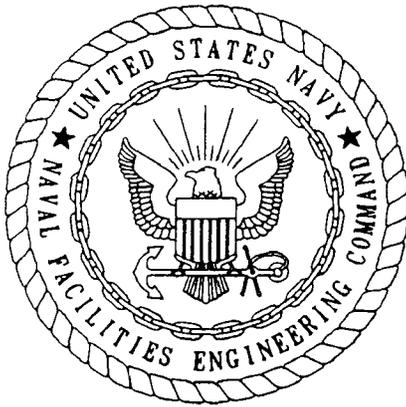


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NAS KEY WEST
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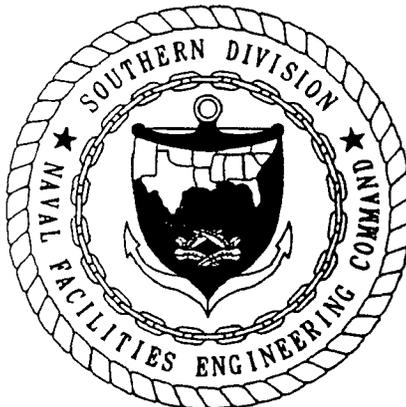
CONTAMINATION ASSESSMENT PLAN AND SITE SPECIFIC HEALTH AND SAFETY PLAN
AT TRUCK STAND BUILDING A935 NAS KEY WEST FL
6/1/1993
ABB ENVIRONMENTAL SERVICES INC



**CONTAMINATION ASSESSMENT PLAN
SITE-SPECIFIC HEALTH AND SAFETY PLAN FOR
CONTAMINATION ASSESSMENT INVESTIGATION
NAVAL AIR STATION KEY WEST
TRUCK STAND, BUILDING A935
KEY WEST, FLORIDA**

**CONTRACT TASK ORDER NO. 093
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 PLAN

**NAVAL AIR STATION KEY WEST
TRUCK STAND, BUILDING A935
BOCA CHICA FIELD, KEY WEST, FLORIDA**

Contract Task Order (CTO) 093

Contract Number N62467-89-D-0317

Prepared by:

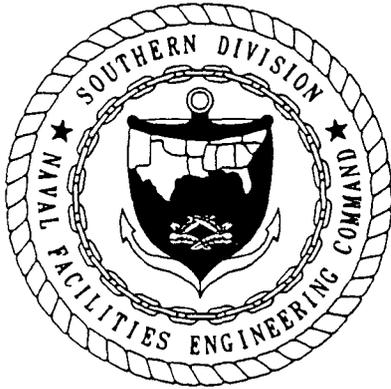
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Luis Vazquez, Engineer-In-Charge

June 1993



FOREWORD

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

The Navy's UST program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This report was prepared to satisfy the requirements of the Florida Department of Environmental 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.

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Truck Stand, Building A935
Boca Chica Field, Key West, Florida

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REFERENCES

GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
BTEX bls	benzene, toluene, ethylbenzene, and xylenes below land surface
CA	Contamination Assessment
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CompQAP	Comprehensive Quality Assurance Plan
CNO	Chief of Naval Operations
CTO	Contract Task Order
FAC	Florida Administrative Code
FDER	Florida Department of Environmental Regulation
FID	flame ionization detector
GC	gas chromatograph
HASP	Health and Safety Plan
HSWA	Hazardous and Solid Waste Amendments of 1984
ID	inside diameter
K	hydraulic conductivity
MOP	Monitoring Only Plan
NAS	Naval Air Station
NOFAP	No Further Action Plan
OVA	organic vapor analyzer
ppm	parts per million
POA	Plan of Action
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
SOUTHNAVFACENCOM SWDA	Southern Division, Naval Facilities Engineering Command Solid Waste Disposal Act of 1965
TDS	total dissolved solids
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	underground storage tank

1.0 INTRODUCTION

ABB Environmental Services, Inc. (ABB-ES), has been contracted by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to prepare a Contamination Assessment Plan (CAP) for the Truck Stand, Building A935, at Boca Chica Field, Naval Air Station (NAS) Key West, Key West, Florida. The CAP outlines a field investigation and sampling program that will assess the source(s) of contamination in the vicinity of Building A935 and delineate the extent of any contamination detected. The following report presents the site location, summarizes previous investigations, and develops the rationale for the proposed field investigation to be implemented under the Contamination Assessment (CA).

2.0 BACKGROUND

2.1 SITE DESCRIPTION. Naval Air Station Key West (NAS Key West), Monroe County, Florida, is located approximately 150 miles southwest of Miami. Key West is strategically significant because it is 90 miles north of Cuba and is the closest point in the United States to the West Indies and Central and South America.

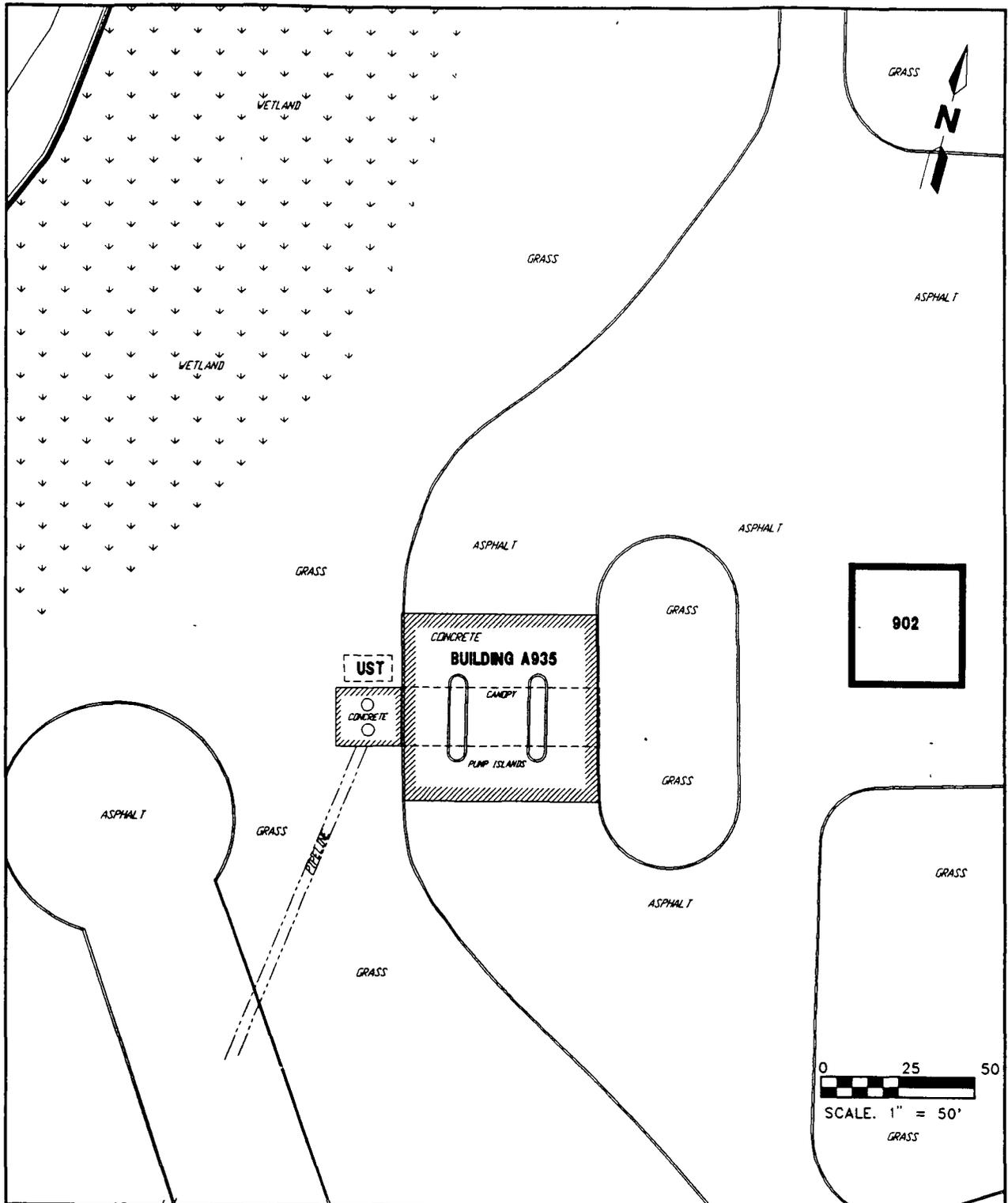
NAS Key West, a complex of activities located in numerous areas of the Lower Florida Keys, encompasses approximately 5,000 acres. The majority of these activities are concentrated on Boca Chica Key and Key West. NAS Key West, the host activity, is situated on Boca Chica Key and encompasses 3,250 acres.

NAS Key West's mission 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 Truck Stand, Building A935, is located approximately $\frac{1}{4}$ mile northwest of the runway intersection on Boca Chica Key (see Figure 9-1 in Health and Safety Plan). JP-5 tanker trucks use the facility to load fuel for use in jet aircraft. The facility consists of a 60-foot-by-60 foot concrete pad with two pump islands located in the middle of the pad (see Figure 2-1). A 20-foot-wide canopy extends in an east-west direction over the pump islands. One 500-gallon underground storage tank (UST) is located on the west side of the concrete pad. Several cylindrical fuel filters are located adjacent to the UST. A pipeline from the southwest connects the tank farm at Boca Chica Key with the Truck Stand. JP-5 jet fuel runs through the pipeline, through the filters, and then to the dispenser pumps. There is no external piping associated with the UST. An asphalt driveway borders the concrete pad to the north and south and leads to a large asphalt parking lot east of the Truck Stand. A small 110-foot-by-45 foot grassy area borders the Truck Stand on the east side. The ground where the UST is located is covered with gravel. The remaining area on the west side of the concrete pad is sand or covered with grass. A wetlands area is located approximately 50 feet northwest of the UST. It is assumed that groundwater at the site flows to the northwest towards the wetlands. A small office building (Building A902) is located approximately 80 feet east of the Truck Stand.

2.2 SITE HISTORY. The Truck Stand at Building A935 at Boca Chica Field is the location of a single 500-gallon UST used for the storage of water-contaminated JP-5 fuel. The UST (No. A902-B) was installed in 1970. Routine overfilling and spillage are the reported causes of contamination at the site. A reported 50- to 60-gallon fuel spill in November 1991 was confined to the bermed concrete pad at the Truck Stand and cleaned up.

2.3 GEOLOGY. The NAS Key West activities are located on the Lower Florida Keys. The Lower Keys are overlain by a mantle of oolite of the Miami Limestone. The oolite is thickest in the northern part of Stock Island, thinning to the south and southwest. Beneath the Miami Limestone lies the Key Largo coral reef limestone. Hoffmeister (1974) reported the Miami Limestone as 27 feet thick and the Key Largo Limestone as greater than 270 feet thick in the western part of Key West. The natural grade in much of the area in and around Boca Chica Key and Key West has either been altered or is completely man-made consisting of imported



**FIGURE 2-1
SITE MAP**



**CONTAMINATION ASSESSMENT
PLAN
TRUCK STAND, BUILDING A935
BOCA CHICA FIELD
NAVAL AIR STATION KEY WEST
KEY WEST, FLORIDA**

fill. Therefore, it is not uncommon to encounter fill materials at the surface or near surface.

2.4 HYDROGEOLOGY.

2.4.1 Regional The highly transmissive limestones of the Lower Keys generally contain brackish or saline water. Small areas of fresh groundwater exist on some of the larger islands (Black, Crow, and Eidness, 1977). The water table aquifer is contained within both the Miami and Key Largo Limestones. Freshwater lenses that do exist are Class G-III groundwater with total dissolved solids (TDS) of >10,000 parts per million (ppm) and are subject to saltwater intrusion through the porous Key Largo Limestone and upward to the less porous Miami Limestone (Black, Crow, Eidness, 1977); McKenzie, 1990).

Groundwater in the Key West area discharges directly to the marine surface waters surrounding the islands. Many of these marine waters have been designated as Outstanding Florida Waters, a classification that affords them the highest environmental protection standards. TDS concentrations, calculated from specific conductance measurements of groundwater at the site, were in excess of 35,000 ppm (ABB-ES, 1991a; 1991b).

Due to the low land surface elevations in the Lower Keys, the water table is shallow. Recharge to the aquifer is directly from precipitation and infiltration is rapid. Discharge, via groundwater flow, is to the surrounding surface waters. Water-table elevations can be greatly influenced by local rainfall and tides. The volume of fresh groundwater in the Key West area is limited; therefore, freshwater wells of any consequence do not exist. Potable water supplies are obtained by rainwater catchment, reverse osmosis desalination, or is imported from the mainland by way of the Florida Keys aqueduct.

2.4.2 Site Specific 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 encountered at less than 5 feet below land surface (bls). Groundwater flow is believed to be to the northwest, towards the marsh. Fill material and rock from the surface to depths of 12 feet consist of white, slightly to heavily weathered, silty, hard limestone with some sand and shell fragments (ABB-ES, 1991a).

3.0 INVENTORY OF PROXIMATE POTABLE WELLS

There are no official potable wells in the Key West area. Potable water is imported from mainland Florida through the Florida Keys Aqueduct obtained by rainwater catchment, or obtained by reverse osmosis desalination. Small lenses of fresh groundwater exist in the area, but these lenses are subject to saltwater intrusion (Black, Crow, and Eidness, 1977).

