N61331.AR.001410
NSA PANAMA CITY
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CONTAMINATION ASSESSMENT REPORT FACILITY 327 NSA PANAMA CITY FL

7/1/1993

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CONTAMINATION ASSESSMENT REPORT

FACILITY 327
COASTAL SYSTEMS STATION PANAMA CITY
PANAMA CITY, FLORIDA

Unit Identification Code: N65928

Contract No. N62467-89-D-0317

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July 1993

FOREWORD

Subtitle I of the Hazardous and Solid Waste Amendments (HSWA) of 1984 to the Solid Waste Disposal Act (SWDA) of 1965 established a national regulatory program for managing underground storage tanks (USTs) containing hazardous materials, especially petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, which was also an amendment to SWDA. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The program was designed to be administered by the individual States, who were allowed to develop more stringent standards, but not less stringent standards. Local governments were permitted to establish regulatory programs and standards that are more stringent, but not less stringent than either State or Federal regulations. The USEPA UST regulations are found in the Code of Federal Regulations, Title 40, Part 280 (40 CFR 280) (*Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks*) and Title 40 CFR 281 (*Approval of State Underground Storage Tank Programs*). Title 40 CFR 280 was revised and published on September 23, 1988, and became effective December 22, 1988.

The Navy's UST program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This report was prepared to satisfy the requirements of the Florida Department of Environmental Protection (formerly the Florida Department of Environmental Regulation) Chapter 17-770, Florida Administrative Code (FAC) (*State Underground Petroleum Environmental Response*) regulations on petroleum contamination in Florida's environment as a result of spills or leaking tanks or piping.

Questions regarding this report should be addressed to the Commanding Officer, Coastal Systems Station (CSS), Panama City, Florida, or to Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Luis Vazquez, Code 1843, at AUTOVON 5630613 or (803)743-0613.

EXECUTIVE SUMMARY

During an underground storage tank (UST) removal program, Facility 327 at the Coastal Systems Station (CSS), Panama City, Florida, was identified as having soil contamination exceeding State target levels for gasoline constituents. ABB Environmental Services, Inc. (ABB-ES), was contracted by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment for this site.

Facility 327 is the former site of a 2,000-gallon fiberglass UST that contained gasoline for use at the base marina. The UST and the associated piping were removed in August 1991. In mid-1990, an undetermined quantity of gasoline leaked from the UST piping in the driveway area of the marina. At that time, an undetermined amount of contaminated soil was removed, and approximately 1,000 gallons of gasoline and contaminated groundwater were pumped from the excavation.

A contamination assessment was conducted by ABB-ES on February 22 through May 19, 1993, to assess the horizontal and vertical extent of soil and groundwater contamination at the site. Twenty-nine soil borings were advanced and fourteen monitoring wells were installed at the site. Groundwater samples were collected and analyzed for constituents of the gasoline analytical group. The findings, conclusions, and recommendations of this contamination assessment are summarized below.

Findings

- Water table elevation measurements indicate that the groundwater flow direction at the site is generally to the north and east.
- Organic vapor analyzer headspace analyses of discrete soil samples indicate "excessive" petroleum contamination (greater than 500 parts per million [ppm]) in soil samples collected from SB1(MW1), SB14, SB16, and SB18, as defined by Florida Department of Environmental Protection (formerly the Florida Department of Environmental Regulation), Chapter 17-770.200, Florida Administrative Code (FAC).
- Contaminants detected in groundwater samples collected on March 9, 1993, and May 18, 1993, include benzene, ethylbenzene, xylenes, methyl tert-butyl ether, chloroform, and lead.
- The vertical extent of contamination, as assessed by deep monitoring well CSS-327-9D, does not exceed 14 feet bls.
- Free product was not found in any well.
- The apparent sources of contamination, the former fuel pipeline and the 2,000-gallon gasoline UST have been removed from the site.
- No potable wells were identified within a 0.25-mile radius of the site.

Conclusions

- Organic vapor analyzer (OVA) analyses indicate the greatest concentrations of soil contamination are located predominantly in the vicinities of monitoring wells CSS-327-1 and CSS-327-13.

- Comparison of data from the March 9, 1993, and May 18, 1993, sampling events indicate that groundwater contaminant levels have significantly decreased. The concentration of benzene in CSS-327-1 decreased from 58 parts per billion (ppb) to 2 ppb. The total volatile organic aromatic (VOA) concentration decreased 63 ppb to 2 ppb. The benzene concentration in CSS-327-5 also decreased from 6 ppb to below the method detection limit. The total VOA concentration in CSS-327-5 decreased from 9 ppb to below method detection limits.

- The level of soil and groundwater contamination identified at the site does not appear to be significant and is not anticipated to affect local potable water supplies on the base.

- Groundwater contaminants do not appear to be migrating from the site, and were detected in concentrations that are not anticipated to present a significant health or environmental concern at the site.

Recommendations

- Based on the findings and interpretations of this contamination assessment, a Monitoring Only Plan (MOP) is recommended for Facility 327 at CSS Panama City. This MOP will be submitted to the Florida Department of Environmental Protection pursuant to approval of the Contamination Assessment Report.

ACKNOWLEDGMENTS

In preparing this report, the Underground Storage Tank Section of the Comprehensive Long-Term Environmental Action, Navy (CLEAN) Group at ABB Environmental Services, Inc. (ABB-ES), commends the support, assistance, and cooperation provided by the personnel at Coastal System Station (CSS), Panama City, Florida, and Southern Division, Naval Facilities Engineering Command.

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GLOSSARY

The following list contains many of the acronyms, initialisms, abbreviations, and units of measure used in this report.

ABB-ES	ABB Environmental Services, Inc.
BETX	benzene, ethylbenzene, toluene, and xylenes
bls	below land surface
CA	contamination assessment
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action, Navy
CompQAP	Comprehensive Quality Assurance Plan
CSS	Coastal Systems Station
CTO	Contract Task Order
EDB	ethylene dibromide
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDER	Florida Department of Environmental Regulation
FID	flame ionization detector
ft/day	feet per day
ft/ft	feet per foot
ft/min	feet per minute
GC	gas chromatograph
gpm	gallons per minute
HSWA	Hazardous and Solid Waste Amendments of 1984
ID	inside diameter
isocon	isoconcentration
K	hydraulic conductivity
MOP	Monitoring Only Plan
MTBE	methyl tert-butyl ether
mg/ℓ	milligrams per liter
msl	mean sea level
OVA	organic vapor analyzer
POA	Plan of Action
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride

GLOSSARY (Continued)

QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
SOUTHNAVFACENGCOM	Southern Division, Naval Facilities Engineering Command
SWDA	Solid Waste Disposal Act of 1965
TOC	top of casing
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
V	average pore water velocity
VOA	volatile organic aromatic
VOC	volatile organic compounds

1.0 INTRODUCTION

Coastal Systems Station (CSS) Panama City, Florida, is one of seven major research, test, and evaluation laboratories of the Space and Naval Warfare Systems Command. CSS Panama City is located on St. Andrew Bay in Bay County, Florida (Figure 1-1). CSS Panama City is bounded by U.S. Highway 98 to the north, St. Andrew Bay to the east, State Road 392B (Magnolia Beach Road) to the south, and State Road 392 (Thomas Drive) to the west.

CSS Panama City consists of two operational areas, the laboratory and ordnance areas, that encompass about 660 acres (Figure 1-1). The laboratory area, situated north of Alligator Bayou (an inlet to St. Andrew Bay), covers about 360 acres and houses research facilities and various support activities and tenants. The ordnance area, south of Alligator Bayou, covers about 300 acres and is used primarily for ordnance storage and limited research.

CSS Panama City was first established in 1942 as a safe 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 with the establishment of the U.S. Navy Mine Countermeasures Station. A research and development program for the use of helicopters for mine countermeasure operations was started at CSS Panama City in 1952. In November 1967, the laboratory became an activity of the Naval Ship Research and Development Center, based in Carderock, Maryland. The activity was redesignated as the Naval Coastal Systems Center in 1978.

In January 1992, the name of the activity was changed to Coastal Systems Station. Though its mission, activities, and name have changed over time, the center has continuously provided technology of mine and undersea countermeasures, special and amphibious warfare, diving, and other naval coastal missions. In order to meet its mission objectives, CSS Panama City performs a variety of operations, some requiring the use, handling, storage, or disposal of petroleum products.

During a tank removal program implemented by the U.S. Department of the Navy in 1989 and 1990, petroleum underground storage tanks (USTs) at various CSS site locations were removed. In many cases these tanks were replaced with new USTs. Tank contents were reportedly restricted to petroleum products including waste oil, diesel fuel, unleaded gasoline, and JP-5.

ABB Environmental Services, Inc. (ABB-ES), was contracted by the Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment (CA) and submit a Contamination Assessment Report (CAR) for Facility 327 at CSS Panama City, Florida. The scope of services for the work at Facility 327 is described in Contract Task Order (CTO) No. 11, the Plan of Action (POA), and the Contamination Assessment Plan (CAP) and includes the following:

- collecting soil samples from borings in the unsaturated zone for headspace analysis using an organic vapor analyzer (OVA) to assess the horizontal and vertical extent of petroleum contaminated soil,

- collecting saturated soil samples for field gas chromatograph (GC) screening to place monitoring wells at optimal locations to delineate groundwater contamination at the site,

- installing and sampling groundwater monitoring wells to assess the horizontal and vertical extent of groundwater contamination,

- collecting water level data to assess the groundwater flow direction and hydraulic gradient at the site,

- conducting a potable well inventory within a 0.25-mile radius of the site,

- conducting slug tests on selected wells to estimate aquifer characteristics, and

- reducing and analyzing pertinent data gathered during the CA to complete this CAR.

A CA field investigation was conducted at Facility 327 during the week of February 22, 1993. After reviewing the results of groundwater sampling analysis from this field investigation, ABB-ES representatives met with Florida Department of Environmental Protection (FDEP) (formerly Florida Department of Environmental Regulation [FDER]) reviewers on April 22, 1993, to discuss the analytical results and the need for installing additional monitoring wells to complete the CA. This supplemental field investigation was conducted the week of May 17, 1993.

The following sections of this report present the background information, data compilation, results from both field investigations, and CA conclusions and recommendations.

2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION. Facility 327 is a pleasure-craft marina located on the east side of the base next to St. Andrew Bay (Figure 2-1 and Figure 2-2). The site is the former location of a 2,000-gallon fiberglass UST that contained gasoline to be used by boats at the marina. The UST and approximately 200 linear feet of associated piping that extended along the south side of Building 327 were removed in August 1991. The UST was replaced with one aboveground storage tank positioned next to the boat ramp. The UST had been buried in a grassy area on the south side of Building 378 approximately 10 feet from the side of the building. The pipeline ran from the tank to the southwest corner of Building 327, along the south side of Building 327 to an elbow, then northeast to the boat ramp. The pipeline was buried under a concrete and asphalt parking area from Building 327 to the boat ramp.

Utility lines did not have a significant impact on the placement of soil borings and monitoring wells. Overhead electrical lines extend southward from Building 327 and southward from a utility pole located in the grassy area east of the excavated soil area (see Figure 2-2). Underground electrical lines extend from Building 327 to Building 378 and Building 377. A 6-inch diameter underground water line extends to the south from the southwest corner of Building 327. Another 2-inch diameter water line extends to the north from the northwest corner of Building 327.

2.2 SITE HISTORY. Facility 327 has been in operation at CSS Panama City for approximately 9 years. A 2,000-gallon fiberglass UST that contained gasoline for use at the base marina was installed in 1985. The site, former UST location, and associated piping are shown in Figure 2-2. The fuel was conveyed to a dispenser at the boat ramp by underground pipelines. There are two abandoned pipelines that were associated with the tank at the site. One runs from the former tank location along the north side of Building 327 to the dispenser. The time of, and reason for, abandonment of this pipeline is unknown. It was replaced by a pipeline that runs from the tank location along the south side of Building 327, across the paved area, then turns north to the dispenser. This second pipeline was abandoned some time prior to mid-1990 following the discovery of a leak in the vicinity of the elbow at the edge of the pavement in the Marina driveway where the piping turns to the north. CSS Panama City personnel notified the local FDEP office of the release and were instructed to remove contaminated soil and groundwater from the site. At that time, base personnel contracted to have an undetermined amount of contaminated soil at the leak location removed and approximately 1,000 gallons of gasoline and contaminated groundwater pumped from the excavation and disposed. The contractor did not provide base personnel with manifests for transport or disposal of the contaminated soil and groundwater, nor was the activity provided with a report for the remedial action. The UST and pipeline were taken out of service after the release. Confirmation sampling was not performed following soil removal at the leak location. The UST was removed in August 1991, and soil and groundwater contamination was discovered at that time.

On June 8, 1992, Terra Resources collected soil samples from the area of the former UST. The samples were analyzed for total organic soil vapors with a flame ionization detector (FID). One temporary monitoring well was installed at the

location of the former UST. A groundwater sample was collected from the temporary well and sent to a certified laboratory to be analyzed for volatile organic aromatics (VOAs), xylenes, and methyl tert-butyl ether (MTBE). In addition, six soil samples were collected along the area of the former fuel pipeline for analysis of soil vapor levels with an FID. Groundwater analytical results indicated 158 parts per billion (ppb) benzene and 1,320 ppb total VOA compounds in samples from the temporary well. Soil sample results indicated excessively contaminated soil (greater than 500 parts per million [ppm]) at two locations in the area of the former UST. A copy of the Terra Resources closure report is attached as Appendix A.

There is no record that the 2,000-gallon gasoline UST at Facility 327 ever underwent tightness testing. The tank removal was conducted by Terra Resources.

3.0 SITE CONDITIONS

3.1 PHYSIOGRAPHY. Regional physiography is discussed in Appendix B, Site Conditions. Surface topography in Bay County varies from flat to slightly rolling hills with elevations of less than 70 feet above mean sea level (msl). Elevations at the site range from 0 to 17 feet above msl.

3.2 HYDROGEOLOGY.

3.2.1 Regional and Local The Panama City area is underlain by three water bearing zones. These zones, in order of increasing depth, are the water-table aquifer, secondary artesian aquifer, and the Floridan aquifer system. A detailed discussion of these three aquifers is presented in Appendix B.

3.2.2 Site Specific The principal aquifer of concern at the site is the water-table aquifer. The water-table aquifer was penetrated to a depth of 18 feet below land surface (bls) during this investigation. This zone is generally composed of fine-grained to medium-grained quartz sand. The sand varies in color from yellowish-gray to yellowish-orange to yellowish-brown, to brownish-gray, dusky green, olive gray, olive black, and pale orange. The water-table aquifer is unconfined, and was encountered at depths of 1 to 3 feet bls during this investigation. Site-specific aquifer characteristics and other hydrogeologic parameters are discussed in Section 5.1.

Lithologic logs for all soil borings and monitoring wells are presented in Appendix C, Lithologic Logs.

4.0 METHODOLOGIES AND EQUIPMENT

4.1 SOIL BORING AND SOIL SAMPLING PROGRAM. On February 23 and 24, 1993, 22 soil borings, SB-1 through SB-22, were drilled by hand augering at the site to assess the horizontal and vertical extent of petroleum contamination in the unsaturated zone, characterize the type of subsurface material, and aid in the placement of groundwater monitoring wells. On May 18, 1993, soil borings SB-23 through SB-29 were drilled to address questions raised during discussion of the field investigation results with FDEP. Soil boring locations are shown in Figure 4-1. Soil headspace samples were analyzed for volatile organic compounds (VOCs) with an OVA equipped with an FID. The results of the soil boring and soil sampling program are discussed in Section 5.2.

4.2 MONITORING WELL INSTALLATION PROGRAM. On February 23 and February 24, 1993, eight 2-inch inside diameter (ID) monitoring wells (CSS-327-1 through CSS-327-8; designated as MW-1 through MW-8 on figures and tables in this report) were installed in eight of the soil borings. Monitoring well locations are shown in Figure 4-1. One deep well, CSS-327-9D (MW-9D), was installed at a depth of 18.20 feet bls with a screen interval of approximately 13 to 18 feet bls. All other wells were screened with 10 feet of slotted screen to a depth of 11 to 12 feet bls.

After discussion with FDEP, a decision was made to install additional monitoring wells at the site to better assess the horizontal extent of groundwater contamination in the vicinity of the former UST and the broken pipeline. On May 17 and 18, 1993, five new monitoring wells (CSS-327-10 through CSS-327-14; designated as MW-10 through MW-14 on figures and tables in this report) were installed. Wells MW-10 through MW-14 are 2-inch ID and screened with 10 feet of slotted screen to a depth of 11 to 13 feet bls.

During the soil boring program, as borings were advanced to the top of the water table, saturated soil samples were encountered between 3 to 4 feet bls. Monitoring well screen intervals were installed from 2 to 12 feet bls based on these readings. However, after well installation, the depth to groundwater in some of the monitoring wells was measured to be less than 2 feet bls, presumably during high tide. Thus, at certain times of the day, the water level in the wells will be above the screen interval. All site monitoring wells were installed in accordance with Chapter 17-761.640 (1)(e) 1-10, Florida Administrative Code (FAC), guidelines, which require 2 feet of surface casing above the screen interval. Monitoring well construction methodologies and materials are discussed in Appendix D, Investigative Methodologies and Procedures.

4.3 GROUNDWATER ELEVATION SURVEY. The elevation and slope of the water table were calculated by surveying the top of the well casing at each monitoring well location to a common datum using a total stationing instrument. Datum points were established using existing survey monuments referenced to the Florida State Plane Coordinate System and the National Geodetic Vertical Datum of 1929.

Depth to groundwater in each monitoring well was recorded on February 24, March 9, and June 2, 1993. Procedures for obtaining depth to groundwater measurements are described in Appendix D.

4.4 SAMPLING PROGRAM. Groundwater samples were collected from all existing site monitoring wells (CSS-327-1 through CSS-327-9D) on March 9, 1993, and sent to Wadsworth/ALERT Laboratories, Tampa, Florida, to be analyzed for constituents of the gasoline analytical group. Appropriate quality assurance/quality control (QA/QC) samples were collected and analyzed. Procedures for collection of groundwater samples are presented in Appendix D.

After discussing the March 9, 1993, groundwater analytical results with FDEP, it was decided that four wells be resampled and five new monitoring wells be installed and sampled. On May 18, 1993, groundwater samples were collected from monitoring wells CSS-327-1, CSS-327-2, CSS-327-5, CSS-327-9D, and new monitoring wells CSS-327-10 through CSS-327-14. The samples were sent to Wadsworth/ALERT Laboratory to be analyzed for constituents of the gasoline analytical group. Appropriate QA/QC samples were also collected and analyzed.

4.5 AQUIFER SLUG TESTS. Three rising head slug tests were performed in monitoring wells CSS-327-5 and CSS-327-7, and two rising head slug tests were performed in CSS-327-2 to estimate the hydraulic conductivity of the aquifer. Procedures for conducting slug tests are included in Appendix D. Slug test graphical data and calculations are attached in Appendix E, Aquifer Parameter Calculations.

5.0 CONTAMINATION ASSESSMENT RESULTS

5.1 SITE-SPECIFIC AQUIFER CHARACTERISTICS AND HYDROGEOLOGIC PARAMETERS. The water-table aquifer is the primary water-bearing zone of concern at the site. The water-table aquifer is unconfined and was encountered at depths from 1 to 3 feet bls.

Groundwater levels were recorded in monitoring wells CSS-327-1 through CSS-327-9D on February 24 and March 9, 1993. These measurements are presented in Table 5-1 and were used to draw water-table elevation contour maps to show the general groundwater flow direction at the site. Water-table elevation contour maps for each date are shown in Figures 5-1 and 5-2, respectively. Groundwater elevation data from deep monitoring well CSS-327-9D correspond well with data from shallow wells indicating no hydraulic head differences exist between the two screened intervals. The data indicate a northeasterly groundwater flow direction of the water-table aquifer toward St. Andrew Bay.

A complete round of groundwater levels were recorded on June 2, 1993, which included water level measurements collected from newly installed monitoring wells CSS-327-10 through CSS-327-14. These measurements are also presented in Table 5-1 and were used to draw water-table elevation contour maps showing the general groundwater flow direction for this date. A water-table elevation contour map for June 2, 1993, is shown in Figure 5-3. Note that the water-table elevations measured on June 2, 1993, are approximately 15 feet lower than those shown on February 24 and March 9, 1993, indicating a marked effect of tides on water levels in this area.

The calculated average hydraulic gradient at the site is 1.32×10^{-2} feet per foot (ft/ft). Slug test results indicate an average horizontal hydraulic conductivity (K) of 10.8 feet per day (ft/day). The calculated pore water velocity (V) is 3.3 ft/day. Equations and calculations used to estimate these values are presented in Appendix E.

5.2 CONTAMINANT PLUME CHARACTERIZATION.

5.2.1 Soil Contamination Assessment Soil samples were collected from hand augers on February 23 and 24, 1993, and May 18, 1993, at depths of 1 to 4 feet bls, and analyzed using OVA headspace techniques. A summary of the OVA analyses is presented in Table 5-2. According to Chapter 17-770, FAC, soil containing constituents of the gasoline analytical group with OVA headspace readings exceeding 500 ppm are defined as "excessively contaminated" and must be remediated, except under extenuating circumstances. Soil with OVA headspace readings between 10 ppm and 500 ppm are considered to be petroleum contaminated and may or may not require remediation, depending on the impact of soil contamination on groundwater. Soil with OVA headspace readings of less than 10 ppm is not considered to be petroleum contaminated (FDER, May 1992).

No VOCs were detected in soil samples collected from soil borings SB-2, SB-3, SB-4, SB-5, SB-11, SB-15(MW-5), SB-17, SB-19(MW-7), SB-20, SB-21(MW-6), SB-22(MW-8), SB-26, SB-27, and SB-29 using OVA headspace techniques. OVA readings from several of the soil samples collected in the vadose zone indicate excessive soil

Table 5-1
Water Table Elevation Data

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Site 327, Coastal Systems Station
Panama City, Florida

Monitoring Well Number	Total Well Depth[1]	Top of Casing Elevation[1]	February 24, 1993		March 9, 1993		June 2, 1993	
			Depth to Groundwater (from TOC)	Relative Groundwater Elevation[1]	Depth to Groundwater (from TOC)	Relative Groundwater Elevation[1]	Depth to Groundwater (from TOC)y	Relative Groundwater Elevation[1]
MW-1	12.25	5.60	1.52	4.08	1.28	4.32	3.12	2.48
MW-2	11.96	3.99	1.72	2.27	1.45	2.54	2.35	1.64
MW-3	12.25	3.30	1.98	1.32	1.95	1.35	2.08	1.22
MW-4	11.90	4.20	1.92	2.28	1.62	2.58	2.56	1.64
MW-5	11.72	3.78	2.90	0.88	2.83	0.95	2.60	1.18
MW-6	12.00	5.54	1.66	3.88	1.65	3.89	3.20	2.34
MW-7	11.94	4.86	0.91	3.95	0.92	3.94	2.50	2.36
MW-8	11.95	3.20	1.53	1.67	1.31	1.89	1.76	1.44
MW-9D	18.20	3.71	1.73	1.98	1.35	2.36	2.13	1.58
MW-10	13.17	3.52	--	--	--	--	2.18	1.34
MW-11	12.24	6.35	--	--	--	--	3.72	2.63
MW-12	12.39	5.44	--	--	--	--	3.08	2.36
MW-13D	11.67	3.49	--	--	--	--	2.14	1.35
MW-14	11.50	3.58	--	--	--	--	2.29	1.29

[1]All elevations referenced to National Geodetic Vertical Datum of 1929.

Notes: TOC = top of casing.
-- = well not installed until May 18, 1993.

Table 5-2
Summary of Soil Sample Organic Vapor Analyzer (OVA) Headspace Analyses
Between February 23 and May 18, 1993

Contamination Assessment Report
Site 327, Coastal System Station
Panama City, Florida

Boring Designation	Depth (feet bls)	Concentration[1] (ppm)	Comments
SB1/MW1	0 to 2	50	Slight odor
	2 to 4	2,000	Odor
SB2	0 to 2	0	Sulfuric odor
	2 to 4	0	Wet
SB3	0 to 2	0	--
SB4	0 to 2	0	--
SB5	0 to 2	0	--
SB6	0 to 2	5	--
	2 to 4	300	Wet
SB7	0 to 2	500	--
	2 to 4	GC	Wet
SB8/MW2	0 to 2	5	--
	2 to 4	GC	Odor, wet
SB9/MW4	0 to 2	500	--
	2 to 4	GC	Wet
SB10	0 to 2	10	--
	2 to 4	GC	Wet
SB11	0 to 2	0	--
	2 to 4	GC	Sulfuric odor, wet
SB12/MW3	0 to 2	3	--
SB13	0 to 2	350	Slight odor
SB14	0 to 2	>5,000	Odor
	2	GC	Odor, wet
SB15/MW5	0 to 2	0	--
	2	GC	Wet
SB16	0 to 2	4,000	Odor
SB17	0 to 2	0	Odor
SB18	0 to 2	550	Odor
	2	GC	Odor, wet
SB19/MW7	0 to 2	0	No odor
	2	GC	No odor, wet
SB20	0 to 2	0	--
	2	GC	Wet
SB21/MW6	0 to 2	0	--
	2	GC	Wet
SB22/MW8	0 to 2	0	--
	2	0	Wet
MW9D	5 to 7	GC	No odor, wet
	9 to 11	GC	Slight odor, wet
	14 to 16	GC	Slight odor, wet
	17 to 19	GC	Wet
SB23/MW10	2	143	--
	4	420	Wet
SB24	2	GC	No odor
	4	GC	Slight organic odor
SB25/MW14	0 to 2	GC	No odor
	2 to 4	GC	No odor, wet
SB26	0 to 2	0	No odor
SB27	0 to 2	0	--
	2 to 3	0	Wet
SB28	3	200	Organic odor
SB29	0 to 2	0	Organic odor

[1]Corrected for methane.

