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CONTAMINATION ASSESSMENT REPORT ADDENDUM FOR BUILDING 352 PHMRON
MAINTENANCE RAMP TRUMAN ANNEX NAS KEY WEST FL
6/1/1993
ABB ENVIRONMENTAL SERVICES INC

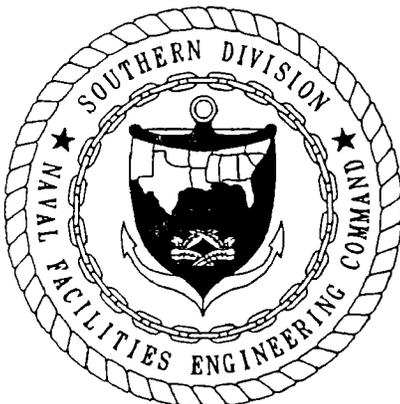
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**CONTAMINATION ASSESSMENT REPORT ADDENDUM
BUILDING 352, PHMRON MAINTENANCE RAMP
TRUMAN ANNEX
NAVAL AIR STATION KEY WEST
KEY WEST, FLORIDA**

**CONTRACT TASK ORDER NO. 007
NAVY CLEAN - DISTRICT I
CONTRACT NO. N62467-89-D-0317**

JUNE 1993



**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010**

**CONTAMINATION ASSESSMENT REPORT
ADDENDUM**

**BUILDING 352, PHMRON MAINTENANCE RAMP
TRUMAN ANNEX
NAVAL AIR STATION KEY WEST
KEY WEST, FLORIDA**

UIC: N00213

Contract No. 62467-89-D-0317

Prepared by:

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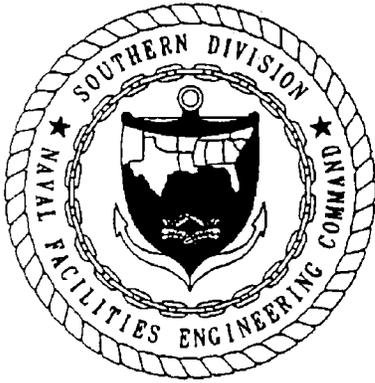
**Pamela J. Wagner
Roger Durham**

Prepared for:

**Department of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Charleston, South Carolina 29411-0068**

Luis Vazquez, Code 1843, Engineer-in-Charge

June 1993



FOREWORD

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

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

Questions regarding this report should be addressed to the Environmental Coordinator, Naval Air Station, Key West, Florida, at 305-293-2194, or to Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Code 1843, at DSN 563-0613 or 803-743-0613.

ACKNOWLEDGMENTS

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

Name	Title	Position	Location
Luis Vazquez	Environmental Engineer	Engineer-in-Charge	SOUTHNAVFACENGCOM
Diane Lancaster	Environmental Coordinator	Environmental Coordinator	NAS Key West

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
CA	Contamination Assessment
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CFR	Code of Federal Regulations
CompQAPP	Comprehensive Quality Assurance Program Plan
CTO	Contract Task Order
FAC	Florida Administrative Code
FDER	Florida Department of Environmental Regulation
FID	flame ionization detector
HSWA	Hazardous and Solid Waste Amendments of 1984
msl	mean sea level
MTBE	methyl tert-butyl ether
NAS	Naval Air Station
NFAP	No Further Action Proposal
OVA	organic vapor analyzer
PAH	polynuclear aromatic hydrocarbons
POA	Plan of Action
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
SOUTHNAV- FACENGC COM	Southern Division, Naval Facilities Engineering Command
SWDA	Solid Waste Disposal Act of 1965
TRPH	total recoverable petroleum hydrocarbons
UIC	uniform identification code
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	underground storage tank
VOA	volatile organic aromatics
VOC	volatile organic compound

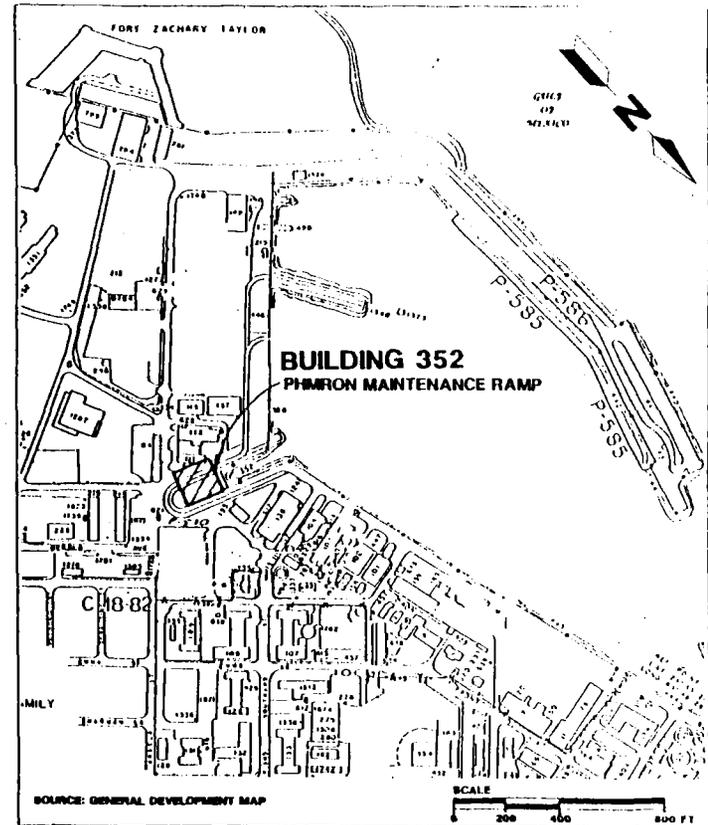
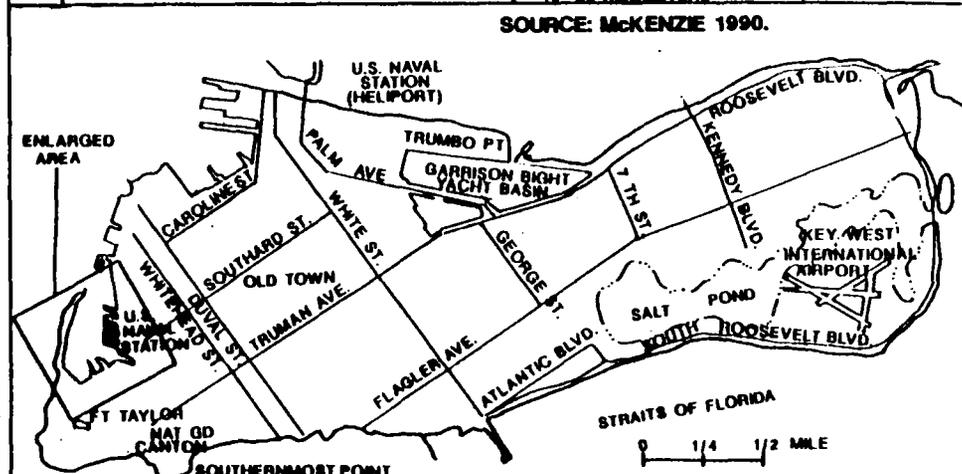
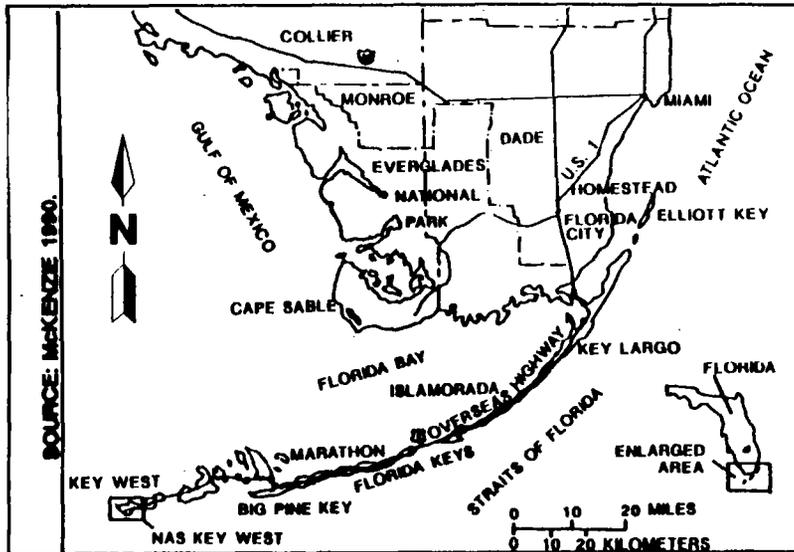
1.0 INTRODUCTION

