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EPA Form 7530-1
Georgia Revision 9/91 GUST #42

Notification for Underground Storage Tanks

Georgia Environmental Protection Division
Underground Storage Tank Management Program
4244 International Parkway, Suite 100
Atlanta, Georgia 30354

STATE USE ONLY

ID NUMBER

A. Date Data Entered ____/____/____

B. Data Entry Clerk Initials ________

DATE RECEIVED:

INSTRUCTIONS

Please type or print in ink all items except "signature" in section VIII. This form must be completed for each facility containing underground storage tanks. If more than five (5) tanks are owned at this facility, photocopy the following sheets, and staple continuation sheets to the form.

TYPE OF NOTIFICATION

☐ NEW FACILITY ☐ AMENDED ☒ CLOSURE

____ Total No. of tanks at facility ____ No. of continuation sheets attached

GENERAL INFORMATION

Notification is required by the Georgia Underground Storage Tank Act, O.C.G.A. 12-13, as amended for all underground tanks that have been used to store regulated substances since January 1, 1974, that are in the ground as of May 8, 1986, or that are brought into use after May 8, 1986.

The primary purpose of this notification is to locate and evaluate underground tanks that store or have stored petroleum or hazardous substances. The information you provide must be based on reasonably available records, or in the absence of such records, your knowledge, belief, or recollection.

Who Must Notify? The GUST Act, as amended, requires that, unless exempted, owners of underground tanks that store regulated substances must notify the Georgia Environmental Protection Division of the existence of their tanks.

Owner means-

a) in the case of an underground storage tank in use on November 8, 1984, or brought into use after that date, any person who owns an underground tank used for the storage, use, or dispensing of regulated substances, and

b) in the case of any underground storage tank in use before November 8, 1984, but no [illegible] in use on that date, any person who owned such tank immediately before the [illegible]nuation of its use.

[illegible] any facility that has undergone any changes to facility information or tank system [illegible] need only submit amended tank information.

What Tanks Are Included? Underground storage tank is defined as any one or combination of tanks that (1) is used to contain an accumulation of "regulated substances," and (2) whose volume (including connected underground piping) is 10% or more beneath the ground. Some examples are underground tanks storing: 1. Gasoline, used oil, or diesel fuel, and 2. industrial solvents, pesticides, herbicides or fumigants.

What Tanks Are Excluded? Tanks removed from the ground are not subject to notification. Other tanks excluded from notification are:

1. farm or residential tanks of 1,100 gallons or less capacity used for storing motor fuel for noncommercial purposes;
2. tanks used for storing heating oil for consumptive use on the premises where stored;
3. septic tanks;
4. pipeline facilities (including gathering lines) regulated under the Natural Gas Pipeline Safety Act of 1968, or the Hazardous Liquid Pipeline Safety Act of 1979, or which is an intrastate pipeline facility regulated under other State laws;
5. surface impoundments, pits, ponds, or lagoons;
6. storm water or waste water collection systems;
7. flow-through process tanks;
8. liquid traps or associated gathering lines directly related to oil or gas production and gathering operations;
9. storage tanks situated in an underground area (such as a basement, cellar, mineworking, drift, shaft, or tunnel) if the storage tank is situated upon or above the surface of the floor.

What Substances Are Covered? The notification requirements apply to underground storage tanks that contain regulated substances. This includes any substance defined as hazardous in section 101 (14) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), with the exception of those substances regulated as hazardous waste under Subtitle C of RCRA. It also includes petroleum, e.g., crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute).

Where To Notify? Send completed forms to:

GA Environmental Protection Division
Underground Storage Tank Management Program
4244 International Parkway, Suite 100
Atlanta, GA 30354

When To Notify? 1. Owners of underground storage tanks in use or that have been taken out of operation after January 1, 1974, but still in the ground, must have notified by May 8, 1986. 2. Owners who bring underground storage tanks into use after May 8, 1986, must notify within 30 days of bringing the tanks into use. 3. Any modification to facility tanks requires immediate notification.

Penalties: Under the GUST Act, O.C.G.A. 12-13-19, any owner who knowingly fails to notify or submits false information shall be subject to a civil penalty not to exceed $10,000 for each tank for which notification is not given or for which false information is submitted.

