

ATTACHMENT III



BC Analytical

December 4, 1990

Mr. Gary Nulty
Pacific Gas and Electric Company
3400 Crow Canyon Road
San Ramon, California 94583

Dear Mr. Nulty:

BC Analytical (BCA) received a set of soils on September 26, 1990 for your project 8011. The samples were logged in under log E90-09-536 for EPA 5030/8020 and EPA 3550/modified 8015. All analytical work was completed and approved with the final report being generated on October 10, 1990. Unfortunately, due to delay in our clerical section, the report was not forwarded to you until November 16. That report, however, did not have the batch quality control data. We are enclosing a copy of the batch quality control report with this letter.

We regret any inconveniences caused by our delay in forwarding the complete report deliverables package to you. If you need more information, please contact me at (415) 428-2300.

Very truly yours,

BC Analytical

A handwritten signature in cursive script, appearing to read 'Chihsan Ho'.

Chihsan Ho
Client Services Representative

CH

Enclosures

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Emeryville, CA
94608
415/428-2300
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1. Introduction

1.1 Background

Quamm, Inc has retained RGA, Inc. to perform a site assessment/investigation at PG & E Power Plant, located at 50 Martin Luther King Way, Oakland, California (figure 1).

The purpose of the site safety plan (SSP) is to provide RGA field personnel and subcontractors with an understanding of the potential chemical and physical hazards that exist or that 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 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 Agreement and Acknowledgement Statement (Appendix A) to certify that they have read, understood and agreed to abide by this SSP and its provisions.

RGA personnel have the authority to stop work activities of our subcontractors at this site if any of the work is not executed according to the requirements of this SSP.

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 (diesel).

2.2 Site Tasks

The field tasks at this site may include:

- Excavation
- Tank Removal
- Soil Sampling

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 PID/FID and use of personal protection equipment (Table 1). Workers should stand upwind of the source of contamination whenever possible. If ambient air levels in the breathing zone exceed 100 ppm, full face respirators equipped with organic vapor cartridges must be worn.
- **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 whenever construction activity is taking place (i.e., drilling, excavation, etc.)
- **Vehicle Traffic:** All project staff 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.

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 1
Hazard Summary

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

PPE = Personal Protective Equipment

3. Personnel Protective Equipment

Modified level D is the minimum acceptable level for this site.

Modified level D includes:

- 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:

- 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 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

- 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

- 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

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

Additional information of these chemicals can be found in the Material Safety Data Sheet located in Appendix E.

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.

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.

Ongoing air monitoring during project tasks will provide data to ensure that vapor concentrations are within acceptable ranges and will provide adequate selection criteria for respiratory and dermal protection.

- If PID readings exceed 100 ppm, a NIOSH approved air-purifying respirator with organic vapor cartridges must be worn by all site workers within any area where monitoring results exceed 100 ppm.
- If PID readings exceed 750 ppm, level B protection will be required. Personnel must leave the site immediately and contact site safety officer or Health and Safety Manager for further instructions.
- Respirator cartridges will be changed once per day as a minimum. This can be done at the end of the work day 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

Note: The scope of work for this project does not include confined space entry.

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 RGA, 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.

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 examination.

7.2 Training

All personnel working 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 RGA field personnel and subcontractors.

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 the drilling operations whenever a hazardous situation is deemed present.

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, lightning and snow.

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 LFL, 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 Appendix E.

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

8. Project Personnel

RGA, Inc. 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

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 Manager

The Health and Safety Manager shall be responsible for the overall coordination and overseeing of the site safety plan.

8.3 Site Safety Officer

The Site Safety Officer shall be responsible for the implementation of the Site Safety Plan on site.

8.4 Field Team Leader

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 technician 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 outlines 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 RGA 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:

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

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

Directions: From the site, go north on Martin Luther King Street 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:

Merritt Hospital
Hawthorne & Webster Street
Oakland, CA
(510) 555-4000

<u>Environmental Emergency:</u>	<u>Phone</u>
Poison Control Center:	476-0600, or (800) 523-2222
RG&A INC.: Robert Gills	(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) 676-4498
Client: Quarm, Inc.	
Contact: Mike Franklin	

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 1.0).

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 Manager 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 Manager 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 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.):

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.

10. Health and Safety Summary

Chemicals of Concern: Gasoline, Benzene, Toluene, Ethylbenzene, and Xylene.

Hazard Determination:

Serious: Moderate: Low: X

Minimum Level of Protection: Modified Level D is the minimum acceptable level for this site.

Action Level for Upgrading Personal Protection: Upgrade from Level D to Level C at 100 ppm measured within the breathing zone. This should be determined by a photoionization detector (PID) with a 10.2 lamp or a flame ionization detector (FID).

Air Monitoring Requirements:

PID:

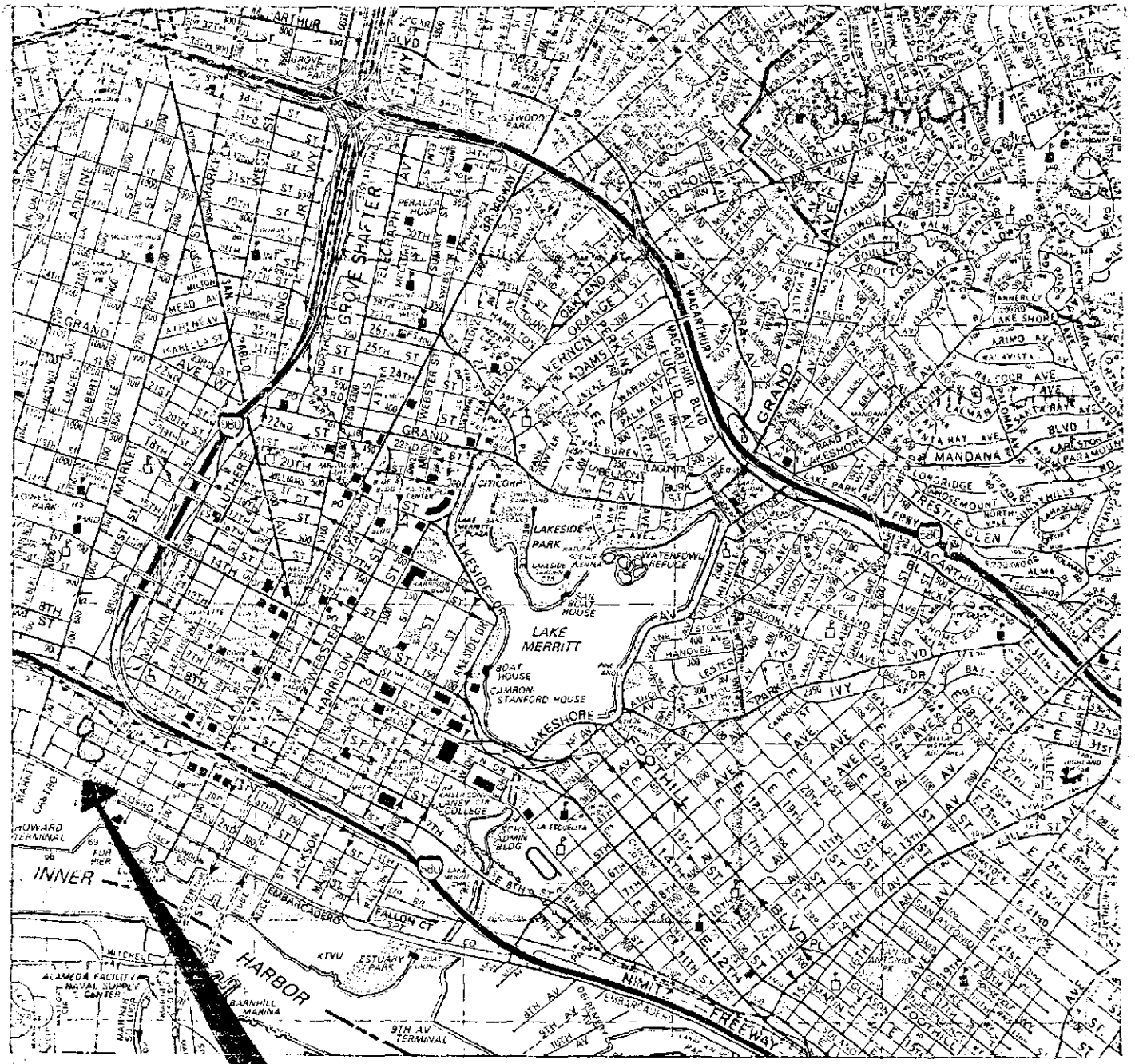
OVA:

FID

O2/LEL:

DETECTOR TUBES:

OTHER:

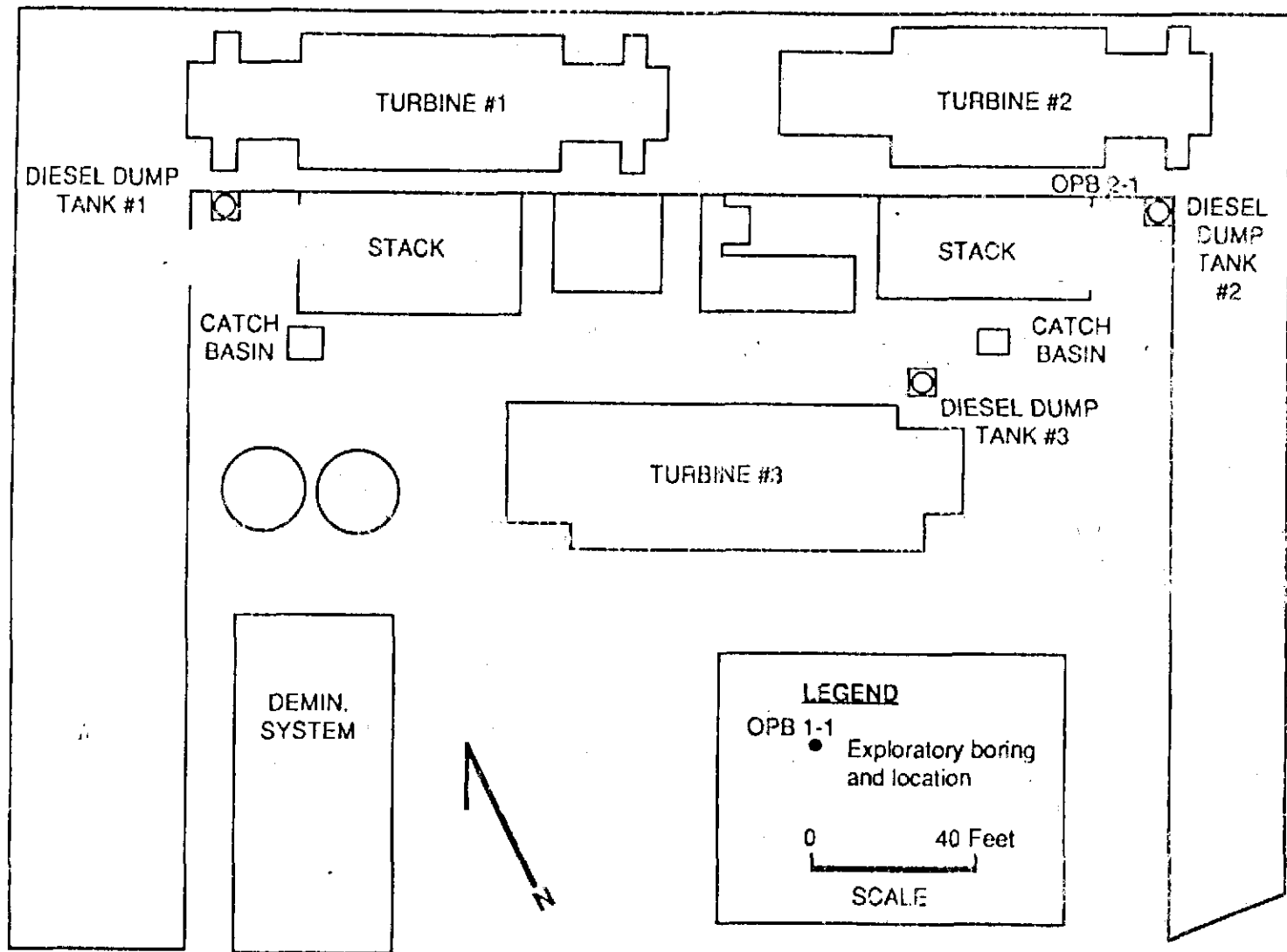


SITE

FIGURE 1

SITE LOCATION MAP: 50 MARTIN LUTHER KING WAY
OAKLAND, CALIFORNIA

90-11-859/TI-40



PG&E's Oakland Power Plant.

FIGURE 2

SITE PLAN

APPENDIX A

Agreement and Acknowledgment Statement

Site Safety Plan Agreement

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

All RGA project personnel 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:

MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION
1145 CATALYN STREET
SCHENECTADY, NY 12303-1836 USA
(518) 377-8855



GENIUM PUBLISHING CORP.

No. 467

AUTOMOTIVE
GASOLINE, LEAD-FREE

Date October 1981

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: AUTOMOTIVE GASOLINE, LEAD-FREE
DESCRIPTION: A volatile blend of hydrocarbons for automotive fuel
OTHER DESIGNATIONS: Petrol, CAS #008 006 619, ASTM D439
MANUFACTURER: Available from several suppliers.

SECTION II. INGREDIENTS AND HAZARDS

	X	HAZARD DATA
Gasoline A hydrocarbon blend that can include normal and branched chain alkanes, cycloalkanes, alkenes, aromatics and other additives.** (Lead max 0.013 g/L, phosphorus max 0.0013 g/L, sulfur max 0.10 wt%. May contain benzene, <5%; see ASTM D3606). *ACGIH 1981 TLV (Intended Changes List). See also Am. Ind. Hyg. A. 39 110-117 (1978) **The composition of fuel is varied with altitude and seasonal requirements for a locality. The blend must meet antiknock requirements. (Antiknock Index min 85, ASTM D439.)	100	8-hr TWA 300 ppm or 900 mg/m ³ * Man Eye: 500 ppm/1H Moderate irritation Inhalation: TCLo 900 ppm/1H TFX:CNS

SECTION III. PHYSICAL DATA

Distillation at 1 atm, Initial, deg C >39 Specific gravity, 60/60 F - 0.72-0.76
50% distilled - 77-121 Melting point, deg C ----- -90.5-95.4
End point ----- <240 Evaporation rate ----- N/A
Vapor density (Air=1) ----- 3.0-4.0
Solubility in water ----- Insoluble

Appearance and Odor: A clear, mobile liquid with a characteristic odor which can be recognized at about 10 ppm in air. (Gasoline may be colored with dye.)

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
-45 F	536-853 F	% by volume	1.4	7.6

Extinguishing Media: Dry chemical, carbon dioxide, alcohol foam. Use of water may be ineffective to extinguish fire, but use water spray for cooling fire-exposed drums and tanks to prevent pressure rupture. It is a dangerous fire and explosion hazard when exposed to heat and flames. Vapors can flow along surfaces, reach distant ignition sources and flash back. Can react violently with oxidizing agents.
Firefighters should wear self-contained breathing apparatus and full protective clothing.

SECTION V. REACTIVITY DATA

This is a stable material in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization.
This is an OSHA Class IA flammable liquid. A mixture of gasoline vapors and air can be explosive. It is incompatible with oxidizing agents.
Thermal-oxidative degradation can yield carbon monoxide and partially oxidized hydrocarbons.

SECTION VI. HEALTH HAZARD INFORMATION	TLV 300 ppm (See Sect. II)
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Inhalation causes intense burning of the mucous membranes, throat and respiratory tract; overexposure to vapors can lead to bronchopneumonia. Inhalation of high conc. can cause fatal pulmonary edema. Repeated or prolonged skin exposure causes dermatitis. Can cause blistering of skin due to its defatting properties. Exposure to eyes can cause hyperemia of the conjunctiva.