The Naval Air Station Key West (NAS Key West) is located approximately 150 miles southwest of Miami in Monroe County, Florida (Figure 1-1). 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.

ABB Environmental Services, Inc. (ABB-ES), was contracted by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment (CA) and submit a contamination assessment report (CAR) for the reported leakage of a 500-gallon, diesel underground storage tank (UST) at the PHMRON maintenance ramp (Building 352) at Truman Annex, NAS Key West. The scope of services is described in Contract Task Order (CTO) No. 007, the Plan of Action (POA), and the Contamination Assessment Plan (CAP) and included the following:

- drilling soil borings and analyzing site soil samples to assess the extent of soil contamination,
- installing and sampling groundwater monitoring wells to assess the extent of groundwater contamination,
- collecting water level data to assess the groundwater flow direction and hydraulic gradient at the site,
- conducting a potable well inventory within a 0.25-mile radius of the site,
- conducting slug tests to estimate aquifer characteristics, and
- reducing and analyzing pertinent data gathered during the contamination assessment to complete a CAR.

The contamination assessment at Building 352 was conducted during July and August 1991. A CAR was submitted to FDER in February 1992. At the request of FDER, a supplemental field investigation was performed, which was conducted during March 1993. This report is an addendum to the original CAR, and presents the findings and conclusions of the supplemental field investigation.



**FIGURE 1-1
FACILITY LOCATION MAP**



**CONTAMINATION ASSESSMENT
REPORT ADDENDUM, BUILDING 352**

**TRUMAN ANNEX
NAVAL AIR STATION
KEY WEST, FLORIDA**

2.0 SITE BACKGROUND

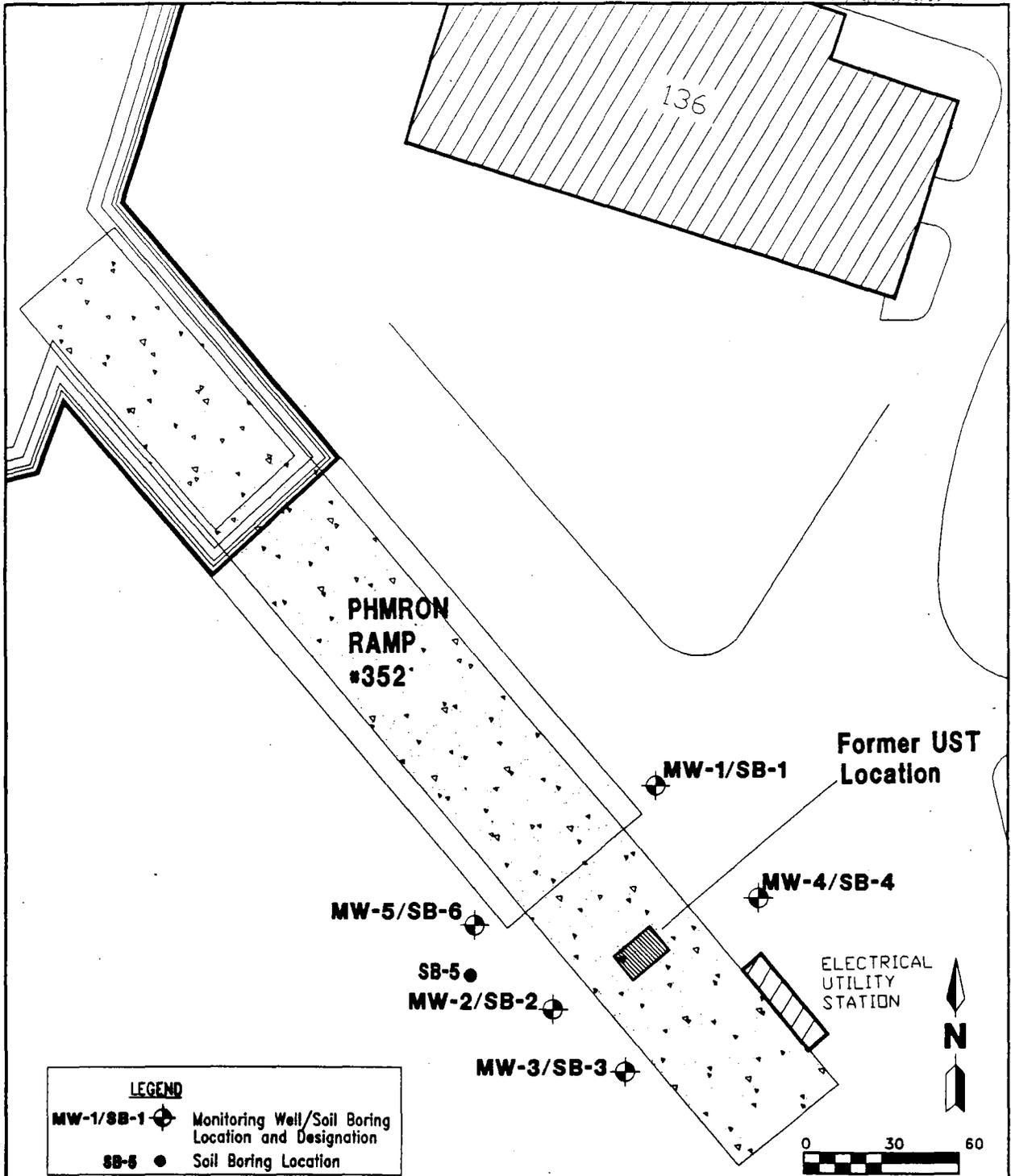
2.1 SITE DESCRIPTION AND HISTORY. Building 352 is located on Key West at the PHMRON maintenance ramp south of Building 136 in Truman Annex (Figure 2-1). The PHMRON maintenance ramp was used to service large seagoing vessels. During reconstruction of the PHMRON maintenance ramp in 1989, a 500-gallon diesel fuel UST was discovered under the ramp approach (Figure 2-1). The UST supplied fuel for a winch that conveyed the vessels along the ramp. Workers observed corrosion of the UST that resulted in the discharge of diesel fuel. Contaminated soils and the UST were removed from the site during ramp reconstruction activities, and the area above the former UST location was resurfaced with concrete. According to facility personnel, the concrete in the ramp vicinity is reinforced and its thickness is in excess of 30 feet. The area surrounding the ramp is covered with asphalt.