I. OWNERSHIP OF TANK(S)

US Army
Owner Name (Corporation, Individual, Public Agency, or Other Entity)

Mailing Address

City State ZIP Code

County

Telephone Number (Must include Area Code)

II. LOCATION OF TANK(S)

Ft Stewart Bldg 430
Facility Name or Company Site Identifier, as applicable

Street Address (P.O. Box not acceptable)

City State Zip Code

County

Facility Telephone Number (Must include Area Code)

If available, give the geographic location of tanks by degrees, minutes, and seconds. Example: Lat. 42° 36' 12" N Long. 85° 24' 17" W

Latitude ________ Longitude ________

Printed on Recycled Paper

IV. INDIAN LANDS

- [X] Federal Government
- [ ] Commercial
- [ ] State Government
- [ ] Private
- [ ] Local Government

Tanks are located on land within an Indian Reservation or on other trust lands. [ ]

Tanks are owned by Native American nation, tribe, or individual. [ ]

Tribe or Nation: _____

V. TYPE OF FACILITY

Select the Appropriate Facility Description

- [ ] Gas Station
- [ ] Petroleum Distributor
- [ ] Air Taxi (Airline)
- [ ] Aircraft Owner
- [ ] Auto Dealership
- [ ] Railroad
- [ ] Federal-Non-Military
- [X] Federal-Military
- [ ] Industrial
- [ ] Contractor
- [ ] Trucking/Transport
- [ ] Utilities
- [ ] Residential
- [ ] Farm
- [ ] Other (Explain) _____

VI. CONTACT PERSON IN CHARGE OF TANKS

Name	Mailing Address	Telephone Number (Include Area Code)
Job Title		

VII. FINANCIAL RESPONSIBILITY (This Section Must Be Completed)

I have met the financial responsibility requirements in accordance with GUST Rule 391-3-15-.12 (40CFR §280.93) as indicated below.

YES	NO	
[ ]	[ ]	- Marketer - Amount required is $ 1,000,000
[ ]	[ ]	- Non - Marketer - Amount required is $ 500,000

Identify primary coverage by "placing" an "X" in the appropriate box.

PRIMARY COVERAGE

- [ ] GUST TRUST FUND (Deductible $ 10,000)
- [ ] Commercial Insurance (Deductible $ _____)
- [ ] Risk Retention Group (Deductible $ _____)
- [ ] Self Insurance
- [ ] Guarantee
- [ ] Surety Bond
- [ ] Letter of Credit
- [ ] _____ Describe other method providing coverage

Identify coverage for deductible amount listed under Primary Coverage by placing an "X" in the appropriate box.

DEDUCTIBLE COVERAGE

- [ ] Commercial Insurance
- [ ] Risk Retention Group
- [ ] Self Insurance
- [ ] Guarantee
- [ ] Surety Bond
- [ ] Letter of Credit
- [ ] _____ Describe other method providing coverage

VIII. CERTIFICATION (Not valid without date & signature)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name of owner or authorized representative (Print/Type) Brent Rose	Signature	Date Signed
Title		

IX. DESCRIPTION OF UNDERGROUND STORAGE TANKS (Complete for each tank at this location)

Tank Identification Number (may be arbitary)	# 430-1	# 430-2	# 430-3	# 430-4	# ____
1. Status of Tank					
Currently in Use					
Temporarily Out of Use (In addition, complete section X.)					
Permanently Out of Use (In addition, complete section X.)	X	X	X	X	
Amendment of Information					
2. Date of Installation (month/day/year)	unknown	unknown	unknown	unknown	
3. Total Capacity (gallons)	10,000	10,000	10,000	10,000	
4. Material of Construction (Mark all that apply)					
Asphalt Coated or Bare Steel	X	X	X	X	
Cathodically Protected Steel					
Epoxy Coated Steel					
Composite (Steel with Fiberglass)					
Fiberglass Reinforced Plastic					
Interior Liner					
Double Wall					
Polyethylene Tank Jacket					
Concrete					
Excavation Liner					
Unknown					
Other, Please specify					
Has tank been repaired?					
Date of repair (month/day/year)					
5. Piping (Material - Mark all that apply)					
Bare Steel					
Galvanized Steel	X	X	X	X	
Fiberglass Reinforced Plastic					
Copper					
Cathodically Protected					
Double Wall					
Unknown					
Other, (specify)					
Secondary Containment					
Trench Liner					
6. Piping (Type - Mark all that apply)					
Suction: check valve at dispenser					
Suction: check valve at tank					
Pressure					
Gravity Feed					
Has piping been repaired?					
Date of repair (month/day/year)					

Tank Identification Number	#430-1	#430-2	#430-3	#430-4	#
: Substance currently or last stored identify as "1". Any additional substance previously stored identify as "2"					
Petroleum Product: Gasoline	1	1	1	1	
Diesel					
Gasohol					
Kerosene					
Heating Oil					
Used Oil					
Other, specify					
Other, specify					
Hazardous Substance					
CERCLA name or CAS (Chemical Abstracts Service) number					
Mixture of Substances (Please specify by CERCLA name or CAS number)					
Substance 1.					
Substance 2.					
Substance 3.					