Ingestion or excessive vapors can cause inebriation, drowsiness, blurred vision, vertigo, confusion, vomiting and cyanosis (2000 ppm produces mild anesthesia in 30 min, higher conc. are intoxicating in less time.) Aspiration after ingestion causes bronchitis, pneumonia, or edema which can be fatal.

FIRST AID:

Eye Contact: Flush thoroughly with running water for 15 min. including under eyelids.

Skin Contact: Remove contaminated clothing. Wash affected area with soap and water.

Inhalation: Remove to fresh air. Restore breathing and administer oxygen if needed.

Ingestion: Do not induce vomiting. Aspiration hazard. Contact physician.

Seek prompt medical assistance for further treatment, observation and support.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel of leaks or spills. Remove sources of heat or ignition. Provide adequate ventilation. Clean-up personnel require protection against liquid contact and vapor inhalation. If a leak or spill has not ignited, use water spray to disperse vapors and to protect men attempting to stop the leakage. Contain spill. Do not allow to enter sewer or surface water. Add absorbent solid to small spills or residues and pick up for disposal.

DISPOSAL: Burn scrap material in an approved incinerator. Burn contaminated liquid by spraying into an incinerator. Follow Federal, State, and Local regulations.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Use general and local exhaust ventilation (explosion-proof) to keep vapors below the TLV requirements in the workplace. Respirators should be available for nonroutine or emergency use above the TLV.

Avoid eye contact by use of chemical safety goggles and/or full faceshield where splashing is possible. Wear protective clothing appropriate for the work situation to minimize skin contact such as rubber gloves and boots. Clothing to be changed daily and laundered.

Eyewash fountains, showers and washing facilities should be readily accessible. Provide suitable training to those handling and working with this material.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in closed containers in a cool, dry, well-ventilated area away from sources of heat, ignition and strong oxidizing agents. Protect containers from physical damage. Avoid direct sunlight. Storage must meet requirements of OSHA-Class IA liquid.

Outdoor or detached storage preferred. No smoking in areas of use. Prevent static electric sparks and use explosion-proof electrical services. (Must meet code.)

Avoid skin and eye contact. Avoid inhalation of vapors. Wear clean work clothing daily. Indoor use of this material requires exhaust ventilation to remove vapors.

ICC Flammable Liquid, Red Label. LABEL: Flammable Liquid DOT I.D. No. UN 1203.

DOT Classification: **FLAMMABLE LIQUID**

DATA SOURCE(S) CODE: 2.4-9.34.37

APPROVALS: MIS
CRD *J.M. Quinn*

Industrial Hygiene
and Safety *JHU 10-27-81*

MEDICAL REVIEW: 14 November 1981

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Material Safety Data Sheet

From Genium's Reference Collection
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(518) 377-8855



No. 316

BENZENE
(Revision D)
Issued: November 1978
Revised: April 1988

SECTION 1. MATERIAL IDENTIFICATION

25

Material Name: BENZENE

Description (Origin/Uses): Used in the manufacture of medicinal chemicals, dyes, linoleum, airplane dopes, varnishes, and lacquers; and as a solvent for waxes, resins, and oils.

Other Designations: Benzol; Phene; Phenylhydride; C_6H_6 ; NIOSH RTECS No. CY1400000;
CAS No. 0071-43-2

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.

HMS
H 2
F 3 R 1
R 0 I 4
PPG* S 2
*See sect. 8 K 4



SECTION 2. INGREDIENTS AND HAZARDS

EXPOSURE LIMITS

Benzene, CAS No. 0071-43-2

%
Ca 100

OSHA PEL

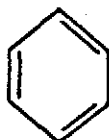
8-Hr TWA: 1 ppm
15-Min Ceiling: 5 ppm
Action Level: 0.5 ppm

ACGIH TLV, 1987-88
TLV-TWA: 10 ppm, 30 mg/m³

Toxicity Data*

Human, Inhalation, LC₅₀: 2000 ppm/5 Min
Human, Oral, TD₅₀: 130 mg/kg
Human, Inhalation, TC₅₀: 210 ppm

*See NIOSH, RTECS, for additional data with references to irritative, mutagenic, tumorigenic, and reproductive effects.



SECTION 3. PHYSICAL DATA

Boiling Point: 176°F (80°C)
Melting Point: 42°F (5.5°C)
Vapor Pressure: 75 Torrs at 68°F (20°C)
Vapor Density (Air = 1): >1

Water Solubility (%): Slight
% Volatile by Volume: 100
Molecular Weight: 78 Grams/Mole
Specific Gravity (H₂O = 1): 0.87865 at 68°F (20°C)

Appearance and Odor: A colorless liquid; characteristic aromatic odor.

SECTION 4. FIRE AND EXPLOSION DATA

LOWER UPPER

Flash Point and Method

Autoignition Temperature

Flammability Limits in Air

12°F (-11.1°C) CC

928°F (493°C)

% by Volume

1.3%

7.1%

Extinguishing Media: Use dry chemical, foam, or carbon dioxide to put out benzene fires. Water may be ineffective as an extinguishing agent because it can scatter and spread the fire. Use water to cool fire-exposed containers, flush spills away from exposures, disperse benzene vapor, and protect personnel attempting to stop an unignited benzene leak.

Unusual Fire or Explosion Hazards: Benzene vapor is heavier than air and can collect in low-lying areas such as sumps or wells.

Eliminate all sources of ignition there to prevent a dangerous flashback to the original liquid benzene. Danger: Explosive and flammable benzene vapor-air mixtures can easily form at room temperature; always use this material in a way that minimizes dispersion of its vapor into general work areas.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Benzene is stable in closed containers during routine operations. It does not undergo hazardous polymerization.

Chemical Incompatibilities: Hazardous chemical reactions involving benzene and the following materials are reported in Genium reference 84: bromine pentafluoride, chlorine, chlorine trifluoride, chromic anhydride, nitryl perchlorate, oxygen, ozone, perchlorates, perchloryl fluoride and aluminum chloride, permanganates and sulfuric acid, potassium peroxide, silver perchlorate, and sodium peroxide.

Conditions to Avoid: Avoid all exposure to sources of ignition and to incompatible chemicals.

Hazardous Products of Decomposition: Toxic gases like carbon monoxide (CO) may be produced during benzene fires.

SECTION 6. HEALTH HAZARD INFORMATION

Benzene is listed as a suspected human carcinogen by the ACGIH.

Summary of Risks: Prolonged skin contact with benzene or excessive inhalation of its vapor may cause headache, weakness, loss of appetite, and lassitude. Continued exposure can cause collapse, bronchitis, and pneumonia. The most important health hazards are cancer (leukemia), bone marrow effects, and injuries to the blood-forming tissue from chronic low-level exposure.

Medical Conditions Aggravated by Long-Term Exposure: Ailments of the heart, lungs, liver, kidneys, blood, and central nervous system (CNS) may be worsened by exposure. Administer preplacement and periodic medical exams emphasizing these organs' functions and reassign workers who test positive. **Target Organs:** Blood, CNS, bone marrow, eyes, and upper respiratory tract (URT). **Primary Entry:** Skin contact, inhalation. **Acute Effects:** Dizziness, mental dullness, nausea, headache, fatigue, and giddiness. **Chronic Effects:** Possible cancer (leukemia).

FIRST AID

Eyes: Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes.
Skin: Immediately wash the affected area with soap and water.

Inhalation: Remove the exposed person to fresh air; restore and/or support his or her breathing as needed.

Ingestion: Never give anything by mouth to someone who is unconscious or convulsing. Do not induce vomiting because of the possibility of aspiration.

GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, provide ventilation, and eliminate all sources of ignition immediately. Cleanup personnel need protection against contact with and inhalation of vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.

Waste Disposal: Contact your supplier or a licensed contractor for detailed recommendations for disposal. Follow Federal, state, and local regulations.