2.2 PREVIOUS SITE INVESTIGATION. A CA was performed by ABB-ES in July and August 1991. The objectives of the CA were to identify petroleum contaminants at the site, to assess the degree and extent of petroleum contamination in soils and groundwater. This CA included the advancement of four soil borings (KYW-352-SB1 through KYW-352-SB4) and the installation of three monitoring wells (KYW-352-MW1 through KYW-352-MW3). The excessive thickness of concrete in the ramp vicinity prevented placement of borings and wells at the former UST location. Soil boring and monitoring well locations are shown in Figure 2-1. For convenience, the prefix (KYW-352-) is not shown in the tables and figures in this report.

Soil samples were collected from each boring and analyzed for volatile organic compounds (VOC) by organic vapor analyzer (OVA) headspace analysis. Groundwater samples were collected from wells KYW-352-MW1 through KYW-352-MW3 and were analyzed for constituents of the kerosene analytical group as defined in Chapter 17-770, Florida Administrative Code (FAC). A CAR was submitted to the Navy and Florida Department of Environmental Regulation (FDER) in February 1992.

The findings of the CAR are summarized below.

- No petroleum-contaminated soils were identified by OVA headspace analysis.
- No free product was detected in any monitoring well.
- Methyl tert-butyl ether (MTBE) was the only contaminant detected in the groundwater. MTBE concentrations were 55 parts per billion (ppb) and 115 ppb in samples collected from wells KYW-352-MW2 and KYW-352-MW3, respectively. MTBE was not detected in well KYW-352-MW1. MTBE is not a constituent of diesel fuel and its source was not identified.
- Groundwater flow direction at the site is tidally influenced. Groundwater flow varies from southwest at high water table elevations to northeast at low water table elevations.
- No potable wells were identified within a 0.25-mile radius of the site.



SOURCE: PHM Berthing Wharf, NAVFAC Drawing No. 5157675, Sheet 46
Truman Annex, Naval Air Station Key West, Florida, 1986

FIGURE 7-1
SITE PLAN SHOWING
MONITORING WELL AND SOIL BORING LOCATIONS



CONTAMINATION ASSESSMENT
REPORT ADDENDUM, BUILDING 352

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NAVAL AIR STATION
KEY WEST, FLORIDA

A *No Further Action Plan (NFAP)* was submitted in the CAR. Upon completion of review, FDER requested that an additional monitoring well be installed downgradient of the former UST location and that an additional round of groundwater sampling be performed. A copy of the correspondence from FDER is presented in Appendix A.

2.3 SCOPE. The scope of services developed to perform the March 1993 supplemental field work included the following.

- Two monitoring wells (KYW-352-MW4 and KYW-352-MW5) were installed to a depth of 13 feet below land surface (bls). Because groundwater flow direction is tidally influenced, two wells were installed to ensure that a well was located downgradient of the UST during both high and low tidal periods. The newly installed wells are located along the periphery of the ramp. The excessive thickness of concrete near the former UST location precluded the installation of a monitoring well in that area.
- Groundwater samples were collected from each well and analyzed for U.S. Environmental Protection Agency (USEPA) Methods 601, 602 (including MTBE), and 610.
- All data gathered during the field investigation were reduced and analyzed to prepare this CAR addendum.

