

N60201.AR.000143
NS MAYPORT
5090.3a

SITE SPECIFIC HEALTH AND SAFETY PLAN CONTAMINATION ASSESSMENT BACHELOR
ENLISTED QUARTERS BUILDING 1586 NS MAYPORT FL
5/1/1994
ABB ENVIRONMENTAL SERVICES

SITE-SPECIFIC HEALTH AND SAFETY PLAN

CONTAMINATION ASSESSMENT

**NAVAL STATION MAYPORT
BACHELOR ENLISTED QUARTERS, BUILDING 1586
MAYPORT, FLORIDA**

Contract Task Order No. 077

Contract No. N62467-89-D-0317

Prepared by:

**ABB Environmental Services, Inc.
2590 Executive Center Circle East
Tallahassee, Florida 32301**

Prepared for:

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

Bryan Kizer, Engineer-In-Charge

May 1994

TABLE OF CONTENTS

Site-Specific Health and Safety Plan
Bachelor Enlisted Quarters, Building 1586
NAVSTA Mayport, Mayport, Florida

	<u>Title</u>	<u>Page No.</u>
	<u>GENERAL</u>	1-1
. 1	SCOPE AND PURPOSE	1-1
. 2	PROJECT PERSONNEL	1-1
	1.2.1 Task Order Manager	1-1
	1.2.2 Field Operations Leader	1-1
	1.2.3 Health and Safety Officer	1-1
. 3	TRAINING	1-1
. 4	MEDICAL SURVEILLANCE	1-2
	<u>ACTIVITY SITE CHARACTERIZATION AND ANALYSIS</u>	2-1
. 1	SITE NAME, LOCATION, AND SIZE	2-1
. 2	SITE HISTORY AND LAYOUT	2-1
. 3	SCOPE OF WORK (WORKPLAN)	2-3
	<u>HAZARD ANALYSES</u>	3-1
. 1	INVASIVE SAMPLING	3-1
. 2	SITE RISKS	3-1
	3.2.1 Health Hazards	3-1
	3.2.2 Safety Hazards	3-1
	3.2.3 Conclusions and Risk Assessment	3-3
. 3	PROTECTIVE MEASURES	3-3
	3.3.1 Engineering Controls (General)	3-3
	3.3.2 Levels of Protection (General)	3-3
. 4	MONITORING (GENERAL)	3-3
	3.4.1 Air Sampling (General)	3-3
	3.4.2 Personal Monitoring (General)	3-4
	<u>DATA SHEETS</u>	4-1
	<u>WASTE CONTROL</u>	5-1
. 1	ZONATION	5-1
. 2	COMMUNICATIONS	5-1
. 3	WORK PRACTICES	5-1
	<u>DECONTAMINATION AND DISPOSAL</u>	6-1
. 1	PERSONNEL DECONTAMINATION	6-1
	6.1.1 Small Equipment Decontamination	6-1
	6.1.2 Heavy Equipment Decontamination	6-1
. 2	COLLECTION AND DISPOSAL OF DECONTAMINATION PRODUCTS	6-1
	<u>EMERGENCY AND CONTINGENCY PLAN</u>	7-1
. 1	PERSONNEL ROLES, LINES OF AUTHORITY, AND COMMUNICATION	7-1
. 2	EVACUATION	7-1
. 3	EMERGENCY MEDICAL TREATMENT AND FIRST AID	7-1

TABLE OF CONTENTS (Continued)

Site-Specific Health and Safety Plan
Bachelor Enlisted Quarters, Building 1586
NAVSTA Mayport, Mayport, Florida

<u>Section</u>	<u>Title</u>	<u>Page No.</u>
8.0	SAFE WORK PRACTICES	8-1
8.1	DRILL RIG SAFETY PROCEDURES	8-1
8.2	SAMPLING SAFETY PROCEDURES	8-1
9.0	ADMINISTRATION	9-1
9.1	PERSONNEL AUTHORIZED DOWNRANGE	9-1
9.2	HEALTH AND SAFETY PLAN (HASP) APPROVALS	9-1
9.3	FIELD TEAM REVIEW	9-2
9.4	MEDICAL DATA SHEET	9-2
9.5	EMERGENCY TELEPHONE NUMBERS	9-3
9.6	ROUTES TO EMERGENCY MEDICAL FACILITIES	9-4

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>	<u>Page No.</u>
2-1	Site Location Map	2-2
9-1	Routes to Hospital	9-5

LIST OF TABLES

<u>Table</u>	<u>Title</u>	<u>Page No.</u>
3-1	Contaminants of Concern	3-2

TABLE OF CONTENTS (Continued)

Site-Specific Health and Safety Plan
Bachelor Enlisted Quarters, Building 1586
NAVSTA Mayport, Mayport, 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.
BEQ	Bachelor Enlisted Quarters
BOSS	Base Operations and Support Services
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
ERG	Environmental Recovery Group
FAC	Florida Administrative Code
FID	flame ionization detector
FOL	Field Operations Leader
GC	gas chromatograph
HASP	Health and Safety Plan
HSM	Health and Safety Manager
HSO	Health and Safety Officer
HSS	Health and Safety Supervisor
ID	inside diameter
LEL	lower explosive limit
NAVSTA	Naval Station
OSHA	Occupational Safety and Health Administration
OVA	organic vapor analyzer
PCA	preliminary contamination assessment
PPE	personal protective equipment
ppm	parts per million
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 Bachelor Enlisted Quarters (BEQ), Building 1586, Naval Station (NAVSTA) Mayport, Mayport, 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), John Kaiser, 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 Mark Joop has been designated the HSO for the BEQ 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 BEQ 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

