

CROSBY, HEAFEY, ROACH & MAY

PROFESSIONAL CORPORATION

ATTORNEYS AT LAW

1999 HARRISON STREET

OAKLAND, CALIFORNIA 94612-3573

(510) 763-2000

(415) 986-3400

FAX (510) 273-8866

700 SOUTH FLOWER STREET, SUITE 2200
LOS ANGELES, CALIFORNIA 90017
(213) 896-8000
FAX (213) 896-8080

333 BUSH STREET, SUITE 2580
SAN FRANCISCO, CALIFORNIA 94104-2899
(415) 543-8700
FAX (415) 391-8269

November 12, 1991

VIA MESSENGER

Mr. Robert E. Gils
President
RGA, Inc.
1260 45th Street
Emeryville, CA 94608

Re: 1432-1434 Harrison Street and 1435 Alice Street
Garages

Dear Bob:

I have enclosed for your review a chronological binder of reports and correspondence from SCS Engineers and Alameda County. Please review them this week as your time permits, and we will plan on meeting with you on Monday, November 18, at our office. John Cummings of SCS will join us. You will be formally retained by our clients, Alvin Bacharach and Barbara Jean Borsuk.

Please call me in the meanwhile if you have any questions.

Very truly yours,



Randall D. Morrison

RDM:ma

Enclosure: Binder

TABLE OF CONTENTS

Section I: Site Safety Plan

1.	Introduction	Page 1
2.	Hazard Evaluation	Page 2
3.	Personal Protection Equipment	Page 4
4.	Decontamination Procedures	Page 5
5.	Chemicals of Concern	Page 6
6.	Gas/Vapor Procedures	Page 7
7.	Health and Safety Requirements	Page 8
8.	Project Personnel	Page 11
9.	Emergency Response	Page 12

Section II: Drawings

1.	G1	Floor Plan/Ground Level
2.	G2	Floor Plan/Basement Level
3.	G3	Floor Plan/Basement Level
4.	G4	Floor Plan/Ground Floor
5.	G5	Floor Plan/Ground Floor
6.	G6	Floor Plan/Ground Floor
7.	G7	Floor Plan/Basement Level

Section III: Appendix

- | | | |
|----|------------------------------|------------|
| 1. | Agreement Statement | Appendix A |
| 2. | Site Safety Plan Agreement | Appendix B |
| 3. | Hazard Waiver | Appendix C |
| 4. | Hazard Evaluation Guidelines | Appendix D |
| 5. | Accident/Incident/Near Miss | Appendix E |
| 6. | Project Personnel | Appendix F |

Section IV: Material Safety Data Sheets

1. Benzene
2. Ethylbenzene
3. Gasolines: Automotive
4. Kerosene
5. Oils, Fuel 1-D
6. Oils, Fuel 2-D
7. Polychlorinated Biphenyl
8. Toluene
9. m-Xylene
10. o-Xylene
11. p-Xylene

Section V: Site Description and History - SCS Engineers

1. Introduction

This job will be divided into five phases as follows:

- ④ 1. Phase I will entail the removal of two waste oil tanks, an asbestos lagged pipe and possibly the removal of an additional hydraulic lift in the basement (Alice Street).
- ③ 2. Phase II includes the removal of hydraulic lifts in the service area garage (Harrison Street).
- ② 3. Phase III entails the removal of two subsurface gasoline tanks and associated piping and pumps. *Harrison st*
- ① 4. Phase IV Scoping of subsurface contamination. *- How*
5. Phase V Remediation of contamination

This Site Safety Plan is applicable to all phases.

1.1 Background

Alvin Bacharach and Barbara Jean Borsuk have retained RGA Environmental Inc. to assess site conditions and provide a Site Safety Plan at 1432-1434 Harrison Street and 1435 Alice Street Garages, Oakland, California (Section 5). The purpose of the Site Safety Plan is to provide SCS Engineers, RGA field personnel and subcontractors with an understanding of the potential chemical and physical hazards that exist or may arise while the tasks of this project are performed.

This SSP describes the procedures to be followed to reduce employee exposure to potential health hazards that may be present on the project site. The emergency response procedures necessary to respond to such hazards are also described within this SSP.

1.2 Objective

The primary objective is to ensure the well being of observers, field personnel and the community surrounding the subject property. To do this, project staff, client personnel and approved subcontractors shall acknowledge and adhere to the policies and procedures established herein. Accordingly, all personnel assigned to this project shall read this SSP and sign the appropriate Agreements and Acknowledgement Statement (Appendix A) to certify that they have read, understood and agreed to abide by this SSP and its provisions.

SCS personnel have the authority to stop work activities and evacuate the area. SCS personnel will consult with RGA hygienists on site during the removal process to determine conditions and the need to discontinue the work of their subcontractors at this site if any of the work is not executed according to the requirements of the Site Safety Plan.

1.3 Amendments

Any changes in the scope of work of this project and/or site conditions must be amended in writing on the Site Safety Plan Amendment Sheet (Appendix B) and approved by the Health and Safety Manager.

2. Hazard Evaluation

2.1 Site Conditions

General site conditions at the site include soil impacted with hydrocarbons (see Section 5 of this Plan).

2.2 Site Tasks

The field tasks at this site may include:

- Excavation
- Well Placement
- Lift Removal
- Soil Sampling
- Tank Removal

2.3 Project Task Hazards

2.3.1 All field task hazards are site specific.

The following hazards may be encountered:

- Organic Vapors: The inhalation of volatile organic vapor during all operations can pose a potential health hazard. Hazard reduction procedures include monitoring the ambient air with OVA and use of personal protection equipment (Table 1). Workers shall use personal protective equipment including Tyveck suits, respirators (full face respirators equipped with organic vapor cartridges), boots and gloves during removal of the waste oil tanks in the basement area and during the excavation work in the Harrison Street side of the garage. Workers should stand upwind of the source of contamination whenever possible. *write about hydrocarbons?*
- Flammable Vapors: The presence of flammable vapors can pose a potential fire and health hazard. Hazard reduction procedures include monitoring the ambient air with an O2/LEL meter. If the LEL reading exceeds 20%, leave the site immediately and contact the fire department.
- Contamination: Contact with contaminated surface or surfaces suspected of being contaminated should be avoided. This includes working through, kneeling or placing equipment in puddles, mud, discolored surfaces or on drums and other containers. Eating, smoking, drinking and/or the application of cosmetics is prohibited on this site in the immediate work area. This reduces the likelihood of contamination by ingestion.
- Falling Objects: Hard hats must be worn by all project staff and observers whenever construction activity is taking place (i.e., drilling, excavation, etc.).

- **Vehicle Traffic:** All project staff and observers will be required to wear a fluorescent safety vest at all times while on site. In addition, use flags, tapes, barricades and cones to designate restricted areas.
- **Explosion Protection:** Explosion-proof lighting will be used in the basement area during all work. Explosion-proof ventilation equipment will be used to control airborne contaminant levels during all work in within the garage area. See Table II for the location of ventilation equipment and other precautions needed.

2.3.2 Well Installation, Development, Gauging, Baling, Sampling

Skin and eye contact with contaminated groundwater and/or soil may occur during these tasks. Butyl nitrile rubber or neoprene gloves and approved safety goggles should be worn when contact with contaminated substance and/or splash is possible.

2.3.3 Samples Preservation

When hydrochloric acid (HCL) is used, skin and eye contact can occur. This hazard can be reduced with the use of butyl nitrile rubber or neoprene gloves and the use of safety goggles.

2.3.4 Cleaning Equipment

Skin and eye contact with trisodium phosphate methanol or other cleaning substances can occur while cleaning equipment. This hazard can be reduced with the use of butyl nitrile rubber or neoprene gloves and the use of safety goggles.

Table I
Hazard Summary - Non Confined Areas

<u>Job Task / PPE Level¹</u>	<u>Instrument</u>	<u>Frequency</u>
Soil Boring Samples/Excavation	PID/FID & OVA	At start of work and 30 minutes to continuously
Monitoring Well Installation	PID/FID & OVA	At start of work and 30 minutes to continuously
Monitoring Well Survey	PID/FID & OVA	Start up of work at each well location
Monitoring Well Development	PID/FID & OVA	Start up of work at each well location
Groundwater Monitoring/Sampling	PID/FID & OVA	Start up of work at each location

1. PPE = Personal Protective Equipment

Table II
Hazard Summary - Confined Areas

<u>Job Task / PPE Level</u>	<u>Instrument</u>	<u>Frequency</u>
Samples/Excavation	PID/FID & OVA, CO meter, O ₂ meter and Draiger Tubes	At start of work and 30 minutes to continuously
Monitoring Well Installation	PID/FID & OVA, CO meter, O ₂ meter and Draiger Tubes	At start of work and 30 minutes to continuously
Monitoring Well Survey	PID/FID & OVA, CO meter, O ₂ meter and Draiger Tubes	Start up of work at each well location
Monitoring Well Development	PID/FID & OVA, CO meter, O ₂ meter and Draiger Tubes	Start up of work at each well location
Groundwater Monitoring/Sampling	PID/FID & OVA, CO meter O ₂ meter and Draiger Tubes	Start up of work at each location

3. Personnel Protective Equipment

Level D is the minimum acceptable level for this site in non-confined areas. Level C is acceptable for this site in confined areas.

Modified Level D/Sidewalk:

- Cover-alls work uniform
- Steel toe and shank boots
- Butyl nitrile rubber or neoprene gloves (optional)
- Splash goggles/safety glasses if potential for splash
- Hard hat
- Fluorescent vest
- Tyvek suit (optional)
- Hearing protection (as appropriate)

Level C/Inside Building (Confined Areas):

- full face respirator, NIOSH approved, with organic vapor cartridges
- Tyvek suits (if splash hazard is possible, a coated suit must be worn)
- Butyl nitrile rubber or neoprene gloves

- Steel toe and shank boots
- Outer Boots/chemical resistant
- inner disposable gloves (two pair recommended)
- hard hat
- fluorescent vest
- hearing protection (as appropriate)

Level B:

- air supplied respirator
- coated Tyvek suit, such as Saranex
- Butyl nitrile rubber or neoprene gloves
- Inner latex or vinyl gloves
- Steel toe and shank boots
- Outer boots/chemical resistant
- Hard hat
- Fluorescent vest
- Hearing protection (as appropriate)

Level A: This is the highest level of skin and respiratory protection. It includes all of Level B.

4. Decontamination Procedures

All operations conducted at this site have the potential to contaminate monitoring equipment and personnel protective equipment (PPE). To prevent the transfer of contamination to vehicles, administrative areas and personnel, the following procedures must be followed:

Equipment Decontamination

Whenever possible, monitoring equipment should be decontaminated with a solution of Alconox and thoroughly rinsed with water prior to leaving the site. This must be done outside a five foot radius of any work area.

Personal Decontamination

Level D/Sidewalk:

- segregated equipment drop
- wash/rinse outer boot (as appropriate)
- wash/rinse chemical resistant outer glove, then remove (as appropriate)
- remove hard hat, goggles/safety glasses/faceshield
- remove and throw out inner disposable gloves in designated lined receptacles (as appropriate)

Level C/Basement (Confined Areas):

- segregated equipment drop
- wash/rinse outer boots
- wash/rinse chemical resistant outer gloves, then remove
- remove outer boots and place to dry (if reusable)
- remove chemical resistant suit (remove by rolling down the suit)

- remove first pair(s) of disposable gloves
- remove respirator/hard hat/faceshield, dispose of cartridges and wash respirator
- remove last pair of disposable gloves

Level B:

- segregated equipment drop
- wash/rinse outer boots
- wash/rinse chemical resistant outer gloves, then remove
- cross hotline (into clean area) and change air tanks, then redress or
- cross hotline (into clean area)
- remove boots and gloves
- remove SCBA, if worn over chemical resistant suit
- if SCBA is worn under the suit, remove the chemical resistant suit, then the SCBA
- remove hard hat

Chromolab
Oct 22, 1990

5/24/91 letter
SCS letter NOV 14, 1990
PCB 1242 110. ppm in WD tank #1
93. ppm " " " 2

Tetrachloroethane	94 ppm
methylene chloride	0.018 ppm
Chlorobenzene	0.056 ppm
PCB	55, 2.3 21. ppm

5. Chemicals of Concern

5.1 Health Effects

Potential health effects from a chemical exposure are dependant on several exposure factors such as toxicity of substances, duration of exposure, concentration during exposure and the overall health of the person exposed.

The chemicals found at this site are: gasoline, benzene, toluene, ethylbenzene, xylene, asbestos, diesel, and PCBs. The following is a health analysis of these chemicals.

calculated solvents DCA, perc, Trichloroethane 60 ppm,

Additional information on these chemicals can be found in the Material Safety Data Sheets located in Section 4.

Gasoline constituents can be divided into five major groups: alkanes, alkenes, cycloalkanes, aromatics and additives. The aromatics are the constituents generally regarded to be of the greatest toxic concern. The major aromatics in gasoline are benzene, toluene, ethyl benzene and xylene. Of these, benzene is considered the most toxic. One characteristic effect of gasoline and its aromatic constituents is their ability to irritate the skin when repeated or prolonged exposure occurs.

Benzene

Benzene can enter the body through inhalation, ingestion and skin contact. Studies have noted that chronic exposure to benzene vapor can produce neurotoxic and hemotopoietic (blood system) effects. Other effects can include headache, dizziness, nausea, convulsions, coma and possible death if exposure is not reversed. One significant effect from chronic benzene exposure is bone marrow toxicity. There is also an association between chronic exposures to benzene and the development of certain types of leukemia.

Toluene

Inhalation exposure to toluene vapor can produce effects such as central nervous system depression. Depending on exposure factors signs and symptoms can include

headache, dizziness, fatigue, muscular weakness, incoordination, drowsiness, collapse and possible coma. Toluene can be a skin and mucous membrane irritant and studies have shown that high levels of toluene exposure can cause liver and kidney damage

Ethylbenzene

Exposure to ethyl benzene at high vapor concentrations may produce irritation to the skin, eyes and upper respiratory tract. Overexposure to ethyl benzene vapors can produce central nervous system depression with symptoms of headache, nausea, dizziness, shortness of breath and unsteadiness. Prolonged skin exposure to ethyl benzene may result in drying and cracking of the skin (dermatitis). Solvent resistant gloves should be worn during sampling to prevent exposure to the skin.

Xylenes

Depending on exposure factors, inhalation exposure to xylene vapor may produce central nervous system excitation followed by depression. Exposure to xylene vapor can produce dizziness, staggering, drowsiness and unconsciousness. At very high concentrations, xylene vapor may produce lung irritation, nausea, vomiting and abdominal pain. Xylene is not known to possess the chronic bone marrow toxicity of benzene, but liver enlargement and nerve-cell damage have been noted from chronic overexposure.

Diesel/Kerosene

Diesel and kerosene fuel components are less volatile than gasoline. Aliphatic hydrocarbons may be saturated or unsaturated open chain, branched or unbranched molecule. Health precautions include ventilation for confined spaces. Symptoms of over exposure include nausea, vomiting, lung irritation and headache.

Polychlorinated Biphenyls (PCBs)

PCB compounds may penetrate into the human body following skin contact, inhalation or ingestion. A broad spectrum of health effects have been reported to be associated with PCB. These include enzyme inhibition, skin and mucous membrane swelling and burning sensation in the skin, irritation of the upper respiratory tract, abdominal pain, headache, dizziness and depression. Experiments have also shown the carcinogeny of PCBs in animals.

Carbon Monoxide

Carbon monoxide is formed as the result of the combustion of fuels. The gas powered vehicles to be used in this project will create carbon monoxide. Symptoms of exposure include headache, nausea and vomiting.

6. Gas/Vapor Monitoring Procedures

The greatest potential hazards to safety and health at this site are:

- exposure to chemical vapors through inhalation
- exposure to chemical contamination through skin contact and ingestion.

Continuous air monitoring (portable gas chromatograph, draiger tubes, CO meter, combustible gas meter, O₂ meter) will be completed by an industrial hygienist during all work in enclosed areas. The hygienist will provide data to ensure that vapor concentrations and combustion gas levels are within acceptable ranges and will provide selection criteria for increased levels of protection if needed.

Ongoing air monitoring by an industrial hygienist² during project tasks will provide data to ensure that vapor concentrations and combustion gas levels are within acceptable ranges and will provide adequate selection criteria for respiratory and dermal protection.

- If OVA readings exceed 100 ppm within any unsecured area of the garage during excavation that area shall be categorized a regulated area and NIOSH approved air-purifying respirator with organic vapor cartridges and protective equipment must be worn. Workers not directly affiliated with the project will be directed to leave the area.
- If OVA readings exceed 750 ppm, Level B protection will be required. Personnel must leave the site immediately and contact site safety officer of Health and Safety Manager for further instructions.
- Respirator cartridges will be changed twice per day at a minimum. This can be done at a scheduled time such as noon or during respirator decontamination. If odor breakthrough is detected while wearing the respirator or breathing becomes difficult, change cartridges immediately.

Tasks Performed Within a Confined Space

- The scope of work for this project does not include confined space entry such as tanks, but will entail work within a building which for the purposes of this plan is considered a confined area. All work within confined areas require the use of Level C protective equipment (see Section 3.0).

All monitoring equipment must be calibrated and maintained in accordance with manufacturer's recommendations.

7. Health and Safety Requirements

7.1 Medical Monitoring Program

All SCS and RGA Environmental, Inc. field personnel must have annual medical evaluations in accordance with the company's Health and Safety Program policy. Additional reevaluation will be considered in the event of chemical over-exposure while working on this project.

*all employees
must have
CFR 29
1910.120
40hr training*

The petrochemicals typical of petroleum hydrocarbons can affect specific organ systems producing characteristic health effects. The medical evaluation will, therefore, focus on the liver, kidney, nervous system, blood systems, and skin and lung function. Laboratory testing will include complete blood count, and applicable kidney and liver-function tests. Other tests include skin examinations.

2. Reporting to a Certified Industrial Hygienist (CIH).

7.2 Training

All personnel working on tank removal at this site should have received a minimum of 40 hours of initial hazardous waste activity instruction, and a minimum of three days of field experience under the direct supervision of a trained, experienced person. Personnel assigned to the site will also receive eight hours refresher training per year. On-site managers and supervisors directly responsible for employees engaged in hazardous waste operations have received an additional eight hours of supervisory training. These training requirements comply with the OSHA Hazardous Waste Operations and Emergency Response regulation, 29 CFR 1910.120.

The initial 40-hour training and the 8 hour annual refresher training includes specific details on the following:

- Regulatory Requirements
- First Aid/CPR
- Confined Space Entry
- Respiratory Protection
- Air Monitoring
- Decontamination Procedures
- Hazard Communication
- Toxicology

These specifics are then complemented with actual hands-on experience with use of personal protective equipment and air monitoring equipment.

7.3 Work Zones Access

Access within a 5 foot radius of any on-site operation is prohibited to all but SCS, RGA field personnel, subcontractors and designated personnel.

7.4 Emergency Equipment

Vehicles used for site work will be equipped with a first aid kit and safety equipment including:

- fluorescent vests
- cones
- flags (as needed)
- barricades (as needed)
- fire extinguisher-dry chemical ABC-type extinguisher
- flashlight
- water, suitable for drinking
- portable eye wash
- appropriate emergency bandage material
- air horn to be used to signal an emergency

7.5 Drilling Procedures

A digsafe authorization number must be obtained prior to drilling. During the drilling operation, two persons (one designated as "driller" and the other as "helper") must be present at all times. Every attempt must be made to keep unauthorized personnel from entering the work area. If this is not possible, the operation should be shut down until the area is cleared. The area where the operation is taking place shall be cordoned off with a barricade. The Site Safety Officer or the Field Team Leader has the authority and the

responsibility to shut down operations whenever a hazardous situation is deemed present.

If a drilling rig is used, the mast of the drilling rig must maintain a minimum clearance of 20 feet from any overhead electrical cables. All drilling operations will cease immediately during hazardous weather conditions such as high winds, heavy rain or lightning.

Hard hats shall be worn at all times. Hearing protection shall be worn during noisy operations.

7.6 Electrical Equipment and Ground-Fault Circuit Interrupters

All electrical equipment and power cables in and around wells or structures suspected of containing chemical contamination must be intrinsically safe and equipped with a three-wire ground lead, rated explosion-proof for hazardous atmospheres. According to OSHA 29 CFR 1926.404, approved ground fault circuit interrupters (GFCI) must be used for all 120 volt, single phase, 15 and 20 ampere receptacle outlets on the site that are not in use by employees. Receptacles on the ends of extension cords are not part of the permanent wiring and, therefore, must be protected by GFCIs whether or not the extension cord is plugged into permanent wiring.

The GFCI is a fast-acting circuit breaker that senses small imbalances in the circuit caused by current leakage to ground, and in a fraction of a second shuts off the electricity. However, the GFCI will not protect the employee from line-to-line contact hazards (such as a person holding two "hot" wires or a hot and neutral wire in each hand). The GFCI does provide protection against the most common form of electrical shock hazard - the ground fault. It also provides protection against fires, overheating, and destruction of insulation on wiring.

GFCIs can be used successfully to reduce electrical hazards on construction sites. Tripping of GFCIs - interruption of current flow - can be caused by wet connectors and tools. It is good practice to limit exposure of connectors and tools to excessive moisture by using watertight or sealable connectors. Providing more GFCIs or shorter circuits can prevent tripping caused by the cumulative leakage from several tools or by leakages from extremely long circuits. (Adapted from OSHA 3007; Ground-Fault Protection on Construction Sites, 1987).

7.7 Fire Prevention

During equipment operation, periodic vapor concentration measurements should be taken with an explosimeter or combustimeter. If at any time the vapor concentrations exceed 20% of LEL, then the Site Safety Officer or designated field worker should immediately shut down all operations.

Only Factory Mutual (FM) approved fire safety cans will be used to transport and store flammable liquids.

All gasoline and diesel-driven engines requiring refueling must be shut down and allowed to cool before filling.

Smoking is not allowed during any operations within the work area in which petroleum products or solvents in free-floating, dissolved or vapor forms, or other flammable liquids may be present.

No open flame or spark is allowed in any area containing petroleum products, or other flammable liquids.

7.8 General Health

Medicine and alcohol can increase the effects of exposure to toxic chemicals. Unless specifically approved by a qualified physician, prescription drugs should not be taken by personnel assigned to operations where the potential for absorption, inhalation, or ingestion of toxic substances exists.

Drinking alcoholic beverages is prohibited. Drinking alcoholic beverages and driving is prohibited at any time. Driving at excessive speeds is always prohibited.

Skin abrasions must be thoroughly protected to prevent chemicals from penetrating the abrasion.

It is recommended that contact lenses not be worn by persons working on the site.

7.9 MSDS Information

Material Safety Data Sheets (MSDS) on chemical substances encountered at the site shall be made available to all persons (including subcontractors) working at the site. The MSDSs shall be enclosed within this Site Safety Plan in Section 4).

For emergency situations not specifically addressed by this site safety plan, refer to MSDS recommendations for action information.

8. Project Personnel

RGA's site Health & Safety hygienist will report to SCS Designated Site Safety officer relating to hazardous conditions measured and remedial measures. SCS will oversee and act accordingly during all phases of the project. The following management structure will be instituted to successfully and safely complete this project.

8.1 Project Manager - SCS

The project manager will be responsible for implementing the project and obtaining any necessary personnel or resources for the completion of the project.

8.2 Health & Safety - (RGA Hygienists)

The Health and Safety Hygienist (RGA's CIH) shall be responsible for the coordination and overseeing of the following aspects of the Site Safety Plan: vapor, combustion gas, particulate, dermal exposure and ventilation.

8.3 Site Safety Officer - SCS

The Site Safety Officer shall be responsible for the implementation of this Site Safety Plan on site and assuring that all other applicable local, state and federal regulations are complied with.

8.4 Field Team Engineer

In the event that the Project Manager and the Site Safety Officer are not on site, the Field Team Leader will assume all responsibility of the Site Safety Officer.

8.5 Other Field Personnel

The technical staff is responsible for system maintenance, calibration and system operation. Records of site visits documenting system conditions are maintained by the technicians. All field personnel shall be responsible for acting in compliance with all safety procedures outlined in the Site Safety Plan. Any hazardous work situations or procedures should be reported to the Site Safety Officer so that corrective steps can be taken.

Hazard: Fire

Guideline
Flashpoint
(Flash P)

Explanation
The lowest temperature at which the vapor or a combustible liquid can be made to ignite momentarily in air.

9. Emergency Response

In the event of an accident or emergency, immediate action must be taken by the first person to recognize the event. First aid equipment is located on site inside the SCS vehicle. Notify (1) the Site Safety Officer and (2) the Project Manager and Health and Safety Manager about the situation immediately after emergency procedures are implemented.

9.1 Emergency Telephone Numbers:

<u>Emergency:</u>	<u>Phone</u>
Local Police	911
Fire	911
State Police	911
Ambulance	911
Underground Service Alert (USA)	(800) 642-2444
Gas Company	834-1234
Electric Company	834-1234
Telephone Company	811-9000

Primary Hospital:

Peralta Hospital
450 30th Street
Oakland, CA
(510) 451-4900

Directions: From the site, go west on 14th Street to Martin Luther King, Jr. Way. Go north on Martin Luther King, Jr. Way to 20th Street. Go east on 20th Street to Telegraph Avenue, from here go north to the intersection of Telegraph Avenue and 30th Street, the hospital is the right side of the street.