Notes: bls = below land surface. ppm = parts per million. GC = analyzed on gas chromatograph.

contamination. These elevated readings were measured in the samples collected from SB-1(MW-1) (2,000 ppm), SB-14 (>5,000 ppm), SB-16 (4,000 ppm), and SB-18 (550 ppm). Figure 5-4 shows the estimated extent of soil contamination at the site based on OVA headspace readings. The elevated readings in vadose zone samples probably result, in part, from tidally influenced groundwater level fluctuations. The extent of excessively contaminated soil is shown within the 500 parts per million (ppm) isoconcentration (isocon) line.

Excessively contaminated soil appears to be restricted to an area approximately 60 feet by 30 feet. The area is located approximately 30 feet downgradient (northeast) of where gasoline was released from the broken pipeline. Most of the area is covered with concrete or asphalt, which will prevent rainfall from entering the soil. A small area of contaminated soil is located in the immediate vicinity of MW-1, where the UST was located. This area is less than 200 square feet as shown by soil borings with OVA readings less than 1 ppm. A third area of contamination is located approximately 15 feet north of Building 327. However, soil samples taken in this area contained significant amounts of organic material. The soil sample from SB-18 had a very strong sulfurous odor and it is believed that the OVA reading of 550 ppm was due to methane from the organic material.

5.2.2 Groundwater Contamination Assessment Groundwater samples were collected from monitoring wells CSS-327-1 through CSS-327-9D on March 9, 1993. Samples were submitted to Wadsworth/ALERT Laboratories in Tampa, Florida, for VOC analysis by U.S. Environmental Protection Agency (USEPA) Methods 601 and 602, for ethylene dibromide (EDB) analysis by USEPA Method 601, and for lead analysis. Groundwater analytical laboratory results for the March 9, 1993, sampling event are summarized in Table 5-3.

Figure 5-5 shows the distribution of contaminants detected in groundwater samples collected March 9, 1993. Contaminants identified in groundwater samples were benzene, ethylbenzene, toluene, xylenes, and MTBE. No contamination was detected in samples collected from wells CSS-327-3, CSS-327-6, CSS-327-7, CSS-327-8, and CSS-327-9D.

Results of laboratory analysis of samples collected on March 9, 1993, indicated concentrations of contaminants exceeded State target levels in only two wells, CSS-327-1 and CSS-327-5. Figure 5-5 shows the distribution of benzene and total VOAs in groundwater samples from monitoring wells CSS-327-1 through CSS-327-9D. The sample collected from CSS-327-1 exceeded the State target levels of 1 ppb for benzene and 50 ppb for total VOAs (total VOAs is the sum of benzene, ethylbenzene, toluene, and xylenes). The sample collected from CSS-327-5 exceeded the State target level of 1 ppb for benzene. The other constituents of the VOC analysis were either not detected, or did not exceed target levels in samples collected from the remaining wells installed at the site and sampled on March 9, 1993. Analytical results of groundwater from monitoring well MW-9D indicate the vertical extent of contamination does not exceed 13 feet bls. All gasoline analytical group compounds analyzed in the groundwater samples from deep well MW-9D were below method detection limits.

Table 5-3
Summary of Groundwater Sample Laboratory Analysis, March 9, 1993

Contamination Assessment Report
Site 327, Coastal Systems Station
Panama City, Florida

Compound	Method Detection Limit	State Target Level or Guidance Concentration	MW 01	MW 02	DUP MW2	MW 03	MW 04	MW 05	MW 06	MW 07	MW 08	MW 09D
Benzene	1	[2]1	58	ND	ND	ND	ND	6	ND	ND	ND	ND
Ethylbenzene	1		4	4	6	ND	ND	2	ND	ND	ND	ND
Toluene	1		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	1		1	17	23	ND	6	1	ND	ND	ND	ND
Total VOA[1]	1	[2]50	63	21	29	ND	6	9	ND	ND	ND	ND
MTBE	1	[2]50	29	ND	ND	ND	ND	ND	ND	ND	ND	ND

[1]Total VOA is the sum of all benzene, ethylbenzene, toluene, and xylenes.
[2]State target level (Florida Department of Environmental Protection [FDEP], Chapter 17-770, Florida Administrative Code [FAC]).

Notes: Concentrations are in parts per billion.
DUP = duplicate sample.
ND = not detected.
VOA = volatile organic aromatics.
MTBE = methyl tert-butyl ether.

Monitoring wells CSS-327-1, CSS-327-2, CSS-327-5, and CSS-327-9D were resampled on May 18, 1993. Groundwater samples were also collected from newly installed monitoring wells CSS-327-10 through CSS-327-14. Samples were submitted to Wadsworth/ALERT Laboratories for VOC analysis by USEPA Methods 601 and 602, for EDB analysis by USEPA Method 601, and for lead analysis. Groundwater analytical laboratory results for the May 18, 1993, sampling event are summarized in Table 5-4.

Figure 5-6 shows the distribution of benzene and total volatile organic aromatics (total VOAs) in the monitoring wells sampled on May 18, 1993. Contaminant levels in wells CSS-327-1 and CSS-327-2 were significantly lower than the levels detected on March 9, 1993. The concentration of benzene in CSS-327-1 decreased from 58 ppb to 2 ppb, and the total VOA concentration decreased from 63 ppb to 2 ppb. The benzene concentration in CSS-327-5 also decreased from 6 ppb to below detection limits of 1 ppb, and total VOA concentration decreased from 9 ppb to less than 1 ppb. Results of laboratory analysis of samples collected from the newly installed monitoring wells indicate State target levels were exceeded in only one well, CSS-327-13 at 4 ppb benzene and 55 ppb total VOAs. The sample collected from CSS-327-13 only slightly exceeded the State target level of 1 ppb for benzene and 50 ppb for total VOAs. Because contaminant levels greatly decreased over a 2-month period in monitoring wells CSS-327-1 and CSS-327-5, and because contamination in CSS-327-13 was only slightly greater than the State target levels, it is anticipated that the concentration of contaminants should rapidly decrease below the State target levels. Contaminants in the other four newly installed wells were either not detected, or did not exceed target levels.

Figure 5-7 shows the distribution of lead in unfiltered groundwater samples collected on May 18, 1993. The concentrations of lead in these samples are below the State target level of 50 ppb. Lead concentrations in filtered samples collected March 9, 1993, were below laboratory detection limits.

Appendix F contains a complete copy of the laboratory analytical results of the samples collected during this investigation.

5.3 POTABLE WELL SURVEY. A potable well survey was conducted to show the proximity of potable water sources to contamination associated with activities at Facility 327. There are four public water supply wells located at CSS Panama City (PWS 1, PWS 2, PWS 3, and PWS 4). Figure 5-8 shows the locations of these wells. Only the well located near Building 394 (PWS 1) is currently in use. This well is used for heating and air conditioning purposes only and draws water from approximately 400 feet bls (Table 5-5). The remaining production wells (PWS 2, PWS 3, and PWS 4) are inactive.

Well inventory data are presented in Table 5-5. The four public water supply wells are screened in the Floridan aquifer system at depths ranging from 350 to 400 feet bls. None of the wells are located within a 0.25-mile radius of the site. The petroleum contamination at the Facility 327 site is less than 13 feet bls. Based on this information, contamination of the public water supply wells from the contamination at Facility 327 is not expected.

Table 5-4
Summary of Groundwater Sample Laboratory Analysis, May 18, 1993

Contamination Assessment Report
Site 327, Coastal Systems Station
Panama City, Florida

Compound	Method Detection Limit	State Target Level or Guidance Concentration	MW 01	DUP MW1	MW 02	MW 05	MW 9D	MW 10	MW 11	MW 12	MW 13	MW 14
Benzene	1		2	2	ND	ND	ND	ND	ND	ND	4	ND
Ethylbenzene	1		ND	ND	2	ND	ND	ND	ND	ND	31	ND
Toluene	1		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	1		ND	ND	5	ND	ND	ND	ND	ND	16	ND
Total VOA[1]	1	[2]50	2	2	7	ND	ND	ND	ND	ND	51	ND
MTBE	1		7	7	ND	ND	ND	ND	ND	ND	5	ND
Chloroform	1		ND	ND	ND	ND	ND	4	ND	ND	ND	ND
Lead	5	[2]50	25	22	21	8	11	12	19	10	6	15

[1]Total VOA is the sum of all benzene, ethylbenzene, toluene, and xylenes.
[2]State target level (Florida Department of Environmental Protection [FDEP], Chapter 17-770, Florida Administrative Code [FAC]).

Notes: Concentrations are in parts per billion.
DUP = duplicate sample.
ND = not detected.
VOA = volatile organic aromatics.
MTBE = methyl tert-butyl ether.

Table 5-5
Public Water Supply Wells Data, Coastal Systems Station, Panama City, Florida

Contamination Assessment Report
Site 327, Coastal Systems Station
Panama City, Florida

Well Identification Number/Local Number	Location	Total Depth (feet bls)	Casing Diameter (inches)
Building 394, PWS 1	Building 394	400	12
Building 281, PWS 2	Building 281	350	12
Building 10, PWS 3	Building 10	350	12
Building 101, PWS 4	Building 101	350	12

Note: bls = below land surface.

6.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 SUMMARY. Based on the findings of the CA field investigations and laboratory analytical results, the following is a summary of existing conditions at the site.

- There are three previously described water-bearing zones in Bay County where the site is located. They are the water-table aquifer, the secondary artesian aquifer, and the Floridan aquifer system. The primary water-bearing zone of concern at the site is the water-table aquifer.

- Sediments encountered in the unsaturated zone and water-table aquifer during onsite drilling operations are predominantly gray to black, fine- to medium-grained quartz sand.

- The water table beneath the site was encountered at depths ranging between 1 and 3 feet bls.

- The direction of groundwater flow in the water table aquifer is generally to the north and east.

- Excessive soil contamination as indicated by headspace OVA analysis was identified in soil borings SB1, SB14, SB16, and SB18. A large part of the areas identified as having excessively contaminated soil are covered by asphalt and concrete.

- Gasoline analytical group compounds detected in groundwater samples only slightly exceeded FDEP target levels for those compounds. Compounds detected in groundwater samples include benzene, ethylbenzene, xylenes, methyl tert-butyl ether, chloroform, and lead.

- The vertical extent of contamination, as assessed by deep monitoring well CSS-327-9D, does not exceed 14 feet bls.

- The apparent sources of contamination, the 2,000-gallon gasoline UST and the former fuel pipelines, have been removed from the site or abandoned in place.

- No potable water sources were identified within a 0.25-mile radius of the site. There appears to be no risk of contamination of the CSS Panama City public water supply system from activities at the site.

6.2 CONCLUSIONS.

- OVA analyses indicate soil contamination is confined to relatively small areas in the vicinities of monitoring wells CSS-327-1 and CSS-327-13.

- Comparison of data from the March 9, 1993, and May 18, 1993, sampling events indicates that contaminant levels are decreasing. The concentration of benzene in CSS-327-1 decreased from 58 ppb to 2 ppb. The total VOA concentration decreased from 63 ppb to 2 ppb. The benzene concentration in

CSS-327-5 also decreased from 6 ppb to less than 1 ppb. The total VOA concentration in CSS-327-5 decreased from 9 ppb to less than 1 ppb.

- The horizontal and vertical extent of soil and groundwater contamination at the site does not appear to be significant and is not anticipated to affect local potable water supplies on the base.

- Groundwater contaminants do not appear to be migrating from the site, and were detected in concentrations that are not anticipated to present a significant health or environmental concern at the site.

6.3 RECOMMENDATIONS. Based on the findings and interpretations of this contamination assessment, a Monitoring Only Plan (MOP) is recommended for Facility 327 at CSS Panama City. The MOP will be submitted to FDEP pursuant to approval of the CAR.

7.0 PROFESSIONAL REVIEW CERTIFICATION

This contamination assessment report was prepared using sound hydrogeologic principles and judgment. This assessment is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment described in this report. This Contamination Assessment Report was developed for Facility 327 at the Coastal Systems Station in Panama City, Florida, and should not be construed to apply to any other site.

Michael J. Williams
Professional Geologist
P.G. No. 344

Date

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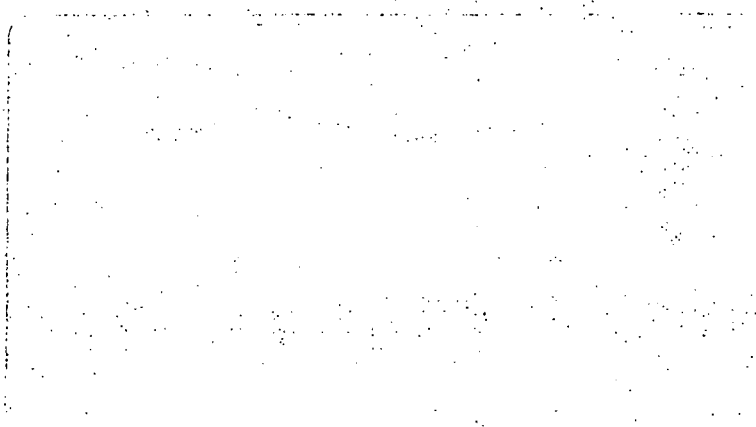
APPENDIX A

UST CLOSURE REPORT



TERRA
ENVIRONMENTAL
SERVICES, INC.

Closure Assessment Report
For the Former 2,000-Gallon
Underground Storage Tank System
Near Building 378
U.S. Navy Coastal Systems Center

Prepared For

U.S. Navy Coastal Systems Center
Panama City, Florida

By

Terra Environmental Services, Inc.

June 1992

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APPENDICES

1.0 INTRODUCTION

On June 1, 1992, Terra Environmental Services, Inc. was retained by the U.S. Navy Coastal Systems Center to conduct a Closure Assessment for an underground storage tank (UST) system at Building ~~378~~ 327 at the Coastal Systems Station facility in Panama City, Florida (the site). A 2,000-gallon gasoline UST and approximately 200 linear feet of product piping were closed by removal. The former locations of the UST system and piping are shown on Figure 1.

2.0 BACKGROUND

Reportedly, in August 1991 Coastal Systems Station contracted B&K Construction to remove a 2,000-gallon gasoline UST and approximately 200 linear feet of associated product piping at the site. No soil or ground-water samples were collected at the time of closure. The dispenser was left in service, and is now supplied from an aboveground storage tank. The dispenser is located on an elevated fueling dock approximately 15 feet from shore.

3.0 WORK PERFORMED

On June 8, 1992 a Closure Assessment was conducted at the site in accordance with the requirements of Chapter 17-761 of the Florida Administrative Code (FAC) and applicable FDER guidance. A completed FDER Closure Assessment Form is included as Appendix A.

3.1 Closure Assessment for the Gasoline UST

Six soil samples (SB-1 through SB-6) were collected from the area of the former 2,000-gallon gasoline UST for field analysis of soil vapor levels with a HeathTech PortaFID II organic vapor analyzer equipped with a flame ionization detector (FID). Sampling locations are shown on Figure 2. At each location, a soil boring was drilled to the water table using a stainless steel hand auger. The water table was encountered at approximately three to four feet below land surface (bls). Soil samples were collected at two-foot intervals, placed in glass jars, sealed with aluminum foil, and allowed to equilibrate. The headspace of each jar was then analyzed for total organic soil vapors with an FID. Soil samples exhibiting readings greater than 10 parts per million (ppm) also were analyzed with an FID equipped with an activated carbon filter to evaluate the contribution of naturally-occurring vapors, such as methane, to the total reading. A corrected reading was obtained by subtracting the filtered reading from the unfiltered reading (Section 17-770.200[2], FAC).

Temporary Monitor Well TMW-1 was installed in the former area of the UST (Figure 3) using a stainless steel hand auger. A four-inch diameter borehole was drilled to approximately five feet below land surface. Subsequently, a five-foot section of two-inch diameter, 0.010-inch slot, threaded-joint PVC well screen fitted with a PVC well point was installed in the borehole. The annular

space was backfilled to land surface with native material. The well was developed and purged for sampling by bailing with a clean Teflon® bailer.

A ground-water sample was collected from the temporary monitor well and submitted to Analytical Technologies, Inc. (ATI) in Pensacola, Florida for analysis of volatile organic aromatics (VOAs) plus xylenes and methyl tert-butyl ether (MTBE) by U.S. Environmental Protection Agency (EPA) Method 602. All equipment decontamination and sampling was conducted in accordance with Terra Environmental's FDER-approved Comprehensive Quality Assurance Plan (CompQAP). All laboratory analyses were conducted in accordance with ATI's CompQAP.

3.2 Closure Assessment for Product Piping

Six soil samples (SB-7 through SB-12) were collected along the area of the former piping run with a stainless steel hand auger for field analysis of soil vapor levels with an FID (Figure 4). The samples were collected at two-foot intervals until the water table was encountered at approximately 3 to 4 feet bls. The samples were collected and analyzed in accordance with the methodologies previously discussed in Section 3.1.

4.0 RESULTS

4.1 Gasoline UST

"Excessively contaminated" soil exhibiting soil vapor levels greater than 500 parts per million (ppm), as defined in Section 17-770.200(2), FAC was detected in soil samples collected from Soil Borings SB-1 and SB-3. Results of organic vapor measurements for the soil samples collected from the area of the excavation are listed in Table 1, and shown on Figure 2.

Analytical results for the ground-water sample collected from Temporary Monitor Well TMW-1 indicate that concentrations of benzene (160 micrograms per liter [µg/L]) and total VOAs (1,320) exceed the FDER criteria of 1 µg/L and 50 µg/L, respectively. No MTBE was detected in the ground-water sample. The laboratory report is presented in Appendix B.

4.2 Product Piping

Elevated organic vapor readings (250 ppm and 100 ppm) were obtained from Soil Boring SB-10 (Figure 4). Although the readings would identify the soil as "contaminated" (FDER January 1989 document, Guidelines for Assessment and Remediation of Petroleum-Contaminated Soils) no hydrocarbon odor was detected. In addition, the filtered readings were elevated, indicating the presence of methane in the soil. Based on these site-specific observations, a ground-water sample was not collected.

5.0 CONCLUSIONS

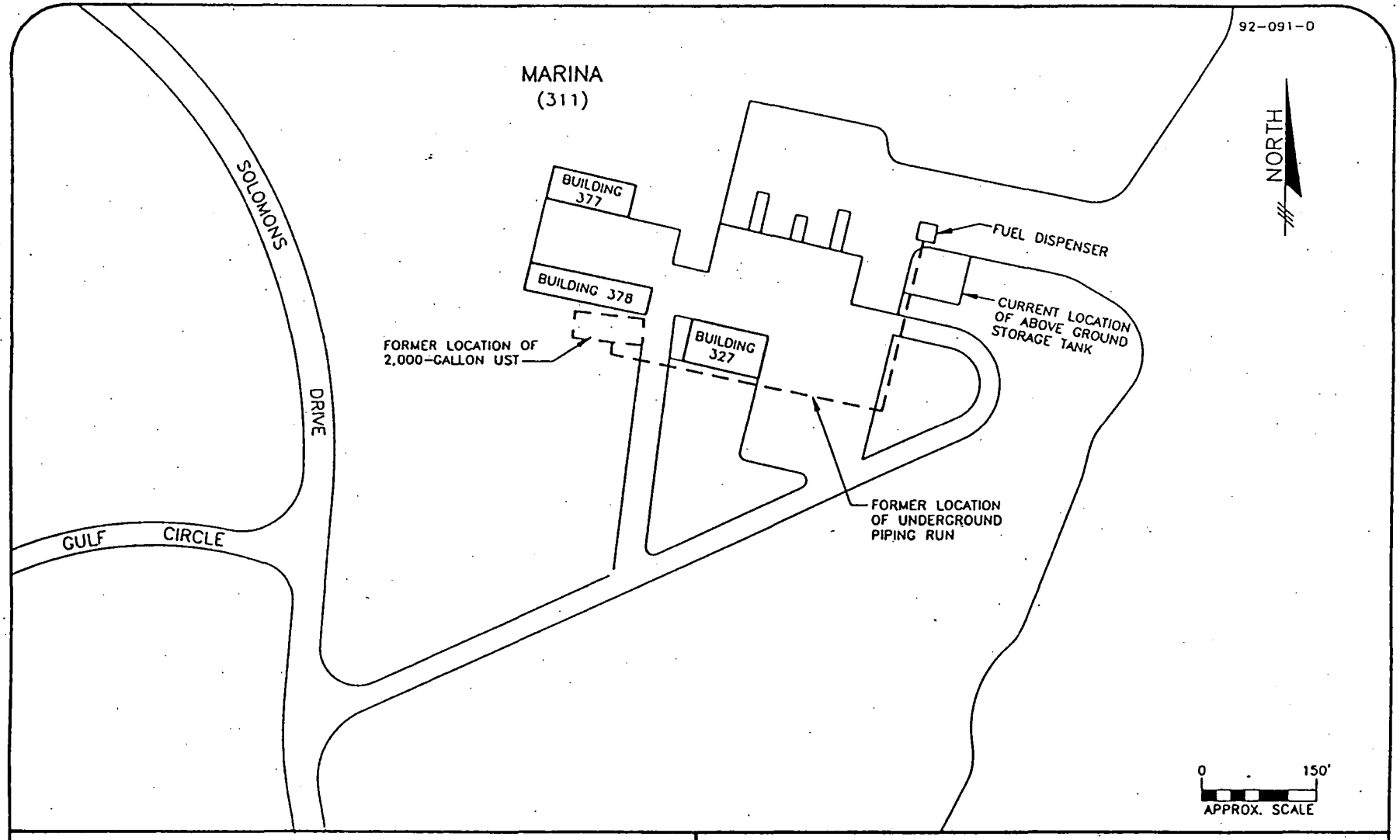
Soil and ground-water quality impacts above applicable FDER target levels were detected in the former area of the 2,000-gallon gasoline UST. No conclusive evidence of a release was detected along the former location of the product piping.

TABLE 1. RESULTS OF ORGANIC SOIL VAPOR MEASUREMENTS FOR SOIL SAMPLES COLLECTED FROM THE UNSATURATED ZONE

Sample Designation	Sample Depth (feet bls)1/	Organic Vapor Concentrations (in parts per million)		
		Unfiltered[2/] (A)	Filtered[3/] (B)	Corrected (A-B)
Soil Borings in the Area of the Former Gasoline UST				
SB-1	0-2 2-3	4 3,400	NA[4/] 800	4 2,600
SB-2	0-2 2-3	4 4	NA NA	4 4
SB-3	0-2 2-4	800 >5,000	600 1,200	200 >3,800
SB-4	0-2 2-3	<1 <1	NA NA	<1 <1
SB-5	0-2 2-3	<1 240	NA 1,000	<1 <1
SB-6	0-2 2-3	<1 <1	NA NA	<1 <1
Soil Borings Along the Former Piping Run				
SB-7	0-2 2-3	<1 <1	NA NA	<1 <1
SB-8	0-2 2-3	<1 <1	NA NA	<1 <1
SB-9	0-2 2-4	50 1,500	250 1,500	<1 <1
SB-10	0-2 2-4	600 4,500	350 4,400	250• 100•
SB-11	0-2 2-3	<1 <1	NA NA	<1 <1
SB-12	0-2	14	10	4

1/ feet bls = feet below land surface
2/ Unfiltered readings collected using the FID
3/ Filtered reading collected using the FID with an activated carbon filter attachment
4/ NA = not analyzed

• Samples collected from area of high organic content. No hydrocarbon odor was detected in the samples.