4.0 PROPOSED ASSESSMENT PLAN

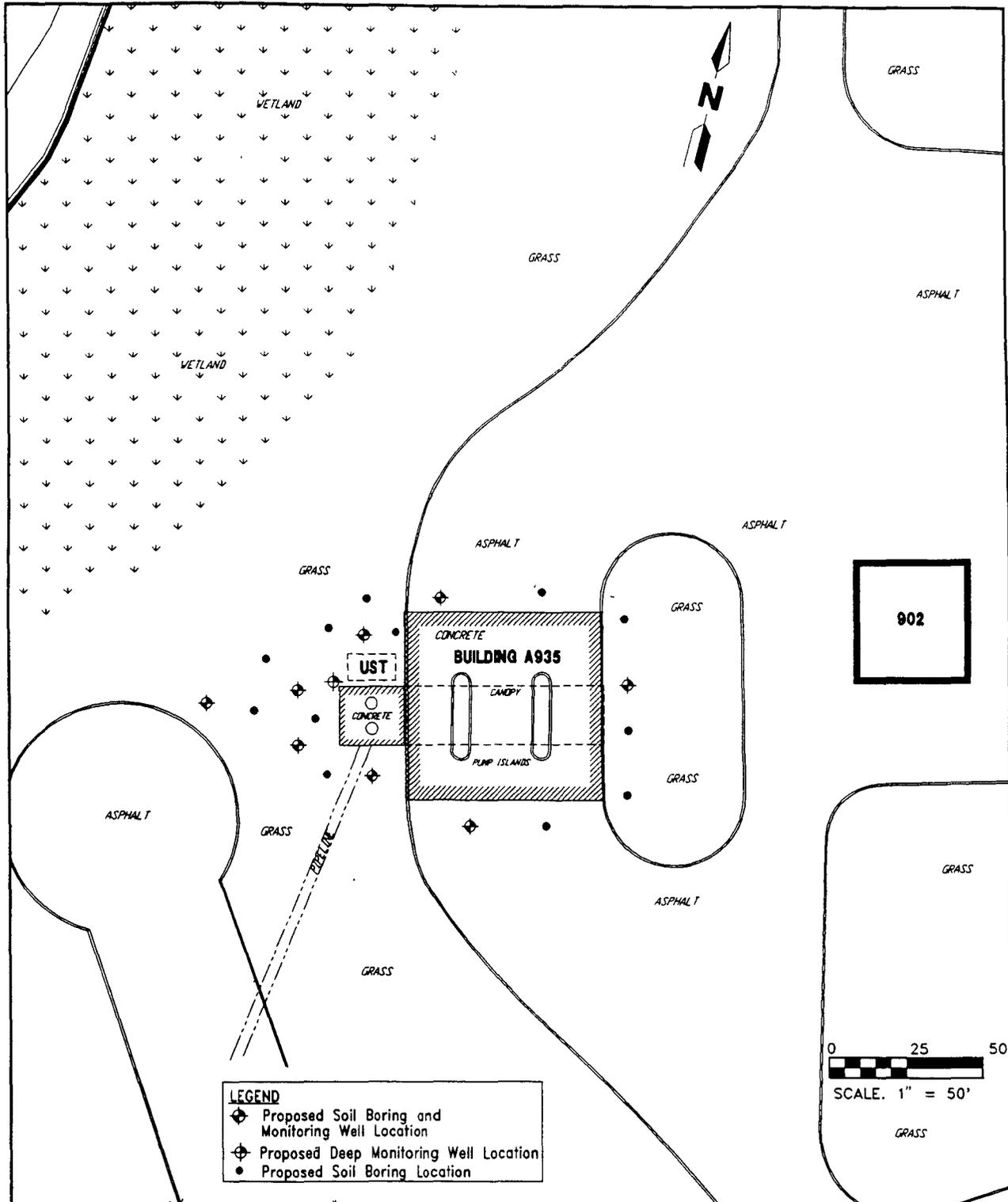
4.1 FIELD INVESTIGATION. Prior to the beginning of the field investigation, a startup meeting will be held onsite at NAS Key West. All personnel associated with the investigation will review the scope of work in the CAP and Health and Safety Plan (HASP). Scheduling, logistics, and special precautions will be discussed.

The purpose of the CA field investigation is to assess the vertical and horizontal extent of soil and groundwater contamination and identify the types of contaminants at the site. The CA will require the drilling of soil borings and installation of monitoring wells at the site.

Approximately 20 soil borings will be advanced using a truck mounted drill rig until the water table is encountered (see Figure 4-1). Soil samples will be collected using a split-spoon sampling device. Samples collected above the water table will be retrieved in 2-foot intervals for organic vapor analyzer (OVA) screening in accordance with Florida Department of Environmental Regulation (FDER) Chapter 17-770.200 (2), Florida Administrative Code (FAC), guidelines. For soil borings in which monitoring wells will be installed, once the water table is reached, soil samples will be collected every 5 feet vertically until total depth is reached. Samples collected below the water table will be analyzed with a portable gas chromatograph (GC) for comparison with petroleum standards. The screening of soil samples from these borings will assist in evaluating the horizontal and vertical extent of the soil contamination and provide information for placement of groundwater monitoring wells. The proposed soil boring locations are shown in Figure 4-1. Actual locations of soil borings will be determined by the field team as more information is obtained about the contaminant plume during soil and groundwater screening.

Approximately eight shallow (20 feet bls) permanent monitoring wells and one permanent deep well (approximately 30 to 50 feet bls) will be installed in selected soil borings to characterize the groundwater contaminant plume and assess its horizontal and vertical extent. Monitoring well locations will be based on the results of groundwater samples screened by a field GC used to measure levels of benzene, toluene, ethyl benzene, and xylenes (BTEX). The shallow monitoring wells will be constructed of 2-inch inside diameter (ID), schedule 40, flush-threaded, polyvinyl chloride (PVC) screen and casing. Screen length will be 10 feet (5 feet for the deep well) with a slotted screen opening of 0.010 inch. At least 2 feet of screen will be placed above the water table to accommodate seasonal fluctuations of the water table. The screen will be surrounded with a quartz sand filter pack of 6/20 size (or an acceptable equivalent) to at least 1 foot above the top of the screen. A 1-foot bentonite seal will be placed above the filter pack. The remaining annulus will be grouted to land surface with neat cement.

One deep monitoring well will be installed at the site. A 10-inch borehole will be advanced, using a hollow-stem auger, to a depth approximately 10 feet below the base of the contaminant plume at the site. Six-inch PVC surface casing will be set into the borehole. The annular space surrounding the surface casing will be filled with a neat cement grout to land surface. A 5/8-inch borehole will be advanced inside the surface casing to a depth approximately 15 feet below the bottom of the surface casing. A 2-inch ID monitoring well will be set inside the



**FIGURE 4-1
PROPOSED SOIL BORING AND
MONITORING WELL LOCATIONS**



**CONTAMINATION ASSESSMENT
PLAN
TRUCK STAND, BUILDING A935
BOCA CHICA FIELD
NAVAL AIR STATION KEY WEST
KEY WEST, FLORIDA**

surface casing. The well will be constructed of 2-inch, Schedule 40 PVC riser with 5 feet of 2-inch, Schedule 40 PVC screen at the bottom. The screen will have 0.010-inch slot size openings. The annular space around the well screen will be filter packed with 6/20 sand to a depth of approximately 2 feet above the top of the screen. Two feet of fine sand (30/65 grade) will be placed immediately above the filter pack. The remainder of the annular space will be filled with a neat cement grout to land surface. A locking, watertight cap will be installed on each well. The monitoring wells will be finished below grade in a subsurface traffic-bearing vault and protected with a metal manhole assembly. Upon completion, all newly installed monitoring wells will be developed by pumping until the purged water is clear and relatively free of sediment to assure a good hydraulic connection with the surrounding aquifer.

Diagrams of typical shallow and deep monitoring wells, finished below grade, are illustrated in Figures 4-2 and 4-3, respectively. Detailed information of monitoring well construction, lithologic descriptions, split-spoon samples, and other pertinent data will be graphically displayed in boring logs in the Contamination Assessment Report (CAR). Soil will be classified in accordance with the Unified Soil Classification System.

Groundwater samples will be collected from all site monitoring wells that do not contain free-floating petroleum product and analyzed for the kerosene analytical group as described in FDER Chapter 17-770, FAC. Appropriate quality assurance/quality control (QA/QC) samples will also be collected and analyzed. The following is a listing of the samples that will be collected from the site:

- nine monitoring well samples,
- one duplicate sample,
- one equipment blank (per day of sampling), and
- one trip blank.

Groundwater samples will be collected with Teflon™ bailers and shipped via overnight carrier to an FDER- or U.S. Environmental Protection Agency (USEPA)-approved analytical laboratory. Sampling and the subsequent analytical program will comply with the ABB-ES FDER-approved Comprehensive Quality Assurance Plan (CompQAP).

Aquifer tests will be conducted to estimate the hydraulic properties of the water table aquifer at the site. Rising-head slug tests will be performed on a minimum of two monitoring wells to collect data for calculating hydraulic conductivity. Hydraulic conductivity will be calculated using the computer program AQTESOLV™ (Geraghty & Miller, Inc. 1989). The AQTESOLV™ program calculates hydraulic conductivity from slug test data following the methods of Bouwer and Rice (1976) for partially penetrating wells screened in unconfined aquifers.

Finally, a Florida-licensed professional surveyor will survey the horizontal and vertical coordinates for each of the monitoring wells for incorporation into either the U.S. Geological Survey (USGS) North American Datum of 1927 or base coordinate grid system.

During this field investigation, ABB-ES personnel and their subcontractors will coordinate efforts with the NAS Key West Environmental Coordinator to dispose of contaminated fluids and soils onsite. It will be the Navy's responsibility to dispose of any hazardous waste.

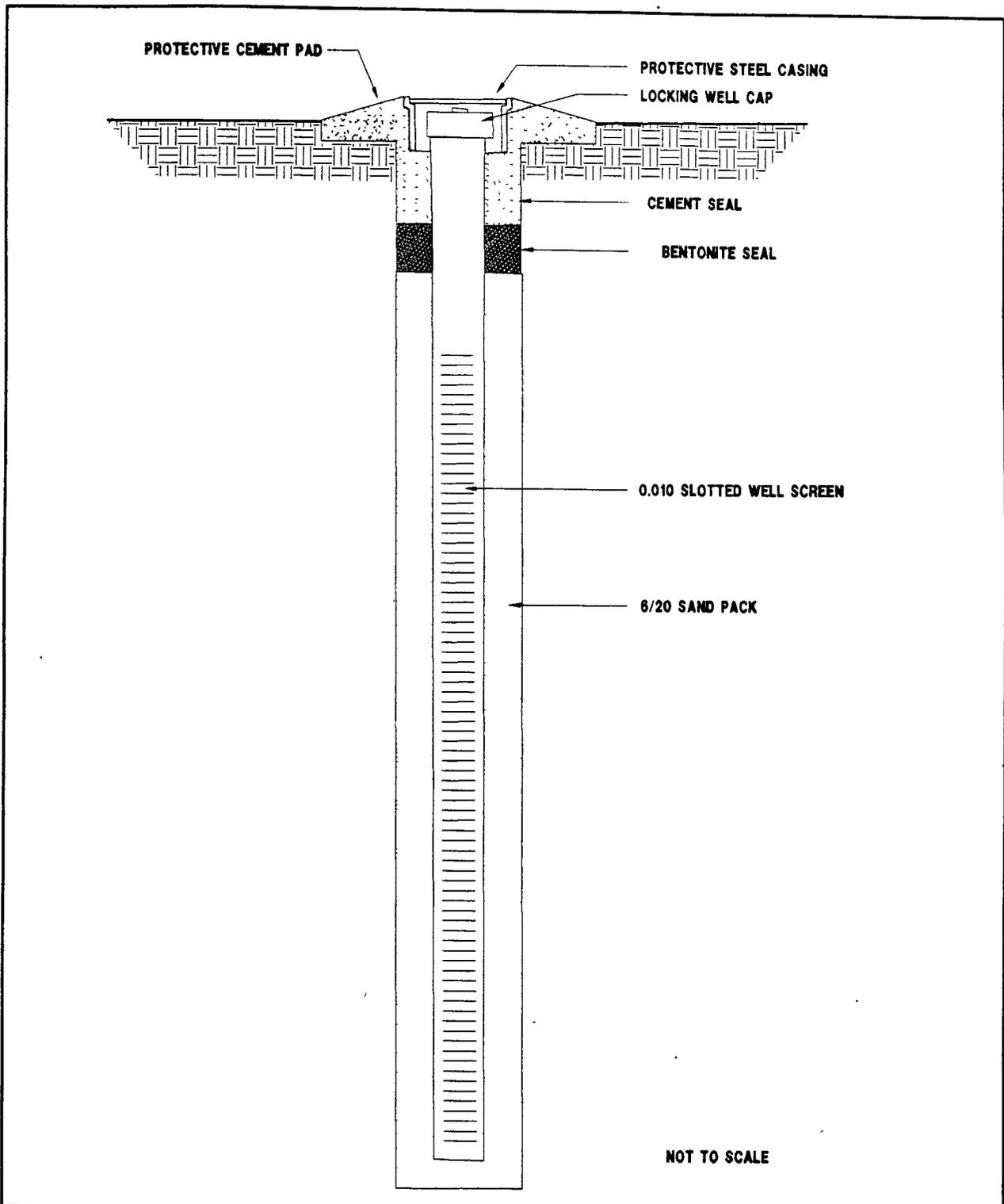
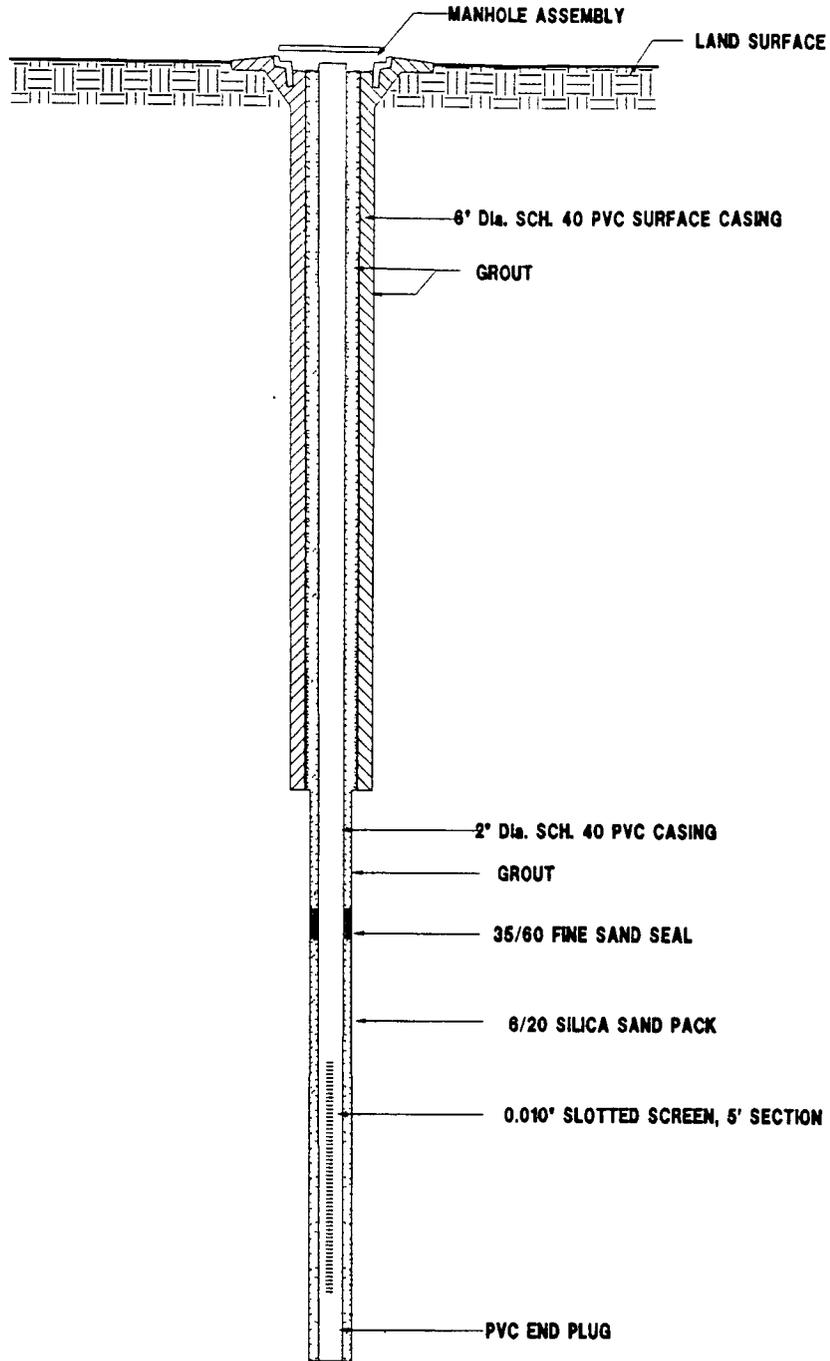


FIGURE 4-2
TYPICAL SHALLOW MONITORING WELL
INSTALLATION DETAIL



CONTAMINATION ASSESSMENT
PLAN
TRUCK STAND, BUILDING A935
BOCA CHICA FIELD
NAVAL AIR STATION KEY WEST
KEY WEST, FLORIDA



NOT TO SCALE

FIGURE 4-3
TYPICAL DEEP MONITORING WELL
INSTALLATION DETAIL



CONTAMINATION ASSESSMENT
PLAN
TRUCK STAND, BUILDING A935
BOCA CHICA FIELD
NAVAL AIR STATION KEY WEST
KEY WEST, FLORIDA

4.2 PREPARATION OF REPORTS. Upon completion of the field investigations and receipt of the laboratory analytical results of the groundwater samples, a CAR will be prepared and submitted to SOUTHNAVFACENGCOM and the Naval activity for review and approval. The reports will discuss site background information, site conditions, findings, and recommendations for the Truck Stand site, Building A935, Boca Chica Field at NAS Key West. Recommendations will also be made as to the need for any follow-up reports. Site location maps, locations of monitoring wells, groundwater contour maps, and contamination delineation maps will be included with the report.