3.0 SUPPLEMENTAL ASSESSMENT RESULTS

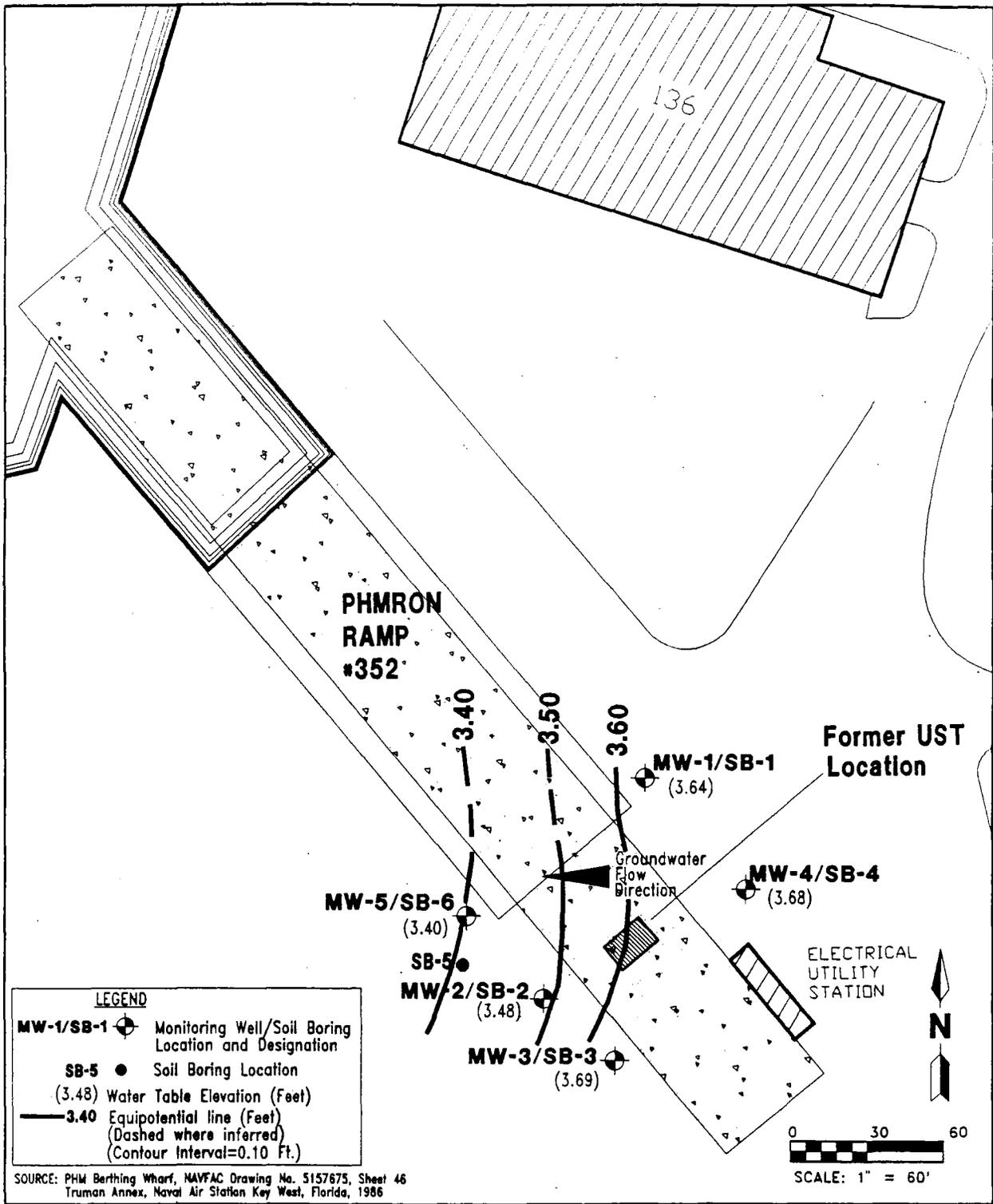
3.1 METHODOLOGIES AND EQUIPMENT. All methodologies and equipment used during the March 1993 field investigation were in conformance with the ABB-ES, FDER-approved, Comprehensive Quality Assurance Program Plan (CompQAPP).

3.1.1 Soil Boring Advancement and Soil Sampling Soil borings were advanced into the water table using rotary drilling and hollow-stem augers. For each boring, a soil sample was collected from the following intervals: 0 to 1 foot bls, 1 to 3 feet bls, and from 3 to 5 feet bls. Groundwater was encountered at a depth of approximately 6 feet bls. Soil samples collected above the water table were placed in 16-ounce glass jars, and analyzed with an OVA equipped with a flame ionization detector (FID). Borings were advanced to a depth of 13 feet bls. Soil boring logs are attached in Appendix B.

3.1.2 Monitoring Well Construction Monitoring wells KYW-352-MW4 and KYW-352-MW5 were installed in soil borings KYW-352-SB4 and KYW-352-SB6, respectively. An obstruction was encountered in KYW-352-SB5, at a depth of 4 feet bls, and the boring was abandoned. Monitoring wells were installed to a depth of 13 feet bls and constructed of 2-inch inside diameter, schedule 40, polyvinyl chloride (PVC) casing with flush-threaded joints and 10 feet of 0.010-inch machine-slotted screen. PVC well casing extends from the top of the screen to land surface. A 20/30 grade silica sand filter pack was placed in the annular space to approximately 1 foot above the top of the screen. A 6- to 12-inch thick bentonite seal was placed on top of the filter pack. The remaining annular space was grouted to the surface with a neat cement grout. A protective traffic-bearing vault was installed to complete the well location. Monitoring wells are equipped with a locking well cap and a padlock.

3.1.3 Water Table Elevation Measurements Water level measurements were recorded from each monitoring well prior to groundwater sampling on March 27, 1993. 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. A water level elevation contour map was constructed using this information (Figure 3-1).

3.1.4 Groundwater Sampling and Analyses Groundwater samples were collected from all five monitoring wells at the site on March 27, 1993. Before sampling, the monitoring wells were purged with a Teflon™ bailer. Purging continued until five well volumes had been removed. Groundwater samples were collected using an extruded Teflon™ bailer. The samples were placed into appropriate containers, properly preserved, placed on ice, and shipped to Wadsworth/ALERT Laboratories, Inc., in Tampa, Florida. Groundwater samples collected from the monitoring wells underwent analyses for USEPA Methods 601, 602 (including MTBE), and 610. A duplicate sample, trip blank, and equipment blank were also analyzed.



SOURCE: PHM Berthing Wharf, NAVFAC Drawing No. 5157675, Sheet 46
Truman Annex, Naval Air Station Key West, Florida, 1986

FIGURE 3-1
WATER TABLE ELEVATION CONTOUR MAP
SURFICIAL ZONE
MARCH 27, 1993



CONTAMINATION ASSESSMENT
REPORT ADDENDUM, BUILDING 352
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NAVAL AIR STATION
KEY WEST, FLORIDA

3.2 SOIL ASSESSMENT RESULTS. Table 3-1 summarizes the results of the OVA headspace analyses for soil samples. No VOCs were detected in any soil samples.