Figue 1. Site Layout

CLIENT

COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

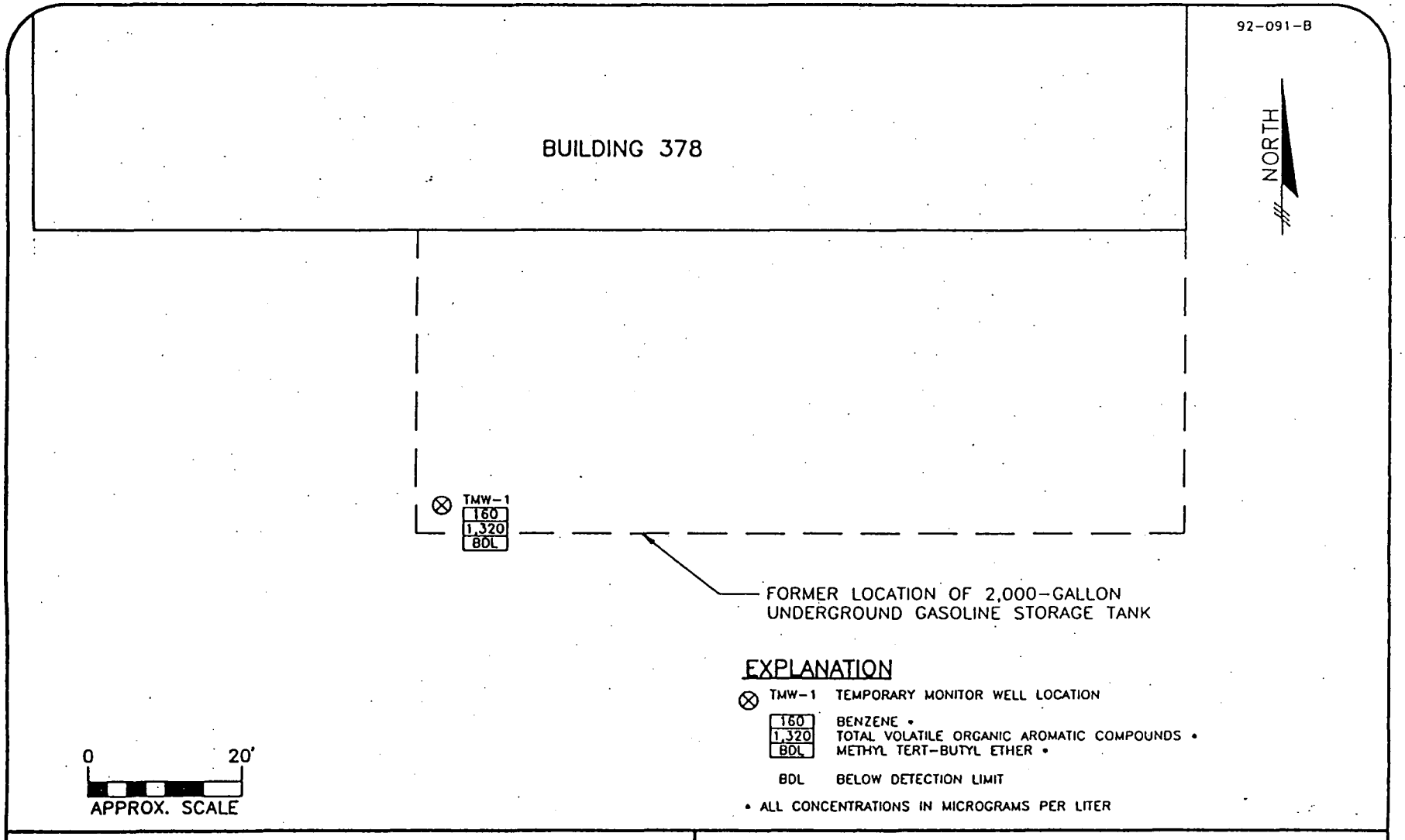


Figure 3. Temporary Monitor Well Location and Analytical Results

CLIENT

COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

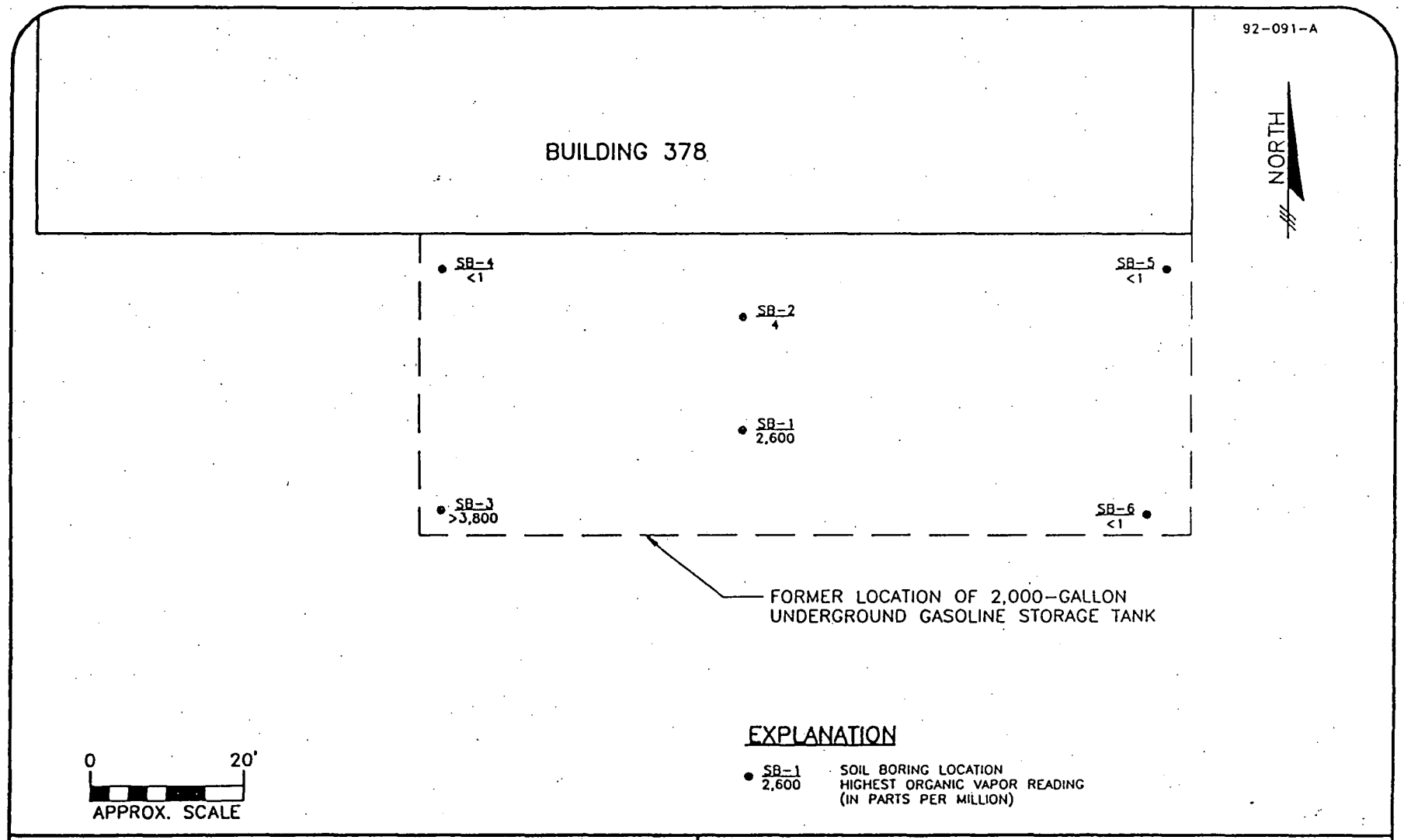


Figure 2. Soil Boring Locations and Organic Vapor Readings in the Area of the Former Gasoline UST

CLIENT

COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

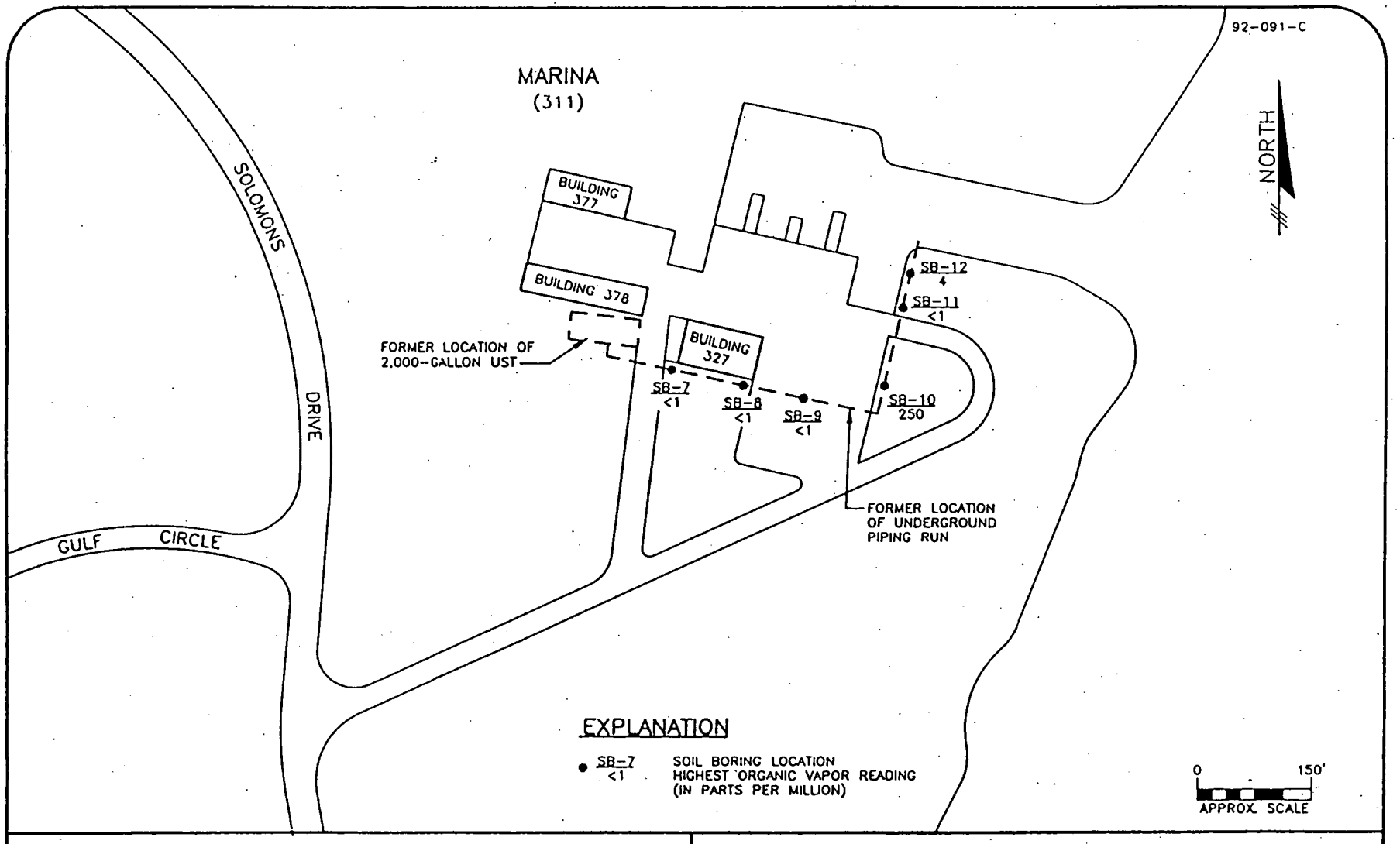


Figure 4. Soil Boring Locations and Organic Vapor Readings Along the Former Unerground Piping Run

CLIENT

COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

APPENDIX A

Closure Assessment Form for the 2,000-Gallon Gasoline UST

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

DER Form # 17-761.900(6)
Form Title Closure Assessment Form
Effective Date December 10, 1990
DER Application No. _____ (Filled in by DER)

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 system closure assesment was performed in accordance with Rule 17-761 or 17-762, Florida Administrative Code. Eligible Early Detection Incentive (EDI) and Reimbursement Program sites do not have to perform a closure assessment.

Please Print or Type
Complete All Applicable Blanks

1. Date: June 29, 1992
2. DER Facility ID Number: 038518667 3. County: Bay
4. Facility Name: Coastal Systems Station
5. Facility Owner: U.S. Navy
6. Facility Address: Coastal Systems Station, Panama City, Florida 32407-5000
7. Mailing Address: Commanding Officer, Code 3610AM, 6703 W. Highway 98, Coastal Systems Station, Panama City, Florida 32407-5000
8. Telephone Number: (904) 234-4290 9. Facility Operator: Department of the Navy
10. Were the Storage Tank(s): (Circle one or both) A. Aboveground or (B. Underground)
11. Type of Product(s) Stored: Unleaded Gasoline
12. Were the Tank(s): (Circle one) A. Replaced (B. Removed) C. Closed in Place D. Upgraded (aboveground tanks only)
13. Number of Tanks Closed: One (1) 14. Age of Tanks: Eight Years

Facility Assessment Information

Yes	No	Not Applicable	
☐	☒		1. Is the facility participating in the Florida Petroleum Liability Insurance and Restoration Program (FPLIRP)?
☒	☐		2. Was a Discharge Reporting Form submitted to the Department? If yes, When: June 30, 1992 Where: FDER-Northwest District
☒	☐		3. Is the depth to ground water less than 20 feet?
☐	☒	☐	4. Are monitoring wells present around the storage system? If yes, specify type: ☐ Water monitoring ☐ Vapor monitoring
☐	☐	☒	5. Is there free product present in the monitoring wells or within the excavation?
☒	☐	☐	6. Were the petroleum hydrocarbon vapor levels in the soils greater than 500 parts per million for gasoline? Specify sample type: ☐ Vapor Monitoring wells ☒ Soil sample(s)
☐	☐	☒	7. Were the petroleum hydrocarbon vapor levels in the soils greater than 50 parts per million for diesel/kerosene? Specify sample type: ☐ Vapor Monitoring wells ☐ Soil sample(s)
☒	☐	☐	8. 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 sheets)
☐	☐	☒	9. If a used oil storage system, did a visual inspection detect any discolored soil indicating a release?
☐	☐	NA	10. Are any potable wells located within ¼ of a mile radius of the facility?
☒	☐		11. Is there a surface water body within ¼ mile radius of the site? If yes, indicate distance: 300 feet

Northwest District, 160 Governmental Center, Pensacola, Florida 32501-5794, 904-436-8300
Northwest District, 7825 Baymeadows Way, Suite B 200, Jacksonville, Florida 32207, 904-798-4200
Central District, 3319 Maguire Blvd., Suite 232, Orlando, Florida 32803-3767, 407-894-7555
Southwest District, 4520 Oak Fair Blvd., Tampa, Florida 33610-7347, 813-623-5561
South District, 2295 Bay St., Fort Myers, Florida 33901-2896, 813-332-6975
Southeast District, 1900 S. Congress Ave., Suite A, West Palm Beach, Florida 33406, 407-433-2650

DER Form # 17-761.900(6)
Form Title Closure Assessment Form
Effective Date December 10, 1990
DER Application No. (Filled in by DER)

12. 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.
13. If a facility has a pollutant storage tank system that has both gasoline and kerosene/diesel stored on site, both EPA Method 602 and EPA Method 610 must be performed on the ground water samples obtained.
14. Amount of soils removed and receipt of proper disposal.
15. If yes is answered to any one of questions 5-9, a Discharge Reporting Form 17-761.900(1) indicating a suspected release shall be submitted to the Department within one working day.
16. A copy of this form and any attachments must be submitted to the Department's district office in your area and to the locally administered program office under contract with the Department within 60 days of completion of tank removal or filling a tank with an inert material.

Signature of Owner — 7/28/92 Date

Signature of Person Performing Assessment — 6/29/92 Date

Hydrogeologist/Project Scientist
Title of Person Performing Assessment

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

State ground water target levels are as follows:

1. For gasoline (EPA Method 602):
   a. Benzene 1 ug/l
   b. Total VOA 50 ug/l
      - Benzene
      - Toluene
      - Total Xylenes
      - Ethylbenzene
   c. Methyl Test-Butyl Ether (MTBE) 50 ug/l

2. For kerosene/diesel (EPA Method 610):
   a. Polynuclear Aromatic Hydrocarbons (PAHS) (Best achievable detection limit, 10 ug/l maximum)

APPENDIX B

Laboratory Report for the Ground-Water
Sample Collected from
Temporary Monitor Well TMW-1

Analytical Technologies, Inc. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

TERRA ENVIRONMENTAL
14902 WINDING CREEK CT
SUITE 101-C
TAMPA FL 33613-0000

Lab I.D.#: 92-5077A
Order Number: P59449
Received Date: 06/10/92
Client: 19021
Sampled By: N/S
Sample Date: 06/08/92
Sample Time: PM

Project Number: 92-091&093
Project Name: COASTAL SYSTEMS STATION
Sample Site: PANAMA CITY, FL
Sample Type: GROUNDWATER

N/S = Not Submitted

R E S U L T S

reported on the following page(s)

Comments: PPB = Parts Per Billion, ug/l; BDL = Below Detection Limit.
Method Reference: Federal Register 40 CFR Part 136, July 1, 1990.

Approved By : Linda Rogan

AnalyticalTechnologies,Inc. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

Client: TERRA ENVIRONMENTAL
Lab I.D.#: 92-5077A-1
Received Date: 06/10/92
Sampled By: N/S

Project Number: 92-091&093
Project Name: COASTAL SYSTEMS STATION
Sample Site: PANAMA CITY, FL
Sample Type: GROUNDWATER

Sample ID.: TMW-1 Sample Date: 06/08/92 Time: PM

VOL/602+X+MTBE VOLATILE METHOD 602 + XYLENE + MTBE

Parameter	Units	Result	Detection Limit
BENZENE	PPB	160	10
CHLOROBENZENE	PPB	BDL	10
1,2-DICHLOROBENZENE	PPB	BDL	20
1,3-DICHLOROBENZENE	PPB	BDL	20
1,4-DICHLOROBENZENE	PPB	BDL	20
ETHYL BENZENE	PPB	230	10
TOLUENE	PPB	270	50
XYLENES	PPB	660	20
METHYL TERT-BUTYL ETHER	PPB	BDL	50
TRIF-TOLUENE *SURR* LIMITS (70-130)	% REC	90	

end of report

Analytical Technologies, Inc. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

QUALITY CONTROL DATA

Analytical**Technologies,**Inc. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

CLIENT: TERRA ENVIRONMENTAL

PROJECT: 92-091 & 92-093

LAB ID: 92-5077A

METHOD: 602 / Federal Register, 40 CFR, Part 136, July 1, 1990

QC LEVEL: I

LAB ID:	CLIENT ID:	DATE SAMPLED	DATE RECEIVED	DATE EXTRACTED	DATE ANALYZED	QC BATCH	QC BLANK
92-5077A-1	TMW-1	06-08-92	06-10-92	N/A	06-17-92	WW102	A

AnalyticalTechnologies,Inc. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

METHOD INSTRUMENT BLANK

BATCH NUMBER: WW102

METHOD: 602 / Federal Register, 40 CFR, Part 136, July 1, 1990

PARAMETERS	DETECTION LIMIT		BLANK A	BLANK B	BLANK C
		ANALYSIS DATE	06-16-92	N/A	N/A
			RESULTS	RESULTS	RESULTS
MTBE	5		BDL	BDL	BDL
BENZENE	1		BDL	BDL	BDL
TOLUENE	5		BDL	BDL	BDL
CHLOROBENZENE	1		BDL	BDL	BDL
ETHYL BENZENE	1		BDL	BDL	BDL
XYLENES	2		BDL	BDL	BDL
1,3-DCB	2		BDL	BDL	BDL
1,2-DCB	2		BDL	BDL	BDL
1,4-DCB	2		BDL	BDL	BDL
TriF-toluene	(70-130)	*SURR*	113	N/A	N/A

NOTE: Units in ug/l = Part Per Billion.
BDL = Below Detection limit.
Samples within the same calibration period may display different dates due to operation past midnight.
Results reported are blank corrected.
Source for control limits is internal laboratory quality assurance program and the method reference.
N/S = NOT SUBMITTED
N/A = NOT APPLICABLE

Analytical Technologies, Inc. 11 East Olive Road Pensacola, Florida 32514 (904) 474-1001

REAGENT WATER SPIKE

BATCH NUMBER: WW102

METHOD: 602 / Federal Register, 40 CFR, Part 136, July 1, 1990

COMPOUNDS	SPIKE ADDED	SAMPLE CONC	SPK CONC	SPK REC%#	REC LIMITS
BENZENE	50	BDL	49	98	82-120
TOLUENE	50	BDL	47	94	77-125
CHLOROBENZENE	50	BDL	49	98	86-128

COMPOUNDS	SPIKE ADDED	SAMPLE CONC	SPD CONC	SPD REC%#	% RPD#	QC LIMITS RPD	QC LIMITS REC
BENZENE	50	BDL	50	100	2	11	82-120
TOLUENE	50	BDL	51	102	8	14	77-125
CHLOROBENZENE	50	BDL	50	100	2	13	86-128

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

ITEM ID:	ANALYSIS DATE	EXTRACTION DATE	SURROGATE RECOVERY TriF-toluene	QC LIMITS
SPK	06-16-92	N/A	89 %	70-130
SPD	06-16-92	N/A	100 %	70-130

D = DILUTED OUT

NOTE: Units in ug/l = Parts Per Billion.
BDL = Below Detection Limit.
Results reported are blank corrected.
Source for control limits is internal laboratory quality assurance program and method reference.

COMMENTS: _____

_____

_____

Committed to Excellence in Service and Quality
AnalyticalTechnologies, Inc.
11 EAST OLIVE ROAD
PENSACOLA, FLORIDA 32514
(904) 474-1001

SAMPLE INSPECTION AND IDENTIFICATION SHEET/OUT OF CONTROL EVENTS

Client: TERRA ENVIRONMENTAL

ATI Lab ID # 92-5077A

PROJ NUMBER: 92-091 & 92-093

PROJ NAME: COSTAL SYSTEMS STATION

SAMPLED BY: N/S

SAMPLE SITE: PANAMA CITY, FL

SAMPLE DATE: 6/8/92

SAMPLE TIME: PM

SAMPLE TYPE: GROUNDWATER

RUSH: Y (N) QC: N 0 (1) 2 3 4

Date Received: 06/10/92

Is there a chain of custody? (Y) N

Was chain of custody signed? (Y) N

Were samples received cold? (Y) N

Were samples received in proper containers? (Y) N

Were samples preserved correctly? (Y) N

Headspace in volatile bottles? Y (N)

Were samples within holding time? (Y) N

SHIPPED BY: FED EX 217947033

	SAMPLE	DATE
1	TMW-1	6/8/92
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

OUT OF CONTROL EVENTS: _____

ATI WILL PERFORM THE SERVICES IN ACCORDANCE WITH NORMAL PROFESSIONAL STANDARD FOR THE INDUSTRY. THE TOTAL LIABILITY OF ATI, ANY AND ALL OFFICERS AND EMPLOYEES OR SUCCESSORS, TO CLIENTS FOR SERVICES PROVIDED, WILL NOT EXCEED THE INVOICE AMOUNT FOR SAID SERVICE. CLIENT ACCEPTANCE OF A PROPOSAL RELEASES ATI FROM ANY LIABILITY IN EXCESS THEREOF.