Back-up Hospital:

Merrit Hospital
Hawthorne & Webster Street
Oakland, CA
(510) 655-4000

Directions: From the site, go west on 14th Street to Broadway. Turn right on Broadway (north to 34th Street. Turn left (west) on 34th Street. Proceed for about one and one half blocks. The hospital is on the left side of the street.

<u>Environmental Emergency:</u>	<u>Phone</u>
Poison Control Center	476-6600/(800) 523-2222
SCS Eng.	(510) 829-0661
RGA Environmental, Inc. (Robert Gils)	(510) 547-7771
National Response Center (NRC)	(800) 424-8802
U.S. EPA (24 hour hotline)	(800) 424-9346
State Regulatory Agency Alameda County Health Care	(415) 271-4320
Services Agency	(510) 820-8468
Client (Alvin Bacharach and Barbara Jean Borsuk)	(510) 676-4498
Contact (Mr. Borsuk)	(415) 922-4740

9.2 Encountering Hazardous Situations (requiring evacuation)

In the event of an emergency, i.e. fires, explosives or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water at the facility, the team member that observes this condition shall give an emergency alarm.

Actions taken will be dictated by the emergency. All appropriate local emergency response agencies shall be notified immediately. The police, fire department, emergency response teams and ambulance may be reached via telephone by dialing 911.

The nearest hospital and additional emergency contacts are listed on the previous page (section 8.1).

Personnel encountering a hazardous situation shall instruct others on site to evacuate the vicinity immediately and call the (1) Site Safety Officer, (2) the Project Manager, and (3) the Health & Safety Hygienist for instructions.

The attached site plan indicates the primary evacuation route and the alternate evacuation routes to be used in an emergency situation.

The site must not be re-entered until back-up help, monitoring equipment, and personal protective equipment are on hand.

9.3 Usual Procedures for Injury

1. Telephone for ambulance/medical assistance if necessary. Whenever possible, notify the receiving hospital of the nature of physical injury or chemical overexposure. If no phone is available, transport the person to the nearest hospital.
2. Send/take this SSP with the attached MSDSs to the medical facility with injured person.
3. If the injury is minor, proceed to administer first aid.
4. Notify the Site Safety Officer, Project Manager, and the Health & Safety Hygienists of all accidents, incidents and near miss situations.
5. Complete Accident/Incident/Near Miss Form found in Appendix F.

9.4 Emergency Treatment

When transporting an injured person to a hospital, bring this Site Safety Plan to assist medical personnel with diagnosis and treatment. In all cases of chemical overexposure, follow standard procedures as outlined below for poison management, first aid, and, if applicable, cardiopulmonary resuscitation. Four different routes of exposure and their respective first aid/poison management procedures are outlined below:

9.4.1 Ingestion:

DO NOT INDUCE VOMITING. Transport person to nearest hospital immediately.

9.4.2 Inhalation/Confined Space:

DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED WITH A SELF-CONTAINED BREATHING APPARATUS, AND YOU HAVE A STANDBY PERSON.

9.4.3 Inhalation/Other:

Remove the person from the contaminated environment. Initiate CPR if necessary. Call or have someone call for medical assistance. Refer to MSDS for additional specific information. If necessary, transport the victim to the nearest hospital as soon as possible.

9.4.4 Skin Contact/Non-Caustic Contaminant (Petroleum, Gasoline, etc.)/PCBs:

Wash off skin with a large amount of water immediately. Remove any contaminated clothing and rewash skin using soap, if available. Transport person to a medical facility if necessary.

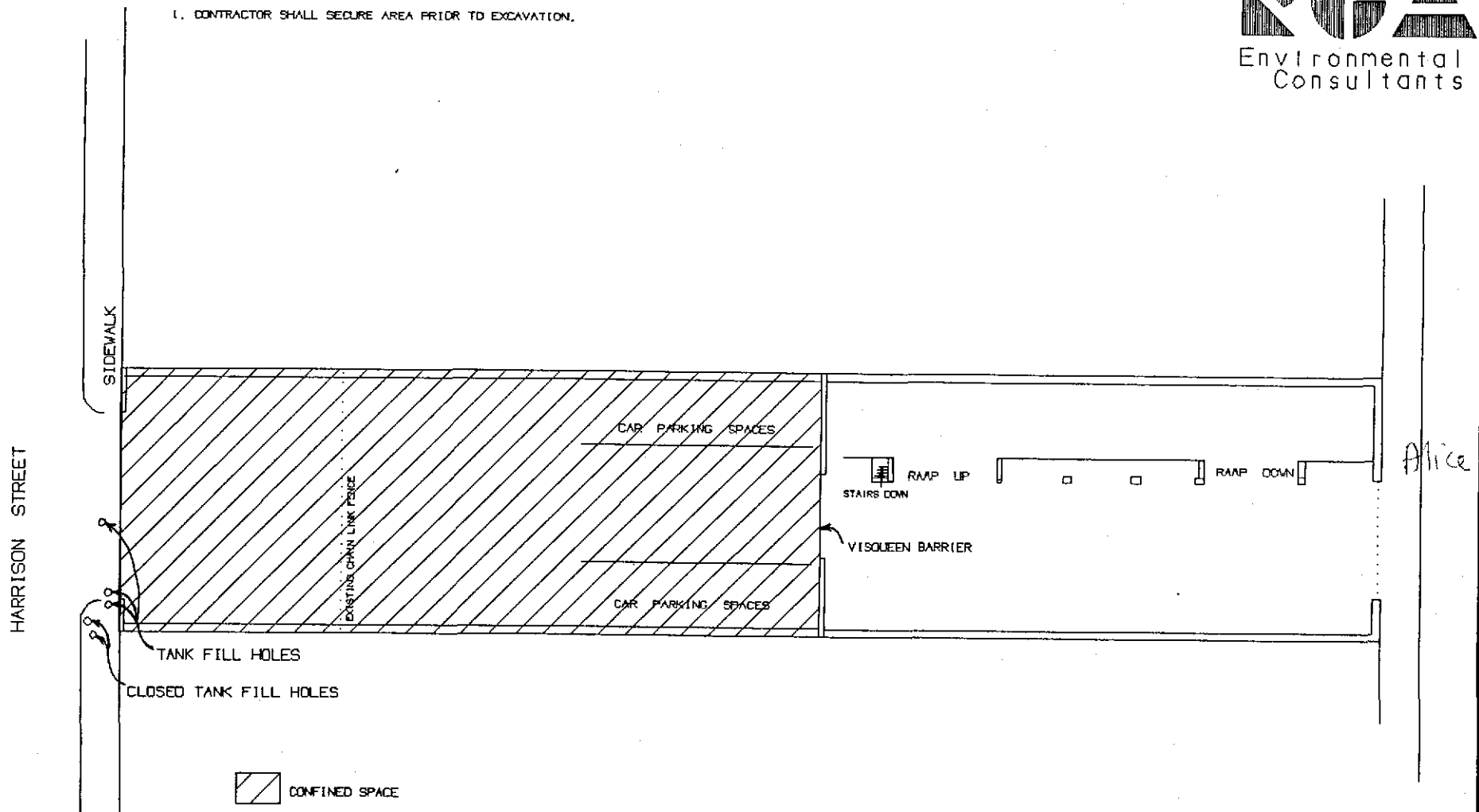
9.4.5 Skin contact/Corrosive Contaminant (Acids, Hydrogen Peroxide):

Wash off skin with a large amount of water immediately. Remove any contaminated clothing and rewash skin with water. Transport person to a medical facility if necessary.

9.4.6 Eyes:

Hold eyelids open and rinse the eyes immediately with large amounts of water for 15 minutes. If possible, have the person remove his/her contact lenses (if worn). Never permit the eyes to be rubbed. Transport person to a medical facility as soon as possible.

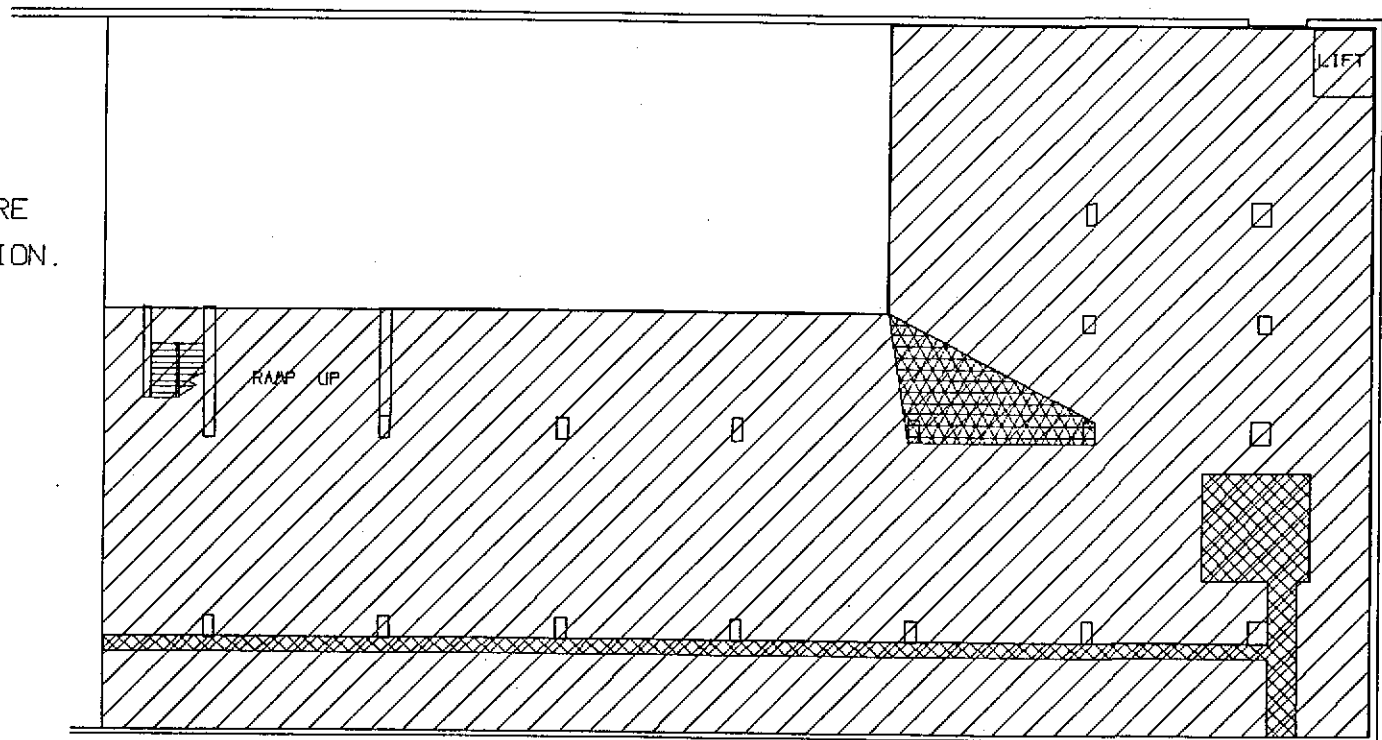
1. CONTRACTOR SHALL SECURE AREA PRIOR TO EXCAVATION.





DRAWING IS SCHEMATIC
SCALE IS APPROXIMATE
LOCATIONS ARE APPROXIMATE

DRAWING NUMBER - G1
FLOOR PLAN
GROUND FLOOR
HARRISON STREET GARAGE
CONFINED SPACES
APPROXIMATE SCALE: 1" = 40'

CONTRACTOR SHALL SECURE
AREA PRIOR TO EXCAVATION.



 - AREA WHERE CONCRETE HAS BEEN
CUT FROM SLAB

 - AREA OF CONCRETE RUBBLE

 - CONFINED SPACE

DRAWING IS SCHEMATIC
SCALE IS APPROXIMATE
LOCATIONS ARE APPROXIMATE

DRAWING NUMBER - G2

FLOOR PLAN

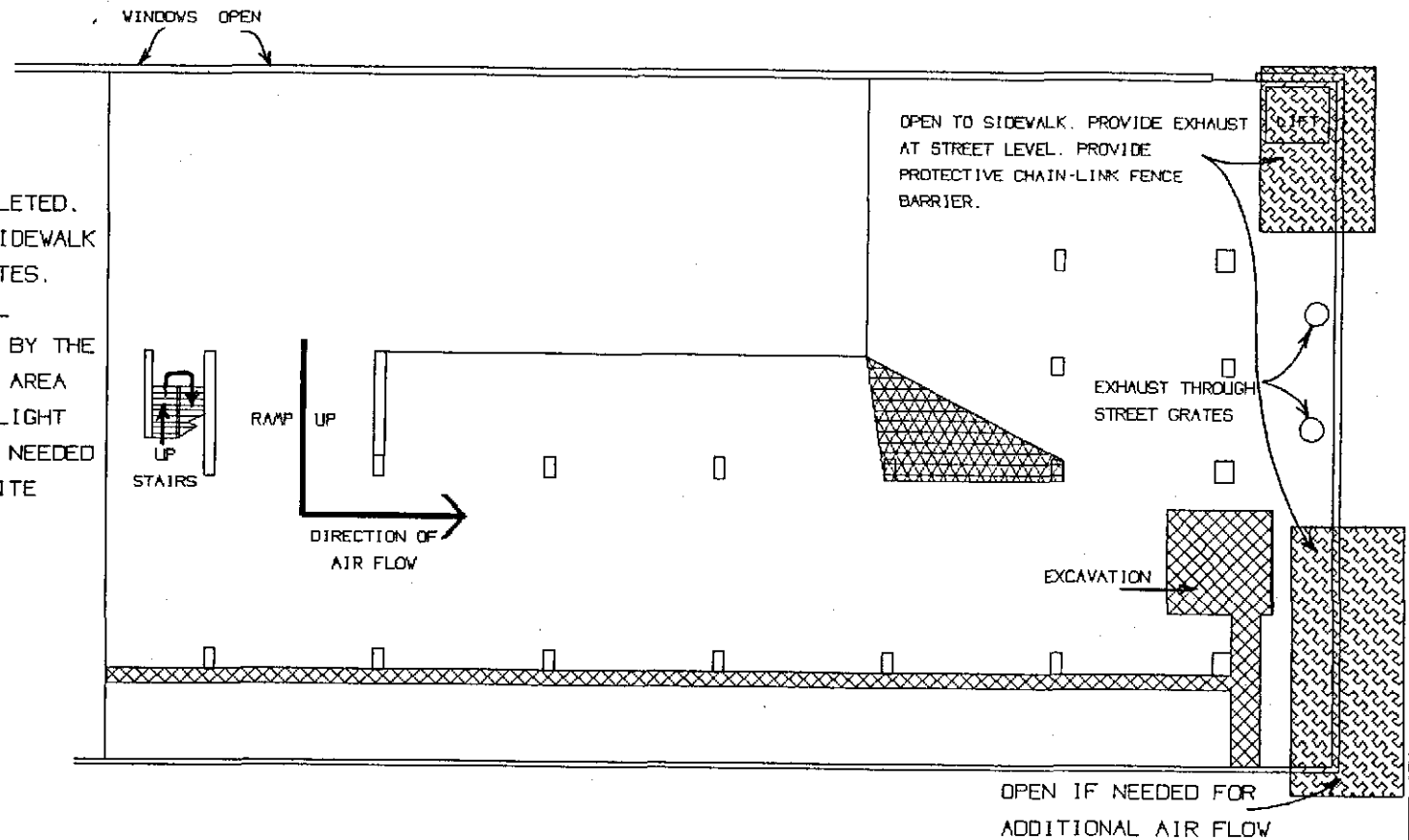
BASEMENT LEVEL

HARRISON STREET GARAGE

CONFINED SPACE

APPROXIMATE SCALE: 1" = 25'

AFTER EXCAVATION IS COMPLETED.
 1.) RECOVER DEMOLISHED SIDEWALK
 AREA WITH TRENCH PLATES.
 2.) CONTRACTOR SHALL SEAL
 OPENINGS AS DIRECTED BY THE
 SITE SAFETY OFFICER. AREA
 IS TO REMAIN UNDER SLIGHT
 NEGATIVE PRESSURE IF NEEDED
 AS DIRECTED BY THE SITE
 SAFETY OFFICER.

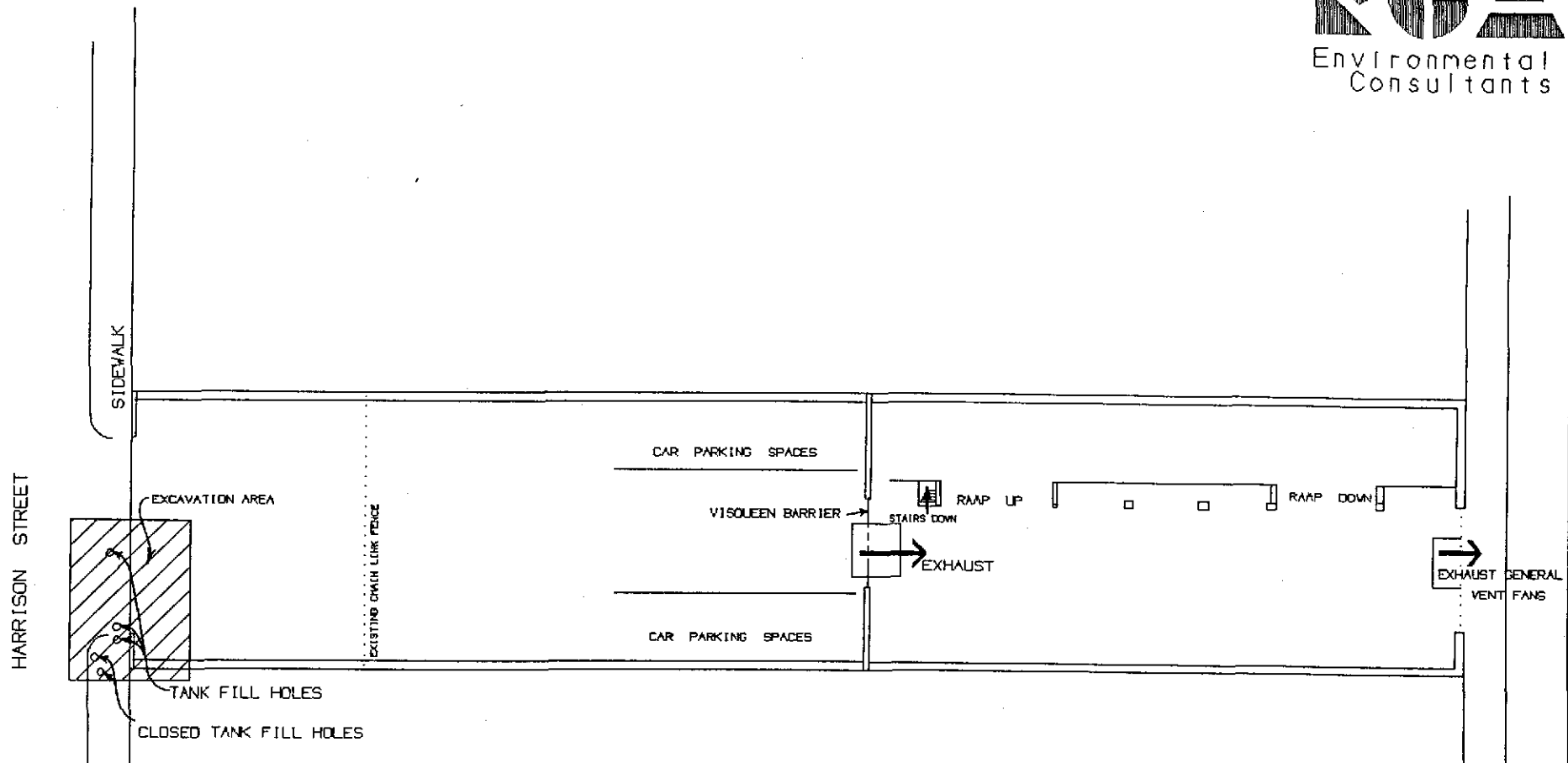


⊗ - AREA WHERE CONCRETE HAS BEEN
 CUT FROM SLAB

▨ - AREA OF CONCRETE RUBBLE

DRAWING IS SCHEMATIC
 SCALE IS APPROXIMATE
 LOCATIONS ARE APPROXIMATE

DRAWING NUMBER - G3
FLOOR PLAN
BASEMENT LEVEL
HARRISON STREET GARAGE
VENTILATION PLAN DURING EXCAVATION
APPROXIMATE SCALE: 1" = 25'

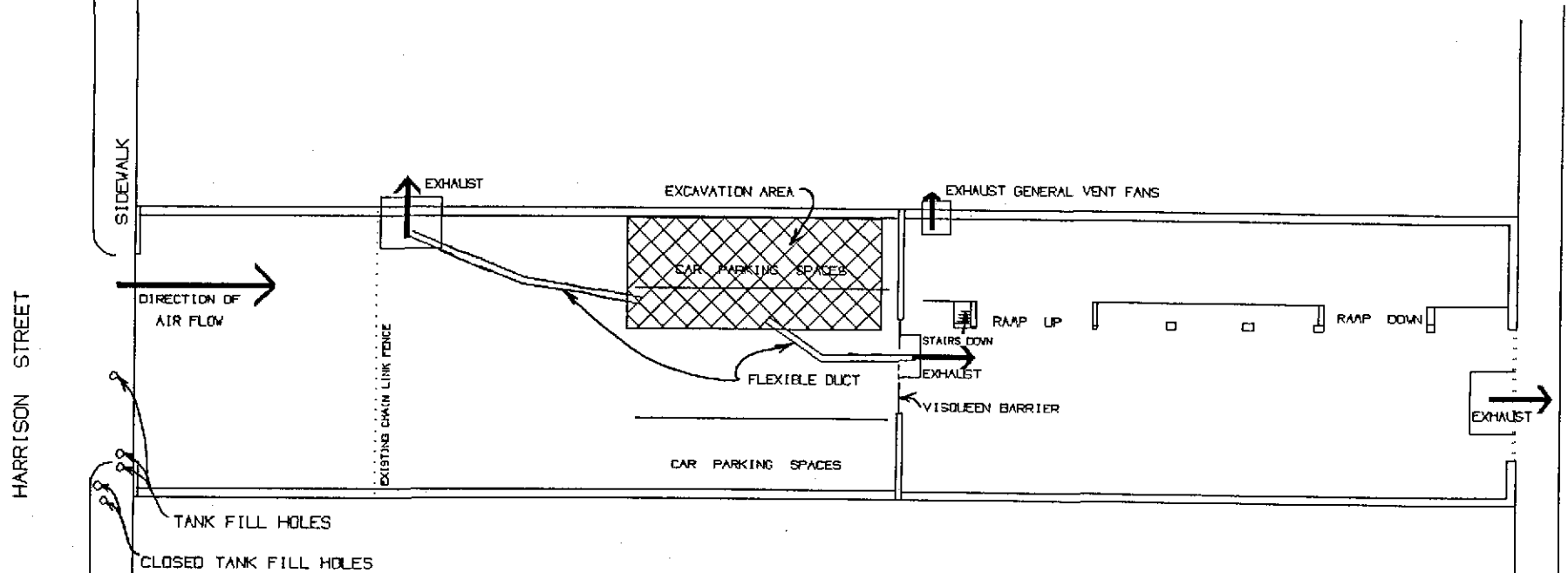


AFTER EXCAVATION HAS BEEN COMPLETED, EXCAVATED SOIL SHALL BE REMOVED OFF-SITE.
 1.) COVER THE EXCAVATION AREA WITH VISQUEEN.
 2.) COVER THE EXCAVATION AREA WITH TRENCH PLATES.

DRAWING IS SCHEMATIC
 SCALE IS APPROXIMATE
 LOCATIONS ARE APPROXIMATE

DRAWING NUMBER - G4
FLOOR PLAN
GROUND FLOOR
HARRISON STREET GARAGE
VENTILATION PLAN - TANK REMOVAL
APPROXIMATE SCALE: 1" = 40'

1. CONTRACTOR SHALL SECURE AREA PRIOR TO EXCAVATION.



AFTER EXCAVATION HAS BEEN COMPLETED, THE EXCAVATED SOIL SHALL BE MOVED OFF-SITE.

- 1.) COVER THE EXCAVATION AREA WITH VISQUEEN
- 2.) COVER THE EXCAVATION AREA WITH TRENCH PLATES
- 3.) VENTILATE TO CONTROL ANY MEASURABLE AIRBORNE CONCENTRATIONS.