X. TANKS OUT OF USE, OR CHANGE IN SERVICE

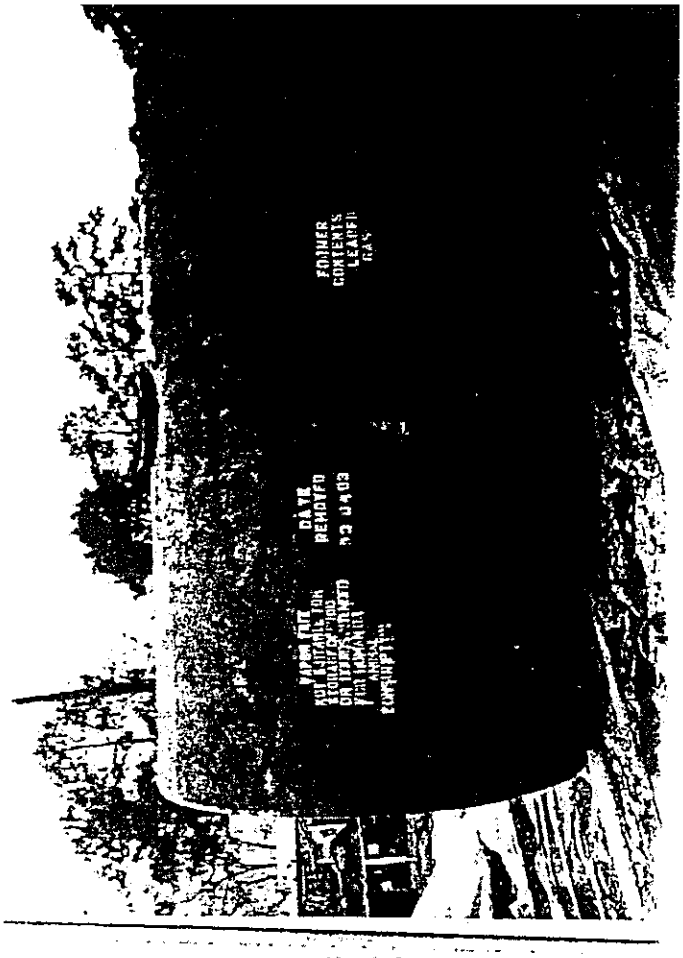
Tank Closure

A. Temporary

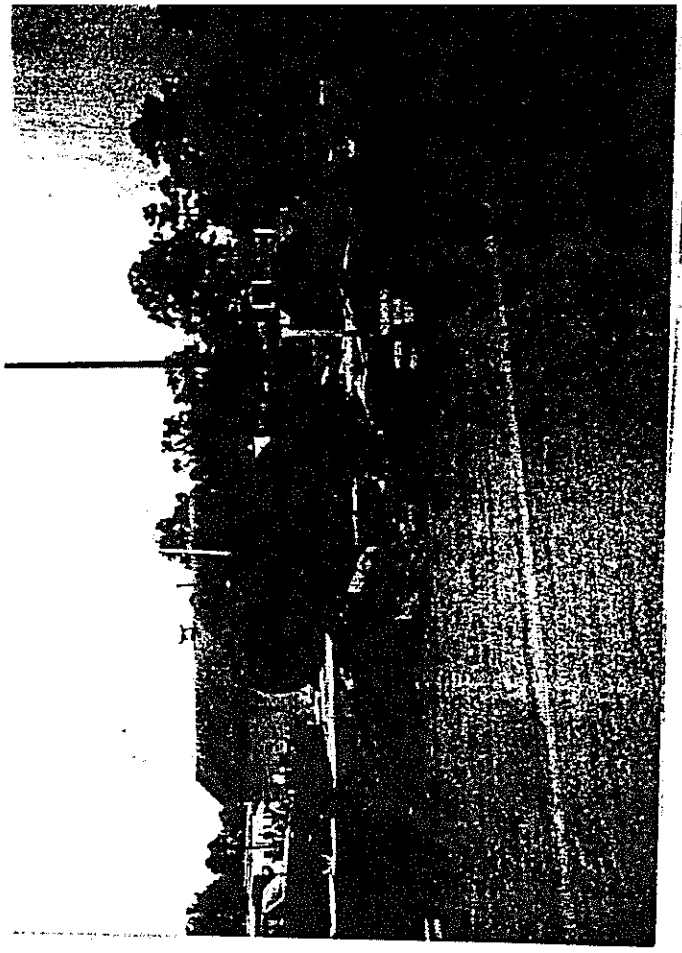
Date Taken Out of Service (month/day/year)					
Date to be Returned to Service (month/day/year)					

B. Permanent

Date Last Used (month/day/year)	unknown	unknown	unknown	unknown	
Date Tank Closed (month/day/year)	3/17/93	3/23/93	3/23/93	3/23/93	
Closure Method					
Removed from Ground	X	X	X	X	
Closed in place by filling with solid inert material					
(Note: Water is not a solid inert material)					
Concrete					
Sand					
Foam					
Other (Specify)					
C. Change in service (Specify New Substance Stored)					