PM APPROVAL AP 6/10/92 INSPECTED BY GF DATE INSPECTED 6/10/92

TIME 13:00 TIME 1200 # OF REPORTS 1

BLR WS/FORMS/INSPSHEE.TS

TERRA ENVIRONMENTAL SERVICES, INC.
14902 Winding Creek Court
Suite 101-C
Tampa, Florida 33613
813-265-1651
(FAX) 813-968-8607

CHAIN-OF-CUSTODY

TERRA PROJECT NUMBER: 92-091 + 92-093
PROJECT NAME: Coastal Systems Station
PROJECT LOCATION: Panama City, FL
LABORATORY: ATI - Tallahassee

SAMPLE ID	MATRIX	DATE SAMPLED	TIME SAMPLED	DESCRIPTION OF ANALYSIS	CONTAINER DESCRIPTION	PRESERVATIVE	NUMBER OF CONTAINERS	
TMW-1	GW	6/8/92	PM	EPA 602 + xylenes + MTBE	40 ml septum vial	HCl+Ice/Ice	2	A,
HOT-1	oil	6/8/92	PM	PCB's by EPA 608 (list)	3oz widemouth	Ice	1	B1
HOT-3	oil	6/8/92	PM	↓ ↓	↓	↓	1	B-2
LCPD-1	Debris	6/8/92	PM	TCLP RCRA Metals	1 liter poly	Ice	1	C1
				(As, Ba, Cd, Cr, Pb, Hg, Ag, Se)				GF 4/14
						TOTAL:	(5)	

METHOD OF SHIPMENT: IN PERSON ____ FEDERAL EXPRESS X OTHER: ____

SAMPLES RELINQUISHED BY: Daniel W. Longbrake (NAME) Terra Environmental Services Inc. (AFFILIATION) 6/9/92 1700 (DATE/TIME)

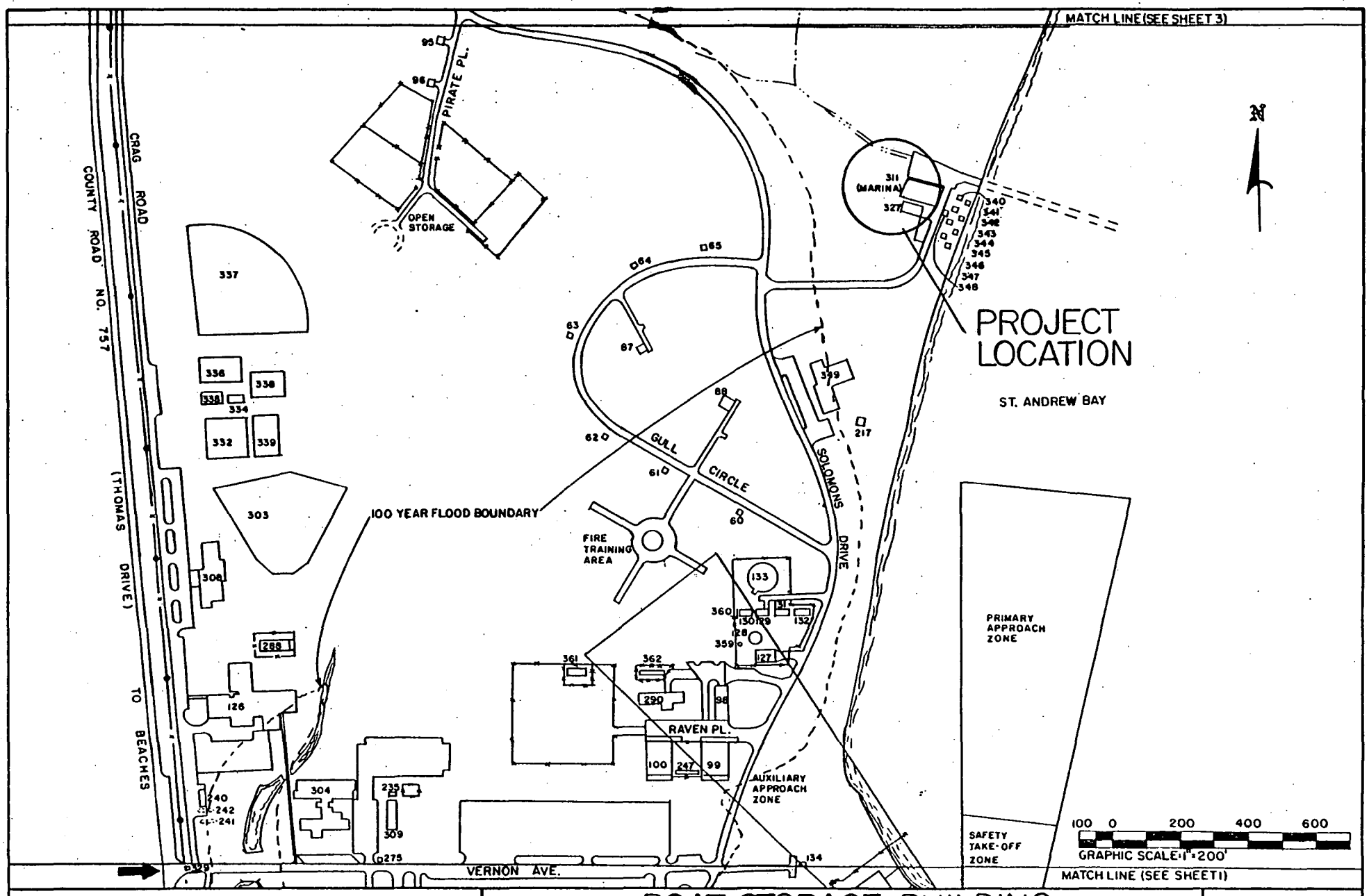
SAMPLES RECEIVED BY: Craig Foote (NAME) ATI (AFFILIATION) 6/10/92 0820 (DATE/TIME)

SAMPLES RECEIVED BY: ____ (NAME) ____ (AFFILIATION) ____ (DATE/TIME)

TURNAROUND TIME: 24hr 48hr 'normal other: See Attachment SEND RESULTS TO: D. Longbrake

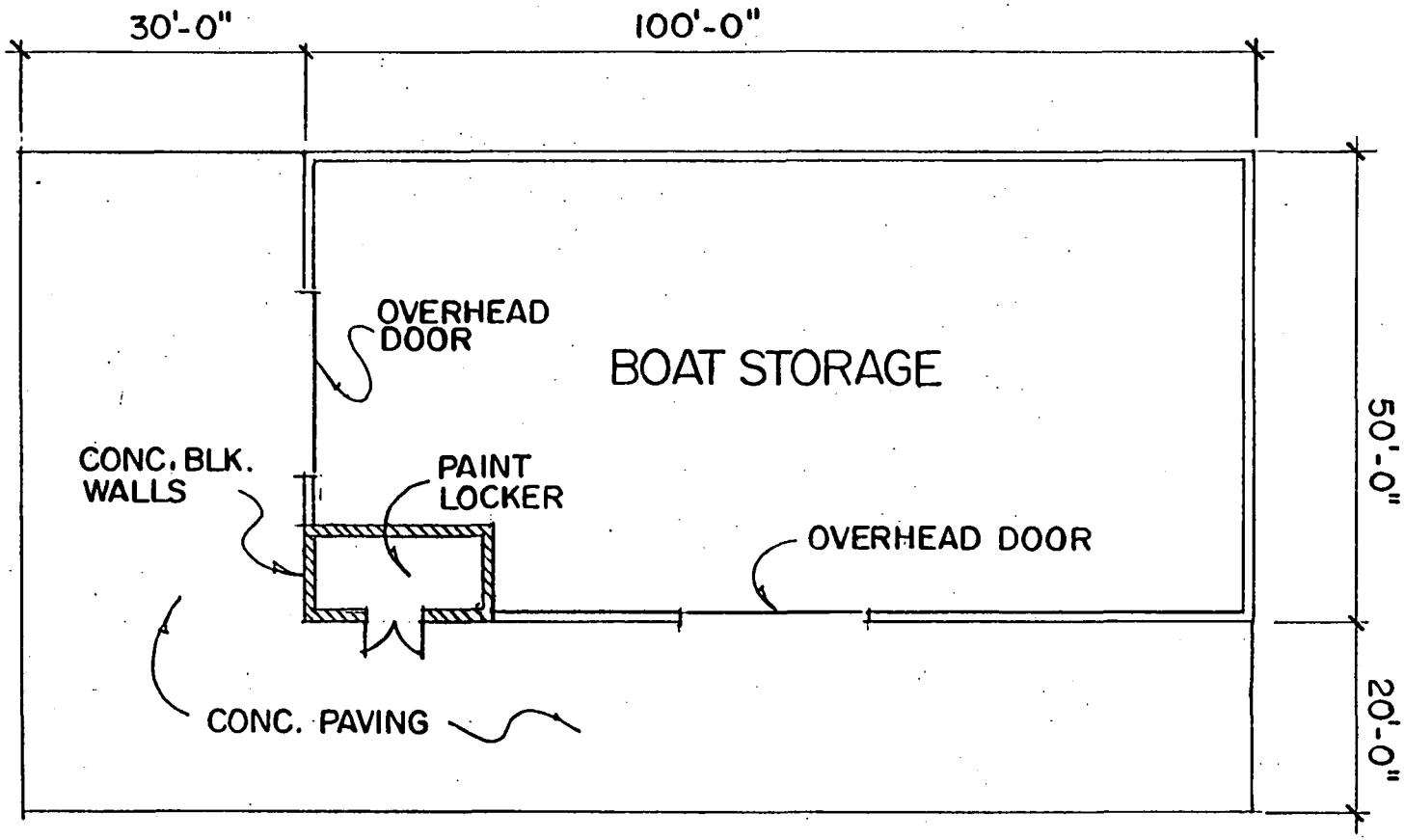
SPECIAL INSTRUCTIONS: ____

92-5074



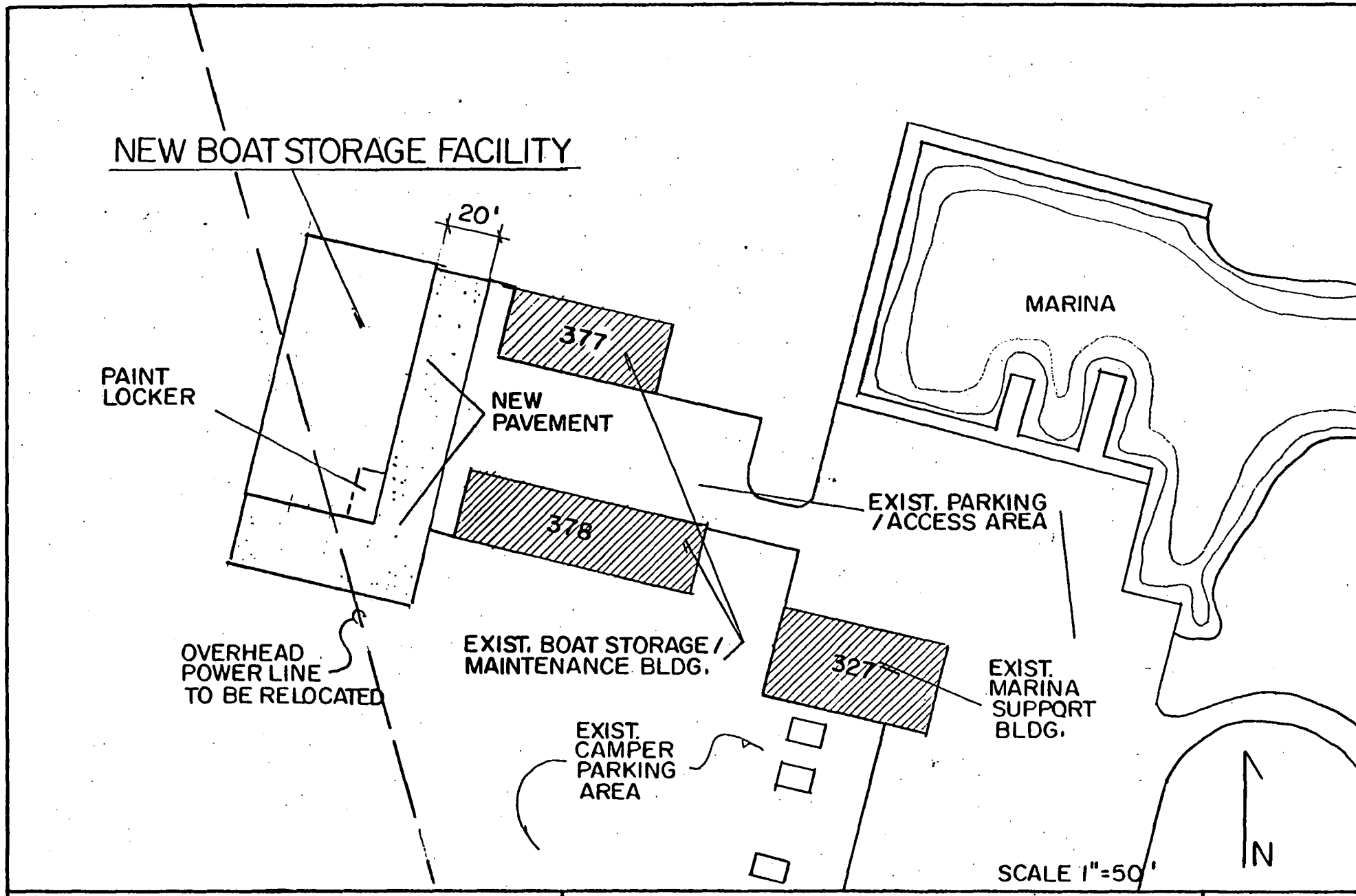
NAVAL COASTAL SYSTEMS CENTER PANAMA CITY, FLORIDA 32407 DRAWN BY: DATE: SHEET of	BOAT STORAGE BUILDING SPECIAL PROJECT C22-86 LOCATION MAP	S-2940

2740, 41, 42



FLOOR PLAN SCALE 1"=20'

NAVAL COASTAL SYSTEMS CENTER PANAMA CITY, FLORIDA 32407 DR'N. BY: DATE:	BOAT STORAGE BUILDING SPECIAL PROJECT C22-86	S-2942



NAVAL COASTAL SYSTEMS CENTER PANAMA CITY, FLORIDA 32407 DR'N. BY: DATE:	BOAT STORAGE BUILDING SPECIAL PROJECT C22-86 SITE PLAN	S-2941

APPENDIX B

SITE CONDITIONS

Regional and Local Physiography

Florida has been divided into five topographic regions by Cooke (1939) which are as follows: the Coastal Lowlands, the Western Highlands, the Marianna Lowlands, the Tallahassee Hills, and the Central Highlands. Vernon (1951), on the basis of origin and age, divided the physiography into four major divisions: the Delta Plain Highlands, the Tertiary Highlands, the Terraced Coastal Lowlands, and the River Valley Lowlands. He further subdivided these major divisions into smaller units and applied local names to them. In 1964, Puri and Vernon divided Florida into six major physiographic groups. These six primary divisions are again subdivided into secondary and tertiary physiographic units. More recently, White (1970) reported on the geomorphology of the Florida Peninsula. His work divides the peninsula into three zones and then subdivides these zones based on local features. His study, however, does not include Northwest Florida, where Bay County is located.

Other than the Puri and Vernon (1964) study, which deals with the entire State and thus includes Bay County, the only study that covers the Bay County area specifically is Musgrove et al. (1965). That report deals primarily with water resources of the area, but does divide the county into four physiographic divisions: the sand hills, sinks and lakes, flat-woods forest, and beach dunes and wave-cut bluffs. The following is taken from the descriptions given by Musgrove et al. (1965).

The physiographic divisions in Bay County have developed on a series of marine terraces that were carved into the surface deposits during Pleistocene times by sea level fluctuations. Low swampy areas occur throughout each of these divisions, but are more prevalent in the Flat-Woods Forest.

The sand hills in the northern part of the county are erosional remnants of the higher marine terraces, which were between 100 feet and 270 feet above present sea level. Puri and Vernon (1964) called the high terrace remnant, a portion of which is in the northeast part of the county, the New Hope Ridge. They assign the remaining part of the sand hills in Bay County to the Greenhead Slope in the west, and the Fountain Slope in the eastern part of Bay County. The sand hills are characterized by gently rolling forested land with a dendritic drainage pattern.

The sinks and lakes occur in the section of the county west of Econfina Creek, where they have developed within the sand hills. This area is typified by irregular sand hills and numerous sink holes and sink-hole lakes. The sink holes range in diameter from a few feet to broad flat areas, such as those in the Deadening Lakes area in southern Washington County and north-central Bay County; these can be up to 2 miles wide. This physiographic region was developed by the solution of the underlying limestone and subsequent collapse of the overlying material into the solution chamber. Most of the lakes have no surface outlets; their drainage is mostly to the underlying groundwater system.

The Flat-Woods Forest is the largest physiographic division in the county. The topography is slightly rolling to flat on the terraces below an elevation of 70 feet. Most of this region is covered with pines, except for the areas cleared for agriculture. The Flat-Woods Forest is well drained with the exception of some low areas around the bays on the 0- to 10-foot and 10- to 25-foot terraces. During rainy weather these low areas of the flat woods become inundated. A few

small perennial swamps occur at various locations throughout the Flat-Woods Forest.

The fourth division occurs adjacent to the Gulf coast and is characterized by beach dune deposits and wave-cut bluffs. The beach dune deposits are the youngest sediments in the basin and are the most rapidly changing physiographic feature. It is in this fourth division that Facility 327 at Coastal Systems Station (CSS) Panama City is located.

Puri and Vernon (1964) placed these last two divisions within their Gulf Coastal Lowlands province, which are gently sloping plains that extend to the coast from the highlands. The landforms in this province are composed of barrier islands, coastal ridges, estuaries, lagoons, relict spits and bars, and sand dune ridges. All of these features are generally parallel to the present coast, indicting an origin shaped by coastal environments.

Regional Hydrogeology

CSS Panama City is underlain by three water bearing zones. These zones include the water-table aquifer, the secondary artesian aquifer, and the Floridan aquifer system.

The water-table aquifer is comprised of highly permeable quartz sands with scattered lenses of clayey sand and sandy clay. It ranges in thickness from 65 to 140 feet. The depth to the water table ranges from less than 1 foot to approximately 4 feet bls, and varies 1 to 2 feet periodically due to tidal influences and changes in rainfall. Groundwater flow direction generally follows local topography. Onsite flow is primarily towards the discharge areas of St. Andrew Bay and the boat launching area, to the east and north.

The groundwater in the water-table aquifer exhibits a high iron content, is acidic and corrosive, has high dissolved solids, and has a hardness ranging from 150 to 200 micrograms per liter (mg/ℓ). Presently, it is considered unsuitable for domestic use and is not used as a potable water source.

The secondary artesian aquifer underlies the water-table aquifer and is composed of isolated sand and shell beds and discontinuous limestone lenses that range from 10 to 25 feet in thickness within the Intracoastal Formation. Clay and low permeability limestone bound these more permeable lenses, confining the water in them and producing artesian conditions. This aquifer does not produce sufficient water locally to make it a viable water source.

The Floridan aquifer system is separated from the overlying aquifers by semi-confining beds within the Intracoastal Formation. It is hydraulically connected with overlying strata in this area. The Floridan aquifer is recharged locally by seepage from the overlying water-table aquifer and, where the water-table aquifer is breached, by sinks and lakes in the northern part of the county and in Washington County. Regional recharge takes place north of Bay County where the limestones are near the surface in Washington, Holmes, and Jackson Counties, and in southern Alabama. This recharged water migrates down-dip to Bay County.

It has been estimated (Causey and Leve, 1976) that the thickness of the potable zone of the Floridan aquifer ranges between 250 feet and 1,000 feet in Bay County, increasing in thickness northward away from the coast. It has also been

estimated (Pascale, 1975) that the yield of most fresh water wells (12 inches in diameter) would vary from less than 250 gallons per minute (gpm) near the southeast coast to greater than 500 gpm in the northern part of the county. Along the coast, however, public supply wells (16 inches in diameter) rarely yield 500 gpm, although most 2-inch wells into the Floridan aquifer provide enough water for most domestic supplies. Panama City and surrounding subdivisions changed to a surface water supply in 1967. This was done because of the continually declining water levels in wells, and the increased potential for salt-water intrusion.

Local Hydrogeology

At CSS Panama City the Floridan aquifer consists of the lower permeable beds of the Intracoastal Formation, the Bruce Creek Formation, the Suwannee Limestone, and the limestones of the Ocala Group. It is composed of limestone and dolomite, its upper units lie about 250 feet below sea level at CSS Panama City, and it is approximately 1,100 feet thick (Foster 1965; 1972). Groundwater flow within the aquifer is southwesterly toward the Gulf of Mexico.

Recharge is predominantly a result of local rainwater infiltration. Some recharge to the Floridan aquifer occurs from north of Bay County. Water entering surface outcrops of limestone in Washington, Holmes, and Jackson Counties and in southern Alabama travels down-dip, providing regional recharge. However, the majority of recharge to the Floridan aquifer in this area is probably a result of seepage from overlying formations.

Although the Floridan aquifer yields up to 500 gpm in wells, the water is generally hard and has a high pH. Hardness, pH, and dissolved solids increase in the down-dip direction toward the coast.

CSS Panama City changed its primary source of potable water from onsite groundwater wells to municipal surface water in 1970 to avoid saltwater intrusion into the aquifer due to excessive pumping.

Water is now supplied by the Bay County Water System which obtains water from Deer Point Lake (located 9 miles northeast of CSS Panama City). There are still two wells at CSS Panama City that can be used as non-potable water sources. In addition, there are nine Floridan aquifer wells in the vicinity surrounding CSS Panama City that are used as water supply sources.

The direction of groundwater flow in the water table aquifer in the site vicinity is predominantly southeasterly, although variations in topography and the presence of surface water bodies result in localized changes in the groundwater flow direction.

APPENDIX C

LITHOLOGIC LOGS

TITLE: CSS Panama City Site 327	LOG of WELL: CSS-327-1		BORING NO. SB-1
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 5.60 FT.	MONITOR INST.: OVA	TOT DPTH: 12.25FT.	DPTH TO ▽ 1.52 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE: 2/23/93		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				50	Sand, medium grained, fair sorting, slight odor.		SP		
				2000	Sand, dark gray,medium grained, fair sorting, odor, wet.				
5									
10									
15									
20									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: CSS Panama City Site 327		LOG of WELL: CSS-327-2	BORING NO. SB-2
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 3.99 FT.	MONITOR INST.: OVA	TOT DPTH: 11.96FT.	DPTH TO ▽ 1.72 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE: 2/23/93		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				50	Sand, medium grained, fair sorting, slight odor.		SP		
				2000	Sand, dark gray,medium grained, fair sorting, odor, wet.				
5									
10									
15									
20									

TITLE: CSS Panama City Site 327		LOG of WELL: CSS-327-3	BORING NO. SB-12
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 3.30 FT.	MONITOR INST.: OVA	TOT DPTH: 12.25FT.	DPTH TO ▽ 1.98 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				3	Sand, beige to tan, fine to medium grained, fair sorting, wet.		SP		
5									
10									
15									
20									

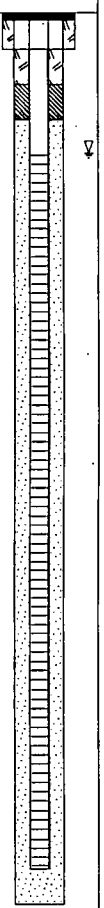


 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: CSS Panama City Site 327		LOG of WELL: CSS-327-4	BORING NO. SB-9
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 4.20 FT.	MONITOR INST.: OVA	TOT DPTH: 11.90FT.	DPTH TO ▽ 1.92 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				500	Sand, dark brown to gray, medium grained, fair sorting, highly organic, damp.		SP		
				GC	Sand, pale gray to dark brown, fine to medium grained, fair sorting, wet.				
5									
10									
15									
20									

TITLE: CSS Panama City Site 327		LOG of WELL: CSS-327-5	BORING NO. SB-15
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/24/93	COMPLTD: 2/24/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 3.78 FT.	MONITOR INST.: OVA	TOT DPTH: 11.72FT.	DPTH TO ▽ 2.90 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE: 2/24/93		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	Sand, light brown, fine to medium grained, fair sorting, moist.		SP		
				GC	Sand, fine to medium grained.				
5									
10									
15									
20									

TITLE: CSS Panama City Site 327	LOG of WELL: CSS-327-6		BORING NO. SB-21
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/24/93	COMPLTD: 2/24/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 5.54 FT.	MONITOR INST.: OVA	TOT DPTH: 12.00FT.	DPTH TO ▽ 1.66 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE: 2/24/93		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	Sand, beige, fine to medium grained, moist.		SP		
				GC	Same as above, wet.				
5									
10									
15									
20									

TITLE: CSS Panama City Site 327		LOG of WELL: CSS-327-7	BORING NO. SB-19
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/24/93	COMPLTD: 2/24/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 4.86 FT.	MONITOR INST.: OVA	TOT DPTH: 11.94FT.	DPTH TO ▽ 0.91 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE: 2/24/93		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	Sand, beige to tan, fine to medium grained, no odor, wet.		SP		
				GC	Same as above.				
5									
10									
15									
20									

TITLE: CSS Panama City Site 327	LOG of WELL: CSS-327-8		BORING NO. SB-22
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/24/93	COMPLTD: 2/24/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 3.20 FT.	MONITOR INST.: OVA	TOT DPTH: 11.95FT.	DPTH TO ▽ 1.53 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE: 2/24/93		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	Sand, dark brown, black, fine to medium grained, fair sorting, highly organic, wet.		SP		
				GC					
5									
10									
15									
20									

TITLE: CSS Panama City Site 327	LOG of WELL: CSS-327-9D		BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/24/93	COMPLTD: 2/24/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 14 - 19 FT.	PROTECTION LEVEL: D
TOC ELEV.: 3.71 FT.	MONITOR INST.: OVA	TOT DPTH: 18.20FT.	DPTH TO ▽ 1.73 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE: 2/24/93		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			24/24	GC	Sand, brown, tan, olive, fine to medium grained, fair sorting, no odor, saturated.		SP		
10			24/24	GC	Sand, brown, tan, fine to medium grained, fair sorting, slight odor, saturated.				
15			24/24	GC	Sand, dark brown, olive, fine to medium grained, fair sorting, slight odor, saturated.				
					Sand, fine to medium grained.				
20			24/24	GC	Clay, hard, gray, olive, white, saturated.		CL		

TITLE: CSS Panama City Site 327		LOG of WELL: CSS-327-10	BORING NO. SB-23
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 5/17/93	COMPLTD: 5/17/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 3 - 13 FT.	PROTECTION LEVEL: D
TOC ELEV.: 3.52 FT.	MONITOR INST.: OVA	TOT DPTH: 13.17FT.	DPTH TO ▽ 2.18 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE: 5/17/93		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				143	Sand, dark gray, fine to medium grained, very moist.		SP		
				420	Sand, dark brown, black, fine to medium grained, fair sorting, highly organic, wet.				
5									
10									
15									
20									

TITLE: CSS Panama City Site 327		LOG of WELL: CSS-327-11	BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 5/18/93	COMPLTD: 5/18/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 6.53 FT.	MONITOR INST.: OVA	TOT DPTH: 12.24FT.	DPTH TO ▽ 3.72 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE: 5/18/93		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				GC	Sand, gray to tan, fine to medium grained, fair sorting, tree roots and organic matter, no odor.		SP		
				GC	Sand, gray, tan, beige, fine to medium grained, fair sorting, tree roots and organic material, slight organic odor, wet.				
5									
10									
15									
20									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: CSS Panama City Site 327	LOG of WELL: CSS-327-12		BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 5/18/93	COMPLTD: 5/18/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 5.44 FT.	MONITOR INST.: OVA	TOT DPTH: 12.39FT.	DPTH TO ▽ 3.08 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE: 5/18/93		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				GC	Sand, gray, tan, beige, dark brown, fine to medium grained, fair sorting, shells, rocks, no odor.		SP		
				GC	Sand, tan, beige, fine to medium grained, wet.				▽
5									
10									
15									
20									