Based on the findings and conclusions of the CAR, a No Further Action Proposal (NFAP), Monitoring Only Proposal (MOP), or Remedial Action Plan (RAP) will be recommended for the site. If a MOP is recommended in the CAR, a MOP will be prepared for the site. If remedial action is recommended in the CAR, a RAP will be prepared for the site.

For the purpose of costing the project, it will be assumed that a RAP will be developed for the site. The RAP will include the following items:

- summary sheet of the CAR;
- general discussion of the technical and economic feasibility of remedial alternatives and more detailed information on the most feasible remedial system;
- general discussion of the rationale for the selected system;
- comparison of contaminant levels found with existing State and USEPA cleanup criteria in tabular format;
- disposition and expected contaminant concentrations in any effluent from the proposed cleanup method;
- cost estimates and schedules for the design, construction startup, and operational phases;
- designation of monitoring wells and proposed methodology for verifying accomplishment of RAP goals (cleanup levels);
- details of any proposed treatment of contaminated soils;
- design and construction details;
- schedule for completion of the remedial action; and
- recommendations for conducting pilot studies and obtaining additional information.

Additional site information that may be needed to develop the performance specification but not included in this scope is as follows.

- existing conditions site survey plans,
- locations of existing utilities, and
- location and availability of electric power.

5.0 SCHEDULE

A projected schedule to complete the CA field investigation program at the Truck Stand is approximately 4 weeks (see Figure 5-1). This includes mobilization, drilling, sampling, surveying, aquifer testing, and demobilization. The field investigation work is scheduled to begin July 12, 1993. Upon completion of the field investigation, a 3-week turn-around time is anticipated before receipt of the laboratory analyses of the groundwater samples collected during the investigation. A CAR for the site is scheduled for submittal to SOUTHNAVFAC-ENGCOM by October 13, 1993. If time schedules for report review are followed, follow-up reports have been scheduled to be delivered to SOUTHNAVFACENGCOM by March 4, 1994.

ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	ORIG DUR	1993						1994		
				JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
PROJECT MANAGEMENT												
NOTICE TO PROCEED CTO NO 093	15JUN93		0	◆								
DAY-TO-DAY MANAGEMENT	15JUN93	3MAR94	182		[Bar]							
SUBCONTRACTOR PROCUREMENT PROCESS	15JUN93	9JUL93	18		[Bar]							
TFMR REVIEW & PREPARATION	15JUN93	3MAR94	182		[Bar]							
CTO NO. 093 COMPLETE		4MAR94	0									◆
CAP & HASP PREPARATION												
CAP/HASP PREPARATION	15JUN93	30JUN93	12		[Bar]							
SUBMIT CAP/HASP TO NAVY		30JUN93	0									◆
FIELD INVESTIGATION												
FIELD INVESTIGATION	1JUL93	28JUL93	19			[Bar]						
LAB ANALYSIS/SURVEY	29JUL93	25AUG93	20				[Bar]					
CONTAMINATION ASSESSMENT REPORT												
DRAFT CAR PREPARATION	26AUG93	29SEP93	24				[Bar]					
CAR REVIEW PROCESS	30SEP93	13OCT93	10					[Bar]				
SUBMIT CAR TO FDER		13OCT93	0									◆
FDER REVIEW OF CAR	14OCT93	24NOV93	30						[Bar]			
FOLLOW-UP REPORT - RAP												
RAP PREPARATION	14JCT93	18NOV93	26							[Bar]		
SUBMIT RAP TO FDER		18NOV93	0									◆
FDER REVIEW OF RAP	19NOV93	5JAN94	30								[Bar]	
TWO MONTHS HOLD	6JAN94	4MAR94	42									[Bar]

Plot Date 21JUN93
 Data Date 15JUN93
 Project Start 15JUN93
 Project Finish 4MAR94



8007 A093

NAVY CLEAN
 CTO NO 093 NAS KEY WEST TRUCK STAND
 BASELINE PROJECT SCHEDULE

Sheet 1 of 1

BASELINE PROJECT SCHEDULE

Date	Revision	Checked	Approved

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**SITE-SPECIFIC HEALTH AND SAFETY PLAN FOR
CONTAMINATION ASSESSMENT INVESTIGATION**

**NAVAL AIR STATION KEY WEST
TRUCK STAND, BUILDING A935
BOCA CHICA FIELD, KEY WEST, FLORIDA**

CTO 093

Contract Number N62467-89-D-0317

Prepared by:

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Prepared for:

**Department of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29418**

Luis Vazquez, Engineer-In-Charge

June 1993

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Boca Chica Field, Key West, Florida

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Site-Specific Health and Safety Plan
Truck Stand, Building A935
Boca Chica Field, Key West, Florida

REFERENCES

The following chapters of the Comprehensive Long-Term Environmental Action, Navy (CLEAN) Program District I Generic Health and Safety Plan (HASP) are applicable for the work anticipated at the site:

- 2.0 AUTHORITY AND RESPONSIBILITY OF HEALTH AND SAFETY PERSONNEL
- 3.0 TRAINING PROGRAM
- 4.0 MEDICAL SURVEILLANCE PROGRAM
- 5.0 ENGINEERING CONTROLS
- 6.0 PERSONAL PROTECTIVE LEVEL DETERMINATION
- 7.0 MONITORING EQUIPMENT
- 8.0 ZONATION
- 9.0 WORK PRACTICES
- 10.0 CONFINED SPACE ENTRY PROCEDURES
- 11.0 EXCAVATION AND TRENCHING
- 12.0 TEMPERATURE EXTREMES
 - HEAT STRESS
 - COLD STRESS
- 13.0 DECONTAMINATION
- 14.0 EMERGENCY PLANNING
- 15.0 HEALTH AND SAFETY FORMS AND DATA SHEETS
 - HEALTH AND SAFETY AUDIT FORM
 - ACCIDENT REPORT FORM
 - HSO CHECKLIST FOR FIELD OPERATIONS
 - MATERIAL SAFETY DATA SHEETS
 - LIQUI-NOX
 - ETHYL ALCOHOL (denatured)
 - TRISODIUM PHOSPHATE
 - OSHA POSTER
 - DAILY HEALTH AND SAFETY AUDIT FORM
- 16.0 RESPIRATORY PROTECTION PROGRAM
- 17.0 OTHER
 - ILLUMINATION
 - SANITATION
 - HEALTH AND SAFETY AUDIT PROCEDURES

GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
CA	Contamination Assessment
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action, Navy
CPR	cardiopulmonary resuscitation
CRZ	Contamination Reduction Zone
EIC	Engineer-in-Charge
FID	flame ionization detector
FOL	Field Operations Leader
HASP	Health and Safety Plan
HSM	Health and Safety Manager
HSO	Health and Safety Officer
HSS	Health and Safety Supervisor
LEL	lower explosive limit
NAS	Naval Air Station
OSHA	Occupational Safety and Health Administration
OVA	organic vapor analyzer
PPE	personal protective equipment
ppm	parts per million
SCBA	self-contained breathing apparatus
SS	site supervisor
TL	Technical Lead
TOM	Task Order Manager
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank

1.0 GENERAL

1.1 SCOPE AND PURPOSE. This Health and Safety Plan (HASP) has been prepared in conformance with the generic HASP developed under the Comprehensive Long-Term Environmental Action, Navy (CLEAN) District I Contract (CLEAN HASP) and is intended to meet the requirements of 29 Code of Federal Regulations (CFR) 1910.120. As such, this HASP addresses activities associated with field operations for the Contamination Assessment (CA) at the Truck Stand, Building, A935, Naval Air Station (NAS) Boca Chica Field, Key West, Florida. Compliance with this HASP is required for all ABB Environmental Services, Inc. (ABB-ES), personnel, contractor personnel, and third parties entering the site.

1.2 PROJECT PERSONNEL.

1.2.1 Task Order Manager The Task Order Manager (TOM), Jack Pittman, is the individual with overall project management responsibilities. Those responsibilities, as they relate to health and safety, include provisions for the development of this site-specific HASP, the necessary resources to meet requirements of this HASP, the coordination of staff assignments to ensure that personnel assigned to the project meet medical and training requirements, and the means and materials necessary to resolve any health and safety issues that are identified or that develop during the project.

1.2.2 Field Operations Leader The Field Operations Leader (FOL) is either the project Technical Lead (TL) or the TOM's designee who is onsite and has vested authority to carry out day-to-day site operations, including interfacing with the site Health and Safety Officer (HSO).

1.2.3 Health and Safety Officer Jay Koch has been designated the HSO for the Truck Stand facility by the TOM with concurrence of the Health and Safety Supervisor (HSS) or Health and Safety Manager (HSM). The HSO will have at least an indirect line of reporting to the HSM through the HSS for the duration of this assignment as project HSO. The HSO is responsible for developing and implementing this site-specific HASP in accordance with the CLEAN HASP. The HSO will investigate all accidents, illnesses, and incidents occurring onsite. The HSO will also conduct safety briefings and site-specific training for onsite personnel. As necessary, the HSO will accompany all U.S. Environmental Protection Agency (USEPA), Occupational Safety and Health Administration (OSHA), or other governmental agency personnel visiting the site in response to health and safety issues. The HSO, in consultation with the HSS or HSM, is responsible for updating and modifying this HASP as site or environmental conditions change.

1.3 TRAINING. Training is defined under the CLEAN HASP, and all personnel entering potentially contaminated areas at the Truck Stand site must meet the requirements of 29 CFR 1910.120. Personnel without the required training will not be permitted in any area with potential for exposure to toxic substances or harmful physical agents (i.e., downrange). Refer to Chapter 3.0 of the CLEAN HASP for further information.

1.4 MEDICAL SURVEILLANCE. All personnel entering potentially contaminated areas of this site will be medically qualified for site assignment through a medical surveillance program outlined in the ABB-ES generic HASP. Personnel who have not received medical clearance will not be permitted in any area with potential for exposure to toxic substances or harmful physical agents (i.e., downrange). Refer to Chapter 4.0 of the CLEAN HASP for further information.

2.0 FACILITY SITE CHARACTERIZATION AND ANALYSIS

2.1 SITE NAME, LOCATION, AND SIZE. NAS Key West is located on Boca Chica Island in Key West, Florida. The location of the Truck Stand at Building A935 is shown in Figure 9-1.

2.2 SITE HISTORY AND LAYOUT. The Truck Stand at Building A935 at Boca Chica Field is the location of a single 500-gallon underground storage tank (UST) used for the storage of water-contaminated JP-5 fuel drained from tank-truck bottoms. Overfilling and spillage are the reported causes of contamination at the site. A reported 500-gallon fuel spill was confined to the Truck Stand concrete pad and cleaned up.

2.3 SCOPE OF WORK (WORKPLAN). ABB-ES will conduct a Contamination Assessment at the site to evaluate the horizontal and vertical extent of potential petroleum contamination in soil and groundwater. The field investigation will consist of the installation and sampling of approximately 20 soil borings, 8 permanent shallow monitoring wells, and 1 permanent deep monitoring well.

3.0 HAZARD ANALYSIS

3.1 INVASIVE SAMPLING. Invasive sampling at the Truck Stand site will include soil borings and monitoring well installation.

The potential hazards to workers are mainly physical ones related to manual labor, such as that involved in drilling operations, but limited hazards exist for exposure to chemical compounds that are suspected to be present in the soil at the site. A potential for exposure may exist during intrusive activities, such as drilling and sampling, when the ground surface and subsurface soil are disturbed. Elevated ambient levels of organic vapors and particulates may be encountered during these periods. However, the field drilling and sampling activities will not involve large scale earth-moving equipment, and personnel exposures are expected to be minimal. Air monitoring will be conducted to assess the need for increasing levels of personal protection.

Contamination of soil and groundwater at the site may have occurred from reported spillage of petroleum products associated with the operation and maintenance activities at the site. The purpose of this field investigation is to assess the extent of that contamination. Caution and awareness should be exercised during drilling and sampling operations pending further definitions of chemical hazards. Any condition encountered that has not been discussed in training should be brought to the attention of the HSO, FOL, and TOM immediately.

The potential presence of chemicals poses exposure hazards in addition to respiratory hazards. All efforts should be made by field personnel to avoid exposure to chemicals via inhalation, ingestion, or absorption through the skin. All efforts must be taken to implement use of safe personal work practices, personal protective equipment (PPE), and decontamination procedures.

3.2 SITE RISKS. The following health and safety hazards may be encountered at the Truck Stand site.

3.2.1 Health Hazards Health hazards include those hazards that personnel may be exposed to that are related to petroleum contamination. The contaminants of concern known or suspected to be present on the site, along with established exposure limits for those substances, are listed in Table 3-1.

3.2.2 Safety Hazards Safety hazards include those hazards that personnel may be exposed to that are unrelated to the contaminants of concern; heat stress, operation and presence around heavy equipment, lifting of objects, and vehicle traffic. Extreme caution should be exhibited by all personnel while conducting work around drill rigs and other heavy equipment. During hot days, personnel should increase fluid intake and cool off to avoid overheating and symptoms related to heat stress.

