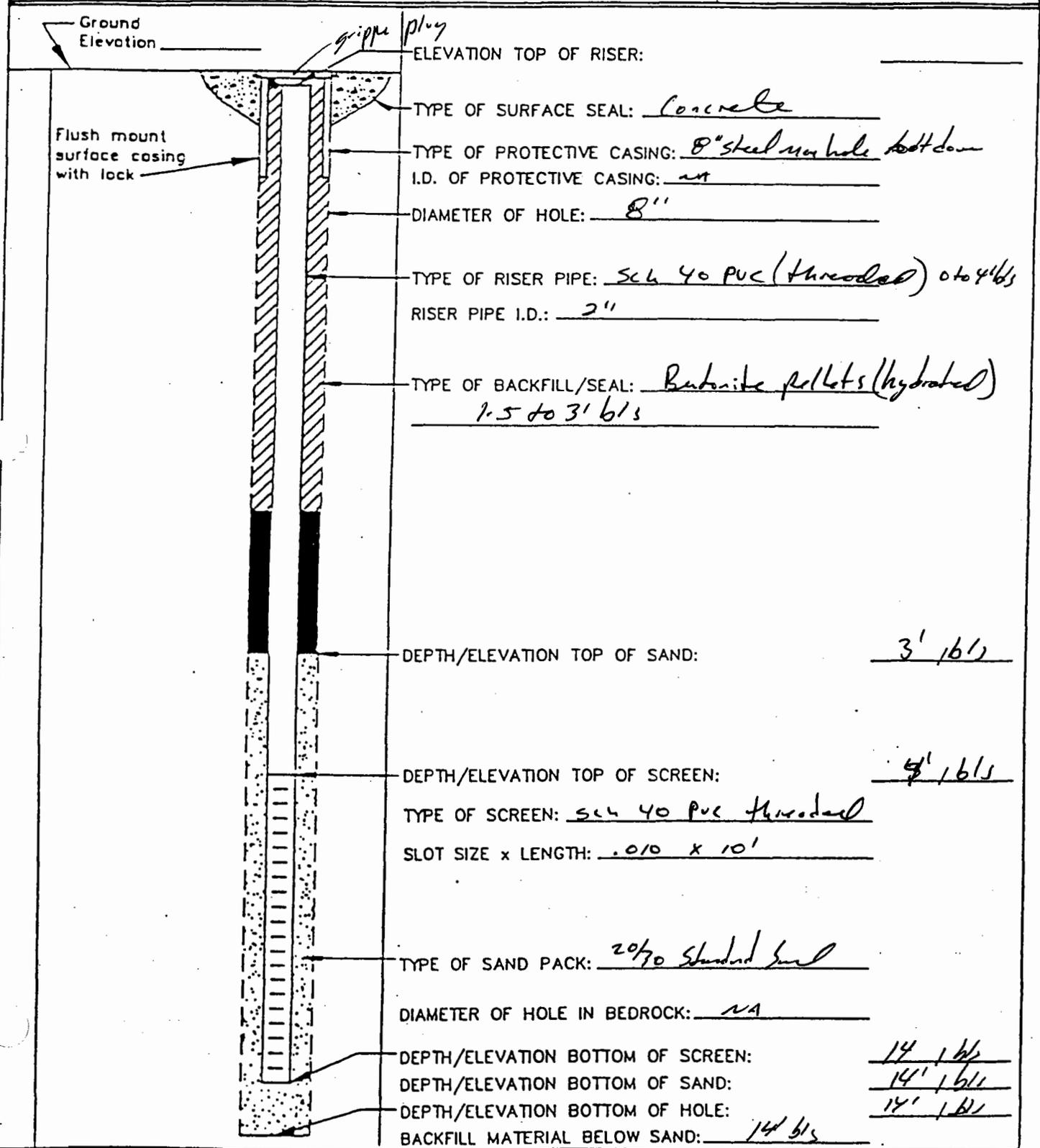
MONITORING WELL SHEET

Coastal System Station

PROJECT CTO 0047
 PROJECT NO. 7766
 ELEVATION _____
 FIELD GEOLOGIST Gerald Coode

LOCATION Site 98
 BORING PCY-98-MW03
 DATE 9/15/98

DRILLER Environmental Drilling Service
 DRILLING METHOD Hollow Stem Auger
 DEVELOPMENT METHOD Suction Pump





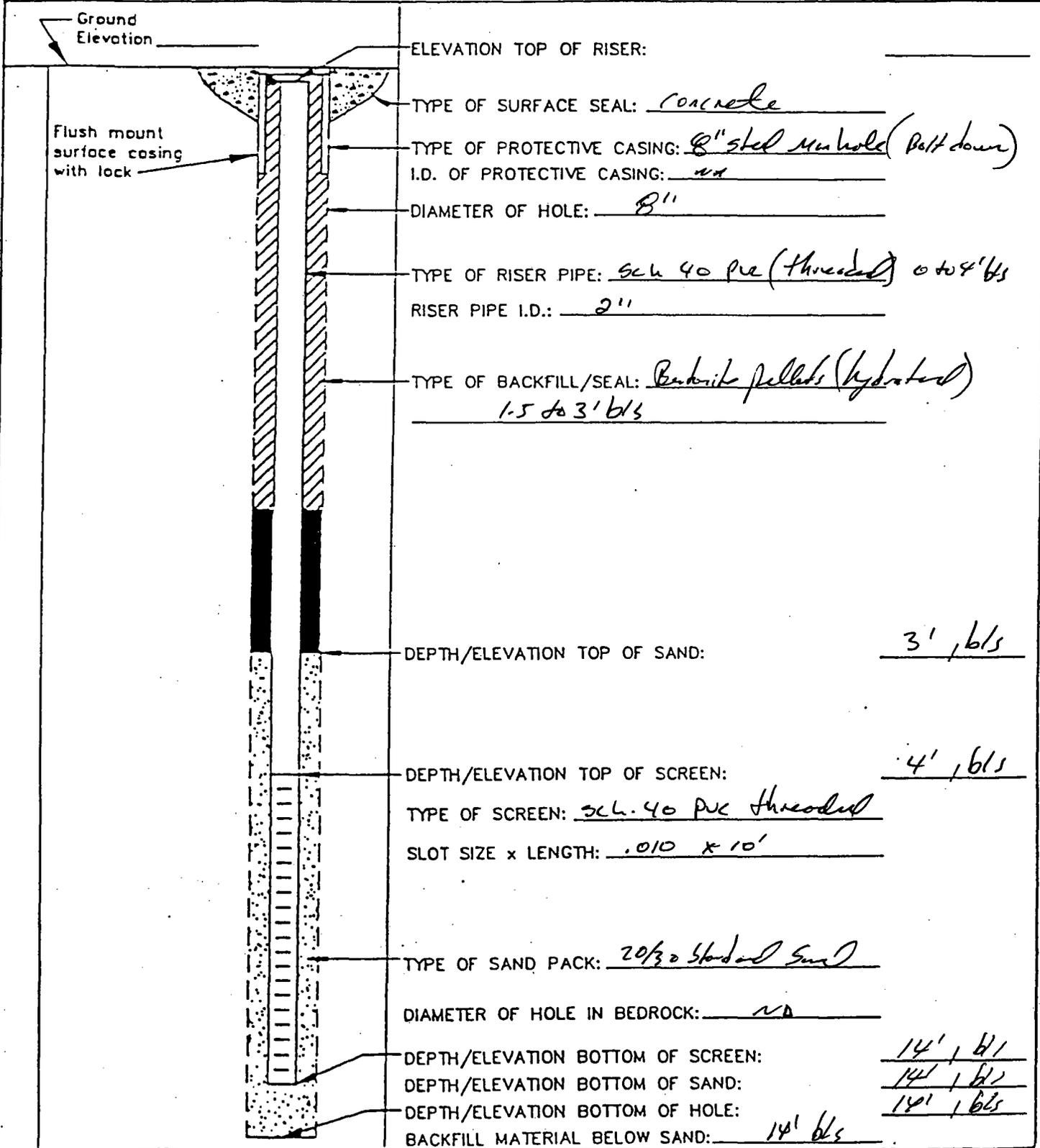
MONITORING WELL SHEET

Coastal Systems Station

PROJECT CTO 0047
 PROJECT NO. 7766
 ELEVATION _____
 FIELD GEOLOGIST Gerald Goodie

LOCATION Site 58
 BORING PLY-58-MW04
 DATE 9/16/98

DRILLER Environmental Drilling Services
 DRILLING _____
 METHOD 1 1/2" Dia. Auger
 DEVELOPMENT _____
 METHOD Suction Pump



ELEVATION TOP OF RISER: _____

TYPE OF SURFACE SEAL: concrete

TYPE OF PROTECTIVE CASING: 8" steel man hole (bolt down)

I.D. OF PROTECTIVE CASING: na

DIAMETER OF HOLE: 8"

TYPE OF RISER PIPE: SCH 40 PVC (threaded) 6 to 8' b/s

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: Benrite pellets (hydrated)
1.5 to 3' b/s

DEPTH/ELEVATION TOP OF SAND: 3' b/s

DEPTH/ELEVATION TOP OF SCREEN: 4' b/s

TYPE OF SCREEN: SCH 40 PVC threaded

SLOT SIZE x LENGTH: .010 x 10'

TYPE OF SAND PACK: 20/30 Standard Sand

DIAMETER OF HOLE IN BEDROCK: na

DEPTH/ELEVATION BOTTOM OF SCREEN: 14' b/s

DEPTH/ELEVATION BOTTOM OF SAND: 14' b/s

DEPTH/ELEVATION BOTTOM OF HOLE: 18' b/s

BACKFILL MATERIAL BELOW SAND: 14' b/s



MONITORING WELL SHEET

Coastal Systems Station

PROJECT <u>COO 0047</u>	LOCATION <u>Site 58</u>	DRILLER <u>Environmental Drilling</u>
PROJECT NO. <u>7766</u>	BORING <u>DY-98-MWSD</u>	DRILLING <u>Service</u>
ELEVATION _____	DATE <u>9/16/98</u>	METHOD <u>Hollow Stem Auger</u>
FIELD GEOLOGIST <u>Gerald Goodo</u>		DEVELOPMENT _____
		METHOD <u>Section Proof</u>

Ground Elevation _____

Flush mount surface casing with lock

ELEVATION TOP OF RISER: _____

TYPE OF SURFACE SEAL: Concrete

TYPE OF PROTECTIVE CASING: 8" Steel manhole bolt down

I.D. OF PROTECTIVE CASING: NA

DIAMETER OF HOLE: 8"

TYPE OF RISER PIPE: SCL 40 PVC 0 to 25' b/s

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: Type I Portland cement with 10% bentonite mixture 20.5' to 26' b/s

Fine Sand 30' b/s - 20.5' to 20.5' b/s

DEPTH/ELEVATION TOP OF SAND: 20.5' b/s

DEPTH/ELEVATION TOP OF SCREEN: 25' b/s

TYPE OF SCREEN: SCL 40 PVC (Threaded)

SLOT SIZE x LENGTH: .010 x 5'

TYPE OF SAND PACK: 20/30 Standard Sand

DIAMETER OF HOLE IN BEDROCK: NA

DEPTH/ELEVATION BOTTOM OF SCREEN: 30' b/s

DEPTH/ELEVATION BOTTOM OF SAND: 30' b/s

DEPTH/ELEVATION BOTTOM OF HOLE: 30' b/s

BACKFILL MATERIAL BELOW SAND: 30' b/s

APPENDIX G

SOIL LABORATORY DATA SHEETS

Technical Report for

Tetra-Tech, NUS

Site 98 CSS, Panama City

CTO 0047

Accutest Job Number: F2416

Report to:

Tetra Tech, NUS
1311 Executive Center Drive
Ellie Building, Suite 220
Tallahassee, FL 32301

ATTN: Gerald Goode

Total number of pages in report:



Harry Behzadi, Ph.D.
Laboratory Director

Results relate only to the items tested.

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.



Sample Summary

Tetra-Tech, NUS

Date: 07/27/98

Site 98 CSS, Panama City
Project No: CTO 0047

Job No: F2416

Sample Number	Collected Date	Time By	Received	Matrix Code Type	Client Sample ID
F2416-1	05/19/98	11:00 KH	05/20/98	AQ Ground Water	98-SB05-05-7-001B
F2416-2	05/19/98	11:35 KH	05/20/98	SO Soil	98-SB05-05-7
F2416-3	05/08/98	00:00 KH	05/20/98	AQ Trip Blank Water	TRIP BLANK



Report of Analysis

Client Sample ID: 98-SB05-05-7-001B	Date Sampled: 05/19/98
Lab Sample ID: F2416-1	Date Received: 05/20/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: FLORIDA-PRO	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	P00837.D	1	06/04/98	NF	06/04/98	OP387	GOP34
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%

(a) Sample analyzed beyond hold time per client's request, values should be considered minimum values.

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

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



Report of Analysis

Client Sample ID: 98-SB05-05-7-001B	Date Sampled: 05/19/98
Lab Sample ID: F2416-1	Date Received: 05/20/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: EPA 610	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	105966.D	1	06/03/98	NF	06/02/98	OP392	GIJ254
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	69%		40-125%
84-15-1	o-Terphenyl	82%		45-130%

(a) Sample analyzed beyond hold time per client's request, values should be considered a minimum value.

<p>ND = Not detected RDL = Reported Detection Limit E = Indicates value exceeds calibration range</p>	<p>J = Indicates an estimated value B = Indicates analyte found in associated method blank N = Indicates presumptive evidence of a compound</p>
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Report of Analysis

Client Sample ID: 98-SB05-05-7-001B	
Lab Sample ID: F2416-1	Date Sampled: 05/19/98
Matrix: AQ - Ground Water	Date Received: 05/20/98
Method: EPA 601/602	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF006234.D	1	06/02/98	RAW	n/a	n/a	GEF136
Run #2							

Purgeable Aromatics, MTBE

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
625-98-9	1-Chloro-3-fluorobenzene	99%		75-125%
462-06-6	Fluorobenzene	98%		75-125%
98-08-8	aaa-Trifluorotoluene	102%		75-125%

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

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



Report of Analysis

Client Sample ID: 98-SB05-05-7	Date Sampled: 05/19/98
Lab Sample ID: F2416-2	Date Received: 05/20/98
Matrix: SO - Soil	Percent Solids: 94.7
Method: EPA 8100	
Project: Site 98 CSS, Panama City	

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	105987.D	1	06/03/98	NF	06/02/98	OP390	GIJ254
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	350	ug/kg	
208-96-8	Acenaphthylene	ND	350	ug/kg	
120-12-7	Anthracene	ND	350	ug/kg	
56-55-3	Benzo(a)anthracene	ND	350	ug/kg	
50-32-8	Benzo(a)pyrene	ND	350	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	350	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	350	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	350	ug/kg	
218-01-9	Chrysene	ND	350	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	350	ug/kg	
206-44-0	Fluoranthene	ND	350	ug/kg	
86-73-7	Fluorene	ND	350	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	350	ug/kg	
91-20-3	Naphthalene	ND	350	ug/kg	
90-12-0	1-Methylnaphthalene	ND	350	ug/kg	
91-57-6	2-Methylnaphthalene	ND	350	ug/kg	
85-01-8	Phenanthrene	ND	350	ug/kg	
129-00-0	Pyrene	ND	350	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	72%		35-125%
84-15-1	o-Terphenyl	86%		35-135%

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

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



Report of Analysis

Client Sample ID: 98-SB05-05-7	Date Sampled: 05/19/98
Lab Sample ID: F2416-2	Date Received: 05/20/98
Matrix: SO - Soil	Percent Solids: 94.7
Method: FLORIDA-PRO	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P00833.D	1	06/04/98	NF	06/02/98	OP388	GOP34
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	ND	8.8	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	80%		40-140%

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

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



Report of Analysis

Client Sample ID: TRIP BLANK		Date Sampled: 05/08/98	
Lab Sample ID: F2416-3		Date Received: 05/20/98	
Matrix: AQ - Trip Blank Water		Percent Solids: n/a	
Method: EPA 601/602			
Project: Site 98 CSS, Panama City			

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF006235.D	1	06/02/98	RAW	n/a	n/a	GEF136
Run #2							

Purgeable Aromatics, Full List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-90-7	Chlorobenzene	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	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	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
625-98-9	1-Chloro-3-fluorobenzene	100%		75-125%
462-06-6	Fluorobenzene	99%		75-125%
98-08-8	aaa-Trifluorotoluene	103%		75-125%

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

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



Brown & Root Environmental

REPORT TO ADDRESS: 331 Executive Center Drive, Suite 200

Tullesburg, Pa.