Table 3-1 Summary of Organic Vapor Analyzer (OVA) Soil Sample Results, March 23, 1993		
Contamination Assessment Report Addendum Building 352, Naval Air Station Key West Key West, Florida		
Soil Boring Number	Depth Below Land Surface (feet)	OVA Headspace Reading (ppm)
KYW-352-SB4	0.3 to 1.0	<1
	1.0 to 3.0	<1
KYW-352-SB5	0.3 to 1.0	<1
	1.0 to 4.0	<1
KYW-352-SB6	0.0 to 1.0	<1
	1.0 to 3.0	<1
	3.0 to 5.0	<1

Note: ppm = parts per million.

3.3 GROUNDWATER ASSESSMENT RESULTS.

3.3.1 Groundwater Flow Direction In 1991, A tidal influence study indicated that groundwater flow direction at Site 352 varies from west to southwestly flow direction at high water table elevations to a north to northeasterly groundwater flow direction at low water table elevations (ABB-ES, 1992). Water level data collected on March 27, 1993 indicate a westerly flow direction consistent with the previous measurements recorded during high water table elevations (ABB-ES, 1992) (Figure 3-1).

3.3.2 Groundwater Contamination Groundwater analytical results from the March 27, 1993, sampling event are presented in Appendix C, and are summarized in Table 3-2 and Figure 3-2. MTBE was the only contaminant detected in groundwater samples. MTBE was detected in samples from each of the five monitoring wells and the equipment blank. MTBE concentrations ranged from 2 ppb to 10 ppb in samples collected from monitoring wells. The MTBE concentration in the equipment blank was 3 ppb. The occurrence of MTBE in the equipment blank may have been the result of contamination during sampling activities.

MTBE concentrations decreased significantly in the samples collected from wells KYW-352-MW2 and KYW-352-MW3 since the previous sampling event of August 1991. MTBE concentrations in samples collected from monitoring wells KYW-352-MW2 and KYW-352-MW3 decreased from 55 ppb to 10 ppb, and 115 ppb to 9 ppb, respectively.

There are no State target levels for MTBE for Class G-III groundwater; however, MTBE concentrations from the most recent sampling event are much less than the State target level of 50 ppb for G-II groundwater.

**Table 3-2
Summary of Groundwater Sample Laboratory Analyses,
March 27, 1993**

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Key West, Florida

Compound	State Target Level ¹	MW1	MW2	MW3	MW4	MW5	DUP ²	Equip Blank	Trip Blank	Lab Blank
MTBE	50	3	10	9	2	7	2	3	ND	ND

¹State target level for G-II groundwater (Chapter 17-770, Florida Administrative Code [FAC]).

²Duplicate sample taken from KYW-352-MW4.

Notes: All concentrations are in parts per billion.
Equip Blank = equipment blank.
Lab Blank = laboratory blank.
MTBE = methyl tert-butyl ether.
ND = not detected.

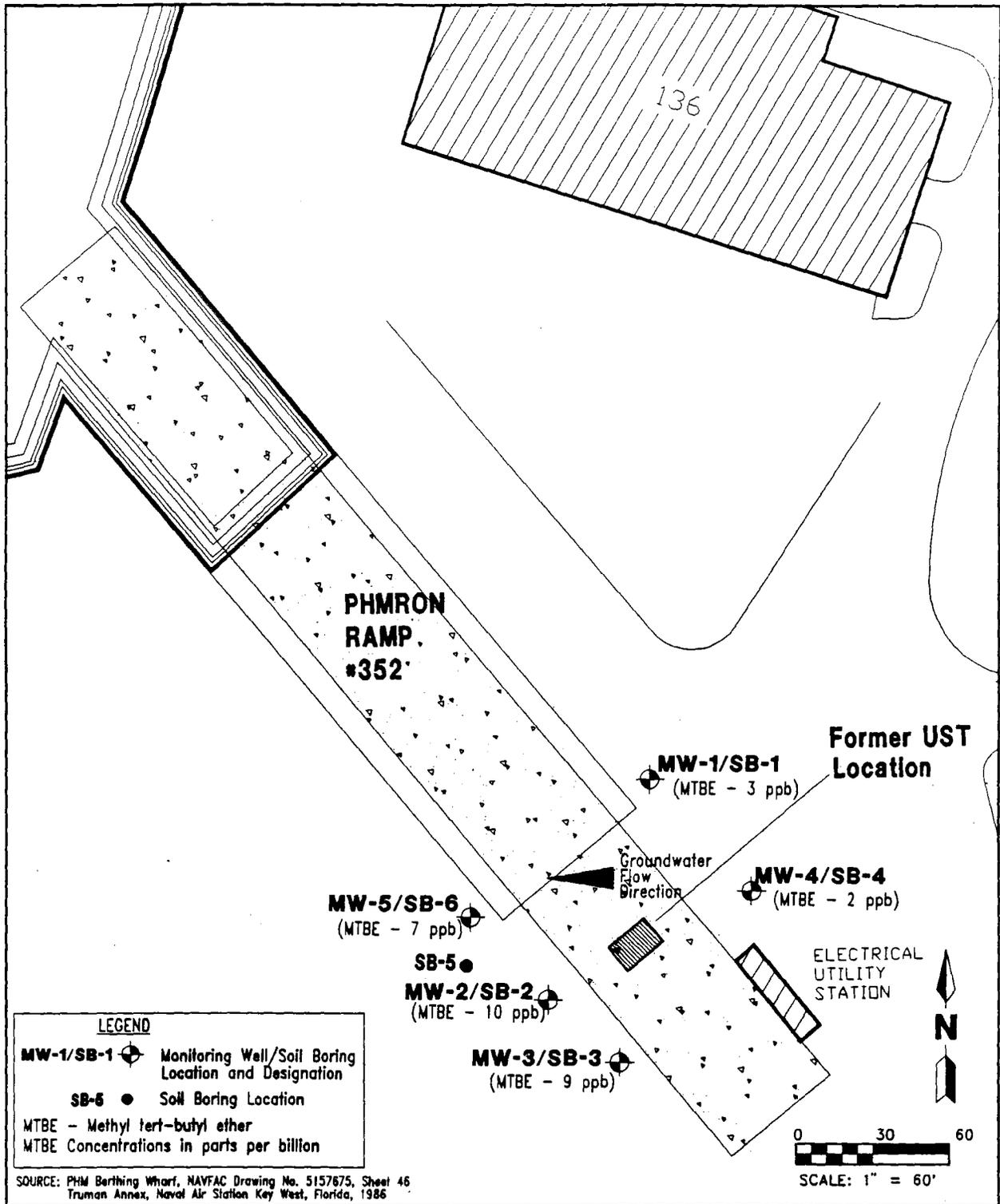


FIGURE 3-2
GROUNDWATER CONTAMINATION
DISTRIBUTION MAP
MARCH 27, 1993



CONTAMINATION ASSESSMENT
REPORT ADDENDUM, BUILDING 352

TRUMAN ANNEX
NAVAL AIR STATION
KEY WEST, FLORIDA

4.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

4.1 SUMMARY.

Based upon results of the previous investigation and the additional field investigation, the following is a summary of the conditions observed at Site 352.