Lifting of heavy objects must be done with caution. Personnel should assist one another with moving heavy objects or use appropriate equipment to accomplish these tasks. Power substations, power lines, underground utilities, and underground pipelines are to be avoided during drilling operations. Necessary work permits for activities at the Truck Stand must be obtained.

**Table 3-1
Contaminants of Concern**

Site-Specific Health and Safety Plan
Truck Stand, Building A935
Boca Chica Field, Key West, Florida

Chemical	Approximate Odor Threshold (ppm)	OSHA Permissible Exposure Limit	Threshold Limit Value (ppm)	Physical Characteristics	Dermal Toxicity	Remarks
Benzene	4.7	1	1	Colorless to light yellow liquid; pleasant aromatic odor.	Moderate skin irritant	Inhalation of large amounts attacks central nervous system; chronic poisoning may cause leukemia and/or decreases circulating levels of blood cells.
Ethylbenzene	140	100	100	Colorless liquid; gasoline like odor.	Moderate skin irritant.	Liquid blisters skin; inhalation results in dizziness and depression.
Toluene	0.17	100	100	Colorless liquid; pleasant aromatic odor.	Mild skin irritant.	Ingestion or aspiration can cause pulmonary edema and depressed respiration.
Xylene	0.05	100	100	Colorless liquid; aromatic odor.	Moderate skin irritant.	Inhalation causes headache and dizziness; vapors irritate eyes; can be fatal if ingested.
Naphthalene	--	10	10	Colorless to brown solid with an odor of mothballs.	Moderate skin irritant.	Inhalation causes headache and confusion; vapors irritate eyes.

Notes: OSHA = Occupational Safety and Health Administration.
ppm = parts per million.

3.2.3 Conclusions and Risk Assessment Based on available information (nature of the work, potential on-site chemicals and their properties, exposure limits, etc.), hazards associated with conducting the described field work are considered to be low, assuming appropriate health and safety practices are maintained.

3.3 PROTECTIVE MEASURES. The following protective measures will be used at the site.

3.3.1 Engineering Controls (General) When needed, engineering controls (e.g., fans to blow volatilized chemicals away from the work area) will be used.

3.3.2 Levels of Protection (General) A level D work uniform will be used at the site when organic vapor concentrations of petroleum constituents in the breathing zone are less than 25 parts per million (ppm) and benzene concentrations are less than 0.5 ppm during sustained drilling or sampling operations. Organic vapor concentrations will be monitored in the breathing zone using an organic vapor analyzer (OVA). Benzene concentrations in the breathing zone will be monitored using a benzene 0.5/a Draeger tube. Level D protection should only be used when the atmosphere contains no known hazard, potential airborne contaminants can be monitored, and work functions preclude splash, immersion, or the potential for unexpected inhalation or contact with hazardous levels of any chemical.

Because of the threat of heat stress, Level D PPE will consist of a shirt, long pants, steel-toed work boots, and protective gloves. A Tyvek™ suit may be worn. When invasive work is being conducted, safety glasses or goggles will be worn. When working around heavy equipment, such as a drill rig, a hard hat will be worn. Hearing protection should be worn when working in the vicinity of the drill rig and near the flight line.

3.4 MONITORING (GENERAL). It is intended that real-time monitoring instrumentation will be used to monitor the work environment in order to provide the appropriate level of protection for the site team.

3.4.1 Air Sampling (General) To the extent feasible, the presence of airborne contaminants will be monitored through the use of direct reading instrumentation. Information gathered will be used to ensure that the levels of protection being used at the site are adequate. In addition, these data may be used as the basis for upgrading or downgrading the levels of protection in conformance with action levels provided in this HASP and at the direction of the site HSO. During operations, air monitoring with a flame ionization detector (FID) or OVA will be conducted regularly in the breathing zone. If the FID readings show a persistent rise above background levels, monitoring with Draeger tubes will be initiated. The following sampling equipment will be used at the site. Refer to Chapter 7.0 of the CLEAN HASP for information on the calibration and maintenance of the equipment.

1. HeathTech PORTA-FID II™
2. Draeger Tubes:
 - Benzene 0.5/a
 - Benzene 5/b

3.4.2 Personal Monitoring (General) All personnel onsite will be enrolled in the ABB-ES medical surveillance program. In addition, all personnel onsite will wear a thermoluminescent dosimetry body badge to measure possible exposure to radiation.

4.0 DATA SHEETS

The Chemical Hazard Data Sheets for the chemicals that may likely be encountered at the Truck Stand site are attached.

BENZENE

BNZ

<p>Common Symptoms</p> <p>Benzol Benzole</p>	<p>Watery liquid Colorless Gasoline-like odor</p> <p>Floats on water Flammable, irritating vapor is produced Freezing point is 42°F</p>																														
<p>Avoid contact with liquid and vapor Keep people away Wear goggles and self-contained breathing apparatus Shut off ignition sources and call fire department Stop discharge if possible Stay upwind and use water spray to "knock down" vapor Isolate and remove discharged material Notify local health and pollution control agencies</p>																															
<p>Fire</p>	<p>FLAMMABLE Flashback along vapor trail may occur Vapor may explode if ignited in an enclosed area Wear goggles and self-contained breathing apparatus Extinguish with dry chemical, foam, or carbon dioxide. Water may be ineffective on fire Cool exposed containers with water</p>																														
<p>Exposure</p>	<p>CALL FOR MEDICAL AID</p> <p>VAPOR Irritating to eyes, nose, and throat If inhaled, will cause headache, difficult breathing, or loss of consciousness Move to fresh air If breathing has stopped, give artificial respiration If breathing is difficult, give oxygen</p> <p>LIQUID Irritating to skin and eyes Harmful if swallowed Remove contaminated clothing and shoes. Flush affected area with plenty of water IF IN EYES, hold eyelids open and flush with plenty of water IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.</p>																														
<p>Water Pollution</p>	<p>HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS May be dangerous if it enters water intakes</p> <p>Notify local health and wildlife officials Notify operators of nearby water intakes.</p>																														
<p>1 RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability Restrict access</p>		<p>2 LABEL</p> <p>2.1 Category: Flammable liquid 2.2 Class 3</p>																													
<p>3 CHEMICAL DESIGNATIONS</p> <p>3.1 CG Compatibility Class: Aromatic Hydrocarbon 3.2 Formula C₆H₆ 3.3 IMO/UN Designation: 3 2/1114 3.4 DOT ID No.: 1114 3.5 CAS Registry No.: 71-43-2</p>		<p>4. OBSERVABLE CHARACTERISTICS</p> <p>4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Aromatic; rather pleasant aromatic odor; characteristic odor</p>																													
<p>5 HEALTH HAZARDS</p>																															
<p>5.1 Personal Protective Equipment: Hydrocarbon vapor canister, supplied air or a hose mask, hydrocarbon-insoluble rubber or plastic gloves; chemical goggles or face splash shield, hydrocarbon-insoluble apron such as neoprene</p> <p>5.2 Symptoms Following Exposure: Dizziness, excitation, pallor, followed by flushing, weakness, headache, breathlessness, chest constriction. Coma and possible death.</p> <p>5.3 Treatment of Exposure: SKIN: flush with water followed by soap and water; remove contaminated clothing and wash skin. EYES: flush with plenty of water until irritation subsides. INHALATION: remove from exposure immediately. Call a physician if breathing is irregular or stopped, start resuscitation, administer oxygen.</p> <p>5.4 Threshold Limit Value: 10 ppm 5.5 Short Term Inhalation Limits: 75 ppm for 30 min 5.6 Toxicity by Ingestion: Grade 3; LD₅₀ = 50 to 500 mg/kg 5.7 Late Toxicity: Leukemia 5.8 Vapor (Gas) Irritant Characteristics: If present in high concentrations, vapors may cause irritation of eyes or respiratory system. The effect is temporary 5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin 5.10 Odor Threshold: 4.88 ppm 5.11 IDLH Value: 2,000 ppm</p>																															
<p>6 FIRE HAZARDS</p> <p>6.1 Flash Point: 12°F C C 6.2 Flammable Limits in Air: 1.3%-7.8% 6.3 Fire Extinguishing Agents: Dry chemical, foam, or carbon dioxide 6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective 6.5 Special Hazards of Combustion Products: Not pertinent 6.6 Behavior in Fire: Vapor is heavier than air and may travel considerable distance to a source of ignition and flashback 6.7 Ignition Temperature: 1097°F 6.8 Electrical Hazard Class: I, Group D 6.9 Burning Rate: 6.0 mm/min 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available</p>																															
<p>7. CHEMICAL REACTIVITY</p> <p>7.1 Reactivity with Water: No reaction 7.2 Reactivity with Common Materials: No reaction 7.3 Stability During Transport: Stable 7.4 Neutralizing Agents for Acids and Caustics: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Molar Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 3.2</p>																															
<p>8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 5 ppm/6 hr/minnow/lethal/distilled water 20 ppm/24 hr/sunfish/TL_m/tap water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 1.2 lb/lb, 10 days 8.4 Food Concentration Potential: None</p>																															
<p>9 SHIPPING INFORMATION</p> <p>9.1 Grades of Purity: Industrial pure: 99+% Thiophene-free: 99+% Nitration: 99+% Industrial 90%: 85+% Reagent: 99+% 9.2 Storage Temperature: Open 9.3 Inert Atmosphere: No requirement 9.4 Venting: Pressure-vacuum</p>																															
<p>10 HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook)</p> <p style="text-align: center;">A-T-U-V-W</p>																															
<p>11 HAZARD CLASSIFICATIONS</p> <p>11.1 Code of Federal Regulations: Flammable liquid 11.2 NAS Hazard Rating for Bulk Water Transportation: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Category</td> <td style="text-align: right;">Rating</td> </tr> <tr> <td>Fire</td> <td style="text-align: right;">3</td> </tr> <tr> <td>Health</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Vapor Irritant</td> <td style="text-align: right;">1</td> </tr> <tr> <td style="padding-left: 20px;">Liquid or Solid Irritant</td> <td style="text-align: right;">1</td> </tr> <tr> <td style="padding-left: 20px;">Poisons</td> <td style="text-align: right;">3</td> </tr> <tr> <td>Water Pollution</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Human Toxicity</td> <td style="text-align: right;">3</td> </tr> <tr> <td style="padding-left: 20px;">Aquatic Toxicity</td> <td style="text-align: right;">1</td> </tr> <tr> <td style="padding-left: 20px;">Aesthetic Affect</td> <td style="text-align: right;">3</td> </tr> <tr> <td>Reactivity</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Other Chemicals</td> <td style="text-align: right;">2</td> </tr> <tr> <td style="padding-left: 20px;">Water</td> <td style="text-align: right;">1</td> </tr> <tr> <td style="padding-left: 20px;">Self Reaction</td> <td style="text-align: right;">0</td> </tr> </table> </p>				Category	Rating	Fire	3	Health		Vapor Irritant	1	Liquid or Solid Irritant	1	Poisons	3	Water Pollution		Human Toxicity	3	Aquatic Toxicity	1	Aesthetic Affect	3	Reactivity		Other Chemicals	2	Water	1	Self Reaction	0
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<p>11.3 NFPA Hazard Classification: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Category</td> <td style="text-align: right;">Classification</td> </tr> <tr> <td>Health Hazard (Blue)</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Flammability (Red)</td> <td style="text-align: right;">3</td> </tr> <tr> <td>Reactivity (Yellow)</td> <td style="text-align: right;">0</td> </tr> </table> </p>				Category	Classification	Health Hazard (Blue)	2	Flammability (Red)	3	Reactivity (Yellow)	0																				
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Flammability (Red)	3																														
Reactivity (Yellow)	0																														
<p>12. PHYSICAL AND CHEMICAL PROPERTIES</p> <p>12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: 78.11 12.3 Boiling Point at 1 atm: 178°F = 80.1°C = 353.3°K 12.4 Freezing Point: 42.0°F = 5.6°C = 278.7°K 12.5 Critical Temperature: 562.0°F = 288.9°C = 562.1°K 12.6 Critical Pressure: 710 psia = 48.3 atm = 4.89 MN/m² 12.7 Specific Gravity: 0.879 at 20°C (liquid) 12.8 Liquid Surface Tension: 28.9 dynes/cm = 0.289 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 35 dynes/cm = 0.035 N/m at 20°C 12.10 Vapor (Gas) Specific Gravity: 2.7 12.11 Ratio of Specific Heats of Vapor (Gas): 1.061 12.12 Latent Heat of Vaporization: 189 Btu/lb = 94.1 cal/g = 3.94 X 10³ J/kg 12.13 Heat of Combustion: -17,460 Btu/lb = -8698 cal/g = -406.0 X 10³ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: 30.45 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 3.22 psia</p>																															
<p>NOTES</p>																															

ETHYLBENZENE

ETB

Common Symptoms	Liquid	Colorless	Sweet, gasoline-like odor
Phenylethane EB	Floats on water	Flammable, irritating vapor is produced	
<p>Avoid contact with liquid and vapor Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves) Shut off ignition sources and call fire department Stop discharge if possible. Keep people away Stay upwind and use water spray to "knock down" vapor Isolate and remove discharged material Notify local health and pollution control agencies</p>			
Fire	<p>FLAMMABLE Flashback along vapor trail may occur Vapor may explode if ignited in an enclosed area Wear goggles, self-contained breathing apparatus and rubber overclothing (including gloves) Extinguish with dry chemical, foam, or carbon dioxide Water may be ineffective on fire Cook exposed containers with water</p>		
Exposure	<p>CALL FOR MEDICAL AID</p> <p>VAPOR Irritating to eyes, nose, and throat If inhaled, will cause dizziness and/or difficult breathing Move to fresh air If breathing has stopped, give artificial respiration If breathing is difficult, give oxygen</p> <p>LIQUID Will burn skin and eyes Harmful if swallowed Remove contaminated clothing and shoes. Flush affected areas with plenty of water IF IN EYES, hold eyelids open and flush with plenty of water IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk DO NOT INDUCE VOMITING</p>		
Water Pollution	<p>HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS Fouling to shoreline May be dangerous if it enters water intakes Notify local health and wildlife officials Notify operators of nearby water intakes.</p>		
1 RESPONSE TO DISCHARGE		2. LABEL	
(See Response Methods Handbook) Mechanical containment Should be removed Chemical and physical treatment		2 1 Category Flammable liquid 2 2 Class 3	
3. CHEMICAL DESIGNATIONS		4 OBSERVABLE CHARACTERISTICS	
3 1 CG Compatibility Class Aromatic Hydrocarbon 3 2 Formula C ₈ H ₈ CH ₂ CH ₃ 3 3 IMO/UN Designation: 3 3/1175 3 4 DOT ID No. 1175 3 5 CAS Registry No.: 100-41-4		4 1 Physical State (as shipped) Liquid 4 2 Color Colorless 4 3 Odor: Aromatic	
5 HEALTH HAZARDS			
5 1 Personal Protective Equipment: Self-contained breathing apparatus; safety goggles. 5 2 Symptoms Following Exposure: Inhalation may cause irritation of nose, dizziness, depression. Moderate irritation of eye with corneal injury possible. Irritates skin and may cause blisters. 5 3 Treatment of Exposure. INHALATION: If ill effects occur, remove to fresh air, keep him warm and quiet, and get medical help promptly, if breathing stops, give artificial respiration. INGESTION: Induce vomiting only upon physician's approval, material in lung may cause chemical pneumonia. SKIN AND EYES: promptly flush with plenty of water (15 min. for eyes) and get medical attention, remove and wash contaminated clothing before reuse 5 4 Threshold Limit Value: 100 ppm 5 5 Short Term Inhalation Limits: 200 ppm for 30 min. 5 6 Toxicity by Ingestion: Grade 2; LD50 = 0.6 to 5 g/kg (rat) 5 7 Late Toxicity: Data not available 5 8 Vapor (Gas) Irritant Characteristics. Vapors cause moderate irritation such that personnel will find high concentrations unpleasant. The effect is temporary. 5 9 Liquid or Solid Irritant Characteristics. Causes smarting of the skin and first-degree burns on short exposure, may cause secondary burns on long exposure. 5 10 Odor Threshold: 140 ppm 5 11 IDLH Value: 2,000 ppm			

