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CONTAMINATION ASSESSMENT REPORT BUILDING A 322 BASE EXCHANGE SERVICE  
STATION NAS KEY WEST FL  
12/1/1991  
ABB ENVIRONMENTAL SERVICES INC

22

**CONTAMINATION ASSESSMENT REPORT**

**BUILDING A-322  
BASE EXCHANGE SERVICE STATION**

**BOCA CHICA FIELD  
NAVAL AIR STATION  
KEY WEST, FLORIDA**

**UIC NO.: N00213**

**DECEMBER, 1991**

**CONTRACT NO. 62467-89-D-0317**

**Prepared by:**

**ABB ENVIRONMENTAL SERVICES INC.  
2571 EXECUTIVE CENTER CIRCLE EAST, SUITE 100  
TALLAHASSEE, FLORIDA**

**Prepared for:**

**SOUTHERN DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
P.O. BOX 10068  
CHARLESTON, SOUTH CAROLINA 29411-0068**

**CARL LOOP, ENGINEER IN CHARGE**

## 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, primarily petroleum products. Prior to 1984, hazardous wastes stored in USTs were regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, an earlier amendment to SWDA. Subtitle I requires the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. Accordingly, programs were designed by the USEPA to be administered by individual states, allowing each state the alternative to develop more stringent, but not less stringent standards for the management and regulation of USTs than the Federal regulations provided in Subtitle I. Local governments were also permitted to establish regulatory standards that were 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 40 CFR 281, *Approval of State Underground Storage Tank Programs*. 40 CFR 280 was revised and published on September 23, 1988, and became effective December 22, 1988.

It is the policy of the Navy 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 Regulations (FDER) Chapter 17-770, Florida Administrative Code (FAC), *State Underground Petroleum Environmental Response*, regarding regulations on petroleum contamination.

Questions regarding this report should be addressed to the Commanding Officer, Naval Air Station (NAS) Key West, Florida, or to Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) at 803-743-0528.

## EXECUTIVE SUMMARY

The Base Exchange Service Station is located at Boca Chica Field, Naval Air Station (NAS) Key West, Florida. The site includes three active unleaded gasoline underground storage tanks (USTs) and associated fuel dispensing systems. Precision tank testing was performed in 1989 and indicated that the fuel systems were leaking. A preliminary site visit also revealed the presence of a waste oil UST at the site.

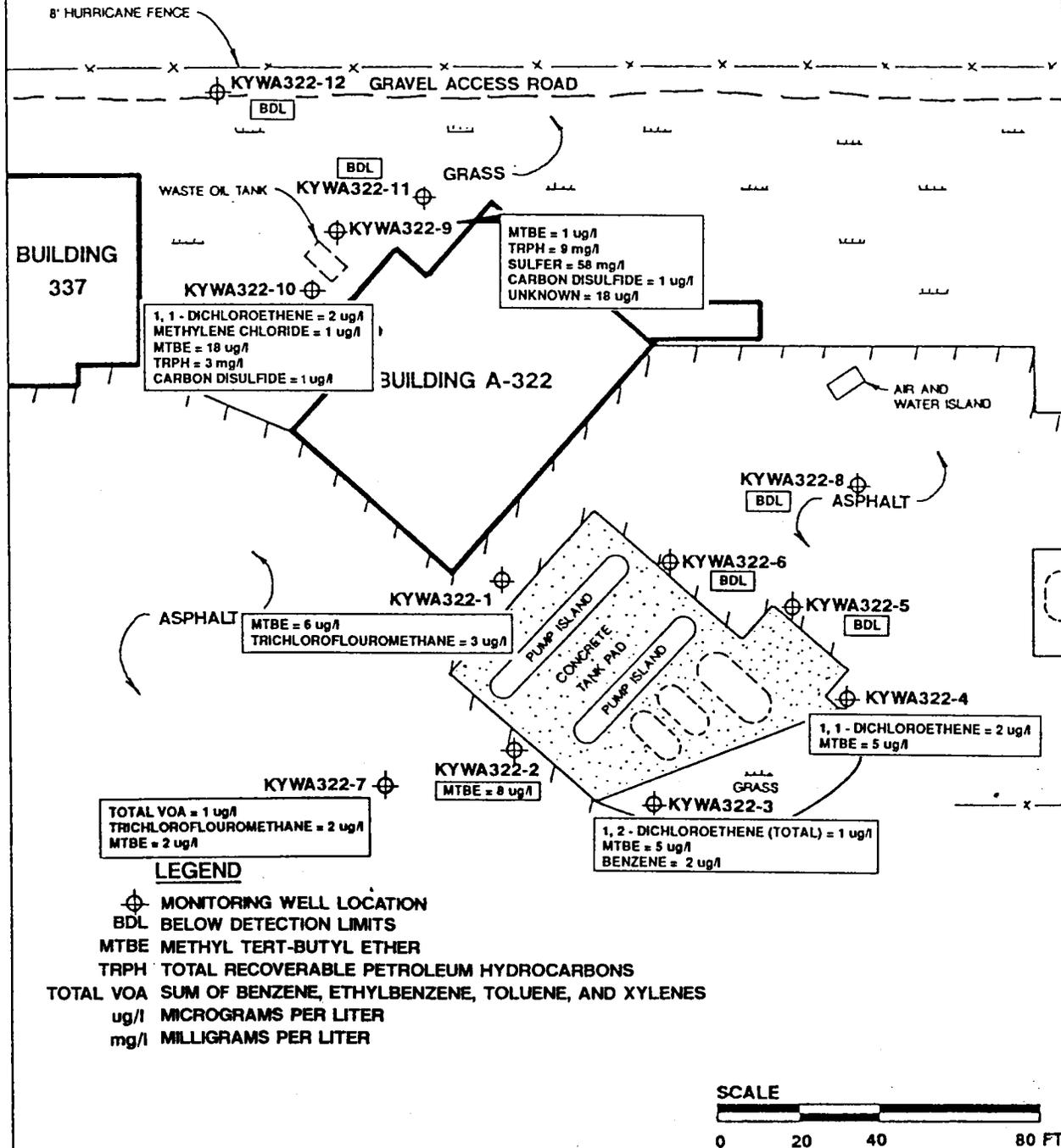
A contamination assessment (CA) was performed by ABB Environmental Services Inc. (ABB-ES) in July and August 1991. The objective of the CA was to identify petroleum contaminants at the site, to assess the degree and extent of petroleum contamination in soils and in the surficial aquifer, and to recommend a feasible course of action, if necessary, to attain compliance with State regulatory levels.

Fourteen soil borings and twelve groundwater monitoring wells were installed at the site. Soil and groundwater samples were collected and analyzed for petroleum constituents of the gasoline analytical group and waste oil constituents. A Contamination Assessment Report (CAR) was prepared and is attached herewith. The findings of the CAR are summarized below.

- No excessively petroleum contaminated soils were identified by organic vapor analyzer (OVA) headspace analysis.
- No free product was found at the site.
- No official potable wells are present in the Key West area.

Groundwater from the surficial aquifer is an unlikely source of potable water (McKenzie, 1990), and is designated as a Class G-III non-potable groundwater source. In addition, groundwater contamination levels appear to be relatively low and all groundwater samples from the gasoline tank area were below regulatory standards for Class G-III groundwater (see Executive Summary Figure). Only one of the four samples collected from the waste oil tank area had concentrations above regulatory levels.

Since precision tank testing indicated that the gasoline UST system was leaking, the system will be removed and replaced with an aboveground system. The waste oil tank will also be removed. Should no free product or excessively contaminated soils be found during tank removal activities, a No Further Action Proposal (NFAP) will be recommended. Should free product and/or excessively contaminated soils be found, the contamination will be removed during initial remedial activities, and a groundwater monitoring plan will be implemented. The scope of the groundwater monitoring plan will depend on the extent of contamination found during tank removal activities.



**EXECUTIVE SUMMARY FIGURE  
GROUNDWATER CONTAMINATION  
DISTRIBUTION  
BUILDING A-322  
BASE EXCHANGE SERVICE STATION**



**CONTAMINATION  
ASSESSMENT REPORT  
BOCA CHICA FIELD  
KEY WEST, FLORIDA  
NAVAL AIR STATION**

## ACKNOWLEDGEMENTS

In preparing this report, the Underground Storage Tank Section of the Comprehensive Long-Term Environmental Action Navy (CLEAN) Group at ABB-ES commends the support, assistance, and cooperation provided by the personnel at NAS Key West, Florida, and Southern Division, Naval Facilities Engineering Command. In particular, ABB-ES acknowledges the effort, dedication, and professionalism provided by the following people during the investigation and preparation of this report.

<u>NAME</u>	<u>TITLE</u>	<u>POSITION</u>	<u>LOCATION</u>
Carl Loop	Env. Engineer	Engineer in Charge	SOUTHNAVFAC
William Hunt	Env. Coordinator	Environmental Coordinator	NAS Key West
Diane Lancaster	Env. Coordinator	Environmental Coordinator	NAS Key West

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## ACRONYMS, INITIALISMS, AND ABBREVIATIONS

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

ABB-ES	ABB Environmental Services Inc.
BDL	below detection limits
BTEX	benzene, toluene, ethylbenzene, and xylenes
bls	below land surface
CA	Contamination Assessment
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CFR	Code of Federal Regulations
CNO	Chief of Naval Operations
CompQAP	Comprehensive Quality Assurance Plan
CTO	Contract Task Order
EDB	ethylene dibromide
FAC	Florida Administrative Code
FDER	Florida Department of Environmental Regulations
ft/day	feet per day
ft <sup>2</sup> /day	feet squared per day
gpd/ft	gallons per day per foot
HSWA	Hazardous and Solid Waste Amendments of 1984
msl	mean sea level
MOP	Monitoring Only Plan
MTBE	methyl-tert-butyl ether
NAS	Naval Air Station
NGVD	National Geodetic Vertical Datum
NOAA	Nation Oceanic and Atmospheric Administration
NTC	Naval Training Center
OVA	organic vapor analyzer
PAH	polynuclear aromatic hydrocarbons
POA	Plan of Action
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
SOUTHNAVFAC	Southern Division Naval Facilities Engineering Command
SPT	standard penetration test
SWDA	Solid Waste Disposal Act of 1965
TRPH	total recoverable petroleum hydrocarbons
µg/l	micrograms per liter
µmhos/cm	micromhos per centimeter
UIC	unit identification code
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	underground storage tank
VOA	volatile organic aromatics
DCA	1,2- dichloroethane

## 1.0 INTRODUCTION

ABB Environmental Services Inc. (ABB-ES) was contracted by the Naval Facilities Engineering Command, Southern Division (SOUTHNAVFAC) to perform a contamination assessment (CA) and submit a Contamination Assessment Report (CAR) for the Base Exchange Service Station, Boca Chica Field, Naval Air Station (NAS), Key West, Florida. The site contains three active underground storage tanks (USTs) and associated fuel transfer piping and dispensing systems. The tanks contain unleaded and leaded gasoline. Precision tank testing was conducted in 1989 and revealed that the fuel system was leaking. A preliminary site investigation also revealed the existence of an additional waste oil UST at the site. An additional site investigation was required to identify petroleum contaminants at the site and to assess the extent of contamination.

The scope of services provided by ABB-ES to SOUTHNAVFAC during the CA were defined by and performed under Contract Task Order (CTO) No. 007, the Plan of Action (POA), and the Contamination Assessment Plan (CAP), and included the following:

- installing soil borings and monitoring wells,
- analyzing groundwater and soil samples to assess the extent of soil and groundwater petroleum contamination,
- collecting water level data,
- conducting an inventory of potable wells within a 1/4-mile radius of the site,
- performing slug tests on select wells to estimate aquifer characteristics, and
- reducing and analyzing data gathered during the CA to complete this CAR.

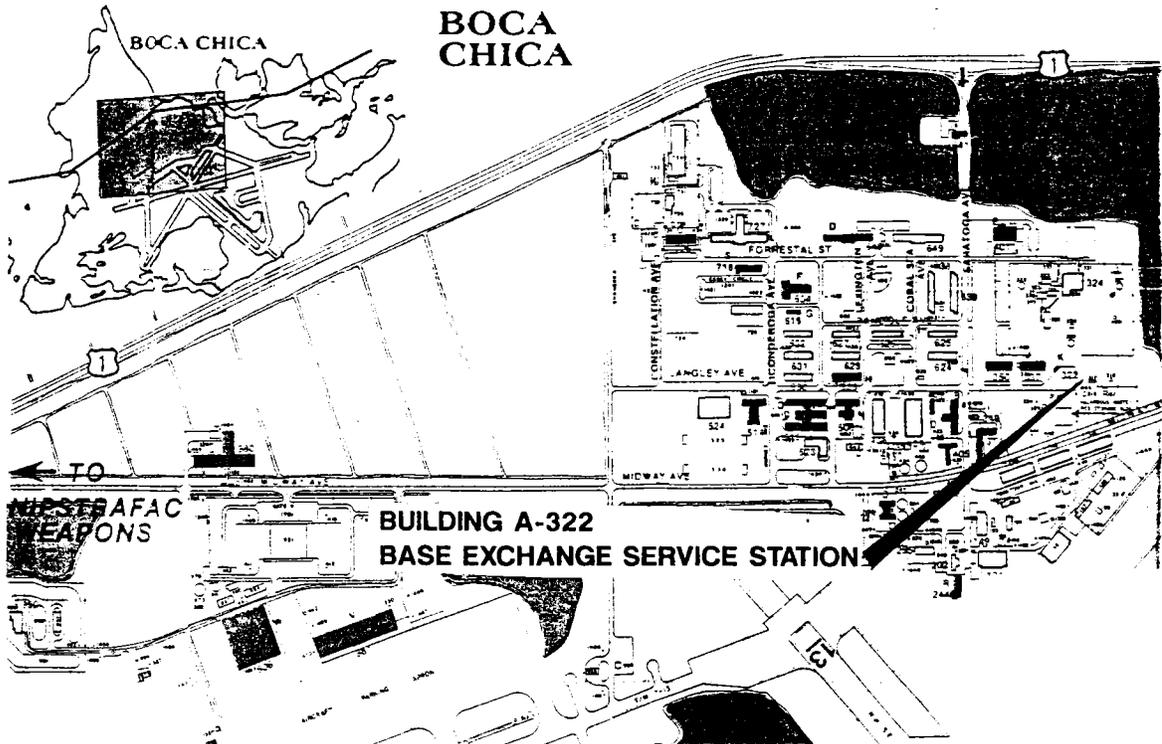
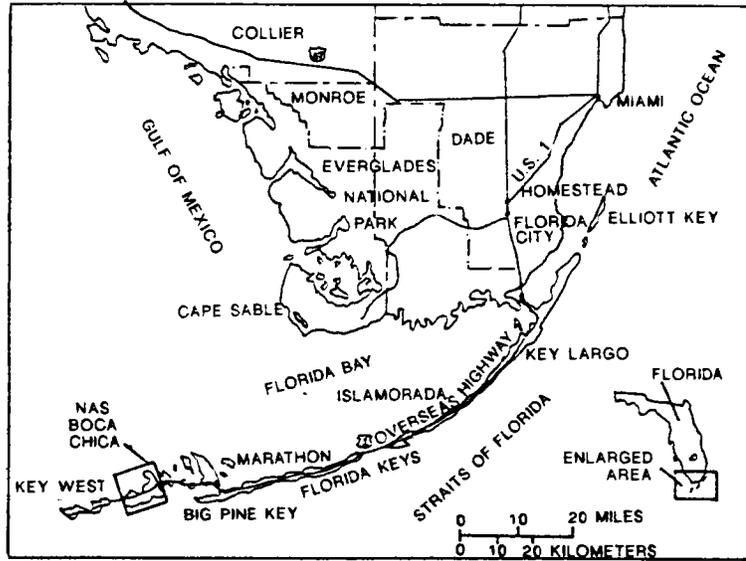
The assessment under this contract was conducted during July and August 1991. The following sections of the report present the background information, investigative methodologies, data compilation, results, conclusions, and recommendations of the CAR.

## 2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION. NAS Key West is located approximately 150 miles southwest of Miami in Monroe County, Florida (Figure 2-1). NAS Key West, a complex of activities located in numerous areas of the Lower Florida Keys, encompasses approximately 5,000 acres. The majority of these activities are concentrated on Boca Chica Key and Key West. The mission of NAS Key West is to maintain and operate facilities and provide services and materials to support operations of aviation activities and units designated by the Chief of Naval Operations (CNO). The Base Exchange Service Station (Building A-322) is located on Boca Chica Key at the east end of Langley Avenue in Boca Chica Field (Figure 2-1). The CA for Building A-317, located immediately east of Building A-322, is being addressed under a separate investigation and report.

The site layout is shown in Figure 2-2. The three active gasoline USTs are located immediately southwest of the pump islands. The pump island area and the surface above the USTs is presently concreted. The waste oil tank of unknown size is presently inactive and is located along the northwest side of Building A-322, approximately 150 feet northwesterly of the active gasoline USTs. The waste oil tank is believed to have an approximately 500-gallon capacity.

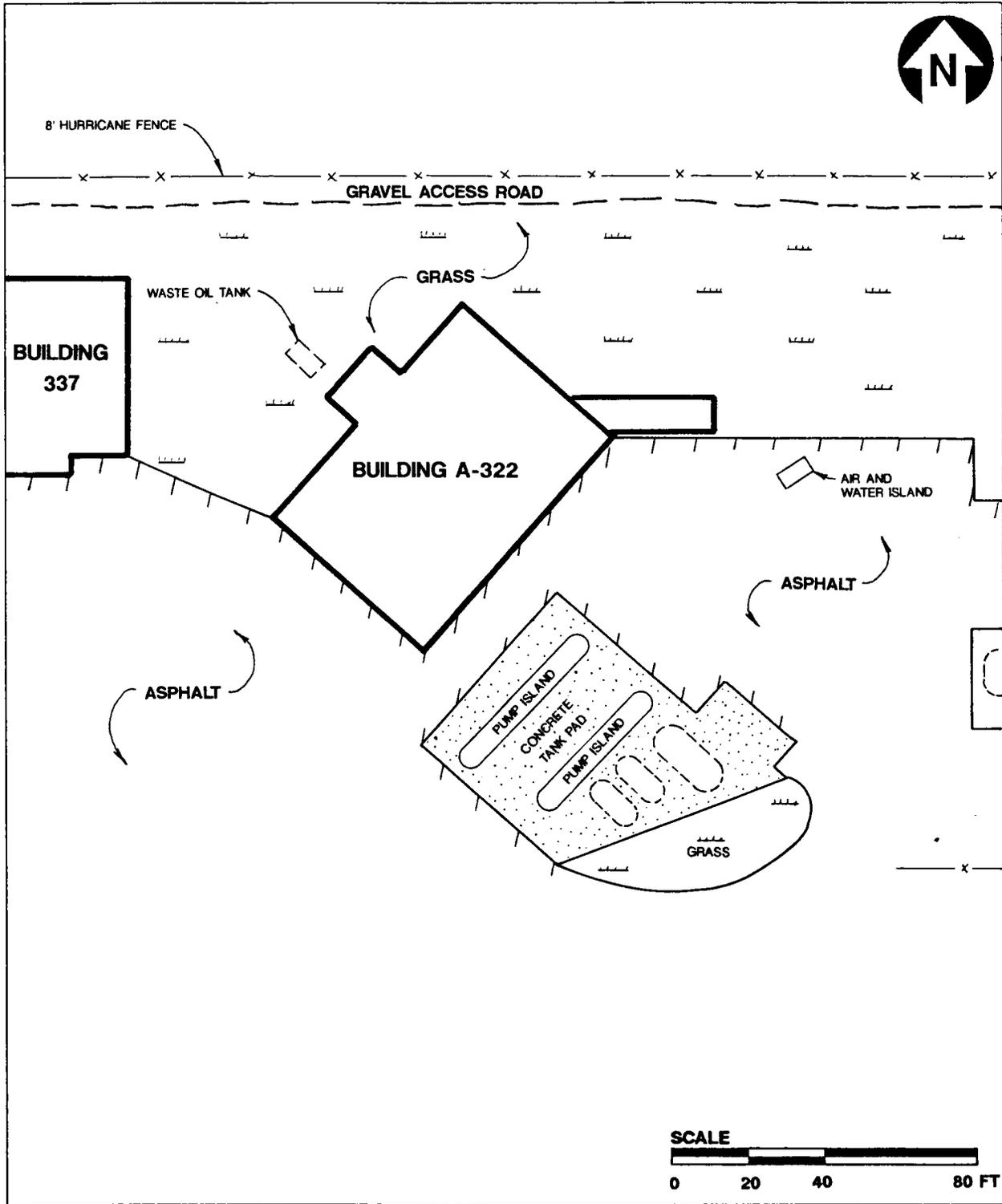
2.2 SITE HISTORY. The Base Exchange Service Station has been in operation since at least 1961. The three active gasoline USTs contain unleaded gasoline. Two of the tanks (A322-B and A322-C) have volumes of approximately 5,900 gallons; the third tank has a volume of approximately 9,400 gallons. The tanks were installed in 1974. Precision tank testing was performed by Acutest Corporation of Houston, Texas in May 1989. Tank testing revealed that the active UST fuel system was leaking. The age of the inactive waste oil tank is presently unknown.