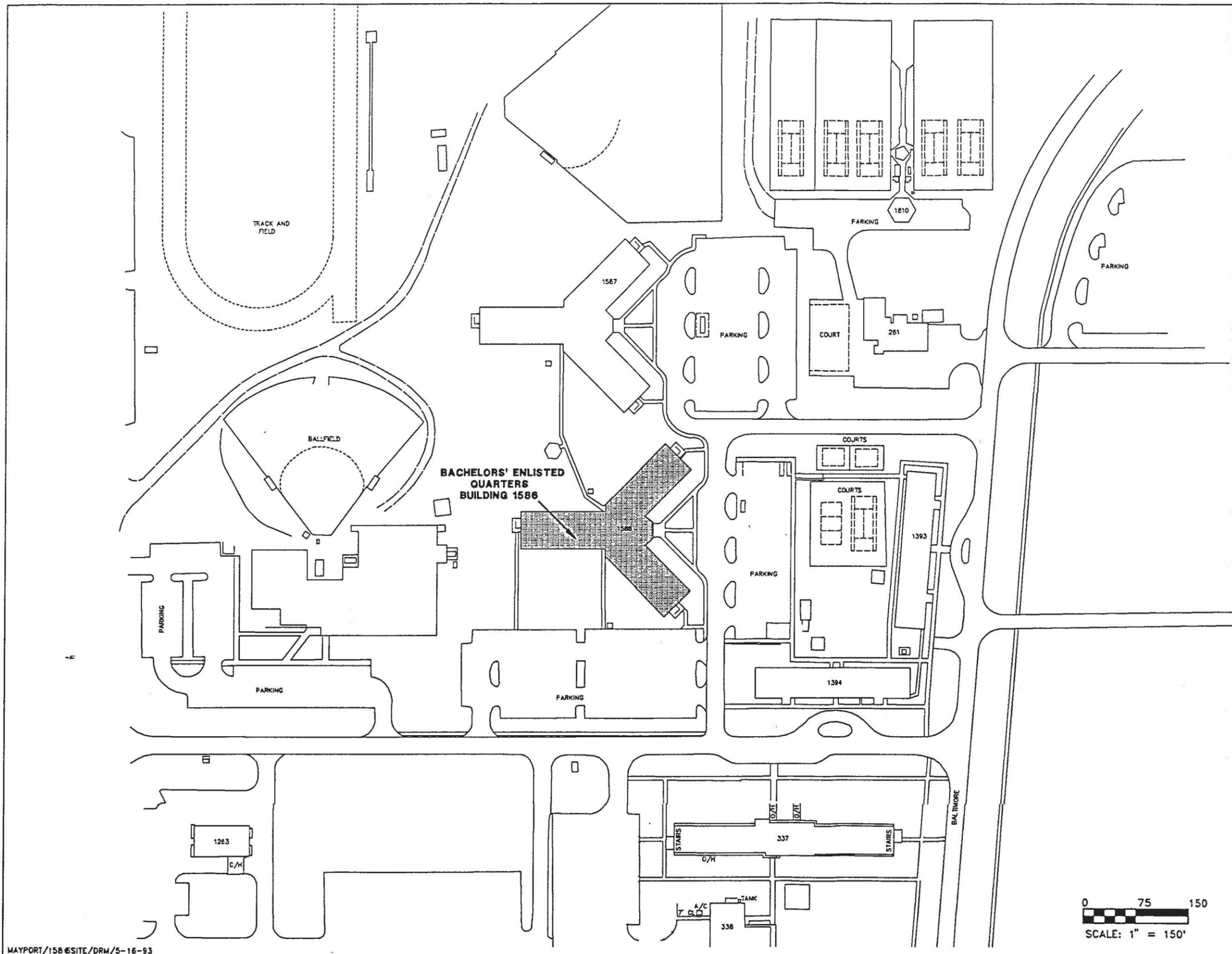
2.1 SITE NAME, LOCATION, AND SIZE. BEQ, Building 1586, is located at NAVSTA Mayport, Mayport, Duval County, Florida. The base is located about 15 miles east-northeast of downtown Jacksonville, Florida (see Figure 2-1). NAVSTA Mayport was established in 1942 on approximately 700 acres of land.

2.2 SITE HISTORY AND LAYOUT. Building 1586 is located off Bon Homme Richard, immediately east of the Turning Basin. Approximately 3,000 gallons of diesel fuel No. 2 leaked from part of the heating fuel pipeline outside the BEQ in the fall of 1991. The boiler fuel system leak was detected September 6, 1991, by weekly fuel inventory records. The leak in the pipeline was reportedly caused by galvanic corrosion of the boiler fuel system pipeline. According to base personnel, the pipeline and associated 4,000-gallon underground storage tank (UST) have never been tested. The UST was installed in 1985 and is constructed of asphalt coated steel. The system has steel piping and no leak detection systems.

The corroded portion of the fuel supply pipeline was replaced in September 1991. In addition, two 24-inch inside diameter (ID) by 48-inch perforated, corrugated metal pipes were installed to act as recovery sinks to remove any remaining free product from the groundwater at the site. The Base Operations and Support Services (BOSS) contracted with Environmental Recovery Group (ERG) for services to implement initial remedial action at the site, which included removal of approximately 800 gallons of free product, 2,000 gallons of contaminated groundwater, and 270 cubic yards of contaminated soil. The excavated area was reportedly backfilled with 4 feet of gravel, covered with a plastic Visqueen™ liner to act as a vapor barrier, then covered with an additional 2 feet of topsoil.

During the excavation, RSDI Environmental, Inc., conducted onsite screening of soils. Soil borings were completed to an average depth of 4 feet below land surface. From September 10, 1991, through September 24, 1991, soil samples were collected using a stainless-steel hand auger and were screened with an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID).

A preliminary contamination assessment (PCA) was performed by ABB-ES from April 13 through 14, 1993. The objectives of the PCA were to assess the effectiveness of the previous cleanup, and assess the extent of petroleum contaminants, if any, remaining in the soil and groundwater at the site. The TerraProbe™ system was used to obtain groundwater and soil samples for field screening and laboratory analysis. A total of 21 soil samples from 7 soil borings were field screened using an OVA. A portable gas chromatograph (GC) was used to screen four saturated soil samples collected at three soil borings. Seven groundwater samples were collected from the monitoring and recovery wells for laboratory analyses of kerosene analytical group constituents as defined in Chapter 17-770, Florida Administrative Code (FAC). During the PCA, excessively-contaminated soil (greater than 50 parts per million) was observed in the vicinity of the heating fuel pipeline.

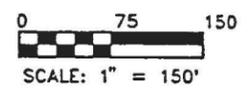


**FIGURE 2-1
SITE LOCATION MAP**



**HEALTH AND SAFETY PLAN,
BACHELORS ENLISTED
QUARTERS SITE**

**NAVSTA MAYPORT
MAYPORT, FLORIDA**



2.3 SCOPE OF WORK (WORKPLAN). ABB-ES will conduct a CA at the site to assess the horizontal and vertical extent of petroleum contamination in soil and groundwater. The field investigation will consist of the installation and sampling of approximately 25 soil borings, 10 permanent shallow monitoring wells, and 1 permanent deep monitoring well.

3.0 HAZARD ANALYSES

3.1 INVASIVE SAMPLING. Invasive sampling at the BEQ 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 the level of personal protection.