TITLE: CSS Panama City Site 327		LOG of WELL: CSS-327-13	BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 5/18/93	COMPLTD: 5/18/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 3.49 FT.	MONITOR INST.: OVA	TOT DPTH: 11.67FT.	DPTH TO ▽ 2.14 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE: 5/18/93		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				GC	Sand, dark brown, black, gray, fine to medium grained, fair sorting, fair amount of organics, strong odor.		SP		
				GC	Sand, dark brown, black, tan, fine to medium grained, fair sorting, fair amount of organics, strong odor, wet.				
5									
10									
15									
20									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: CSS Panama City Site 327		LOG of WELL: CSS-327-14	BORING NO. SB-25
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 5/18/93	COMPLTD: 5/18/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 2 - 12 FT.	PROTECTION LEVEL: D
TOC ELEV.: 3.58 FT.	MONITOR INST.: OVA	TOT DPTH: 11.50FT.	DPTH TO ▽ 2.29 FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE: 5/18/93		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				GC	Sand, beige, dark brown, fine to medium grained, fair sorting, no odor.		SP		
				GC	Sand, beige, tan, fine to medium grained, fair sorting, no odor, saturated.				
5									
10									
15									
20									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: CSS Panama City Site 327	LOG of WELL:	BORING NO. SB2
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection	DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: Posthole	CASE SIZE: / SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA / TOT DPTH: 4FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:	SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	Sand, pale brown, medium grained, sulfuric odor.		SP		
				0	Sand, pale brown, medium grained, fair sorting, wet.				
5									
10									
15									
20									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: Panama City Site 327	LOG of WELL:		BORING NO. SB-3
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: Posthole	CASE SIZE:	SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 2FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	Sand, pale brown, fine to medium grained, fair sorting, wet.		SP		

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: Panama City Site 327	LOG of WELL:		BORING NO. SB-4
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: Posthole	CASE SIZE:	SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 2FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	Sand, pale brown to dark gray, fine to medium grained, fair sorting, organic material, wet.		SP		
5									
10									
15									
20									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: Panama City Site 327	LOG of WELL:		BORING NO. SB-5
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: Posthole	CASE SIZE:	SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 2FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	Sand, pale brown to dark gray, fine to medium grained, fair sorting, organic material, wet.		SP		
5									
10									
15									
20									

TITLE: Panama City Site 327	LOG of WELL:	BORING NO. SB-6
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection	DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: Posthole / CASE SIZE:	SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT. / MONITOR INST.: OVA	TOT DPTH: 4FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:	SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				5	Sand, dark brown, medium grained, fair sorting.		SP		
				300	Sand, pale brown, fine to medium grained, fair sorting, shell fragments, wet.				
5									
10									
15									
20									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: CSS Panama City Site 327	LOG of WELL:	BORING NO. SB-7
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection	DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: Posthole	CASE SIZE: SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA TOT DPTH: 4FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:	SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				500	Sand, dark brown, gray, medium grained, fair sorting, highly organic, tree roots.		SP		
				GC	Sand, dark brown, fine to medium grained, fair sorting, highly organic, wet.				
5									
10									
15									
20									

TITLE: CSS Panama City Site 327	LOG of WELL:		BORING NO. SB-10
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: Posthole	CASE SIZE:	SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 4FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				10	Sand, dark brown, fine to medium grained, fair sorting, damp.		SP		
				GC	Sand, dark brown, fine to medium grained, fair sorting, sulfurous odor, wet.				
5									
10									
15									
20									

TITLE: CSS Panama City Site 327		**LOG of WELL:**	**BORING NO.** SB-11
CLIENT: SOUTHNAVFACENGCOM			**PROJECT NO:** 7578-30
CONTRACTOR: Groundwater Protection		**DATE STARTED:** 2/23/93	**COMPLTD:** 2/23/93
METHOD: Posthole	**CASE SIZE:**	**SCREEN INT.:**	**PROTECTION LEVEL:** D
TOC ELEV.: FT.	**MONITOR INST.:** OVA	**TOT DPTH:** 4FT.	**DPTH TO ▽** FT.
LOGGED BY: C. Jackson	**WELL DEVELOPMENT DATE:**		**SITE:** Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	Sand, beige to light gray, fine to medium grained, fair sorting, moist.		SP		
				GC	Sand, light gray to dark brown, to black, fine to medium grained, fair sorting, sulfurous odor, wet.				
5									
10									
15									
20									

TITLE: CSS Panama City Site 327	LOG of WELL:	BORING NO. SB-13
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection	DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: Posthole	CASE SIZE: / SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA / TOT DPTH: 2FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:	SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				350	Sand, dark brown, fine to medium grained, fair sorting, some odor, wet.		SP		
				GC					
5									
10									
15									
20									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: CSS Panama City Site 327	LOG of WELL:		BORING NO. SB-14
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: Posthole	CASE SIZE:	SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 2FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				5000	Sand, light beige to gray, fine to medium grained,fair sorting, odor, moist.		SP		
				GC	Sand, dark brown, fine to medium grained, fair sorting, odor, wet.				
5									
10									
15									
20									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: CSS Panama City Site 327	LOG of WELL:	BORING NO. SB-16
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection	DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: Posthole	CASE SIZE: / SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA / TOT DPTH: 2FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:	SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				4000	Sand, dark brown, black, fine to medium grained, fair sorting, highly organic, odor.		SP		

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: CSS Panama City Site 327	LOG of WELL:	BORING NO. SB-17
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection	DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: Posthole	CASE SIZE:	SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 2FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:	SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	Sand, dark brown, fine to medium grained, fair sorting, odor.		SP		

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: CSS Panama City Site 327	LOG of WELL:		BORING NO. SB-18
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: Posthole	CASE SIZE:	SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 2FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				550	Sand, dark brown, fine to medium grained, fair sorting, highly organic, strong sulfurous odor.		SP		
				GC	Sand, dark brown, fine to medium grained, highly organic, strong sulfurous odor.				
5									
10									
15									
20									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: CSS Panama City Site 327	LOG of WELL:	BORING NO. SB-20
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection	DATE STARTED: 2/23/93	COMPLTD: 2/23/93
METHOD: Posthole	CASE SIZE:	SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 2FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:	SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	Sand, olive to beige, fine to medium grained, fair sorting, moist.		SP		
				GC	Same as above, wet.				
5									
10									
15									
20									

TITLE: CSS Panama City Site 327	LOG of WELL:	BORING NO. SB-24
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection	DATE STARTED: 5/18/93	COMPLTD: 5/18/93
METHOD: Posthole	CASE SIZE:	SCREEN INT.:
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 4FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:	SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				GC	Sand, beige, tan, fine to medium grained, fair sorting, no odor.		SP		
				GC	Sand, beige to white, fine to medium grained, fair sorting, slight organic odor.				
5									
10									
15									
20									

TITLE: CSS Panama City Site 327	LOG of WELL:	BORING NO. SB-26
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection	DATE STARTED: 5/18/93	COMPLTD: 5/18/93
METHOD: Posthole	CASE SIZE: SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA TOT DPTH: 4FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:	SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					Sand, gray, light gray, fine to medium grained, fair sorting, some organics, no odor, wet.		SP		
5									
10									
15									
20									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: CSS Panama City Site 327		LOG of WELL:	BORING NO. SB-27
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 5/18/93	COMPLTD: 5/18/93
METHOD: Posthole	CASE SIZE:	SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 3FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				GC	Sand, gray, fine to medium grained, fair sorting, high organic materials.		SP		
				GC	Sand, gray, fine to medium grained, fair sorting, high organic materials, wet.				
5									
10									
15									
20									

TITLE: CSS Panama City Site 327	LOG of WELL:	BORING NO. SB-28
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection	DATE STARTED: 5/18/93	COMPLTD: 5/18/93
METHOD: Posthole	CASE SIZE: SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA TOT DPTH: 3FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:	SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				GC	Sand, dark gray, brown, fine to medium grained, organic materials, odor, wet.		SP		
				GC					
5									
10									
15									
20									

TITLE: CSS Panama City Site 327	LOG of WELL:		BORING NO. SB-29
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7578-30
CONTRACTOR: Groundwater Protection		DATE STARTED: 5/18/93	COMPLTD: 5/18/93
METHOD: Posthole	CASE SIZE:	SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 2FT.	DPTH TO ▽ FT.
LOGGED BY: C. Jackson	WELL DEVELOPMENT DATE:		SITE: Facility 327

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				GC	Sand, light gray, beige, tan, fine to medium grained, fair sorting, organic materials, odor, wet.		SP		
5									
10									
15									
20									

 ABB ENVIRONMENTAL SERVICES, INC.

APPENDIX D

INVESTIGATIVE METHODOLOGIES AND PROCEDURES

Soil Boring Methods

The soil borings were advanced to the top of the water table using either a posthole digging tool or a 3¼-inch (inside diameter) hand auger. A soil sample from each borehole, retrieved from 0 to 2 feet bls and the soil-water interface, was placed in a 16-ounce soil jar for headspace analysis using an organic vapor analyzer (OVA) with a flame ionization detector (FID) following Florida Department of Environmental Protection (FDEP) (formerly Florida Department of Environmental Regulation [FDER]) Chapter 17-770.200(2), Florida Administrative Code (FAC), guidelines. Soil samples from below the water table were analyzed using a portable gas chromatograph (GC) calibrated to detect benzene, ethylbenzene, toluene, and xylene (BETX) to the part per billion (ppb) level. The purpose of the screening procedure was to optimize monitoring well placement during the investigation.

Monitoring Well Construction

Monitoring wells were installed in many of the boreholes drilled at the Coastal System Station (CSS) Panama City facility. All monitoring wells installed during the investigation were constructed of 2-inch ID, schedule 40, polyvinyl chloride (PVC) casing with flush-threaded joints and 0.010-inch machine-slotted screen. Shallow wells were constructed with 10 feet of screen. One deeper well was constructed with 5 feet of screen. PVC well casings extend from the top of the screen to land surface. A 20/30 grade silica sand filter pack was placed in the annular space to approximately 1 foot above the top of the screen. A ½-foot thick bentonite pellet seal was then placed on top of the filter pack. The remaining annular space was grouted to the surface with a neat cement grout. A protective traffic-bearing vault was installed to complete each well location. In concreted areas, the well pad consisted of 6-inch thick reinforced concrete around the traffic-bearing vault to the depth of the surrounding concrete. Each monitoring well is equipped with a locking well cap and a padlock. Figure D-1 depicts a typical shallow monitoring well installation for the site. Figure D-2 depicts a tytpical deep monitoring well installation for the site.

Water Level Measurements

Groundwater levels were measured using an electric water level indicator and an engineering tape divided into increments of 0.01 foot. The wells were checked for the presence of free product by visual observation of a groundwater sample taken from each well using an extruded Teflon™ bailer. Water level elevations were calculated by subtracting the measured depth to groundwater from the elevation at the top of the well casing.

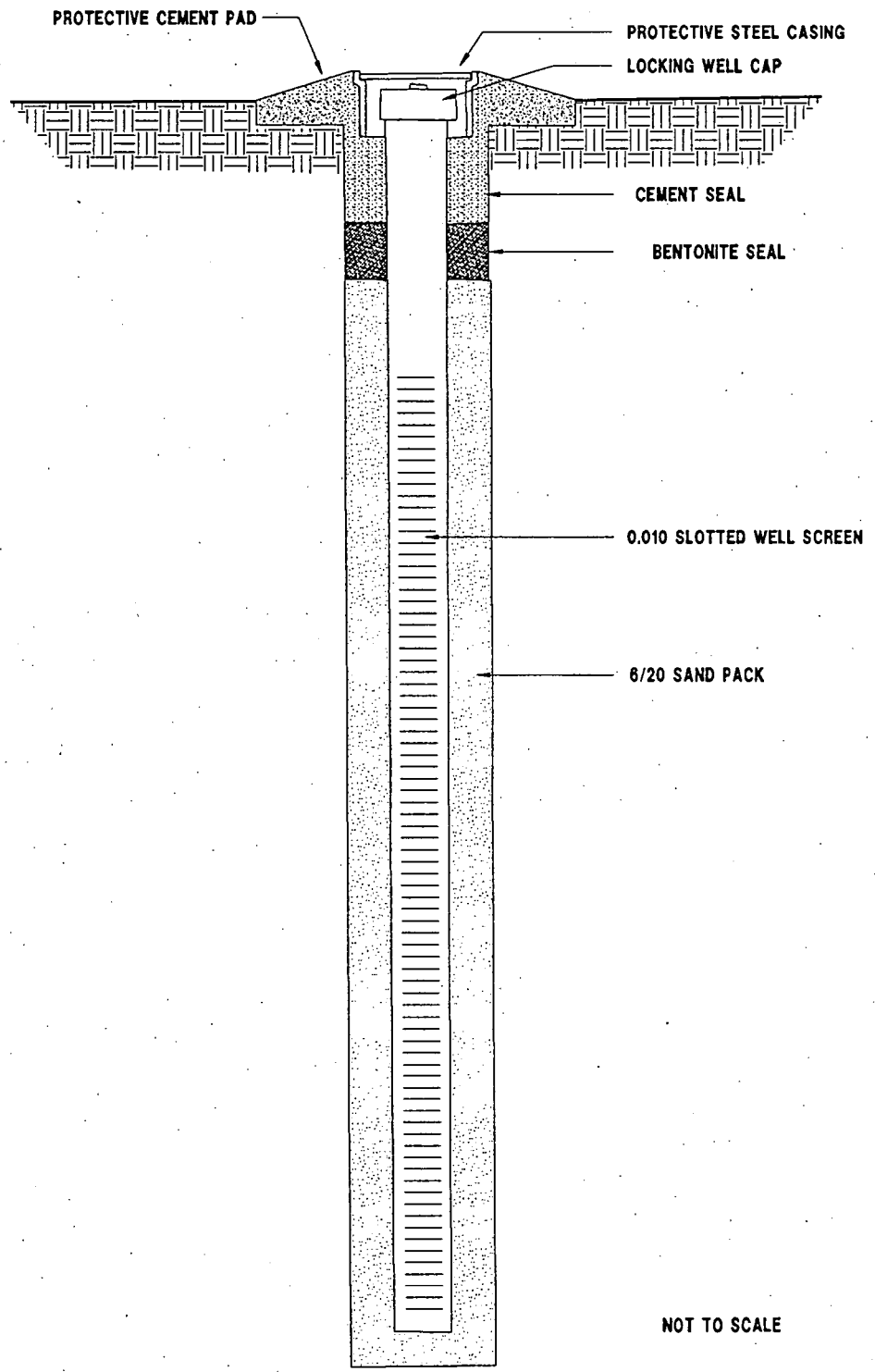


FIGURE D-1
TYPICAL SHALLOW MONITORING WELL INSTALLATION DETAIL

CONTAMINATION ASSESSMENT REPORT
FACILITY 327

COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

PANWELL/KGP/07/21/93

Groundwater Sampling

Groundwater samples were collected in accordance with ABB Environmental Services, Inc. (ABB-ES), FDEP-approved Comprehensive Quality Assurance Plan (CompQAP). The monitoring wells were purged with a Teflon™ bailer. Purging continued until a minimum of three well volumes had been removed from the well. Groundwater samples were collected using an extruded Teflon™ bailer. The samples were placed into appropriate containers, properly preserved, and placed on ice. Conductivity, pH, and temperature were measured at the time of sampling. Samples were then shipped to Wadsworth/ALERT Laboratories, Inc., in Tampa, Florida. All groundwater samples collected were analyzed for gasoline analytical group constituents as outlined in FDEP Chapter 17-770, FAC.

Slug Test Procedures

The slug test developed by Bouwer and Rice (1976) measures the saturated hydraulic conductivity (K) using a single well. The test method used is termed a "rising head" test and is performed by quickly withdrawing a volume of water (slug) from the well and measuring the subsequent rate of the rising water level in the well. Bouwer (1989) recommends the rising head slug test for wells with screened intervals that are only partially submerged or partially penetrate unconfined aquifers.

The slug was constructed of 1-inch outside diameter PVC pipe, 5 feet in length, filled with sand, and capped watertight at both ends. The water level changes in the monitoring wells were recorded using a data logger and pressure transducer. The pressure transducer was suspended less than 1 foot above the bottom of the well and an initial water level was recorded prior to beginning the test. The slug was then lowered into the well to a depth below the original water table. Water levels were then observed until they stabilized at the original level. The slug was removed from the well and the rate of the rising water level in the well was measured as the well recovered. Generally, recovery occurred within 1 to 2 minutes. Three rising head tests were conducted for each well in order to obtain an average recovery response.

APPENDIX E

AQUIFER PARAMETER CALCULATIONS

Aquifer Parameter Calculations

Hydraulic gradient

Water table elevations were plotted on a map of the site. A water table contour map was drawn with flow lines (depicting groundwater flow direction) perpendicular to the groundwater elevation contours. The average groundwater hydraulic gradient was calculated by subtracting the differences in groundwater elevation (in feet) between two points on the map and dividing the elevation difference by the distance between the two points to obtain a resulting gradient in feet per foot. Water elevation data collected on February 24, and March 8, 1993, were used to calculate hydraulic gradients at the site. For each date, three traverses were made perpendicular to equipotential contour lines to calculate an average site hydraulic gradient. For each traverse, the hydraulic gradient was calculated as follows:

$$i = (h_1 - h_2) / d$$

where

i = hydraulic gradient (feet per foot [ft/ft]),
h_1 = water table elevation, upgradient (feet),
h_2 = water table elevation, downgradient (feet), and
d = horizontal distance (feet) between h_1 and h_2 along a flow line.

Hydraulic gradients calculated in this manner varied from 1.05×10^{-2} ft/ft to 1.57×10^{-2} ft/ft. The average hydraulic gradient at the site was calculated to be 1.32×10^{-2} ft/ft.

Hydraulic conductivity

Hydraulic conductivity from slug test data was calculated following the methods of Bouwer and Rice (1976) and Bouwer (1989) for partially penetrating wells screened in unconfined aquifers. The following well information was needed to assess the hydraulic conductivity:

- radius of well casing (r_c),
- r_w = radius of borehole (r_c plus radius of the sand pack surrounding the well screen),
- length of screened interval below the water table (L_e),
- effective well radius (r_e),
- depth of well below the water table (L_w),
- depth to confining unit or bottom of aquifer below the static water table (H), and
- plot of time versus the logarithm of y, where y is the difference between the static water level outside the well and the water level inside the well.

Figure E-1 is a well diagram depicting most of the aquifer and well parameters. Calculations were made assuming that $L_w < H$. Hydraulic conductivity, K, was calculated as follows:

$$K = [R_c^2 \ln(\frac{r_e}{r_w}) - 2L_e] \ [\frac{1}{t} \ln(\frac{y_o}{y_t})] \qquad (1)$$

where

y_0 = y at time zero, and
y_t = y at time t.

The effective well radius, r_e, and the term $[(1/t)\ln(y_0/y_t)]$ were derived by using the computer program AQTESOLV™ (Geraghty & Miller, Inc., 1989). This computer program follows procedures and assumptions outlined by Bouwer (1989).

Slug test graphs are attached at the end of this appendix. Values of y were calculated for a particular time, t, and plotted on the graph. The computer program selects a "best-fit" line through the data points by linear regression along a "straight-line" portion of the graph. The slope of the "best-fit" line is used to calculate the hydraulic conductivity, K.

Three slug tests each were performed inside wells CSS-327-7 and CSS-327-5. Two slug tests were performed inside well CSS-327-2. Hydraulic conductivity, K, is reported in feet per minute (ft/min) on the slug test graphs, and was recalculated to feet per day (ft/day). K was found to vary from 9.4 ft/day to 16.7 ft/day with an average K of 10.8 ft/day.

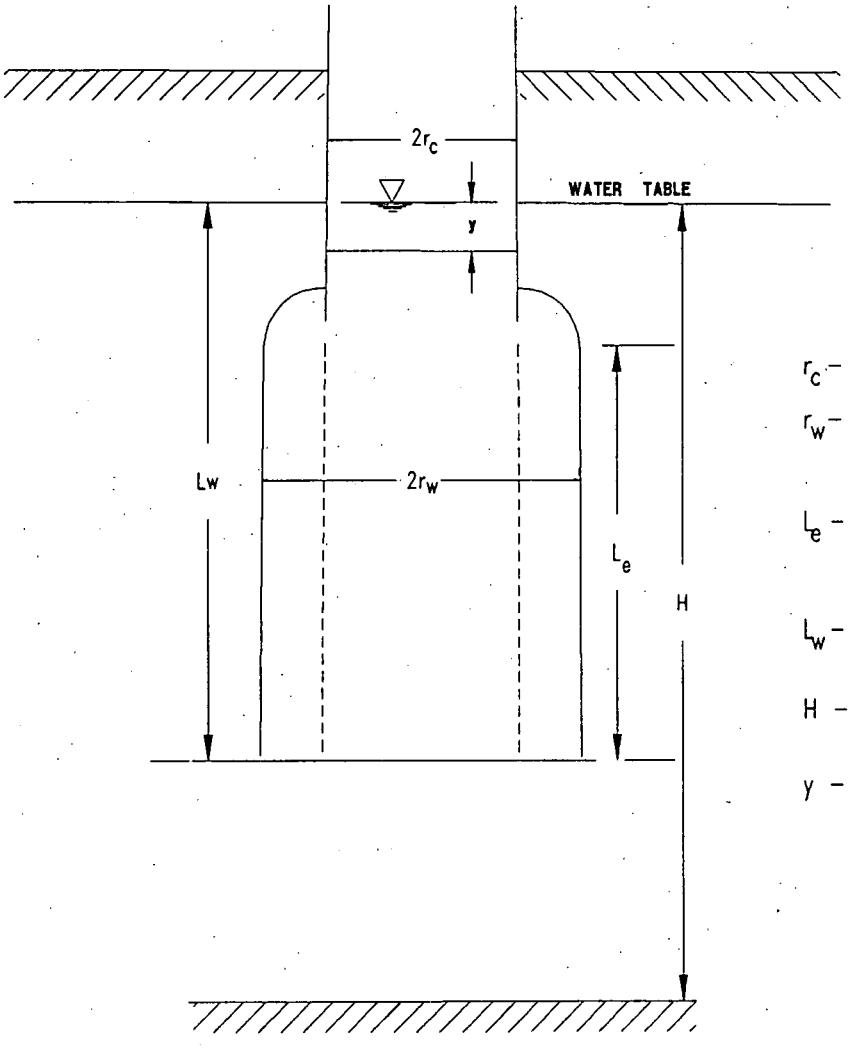
Average pore water velocity

Estimates of average pore water velocity were obtained using the following formula:

$$V = (K*I)/n$$

where

V = seepage velocity in ft/day,
K = hydraulic conductivity in ft/day,
i = hydraulic gradient, and
n = estimated porosity.



r_c – Radius of well

r_w – Radius of well + total thickness of the sand/gravel pack

L_e – Length of screened interval below the water table

L_w – Depth of well below water table

H – Depth to confining unit below the water table

y – Difference between static water level outside well and water level inside well

FIGURE E-1
DEFINITIONS OF SLUG TEST PARAMETERS (From Bouwer, 1989)

CONTAMINATION ASSESSMENT REPORT
FACILITY 327

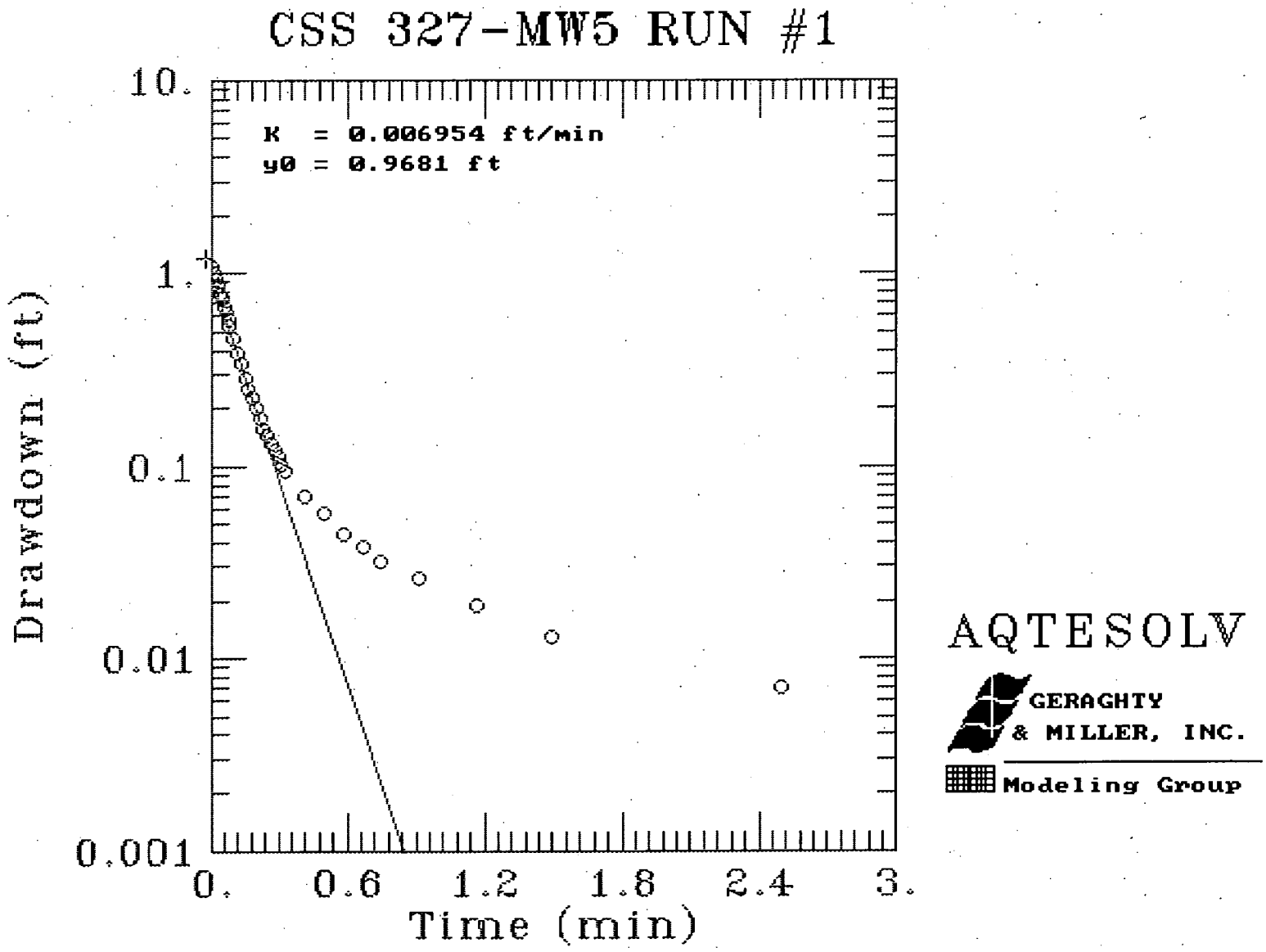
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

panwell/kgp/07/21/93

Assuming an estimated porosity of 25 percent, an average hydraulic gradient of 1.30×10^{-2} ft/ft, and an average hydraulic conductivity of 10.8 ft/day, the average pore water velocity is calculated as follows:

$$V = (10.8 * .013) / 0.25$$
$$V = 0.56 \text{ ft/day}$$

SLUG TEST PLOTS


CSS 327-MW5 RUN #1
K = 0.006954 ft/min
y0 = 0.9681 ft
Drawdown (ft)
10.
1.
0.1
0.01
0.001
0.
0.6
1.2
1.8
2.4
3.
Time (min)
AQTESOLV
GERAGHTY
& MILLER, INC.
Modeling Group