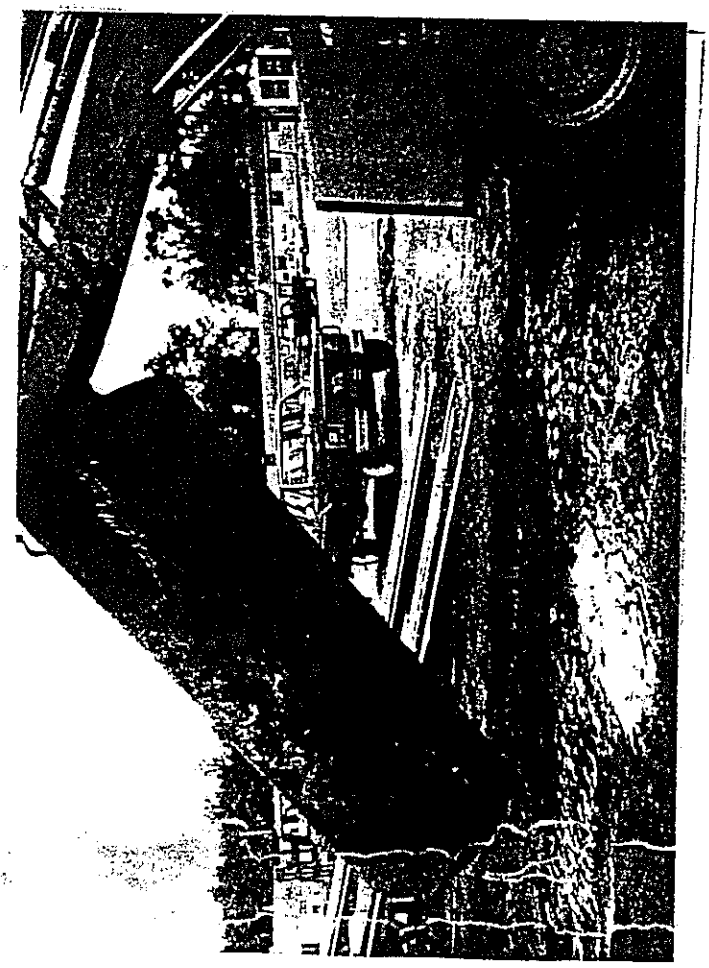


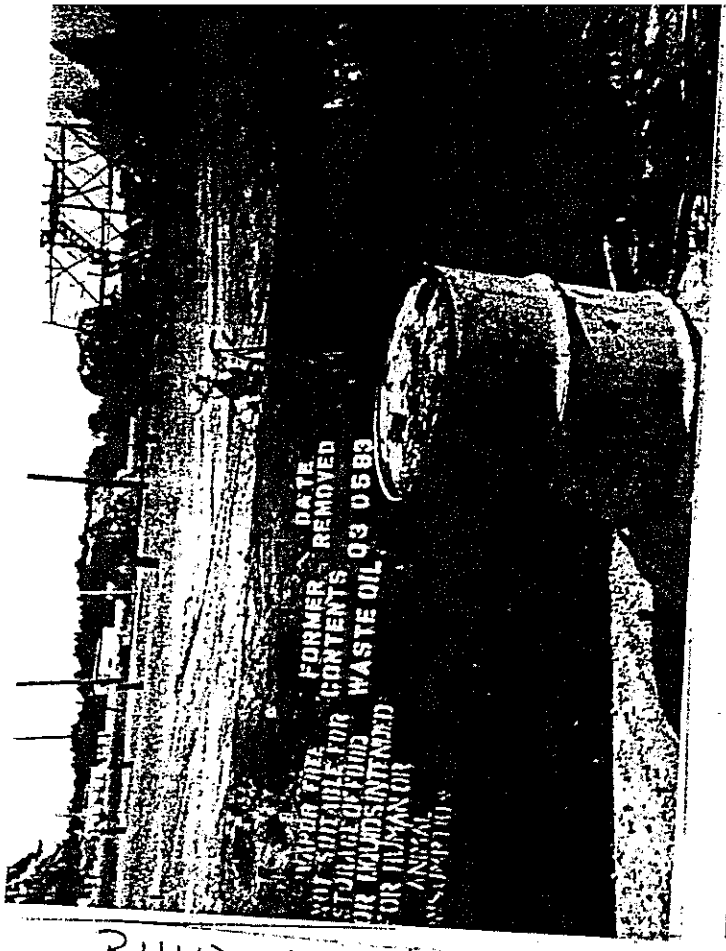
BUILDING 1128 TANK 1



BUILDING 1128 TANK 1