Contamination of soil and groundwater at the site may have occurred from reported leakage of petroleum products associated with the boiler fuel system 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 BEQ site.

3.2.1 Health Hazards Health hazards include those hazards 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 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 BEQ must be obtained.

**Table 3-1
Contaminants of Concern**

Site-Specific Health and Safety Plan
Bachelor Enlisted Quarters, Building 1586
NAVSTA Mayport, Mayport, Florida

Chemical	Approximate Odor Threshold (ppm)	OSHA Permissible Exposure Limit (ppm)	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 decrease 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.
Xylenes	0.05	100	100	Colorless liquid; aromatic odor.	Moderate skin irritant.	Inhalation causes headaches and dizziness; vapors irritate eyes; can be fatal if ingested.
Naphthalenes	--	10	10	Colorless to brown solid with an odor of mothballs.	Moderate skin irritant.	Inhalation causes headaches and confusion; vapors irritate eyes.

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

3.2.3 Conclusions and Risk Assessment Based on available information (nature of the work, potential onsite chemicals and their properties, and exposure limits), 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 OVA. Benzene concentrations in the breathing zone will be monitored using a benzene 0.5/a Dräger 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.

Level C PPE will be used by all personnel working in the contaminated zone if FID monitoring of organic vapor concentrations in the breathing zone are greater than or equal to 25 ppm but less than 170 ppm, and benzene levels are greater than or equal to 0.5 ppm but less than 50 ppm. Benzene concentrations in the breathing zone will be monitored using benzene Dräger tubes (0.5/a and 5/b).

Level B PPE will be used by all personnel working in the contaminated zone if FID monitoring in the breathing zone is greater than or equal to 170 ppm and Dräger tube (5/b) monitoring indicates greater than or equal to 50 ppm benzene.

Procedures for using Level B and Level C PPE, heat and cold stress monitoring associated with upgrading levels of protection, and other relevant factors associated with the respiratory protection program are described in the CLEAN HASP.

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 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 FID or OVA will be conducted regularly in the breathing zone. If the FID readings show a persistent rise above background levels, monitoring with Dräger 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. Dräger 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 BEQ site are attached.

BENZENE

BNZ

Common Symptoms	Watery liquid Colorless Gasoline-like odor
Benzol Benzole	Floats on water. Flammable, irritating vapor is produced. Freezing point is 42°F.
<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>	
Fire	<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>
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. 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>
Water Pollution	<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>
1. RESPONSE TO DISCHARGE	2. LABEL
(See Response Methods Handbook) Issue warning-high flammability Restrict access	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 ₆ H ₆ 3.3 IMO/UN Designation: 3.2/1114 3.4 DOT ID No.: 1114 3.5 CAS Registry No.: 71-43-2	4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Aromatic; rather pleasant aromatic odor; characteristic odor
5. HEALTH HAZARDS	
<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: 4.68 ppm 5.11 IDLH Value: 2,000 ppm</p>	

<p style="text-align: center;">6. FIRE HAZARDS</p> <p>6.1 Flash Point: 12°F C.C. 6.2 Flammable Limits in Air: 1.3%-7.9% 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 flash back 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 style="text-align: center;">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 (Reagent to Product): Data not available 7.8 Reactivity Group: 32</p> <p style="text-align: center;">8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 5 ppm/8 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 style="text-align: center;">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 style="text-align: center;">10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook)</p> <p style="text-align: center;">A-T-U-V-W</p> <p style="text-align: center;">11. HAZARD CLASSIFICATIONS</p> <p>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 3 Water Pollution Human Toxicity 3 Aquatic Toxicity 1 Aesthetic Affect 3 Reactivity Other Chemicals 2 Water 1 Self Reaction 0 11.3 NFPA Hazard Classification: Category Classification Health Hazard (Blue) 2 Flammability (Red) 3 Reactivity (Yellow) 0</p> <p style="text-align: center;">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 = 363.3°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: 169 Btu/lb = 94.1 cal/g = 3.94 X 10⁶ J/kg 12.13 Heat of Combustion: -17,460 Btu/lb = -9698 cal/g = -406.0 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: 30.45 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 3.22 psia</p> <p style="text-align: center;">NOTES</p>
---	---

BNZ

BENZENE

12.17 SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY		12.19 LIQUID THERMAL CONDUCTIVITY		12.20 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit- inch per hour- square foot-F	Temperature (degrees F)	Centipoise
55	55.330	45	.394	75	.988	55	.724
60	55.140	50	.396	80	.981	60	.693
65	54.960	55	.398	85	.975	65	.665
70	54.770	60	.400	90	.969	70	.638
75	54.580	65	.403	95	.962	75	.612
80	54.400	70	.405	100	.956	80	.588
85	54.210	75	.407	105	.950	85	.566
90	54.030	80	.409	110	.944	90	.544
95	53.840	85	.411	115	.937	95	.524
100	53.660	90	.414	120	.931	100	.505
105	53.470	95	.416	125	.925	105	.487
110	53.290	100	.418	130	.919	110	.470
115	53.100			135	.912	115	.453
120	52.920			140	.906	120	.438
125	52.730			145	.900		
130	52.540			150	.893		
135	52.360			155	.887		
140	52.170			160	.881		
145	51.990			165	.875		
150	51.800			170	.868		
155	51.620						
160	51.430						
165	51.250						
170	51.060						
175	50.870						

12.21 SOLUBILITY IN WATER		12.22 SATURATED VAPOR PRESSURE		12.23 SATURATED VAPOR DENSITY		12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
77.02	.180	50	.881	50	.01258	0	.204
		60	1.171	60	.01639	25	.219
		70	1.535	70	.02109	50	.234
		80	1.989	80	.02681	75	.248
		90	2.547	90	.03371	100	.261
		100	3.227	100	.04196	125	.275
		110	4.049	110	.05172	150	.288
		120	5.033	120	.06317	175	.301
		130	6.201	130	.07652	200	.313
		140	7.577	140	.09194	225	.325
		150	9.187	150	.10960	250	.337
		160	11.060	160	.12980	275	.349
		170	13.220	170	.15270	300	.360
		180	15.700	180	.17850	325	.371
		190	18.520	190	.20750	350	.381
		200	21.740	200	.23970	375	.392
		210	25.360	210	.27560	400	.402
						425	.412
						450	.421
						475	.431
						500	.440
						525	.449
						550	.457
						575	.465
						600	.474