- 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 (McKenzie, 1990).
- The UST and petroleum-contaminated soils were removed during reconstruction activities at the ramp. No diesel fuel constituents were found in groundwater samples collected during this investigation. Therefore, the reported source of diesel fuel contamination was apparently abated by the removal action.
- No petroleum contaminated soil was identified by OVA headspace analysis.
- No free product was found at the site.
- MTBE was detected in samples collected from all five monitoring wells at concentrations ranging from 2 to 10 ppb, and in the equipment blank at a concentration of 3 ppb. There is no State target level for MTBE in G-III groundwater; however, MTBE concentrations from the most recent sampling event are much less than the State target level of 50 ppb for G-II groundwater.

4.2 CONCLUSIONS

- MTBE, the only contaminant identified during the investigation, is not a constituent of diesel fuel. The source of MTBE contamination is not known and was not identified in this assessment.
- MTBE is a constituent of unleaded gasoline. No other gasoline constituents were detected in groundwater samples collected at the site during this investigation. It is possible that the presence of MTBE in groundwater at the site resulted from a small gasoline spill that occurred during ramp reconstruction activities.
- Between April 1991 and March 1993, significant decreases were observed in MTBE concentrations in the samples collected from monitoring wells KYW-352-MW2 and KYW-252-MW3. MTBE concentrations in the groundwater are expected to continue to decrease through time.

4.3 RECOMMENDATIONS. Based on the findings and conclusions of the CAR and CAR addendum, a *No Further Action Proposal (NFAP)* is recommended.

5.0 PROFESSIONAL REVIEW CERTIFICATION

The contamination assessment 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 determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment described in this report. This Contamination Assessment Report Addendum was developed for the UST located at Building 352 at Truman Annex, Naval Air Station, Key West, Florida, and should not be construed to apply to any other site.

Roger Durham
Professional Geologist
P.G. No. 001127

Date

REFERENCES

ABB Environmental Services, Inc., 1992, Contamination Assessment Report, Site 352, Truman Annex, Naval Air Station, Key West, Florida: prepared for Southern Division, Naval Facilities Engineering Command, Charleston, South Carolina.

Florida Department of Environmental Regulation, Division of Waste Management, May 1992: Guidelines for assessment and remediation of petroleum contaminated soils.

McKenzie, D.J., 1990, Water resources potential of the freshwater lens at Key West, Florida: U.S. Geological Survey Water-Resources Investigations Report 90-4115, 24 p.

APPENDIX A
FDER CORRESPONDENCE



State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee	
_____	Location _____
_____	Location _____
_____	Location _____
From: _____	Date: _____

Interoffice Memorandum

TO: Eric S. Nuzie, Federal Facilities Coordinator
Bureau of Waste Cleanup

THROUGH: Dr. James J. Crane, PGOII/Administrator *JJC*
Technical Review Section

FROM: Jorge R. Caspary P.G., Base Coordinator *J.R.C.*
Technical Review Section

DATE: April 22, 1992

SUBJECT: Meeting with ABB Environmental Services, Inc. on Contamination Assessment Reports for Base Exchange Station Bldg. A-322, PHMRON Maintenance Ramp Bldg. 352, Public Works Motor Pool Bldg. A-317, and Berthing Wharf Bldg. 189. Key West Naval Air Station

As agreed during an April 17th meeting with an ABB Environmental Services, Inc. representative, and followed by a confirmatory telephone conversation on April 21st, the following comments are issued on a site specific basis.

Base Exchange Service Station Bldg. A-322

As accorded with the ABB project manager, comments 1 and 2 of the March 30th interoffice memorandum are left as optional. However, it must be noted that if significant contaminant concentrations are detected at wells KYWA322- 9, 10, and 11, the previously asked water table monitoring wells will be required.

Comment 3 is rescinded. Only wells number 9, 10, and 12 will be required to be sampled and analyzed. Said wells should be analyzed for EPA Methods 624 and 625 for listed compounds. Non Priority Pollutants with peaks larger than 10 ppb should also be identified. In addition, a confirmatory analysis for Sulfur in groundwater should be implemented.

PHMRON Maintenance Ramp Bldg. 352

An additional well is needed downgradient of the underground storage tank. Well KYW352-1 is lateral to the groundwater flow.

ERIC S. NUZIE
APRIL 22, 1992
PAGE TWO

PEMIRON Maintenance Ramp Bldg. 352 - Cont'd

Concurrent with the above installation, sampling and analysis for EPA Methods 601, 602 and 610 should be conducted at all four wells.

Public Works Motor Pool Bldg. A-317

The comment is rescinded. A No-Further Action notice will be issued shortly.

Berthing Wharf Bldg. 189

As agreed during the meeting and telephone conversation, a Monitoring Only Plan is inappropriate for any site whose wells contain free product. Free-product should be recovered according to Section 17-770.300 (1) F.A.C. Manually bailing the Bunker C fuel oil is acceptable.

Wells KYW-189-2, 3, and 5 should be sampled and analyzed for EPA Methods 601, 602, 610, and 418.1.

Well KYW-189-1 should have the groundwater below the free product line analyzed for Methods 601, 602, 610, and 418.1.