BUILDING 1128 TANK 2





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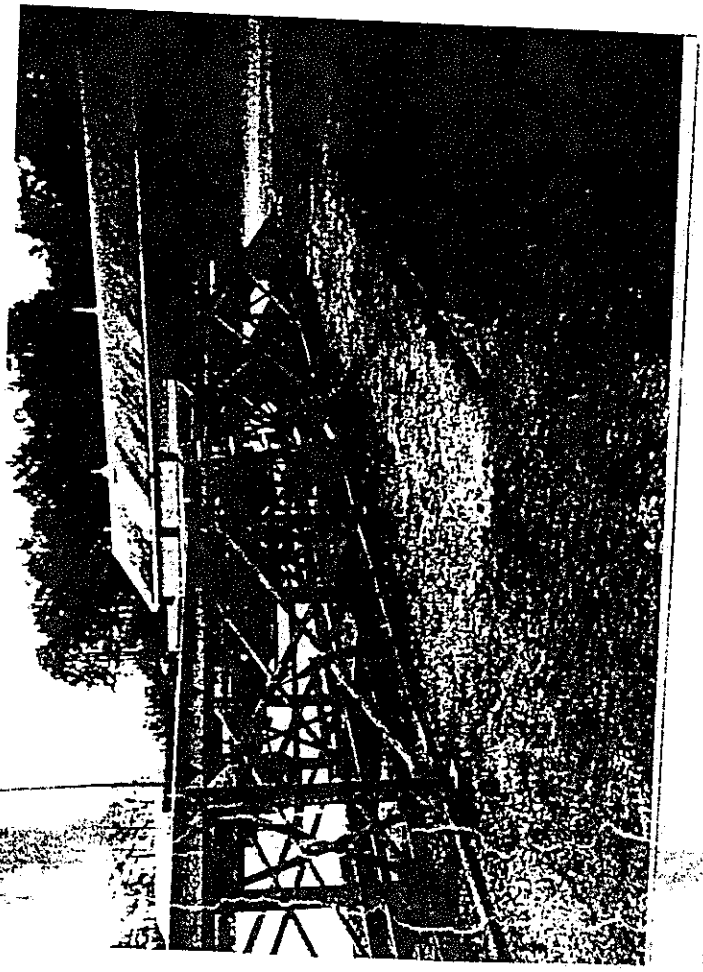