TELEPHONE: 800-676-5450 FAX: (724) 751-7413

SITE MANAGER: Gerald Goode

PROJECT NAME: GTO 0047

BRE PROJECT NO.: _____ CODE: _____

P.O. NO.: 20497766 P98717

SHIPPED TO: Accurate (1/6/98) PAGE 1 OF 1
4055 Unimetal Road, Suite C15
Orlando, FL 32811-7303
(LABORATORY NAME, CITY)

CHAIN OF CUSTODY RECORD

LABORATORY ANALYSIS

SAMPLED BY (PRINT): Roulette Hayes
SAMPLER SIGNATURE: R. Hayes

SAMPLE TYPE
COMP GRAB

PRES. TYPE
PARAMETERS
Asbestos
Pb
Cd
Cu
Mn
Ni
V
Zn
Other
PH/Temp
NO. OF CONTAINERS

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

LAB NO.	DATE	TIME	SAMPLE IDENTIFICATION	COMP	GRAB	MATRIX	Asbestos	Pb	Cd	Cu	Mn	Ni	V	Zn	Other	PH/Temp	NO. OF CONTAINERS	COMMENTS:
F2401	5/19/98	11:00	98-3805-05-7-001B			Soil	2	1	1								4	Suppl. 1000
-2	5/19/98	11:35	98-3805-05-7-1			Soil	1			4	1						5	
-3	5-8-98		T.B.			Water	X										2	

TOTAL NUMBER OF CONTAINERS 27741 9

EMPTY BOTTLES RELINQUISHED BY (SIGNATURE) <u>R. Hayes</u>	SEAL INTACT? YES NO N/A	DATE: <u>5/21/98</u>	TIME: <u>15:50</u>	EMPTY BOTTLES RECEIVED BY (SIGNATURE) <u>Bill Stork</u>	SEAL INTACT? YES NO N/A	DATE: <u>5/19/98</u>	TIME: <u>17:00</u>
RELINQUISHED BY (SIGNATURE) <u>Bill Stork</u>	SEAL INTACT? YES NO N/A	DATE: <u>5/19/98</u>	TIME: <u>8:00</u>	RECEIVED BY (SIGNATURE) <u>R. Hayes</u>	SEAL INTACT? YES NO N/A	DATE: <u>5/19/98</u>	TIME: <u>08:00</u>
RELINQUISHED BY (SIGNATURE) <u>Roulette Hayes</u>	SEAL INTACT? YES NO N/A	DATE: <u>5/11/98</u>	TIME: <u>15:00</u>	RECEIVED BY (SIGNATURE)	SEAL INTACT? YES NO N/A	DATE:	TIME:

SPECIAL INSTRUCTIONS: 4-15-98

LABORATORY REMARKS:

SAMPLE CONTAINERS PRECLEANED BY: BRE LABORATORY MANUFACTURER * METHOD OF SHIPMENT: Federal Express BILL OF LADING NO.: 668745911

WHITE-FULLY EXERCISED COPY
YELLOW-RECEIVING LABORATORY COPY
PINK-SAMPLERS' COPY/OA COPY

SAMPLING TEAM: Roulette Hayes

RECEIVED FOR LABORATORY BY (SIGNATURE): alby wison
DATE: 6-2-98 TIME: 0850

No. 3076

APPENDIX H

FIELD MEASUREMENTS AND SAMPLING FORMS



WELL DEVELOPMENT SHEET

PROJECT SITE NAME: 98-CSS SITE/LOCATION: PANAMA COY
 PROJECT NUMBER: 7766 WELL ID.: PCY-98-MW01-
 WEATHER: CLOUDY/RAIN DATE: 9/20/97
 STATIC WATER LEVEL: 4.73 PERSONNEL: POB-126
 TOTAL WELL DEPTH: 14.00 WELL TYPE: (PVC) [S.S.], or
 ONE CASING VOLUME: 1.48 OTHER _____
 START TIME: 1040 MEASURING DEVICE: ORS INTER-TECH.
 END TIME: 1130 ADJUSTMENT FACTOR: 0

[] DOMESTIC WELL, MONITORING WELL, [] OTHER _____

METHOD & REMARKS Drill by Pump (Suction Pump)

Approximate Volume	Time	Color	pH (S.U.)	Cond. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)
10	1050	CLOUDY	6.35	.117	999	3.91	30.7	0
25	1000	CLOUDY	6.58	.124	999	3.87	29.6	0
40	1110	CLOUDY	6.51	1.28	999	3.92	29.0	0
50	1120	CLOUDY	6.50	1.29	999	4.01	29.4	0
65	1130	CLOUDY	6.49	1.28	999	4.12	29.3	0

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

ADDITIONAL COMMENTS: WELL NEVER CLEARED UP.

SIGNATURE(s): [Signature]

PAGE 1 OF 1



WELL DEVELOPMENT SHEET

PROJECT SITE NAME: 98 855 SITE/LOCATION: PANAMA CITY FL
 PROJECT NUMBER: 7766 WELL ID.: PCY-98-MW02
 WEATHER: CLOUDY DATE: 9/26/98
 STATIC WATER LEVEL: 4.18 PERSONNEL: [Signature]
 TOTAL WELL DEPTH: 14.0 WELL TYPE: [X] P.V.C. [] S.S. [] OTHER
 ONE CASING VOLUME: 1.57 MEASURING DEVICE: ORIS I.P.
 START TIME: 1200 ADJUSTMENT FACTOR: 0
 END TIME: _____

[] DOMESTIC WELL, [] MONITORING WELL, [] OTHER

METHOD & REMARKS Drill Rig Pump (Suction Pump)

Approximate Volume	Time	Color	pH (S.U.)	Cond. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)
10	1225	CLOUDY	6.44	.087	999	6.12	27.8	0
25	1235	CLOUDY	6.52	.086	781	6.65	27.8	0
35	1245	CLEAR	6.60	.086	329	7.05	28.0	0
45	1255	CLEAR	6.62	.086	190	6.83	28.2	0
55	1300	CLEAR	6.61	.086	100	6.83	28.2	0

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

ADDITIONAL COMMENTS: _____

SIGNATURE(s): [Signature]

PAGE 1 OF 1



WELL DEVELOPMENT SHEET

PROJECT SITE NAME: 98-CSS SITE/LOCATION: PANAMA CITY
 PROJECT NUMBER: 7766 WELL ID.: PCY-98-MW03
 WEATHER: CLOUDY DATE: 9/20/98
 STATIC WATER LEVEL: 4.15 PERSONNEL: POB
 TOTAL WELL DEPTH: 14.0 WELL TYPE: [PVC], [S.S.], or
 ONE CASING VOLUME: 1.57 OTHER: _____
 START TIME: 0930 MEASURING DEVICE: ORS INTER. PROBE
 END TIME: 1630 ADJUSTMENT FACTOR: 0

[] DOMESTIC WELL, MONITORING WELL, [] OTHER

METHOD & REMARKS DRILL RIG PUMP (Subin Pump)

Approximate Volume	Time	Color	pH (S.U.)	Cond. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (Celsius)	Salinity (%)
10	0930	CLOUDY	6.56	1.33	715	3.85	29.3	Ø
15	0945	CLOUDY	6.61	1.25	700	3.72	29.3	Ø
25	0950	CLOUDY	6.65	1.08	295	3.65	29.3	Ø
32	1010	CLOUDY	6.70	1.10	265	2.98	29.3	Ø
40	1020	CLOUDY	6.70	1.09	245	3.41	29.3	Ø

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

ADDITIONAL COMMENTS:

SIGNATURE(S):

[Handwritten Signature]

PAGE 1 OF 1



WELL DEVELOPMENT SHEET

PROJECT SITE NAME: 98 CSS SITE/LOCATION: PANAMA CITY FL.
 PROJECT NUMBER: 7766 WELL ID.: PCY-98-011004
 WEATHER: P. CLOUDY DATE: 9/25/98
 STATIC WATER LEVEL: 4.18 4.85 PERSONNEL: [Signature]
 TOTAL WELL DEPTH: 14.0 WELL TYPE: [FVC], [S.S.], or
 ONE CASING VOLUME: 1.46 OTHER: _____
 START TIME: 1310 MEASURING DEVICE: CRS P.1
 END TIME: 1340 ADJUSTMENT FACTOR: 0

[] DOMESTIC WELL, MONITORING WELL, [] OTHER

METHOD & REMARKS Drill Rig Pump (Saline Pump)

Approximate Volume	Time	Color	pH (S.U.)	Cond. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (Celcius)	Salinity (%)
10	1310	DARK	6.42	.074	999	5.47	28.1	0
25	1320	DARK	6.54	.078	299	6.14	28.0	0
35	1330	CLEARING	6.55	.078	295	6.14	28.0	0
55	1340	GLASSING	6.57	.078	221	6.02	28.0	0

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

ADDITIONAL COMMENTS: _____

SIGNATURE(S): [Signature]

PAGE 1 OF 1



WELL DEVELOPMENT SHEET

PROJECT SITE NAME: 98 CSS SITE/LOCATION: PANAMA CITY
 PROJECT NUMBER: 7766 WELL ID.: PCY/98-MWSD
 WEATHER: CLOUDY DATE: 9/20/98
 STATIC WATER LEVEL: 4.81 PERSONNEL: DD
 TOTAL WELL DEPTH: 30.0 WELL TYPE: [PVC] [S.S.], or
 ONE CASING VOLUME: 4.03 OTHER: _____
 START TIME: 1140 MEASURING DEVICE: C/S INTER PROBE
 END TIME: 1220 ADJUSTMENT FACTOR: _____

[] DOMESTIC WELL, [] MONITORING WELL, [] OTHER

METHOD & REMARKS: DRILL RIG PUMP. (Suction Pump)

Approximate Volume	Time	Color	pH (S.U.)	Cond. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (Celcius)	Salinity (%)
15	1145	CLOUDY	6.76	.089	999	3.85	25.5	0
30	1200	CLOUDY	6.37	.089	999	3.95	25.5	0
45	1210	CLOUDY	6.40	.088	999	4.01	25.5	0
55	1215	CLOUDY	6.41	.088	999	4.01	25.5	0
65	1220	CLOUDY	6.42	.088	999	3.85	25.5	0

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

ADDITIONAL COMMENTS: _____

SIGNATURE(s): [Signature]

PAGE 1 OF 1



DEP Form # 62-770 (09/02)
 Form Title: Petroleum or Petroleum Products
 Water Sampling Log
 Revision Date: _____

Petroleum or Petroleum Products Water Sampling Log

PRY-98-MW02

FDEP FACILITY NO.: 038518667 | WELL NO.: 1 | SAMPLE ID: PRY-98-MW02-001 | DATE: 9/22/98
 SITE NAME: CSE Panama City | SITE LOCATION: Site 98

PURGE DATA

WELL DIAMETER (in): 2" | TOTAL WELL DEPTH (ft): 14 | DEPTH TO WATER (ft): 4.01 | WELL CAPACITY (gal/ft): 0.16

1 WELL VOLUME (gal) = (TOTAL WELL DEPTH - DEPTH TO WATER) x WELL CAPACITY =

$$= (14 - 4.01) \times 0.16 = 1.5$$

PURGE METHOD: Peristaltic Pump					PURGING INITIATED AT: 0946		PURGING ENDED AT: 1008	
WELL VOLS PURGED	CUMUL VOLUME PURGED (gal)	pH	TEMP. (C)	ms/cm COND. (umhos)	PURGE RATE (gpm): 0.3 gpm	COLOR	ODOR	TOTAL VOLUME PURGED (gal): 8
1	1.5	6.20	28.2	0.94		clear		-
2	4.5	6.18	28.3	0.96		clear		-
2	8	6.15	28.0	0.94		clear		-

SAMPLING DATA

SAMPLED BY: IGG/PH | AFFILIATION: Tetra Tech NUS | SAMPLER(S) SIGNATURE(S): *[Signature]*
 SAMPLING METHOD(S): Low Flow | SAMPLING INITIATED AT: 10:10 | SAMPLING ENDED AT: 10:20

FIELD DECONTAMINATION: Y (N)		FIELD-FILTERED: Y (N)		DUPLICATE: Y (N)		
SAMPLE CONTAINER SPECIFICATIONS			SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	FINAL pH	
1	CG	40	Acc	Laboratory preserved		8021
2	CG	40	Asby	Laboratory preserved		504
3	HDP	500	HNO3	Laboratory preserved		Total lead
4	AG	1000	none	"	"	8310
5	AG	1000	H2SO4	"	"	FL PRO

REMARKS:

MATERIAL CODES: AG = AMBER GLASS; CG = CLEAR GLASS; HDP = HIGH DENSITY POLYETHYLENE; O = OTHER (SPECIFY)
 WELL CAPACITY: 1.25" = 0.06 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.17 gal/ft; 8" = 2.61 gal/ft; 12" = 5.88 gal/ft

NOTE: this does not constitute all the information required by Chapter 62-160, F.A.C.