OSHA Designations

Air Contaminant (29 CFR 1910.1000 Subpart Z)

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U019

CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg)

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield. Follow the eye- and face-protection guidelines in 29 CFR 1910.133. **Respirator:** Wear a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow the respirator guidelines in 29 CFR 1910.134. For emergency or nonroutine use (e.g., cleaning reactor vessels or storage tanks), wear an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will not protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, gaudlets, etc., to prevent any possibility of skin contact with this suspected human carcinogen. **Ventilation:** Install and operate general and local ventilation systems powerful enough to maintain airborne levels of benzene below the OSHA PEL standard cited in section 2.

Safety Stations: Make eyewash stations, washing facilities, and safety showers available in use and handling areas. Contaminated

Equipment: Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do not wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from shoes and equipment. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material. Keep it off of your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do not eat, drink, or smoke in my work area. Do not inhale benzene vapor!

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store benzene in a cool, dry, well-ventilated area away from sources of ignition and incompatible chemicals.

Special Handling/Storage: Protect containers from physical damage. Electrically ground and bond all metal containers used in shipping or transferring operations. Follow all parts of 29 CFR 1910.1028.

Engineering Controls: All engineering systems (production, transportation, etc.) must be of maximum explosion-proof design (non-sparking, electrically grounded and bonded, etc.)

Comments: If possible, substitute less toxic solvents for benzene; use this material with extreme caution and only if it is absolutely essential.

Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: Benzene

DOT Class: Flammable Liquid

DOT Label: Flammable Liquid

DOT ID No. UN1114

IMO Label: Flammable Liquid

IMO Class: 3.2

References: 1, 2, 12, 73, 84-94, 100, 103.

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MATERIAL SAFETY DATA SHEET

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GENIUM PUBLISHING CORP

No. 385

ETHYL BENZENE

Date August 1978

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: ETHYL BENZENE

OTHER DESIGNATIONS: Phenylethane, Ethylbenzol, $C_2H_5C_6H_5$, CAS# 000 100 414

MANUFACTURER: Available from several suppliers.

SECTION II. INGREDIENTS AND HAZARDS

Ethyl Benzene

%

ca 100

HAZARD DATA

8-hr TWA 100 ppm*

*Current OSHA permissible exposure level. A Standard was proposed by OSHA in October 1975 which includes an action level of 50 ppm, and detailed requirements of monitoring, medical surveillance, employee training, etc.; when exposure exceeds 50 ppm. It has not yet issued as a legal requirement.

Human, inhalation
TCLo 100 ppm for
8 hr (irritation)
Rat, Oral LD50
3500 mg/kg

SECTION III. PHYSICAL DATA

Boiling point at 1 atm, deg C	-- 136	Specific gravity 20/4C	----- 0.867
Vapor pressure at 25.9 C, mm Hg	- 10	Volatiles, %	----- ca 100
Vapor density (Air=1)	----- 3.66	Evaporation rate (BuAc=1)	----- <1
Water solubility at 20 C Wt. %	- 0.015	Melting point, deg C	----- -95
		Molecular weight	----- 106.16

Appearance & Odor: Clear, colorless liquid with an aromatic hydrocarbon odor.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
59°F (15 C) (closed cup)	810 F (432 C)	Volume %	1.0	6.7

Extinguishing media: Carbon dioxide, dry chemical or "alcohol" foam. A water spray may be ineffective to put out fire, but may be used to cool fire-exposed containers. A stream of water can spread fire of burning liquid. This is a flammable liquid (OSHA Class IB) which can readily form explosive mixtures with air, especially when heated. Heavier-than-air vapors can flow along surfaces to reach distant ignition sources, and then flash back. Firefighters should use self-contained breathing equipment and eye protection to fight fires in enclosed places.

SECTION V. REACTIVITY DATA

This material is stable in storage in closed containers at room temperature. It does not polymerize.

This flammable material should be kept separated from oxidizing agents, strong acids and bases and ammonia. Thermal-oxidative degradation can produce toxic products, including carbon monoxide.

SECTION VI. HEALTH HAZARD INFORMATION	TLV - 100 ppm
--	---------------

Excessive exposure to vapors will irritate the eyes and mucous membranes of the upper respiratory tract. Sustained high levels can produce headache, depression of the central nervous system, narcosis and coma.

Liquid contact is irritating to the eyes and irritation and defatting to the skin, leading to dermatitis on prolonged or repeated exposures. Ingestion may lead to aspiration of liquid into the lungs small amounts of aspirated ethyl benzene cause extensive edema and hemorrhage of lung tissue. **FIRST AID:**

Eye contact: Wash eyes well with plenty of running water. Get medical help if irritation persists.

Skin contact: Wash exposed areas of skin. Promptly remove contaminated clothing.

Inhalation: Remove victim to fresh air. Restore breathing if necessary. Get medical help for serious exposure.

Ingestion: Get prompt medical help! (The danger of aspirating ethyl benzene into the lungs indicates medical direction before inducing vomiting.)

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Personnel involved in leak or spill control and clean-up must use protective equipment to avoid inhalation of vapors and contact with liquid. Eliminate ignition sources. Provide maximum explosion-proof ventilation.

Pick-up spilled material for recovery or disposal. Absorb with sand, etc. for disposal in a sanitary landfill or with paper towels or cloths for burning. Water can be used to flush liquid away from sensitive areas to special catch basins or ground, but not to sewer or surface water.

DISPOSAL: Scrap material can be burned in approved incinerators in accordance with Federal, State and local regulations.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide explosion-proof general and local exhaust ventilation to meet TLV requirements. Approved respirators must be available for non-routine or emergency use. A full face respirator with organic vapor cartridge can be used up to 1000 ppm; a gas mask with organic vapor canister can be used up to 5000 ppm. a self-contained respirator is needed for high and unknown concentrations of vapor.

Use impervious gloves and clothing and a face shield to prevent repeated or prolonged contact with the liquid. Where splashing is possible chemical goggles should be used. Clothing contaminated with ethyl benzene should be promptly removed and not reused until free of the contaminant.

Exposures above the action level, liquid contact, or working where fire and explosion hazards exist may require instituting employee training, medical surveillance, vapor concentration monitoring, record keeping, etc. when the proposed standard issues.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store this material in tightly closed containers in cool, well-ventilated areas, away from oxidizing agents, heat and sources of ignition. Use non-sparking tools around this material. Containers must be electrically bonded and grounded for transfers of liquid. Use safety cans for small amounts. No Smoking! where this material is stored or used.

Screen workers for history of kidney, liver, skin and lung problems which could give increased sensitivity and risk in ethyl benzene exposure.

Avoid breathing of vapors and contact with liquid. Do not ingest. Chronic properties are not fully known; use with care.

DATA SOURCE(S) CODE: 2-9, 11, 12

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APPROVALS: MIS. <i>J. M. ...</i>
CRD. <i>[Signature]</i>
Industrial Hygiene and Safety <i>[Signature]</i>
Corporate Medical Staff <i>G. F. Martin M.D.</i>



SECTION 1. MATERIAL IDENTIFICATION

20

MATERIAL NAME: Toluene

OTHER DESIGNATIONS: Methyl Benzene, Methyl Benzol, Phenylmethane, Toluol, C₇H₈, CAS #0108-88-3

MANUFACTURER/SUPPLIER: Available from many suppliers, including:
 Allied Corp., PO Box 2064R, Morristown, NJ 07960; Telephone: (201) 455-4400
 Ashland Chemical Co., Industrial Chemicals & Solvents Div., PO Box 2219,
 Columbus, OH; Telephone: (614) 889-3844

HIMIS

H: 2

F: 3

R: 0

PPE*

*See sect. 8



R 1

I 3

S 2

K 4

SECTION 2. INGREDIENTS AND HAZARDS

%

HAZARD DATA

Toluene



ca 100

8-hr TLV: 100 ppm, or
 375 mg/m³ (Skin)**

Mm, Inhalation, TLo:
 100 ppm: Psychotropic***

Rat, Oral, LD₅₀: 5000 mg/kg

Rat, Inhalation, LCLo:
 4000 ppm/4 hrs.

Rabbit, Skin, LD₅₀: 14 gm/kg

Human, Eye: 300 ppm

- * Current (1985-86) ACGIH TLV. The OSHA PEL is 200 ppm with an acceptable ceiling concentration of 300 ppm and an acceptable maximum peak of 500 ppm/10 minutes.
- ** Skin designation indicates that toluene can be absorbed through intact skin and contribute to overall exposure.
- *** Affects the mind.