ETHYLBENZENE

ETB

<p>Common Symptoms</p> <p>Phenylethane EB</p>	<p>Liquid</p> <p>Colorless</p> <p>Sweet, gasoline-like odor</p>	<p>Floats on water. Flammable, irritating vapor is produced.</p>																																							
<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>																																								
<p>1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Mechanical containment 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: C₈H₁₀ 3.3 IMO/UN Designation: 3.3/1175 3.4 DOT ID No.: 1175 3.5 CAS Registry No.: 100-41-4</p>		<p>4. OBSERVABLE CHARACTERISTICS</p> <p>4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Aromatic</p>																																							
5. HEALTH HAZARDS																																									
<p>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</p>																																									
<p>6. FIRE HAZARDS</p> <p>6.1 Flash Point: 80°F O.C.; 59°F C.C. 6.2 Flammable Limits in Air: 1.0%-8.7% 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: 860°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</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>8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 29 ppm/96 hr/bluegill/TM/fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 2.8% (theor.), 6 days 8.4 Food Concentration Potential: None</p>																																									
<p>9. SHIPPING INFORMATION</p> <p>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.</p>																																									
<p>10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U</p>																																									
<p>11. HAZARD CLASSIFICATIONS</p> <p>11.1 Code of Federal Regulations: Flammable liquid. 11.2 NAS Hazard Rating for Bulk Water Transportation:</p> <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 style="text-align: right;">2</td> </tr> <tr> <td> Vapor Irritant</td> <td style="text-align: right;">2</td> </tr> <tr> <td> Liquid or Solid Irritant</td> <td style="text-align: right;">2</td> </tr> <tr> <td> Poisons</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Water Pollution</td> <td style="text-align: right;">1</td> </tr> <tr> <td> Human Toxicity</td> <td style="text-align: right;">1</td> </tr> <tr> <td> Aquatic Toxicity</td> <td style="text-align: right;">3</td> </tr> <tr> <td> Aesthetic Affect</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Reactivity</td> <td style="text-align: right;">1</td> </tr> <tr> <td> Other Chemicals</td> <td style="text-align: right;">1</td> </tr> <tr> <td> Water</td> <td style="text-align: right;">0</td> </tr> <tr> <td> Self Reaction</td> <td style="text-align: right;">0</td> </tr> </table> <p>11.3 NFPA Hazard Classification:</p> <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>						Category	Rating	Fire	3	Health	2	Vapor Irritant	2	Liquid or Solid Irritant	2	Poisons	2	Water Pollution	1	Human Toxicity	1	Aquatic Toxicity	3	Aesthetic Affect	2	Reactivity	1	Other Chemicals	1	Water	0	Self Reaction	0	Category	Classification	Health Hazard (Blue)	2	Flammability (Red)	3	Reactivity (Yellow)	0
Category	Rating																																								
Fire	3																																								
Health	2																																								
Vapor Irritant	2																																								
Liquid or Solid Irritant	2																																								
Poisons	2																																								
Water Pollution	1																																								
Human Toxicity	1																																								
Aquatic Toxicity	3																																								
Aesthetic Affect	2																																								
Reactivity	1																																								
Other Chemicals	1																																								
Water	0																																								
Self Reaction	0																																								
Category	Classification																																								
Health Hazard (Blue)	2																																								
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: 106.17 12.3 Boiling Point at 1 atm: 277.2°F = 136.2°C = 409.4°K 12.4 Freezing Point: -139°F = -95.0°C = 178°K 12.5 Critical Temperature: 651.0°F = 343.9°C = 617.1°K 12.6 Critical Pressure: 623 psia = 35.6 atm = 3.61 MN/m² 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: 35.48 dynes/cm = 0.03548 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 = 3.36 X 10⁶ J/kg 12.13 Heat of Combustion: -17,780 Btu/lb = -9877 cal/g = -413.5 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: Data not available 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 0.4 psia</p>																																									
NOTES																																									

ETB

ETHYLBENZENE

12.17 SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY		12.19 LIQUID THERMAL CONDUCTIVITY		12.20 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit- inch per hour- square foot-F	Temperature (degrees F)	Centipoise
40	54.990	40	.402	-90	1.065	40	.835
50	54.680	50	.404	-80	1.056	50	.774
60	54.370	60	.407	-70	1.047	60	.719
70	54.060	70	.409	-60	1.037	70	.670
80	53.750	80	.412	-50	1.028	80	.626
90	53.430	90	.414	-40	1.018	90	.586
100	53.120	100	.417	-30	1.009	100	.550
110	52.610	110	.419	-20	1.000	110	.518
120	52.500	120	.421	-10	.990	120	.488
130	52.190	130	.424	0	.981	130	.461
140	51.870	140	.426	10	.971	140	.436
150	51.560	150	.429	20	.962	150	.414
160	51.250	160	.431	30	.953	160	.393
170	50.940	170	.434	40	.943	170	.374
180	50.620	180	.436	50	.934	180	.356
190	50.310	190	.439	60	.924	190	.340
200	50.000	200	.441	70	.915	200	.325
210	49.690	210	.443	80	.906	210	.311
				90	.896		
				100	.887		
				110	.877		
				120	.868		
				130	.859		
				140	.849		
				150	.840		
				160	.830		

12.21 SOLUBILITY IN WATER		12.22 SATURATED VAPOR PRESSURE		12.23 SATURATED VAPOR DENSITY		12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
68.02	.020	80	.202	80	.00370	-400	-.007
		100	.370	100	.00654	-350	.026
		120	.644	120	.01099	-300	.060
		140	1.071	140	.01767	-250	.093
		160	1.713	160	.02734	-200	.125
		180	2.643	180	.04087	-150	.157
		200	3.953	200	.05926	-100	.187
		220	5.747	220	.08363	-50	.217
		240	8.147	240	.11520	0	.246
		260	11.290	260	.15510	50	.274
		280	15.320	280	.20490	100	.301
		300	20.410	300	.26570	150	.327
		320	26.730	320	.33910	200	.353
		340	34.460	340	.42620	250	.377
		360	43.800	360	.52850	300	.401
		380	54.950	380	.64720	350	.424
						400	.446
						450	.467
						500	.487
						550	.507
						600	.525