DEP Form # 92-770-0002
 Form Title: Petroleum or Petroleum Products
 Water Sampling Log
 Effective Date:

Petroleum or Petroleum Products Water Sampling Log

PCY-98-MWS0-001

FDEP FACILITY NO.: 038518667 | WELL NO.: 7 | SAMPLE ID: PCY-98-MWS0-001 | DATE: 9/22/98
 SITE NAME: CSS Panama City | SITE LOCATION: Site 98

PURGE DATA

WELL DIAMETER (in): 2 | TOTAL WELL DEPTH (ft): 30 | DEPTH TO WATER (ft): 8.58 | WELL CAPACITY (gal/ft): 0.16

1 WELL VOLUME (gal) = (TOTAL WELL DEPTH - DEPTH TO WATER) x WELL CAPACITY =

$$= (30 - 8.58) \times 0.16 = 3.8$$

PURGE METHOD: Peristaltic Pump		PURGING INITIATED AT: 11:00		PURGING ENDED AT: 11:30				
WELL VOLS PURGED	CUMUL VOLUME PURGED (gal)	pH	TEMP. (C)	COND. (umhos)	PURGE RATE (gpm): .4	TOTAL VOLUME PURGED (gal): 12		
					COLOR	ODOR	APPEARANCE	OTHER
1	4	6.08	28.7	.112	-	-	cloudy	-
2	8	5.88	26.5	.096	-	-	clear	-
1	12	5.81	26.2	.094	-	-	clear	-
-	-	5.79	26.1	.095	-	-	clear	-

SAMPLING DATA

SAMPLED BY: G.S./PH. | AFFILIATION: Term Tech NCS | SAMPLER(S) SIGNATURE(S): *Paul F. Hood*
 SAMPLING METHOD(S): Low Flow | SAMPLING INITIATED AT: 11:30 | SAMPLING ENDED AT: 11:40

FIELD DECONTAMINATION: Y (N)		FIELD-FILTERED: Y (N)		DUPLICATE: Y (N)		
SAMPLE CONTAINER SPECIFICATIONS			SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD
NO.	MATERIAL CODE	VOLUME ml	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	FINAL pH	
1	CG	40	HCL	Laboratory Preserved		8021
2	CG	40	H2SO4	Laboratory Preserved		504
3	HDP	500	HNO3	Laboratory Preserved		Total Lead
4	AG	1000	None			8310
5	AG	1000	H2SO4	Laboratory Preserved		FC PRO

REMARKS:

MATERIAL CODES: AG = AMBER GLASS; CG = CLEAR GLASS; HDP = HIGH DENSITY POLYETHYLENE; O = OTHER (SPECIFY)
 WELL CAPACITY: 1.25" = 0.06 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.47 gal/ft; 8" = 2.61 gal/ft; 12" = 5.88 gal/ft

NOTE: This does not constitute all the information required by Chapter 62-160, F.A.C.



DEP Form # 02-70 (03/01)
 Form Title: Petroleum or Petroleum Products
 Water Sampling Log
 Effective Date:

**Petroleum or Petroleum Products
 Water Sampling Log**

PCY-98-TCW-001

PCY-98-0010 - Duplicate

FDEP FACILITY NO.: 038518667	WELL NO.:	SAMPLE ID: PCY-98-TCW-001	DATE: 9/22/98
SITE NAME: CSS, Panama City		SITE LOCATION: Site 98	

PURGE DATA

WELL DIAMETER (in): 2	TOTAL WELL DEPTH (ft): 13.93	DEPTH TO WATER (ft): 4.56	WELL CAPACITY (gal/ft): .16
-----------------------	------------------------------	---------------------------	-----------------------------

1 WELL VOLUME (gal) = (TOTAL WELL DEPTH - DEPTH TO WATER) x WELL CAPACITY =
 = (13.93 - 4.56) x .16 = 1.5

PURGE METHOD: Peristaltic Pump				PURGING INITIATED AT: 12:08		PURGING ENDED AT: 15:00	
WELL VOLS PURGED	CUMUL VOLUME PURGED (gal)	PH	TEMP. (C)	COND. (umhos)	PURGE RATE (gpm): .25	TOTAL VOLUME PURGED (gal): 7.5	
					COLOR	ODOR	APPEARANCE
50	Removal				No. 5 well Volume prior to sampling (16.0)		

SAMPLING DATA

SAMPLED BY: G.G./RH	SAMPLER(S) SIGNATURE(S): <i>John Hoode</i>
AFFILIATION: Tota Tool Inc	
SAMPLING METHOD(S): Low Flow	SAMPLING INITIATED AT: 15:00
	SAMPLING ENDED AT: 15:25

FIELD DECONTAMINATION: Y N FIELD-FILTERED: Y N DUPLICATE: Y N

SAMPLE CONTAINER SPECIFICATIONS			SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	FINAL PH	
1	CG	40	HCL	laboratory preserved		8021
2	CG	40	H2SO4	"	"	504
3	HDP	500	HNO3	"	"	Total lead
4	AG	2000	None	-		8310
5	AG	1000	H2SO4	laboratory preserved		FL-PRO

REMARKS:

MATERIAL CODES: AG-AMBER GLASS; CG-CLEAR GLASS; HDP-HIGH DENSITY POLYETHYLENE; O-OTHER (SPECIFY)

WELL CAPACITY: 1.25" = 0.06 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.47 gal/ft; 8" = 2.61 gal/ft; 12" = 5.88 gal/ft

NOTE: this does not constitute all the information required by Chapter 62-160, F.A.C.



DEP Form # 62-70 (REV. 11-87)
 Form Title: Petroleum or Petroleum Products
 Water Sampling Log
 Effective Date:

Petroleum or Petroleum Products Water Sampling Log

PCY-98-MW04

PCY-98-MW04-001

FDEP FACILITY NO.: 038518667	WELL NO.: 15	SAMPLE ID: 1	DATE: 9/11/82
SITE NAME: CSS, Panama City		SITE LOCATION: Site 98	

PURGE DATA

WELL DIAMETER (in): 2	TOTAL WELL DEPTH (ft): 14	DEPTH TO WATER (ft): 4.75	WELL CAPACITY (gal/ft): .16
1 WELL VOLUME (gal) = (TOTAL WELL DEPTH - DEPTH TO WATER) x WELL CAPACITY =			
= (14 - 4.75) x .16 = 1.5			
PURGE METHOD: Peristaltic Pump		PURGING INITIATED AT: 17:00	PURGING ENDED AT: 17:30
WELL VOL% PURGED		PURGE RATE (rpm): .3	TOTAL VOLUME PURGED (gal): 11
CUMUL VOLUME PURGED (gal)	pH	TEMP. (°C)	COND. (umhos)
↓ 5	4.0	20	150
Note: 5 well volumes prior to sampling removed. Temperature/Conductivity/Total Solids Monitoring: (clear)			

SAMPLING DATA

SAMPLED BY: G.C./HP			SAMPLER(S) SIGNATURE(S): [Signature]			
AFFILIATION: Technical Unit			SAMPLING INITIATED AT: 17:30			
SAMPLING METHOD(S): Low Flow			SAMPLING ENDED AT: 17:45			
FIELD DECONTAMINATION: Y (N)		FIELD-FILTERED: Y (N)		DUPLICATE: Y (N)		
SAMPLE CONTAINER SPECIFICATIONS		SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD	
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)		FINAL pH
1	CG	40	HCL	Laboratory Preserved		8021
2	CG	40	H2SO4	" "		504
3	HDP	500	HNO3	" "		Total Lead
4	AG	1000	None	-		8310
5	AG	1000	H2SO4	Laboratory Preserved		ELPRD

REMARKS:

MATERIAL CODES: AG-AMBER GLASS; CG-CLEAR GLASS; HDP-HIGH DENSITY POLYETHYLENE; O-OTHER (SPECIFY)

WELL CAPACITY: 12" = 0.06 gal/ft; 8" = 0.16 gal/ft; 6" = 0.65 gal/ft; 4" = 1.47 gal/ft; 2" = 2.61 gal/ft; 12" = 5.98 gal/ft

Note: this does not constitute all the information required by Chapter 62-160, F.A.C.



DEP Form # 62-773 (00-01)
 Form Title: Petroleum or Petroleum Products
 Water Sampling Log
 Effective Date:

Petroleum or Petroleum Products Water Sampling Log

PCY-98-MW01

FDEP FACILITY NO.: 038578667	WELL NO.: 1	SAMPLE ID: PCY-98-MW01-001	DATE: 9 / 11 / 22
SITE NAME: CSS, Panama City		SITE LOCATION: Site 98	

PURGE DATA

WELL DIAMETER (in): 2	TOTAL WELL DEPTH (ft): 14	DEPTH TO WATER (ft): 4.62	WELL CAPACITY (gal/ft): .16
$1 \text{ WELL VOLUME (gal)} = (\text{TOTAL WELL DEPTH} - \text{DEPTH TO WATER}) \times \text{WELL CAPACITY} =$ $= (14 - 4.62) \times .16 = 1.5$			

PURGE METHOD: Percolator Pump				PURGING INITIATED AT: 16:00		PURGING ENDED AT: 16:40	
WELL VOLTS PURGED				PURGE RATE (rpm): 2		TOTAL VOLUME PURGED (gal): 9	
CUMUL. VOLUME PURGED (gal)		PH	TEMP. (°C)	COND. (umhos)	COLOR	ODOR	APPEARANCE
5		7.5	25	150	None	None	(Clear)
Note: 5 well volumes removed to sample collection. (Temp, PH, & Conductivity not recorded).							

SAMPLING DATA

SAMPLED BY: 6.67 RP			SAMPLER(S) SIGNATURE(S): <i>JM Jorde</i>		
AFFILIATION: Tech US			SAMPLING INITIATED AT: 16:40		
SAMPLING METHOD(S): Low Flow			SAMPLING ENDED AT: 16:50		

FIELD DECONTAMINATION: Y <input checked="" type="checkbox"/>		FIELD-FILTERED: Y <input checked="" type="checkbox"/>		DUPLICATE: Y <input checked="" type="checkbox"/>	
SAMPLE CONTAINER SPECIFICATIONS			SAMPLE PRESERVATION		INTENDED ANALYSIS AND/OR METHOD
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	FINAL PH
1	CG	40	HCl	laboratory preserved	8.021
2	CG	40	H ₂ SO ₄	"	5.04
3	HDP	500	HNO ₃	"	Total head
4	AG	1000	none	-	8.310
5	AG	1000	H ₂ SO ₄	laboratory preserved	FL PRO

REMARKS:

MATERIAL CODES: AG = AMBER GLASS; CG = CLEAR GLASS; HDP = HIGH DENSITY POLYETHYLENE; O = OTHER (SPECIFY)
 WELL CAPACITY: 1.25" = 0.06 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.47 gal/ft; 8" = 2.61 gal/ft; 12" = 5.88 gal/ft

NOTE: this does not constitute all the information required by Chapter 62-160, F.A.C.



DEP Form # 42-770 (5/82)
 Form Title: Petroleum or Petroleum Products
Water Sampling Log
 Effective Date:

Petroleum or Petroleum Products Water Sampling Log

PCY-98-MW03

FDEP FACILITY NO.: <u>38578 667</u>	WELL NO.: <u>1</u>	SAMPLE ID: <u>PCY-98-MW03-001</u>	DATE: <u>9/22/98</u>
SITE NAME: <u>CSS, Panama City</u>		SITE LOCATION: <u>Site 98</u>	

PURGE DATA

WELL DIAMETER (in): <u>2</u>	TOTAL WELL DEPTH (ft): <u>14</u>	DEPTH TO WATER (ft): <u>4.18</u>	WELL CAPACITY (gal/ft): <u>.16</u>
1 WELL VOLUME (gal) = (TOTAL WELL DEPTH - DEPTH TO WATER) x WELL CAPACITY = $(14 - 4.18) \times .16 = 1.5$			
PURGE METHOD: <u>Peristaltic Pump</u>		PURGING INITIATED AT: <u>17:50</u>	PURGING ENDED AT: <u>18:15</u>
WELL VOLS. PURGED		CUMUL. VOLUME PURGED (gal)	TEMP. (°C)
5 ↓		14	5
COND. (µmhos)		PURGE RATE (rpm): <u>0.3</u>	TOTAL VOLUME PURGED (gal): <u>7.8</u>
COLOR		ODOR	APPEARANCE
5 ↓			
REMARKS: <u>Horrible (PH/Conductivity, Temperature) Malfunctioning: Removed 5 well volumes prior to sampling. (check)</u>			

SAMPLING DATA

SAMPLED BY: <u>G.C./HC</u>			SAMPLER(S) SIGNATURE(S): <u>Mark F. Woods</u>		
AFFILIATION: <u>Tetra Tech, Inc</u>			SAMPLING INITIATED AT: <u>18:15</u>		
SAMPLING METHOD(S): <u>Low Flow</u>			SAMPLING ENDED AT: <u>18:30</u>		
FIELD DECONTAMINATION: <u>Y (N)</u>		FIELD-FILTERED: <u>Y (N)</u>		DUPLICATE: <u>Y (N)</u>	
SAMPLE CONTAINER SPECIFICATIONS		SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	
1	CG	40	HCL	- laboratory preserved -	8021
2	CG	40	H ₂ SO ₄	" "	504
3	HDP	500	HNO ₃	" "	Total lead
4	AG	none	none	✓	8310
5	AG	H ₂ SO ₄	H ₂ SO ₄	- laboratory preserved	EC PRO

REMARKS:

MATERIAL CODES: AG = AMBER GLASS; CG = CLEAR GLASS; HDP = HIGH DENSITY POLYETHYLENE; O = OTHER (SPECIFY)

CAPACITY: 1.25" = 0.06 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.47 gal/ft; 8" = 2.61 gal/ft; 12" = 5.88 gal/ft

NOTE: this does not constitute all the information required by Chapter 62-160, F.A.C.

APPENDIX I

TOP OF WELL CASING SURVEY MEASUREMENTS

TITLE

PROJECT NO.