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

A Q T E S O L V R E S U L T S

Version 1.10

03/12/93 09:15:53

==

TEST DESCRIPTION

Data set........... a:327mw5r1.set
Data set title..... CSS 327-MW5 RUN #1

Knowns and Constants:

- No. of data points.................. 34
- Radius of well casing............... 0.083
- Radius of well...................... 0.33
- Aquifer saturated thickness......... 8.89
- Well screen length.................. 10
- Static height of water in well...... 8.89
- Log(Re/Rw).......................... 2.505
- A, B, C............................. 0.000, 0.000, 1.979

==

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

==

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

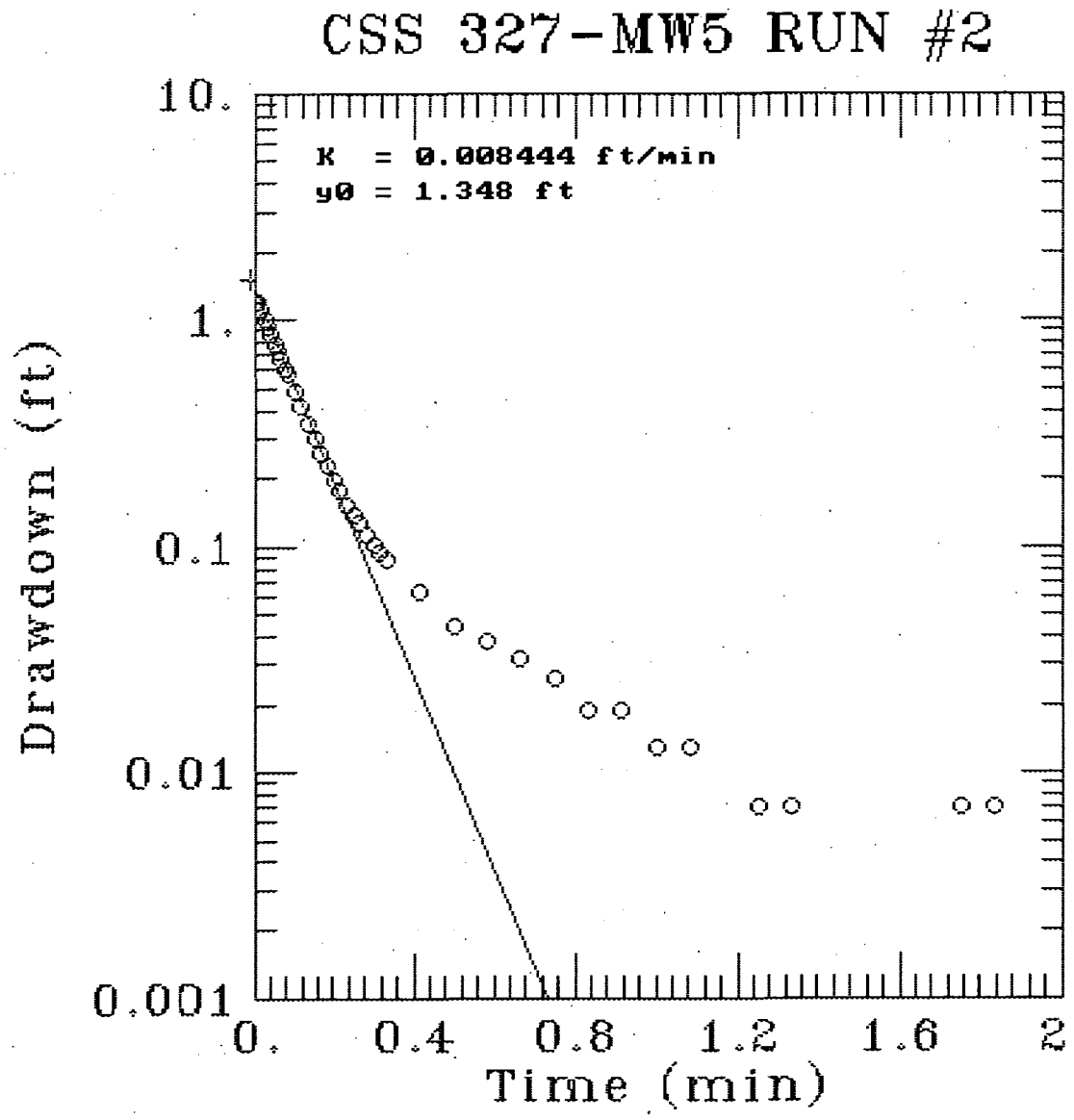
	Estimate
K =	1.9918E-003
y0 =	3.3161E-309

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

TYPE CURVE DATA

K = 6.95372E-003
y0 = 9.68138E-001

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	9.681E-001	3.000E+000	3.048E-011		



AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

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A Q T E S O L V R E S U L T S
Version 1.10

03/12/93 09:23:49

TEST DESCRIPTION

Data set........... a:327mw5r2.set
Data set title..... CSS 327-MW5 RUN #2

Knowns and Constants:

No. of data points..................	38
Radius of well casing...............	0.083
Radius of well......................	0.33
Aquifer saturated thickness.........	8.89
Well screen length..................	10
Static height of water in well......	8.89
Log(Re/Rw)..........................	2.505
A, B, C.............................	0.000, 0.000, 1.979

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

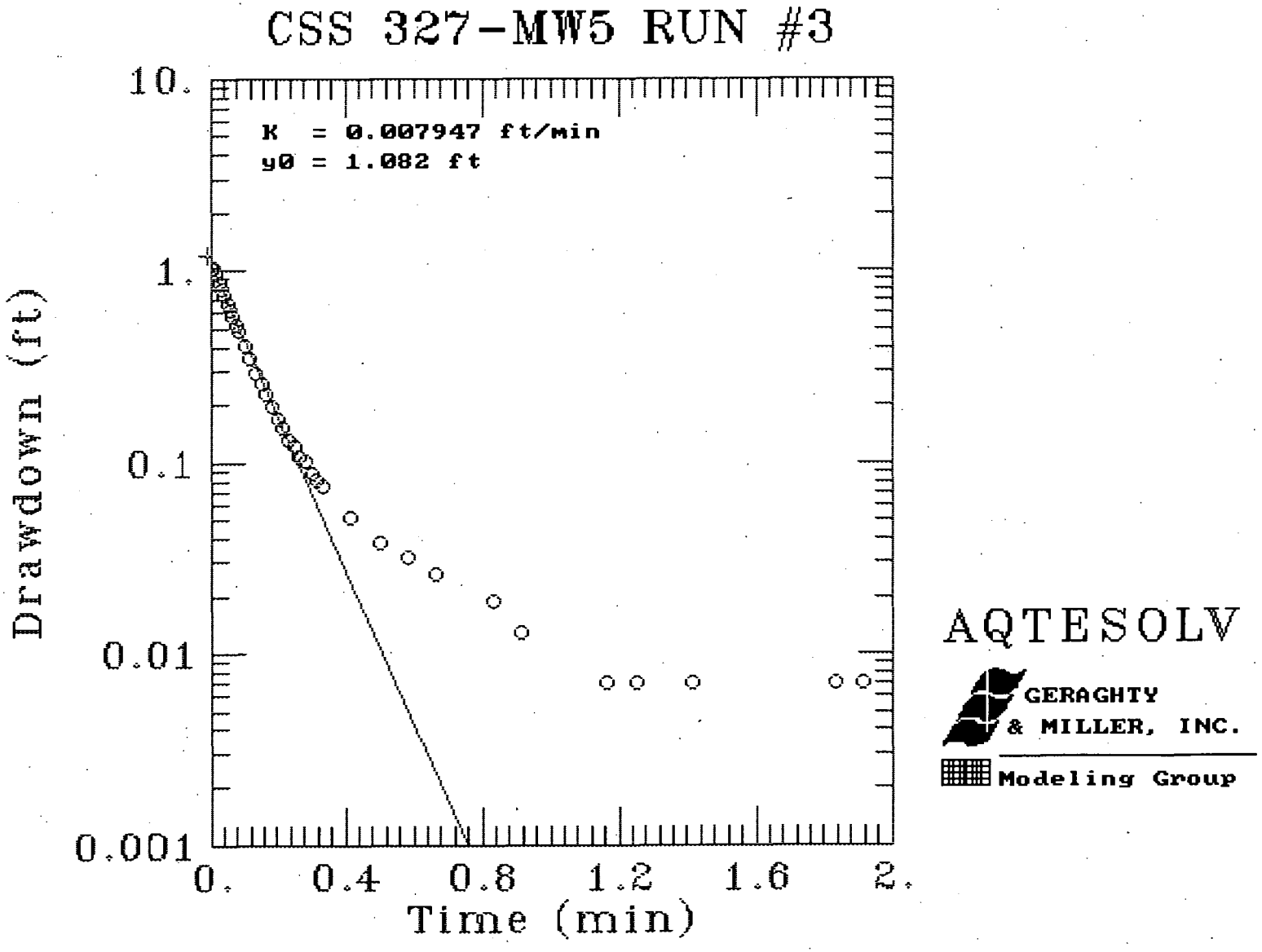
	Estimate
K =	2.6986E-003
y0 =	3.3161E-309

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

TYPE CURVE DATA

K = 8.44381E-003
y0 = 1.34799E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.348E+000	2.000E+000	4.248E-009		


CSS 327-MW5 RUN #3
K = 0.007947 ft/min
y0 = 1.082 ft
Drawdown (ft)
10.
1.
0.1
0.01
0.001
0.
0.4
0.8
1.2
1.6
2.
Time (min)
AQTESOLV
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A Q T E S O L V   R E S U L T S

Version 1.10

03/12/93 09:28:50

TEST DESCRIPTION

Data set........... a:327mw5r3.set
Data set title..... CSS 327-MW5 RUN #3

Knowns and Constants:

No. of data points..................	36
Radius of well casing...............	0.083
Radius of well......................	0.33
Aquifer saturated thickness.........	8.89
Well screen length..................	10
Static height of water in well......	8.89
Log(Re/Rw)..........................	2.505
A, B, C.............................	0.000, 0.000, 1.979

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

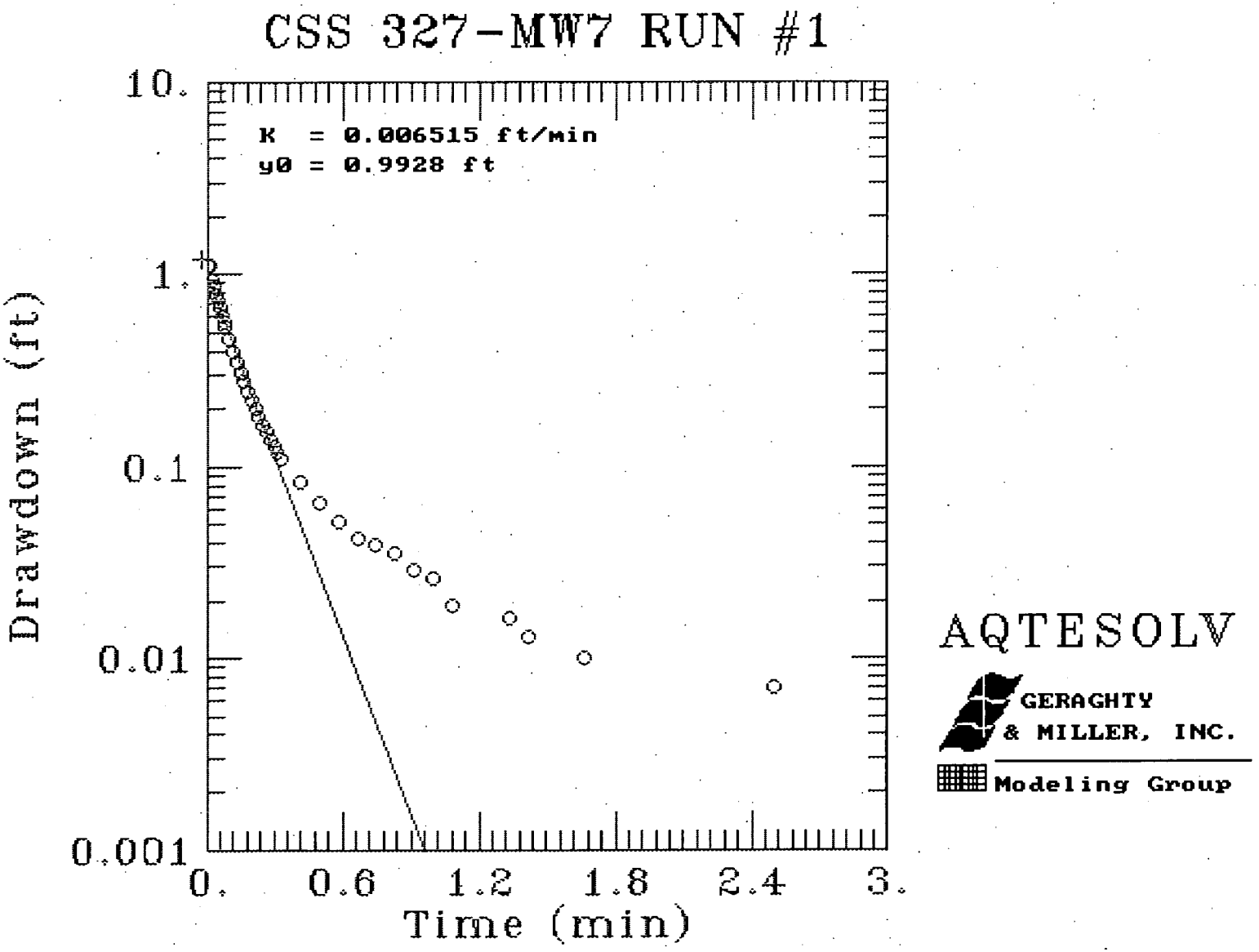
	Estimate
K =	2.4911E-003
y0 =	3.3161E-309

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

TYPE CURVE DATA

K = 7.94711E-003
y0 = 1.08237E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.082E+000	2.000E+000	1.079E-008		


CSS 327-MW7 RUN #1
K = 0.006515 ft/min
y0 = 0.9928 ft
10.
1.
0.1
0.01
0.001
Drawdown (ft)
0.
0.6
1.2
1.8
2.4
3.
Time (min)
AQTESOLV
GERAGHTY
& MILLER, INC.
Modeling Group

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A Q T E S O L V   R E S U L T S
Version 1.10

03/12/93 08:45:54

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TEST DESCRIPTION

Data set........... a:327mw7r1.set
Data set title..... CSS 327-MW7 RUN #1

Knowns and Constants:
- No. of data points.................. 37
- Radius of well casing............... 0.083
- Radius of well...................... 0.33
- Aquifer saturated thickness......... 11.02
- Well screen length.................. 10
- Static height of water in well...... 11.02
- Log(Re/Rw).......................... 2.64
- A, B, C............................. 0.000, 0.000, 1.979

==

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

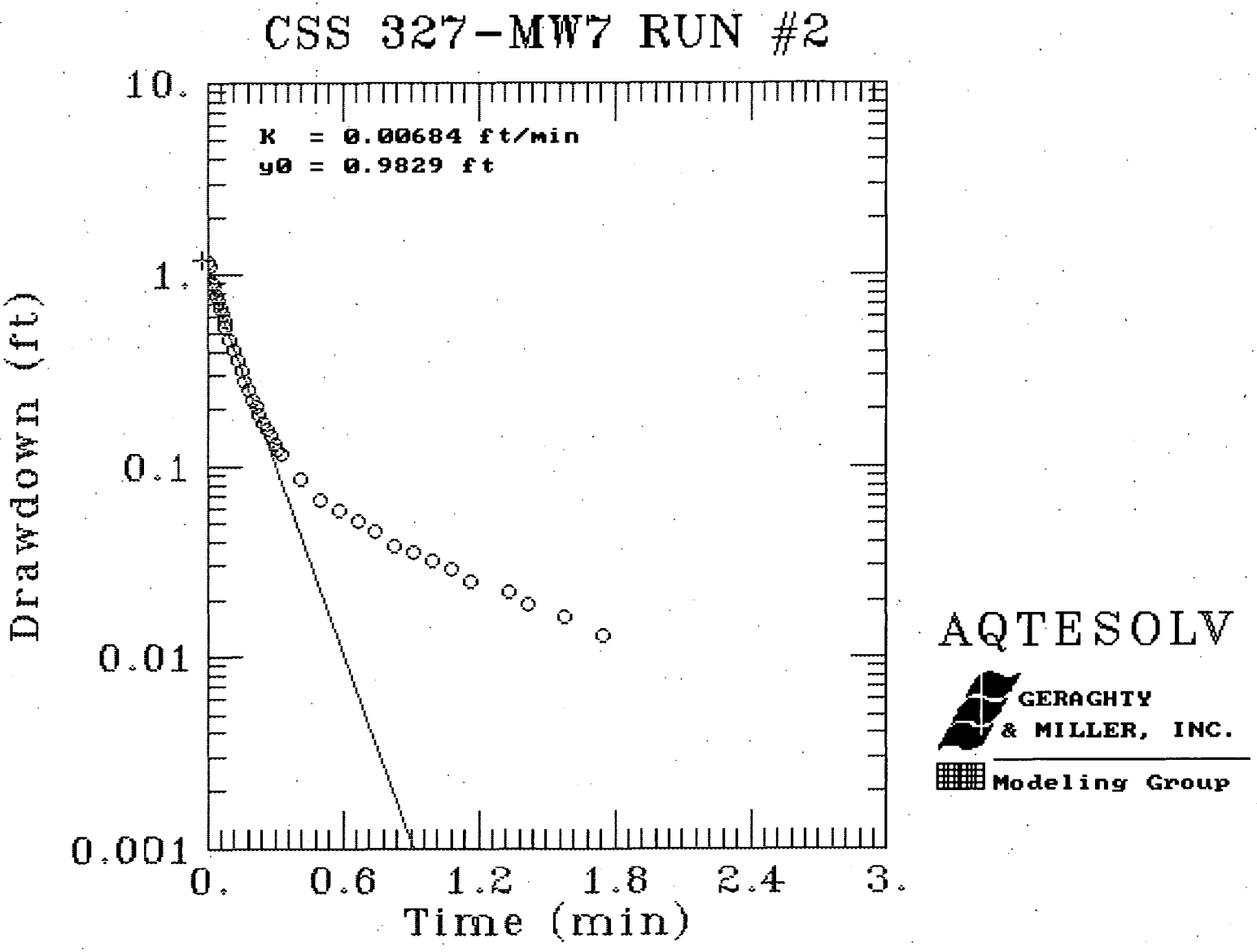
	Estimate
K =	2.1336E-003
y0 =	3.9678E-164

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

TYPE CURVE DATA

K = 6.51470E-003
y0 = 9.92830E-001

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	9.928E-001	3.000E+000	4.591E-010		


CSS 327-MW7 RUN #2
K = 0.00684 ft/min
y0 = 0.9829 ft
10.
1.
0.1
0.01
0.001
Drawdown (ft)
0.
0.6
1.2
1.8
2.4
3.
Time (min)
AQTESOLV
GERAGHTY
& MILLER, INC.
Modeling Group

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                                  Version 1.10

03/12/93                                                                09:01:50

================================================================================
                                TEST DESCRIPTION

Data set........... a:327mw7r2.set
Data set title..... CSS 327-MW7 RUN #2

Knowns and Constants:
   No. of data points.................. 39
   Radius of well casing............... 0.083
   Radius of well...................... 0.33
   Aquifer saturated thickness......... 11.02
   Well screen length.................. 10
   Static height of water in well...... 11.02
   Log(Re/Rw).......................... 2.64
   A, B, C.............................  0.000,  0.000,  1.979

================================================================================
                               ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

================================================================================
                        RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

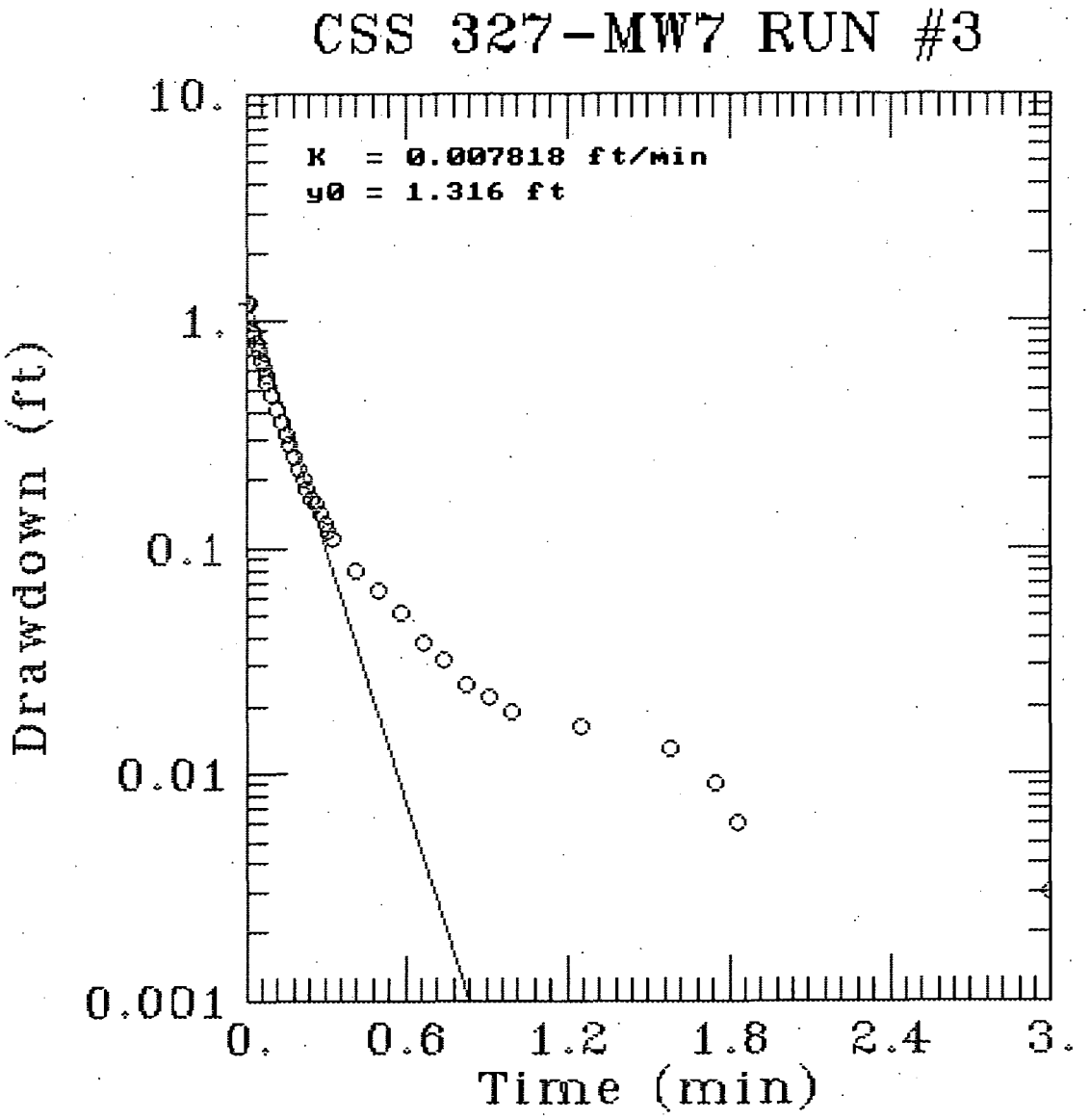
             Estimate
   K  =    2.3252E-003
   y0 =    3.9678E-164