DRAWING IS SCHEMATIC
SCALE IS APPROXIMATE
LOCATIONS ARE APPROXIMATE

DRAWING NUMBER - G5

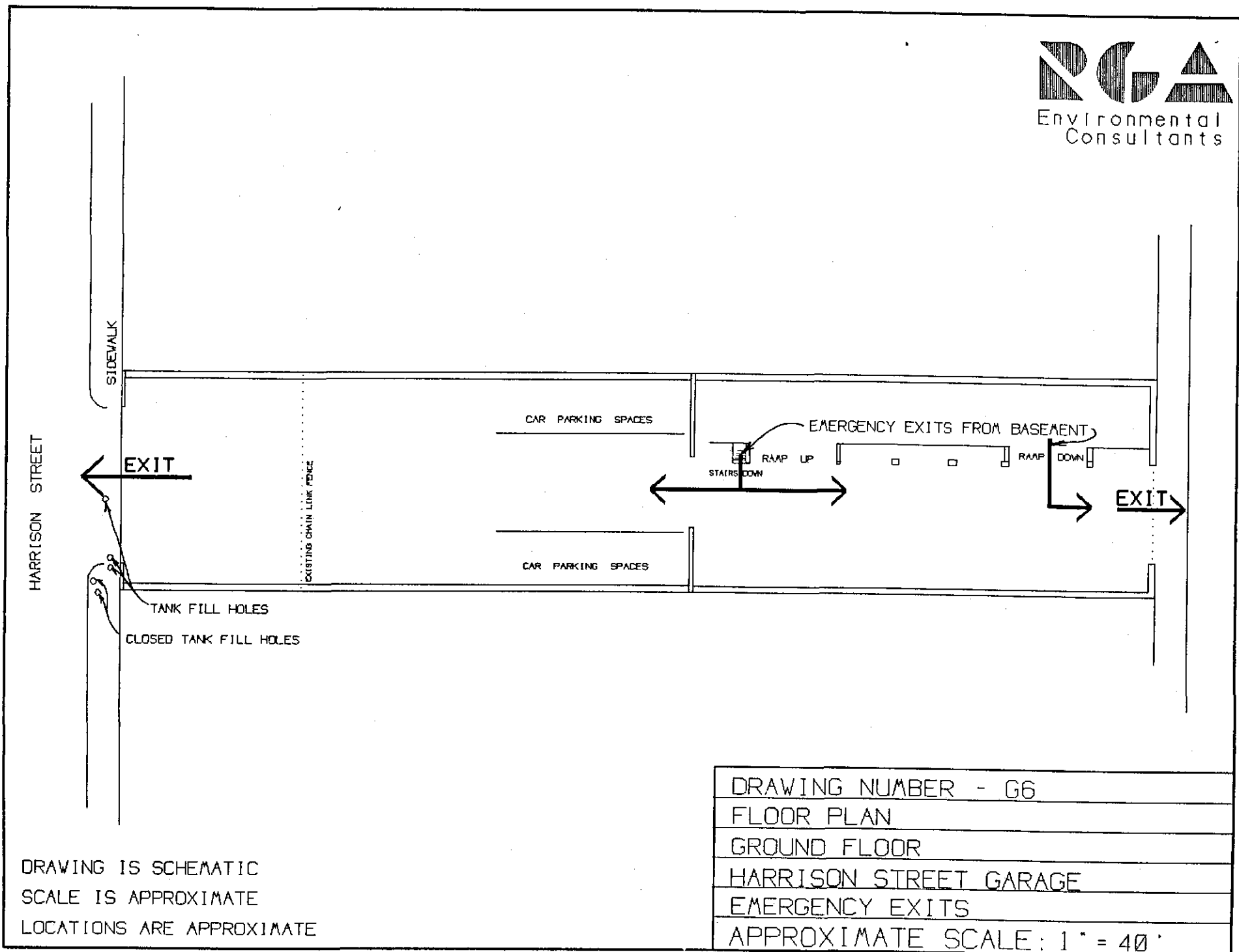
FLOOR PLAN

GROUND FLOOR

HARRISON STREET GARAGE

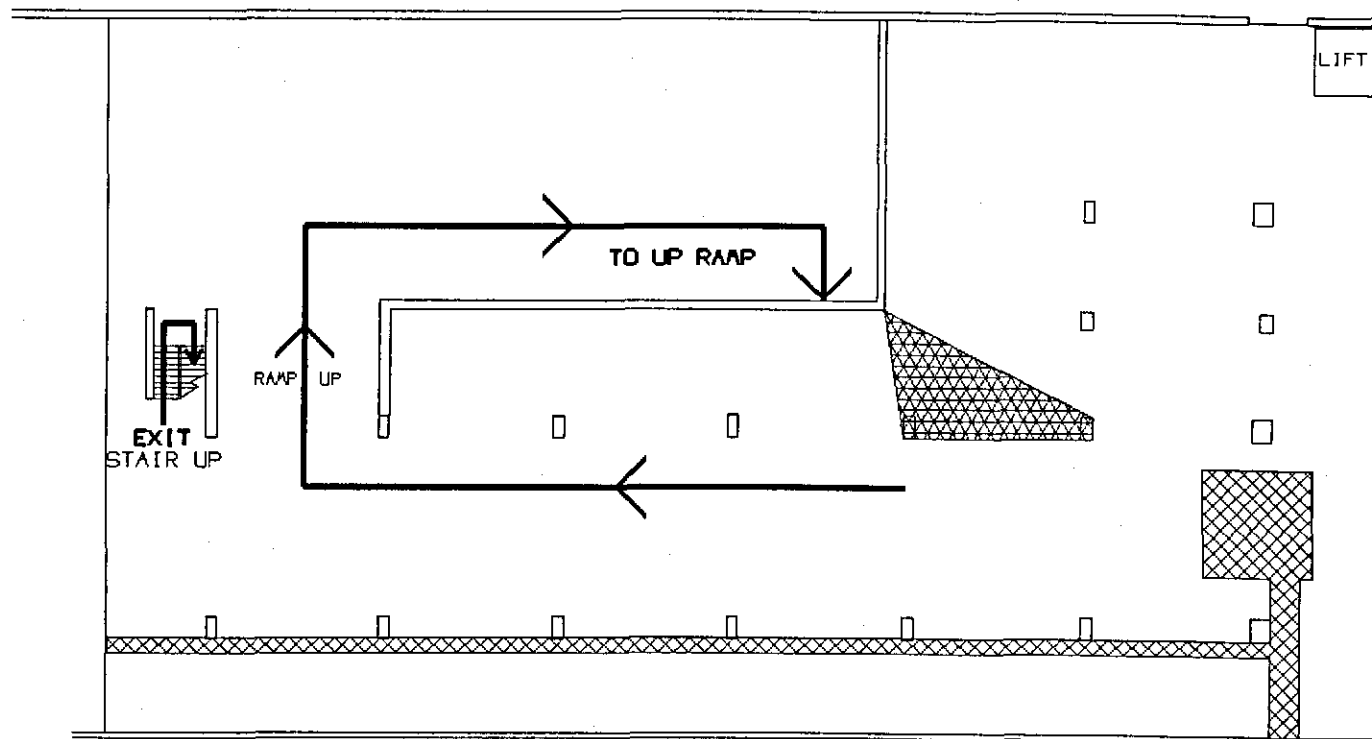
VENTILATION PLAN

APPROXIMATE SCALE: 1" = 40'



DRAWING IS SCHEMATIC
SCALE IS APPROXIMATE
LOCATIONS ARE APPROXIMATE

DRAWING NUMBER - G6
FLOOR PLAN
GROUND FLOOR
HARRISON STREET GARAGE
EMERGENCY EXITS
APPROXIMATE SCALE: 1" = 40'



⊠ - AREA WHERE CONCRETE HAS BEEN
CUT FROM SLAB

▨ - AREA OF CONCRETE RUBBLE

DRAWING IS SCHEMATIC
SCALE IS APPROXIMATE
LOCATIONS ARE APPROXIMATE

DRAWING NUMBER - G7

FLOOR PLAN

BASEMENT LEVEL

HARRISON STREET GARAGE

EMERGENCY EXITS FROM BASEMENT

APPROXIMATE SCALE: 1" = 25'

APPENDIX A

Agreement and Acknowledgment Statement

Site Safety Plan Agreement

SCS personnel have the authority to stop work performed by their subcontractors at this site if any work is not performed in accordance with the requirements of this Site Safety Plan.

All RGA project personnel, observers and subcontractor personnel are required to sign the following agreement prior to conducting work at the site.

1. I have read and fully understand the Site Safety Plan and my individual responsibilities.
2. I agree to abide by the provisions of the Site Safety Plan.

Name/Company:

Signature:

Date:

APPENDIX B

Site Safety Plan Amendment Sheet

Project Name:

Project Number:

Location:

Changes in field activities or hazards:

Proposed Amendment:

Proposed By:
Date:

Approved By (Project Manager):
Date:

Approved By (Health & Safety Manager):
Date:

Declined By:
Date:

Amendment Number:
Amendment Effective Date:

APPENDIX D

Definition of Hazard Evaluation Guidelines

Hazard: Airborne Contaminants

Guideline

Threshold Limit Value
Time-Weighted Average
(TLV-TWA)

Explanation

The time weighted average concentration for a normal eight hour work day and a forty hour work week, to which nearly all workers may be repeatedly exposed without adverse effect.

Permissible Exposure Limit (PEL)

Time weighted average concentrations similar to (and in many cases derived from) the Threshold Limit Values.

Immediately Dangerous to Life and Health (IDLH)

"IDLH" or "Immediately dangerous to life or health" means any atmospheric condition that poses an immediate threat to life, or that is likely to result in acute or immediate severe health effects. This includes oxygen deficiency conditions.

Hazard: Explosion

Guideline

Lower Explosive Limit (LEL)

Explanation

The minimum concentration of vapor in air below which propagation of a flame will not occur in the presence of an ignition source.

Upper Explosive Limit (UEL)

The maximum concentration of vapor in air above which propagation of a flame will not occur in the presence of an ignition source.

ACCIDENT/INCIDENT/NEAR MISS

Date: _____
Time of incident: _____

Name of Individual Affected: _____

Description of Incident:

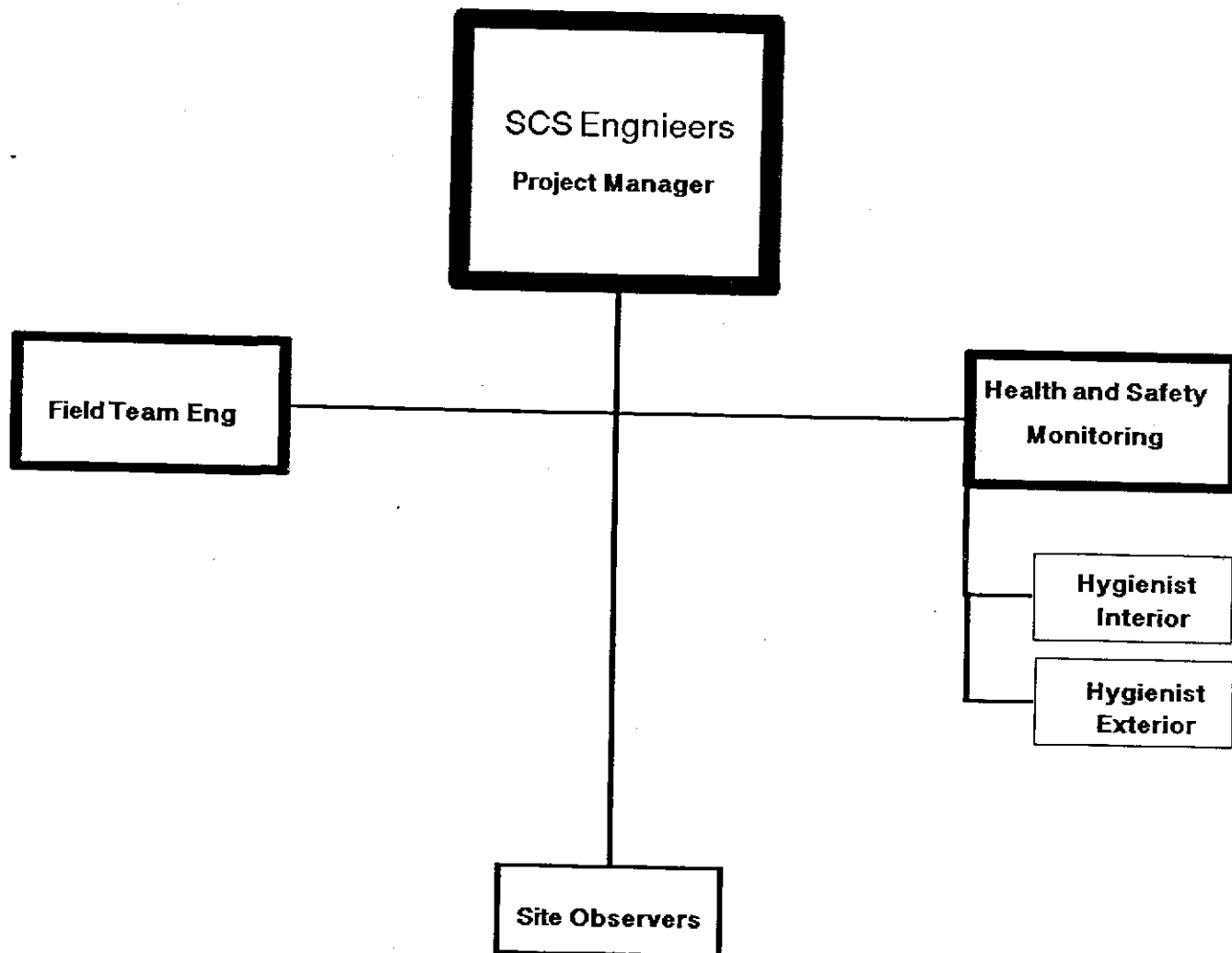
Remedial Actions Taken:

Hospital: _____

Witnesses (name and phone Number):

Signature of Person filling out this form:

Appendix F
Project Personnel



BENZENE

BNZ

Common Synonyms Benzol Benzole		Watery liquid Floats on water. Flammable, irritating vapor is produced. Freezing point is 42°F.	Colorless	Gasoline-like odor
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.				
Fire		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.		
Exposure		CALL FOR MEDICAL AID VAPOR Irritating to eyes, nose and throat. If inhaled, will cause headache, difficult breathing, or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. LIQUID Irritating to skin and eyes. 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.		
Water Pollution		HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.		
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability. Restrict access.		2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3		
3. CHEMICAL DESIGNATIONS 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. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Aromatic; rather pleasant aromatic odor; characteristic odor		
5. HEALTH HAZARDS 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. 5.2 Symptoms Following Exposure: Dizziness, excitation, pallor, followed by flushing, weakness, headache, breathlessness, chest constriction. Coma and possible death. 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. 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; LD ₅₀ = 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 smearing and reddening of the skin. 5.10 Odor Threshold: 4.68 ppm 5.11 ADLH Value: 2,000 ppm				

6. FIRE HAZARDS 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		10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U-V-W																																					
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		11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Flammable liquid 11.2 NAS Hazard Rating for Bulk Water Transportation: <table border="1"> <thead> <tr> <th>Category</th> <th>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>3</td> </tr> <tr> <td>Water Pollution:</td> <td></td> </tr> <tr> <td>Human Toxicity</td> <td>3</td> </tr> <tr> <td>Aquatic Toxicity</td> <td>1</td> </tr> <tr> <td>Aesthetic Effect</td> <td>3</td> </tr> <tr> <td>Reactivity:</td> <td></td> </tr> <tr> <td>Other Chemicals</td> <td>2</td> </tr> <tr> <td>Water</td> <td>1</td> </tr> <tr> <td>Self Reaction</td> <td>0</td> </tr> </tbody> </table> 11.3 NFPA Hazard Classification: <table border="1"> <thead> <tr> <th>Category</th> <th>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	3	Water Pollution:		Human Toxicity	3	Aquatic Toxicity	1	Aesthetic Effect	3	Reactivity:		Other Chemicals	2	Water	1	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	3																																						
Water Pollution:																																							
Human Toxicity	3																																						
Aquatic Toxicity	1																																						
Aesthetic Effect	3																																						
Reactivity:																																							
Other Chemicals	2																																						
Water	1																																						
Self Reaction	0																																						
Category	Classification																																						
Health Hazard (Blue)	2																																						
Flammability (Red)	3																																						
Reactivity (Yellow)	0																																						
8. WATER POLLUTION 8.1 Aquatic Toxicity: 5 ppm/6 hr/minnow/lethal/distilled water 20 ppm/24 hr/sunfish/TL ₅₀ /tap water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 1.2 lb/lb, 10 days 8.4 Food Chain Concentration Potential: None		12. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: 78.11 12.3 Boiling Point at 1 atm: 176°F = 80.1°C = 353.3°K 12.4 Freezing Point: 42.0°F = 5.5°C = 278.7°K 12.5 Critical Temperature: 552.0°F = 288.9°C = 562.1°K 12.6 Critical Pressure: 710 psia = 48.3 atm = 4.89 MN/m ² 12.7 Specific Gravity: 0.879 at 20°C (liquid) 12.8 Liquid Surface Tension: 28.9 dynes/cm = 0.0289 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 35.0 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 10 ⁴ J/kg 12.13 Heat of Combustion: -17,450 Btu/lb = -696 cal/g = -406.0 X 10 ⁴ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: 30.45 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 3.22 psia																																					
9. SHIPPING INFORMATION 9.1 Grades of Purity: Industrial pure 99 + % Thiouphene-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		NOTES																																					

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

BENZENE

BNZ

<p>Common Synonyms</p> <p>Benzol Benzole</p>	<p>Watery liquid</p> <p>Colorless</p> <p>Gasoline-like odor</p>	<p>Floats on water. Flammable, irritating vapor is produced. Freezing point is 42°F.</p>
<p>Avoid contact with liquid and vapor. Keep people away. Wear goggles and self-contained breathing apparatus. Shut off ignition sources and call fire department. Stop discharge, if possible. Stay upwind and use water spray to "knock down" vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.</p>		
Fire	<p>FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area.</p> <p>Wear goggles and self-contained breathing apparatus. Extinguish with dry chemical, foam, or carbon dioxide. Water may be ineffective on fire. Gas 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.</p> <p>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.</p> <p>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.</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>	
<p>1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability. Restrict access.</p>		<p>2. LABEL</p> <p>2.1 Category: Flammable liquid 2.2 Class: 3</p>
<p>3. CHEMICAL DESIGNATIONS</p> <p>3.1 CG Compatibility Class: Aromatic Hydrocarbon 3.2 Formula: C₆H₆ 3.3 IMO/IUN Designation: 3.2/1114 3.4 DOT ID No.: 1114 3.5 CAS Registry No.: 71-43-2</p>		<p>4. OBSERVABLE CHARACTERISTICS</p> <p>4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Aromatic, rather pleasant aromatic odor, characteristic odor</p>
<p>5. HEALTH HAZARDS</p> <p>5.1 Personal Protective Equipment: Hydrocarbon vapor canister, supplied air or a hose mask; hydrocarbon-insoluble rubber or plastic gloves; chemical goggles or face splash shield; hydrocarbon-insoluble apron such as neoprene.</p> <p>5.2 Symptoms Following Exposure: Dizziness, excitation, pallor, followed by flushing, weakness, headache, breathlessness, chest constriction. Coma and possible death.</p> <p>5.3 Treatment of Exposure: SKIN: flush with water followed by soap and water; remove contaminated clothing and wash skin. EYES: flush with plenty of water until irritation subsides. INHALATION: remove from exposure immediately. Call a physician. If breathing is irregular or stopped, start resuscitation, administer oxygen.</p> <p>5.4 Threshold Limit Value: 10 ppm 5.5 Short Term Inhalation Limits: 75 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 3, LD₅₀ = 50 to 500 mg/kg 5.7 Late Toxicity: Leukemia 5.8 Vapor (Gas) Irritant Characteristics: If present in high concentrations, vapors may cause irritation of eyes or respiratory system. The effect is temporary. 5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin. 5.10 Odor Threshold: 4.68 ppm 5.11 IDLH Value: 2,000 ppm</p>		

<p>6. FIRE HAZARDS</p> <p>6.1 Flash Point: 12°F C.C. 6.2 Flammable Limits in Air: 1.3%-7.9% 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: 1087°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>10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U-V-W</p>																																				
<p>7. CHEMICAL REACTIVITY</p> <p>7.1 Reactivity With Water: No reaction 7.2 Reactivity with Common Materials: No reaction 7.3 Stability During Transport: Stable 7.4 Neutralizing Agents for Acids and Caustics: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Molar Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 32</p>	<p>11. HAZARD CLASSIFICATIONS</p> <p>11.1 Code of Federal Regulations: Flammable liquid 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>3</td> </tr> <tr> <td>Water Pollution</td> <td></td> </tr> <tr> <td>Human Toxicity</td> <td>3</td> </tr> <tr> <td>Aquatic Toxicity</td> <td>1</td> </tr> <tr> <td>Aesthetic Effect</td> <td>3</td> </tr> <tr> <td>Reactivity</td> <td></td> </tr> <tr> <td>Other Chemicals</td> <td>2</td> </tr> <tr> <td>Water</td> <td>1</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	3	Water Pollution		Human Toxicity	3	Aquatic Toxicity	1	Aesthetic Effect	3	Reactivity		Other Chemicals	2	Water	1	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	3																																				
Water Pollution																																					
Human Toxicity	3																																				
Aquatic Toxicity	1																																				
Aesthetic Effect	3																																				
Reactivity																																					
Other Chemicals	2																																				
Water	1																																				
Self Reaction	0																																				
Category	Classification																																				
Health Hazard (Blue)	2																																				
Flammability (Red)	3																																				
Reactivity (Yellow)	0																																				
<p>8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 5 ppm/6 hr/minnow/lethal/distilled water 20 ppm/24 hr/sunfish/TL₅₀/tap water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 1.2 lb/lb, 10 days 8.4 Food Chain Concentration Potential: None</p>	<p>12. PHYSICAL AND CHEMICAL PROPERTIES</p> <p>12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: 78.11 12.3 Boiling Point at 1 atm: 178°F = 80.1°C = 353.3°K 12.4 Freezing Point: 42.0°F = 5.5°C = 278.7°K 12.5 Critical Temperature: 552.0°F = 288.9°C = 562.1°K 12.6 Critical Pressure: 710 psia = 48.9 atm = 4.89 MN/m² 12.7 Specific Gravity: 0.879 at 20°C (liquid) 12.8 Liquid Surface Tension: 28.9 dynes/cm = 0.0289 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 35.0 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 10³ J/kg 12.13 Heat of Combustion: -17,460 Btu/lb = -9698 cal/g = -406.0 X 10³ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: 30.45 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 3.22 psia</p>																																				
<p>9. SHIPPING INFORMATION</p> <p>9.1 Grades of Purity: Industrial pure 99+ % Thiophene-free 99+ % Nitration 99+ % Industrial 80% 85+ % Reagent 99+ %</p> <p>9.2 Storage Temperature: Open 9.3 Inert Atmosphere: No requirement 9.4 Venting: Pressure-vacuum</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

Common Synonyms Phenylethane EB		Liquid Colorless Sweet, gasoline-like odor Floats on water. Flammable, irritating vapor is produced.
Avoid contact with liquid and vapor. Keep people away. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). 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.		
Fire	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. Cool exposed containers with water.	
Exposure	CALL FOR MEDICAL AID VAPOR Irritating to eyes, nose and throat. If inhaled, will cause dizziness or difficult breathing. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. 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.	
Water Pollution	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.	
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Mechanical containment Should be removed Chemical and physical treatment		2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3
3. CHEMICAL DESIGNATIONS 3.1 CO Compatibility Class: Aromatic hydrocarbon 3.2 Formula: C ₈ H ₁₀ 3.3 IMO/IUN Designation: 3.3/1175 3.4 DOT ID No.: 1175 3.5 CAS Registry No.: 100-41-4		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Aromatic
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Self-contained breathing apparatus; safety goggles. 5.2 Symptoms Following Exposure: Inhalation may cause irritation of nose, dizziness, depression. Moderate irritation of eye with corneal injury possible. Irritates skin and may cause blisters. 5.3 Treatment of Exposure: INHALATION: If ill effects occur, remove victim 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 pneumonitis. 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 Limit: 200 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 2; LD ₅₀ = 0.5 to 5 g/kg (rat) 5.7 Leta 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 emerying of the skin and first-degree burns on short exposure; may cause secondary burns on long exposure. 5.10 Odor Threshold: 140 ppm 5.11 IDLH Value: 2,000 ppm		

6. FIRE HAZARDS 6.1 Flash Point: 80°F O.C.; 59°F C.C. 6.2 Flammable Limits in Air: 1.0%-6.7% 6.3 Fire Extinguishing Agents: Foam (most effective), water fog, carbon dioxide or dry chemical. 6.4 Fire Extinguishing Agents Not to be Used: Not pertinent 6.5 Special Hazards of Combustion: Products: Irritating vapors are generated when heated. 6.6 Behavior in Fire: Vapor is heavier than air and may travel considerable distance to the source of ignition and flash back. 6.7 Ignition Temperature: 860°F 6.8 Electrical Hazard: Not pertinent 6.9 Burning Rate: 5.8 mm/min 6.10 Adiabatic Flame Temperature: Data Not Available (Continued)

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: 29 ppm/96 hr/bluegill/TL ₅₀ /fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 2.8% (theor.), 5 days 8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION 9.1 Grades of Purity: Research grade: 99.98%; pure grade: 99.5%; technical grade: 99.0% 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester) or pressure-vacuum
--

6. FIRE HAZARDS (Continued) 6.11 Stoichiometric Air to Fuel Ratio: Data Not Available 6.12 Flame Temperature: Data Not Available