TOLUENE

TOL

<p>Common Symptoms</p> <p>Toluene Methylbenzene Methylbenzol</p>	<p>Watery liquid Colorless Pleasant odor</p> <p>Floats on water. Flammable, irritating vapor is produced.</p>	<p>6. FIRE HAZARDS</p> <p>6.1 Flash Point: 40°F C.C.; 65° F. O.C.</p> <p>6.2 Flammable Limits in Air: 1.27%-7%</p> <p>6.3 Fire Extinguishing Agents: Carbon dioxide or dry chemical for small fires, ordinary foam for large fires.</p> <p>6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective.</p> <p>6.5 Special Hazards of Combustion Products: Not pertinent.</p> <p>6.6 Behavior in Fire: Vapor is heavier than air and may travel a considerable distance to a source of ignition and flash back.</p> <p>6.7 Ignition Temperature: 997°F</p> <p>6.8 Electrical Hazard: Class I, Group D</p> <p>6.9 Burning Rate: 5.7 mm/min.</p> <p>6.10 Adiabatic Flame Temperature: Data not available.</p> <p>6.11 Stoichiometric Air to Fuel Ratio: Data not available.</p> <p>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>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>11. HAZARD CLASSIFICATIONS</p> <p>11.1 Code of Federal Regulations: Flammable liquid.</p> <p>11.2 NAS 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: right;">Rating</th> </tr> </thead> <tbody> <tr> <td>Fire</td> <td style="text-align: right;">3</td> </tr> <tr> <td>Health</td> <td style="text-align: right;">3</td> </tr> <tr> <td>Vapor Irritant</td> <td style="text-align: right;">1</td> </tr> <tr> <td>Liquid or Solid Irritant</td> <td style="text-align: right;">1</td> </tr> <tr> <td>Poisons</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Water Pollution</td> <td style="text-align: right;">1</td> </tr> <tr> <td>Human Toxicity</td> <td style="text-align: right;">1</td> </tr> <tr> <td>Aquatic Toxicity</td> <td style="text-align: right;">3</td> </tr> <tr> <td>Aesthetic Affect</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Reactivity</td> <td style="text-align: right;">1</td> </tr> <tr> <td>Other Chemicals</td> <td style="text-align: right;">1</td> </tr> <tr> <td>Water</td> <td style="text-align: right;">0</td> </tr> <tr> <td>Self Reaction</td> <td style="text-align: right;">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: right;">Classification</th> </tr> </thead> <tbody> <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> </tbody> </table>		Category	Rating	Fire	3	Health	3	Vapor Irritant	1	Liquid or Solid Irritant	1	Poisons	2	Water Pollution	1	Human Toxicity	1	Aquatic Toxicity	3	Aesthetic Affect	2	Reactivity	1	Other Chemicals	1	Water	0	Self Reaction	0	Category	Classification	Health Hazard (Blue)	2	Flammability (Red)	3	Reactivity (Yellow)	0
Category	Rating																																						
Fire	3																																						
Health	3																																						
Vapor Irritant	1																																						
Liquid or Solid Irritant	1																																						
Poisons	2																																						
Water Pollution	1																																						
Human Toxicity	1																																						
Aquatic Toxicity	3																																						
Aesthetic Affect	2																																						
Reactivity	1																																						
Other Chemicals	1																																						
Water	0																																						
Self Reaction	0																																						
Category	Classification																																						
Health Hazard (Blue)	2																																						
Flammability (Red)	3																																						
Reactivity (Yellow)	0																																						
<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. 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/UN Designation: 3.2/1294 3.4 DOT ID No.: 1294 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>5.1 Personal Protective Equipment: Air-supplied mask; goggles or face shield; plastic gloves.</p> <p>5.2 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.</p> <p>5.3 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.</p> <p>5.4 Threshold Limit Value: 100 ppm 5.5 Short Term Inhalation Limits: 600 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 2; LD50 = 0.5 to 6 g/kg 5.7 Late Toxicity: Kidney and liver damage may follow ingestion. 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 on clothing and allowed to remain, may cause smarting and reddening of the skin. 5.10 Odor Threshold: 0.17 ppm 5.11 IDLH Value: 2,000 ppm</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>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>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>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: 605.4°F = 318.6°C = 691.8°K 12.6 Critical Pressure: 596.1 psia = 40.65 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: 36.1 dynes/cm = 0.0361 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: 155 Btu/lb = 86.1 cal/g = 3.81 X 10⁶ J/kg 12.13 Heat of Combustion: -17,430 Btu/lb = 9686 cal/g = -4.05.6 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: 17.17 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 1.1 psia</p>																																							
<p>NOTES</p>																																							

TOL	TOLUENE
------------	----------------

12.17 SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY		12.19 LIQUID THERMAL CONDUCTIVITY		12.20 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit- inch per hour- square foot-F	Temperature (degrees F)	Centipoise
-30	57.180	0	.396	0	1.026	0	1.024
-20	56.870	5	.397	10	1.015	5	.978
-10	56.550	10	.399	20	1.005	10	.935
0	56.240	15	.400	30	.994	15	.894
10	55.930	20	.402	40	.983	20	.857
20	55.620	25	.403	50	.972	25	.821
30	55.310	30	.404	60	.962	30	.788
40	54.990	35	.406	70	.951	35	.757
50	54.680	40	.407	80	.940	40	.727
60	54.370	45	.409	90	.929	45	.700
70	54.060	50	.410	100	.919	50	.673
80	53.750	55	.411	110	.908	55	.649
90	53.430	60	.413	120	.897	60	.625
100	53.120	65	.414	130	.886	65	.603
110	52.810	70	.415	140	.876	70	.582
120	52.500	75	.417	150	.865	75	.562
		80	.418	160	.854	80	.544
		85	.420	170	.843	85	.526
		90	.421	180	.833	90	.509
		95	.422	190	.822	95	.493
		100	.424	200	.811	100	.477
		105	.425	210	.800		
		110	.427				
		115	.428				
		120	.429				
		125	.431				

12.21 SOLUBILITY IN WATER		12.22 SATURATED VAPOR PRESSURE		12.23 SATURATED VAPOR DENSITY		12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
68.02	.050	0	.038	0	.00070	0	.228
		10	.057	10	.00103	25	.241
		20	.084	20	.00150	50	.255
		30	.121	30	.00212	75	.268
		40	.172	40	.00296	100	.281
		50	.241	50	.00405	125	.294
		60	.331	60	.00547	150	.306
		70	.449	70	.00727	175	.319
		80	.600	80	.00954	200	.331
		90	.792	90	.01237	225	.343
		100	1.033	100	.01584	250	.355
		110	1.332	110	.02007	275	.367
		120	1.700	120	.02518	300	.378
		130	2.148	130	.03127	325	.389
		140	2.690	140	.03850	350	.400
		150	3.338	150	.04700	375	.411
		160	4.109	160	.05691	400	.422
		170	5.018	170	.06840	425	.432
		180	6.083	180	.08162	450	.443
		190	7.323	190	.09675	475	.453
		200	8.758	200	.11400	500	.462
		210	10.410	210	.13340	525	.472
						550	.482
						575	.491
						600	.500