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

TYPE CURVE DATA

     K  = 6.84044E-003
     y0 = 9.82879E-001
```

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	9.829E-001	3.000E+000	1.551E-010		



AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

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Version 1.10

03/12/93 08:11:44

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TEST DESCRIPTION

Data set........... a:327mw7r3.set
Data set title..... CSS 327-MW7 RUN #3

Knowns and Constants:
- No. of data points.................. 37
- Radius of well casing............... 0.083
- Radius of well...................... 0.33
- Aquifer saturated thickness......... 11.02
- Well screen length.................. 10
- Static height of water in well...... 11.02
- Log(Re/Rw).......................... 2.64
- A, B, C............................. 0.000, 0.000, 1.979

==

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

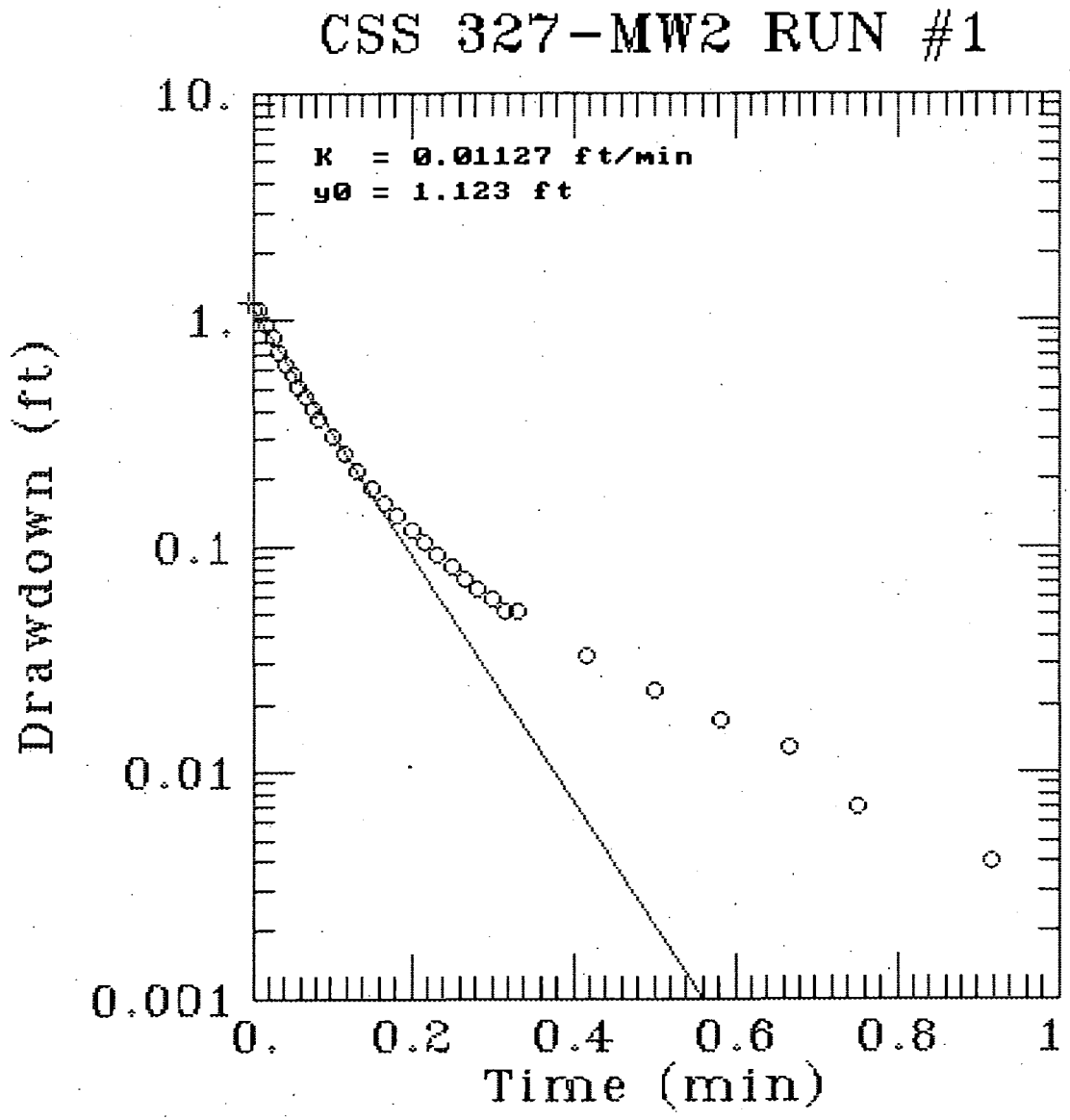
	Estimate
K =	2.0182E-003
y0 =	3.9678E-164

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

TYPE CURVE DATA

K = 7.81764E-003
y0 = 1.31636E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.316E+000	3.000E+000	8.267E-012		



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Version 1.10

03/12/93 10:21:22

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TEST DESCRIPTION

Data set........... a:327mw2r1.set
Data set title..... CSS 327-MW2 RUN #1

Knowns and Constants:
- No. of data points.................. 31
- Radius of well casing............... 0.083
- Radius of well...................... 0.33
- Aquifer saturated thickness......... 10.5
- Well screen length.................. 10
- Static height of water in well...... 10.5
- Log(Re/Rw).......................... 2.61
- A, B, C............................. 0.000, 0.000, 1.979

==

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

==

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

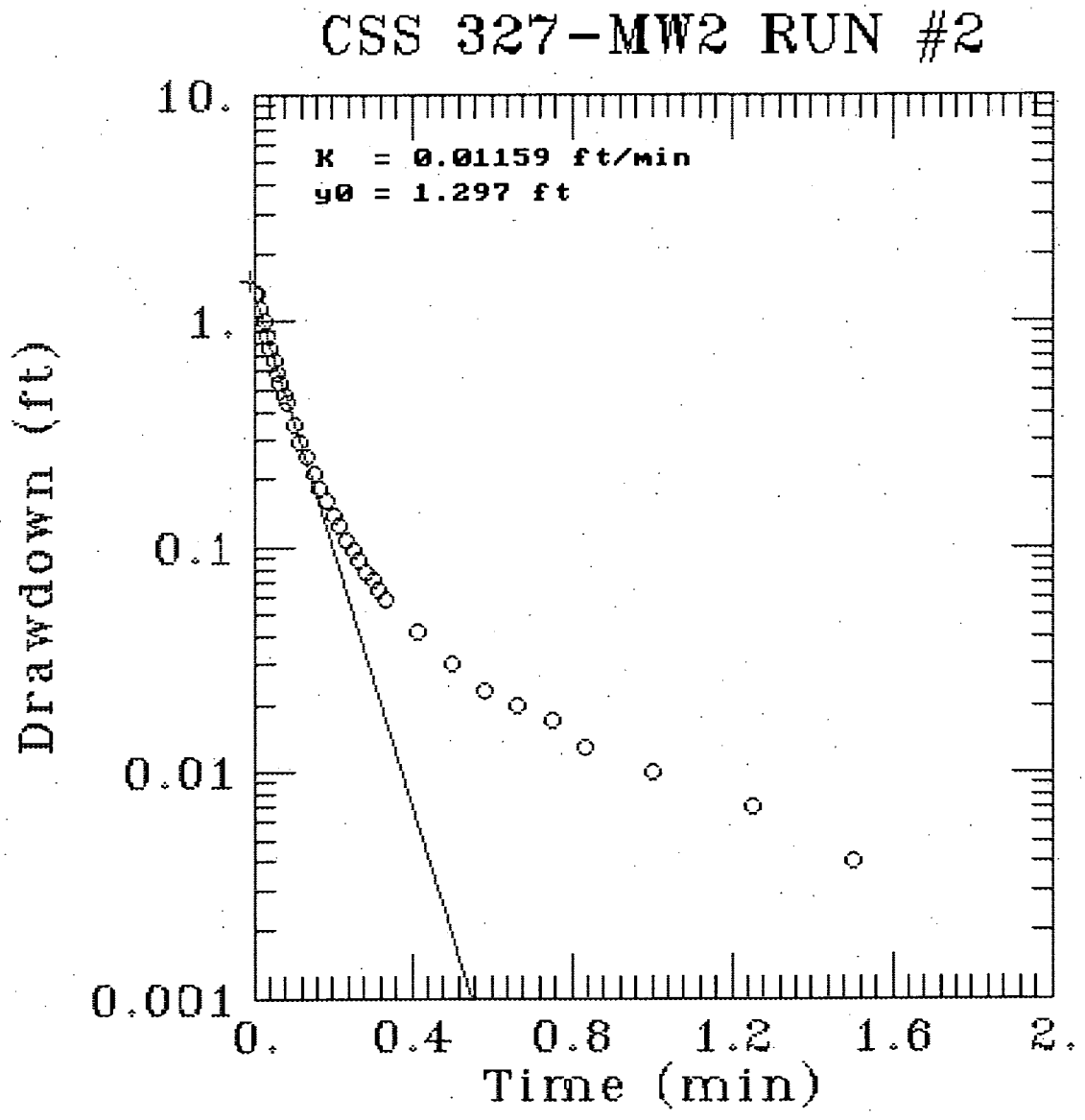
	Estimate
K =	5.6017E-003
y0 =	3.3161E-309

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

TYPE CURVE DATA

K = 1.12704E-002
y0 = 1.12292E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.123E+000	1.000E+000	4.026E-006		



AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

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A Q T E S O L V   R E S U L T S
Version 1.10

03/12/93 10:26:15

===

TEST DESCRIPTION

Data set........... a:327mw2r2.set
Data set title..... CSS 327-MW2 RUN #2

Knowns and Constants:
No. of data points.................. 34
Radius of well casing............... 0.083
Radius of well...................... 0.33
Aquifer saturated thickness......... 10.5
Well screen length.................. 10
Static height of water in well...... 10.5
Log(Re/Rw).......................... 2.61
A, B, C............................. 0.000, 0.000, 1.979

===

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

===

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	3.5811E-003
y0 =	3.3161E-309

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

TYPE CURVE DATA

K = 1.15924E-002
y0 = 1.29662E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.297E+000	2.000E+000	8.143E-012		

APPENDIX E

LABORATORY ANALYTICAL DATA

GROUNDWATER SAMPLE ANALYSES

March 9, 1993

APPENDIX F

LABORATORY ANALYTICAL DATA

GROUNDWATER SAMPLE ANALYSES

March 9, 1993

WADSWORTH/ALERT Laboratories
Division of Enseco Incorporated

5910 Breckenridge Parkway, Suite H
Tampa, FL 33610

813-621-0784
FAX 813-623-6021

ANALYTICAL REPORT

PROJECT NUMBER CTO-69

PURCHASE ORDER NUMBER 1081-3430

FACILITY 327 PANAMA CITY

10 MARCH 1993

Presented to:

SELORA JACKSON

ABB ENVIRONMENTAL SERVICES, INC.

ENSECO-WADSWORTH/ALERT LABORATORIES

Joanne Anderson
Project Manager

Randall C. Grubbs

Randall C. Grubbs
Laboratory Director - Florida

March 26, 1993

ENSECO-WADSWORTH/ALERT
Laboratories

INVOLVEMENT

This report summarizes the analytical results of the Facility 327 Panama City site submitted by ABB Environmental Services, Inc. to Enseco-Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Selora Jackson. The samples were accepted into Wadsworth's Florida facility on 10 March 1993, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the number of samples and sample matrices is also included. Any qualifications and/or non-compliant items have been noted below.

ENSECO-WADSWORTH/ALERT
Laboratories

ANALYTICAL METHODS

Wadsworth/ALERT Laboratories utilizes only USEPA approved analytical methods and instrumentation. The analytical methods utilized for the analysis of these samples are listed below.

PARAMETER	METHOD
ORGANICS	
Volatile Organics	** EPA Method 601/2
Ethylene Dibromide	** EPA Method 601 Mod.
METALS	
Lead	** EPA Method 239.2

NOTE:	** Indicates usage of this method to obtain results for this report.
(D)	Indicates draft version of this method was used
EPA Methods	Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4-79-020, March, 1983. July, 1982 Drinking Waters USEPA, 600/4-88/039, December, 1988.
Std. Methods	Standard Methods for the Examination of Water and Waste-water, APHA, 16th edition, 1985.
USEPA Methods	From 40CFR Part 136, published in Federal Register on October 26, 1984.
SW846 Methods	Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd Edition, USEPA, 1986.
ASTM Methods	American Society for Testing and Materials.
NIOSH Method	NIOSH Manual of Analytical Methods, National Institute for Occupational Safety and Health, 2nd Edition, April 1977.

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-1
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-1 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	58	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-1
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-1 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	4	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	1	1
Methyl-tert-butylether	29	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	105
Toluene-d8	(92-107)	(89-124)	98
Bromofluorobenzene	(86-115)	(84-124)	109

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-1
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/11/93

SAMPLE ID: CSS-327-1 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	82

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 3/10/93
LAB #: 3C1006-1
MATRIX : WATER

SAMPLE ID : CSS-327-1 CTO-69

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	3/18/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-2
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-2 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-2
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-2 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	4	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	17	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	104
Toluene-d8	(92-107)	(89-124)	99
Bromofluorobenzene	(86-115)	(84-124)	108

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-2
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/11/93

SAMPLE ID: CSS-327-2 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	102

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 3/10/93
LAB #: 3C1006-2
MATRIX : WATER

SAMPLE ID : CSS-327-2 CTO-69

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	3/18/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-3
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-3 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-3
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-3 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	ND	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	ND	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	102
Toluene-d8	(92-107)	(89-124)	99
Bromofluorobenzene	(86-115)	(84-124)	108

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-3
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/11/93

SAMPLE ID: CSS-327-3 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	109

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 3/10/93
LAB #: 3C1006-3
MATRIX : WATER

SAMPLE ID : CSS-327-3 CTO-69

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	3/18/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-4
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-4 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-4
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-4 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	ND	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	6	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	103
Toluene-d8	(92-107)	(89-124)	98
Bromofluorobenzene	(86-115)	(84-124)	109

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-4
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/11/93

SAMPLE ID: CSS-327-4 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	97

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 3/10/93
LAB #: 3C1006-4
MATRIX : WATER

SAMPLE ID : CSS-327-4 CTO-69

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	3/18/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-5
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-5 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	6	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-5
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-5 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	2	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	1	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	105
Toluene-d8	(92-107)	(89-124)	98
Bromofluorobenzene	(86-115)	(84-124)	109

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-5
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/11/93

SAMPLE ID: CSS-327-5 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	124

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 3/10/93
LAB #: 3C1006-5
MATRIX : WATER

SAMPLE ID : CSS-327-5 CTO-69

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	3/18/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-6
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-6 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-6
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-6 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	ND	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	ND	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	103
Toluene-d8	(92-107)	(89-124)	98
Bromofluorobenzene	(86-115)	(84-124)	108

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-6
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/11/93

SAMPLE ID: CSS-327-6 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	107

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 3/10/93
LAB #: 3C1006-6
MATRIX : WATER

SAMPLE ID : CSS-327-6 CTO-69

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	3/18/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-7
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-7 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-7
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-7 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	ND	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	ND	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	104
Toluene-d8	(92-107)	(89-124)	97
Bromofluorobenzene	(86-115)	(84-124)	110

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-7
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/93

SAMPLE ID: CSS-327-7 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	100

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 3/10/93
LAB #: 3C1006-7
MATRIX : WATER

SAMPLE ID : CSS-327-7 CTO-69

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	3/18/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-8
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-8 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-8
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: CSS-327-8 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	ND	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	ND	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	104
Toluene-d8	(92-107)	(89-124)	98
Bromofluorobenzene	(86-115)	(84-124)	108

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-8
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/93

SAMPLE ID: CSS-327-8 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	110

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 3/10/93
LAB #: 3C1006-8
MATRIX : WATER

SAMPLE ID : CSS-327-8 CTO-69

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	3/18/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-9
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/19/93

SAMPLE ID: CSS-327-9D CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-9
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/19/93

SAMPLE ID: CSS-327-9D CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	ND	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	ND	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	106
Toluene-d8	(92-107)	(89-124)	99
Bromofluorobenzene	(86-115)	(84-124)	111

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-9
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/93

SAMPLE ID: CSS-327-9D CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	128

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 3/10/93
LAB #: 3C1006-9
MATRIX : WATER

SAMPLE ID : CSS-327-9D CTO-69

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	3/18/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-10
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/19/93

SAMPLE ID: CSS-327-DUP 1 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-10
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/19/93

SAMPLE ID: CSS-327-DUP 1 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	6	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	23	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	105
Toluene-d8	(92-107)	(89-124)	98
Bromofluorobenzene	(86-115)	(84-124)	109

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-10
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/17/93

SAMPLE ID: CSS-327-DUP 1 CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	100

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 3/10/93
LAB #: 3C1006-10
MATRIX : WATER

SAMPLE ID : CSS-327-DUP 1 CTO-69

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	3/18/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-11
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/19/93

SAMPLE ID: CSS-327-EQUIPMENT BLANK CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-11
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/19/93

SAMPLE ID: CSS-327-EQUIPMENT BLANK CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	ND	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	ND	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	106
Toluene-d8	(92-107)	(89-124)	98
Bromofluorobenzene	(86-115)	(84-124)	112

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-11
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/93

SAMPLE ID: CSS-327-EQUIPMENT BLANK CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	94

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 3/10/93
LAB #: 3C1006-11
MATRIX : WATER

SAMPLE ID : CSS-327-EQUIPMENT BLANK CTO-69

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	3/18/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-12
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/19/93

SAMPLE ID: CSS-327-FIELD BLANK CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-12
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/19/93

SAMPLE ID: CSS-327-FIELD BLANK CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	ND	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	ND	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	104
Toluene-d8	(92-107)	(89-124)	98
Bromofluorobenzene	(86-115)	(84-124)	111

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-12
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/93

SAMPLE ID: CSS-327-FIELD BLANK CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	98

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 3/10/93
LAB #: 3C1006-12
MATRIX : WATER

SAMPLE ID : CSS-327-FIELD BLANK CTO-69

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	3/18/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-13
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/19/93

SAMPLE ID: TRIP BLANK CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-13
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/19/93

SAMPLE ID: TRIP BLANK CTO-69

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	ND	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	ND	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	100
Toluene-d8	(92-107)	(89-124)	98
Bromofluorobenzene	(86-115)	(84-124)	101

ENSECO-WADSWORTH/ALERT
Laboratories

QUALITY CONTROL SECTION

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation

ENSECO-WADSWORTH/ALERT
Laboratories

QUALITY ASSURANCE / QUALITY CONTROL PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

Volatiles	Semi-volatiles	Metals
Methylene chloride	Dimethyl phthalate	Calcium
Toluene	Diethly phthalate	Magnesium
2-Butanone	Di-n-butyl phthalate	Sodium
Acetone	Butyl benzyl phthalate	
	Bis (2-ethylhexyl) phthalate	

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.

QUALITY ASSURANCE / QUALITY CONTROL
PROGRAM SUMMARY
(cont'd)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

**********EXAMPLE**********

COMPOUND	SAMPLE CONC.	MS %REC	MSD %REC	RPD	QC LIMITS RPD	QC LIMITS RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150
(cmpd. name)	sample result	1st% recov.	2nd% recov.	Rel.% diff.	accep. method perform range	

Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where the surrogate or spike concentrations fell below a quantifiable amount and could not be reported.

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-BK
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-BK
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/18/93

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	ND	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	ND	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	103
Toluene-d8	(92-107)	(89-124)	102
Bromofluorobenzene	(86-115)	(84-124)	108

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-BK
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/19/93

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Benzene	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
Chloroethylvinyl ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
1,2-Dichloroethene(total)	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit: estimated value)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-BK
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/19/93

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT - 2

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
trans-1,3-Dichloropropene	ND	1
Ethylbenzene	ND	1
Methylene chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
Toluene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl chloride	ND	1
Xylenes	ND	1
Methyl-tert-butylether	ND	1

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
1,2-Dichloroethane-d4	(75-123)	(85-126)	102
Toluene-d8	(92-107)	(89-124)	100
Bromofluorobenzene	(86-115)	(84-124)	101

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-BK
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/93

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	92

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-BK
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/11/93

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	91

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C1006-BK
MATRIX: WATER

DATE RECEIVED: 3/10/93
DATE EXTRACTED: NA
DATE ANALYZED: 3/17/93

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	95

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 3/10/93
LAB #: 3C1006-BK
MATRIX : WATER

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	3/18/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 624
RUN ID : CW158

DATE EXTRACTED: N/A
DATE ANALYZED : 03/18/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
1,1-Dichloroethene	CW158	100	40	56-133
Trichloroethene		88	17	77-111
Chlorobenzene		91	21	78-122
Toluene		95	30	64-128
Benzene		104	21	83-123
Dichlorobromomethane		88	25	71-123

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 624
RUN ID : CW177

DATE EXTRACTED: NA
DATE ANALYZED : 03/19/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
1,1-Dichloroethene	CW177	101	40	56-133
Trichloroethene		91	17	77-111
Chlorobenzene		97	21	78-122
Toluene		96	30	64-128
Benzene		98	21	83-123
Dichlorobromomethane		95	25	71-123

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 601 MOD.
RUN ID : EDB0521

DATE EXTRACTED: NA
DATE ANALYZED : 03/12/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
Ethylene Dibromide	EDB0521	106	25	81-135

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 601 MOD.
RUN ID : EDB0517

DATE EXTRACTED: NA
DATE ANALYZED : 03/11/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
Ethylene Dibromide	EDB0517	91	25	81-135

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 601 MOD.
RUN ID : EDB0573

DATE EXTRACTED: NA
DATE ANALYZED : 03/17/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD	QC LIMITS %REC
Ethylene Dibromide	EDB0573	126	25	81-135

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS MATRIX : WATER

LABORATORY CONTROL SAMPLE RESULTS
METALS

ELEMENT	DATE PREPARED	DATE ANALYZED	LCS %REC	QC LIMITS RPD	QC LIMITS %REC	
Chromium	03/18/93	03/19/93	105	21	79-121	LCS
Copper	03/18/93	03/19/93	104	19	80-119	
Nickel	03/18/93	03/19/93	99	13	84-111	
Zinc	03/18/93	03/19/93	98	19	77-116	
Lead (furnace)	03/18/93	03/18/93	82	33	64-132	

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : 3C1006-6
MATRIX : WATER
METHOD : 624
RUN ID : CW180

DATE RECEIVED : 03/10/93
DATE PREPARED : NA
DATE ANALYZED : 03/19/93

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS %REC	MSD %REC	RPD	QC LIMITS RPD	QC LIMITS %REC
1,1-Dichloroethene	CW180	92	96	4	19	63-123
Trichloroethene		87	92	6	10	75-115
Chlorobenzene		85	90	6	13	74-113
Toluene		94	98	4	23	75-122
Benzene		98	102	4	16	76-126
Dichlorobromomethane		92	92	0	15	67-114

* = Diluted Out

ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : 3C1006-9 DATE RECEIVED : 03/10/93
MATRIX : WATER

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
INORGANIC PARAMETERS - METALS

ELEMENT	DATE PREPARED	DATE ANALYZED	MS %REC	MSD %REC	RPD	QC LIMITS RPD	QC LIMITS %REC	LAB ID
Lead (furnace)	03/18/93	03/18/93	74	76	3	24	76-124	3C1006-9

* = Diluted out

ENSECO-WADSWORTH/ALERT LABORATORIES
SAMPLE SHIPPER EVALUATION AND RECEIPT FORM

Client: ABB Project Name/Number: CTO-69

Samples Received By: [signature] - WAD Date Received: 3-10-93
(Signature)

Sample Evaluation Form By: [signature] - WAD LAB No: 6508 / 3C1006-1 to 16
(Signature)

Type of shipping container samples received in? WAL Cooler ✓

Client Cooler ____ WAL Shipper ____ Box ____ Other ____

Any "NO" responses or discrepancies should be explained in comments section.

		YES	NO
1.	Were custody seals on shipping container(s) intact?	✓	
2.	Were custody papers properly included with samples?	✓	
3.	Were custody papers properly filled out (ink, signed, match labels)?	✓	
4.	Did all bottles arrive in good condition (unbroken)?	✓	
5.	Were all bottle labels complete (Sample No., date, signed, analysis preservatives)?	✓	
6.	Were correct bottles used for the tests indicated?	✓	
7.	Were proper sample preservation techniques indicated?	✓	
8.	Were samples received within adequate holding time?	✓	
9.	Were all VOA bottles checked for the presence of air bubbles? (If air bubbles were found indicate in comment section)	✓	
10.	Were samples in direct contact with wet ice? (NOTE TEMPERATURE BELOW)	✓	
11.	Were samples accepted into the laboratory? (If no see comments)	✓	

Cooler # — Temp 4 °C Cooler # _____ Temp _____ °C

Cooler # _____ Temp _____ °C Cooler # _____ Temp _____ °C

Comments: _____

WADSWORTH/ALERT LABORATORIES
Sampling, testing, mobile labs

5910 Breckenridge Pkwy.
Suite H
Tampa, FL 33610

(813) 621-0784
Fax (813) 623-6021

Chain of Custody Record

Record 2 of 2

07620

Client: ABB

Project Name / Location: CTO-69 327

Sampler(s):

Project #: Facility ~~325~~, CSS Panama City

Item #	Date	Time	MATRIX	Sample Location	No. Of CONTAINERS	VOC-601/2	PAH-	METALS-Pb	TRPH-	EDB-					Remarks
1	3/9/93	1053	H20	CSS-327-EQUIP BLK	7	3		1		3					
2	3/9/93	1042		CSS-327-FIELD BLK	7	3		1		3					
~~3~~					~~7~~	~~3~~		~~1~~		~~3~~					
~~4~~					~~7~~	~~3~~		~~1~~		~~3~~					
~~5~~					~~7~~	~~3~~		~~1~~		~~3~~					
~~6~~					~~7~~	~~3~~		~~1~~		~~3~~					
~~7~~					~~7~~	~~3~~		~~1~~		~~3~~					
~~8~~					~~7~~	~~3~~		~~1~~		~~3~~					
~~9~~					~~7~~	~~3~~		~~1~~		~~3~~					
~~10~~					~~7~~	~~3~~		~~1~~		~~3~~					
11															

Total Containers: ~~70~~ 14

Number of Coolers in Shipment: 1

Bailers: 0

Report To:

Additional Comments:

Transfer Number	Item Number(s)	Relinquished By / Company	Accepted By / Company	Date	Time