6 FIRE HAZARDS	
6 1	Flash Point: 80°F O.C., 69°F C.C.
6 2	Flammable Limits in Air: 1.0% - 6.7%
6 3	Fire Extinguishing Agents: Foam (most effective), water fog, carbon dioxide or dry chemical
6 4	Fire Extinguishing Agents Not to be Used: Not pertinent
6 5	Special Hazards of Combustion Products: Irritating vapors are generated when heated
6 6	Behavior in Fire: Vapor is heavier than air and may travel considerable distance to the source of ignition and flash back
6 7	Ignition Temperature: 880°F
6 8	Electrical Hazard: Not pertinent
6 9	Burning Rate: 5.8 mm/min
6 10	Adiabatic Flame Temperature: Data not available
6 11	Stoichiometric Air to Fuel Ratio: Data not available
6 12	Flame Temperature: Data not available

7. CHEMICAL REACTIVITY	
7 1	Reactivity with Water: No reaction
7 2	Reactivity with Common Materials: No reaction
7 3	Stability During Transport: Stable
7 4	Neutralizing Agents for Acids and Caustics: Not pertinent
7 5	Polymerization: Not pertinent
7 6	Inhibitor of Polymerization: Not pertinent
7 7	Molar Ratio (Reagent to Product): Data not available
7 8	Reactivity Group: 32

8 WATER POLLUTION	
8 1	Aquatic Toxicity: 29 ppm/96 hr/ bluegill/TL ₅₀ /fresh water
8 2	Waterfowl Toxicity: Data not available
8 3	Biological Oxygen Demand (BOD): 2.8% (theor.), 5 days
8 4	Food Concentration Potential: None

9. SHIPPING INFORMATION	
9 1	Grades of Purity: Research grade 99.98%, pure grade: 99.5%; technical grade: 99.0%
9 2	Storage Temperature: Ambient
9 3	Inert Atmosphere: No requirement
9 4	Venting: Open (flame arrester) or pressure-vacuum.

10 HAZARD ASSESSMENT CODE	
(See Hazard Assessment Handbook)	
A-T-U	

11 HAZARD CLASSIFICATIONS		
11 1	Code of Federal Regulations	
11 2	NAS Hazard Rating for Bulk Water Transportation	
	Category	Rating
	Fire	3
	Health	
	Vapor Irritant	2
	Liquid or Solid Irritant	2
	Poisons	2
	Water Pollution	
	Human Toxicity	1
	Aquatic Toxicity	3
	Aesthetic Affect	2
	Reactivity	
	Other Chemicals	1
	Water	0
	Self Reaction	0
11 3	NFPA Hazard Classification	
	Category	Classification
	Health Hazard (Blue)	2
	Flammability (Red)	3
	Reactivity (Yellow)	0

12 PHYSICAL AND CHEMICAL PROPERTIES	
12 1	Physical State at 15°C and 1 atm: Liquid
12 2	Molecular Weight: 106.17
12 3	Boiling Point at 1 atm: 277.2°F = 136.2°C = 409.4K
12 4	Freezing Point: -139°F = -95.0°C = 178°K
12 5	Critical Temperature: 651.0°F = 343.8°C = 817.1°K
12 6	Critical Pressure: 623 psia = 36.6 atm = 3.81 MN/m ²
12 7	Specific Gravity: 0.867 at 20°C (liquid)
12 8	Liquid Surface Tension: 29.2 dynes/cm = 0.0292 N/m at 20°C
12 9	Liquid Water Interfacial Tension: 36.48 dynes/cm = 0.03648 N/m at 20°C
12 10	Vapor (Gas) Specific Gravity: Not pertinent
12 11	Ratio of Specific Heats of Vapor (Gas): 1.071
12 12	Latent Heat of Vaporization: 144 Btu/lb = 80.1 cal/g = 3.35 X 10 ⁴ J/kg
12 13	Heat of Combustion: -17 780 Btu/lb = -9877 cal/g = -413.5 X 10 ⁴ J/kg
12 14	Heat of Decomposition: Not pertinent
12 15	Heat of Solution: Not pertinent
12 16	Heat of Polymerization: Not pertinent
12 17	Heat of Fusion: Data not available
12 18	Limiting Value: Data not available
12 19	Reid Vapor Pressure: 0.4 psia

NOTES

TOLUENE

TOL

<p>Common Symptoms</p> <p>Toluol Methylbenzene Methylbenzol</p>	<p>Watery liquid Colorless Pleasant odor</p> <p>Floats on water Flammable, irritating vapor is produced</p>
<p>Stop discharge if possible Keep people away Shut off ignition sources and call fire department Stay upwind and use water spray to "knock down" vapor Avoid contact with liquid and vapor Isolate and remove discharged material Notify local health and pollution control agencies</p>	
<p>Fire</p>	<p>FLAMMABLE Flashback along vapor trail may occur Vapor may explode if ignited in an enclosed area Wear goggles and self-contained breathing apparatus Extinguish with dry chemical, foam, or carbon dioxide Water may be ineffective on fire Cook exposed containers with water</p>
<p>Exposure</p>	<p>CALL FOR MEDICAL AID</p> <p>VAPOR Irritating to eyes, nose, and throat If inhaled, will cause nausea, vomiting, headache, dizziness, difficult breathing, or loss of consciousness Move to fresh air If breathing has stopped, give artificial respiration If breathing is difficult, give oxygen</p> <p>LIQUID Irritating to skin and eyes. If swallowed, will cause nausea, vomiting, or loss of consciousness Remove contaminated clothing and shoes Flush affected areas with plenty of water IF IN EYES, hold eyelids open and flush with plenty of water IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk DO NOT INDUCE VOMITING.</p>
<p>Water Pollution</p>	<p>Dangerous to aquatic life in high concentrations Fouling to shoreline. May be dangerous if it enters water intakes</p> <p>Notify local health and wildlife officials Notify operators of nearby water intakes.</p>
<p>1 RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability Evacuate area</p>	<p>2 LABEL</p> <p>2.1 Category Flammable liquid 2.2 Class 3</p>
<p>3 CHEMICAL DESIGNATIONS</p> <p>3.1 CG Compatibility Class Aromatic Hydrocarbon 3.2 Formula C₇H₈CH₃ 3.3 IMO/IUN Designation 3 2/1284 3.4 DOT ID No 1284 3.5 CAS Registry No 108-88-3</p>	<p>4. OBSERVABLE CHARACTERISTICS</p> <p>4.1 Physical State (as shipped) Liquid 4.2 Color: Colorless 4.3 Odor: Pungent, aromatic, benzene-like; distinct, pleasant</p>
<p>5 HEALTH HAZARDS</p>	
<p>6.1 Personal Protective Equipment: Air-supplied mask, goggles or face shield, plastic gloves 6.2 Symptoms Following Exposure: Vapors irritate eyes and upper respiratory tract, cause dizziness, headache, anesthesia, respiratory arrest. Liquid irritates eyes and causes drying of skin. If aspirated, causes coughing, gagging, distress, and rapidly developing pulmonary edema. If ingested, causes vomiting, griping, diarrhea, depressed respiration. 6.3 Treatment of Exposure: INHALATION: remove to fresh air, give artificial respiration and oxygen if needed; call a doctor. INGESTION: do NOT induce vomiting, call a doctor. EYES: flush with water for at least 15 min. SKIN: wipe off, wash with soap and water. 6.4 Threshold Limit Value. 100 ppm 6.5 Short Term Inhalation Limits: 600 ppm for 30 min. 6.6 Toxicity by Ingestion Grade 2, LD50 = 0.6 to 5 g/kg 6.7 Late Toxicity Kidney and liver damage may follow ingestion. 6.8 Vapor (Gas) Irritant Characteristics Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary. 6.9 Liquid or Solid Irritant Characteristics Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin. 6.10 Odor Threshold. 0.17 ppm 6.11 IDLH Value 2,000 ppm</p>	

<p>6 FIRE HAZARDS</p> <p>6.1 Flash Point 40°F C.C., 55°F O.C. 6.2 Flammable Limits in Air 1.27%-7% 6.3 Fire Extinguishing Agents Carbon dioxide or dry chemical for small fires, ordinary foam for large fires 6.4 Fire Extinguishing Agents Not to be Used Water may be ineffective 6.5 Special Hazards of Combustion Products Not pertinent 6.6 Behavior in Fire Vapor is heavier than air and may travel a considerable distance to a source of ignition and flash back. 6.7 Ignition Temperature: 897°F 6.8 Electrical Hazard Class I, Group D 6.9 Burning Rate 5.7 mm/min 6.10 Adiabatic Flame Temperature Data not available 6.11 Stoichiometric Air to Fuel Ratio Data not available 6.12 Flame Temperature Data not available.</p>	<p>10 HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook)</p> <p style="text-align: center;">A-T-U</p>
<p>7 CHEMICAL REACTIVITY</p> <p>7.1 Reactivity with Water No reaction 7.2 Reactivity with Common Materials No reaction 7.3 Stability During Transport. Stable 7.4 Neutralizing Agents for Acids and Bases. Not pertinent 7.5 Polymerization. Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Molar Ratio (Reactant to Product): Data not available 7.8 Reactivity Group 32</p>	<p>11 HAZARD CLASSIFICATIONS</p> <p>11.1 Code of Federal Regulations Flammable liquid 1 11.2 NAS Hazard Rating for Bulk Water Transportation Category Rating Fire Health 3 Vapor Irritant 1 Liquid or Solid Irritant 1 Poisons 2 Water Pollution Human Toxicity 1 Aquatic Toxicity 3 Aesthetic Affect 2 Reactivity Other Chemicals 1 Water 0 Self Reaction 0</p> <p>11.3 NFPA Hazard Classification Category Classification Health Hazard (Blue) 2 Flammability (Red) 3 Reactivity (Yellow) 0</p>
<p>8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 1180 mg/l/96 hr/sunfish/TL₅₀/fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 0%, 5 days; 38% (theor.), 8 days 8.4 Food Concentration Potential: None</p>	<p>12 PHYSICAL AND CHEMICAL PROPERTIES</p> <p>12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: 92.14 12.3 Boiling Point at 1 atm: 231.1°F = 110.6°C = 383.8°K 12.4 Freezing Point: -139°F = -95.0°C = 178.2°K 12.5 Critical Temperature: 606.4°F = 318.8°C = 581.9°K 12.6 Critical Pressure: 686.1 psia = 40.55 atm = 4.108 MN/m² 12.7 Specific Gravity: 0.867 at 20°C (liquid) 12.8 Liquid Surface Tension: 29.0 dynes/cm = 0.0290 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 38.1 dynes/cm = 0.0381 N/m at 25°C 12.10 Vapor (Gas) Specific Gravity Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas) 1.089 12.12 Latent Heat of Vaporization: 156 Btu/lb = 86.1 cal/g = 3.61 X 10⁶ J/kg 12.13 Heat of Combustion: -17 430 Btu/lb = 9888 cal/g = -4.065 X 10⁷ J/kg 12.14 Heat of Decomposition Not pertinent 12.15 Heat of Solution Not pertinent 12.16 Heat of Polymerization Not pertinent 12.25 Heat of Fusion: 17.17 cal/g 12.26 Limiting Value Data not available 12.27 Reid Vapor Pressure 1.1 psia</p>
<p>9. SHIPPING INFORMATION</p> <p>9.1 Grades of Purity: Research, reagent, nitration-all 99.8 + %, industrial: contains 94 + %, with 5% xylene and small amounts of benzene and nonaromatic hydrocarbons; 90/120: less pure than industrial. 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester) or pressure-vacuum.</p>	
<p>NOTES</p>	

m-XYLENE

XLM

<p>Common Symptoms 1,3-Dimethylbenzene Xylo</p>	<p>Watery liquid Colorless Sweet odor</p> <p>Floats on water Flammable, irritating vapor is produced</p>
<p>Stop discharge if possible Keep people away Call fire department Avoid contact with liquid and vapor Isolate and remove discharged material Notify local health and pollution control agencies</p>	
Fire	<p>FLAMMABLE Flashback along vapor trail may occur Vapor may explode if ignited in an enclosed area Wear self-contained breathing apparatus Extinguish with foam, dry chemical, or carbon dioxide Water may be ineffective on fire Cool exposed containers with water</p>
Exposure	<p>CALL FOR MEDICAL AID</p> <p>VAPOR Irritating to eyes, nose, and throat If inhaled, will cause headache, difficult breathing, or loss of consciousness Move to fresh air If breathing has stopped, give artificial respiration If breathing is difficult, give oxygen.</p> <p>LIQUID Irritating to skin and eyes If swallowed, will cause nausea, vomiting, or loss of consciousness. Remove contaminated clothing and shoes. Flush affected areas with plenty of water IF IN EYES, hold eyelids open and flush with plenty of water IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk DO NOT INDUCE VOMITING</p>
Water Pollution	<p>HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS Fouling to shoreline May be dangerous if it enters water intakes Notify local health and wildlife officials Notify operators of nearby water intakes</p>
<p>1 RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability Evacuate area Should be removed Chemical and physical treatment</p>	<p>2 LABEL</p> <p>2.1 Category: Flammable liquid 2.2 Class: 3</p>
<p>3 CHEMICAL DESIGNATIONS</p> <p>3.1 CG Compatibility Class: Aromatic Hydrocarbon 3.2 Formula: m-C₈H₁₀(CH₃)₂ 3.3 IMO/JUN Designation: 3.2/1307 3.4 DOT ID No: 1307 3.5 CAS Registry No.: 108-38-3</p>	<p>4 OBSERVABLE CHARACTERISTICS</p> <p>4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Like benzene, characteristic aromatic</p>
<p>5 HEALTH HAZARDS</p>	
<p>5.1 Personal Protective Equipment: Approved canister or air-supplied mask, goggles or face shield, plastic gloves and boots</p> <p>5.2 Symptoms Following Exposure: Vapors cause headache and dizziness. Liquid irritates eyes and skin. If taken into lungs, causes severe coughing, distress, and rapidly developing pulmonary edema. If ingested, causes nausea, vomiting, cramps, headache, and coma; can be fatal. Kidney and liver damage can occur</p> <p>5.3 Treatment of Exposure: INHALATION: remove to fresh air, administer artificial respiration and oxygen if required; call a doctor. INGESTION: do NOT induce vomiting, call a doctor. EYES: flush with water for at least 15 min. SKIN: wipe off, wash with soap and water.</p> <p>5.4 Threshold Limit Value: 100 ppm 5.5 Short Term Inhalation Limits: 300 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 3; LD₅₀ = 50 to 500 g/kg 5.7 Late Toxicity: Kidney and liver damage 5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.</p> <p>5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled or clothing allowed to remain, may cause smarting and reddening of the skin</p> <p>5.10 Odor Threshold: 0.06 ppm 5.11 IDLH Value: 10,000 ppm</p>	