10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U																																				
11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Flammable liquid 11.2 NAS Hazard Rating for Bulk Water Transportation: <table border="1"> <thead> <tr> <th>Category</th> <th>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>2</td> </tr> <tr> <td>Liquid or Solid Irritant</td> <td>2</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 Effect</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> 11.3 NFPA Hazard Classification: <table border="1"> <thead> <tr> <th>Category</th> <th>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	2	Liquid or Solid Irritant	2	Poisons	2	Water Pollution		Human Toxicity	1	Aquatic Toxicity	3	Aesthetic Effect	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	2																																			
Liquid or Solid Irritant	2																																			
Poisons	2																																			
Water Pollution																																				
Human Toxicity	1																																			
Aquatic Toxicity	3																																			
Aesthetic Effect	2																																			
Reactivity																																				
Other Chemicals	1																																			
Water	0																																			
Self Reaction	0																																			
Category	Classification																																			
Health Hazard (Blue)	2																																			
Flammability (Red)	3																																			
Reactivity (Yellow)	0																																			

12. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 16°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°C = 178°K 12.5 Critical Temperature: 651.0°F = 343.9°C = 617.1°K 12.6 Critical Pressure: 523 psia = 35.8 atm = 3.61 MN/m ² 12.7 Specific Gravity: 0.867 at 20°C (liquid) 12.8 Liquid Surface Tension: 29.2 dynes/cm = 0.0292 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 35.46 dynes/cm = 0.03546 N/m at 20°C 12.10 Vapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): 1.071 12.12 Latent Heat of Vaporization: 144 Btu/lb = 80.1 cal/g = 3.35 X 10 ⁴ J/kg 12.13 Heat of Combustion: -17,780 Btu/lb = -9677 cal/g = -418.5 X 10 ⁴ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: Data Not Available 12.26 Limiting Value: Data Not Available 12.27 Reid Vapor Pressure: 0.4 psia
--

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	-80	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	52.810	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

ETHYLBENZENE

ETB

Common Synonyms Phenylthane EB		Liquid Colorless Sweet, gasoline-like odor
Floats on water Flammable, irritating vapor is produced.		
Avoid contact with liquid and vapor. Keep people away. Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). 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.		
Fire	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. Cool exposed containers with water.	
Exposure	CALL FOR MEDICAL AID. VAPOR Irritating to eyes, nose and throat. If inhaled, will cause dizziness or difficult breathing. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. 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.	
Water Pollution	HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. Fouling to shorelines. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.	
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Mechanical containment 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: C ₈ H ₁₀ 3.3 IMO/IUN Designation: 3.3/1175 3.4 DOT ID No.: 1175 3.5 CAS Registry No.: 100-41-4		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Aromatic
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Self-contained breathing apparatus; safety goggles. 5.2 Symptoms Following Exposure: Inhalation may cause irritation of nose, dizziness, depression. Moderate irritation of eye with corneal injury possible. Irritates skin and may cause blisters. 5.3 Treatment of Exposure: INHALATION If ill effects occur, remove victim 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 pneumonitis. 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 Limit: 200 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 2; LD ₅₀ = 0.5 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 smearing 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 IDLN Value: 2,000 ppm		

6. FIRE HAZARDS 6.1 Flash Point: 80°F O.D.; 56°F C.C. 6.2 Flammable Limits in Air: 1.0%-6.7% 6.3 Fire Extinguishing Agents: Foam (most effective), water fog, carbon dioxide or dry chemicals. 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: 660°F 6.8 Electrical Hazard: Not pertinent. 6.9 Burning Rate: 5.8 mm/min. 6.10 Adiabatic 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: 20 ppm/96 hr/bluegill/TL ₅₀ /fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 2.8% (theor.), 5 days 8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION 9.1 Grade or Purity: Research grade: 99.96%; pure grade: 99.5%; technical grade: 99.0% 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester) or pressure-vacuum

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

11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Flammable liquid 11.2 NAS Hazard Rating for Bulk Water Transportation: <table border="1"> <thead> <tr> <th>Category</th> <th>Rating</th> </tr> </thead> <tbody> <tr> <td>Fire</td> <td>3</td> </tr> <tr> <td>Health</td> <td>2</td> </tr> <tr> <td>Vapor Irritant</td> <td>2</td> </tr> <tr> <td>Liquid or Solid Irritant</td> <td>2</td> </tr> <tr> <td>Poisons</td> <td>2</td> </tr> <tr> <td>Water Pollution</td> <td>1</td> </tr> <tr> <td>Human Toxicity</td> <td>3</td> </tr> <tr> <td>Aquatic Toxicity</td> <td>3</td> </tr> <tr> <td>Aesthetic Effect</td> <td>2</td> </tr> <tr> <td>Reactivity</td> <td>0</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> 11.3 NFPA Hazard Classification: <table border="1"> <thead> <tr> <th>Category</th> <th>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	2	Vapor Irritant	2	Liquid or Solid Irritant	2	Poisons	2	Water Pollution	1	Human Toxicity	3	Aquatic Toxicity	3	Aesthetic Effect	2	Reactivity	0	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	3																																			
Aquatic Toxicity	3																																			
Aesthetic Effect	2																																			
Reactivity	0																																			
Other Chemicals	1																																			
Water	0																																			
Self Reaction	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: 106.17 12.3 Boiling Point at 1 atm: 277.2°F = 136.2°C = 409.4°K 12.4 Freezing Point: -136°F = -95°C = 178°K 12.5 Critical Temperature: 651.0°F = 343.9°C = 617.1°K 12.6 Critical Pressure: 523 psia = 36.6 atm = 3.61 MPa/m ² 12.7 Specific Gravity: 0.867 at 20°C (liquid) 12.8 Liquid Surface Tension: 29.2 dynes/cm = 0.0292 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 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 = 3.35 x 10 ⁴ J/kg 12.13 Heat of Combustion: -17,780 Btu/lb = -8677 cal/g = -419.5 x 10 ⁴ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: Data Not Available 12.26 Limiting Value: Data Not Available 12.27 Reid Vapor Pressure: 0.4 psia

6. FIRE HAZARDS (Continued) 6.11 Stoichiometric Air to Fuel Ratio: Data Not Available 6.12 Flame Temperature: Data Not Available

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	52.810	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	43.600	360	.52850	300	.401
		380	54.950	380	.64720	350	.424
						400	.446
						450	.467
						500	.487
						550	.507
						600	.525

GASOLINES: AUTOMOTIVE (<4.23g lead/gal)

GAT

<p>Common Synonyms Motor spirit Petrol</p>	<p>Watery liquid Colorless to pale brown or pink</p> <p>Floats on water. Flammable, irritating vapor is produced.</p>	<p>Gasoline odor</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. 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. Compatible 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 dizziness, 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 or vomiting. 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. Floating 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 Disperse and flush</p>		<p>2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3</p>
<p>3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures 3.2 Formula: (Mixture of hydrocarbons) 3.3 IMO/UN Designation: 3.1/1203 3.4 DOT ID No.: 1203 3.5 CAS Registry No.: Data not available</p>		<p>4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless to brown 4.3 Odor: Gasoline</p>
<p>5. HEALTH HAZARDS</p>		
<p>5.1 Personal Protective Equipment: Protective goggles, gloves. 5.2 Symptoms Following Exposure: Irritation of mucous membranes and stimulation followed by depression of central nervous system. Breathing of vapor may also cause dizziness, headache, and incoordination or, in more severe cases, anesthesia, coma, and respiratory arrest. If liquid enters lungs, it will cause severe irritation, coughing, gagging, pulmonary edema, and, later, signs of bronchopneumonia and pneumonia. Swallowing may cause irregular heartbeat. 5.3 Treatment of Exposure: INHALATION: maintain respiration and administer oxygen; enforce bed rest if liquid is in lungs. INGESTION: do NOT induce vomiting; stomach should be lavaged (by doctor) if appreciable quantity is swallowed. EYES: wash with copious quantity of water. SKIN: wipe off and wash with soap and water. 5.4 Threshold Limit Value: 300 ppm 5.5 Short Term Inhalation Limits: 500 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 2; LD₅₀ = 0.5 to 5 g/kg. 5.7 Late Toxicity: None 5.8 Vapor (Gas) Irritant Characteristics: Vapors 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: 0.25 ppm 5.11 IDLH Value: Data not available</p>		

<p>6. FIRE HAZARDS</p> <p>6.1 Flash Point: -36°F C.C. 6.2 Flammable Limits in Air: 1.4%-7.4% 6.3 Fire Extinguishing Agents: Foam, carbon dioxide, dry chemical 6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective 6.5 Special Hazards of Combustion Products: None 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: 853°F 6.8 Electrical Hazard: Class I, Group D 6.9 Burning Rate: 4 mm/min 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available</p>	<p>10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U-V-W</p> <p>11. HAZARD CLASSIFICATIONS</p> <p>11.1 Code of Federal Regulations: Flammable liquid 11.2 NAS Hazard Rating for Bulk Water Transportation:</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>2</td> </tr> <tr> <td>Aesthetic Effect.....</td> <td>2</td> </tr> <tr> <td>Reactivity:</td> <td></td> </tr> <tr> <td>Other Chemicals.....</td> <td>0</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>1</td> </tr> <tr> <td>Flammability (Red).....</td> <td>3</td> </tr> <tr> <td>Reactivity (Yellow).....</td> <td>D</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.....	2	Aesthetic Effect.....	2	Reactivity:		Other Chemicals.....	0	Water.....	0	Self Reaction.....	0	Category	Classification	Health Hazard (Blue).....	1	Flammability (Red).....	3	Reactivity (Yellow).....	D
Category	Rating																																				
Fire.....	3																																				
Health:																																					
Vapor Irritant.....	1																																				
Liquid or Solid Irritant.....	1																																				
Poisons.....	2																																				
Water Pollution:																																					
Human Toxicity.....	1																																				
Aquatic Toxicity.....	2																																				
Aesthetic Effect.....	2																																				
Reactivity:																																					
Other Chemicals.....	0																																				
Water.....	0																																				
Self Reaction.....	0																																				
Category	Classification																																				
Health Hazard (Blue).....	1																																				
Flammability (Red).....	3																																				
Reactivity (Yellow).....	D																																				
<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 Motor Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 33</p>	<p>12. PHYSICAL AND CHEMICAL PROPERTIES</p> <p>12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: Not pertinent 12.3 Boiling Point at 1 atm: 140-390°F = 60-199°C = 333-472°K 12.4 Freezing Point: Not pertinent 12.5 Critical Temperature: Not pertinent 12.6 Critical Pressure: Not pertinent 12.7 Specific Gravity: 0.7321 at 20°C (liquid) 12.8 Liquid Surface Tension: 19-23 dynes/cm = 0.019-0.023 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 49-51 dynes/cm = 0.049-0.051 N/m at 20°C 12.10 Vapor (Gas) Specific Gravity: 3.4 12.11 Ratio of Specific Heats of Vapor (Gas): (est.) 1.054 12.12 Latent Heat of Vaporization: 130-150 Btu/lb = 71-81 cal/g = 30 - 3.4 X 10³ J/kg 12.13 Heat of Combustion: -18,720 Btu/lb = -10,400 cal/g = 435.1 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: Data not available 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 7.4 psia</p>																																				
<p>8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 90 ppm/24 hr/juvenile American shad/TL₅₀/fresh water 81 mg/1/24 hr/juvenile American shad/TL₅₀/salt water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 8%, 5 days 8.4 Food Chain Concentration Potential: None</p>	<p>9. SHIPPING INFORMATION</p> <p>9.1 Grades of Purity: Various octane ratings; military specifications 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester) or pressure-vacuum</p>																																				
<p>NOTES</p>																																					

GASOLINES: AUTOMOTIVE (<4.23g lead/gal)

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 (estimate)	Temperature (degrees F)	Centipoise
45	46.270	10	.459	40	.909	46	.521
50	46.130	15	.462	50	.900	48	.514
55	46.000	20	.464	60	.891	50	.507
60	45.850	25	.467	70	.883	52	.500
65	45.710	30	.470	80	.874	54	.494
70	45.560	35	.472	90	.865	56	.487
75	45.400	40	.475	100	.856	58	.481
80	45.240	45	.478	110	.847	60	.475
85	45.080	50	.480	120	.838	62	.469
90	44.910	55	.483	130	.829	64	.463
95	44.750	60	.486	140	.821	66	.457
100	44.570	65	.488	150	.812	68	.451
105	44.390	70	.491	160	.803	70	.446
110	44.210	75	.494	170	.794	72	.440
115	44.030	80	.496	180	.785	74	.435
		85	.499	190	.776	76	.430
		90	.502			78	.424
		95	.504			80	.419
		100	.507			82	.414
		105	.510			84	.410
						86	.405
						88	.400
						90	.396
						92	.391
						94	.387
						96	.382

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 N S O L U B L E		D A T A N O T A V A I L A B L E		N O T P E R T I N E N T		D A T A N O T A V A I L A B L E

GASOLINES: AUTOMOTIVE (<4.23g lead/gal)

GAT

<p>Common Synonyms Motor spirit Petrol</p>	<p>Watery liquid Colorless to pale brown or pink</p> <p>Floats on water. Flammable, irritating vapor is produced.</p>	<p>Gasoline odor</p>	<p>6. FIRE HAZARDS</p> <p>6.1 Flash Point: -36°F C.C. 6.2 Flammable Limits in Air: 1.4%-7.4% 6.3 Fire Extinguishing Agents: Foam, carbon dioxide, dry chemical 6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective 6.5 Special Hazards of Combustion Products: None 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: 653°F 6.8 Electrical Hazard: Class I, Group D 6.9 Burning Rate: 4 mm/min. 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available</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. Isolate and remove discharged material. Notify local health and pollution control agencies.</p>			<p>10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U-V-W</p>																																						
<p>Fire</p>	<p>FLAMMABLE. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Extinguish with dry chemical, foam or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.</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;"> <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>2</td> </tr> <tr> <td>Aesthetic Effect.....</td> <td>2</td> </tr> <tr> <td>Reactivity</td> <td></td> </tr> <tr> <td>Other Chemicals.....</td> <td>0</td> </tr> <tr> <td>Water.....</td> <td>0</td> </tr> <tr> <td>Self Reaction.....</td> <td>0</td> </tr> <tr> <td>11.3 NFPA Hazard Classification:</td> <td></td> </tr> <tr> <td>Category</td> <td>Classification</td> </tr> <tr> <td>Health Hazard (Blue).....</td> <td>1</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.....	2	Aesthetic Effect.....	2	Reactivity		Other Chemicals.....	0	Water.....	0	Self Reaction.....	0	11.3 NFPA Hazard Classification:		Category	Classification	Health Hazard (Blue).....	1	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.....	2																																								
Aesthetic Effect.....	2																																								
Reactivity																																									
Other Chemicals.....	0																																								
Water.....	0																																								
Self Reaction.....	0																																								
11.3 NFPA Hazard Classification:																																									
Category	Classification																																								
Health Hazard (Blue).....	1																																								
Flammability (Red).....	3																																								
Reactivity (Yellow).....	0																																								
<p>Exposure</p>	<p>CALL FOR MEDICAL AID.</p> <p>VAPOR Irritating to eyes, nose and throat. If inhaled, will cause dizziness, 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 or vomiting. 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>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: 33</p>																																						
<p>Water Pollution</p>	<p>HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. Foaming to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.</p>		<p>12. PHYSICAL AND CHEMICAL PROPERTIES</p> <p>12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: Not pertinent 12.3 Boiling Point at 1 atm: 140-390°F = 60-189°C = 303-472°K 12.4 Freezing Point: Not pertinent 12.5 Critical Temperature: Not pertinent 12.6 Critical Pressure: Not pertinent 12.7 Specific Gravity: 0.7321 at 20°C (liquid) 12.8 Liquid Surface Tension: 19-23 dynes/cm = 0.019-0.023 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 49-51 dynes/cm = 0.049-0.051 N/m at 20°C 12.10 Vapor (Gas) Specific Gravity: 3.4 12.11 Ratio of Specific Heats of Vapor (Gas) (est.) 1.054 12.12 Latent Heat of Vaporization: 130-150 Btu/lb = 71-81 cal/g = 3.0 - 3.4 X 10⁴ J/kg 12.13 Heat of Combustion: -16,720 Btu/lb = -10,400 cal/g = 435.1 X 10⁴ 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: 7.4 psia</p>																																						
<p>1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability Evacuate area Disperse and flush</p>	<p>2. LABEL</p> <p>2.1 Category: Flammable liquid 2.2 Class: 3</p>	<p>8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 90 ppm/24 hr/juvenile American shad/TL₅₀/fresh water 91 mg/1/24 hr/juvenile American shad/TL₅₀/salt water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 8%, 5 days 8.4 Food Chain Concentration Potential: None</p>																																							
<p>3. CHEMICAL DESIGNATIONS</p> <p>3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures 3.2 Formula: (Mixture of hydrocarbons) 3.3 IMO/UN Designation: 3.1/1203 3.4 DOT ID No.: 1203 3.5 CAS Registry No.: Data not available</p>	<p>4. OBSERVABLE CHARACTERISTICS</p> <p>4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless to brown 4.3 Odor: Gasoline</p>	<p>9. SHIPPING INFORMATION</p> <p>9.1 Grades of Purity: Various octane ratings; military specifications 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester) or pressure-vacuum</p>																																							
<p>5. HEALTH HAZARDS</p> <p>5.1 Personal Protective Equipment: Protective goggles, gloves. 5.2 Symptoms Following Exposure: Irritation of mucous membranes and stimulation followed by depression of central nervous system. Breathing of vapor may also cause dizziness, headache, and incoordination or, in more severe cases, anesthesia, coma, and respiratory arrest. If liquid enters lungs, it will cause severe irritation, coughing, gagging, pulmonary edema, and, later, signs of bronchopneumonia and pneumonia. Swallowing may cause irregular heartbeat. 5.3 Treatment of Exposure: INHALATION: maintain respiration and administer oxygen; enforce bed rest if liquid is in lungs. INGESTION: do NOT induce vomiting; stomach should be lavaged (by doctor) if appreciable quantity is swallowed. EYES: wash with copious quantity of water. SKIN: wipe off and wash with soap and water. 5.4 Threshold Limit Value: 300 ppm 5.5 Short Term Inhalation Limits: 500 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 2; LD₅₀ = 0.5 to 5 g/kg. 5.7 Late Toxicity: None 5.8 Vapor (Gas) Irritant Characteristics: Vapors 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: 0.25 ppm 5.11 IDLH Value: Data not available</p>			<p>NOTES</p>																																						

GAT	GASOLINES: AUTOMOTIVE (<4.23g lead/gal)
------------	---

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 (estimate)	Temperature (degrees F)	Centipoise
45	46.270	10	.459	40	.909	46	.521
50	46.130	15	.462	50	.900	48	.514
55	46.000	20	.464	60	.891	50	.507
60	45.850	25	.467	70	.883	52	.500
65	45.710	30	.470	80	.874	54	.494
70	45.560	35	.472	90	.865	56	.487
75	45.400	40	.475	100	.856	58	.481
80	45.240	45	.478	110	.847	60	.475
85	45.080	50	.480	120	.838	62	.469
90	44.910	55	.483	130	.829	64	.463
95	44.750	60	.486	140	.821	66	.457
100	44.570	65	.488	150	.812	68	.451
105	44.390	70	.491	160	.803	70	.446
110	44.210	75	.494	170	.794	72	.440
115	44.030	80	.496	180	.785	74	.435
		85	.499	190	.776	76	.430
		90	.502			78	.424
		95	.504			80	.419
		100	.507			82	.414
		105	.510			84	.410
						86	.405
						88	.400
						90	.396
						92	.391
						94	.387
						96	.382

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 N S O L U B L E		D A T A N O T A V A I L A B L E		N O T P E R T I N E N T		D A T A N O T A V A I L A B L E

KEROSENE

KRS

<p>Common Synonyms Illuminating oil Kerosine Range oil Fuel oil No. 1 Jet Fuel, JP-1</p>	<p>Watery liquid Colorless Fuel oil odor</p>	<p>Floets on water.</p>	
<p>Stop discharge if possible Call fire department Avoid contact with liquid Isolate and remove discharged material. Notify local health and pollution control agencies</p>			
<p>Fire</p>	<p>Combustible. Flammable liquid, Category 2. Water may be ineffective on fire. Cool exposed containers with water.</p>		
<p>Exposure</p>	<p>CALL FOR MEDICAL AID</p> <p>LIQUID Irritating to 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>		
<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) Mechanical containment Should be removed Chemical and physical treatment</p>		<p>2. LABEL 2.1 Category: None 2.2 Class: Not pertinent</p>	
<p>3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures 3.2 Formula: C₁₂H₂₆ 3.3 IMO/UN Designation: 3.3/1223 3.4 DOT ID No.: 1223 3.5 CAS Registry No.: 8006-20-6</p>		<p>4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless to light brown 4.3 Odor: Characteristic</p>	
<p>5. HEALTH HAZARDS</p>			
<p>5.1 Personal Protective Equipment: Protective gloves, goggles or face shield. 5.2 Symptoms Following Exposure: Vapor causes slight irritation of eyes and nose. Liquid irritates stomach; if taken into lungs, causes coughing, distress, and rapidly developing pulmonary edema. 5.3 Treatment of Exposure: ASPIRATION: enforce bed rest, administer oxygen, call a doctor. INGESTION: do NOT induce vomiting; call a doctor. EYES: wash with plenty of water. SKIN: wipe off and wash with soap and water. 5.4 Threshold Limit Value: 200 ppm 5.5 Short Term Inhalation Limits: 2500 mg/m³ for 60 min. 5.6 Toxicity by Ingestion: Grade 1; LD₅₀ = 5 to 15 g/kg 5.7 Lethal Toxicity: Data not available 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: 1 ppm 5.11 IDLH Value: Data not available</p>			

<p>6. FIRE HAZARDS</p> <p>6.1 Flash Point: 100°F (min.) C.C. 6.2 Flammable Limits in Air: 0.7%-5% 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: Not pertinent 6.7 Ignition Temperature: 444°F 6.8 Electrical Hazard: Not pertinent 6.9 Burning Rate: 4 mm/min. 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available</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: Combustible 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>2</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>1</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>1</td> </tr> <tr> <td>Aesthetic Effect.....</td> <td>3</td> </tr> <tr> <td>Reactivity.....</td> <td></td> </tr> <tr> <td>Other Chemicals.....</td> <td>0</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>0</td> </tr> <tr> <td>Flammability (Red).....</td> <td>2</td> </tr> <tr> <td>Reactivity (Yellow).....</td> <td>0</td> </tr> </tbody> </table>	Category	Rating	Fire.....	2	Health.....		Vapor Irritant.....	1	Liquid or Solid Irritant.....	1	Poisons.....	1	Water Pollution.....		Human Toxicity.....	1	Aquatic Toxicity.....	1	Aesthetic Effect.....	3	Reactivity.....		Other Chemicals.....	0	Water.....	0	Self Reaction.....	0	Category	Classification	Health Hazard (Blue).....	0	Flammability (Red).....	2	Reactivity (Yellow).....	0
Category	Rating																																				
Fire.....	2																																				
Health.....																																					
Vapor Irritant.....	1																																				
Liquid or Solid Irritant.....	1																																				
Poisons.....	1																																				
Water Pollution.....																																					
Human Toxicity.....	1																																				
Aquatic Toxicity.....	1																																				
Aesthetic Effect.....	3																																				
Reactivity.....																																					
Other Chemicals.....	0																																				
Water.....	0																																				
Self Reaction.....	0																																				
Category	Classification																																				
Health Hazard (Blue).....	0																																				
Flammability (Red).....	2																																				
Reactivity (Yellow).....	0																																				
<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: 33</p>	<p>12. PHYSICAL AND CHEMICAL PROPERTIES</p> <p>12.1 Physical State at 15°C and 1 atm: Liquid</p> <p>12.2 Molecular Weight: Not pertinent</p> <p>12.3 Boiling Point at 1 atm: 392-500°F = 200-260°C = 473-533°K</p> <p>12.4 Freezing Point: -50°F = -45.6°C = 227.6°K</p> <p>12.5 Critical Temperature: Not pertinent</p> <p>12.6 Critical Pressure: Not pertinent</p> <p>12.7 Specific Gravity: 0.80 at 15°C (liquid)</p> <p>12.8 Liquid Surface Tension: 23-32 dynes/cm = 0.023-0.032 N/m at 20°C</p> <p>12.9 Liquid Water Interfacial Tension: 47-49 dynes/cm = 0.047-0.049 N/m at 20°C</p> <p>12.10 Vapor (Gas) Specific Gravity: Not pertinent</p> <p>12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent</p> <p>12.12 Latent Heat of Vaporization: 110 Btu/lb = 60 cal/g = 2.5 X 10⁴ J/kg</p> <p>12.13 Heat of Combustion: -18,540 Btu/lb = -10,300 cal/g = -431.24 X 10⁴ J/kg</p> <p>12.14 Heat of Decomposition: Not pertinent</p> <p>12.15 Heat of Solution: Not pertinent</p> <p>12.16 Heat of Polymerization: Not pertinent</p> <p>12.25 Heat of Fusion: Data not available</p> <p>12.26 Limiting Value: Data not available</p> <p>12.27 Reid Vapor Pressure: 0.1 psia</p>																																				
<p>8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 2990 ppm/24 hr/blue/gill/TL₅₀/fresh water</p> <p>8.2 Waterfowl Toxicity: Data not available</p> <p>8.3 Biological Oxygen Demand (BOD): 53%, 5 days</p> <p>8.4 Food Chain Concentration Potential: None</p>	<p>9. SHIPPING INFORMATION</p> <p>9.1 Grades of Purity: Light hydrocarbon distillate, 100% 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester)</p>																																				
<p>NOTES</p>																																					