SECTION 3. PHYSICAL DATA

Boiling Point ... 231°F (111°C)

Vapor Pressure @ 20°C, mm Hg ... 22

Water Solubility @ 20°C, wt. % ... 0.05

Vapor Density (Air = 1) ... 3.14

Evaporation Rate (BuAc = 1) ... 2.24

Specific Gravity (H₂O = 1) ... 0.866

Melting Point ... -139°F (-95°C)

Percent Volatile by Volume ... ca 100

Molecular Weight ... 92.15

Appearance and odor: Clear, colorless liquid with a characteristic aromatic odor. The odor is detectable to most individuals in the range of 10 to 15 ppm. Because olfactory fatigue occurs rapidly upon exposure to toluene, odor is not a good warning property.

SECTION 4. FIRE AND EXPLOSION DATA

LOWER UPPER

Flash Point and Method

Autoignition Temp.

Flammability Limits In Air

40°F (4°C) CC

896°F (480°C)

% by Volume

1.27

7.1

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, alcohol foam. Do not use a solid stream of water because the stream will scatter and spread the fire. Use water spray to cool tanks/containers that are exposed to fire and to disperse vapors.

UNUSUAL FIRE/EXPLOSION HAZARDS: This OSHA class IB flammable liquid is a dangerous fire hazard. It is a moderate fire hazard when exposed to oxidizers, heat, sparks, or open flame. Vapors are heavier than air and may travel a considerable distance to an ignition source and flash back.

SPECIAL FIRE-FIGHTING PROCEDURES: Fire fighters should wear self-contained breathing apparatus with full facepiece operated in a positive-pressure mode when fighting fires involving toluene.

SECTION 5. REACTIVITY DATA

CHEMICAL INCOMPATIBILITIES: Toluene is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization. This material is incompatible with strong oxidizing agents, dinitrogen tetroxide, silver perchlorate, tetranitromethane, and uranium hexafluoride. Contact with these materials may cause fire or explosion. Nitric acid and toluene, especially in the presence of sulfuric acid, will produce nitrated compounds that are dangerously explosive.

CONDITIONS TO AVOID: Avoid exposure to sparks, open flame, hot surfaces, and all sources of heat and ignition. Toluene will attack some forms of plastics, rubber, and coatings. Thermal decomposition or burning produces carbon dioxide and/or carbon monoxide.

SECTION 6. HEALTH HAZARD INFORMATION | TLV

Toluene is not considered a carcinogen by the NTP, IARC, or OSHA. **SUMMARY OF RISKS:** Vapors of toluene may cause irritation of the eyes, nose, upper respiratory tract, and skin. Exposure to 200 ppm for 8 hours causes mild fatigue, weakness, confusion, lacrimation (tearing) and paresthesia (a sensation of prickling, tingling, or creeping on the skin that has no objective cause). Exposure to higher concentrations may cause headache, nausea, dizziness, dilated pupils, and euphoria, and, in severe cases, may cause unconsciousness and death. The liquid is irritating to the eyes and skin. Contact with the eyes may cause transient corneal damage, conjunctival irritation, and burns if not promptly removed. Repeated and/or prolonged contact with the skin may cause drying and cracking. It may be absorbed through the skin in toxic amounts. Ingestion causes irritation of the gastrointestinal tract and may cause effects resembling those from inhalation of the vapor. Chronic overexposure to toluene may cause reversible kidney and liver injury. **FIRST AID: EYE CONTACT:** Immediately flush eyes, including under eyelids, with running water for at least 15 minutes. Get medical attention if irritation persists.* **SKIN CONTACT:** Immediately flush skin (for at least 15 minutes) while removing contaminated shoes and clothing. Wash exposed area with soap and water. Get medical attention if irritation persists or if a large area has been exposed.* **INHALATION:** Remove victim to fresh air. Restore and/or support breathing as required. Keep victim warm and quiet. Get medical help.* **INGESTION:** Give victim 1 to 2 glasses of water or milk. Contact a poison control center. Do not induce vomiting unless directed to do so. Transport victim to a medical facility. Never give anything by mouth to a person who is unconscious or convulsing. * **GET MEDICAL ASSISTANCE** - In plant, paramedic, community. Get medical help for further treatment, observation, and support after first aid, if indicated.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

SPILL/LEAK: Notify safety personnel of large spills or leaks. Remove all sources of heat and ignition. Provide maximum explosion-proof ventilation. Limit access to spill area to necessary personnel only. Remove leaking containers to safe place if feasible. Cleanup personnel need protection against contact with liquid and inhalation of vapor (see sect. 8). **WASTE DISPOSAL:** Absorb small spills with paper towel or vermiculite. Contain large spills and collect if feasible, or absorb with vermiculite or sand. Place waste solvent or absorbent into closed containers for disposal using nonsparking tools. Liquid can be flushed with water to an open holding area for handling. Do not flush to sewer, watershed, or waterway. **COMMENTS:** Place in suitable container for disposal by a licensed contractor or burn in an approved incinerator. Consider reclaiming by distillation. Contaminated absorbent can be buried in a sanitary landfill. Follow all Federal, state, and local regulations. TLM 96: 100-10 ppm. Toluene is designated as a hazardous waste by the EPA. The EPA (RCRA) HW No. is U220 (40 CFR 261). The reportable quantity (RQ) is 1000 lbs/454 kg (40 CFR 117).

SECTION 8. SPECIAL PROTECTION INFORMATION

Provide general and local exhaust ventilation to meet TLV requirements. Ventilation fans and other electrical service must be nonsparking and have an explosion-proof design. Exhaust hoods should have a face velocity of at least 100 fpm (linear feet per minute) and be designed to capture heavy vapor. For emergency or nonroutine exposures where the TLV may be exceeded, use an organic chemical cartridge respirator if concentration is less than 200 ppm and an approved canister gas mask or self-contained breathing apparatus with full facepiece if concentration is greater than 200 ppm. Safety glasses or splash goggles should be worn in all work areas. Neoprene gloves, apron, face shield, boots, and other appropriate protective clothing and equipment should be available and worn as necessary to prevent skin and eye contact. Remove contaminated clothing immediately and do not wear it until it has been properly laundered.

Eyewash stations and safety showers should be readily available in use and handling areas.

Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

STORAGE SEGREGATION: Store in a cool, dry, well-ventilated area away from oxidizing agents, heat, sparks, or open flame. Storage areas must meet OSHA requirements for class IB flammable liquids. Use metal safety cans for handling small amounts. Protect containers from physical damage. Use only with adequate ventilation. Avoid contact with eyes, skin, or clothing. Do not inhale or ingest. Use caution when handling this compound because it can be absorbed through intact skin in toxic amounts. **SPECIAL HANDLING/STORAGE:** Ground and bond metal containers and equipment to prevent static sparks when making transfers. Do not smoke in use or storage areas. Use nonsparking tools. **ENGINEERING CONTROLS:** Preplacement and periodic medical exams emphasizing the liver, kidneys, nervous system, lungs, heart, and blood should be provided. Workers exposed to concentrations greater than the action level (50 ppm) should be examined at least once a year. Use of alcohol can aggravate the toxic effects of toluene.

COMMENTS: Emptied containers contain product residues. Handle accordingly!
Toluene is designated as a hazardous substance by the EPA (40 CFR 116). DOT Classification: Flammable liquid. UN1294.
Data Source(s) Code: 1-9, 12, 16, 20, 21, 24, 25, 34, 81, 82, CR

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Approvals *JO. Accardo, 11/96.*

Indust. Hygiene/Safety *JW 11-86*

Medical Review *[Signature]*

MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION
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No. 318
XYLENE
(mixed isomers)
Revision C
Date November 1980

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: XYLENE (mixed isomers)
OTHER DESIGNATIONS: Xylol, Dimethylbenzene, $C_6H_4(CH_3)_2$; ASTM D843, D845 and D846;
GE Material D589, CAS #001 330 207.
MANUFACTURER: Available from many suppliers, including EXXON Company USA and Shell Chemical Company.