m-XYLENE

XLM

Common Symptoms	Watery liquid	Colorless	Sweet odor
1,3-Dimethylbenzene Xylol	Floats on water. Flammable, irritating vapor is produced.		
<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>		
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability Evacuate area Should be removed Chemical and physical treatment		2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3	
3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Aromatic Hydrocarbon 3.2 Formula: m-C ₈ H ₁₀ (CH ₃) ₂ 3.3 IMO/UN Designation: 3.2/1307 3.4 DOT ID No.: 1307 3.5 CAS Registry No.: 108-38-3		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Like benzene; characteristic aromatic	
5. HEALTH HAZARDS			
<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</p> <p>5.5 Short Term Inhalation Limits: 300 ppm for 30 min.</p> <p>5.6 Toxicity by Ingestion: Grade 3; LD50 = 50 to 500 g/kg</p> <p>5.7 Late Toxicity: Kidney and liver damage</p> <p>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 and allowed to remain, may cause smarting and reddening of the skin.</p> <p>5.10 Odor Threshold: 0.05 ppm</p> <p>5.11 IDLH Value: 10,000 ppm</p>			

<p style="text-align: center;">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 is 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 style="text-align: center;">10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook)</p> <p style="text-align: center;">A-T-U</p> <p style="text-align: center;">11. HAZARD CLASSIFICATIONS</p> <p>11.1 Code of Federal Regulations: Flammable liquid</p> <p>11.2 NAS 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
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																																				
<p style="text-align: center;">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 style="text-align: center;">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° = 405.1°K 12.4 Freezing Point: -54.2°F = -47.9°C = 225.3°K 12.5 Critical Temperature: 650.8°F = 343.8°C = 617.0°K 12.6 Critical Pressure: 513.8 atm = 34.95 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 10⁵ J/kg 12.13 Heat of Combustion: -17,554 Btu/lb = -9752.4 cal/g = -408.31 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: 26.01 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 0.34 psia</p>																																				
<p style="text-align: center;">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 style="text-align: center;">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>																																				
NOTES																																					

XLM	m-XYLENE
------------	-----------------

12.17 SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY		12.19 LIQUID THERMAL CONDUCTIVITY		12.20 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit- inch per hour- square foot-F	Temperature (degrees F)	Centipoise
15	55.400	40	.387	35	.962	15	.938
20	55.260	50	.393	40	.953	20	.898
25	55.130	60	.398	45	.944	25	.862
30	54.990	70	.404	50	.935	30	.827
35	54.850	80	.410	55	.926	35	.794
40	54.710	90	.415	60	.917	40	.764
45	54.570	100	.421	65	.908	45	.735
50	54.430	110	.426	70	.899	50	.708
55	54.290	120	.432	75	.890	55	.682
60	54.160	130	.437	80	.881	60	.658
65	54.020	140	.443	85	.873	65	.635
70	53.880	150	.448	90	.864	70	.613
75	53.740	160	.454	95	.855	75	.592
80	53.600	170	.460	100	.846	80	.572
85	53.460	180	.465			85	.554
90	53.320	190	.471				
95	53.180	200	.476				
100	53.050	210	.482				

12.21 SOLUBILITY IN WATER		12.22 SATURATED VAPOR PRESSURE		12.23 SATURATED VAPOR DENSITY		12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
	K	60	.090	60	.00172	0	.247
	N	70	.127	70	.00238	25	.260
	S	80	.177	80	.00324	50	.273
	O	90	.242	90	.00435	75	.286
	L	100	.326	100	.00577	100	.299
	U	110	.434	110	.00754	125	.311
	B	120	.571	120	.00975	150	.324
	L	130	.743	130	.01247	175	.336
	E	140	.956	140	.01577	200	.348
		150	1.219	150	.01977	225	.360
		160	1.538	160	.02455	250	.371
		170	1.924	170	.03023	275	.383
		180	2.388	180	.03691	300	.394
		190	2.939	190	.04473	325	.406
		200	3.590	200	.05382	350	.417
		210	4.355	210	.06431	375	.427
		220	5.247	220	.07635	400	.438
		230	6.282	230	.09009	425	.449
		240	7.476	240	.10570	450	.459
		250	8.846	250	.12330	475	.469
		260	10.410	260	.14310	500	.479
						525	.489
						550	.499
						575	.508
						600	.517

o-XYLENE

XLO

Common Symptoms	Watery liquid	Colorless	Sweet odor
1,2-Dimethylbenzene Xylol	Floats on water. Flammable, irritating vapor is produced.		
<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>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.</p>		
1. RESPONSE TO DISCHARGE		2. LABEL	
<p>(See Response Methods Handbook) Issue warning-high flammability Evacuate area Should be removed Chemical and physical treatment</p>		<p>2.1 Category: Flammable liquid 2.2 Class: 3</p>	
3. CHEMICAL DESIGNATIONS		4. OBSERVABLE CHARACTERISTICS	
<p>3.1 CG Compatibility Class: Aromatic Hydrocarbon 3.2 Formula: o-C₈H₄(CH₃)₂ 3.3 IMO/UN Designation: 3.2/1307 3.4 DOT ID No.: 1307 3.5 CAS Registry No.: 95-47-8</p>		<p>4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Benzene-like; characteristic aromatic</p>	
5. HEALTH HAZARDS			
<p>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 Limit: 300 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 3; LD₅₀ = 50 to 600 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: 0.05 ppm 5.11 IDLH Value: 10,000 ppm</p>			

<p style="text-align: center;">6. FIRE HAZARDS</p> <p>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</p>	<p style="text-align: center;">10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook)</p> <p style="text-align: center;">A-T-U</p> <p style="text-align: center;">11. HAZARD CLASSIFICATIONS</p> <p>11.1 Code of Federal Regulations: Flammable liquid 11.2 NAS Hazard Rating for Bulk Water Transportation: Category Rating Fire 3 Health 0 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</p>
<p style="text-align: center;">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 style="text-align: center;">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: 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: 0.890 at 20°C (liquid) 12.8 Liquid Surface Tension: 30.53 dynes/cm = 0.03053 N/m at 15.5°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): 1.068 12.12 Latent Heat of Vaporization: 149 Btu/lb = 82.9 cal/g = 3.47 x 10⁵ J/kg 12.13 Heat of Combustion: -17,568 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: 30.64 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 0.28 psia</p>
<p style="text-align: center;">8. WATER POLLUTION</p> <p>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</p>	<p style="text-align: center;">9. SHIPPING INFORMATION</p> <p>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</p>
NOTES	