KRS

KEROSENE

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
34	50.810	0	.434	0	.926	-35	6.727
36	50.740	10	.439	10	.924	-30	6.065
38	50.670	20	.444	20	.921	-25	5.482
40	50.600	30	.449	30	.919	-20	4.965
42	50.530	40	.454	40	.917	-15	4.508
44	50.460	50	.459	50	.915	-10	4.101
46	50.390	60	.464	60	.913	-5	3.739
48	50.320	70	.469	70	.911	0	3.416
50	50.250	80	.474	80	.909	5	3.127
52	50.180	90	.479	90	.907	10	2.867
54	50.110	100	.484	100	.905	15	2.634
56	50.040	110	.489	110	.903	20	2.424
58	49.970	120	.494	120	.901	25	2.235
60	49.900	130	.499	130	.899	30	2.064
62	49.830	140	.504	140	.897	35	1.909
64	49.760	150	.509	150	.895	40	1.768
66	49.700	160	.514	160	.893	45	1.641
68	49.630	170	.519	170	.891	50	1.525
70	49.560	180	.524	180	.889	55	1.419
72	49.490	190	.529	190	.887	60	1.322
74	49.420	200	.534	200	.885	65	1.233
76	49.350	210	.539	210	.883	70	1.152
78	49.280					75	1.078
80	49.210						
82	49.140						
84	49.070						

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	70	.041		N		D
	N	80	.056		O		A
	S	90	.075		T		T
	O	100	.099				A
	L	110	.130		P		N
	U	120	.168		E		O
	B	130	.217		R		T
	L	140	.277		T		A
	E	150	.350		I		V
		160	.440		N		A
		170	.548		E		I
		180	.679		N		L
		190	.835		T		A
		200	1.021				B
		210	1.241				L
		220	1.500				E
		230	1.802				
		240	2.154				
		250	2.562				
		260	3.033				
		270	3.573				
		280	4.192				
		290	4.896				
		300	5.695				

KEROSENE

KRS

<p>Common Synonyms</p> <p>Numbering of Kerosene Range oil Fuel Oil No. 1 Jet Fuel JP-1</p>	<p>Watery liquid</p> <p>Colorless</p> <p>Fuel oil odor</p> <p>Floats on water.</p>
<p>Stop discharge if possible Call fire department. Avoid contact with liquid Isolate and remove discharged material Notify local health and pollution control agencies</p>	
<p>Fire</p>	<p>Combustible. Extinguished by dry chemical, foam, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.</p>
<p>Exposure</p>	<p>CALL FOR MEDICAL AID.</p> <p>LIQUID Irritating to 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>
<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)</p> <p>Mechanical containment Should be removed Chemical and physical treatment</p>	<p>2. LABEL</p> <p>2.1 Category: None 2.2 Class: Not pertinent</p>
<p>3. CHEMICAL DESIGNATIONS</p> <p>3.1 CG Competibility Class: Miscellaneous Hydrocarbon Mixtures 3.2 Formula: C₁₂H₂₆+ 3.3 IMO/IUM Designation: 3.3/1223 3.4 DOT ID No.: 1223 3.5 CAS Registry No.: 8009-20-6</p>	<p>4. OBSERVABLE CHARACTERISTICS</p> <p>4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless to light brown 4.3 Odor: Characteristic</p>
<p>5. HEALTH HAZARDS</p> <p>5.1 Personal Protective Equipment: Protective gloves; goggles or face shield. 5.2 Symptoms Following Exposure: Vapor causes slight irritation of eyes and nose. Liquid irritates stomach; if taken into lungs, causes coughing, distress, and rapidly developing pulmonary edema. 5.3 Treatment of Exposure: ASPIRATION: enforce bed rest, administer oxygen; call a doctor. INGESTION: do NOT induce vomiting; call a doctor. EYES: wash with plenty of water. SKIN: wipe off and wash with soap and water. 5.4 Threshold Limit Value: 200 ppm 5.5 Short Term Inhalation Limits: 2500 mg/m³ for 60 min. 5.6 Toxicity by Ingestion: Grade 1; LD₅₀ = 5 to 15 g/kg 5.7 Late Toxicity: Data not available 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: 1 ppm 5.11 IDLH Value: Data not available</p>	

<p>6. FIRE HAZARDS</p> <p>6.1 Flash Point: 100°F (min.) C.C. 6.2 Flammable Limits in Air: 0.7%-5% 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: Not pertinent 6.7 Ignition Temperature: 444°F 6.8 Electrical Hazard: Not pertinent 6.9 Burning Rate: 4 mm/min. 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available</p>	<p>10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook)</p> <p style="text-align: center;">A-T-U</p>																																				
<p>7. CHEMICAL REACTIVITY</p> <p>7.1 Reactivity With Water: No reaction 7.2 Reactivity with Common Materials: No reaction 7.3 Stability During Transport: Stable 7.4 Neutralizing Agents for Acids and Caustics: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Molar Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 33</p>	<p>11. HAZARD CLASSIFICATIONS</p> <p>11.1 Code of Federal Regulations: Combustible liquid 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>2</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>1</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>1</td> </tr> <tr> <td>Aesthetic Effect.....</td> <td>3</td> </tr> <tr> <td>Reactivity.....</td> <td></td> </tr> <tr> <td>Other Chemicals.....</td> <td>0</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>0</td> </tr> <tr> <td>Flammability (Red).....</td> <td>2</td> </tr> <tr> <td>Reactivity (Yellow).....</td> <td>0</td> </tr> </tbody> </table>	Category	Rating	Fire.....	2	Health.....		Vapor Irritant.....	1	Liquid or Solid Irritant.....	1	Poisons.....	1	Water Pollution.....		Human Toxicity.....	1	Aquatic Toxicity.....	1	Aesthetic Effect.....	3	Reactivity.....		Other Chemicals.....	0	Water.....	0	Self Reaction.....	0	Category	Classification	Health Hazard (Blue).....	0	Flammability (Red).....	2	Reactivity (Yellow).....	0
Category	Rating																																				
Fire.....	2																																				
Health.....																																					
Vapor Irritant.....	1																																				
Liquid or Solid Irritant.....	1																																				
Poisons.....	1																																				
Water Pollution.....																																					
Human Toxicity.....	1																																				
Aquatic Toxicity.....	1																																				
Aesthetic Effect.....	3																																				
Reactivity.....																																					
Other Chemicals.....	0																																				
Water.....	0																																				
Self Reaction.....	0																																				
Category	Classification																																				
Health Hazard (Blue).....	0																																				
Flammability (Red).....	2																																				
Reactivity (Yellow).....	0																																				
<p>8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 2990 ppm/24 hr/bluegill/TL₅₀/fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 53%, 5 days 8.4 Food Chain Concentration Potential: None</p>	<p>12. PHYSICAL AND CHEMICAL PROPERTIES</p> <p>12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: Not pertinent 12.3 Boiling Point at 1 atm: 392-500°F = 200-260°C = 473-533°K 12.4 Freezing Point: -50°F = -45.6°C = 227.6°K 12.5 Critical Temperature: Not pertinent 12.6 Critical Pressure: Not pertinent 12.7 Specific Gravity: 0.80 at 15°C (liquid) 12.8 Liquid Surface Tension: 23-32 dynes/cm = 0.023-0.032 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 47-49 dynes/cm = 0.047-0.049 N/m at 20°C 12.10 Vapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent 12.12 Latent Heat of Vaporization: 110 Btu/lb = 60 cal/g = 2.5 X 10⁴ J/kg 12.13 Heat of Combustion: -18,540 Btu/lb = -10,300 cal/g = -431.24 X 10⁴ 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: 0.1 psia</p>																																				
<p>9. SHIPPING INFORMATION</p> <p>9.1 Grades of Purity: Light hydrocarbon distillate: 100% 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester)</p>																																					
<p style="text-align: center;">NOTES</p>																																					

KRS

KEROSENE

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
34	50.810	0	.434	0	.926	-35	6.727
36	50.740	10	.439	10	.924	-30	6.065
38	50.670	20	.444	20	.921	-25	5.482
40	50.600	30	.449	30	.919	-20	4.965
42	50.530	40	.454	40	.917	-15	4.508
44	50.460	50	.459	50	.915	-10	4.101
46	50.390	60	.464	60	.913	-5	3.739
48	50.320	70	.469	70	.911	0	3.416
50	50.250	80	.474	80	.909	5	3.127
52	50.180	90	.479	90	.907	10	2.867
54	50.110	100	.484	100	.905	15	2.634
56	50.040	110	.489	110	.903	20	2.424
58	49.970	120	.494	120	.901	25	2.235
60	49.900	130	.499	130	.899	30	2.064
62	49.830	140	.504	140	.897	35	1.909
64	49.760	150	.509	150	.895	40	1.768
66	49.700	160	.514	160	.893	45	1.641
68	49.630	170	.519	170	.891	50	1.525
70	49.560	180	.524	180	.889	55	1.419
72	49.490	190	.529	190	.887	60	1.322
74	49.420	200	.534	200	.885	65	1.233
76	49.350	210	.539	210	.883	70	1.152
78	49.280					75	1.078
80	49.210						
82	49.140						
84	49.070						

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	70	.041		N		D
	N	80	.056		O		A
	S	90	.075		T		T
	O	100	.099				A
	L	110	.130		P		N
	U	120	.168		E		O
	B	130	.217		R		T
	L	140	.277		T		A
	L	150	.350		I		V
	E	160	.440		N		A
		170	.548		E		I
		180	.679		N		L
		190	.835		E		A
		200	1.021		N		V
		210	1.241		T		A
		220	1.500				I
		230	1.802				L
		240	2.154				A
		250	2.562				V
		260	3.033				A
		270	3.573				I
		280	4.182				L
		290	4.896				A
		300	5.695				V

OILS, FUEL: 1-D

OOD

<p>Common Synonyms Diesel oil (light)</p>	<p>Dily liquid Yellow-brown</p>	<p>Lube or fuel oil odor Lube or fuel oil odor</p>
<p>Floets on water.</p>		
<p>Stop discharge if possible Call fire department Avoid contact with liquid Isolate and remove discharged material Notify local health and pollution control agencies.</p>		
Fire	<p>Combustible. Extinguish with dry chemical, foam or carbon dioxide. Data not available. Cool exposed containers with water.</p>	
Exposure	<p>CALL FOR MEDICAL AID. LIQUID Irritating to 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>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 <small>(See Response Methods Handbook)</small>	2. LABEL	
<p>Mechanical containment Should be removed Chemical and physical treatment</p>	<p>2.1 Category: None 2.2 Class: Not pertinent</p>	
3. CHEMICAL DESIGNATIONS	4. OBSERVABLE CHARACTERISTICS	
<p>3.1 CG Competibility Class: Miscellaneous Hydrocarbon Mixtures 3.2 Formula: Not applicable 3.3 IMO/UN Designation: 3.1/1270 3.4 DOT ID No.: 1270 3.5 CAS Registry No.: Data not available</p>	<p>4.1 Physical State (as shipped): Liquid 4.2 Color: Light brown 4.3 Odor: Characteristic</p>	
5. HEALTH HAZARDS		
<p>5.1 Personal Protective Equipment: Protective gloves; goggles or face shield. 5.2 Symptoms Following Exposure: INHALATION causes headache and slight dizziness. INGESTION causes nausea, vomiting, and cramping; depression of central nervous system ranging from mild headache to anesthesia, coma, and death; pulmonary irritation secondary to exhalation of solvent; signs of kidney and liver damage may be delayed. ASPIRATION causes severe lung irritation with coughing, gagging, dyspnea, substernal distress, and rapidly developing pulmonary edema; later, signs of bronchopneumonia and pneumonitis; acute onset of central nervous system excitement followed by depression. 5.3 Treatment of Exposure: INGESTION: do NOT induce vomiting; seek medical attention. ASPIRATION: enforce bed rest; administer oxygen. EYES: wash with copious quantity of water. SKIN: remove solvent by wiping and wash with soap and water. 5.4 Threshold Limit Value: No single value applicable. 5.5 Short Term Inhalation Limits: Data not available. 5.6 Toxicity by Ingestion: Grade 1; LD₅₀ = 5-15 g/kg 5.7 Late Toxicity: Data not available. 5.8 Vapor (Gas) Irritant Characteristics: Slight smarting of 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 skin. 5.10 Odor Threshold: 0.7 ppm 5.11 IDLH Value: Data not available</p>		

<p style="text-align: center;">6. FIRE HAZARDS</p> <p>6.1 Flash Point: 100°F C.C. 6.2 Flammable Limits in Air: 1.3%-6% 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: Not pertinent 6.7 Ignition Temperature: 350-625°F 6.8 Electrical Hazard: Not pertinent 6.9 Burning Rate: 4 mm/min. 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available</p>	<p style="text-align: center;">10. HAZARD ASSESSMENT CODE <small>(See Hazard Assessment Handbook)</small> A-T-U</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: 33</p>	<p style="text-align: center;">11. HAZARD CLASSIFICATIONS</p> <p>11.1 Code of Federal Regulations: Combustible liquid 11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed 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;">0</td> </tr> <tr> <td>Flammability (Red)</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Reactivity (Yellow)</td> <td style="text-align: right;">0</td> </tr> </table>	Category	Classification	Health Hazard (Blue)	0	Flammability (Red)	2	Reactivity (Yellow)	0
Category	Classification								
Health Hazard (Blue)	0								
Flammability (Red)	2								
Reactivity (Yellow)	0								
<p style="text-align: center;">8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 204 mg/1/24 hr/Juvenile American shad/TL₅₀/salt water 8.2 Waterfowl Toxicity: 20 mg/kg LD₅₀ (mallard) 8.3 Biological Oxygen Demand (BOD): Data not available 8.4 Food Chain Concentration Potential: None</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: Not pertinent 12.3 Boiling Point at 1 atm: 300-560°F = 160-290°C = 466-566°K 12.4 Freezing Point: -30°F = -34°C = 240°K 12.5 Critical Temperature: Not pertinent 12.6 Critical Pressure: Not pertinent 12.7 Specific Gravity: 0.81-0.85 at 15°C (liquid) 12.8 Liquid Surface Tension: 23-32 dynes/cm = 0.023-0.032 N/m at 20°C 12.9 Liquid Water Interfacial Tension: 47-49 dynes/cm = 0.047-0.049 N/m at 20°C 12.10 Vapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent 12.12 Latent Heat of Vaporization: 110 Btu/lb = 80 cal/g = 2.5 X 10⁴ J/kg 12.13 Heat of Combustion: -18,540 Btu/lb = -10,300 cal/g = -431.24 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: Data not available 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: Data not available</p>								
<p style="text-align: center;">9. SHIPPING INFORMATION</p> <p>9.1 Grades of Purity: Diesel fuel 1-D (ASTM) 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester)</p>	<p style="text-align: center;">NOTES</p>								

OOD

OILS, FUEL: 1-D

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
34	51.430	70	.469	50	.964	-30	6.065
36	51.360	75	.471	60	.964	-25	5.482
38	51.290	80	.474	70	.964	-20	4.965
40	51.220	85	.476	80	.964	-15	4.508
42	51.150	90	.479	90	.964	-10	4.101
44	51.080	95	.481	100	.964	-5	3.739
46	51.010	100	.484	110	.964	0	3.416
48	50.940	105	.486	120	.964	5	3.127
50	50.870	110	.489	130	.964	10	2.867
52	50.800	115	.491	140	.964	15	2.634
54	50.740	120	.494	150	.964	20	2.424
56	50.670	125	.496	160	.964	25	2.235
58	50.600	130	.499	170	.964	30	2.064
60	50.530	135	.501	180	.964	35	1.909
62	50.460	140	.504	190	.964	40	1.768
64	50.390	145	.506	200	.964	45	1.641
66	50.320	150	.509			50	1.525
68	50.250	155	.511			55	1.419
70	50.180	160	.514			60	1.322
72	50.110	165	.516			65	1.233
74	50.040	170	.519			70	1.152
76	49.970	175	.521			75	1.078
78	49.900	180	.524				
80	49.830	185	.526				
82	49.760	190	.529				
84	49.690	195	.531				

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 N S O L U B L E	70	.041		N O T P E R T I N E N T		N O T P E R T I N E N T
		80	.056				
		90	.075				
		100	.099				
		110	.130				
		120	.168				
		130	.217				
		140	.277				
		150	.350				
		160	.440				
		170	.548				
		180	.679				
		190	.835				
		200	1.021				
		210	1.241				
		220	1.500				
		230	1.802				
		240	2.154				
		250	2.562				
		260	3.033				
	270	3.573					
	280	4.192					
	290	4.896					
	300	5.695					

OILS, FUEL: 1-D

OOD

<p>Common Synonyms Diesel oil (light)</p>	<p>Oily liquid Yellow-brown Lubricating odor</p> <p>Floats on water.</p>
<p>Stop discharge, if possible. Call fire department. Avoid contact with liquid. Isolate and remove discharged material. Notify local health and pollution control agencies.</p>	
Fire	<p>Combustible. Extinguish with alcohol-resistant foam or dry chemical. Cool exposed containers with water.</p>
Exposure	<p>CALL FOR MEDICAL AID.</p> <p>LIQUID Irritating to 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>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) Mechanical containment Should be removed Chemical and physical treatment</p>	<p>2. LABEL</p> <p>2.1 Category: None 2.2 Class: Not pertinent</p>
<p>3. CHEMICAL DESIGNATIONS</p> <p>3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures 3.2 Formula: Not applicable 3.3 IMO/IUN Designation: 3.1/1270 3.4 DOT ID No.: 1270 3.5 CAS Registry No.: Data not available</p>	<p>4. OBSERVABLE CHARACTERISTICS</p> <p>4.1 Physical State (as shipped): Liquid 4.2 Color: Light brown 4.3 Odor: Characteristic</p>
<p>5. HEALTH HAZARDS</p> <p>5.1 Personal Protective Equipment: Protective gloves; goggles or face shield. 5.2 Symptoms Following Exposure: INHALATION causes headache and slight dizziness. INGESTION causes nausea, vomiting, and cramping; depression of central nervous system ranging from mild headache to anesthesia, coma, and death; pulmonary irritation secondary to exhalation of solvent; signs of kidney and liver damage may be delayed. ASPIRATION causes severe lung irritation with coughing, gagging, dyspnea, sublethal distress, and rapidly developing pulmonary edema; later, signs of bronchopneumonia and pneumonitis; acute onset of central nervous system excitement followed by depression. 5.3 Treatment of Exposure: INGESTION: do NOT induce vomiting; seek medical attention. ASPIRATION: enforce bed rest; administer oxygen. EYES: wash with copious quantity of water. SKIN: remove solvent by wiping and wash with soap and water. 5.4 Threshold Limit Value: No single value applicable. 5.5 Short Term Inhalation Limits: Data not available. 5.6 Toxicity by Ingestion: Grade 1; LD₅₀ = 5-15 g/kg. 5.7 Late Toxicity: Data not available. 5.8 Vapor (Gas) Irritant Characteristics: Slight smarting of 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 skin. 5.10 Odor Threshold: 0.7 ppm. 5.11 IDLH Value: Data not available.</p>	

6. FIRE HAZARDS

6.1 Flash Point: 100°F C.C.
6.2 Flammable Limits in Air: 1.3%-6%
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: Not pertinent
6.7 Ignition Temperature: 350-625°F
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: 4 mm/min.
6.10 Adiabatic Flame Temperature: Data not available.
6.11 Stoichiometric Air to Fuel Ratio: Data not available.
6.12 Flame Temperature: Data not available.

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: 93

8. WATER POLLUTION

8.1 Aquatic Toxicity: 204 mg/1/24 h/Juvenile American shad/TL₅₀/aah water
8.2 Waterfowl Toxicity: 20 mg/kg LD₅₀ (male)rd
8.3 Biological Oxygen Demand (BOD): Data not available
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Diesel fuel 1-D (ASTM)
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open (flame arrester)

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

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Combustible liquid
11.2 MAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification:
Category Classification
Health Hazard (Blue) 0
Flammability (Red) 2
Reactivity (Yellow) 0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 18°C and 1 atm: Liquid
12.2 Molecular Weight: Not pertinent
12.3 Boiling Point at 1 atm: 380-560°F = 193-293°C = 466-566°K
12.4 Freezing Point: -30°F = -34°C = 240°K
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 0.81-0.85 at 15°C (liquid)
12.8 Liquid Surface Tension: 23-32 dynes/cm = 0.023-0.032 N/m at 20°C
12.9 Liquid Water Interfacial Tension: 47-49 dynes/cm = 0.047-0.049 N/m at 20°C
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: 110 Btu/lb = 80 cal/g = 2.5 X 10⁴ J/kg
12.13 Heat of Combustion: -16,540 Btu/lb = -10,300 cal/g = -431.24 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: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Data not available

NOTES

OILS, FUEL: 1-D

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
34	51.430	70	.469	50	.964	-30	6.065
36	51.360	75	.471	60	.964	-25	5.482
38	51.290	80	.474	70	.964	-20	4.965
40	51.220	85	.476	80	.964	-15	4.508
42	51.150	90	.479	90	.964	-10	4.101
44	51.080	95	.481	100	.964	-5	3.739
46	51.010	100	.484	110	.964	0	3.416
48	50.940	105	.486	120	.964	5	3.127
50	50.870	110	.489	130	.964	10	2.867
52	50.800	115	.491	140	.964	15	2.634
54	50.740	120	.494	150	.964	20	2.424
56	50.670	125	.496	160	.964	25	2.235
58	50.600	130	.499	170	.964	30	2.064
60	50.530	135	.501	180	.964	35	1.909
62	50.460	140	.504	190	.964	40	1.768
64	50.390	145	.506	200	.964	45	1.641
66	50.320	150	.509			50	1.525
68	50.250	155	.511			55	1.419
70	50.180	160	.514			60	1.322
72	50.110	165	.516			65	1.233
74	50.040	170	.519			70	1.152
76	49.970	175	.521			75	1.078
78	49.900	180	.524				
80	49.830	185	.526				
82	49.760	190	.529				
84	49.690	195	.531				

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	70	.041		N		N
	N	80	.056		O		O
	S	90	.075		T		T
	O	100	.099				
	L	110	.130		P		P
	U	120	.168		E		E
	B	130	.217		R		R
	L	140	.277		T		T
	E	150	.350		I		I
		160	.440		N		N
		170	.548		E		E
		180	.679		N		N
		190	.835		T		T
		200	1.021				
		210	1.241				
		220	1.500				
		230	1.802				
		240	2.154				
		250	2.562				
		260	3.033				
		270	3.573				
		280	4.192				
		290	4.896				
		300	5.695				

OILS, FUEL: 2-D

OTD

Common Synonyms Diesel oil, medium	Oily liquid Yellow-brown Lube or fuel oil odor	Oily liquid Yellow-brown Lube or fuel oil odor	Oily liquid Yellow-brown Lube or fuel oil odor
Floats on water.			
Stop discharge if possible. Call fire department. Avoid contact with liquid. Isolate and remove discharged material. Notify local health and pollution control agencies.			
Fire	Combustible. Extinguish with dry chemical, foam, carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.		
Exposure	CALL FOR MEDICAL AID. LIQUID Irritating to 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.		
Water Pollution	Dangerous to aquatic life in high concentrations. Fouling to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.		
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Mechanical containment Should be removed Chemical and physical treatment		2. LABEL 2.1 Category: None 2.2 Class: Not pertinent	
3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures 3.2 Formula: Not applicable 3.3 IMO/IUN Designation: 3.1/127D 3.4 DOT ID No.: 1270 3.5 CAS Registry No.: Data not available		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Light brown 4.3 Odor: Characteristic	
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Protective gloves, goggles or face shield. 5.2 Symptoms Following Exposure: INGESTION causes nausea, vomiting, and cramping; depression of central nervous system ranging from mild headache to anesthesia, coma, and death; pulmonary irritation secondary to exhalation of solvent; signs of kidney and liver damage may be delayed. ASPIRATION causes severe lung irritation with coughing, gagging, dyspnea, subternal distress, and rapidly developing pulmonary edema; later, signs of bronchopneumonia and pneumonia; acute onset of central nervous system excitement followed by depression. 5.3 Treatment of Exposure: INGESTION: do NOT induce vomiting. ASPIRATION: enforce bed rest; administer oxygen; seek medical attention. EYES: wash with copious quantity of water. SKIN: remove solvent by wiping and wash with soap and water. 5.4 Threshold Limit Value: No single TLV applicable. 5.5 Short Term Inhalation Limit: Data not available 5.6 Toxicity by Ingestion: Grade 1; LD ₅₀ = 5-15 g/kg 5.7 Late Toxicity: Data not available 5.8 Vapor (Gas) Irritant Characteristics: Slight smarting of 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 skin. 5.10 Odor Threshold: Data not available 5.11 IDLH Value: Data not available			