SECTION II. INGREDIENTS AND HAZARDS

INGREDIENTS AND HAZARDS	%	HAZARD DATA
Xylene (o, m, p-isomers) Other C ₇ to C ₉ Hydrocarbons*	>90 <10	8-hr TWA 100 ppm (skin)** or 435 mg/m ³ <u>Xylene Typical</u> Human, inhalation TCLo 200 ppm (Irritation Effects) <hr/> Rat, oral LD ₅₀ 4.3 g/kg <hr/> Human, oral LDLo 50 mg/kg
*Material may contain ethylbenzene (8-hr TWA 100 ppm) and traces of toluene and C ₉ aromatic and aliphatic hydrocarbons. Some commercial products may contain over 10% non-xylene hydrocarbons, mostly ethylbenzene. **Current OSHA standard and ACGIH (1980) TLV. NIOSH has proposed a 10-hr TWA of 100 ppm with a 200 ppm ceiling level (10 min. sample). STATUS: NCI bioassay for carcinogenesis study 9/78. TLV set to prevent irritant effects and CNS depression.		

SECTION III. PHYSICAL DATA

Boiling range, 1 atm, deg C	135-145*	Specific gravity (H ₂ O=1)	0.86-0.87
Vapor pressure at 20 C, mm Hg	ca 6	Volatiles, %	ca 100
Vapor density (Air=1)	3.7	Evaporation rate (BuAc=1)	0.6
Solubility in water	Negligible	Molecular weight	106.18

Appearance & Odor: Light colored or colorless, mobile liquid with an aromatic odor. The recognition threshold (100% of test panel) is about 0.3 ppm in air (unfatigued) for xylene.

*Wider and narrower boiling range materials are commercially available.

SECTION IV. FIRE AND EXPLOSION DATA

SECTION IV. FIRE AND EXPLOSION DATA			LOWER	UPPER
Flash Point and Method	Autoignition Temp.	Flammability Limits in Air		
>77 F (TCC)	867 F	Volume %	1	7

Extinguishing Media: Use dry chemical, foam, CO₂, and water fog or steam to provide a smothering effect on fire. A water stream can scatter flames. A spray of water may be used to cool fire-exposed containers.

This flammable liquid is a dangerous fire hazard and a moderate explosion hazard when exposed to heat or flame. Heavier-than-air vapors can flow along surfaces to distant ignition sources and flash back.

Firefighters should use self-contained breathing apparatus.

SECTION V. REACTIVITY DATA

This material is stable in closed containers at room temperature. It does not polymerize.

It is flammable (OSHA Class IC liquid) and can form explosive mixtures with air. Keep away from sources of heat, sources of ignition and strong oxidizing agents. Thermal-oxidative degradation in air can produce toxic vapors and gases, including carbon monoxide and oxides of nitrogen.

SECTION VI. HEALTH HAZARD INFORMATION	TLV 100 ppm or 435 mg/m ³
<p>Inhalation of xylene at the TLV may cause mild irritation and dizziness in sensitive persons. Concentrations from 100-200 ppm may cause nausea, headache and depression. Vapor levels >200 ppm can have an anesthetic effect. Skin contact may produce mild irritation and skin defatting. Eye contact may cause burning and irritation. Ingestion of xylene may cause poisoning. One ounce or more may be fatal. Aspiration can be a hazard if this material is swallowed.</p>	
<p>FIRST AID: <u>Eye Contact:</u> Irrigate with water for 15 minutes. Get medical attention! <u>Skin Contact:</u> Wash with soap and water. Remove contaminated clothing promptly. Replace lost skin oils with approved lotions or creams. <u>Inhalation:</u> Remove victim to fresh air. Restore breathing if required. Get medical attention if symptoms persist or if nausea or collapse has occurred. <u>Ingestion:</u> Get medical attention immediately! Give white mineral oil demulcent and saline cathartic, but <u>do not</u> induce vomiting unless directed by a physician. Maintain observation of patient for possible delayed onset of pulmonary edema.</p>	
SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES	
<p>Notify safety personnel. Remove all ignition sources. Provide adequate ventilation. Use vermiculite or sand to absorb spill; scrape up with nonsparking tools and place in a covered metal container. The absorbed material may be burned in an open pit, or placed in cardboard boxes and burned in an incinerator. Spilled liquid can be flushed away from sensitive locations with a water stream; flush to open area not to sewer! <u>DISPOSAL:</u> Scrap liquid may be atomized into an approved incinerator, or it may be disposed of via a licensed solvent disposal company. When large amounts are involved reclamation procedures may prove economical. Follow Federal, State, and Local regulations. Aquatic toxicity rating TLM 96: 100-10 ppm.</p>	
SECTION VIII. SPECIAL PROTECTION INFORMATION	
<p>Provide general ventilation and efficient exhaust ventilation (explosion-proof equipment to meet TLV requirements and to control heavier-than-air vapors. Use >100 fpm face velocity for exhaust hoods. Use approved organic vapor canister respirators for short periods of nonroutine work or emergency situations at up to 1000-2000 ppm and approved self-contained respirators for higher and unknown vapor levels. Full facepiece required. Buna-N rubber gloves and aprons should be worn to prevent contact of xylene with the skin. Safety glasses or goggles should be used for eye protection and eyewash stations should be readily accessible to use areas. Comprehensive preplacement and biennial medical examinations to be directed toward, but not limited to, liver, kidney, gastrointestinal disorders, skin irritation, and the central nervous system.</p>	
SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS	
<p>Store in closed containers in a clean, cool, well-ventilated area, away from sources of heat, sources of ignition and strong oxidizing agents. Protect containers from physical damage. Bond and ground metal containers when transferring liquid. Use metal safety cans for small amounts. Use nonsparking tools for work in solvent areas. No Smoking in areas of use or storage. Prevent skin contact and remove contaminated clothing promptly. Avoid repeated or prolonged breathing of vapor. Do not ingest!</p>	
<p>DATA SOURCE(S) CODE: 1-12,19-21,23,26,31,34,37-39</p> <p><small>Judgments as to the suitability of information herein for individual businesses and individuals are the responsibility of the user. The publisher, through reasonable care, has taken steps to insure the accuracy of the information herein. However, the publisher does not assume any responsibility for the accuracy or suitability of such information for individual businesses and individuals.</small></p>	<p>APPROVALS: MIS CRO <i>J.M. [Signature]</i></p> <p>Industrial Hygiene and Safety <i>JHW 11-26-80</i></p> <p>MEDICAL REVIEW: December 5, 1980</p>

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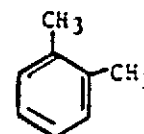
No. 318A

o-XYLENE

Date November 1980

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: o-XYLENE
DESCRIPTION: An aromatic hydrocarbon.
OTHER DESIGNATIONS: C₆H₄(CH₃)₂, 1,2-Dimethylbenzene, o-Xylol,
CAS #000 095 476
MANUFACTURER: Available from many suppliers, including EXXON Company USA
and Shell Chemical Company.



SECTION II. INGREDIENTS AND HAZARDS

	X	HAZARD DATA
Xylene (<u>o</u> -isomer)	> .97	8-hr TWA 100 ppm (Skin)**
Other C ₇ to C ₉ Hydrocarbons*	< 3	or 435 mg/m ³
*Material may contain ethylbenzene (8-hr TWA 100 ppm) and traces of toluene, C ₉ aromatic and aliphatic hydrocarbons.		Rac, oral LDLo 5000 mg/kg
**Current OSHA standard and ACGIH (1980) TLV. NIOSH recommends a 10-hr workday, 40-hr workweek TWA of 100 ppm and a <u>ceiling level</u> of 200 ppm (10 min. sample). TLV set at a level to prevent irritant effects and CNS depression. Selected for mutagenicity and teratogenicity testing in FY80 by EPA under TSCA.		Rat, inhalation LCLo 6125 ppm/12-hr Goldfish, LD ₅₀ 13 mg/L, 24-hrs (ASTM D1345)

SECTION III. PHYSICAL DATA

Boiling point, deg C -----	143-145	Specific gravity (25/4 C) -	0.876
Vapor pressure, at 25 C, mm Hg --	5.2	Melting point, deg C -----	-23 to -25
Vapor density (Air=1) -----	3.7	Molecular weight -----	106.17
Solubility in water at 20C, g/L -	0.175	Volatiles, % -----	ca 100

Appearance & Odor: Clear, colorless liquid. Characteristic sweet odor; recognition threshold (unfatigued) <1 ppm.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
63 F (17.2 C) (CC)	869 F	%	1.1	6.4

Extinguishing Media: Use dry chemical, foam, carbon dioxide. A water stream can scatter flames. A water spray may be used to cool fire-exposed containers.
This flammable liquid is a dangerous fire hazard and a moderate explosion hazard when exposed to heat or flame. Heavier-than-air vapors can flow along surfaces to distant ignition sources and flash back.
Firefighters should use self-contained breathing apparatus.