**FIGURE 2-1**  
**FACILITY LOCATION MAP**  
**BUILDING A-322**  
**BASE EXCHANGE SERVICE STATION**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**BOCA CHICA FIELD**  
**NAVAL AIR STATION**  
**KEY WEST, FLORIDA**



**FIGURE 2-2**  
**SITE LAYOUT**  
**BUILDING A-322**  
**BASE EXCHANGE SERVICE STATION**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**BOCA CHICA FIELD**  
**KEY WEST, FLORIDA**  
**NAVAL AIR STATION**

## 3.0 SITE CONDITIONS

3.1 PHYSIOGRAPHY. Regional physiography is discussed in Appendix A. The site lies within the southern or distal geomorphic zone of Florida (White, 1970). Ground elevations at the site are approximately 5 feet above mean sea level.

### 3.2 HYDROGEOLOGY

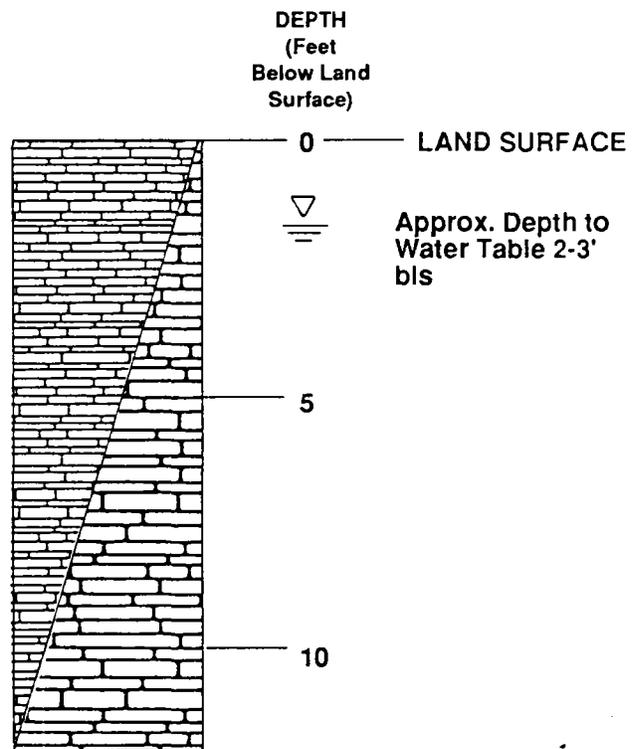
3.2.1 Regional. Regional hydrogeology is discussed in Appendix A.

3.2.2 Site Specific. Site-specific hydrogeologic characteristics were based on information obtained during soil boring and monitoring well installation. The surficial aquifer is the only aquifer of concern in the Key West area. The surficial aquifer in the Key West area is unconfined. The water table is found at shallow depths at the site, occurring from 2 to 3 feet below land surface (bls) during this investigation. Groundwater flow direction in the surficial aquifer during this investigation varied from southwest to southeast.

Material from the surface to depths of 12 feet (the maximum depth of site monitoring wells) consist of white, slightly to heavily weathered, silty, hard limestone with some sand and shell fragments. A generalized lithologic section is presented in Figure 3-1. Complete lithologic logs for all site monitoring wells are presented in Appendix B.

**DEPTH:** 0 - >12' bls  
**DESCRIPTION:** Limestone; White Soft, Fossiliferous, Silty, Highly Weathered

**DEPTH:** 0 - >12' bls  
**DESCRIPTION:** Limestone; White, Hard, Fossiliferous, Slightly Weathered



**FIGURE 3-1**

**GENERALIZED LITHOLOGIC SECTION  
BUILDING A-322  
BASE EXCHANGE SERVICE STATION**



**CONTAMINATION  
ASSESSMENT REPORT**

**BOCA CHICA FIELD  
NAVAL AIR STATION  
KEY WEST, FLORIDA**

## 4.0 METHODOLOGIES AND EQUIPMENT

4.1 SOIL BORING PROGRAM. Fourteen soil borings, designated as SB-1 through SB-14, were drilled into the water table to assess the degree and extent of soil contamination, to identify the type of subsurface material, and to aid in placement of subsequent groundwater monitoring wells. Soil borings SB-1 through SB-9 were placed in the vicinity of the three active USTs. Soil borings SB-10 through SB-14 were placed in the waste oil tank vicinity. Soil boring locations are shown in Figure 4-1. Soil samples were collected from each borehole and underwent organic vapor analyzer (OVA) headspace analysis. The results of the soil boring program are discussed in Section 5.2 of this report.

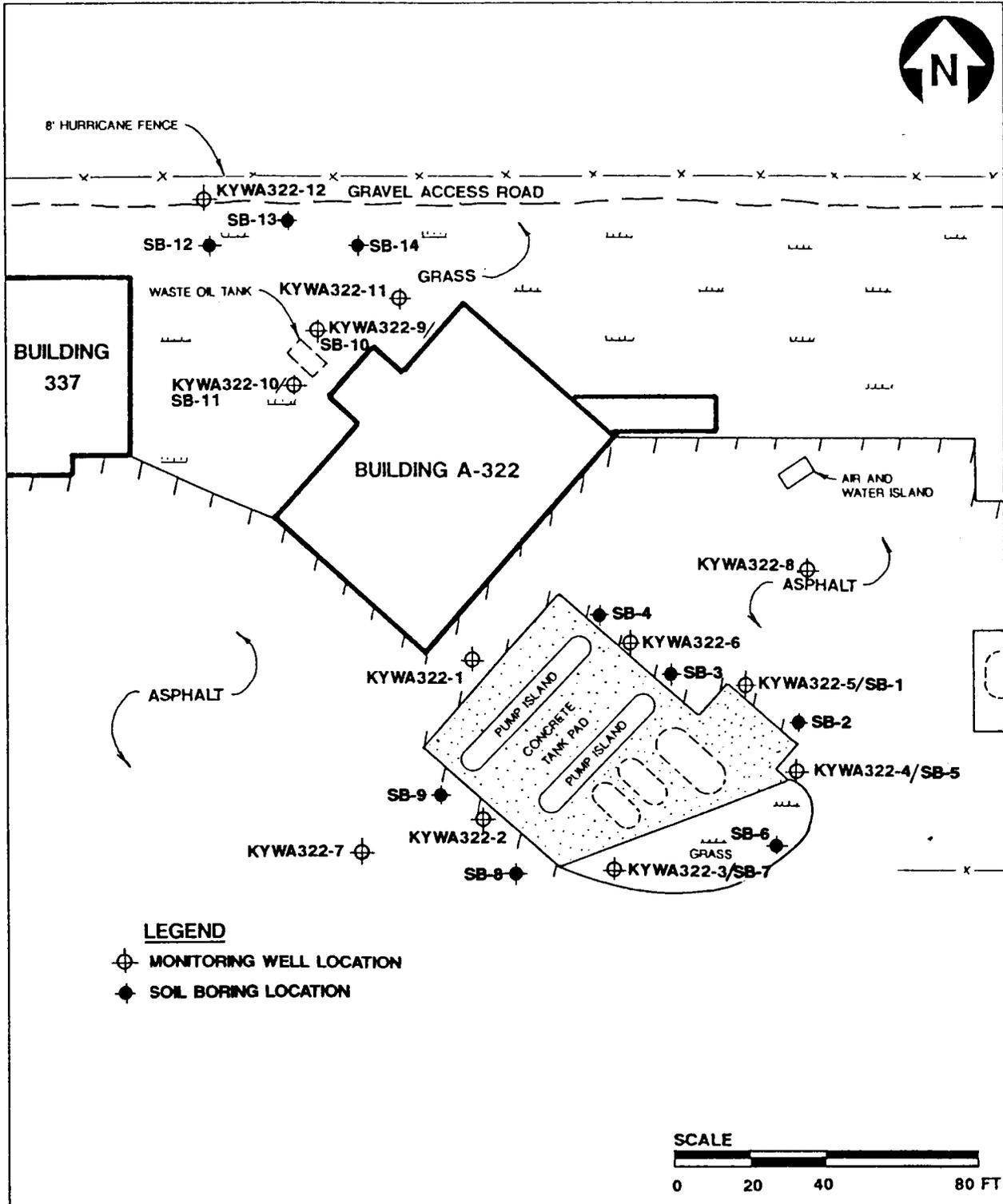
4.2 MONITORING WELL INSTALLATION PROGRAM. Twelve 2-inch-diameter monitoring wells (KYW-A322-1 through KYW-A322-12) were installed using a hollow-stem auger drill rig. Monitoring wells were drilled to a depth of 12 feet. Monitoring wells KYW-A322-1 through KYW-A322-8 were installed in the vicinity of the active fuel system. Monitoring wells KYW-A322-9 through KYW-A322-12 were installed in the waste oil tank vicinity. Monitoring well locations are shown in Figure 4-1. Monitoring well construction methodologies and materials are discussed in Appendix C.

4.3 GROUNDWATER ELEVATION SURVEY. The elevation and slope of the water table were estimated by surveying the top of the well casing for each monitoring well to a common reference datum. As no benchmark could be located in the area, an arbitrary reference elevation of 5.00 feet was established at a temporary benchmark at the site. To assess the effects of tidal fluctuations, groundwater levels were measured over an 8 hour period on August 17, 1991. Procedures for groundwater level measurements are contained in Appendix C.

4.4 GROUNDWATER SAMPLING PROGRAM. Groundwater samples were collected from site monitoring wells on August 21, 1991. Sampling procedures followed the guidelines set forth in the Florida Department of Environmental Regulation (FDER) approved Comprehensive Quality Assurance Program Plan (CompQAPP) of ABB-ES. The appropriate number of field blanks, equipment blanks, and duplicates were collected. Samples were shipped under chain of custody to Wadsworth/Alert Laboratories in Tampa, Florida. Procedures for collection of groundwater samples are presented in Appendix C.

4.5 AQUIFER SLUG TESTS. An aquifer test was performed on monitoring well KYW-A317-5 at the Public Works Department Motor Pool (Facility A-317) site located adjacent to the site. Monitoring well KYW-A317-5 is located approximately 200 feet east of the Base Exchange Service Station.

Since the lithologies of the Public Works Department Motor Pool and the Base Exchange Service Station are similar, the hydraulic conductivities calculated from the slug test data from monitoring well KYW-A317-5 should yield a reasonable estimate of site hydraulic conductivities in the surficial aquifer. Slug test procedures are discussed in Appendix C.



**FIGURE 4-1**  
**SOIL BORING AND MONITORING**  
**WELL LOCATIONS**  
**BUILDING A-322**  
**BASE EXCHANGE SERVICE STATION**



**CONTAMINATION**  
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4.6 TANK TESTING METHODOLOGIES. The underground storage tanks were tested using the "leak computer" system by AcuTest Corporation. The tanks were first tested at a high level leak rate. This testing method measures product loss in the tank, vent pipe, and delivery line (full system) and will indicate if the system has a leak. The tanks were then tested at a low level leak rate where product loss was measured only in the tank. The results of these two tests indicate if the system has a leak and will determine if the leak is occurring in the tank or the piping. If the tests indicated a leak was occurring in the system but not the tank itself, a delivery line test was performed. The delivery line test consisted of isolating and pressurizing the line with nitrogen to 40 pounds per square inch (psi) and monitoring for a pressure drop for a 30-minute period.

## 5.0 CONTAMINATION ASSESSMENT RESULTS

5.1 AQUIFER CHARACTERISTICS AND HYDROGEOLOGIC PARAMETERS. The slug test analyses for well KYW-A317-5 indicate an average horizontal hydraulic conductivity of 3.8 feet per day (ft/day). This value represents a hydraulic conductivity of silty sand to clean sand (Freeze and Cherry, 1979). An average hydraulic gradient was calculated along traverses taken perpendicular to equipotential lines shown on water table maps presented in Figures 5-3 through 5-6. Hydraulic gradients assessed in this manner vary from approximately  $2.1 \times 10^{-3}$  feet per foot (ft/ft) to  $6.8 \times 10^{-3}$  ft/ft yielding an average hydraulic conductivity of  $4.5 \times 10^{-3}$  ft/ft. Calculated groundwater flow velocity in the surficial aquifer is  $7.8 \times 10^{-2}$  ft/day. Calculated transmissivity is  $3.6 \times 10^1$  feet squared per day (ft<sup>2</sup>/day).

Presented in Appendix D are the slug test results and aquifer calculations.

### 5.2 CONTAMINATION ASSESSMENT AND CHARACTERIZATION

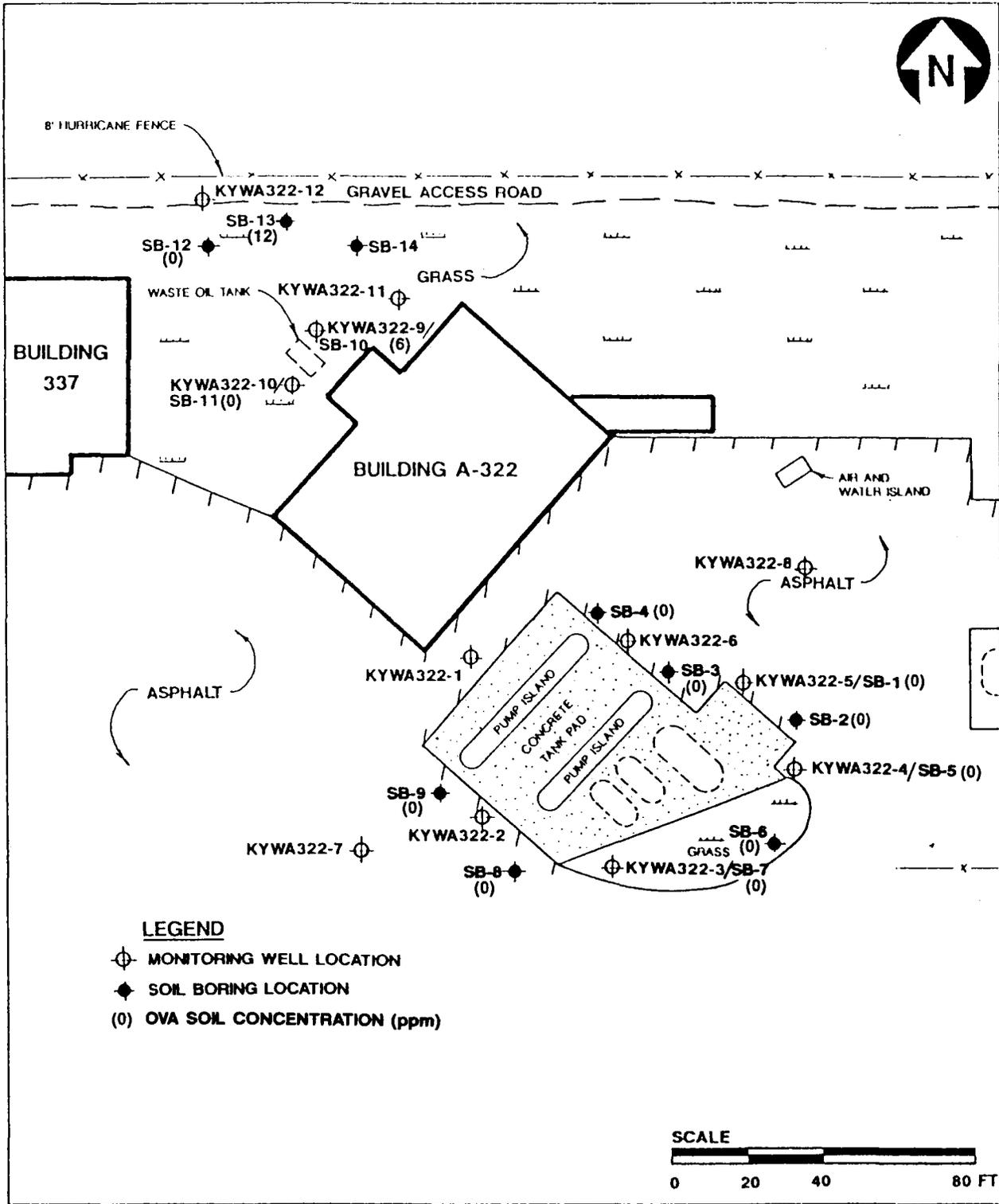
5.2.1 Soil Assessment. Soil samples collected with a split-spoon sampler from soil borings and monitoring well borings underwent OVA headspace analysis. For gasoline analytical group constituents, excessively contaminated soils are defined as those having OVA detected organic vapor concentrations in excess of 500 parts per million (ppm) and these soils must be remediated (FDER, 1991). For waste oil or unknown petroleum constituents, OVA headspace analysis may not be adequate for the assessment of the degree of soil contamination. In this case, discoloration and odor are used to assess the degree of soil contamination. Table 5-1 summarizes results of the OVA headspace survey, and indicates maximum OVA concentrations detected in each soil sample. No petroleum contaminated soils were identified in the vicinity of the active gasoline tanks. In the waste oil tank area, the only soil samples containing detectable OVA headspace readings were those collected from soil borings SB-10 and SB-13. OVA concentrations in these two samples were 6.2 ppm and 1.2 ppm, respectively. No discoloration or odor was detected in any samples collected from the waste oil tank vicinity. Figure 5-1 is a soil contamination map showing OVA concentrations at the site.

5.2.2 Groundwater Assessment. Water quality field parameters were measured for each monitoring well installed during the field investigation. In summary, the pH ranged from 7.0 to 7.6 standard units. The specific conductance ranged from 2,860 to >50,000 micromhos per centimeter ( $\mu\text{mhos/cm}$ ).

Groundwater analytical results are attached in Appendix E. Pursuant to FDER Chapter 17-770, Florida Administrative Code (FAC), groundwater samples collected from site monitoring wells near the gasoline tank area underwent analyses for United States Environmental Protection Agency (USEPA) Methods 601, 602, ethylene dibromide, and lead. Samples collected from the waste oil tank area were analyzed for USEPA Methods 418.1, 624, 625, and the metals arsenic, cadmium, chromium, and lead.

**TABLE 5-1**  
**SUMMARY OF SOIL SAMPLE**  
**OVA READINGS**  
**BUILDING A-322, BASE EXCHANGE SERVICE STATION,**  
**BOCA CHICA FIELD, NAS KEY WEST, FLORIDA**

LOCATION	DEPTH (ft)	OVA READING (ppm)
<b>GASOLINE TANK AREA</b>		
SB-1/KYW-A322-5	2.5	0
SB-2	2.5	0
SB-3	2.5	0
SB-4	2.5	0
SB-5/KYW-A322-4	2.5	0
SB-6	2.5	0
SB-7/KYW-A322-3		0
SB-8	2.5	0
<b>WASTE OIL TANK AREA</b>		
SB-9	2.5	0
SB-10/KYW-A322-9	2.5	6.2
SB-11/KYW-A322-10	2.5	0
SB-12	2.5	0
SB-13	2.5	1.2
SB-14	2.5	0



**FIGURE 5-1**  
**SOIL CONTAMINATION MAP**  
**BUILDING A-322**  
**BASE EXCHANGE SERVICE STATION**



**CONTAMINATION**  
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Laboratory sample designations differ from report sample designations. Laboratory samples are prefixed with "BCBXMW" and "BCWOTMW". Samples prefixed with "BCBXMW" were collected from monitoring wells in the gasoline tank area vicinity. Samples prefixed with "BCWOTMW" were collected from monitoring wells in the waste oil tank vicinity. All report samples are designated with a "KYW-A322" prefix. Laboratory samples BCBXMW-1 through BCBXMW-8 correspond to the groundwater samples collected from monitoring wells KYW-A322-1 through KYW-A322-8. Laboratory samples BCWOTMW-1 through BCWOTMW-4 correspond to samples collected from monitoring wells KYW-A322-9 through KYW-A322-12. Monitoring wells KYW-A322-4 and KYW-A322-9 were sampled in duplicate. These analyses are designated in the laboratory report as BC DUPE 1 and BCWOTDUPE, respectively.

Tables 5-2 and 5-3 summarize groundwater analytical results. Table 5-2 shows contaminants and their concentrations found near the gasoline tank area. Table 5-3 shows contaminants and their concentrations near the waste oil tank.

In the gasoline UST vicinity, petroleum contaminants identified in the groundwater include benzene, ethylbenzene, and methyl-tert-butyl ether (MTBE). Non-petroleum contaminants identified were 1,1-dichloroethene, 1,2-dichloroethene, and trichlorofluoromethane. Concentrations of all identified contaminants were below regulatory levels for Class G-III groundwater. No contamination was detected in monitoring wells KYW-A322-5, KYW-A322-6, and KYW-A322-8. Trichlorofluoromethane, a common laboratory contaminant, was also found in the trip blank. The trip blank also contained toluene and methylene chloride. Both of these compounds are also common laboratory contaminants. The source of 1,1-dichloroethene and 1,2-dichloroethene was not identified in this investigation.

In the waste oil tank vicinity, petroleum contaminants identified in the groundwater include methylene chloride, MTBE, and total recoverable petroleum hydrocarbons (TRPH). No petroleum contaminants were identified in wells KYW-A322-11 and KYW-A322-12. Monitoring well KYW-A322-9, which was sampled in duplicate, had MTBE and TRPH concentrations of 1 ppb and 9 ppm, respectively. Monitoring well KYW-A322-10 had MTBE and TRPH concentrations of 18 ppb and 3 ppm, respectively. Methylene chloride and the non-petroleum compounds 1,1-dichloroethane and carbon disulfide were also detected in well KYW-A322-10. All petroleum contamination levels were below Class G-III groundwater regulatory levels except for sample KYW-A322-9 which exceeded the TRPH regulatory level of 5 ppm.