BOOK

Work continued from Page **10/13/98** **T.S.C** **I.B.S** **Side 98**

Weather: Sunny, wind calm 75°F

STA	Bst	HI	FS-	ELE.	Location
Bm	1.10	16.20		15.10	Pcy-13-9I ^{top of well} casing Elevation
			4.93	11.27	Pcy-98-mw02
			4.93	11.27	Pcy-98-mw03
			4.63	11.57	Pcy-98-mw05
			4.65	11.55	Pcy-98-TCW
			4.59	11.61	Pcy-98-mw01
			1.10	15.10	Pcy-13-9I
	4.66	16.27		11.61	TP1 Shading at Pcy-98-mw01
			4.70	11.57	Pcy-98-mw05
			4.72	11.55	Pcy-98-TCW
			5.02	11.25	Pcy-98-mw03 J.02
			3.01	11.26	Pcy-98-mw02 J.01
			-	-	Pcy-13-9I
	1.39	16.49		15.10	TP2 Shading at Pcy-98-9I
			5.11	11.38	Pcy-98-mw04
	5.10	16.49			TP3 Shading at Pcy-98-mw04
			1.39	15.10	Pcy-98-13-9I

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 80605

Work continued to Page

SIGNATURE *W. Ford*

DATE 10-17-98

171

WITNESS

DATE

APPENDIX J

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:

$$\text{PCY-98-MW01} = 0.004878 \text{ feet/min} = 2.74 \times 10^{-3} \text{ cm/sec}$$

$$\text{PCY-98-MW03} = 0.000813 \text{ feet/min} = 4.13 \times 10^{-4} \text{ cm/sec}$$

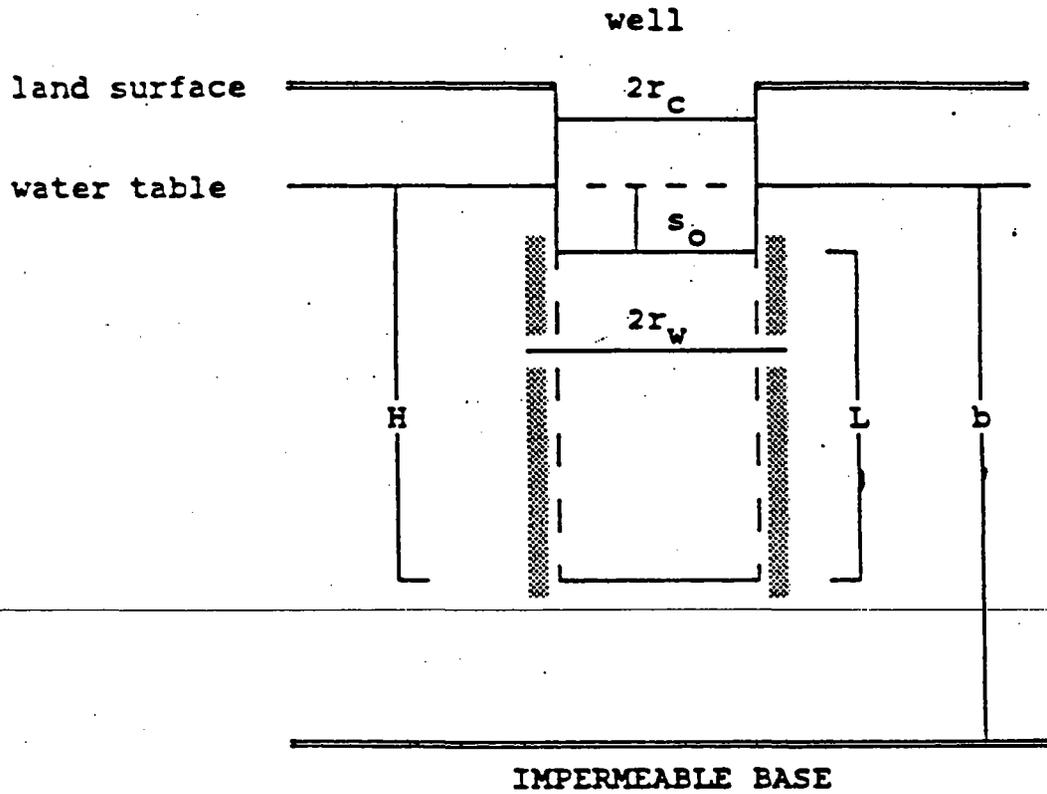
$$\text{PCY-98-MW04} = 0.00077 \text{ feet/min} = 3.91 \times 10^{-4} \text{ cm/sec}$$

The average hydraulic conductivity was determined by calculating the geometric mean of the three values as follows:

$$\begin{aligned} &= e^{\left[\frac{\ln x_1 + \ln x_2 + \dots + \ln x_n}{n} \right]} \\ &= e^{\left[\frac{\ln x_1 + \ln x_2 + \ln x_3}{3} \right]} \\ &= e^{\left[\frac{\ln(0.004878 \text{ ft/min}) + \ln(0.0008132 \text{ ft/min}) + \ln(0.00077 \text{ ft/min})}{3} \right]} \\ &= e^{\left[\frac{-19.60 \text{ ft/min}}{3} \right]} \\ &= 0.001454 \text{ ft/min} \\ &= 7.38 \times 10^{-4} \text{ cm/sec} \\ &= 2.09 \text{ ft/day} \end{aligned}$$

SLUG TEST METHOD FOR UNCONFINED AQUIFERS
(continued)

DEFINITION OF TERMS:



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:

$$\ln s_0 - \ln s_t = \frac{2 K L t}{r_c^2 \ln(r_e/r_w)}$$

where:

s_0 = 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]

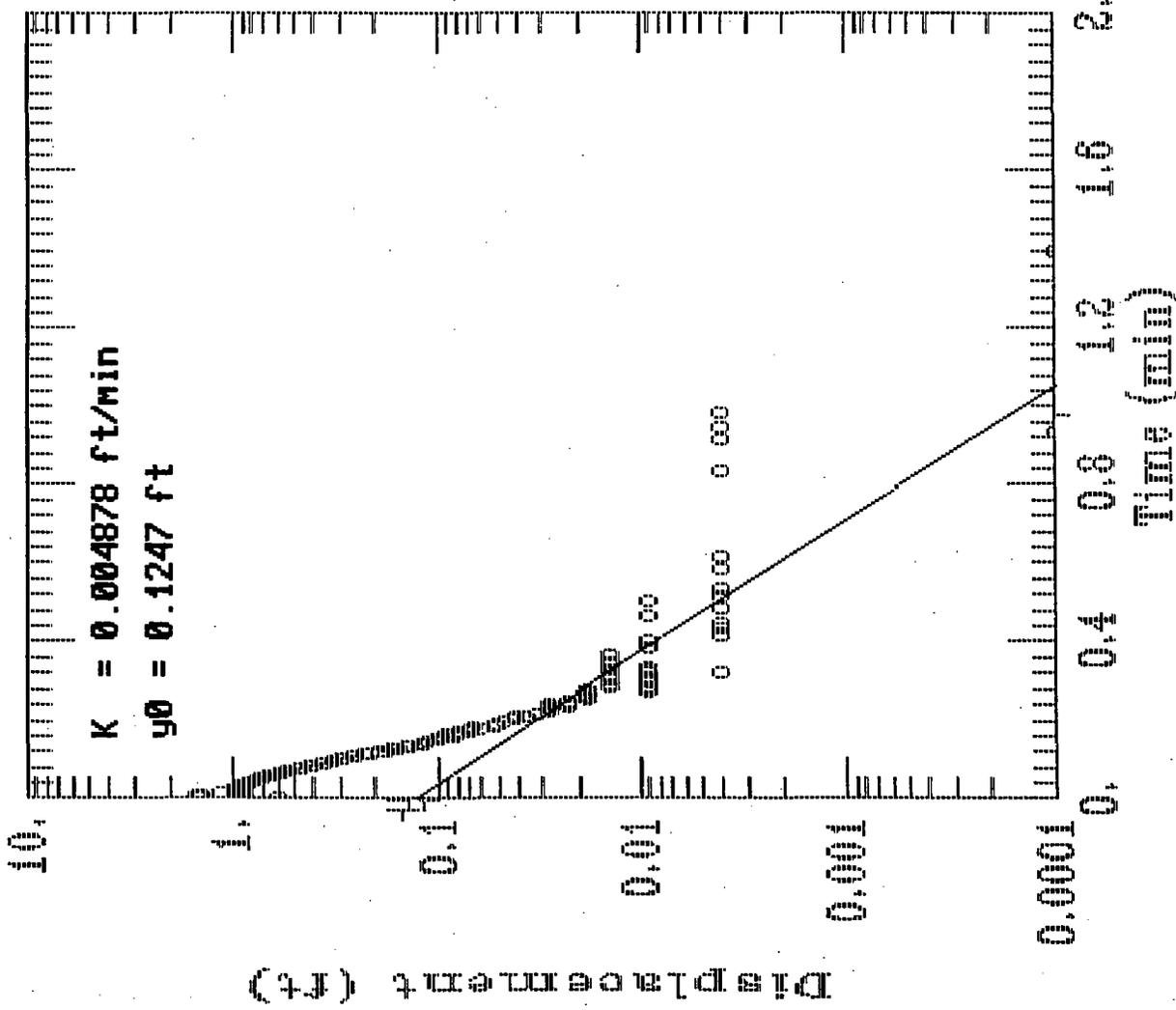
H = static height of water in well [L]

b = saturated thickness of aquifer

PCY88-MW01

$K = 0.004878 \text{ ft/min}$

$y_0 = 0.1247 \text{ ft}$



AQTESOLV



Modeling Group

SE1000C
 Environmental Logger
 11/16 08:13

Unit# 00761 Test 0

Setups: INPUT 1

 Type Level (F)
 Mode TOC
 I.D. 00000

Reference 4.620
 Linearity 0.000
 Scale factor 14.910
 Offset 0.120
 Delay mSEC 50.000

Step 0 09/21 12:57:25

Elapsed Time	INPUT 1
-----	-----
0.0000	4.610
0.0033	5.232
0.0066	6.103
0.0100	6.019
0.0133	5.783
0.0166	5.529
0.0200	5.599
0.0233	5.590
0.0266	5.599
0.0300	5.580
0.0333	5.529
0.0366	5.482
0.0400	5.449
0.0433	5.420
0.0466	5.392
0.0500	5.364
0.0533	5.331
0.0566	5.298
0.0600	5.265
0.0633	5.232
0.0666	5.199
0.0700	5.171
0.0733	5.138
0.0766	5.109
0.0800	5.081
0.0833	5.048
0.0866	5.025
0.0900	5.001
0.0933	4.978

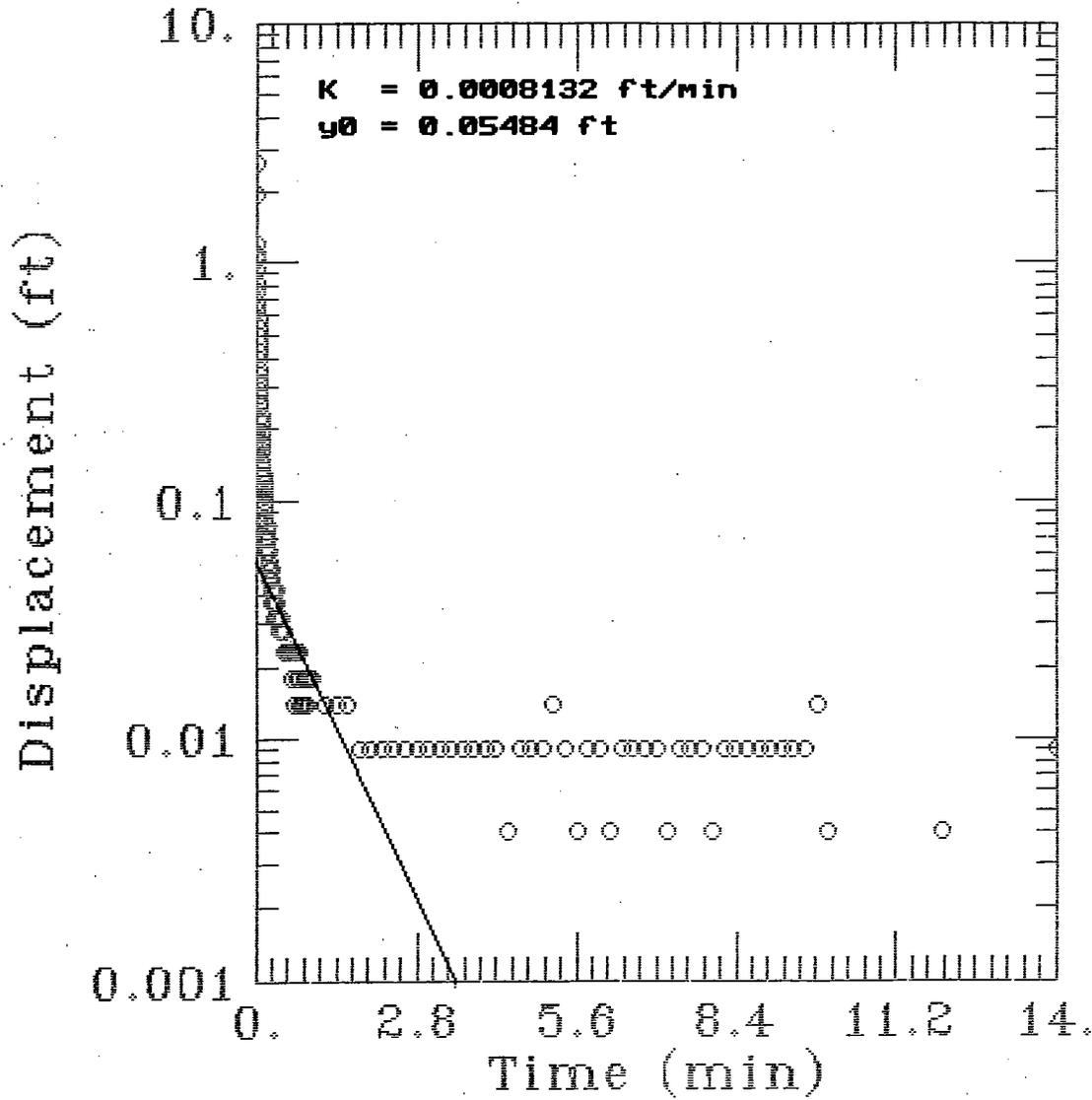
0.0966	4.954
0.1000	4.926
0.1033	4.907
0.1066	4.888
0.1100	4.869
0.1133	4.850
0.1166	4.831
0.1200	4.817
0.1233	4.803
0.1266	4.789
0.1300	4.775
0.1333	4.766
0.1366	4.756
0.1400	4.742
0.1433	4.737
0.1466	4.733
0.1500	4.723
0.1533	4.718
0.1566	4.714
0.1600	4.704
0.1633	4.709
0.1666	4.700
0.1700	4.700
0.1733	4.690
0.1766	4.690
0.1800	4.681
0.1833	4.685
0.1866	4.671
0.1900	4.671
0.1933	4.671
0.1966	4.667
0.2000	4.662
0.2033	4.662
0.2066	4.662
0.2100	4.657
0.2133	4.652
0.2166	4.652
0.2200	4.648
0.2233	4.648
0.2266	4.648
0.2300	4.648
0.2333	4.643
0.2366	4.648
0.2400	4.643
0.2433	4.648
0.2466	4.643
0.2500	4.638
0.2533	4.638
0.2566	4.638
0.2600	4.638
0.2633	4.638
0.2666	4.638

0.2700	4.638
0.2733	4.629
0.2766	4.638
0.2800	4.629
0.2833	4.634
0.2866	4.629
0.2900	4.634
0.2933	4.634
0.2966	4.629
0.3000	4.634
0.3033	4.634
0.3066	4.634
0.3100	4.629
0.3133	4.634
0.3166	4.634
0.3200	4.629
0.3233	4.624
0.3266	4.634
0.3300	4.629
0.3333	4.629
0.3500	4.634
0.3666	4.634
0.3833	4.629
0.4000	4.629
0.4166	4.624
0.4333	4.624
0.4500	4.624
0.4666	4.629
0.4833	4.624
0.5000	4.629
0.5166	4.624
0.5333	4.624
0.5500	4.620
0.5666	4.620
0.5833	4.624
0.6000	4.620
0.6166	4.624
0.6333	4.620
0.6500	4.620
0.6666	4.620
0.6833	4.620
0.7000	4.620
0.7166	4.615
0.7333	4.620
0.7500	4.620
0.7666	4.620
0.7833	4.620
0.8000	4.620
0.8166	4.620
0.8333	4.624
0.8500	4.620
0.8666	4.620