SECTION V. REACTIVITY DATA

This material is stable in closed containers at room temperature. It does not polymerize.
It is flammable (OSHA Class IB liquid) and can form explosive mixtures with air. Keep away from sources of heat, sources of ignition and strong oxidizing agents. Thermal-oxidative degradation in air can produce toxic vapors and gases, including carbon monoxide and oxides of nitrogen.

SECTION VI. HEALTH HAZARD INFORMATION

TLV 100 ppm or 435 mg/m³

Xylene is toxic by all portals of entry. It is an irritant of the eyes, mucous membrane, and skin; at high conc. it causes narcosis. Percutaneous absorption is slow and can cause a dermatitis attributed to its defatting properties with prolonged contact causing formation of vesicles. Acute exposure to its vapors may cause CNS depression and minor effects upon liver and kidney functions. Conc. >200 ppm can cause anorexia, nausea, vomiting, dyspnea, vertigo, incoordination, and conjunctivitis. Very high conc. can cause chemical pneumonitis and pulmonary edema. Conc. of 10,000-30,000 ppm may produce anesthesia within one minute.

FIRST AID:

Eye Contact: Flush with running water for 15 minutes, including under eyelids.

Skin Contact: Wash with soap and water. Remove contaminated clothing promptly.

Inhalation: Remove to fresh air. Restore breathing if required.

Ingestion: Get medical attention immediately! Give white mineral oil demulcent and saline cathartic, but do not induce vomiting unless directed by a physician.

Maintain observation of patient for possible delayed onset of pulmonary edema.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel. Remove all ignition sources. Provide adequate ventilation. Use vermiculite or sand to absorb spill; scrape up with nonsparking tools and place in a covered metal container. The absorbed material may be burned in an open pit or placed in cardboard boxes and burned in an incinerator. Spilled liquid can be flushed away from sensitive locations with a water stream; flush to open area not to sewer!

DISPOSAL: Atomized into an approved incinerator, or disposed of via a licensed solvent disposal company, or Bellot process for oxidation destruction of gaseous organic cmpds (#20, pg 380). When large amounts are involved reclamation procedures may prove economical. Follow Federal, State, and Local regulations. May be toxic to aquatic life.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general ventilation and efficient exhaust ventilation (explosion-proof equipment to meet TLV requirements and to control heavier-than-air vapors. Use >100 fpm face velocity for exhaust hoods. Respirators to be available for nonroutine or emergency use. Where fumes are <1000 ppm, a chemical cartridge respirator with full facepiece and organic vapor canister is warranted; at >10,000 ppm, a self-contained breathing apparatus with full facepiece operated in the positive pressure-demand mode is used. **CAUTION!** The lower explosive limit is approx. 11,000 ppm.

Buna-N rubber gloves and aprons should be worn to prevent contact of xylene with the skin. Safety glasses or goggles should be used for eye protection and eyewash stations should be readily accessible to use areas.

Comprehensive preplacement and biennial medical examinations to be directed toward, but not limited to, liver, kidney, gastrointestinal disorders, skin irritation, and the central nervous system.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in closed containers in a clean, cool, well-ventilated area, away from sources of heat, sources of ignition and strong oxidizing agents. Protect containers from physical damage. Bond and ground metal containers when transferring liquid. Use metal safety cans for small amounts. Use nonsparking tools for work in solvent areas. No Smoking in areas of use, storage, or manufacturing. Prevent skin contact and remove contaminated clothing promptly. Avoid repeated or prolonged breathing of vapor. Do not ingest!

DATA SOURCE(S) CODE: 1-12, 19-21, 23, 26, 31, 34, 37-39

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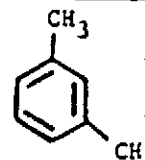
No. 3188

m-XYLENE

Date November 1980

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: m-XYLENE
 DESCRIPTION: An Aromatic Hydrocarbon
 OTHER DESIGNATIONS: C₆H₄(CH₃)₂, 1,3-Dimethylbenzene, m-Xylol,
 CAS #000 108 383



MANUFACTURER: Available from many suppliers, including EXXON Company USA
 and Shell Chemical Company.

SECTION II. INGREDIENTS AND HAZARDS

Xylene (m-isomer)
 Other C₇ to C₉ Hydrocarbons*

x

HAZARD DATA

~99
 <1

8-hr TWA 100 ppm (Skin)**
 or 435 mg/m³

*Material may contain ethylbenzene (8-hr TWA 100 ppm)
 and traces of toluene, C₉ aromatic and aliphatic
 hydrocarbons.

Rat, Oral
 LD₅₀ 5000 mg/kg

**Current OSHA standard and ACGIH (1980) TLV. NIOSH
 recommends a 10-hr workday, 40-hr workweek TWA of
 100 ppm and a ceiling level of 200 ppm (10 min. sample).
 TLV set at a level to prevent irritant effects and CNS
 depression. Selected for mutagenicity & teratogenicity
 testing in FY 80 by EPA under TSCA.

Rat, Inhalation
 LCLo 8000 ppm/4-hr

Goldfish, LD₅₀
 16 mg/L, 24 hrs
 (ASTM D1345)

SECTION III. PHYSICAL DATA

Boiling point, deg C -----	139	Specific gravity (25/4 C) -----	0.860
Vapor pressure at 25 C, mm Hg --	8.3	Melting point, deg C -----	-48
Vapor density (Air=1) -----	3.7	Molecular weight -----	106.17
Solubility in Water -----	Insoluble		

Appearance and Odor: Clear, colorless liquid. Threshold odor concentration 3.7 ppm.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits in Air	LOWER	UPPER
25 C (CC)	986 F	Z	1.1	6.4

Extinguishing Media: Use dry chemical, foam, carbon dioxide. A water stream can scatter flames. A water spray may be used to cool fire-exposed containers. This flammable liquid is a dangerous fire hazard and a moderate explosion hazard when exposed to heat or flame. Heavier-than-air vapors can flow along surfaces to distant ignition sources and flash back. Firefighters should use self-contained breathing apparatus.

SECTION V. REACTIVITY DATA

This material is stable in closed containers at room temperature. It does not polymerize. It is flammable (OSHA Class IC liquid) and can form explosive mixtures with air. Keep away from sources of heat, sources of ignition and strong oxidizing agents. Thermal-oxidative degradation in air can produce toxic vapors and gases, including carbon monoxide and oxides of nitrogen.

SECTION VI. HEALTH HAZARD INFORMATION

TLV 100 ppm or 435 mg/m³

Xylene is toxic by all portals of entry. It is an irritant of the eyes, mucous membranes, and skin; at high conc. it causes narcosis. Percutaneous absorption is slow and can cause a dermatitis attributed to its defatting properties with prolonged contact causing formation of vesicles. Acute exposure to its vapors may cause CNS depression and minor effects upon liver and kidney functions. Conc. >200 ppm can cause anorexia, nausea, vomiting, dyspnea, vertigo, incoordination, and conjunctivitis. Very high conc. can cause chemical pneumonitis and pulmonary edema. Conc. of 10,000-30,000 ppm may produce anesthesia within one minute.

FIRST AID:

Eye Contact: Flush with running water for 15 minutes, including under eyelids.