Tentatively identified compounds in the waste oil tank vicinity include sulfur, 1,4-diethylbenzene, methyl (1-methyl ethyl) benzene, 3,6,6-trimethyl bicyclo(3.1.1) hept-2-ene, 3,7,7-trimethyl bicyclo(4.1.0) hept-2-ene, trifluoroacetic acid, 1,3-benzodioxole-5-carboxylic acid, and 3-ethenyl-1,1-dimethyl-1,4-cyclohexadiene. An unidentified contaminant was also detected in sample KYW-A322-9 and KYW-A322-12.

Figure 5-2 shows the concentrations of contaminants found in groundwater monitoring wells at the site.

**TABLE 5-2**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS – GASOLINE TANK AREA**  
**AUGUST 21, 1991**  
**BUILDING A-322, BASE EXCHANGE SERVICE STATION**  
**BOCA CHICA FIELD, NAS KEY WEST, FLORIDA**

COMPOUND	MONITORING WELL IDENTIFICATION											REGULATORY STANDARDS CLASS G-III GROUNDWATER*
	KYW-A322-1	KYW-A322-2	KYW-A322-3	KYW-A322-4/DUP	KYW-A322-5	KYW-A322-6	KYW-A322-7	KYW-A322-8	EQUIPMENT BLANK	TRIP BLANK	FIELD BLANK	
Laboratory Identification:	BCBXMW-1	BCBXMW-2	BCBXMW-3	BCBXMW-4	BCBXMW-5	BCBXMW-6	BCBXMW-7	BCBXMW-8				
<b>PURGABLE HALOCARBONS (001), ug/L</b>												
1,1-Dichloroethene	BDL	BDL	BDL	1/2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	3
1,2-Dichloroethene (total)	BDL	BDL	1	BDL/BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
<b>PURGABLE AROMATICS, ug/L</b>												
Methylene chloride	BDL	BDL	BDL	BDL/BDL	BDL	BDL	BDL	BDL	BDL	BDL	9	BDL
Benzene	BDL	BDL	2	BDL/BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	200
Ethylbenzene	BDL	BDL	BDL	BDL/BDL	BDL	BDL	1	BDL	BDL	BDL	BDL	
Toluene	BDL	BDL	BDL	BDL/BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	BDL
Trichlorofluoromethane	3	BDL	BDL	BDL/BDL	BDL	BDL	2	BDL	BDL	BDL	34	BDL
Methyl-tert-butylether (MTBE)	6	8	5	5/4	BDL	BDL	2	BDL	BDL	BDL	BDL	50

Notes:

\* Florida Department of Environmental Regulation, Division of Waste Management.  
 "No Further Action and Monitoring Only Guidelines for Petroleum Contaminated Sites", October, 1990.

BDL – Below Detection Limits

ug/L – micrograms per liter

Laboratory Data Sheets are included in Appendix A

5.2.3 Tidal Influence Study. On August 17, 1991, an 8-hour tidal influence study was conducted at the site. The purpose of the study was to observe water level fluctuations over a higher high water and lower low water tidal event and to determine the impact of the fluctuations on groundwater flow directions. Over the course of the study, water level measurements were obtained from each monitoring well. Table 5-4 summarizes groundwater elevation data collected from onsite monitoring wells during the study. Water level elevations were found to change up to 0.4 feet over the 8-hour interval. Groundwater flow direction was also slightly affected. Groundwater flow at the site was predominantly to the south during the study, but was found to change from southwesterly to southeasterly over the eight hour study. Figures 5-3 through 5-6 show the changes in water elevations and groundwater flow directions for times from 0815 to 1610 hours.

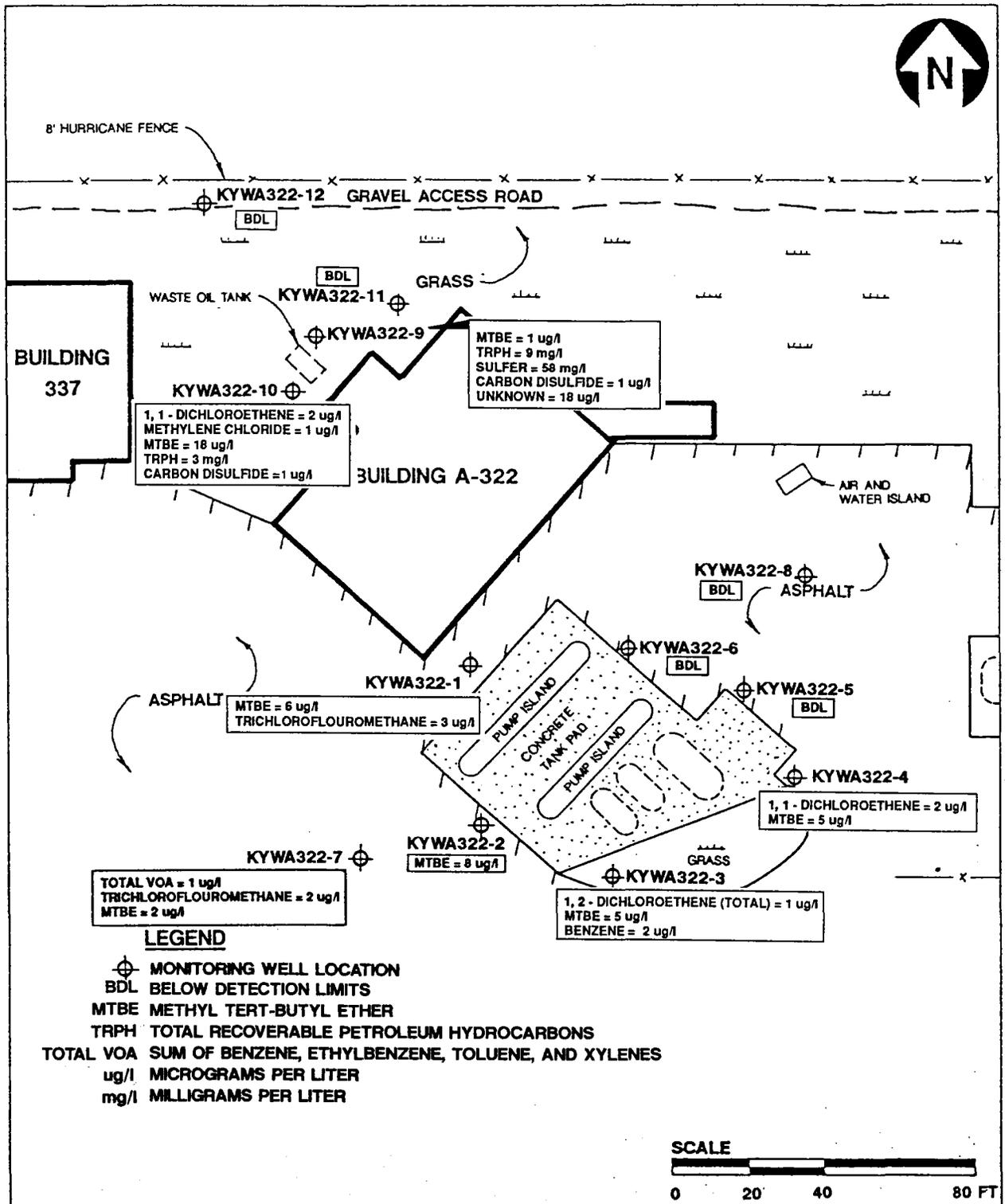
Graphs of water level elevations versus time for each well monitored during the study are in Appendix F. The predicted high and low tides, based on information from tide table published by the U.S. Commerce National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (1990), are shown on each graph.

5.3 POTABLE WELL SURVEY AND GROUNDWATER CLASSIFICATION. There are no official potable wells in the Key West area. Potable water in the area is imported from mainland Florida through the Florida Keys Aqueduct. The volume of fresh groundwater in the Key West area is limited. Small lenses of fresh groundwater exist in the area, but these lenses are subject to saltwater intrusion (Black, Crow, and Eidness, 1977).

Groundwater in the Key West area is classified as G-III groundwater for the following reasons.

- There are no official potable wells in the Key West area.
- Water quality data indicate that the surficial aquifer is an unlikely potable water source (McKenzie, 1990).
- Total dissolved solid (TDS) concentrations in the water table aquifer are often in excess of 10,000 parts per million (ppm) (McKenzie, 1990).
- TDS concentrations, calculated from specific conductance measurements of groundwater at the site, were in excess of 35,000 ppm.

5.4 PRECISION TANK TEST RESULTS. The three active USTs at the site, designated as tanks A322-A, A322-B, and A322-C, underwent precision tank testing. Testing was performed by Acutest Corporation of Houston, Texas in May, 1989. Tank A322-A contains unleaded plus gasoline, tank A322-B contains super unleaded gasoline, and tank A322-C contains unleaded gasoline. Test results indicate that all three storage systems are leaking. Tank A322-B also showed signs of visible leakage. Precision tank testing results are shown in Table 5-5.



**FIGURE 5-2**  
**GROUNDWATER CONTAMINATION**  
**DISTRIBUTION**  
**BUILDING A-32**  
**BASE EXCHANGE SERVICE STATION**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**BOCA CHICA FIELD**  
**KEY WEST, FLORIDA**  
**NAVAL AIR STATION**

**TABLE 5-3**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - WASTE OIL TANK AREA**  
**AUGUST 21, 1991**  
**BUILDING A-322, BASE EXCHANGE SERVICE STATION**  
**BOCA CHICA FIELD, NAS KEY WEST, FLORIDA**

COMPOUND	MONITORING WELL IDENTIFICATION						REGULATORY STANDARDS CLASS G-III GROUNDWATER*
	KYW-A322-9/DUP	KYW-A322-10	KYW-A322-11	KYW-A322-12	TRIP BLANK	EQUIPMENT BLANK	
Laboratory Designation:	BCWOTMW-1	BCWOTMW-2	BCWOTMW-3	BCWOTMW-4			
<b>PURGABLE HALOCARBONS (601), ug/L</b>							
1,1-Dichloroethane	BDL/BDL	2	BDL	BDL	BDL	BDL	
<b>PURGABLE AROMATICS, ug/L</b>							
Methylene Chloride	BDL/BDL	1	BDL	BDL	10	BDL	
Toluene	BDL/BDL	BDL	BDL	BDL	1	BDL	
Trichlorofluoromethane	BDL/BDL	BDL	BDL	BDL	37	BDL	
Methyl-tert-butyl ether (MTBE)	BDL/1	18	BDL	BDL	BDL	BDL	
Total Recoverable Petroleum Hydrocarbons (TRPH), mg/L	3/9	3	BDL	BDL	BDL	BDL	5
<b>OTHER CONTAMINANTS</b>							
Carbon disulfide, ug/L	1/BDL	1	BDL	BDL	BDL	BDL	
Sulfur, ug/L**	58/46	BDL	BDL	BDL	BDL	BDL	
1,4-Diethyl benzene, ug/L**	2/3	BDL	BDL	BDL	BDL	BDL	
Methyl (1-Methyl ethyl) Benzene, ug/L**	BDL/BDL	190	BDL	BDL	BDL	BDL	
3,6,6-trimethyl bicyclo[3.1.1] hept-2-ene, ug/L**	BDL/BDL	3	BDL	BDL	BDL	BDL	
3,7,7-trimethyl bicyclo[4.1.0] hept-2-ene, ug/L**	BDL/BDL	5	BDL	BDL	BDL	BDL	
Acetic Acid, Trifluoro, ug/L**	BDL/BDL	BDL	BDL	26	BDL	BDL	
1,3-Benzodioxole-5-carboxylic acid, ug/L**	BDL/BDL	BDL	BDL	79	BDL	BDL	
3-Ethenyl-1-1-dimethyl-1,4-cyclohexadiene, ug/L**	BDL/2	BDL	BDL	BDL	BDL	BDL	
Unknown, ug/L**	18/24	-	-	300	-	-	

Notes:

\* Florida Department of Environmental Regulation, Division of Waste Management.  
 "No Further Action and Monitoring Only Guidelines for Petroleum Contaminated  
 Sites", October, 1990.

ug/L = micrograms per liter  
 BDL = Below Detection Limit  
 mg/L = milligrams per liter

\*\*Tentatively Identified Compounds

Lab data sheets are included in Appendix A

**TABLE 5-4**  
**TOP OF CASING ELEVATIONS, DEPTH TO GROUNDWATER, AND GROUNDWATER ELEVATIONS**  
**FROM TIDAL INFLUENCE STUDY OF AUGUST 17, 1991 - 8-HOUR PERIOD**  
**BUILDING A-322, BASE EXCHANGE SERVICE STATION**  
**BOCA CHICA FIELD, NAS KEY WEST, FLORIDA**

WELL I.D.	24-HOUR TIME:	081:		092:		101:		111:		121:		
		TOC ELEV.	DEPTH TO WATER	WATER ELEV.								
KYW-A322-1		4.41	2.42	1.99	2.44	1.97	2.62	1.79	2.70	1.71	2.74	1.67
KYW-A322-2		4.41	2.46	1.95	2.48	1.93	2.68	1.73	2.76	1.65	2.84	1.57
KYW-A322-3		4.35	2.47	1.88	2.48	1.87	2.66	1.69	2.76	1.59	2.76	1.59
KYW-A322-4		3.42	1.51	1.91	1.63	1.79	1.70	1.72	1.77	1.65	1.82	1.60
KYW-A322-5		4.12	2.16	1.96	2.22	1.90	2.31	1.81	2.36	1.76	2.41	1.71
KYW-A322-6		4.29	2.31	1.98	2.35	1.94	2.40	1.89	2.45	1.84	2.48	1.81
KYW-A322-7		3.65	1.91	1.74	1.91	1.74	1.91	1.74	1.90	1.75	1.90	1.75
KYW-A322-8		4.18	2.18	2.00	2.21	1.97	2.20	1.98	2.24	1.94	2.24	1.94
KYW-A322-9		3.97	2.04	1.93	2.05	1.92	2.05	1.92	2.06	1.91	2.04	1.93
KYW-A322-10		4.34	2.43	1.91	2.44	1.90	2.45	1.89	2.45	1.89	2.45	1.89
KYW-A322-11		3.84	1.87	1.97	1.88	1.96	1.91	1.93	1.91	1.93	1.90	1.94
KYW-A322-12		3.94	2.02	1.92	2.02	1.92	2.03	1.91	2.04	1.90	2.04	1.90

WELL I.D.	24-HOUR TIME:	131:		141:		151:		161:		
		TOC ELEV.	DEPTH TO WATER	WATER ELEV.						
KYW-A322-1		4.41	2.76	1.65	2.75	1.66	2.74	1.67	2.73	1.68
KYW-A322-2		4.41	2.85	1.56	2.84	1.57	2.84	1.57	2.83	1.58
KYW-A322-3		4.35	2.82	1.53	2.84	1.51	2.84	1.51	2.83	1.52
KYW-A322-4		3.42	1.85	1.57	1.85	1.57	1.84	1.58	1.84	1.58
KYW-A322-5		4.12	2.44	1.68	2.46	1.66	2.49	1.63	2.46	1.66
KYW-A322-6		4.29	2.53	1.76	2.55	1.74	2.55	1.74	2.55	1.74
KYW-A322-7		3.65	1.91	1.74	1.93	1.72	1.94	1.71	1.95	1.70
KYW-A322-8		4.18	2.26	1.92	2.27	1.91	2.28	1.90	2.29	1.89
KYW-A322-9		3.97	2.03	1.94	2.09	1.88	2.10	1.87	2.11	1.86
KYW-A322-10		4.34	2.46	1.88	2.49	1.85	2.49	1.85	2.50	1.84
KYW-A322-11		3.84	1.91	1.93	1.92	1.92	1.93	1.91	1.93	1.91
KYW-A322-12		3.94	2.04	1.90	2.06	1.88	2.05	1.89	2.05	1.89

NOTES:

TOC = Top of Casing

High Tides: 0420 & 1811 o'clock

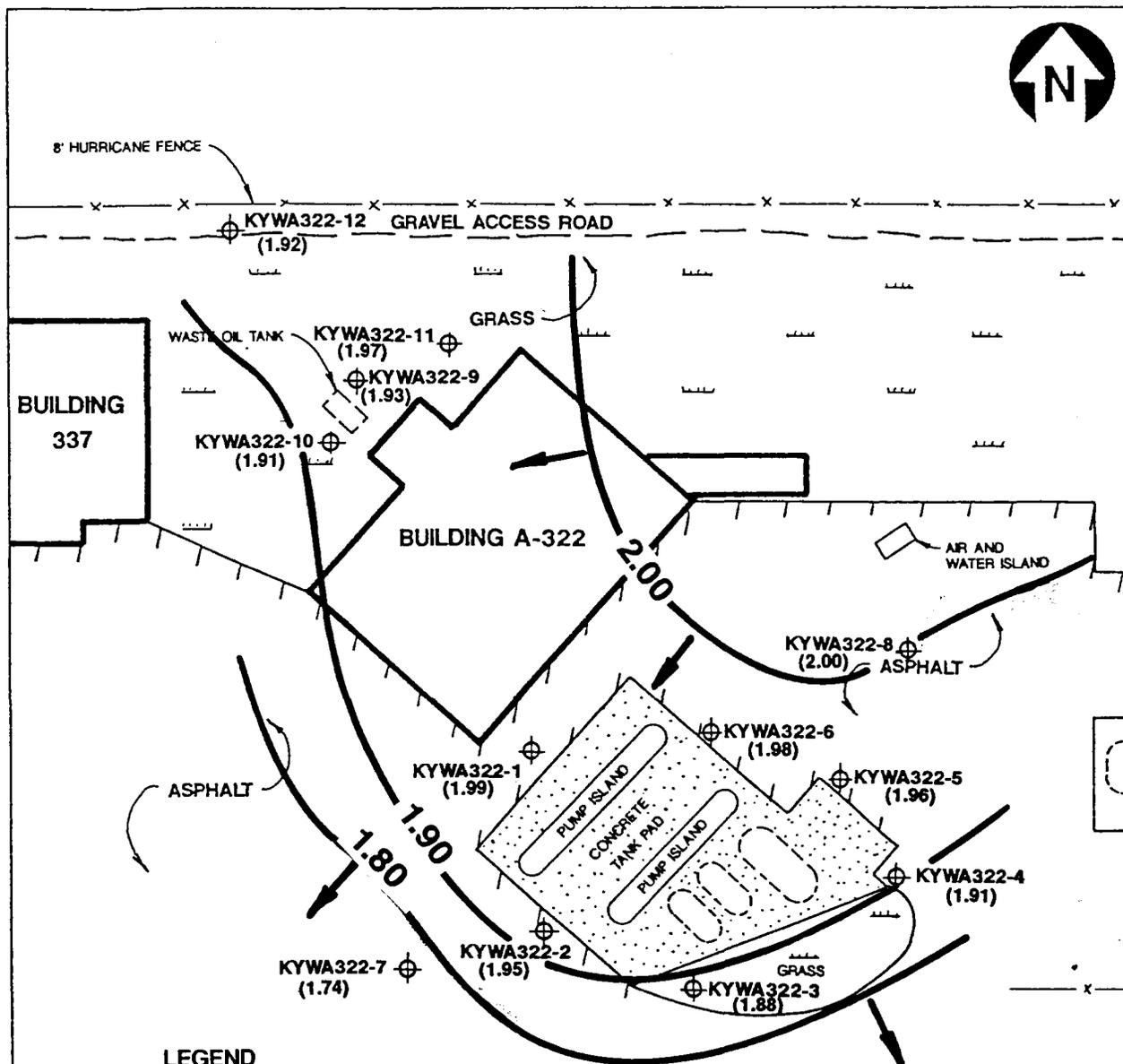
Low Tides: 1149 & 2223 o'clock

**ALL MEASUREMENTS IN FEET.**

**TABLE 5-5  
PRECISION TANK TEST RESULTS  
MAY 8, 1989  
BUILDING A-322, BASE EXCHANGE SERVICE STATION  
BOCA CHICA FIELD, NAS KEY WEST, FLORIDA**

TANK NUMBER	PRODUCT	TANK VOLUME (gallons)	HIGH LEVEL LEAK RATE (GPH)	LOW LEVEL LEAK RATE (GPH)	FULL SYSTEM	TANK ONLY	DISTRIBUTION PIPING ONLY
A322-A	Unl. Plus	9,403	0.16	-0.02	Fail	Pass	Pass
A322-B	Super Unl.	5,893	VisibleLeak		Fail	Fail	Pass
A322-C	Unleaded	5,893	0.28	0.01	Fail	Pass	Pass

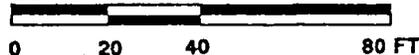
*Note: GPH = gallons per hour*



**LEGEND**

-  MONITORING WELL LOCATION
-  2.00 WATER TABLE EQUIPOTENTIAL LINES  
CONTOUR INTERVAL = 0.10 FT
-  (1.74) WATER TABLE ELEVATION (FT)
-  GROUNDWATER FLOW DIRECTION