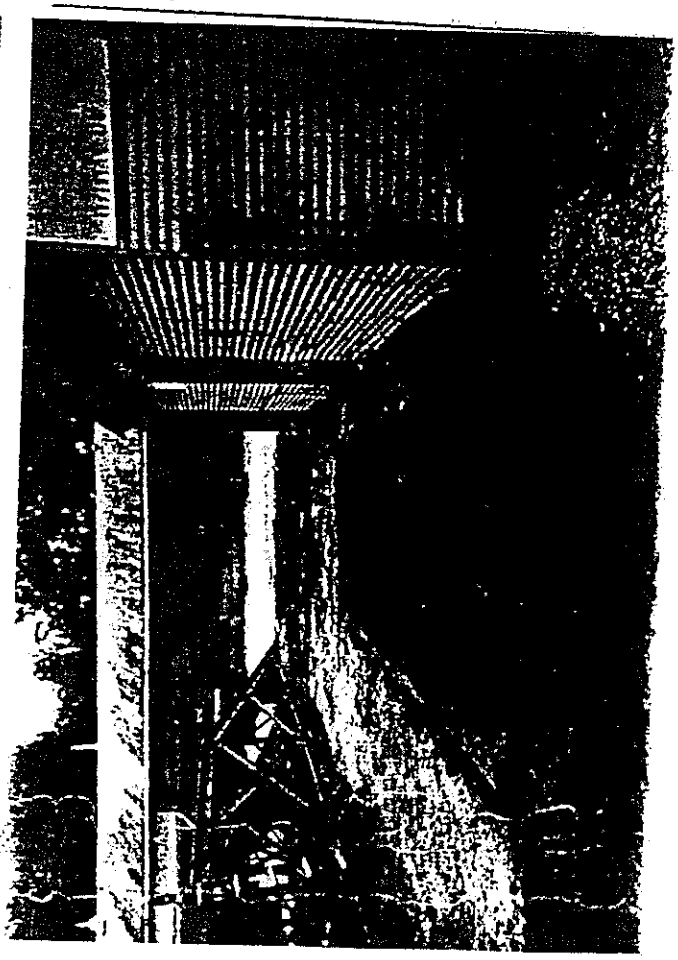

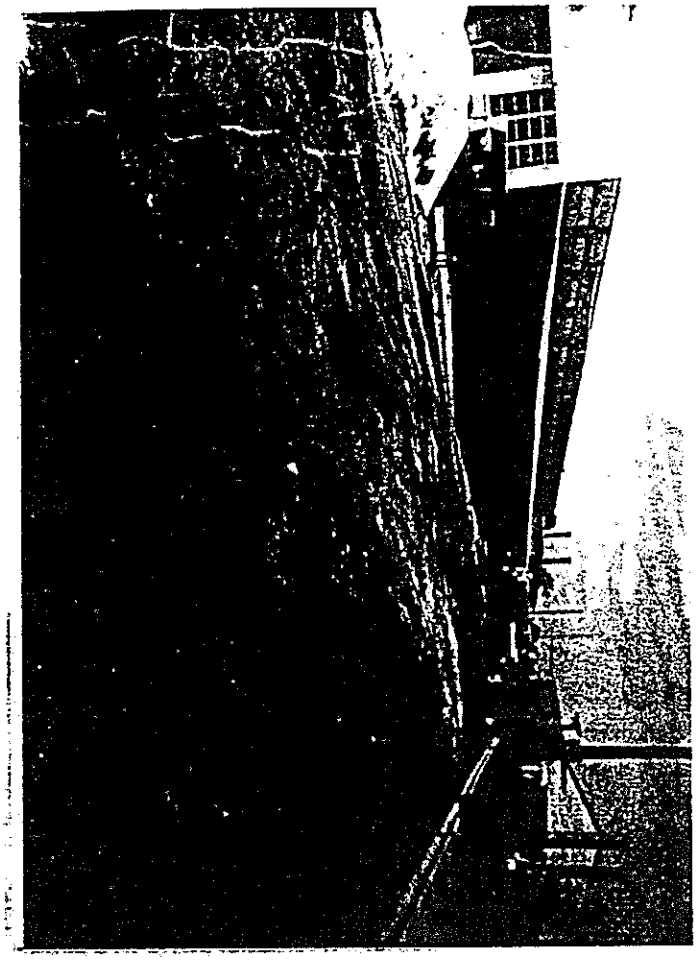

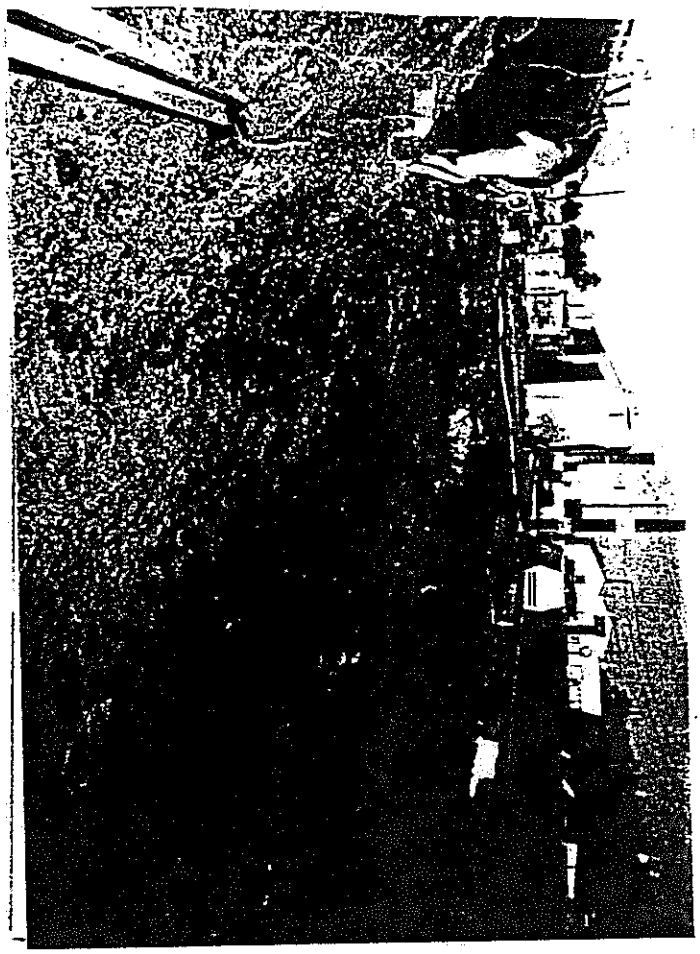