Skin Contact: Wash with soap and water. Remove contaminated clothing promptly.

Inhalation: Remove to fresh air. Restore breathing if required.

Ingestion: Get medical attention immediately! Give white mineral oil demulcent and saline cathartic, but do not induce vomiting unless directed by a physician.

Maintain observation of patient for possible delayed onset of pulmonary edema.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel. Remove all ignition sources. Provide adequate ventilation. Use vermiculite or sand to absorb spill; scrape up with nonsparking tools and place in a covered metal container. The absorbed material may be burned in an open pit or placed in cardboard boxes and burned in an incinerator. Spilled liquid can be flushed away from sensitive locations with a water stream; flush to open area not to sewer!

DISPOSAL: Atomized into an approved incinerator, or disposed of via a licensed solvent disposal company, or Belliot process for oxidation destruction of gaseous organic compds (#20, pg 380). When large amounts are involved reclamation procedures may prove economical. Follow Federal, State, and Local regulations.

May be toxic to aquatic life.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general ventilation and efficient exhaust ventilation (explosion-proof equipment to meet TLV requirements and to control heavier-than-air vapors. Use >100 lfm face velocity for exhaust hoods. Respirators to be available for nonroutine or emergency use. Where fumes are <1000 ppm, a chemical cartridge respirator with full facepiece and organic vapor canister is warranted; at >10,000 ppm, a self-contained breathing apparatus with full facepiece operated in the positive pressure-demand mode is used. **CAUTION!** The lower explosive limit is approx. 11,000 ppm.

Buna-N rubber gloves and aprons should be worn to prevent contact of xylene with the skin. Safety glasses or goggles should be used for eye protection and eyewash stations should be readily accessible to use areas.

Comprehensive preplacement and biennial medical examinations to be directed toward, but not limited to, liver, kidney, gastrointestinal disorders, skin irritation, and the central nervous system.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in closed containers in a clean, cool, well-ventilated area, away from sources of heat, sources of ignition and strong oxidizing agents. Protect containers from physical damage. Bond and ground metal containers when transferring liquid. Use metal safety cans for small amounts. Use nonsparking tools for work in solvent areas. No Smoking in areas of use, storage, or manufacturing. Prevent skin contact and remove contaminated clothing promptly. Avoid repeated or prolonged breathing of vapor. Do not ingest!

DATA SOURCE(S) CODE: 1-12, 19-21, 23, 26, 31, 34, 37-39

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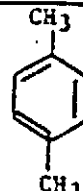
No. 318C

p-XYLENE

Date November 1980

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: p-XYLENE
DESCRIPTION: An Aromatic Hydrocarbon
OTHER DESIGNATIONS: C₆H₄(CH₃)₂, 1,4-Dimethylbenzene, p-Xylol,
CAS #000 106 423
MANUFACTURER: Available from many suppliers, including EXXON Company USA
and Shell Chemical Company.



SECTION II. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Xylene (p-isomer)	~99	8-hr TWA 100 ppm (Skin)** or 435 mg/m ³ Rac, oral LD ₅₀ 5000 mg/kg Rac, inhalation LC ₅₀ 4912 ppm/24-hr Goldfish, LD ₅₀ 18 mg/L, 24 hrs (ASTM D1345)
Other C ₇ to C ₉ Hydrocarbons*	<1	
*Material may contain ethylbenzene (8-hr TWA 100 ppm) and traces of toluene, C ₉ aromatic and aliphatic hydrocarbons.		
**Current OSHA standard and ACGIH (1980) TLV. NIOSH recommends a 10-hr workday, 40-hr workweek TWA of 100 ppm and a ceiling level of 200 ppm (10 min. sample). TLV set at a level to prevent irritant effects and CNS depression. Selected for mutagenicity and teratogenicity testing in FY80 by EPA under TSCA.		

SECTION III. PHYSICAL DATA

Boiling point, deg C	138	Specific gravity (25/4 C)	0.857
Vapor pressure at 25 C, mm Hg	8.6	Melting point, deg C	12-13
Vapor density (Air=1)	3.7	Molecular weight	106.17
Solubility in water	Insoluble		

Appearance & Odor: Clear, colorless plates or prisms at low temp. A clear, colorless liquid at >13 C. Threshold odor concentration 0.47 ppm.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits in Air	LOWER	UPPER
25 C (CC)	986 F	X	1.1	6.6

Extinguishing Media: Use dry chemical, foam, Carbon dioxide. A water stream can scatter flames. A water spray may be used to cool fire-exposed containers.

This flammable liquid is a dangerous fire hazard and a moderate explosion hazard when exposed to heat or flame. Heavier-than-air vapors can flow along surfaces to distant ignition sources and flash back.

Firefighters should use self-contained breathing apparatus.

SECTION V. REACTIVITY DATA

This material is stable in closed containers at room temperature. It does not polymerize.

It is flammable (OSHA Class IC liquid) and can form explosive mixtures with air. Keep away from sources of heat, sources of ignition and strong oxidizing agents. Thermal-oxidative degradation in air can produce toxic vapors and gases, including carbon monoxide and oxides of nitrogen.

SECTION VI. HEALTH HAZARD INFORMATION

TLV 100 ppm or 435 mg/m³

Xylene is toxic by all portals of entry. It is an irritant of the eyes, mucous membrane, and skin; at high conc. it causes narcosis. Percutaneous absorption is slow and can cause a dermatitis attributed to its defatting properties with prolonged contact causing formation of vesicles. Acute exposure to its vapors may cause CNS depression and minor effects upon liver and kidney functions. Conc. >200 ppm can cause anorexia, nausea, vomiting, dyspnea, vertigo, incoordination, and conjunctivities. Very high conc. can cause chemical pneumonitis and pulmonary edema. Conc. of 10,000-30,000 ppm may produce anesthesia within one minute.

FIRST AID:

Eye Contact: Flush with running water for 15 minutes, including under eyelids.

Skin Contact: Wash with soap and water. Remove contaminated clothing promptly.

Inhalation: Remove to fresh air. Restore breathing if required.

Ingestion: Get medical attention immediately! Give white mineral oil demulcent and saline cathartic, but do not induce vomiting unless directed by a physician.

Maintain observation of patient for possible delayed onset of pulmonary edema.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel. Remove all ignition sources. Provide adequate ventilation.

Use vermiculite or sand to absorb spill; scrape up with nonsparking tools and place in a covered metal container. The absorbed material may be burned in an open pit or placed in cardboard boxes and burned in an incinerator. Spilled liquid can be flushed away from sensitive locations with a water stream; flush to open area not to sewer!

DISPOSAL: Atomized into an approved incinerator, or disposed of via a licensed solvent disposal company, or Balliot process for oxidation destruction of gaseous organic compds (#20, pg 380). When large amounts are involved reclamation procedures may prove economical. Follow Federal, State, and Local regulations.

May be toxic to aquatic life.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general ventilation and efficient exhaust ventilation (explosion-proof equipment to meet TLV requirements and to control heavier-than-air vapors. Use >100 fpm face velocity for exhaust hoods. Respirators to be available for nonroutine or emergency use. When fumes are <1000 ppm, a chemical cartridge respirator with full facepiece and organic vapor canister is warranted; at >10,000 ppm, a self-contained breathing apparatus with full facepiece operated in the positive pressure-demand mode is used. **CAUTION!** The lower explosive limit is approx. 11,000 ppm.

Buna-N rubber gloves and aprons should be worn to prevent contact of xylene with the skin. Safety glasses or goggles should be used for eye protection and eyewash stations should be readily accessible to use areas.

Comprehensive preplacement and biennial medical examinations to be directed toward, but not limited to, liver, kidney, gastrointestinal disorders, skin irritation, and the central nervous system.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

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APPENDIX D

Definition of Hazard Evaluation Guidelines

Hazard: Airborne Contaminants

<u>Guideline</u>	<u>Explanation</u>
Threshold Limit Value Time-Weighted Average (TLV-TWA)	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

<u>Guideline</u>	<u>Explanation</u>
Lower Explosive Limit (LEL)	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.