1	1-10	Ensco/WAL [signature]	Fed Ex	2/18/93	1900
2	1-2	[signature]	Fed Ex	3/9/93	1600
3			[signature] / WAL	3/10/93	1715
4					
5					
6					

Original Accompanies Shipment

WADSWORTH/ALERT LABORATORIES
Sampling, testing, mobile labs
5910 Breckenridge Pkwy.
Suite H
Tampa, FL 33610
(813) 621-0784
Fax (813) 623-6021

Chain of Custody Record

Record 1 of 2

07621

Client: ABB

Project Name / Location: CTO-69

Sampler(s):

Project #: Facility 325, CSS Panama City

Item #	Date	Time	MATRIX	Sample Location	No. Of CONTAINERS	VOC-601/2	PAH-	METALS-Pb	TRPH-	EDB-						Remarks
1	3/9/93	827	H2O	CSS-327-1	7	3		1		3						
2	3/9/93	920		CSS-327-2	7	3		1		3						
3	3/9/93	1024		CSS-327-3	7	3		1		3						
4	3/9/93	835		CSS-327-4	7	3		1		3						SLIGHT ODOR
5	3/9/93	1040		CSS-327-5	7	3		1		3						
6	3/9/93	927		CSS-327-6	7	3		1		3						
7	3/9/93	956		CSS-327-7	7	3		1		3						
8	3/9/93	1112		CSS-327-8	7	3		1		3						
9	3/9/93	1005		CSS-327-9D	7	3		1		3						
10	3/9/93			CSS-327-DUP1	7	3		1		3						
~~11~~	~~3/9/93~~				~~7~~	~~3~~		~~1~~		~~3~~						

Total Containers: ~~77~~ 70

Number of Coolers in Shipment: 1

Bailers: Ø

Report To:

Additional Comments:

Transfer Number	Item Number(s)	Relinquished By / Company	Accepted By / Company	Date	Time
1	1-11	Earl A. Echan / Ensco/ABB	Fed Ex	3/8/93	1800
2	1-10	[signature]	Fed Ex	3/9/93	1600
3			[signature] AWAD	3/10/93	17:15
4					
5					
6					

Original Accompanies Shipment

WADSWORTH/ALERT LABORATORIES
Sampling, testing, mobile labs

5910 Breckenridge Pkwy.
Suite H
Tampa, FL 33610

(813) 621-0784
Fax (813) 623-6021

Chain of Custody Record

Record 3 of 3

07618

Client: ABB

Project Name / Location: CTO-69

Sampler(s):

Project #: Facility 325, CSS Panama City

Item #	Date	Time	MATRIX	Sample Location	No. Of CONTAINERS	VOC-601/2	PAH-	METALS-	TRPH-	EDB-						Remarks
1	3/9/93		H2O	Trip Blank	3	3										
~~2~~			~~H2O~~	~~Trip Blank~~	~~3~~	~~3~~										
3																
4																
5																
6																
7																
8																
9																
10																
11																

Total Containers: ~~6~~ 3

Number of Coolers in Shipment: 1

Bailers:

Report To:

Additional Comments:

Transfer Number	Item Number(s)	Relinquished By / Company	Accepted By / Company	Date	Time
1	1-2	[signature] Ensco/WWR	Fed Exp	2/18/93	1800
2	1	[signature]	Fed Ex	3/9/93	1600
3			[signature] / WAL	3/10/93	17^15
4					
5					
6					

Original Accompanies Shipment

GROUNDWATER SAMPLE ANALYSES

May 18, 1993

ENSECO-WADSWORTH/ALERT Laboratories
Division of Corning Lab Services, Inc.

5910 Breckenridge Parkway, Suite H
Tampa, FL 33610

813-621-0784
FAX 813-623-6021

ANALYTICAL REPORT

SUBCONTRACT NUMBER: SE1-08-134

TASK ORDER NUMBER: 40

CSS PANAMA CITY SITE 278 & SITE 327

Presented to:

CELORA JACKSON

ABB ENVIRONMENTAL SERVICES, INC.

ENSECO-WADSWORTH/ALERT LABORATORIES

5910 BRECKENRIDGE PARKWAY, SUITE H

TAMPA, FLORIDA 33610

(813) 621-0784

Joanne Anderson
Project Manager

Randall C. Grubbs
Laboratory Director - Florida

June 8, 1993

ENSECO-WADSWORTH/ALERT
Laboratories

INVOLVEMENT

This report summarizes the analytical results of the CSS Panama City Site 278 & Site 327 submitted by ABB Environmental Services, inc. to Enseco-Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Celora Jackson. The samples were accepted into Wadsworth's Florida facility on 20 May 1993, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the number of samples and sample matrices is also included. Any qualifications and/or non-compliant items have been noted below.

Laboratory ID #	Narrative
3E2009-5,6,7,16,17	In order to meet laboratory and method QC requirements, it was necessary to perform the original analysis of each of these water samples at a dilution due to a high level of matrix interference. The matrix interference appears to be associated with the presence of extractable hydrocarbons. These necessary dilutions resulted in elevated detection limits for these samples. Upon request, these samples were reanalyzed without diluting. Results were obtained at a lower detection limit of 5 ug/L, however the results should be considered tentative or qualitative due to the presence of extractable hydrocarbon interference. In addition, the undiluted analyses

Continued - Page 2

ENSECO-WADSWORTH/ALERT
Laboratories

Laboratory ID #	Narrative
	of samples -6, -7 and -16 did not meet laboratory and method QC requirements for internal standard response due to the interferences present in these samples.

ENSECO-WADSWORTH/ALERT
Laboratories

ANALYTICAL METHODS

sworth/ALERT Laboratories utilizes only USEPA approved analytical methods and trumentation. The analytical methods utilized for the analysis of these ples are listed below.

AMETER	METHOD
ORGANICS	
atile Organics	** EPA Method 601/2
ylene Dibromide	** EPA Method 601 Mod.
ynuclear Aromatic Hydrocarbons	** EPA Method 625
METALS	
d	** EPA Method 239.2
MISCELLANEOUS	
. Rec. Petroleum Hydrocarbons	** EPA Method 418.1

E:	** Indicates usage of this method to obtain results for this report.
	Indicates draft version of this method was used
Methods	Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4-79-020, March, 1983. July, 1982
	Drinking Waters USEPA, 600/4-88/039, December, 1988.
. Methods	Standard Methods for the Examination of Water and Waste-water, APHA, 16th edition, 1985.
PA Methods	From 40CFR Part 136, published in Federal Register on October 26, 1984.
46 Methods	Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd Edition, USEPA, 1986.
M Methods	American Society for Testing and Materials.
SH Method	NIOSH Manual of Analytical Methods, National Institute for Occupational Safety and Health, 2nd Edition, April 1977.

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY: ABB ENVIRONMENTAL SERVICES, INC.
3 # 3E2003-1
:RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/25/93

IPLE ID: CSS-327-MW-1

CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
VOLATILE ORGANICS HRS84297
METHOD 601/602 - GC

ızene	2	1,2-Dichloroethane	ND
›modichloromethane	ND	1,1-Dichloroethene	ND
›moform	ND	1,2-Dichloroethene (Total)	ND
›momethane	ND	1,2-Dichloropropane	ND
:bon tetrachloride	ND	cis-1,3-Dichloropropene	ND
.orobenzene	ND	trans-1,3-Dichloropropene	ND
.oroethane	ND	Ethylbenzene	ND
?hloroethylvinyl ether	ND	Methylene chloride	ND
.oroform	ND	1,1,2,2-Tetrachloroethane	ND
.oromethane	ND	Tetrachloroethene	ND
›romochloromethane	ND	Toluene	ND
?-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
;-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
;-Dichlorobenzene	ND	Trichloroethene	ND
:hlorodifluoromethane	ND	Trichlorofluoromethane	ND
.-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	7

ΓE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

RROGATE RECOVERY:	%	ACCEPTABLE LIMITS
›mochloromethane (HECD)	92	(78-122)
ıfluorotoluene (PID)	100	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
#: 3E2003-1
RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

PLE ID: CSS-327-MW-1 CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

RAMETER	RESULT (ug/L)	DETECTION LIMIT
hylene dibromide	ND	0.02

E: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

ROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
moform (ECD)	(41-152)	(41-152)	114

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 5/20/93
3 #: 3E2003-1
:RIX : WATER

IPLE ID : CSS-327-MW-1 CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

:al metals analysis results - as received

:EMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
:d	5/28/93	25	5	ug/L

:E: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
3E2003-2
RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/25/93

PLE ID: CSS-327-MW-2

CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
VOLATILE ORGANICS HRS84297
METHOD 601/602 - GC

zene	ND	1,2-Dichloroethane	ND
modichloromethane	ND	1,1-Dichloroethene	ND
moform	ND	1,2-Dichloroethene (Total)	ND
momethane	ND	1,2-Dichloropropane	ND
bon tetrachloride	ND	cis-1,3-Dichloropropene	ND
orobenzene	ND	trans-1,3-Dichloropropene	ND
oroethane	ND	Ethylbenzene	2
hloroethylvinyl ether	ND	Methylene chloride	ND
oroform	ND	1,1,2,2-Tetrachloroethane	ND
oromethane	ND	Tetrachloroethene	ND
romochloromethane	ND	Toluene	ND
-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
-Dichlorobenzene	ND	Trichloroethene	ND
hlorodifluoromethane	ND	Trichlorofluoromethane	ND
-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	5
		Methyl-tert-butylether	ND

E: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

ROGATE RECOVERY:	%	ACCEPTABLE LIMITS
omochloromethane (HECD)	91	(78-122)
fluorotoluene (PID)	99	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY: ABB ENVIRONMENTAL SERVICES, INC.
) #: 3E2003-2
'RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

IPLE ID: CSS-327-MW-2 CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

RAMETER	RESULT (ug/L)	DETECTION LIMIT
hylene dibromide	ND	0.02

TE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

RROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
omoform (ECD)	(41-152)	(41-152)	119

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 5/20/93
) #: 3E2003-2
'RIX : WATER

IPLE ID : CSS-327-MW-2 CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

:al metals analysis results - as received

EMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
:d	5/28/93	21	5	ug/L

TE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
3E2003-3
RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/25/93

PLE ID: CSS-327-MW-5

CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

zene	ND	1,2-Dichloroethane	ND
modichloromethane	ND	1,1-Dichloroethene	ND
moform	ND	1,2-Dichloroethene (Total)	ND
momethane	ND	1,2-Dichloropropane	ND
bon tetrachloride	ND	cis-1,3-Dichloropropene	ND
orobenzene	ND	trans-1,3-Dichloropropene	ND
oroethane	ND	Ethylbenzene	ND
hloroethylvinyl ether	ND	Methylene chloride	ND
oroform	ND	1,1,2,2-Tetrachloroethane	ND
oromethane	ND	Tetrachloroethene	ND
romochloromethane	ND	Toluene	ND
-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
-Dichlorobenzene	ND	Trichloroethene	ND
hlorodifluoromethane	ND	Trichlorofluoromethane	ND
-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

E: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

ROGATE RECOVERY:	%	ACCEPTABLE LIMITS
omochloromethane (HECD)	94	(78-122)
ifluorotoluene (PID)	98	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY: ABB ENVIRONMENTAL SERVICES, INC.
} #: 3E2003-3
'RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

IPLE ID: CSS-327-MW-5 CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

\RAMETER	RESULT (ug/L)	DETECTION LIMIT
:hylene dibromide	ND	0.02

ΓE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

RROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
ɔmoform (ECD)	(41-152)	(41-152)	113

ENSECO-WADSWORTH/ALERT
Laboratories

ıPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 5/20/93
ɜ #: 3E2003-3
:RIX : WATER

ıPLE ID : CSS-327-MW-5 CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

:al metals analysis results - as received

ıEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
ıd	5/28/93	8	5	ug/L

ΓE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
3E2003-4
RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

PLE ID: CSS-327-MW-9D

CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
VOLATILE ORGANICS HRS84297
METHOD 601/602 - GC

zene	ND	1,2-Dichloroethane	ND
modichloromethane	ND	1,1-Dichloroethene	ND
moform	ND	1,2-Dichloroethene (Total)	ND
momethane	ND	1,2-Dichloropropane	ND
bon tetrachloride	ND	cis-1,3-Dichloropropene	ND
orobenzene	ND	trans-1,3-Dichloropropene	ND
oroethane	ND	Ethylbenzene	ND
hloroethylvinyl ether	ND	Methylene chloride	ND
oroform	ND	1,1,2,2-Tetrachloroethane	ND
oromethane	ND	Tetrachloroethene	ND
romochloromethane	ND	Toluene	ND
-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
-Dichlorobenzene	ND	Trichloroethene	ND
hlorodifluoromethane	ND	Trichlorofluoromethane	ND
-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

E: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

RROGATE RECOVERY:	%	ACCEPTABLE LIMITS
omochloromethane (HECD)	107	(78-122)
ifluorotoluene (PID)	101	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

1PANY: ABB ENVIRONMENTAL SERVICES, INC.
3 #: 3E2003-4
'RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

1PLE ID: CSS-327-MW-9D CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

\RAMETER	RESULT (ug/L)	DETECTION LIMIT
:hylene dibromide	ND	0.02

ΓE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

RROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
omoform (ECD)	(41-152)	(41-152)	120

ENSECO-WADSWORTH/ALERT
Laboratories

ıPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 5/20/93
3 #: 3E2003-4
ΓRIX : WATER

ıPLE ID : CSS-327-MW-9D CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

:al metals analysis results - as received

ıEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
ıd	5/28/93	11	5	ug/L

ΓE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
3E2003-5
RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/25/93

PLE ID: CSS-327-MW-10

CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

zene	ND	1,2-Dichloroethane	ND
modichloromethane	ND	1,1-Dichloroethene	ND
moform	ND	1,2-Dichloroethene (Total)	ND
momethane	ND	1,2-Dichloropropane	ND
bon tetrachloride	ND	cis-1,3-Dichloropropene	ND
orobenzene	ND	trans-1,3-Dichloropropene	ND
oroethane	ND	Ethylbenzene	ND
hloroethylvinyl ether	ND	Methylene chloride	ND
oroform	4	1,1,2,2-Tetrachloroethane	ND
oromethane	ND	Tetrachloroethene	ND
romochloromethane	ND	Toluene	ND
-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
-Dichlorobenzene	ND	Trichloroethene	ND
hlorodifluoromethane	ND	Trichlorofluoromethane	ND
-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

E: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

ROGATE RECOVERY:	%	ACCEPTABLE LIMITS
omochloromethane (HECD)	102	(78-122)
ifluorotoluene (PID)	99	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

1PANY: ABB ENVIRONMENTAL SERVICES, INC.
3 #: 3E2003-5
TRIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/27/93

1PLE ID: CSS-327-MW-10 CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

ARAMETER	RESULT (ug/L)	DETECTION LIMIT
:hylene dibromide	ND	0.02

TE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

RROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
omoform (ECD)	(41-152)	(41-152)	4

ENSECO-WADSWORTH/ALERT
Laboratories

(PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 5/20/93
: #: 3E2003-5
'RIX : WATER

(PLE ID : CSS-327-MW-10 CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT HRS84297

SELECTED LIST

:al metals analysis results - as received

EMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
d	5/28/93	12	5	ug/L

'E: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

PANY: ABB ENVIRONMENTAL SERVICES, INC.
3E2003-6
RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/25/93

PLE ID: CSS-327-MW-11

CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
VOLATILE ORGANICS HRS84297
METHOD 601/602 - GC

zene	ND	1,2-Dichloroethane	ND
modichloromethane	ND	1,1-Dichloroethene	ND
moform	ND	1,2-Dichloroethene (Total)	ND
momethane	ND	1,2-Dichloropropane	ND
bon tetrachloride	ND	cis-1,3-Dichloropropene	ND
orobenzene	ND	trans-1,3-Dichloropropene	ND
oroethane	ND	Ethylbenzene	ND
hloroethylvinyl ether	ND	Methylene chloride	ND
oroform	ND	1,1,2,2-Tetrachloroethane	ND
oromethane	ND	Tetrachloroethene	ND
romochloromethane	ND	Toluene	ND
-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
-Dichlorobenzene	ND	Trichloroethene	ND
hlorodifluoromethane	ND	Trichlorofluoromethane	ND
-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

E: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

ROGATE RECOVERY:	%	ACCEPTABLE LIMITS
omochloromethane (HECD)	94	(78-122)
fluorotoluene (PID)	101	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

[PANY: ABB ENVIRONMENTAL SERVICES, INC.
) #: 3E2003-6
:RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

[PLE ID: CSS-327-MW-11 CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

,RAMETER	RESULT (ug/L)	DETECTION LIMIT
:hylene dibromide	ND	0.02

[E: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

RROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
)moform (ECD)	(41-152)	(41-152)	73

ENSECO-WADSWORTH/ALERT
Laboratories

(PANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 5/20/93
) #: 3E2003-6
'RIX : WATER

:PLE ID : CSS-327-MW-11 CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

.al metals analysis results - as received

:EMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
d	5/28/93	19	5	ug/L

'E: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

(PANY: ABB ENVIRONMENTAL SERVICES, INC.
) # 3E2003-7
'RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/25/93

(PLE ID: CSS-327-MW-12

CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
VOLATILE ORGANICS HRS84297
METHOD 601/602 - GC

.zene	ND	1,2-Dichloroethane	ND
›modichloromethane	ND	1,1-Dichloroethene	ND
moform	ND	1,2-Dichloroethene (Total)	ND
›momethane	ND	1,2-Dichloropropane	ND
'bon tetrachloride	ND	cis-1,3-Dichloropropene	ND
.orobenzene	ND	trans-1,3-Dichloropropene	ND
.oroethane	ND	Ethylbenzene	ND
'hloroethylvinyl ether	ND	Methylene chloride	ND
.oroform	ND	1,1,2,2-Tetrachloroethane	ND
.oromethane	ND	Tetrachloroethene	ND
›romochloromethane	ND	Toluene	ND
.-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
:-Dichlorobenzene	ND	Trichloroethene	ND
'hlorodifluoromethane	ND	Trichlorofluoromethane	ND
.-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

'E: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

'ROGATE RECOVERY:	%	ACCEPTABLE LIMITS
›mochloromethane (HECD)	99	(78-122)
ifluorotoluene (PID)	104	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

MPANY: ABB ENVIRONMENTAL SERVICES, INC.
B #: 3E2003-7
TRIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

MPLE ID: CSS-327-MW-12 CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

ARAMETER	RESULT (ug/L)	DETECTION LIMIT
thylene dibromide	ND	0.02

TE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

RROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
omoform (ECD)	(41-152)	(41-152)	82

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 5/20/93
3 #: 3E2003-7
RIX : WATER

IPLE ID : CSS-327-MW-12 CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

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al metals analysis results - as received

EMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
d	5/28/93	10	5	ug/L

E: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

MPANY: ABB ENVIRONMENTAL SERVICES, INC.
B # 3E2003-8
TRIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/25/93

MPLE ID: CSS-327-MW-13

CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
VOLATILE ORGANICS HRS84297
METHOD 601/602 - GC

zene	4	1,2-Dichloroethane	ND
omodichloromethane	ND	1,1-Dichloroethene	ND
omoform	ND	1,2-Dichloroethene (Total)	ND
omomethane	ND	1,2-Dichloropropane	ND
bon tetrachloride	ND	cis-1,3-Dichloropropene	ND
lorobenzene	ND	trans-1,3-Dichloropropene	ND
loroethane	ND	Ethylbenzene	31
hloroethylvinyl ether	ND	Methylene chloride	ND
loroform	ND	1,1,2,2-Tetrachloroethane	ND
loromethane	ND	Tetrachloroethene	ND
romochloromethane	ND	Toluene	ND
-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
-Dichlorobenzene	ND	Trichloroethene	ND
hlorodifluoromethane	ND	Trichlorofluoromethane	ND
-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	16
		Methyl-tert-butylether	5

TE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

RROGATE RECOVERY:	%	ACCEPTABLE LIMITS
omochloromethane (HECD)	80	(78-122)
ifluorotoluene (PID)	122	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY: ABB ENVIRONMENTAL SERVICES, INC.
) #: 3E2003-8
:RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

IPLE ID: CSS-327-MW-13 CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

RAMETER	RESULT (ug/L)	DETECTION LIMIT
hylene dibromide	ND	0.02

TE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

RROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
omoform (ECD)	(41-152)	(41-152)	85

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 5/20/93
3 #: 3E2003-8
TRIX : WATER

IPLE ID : CSS-327-MW-13 CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

:al metals analysis results - as received

LEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
id	5/28/93	6	5	ug/L

TE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY: ABB ENVIRONMENTAL SERVICES, INC.
3 # 3E2003-9
:RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

IPLE ID: CSS-327-MW-14

CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
VOLATILE ORGANICS HRS84297
METHOD 601/602 - GC

ızene	ND	1,2-Dichloroethane	ND
›modichloromethane	ND	1,1-Dichloroethene	ND
›moform	ND	1,2-Dichloroethene (Total)	ND
›momethane	ND	1,2-Dichloropropane	ND
:bon tetrachloride	ND	cis-1,3-Dichloropropene	ND
.orobenzene	ND	trans-1,3-Dichloropropene	ND
.oroethane	ND	Ethylbenzene	ND
:hloroethylvinyl ether	ND	Methylene chloride	ND
.oroform	ND	1,1,2,2-Tetrachloroethane	ND
.oromethane	ND	Tetrachloroethene	ND
›romochloromethane	ND	Toluene	ND
:-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
›-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
:-Dichlorobenzene	ND	Trichloroethene	ND
:hlorodifluoromethane	ND	Trichlorofluoromethane	ND
:-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

TE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

RROGATE RECOVERY:	%	ACCEPTABLE LIMITS
›mochloromethane (HECD)	103	(78-122)
ifluorotoluene (PID)	116	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

MPANY: ABB ENVIRONMENTAL SERVICES, INC.
B #: 3E2003-9
TRIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

MPLE ID: CSS-327-MW-14 CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

ARAMETER	RESULT (ug/L)	DETECTION LIMIT
thylene dibromide	ND	0.02

TE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

RROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
omoform (ECD)	(41-152)	(41-152)	18

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 5/20/93
3 #: 3E2003-9
:RIX : WATER

IPLE ID : CSS-327-MW-14 CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

:al metals analysis results - as received

:EMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
:d	5/28/93	15	5	ug/L

:E: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

IPANY: ABB ENVIRONMENTAL SERVICES, INC.
) # 3E2003-10
:RIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/25/93

IPLE ID: DUPLICATE

CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
VOLATILE ORGANICS HRS84297
METHOD 601/602 - GC

ızene	2	1,2-Dichloroethane	ND
›modichloromethane	ND	1,1-Dichloroethene	ND
›moform	ND	1,2-Dichloroethene (Total)	ND
›momethane	ND	1,2-Dichloropropane	ND
:bon tetrachloride	ND	cis-1,3-Dichloropropene	ND
.orobenzene	ND	trans-1,3-Dichloropropene	ND
.oroethane	ND	Ethylbenzene	ND
:hloroethylvinyl ether	ND	Methylene chloride	ND
.oroform	ND	1,1,2,2-Tetrachloroethane	ND
.oromethane	ND	Tetrachloroethene	ND
›romochloromethane	ND	Toluene	ND
:-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
›-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
:-Dichlorobenzene	ND	Trichloroethene	ND
:hlorodifluoromethane	ND	Trichlorofluoromethane	ND
:-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	7

TE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

RROGATE RECOVERY:	%	ACCEPTABLE LIMITS
›mochloromethane (HECD)	99	(78-122)
ifluorotoluene (PID)	98	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3E2003-10
MATRIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

SAMPLE ID: DUPLICATE

CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	117

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 5/20/93
LAB #: 3E2003-10
MATRIX : WATER

SAMPLE ID : DUPLICATE CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	5/28/93	22	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3E2003-11
MATRIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

SAMPLE ID: EQUIPMENT BLANK

CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	103	(78-122)
Trifluorotoluene (PID)	93	(73-131)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3E2003-11
MATRIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

SAMPLE ID: EQUIPMENT BLANK CSS PANAMA CITY SITE 327

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS WATER	SOLID	%
Bromoform (ECD)	(41-152)	(41-152)	119

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC. DATE RECEIVED: 5/20/93
LAB #: 3E2003-11
MATRIX : WATER

SAMPLE ID : EQUIPMENT BLANK CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
METALS ANALYTICAL REPORT HRS84297
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	5/28/93	ND	5	ug/L

NOTE: ND (None Detected)

ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3E2003-12
MATRIX: WATER

DATE RECEIVED: 5/20/93
DATE EXTRACTED: NA
DATE ANALYZED: 5/26/93

SAMPLE ID: TRIP BLANK

CSS PANAMA CITY SITE 327
CERTIFICATION #: E84059
VOLATILE ORGANICS HRS84297
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	108	(78-122)
Trifluorotoluene (PID)	91	(73-131)