0.8833	4.620
0.9000	4.620
0.9166	4.624
0.9333	4.620
0.9500	4.624
0.9666	4.620
0.9833	4.624
1.0000	4.620
1.2000	4.615
1.4000	4.620
1.6000	4.620
1.8000	4.615
2.0000	4.620
2.2000	4.620
2.4000	4.615
2.6000	4.620
2.8000	4.620
3.0000	4.620
3.2000	4.615
3.4000	4.620
3.6000	4.615
3.8000	4.615
4.0000	4.620
4.2000	4.620
4.4000	4.610
4.6000	4.615
4.8000	4.615
5.0000	4.615
5.2000	4.610
5.4000	4.615
5.6000	4.615
5.8000	4.620
6.0000	4.620
6.2000	4.615
6.4000	4.615
6.6000	4.615
6.8000	4.615
7.0000	4.615
7.2000	4.615
7.4000	4.610
7.6000	4.620
7.8000	4.615
8.0000	4.620
8.2000	4.615
8.4000	4.610
8.6000	4.615
8.8000	4.620
9.0000	4.620
9.2000	4.615
9.4000	4.620
9.6000	4.615
9.8000	4.615

10.0000	4.615
12.0000	4.615
14.0000	4.620
16.0000	4.620

PCY98-MW03



AQTESOLV



Modeling Group

SE1000C
 Environmental Logger
 11/16 08:17

Unit# 00761 Test 1

Setups:	INPUT 1
-----	-----
Type	Level (F)
Mode	TOC
I.D.	00000

Reference	5.270
Linearity	0.000
Scale factor	14.910
Offset	0.120
Delay mSEC	50.000

Step 0 09/21 13:29:54

Elapsed Time	INPUT 1
-----	-----
0.0000	7.526
0.0033	7.865
0.0066	7.229
0.0100	5.434
0.0133	5.967
0.0166	6.471
0.0200	6.353
0.0233	6.325
0.0266	6.301
0.0300	6.207
0.0333	6.099
0.0366	6.023
0.0400	5.957
0.0433	5.901
0.0466	5.849
0.0500	5.807
0.0533	5.764
0.0566	5.731
0.0600	5.698
0.0633	5.665
0.0666	5.632
0.0700	5.613
0.0733	5.585
0.0766	5.566
0.0800	5.547
0.0833	5.529
0.0866	5.519
0.0900	5.500
0.0933	5.486

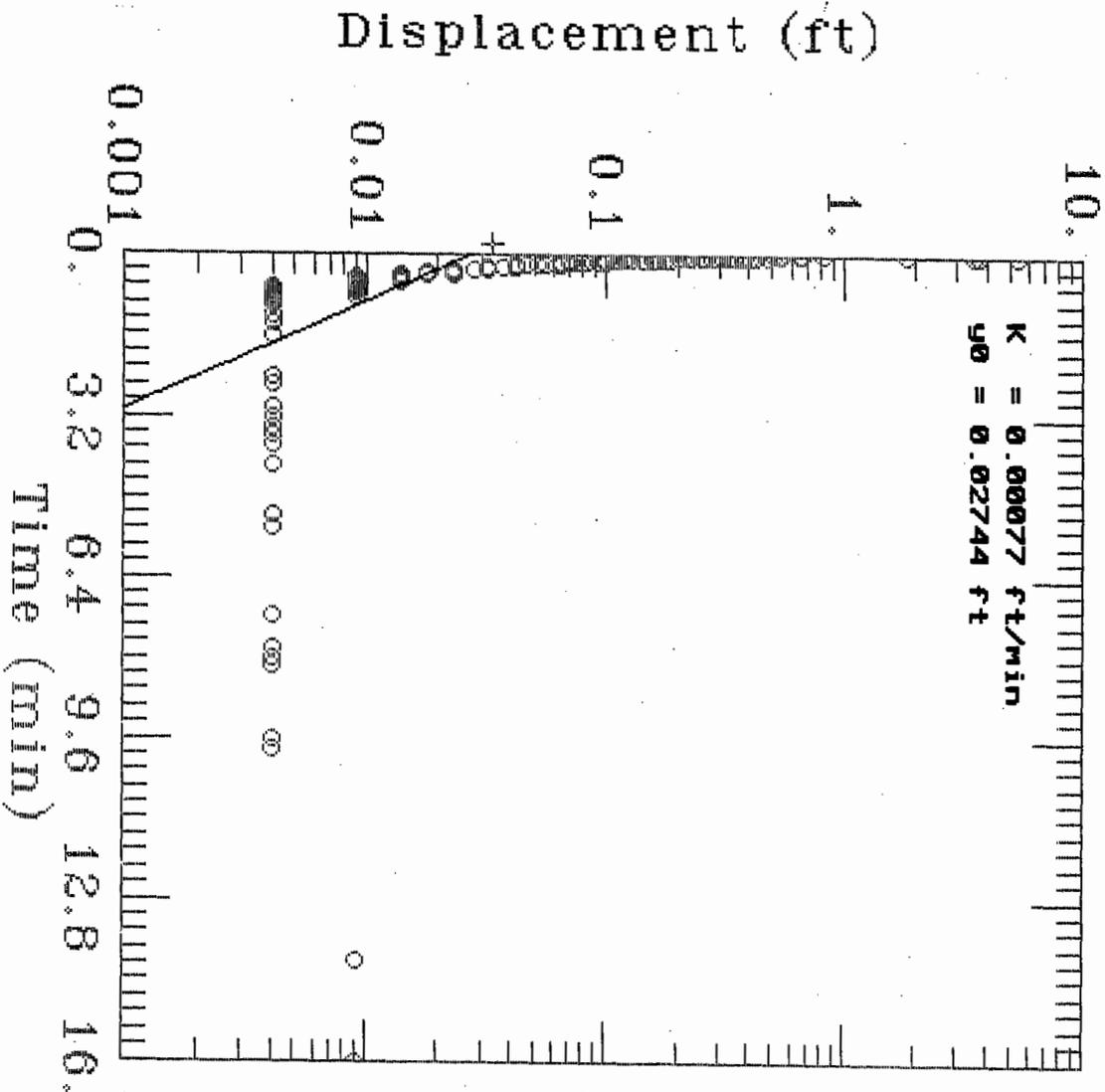
0.0966	5.481
0.1000	5.467
0.1033	5.463
0.1066	5.449
0.1100	5.444
0.1133	5.434
0.1166	5.425
0.1200	5.416
0.1233	5.406
0.1266	5.406
0.1300	5.397
0.1333	5.397
0.1366	5.387
0.1400	5.383
0.1433	5.383
0.1466	5.378
0.1500	5.373
0.1533	5.373
0.1566	5.368
0.1600	5.364
0.1633	5.359
0.1666	5.359
0.1700	5.354
0.1733	5.354
0.1766	5.350
0.1800	5.350
0.1833	5.350
0.1866	5.350
0.1900	5.340
0.1933	5.340
0.1966	5.345
0.2000	5.340
0.2033	5.340
0.2066	5.335
0.2100	5.335
0.2133	5.331
0.2166	5.331
0.2200	5.331
0.2233	5.331
0.2266	5.331
0.2300	5.326
0.2333	5.326
0.2366	5.326
0.2400	5.321
0.2433	5.326
0.2466	5.321
0.2500	5.317
0.2533	5.321
0.2566	5.317
0.2600	5.317
0.2633	5.321
0.2666	5.317

0.2700	5.317
0.2733	5.312
0.2766	5.312
0.2800	5.312
0.2833	5.312
0.2866	5.317
0.2900	5.317
0.2933	5.317
0.2966	5.312
0.3000	5.307
0.3033	5.312
0.3066	5.307
0.3100	5.307
0.3133	5.307
0.3166	5.312
0.3200	5.307
0.3233	5.312
0.3266	5.302
0.3300	5.312
0.3333	5.307
0.3500	5.312
0.3666	5.307
0.3833	5.302
0.4000	5.302
0.4166	5.298
0.4333	5.302
0.4500	5.302
0.4666	5.298
0.4833	5.298
0.5000	5.293
0.5166	5.293
0.5333	5.293
0.5500	5.293
0.5666	5.293
0.5833	5.293
0.6000	5.293
0.6166	5.288
0.6333	5.293
0.6500	5.288
0.6666	5.293
0.6833	5.284
0.7000	5.288
0.7166	5.293
0.7333	5.288
0.7500	5.284
0.7666	5.288
0.7833	5.293
0.8000	5.284
0.8166	5.284
0.8333	5.288
0.8500	5.284
0.8666	5.284

0.8833	5.288
0.9000	5.288
0.9166	5.284
0.9333	5.288
0.9500	5.288
0.9666	5.288
0.9833	5.288
1.0000	5.288
1.2000	5.284
1.4000	5.284
1.6000	5.284
1.8000	5.279
2.0000	5.279
2.2000	5.279
2.4000	5.279
2.6000	5.279
2.8000	5.279
3.0000	5.279
3.2000	5.279
3.4000	5.279
3.6000	5.279
3.8000	5.279
4.0000	5.279
4.2000	5.279
4.4000	5.274
4.6000	5.279
4.8000	5.279
5.0000	5.279
5.2000	5.284
5.4000	5.279
5.6000	5.274
5.8000	5.279
6.0000	5.279
6.2000	5.274
6.4000	5.279
6.6000	5.279
6.8000	5.279
7.0000	5.279
7.2000	5.274
7.4000	5.279
7.6000	5.279
7.8000	5.279
8.0000	5.274
8.2000	5.279
8.4000	5.279
8.6000	5.279
8.8000	5.279
9.0000	5.279
9.2000	5.279
9.4000	5.279
9.6000	5.279
9.8000	5.284

10.0000	5.274
12.0000	5.274
14.0000	5.279

PCY98-MW04



AQTESOLV



GERAGHTY
& MILLER, INC.

Modeling Group

SE1000C
Environmental Logger
11/16 08:21

Unit# 00761 Test 2

Setups: INPUT 1

Type Level (F)
Mode TOC
I.D. 00000

Reference 4.750
Linearity 0.000
Scale factor 14.910
Offset 0.120
Delay mSEC 50.000

Step 0 09/21 13:58:52

Elapsed Time INPUT 1

0.0000 4.745
0.0033 4.745
0.0066 4.745
0.0100 4.745
0.0133 5.136
0.0166 8.315
0.0200 10.190
0.0233 8.457
0.0266 6.573
0.0300 5.569
0.0333 5.305
0.0366 5.414
0.0400 5.409
0.0433 5.291
0.0466 5.258
0.0500 5.230
0.0533 5.173
0.0566 5.155
0.0600 5.131
0.0633 5.098
0.0666 5.079
0.0700 5.060
0.0733 5.042
0.0766 5.027
0.0800 5.009
0.0833 4.999
0.0866 4.980
0.0900 4.971
0.0933 4.961

0.0966	4.952
0.1000	4.938
0.1033	4.928
0.1066	4.914
0.1100	4.910
0.1133	4.905
0.1166	4.896
0.1200	4.891
0.1233	4.891
0.1266	4.877
0.1300	4.877
0.1333	4.872
0.1366	4.867
0.1400	4.863
0.1433	4.858
0.1466	4.848
0.1500	4.848
0.1533	4.848
0.1566	4.848
0.1600	4.844
0.1633	4.834
0.1666	4.834
0.1700	4.834
0.1733	4.830
0.1766	4.825
0.1800	4.820
0.1833	4.825
0.1866	4.815
0.1900	4.820
0.1933	4.815
0.1966	4.815
0.2000	4.811
0.2033	4.815
0.2066	4.811
0.2100	4.806
0.2133	4.801
0.2166	4.806
0.2200	4.797
0.2233	4.806
0.2266	4.801
0.2300	4.801
0.2333	4.797
0.2366	4.792
0.2400	4.792
0.2433	4.797
0.2466	4.792
0.2500	4.792
0.2533	4.792
0.2566	4.792
0.2600	4.787
0.2633	4.792
0.2666	4.787

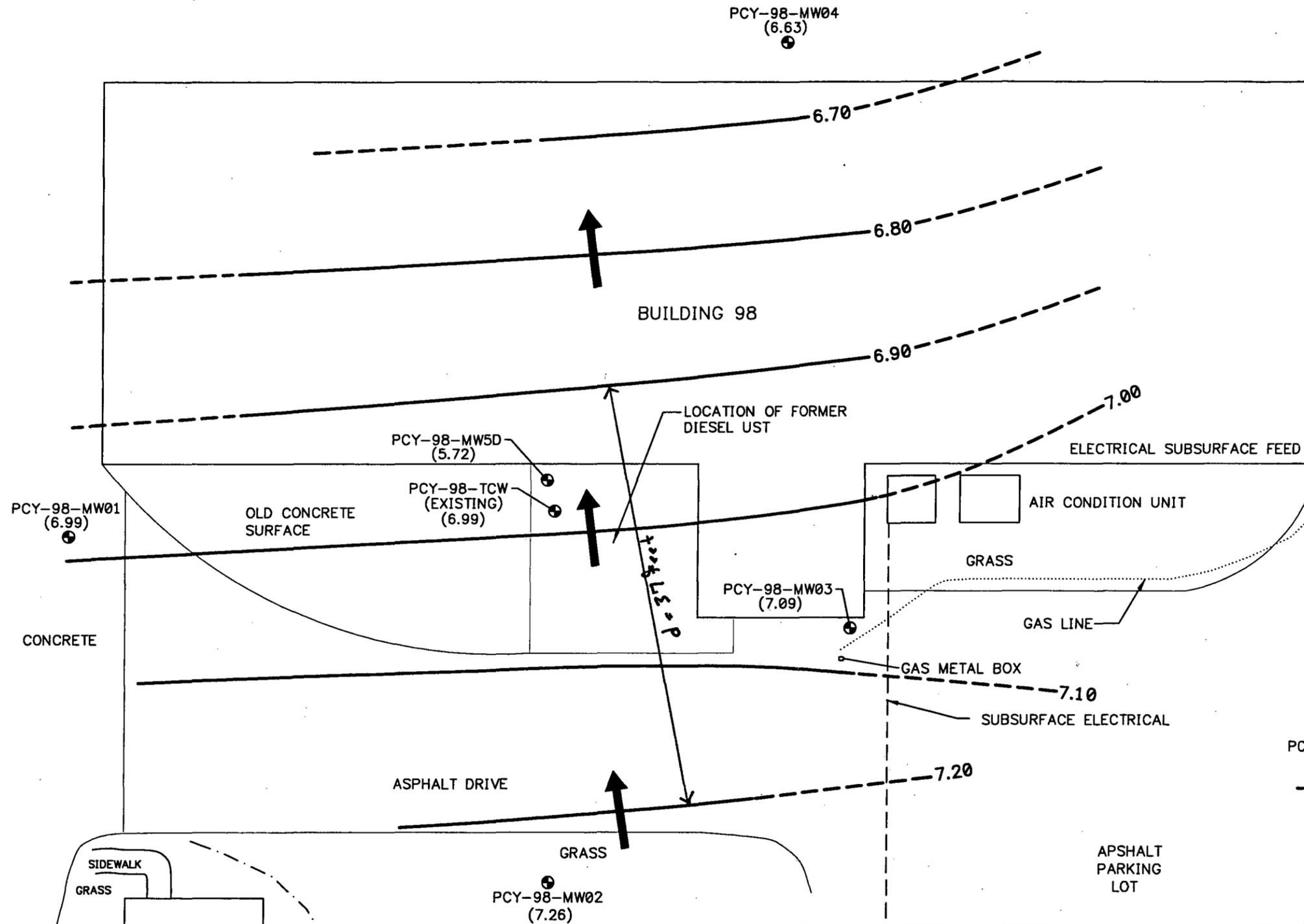
0.2700	4.782
0.2733	4.787
0.2766	4.782
0.2800	4.782
0.2833	4.782
0.2866	4.787
0.2900	4.782
0.2933	4.782
0.2966	4.782
0.3000	4.782
0.3033	4.778
0.3066	4.778
0.3100	4.778
0.3133	4.773
0.3166	4.773
0.3200	4.778
0.3233	4.778
0.3266	4.773
0.3300	4.773
0.3333	4.773
0.3500	4.773
0.3666	4.773
0.3833	4.768
0.4000	4.773
0.4166	4.768
0.4333	4.768
0.4500	4.764
0.4666	4.759
0.4833	4.764
0.5000	4.764
0.5166	4.759
0.5333	4.759
0.5500	4.764
0.5666	4.764
0.5833	4.759
0.6000	4.759
0.6166	4.759
0.6333	4.759
0.6500	4.759
0.6666	4.759
0.6833	4.754
0.7000	4.759
0.7166	4.754
0.7333	4.759
0.7500	4.759
0.7666	4.754
0.7833	4.754
0.8000	4.754
0.8166	4.754
0.8333	4.754
0.8500	4.754
0.8666	4.759