XLO	o-XYLENE
------------	-----------------

12.17 SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY		12.19 LIQUID THERMAL CONDUCTIVITY		12.20 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit- inch per hour- square foot-F	Temperature (degrees F)	Centipoise
15	56.460	35	.389	35	1.043	15	1.328
20	56.330	40	.391	40	1.035	20	1.263
25	56.190	45	.394	45	1.027	25	1.202
30	56.050	50	.396	50	1.018	30	1.145
35	55.910	55	.398	55	1.010	35	1.092
40	55.770	60	.400	60	1.002	40	1.042
45	55.630	65	.402	65	.993	45	.995
50	55.490	70	.404	70	.985	50	.952
55	55.360	75	.406	75	.977	55	.911
60	55.220	80	.408	80	.969	60	.873
65	55.080	85	.411	85	.960	65	.836
70	54.940	90	.413	90	.952	70	.802
75	54.800	95	.415	95	.944	75	.770
80	54.660	100	.417	100	.935	80	.740
85	54.520					85	.712
90	54.380						
95	54.250						
100	54.110						

12.21 SOLUBILITY IN WATER		12.22 SATURATED VAPOR PRESSURE		12.23 SATURATED VAPOR DENSITY		12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
	I	60	.071	60	.00135	0	.261
	N	70	.101	70	.00188	25	.274
	S	80	.141	80	.00258	50	.287
	O	90	.194	90	.00349	75	.299
	L	100	.263	100	.00464	100	.311
	U	110	.352	110	.00611	125	.323
	B	120	.465	120	.00794	150	.335
	L	130	.609	130	.01021	175	.347
	E	140	.787	140	.01298	200	.358
		150	1.007	150	.01634	225	.370
		160	1.227	160	.02038	250	.381
		170	1.605	170	.02520	275	.392
		180	1.999	180	.03090	300	.403
		190	2.469	190	.03759	325	.414
		200	3.028	200	.04539	350	.424
		210	3.686	210	.05443	375	.435
		220	4.456	220	.06484	400	.445
		230	5.352	230	.07674	425	.455
		240	6.389	240	.09030	450	.465
		250	7.581	250	.10560	475	.475
		260	8.947	260	.12290	500	.485
						525	.494
						550	.504
						575	.513
						600	.522

p-XYLENE

XLP

Common Symptoms	Watery liquid	Colorless	Sweet odor
1,4-Dimethylbenzene Xylol	Floats on water. Flammable, irritating vapor is produced. Freezing point is 56°F.		
<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. Notify local health and wildlife officials. Notify operators of nearby water intakes.</p>		
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: p-C ₆ H ₄ (CH ₃) ₂ 3.3 IMO/UN Designation: 3.2/1307 3.4 DOT ID No.: 1307 3.5 CAS Registry No.: 106-42-3		4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Like benzene; 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; 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. 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: 0.05 ppm 5.11 IDLH Value: 10,000 ppm			

6. FIRE HAZARDS
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 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: 22 ppm/96/hr/ bluegill/TL/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
9. SHIPPING INFORMATION
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
NOTES

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:																												
<table style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: left;">Category</th> <th style="text-align: left;">Rating</th> </tr> <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> </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	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:																												
<table style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: left;">Category</th> <th style="text-align: left;">Classification</th> </tr> <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> </table>	Category	Classification	Health Hazard (Blue)	2	Flammability (Red)	3	Reactivity (Yellow)	0																				
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: 280.9°F = 138.3°C = 411.5°K 12.4 Freezing Point: 56.9°F = 13.3°C = 286.5°K 12.5 Critical Temperature: 649.4°F = 343.0°C = 616.2°K 12.6 Critical Pressure: 609.4 atm = 34.66 psia = 3.510 MN/m ² 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: 150 Btu/lb = 81 cal/g = 3.4 x 10 ⁶ J/kg 12.13 Heat of Combustion: -17,659 Btu/lb = -9754.7 cal/g = -408.41 x 10 ⁶ 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																												

XLP	p-XYLENE
------------	-----------------

12.17 SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY		12.19 LIQUID THERMAL CONDUCTIVITY		12.20 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit- inch per hour- square foot-F	Temperature (degrees F)	Centipoise
60	53.970	60	.412	60	.935	60	.678
65	53.830	70	.418	65	.928	65	.654
70	53.690	80	.424	70	.921	70	.631
75	53.550	90	.429	75	.914	75	.610
80	53.410	100	.435	80	.907	80	.590
85	53.270	110	.440	85	.900	85	.571
90	53.140	120	.446	90	.892	90	.552
95	53.000	130	.451	95	.885	95	.535
100	52.860	140	.457	100	.878	100	.519
105	52.720	150	.462			105	.503
110	52.580	160	.468			110	.488
115	52.440	170	.474			115	.474
120	52.300	180	.479			120	.460
		190	.485				
		200	.490				
		210	.496				
		220	.501				
		230	.507				
		240	.512				
		250	.518				
		260	.524				
		270	.529				
		280	.535				

12.21 SOLUBILITY IN WATER		12.22 SATURATED VAPOR PRESSURE		12.23 SATURATED VAPOR DENSITY		12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
	I	60	.096	60	.00183	0	.246
	N	70	.135	70	.00252	25	.259
	S	80	.187	80	.00343	50	.272
	O	90	.255	90	.00459	75	.285
	L	100	.343	100	.00607	100	.297
	U	110	.456	110	.00792	125	.309
	B	120	.599	120	.01022	150	.321
	L	130	.777	130	.01303	175	.333
	E	140	.998	140	.01646	200	.345
		150	1.270	150	.02059	225	.357
		160	1.600	160	.02553	250	.368
		170	1.998	170	.03138	275	.380
		180	2.475	180	.03826	300	.391
		190	3.041	190	.04629	325	.402
		200	3.710	200	.05561	350	.413
		210	4.493	210	.06636	375	.424
		220	5.407	220	.07867	400	.435
		230	6.465	230	.09270	425	.445
		240	7.683	240	.10860	450	.456
		250	9.080	250	.12650	475	.466
		260	10.670	260	.14670	500	.476
						525	.486
						550	.496
						575	.505
						600	.515

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 individuals not working on the project. 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.
- The buddy system will be used.
- 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 investigative 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 by 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 will be disposed as required by the provisions included in the contract and consistent with NAVSTA 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 chapter 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 sections 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 9.6. 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 U.S. Department of Transportation regulations.