<p>6 FIRE HAZARDS</p> <p>6.1 Flash Point: 84°F C C 6.2 Flammable Limits in Air: 1.1% - 6.4% 6.3 Fire Extinguishing Agents: Foam, dry chemical, or carbon dioxide 6.4 Fire Extinguishing Agents Not to be Used: Water be ineffective 6.5 Special Hazards of Combustion Products: Not pertinent 6.6 Behavior in Fire: Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back 6.7 Ignition Temperature: 986°F 6.8 Electrical Hazard: Class I, Group D 6.9 Burning Rate: 5.8 mm/min 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available</p>	<p>10 HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook)</p> <p style="text-align: center;">A-T-U</p>																																				
<p>7 CHEMICAL REACTIVITY</p> <p>7.1 Reactivity with Water: No reaction 7.2 Reactivity with Common Materials: No reaction 7.3 Stability During Transport: Stable 7.4 Neutralizing Agents for Acids and Caustics: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Molar Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 32</p>	<p>11 HAZARD CLASSIFICATIONS</p> <p>11.1 Code of Federal Regulations Flammable liquid</p> <p>11.2 NFAS Hazard Rating for Bulk Water Transportation</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Category</th> <th style="text-align: left;">Rating</th> </tr> </thead> <tbody> <tr> <td>Fire</td> <td>3</td> </tr> <tr> <td>Health</td> <td></td> </tr> <tr> <td>Vapor Irritant</td> <td>1</td> </tr> <tr> <td>Liquid or Solid Irritant</td> <td>1</td> </tr> <tr> <td>Poisons</td> <td>2</td> </tr> <tr> <td>Water Pollution</td> <td></td> </tr> <tr> <td>Human Toxicity</td> <td>1</td> </tr> <tr> <td>Aquatic Toxicity</td> <td>3</td> </tr> <tr> <td>Aesthetic Affect</td> <td>2</td> </tr> <tr> <td>Reactivity</td> <td></td> </tr> <tr> <td>Other Chemicals</td> <td>1</td> </tr> <tr> <td>Water</td> <td>0</td> </tr> <tr> <td>Self Reaction</td> <td>0</td> </tr> </tbody> </table> <p>11.3 NFPA Hazard Classification</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Category</th> <th style="text-align: left;">Classification</th> </tr> </thead> <tbody> <tr> <td>Health Hazard (Blue)</td> <td>2</td> </tr> <tr> <td>Flammability (Red)</td> <td>3</td> </tr> <tr> <td>Reactivity (Yellow)</td> <td>0</td> </tr> </tbody> </table>	Category	Rating	Fire	3	Health		Vapor Irritant	1	Liquid or Solid Irritant	1	Poisons	2	Water Pollution		Human Toxicity	1	Aquatic Toxicity	3	Aesthetic Affect	2	Reactivity		Other Chemicals	1	Water	0	Self Reaction	0	Category	Classification	Health Hazard (Blue)	2	Flammability (Red)	3	Reactivity (Yellow)	0
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<p>8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 22 ppm/96 hr/bluegill/TL₅₀/fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 0 lb/lb, 5 days; 0% (theor.), 8 days 8.4 Food Concentration Potential: Data not available</p>	<p>12. PHYSICAL AND CHEMICAL PROPERTIES</p> <p>12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: 106.16 12.3 Boiling Point at 1 atm: 269.4°F = 131.9°C = 405.1 K 12.4 Freezing Point: -64.2°F = -47.9°C = 226.3 K 12.5 Critical Temperature: 850.8°F = 343.8°C = 617.0 K 12.6 Critical Pressure: 513.8 atm = 34.96 psia = 3,540 MN/m² 12.7 Specific Gravity: 0.884 at 20°C (liquid) 12.8 Liquid Surface Tension: 28.6 dynes/cm = 0.0286 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 36.4 dynes/cm = 0.0364 N/m at 30°C 12.10 Vapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): 1.071 12.12 Latent Heat of Vaporization: 147 Btu/lb = 81.9 cal/g = 3.43 x 10⁶ J/kg 12.13 Heat of Combustion: -17,654 Btu/lb = -9752.4 cal/g = -406.31 x 10⁶ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: 28.01 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 0.34 psia</p>																																				
<p>9. SHIPPING INFORMATION</p> <p>9.1 Grades of Purity: Research: 99.99%; Pure: 99.9%; Technical: 99.2% 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester) or pressure-vacuum</p>	<p style="text-align: center;">NOTES</p>																																				

o-XYLENE

XLO

Common Symptoms	Watery liquid	Colorless	Sweet odor
1,2-Dimethylbenzene Xylo	Floats on water	Flammable, irritating vapor is produced	
Stop discharge if possible Keep people away Call fire department Avoid contact with liquid and vapor Isolate and remove discharged material Notify local health and pollution control agencies			
Fire	FLAMMABLE Flashback along vapor trail may occur Vapor may explode if ignited in an enclosed area Wear self-contained breathing apparatus Extinguish with foam, dry chemical, or carbon dioxide Water may be ineffective on fire Cool exposed containers with water		
Exposure	CALL FOR MEDICAL AID VAPOR Irritating to eyes, nose, and throat If inhaled, will cause headache, difficult breathing, or loss of consciousness Move to fresh air If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. LIQUID Irritating to skin and eyes If swallowed, will cause nausea, vomiting, or loss of consciousness. Remove contaminated clothing and shoes Flush affected areas with plenty of water IF IN EYES, hold eyelids open and flush with plenty of water IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk DO NOT INDUCE VOMITING		
Water Pollution	Dangerous to aquatic life in high concentrations. Fouling to shoreline May be dangerous if it enters water intakes Notify local health and wildlife officials Notify operators of nearby water intakes.		
1 RESPONSE TO DISCHARGE		2 LABEL	
(See Response Methods Handbook) Issue warning-high flammability Evacuate area Should be removed Chemical and physical treatment		2.1 Category: Flammable liquid 2.2 Class 3	
3 CHEMICAL DESIGNATIONS		4 OBSERVABLE CHARACTERISTICS	
3 1 CG Compatibility Class Aromatic Hydrocarbon 3 2 Formula o-C ₈ H ₁₀ (CH ₃) ₂ 3 3 IMO/JUN Designation 3.2/1307 3 4 DOT ID No 1307 3 5 CAS Registry No 95-47 8		4 1 Physical State (as shipped). Liquid 4 2 Color Colorless 4 3 Odor: Benzene-like; characteristic aromatic	
5 HEALTH HAZARDS			
5 1 Personal Protective Equipment. Approved canister or air-supplied mask; goggles or face shield, plastic gloves and boots 5 2 Symptoms Following Exposure: Vapors cause headache and dizziness. Liquid irritates eyes and skin. If taken into lungs, causes severe coughing, distress, and rapidly developing pulmonary edema. If ingested, causes nausea, vomiting, cramps, headache, and coma, can be fatal. Kidney and liver damage can occur 5 3 Treatment of Exposure INHALATION: remove to fresh air, administer artificial respiration and oxygen if required; call a doctor INGESTION do NOT induce vomiting, call a doctor EYES: flush with water for at least 15 min. SKIN: wipe off, wash with soap and water. 5 4 Threshold Limit Value: 100 ppm 5 5 Short Term Inhalation Limits: 300 ppm for 30 min. 5 6 Toxicity by Ingestion Grade 3; LD ₅₀ = 50 to 500 g/kg 5 7 Late Toxicity: Kidney and liver damage 5 8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary 5 9 Liquid or Solid Irritant Characteristics Minimum hazard If spilled or clothing and allowed to remain, may cause smarting and reddening of the skin 5 10 Odor Threshold. 0.06 ppm 5 11 IDLH Value 10,000 ppm			

6 FIRE HAZARDS

6 1 Flash Point. 63°F C C ,
75°F O C

6 2 Flammable Limits in Air: 1.1%-7.0%

6 3 Fire Extinguishing Agents: Foam, dry chemical, or carbon dioxide

6 4 Fire Extinguishing Agents Not to be Used: Water be ineffective.

6 5 Special Hazards of Combustion Products: Not pertinent

6 6 Behavior in Fire: Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back

6 7 Ignition Temperature 869°F

6 8 Electrical Hazard: Class I, Group D

6 9 Burning Rate 5.8 mm/min

6 10 Adiabatic Flame Temperature: Data not available

6 11 Stoichiometric Air to Fuel Ratio: Data not available

6 12 Flame Temperature: Data not available

7 CHEMICAL REACTIVITY

7 1 Reactivity with Water: No reaction

7 2 Reactivity with Common Materials: No reaction

7 3 Stability During Transport: Stable

7 4 Neutralizing Agents for Acids and Caustics: Not pertinent

7 5 Polymerization: Not pertinent

7 6 Inhibitor of Polymerization: Not pertinent

7 7 Molar Ratio (Reactant to Product): Data not available

7 8 Reactivity Group: 32

8 WATER POLLUTION

8 1 Aquatic Toxicity: > 100 mg/l/96 hr/D magna/TL₁₀₀/fresh water

8 2 Waterfowl Toxicity: Data not available

8 3 Biological Oxygen Demand (BOD). 0 lb/lb, 5 days; 2.5% (theor), 8 days

8 4 Food Concentration Potential. Data not available

9. SHIPPING INFORMATION

9 1 Grades of Purity
 Research: 99.99%,
 Pure: 99.7%;
 Commercial: 95 + %

9 2 Storage Temperature: Ambient

9 3 Inert Atmosphere: No action

9 4 Venting: Open (flame arrester) or pressure-vacuum

10 HAZARD ASSESSMENT CODE
(See Hazard Assessment Handbook)

A-T-U

11 HAZARD CLASSIFICATIONS

11 1 Code of Federal Regulations
 Flammable liquid

11 2 NAS Hazard Rating for Bulk Water Transportation:

Category	Rating
Fire	3
Health	
Vapor Irritant	1
Liquid or Solid Irritant	1
Poisons	2
Water Pollution	
Human Toxicity	1
Aquatic Toxicity	3
Aesthetic Affect	2
Reactivity	
Other Chemicals	1
Water	0
Self Reaction	0

11 3 NFPA Hazard Classification

Category	Classification
Health Hazard (Blue)	2
Flammability (Red)	3
Reactivity (Yellow)	0

12 PHYSICAL AND CHEMICAL PROPERTIES

12 1 Physical State at 15°C and 1 atm: Liquid

12 2 Molecular Weight: 106.16

12 3 Boiling Point at 1 atm. 291.9°F = 144.4°C = 417.6°K

12 4 Freezing Point. -13.3°F = -25.2°C = 248.0°K

12 5 Critical Temperature 674.8°F = 357.1°C = 630.3°K

12 6 Critical Pressure: 541.5 atm = 36.84 psia = 3.732 MN/m²

12 7 Specific Gravity: 0.880 at 20°C (liquid)

12 8 Liquid Surface Tension. 30.53 dynes/cm = 0.03053 N/m at 15.6°C

12 9 Liquid Water Interfacial Tension 36.06 dynes/cm = 0.03606 N/m at 20°C

12 10 Vapor (Gas) Specific Gravity: Not pertinent

12 11 Ratio of Specific Heats of Vapor (Gas): 1.089

12 12 Latent Heat of Vaporization 149 Btu/lb = 82.9 cal/g = 3.47 x 10⁶ J/kg

12 13 Heat of Combustion -17,558 Btu/lb = -9764.7 cal/g = -408.41 x 10⁶ J/kg

12 14 Heat of Decomposition: Not pertinent

12 15 Heat of Solution: Not pertinent

12 16 Heat of Polymerization: Not pertinent

12 25 Heat of Fusion 30.84 cal/g

12 26 Limiting Value: Data not available

12 27 Reid Vapor Pressure. 0.28 psia

NOTES

p-XYLENE

XLP

<p>Common Symptoms 1,4-Dimethylbenzene Xylo</p>	<p>Watery liquid Colorless Sweet odor</p> <p>Floats on water Flammable, irritating vapor is produced Freezing point is 66°F</p>
<p>Stop discharge if possible Keep people away Call fire department Avoid contact with liquid and vapor Isolate and remove discharged material Notify local health and pollution control agencies</p>	
Fire	<p>FLAMMABLE Flashback along vapor trail may occur Vapor may explode if ignited in an enclosed area Wear self-contained breathing apparatus Extinguish with foam, dry chemical, or carbon dioxide Water may be ineffective on fire Cool exposed containers with water</p>
Exposure	<p>CALL FOR MEDICAL AID</p> <p>VAPOR Irritating to eyes, nose, and throat If inhaled, will cause dizziness, difficult breathing, or loss of consciousness Move to fresh air If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen</p> <p>LIQUID Irritating to skin and eyes. If swallowed, will cause nausea, vomiting, loss of consciousness Remove contaminated clothing and shoes Flush affected areas with plenty of water IF IN EYES, hold eyelids open and flush with plenty of water IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk DO NOT INDUCE VOMITING</p>
Water Pollution	<p>HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS Fouling to shoreline May be dangerous if it enters water intakes</p> <p>Notify local health and wildlife officials. Notify operators of nearby water intakes</p>
<p>1 RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability Evacuate area Should be removed Chemical and physical treatment</p>	<p>2 LABEL</p> <p>2.1 Category: Flammable liquid 2.2 Class: 3</p>
<p>3 CHEMICAL DESIGNATIONS</p> <p>3.1 CG Compatibility Class Aromatic Hydrocarbon 3.2 Formula p-C₆H₄(CH₃)₂ 3.3 IMO/UN Designation: 3 2/1307 3.4 DOT ID No 1307 3.5 CAS Registry No 106-42-3</p>	<p>4 OBSERVABLE CHARACTERISTICS</p> <p>4.1 Physical State (as shipped) Liquid 4.2 Color: Colorless 4.3 Odor: Like benzene, characteristic aromatic</p>
<p>5. HEALTH HAZARDS</p>	
<p>5.1 Personal Protective Equipment: Approved canister or air-supplied mask; goggles or face shield, plastic gloves and boots</p> <p>5.2 Symptoms Following Exposure: Vapors cause headache and dizziness. Liquid irritates eyes and skin. If taken into lungs, causes severe coughing, distress, and rapidly developing pulmonary edema. If ingested, causes nausea, vomiting, cramps, headache, and coma. Can be fatal. Kidney and liver damage can occur.</p> <p>5.3 Treatment of Exposure: INHALATION: remove to fresh air, administer artificial respiration and oxygen if required; call a doctor. INGESTION: do NOT induce vomiting, call a doctor. EYES: flush with water for at least 15 min. SKIN: wipe off, wash with soap and water</p> <p>5.4 Threshold Limit Value: 100 ppm 5.5 Short Term Inhalation Limits: 300 ppm for 30 min 5.6 Toxicity by Ingestion: Grade 3; LD50 = 50 to 500 mg/kg 5.7 Late Toxicity: Kidney and liver damage. 5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.</p> <p>5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.</p> <p>5.10 Odor Threshold: 0.06 ppm 5.11 IDLH Value: 10,000 ppm</p>	