0.8833	4.754
0.9000	4.759
0.9166	4.754
0.9333	4.754
0.9500	4.754
0.9666	4.754
0.9833	4.754
1.0000	4.754
1.2000	4.754
1.4000	4.754
1.6000	4.754
1.8000	4.750
2.0000	4.750
2.2000	4.750
2.4000	4.754
2.6000	4.754
2.8000	4.750
3.0000	4.754
3.2000	4.754
3.4000	4.754
3.6000	4.754
3.8000	4.754
4.0000	4.750
4.2000	4.754
4.4000	4.750
4.6000	4.750
4.8000	4.750
5.0000	4.750
5.2000	4.754
5.4000	4.754
5.6000	4.745
5.8000	4.750
6.0000	4.750
6.2000	4.750
6.4000	4.750
6.6000	4.750
6.8000	4.750
7.0000	4.750
7.2000	4.754
7.4000	4.750
7.6000	4.750
7.8000	4.754
8.0000	4.754
8.2000	4.754
8.4000	4.750
8.6000	4.750
8.8000	4.750
9.0000	4.750
9.2000	4.745
9.4000	4.745
9.6000	4.754
9.8000	4.754

10.0000	4.745
12.0000	4.750
14.0000	4.759
16.0000	4.759

APPENDIX K

GROUNDWATER GRADEINT, GROUNDWATER FLOW RATE, AND TRANSMISSIVITY CALCULATIONS

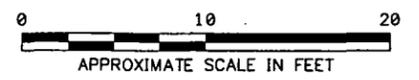


$\Delta H = .307\text{ft}$
 $d = 37\text{ft}$

$\frac{\Delta H}{d} = \frac{.307\text{ft}}{37} = 0.008$

LEGEND

- PCY-98-MW01 (6.99) MONITORING WELL (GROUNDWATER ELEVATION)
- GROUNDWATER CONTOUR DASHED WHERE INFERRED
- GROUNDWATER FLOW DIRECTION



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DATE
 MF 11/16/98
 CHECKED BY DATE
 JG 11/16/98
 COST/SCHED-AREA
 SCALE
 AS NOTED



GROUNDWATER ELEVATION CONTOUR MAP
 SEPTEMBER 22, 1998
 SITE 98
 COASTAL SYSTEMS STATION
 PANAMA CITY, FLORIDA

CONTRACT NO. 7766	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3-3	REV. 0

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 3-3.

September 22, 1998

The gradient across the site was calculated after constructing groundwater contours from the September 22, 1998, depth to water data, determining the perpendicular distance between two of these contours, and utilizing the following calculation:

$$i = \frac{7.20 \text{ ft} - 6.90 \text{ ft}}{37 \text{ ft}}$$

$$i = \frac{0.30 \text{ ft}}{37 \text{ ft}}$$

$$i = 0.008 \text{ ft/ft}$$

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:

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

where:

V = average velocity

K = hydraulic conductivity = 2.09 ft/day

n = effective porosity (assumed) = 0.30

i = average hydraulic gradient = 0.008

therefore:

$$V = \left(\frac{2.09 \text{ ft/day}}{0.30} \right) \times 0.008 \text{ ft/ft}$$

$$V = 0.05 \text{ ft/day}$$

TRANSMISSIVITY

Transmissivity can be determined by multiplying the hydraulic conductivity by the effective aquifer thickness (b_e). The effective aquifer thickness is defined as depth to the top of the water table to (approximately 5 feet bls) to the top of a limestone of the Intracoastal Formation (encountered at CSS at depths of approximately 62 feet bls) The transmissivity was calculated as follows:

$$T = Kb_e$$

where:

T = transmissivity

K = hydraulic conductivity = 2.09 ft/day

b_e = affected aquifer thickness = 57 ft

therefore:

$$T = 2.09 \text{ ft/day} \times 57 \text{ ft}$$

$$T = 1.19 \times 10^2 \text{ ft}^2/\text{day} \times 7.48 \text{ gal/ft}^3$$

$$T = 8.90 \times 10^2 \text{ gal/day/ft}$$

Note: Depth to Intracoastal Formation obtained from data presented in the RCRA Facility Investigation Report (ABB Environmental Services, Inc., 1995).

APPENDIX L

**MOBILE LABORATORY GROUNDWATER FIELD SCREENING DATA
SHEETS**



QA/QC DATA REPORT

TETRATECH NUS (BROWN -N-ROOT)
1311 EXECUTIVE CENTER, ELLIS BLD SUITE 220
TALLAHASSEE FL 32301

COASTAL SYSTEM STATION SITE
CLIENT PROJECT # 7766

EG PROJECT # 3-98179-C1

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

DATA REPORTED IN MILLIGRAMS PER LITER (PPM)

DATE ANALYZED: 5/28/98
SAMPLE SPIKED: GW-SSB24-7

TPH-DRO
(mg/L)

MATRIX SPIKE

SPIKED CONC.	5.00
MEASURED CONC.	5.03
% RECOVERY	100.6%

MAT SPIKE DUPLICATE

SPIKED CONC.	5.00
MEASURED CONC.	4.98
% RECOVERY	99.6%

RELATIVE PERCENT

DIFFERENCE (RPD) 1.0%

ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY

ANALYSIS PERFORMED BY: ROBERT BARTHOLOMEW

DATA REVIEWED BY: *T.H.M.*



DATA REPORT

TETRATECH NUS (BROWN -N-ROOT)
1311 EXECUTIVE CENTER, ELLIS BLD SUITE 220
TALLAHASSEE FL 32301

COASTAL SYSTEM STATION SITE
CLIENT PROJECT # 7766

TEG PROJECT # 3-98179-C1

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	—	5/20/98	ND	98.8		0.50
98-GWSB02-7	5/19/98	5/20/98	2960	MI		0.50
98-GWSB04-7	5/19/98	5/20/98	2100	MI		0.50
98-SWSB05-7	5/19/98	5/20/98	7.48	84.1		0.50
98-SWSB06-7	5/19/98	5/20/98	45.6	MI		0.50
98-SWSB03-30	5/19/98	5/20/98	1046	MI		0.50

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)

ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY

ANALYSIS PERFORMED BY: ROBERT BARTHOLOMEW

DATA REVIEWED BY: *R. Bartholomew*

DATA QUALIFIERS

MI = MATRIX INTERFERENCE

DO = SURROGATE SPIKE DILUTED OUT

D = ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY

d = INDIVIDUAL VALUE OBTAINED BY DILUTION

E = ESTIMATED CONCENTRATION(S)



QA/QC DATA REPORT

TETRATECH NUS (BROWN-N-ROOT)
1311 EXECUTIVE CENTER, ELLIS BLD SUITE 220
TALLAHASSEE FL 32301

COASTAL SYSTEM STATION SITE
CLIENT PROJECT # 7766

TEG PROJECT # 3-98179-C1

TPH-GRO ANALYSIS OF WATER (EPA METHOD 5030/8015 Mod.)

DATA REPORTED IN MILLIGRAMS PER LITER (PPM)

DATE ANALYZED: 5/28/98
SAMPLE SPIKED: GW-SSB24-7

	TPH-GRO (mg/L)
MATRIX SPIKE	
SPIKED CONC.	5.00
MEASURED CONC.	5.22
% RECOVERY	104.4%
MATRIX SPIKE DUPLICATE	
SPIKED CONC.	5.00
MEASURED CONC.	4.88
% RECOVERY	97.6%
RELATIVE PERCENT DIFFERENCE (RPD)	6.7%

ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY
ANALYSIS PERFORMED BY: ROBERT BARTHOLOMEW
DATA REVIEWED BY: *T. H. M.*



CTO 047

DATA REPORT

TETRATECH NUS (BROWN-N-ROOT)
1311 EXECUTIVE CENTER, ELLIS BLD SUITE 220
TALLAHASSEE FL 32301

COASTAL SYSTEM STATION SITE
CLIENT PROJECT # 7766

TEG PROJECT # 3-98179-C1

TPH-GRO ANALYSIS OF WATER (EPA METHOD 5030/8015 Mod.)

DATA REPORTED IN MILLIGRAMS PER LITER (PPM)

SAMPLE ID	DATE COLLECTED	DATE ANALYZED	TPH-GRO (mg/L)	Surrogate Recovery (%)	Data Qualifiers	PQL
METHOD BLANK	---	5/20/98	ND	96.2		0.50
98-GWSB02-7	5/19/98	5/20/98	ND	MI		0.50
98-GWSB04-7	5/19/98	5/20/98	ND	MI		0.50
98-GWSB05-7	5/19/98	5/20/98	0.90	MI		0.50
98-GWSB06-7	5/19/98	5/20/98	ND	MI		0.50
98-GWSB03-30	5/19/98	5/20/98	ND	MI		0.50

"ND" INDICATES ANALYTE NOT DETECTED AT OR ABOVE LISTED PRACTICAL QUANTITATION LIMITS (PQL'S)

ANALYSIS PERFORMED IN TEG'S CERTIFIED LABORATORY

ANALYSIS PERFORMED BY: ROBERT BARTHOLOMEW

DATA REVIEWED BY: *J.H.M.*

DATA QUALIFIERS

MI = MATRIX INTERFERENCE

DO = SURROGATE SPIKE DILUTED OUT

D = ALL SAMPLE VALUES OBTAINED BY DILUTION, PQL IS ADJUSTED ACCORDINGLY

d = INDIVIDUAL VALUE OBTAINED BY DILUTION

E = ESTIMATED CONCENTRATION(S)

APPENDIX M

GROUNDWATER LABORATORY DATA SHEETS

Technical Report for**Tetra-Tech, NUS**

Site 98 CSS, Panama City

7766 CTO 0047

Accutest Job Number: F2964

Report to:

Tetra Tech, NUS
1311 Executive Center Drive
Ellie Building, Suite 220
Tallahassee, FL 32301

ATTN: Gerald Goode

Total number of pages in report: 51


**Harry Benzadi, Ph.D.
Laboratory Director**

Results relate only to the items tested.

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.



Sample Summary

Tetra-Tech, NUS

Date: 10/15/98

Site 98 CSS, Panama City
Project No: 7766 CTO 0047

Job No: F2964

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
F2964-1	09/22/98	10:00 PH	09/24/98	AQ	Ground Water	PCY-98-MW02-001
F2964-2	09/22/98	11:30 PH	09/24/98	AQ	Ground Water	PCY-98-MW5D-001
F2964-3	09/22/98	12:00 PH	09/24/98	AQ	Ground Water	PCY-98-TCW-001B
F2964-4	09/22/98	15:00 PH	09/24/98	AQ	Ground Water	PCY-98-TCW-001
F2964-5	09/22/98	15:00 PH	09/24/98	AQ	Ground Water	PCY-98-TCW-001D
F2964-6	09/22/98	16:40 PH	09/24/98	AQ	Ground Water	PCY-98-MW01-001
F2964-7	09/22/98	17:30 PH	09/24/98	AQ	Ground Water	PCY-98-MW04-001
F2964-8	09/22/98	18:15 PH	09/24/98	AQ	Ground Water	PCY-98-MW03-001



Report of Analysis

Client Sample ID: PCY-98-MW02-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-1	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: FLORIDA-PRO	
Project: Site 98 CSS, Panama City	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P01981.D	1	09/30/98	NF	09/25/98	OP526	GOP93
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	1.37	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 analyte found in associated method blank
N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID: PCY-98-MW02-001	
Lab Sample ID: F2964-1	Date Sampled: 09/22/98
Matrix: AQ - Ground Water	Date Received: 09/24/98
Method: SW846 8310	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #2		1	10/11/98	AMA	09/29/98	M:OP821	M:GC682

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	ug/l	
208-96-8	Acenaphthylene	ND	1.0	ug/l	
120-12-7	Anthracene	ND	1.0	ug/l	
56-55-3	Benzo (a) anthracene	ND	0.15	ug/l	
50-32-8	Benzo (a) pyrene	ND	0.15	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	0.15	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	0.15	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	0.15	ug/l	
218-01-9	Chrysene	ND	0.15	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	0.15	ug/l	
206-44-0	Fluoranthene	ND	1.0	ug/l	
86-73-7	Fluorene	2.95	1.0	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	0.15	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	ug/l	
91-20-3	Naphthalene	ND	1.0	ug/l	
85-01-8	Phenanthrene	ND	1.0	ug/l	
129-00-0	Pyrene	ND	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	152%		20-160%

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

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

Report of Analysis

Client Sample ID: PCY-98-MW02-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-1	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: EPA 504.1	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	MN01485.D	1	09/29/98	SKW	n/a	n/a	GMN70
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
106-93-4	1,2-Dibromoethane	0.050	0.020	ug/l	

(a) All hits confirmed by dual column analysis.