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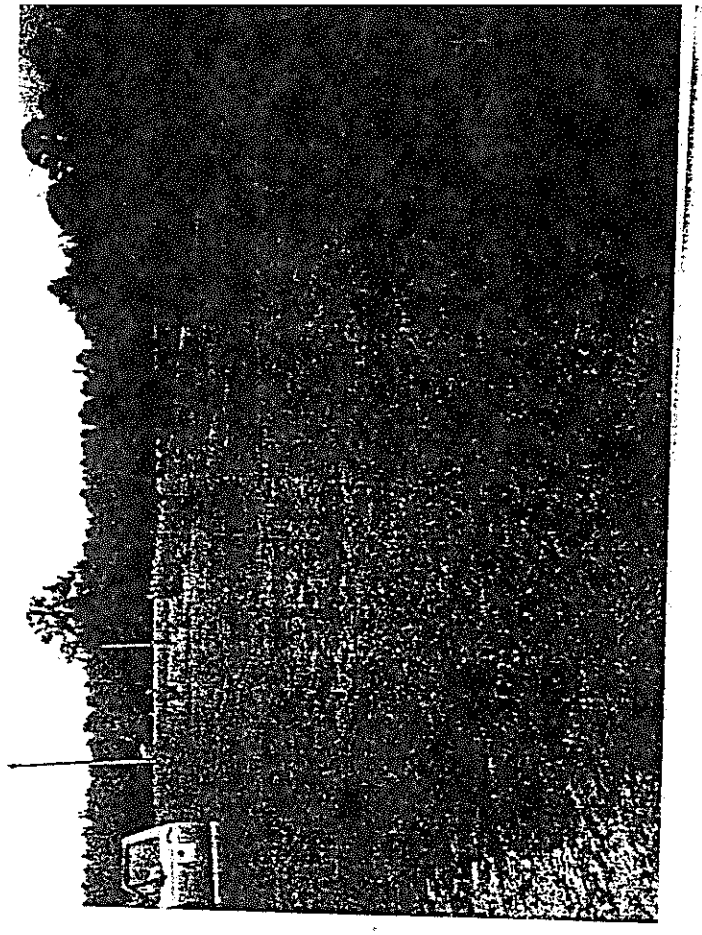
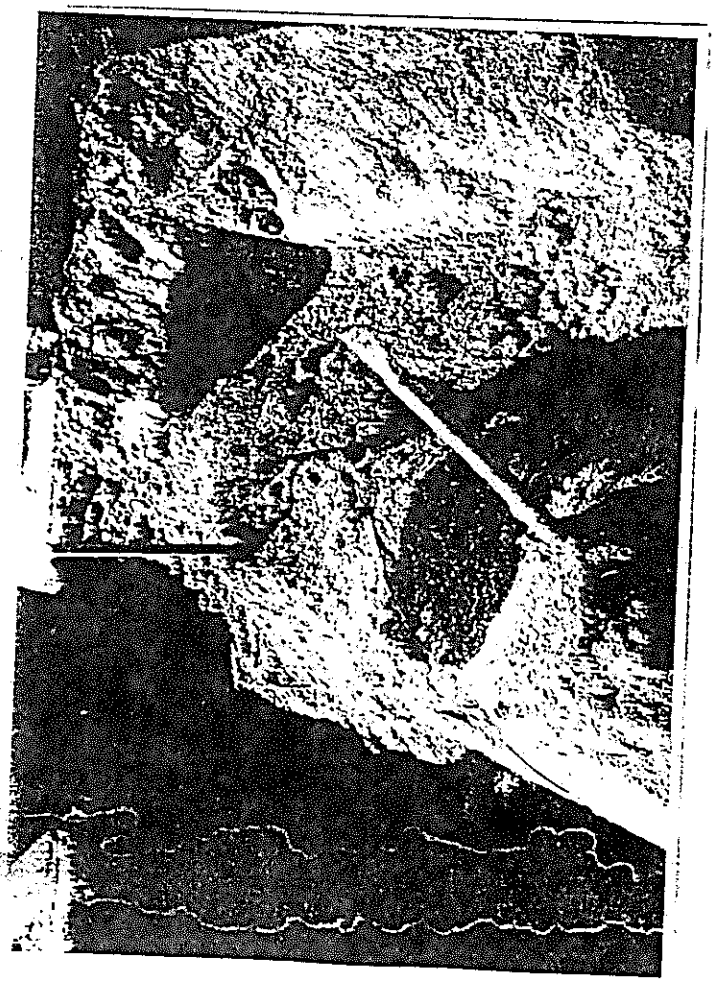