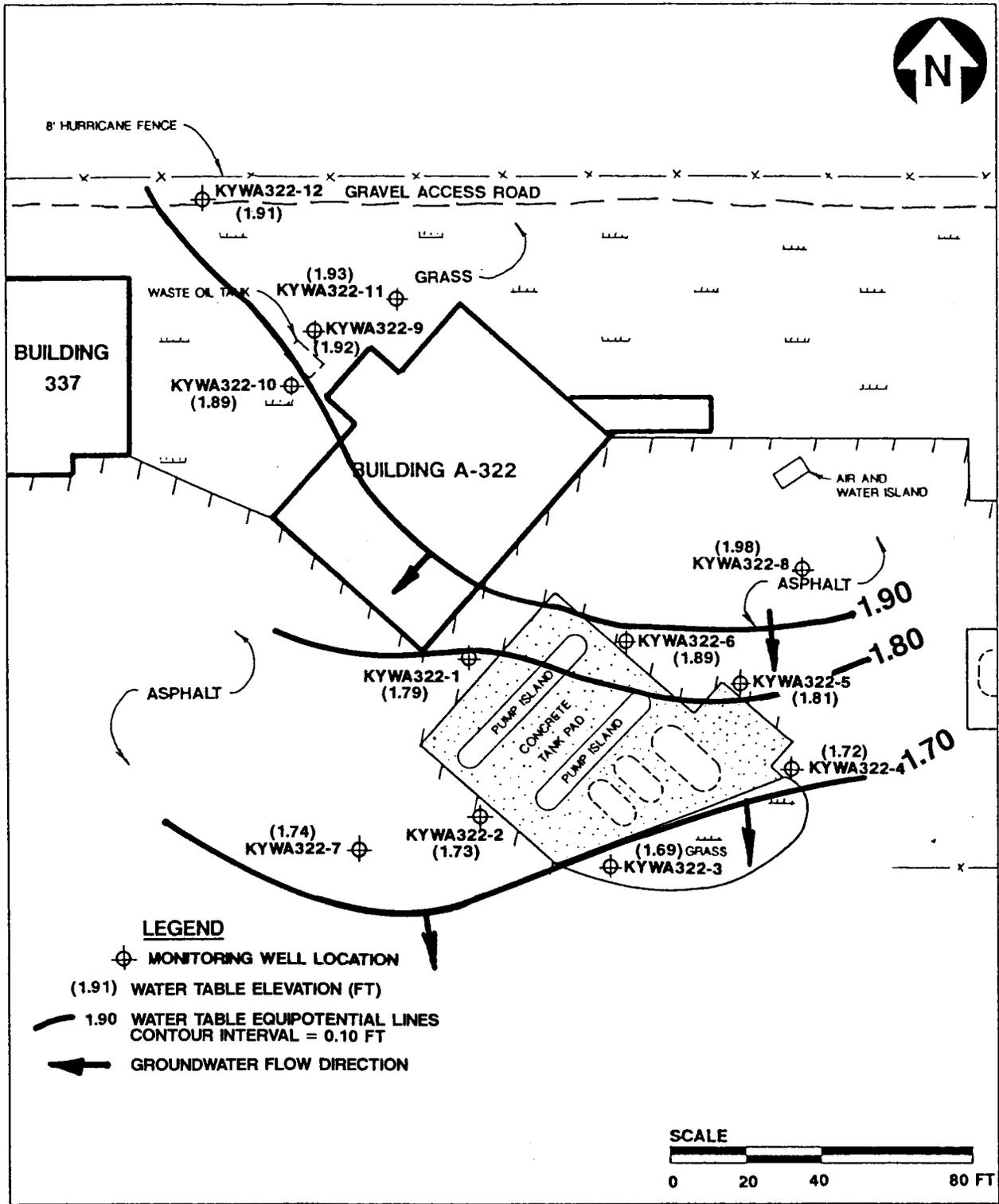
**SCALE**



**FIGURE 5-3**  
**WATER TABLE ELEVATIONS**  
**AUGUST 17, 1991, 0815 HRS**  
**BUILDING A-322**  
**BASE EXCHANGE SERVICE STATION**



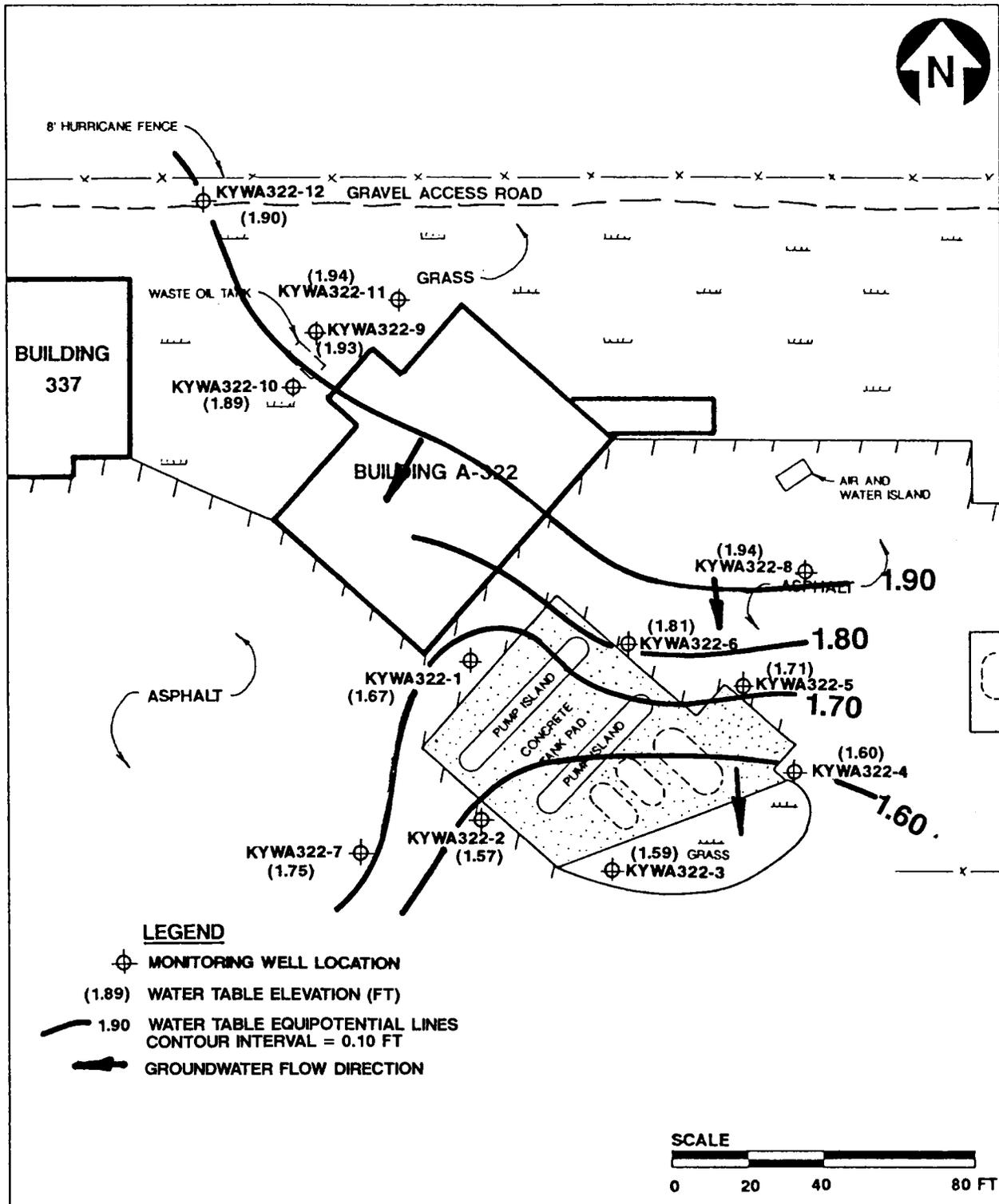
**CONTAMINATION**  
**ASSESSMENT REPORT**  
**BOCA CHICA FIELD**  
**KEY WEST, FLORIDA**  
**NAVAL AIR STATION**



**FIGURE 5-4**  
**WATER TABLE ELEVATIONS**  
**AUGUST 17, 1991, 1013 HRS**  
**BUILDING A-322**  
**BASE EXCHANGE SERVICE STATION**



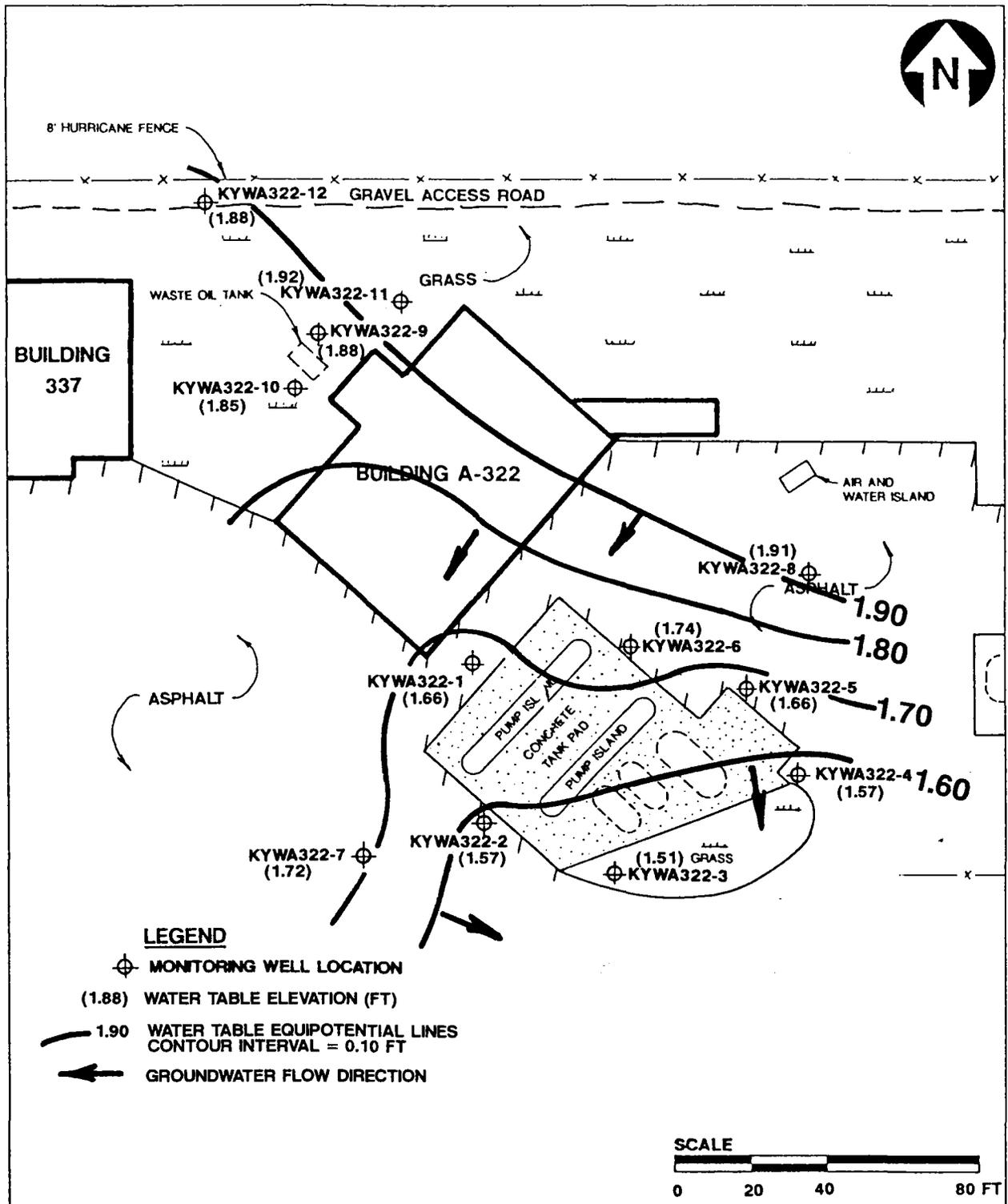
**CONTAMINATION**  
**ASSESSMENT REPORT**  
**BOCA CHICA FIELD**  
**KEY WEST, FLORIDA**  
**NAVAL AIR STATION**



**FIGURE 5-5**  
**WATER TABLE ELEVATIONS**  
**AUGUST 17, 1991, 1215 HRS**  
**BUILDING A-322**  
**BASE EXCHANGE SERVICE STATION**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**BOCA CHICA FIELD**  
**KEY WEST, FLORIDA**  
**NAVAL AIR STATION**



**FIGURE 5-6**  
**WATER TABLE ELEVATIONS**  
**AUGUST 17, 1991, 1415 HRS**  
**BUILDING A-322**  
**BASE EXCHANGE SERVICE STATION**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**BOCA CHICA FIELD**  
**KEY WEST, FLORIDA**  
**NAVAL AIR STATION**

## 6.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

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

- The surficial aquifer in the Key West area is classified as a Class G-III groundwater source. There are no official potable wells in the Key West area. Groundwater from the surficial aquifer has been designated as an unlikely source of potable water (McKenzie, 1990).
- Surficial and shallow subsurface materials are composed of white, slightly to heavily weathered, silty, hard limestone.
- No excessively petroleum contaminated soils were identified in the OVA headspace survey.
- Groundwater was found at depths of 2 to 3 feet bls.
- The direction of groundwater flow in the surficial aquifer is predominantly to the south. Tidal fluctuations appear to cause slight changes in the groundwater flow direction. During an 8-hour tidal influence study, groundwater flow direction varied from southwest to southeast.
- The calculated hydraulic conductivity in the surficial aquifer is from 3.8 ft/day.
- The average hydraulic gradient is approximately  $4.5 \times 10^{-3}$  ft/ft.
- Groundwater contamination at the site appears to be low. Groundwater contaminants identified during the investigation at the gasoline tank area were below regulatory levels. At the waste oil tank area, only one well sample, taken from monitoring well KYW-A322-9, slightly exceeded regulatory standards. The TRPH concentration in this well was 9 ppm.

6.2 CONCLUSIONS. In the area of the waste oil tank the contamination only slightly exceeds regulatory standards and is restricted to the vicinity of the tank and monitoring well KYW-A322-9. At the gasoline tank area, although precision tank tests revealed leakage of the fuel systems, contamination levels are below regulatory levels.

6.3 RECOMMENDATIONS. Since precision tank testing indicated that the gasoline UST system was leaking, the system has been shut down and is scheduled to be removed and replaced with an aboveground system. The waste oil tank will also be removed. If no free product or excessively contaminated soils are found during tank removal activities, a No Further Action Proposal (NFAP) will be recommended. If free product and/or excessively contaminated soils are found, the contamination will be removed during initial remedial activities, and a groundwater monitoring plan will be implemented. The scope of the groundwater monitoring plan will depend on the extent of contamination found during tank removal activities.

7.0 PROFESSIONAL REVIEW CERTIFICATION

The CA contained in this 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 revealed 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 CAR was developed for the NAS, Key West Base Exchange Service Station (Facility A-322), Boca Chic Field, and should not be construed to apply to any other site.

\_\_\_\_\_  
Kenneth L. Busen  
Professional Geologist  
P.G. No. 0000191

\_\_\_\_\_  
Date

## 8.0 REFERENCES

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## APPENDIX A

### SITE CONDITIONS

#### Physiography

The State of Florida is divided into three geomorphic zones: the northern or proximal zone, the central or mid-peninsular zone, and the southern or distal zone (White, 1970). The Key West area is part of the Lower Keys and is located entirely within the southern or distal zone. This area is characterized by a sparse veneer of residual soil and surface vegetation overlying eroded limestone. The topography of the Lower Keys is generally smooth and flat in the center of the key and slopes gently downward toward the shoreline (White, 1970). Ground elevations at the site are approximately 10 feet above mean sea level.

#### Regional Hydrogeology

The Lower Keys are overlain by an oolitic member of the Pleistocene Miami Limestone. The Key Largo coral reef limestone underlies the Miami Limestone. Hoffmeister (1974) reported that the Miami Limestone is 27 feet thick and the Key Largo Limestone is greater than 270 feet thick in the western part of Key West. The Key Largo Limestone is generally more porous than the Miami Limestone. Surficial and shallow subsurface features in the area have often been altered by imported fill material.

The surficial aquifer in the Key West area is unconfined. The water table is found at shallow depths in the area, generally occurring from less than 1 foot to 10 feet below land surface. Water table elevations can be influenced by local rainfall and tidal fluctuations (McKenzie, 1990). The surficial aquifer is contained within the Miami Limestone, the underlying Key Largo Limestone, and surficial fill materials. The limestones generally contain brackish or saline water. Recharge to the aquifer is directly from precipitation, and infiltration rates are rapid. Groundwater flow discharge is to surrounding surface waters.

The surficial aquifer contains a small freshwater lens that floats on the saline groundwater. The lens, which is very thin (from less than 1 foot near the edge to an average of 5 feet near the center), is located below the center of the western half (Old Town) of the island. The lens contains about 20 million gallons of freshwater during the dry season and about 30 million gallons during the wet season.

The water table fluctuates and the configuration of the lens constantly changes, largely as a result of tidal effects. On the average the lens is approximately 8,000 feet in length by 4,000 feet in width. Water quality data indicate that the lens is an unlikely source of potable water (McKenzie, 1990).

APPENDIX B  
LITHOLOGIC LOGS

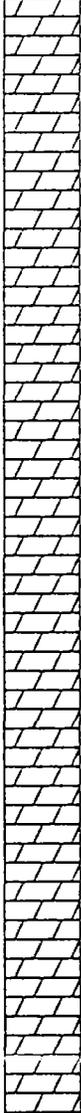
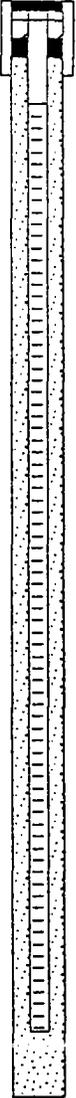
TITLE: NAS Key West, Boca Chica Field		LOG of WELL: KYW-A322-1	BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7519-30
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 7/11/91	COMPLTD: 7/11/91
METHOD: HSA	CASE SIZE: 2 inch	SCREEN INT.: 1.3' to 11.3'	PROTECTION LEVEL: D
TOC ELEV.: 3.41 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO $\nabla$ 2.74 FT.
LOGGED BY: A. DeSandro	WELL DEVELOPMENT DATE: 7/11/91		SITE: Base Exchange

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5		1.9/2 N.O.	Limestone: White, highly weathered, silty, some sand and shell fragments			50/3"	
10		0.5/2 N.O.	Limestone: White to very light gray, hard.			50/3"	
15							

TITLE: NAS Key West, Boca Chica Field		LOG of WELL: KYW A322-2	BORING NO.
CLIENT: SOUTHNAVFACENGD COM		PROJECT NO: 7519-30	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 7/11/91	COMPLTD: 7/11/91
METHOD: HSA	CASE SIZE: 2 inch	SCREEN INT.: 1.3' to 11.3'	PROTECTION LEVEL: D
TOD ELEV.: 4.41 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO $\nabla$ 2.84 FT.
LOGGED BY: A. DeSandro	WELL DEVELOPMENT DATE: 7/12/91		SITE: Base Exchange

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			2/2	GC	Limestone; Gray and brown, hard, highly weathered.			10, 8, 11, 17	
10			2/2	N.O.	Limestone: White to very light gray, hard.			13, 40, 38, 42	
15									

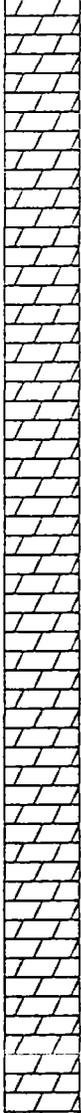
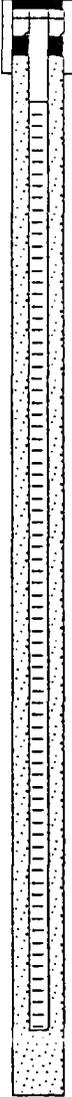
TITLE: NAS Key West, Boca Chica Field		LOG of WELL: KYW A322-3	BORING NO.
CLIENT: SOUTHNAVFACENGBOM		PROJECT NO: 7519-30	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 7/11/91	COMPLTD: 7/11/91
METHOD: HSA	CASE SIZE: 2 inch	SCREEN INT.: 1.3' to 11.3'	PROTECTION LEVEL: D
TOC ELEV.: 4.35 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO $\nabla$ 2.82 FT.
LOGGED BY: A. DeSandro	WELL DEVELOPMENT DATE: 7/12/91		SITE: Base Exchange

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			2/2	G.C.	Limestone: White to very light gray, hard, moderately weathered.			9,7,8,5	
10			1.5/2	G.C.				11,10,17,13	
15									

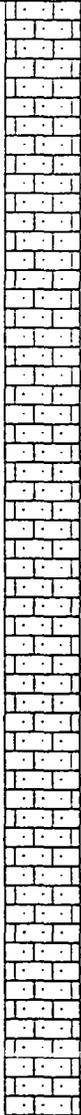
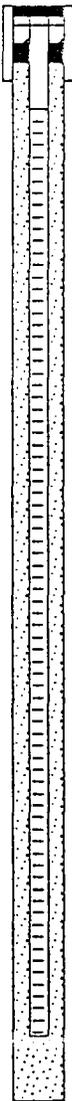
TITLE: NAS Key West, Boca Chica Field		LOG of WELL: KYW A322-4	BORING NO.
CLIENT: SOUTHNAVFACENGBOM		PROJECT NO: 7519-30	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 7/11/91	COMPLTD: 7/11/91
METHOD: HSA	CASE SIZE: 2 inch	SCREEN INT.: 1.3' to 11.3'	PROTECTION LEVEL: D
TOD ELEV.: 4.42 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO $\nabla$ 1.82 FT.
LOGGED BY: A. DeSandro	WELL DEVELOPMENT DATE: 7/12/91		SITE: Base Exchange

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			2/2	G.C.	Limestone: White, highly weathered.			9,7,8,5	
10			1,6/2	G.C.				11,10,17,13	
15									