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

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



Report of Analysis

Client Sample ID: PCY-98-MW02-001 Lab Sample ID: F2964-1 Matrix: AQ - Ground Water Method: SW846 8021B Project: Site 98 CSS, Panama City	Date Sampled: 09/22/98 Date Received: 09/24/98 Percent Solids: n/a
---	---

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007221.D	1	09/25/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	1.7	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
75-25-2	Bromoform	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	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
110-75-8	2-Chloroethylvinyl ether	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	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	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	22.6	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	ug/l	
75-35-4	1,1-Dichloroethene	1.8	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	10.9	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	17.1	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	1.0	1.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l	
75-01-4	Vinyl chloride	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	23.5	3.0	ug/l	

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

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



Report of Analysis

Client Sample ID: PCY-98-MW02-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-1	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8021B	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007221.D	1	09/25/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
74-97-5	Bromochloromethane	105%		75-125%
75-29-6	2-Chloropropane	105%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	105%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	96%		75-125%
462-06-6	Fluorobenzene	107%		75-125%
98-08-8	aaa-Trifluorotoluene	107%		75-125%

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

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



Report of Analysis

Page 1 of 1

Client Sample ID: PCY-98-MW02-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-1	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Lead	0.0054	0.0030	mg/l	1	09/29/98	10/06/98 JK	EPA 200.7

RDL = Reported Detection Limit



Report of Analysis

Client Sample ID: PCY-98-MW5D-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-2	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: FLORIDA-PRO	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P01984.D	1	09/30/98	NF	09/25/98	OP526	GOP93
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	101%		40-140%

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

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



Report of Analysis

Client Sample ID: PCY-98-MW5D-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-2	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8310	
Project: Site 98 CSS, Panama City	

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1		1	10/11/98	AMA	09/29/98	M:OP821	M:GC682
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	ug/l	
208-96-8	Acenaphthylene	ND	1.0	ug/l	
120-12-7	Anthracene	ND	1.0	ug/l	
56-55-3	Benzo (a) anthracene	ND	0.15	ug/l	
50-32-8	Benzo (a) pyrene	ND	0.15	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	0.15	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	0.15	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	0.15	ug/l	
218-01-9	Chrysene	ND	0.15	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	0.15	ug/l	
206-44-0	Fluoranthene	ND	1.0	ug/l	
86-73-7	Fluorene	ND	1.0	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	0.15	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	ug/l	
91-20-3	Naphthalene	ND	1.0	ug/l	
85-01-8	Phenanthrene	ND	1.0	ug/l	
129-00-0	Pyrene	ND	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	96.4%		20-160%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID: PCY-98-MW5D-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-2	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: EPA 504.1	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	MN01486.D	1	09/29/98	SKW	n/a	n/a	GMN70
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 analyte found in associated method blank
N = Indicates presumptive evidence of a compound

**Report of Analysis**

Client Sample ID: PCY-98-MW5D-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-2	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8021B	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007222.D	1	09/25/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
75-25-2	Bromoform	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	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
110-75-8	2-Chloroethylvinyl ether	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	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	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	7.7	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	ug/l	
75-35-4	1,1-Dichloroethene	1.2	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	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	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Client Sample ID: PCY-98-MW5D-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-2	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8021B	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007222.D	1	09/25/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
74-97-5	Bromochloromethane	106%		75-125%
75-29-6	2-Chloropropane	105%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	102%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	92%		75-125%
462-06-6	Fluorobenzene	106%		75-125%
98-08-8	aaa-Trifluorotoluene	104%		75-125%

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

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



Report of Analysis

Client Sample ID: PCY-98-MW5D-001

Lab Sample ID: F2964-2

Matrix: AQ - Ground Water

Date Sampled: 09/22/98

Date Received: 09/24/98

Percent Solids: n/a

Project: Site 98 CSS, Panama City

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Lead	0.0152	0.0030	mg/l	1	09/29/98	10/06/98 JK	EPA 200.7

RDL = Reported Detection Limit



ACCUTEST.

Report of Analysis

Client Sample ID: PCY-98-TCW-001B	Date Sampled: 09/22/98
Lab Sample ID: F2964-3	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: FLORIDA-PRO	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P01985.D	1	09/30/98	NF	09/25/98	OP526	GOP93
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	93%		40-140%	

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

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



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Report of Analysis

Client Sample ID:	PCY-98-TCW-001B	Date Sampled:	09/22/98
Lab Sample ID:	F2964-3	Date Received:	09/24/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8310		
Project:	Site 98 CSS, Panama City		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1		1	10/11/98	AMA	09/29/98	M:OP821	M:GC682
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	ug/l	
208-96-8	Acenaphthylene	ND	1.0	ug/l	
120-12-7	Anthracene	ND	1.0	ug/l	
56-55-3	Benzo (a) anthracene	ND	0.15	ug/l	
50-32-8	Benzo (a) pyrene	ND	0.15	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	0.15	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	0.15	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	0.15	ug/l	
218-01-9	Chrysene	ND	0.15	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	0.15	ug/l	
206-44-0	Fluoranthene	ND	1.0	ug/l	
86-73-7	Fluorene	ND	1.0	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	0.15	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	ug/l	
91-20-3	Naphthalene	ND	1.0	ug/l	
85-01-8	Phenanthrene	ND	1.0	ug/l	
129-00-0	Pyrene	ND	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	78.6%		20-160%

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

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



ACCUTEST.

Report of Analysis

Client Sample ID: PCY-98-TCW-001B	Date Sampled: 09/22/98
Lab Sample ID: F2964-3	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: EPA 504.1	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	MN01487.D	1	09/29/98	SKW	n/a	n/a	GMN70
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 analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

**ACCUTEST.****Report of Analysis**

Client Sample ID:	PCY-98-TCW-001B	Date Sampled:	09/22/98
Lab Sample ID:	F2964-3	Date Received:	09/24/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8021B		
Project:	Site 98 CSS, Panama City		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007223.D	1	09/25/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
75-25-2	Bromoform	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	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
110-75-8	2-Chloroethylvinyl ether	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	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	
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	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	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	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID: PCY-98-TCW-001B	
Lab Sample ID: F2964-3	Date Sampled: 09/22/98
Matrix: AQ - Ground Water	Date Received: 09/24/98
Method: SW846 8021B	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007223.D	1	09/25/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
74-97-5	Bromochloromethane	103%		75-125%
75-29-6	2-Chloropropane	104%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	101%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	91%		75-125%
462-06-6	Fluorobenzene	106%		75-125%
98-08-8	aaa-Trifluorotoluene	103%		75-125%

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

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



Report of Analysis

Client Sample ID: PCY-98-TCW-001B	Date Sampled: 09/22/98
Lab Sample ID: F2964-3	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Lead	<0.0030	0.0030	mg/l	1	09/29/98	10/06/98 JK	EPA 200.7

RDL = Reported Detection Limit



ACCUTEST.

Report of Analysis

Client Sample ID: PCY-98-TCW-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-4	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: FLORIDA-PRO	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P01986.D	8	09/30/98	NF	09/25/98	OP526	GOP93
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	10.7	4.0	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	102%		40-140%

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

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



Report of Analysis

Client Sample ID: PCY-98-TCW-001	
Lab Sample ID: F2964-4	Date Sampled: 09/22/98
Matrix: AQ - Ground Water	Date Received: 09/24/98
Method: SW846 8310	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1		1	10/11/98	AMA	09/29/98	M:OP821	M:GC682
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	ug/l	
208-96-8	Acenaphthylene	ND	1.0	ug/l	
120-12-7	Anthracene	ND	1.0	ug/l	
56-55-3	Benzo (a) anthracene	ND	0.15	ug/l	
50-32-8	Benzo (a) pyrene	ND	0.15	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	0.15	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	0.15	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	0.15	ug/l	
218-01-9	Chrysene	ND	0.15	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	0.15	ug/l	
206-44-0	Fluoranthene	ND	1.0	ug/l	
86-73-7	Fluorene	ND	1.0	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	0.15	ug/l	
90-12-0	1-Methylnaphthalene	18.4	1.0	ug/l	
91-57-6	2-Methylnaphthalene	22.8	1.0	ug/l	
91-20-3	Naphthalene	17.8	1.0	ug/l	
85-01-8	Phenanthrene	5.05	1.0	ug/l	
129-00-0	Pyrene	ND	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	65%		20-160%

<p>ND = Not detected RDL = Reported Detection Limit E = Indicates value exceeds calibration range</p>	<p>J = Indicates an estimated value B = Indicates analyte found in associated method blank N = Indicates presumptive evidence of a compound</p>
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Report of Analysis

Client Sample ID: PCY-98-TCW-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-4	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: EPA 504.1	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	MN01488.D	1	09/29/98	SKW	n/a	n/a	GMN70
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
106-93-4	1,2-Dibromoethane	0.033	0.020	ug/l	

(a) All hits confirmed by dual column analysis.

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

**ACCUTEST.****Report of Analysis**

Client Sample ID:	PCY-98-TCW-001	Date Sampled:	09/22/98
Lab Sample ID:	F2964-4	Date Received:	09/24/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8021B		
Project:	Site 98 CSS, Panama City		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007251.D	1	09/29/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	1.9	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
75-25-2	Bromoform	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	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
110-75-8	2-Chloroethylvinyl ether	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	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	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	28.3	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	ug/l	
75-35-4	1,1-Dichloroethene	2.4	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	27.8	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	60.1	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	
1330-20-7	Xylenes (total)	94.0	3.0	ug/l	

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



Client Sample ID: PCY-98-TCW-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-4	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8021B	
Project: Site 98 CSS, Panama City	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007251.D	1	09/29/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
74-97-5	Bromochloromethane	100%		75-125%
75-29-6	2-Chloropropane	93%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	109%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	94%		75-125%
462-06-6	Fluorobenzene	112%		75-125%
98-08-8	aaa-Trifluorotoluene	110%		75-125%

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

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



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Report of Analysis

Client Sample ID: PCY-98-TCW-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-4	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Lead	0.0104	0.0030	mg/l	1	09/29/98	10/06/98 JK	EPA 200.7

RDL = Reported Detection Limit



Report of Analysis

Client Sample ID: PCY-98-TCW-001D	
Lab Sample ID: F2964-5	Date Sampled: 09/22/98
Matrix: AQ - Ground Water	Date Received: 09/24/98
Method: FLORIDA-PRO	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P01988.D	5	09/30/98	NF	09/25/98	OP526	GOP93
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	8.16	2.5	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	76%		40-140%

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

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



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Report of Analysis

Client Sample ID: PCY-98-TCW-001D	
Lab Sample ID: F2964-5	Date Sampled: 09/22/98
Matrix: AQ - Ground Water	Date Received: 09/24/98
Method: SW846 8310	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1		1	10/11/98	AMA	09/29/98	M:OP821	M:GC682
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	ug/l	
208-96-8	Acenaphthylene	ND	1.1	ug/l	
120-12-7	Anthracene	ND	1.1	ug/l	
56-55-3	Benzo (a) anthracene	ND	0.16	ug/l	
50-32-8	Benzo (a) pyrene	ND	0.16	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	0.16	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	0.16	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	0.16	ug/l	
218-01-9	Chrysene	ND	0.16	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	0.16	ug/l	
206-44-0	Fluoranthene	ND	1.1	ug/l	
86-73-7	Fluorene	ND	1.1	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	0.16	ug/l	
90-12-0	1-Methylnaphthalene	6.60	1.1	ug/l	
91-57-6	2-Methylnaphthalene	4.80	1.1	ug/l	
91-20-3	Naphthalene	5.43	1.1	ug/l	
85-01-8	Phenanthrene	ND	1.1	ug/l	
129-00-0	Pyrene	ND	1.1	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	82.8%		20-160%

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

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



Report of Analysis

Client Sample ID: PCY-98-TCW-001D	
Lab Sample ID: F2964-5	Date Sampled: 09/22/98
Matrix: AQ - Ground Water	Date Received: 09/24/98
Method: EPA 504.1	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	MN01489.D	1	09/29/98	SKW	n/a	n/a	GMN70
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
106-93-4	1,2-Dibromoethane	0.031	0.020	ug/l	

(a) All hits confirmed by dual column analysis.

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



Report of Analysis

Client Sample ID: PCY-98-TCW-001D
Lab Sample ID: F2964-5
Matrix: AQ - Ground Water
Method: SW846 8021B
Project: Site 98 CSS, Panama City

Date Sampled: 09/22/98
Date Received: 09/24/98
Percent Solids: n/a

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007252.D	1	09/29/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	1.8	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
75-25-2	Bromoform	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	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
110-75-8	2-Chloroethylvinyl ether	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	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	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	27.4	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	ug/l	
75-35-4	1,1-Dichloroethene	2.6	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	25.8	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	56.9	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	
1330-20-7	Xylenes (total)	88.2	3.0	ug/l	

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

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



Report of Analysis

Client Sample ID: PCY-98-TCW-001D	
Lab Sample ID: F2964-5	Date Sampled: 09/22/98
Matrix: AQ - Ground Water	Date Received: 09/24/98
Method: SW846 8021B	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007252.D	1	09/29/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
74-97-5	Bromochloromethane	103%		75-125%
75-29-6	2-Chloropropane	95%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	108%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	92%		75-125%
462-06-6	Fluorobenzene	111%		75-125%
98-08-8	aaa-Trifluorotoluene	109%		75-125%

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

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



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Report of Analysis

Client Sample ID: PCY-98-TCW-001D	Date Sampled: 09/22/98
Lab Sample ID: F2964-5	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Lead	0.0109	0.0030	mg/l	1	09/29/98	10/06/98 JK	EPA 200.7

RDL = Reported Detection Limit



Report of Analysis

Client Sample ID: PCY-98-MW01-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-6	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: FLORIDA-PRO	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P01989.D	1	09/30/98	NF	09/25/98	OP526	GOP93
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	0.888	0.50	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	98%		40-140%

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

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



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Report of Analysis

Client Sample ID: PCY-98-MW01-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-6	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8310	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1		1	10/11/98	AMA	09/29/98	M:OP821	M:GC682
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	ug/l	
208-96-8	Acenaphthylene	ND	1.0	ug/l	
120-12-7	Anthracene	ND	1.0	ug/l	
56-55-3	Benzo (a) anthracene	ND	0.16	ug/l	
50-32-8	Benzo (a) pyrene	ND	0.16	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	0.16	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	0.16	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	0.16	ug/l	
218-01-9	Chrysene	ND	0.16	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	0.16	ug/l	
206-44-0	Fluoranthene	ND	1.0	ug/l	
86-73-7	Fluorene	ND	1.0	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	0.16	ug/l	
90-12-0	1-Methylnaphthalene	ND	1.0	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	ug/l	
91-20-3	Naphthalene	ND	1.0	ug/l	
85-01-8	Phenanthrene	ND	1.0	ug/l	
129-00-0	Pyrene	ND	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	92.5%		20-160%

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

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



Report of Analysis

Client Sample ID: PCY-98-MW01-001		Date Sampled: 09/22/98
Lab Sample ID: F2964-6		Date Received: 09/24/98
Matrix: AQ - Ground Water		Percent Solids: n/a
Method: EPA 504.1		
Project: Site 98 CSS, Panama City		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	MN01490.D	1	09/29/98	SKW	n/a	n/a	GMN70
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 analyte found in associated method blank
N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID: PCY-98-MW01-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-6	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8021B	
Project: Site 98 CSS, Panama City	

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007226.D	1	09/25/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	1.1	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
75-25-2	Bromoform	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	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
110-75-8	2-Chloroethylvinyl ether	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	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	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	28.4	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	ug/l	
75-35-4	1,1-Dichloroethene	3.0	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	5.1	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	
1330-20-7	Xylenes (total)	8.4	3.0	ug/l	

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID: PCY-98-MW01-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-6	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8021B	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007226.D	1	09/25/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
74-97-5	Bromochloromethane	105%		75-125 %
75-29-6	2-Chloropropane	103%		75-125 %
625-98-9	1-Chloro-3-fluorobenzene	103%		75-125 %
625-98-9	1-Chloro-3-fluorobenzene	92%		75-125 %
462-06-6	Fluorobenzene	108%		75-125 %
98-08-8	aaa-Trifluorotoluene	106%		75-125 %

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

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



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Report of Analysis

Client Sample ID: PCY-98-MW01-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-6	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Lead	<0.0030	0.0030	mg/l	1	09/29/98	10/06/98 JK	EPA 200.7

RDL = Reported Detection Limit



Report of Analysis

Client Sample ID: PCY-98-MW04-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-7	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: FLORIDA-PRO	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P01990.D	3	09/30/98	NF	09/25/98	OP526	GOP93
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	3.70	1.5	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	95%		40-140%

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

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



Report of Analysis

Client Sample ID: PCY-98-MW04-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-7	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8310	
Project: Site 98 CSS, Panama City	

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #2		1	10/11/98	AMA	09/29/98	M:OP821	M:GC682

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	ug/l	
208-96-8	Acenaphthylene	ND	1.1	ug/l	
120-12-7	Anthracene	ND	1.1	ug/l	
56-55-3	Benzo (a) anthracene	ND	0.16	ug/l	
50-32-8	Benzo (a) pyrene	ND	0.16	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	0.16	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	0.16	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	0.16	ug/l	
218-01-9	Chrysene	ND	0.16	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	0.16	ug/l	
206-44-0	Fluoranthene	ND	1.1	ug/l	
86-73-7	Fluorene	ND	1.1	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	0.16	ug/l	
90-12-0	1-Methylnaphthalene	6.19	1.1	ug/l	
91-57-6	2-Methylnaphthalene	5.81	1.1	ug/l	
91-20-3	Naphthalene	10.4	1.1	ug/l	
85-01-8	Phenanthrene	ND	1.1	ug/l	
129-00-0	Pyrene	ND	1.1	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	137.5%		20-160%

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

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



ACCUTEST.