6. FIRE HAZARDS 6.1 Flash Point: 125°F C.C. 6.2 Flammable Limits in Air: 1.3%-6.0% 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: Not pertinent 6.7 Ignition Temperature: 490-545°F 6.8 Electrical Hazard: Not pertinent 6.9 Burning Rate: 4 mm/min. 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available	10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U 11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Combustible liquid 11.2 MAS Hazard Rating for Bulk Water Transportation: Not listed 11.3 MFPA Hazard Classification: <table style="width: 100%; border: none;"> <tr> <td style="text-align: right;">Category</td> <td style="text-align: right;">Classification</td> </tr> <tr> <td style="text-align: right;">Health Hazard (Blue)</td> <td style="text-align: right;">0</td> </tr> <tr> <td style="text-align: right;">Flammability (Red)</td> <td style="text-align: right;">2</td> </tr> <tr> <td style="text-align: right;">Reactivity (Yellow)</td> <td style="text-align: right;">0</td> </tr> </table>	Category	Classification	Health Hazard (Blue)	0	Flammability (Red)	2	Reactivity (Yellow)	0
Category	Classification								
Health Hazard (Blue)	0								
Flammability (Red)	2								
Reactivity (Yellow)	0								
7. CHEMICAL REACTIVITY 7.1 Reactivity With Water: No reaction 7.2 Reactivity with Common Materials: No reaction 7.3 Stability During Transport: Stable 7.4 Neutralizing Agents for Acids and Caustics: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Molar Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 33	12. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 16°C and 1 atm: Liquid 12.2 Molecular Weight: Not pertinent 12.3 Boiling Point at 1 atm: 540-640°F = 282-336°C = 555-611°K 12.4 Freezing Point: 0°F = 18°C = 255°K 12.5 Critical Temperature: Not pertinent 12.6 Critical Pressure: Not pertinent 12.7 Specific Gravity: 0.87-0.90 at 20°C (liquid) 12.8 Liquid Surface Tension: Data not available 12.9 Liquid Water Interfacial Tension: Data not available 12.10 Vapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent 12.12 Latent Heat of Vaporization: Not pertinent 12.13 Heat of Combustion: -18,440 Btu/lb = -10,800 cal/g = -452.17 X 10 ⁴ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: Data not available 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: Data not available								
8. WATER POLLUTION 8.1 Aquatic Toxicity: 204 mg/1/24 hr/Juvenile American shad/TL ₅₀ /salt water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): Data not available 8.4 Food Chain Concentration Potential: None	9. SHIPPING INFORMATION 9.1 Grade or Purity: Diesel fuel 2-D (ASTM) 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester)								
NOTES									

OTD

OILS, FUEL: 2-D

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 (estimate)	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
50	54.310	0	.414	35	.908	0	3.773
52	54.310	5	.416	40	.908	10	3.397
54	54.310	10	.419	45	.908	20	3.071
56	54.310	15	.421	50	.908	30	2.788
58	54.310	20	.424	55	.908	40	2.541
60	54.310	25	.426	60	.908	50	2.324
62	54.310	30	.428	65	.908	60	2.134
64	54.310	35	.431	70	.908	70	1.965
66	54.310	40	.433	75	.908	80	1.815
68	54.310	45	.436	80	.908	90	1.681
70	54.310	50	.438	85	.908	100	1.561
72	54.310	55	.440	90	.908	110	1.454
74	54.310	60	.443	95	.908	120	1.358
76	54.310	65	.445	100	.908	130	1.270
78	54.310	70	.448	105	.908	140	1.191
80	54.310	75	.450	110	.908	150	1.120
82	54.310	80	.452	115	.908	160	1.054
84	54.310	85	.455	120	.908	170	.995
		90	.457	125	.908	180	.940
		95	.460			190	.890
		100	.462			200	.844
						210	.802

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	55	.456		N		N
	N	60	.474		O		O
	S	65	.492		T		T
	O	70	.510				
	L	75	.529		P		P
	U	80	.548		E		E
	B	85	.567		R		R
	L	90	.587		T		T
	E	95	.607		I		I
		100	.627		N		N
		105	.647		E		E
		110	.668		N		N
		115	.689		E		E
		120	.711		N		N
		125	.732		T		T
		130	.754				

OILS, FUEL: 2-D

OTD

Common Synonyms Diesel oil, medium	Oily liquid Yellow-brown Lube or fuel oil odor	Oily liquid Yellow-brown Lube or fuel oil odor	Lube or fuel oil odor
Floats on water.			
Stop discharge if possible. Call fire department. Avoid contact with liquid. Isolate and remove discharged material. Notify local health and pollution control agencies.			
Fire	Combustible. Extinguish with dry chemical, foam, carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.		
Exposure	CALL FOR MEDICAL AID. LIQUID Irritating to 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.		
Water Pollution	Dangerous to aquatic life in high concentrations. Fouling to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.		
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Mechanical containment Should be removed Chemical and physical treatment		2. LABEL 2.1 Category: None 2.2 Class: Not pertinent	
3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures 3.2 Formula: Not applicable 3.3 BBO/UN Designation: 3.1/1270 3.4 DOT ID No.: 1270 3.5 CAS Registry No.: Data not available		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Light brown 4.3 Odor: Characteristic	
5. HEALTH HAZARDS			
5.1 Personal Protective Equipment: Protective gloves; goggles or face shield. 5.2 Symptoms Following Exposure: INGESTION causes nausea, vomiting, and cramping; depression of central nervous system ranging from mild headache to anesthesia, coma, and death; pulmonary irritation secondary to exhalation of solvent; signs of kidney and liver damage may be delayed. ASPIRATION causes severe lung irritation with coughing, gagging, dyspnea, substernal distress, and rapidly developing pulmonary edema; later, signs of bronchopneumonia and pneumonia; acute onset of central nervous system excitement followed by depression. 5.3 Treatment of Exposure: INGESTION: do NOT induce vomiting. ASPIRATION: enforce bed rest; administer oxygen; seek medical attention. EYES: wash with copious quantity of water. SKIN: remove solvent by wiping and wash with soap and water. 5.4 Threshold Limit Value: No single TLV applicable. 5.5 Short Term Inhalation Limits: Data not available. 5.6 Toxicity by Ingestion: Grade 1; LD ₅₀ = 5-15 g/kg 5.7 Late Toxicity: Data not available. 5.8 Vapor (Gas) Irritant Characteristics: Slight smarting of eyes or respiratory system if present in high concentrations. The effect is temporary. 5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If applied on clothing and allowed to remain, may cause smarting and reddening of skin. 5.10 Odor Threshold: Data not available. 5.11 IDLH Value: Data not available.			

6. FIRE HAZARDS 6.1 Flash Point: 125°F C.C. 6.2 Flammable Limits in Air: 1.3%-6.0% 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: Not pertinent 6.7 Ignition Temperature: 490-545°F 6.8 Electrical Hazard: Not pertinent 6.9 Burning Rate: 4 mm/min. 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available	10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U								
7. CHEMICAL REACTIVITY 7.1 Reactivity With Water: No reaction 7.2 Reactivity with Common Materials: No reaction 7.3 Stability During Transport: Stable 7.4 Neutralizing Agents for Acids and Caustics: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Molar Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 33									
8. WATER POLLUTION 8.1 Aquatic Toxicity: 204 mg/l/24 hr/Juvenile American shad/TL ₅₀ /fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): Data not available 8.4 Food Chain Concentration Potential: None									
9. SHIPPING INFORMATION 9.1 Grades of Purity: Diesel fuel 2-D (ASTM) 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester)									
11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Combustible liquid 11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed 11.3 NFPA Hazard Classification: <table style="width: 100%; border: none;"> <tr> <td style="text-align: right;">Category</td> <td style="text-align: right;">Classification</td> </tr> <tr> <td style="text-align: right;">Health Hazard (Blue)</td> <td style="text-align: right;">0</td> </tr> <tr> <td style="text-align: right;">Flammability (Red)</td> <td style="text-align: right;">2</td> </tr> <tr> <td style="text-align: right;">Reactivity (Yellow)</td> <td style="text-align: right;">0</td> </tr> </table>		Category	Classification	Health Hazard (Blue)	0	Flammability (Red)	2	Reactivity (Yellow)	0
Category	Classification								
Health Hazard (Blue)	0								
Flammability (Red)	2								
Reactivity (Yellow)	0								
12. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: Not pertinent 12.3 Boiling Point at 1 atm: 540-540°F = 282-338°C = 555-611°K 12.4 Freezing Point: 0°F = 18°C = 255°K 12.5 Critical Temperature: Not pertinent 12.6 Critical Pressure: Not pertinent 12.7 Specific Gravity: 0.87-0.90 at 20°C (liquid) 12.8 Liquid Surface Tension: Data not available 12.9 Liquid Water Interfacial Tension: Data not available 12.10 Vapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent 12.12 Latent Heat of Vaporization: Not pertinent 12.13 Heat of Combustion: -19,440 Btu/lb = -10,800 cal/g = -452.17 x 10 ³ 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: Data not available									
NOTES									

OTD

OILS, FUEL: 2-D

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 (estimate)	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
50	54.310	0	.414	35	.908	0	3.773
52	54.310	5	.416	40	.908	10	3.397
54	54.310	10	.419	45	.908	20	3.071
56	54.310	15	.421	50	.908	30	2.788
58	54.310	20	.424	55	.908	40	2.541
60	54.310	25	.426	60	.908	50	2.324
62	54.310	30	.428	65	.908	60	2.134
64	54.310	35	.431	70	.908	70	1.965
66	54.310	40	.433	75	.908	80	1.815
68	54.310	45	.436	80	.908	90	1.681
70	54.310	50	.438	85	.908	100	1.561
72	54.310	55	.440	90	.908	110	1.454
74	54.310	60	.443	95	.908	120	1.358
76	54.310	65	.445	100	.908	130	1.270
78	54.310	70	.448	105	.908	140	1.191
80	54.310	75	.450	110	.908	150	1.120
82	54.310	80	.452	115	.908	160	1.054
84	54.310	85	.455	120	.908	170	.995
		90	.457	125	.908	180	.940
		95	.460			190	.890
		100	.462			200	.844
						210	.802

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 N S O L U B L E	55	.456		N O T P E R T I N E N T		N O T P E R T I N E N T
		60	.474				
		65	.492				
		70	.510				
		75	.529				
		80	.548				
		85	.567				
		90	.587				
		95	.607				
		100	.627				
		105	.647				
		110	.668				
		115	.689				
		120	.711				
	125	.732					
	130	.754					

POLYCHLORINATED BIPHENYL

PCB

Common Synonyms PCB Chlorinated biphenyl Arochlor Halogenated waxes Polychlorobiphenyls		Only liquid to solid powder Sinks in water.	Light yellow liquid, or white powder Weak odor
Stop discharge if possible. Keep people away. Avoid contact with liquid and solid. Call fire department. Isolate and remove discharged material. Notify local health and pollution control agencies.			
Fire	Combustible Extinguish with water, foam, dry chemical, or carbon dioxide.		
Exposure	CALL FOR MEDICAL AID LIQUID OR SOLID Irritating to skin and eyes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water.		
Water Pollution	HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.		
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-water contaminant Should be removed Chemical and physical treatment		2. LABEL 2.1 Category: None 2.2 Class: Not pertinent	
3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Not listed 3.2 Formula: $(C_{12}H_{10-x}Cl_x)_n$ 3.3 IMO/IH Designation: Not listed 3.4 DOT ID No.: 2315 3.5 CAS Registry No.: 1336-96-3		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid or solid 4.2 Color: Pale yellow (liquid), colorless (solid) 4.3 Odor: Practically odorless	
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Gloves and protective garments. 5.2 Symptoms Following Exposure: Acne from skin contact. 5.3 Treatment of Exposure: SKIN: wash with soap and water. 5.4 Threshold Limit Value: 0.5 to 1.0 mg/m ³ 5.5 Short Term Inhalation Limits: Data not available 5.6 Toxicity by Ingestion: Grade 2; oral rat LD ₅₀ = 3980 mg/kg 5.7 Late Toxicity: Causes chromosomal abnormalities in rats, birth defects in birds 5.8 Vapor (Gas) Irritant Characteristics: Vapors cause severe irritation of eyes and throat and cause eye and lung injury. They cannot be tolerated even at low concentrations. 5.9 Liquid or Solid Irritant Characteristics: Contact with skin may cause irritation. 5.10 Odor Threshold: Data not available 5.11 IDLH Value: 5 to 10 mg/m ³			

6. FIRE HAZARDS 6.1 Flash Point: > 286°F 6.2 Flammable Limits in Air: Data not available 6.3 Fire Extinguishing Agents: Water, foam, dry chemical, or carbon dioxide 6.4 Fire Extinguishing Agents Not to be Used: Not pertinent 6.5 Special Hazards of Combustion: Products: Irritating gases are generated in fires 6.6 Behavior in Fire: Not pertinent 6.7 Ignition Temperature: Data not available 6.8 Electrical Hazard: Not pertinent 6.9 Burning Rate: Data not available 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available	10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) II
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: Data not available	11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: ORM-E 11.2 MAS Hazard Rating for Bulk Water Transportation: Not listed 11.3 NFPA Hazard Classification: Not listed
8. WATER POLLUTION 8.1 Aquatic Toxicity: 0.278 ppm/96 hr/bluegill/TL ₅₀ /fresh water 0.005 ppm/336-1080 hr/pinfish/TL ₅₀ /salt water 8.2 Waterfowl Toxicity: LD ₅₀ 2000 ppm (mallard duck) 8.3 Biological Oxygen Demand (BOD): Very low 8.4 Food Chain Concentration Potential: High	12. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 15°C and 1 atm: Solid 12.2 Molecular Weight: Not pertinent 12.3 Boiling Point at 1 atm: Very high 12.4 Freezing Point: Not pertinent 12.5 Critical Pressure: Not pertinent 12.6 Critical Temperature: Not pertinent 12.7 Specific Gravity: 1.3-1.8 at 20°C (liquid) 12.8 Liquid Surface Tension: Not pertinent 12.9 Liquid Water Interfacial Tension: Not pertinent 12.10 Vapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent 12.12 Latent Heat of Vaporization: Not pertinent 12.13 Heat of Combustion: Not pertinent 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: Data not available 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: Data not available
9. SHIPPING INFORMATION 9.1 Grades of Purity: 11 grades (some liquid, some solids) which differ primarily in their chlorine content (20%-68% by weight) 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open	NOTES

PCB

POLYCHLORINATED BIPHENYL

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 (estimate)	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
68	81.150		N O T P E R T I N E N T		N O T P E R T I N E N T		N O T P E R T I N E N T
69	81.150						
70	81.150						
71	81.150						
72	81.150						
73	81.150						
74	81.150						
75	81.150						
76	81.150						
77	81.150						
78	81.150						
79	81.150						
80	81.150						
81	81.150						
82	81.150						
83	81.150						
84	81.150						
85	81.150						

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 N S O L U B L E		N O T P E R T I N E N T		N O T P E R T I N E N T		N O T P E R T I N E N T

POLYCHLORINATED BIPHENYL

PCB

Common Synonyms PCB Chlorinated biphenyl Arochlor Halogenated waxes Polychlorobiphenyls		Only liquid to solid powder Sinks in water.	Light yellow liquid, or white powder Weak odor
Stop discharge if possible. Keep people away. Avoid contact with liquid and solid. Call fire department. Isolate and remove discharged material. Notify local health and pollution control agencies.			
Fire		Combustible May react with water, form explosive chemical compounds.	
Exposure		CALL FOR MEDICAL AID LIQUID OR SOLID Irritating to skin and eyes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water.	
Water Pollution		HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.	
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-water contaminant Should be removed Chemical and physical treatment		2. LABEL 2.1 Category: None 2.2 Class: Not pertinent	
3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Not listed 3.2 Formula: $(C_{12}H_{10-x}Cl_x)_n$ 3.3 IMO/IUM Designation: Not listed 3.4 DOT ID No.: 2315 3.5 CAS Registry No.: 1336-36-3		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid or solid 4.2 Color: Pale yellow (liquid); colorless (solid) 4.3 Odor: Practically odorless	
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Gloves and protective garments. 5.2 Symptoms Following Exposure: Acne from skin contact. 5.3 Treatment of Exposure: SKIN: wash with soap and water. 5.4 Threshold Limit Value: 0.5 to 1.0 mg/m ³ 5.5 Short Term Inhalation Limits: Data not available 5.6 Toxicity by Ingestion: Grade 2; oral rat LD ₅₀ = 9980 mg/kg 5.7 Late Toxicity: Causes chromosomal abnormalities in rats, birth defects in birds 5.8 Vapor (Gas) Irritant Characteristics: Vapors cause severe irritation of eyes and throat and cause eye and lung injury. They cannot be tolerated even at low concentrations. 5.9 Liquid or Solid Irritant Characteristics: Contact with skin may cause irritation. 5.10 Odor Threshold: Data not available 5.11 IDLH Value: 5 to 10 mg/m ³			

6. FIRE HAZARDS 6.1 Flash Point: > 266°F 6.2 Flammable Limits in Air: Data not available 6.3 Fire Extinguishing Agents: Water, foam, dry chemical, or carbon dioxide 6.4 Fire Extinguishing Agents Not to be Used: Not pertinent 6.5 Special Hazards of Combustion: Products: Irritating gases are generated in fires. 6.6 Behavior in Fire: Not pertinent 6.7 Ignition Temperature: Data not available 6.8 Electrical Hazard: Not pertinent 6.9 Burning Rate: Data not available 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: Data not available	
8. WATER POLLUTION 8.1 Aquatic Toxicity: 0.276 ppm/96 hr/bluegill/TL ₅₀ /fresh water 0.005 ppm/336-1080 hr/pinfish/TL ₅₀ /salt water 8.2 Waterfowl Toxicity: LD ₅₀ 2000 ppm (mallard duck) 8.3 Biological Oxygen Demand (BOD): Very low 8.4 Food Chain Concentration Potential: High	
9. SHIPPING INFORMATION 9.1 Grades of Purity: 11 grades (some liquid, some solids) which differ primarily in their chlorine content (20%-68% by weight) 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open	
NOTES	

10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) II	
11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: ORM-E 11.2 NAB Hazard Rating for Bulk Water Transportation: Not listed 11.3 MFPA Hazard Classification: Not listed	
12. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 15°C and 1 atm: Solid 12.2 Molecular Weight: Not pertinent 12.3 Boiling Point at 1 atm: Very high 12.4 Freezing Point: Not pertinent 12.5 Critical Temperature: Not pertinent 12.6 Critical Pressure: Not pertinent 12.7 Specific Gravity: 1.3-1.8 at 20°C (liquid) 12.8 Liquid Surface Tension: Not pertinent 12.9 Liquid Water Interfacial Tension: Not pertinent 12.10 Vapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent 12.12 Latent Heat of Vaporization: Not pertinent 12.13 Heat of Combustion: Not pertinent 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: Data not available 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: Data not available	

PCB

POLYCHLORINATED BIPHENYL

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 (estimate)	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
68	81.150		N		N		N
69	81.150		O		O		O
70	81.150		T		T		T
71	81.150						
72	81.150		P		P		P
73	81.150		E		E		E
74	81.150		R		R		R
75	81.150		T		T		T
76	81.150		I		I		I
77	81.150		N		N		N
78	81.150		E		E		E
78	81.150		N		N		N
80	81.150		E		E		E
81	81.150		N		N		N
82	81.150						
83	81.150						
84	81.150						
85	81.150						

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 N S O L U B L E		N O T P E R T I N E N T		N O T P E R T I N E N T		N O T P E R T I N E N T

TOLUENE

TOL

Common Synonyms Toluol Methylbenzene Methylbenzol		Watery liquid Colorless Pleasant odor
Floats on water. Flammable, irritating vapor is produced.		
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.		
Fire	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.	
Exposure	CALL FOR MEDICAL AID 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 difficult, give oxygen. LIQUID Irritating to skin and eyes. If swallowed, will cause nausea, vomiting or loss of consciousness. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. DO NOT INDUCE VOMITING.	
Water Pollution	Dangerous to aquatic life in high concentrations. Fouling to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.	
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability Evacuate area		2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3
3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Aromatic Hydrocarbon 3.2 Formula: C ₇ H ₈ 3.3 IMD/UN Designation: 3.2/1294 3.4 DOT ID No.: 1294 3.5 CAS Registry No.: 108-88-3		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Pungent; aromatic, benzene-like; distinct, pleasant
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Air-supplied mask; goggles or face shield; plastic gloves. 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. 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. 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; LD ₅₀ = 0.5 to 5 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		

6. FIRE HAZARDS 6.1 Flash Point: 40°F C.C.; 55°F O.C. 6.2 Flammable Limits in Air: 1.27%-7% 6.3 Fire Extinguishing Agents: Carbon dioxide or dry chemical for small fires, ordinary foam for large fires. 6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective. 6.5 Special Hazards of Combustion: Products: Not pertinent. 6.6 Behavior in Fire: Vapor is heavier than air and may travel a considerable distance to a source of ignition and flash back. 6.7 Ignition Temperature: 997°F 6.8 Electrical Hazard: Class I, Group D 6.9 Burning Rate: 5.7 mm/min. 6.10 Adiabatic Flame Temperature: Data not available.	10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U																																				
(Continued)	11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Flammable liquid 11.2 MAS Hazard Rating for Bulk Water Transportation: <table border="1"> <thead> <tr> <th>Category</th> <th>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 Effect</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> 11.3 NFPA Hazard Classification: <table border="1"> <thead> <tr> <th>Category</th> <th>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 Effect	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 Effect	2																																				
Reactivity																																					
Other Chemicals	1																																				
Water	0																																				
Self Reaction	0																																				
Category	Classification																																				
Health Hazard (Blue)	2																																				
Flammability (Red)	3																																				
Reactivity (Yellow)	0																																				
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 Motor Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 2	12. PHYSICAL AND CHEMICAL PROPERTIES 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 = 363.8°K 12.4 Freezing Point: -39°F = -65.0°C = 178.2°K 12.5 Critical Temperature: 605.4°F = 318.8°C = 561.8°K 12.6 Critical Pressure: 596.1 psia = 40.55 atm = 4.108 MN/m ² 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): 1.069 12.12 Latent Heat of Vaporization: 155 Btu/lb = 86.1 cal/g = 3.61 X 10 ⁴ J/kg 12.13 Heat of Combustion: -17,490 Btu/lb = -9696 cal/g = -405.5 X 10 ⁴ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: 17.17 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 1.1 psia																																				
8. WATER POLLUTION 8.1 Aquatic Toxicity: 1180 mg/l/96 hr/sunfish/TL ₅₀ /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 Chain Concentration Potential: None	9. SHIPPING INFORMATION 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 arrestor) or pressure-vacuum																																				
6. FIRE HAZARDS (Continued) 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available																																					

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				
		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	2.680	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

TOLUENE

TOL

Common Synonyms Toluol Methylbenzene Methylbenzol		Watery liquid Colorless Pleasant odor
Floats on water. Flammable, irritating vapor is produced.		
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.		
Fire	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.	
Exposure	CALL FOR MEDICAL AID 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 difficult, give oxygen. LIQUID Irritating to skin and eyes. If swallowed, will cause nausea, vomiting or loss of consciousness. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. DO NOT INDUCE VOMITING.	
Water Pollution	Dangerous to aquatic life in high concentrations. Floating to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.	
1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability. Evacuate area.		2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3
3. CHEMICAL DESIGNATIONS 3.1 DG Compatibility Class: Aromatic Hydrocarbon 3.2 Formula: C ₇ H ₈ 3.3 IMO/UN Designation: 3.2/1294 3.4 DOT ID No.: 1204 3.5 CAS Registry No.: 108-88-3		4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Pungent, aromatic, benzene-like; distinct, pleasant
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Air-supplied mask; goggles or face shield; plastic gloves. 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. 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. 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; LD ₅₀ = 0.5 to 5 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		

6. FIRE HAZARDS 6.1 Flash Point: 40°F C.C.; 55°F D.C. 6.2 Flammable Limits in Air: 1.27%-7% 6.3 Fire Extinguishing Agents: Carbon dioxide or dry chemical for small fires, ordinary foam for large fires. 6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective 6.5 Special Hazards of Combustion Products: Not pertinent 6.6 Behavior in Fire: Vapor is heavier than air and may travel a considerable distance to a source of ignition and flash back. 6.7 Ignition Temperature: 997°F 6.8 Electrical Hazard: Class I, Group D 6.9 Burning Rate: 5.7 mm/min. 6.10 Adiabatic Flame Temperature: Data not available (Continued)	10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-J																																				
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	11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Flammable liquid 11.2 MAS Hazard Rating for Bulk Water Transportation: <table border="1"> <thead> <tr> <th>Category</th> <th>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 Effect</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> 11.3 NFPA Hazard Classification: <table border="1"> <thead> <tr> <th>Category</th> <th>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 Effect	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 Effect	2																																				
Reactivity																																					
Other Chemicals	1																																				
Water	0																																				
Self Reaction	0																																				
Category	Classification																																				
Health Hazard (Blue)	2																																				
Flammability (Red)	3																																				
Reactivity (Yellow)	0																																				
8. WATER POLLUTION 8.1 Aquatic Toxicity: 1180 mg/L/96 hr (sunfish/TL ₅₀ /fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 0%, 5 days; 36% (theor), 8 days 8.4 Food Chain Concentration Potential: None	12. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 16°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: 805.4°F = 318.6°C = 591.8°K 12.6 Critical Pressure: 596.1 psia = 40.55 atm = 4.108 MN/m ² 12.7 Specific Gravity: 0.867 at 20°C (liquid) 12.8 Liquid Surface Tension: 28.0 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): 1.069 12.12 Latent Heat of Vaporization: 155 Btu/lb = 86.1 cal/g = 3.61 X 10 ⁵ J/kg 12.13 Heat of Combustion: -17,430 Btu/lb = -8686 cal/g = -405.5 X 10 ⁴ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: 17.17 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 1.1 psia																																				
9. SHIPPING INFORMATION 9.1 Grades of Purity: Research, reagent, nitration: 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	6. FIRE HAZARDS (Continued) 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available																																				