TITLE: NAS Key West, Boca Chica Field		LOG of WELL: KYW A322-5	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7519-30	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 7/11/91	COMPLTD: 7/11/91
METHOD: HSA	CASE SIZE: 2 inch	SCREEN INT.: 1.3' to 11.3'	PROTECTION LEVEL: D
TOC ELEV.: 4.12 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO $\nabla$ 2.41 FT.
LOGGED BY: A. DeSandro	WELL DEVELOPMENT DATE: 7/11/91		SITE: Base Exchange

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			1.8/2	G.C.	Limestone: White to very light gray, hard, slightly to moderately weathered.			9,8,8,5	
10			1.8/2	G.C.				N.O.	
15									

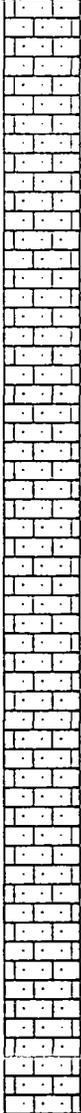
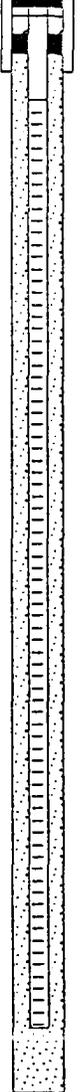
TITLE: NAS Key West, Boca Chica Field		LOG of WELL: KYW A322-B	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7519-30	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 7/12/91	COMPLTD: 7/12/91
METHOD: HSA	CASE SIZE: 2 inch	SCREEN INT.: 1.3' to 11.3'	PROTECTION LEVEL: D
TOC ELEV.: 4.28 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO $\nabla$ 2.48 FT.
LOGGED BY: A. DeSandro	WELL DEVELOPMENT DATE: 7/16/91		SITE: Base Exchange

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5		1.6/2	G.C.	Limestone: White, highly weathered.			10,21,15,30	
10		2/2	G.C.				7,19,27,42	
15								

TITLE: NAS Key West, Boca Chica Field		LOG of WELL: KYW A322-7	BORING NO.
CLIENT: SOUTHNAVFACENCOM			PROJECT NO: 7519-30
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 8/8/91	COMPLTD: 8/8/91
METHOD: HSA	CASE SIZE: 2 inch	SCREEN INT.: 1.3' to 11.3'	PROTECTION LEVEL: D
TOT ELEV.: 3.65 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO $\nabla$ 1.90 FT.
LOGGED BY: A. DeSandro	WELL DEVELOPMENT DATE: 8/8/91		SITE: Base Exchange

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/8-IN	WELL DATA
5					Limestone: White, highly weathered.	[Symbol]			[Diagram]
10						[Symbol]			
15						[Symbol]			

TITLE: NAS Key West, Boca Chica Field		LOG of WELL: KYW A322-8	BORING NO.
CLIENT: SOUTHNAVFACENSGDOM		PROJECT NO: 7519-30	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 8/8/91	COMPLTD: 8/8/91
METHOD: HSA	CASE SIZE: 2 inch	SCREEN INT.: 1.3' to 11.3'	PROTECTION LEVEL: D
TOC ELEV.: 4.18 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO $\nabla$ 2.24 FT.
LOGGED BY: A. DeSandro	WELL DEVELOPMENT DATE: 8/8/91		SITE: Base Exchange

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY SAMPLE	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5				Limestone: White, highly weathered.				
10								
15								

TITLE: NAS Key West, Boca Chica Field		LOG of WELL: KYW-A322-10	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7519-30	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 7/16/91	COMPLTD: 7/16/91
METHOD: HSA	CASE SIZE: 2 inch	SCREEN INT.: 1.3' to 11.3'	PROTECTION LEVEL: D
TOC ELEV.: 3.97 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO $\nabla$ 2.04 FT.
LOGGED BY: A. DeSandro	WELL DEVELOPMENT DATE: 7/16/91		SITE: Waste Oil Tank Area

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY SAMPLE	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			0.4/2	G.C.	[Lithologic symbol: brick pattern]		28,50/2"	[Well diagram showing casing and screen]
				Limestone: white, hard, highly weathered. Note strong hydrocarbon (heavy oil) in boring cuttings.				
10			0.8/2	G.C.			28,42,50/2"	
15								

TITLE: NAS Key West, Boca Chica Field		LOG of WELL: KYW A322-11	BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7518-30
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 7/16/91	COMPLTD: 7/16/91
METHOD: HSA	CASE SIZE: 2 inch	SCREEN INT.: 1.3' to 11.3'	PROTECTION LEVEL: D
TOC ELEV.: 4.34 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO $\nabla$ 2.45 FT.
LOGGED BY: A. DeSandro	WELL DEVELOPMENT DATE: 7/16/91		SITE: Waste Oil Tank Area

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY SAMPLE	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5		0.8/2	G.C.	Limestone: White and brown, highly weathered.	[Brick pattern symbol]		17,23,14,29	[Well diagram showing casing and screen]
10		1/2	G.C.	Limestone: White, hard, moderately weathered.	[Diagonal line pattern symbol]		28,37,50/3"	
15								

TITLE: NAS Key West, Boca Chica Field		LOG of WELL: KYW A322-12	BORING NO.
CLIENT: SOUTHNAVFACENCOM			PROJECT NO: 7519-30
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 8/8/91	COMPLTD: 8/8/91
METHOD: HSA	CASE SIZE: 2 inch	SCREEN INT.: 1.3' to 11.3'	PROTECTION LEVEL: D
TOC ELEV.: 3.84 FT.	MONITOR INST.: OVA	TOT DPTH: 12FT.	DPTH TO $\nabla$ 1.90 FT.
LOGGED BY: A. DeSandro	WELL DEVELOPMENT DATE: 8/8/91		SITE: Waste Oil Tank Area

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0								
5								
10				Limestone: White, hard, moderately to highly weathered.				
15								

## APPENDIX C

### INVESTIGATIVE METHODOLOGIES AND PROCEDURES

#### Soil borings

Soil borings were used to assess the degree of soil contamination at the site and to aid in the placement of subsequent monitoring wells. Soil borings were advanced into the water table using rotary drilling and hollow-stem augers. For each boring, a soil sample was collected immediately above the soil-groundwater interface. Samples were collected with a standard penetration test (SPT) split-spoon sampler. Samples were placed in 16-ounce glass jars, and headspace analysis was performed with an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID).

#### Monitoring well construction

All monitoring wells were constructed of 2-inch diameter, schedule 40, polyvinyl chloride (PVC) casing. The bottom 10 feet of each well was screened with 2-inch diameter, 0.010-inch slotted, PVC well screen. The shallow water table conditions necessitated limiting the thickness of the sand filter pack, bentonite seal, and grout above the screened interval. A 6/20 grade silica sand filter pack was placed in the annular space around each well to approximately 7 inches above the top of the screen. A 4-inch thick bentonite seal was then placed on top of the filter pack. The remaining annular space was grouted to the surface with neat cement. A protective traffic-bearing vault was installed to complete each well. Each monitoring well was equipped with a locking well cap. Typical monitoring well construction details are presented in Figure C-1.

#### Groundwater elevation measurements and tidal influence study

The elevation of the water table was estimated by surveying the top of the well casing of each monitoring well to a common reference datum. No benchmark was located in the area; therefore, an arbitrary reference elevation of 10.00 feet was established. Groundwater levels were measured using an electronic water level indicator. Water level elevations were calculated by subtracting the measured depth to groundwater from the elevation at the top of the well casing. To assess the effect of tidal fluctuations on water level elevations, water elevations were measured over an 8 hour period.

#### Groundwater sampling

Groundwater samples were collected from site monitoring wells on August 21, 1991. The groundwater samples were collected in accordance with ABB-ES' FDER-approved CompQAPP. Before sampling, monitoring wells were properly developed and purged with Teflon™ bailers. Purging continued until a minimum of five well volumes had been removed. Groundwater samples were then collected, and the samples were placed into appropriate containers. The containers were labeled, placed on ice, and shipped under chain of custody to Wadsworth/Alert Laboratories in Tampa, Florida, for analyses. Pursuant to FDER Chapter 17-770, FAC groundwater samples

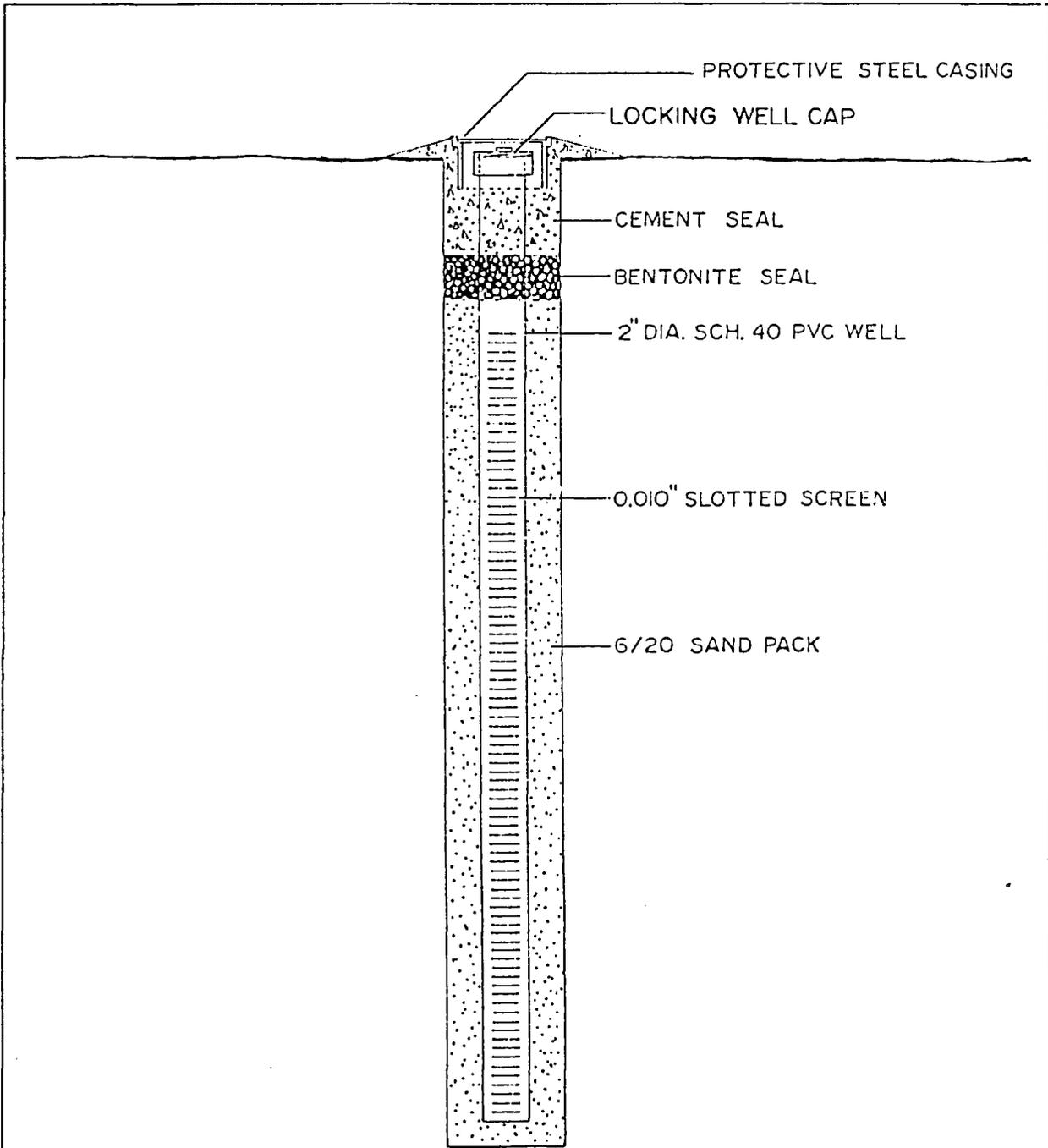
collected from monitoring wells at the gasoline tank area underwent analyses for USEPA Methods 601, 602, ethylene dibromide, and lead. Monitoring well KYW-A322-4 was sampled in duplicate. Samples collected from the waste oil tank area underwent analyses for USEPA Methods 418.1, 624, 625, and the metals arsenic, cadmium, chromium, and lead. Monitoring well KYW-A322-9 was sampled in duplicate. Field blanks, trip blanks, and equipment blanks were also analyzed.

#### Slug tests

No aquifer slug tests were performed on site monitoring wells. Instead, the aquifer slug test data from monitoring well KYW-A317-5 at the adjacent Public Works Department Motor Pool was used to assess the hydraulic conductivity of the surficial aquifer. The slug was constructed of 1-inch outside diameter PVC pipe, 5 feet in length. The slug was filled with sand and capped watertight at both ends. Water level changes in the monitoring wells were recorded with a data logger and pressure transducer.

The pressure transducer was suspended less than 6 inches above the bottom of the well and the initial water level was recorded prior to beginning the test. The slug was then lowered into the well until it was totally submerged beneath the water table. Following recovery, the slug was quickly removed, and water level measurements were recorded until the water level recovered. Three rising head tests were conducted for each well in order to obtain an average recovery response. Slug test results are attached in Appendix D.

Hydraulic conductivities were calculated from slug test data based on the analytical method of Bouwer and Rice (1976) for partially penetrating wells screened in an unconfined aquifer. The computer program, AQTESOLV™ (Geraghty and Miller, 1989) was used to calculate a hydraulic conductivity (K) value based on linear regression of the data gathered during the slug test.



**FIGURE C-1**  
**TYPICAL MONITORING WELL**  
**CONSTRUCTION DIAGRAM**  
**BUILDING A-322**  
**BASE EXCHANGE SERVICE STATION**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**BOCA CHICA FIELD**  
**NAVAL AIR STATION**  
**KEY WEST, FLORIDA**

APPENDIX D  
AQUIFER SLUG TEST RESULTS AND CALCULATIONS

## AQUIFER SLUG TEST CALCULATIONS

### Average pore water Velocity Calculations

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

$$v = (KI_{av})/n$$

where

v = average pore water velocity (ft/day),  
K = hydraulic conductivity (ft/day),  
 $I_{av}$  = average hydraulic gradient across site =  $4.5 \times 10^{-3}$  ft/ft, and  
n = estimated porosity.

Using an estimated porosity of 22 percent (Davis and DeWiest, 1966), the average hydraulic gradient across the site ( $I_{av}$ ) and the hydraulic conductivity from well KYW-A322-5 ( $K = 3.8$  ft/day), the calculated average pore water velocity is:

$$v = (3.8 \text{ ft/day})(4.5 \times 10^{-3}) / 0.22$$

$$v = 7.8 \times 10^{-2} \text{ ft/day.}$$

### Transmissivity

Transmissivity, T, for the surficial aquifer, was estimated by using the following formula:

$$T = K * b$$

where

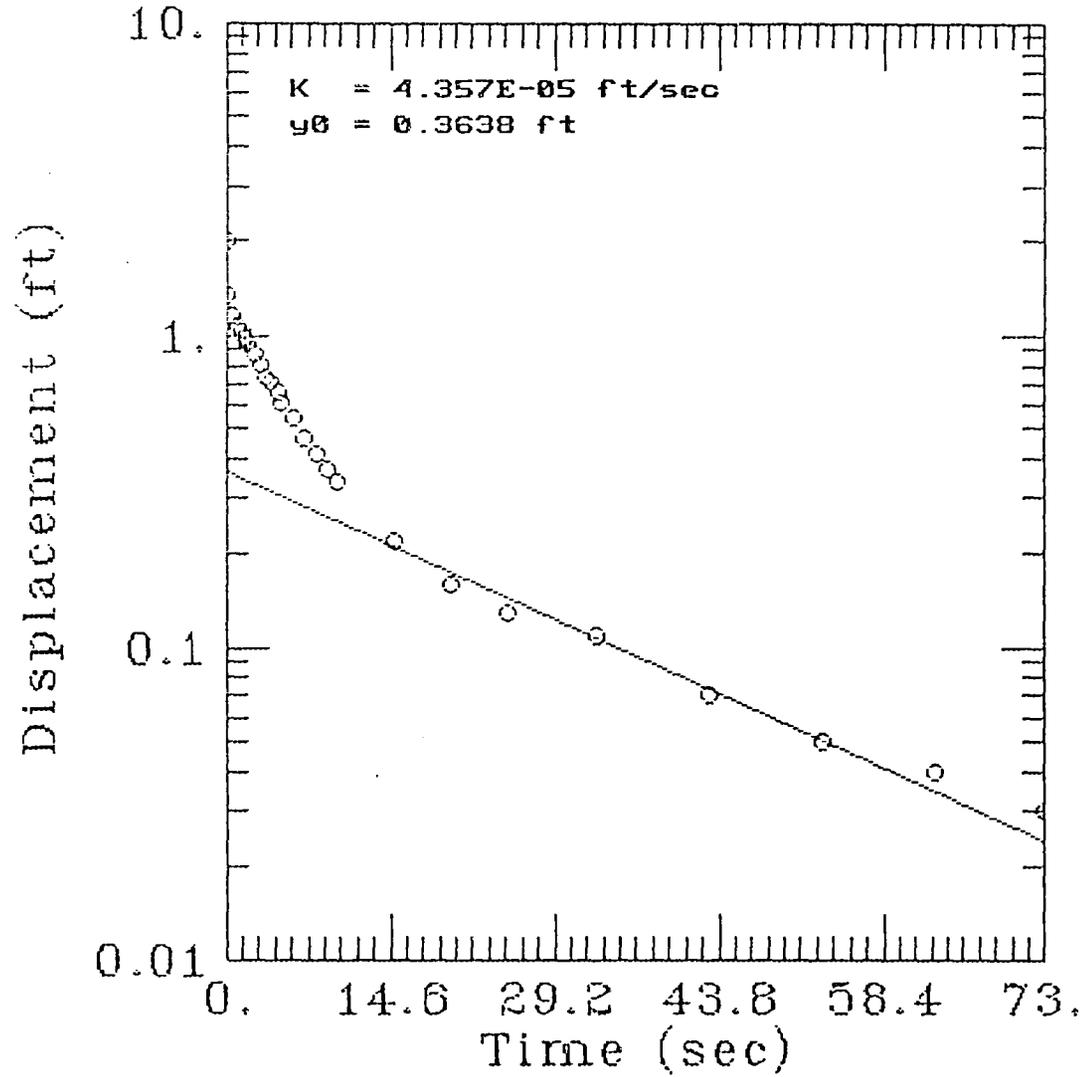
T = transmissivity (ft<sup>2</sup>/day),  
K = hydraulic conductivity (ft/day), and  
b = aquifer test interval or thickness (ft).

For monitoring well KYW-A317-5, using a K value of 3.8 ft/day and a b value of 9.52 ft, the calculated transmissivity is as follows:

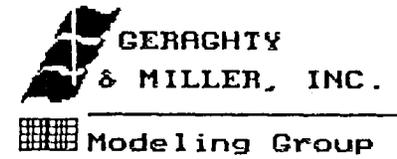
$$T = 3.8 \text{ ft/day} \times 9.52 \text{ ft}$$

$$T = 3.6 \times 10^1 \text{ ft}^2/\text{day.}$$

# NAS KEY WEST KYW-A317-5



AQTESOLV



APPENDIX E  
GROUNDWATER ANALYTICAL RESULTS

Laboratory Analytical Data  
Conversion Table

<u>Monitoring Well Designation</u>	<u>Laboratory Sample Designation</u>
KYWA322-1	BCBXMW-1
KYWA322-2	BCBXMW-2
KYWA322-3	BCBXMW-3
KYWA322-4	BCBXMW-4
KYWA322-4 Duplicate	BCDUPE 1
KYWA322-5	BCBXMW-5
KYWA322-6	BCBXMW-6
KYWA322-7	BCBXMW-7
KYWA322-8	BCBXMW-8
KYWA322-9	BCBXMW-1
KYWA322-9 Duplicate	BCWOTDUPE
KYWA322-10	BCWOTMW-2
KYWA322-11	BCWOTMW-3
KYWA322-12	BCWOTMW-4



WADSWORTH/ALERT  
LABORATORIES, INC.

### INVOLVEMENT

This report summarizes the analytical results of the NAS Key West - Truman Annex site submitted by ABB Environmental Services, Inc. to Wadsworth/ALERT Laboratories, Inc. who provided independent, analytical services for this project under the direction of Ken Busen. The samples were accepted into Wadsworth's Florida facility on 15, 17, 22 & 23 August 1991, 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 #

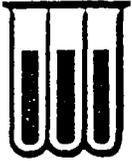
Narrative

1H1906-1

The surrogate compound recoveries for the polynuclear aromatic hydrocarbon analysis of this sample were outside of established laboratory control limits. A second extraction and analysis performed outside of the EPA recommended holding time demonstrated acceptable recoveries. Both sets of data are reported and may be interpreted accordingly.

1H2205-9,10,11

The acid extractable spiking compound recoveries in the laboratory control sample associated with these samples were outside of established laboratory control limits. Sample nine also demonstrated low acid surrogate recoveries. This batch is being re-extracted and re-analyzed outside of the EPA recommended holding time. These results will be forthcoming and may be interpreted accordingly at that time.



WADSWORTH/ALERT  
LABORATORIES, INC.