Report of Analysis

Client Sample ID: PCY-98-MW04-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-7	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: EPA 504.1	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	MN01491.D	1	09/29/98	SKW	n/a	n/a	GMN70
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 analyte found in associated method blank
N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID:	PCY-98-MW04-001	Date Sampled:	09/22/98
Lab Sample ID:	F2964-7	Date Received:	09/24/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8021B		
Project:	Site 98 CSS, Panama City		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	EF007227.D	1	09/25/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	2.1	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
75-25-2	Bromoform	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	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-00-3	Chloroethane	31.5	1.0	ug/l	
110-75-8	2-Chloroethylvinyl ether	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	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	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	58.0	1.0	ug/l	E
107-06-2	1,2-Dichloroethane	ND	1.0	ug/l	
75-35-4	1,1-Dichloroethene	11.7	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	10.4	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	46.0	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	3.2	1.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/l	
79-01-6	Trichloroethene	1.8	1.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l	
75-01-4	Vinyl chloride	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	34.1	3.0	ug/l	

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Client Sample ID: PCY-98-MW04-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-7	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8021B	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	EF007227.D	1	09/25/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
74-97-5	Bromochloromethane	98%		75-125%
75-29-6	2-Chloropropane	101%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	104%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	95%		75-125%
462-06-6	Fluorobenzene	109%		75-125%
98-08-8	aaa-Trifluorotoluene	108%		75-125%

(a) Presence confirmed by GC/MS

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

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



Report of Analysis

Client Sample ID: PCY-98-MW04-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-7	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Lead	0.0050	0.0030	mg/l	1	09/29/98	10/06/98 JK	EPA 200.7

RDL = Reported Detection Limit



Report of Analysis

Client Sample ID: PCY-98-MW03-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-8	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: FLORIDA-PRO	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P01991.D	5	09/30/98	NF	09/25/98	OP526	GOP93
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	5.68	2.5	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	103%		40-140%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID: PCY-98-MW03-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-8	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8310	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1		1	10/11/98	AMA	09/29/98	M:OP821	M:GC682
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	ug/l	
208-96-8	Acenaphthylene	ND	1.0	ug/l	
120-12-7	Anthracene	ND	1.0	ug/l	
56-55-3	Benzo (a) anthracene	ND	0.15	ug/l	
50-32-8	Benzo (a) pyrene	ND	0.15	ug/l	
205-99-2	Benzo (b) fluoranthene	ND	0.15	ug/l	
191-24-2	Benzo (g,h,i) perylene	ND	0.15	ug/l	
207-08-9	Benzo (k) fluoranthene	ND	0.15	ug/l	
218-01-9	Chrysene	ND	0.15	ug/l	
53-70-3	Dibenz(a,h)anthracene	ND	0.15	ug/l	
206-44-0	Fluoranthene	ND	1.0	ug/l	
86-73-7	Fluorene	ND	1.0	ug/l	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	0.15	ug/l	
90-12-0	1-Methylnaphthalene	3.00	1.0	ug/l	
91-57-6	2-Methylnaphthalene	1.48	1.0	ug/l	
91-20-3	Naphthalene	3.55	1.0	ug/l	
85-01-8	Phenanthrene	ND	1.0	ug/l	
129-00-0	Pyrene	ND	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	147%		20-160%

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

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



ACCUTEST.

Report of Analysis

Client Sample ID: PCY-98-MW03-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-8	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: EPA 504.1	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	MN01492.D	1	09/30/98	SKW	n/a	n/a	GMN70
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 analyte found in associated method blank
 N = Indicates presumptive evidence of a compound



Report of Analysis

Client Sample ID:	PCY-98-MW03-001	Date Sampled:	09/22/98
Lab Sample ID:	F2964-8	Date Received:	09/24/98
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SW846 8021B		
Project:	Site 98 CSS, Panama City		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007228.D	1	09/25/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Compound	Result	RDL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
75-25-2	Bromoform	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	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
110-75-8	2-Chloroethylvinyl ether	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
74-87-3	Chloromethane	ND	1.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
95-50-1	1,2-Dichlorobenzene	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	
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	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	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	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	

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

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



Report of Analysis

Client Sample ID: PCY-98-MW03-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-8	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8021B	
Project: Site 98 CSS, Panama City	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EF007228.D	1	09/25/98	JG	n/a	n/a	GEF175
Run #2							

VOA 8021 List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
74-97-5	Bromochloromethane	98%		75-125%
75-29-6	2-Chloropropane	100%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	101%		75-125%
625-98-9	1-Chloro-3-fluorobenzene	89%		75-125%
462-06-6	Fluorobenzene	105%		75-125%
98-08-8	aaa-Trifluorotoluene	102%		75-125%

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

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



Report of Analysis

Client Sample ID: PCY-98-MW03-001	Date Sampled: 09/22/98
Lab Sample ID: F2964-8	Date Received: 09/24/98
Matrix: AQ - Ground Water	Percent Solids: n/a
Project: Site 98 CSS, Panama City	

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Lead	0.0044	0.0030	mg/l	1	09/29/98	10/06/98 JK	EPA 200.7

RDL = Reported Detection Limit

CLIENT INFORMATION	FACILITY INFORMATION	ANALYTICAL INFORMATION	MATRIX CODES
Tetra Tech NUS, Inc. NAME 1311 Executive Center Drive, Ellis Bldg, Suite 220 ADDRESS Tallahassee FL 32301 CITY, STATE ZIP SEND REPORT TO: Gerald Gooda PHONE # 850-656-5458	PROJECT NAME: Site 98 LOCATION: Coastal Systems Station PROJECT NO.: 7766 / CTO0047 FAX #	(TRPH) 16204 FL APO 8310 10 TOTAL Pb (LN03) 504 (CH2SO4) 8021 (CHCL)	DW - DRINKING WATER GW - GROUND WATER WW - WASTE WATER SO - SOIL SL - SLUDGE OI - OIL LIQ - OTHER LIQUID SOL - OTHER SOLID

ACCUTEST SAMPLE #	FIELD ID / POINT OF COLLECTION	COLLECTION			MATRIX	# OF BOTTLES	PRESERVATION					TOTAL	LAB USE ONLY				
		DATE	TIME	SAMPLED BY:			HCl	NaOH	HNO3	H2SO4	NONE						
1	PCY-98-MW02-001	9/22/98	10:00	P.H.	GW	9						1	2	1	3	2	99
2	PCY-98-MWSD-001	9/22/98	11:30	P.H.	GW	9						1	2	1	3	2	99
3	PCY-98-TCW-001B	9/22/98	12:00	P.H.	GW	9						1	2	1	3	2	99
4	PCY-98-TCW-001	9/22/98	15:00	P.H.	GW	9						1	2	1	3	2	99
5	PCY-98-TCW-001D	9/22/98	15:00	PH	GW	9						1	2	1	3	2	99
True Blank																	
6	PCY-98-MW01-001	9/22/98	16:40	PH	GW	9						1	2	1	3	2	99
7	PCY-98-MW04-001	9/22/98	17:30	PH	GW	9						1	2	1	3	2	99
8	PCY-98-MW03-001	9/22/98	18:15	PH	GW	9						1	2	1	3	2	99
Total											8	16	8	24	16	72	

DATA TURNAROUND INFORMATION	DATA DELIVERABLE INFORMATION	COMMENTS/REMARKS
<input checked="" type="checkbox"/> STANDARD <input type="checkbox"/> 48 HOUR RUSH <input type="checkbox"/> 24 HOUR EMERGENCY <input type="checkbox"/> OTHER APPROVED BY: _____ EMERGENCY OR RUSH IS FAX DATA UNLESS PREVIOUSLY APPROVED	<input type="checkbox"/> STANDARD <input type="checkbox"/> COMMERCIAL "B" <input type="checkbox"/> DISK DELIVERABLE <input type="checkbox"/> STATE FORMS <input type="checkbox"/> OTHER (SPECIFY) _____	KR# 0374 KEPT ON ICE 4° C. Air Bill # 807031734183

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION, INCLUDING COURIER DELIVERY									
RELINQUISHED BY: 1. <u>APD Wilson</u>	DATE TIME: 7-10-98	RECEIVED BY: <u>[Signature]</u>	RELINQUISHED BY: 2.	DATE TIME:	RECEIVED BY: 2.				
RELINQUISHED BY: 3.	DATE TIME:	RECEIVED BY: 3. <u>[Signature]</u>	RELINQUISHED BY: 4.	DATE TIME:	RECEIVED BY: 4.				
RELINQUISHED BY: 5.	DATE TIME:	RECEIVED BY: 5.	SEAL #	PRESERVE WHERE APPLICABLE <input type="checkbox"/>	ON ICE <input type="checkbox"/>	TEMPERATURE _____ C			

APPENDIX N
CHEMICALS OF CONCERN AND NATURAL DEFAULT SOURCE
CONCENTRATIONS

Chemicals of Concern	Table V Groundwater Cleanup Target Levels ¹	Table VII Freshwater Surface Water Criteria ¹	Table VII Marine Surface Water Criteria ¹	Table VIII Groundwater of Low Yield/ Poor Quality	Table IX Natural Attenuation Default Source Concentrations
Benzene	1 ug/l **	71 ug/l *	71 ug/l *	10 ug/l	100 ug/l
Ethylbenzene	30 ug/l **	605 ug/l	605 ug/l	300 ug/l	300 ug/l
Toluene	40 ug/l **	475 ug/l	475 ug/l	400 ug/l	400 ug/l
Total Xylenes	20 ug/l **	370 ug/l	370 ug/l	200 ug/l	200 ug/l
MTBE	35 ug/l	33600 ug/l	33600 ug/l	350 ug/l	350 ug/l
Acenaphthene	20 ug/l	3 ug/l	3 ug/l	200 ug/l	200 ug/l
Acenaphthylene	210 ug/l	0.031 ug/l *	0.031 ug/l *	2100 ug/l	2100 ug/l
Anthracene	2100 ug/l	0.3 ug/l	0.3 ug/l	21000 ug/l	21000 ug/l
Benzo(a)anthracene	0.2 ug/l	0.031 ug/l *	0.031 ug/l *	2 ug/l	20 ug/l
Benzo(a)pyrene	0.2 ug/l **	0.031 ug/l *	0.031 ug/l *	2 ug/l	20 ug/l
Benzo(b)fluoranthene	0.2 ug/l	0.031 ug/l *	0.031 ug/l *	2 ug/l	20 ug/l
Benzo(g,h,i)perylene	210 ug/l	0.031 ug/l *	0.031 ug/l *	2100 ug/l	2100 ug/l
Benzo(k)fluoranthene	0.5 ug/l	0.031 ug/l *	0.031 ug/l *	5 ug/l	50 ug/l
Chrysene	5 ug/l	0.031 ug/l *	0.031 ug/l *	50 ug/l	500 ug/l
Dibenzo(a,h)anthracene	0.2 ug/l	0.031 ug/l *	0.031 ug/l *	2 ug/l	20 ug/l
Fluoranthene	280 ug/l	0.3 ug/l	0.3 ug/l	2800 ug/l	2800 ug/l
Fluorene	280 ug/l	30 ug/l	30 ug/l	2800 ug/l	2800 ug/l
Indeno(1,2,3-c,d)pyrene	0.2 ug/l	0.031 ug/l *	0.031 ug/l *	2 ug/l	20 ug/l
Naphthalene	20 ug/l	26 ug/l	26 ug/l	200 ug/l	200 ug/l
Phenanthrene	210 ug/l	0.031 ug/l *	0.031 ug/l *	2100 ug/l	2100 ug/l
Pyrene	210 ug/l	0.3 ug/l	0.3 ug/l	2100 ug/l	2100 ug/l
1,1-Dichloroethane	3 ug/l **	127 ug/l	127 ug/l	30 ug/l	300 ug/l
1,2-dibromoethane (EDB)	0.02 ug/l **	13 ug/l	13 ug/l	0.2 ug/l	2 ug/l
Toxicity bioassay tests	Not applicable	Pass test *	Pass test *	Not applicable	Not applicable
Arsenic	50 ug/l **	50 ug/l *	50 ug/l *	500 ug/l	500 ug/l
Barium	2000 ug/l **	###	###	20000 ug/l	20000 ug/l
Cadmium	5 ug/l **	##	0.3 ug/l *	50 ug/l	50 ug/l
Chromium	100 ug/l **	##	515 ug/l	1000 ug/l	1000 ug/l
Lead	15 ug/l **	##	5.6 ug/l *	150 ug/l	150 ug/l
Mercury	2 ug/l **	0.012 ug/l *	0.025 ug/l *	20 ug/l	20 ug/l
Selenium	50 ug/l **	5 ug/l *	71 ug/l *	500 ug/l	500 ug/l
Silver	100 ug/l **	0.07 ug/l *	0.35 ug/l	1000 ug/l	1000 ug/l
TRPHs	5 mg/l	5 mg/l	5 mg/l	50 mg/l	50 mg/l
Chloride	250 mg/l **#	####	####	2500 mg/l #	2500 mg/l #
Sulfate	250 mg/l **#	####	####	2500 mg/l #	2500 mg/l #
Total Dissolved Solids (TDS)	500 mg/l **#	####	####	5000 mg/l #	5000 mg/l #

¹ If the MDL given the condition of the sample, using the most sensitive and currently available technology, is higher than a specified criterion, the PQL shall be used.

In lieu of Table VI use the lower of Table V and Table VII Freshwater Surface Water Criteria.

* As provided in Chapter 62-302, F.A.C.

** As provided in Chapters 62-520 or 62-550, F.A.C.

Only applicable to sites where the contamination is derived from petroleum as defined in Section 376.301, F.S.

Hardness-dependent as provided in Chapter 62-302, F.A.C.

Not greater than 10% above background concentration.

Not greater than 10% above background concentration and only applicable to sites where the contamination is derived from petroleum as defined in Section 376.301, F.S.