APPENDIX B
LITHOLOGIC LOGS

TITLE: NAS Key West, Truman Annex		LOG of WELL: KYW-352-MW4	BORING NO. SB4
ENT: SOUTHNAVFACENGCOM		PROJECT NO: 7519-30	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 3/23/93	COMPLTD: 3/23/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 3 - 13 FT.	PROTECTION LEVEL: D
TOC ELEV.: 9.64 FT.	MONITOR INST.: OVA	TOT DPTH: 13FT.	DPTH TO ∇ 5.96 FT.
LOGGED BY: R. Durham	WELL DEVELOPMENT DATE: 3/23/93		SITE: Bldg. 352, PHMRON Ramp

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			<1	ASPHALT				
			<1	LIME FILL: light tan to gray, silty, loose				
5								
10								
15								
20								

TITLE: NAS Key West, Truman Annex		LOG of WELL:	BORING NO. SB5
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7519-30	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 3/23/93	COMPLTD: 3/23/93
METHOD: 4.25" HSA	CASE SIZE:	SCREEN INT.:	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: OVA	TOT DPTH: 4FT.	DPTH TO ∇ FT.
LOGGED BY: R. Durham	WELL DEVELOPMENT DATE:		SITE: Bldg. 352, PHMRON Ramp

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			<1	ASPHALT				
			<1	SANDY FILL: gray-brown, silty, mixed with limerock				
				MET REFUSAL				
5								
10								
15								
20								

TITLE: NAS Key West, Truman Annex		LOG of WELL: KYW-352-MW5	BORING NO. SB6
ENT: SOUTHNAVFACENGCOM		PROJECT NO: 7519-30	
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 3/23/93	COMPLTD: 3/23/93
METHOD: 4.25" HSA	CASE SIZE: 2 inch	SCREEN INT.: 3 - 13 FT.	PROTECTION LEVEL: D
TOC ELEV.: 9.59 FT.	MONITOR INST.: OVA	TOT DPTH: 13FT.	DPTH TO ∇ 6.19 FT.
LOGGED BY: R. Durham	WELL DEVELOPMENT DATE: 3/23/93		SITE: Bldg. 352, PHMRON Ramp

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			< 1	ASPHALT				
			< 1					
			< 1					
5								
				CLAYEY SAND: light brown, mixed with limerock				
10								
15								
20								

APPENDIX C

**GROUNDWATER ANALYTICAL DATA
MARCH 27, 1993, SAMPLING EVENT**



WADSWORTH/ALERT Laboratories

Division of Enseco Incorporated

5910 Breckenridge Parkway, Suite H
Tampa, FL 33610

813-621-0784
FAX 813-623-6021

ANALYTICAL REPORT

SUBCONTRACT NUMBER: 1-08-134

TASK ORDER NUMBER: 0019

TRUMAN ANNEX-BLDG 352

Presented to:

ROGER DURHAM

ABB ENVIRONMENTAL SERVICES, INC

ENSECO-WADSWORTH/ALERT LABORATORIES

5910 BRECKENRIDGE PARKWAY, SUITE H

TAMPA, FLORIDA 33610

(813) 621-0784

Joanne Anderson
Joanne Anderson
Project Manager

Randall C. Grubbs
Randall C. Grubbs
Laboratory Director - Florida

April 20, 1993



ENSECO-WADSWORTH/ALERT
Laboratories

ANALYTICAL METHODS

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

AMETER

METHOD

ORGANICS

volatile Organics

** EPA Method 601/2

polynuclear Aromatic Hydrocarbons

** EPA Method 625

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

Indicates draft version of this method was used

Methods Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4-79-020, March, 1983. July, 1982

Drinking Waters USEPA, 600/4-88/039, December, 1988.

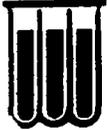
. Methods Standard Methods for the Examination of Water and Waste-water, APHA, 16th edition, 1985.

PA Methods From 40CFR Part 136, published in Federal Register on October 26, 1984.

46 Methods Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd Edition, USEPA, 1986.

M Methods American Society for Testing and Materials.

SH Method NIOSH Manual of Analytical Methods, National Institute for Occupational Safety and Health, 2nd Edition, April 1977.



ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C3005-1
MATRIX: WATER

DATE RECEIVED: 3/30/93
DATE EXTRACTED: 3/31/93
DATE ANALYZED: 4/14/93

SAMPLE ID: KYW-352-MW1

TRUMAN ANNEX-BLDG 352

CERTIFICATION #: E84059

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

HRS84297

benaphthene	ND
benaphthylene	ND
anthracene	ND
benzo (a) anthracene	ND
benzo (a) pyrene	ND
benzo (b) fluoranthene	ND
benzo (ghi) perylene	ND
benzo (k) fluorene	ND
fluoranthene	ND
anthracene	ND
fluorene	ND
fluorene	ND
benzo (1,2,3-cd) pyrene	ND
Methylnaphthalene	ND
Methylnaphthalene	ND
naphthalene	ND
phenanthrene	ND
pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
 ND* (None Detected, lower detectable limit = ug/L) as rec'd
 -- (Not Analyzed)

PROBATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
dibromobenzene-d5	104	(22-135)	(10-155)
fluorobiphenyl	78	(34-140)	(12-153)
perfluorobiphenyl-d14	42	(10-132)	(13-140)



ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
 JOB #: 3C3005-2
 MATRIX: WATER

DATE RECEIVED: 3/30/93
 DATE EXTRACTED: 3/31/93
 DATE ANALYZED: 4/14/93

SAMPLE ID: KYW-352-MW2

TRUMAN ANNEX-BLDG 352

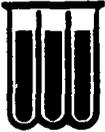
CERTIFICATION #: E84059
 HRS84297

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

fluoranthene	ND
fluoranthene	ND
fluoranthene	ND
fluoro(a)anthracene	ND
fluoro(a)pyrene	ND
fluoro(b)fluoranthene	ND
fluoro(ghi)perylene	ND
fluoro(k)fluoranthene	ND
fluoropyrene	ND
fluoro(a,h)anthracene	ND
fluoranthene	ND
fluorene	ND
fluoro(1,2,3-cd)pyrene	ND
fluoromethylanthracene	ND
fluoromethylanthracene	ND
fluoranthracene	ND
fluoranthrene	ND
fluorene	ND

RE: ND (None Detected, lower detectable limit = 6 ug/L) as rec'd
 ND* (None Detected, lower detectable limit = ug/L) as rec'd
 -- (Not Analyzed)

PROBATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
fluorobenzene-d5	106	(22-135)	(10-155)
fluorobiphenyl	77	(34-140)	(12-153)
fluorophenyl-d14	40	(10-132)	(13-140)



ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C3005-4
MATRIX: WATER

DATE RECEIVED: 3/30/93
DATE EXTRACTED: 3/31/93
DATE ANALYZED: 4/15/93

SAMPLE ID: KYW-352-MW4

TRUMAN ANNEX-BLDG 352

CERTIFICATION #: E84059
HRS84297

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

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 = 5 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	114	(22-135)	(10-155)
Fluorobiphenyl	97	(34-140)	(12-153)
Terphenyl-d14	48	(10-132)	(13-140)



ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C3005-6
MATRIX: WATER

DATE RECEIVED: 3/30/93
DATE EXTRACTED: 3/31/93
DATE ANALYZED: 4/15/93

SAMPLE ID: KYW-352-DUP

TRUMAN ANNEX-BLDG 352

CERTIFICATION #: E84059
HRS84297

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

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
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 = 5 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	100	(22-135)	(10-155)
Fluorobiphenyl	96	(34-140)	(12-153)
Terphenyl-d14	53	(10-132)	(13-140)



ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C3005-7
MATRIX: WATER

DATE RECEIVED: 3/30/93
DATE EXTRACTED: 3/31/93
DATE ANALYZED: 4/15/93

SAMPLE ID: KYW-352-EB

TRUMAN ANNEX-BLDG 352

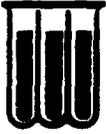
CERTIFICATION #: E84059
HRS84297

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

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
Benzo (e) 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 = 5 ug/L) as rec'd
 ND* (None Detected, lower detectable limit = ug/L) as rec'd
 -- (Not Analyzed)

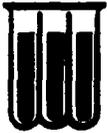
SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	94	(22-135)	(10-155)
Chlorobiphenyl	86	(34-140)	(12-153)
Biphenyl-d14	82	(10-132)	(13-140)



**ENSECO-WADSWORTH/ALERT
Laboratories**

QUALITY CONTROL SECTION

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



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

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

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

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

*****EXAMPLE*****

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

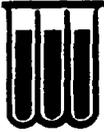
Analytical Result Qualifiers

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

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

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

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



ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 3C3005-BK
MATRIX: WATER

DATE RECEIVED: 3/30/93
DATE EXTRACTED: NA
DATE ANALYZED: 4/ 5/93

SAMPLE ID: LABORATORY BLANK

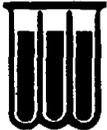
VOLATILE ORGANICS
METHOD 601/602 - GC

CERTIFICATION #: E84059
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	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
Chlorodifluoromethane	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)	116	(78-122)
Trifluorotoluene (PID)	102	(73-131)



ENSECO-WADSWORTH/ALERT
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 3C3005-BK
MATRIX: WATER

DATE RECEIVED: 3/30/93
DATE EXTRACTED: 3/31/93
DATE ANALYZED: 4/14/93

SAMPLE ID: LABORATORY BLANK

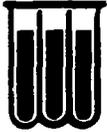
POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

CERTIFICATION #: E84059
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
Benzo (m) perylene	ND
Benzo (p) anthracene	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 = 5 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	126	(22-135)	(10-155)
Fluorobiphenyl	89	(34-140)	(12-153)
Terphenyl-d14	88	(10-132)	(13-140)



ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 601/2
RUN ID : MA/MB01021

DATE EXTRACTED: N/A
DATE ANALYZED : 04/05/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD %REC
Benzene	MA/MB01021	106	15 70-117
Toluene		108	16 70-117
Chlorobenzene		101	24 58-133
1,1-Dichloroethene		122	28 43-131
Trichloroethene		125	30 69-129
Dichlorobromomethane		92	22 61-133



ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : LCS
MATRIX : WATER
METHOD : 625
RUN ID : D0275

DATE EXTRACTED: 03/31/93
DATE ANALYZED : 04/14/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS	
			RPD	%REC
Naphthalene	D0275	89	43	10-139
1-Methylnaphthalene		84	48	10-150
Acenaphthene		88	29	45-130
Fluorene		91	24	37-133
Pyrene		109	41	20-144
Chrysene		86	45	15-152



ENSECO-WADSWORTH/ALERT
Laboratories

LAB ID : 3C3005-5
MATRIX : WATER
METHOD : 625
RUN ID : D0304/D0305

DATE RECEIVED : 03/30/93
DATE PREPARED : 03/31/93
DATE ANALYZED : 04/15/93

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS	MSD	RPD	QC LIMITS	
		%REC	%REC		RPD	%REC
Naphthalene	D0304/D0305	90	84	7	23	25-97
1-Methylnaphthalene		81	76	6	24	48-101
Acenaphthene		81	77	5	24	57-104
Fluorene		90	83	8	28	34-118
Pyrene		79	71	11	30	58-148
Chrysene		63	59	7	36	48-118

* = Diluted Out



Client:		Project Name / Location				No. of CONTAINERS	Parameter										Remarks		
Sampler(s)		Project #:					VOC - 601/602	PAH - 610	METALS -	TRPH -	EDB -								
Item #	Date	Time	MATRIX	Sample Location															
	ABB-ES		TRUMAN Annex - Pkg 352																
	R. Durham P. Wagner		KEYWEST-CTO 7																
1	3-27-93	13:10	H ₂ O	KYW-352-MW5	5	3	2												
2	↑	13:20		KYW-352-MW4	5	3	2												
3		13:30		KYW-352-MW2	5	3	2												
4		13:45		KYW-352-MW3	5	3	2												
5		14:05		KYW-352-MW1	5	3	2												
6		12:55		KYW-352-EB	5	3	2												
7	7-27-93			KYW-352-DUP	5	3	2												
8																			
9																			
10																			
11																			

Total Containers **35** Number of Coolers in Shipment Bailers

Report To:	Transfer Number	Item Number(s)	Relinquished By / Company	Accepted By / Company	Date	Time
Additional Comments: No Van's included will ship tomorrow	1		ABB-ES	Chad McHarty	7/30/93	10:10
	2					
	3					
	4					
	5					
	6					

Original Accompanies Shipment

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

AB3 Project Name/Number: Key West CTC7

Received By: [Signature] Date Received: 3-31-93

Evaluation Form By: [Signature] LAB No: 3C3005, 3C3010, 3C3011 received vials 2
projects received 3,
3C3109/10/17

of shipping container samples received in? WAL Cooler
 Client Cooler WAL Shipper Box Other

NO responses or discrepancies should be explained in comments section.

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

Cooler # — Temp 4 °C Cooler # — Temp 5 °C
 Cooler # — Temp 4 °C Cooler # — Temp 4 °C

Comments: Approximately half the vials have headspace
received voas only on 3-31-93, 3 voas
each sample for 601/2