### 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
Volatile Organics	** EPA Method 624
Ethylene Dibromide	** EPA Method 601 Mod.
Base/Neutral Acid Extractables	** EPA Method 625
Polynuclear Aromatic Hydrocarbons	** EPA Method 625
METALS	
Arsenic	** EPA Method 206.2
Cadmium	** EPA Method 200.7
Chromium	** EPA Method 200.7
Lead	** EPA Method 239.2
MISCELLANEOUS	
Tot. Rec. Petroleum Hydrocarbons	** EPA Method 418.1

NOTE: \*\* Indicates usage of this method to obtain results for this report.

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 (SW846) 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.



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2205-1  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/29/91

SAMPLE ID: BCBXMW-1: NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

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	3
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	6

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)	105	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-1  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BCBXMW-1· NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

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)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-1  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BCBXMW-1 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	8/30/91	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2205-2  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

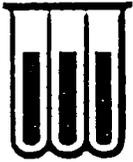
SAMPLE ID: BCBXMW-2 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30  
CERTIFICATION #: E84059  
VOLATILE ORGANICS HRS84297  
METHOD 601/602 - GC

---

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	8

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)	116	(78-122)
Trifluorotoluene (PID)	99	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-2  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BCBXMW-2 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

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)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-2  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BCBXMW-2 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	8/30/91	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2205-3  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BCBXMW-3 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	2	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	1
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	5

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)	109	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-3  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BCBXMW-3 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

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)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-3  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BCBXMW-3 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT  
SELECTED LIST

HRS84297

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Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	8/30/91	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2205-4  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BCBXMW-4 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	1
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	5

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)	105	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-4  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BCBXMW-4 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30  
CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

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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)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-4  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BCBXMW-4 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT  
SELECTED LIST

HRS84297

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Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	8/30/91	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2205-12  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BC DUPE 1 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	2
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	4

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)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-12  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/91

SAMPLE ID: BC DUPE 1 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

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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)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-12  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BC DUPE 1 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT  
SELECTED LIST

HRS84297

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Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	8/30/91	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2205-5  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BCBXMW-5 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

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 = 1 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	105	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-5  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BCBXMW-5 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

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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)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-5  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BCBXMW-5 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT  
SELECTED LIST

HRS84297

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Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	8/30/91	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2205-6  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BCBXMW-6 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

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)	106	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-6  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BCBXMW-6 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

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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)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB # : 1H2205-6  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BCBXMW-6 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT  
SELECTED LIST

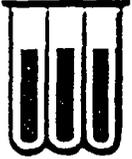
HRS84297

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Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	8/30/91	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2205-7  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BCBXMW-7 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30  
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	1
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	2
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	2

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)	107	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-7  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/91

SAMPLE ID: BCBXMW-7 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30  
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)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES; INC.  
LAB #: 1H2205-7  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BCBXMW-7 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT  
SELECTED LIST

HRS84297

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Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	8/30/91	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2205-8  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BCBXMW-8 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

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:	Z	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	106	(78-122)
Trifluorotoluene (PID)	99	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-8  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/91

SAMPLE ID: BCBXMW-8 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30  
CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

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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)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-8  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BCXMW-8 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30  
CERTIFICATION #: E84059  
METALS ANALYTICAL REPORT HRS84297  
SELECTED LIST

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Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	8/30/91	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2205-15  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: TRIP BLANK

NAS KEY WEST (BOCA CHICA FIELD)

CERTIFICATION #: E84059

VOLATILE ORGANICS  
METHOD 601/602 - GC

HRS84297

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	9
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	1
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	34
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)	110	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2205-14  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BC FIELD BLANK

NAS KEY WEST (BOCA CHICA FIELD)

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)	100	(78-122)
Trifluorotoluene (PID)	99	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-14  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/91

SAMPLE ID: BC FIELD BLANK

NAS KEY WEST (BOCA CHICA FIELD)

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)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-14  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BC FIELD BLANK      NAS KEY WEST (BOCA CHICA FIELD)  
CERTIFICATION #: E84059  
METALS ANALYTICAL REPORT      HRS84297  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	8/30/91	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2205-13  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/30/91

SAMPLE ID: BC EQUIPMENT BLANK NAS KEY WEST (BOCA CHICA FIELD)

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)	110	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-13  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/91

SAMPLE ID: BC EQUIPMENT BLANK NAS KEY WEST (BOCA CHICA FIELD)

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)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-13  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BC EQUIPMENT BLANK NAS KEY WEST (BOCA CHICA FIELD)

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT  
SELECTED LIST

HRS84297

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Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	8/30- 9/ 3/91	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2305-8  
MATRIX: WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/91

SAMPLE ID: BCWOTMW-1 NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
 ND\* (None Detected, lower detectable limit = 10 ug/L) as rec'd  
 ND\*\* (None Detected, lower detectable limit = ug/L) as rec'd  
 J (Detected, but below quantitation limit; estimated value)  
 B (Compound detected in method blank associated with this sample)  
 -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	84	(75-123)	(85-126)	(85-138)
Toluene-d8	97	(75-123)	(89-124)	(89-128)





WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, - INC.  
LAB #: 1H2305-8  
MATRIX: WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: 8/26/91  
DATE ANALYZED: 9/ 5/91

SAMPLE ID: BCWOTMW-1 NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30

CERTIFICATION #: E84059

BASE/NEUTRAL -- EXTRACTABLE ORGANICS  
USEPA METHOD 625 - GC/MS (1 of 2)

HRS84297

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND*
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
J (Detected, but below quantitation limit; estimated value)  
B (Compound detected in method blank associated with this sample)  
-- (Not Analyzed)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2305-8  
MATRIX: WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: 8/26/91  
DATE ANALYZED: 9/ 5/91

SAMPLE ID: BCWOTMW-1      NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30  
CERTIFICATION #: E84059  
BASE/NEUTRAL EXTRACTABLE ORGANICS      HRS84297  
USEPA METHOD 625 - GC/MS (2 of 2)

---

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
J (Detected, but below quantitation limit: estimated value)  
B (Compound detected in method blank associated with this sample)  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	51	(22-135)	(10-155)
Fluorobiphenyl	63	(34-140)	(12-153)
Terphenyl-d14	79	(10-132)	(13-140)





WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2305-8  
MATRIX : WATER

DATE RECEIVED: 8/23/91

SAMPLE ID : BCWOTMW-1      NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30  
CERTIFICATION #: E84059  
METALS ANALYTICAL REPORT      HRS84297  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	8/29/91	ND	10 ug/L
Cadmium	8/29/91	ND	10 ug/L
Chromium	8/29/91	ND	50 ug/L
Lead	8/29/91	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2305-8  
MATRIX: WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: 8/26/91  
DATE ANALYZED: 9/ 5/91

SAMPLE ID: BCWOTMW-1      NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30  
ACID EXTRACTABLE ORGANICS      CERTIFICATION #: E84059  
USEPA METHOD 625 - GC/MS      HRS84297

---

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
J (Detected, but below quantitation limit; estimated value)  
B (Compound detected in method blank associated with this sample)  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	43	(17-95)	(24-118)
Phenol-d5	27	(11-89)	(17-124)
2,4,6-Tribromophenol	61	(10-134)	(10-156)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 1H2305-8  
MATRIX : WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: 9/ 4/91  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCWOTMW-1 NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	3	ng/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2305-9  
MATRIX: WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/91

SAMPLE ID: BCWOTDUPE      NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30  
CERTIFICATION #: E84059  
VOLATILE ORGANICS      HRS84297  
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
 ND\* (None Detected, lower detectable limit = 10 ug/L) as rec'd  
 ND\*\* (None Detected, lower detectable limit = ug/L) as rec'd  
 J (Detected, but below quantitation limit; estimated value)  
 B (Compound detected in method blank associated with this sample)  
 -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	91	(75-123)	(85-126)	(85-138)
Toluene-d8	100	(75-123)	(89-124)	(89-128)
	100	(85-125)	(84-124)	(83-128)





WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2305-9  
MATRIX: WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: 8/26/91  
DATE ANALYZED: 9/ 5/91

SAMPLE ID: BCWOTDUPE      NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30  
CERTIFICATION #: E84059  
BASE/NEUTRAL -- EXTRACTABLE ORGANICS      HRS84297  
USEPA METHOD 625 - GC/MS (1 of 2)\*

---

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzydine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND*
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
J (Detected, but below quantitation limit; estimated value)  
B (Compound detected in method blank associated with this sample)  
-- (Not Analyzed)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2305-9  
MATRIX: WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: 8/26/91  
DATE ANALYZED: 9/ 5/91

SAMPLE ID: BCWOTDUPE      NAS KEY WEST/BOCA CHICA FIELD      PROJ.#7519-30  
CERTIFICATION #: E84059  
BASE/NEUTRAL EXTRACTABLE ORGANICS      HRS84297  
USEPA METHOD 625 - GC/MS (2 of 2)

---

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
 ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
 J (Detected, but below quantitation limit: estimated value)  
 B (Compound detected in method blank associated with this sample)  
 -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	50	(22-135)	(10-155)
Fluorobiphenyl	65	(34-140)	(12-153)
Terphenyl-d14	96	(10-132)	(13-140)







WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2305-9  
MATRIX : WATER

DATE RECEIVED: 8/23/91

SAMPLE ID : BCWOTDUPE      NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30  
CERTIFICATION #: E84059  
METALS ANALYTICAL REPORT      HRS84297  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	8/29/91	ND	10	ug/L
Cadmium	8/29/91	ND	10	ug/L
Chromium	8/29/91	ND	50	ug/L
Lead	8/29/91	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 1H2305-9  
MATRIX : WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: 9/ 4/91  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCWOTDUPE NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30  
CERTIFICATION #: E84059  
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	9	mg/L	2

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-9  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/29/91

SAMPLE ID: BCWOTMW-2 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	1
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	2		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
 ND\* (None Detected, lower detectable limit = 10 ug/L) as rec'd  
 ND\*\* (None Detected, lower detectable limit = ug/L) as rec'd  
 J (Detected, but below quantitation limit; estimated value)  
 B (Compound detected in method blank associated with this sample)  
 -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	99	(75-123)	(85-126)	(85-138)
Toluene-d8	102	(75-123)	(89-124)	(89-128)
Bromo-chlorobenzene	100	(85-125)	(91-121)	(89-120)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-9  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/29/91

SAMPLE ID: BCWOTMW-2 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
OTHER COMPOUNDS

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Methyl-tert-butyl ether	18 ug/L
Carbon disulfide	1 ug/L

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS  
with their estimated concentrations

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Methyl (1-methyl ethyl) benzene	190 ug/L
3,6,6-Trimethyl bicyclo[3.1.1] hept-2-ene	3 ug/L
3,7,7-Trimethyl bicyclo[4.1.0] hept-2-ene	5 ug/L



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, .INC.  
LAB #: 1H2205-9  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: 8/22/91  
DATE ANALYZED: 9/ 5/91

SAMPLE ID: BCWOTMW-2 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059

BASE/NEUTRAL -- EXTRACTABLE ORGANICS  
USEPA METHOD 625 - GC/MS (1 of 2)

HRS84297

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Ben-zidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND*
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
J (Detected, but below quantitation limit; estimated value)  
B (Compound detected in method blank associated with this sample)  
-- (Not Analyzed)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-9  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: 8/22/91  
DATE ANALYZED: 9/ 5/91

SAMPLE ID: BCWOTMW-2 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30  
CERTIFICATION #: E84059  
BASE/NEUTRAL EXTRACTABLE ORGANICS HRS84297  
USEPA METHOD 625 - GC/MS (2 of 2)

---

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
J (Detected, but below quantitation limit: estimated value)  
B (Compound detected in method blank associated with this sample)  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	39	(22-135)	(10-155)
Fluorobiphenyl	60	(34-140)	(12-153)
Terphenyl-d14	80	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-9  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: 8/22/91  
DATE ANALYZED: 9/ 5/91

SAMPLE ID: BCWOTMW-2 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

ACID EXTRACTABLE ORGANICS  
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
 ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
 J (Detected, but below quantitation limit; estimated value)  
 B (Compound detected in method blank associated with this sample)  
 -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	1	(17-95)	(24-118)
Phenol-d5	1	(11-89)	(17-124)
2,4,6-Tribromophenol	2	(10-134)	(10-156)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-9  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BCWOTMW-2 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT  
SELECTED LIST

HRS84297

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	8/30/91	ND	10	ug/L
Cadmium	8/30/91	ND	10	ug/L
Chromium	8/30/91	ND	50	ug/L
Lead	8/30/91	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 1H2205-9  
MATRIX : WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: 9/ 4/91  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCWOTMW-2 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	3	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-10  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/29/91

SAMPLE ID: BCWOTMW-3 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

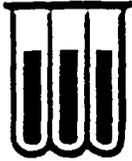
CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 10 ug/L) as rec'd  
ND\*\* (None Detected, lower detectable limit = ug/L) as rec'd  
J (Detected, but below quantitation limit; estimated value)  
B (Compound detected in method blank associated with this sample)  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	97	(75-123)	(85-126)	(85-138)
Toluene-d8	100	(75-123)	(89-124)	(89-128)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-10  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: 8/22/91  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCWOTMW-3 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059

BASE/NEUTRAL -- EXTRACTABLE ORGANICS  
USEPA METHOD 625 - GC/MS (1 of 2)

HRS84297

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzdine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND*
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
J (Detected, but below quantitation limit; estimated value)  
B (Compound detected in method blank associated with this sample)  
-- (Not Analyzed)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-10  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: 8/22/91  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCWOTMW-3 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059

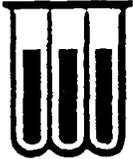
BASE/NEUTRAL EXTRACTABLE ORGANICS  
USEPA METHOD 625 - GC/MS (2 of 2)

HRS84297

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
J (Detected, but below quantitation limit: estimated value)  
B (Compound detected in method blank associated with this sample)  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	46	(22-135)	(10-155)
Fluorobiphenyl	69	(34-140)	(12-153)
Terphenyl-d14	70	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-10  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: 8/22/91  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCWOTMW-3 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

ACID EXTRACTABLE ORGANICS  
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
 ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
 J (Detected, but below quantitation limit; estimated value)  
 B (Compound detected in method blank associated with this sample)  
 -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	32	(17-95)	(24-118)
Phenol-d5	28	(11-89)	(17-124)
2,4,6-Trichlorophenol	50	(10-124)	(10-156)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-10  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BCWOTMW-3 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT  
SELECTED LIST

HRS84297

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	8/30/91	ND	10	ug/L
Cadmium	8/30/91	ND	10	ug/L
Chromium	8/30/91	ND	50	ug/L
Lead	8/30/91	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 1H2205-10  
MATRIX : WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: 9/ 4/91  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCWOTMW-3 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-11  
MATRIX: WATER

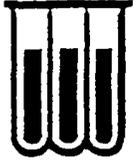
DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/29/91

SAMPLE ID: BCWOTMW-4 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30  
CERTIFICATION #: E84059  
HRS84297  
VOLATILE ORGANICS  
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
 ND\* (None Detected, lower detectable limit = 10 ug/L) as rec'd  
 ND\*\* (None Detected, lower detectable limit = ug/L) as rec'd  
 J (Detected, but below quantitation limit; estimated value)  
 B (Compound detected in method blank associated with this sample)  
 -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	101	(75-123)	(85-126)	(85-138)
Toluene-d8	101	(75-123)	(89-124)	(89-128)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-11  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: 8/22/91  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCWOTMW-4 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30  
CERTIFICATION #: E84059  
BASE/NEUTRAL -- EXTRACTABLE ORGANICS HRS84297  
USEPA METHOD 625 - GC/MS (1 of 2)

---

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND*
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
J (Detected, but below quantitation limit; estimated value)  
B (Compound detected in method blank associated with this sample)  
-- (Not Analyzed)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-11  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: 8/22/91  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCWOTMW-4 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059

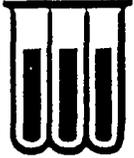
BASE/NEUTRAL EXTRACTABLE ORGANICS  
USEPA METHOD 625 - GC/MS (2 of 2)

HRS84297

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
 ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
 J (Detected, but below quantitation limit: estimated value)  
 B (Compound detected in method blank associated with this sample)  
 -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	13	(22-135)	(10-155)
Fluorobiphenyl	41	(34-140)	(12-153)
Tetrahydro-d11	65	(10-122)	(12-140)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-11  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCWOTMW-4 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

EXTRACTABLE ORGANICS  
OTHER COMPOUNDS

---

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS  
with their estimated concentrations

---

Acetic acid, trifluoro	26 ug/L
1,3-Benzodioxole-5-carboxylic acid	79 ug/L
4-Unknown total	300 ug/L



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, - INC.  
LAB #: 1H2205-11  
MATRIX: WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: 8/22/91  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCWOTMW-4 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

ACID EXTRACTABLE ORGANICS  
USEPA METHOD 625 - GC/MS

---

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 50 ug/L) as rec'd  
J (Detected, but below quantitation limit; estimated value)  
B (Compound detected in method blank associated with this sample)  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	12	(17-95)	(24-118)
Phenol-d5	11	(11-89)	(17-124)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2205-11  
MATRIX : WATER

DATE RECEIVED: 8/22/91

SAMPLE ID : BCWOTMW-4 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT  
SELECTED LIST

HRS84297

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Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	8/30/91	ND	10	ug/L
Cadmium	8/30/91	ND	10	ug/L
Chromium	8/30/91	ND	50	ug/L
Lead	8/30/91	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, -INC.  
LAB ID: 1H2205-11  
MATRIX : WATER

DATE RECEIVED: 8/22/91  
DATE EXTRACTED: 9/ 4/91  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCWOTMW-4 NAS KEY WEST (BOCA CHICA FIELD) PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

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	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2305-12  
MATRIX: WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/31/91

SAMPLE ID: TRIP BLANK      NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30  
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	10
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	1
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	37
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)	115	(78-122)
Trifluorotoluene (PID)	99	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 1H2305-11  
MATRIX: WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 8/31/91

SAMPLE ID: BCEQUIP BLANK NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30

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)	114	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2305-11  
MATRIX: WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCEQUIP BLANK NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

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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)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2305-11  
MATRIX: WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: 8/26/91  
DATE ANALYZED: 9/ 5/91

SAMPLE ID: BCEQUIP BLANK NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS,  
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	50	(22-135)	(10-155)
Fluorobiphenyl	55	(34-140)	(12-153)
Terphenyl-d14	90	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 1H2305-11  
MATRIX : WATER

DATE RECEIVED: 8/23/91

SAMPLE ID : BCEQUIP BLANK NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT  
SELECTED LIST

HRS84297

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Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	8/29/91	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES, INC.