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

XLN

<p>Common Synonyms 1,3-Dimethylbenzene Xylol</p>		<p>Watery liquid Colorless Sweet odor</p> <p>Floats on water. Flammable, irritating vapor is produced.</p>
<p>Stop discharge if possible. Keep people away. Call fire department. Avoid contact with liquid and vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.</p>		
<p>Fire</p>	<p>FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Vapor is a serious breathing hazard. Extinguish with foam, dry chemical, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.</p>	
<p>Exposure</p>	<p>CALL FOR MEDICAL AID.</p> <p>VAPOR Irritating to eyes, nose, and throat. If inhaled, will cause headache, difficult breathing, or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.</p> <p>LIQUID Irritating to skin and eyes. 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>HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. Fouling to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.</p>	
<p>1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability Evacuate area Should be removed Chemical and physical treatment</p>		<p>2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3</p>
<p>3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Aromatic Hydrocarbon 3.2 Formula: m-C₈H₁₀(CH₃)₂ 3.3 IMO/IUN Designation: 3.2/1307 3.4 DOT ID No.: 1307 3.5 CAS Registry No.: 106-36-3</p>		<p>4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Like benzene; characteristic aromatic</p>
<p>5. HEALTH HAZARDS</p> <p>5.1 Personal Protective Equipment: Approved canister or air-supplied mask; goggles or face shield; plastic gloves and boots.</p> <p>5.2 Symptoms Following Exposure: Vapors cause headache and dizziness. Liquid irritates eyes and skin. If taken into lungs, causes severe coughing, distress, and rapidly developing pulmonary edema. If ingested, causes nausea, vomiting, cramps, headache, and coma; can be fatal. Kidney and liver damage can occur.</p> <p>5.3 Treatment of Exposure: INHALATION: remove to fresh air; administer artificial respiration and oxygen if required; call a doctor. INGESTION: do NOT induce vomiting; call a doctor. EYES: flush with water for at least 15 min. SKIN: wipe off; wash with soap and water.</p> <p>5.4 Threshold Limit Value: 100 ppm</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 on 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>6. FIRE HAZARDS</p> <p>6.1 Flash Point: 84°F C.C.</p> <p>6.2 Flammable Limits in Air: 1.1%-6.4%</p> <p>6.3 Fire Extinguishing Agents: Foam, dry chemical, or carbon dioxide</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 considerable distance to a source of ignition and flash back.</p> <p>6.7 Ignition Temperature: 986°F</p> <p>6.8 Electrical Hazard: Class I, Group D</p> <p>6.9 Burning Rate: 5.8 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) A-T-U</p>																																				
<p>7. CHEMICAL REACTIVITY</p> <p>7.1 Reactivity With Water: No reaction</p> <p>7.2 Reactivity with Common Materials: No reaction</p> <p>7.3 Stability During Transport: Stable</p> <p>7.4 Neutralizing Agents for Acids and Caustics: Not pertinent</p> <p>7.5 Polymerization: Not pertinent</p> <p>7.6 Inhibitor of Polymerization: Not pertinent</p> <p>7.7 Molar Ratio (Reactant to Product): Data not available</p> <p>7.8 Reactivity Group: 82</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 border="1"> <thead> <tr> <th>Category</th> <th>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>3</td> </tr> <tr> <td>Aquatic Toxicity.....</td> <td>3</td> </tr> <tr> <td>Aesthetic Effect.....</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 border="1"> <thead> <tr> <th>Category</th> <th>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.....	3	Aquatic Toxicity.....	3	Aesthetic Effect.....	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.....	3																																				
Aquatic Toxicity.....	3																																				
Aesthetic Effect.....	2																																				
Reactivity.....																																					
Other Chemicals.....	1																																				
Water.....	0																																				
Self Reaction.....	0																																				
Category	Classification																																				
Health Hazard (Blue).....	2																																				
Flammability (Red).....	3																																				
Reactivity (Yellow).....	0																																				
<p>8. WATER POLLUTION</p> <p>8.1 Aquatic Toxicity: 22 ppm/96 hr/bluegill/TL₅₀/fresh water</p> <p>8.2 Waterfowl Toxicity: Data not available</p> <p>8.3 Biological Oxygen Demand (BOD): 0 lb/lb, 5 days: 0% (theor.); 8 days</p> <p>8.4 Food Chain Concentration Potential: Data not available</p>	<p>12. PHYSICAL AND CHEMICAL PROPERTIES</p> <p>12.1 Physical State at 15°C and 1 atm: Liquid</p> <p>12.2 Molecular Weight: 106.16</p> <p>12.3 Boiling Point at 1 atm: 268.4°F = 131.9°C = 405.1°K</p> <p>12.4 Freezing Point: -54.2°F = -47.9°C = 225.3°K</p> <p>12.5 Critical Temperature: 650.8°F = 343.8°C = 617.0°K</p> <p>12.6 Critical Pressure: 513.8 atm = 34.95 psia = 3.540 MN/m²</p> <p>12.7 Specific Gravity: 0.864 at 20°C (liquid)</p> <p>12.8 Liquid Surface Tension: 26.6 dynes/cm = 0.0266 N/m at 20°C</p> <p>12.9 Liquid Water Interfacial Tension: 36.4 dynes/cm = 0.0364 N/m at 30°C</p> <p>12.10 Vapor (Gas) Specific Gravity: Not pertinent</p> <p>12.11 Ratio of Specific Heats of Vapor (Gas): 1.071</p> <p>12.12 Latent Heat of Vaporization: 147 Btu/lb = 81.9 cal/g = 3.43 X 10⁴ J/kg</p> <p>12.13 Heat of Combustion: -17,564 Btu/lb = -8752.4 cal/g = -406.31 X 10⁴ J/kg</p> <p>12.14 Heat of Decomposition: Not pertinent</p> <p>12.16 Heat of Solution: Not pertinent</p> <p>12.16 Heat of Polymerization: Not pertinent</p> <p>12.25 Heat of Fusion: 26.01 cal/g</p> <p>12.26 Limiting Value: Data not available</p> <p>12.27 Reid Vapor Pressure: 0.34 psia</p>																																				
<p>9. SHIPPING INFORMATION</p> <p>9.1 Grade or Purity: Research: 99.99%; Pure: 99.9%; Technical: 99.2%</p> <p>9.2 Storage Temperature: Ambient</p> <p>9.3 Inert Atmosphere: No requirement</p> <p>9.4 Venting: Open (flame arrester) or pressure-vacuum</p>	<p>NOTES</p>																																				

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
	I N S O L U B L E	60	.090	60	.00172	0	.247
		70	.127	70	.00238	25	.260
		80	.177	80	.00324	50	.273
		90	.242	90	.00435	75	.286
		100	.326	100	.00577	100	.299
		110	.434	110	.00754	125	.311
		120	.571	120	.00975	150	.324
		130	.743	130	.01247	175	.336
		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	

m-XYLENE

XLM

<p>Common Synonyms 1,3-Dimethylbenzene Xylol</p>	<p>Watery liquid</p>	<p>Colorless</p>	<p>Sweet odor</p>
<p>Floets on water. Flammable, irritating vapor is produced.</p>			
<p>Stop discharge if possible. Keep people away. Call fire department. Avoid contact with liquid and vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.</p>			
<p>Fire</p>	<p>FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Extinguish with foam, dry chemical, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.</p>		
<p>Exposure</p>	<p>CALL FOR MEDICAL AID.</p> <p>VAPOR Irritating to eyes, nose, and throat. If inhaled, will cause headache, difficult breathing, or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.</p> <p>LIQUID Irritating to skin and eyes. 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>HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. Floating to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.</p>		
<p>1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability Evacuate area Should be removed Chemical and physical treatment</p>		<p>2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3</p>	
<p>3. CHEMICAL DESIGNATIONS 3.1 CG Compatibility Class: Aromatic Hydrocarbon 3.2 Formula: m-C₈H₁₀(CH₃)₂ 3.3 IMO/UN Designation: 3.2/1307 3.4 DOT ID No.: 1307 3.5 CAS Registry No.: 106-36-3</p>		<p>4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Like benzene; characteristic aromatic</p>	
<p>5. HEALTH HAZARDS</p>			
<p>5.1 Personal Protective Equipment: Approved canister or air-supplied mask; goggles or face shield, plastic gloves and boots 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 g/kg 5.7 Lethal 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 applied 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</p>			

<p>6. FIRE HAZARDS</p> <p>6.1 Flash Point: 84°F C.C. 6.2 Flammable Limits in Air: 1.1%-6.4% 6.3 Fire Extinguishing Agents: Foam, dry chemical, or carbon dioxide 6.4 Fire Extinguishing Agents Not to be Used: Water 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: 866°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>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: 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 Chain Concentration Potential: Data not available</p> <p>9. SHIPPING INFORMATION</p> <p>9.1 Grades of Purity: Research: 99.99%; Pure: 99.9%; Technical: 99.2% 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester) or pressure-vacuum</p>	<p>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 NFPA 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 Effect</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> <p>12. PHYSICAL AND CHEMICAL PROPERTIES</p> <p>12.1 Physical State at 15°C and 1 atm: Liquid 12.2 Molecular Weight: 106.16 12.3 Boiling Point at 1 atm: 269.4°F = 131.9°C = 405.1°K 12.4 Freezing Point: -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: 0.864 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 = 61.8 cal/g = 3.43 x 10⁴ J/kg 12.13 Heat of Combustion: -17,554 Btu/lb = -8752.4 cal/g = -408.31 x 10⁴ 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>	Category	Rating	Fire	3	Health		Vapor Irritant	1	Liquid or Solid Irritant	1	Poisons	2	Water Pollution		Human Toxicity	1	Aquatic Toxicity	3	Aesthetic Effect	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 Effect	2																																				
Reactivity																																					
Other Chemicals	1																																				
Water	0																																				
Self Reaction	0																																				
Category	Classification																																				
Health Hazard (Blue)	2																																				
Flammability (Red)	3																																				
Reactivity (Yellow)	0																																				
<p>NOTES</p>																																					

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
	I N S O L U B L E	60	.090	60	.00172	0	.247
		70	.127	70	.00238	25	.260
		80	.177	80	.00324	50	.273
		90	.242	90	.00435	75	.286
		100	.326	100	.00577	100	.299
		110	.434	110	.00754	125	.311
		120	.571	120	.00975	150	.324
		130	.743	130	.01247	175	.336
		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	.448
		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 Synonyms 1, 2-Dimethylbenzene Xylol	Watery liquid Colorless Sweet odor Floats on water. Flammable, irritating vapor is produced.
Stop discharge if possible. Keep people away. Call fire department. Avoid contact with liquid and vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.	
Fire	FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Weigh before using in breathing apparatus. Extinguish with foam, dry chemical, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.
Exposure	CALL FOR MEDICAL AID. VAPOR Irritating to eyes, nose and throat. If inhaled, will cause headache, difficult breathing, or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. LIQUID Irritating to skin and eyes. If swallowed, will cause nausea, vomiting, or loss of consciousness. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. DO NOT INDUCE VOMITING.
Water Pollution	Dangerous to aquatic life in high concentrations. Fouling to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.
1. RESPONSE TO DISCHARGE (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: $C_8H_{10}(CH_3)_2$ 3.3 IMO/UN Designation: 3.2/1307 3.4 DOT ID No.: 1307 3.5 CAS Registry No.: 95-47-6	4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Benzene-like, characteristic aromatic
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Approved canister or air-supplied mask; goggles or face shield, plastic gloves and boots. 5.2 Symptoms Following Exposure: Vapors cause headache and dizziness. Liquid irritates eyes and skin. If taken into lungs, causes severe coughing, distress, and rapidly developing pulmonary edema. If ingested, causes nausea, vomiting, cramps, headache, and coma. Can be fatal. Kidney and liver damage can occur. 5.3 Treatment of Exposure: INHALATION: remove to fresh air; administer artificial respiration and oxygen if required; call a doctor. INGESTION: do NOT induce vomiting; call a doctor. EYES: flush with water for at least 15 min. SKIN: wipe off, wash with soap and water. 5.4 Threshold Limit Value: 100 ppm 5.5 Short Term Inhalation Limits: 300 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 3; LD ₅₀ = 50 to 500 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: 63°F C.C.; 75°F D.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 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: 869°F 6.8 Electrical Hazard: Class I, Group D 6.9 Burning Rate: 5.8 mm/min. 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available
7. CHEMICAL REACTIVITY 7.1 Reactivity With Water: No reaction 7.2 Reactivity with Common Materials: No reaction 7.3 Stability During Transport: Stable 7.4 Neutralizing Agents for Acids and Caustics: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Inhibitor of Polymerization: Not pertinent 7.7 Molar Ratio (Reactant to Product): Data not available 7.8 Reactivity Group: 32

8. WATER POLLUTION 8.1 Aquatic Toxicity: > 100 mg/l/96 hr/D, magna/TL ₅₀ /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 Chain Concentration Potential: Data not available
--

9. SHIPPING INFORMATION 9.1 Grades of Purity: Research: 99.99%; Pure: 99.7%; Commercial: 95+% 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No reaction 9.4 Venting: Open (flame arrester) or pressure-vacuum

10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U																																				
11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Flammable liquid 11.2 NAS Hazard Rating for Bulk Water Transportation: <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 Effect.....</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> 11.3 NFPA Hazard Classification: <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 Effect.....	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 Effect.....	2																																			
Reactivity.....																																				
Other Chemicals.....	1																																			
Water.....	0																																			
Self Reaction.....	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: 281.9°F = 144.4°C = 417.6°K 12.4 Freezing Point: -13.3°F = -25.2°C = 248.0°K 12.5 Critical Temperature: 674.6°F = 357.1°C = 630.3°K 12.6 Critical Pressure: 541.5 atm = 36.84 psia = 3.732 MN/m ² 12.7 Specific Gravity: 0.880 at 20°C (liquid) 12.8 Liquid Surface Tension: 30.53 dynes/cm = 0.00553 N/m at 15.5°C 12.9 Liquid Water Interfacial Tension: 36.06 dynes/cm = 0.00606 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 10 ⁴ J/kg 12.13 Heat of Combustion: -17,656 Btu/lb = -9754.7 cal/g = -406.41 X 10 ⁴ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: 30.64 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 0.28 psia
--

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	1.277	160	.02038	250	.381
		170	1.605	170	.02520	275	.392
		180	1.999	180	.03090	300	.403
		190	2.469	180	.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

O-XYLENE

XLO

<p>Common Synonyms 1,2-Dimethylbenzene Xylol</p>	<p>Wetly liquid Colorless Sweet odor</p> <p>Floats on water. Flammable, irritating vapor is produced.</p>
<p>Stop discharge if possible. Keep people away. Call fire department. Avoid contact with liquid and vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.</p>	
Fire	<p>FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. 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. Floating to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.</p>
<p>1. RESPONSE TO DISCHARGE (See Response Methods Handbook) Issue warning-high flammability Evacuate area Should be removed Chemical and physical treatment</p>	<p>2. LABEL 2.1 Category: Flammable liquid 2.2 Class: 3</p>
<p>3. CHEMICAL DESIGNATIONS 3.1 CO Compatibility Class: Aromatic Hydrocarbon 3.2 Formula: C₈H₁₀(CH₃)₂ 3.3 IMO/IUN Designation: 3.2/1307 3.4 DOT ID No.: 1307 3.5 CAS Registry No.: 95-47-6</p>	<p>4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Benzene-like; characteristic aromatic</p>
5. HEALTH HAZARDS	
<p>6.1 Personal Protective Equipment: Approved canister or air-supplied mask, goggles or face shield, plastic gloves and boots. 6.2 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. 6.3 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. 6.4 Threshold Limit Value: 100 ppm 6.5 Short Term Inhalation Limits: 300 ppm for 30 min. 6.6 Toxicity by Ingestion: Grade 3; LD₅₀ = 50 to 500 mg/kg 6.7 Late Toxicity: Kidney and liver damage. 6.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary. 6.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin. 6.10 Odor Threshold: 0.05 ppm 6.11 IDLH Value: 10,000 ppm</p>	

<p>6. FIRE HAZARDS 6.1 Flash Point: 63°F C.C.; 75°F O.C. 6.2 Flammable Limits in Air: 1.1%-7.0% 6.3 Fire Extinguishing Agents: Foam, dry chemical, or carbon dioxide 6.4 Fire Extinguishing Agents Not to be Used: Water 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: 659°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>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</p>
8. WATER POLLUTION	
<p>8.1 Aquatic Toxicity: >100 mg/l/96 hr/D. magna/TL₅₀/fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 0 lb/d. 5 days; 2.5% (theor.), 5 days 8.4 Food Chain Concentration Potential: Data not available</p>	
9. SHIPPING INFORMATION	
<p>9.1 Grades of Purity: Research: 99.99%; Pure: 99.7%; Commercial: 95 + % 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No reaction 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 11.1 Code of Federal Regulations: Flammable liquid 11.2 NFPA Hazard Rating for Bulk Water Transportation: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Category</th> <th style="text-align: center;">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;">0</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;">0</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 Effect.....</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Reactivity.....</td> <td style="text-align: right;">0</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>	Category	Rating	Fire.....	3	Health.....	0	Vapor Irritant.....	1	Liquid or Solid Irritant.....	1	Poisons.....	2	Water Pollution.....	0	Human Toxicity.....	1	Aquatic Toxicity.....	3	Aesthetic Effect.....	2	Reactivity.....	0	Other Chemicals.....	1	Water.....	0	Self Reaction.....	0
Category	Rating																											
Fire.....	3																											
Health.....	0																											
Vapor Irritant.....	1																											
Liquid or Solid Irritant.....	1																											
Poisons.....	2																											
Water Pollution.....	0																											
Human Toxicity.....	1																											
Aquatic Toxicity.....	3																											
Aesthetic Effect.....	2																											
Reactivity.....	0																											
Other Chemicals.....	1																											
Water.....	0																											
Self Reaction.....	0																											
<p>11.3 NFPA Hazard Classification: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Category</th> <th style="text-align: center;">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> </p>	Category	Classification	Health Hazard (Blue).....	2	Flammability (Red).....	3	Reactivity (Yellow).....	0																				
Category	Classification																											
Health Hazard (Blue).....	2																											
Flammability (Red).....	3																											
Reactivity (Yellow).....	0																											
<p>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: 201.9°F = 144.4°C = 417.6°K 12.4 Freezing Point: -13.3°F = -25.2°C = 248.0°K 12.5 Critical Temperature: 674.8°F = 357.1°C = 630.3°K 12.6 Critical Pressure: 541.5 atm = 36.84 psia = 3.732 MN/m² 12.7 Specific Gravity: 0.880 at 20°C (liquid) 12.8 Liquid Surface Tension: 30.53 dynes/cm = 0.03053 N/m at 15.5°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 10⁴ J/kg 12.13 Heat of Combustion: -17,558 Btu/lb = -8754.7 cal/g = -406.41 X 10⁴ 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: 0.26 psia</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 N S O L U B I L I T Y	60	.071	60	.00135	0	.261
		70	.101	70	.00188	25	.274
		80	.141	80	.00258	50	.287
		90	.194	90	.00349	75	.299
		100	.263	100	.00464	100	.311
		110	.352	110	.00611	125	.323
		120	.465	120	.00794	150	.335
		130	.609	130	.01021	175	.347
		140	.787	140	.01298	200	.358
		150	1.007	150	.01634	225	.370
		160	1.277	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 Synonyms 1, 4-Dimethylbenzene Xylol		Watery liquid Colorless Sweet odor
Floats on water. Flammable. Irritating vapor is produced. Freezing point is 56°F.		
Stop discharge if possible. Keep people away. Call fire department. Avoid contact with liquid and vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.		
Fire	FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear self-contained breathing apparatus. Extinguish with foam, dry chemical, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.	
Exposure	CALL FOR MEDICAL AID. VAPOR Irritating to eyes, nose and throat. If inhaled, will cause dizziness, difficult breathing, or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. LIQUID Irritating to skin and eyes. If swallowed, will cause nausea, vomiting, loss of consciousness. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. DO NOT INDUCE VOMITING.	
Water Pollution	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.	
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: p-C ₈ H ₁₀ (CH ₃) ₂ 3.3 IMO/IUN Designation: 3.2/1307 3.4 DOT ID No.: 1307 3.5 CAS Registry No.: 106-42-3	4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Like benzene; characteristic aromatic.	
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Approved canister or air-supplied mask; goggles or face shield; plastic gloves and boots. 5.2 Symptoms Following Exposure: Vapors cause headache and dizziness. Liquid irritates eyes and skin. If taken into lungs, causes severe coughing, distress, and rapidly developing pulmonary edema. If ingested, causes nausea, vomiting, cramps, headache, and coma. Can be fatal. Kidney and liver damage can occur. 5.3 Treatment of Exposure: #INHALATION: remove to fresh air; administer artificial respiration and oxygen if required; call a doctor. #INGESTION: do NOT induce vomiting; call a doctor. #EYES: flush with water for at least 15 min. #SKIN: wipe off, wash with soap and water. 5.4 Threshold Limit Value: 100 ppm 5.5 Short Term Inhalation Limits: 300 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 3; LD ₅₀ = 50 to 500 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: 5.6 mm/min 6.10 Adiabatic Flame Temperature: Data not available. 6.11 Stoichiometric Air to Fuel Ratio: Data not available. 6.12 Flame Temperature: Data not available.	10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U																																				
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.	11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Flammable liquid 11.2 MAS Hazard Rating for Bulk Water Transportation: <table border="1"> <thead> <tr> <th>Category</th> <th>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 Effect</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> 11.3 NFPA Hazard Classification: <table border="1"> <thead> <tr> <th>Category</th> <th>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 Effect	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 Effect	2																																				
Reactivity																																					
Other Chemicals	1																																				
Water	0																																				
Self Reaction	0																																				
Category	Classification																																				
Health Hazard (Blue)	2																																				
Flammability (Red)	3																																				
Reactivity (Yellow)	0																																				
8. WATER POLLUTION 8.1 Aquatic Toxicity: 22 ppm/96 hr/bluegill/TL ₅₀ /fresh water 8.2 Waterfowl Toxicity: Data not available. 8.3 Biological Oxygen Demand (BOD): 0 lb/lb in 5 days 8.4 Food Chain Concentration Potential: Data not available.	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 280.9°F = 138.3°C = 411.5°K 12.4 Freezing Point: 55.9°F = 13.3°C = 266.5°K 12.5 Critical Temperature: 648.4°F = 343.0°C = 616.2°K 12.6 Critical Pressure: 509.4 atm = 34.85 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 = 61 cal/g = 3.4 X 10 ⁴ J/kg 12.13 Heat of Combustion: -17,550 Btu/lb = -8754.7 cal/g = -408.41 X 10 ⁴ J/kg 12.14 Heat of Decomposition: Not pertinent. 12.15 Heat of Solution: Not pertinent. 12.16 Heat of Polymerization: Not pertinent. 12.25 Heat of Fusion: 37.83 cal/g 12.26 Limiting Value: Data not available. 12.27 Reid Vapor Pressure: 0.34 psia																																				
9. SHIPPING INFORMATION 9.1 Grades of Purity: Research: 99.99%; Pure 99.9%; Technical 99.0% 9.2 Storage Temperature: Ambient 9.3 Inert Atmosphere: No requirement 9.4 Venting: Open (flame arrester) or pressure-vacuum	NOTES																																				

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

p-XYLENE

XLP

Common Synonyms 1,4-Dimethylbenzene Xylol		Watery liquid Colorless Sweet odor
Floats on water. Flammable, irritating vapor is produced. Freezing point is 56°F.		
Stop discharge if possible. Keep people away. Call fire department. Avoid contact with liquid and vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.		
Fire	FLAMMABLE Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear self-contained breathing apparatus. Extinguish with foam, dry chemical, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.	
Exposure	CALL FOR MEDICAL AID. VAPOR Irritating to eyes, nose and throat. If inhaled, will cause dizziness, difficult breathing, or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. LIQUID Irritating to skin and eyes. If swallowed, will cause nausea, vomiting, loss of consciousness. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. DO NOT INDUCE VOMITING.	
Water Pollution	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.	
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: $p-C_6H_4(CH_3)_2$ 3.3 IMO/IUN Designation: 3.2/1307 3.4 DOT ID No.: 1307 3.5 CAS Registry No.: 106-42-3	4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Colorless 4.3 Odor: Like benzene; characteristic aromatic	
5. HEALTH HAZARDS 5.1 Personal Protective Equipment: Approved canister or air-supplied mask; goggles or face shield; plastic gloves and boots. 5.2 Symptoms Following Exposure: Vapors cause headache and dizziness. Liquid irritates eyes and skin. If taken into lungs, causes severe coughing, distress, and rapidly developing pulmonary edema. If ingested, causes nausea, vomiting, cramps, headache, and coma. Can be fatal. Kidney and liver damage can occur. 5.3 Treatment of Exposure: INHALATION: remove to fresh air; administer artificial respiration and oxygen if required; call a doctor. INGESTION: do NOT induce vomiting; call a doctor. EYES: flush with water for at least 15 min. SKIN: wipe off, wash with soap and water. 5.4 Threshold Limit Value: 100 ppm 5.5 Short Term Inhalation Limits: 300 ppm for 30 min. 5.6 Toxicity by Ingestion: Grade 3, LD ₅₀ = 50 to 500 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: 5.6 mm/min. 6.10 Adiabatic Flame Temperature: Data not available 6.11 Stoichiometric Air to Fuel Ratio: Data not available 6.12 Flame Temperature: Data not available	10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U																																				
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	11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Flammable liquid 11.2 NAS Hazard Rating for Bulk Water Transportation: <table border="1"> <thead> <tr> <th>Category</th> <th>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 Effect.....</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>Sol. Reaction.....</td> <td>0</td> </tr> </tbody> </table> 11.3 NFPA Hazard Classification: <table border="1"> <thead> <tr> <th>Category</th> <th>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 Effect.....	2	Reactivity.....		Other Chemicals.....	1	Water.....	0	Sol. 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 Effect.....	2																																				
Reactivity.....																																					
Other Chemicals.....	1																																				
Water.....	0																																				
Sol. Reaction.....	0																																				
Category	Classification																																				
Health Hazard (Blue).....	2																																				
Flammability (Red).....	3																																				
Reactivity (Yellow).....	0																																				
8. WATER POLLUTION 8.1 Aquatic Toxicity: 22 ppm/96 hr/bluegill/TL ₅₀ /fresh water 8.2 Waterfowl Toxicity: Data not available 8.3 Biological Oxygen Demand (BOD): 0 lb/lb in 5 days 8.4 Food Chain Concentration Potential: Data not available	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 = 188.3°C = 411.5°K 12.4 Freezing Point: 56.9°F = 13.3°C = 265.5°K 12.5 Critical Temperature: 648.4°F = 343.0°C = 616.2°K 12.6 Critical Pressure: 508.4 atm = 34.85 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: 37.6 dynes/cm = 0.0376 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 ⁴ J/kg 12.13 Heat of Combustion: -17,568 Btu/lb = -9754.7 cal/g = -408.41 X 10 ⁴ J/kg 12.14 Heat of Decomposition: Not pertinent 12.15 Heat of Solution: Not pertinent 12.16 Heat of Polymerization: Not pertinent 12.25 Heat of Fusion: 37.83 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 0.34 psia																																				
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																																				

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	80	.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

SECTION 2

SITE DESCRIPTION AND HISTORY

The subject site is located in downtown Oakland and is bordered by Harrison Street on the west and Alice Street on the east, between 14th and 15th Streets (Figure 1). Lake Merritt is located approximately one-quarter mile east of the subject site. Figure 2 presents a site plan that outlines the building perimeter, adjacent streets, and suspected locations of both on-site and off-site USTs.