<p>6 FIRE HAZARDS</p> <p>6.1 Flash Point 81°F C.C 6.2 Flammable Limits in Air 1.1% - 6.6% 6.3 Fire Extinguishing Agents: Foam, dry chemical, or carbon dioxide 6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective 6.5 Special Hazards of Combustion Products: Not pertinent 6.6 Behavior in Fire: Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back 6.7 Ignition Temperature: 870°F 6.8 Botanical Hazard: Class I, Group D 6.9 Burning Rate: 5.8 mm/min 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available</p>	<p>10 HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook)</p> <p style="text-align: center;">A-T-U</p>																																				
<p>7 CHEMICAL REACTIVITY</p> <p>7.1 Reactivity with Water: No reaction 7.2 Reactivity with Common Materials: No reaction 7.3 Stability During Transport: Stable 7.4 Neutralizing Agents for Acids and Caustics: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Molar Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 32</p>	<p>11 HAZARD CLASSIFICATIONS</p> <p>11.1 Code of Federal Regulations Flammable liquid 1 11.2 NAB Hazard Rating for Bulk Water Transportation</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Category</th> <th style="text-align: left;">Rating</th> </tr> </thead> <tbody> <tr> <td>Fire</td> <td>3</td> </tr> <tr> <td>Health</td> <td></td> </tr> <tr> <td> Vapor Irritant</td> <td>1</td> </tr> <tr> <td> Liquid or Solid Irritant</td> <td>1</td> </tr> <tr> <td> Poisons</td> <td>2</td> </tr> <tr> <td>Water Pollution</td> <td></td> </tr> <tr> <td> Human Toxicity</td> <td>1</td> </tr> <tr> <td> Aquatic Toxicity</td> <td>3</td> </tr> <tr> <td> Aesthetic Affect</td> <td>2</td> </tr> <tr> <td>Reactivity</td> <td></td> </tr> <tr> <td> Other Chemicals</td> <td>1</td> </tr> <tr> <td> Water</td> <td>0</td> </tr> <tr> <td> Self Reaction</td> <td>0</td> </tr> </tbody> </table> <p>11.3 NFPA Hazard Classification</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Category</th> <th style="text-align: left;">Classification</th> </tr> </thead> <tbody> <tr> <td>Health Hazard (Blue)</td> <td>2</td> </tr> <tr> <td>Flammability (Red)</td> <td>3</td> </tr> <tr> <td>Reactivity (Yellow)</td> <td>0</td> </tr> </tbody> </table>	Category	Rating	Fire	3	Health		Vapor Irritant	1	Liquid or Solid Irritant	1	Poisons	2	Water Pollution		Human Toxicity	1	Aquatic Toxicity	3	Aesthetic Affect	2	Reactivity		Other Chemicals	1	Water	0	Self Reaction	0	Category	Classification	Health Hazard (Blue)	2	Flammability (Red)	3	Reactivity (Yellow)	0
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<p>8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 22 ppm/96/hr/ bluegill/TL₅₀ /fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 0 lb/lb in 5 days 8.4 Food Concentration Potential: Data not available</p>	<p>12 PHYSICAL AND CHEMICAL PROPERTIES</p> <p>12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: 106.16 12.3 Boiling Point at 1 atm: 280.9°F = 138.3°C = 411.6°K 12.4 Freezing Point: 66.9°F = 13.3°C = 286.6°K 12.5 Critical Temperature: 649.4°F = 343.0°C = 616.2°K 12.6 Critical Pressure: 509.4 atm = 34.66 psia = 3.510 MN/m² 12.7 Specific Gravity: 0.861 at 20°C (liquid) 12.8 Liquid Surface Tension: 28.3 dynes/cm = 0.0283 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 37.8 dynes/cm = 0.0378 N/m at 20°C 12.10 Vapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): 1.071 12.12 Latent Heat of Vaporization: 160 Btu/lb = 81 cal/g = 3.4 x 10⁵ J/kg 12.13 Heat of Combustion: -17,558 Btu/lb = -9754.7 cal/g = -408.41 x 10³ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: 37.63 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 0.34 psia</p>																																				
<p>9. SHIPPING INFORMATION</p> <p>9.1 Grades of Purity: Research: 99.99%, Pure: 99.8%; Technical: 99.0% 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester) or pressure-vacuum</p>	<p style="text-align: center;">NOTES</p>																																				

PETROLEUM NAPHTHA

PTN

Common Symptoms Petroleum solvent	Liquid Floats on water	Colorless Flammable vapor is produced	Gasoline odor
Stop discharge if possible. Keep people away. Shut off ignition sources and call fire department. Stay upwind and use water spray to knock down vapor. Avoid contact with liquid. Isolate and remove discharged material. Notify local health and pollution control agencies.			
Fire	FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Extinguish with foam, dry chemical, or carbon dioxide. Cool exposed containers with water.		
Exposure	CALL FOR MEDICAL AID VAPOR Not irritating to eyes, nose, or throat. LIQUID Harmful if swallowed. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. DO NOT INDUCE VOMITING.		
Water Pollution	Effect of low concentrations on aquatic life is unknown. Fouling to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.		
1 RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability. Restrict access. Evacuate area.		2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3	
3 CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures 3.2 Formula: Not applicable 3.3 IMO/UN Designation: 3.2/1255 3.4 DOT ID No: 1265 3.5 CAS Registry No: 8030-30-8		4 OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Like gasoline and kerosene	
5 HEALTH HAZARDS 5.1 Personal Protective Equipment: Goggles or face shield (as for gasoline). 5.2 Symptoms Following Exposure: Inhalation of concentrated vapor may cause intoxication. Liquid is not very irritating to skin or eyes but may get into lungs by aspiration. 5.3 Treatment of Exposure: INHALATION remove victim to fresh air and treat symptoms. INGESTION : have victim drink water or milk, do NOT induce vomiting. EYES flush with water for 15 min. SKIN : wipe off and wash with soap and water. 5.4 Threshold Limit Value: No single TLV applicable. 5.5 Short Term Inhalation Limits: 500 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 2; LD50 = 0.5 to 5 g/kg. 5.7 Late Toxicity: None. 5.8 Vapor (Gas) Irritant Characteristics: Vapors are non-irritating to the eyes and throat. 5.9 Liquid or Solid Irritant Characteristics: No appreciable hazard. Practically harmless to the skin. 5.10 Odor Threshold: Data not available. 5.11 IDLH Value: 10,000 ppm.			

6. FIRE HAZARDS 6.1 Flash Point: 20°F (approx.) C.C. 6.2 Flammable Limits in Air: 0.9% - 8.0% 6.3 Fire Extinguishing Agents: Foam, carbon dioxide, or dry chemical. 6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective. 6.5 Special Hazards of Combustion Products: Not pertinent. 6.6 Behavior in Fire: Not pertinent. 6.7 Ignition Temperature: 450°F (approx.). 6.8 Electrical Hazard: Not pertinent. 6.9 Burning Rate: 4 mm/min. 6.10 Adiabatic Flame Temperature: Data not available. 6.11 Stoichiometric Air to Fuel Ratio: Data not available. 6.12 Flame Temperature: Data not available.	10 HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U-V-W 11 HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Flammable liquid. 11.2 NFPA Hazard Rating for Bulk Water Transportation: Not listed. 11.3 NFPA Hazard Classification: Not listed.
7 CHEMICAL REACTIVITY 7.1 Reactivity with Water: No reaction. 7.2 Reactivity with Common Materials: No reaction. 7.3 Stability During Transport: Stable. 7.4 Neutralizing Agents for Acids and Caustics: Not pertinent. 7.5 Polymerization: Not pertinent. 7.6 Inhibitor of Polymerization: Not pertinent. 7.7 Molar Ratio (Reactant to Product): Data not available. 7.8 Reactivity Group: 33.	12 PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 15°C and 1 atm: Liquid. 12.2 Molecular Weight: Not pertinent. 12.3 Boiling Point at 1 atm: 207.0°F = 97.2°C = 370.4°K. 12.4 Freezing Point: Not pertinent. 12.5 Critical Temperature: Not pertinent. 12.6 Critical Pressure: Not pertinent. 12.7 Specific Gravity: 0.74 at 20°C (liquid). 12.8 Liquid Surface Tension: 18-23 dynes/cm = 0.019-0.023 N/m at 20°C. 12.9 Liquid Water Interfacial Tension: 39-51 dynes/cm = 0.039-0.051 N/m at 20°C. 12.10 Vapor (Gas) Specific Gravity: Not pertinent. 12.11 Ratio of Specific Heats of Vapor (Gas) (est.): 1.030. 12.12 Latent Heat of Vaporization: 130-160 Btu/lb = 71-81 cal/g = 3.0-3.4 X 10 ⁵ J/kg. 12.13 Heat of Combustion: Data not available. 12.14 Heat of Decomposition: Not pertinent. 12.15 Heat of Solution: Not pertinent. 12.16 Heat of Polymerization: Not pertinent. 12.25 Heat of Fusion: Data not available. 12.26 Limiting Value: Data not available. 12.27 Reid Vapor Pressure: Data not available.
8. WATER POLLUTION 8.1 Aquatic Toxicity: Data not available. 8.2 Waterfowl Toxicity: Data not available. 8.3 Biological Oxygen Demand (BOD): Data not available. 8.4 Food Concentration Potential: None.	9 SHIPPING INFORMATION 9.1 Grades of Purity: Data not available. 9.2 Storage Temperature: Ambient. 9.3 Inert Atmosphere: No requirement. 9.4 Venting: Open (flame arrester) or pressure-vacuum.
NOTES	

LEAD	Pb
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PHYSICAL AND CHEMICAL DESCRIPTION	<p>Pb, soft, ductile, gray metal, insoluble in water but dissolves slowly in water containing a weak acid. Since lead is an element, it will remain indefinitely once released to the environment.</p>
USES	<p>Lead is used in electroplating, radiation protection devices, plastics, electronic equipment, storage batteries, gasoline anti-knock additives, and pigments.</p>
TOXICITY IN WATER	<p>The hazards of human exposure to lead are well known. Symptoms of lead poisoning include fatigue, anemia, abdominal pains, constipation, and neurological damage. The Florida Primary Drinking Water Standard (FAC 17-22) for lead is 50 $\mu\text{g}/\ell$.</p> <p>The toxic effects of lead on aquatic organisms is strongly dependent on the water hardness. To protect freshwater aquatic life at hardnesses of 50, 100, and 200 mg/ℓ as CaCO_3, the concentrations of lead should not exceed 0.75, 3.8, and 20 $\mu\text{g}/\ell$, respectively. To protect saltwater life, lead should not exceed 25 $\mu\text{g}/\ell$ (EPA, 1979).</p>
CLASSIFICATION	<p>Hazardous Substance (EPA) Hazardous Waste Constituent (EPA) Priority Toxic Pollutant (EPA)</p>

5.0 SITE CONTROL

5.1 ZONATION. Due to the nature of the work (multiple soil borings and monitoring well sampling throughout the study area) and the properties of the potential chemicals found onsite, typical exclusion, contamination reduction, and support zones are not necessary or practical at all locations. Therefore, where appropriate, a "floating" exclusion zone at the perimeter of the sampling site will be established to eliminate access to the area by the individuals not working on the project or involved in the assignment work. The perimeter will be at least 20 feet in radius and moved accordingly with the sampling locations.

5.2 COMMUNICATIONS. When radio communication is not used, the following air horn signals will be employed:

HELP	three short blasts	(. . .)
EVACUATION	three long blasts	(_ _ _)
ALL CLEAR	alternating long and short blasts	(_ . _ .)

5.3 WORK PRACTICES. General work practices to be used during ABB-ES projects are described in Chapter 9.0 of the CLEAN HASP. Work at the site will be conducted according to these established protocol and guidelines for the safety and health of all involved. Specific work practices necessary for this project or those that are of significant concern are described as follows.

- Work and sampling will be conducted in level D clothing and equipment.
- Use the buddy system.
- Smoking, eating and drinking in the work area prior to decontamination is not permitted.
- Heat stress must be considered in planning work schedules and breaks.
- Hearing protection must be considered when working in the immediate vicinity of the drill rig and the aircraft flight line.
- All personnel must minimize contact with excavated or contaminated materials. Do not place equipment on the ground. Do not sit or kneel on the ground in the Exclusion Zone. Avoid standing in or walking through puddles or stained soil.
- Maintain monitoring systems. Conditions can change quickly if subsurface areas of contamination are penetrated.
- Personnel must be observant of not only their own immediate surroundings but also that of others. Everyone will be working under constraints; therefore, a team effort is needed to notice and warn of impending dangerous situations. Extra precautions are necessary when working near heavy equipment.
- Contact lenses are not allowed to be worn onsite; if corrosive or lachrymous substances enter the eyes, proper flushing is impeded.

6.0 DECONTAMINATION AND DISPOSAL

All personnel and/or equipment leaving contaminated areas of the site will be subject to decontamination, which will take place in the Contamination Reduction Zone (CRZ). General decontamination practices used during ABB-ES projects are described in Chapter 13.0 of the CLEAN HASP.

6.1 PERSONNEL DECONTAMINATION. All personnel leaving the investigation area are subject to decontamination (as necessary). The decontamination procedure required will be determined by the nature and level of contamination found at the sites. At a minimum, site personnel will remove loose soil from boots and clothing before leaving the site. More thorough decontamination procedures will be observed as dictated by site conditions. These procedures are described in Chapter 13.0 of the CLEAN HASP.

6.1.1 Small Equipment Decontamination Small equipment will be protected from contamination as much as possible by keeping the equipment covered when at the site and placing the equipment on plastic sheeting, not the ground. Sampling equipment used at the site will be used only once or will be cleaned in the field between samples with soapy water (Alconox™), rinsed with clean water, rinsed with an approved Quality Assurance/Quality Control solvent, and given a final rinse with organic free water.