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 1H2305-11  
MATRIX : WATER

DATE RECEIVED: 8/23/91  
DATE EXTRACTED: 9/ 4/91  
DATE ANALYZED: 9/ 4/91

SAMPLE ID: BCEQUIP BLANK NAS KEY WEST/BOCA CHICA FIELD PROJ.#7519-30

CERTIFICATION #: E84059  
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

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	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)

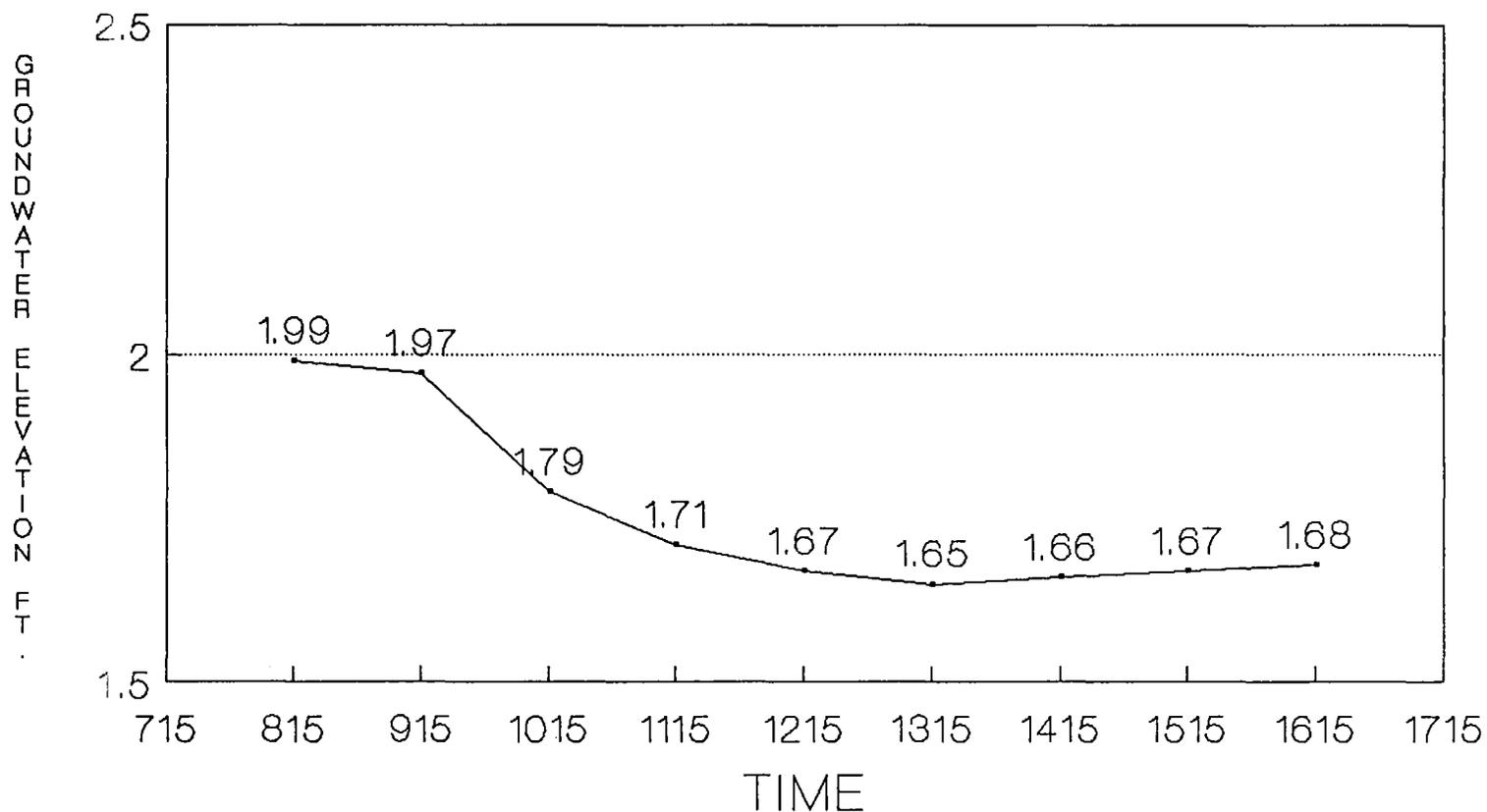
APPENDIX F

GROUNDWATER ELEVATION GRAPHS FROM TIDAL INFLUENCE STUDY

AUGUST 17, 1991 (8 HOUR PERIOD)

# TIDAL INFLUENCE STUDY, BUILDING A-322

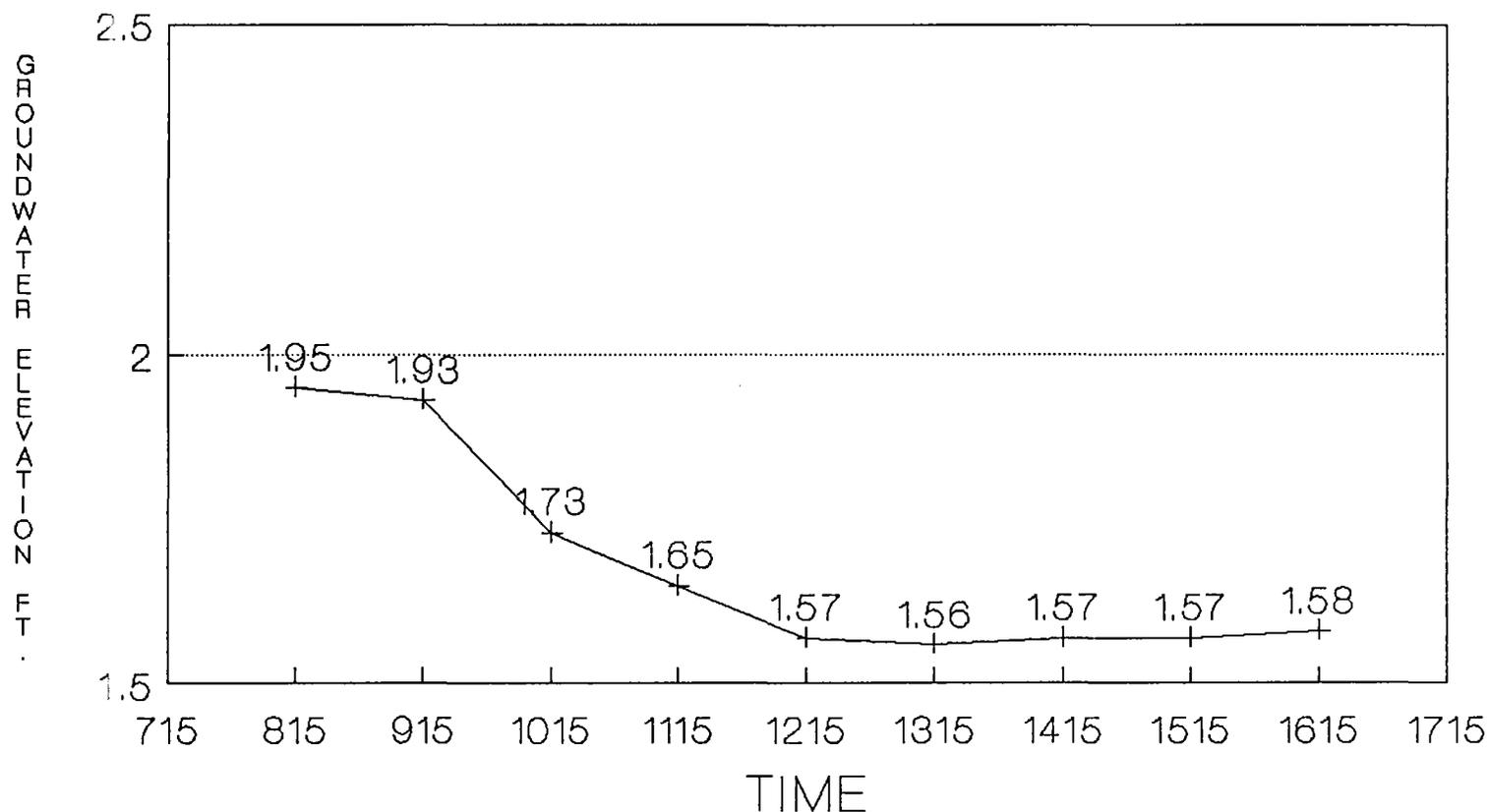
BASE EXCHANGE SVC STATION, AUG. 17, 1991  
KYW-A322-1



HIGH TIDES: 0420 & 1811 HOURS  
LOW TIDES: 1149 & 2223 HOURS  
BASE EXCHANGE SERVICE STATION

# TIDAL INFLUENCE STUDY, BUILDING A-322

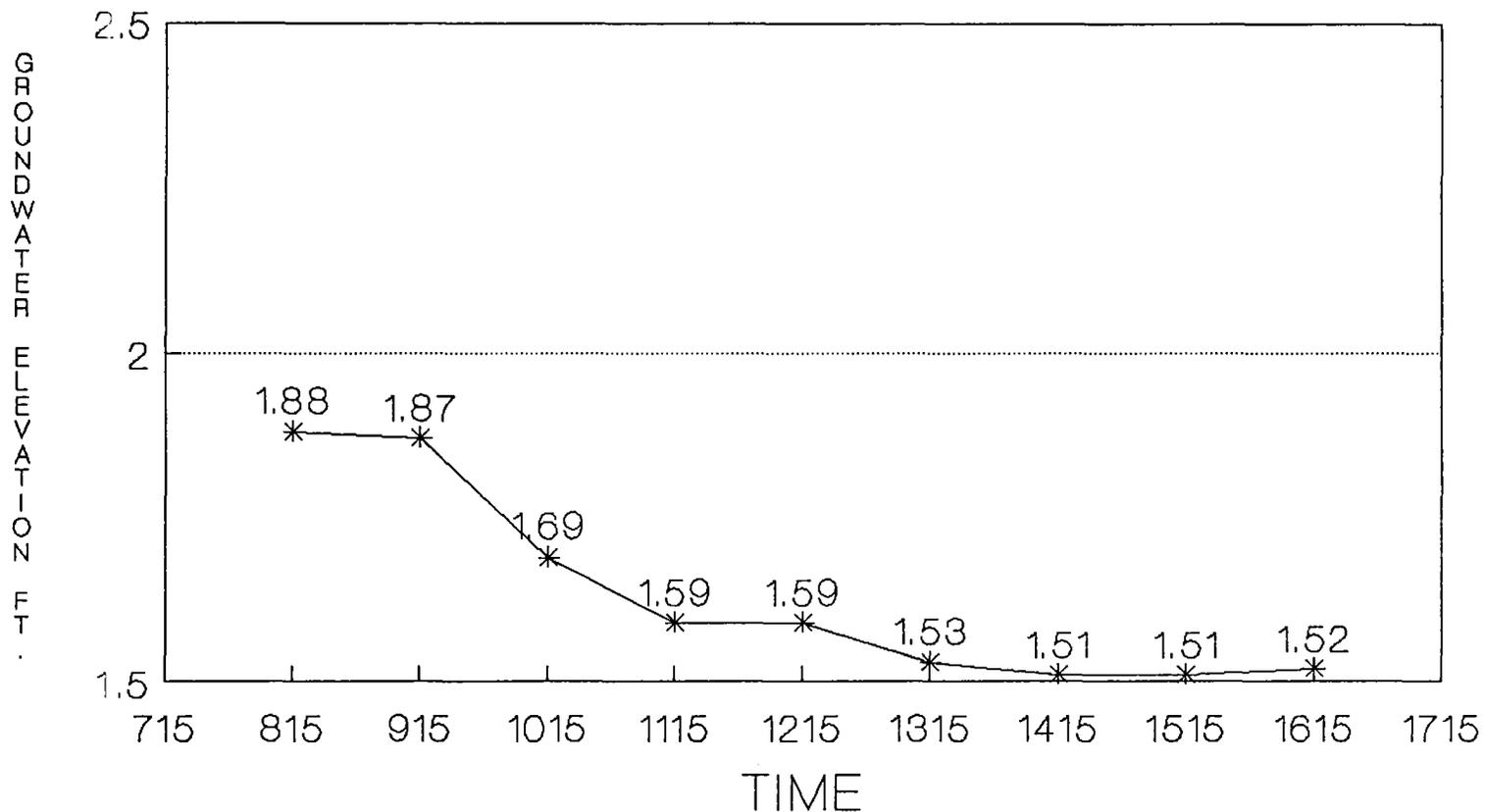
BASE EXCHANGE SVC STATION, AUG. 17, 1991  
KYW-A322-2



HIGH TIDES: 0420 & 1811 HOURS  
LOW TIDES: 1149 & 2223 HOURS  
BASE EXCHANGE SERVICE STATION

# TIDAL INFLUENCE STUDY, BUILDING A-322

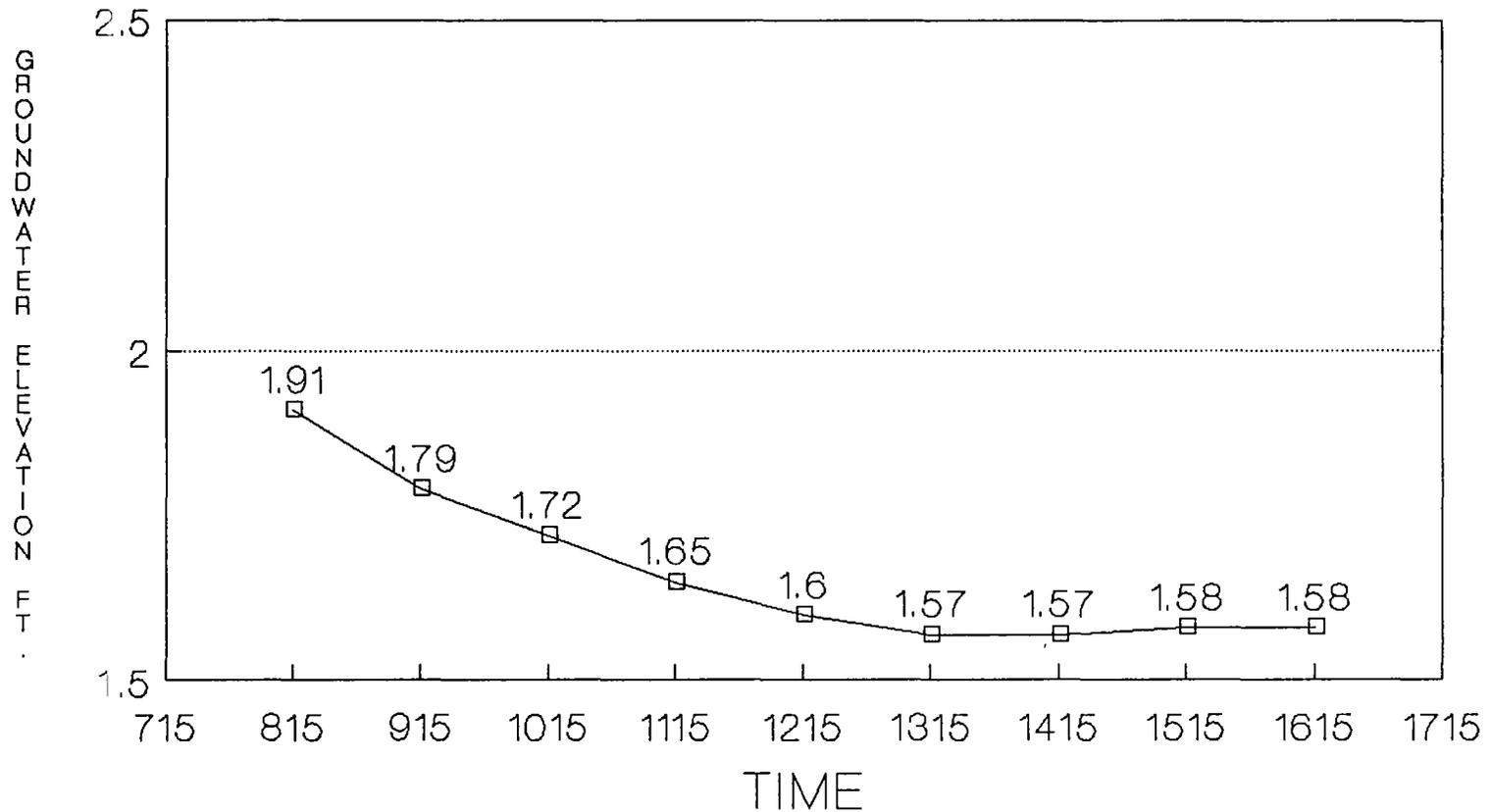
BASE EXCHANGE SVC STATION, AUG. 17, 1991  
KYW-A322-3