A garage facility utilized for parking automobiles and light trucks currently exists on the site, and essentially consists of two directly adjoining buildings. The first is the principal entrance to the parking garage at 1432 Harrison Street. This single-story building contains a partial mezzanine and is constructed of timber and masonry. The second is a multi-story garage that is on the Alice Street portion of the property and is constructed of reinforced concrete. Historical aerial photographs date construction of the buildings back some forty to fifty years.

Results of Previous Investigations

Previous investigations by others indicate that the soil is contaminated beneath the site and that such contamination includes measurable quantities of gasoline and diesel fuels, benzene, toluene, ethylbenzene, and xylenes (BTEX) aromatic constituents, and PCBs. The reported analytical results (Table 1) are based on analyses of selected soil samples collected during the drilling of 6 exploratory borings by Subsurface Consultants in October 1990. The Subsurface Consultants' report also indicates that subsurface materials consist primarily of dense, fine-grained sands containing varying amounts of clay and silt. Published geologic maps indicate that these sediments are part of the Merritt Sand Formation. Groundwater was encountered by Subsurface Consultants during the drilling at depths ranging from 23 to 25 feet below the Harrison Street grade. Information regarding groundwater flow direction is not available; however, it is presumed to flow eastward toward Lake Merritt.

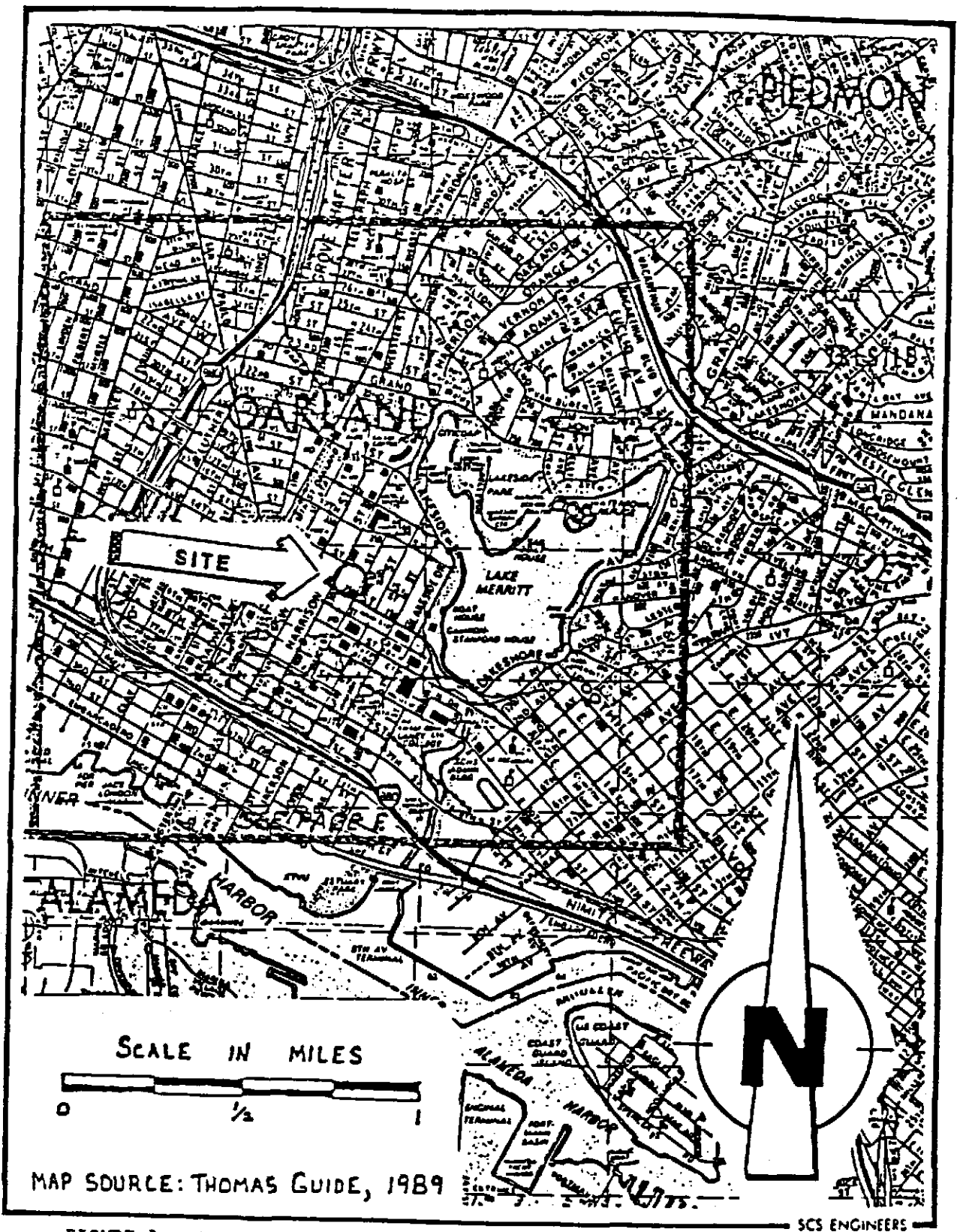


FIGURE 1: Vicinity Map Showing the Location of Subject Site

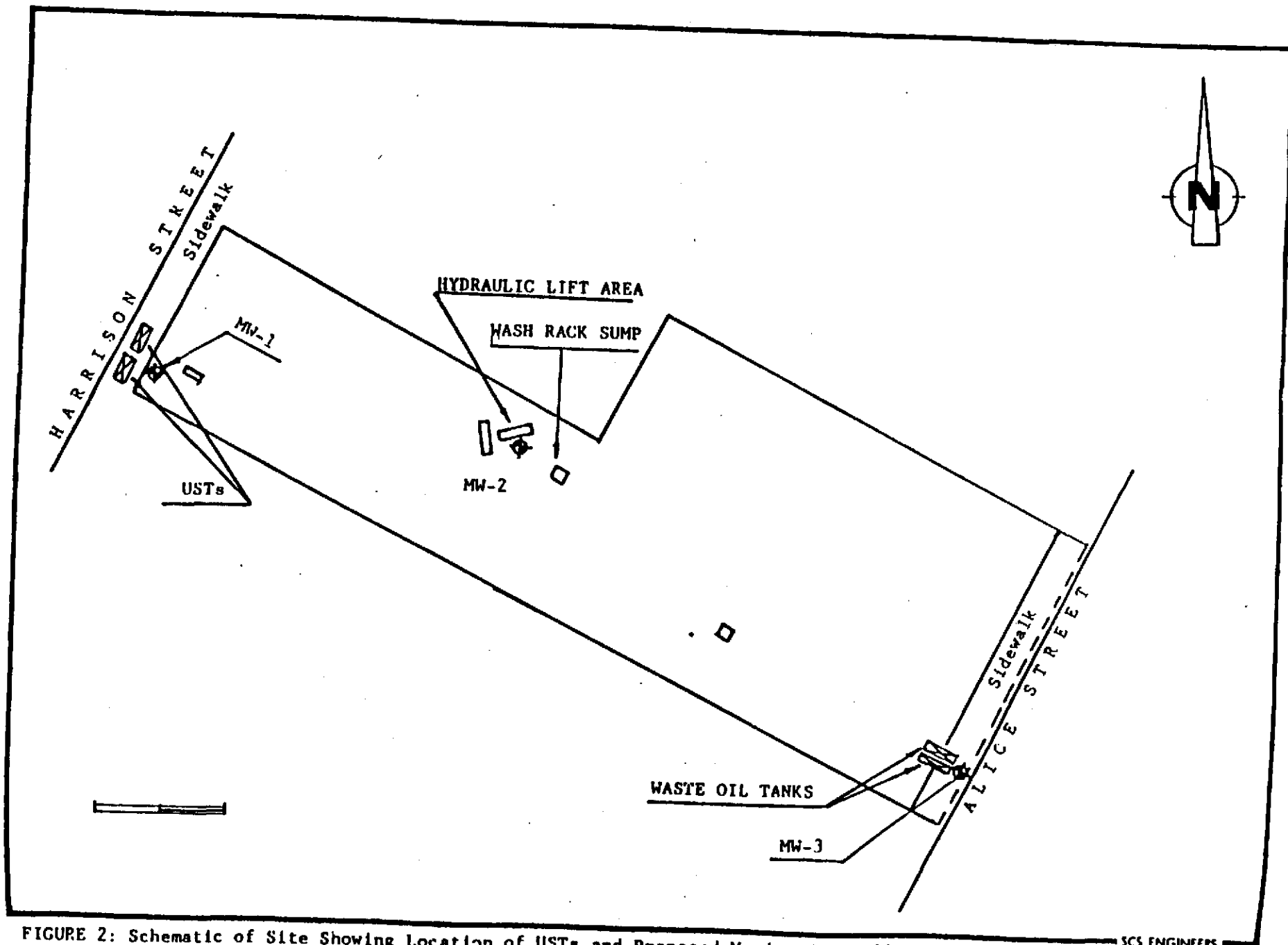


FIGURE 2: Schematic of Site Showing Location of USTs and Proposed Monitoring Wells

TABLE 1. CONTAMINANT CONCENTRATIONS IN SOIL
 (Results of Subsurface Consultants October 1990 Investigation)

<u>Boring No. & Depth (ft)</u>	<u>TVH¹ (ppm)</u>	<u>B² (ppb)</u>	<u>T³ (ppb)</u>	<u>X⁴ (ppb)</u>	<u>X⁵ (ppb)</u>	<u>TOG⁶ (ppm)</u>	<u>TKH⁷ (ppm) Keros./Diesel</u>	<u>OTHER 8010/Sol Pb/PCBs ---/(ppm)/(ppb)</u>
B1 @ 20	6,300	99,000	490,000	610,000	110,000	--- ⁸	---/---	---/---/---
B2 @ 18.5	9,300	98,000	900,000	1,100,000	190,000	---	---/---	---/0.21/---
B3 (in sump)	---	---	---	---	---	---	---/---	---/---/---
B4 @ 10	---	---	---	---	---	6,300	ND ⁹ /1,700	---/---/---
B5 @ 22.5	110	24	210	1,300	69	---	---/---	---/---/---
B6 @ 9	---	ND	ND	ND	ND	ND	98/ND	ND/0.06, ⁹ (Arochlor 1260)
B6 @ 9.5	---	---	---	---	---	ND	140/ND	---/---/---

- 1 Total Volatile Hydrocarbons, mg/kg = ppm
- 2 Benzene, ug/kg = ppb
- 3 Toluene
- 4 Xylene
- 5 Ethylbenzene
- 6 Total Oil & Grease
- 7 Total Extractable Hydrocarbons (as kerosene and diesel)
- 8 --- = Not tested for
- 9 ND = Not detected

TABLE 1. CONTAMINANT CONCENTRATIONS IN SOIL (CONT'D)
 (Results of Subsurface Consultants October 1990 Investigation)

Boring No. & Depth (ft)	TVH ¹ (ppm)	B ² (ppb)	T ³ (ppb)	X ⁴ (ppb)	X ⁵ (ppb)	TOG ⁶ (ppm)	TKH ⁷ (ppm)		OTHER 8010/Sol Pb/PCBs ---/(ppm)/(ppb)
							Keros./Diesel		
B7 @ 13	ND	ND	ND	ND	ND				
B7 @ 20	2,500	3,500	34,000	130,000	33,000	---	---/---	---/0.07/---	
B8 @ 22.5	1,200	2,300	38,000	89,000	18,000	---	---/---	---/---/---	

- 1 Total Volatile Hydrocarbons, mg/kg = ppm
- 2 Benzene, ug/kg = ppb
- 3 Toluene
- 4 Xylene
- 5 Ethylbenzene
- 6 Total Oil & Grease
- 7 Total Extractable Hydrocarbons (as kerosene and diesel)
- 8 --- = Not tested for
- 9 ND = Not detected

Suspected sources of contamination may include either on-site and/or off-site USTs. The lateral and vertical extent of contamination has not yet been defined. A previous geophysical investigation by J. R. Associates completed in August 1990 disclosed the presence of several USTs and associated facilities within the boundaries of the subject site. A description of these tanks and a summary of investigative and remedial actions which have been performed to date are presented below.

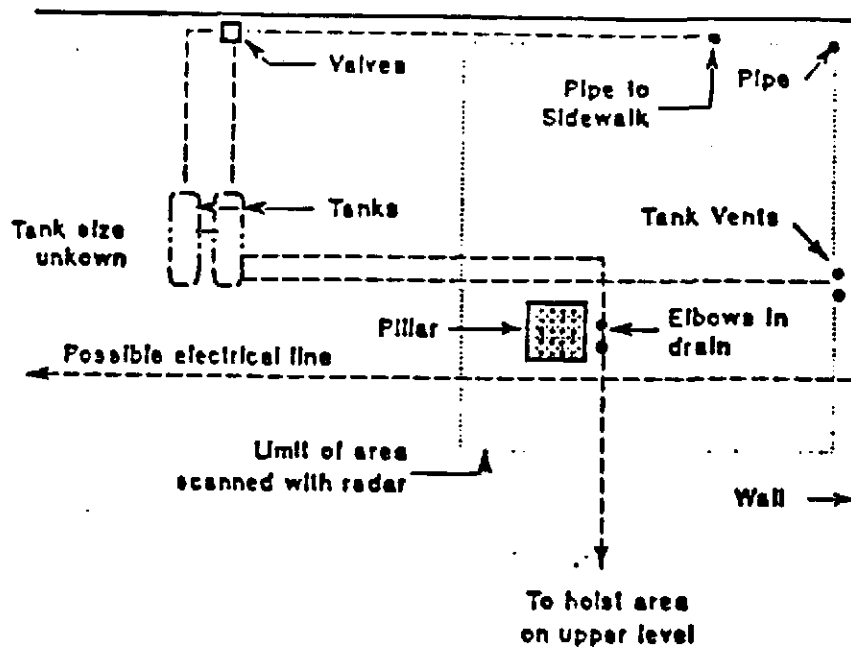
Waste Oil Tanks

Two waste oil tanks are located beneath the basement floor of the multi-story parking structure along Alice Street. Figure 3 shows the tanks and associated piping and vent lines in the area. The date of installation of these tanks is unknown. No records have been located which have documented the capacity or composition of these tanks. However, it is believed that each tank has an approximately 1000-gallon capacity and is of steel construction. On October 27, 1990, Falcon Energy drained the contents of both tanks by removing a combined total of 1300-gallons of waste oil from them.

Gasoline Tanks

Two gasoline tanks are located near the western property boundary beneath the Harrison Street sidewalk in front of the entrance to the garage. Permits issued to a former long-term tenant of the garage, Douglas Motor Services, show that these tanks each have 1000-gallon capacities, are of steel construction, and were installed in 1975 and 1982, respectively. On October 27, 1990, Falcon Energy removed most gasoline (total less than 200 gallons) from the tanks. The condition of these two tanks is unknown, although a sample collected from one was discolored by rust. The recovered gasoline and waste oil was accepted and utilized by a recycling contractor.

It should be noted that there is evidence of two other abandoned-in-place USTs a few feet west of the above-described gasoline tanks, beneath the Harrison Street sidewalk of the adjacent property. These tanks and property are owned and operated by other parties.



EXPLANATION:

----- Buried Line

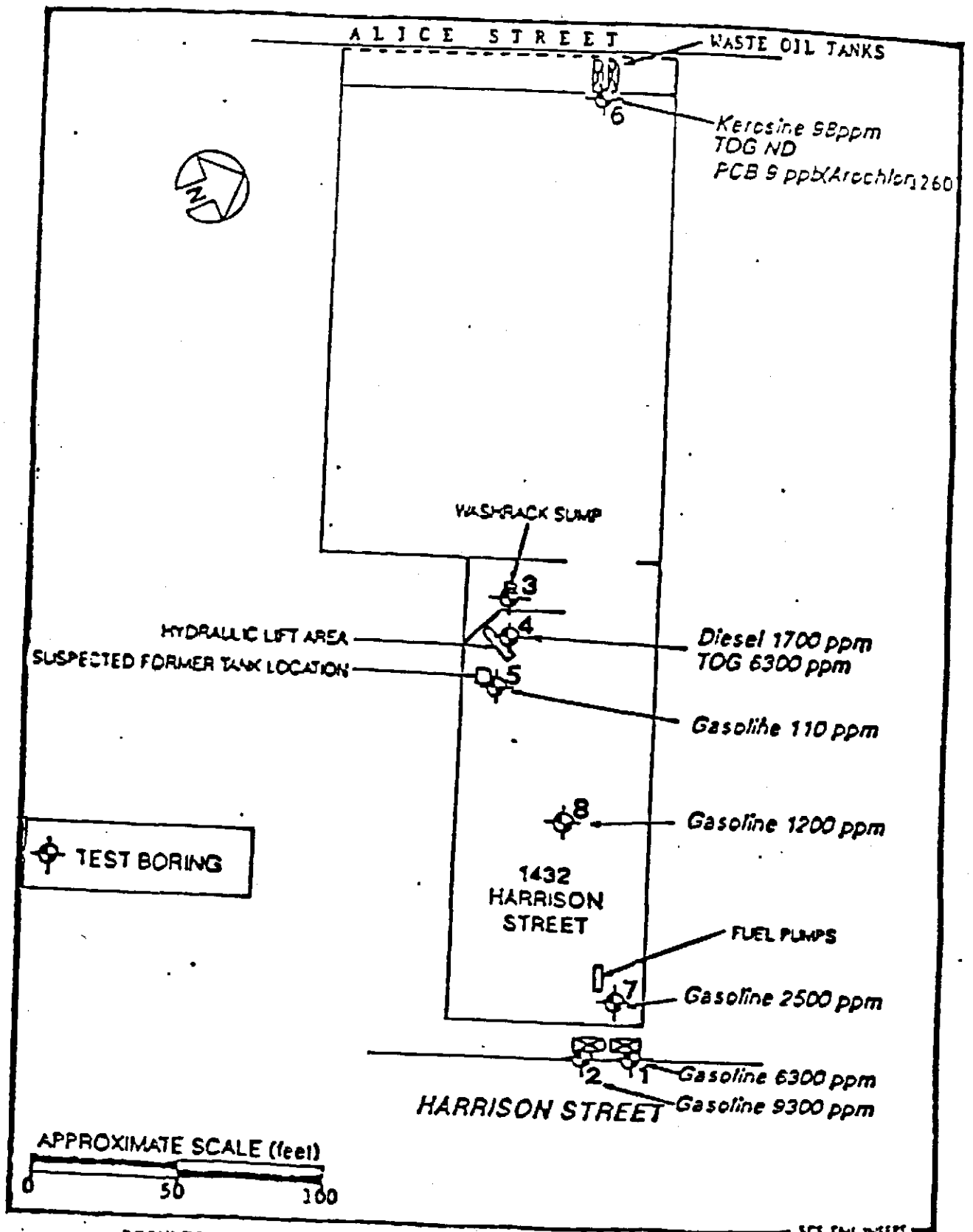
SCS ENGINEERS

FIGURE 3: Detailed Site Plan of Alice Street Basement Garage, Showing Tank and Associated Piping Locations based on Geophysical Survey

Hydraulic Lift Area

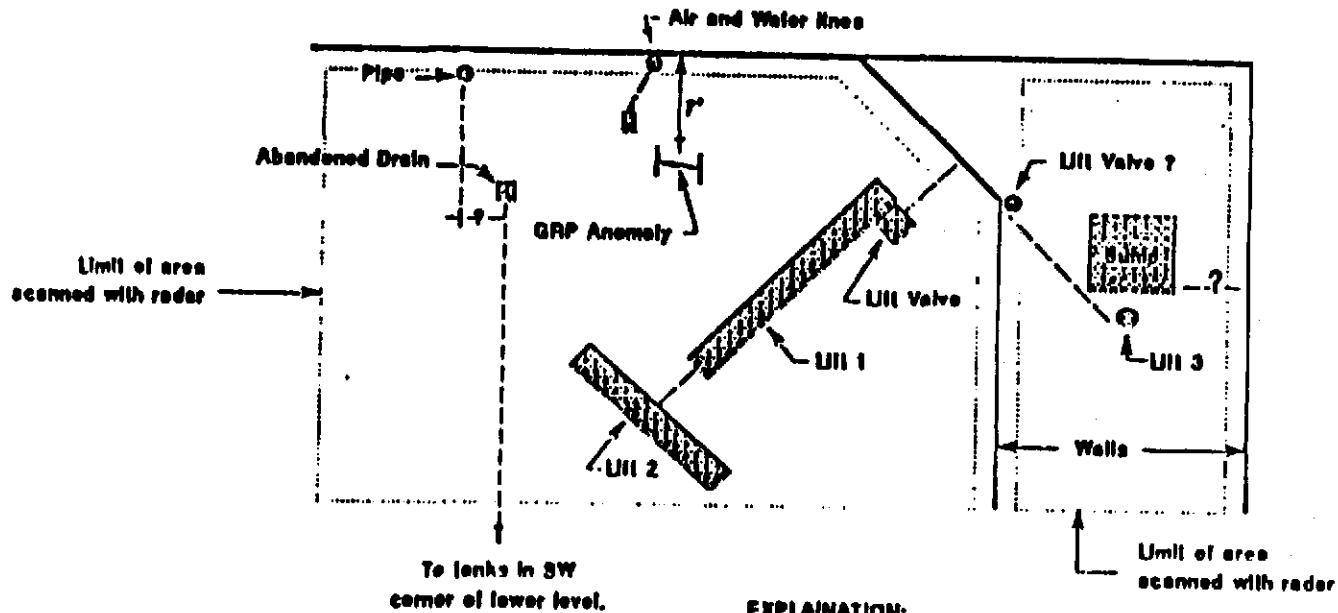
The recent J. R. Associates geophysical investigation also identified a probable underground fluid reservoir located near the hydraulic lift area as well as three hydraulic lift rams inside the Harrison Street parking garage. Figure 4 shows the hydraulic lifts and associated piping in the area; the area of the Ground Penetrating Radar (GPR) anomaly marks the suspected location of the underground fluid reservoir.

There is no available record to indicate that integrity testing has ever been performed on any of the above-described tanks. The tanks are suspected to be the principal source(s) of the site's contamination. However, the time(s) of occurrence and total quantity of product(s) lost cannot be estimated at this time.



RESULTS FROM SUBSURFACE CONSULTANTS

SCS ENGINEERS



EXPLANATION:

- Buried Line
- ?--- Possible Buried Line

FIGURE 4: Detailed Site Plan of Hydraulic Lift Area in upper Harrison Street Garage, Showing Lift and associated Piping and Suspected Underground Fluid Reservoir (GPR anomaly) areas