6.1.2 Heavy Equipment Decontamination Drilling rigs and other heavy equipment will be cleaned with high-pressure water or steam. Loose material will be removed with a brush. Downhole tools and heavy equipment will be similarly decontaminated.

6.2 COLLECTION AND DISPOSAL OF DECONTAMINATION PRODUCTS. Investigation-derived wastes will be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left onsite. Potentially contaminated materials (e.g., clothing, gloves, etc.) will be bagged or drummed as necessary and segregated for disposal. Contaminated waste materials shall be disposed of as required by the provisions included in the contract and consistent with NAS and regulatory provisions. All non-contaminated materials will be collected and bagged for appropriate disposal as normal domestic waste.

7.0 EMERGENCY AND CONTINGENCY PLAN

This section identifies emergency and contingency planning that has been undertaken for operations at this site. Most sections of the HASP provide information that would be used under emergency conditions. General emergency planning information is addressed in Chapter 14.0 of the CLEAN HASP. The following subsections present site-specific emergency and contingency planning information.

7.1 PERSONNEL ROLES, LINES OF AUTHORITY, AND COMMUNICATION. The site HSO or the Health and Safety designee is the primary authority for directing operations at the site under emergency conditions. All communications both onsite and offsite will be directed through the HSO or designee. Emergency telephone numbers are listed in Section 9.5.

7.2 EVACUATION. In the event of an emergency situation such as fire, explosion, significant release of toxic gases, etc., an air horn or other appropriate device will be sounded for three long blasts indicating the initiation of evacuation procedures. All personnel will evacuate the work area. The location of safe areas will be upwind of the site. For efficient and safe site evacuation and assessment of the emergency situation, the HSO will have authority to initiate proper action if outside services are required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The HSO must see that access for emergency equipment is provided and that all combustible apparatus have been shut down once the alarm has been sounded.

The HSO will notify local fire and police departments and other appropriate emergency response groups if lower explosive limit (LEL) values are above 20 percent in the work zone, or if an actual fire or explosion has taken place.

7.3 EMERGENCY MEDICAL TREATMENT AND FIRST AID. Any personnel injured onsite will be rendered first aid as appropriate and transported to competent medical facilities for further examination and treatment. Designated emergency medical facilities and routes from the site are listed in Section 8.6. The preferred method of transport would be through professional emergency transportation means; however, when this is not readily available or would result in excessive delay, other transportation will be authorized. Under no circumstances will injured persons transport themselves to a medical facility for emergency treatment.

8.0 SAFE WORK PRACTICES

All personnel onsite are required to promote and follow prudent work practices to provide a safe working environment. All individuals are to follow the guidelines given below for their specific work activities.

8.1 DRILL RIG SAFETY PROCEDURES. The ABB-ES FOL will observe drilling and well installation procedures and provide air monitoring, as needed, for specific activities. The FOL will remain outside the immediate work area around the rig, whenever possible, to avoid interference with drilling activities. In addition, drilling subcontractors are responsible for maintaining safe, fully operational drilling equipment in the field, and should conduct regular safety inspections of equipment and working conditions.

8.2 SAMPLING SAFETY PROCEDURES. Safety practices for sampling activities provide worker protection from chemical hazards associated with the sample materials, preservatives, and chemicals that may be required for equipment decontamination. In addition, the following points of good field practice should be implemented.

- Specified USEPA Region IV sampling techniques should be used.
- Good judgment should be used in collecting and handling samples. (If a proposed sampling site is not readily accessible or the sampling method is unfeasible, sample collection should not be attempted. The TOM and FOL should be contacted to select an alternate sampling site.)
- Spills, dirt, and residue from sampling should be cleaned up immediately.
- Damaged sampling gear or equipment should be repaired or replaced immediately.
- The sampling area should be evacuated if any symptoms of overexposure are detected, and such incidents should be reported to the HSO and TOM.
- Unnecessary physical contact with sample material should be avoided.
- Exposure and environmental monitoring should be performed as required by the safety plan.
- Contact with chemicals used for sample preservation or decontamination of sampling equipment should be avoided.
- Safety plan requirements should be adhered to when handling or packaging hazardous samples. Packaging, labeling, and shipping should conform with the Department of Transportation regulations.

9.0 ADMINISTRATION

9.1 PERSONNEL AUTHORIZED DOWNRANGE. Personnel authorized to participate in downrange activities at this site have been reviewed and certified for site operations by the TOM and the HSS. Certification involves the completion of appropriate training (including first-aid and cardiopulmonary resuscitation [CPR] training), a medical examination, and a review of this site-specific HASP. All persons entering the site must use the buddy system, and check in with the FOL and/or HSO before going downrange.

CERTIFIED ABB ENVIRONMENTAL TEAM PERSONNEL:

<u>Roger Durham*+</u>	<u>Jim Williams*+</u>
<u>Mike Dunaway*+</u>	<u>John Kaiser*+</u>
<u>Jay Koch*+</u>	<u>Lisa Ruthier</u>
<u>Blake Svendsen</u>	<u>Celora Jackson*+</u>
<u>Pamela Wagner*+</u>	<u>Jack Pittman*+</u>
_____	_____

OTHER CERTIFIED PERSONNEL:

<u>Brent Anderson*+</u>	_____
_____	_____

* First Aid-trained
+ CPR-trained

9.2 HEALTH AND SAFETY PLAN (HASP) APPROVALS. By their signatures, the undersigned certify that this HASP will be used for the protection of the health and safety of all persons entering this site.

_____	_____
Health and Safety Officer	Date
_____	_____
Task Order Manager	Date
_____	_____
Health and Safety Manager/Supervisor	Date

9.3 FIELD TEAM REVIEW. I have read and reviewed the health and safety information in this HASP. I understand the information and will comply with the requirements of the HASP.

NAME: _____

DATE: _____

SITE/PROJECT: _____

9.4 MEDICAL DATA SHEET. This Medical Data Sheet will be completed by all on-site personnel and kept in the support zone during site operations. It is not a substitute for the Medical Surveillance Program requirements consistent with the CLEAN HASP. This data sheet will accompany any personnel when medical assistance or transport to hospital facilities is required. If more space is required, use the back of this sheet.

Project: Truck Stand at Building A935, Boca Chica, Key West, Florida

Name: _____

Address: _____

Home Telephone: Area Code () _____

Age: _____ Height: _____ Weight: _____

In case of emergency, contact: _____

Address: _____

Telephone: Area Code () _____

Do you wear contact lenses? Yes () No ()

Allergies: _____

List medication(s) taken regularly: _____

Particular sensitivities: _____

Previous/current medical conditions or exposures to hazardous chemicals:

Name of Personal Physician: _____

Telephone: Area Code () _____

9.5 EMERGENCY TELEPHONE NUMBERS

Police Department	911
Ambulance	911
Emergency Room	(305) 294-5531\4764
Primary Hospital	(305) 294-5531
Fire Department	911
Offsite Emergency Services	911
Poison Control Center	(800) 282-3171
National Response Center	(800) 424-8802
Site HSO: <u>Jay Koch - onsite</u>	(904) 656-1293
Field Operations Leader: <u>Roger Durham</u>	(904) 656-1293
Environmental Coordinator: <u>Diane Lancaster</u>	(305) 293-2911
Task Order Manager: <u>Jack Pittman</u>	(904) 656-1293
ABB Environmental HSS: <u>David Daniel</u>	(904) 656-1293 x318
ABB Environmental HSM: <u>C.E. Sundquist</u>	(800) 341-0460 x2101
SOUTHNAVFACENGCOC Engineer-in-Charge (EIC): <u>Luis Vazquez</u>	(803) 743-0613

9.6 ROUTES TO EMERGENCY MEDICAL FACILITIES

The primary source of medical assistance for the site is as follows.

Facility Name: Florida Keys Memorial Hospital

Address: 3900 Junior College Road, Key West, Florida 33040

Telephone Number: (305) 294-5531

Directions to primary source of medical assistance (Figure 9-1):

Leave site on Shangri-Las, turn left on Midway, and proceed to main gate.

Exit NAS via main gate and take a left on U.S. Highway 1 heading west.

Proceed west on U.S. Highway 1 for approximately 4 miles to Stock Island.

Turn right at the hospital sign onto Junior College Road and the hospital will be on the left.

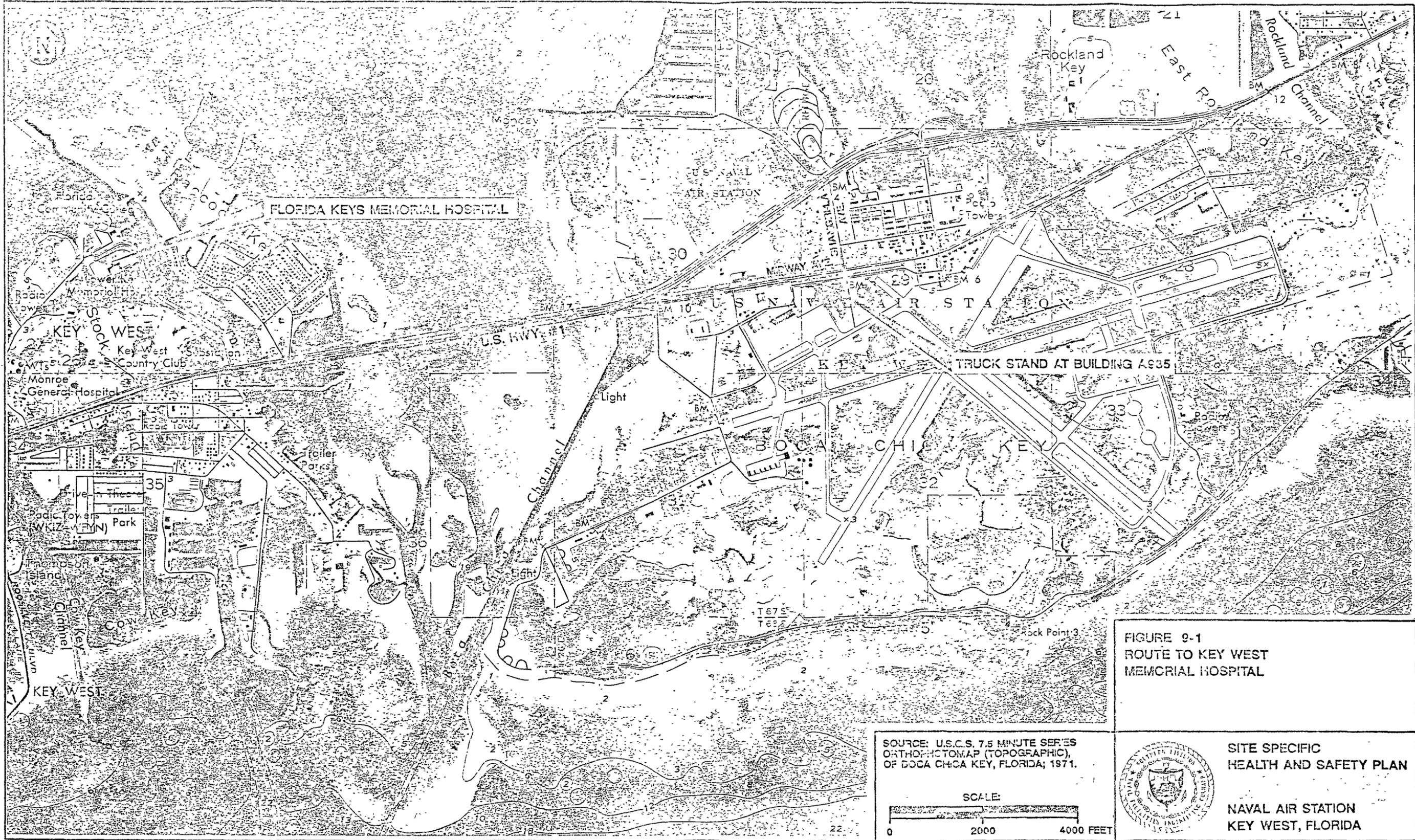
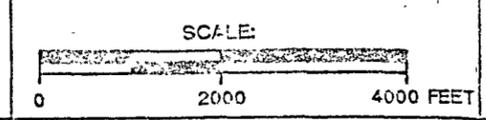


FIGURE 9-1
 ROUTE TO KEY WEST
 MEMORIAL HOSPITAL

SOURCE: U.S.C.S. 7.5 MINUTE SERIES
 ORTHOPHOTOMAP (TOPOGRAPHIC),
 OF BOCA CHICA KEY, FLORIDA; 1971.



SITE SPECIFIC
 HEALTH AND SAFETY PLAN
 NAVAL AIR STATION
 KEY WEST, FLORIDA

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Requirements of the Act include the following:

EMPLOYERS

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm or employees. Employers must comply with occupational safety and health standards issued under the Act.

EMPLOYEES

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

INSPECTION

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

COMPLAINT

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides the employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discriminatory action.

CITATION

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

PROPOSED PENALTY

The Act provides for mandatory civil penalties against employers of up to \$7,000 for each serious violation and for optional penalties of up to \$7,000 for each nonserious violation. Penalties of up to \$7,000 per day may be proposed for failure to correct violations within the proposed time period and for each day the violation continues beyond the prescribed abatement date. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to \$70,000 for each such violation. A violation of posting requirements can bring a penalty of up to \$7,000.

There are also provisions for criminal penalties. Any willful violation resulting in the death of any employee, upon conviction, is punishable by a fine of up to \$250,000 (or \$500,000 if the employer is a corporation), or by imprisonment for up to six months, or both. A second conviction of an employer doubles the possible term of imprisonment. Falsifying records, reports, or applications is punishable by a fine of \$10,000 or up to six months in jail or both.

VOLUNTARY ACTIVITY

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for health such as training.

VOLUNTARY ACTIVITY

Free assistance in identifying and correcting hazards and in improving safety and health management is available to employers, without citation or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State labor or Health department or a State university.

POSTING INSTRUCTIONS

Employees in States operating OSHA approved State Plans should obtain and post the State's equivalent poster.

Under provisions of Title 29, Code of Federal Regulations, Part 1903.2(a)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta, Georgia (404) 347-3573
Boston, Massachusetts (617) 565-7164
Chicago, Illinois (312) 353-2220
Dallas, Texas (214) 767-4731
Denver, Colorado (303) 844-3061
Kansas City, Missouri (816) 426-5861
New York, New York (212) 337-2378
Philadelphia, Pennsylvania (215) 596-1201
San Francisco, California (415) 744-6670
Seattle, Washington (206) 442-5930

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Lynn Martin, Secretary of Labor
U.S. Department of Labor
Occupational Safety and Health Administration

To report suspected fire hazards, imminent danger safety and health hazards in the workplace, or other job safety and health emergencies, such as toxic waste in the workplace, call OSHA's 24-hour hotline: 1-800-321-OSHA.