HIGH TIDES: 0420 & 1811 HOURS  
LOW TIDES: 1149 & 2223 HOURS  
BASE EXCHANGE SERVICE STATION

# TIDAL INFLUENCE STUDY, BUILDING A-322

BASE EXCHANGE SVC STATION, AUG. 17, 1991  
KYW-A322-4

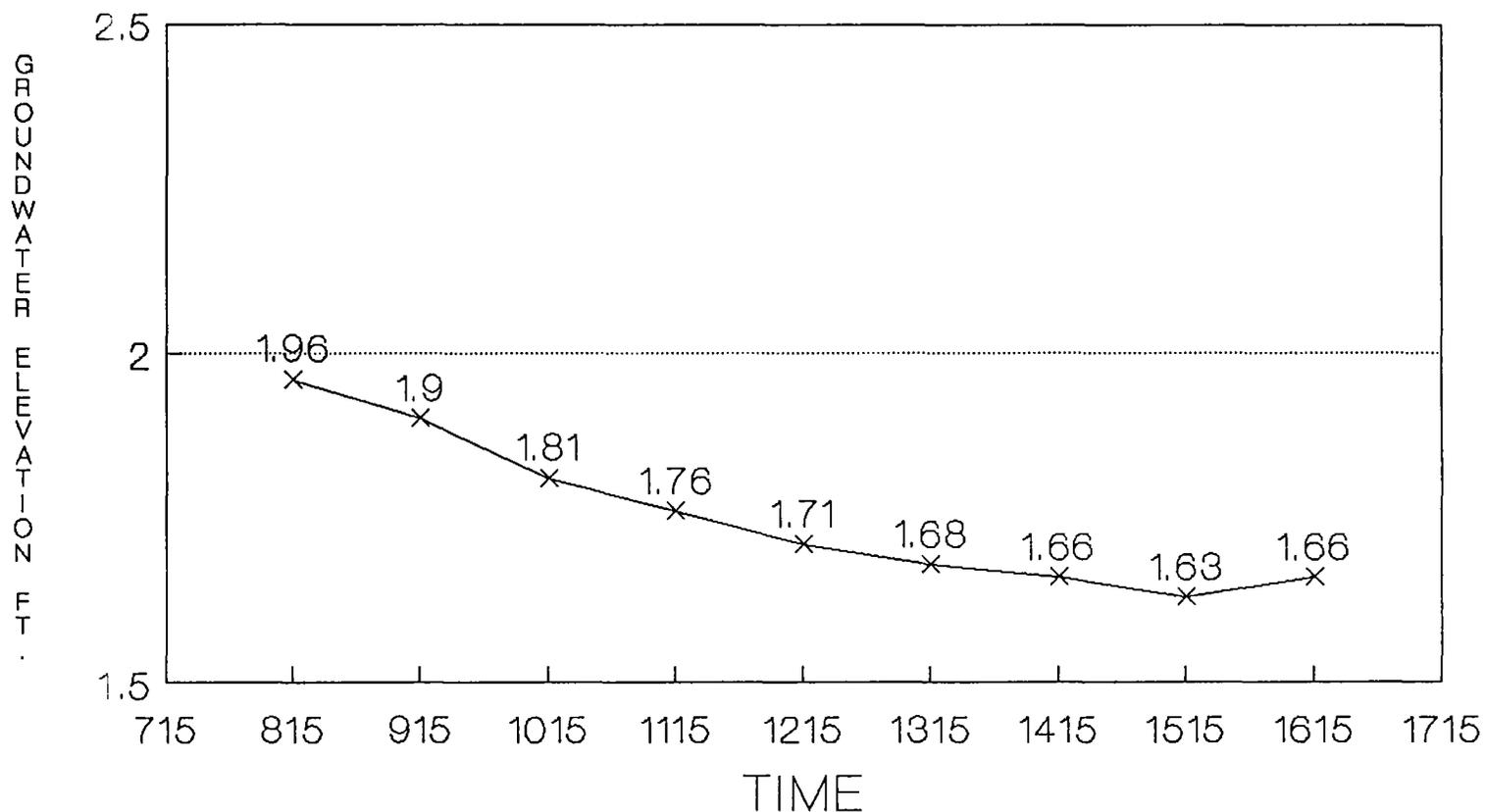


HIGH TIDES: 0420 & 1811 HOURS  
LOW TIDES: 1149 & 2223 HOURS  
BASE EXCHANGE SERVICE STATION

# TIDAL INFLUENCE STUDY, BUILDING A-322

## BASE EXCHANGE SVC STATION, AUG. 17, 1991

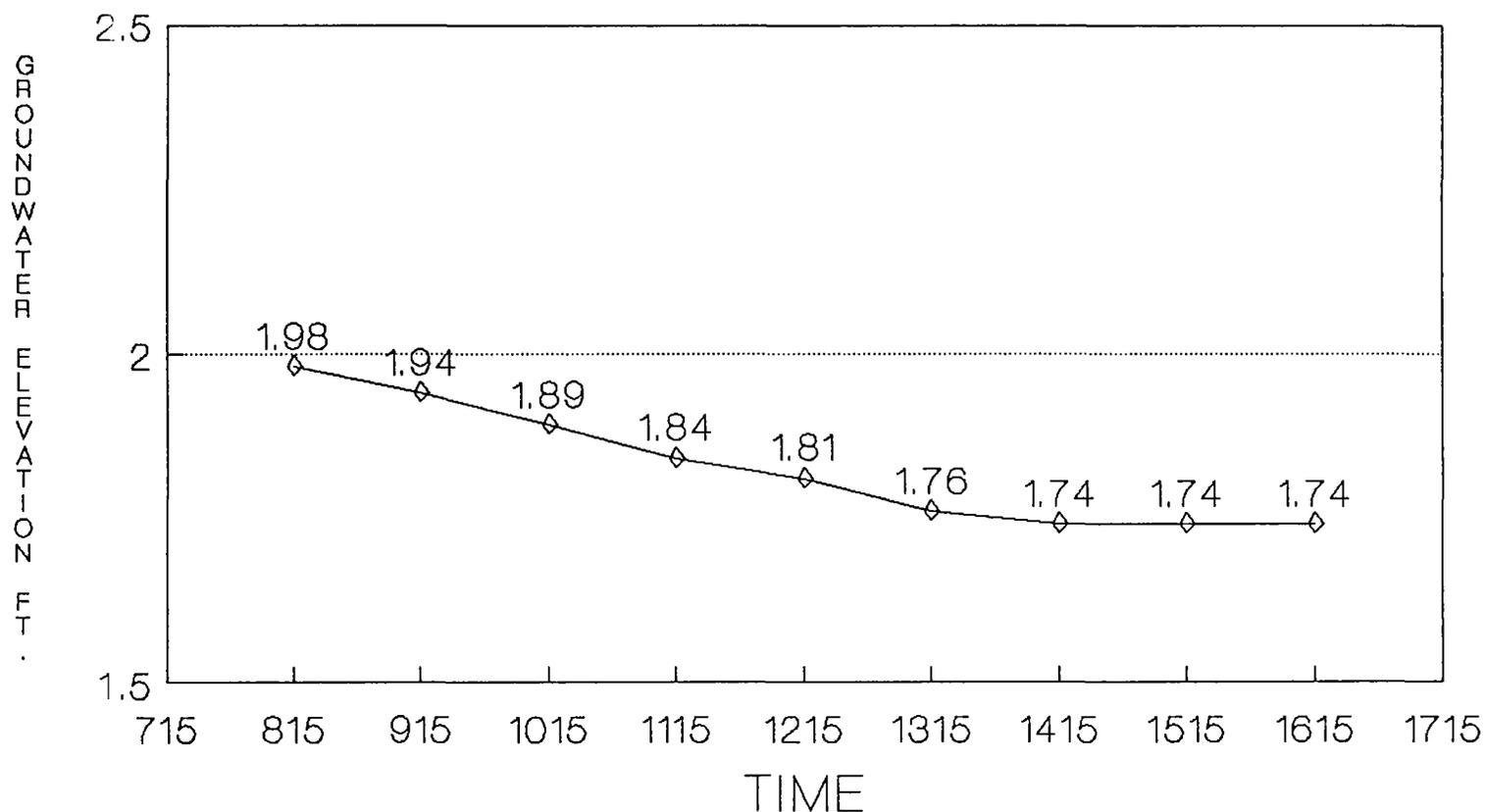
### KYW-A322-5



HIGH TIDES: 0420 & 1811 HOURS  
LOW TIDES: 1149 & 2223 HOURS  
BASE EXCHANGE SERVICE STATION

# TIDAL INFLUENCE STUDY, BUILDING A-322

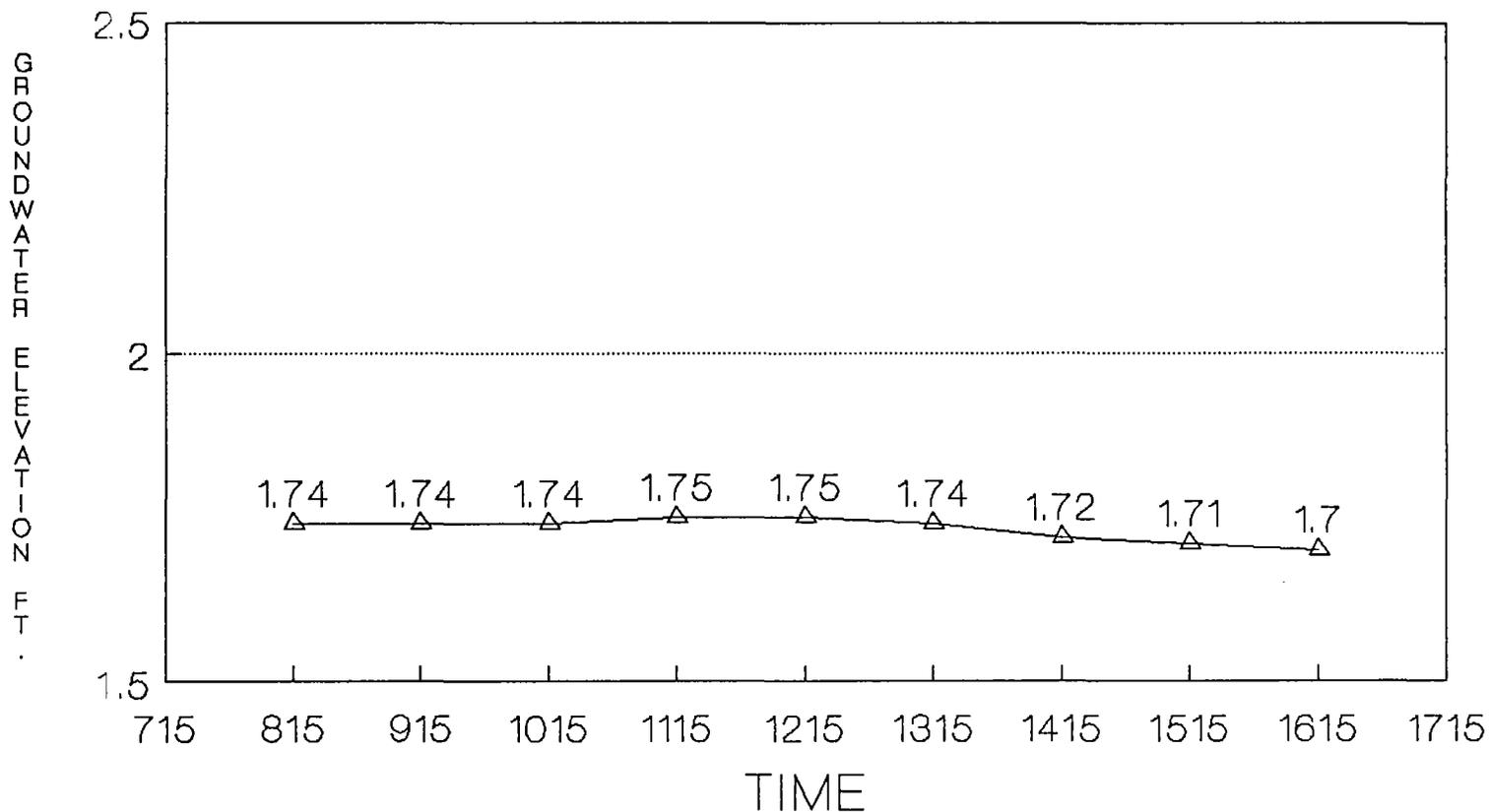
BASE EXCHANGE SVC STATION, AUG. 17, 1991  
KYW-A322-6



HIGH TIDES: 0420 & 1811 HOURS  
LOW TIDES: 1149 & 2223 HOURS  
BASE EXCHANGE SERVICE STATION

# TIDAL INFLUENCE STUDY, BUILDING A-322

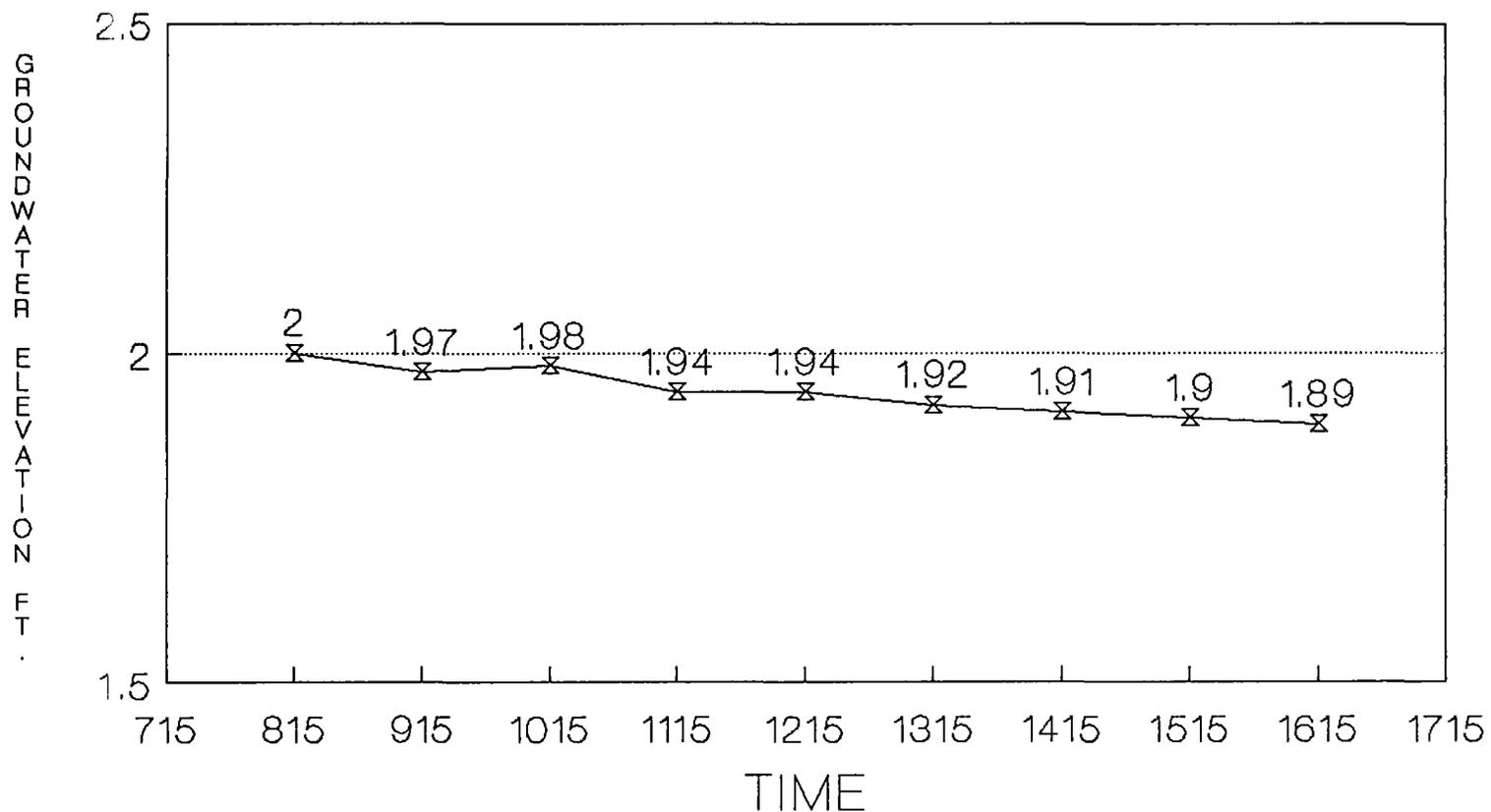
BASE EXCHANGE SVC STATION, AUG. 17, 1991  
KYW-A322-7



HIGH TIDES: 0420 & 1811 HOURS  
LOW TIDES: 1149 & 2223 HOURS  
BASE EXCHANGE SERVICE STATION

# TIDAL INFLUENCE STUDY, BUILDING A-322

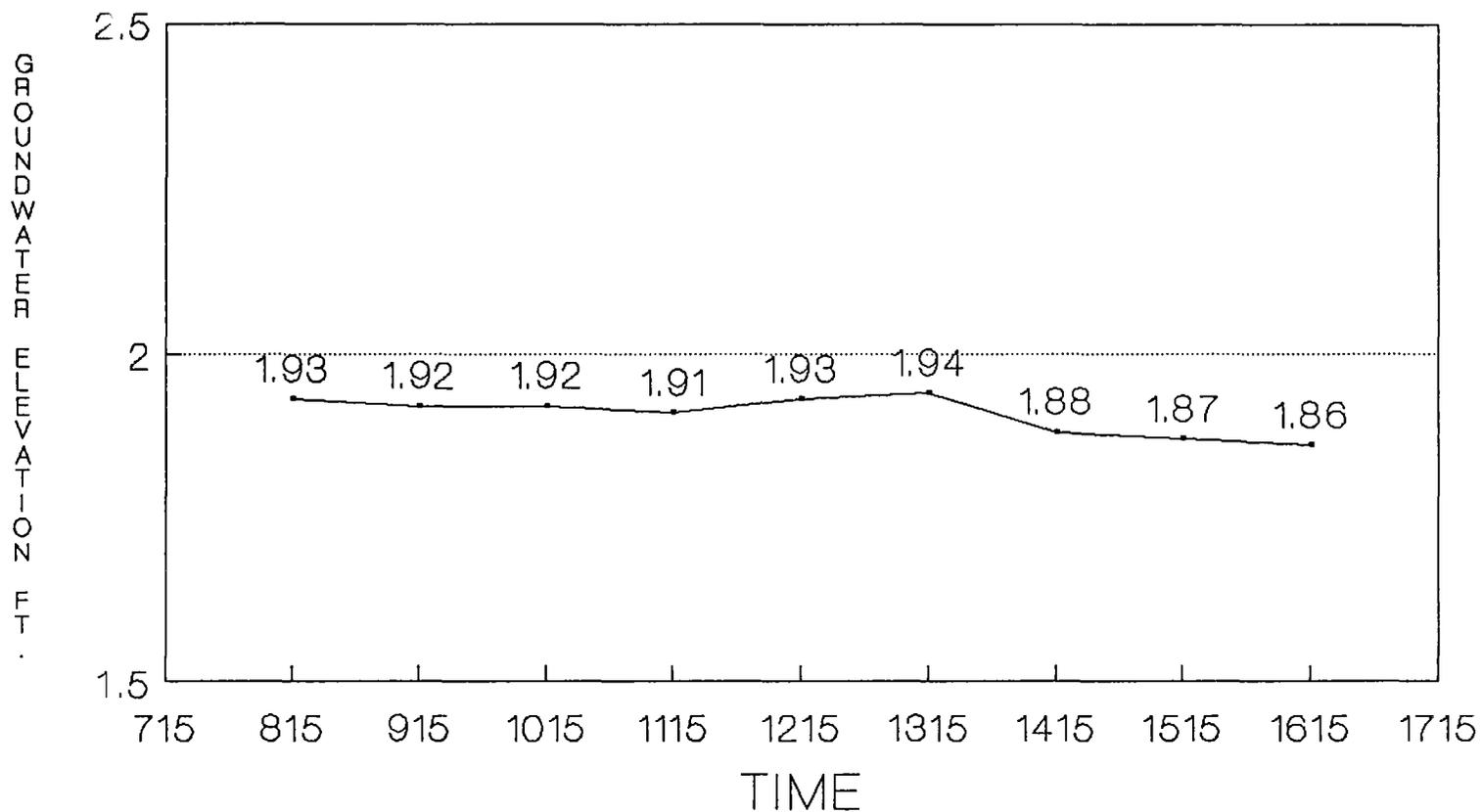
BASE EXCHANGE SVC STATION, AUG. 17, 1991  
KYW-A322-8



HIGH TIDES: 0420 & 1811 HOURS  
LOW TIDES: 1149 & 2223 HOURS  
BASE EXCHANGE SERVICE STATION

# TIDAL INFLUENCE STUDY, BUILDING A-322

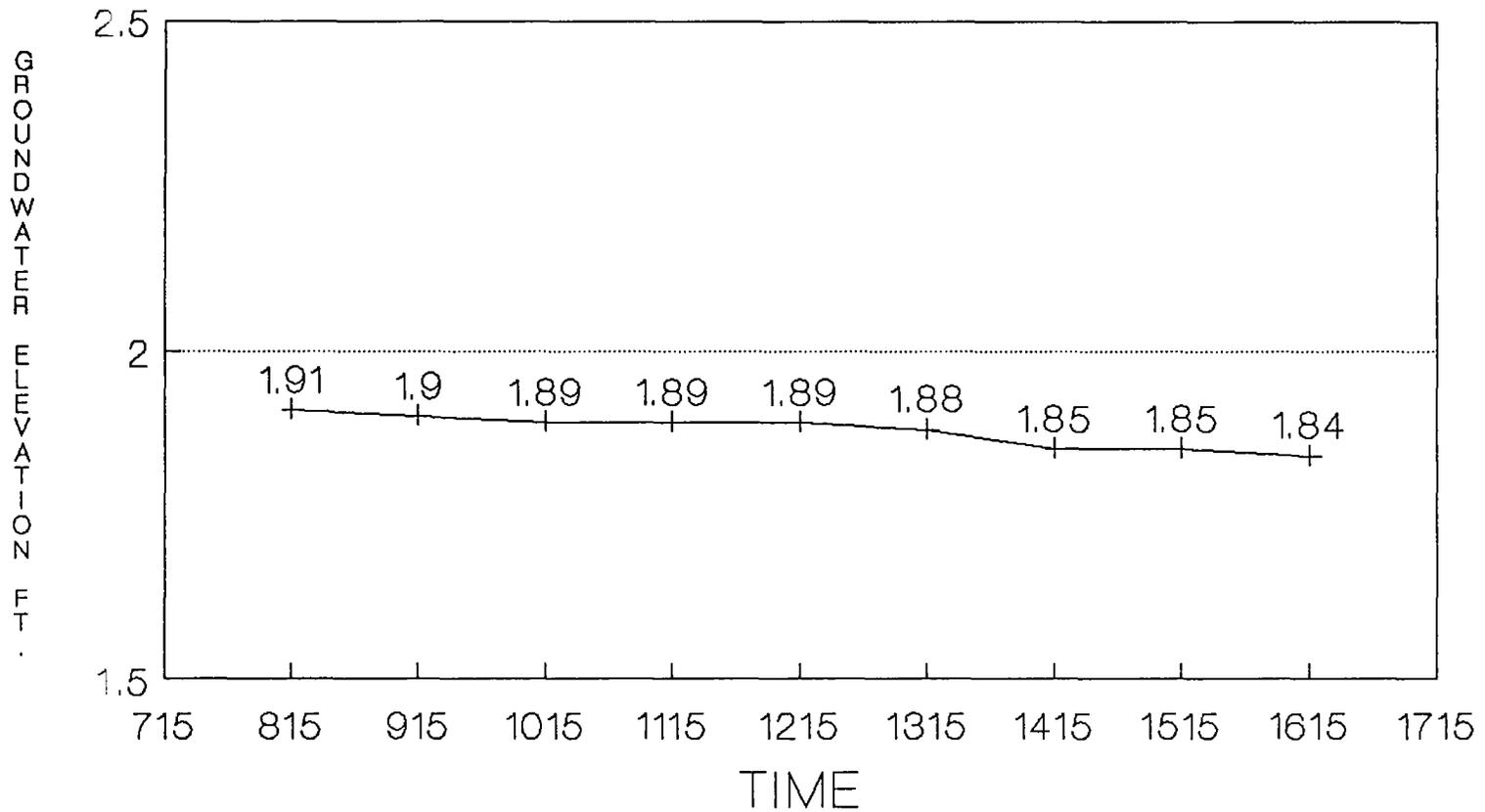
BASE EXCHANGE SVC STATION, AUG. 17, 1991  
KYW-A322-9



HIGH TIDES: 0420 & 1811 HOURS  
LOW TIDES: 1149 & 2223 HOURS  
BASE EXCHANGE SERVICE STATION

# TIDAL INFLUENCE STUDY, BUILDING A-322

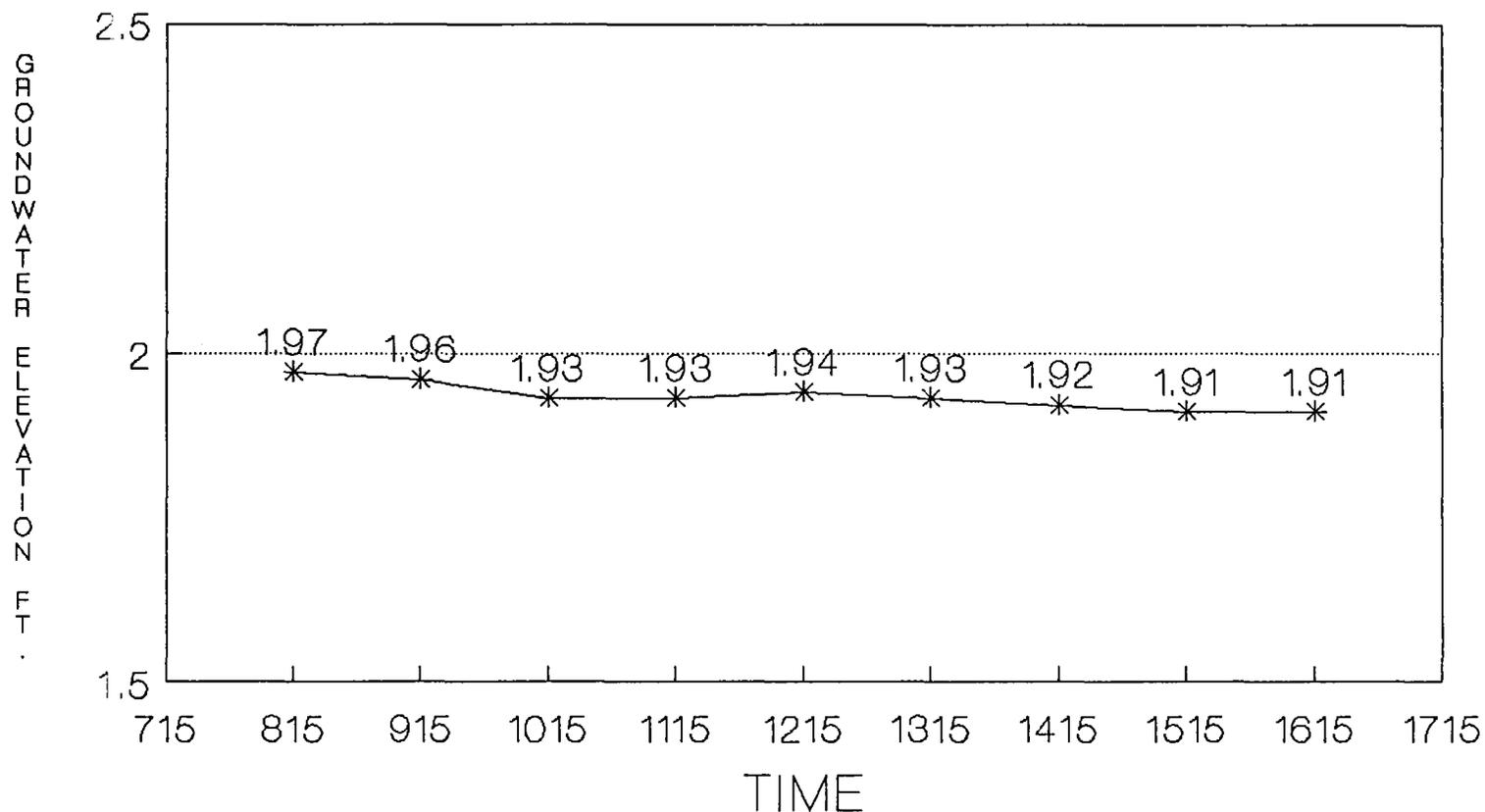
BASE EXCHANGE SVC STATION, AUG. 17, 1991  
KYW-A322-10



HIGH TIDES: 0420 & 1811 HOURS  
LOW TIDES: 1149 & 2223 HOURS  
BASE EXCHANGE SERVICE STATION

# TIDAL INFLUENCE STUDY, BUILDING A-322

BASE EXCHANGE SVC STATION, AUG. 17, 1991  
KYW-A322-11



HIGH TIDES: 0420 & 1811 HOURS  
LOW TIDES: 1149 & 2223 HOURS  
BASE EXCHANGE SERVICE STATION