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 onsite 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: BEQ, Building 1586, NAVSTA Mayport, Mayport, 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
Primary Hospital, Baptist Medical Center	(904) 247-2900
Local Fire Department	9-911
Offsite Emergency Services	911
Poison Control Center	(800) 282-3171
National Response Center	(800) 424-8802
Site HSO: <u>Mark Joop</u>	(904) ²⁶⁹⁻⁷⁰¹² 656-1293
Field Operations Leader: <u>Kelly Murray</u>	(904) ²⁶⁹⁻⁷⁰¹² 656-1293
Task Order Manager: <u>John Kaiser</u>	(904) 656-1293
ABB Environmental HSS: <u>Marland Dulaney</u>	(904) 656-1293
ABB Environmental HSM: <u>C.E. Sundquist</u>	(800) 341-0460 x2101
SOUTHNAVFACENGCOM Engineer-in-Charge (EIC): <u>Bryan Kizer</u>	(803) 743-0893

9.6 ROUTES TO EMERGENCY MEDICAL FACILITIES

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

Facility Name: Baptist Medical Center Beaches

Address: 1350 13th Ave. South, Jacksonville, Florida

Telephone Number: (904) 247-2900

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

Travel approximately 7.8 miles south on Highway 101, which becomes A1A, from NAVSTA Mayport to 13th Avenue, turn right, travel approximately 0.6 mile, the hospital is on the left. See Figure 9-1.

The alternate source of medical assistance is:

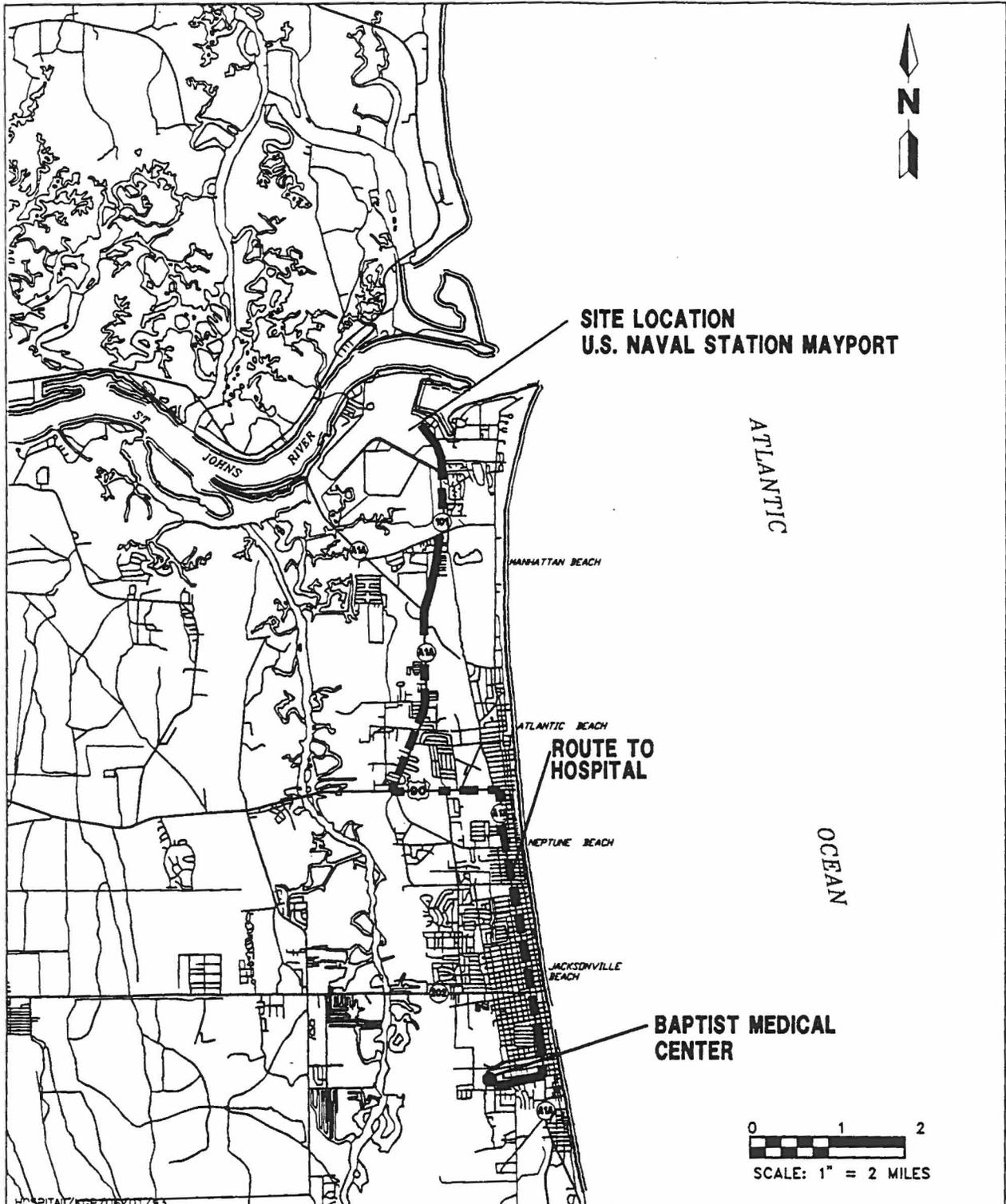
Facility: St. Luke's Hospital

Address: 4201 Belfort Road, Jacksonville, FL

Telephone Number: (904) 296-3700

Directions to alternate hospital:

Travel south from NAVSTA Mayport to Atlantic Blvd., turn west (right) on Atlantic. Proceed to St. John's Bluff Road, turn south (left) onto St. John's Bluff and follow to Belfort Road. St. Luke's Hospital is located at the corner of Butler and Belfort. See Figure 9-1.



**FIGURE 9-1
ROUTE TO HOSPITAL**



**HEALTH AND SAFETY PLAN,
BACHELORS ENLISTED
QUARTERS SITE**

**NAVSTA MAYPORT
MAYPORT, 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
Boston, Massachusetts
Chicago, Illinois
Dallas, Texas
Denver, Colorado
Kansas City, Missouri
New York, New York
Philadelphia, Pennsylvania
San Francisco, California
Seattle, Washington

(404) 347-3573
(617) 565-7164
(312) 353-2220
(214) 767-4731
(303) 844-3061
(816) 426-5861
(212) 337-2378
(215) 596-1201
(415) 744-6670
(206) 442-5930

Washington, D.C.
1991 (Reprinted)
OSHA 2203

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.