BUILDING 15016 TANK-1



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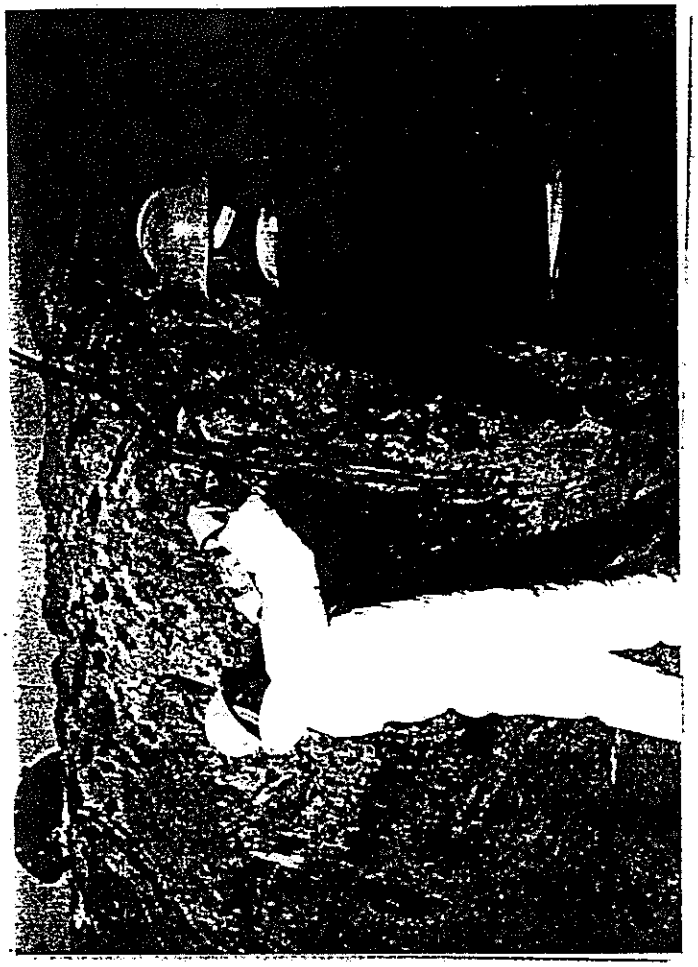
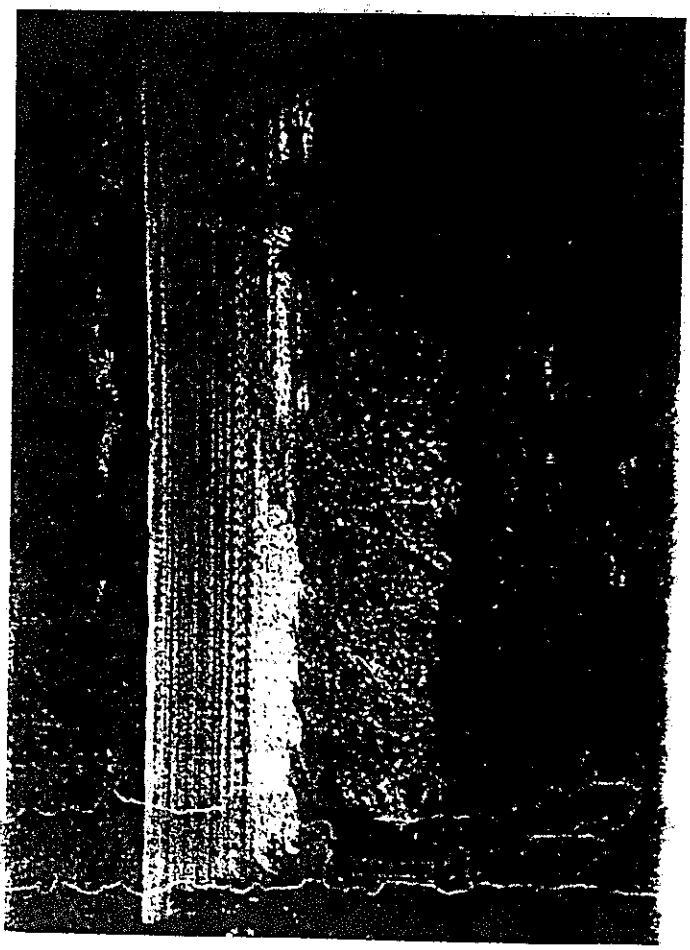
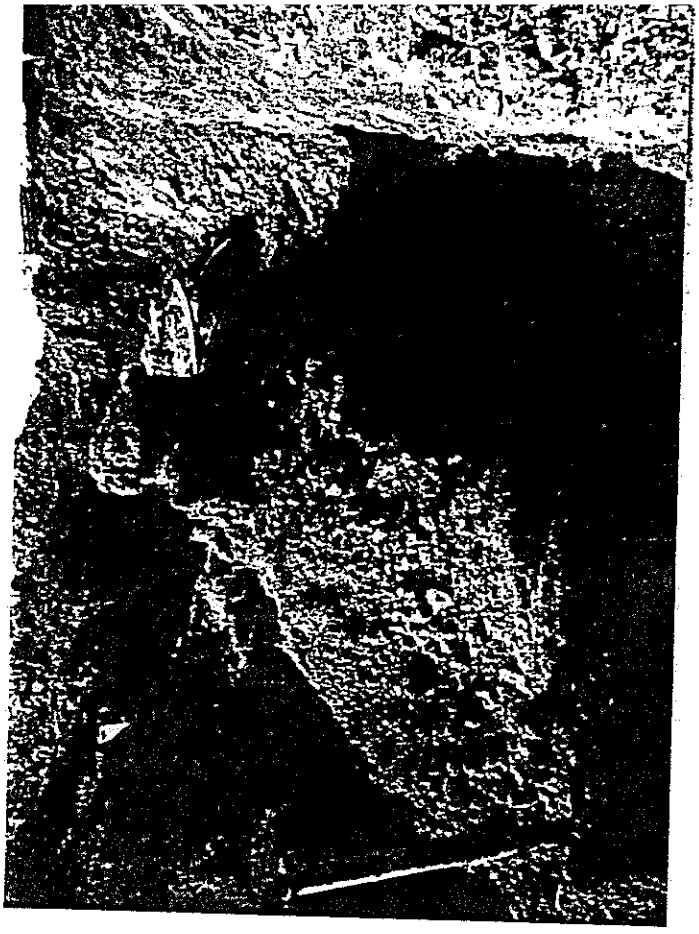
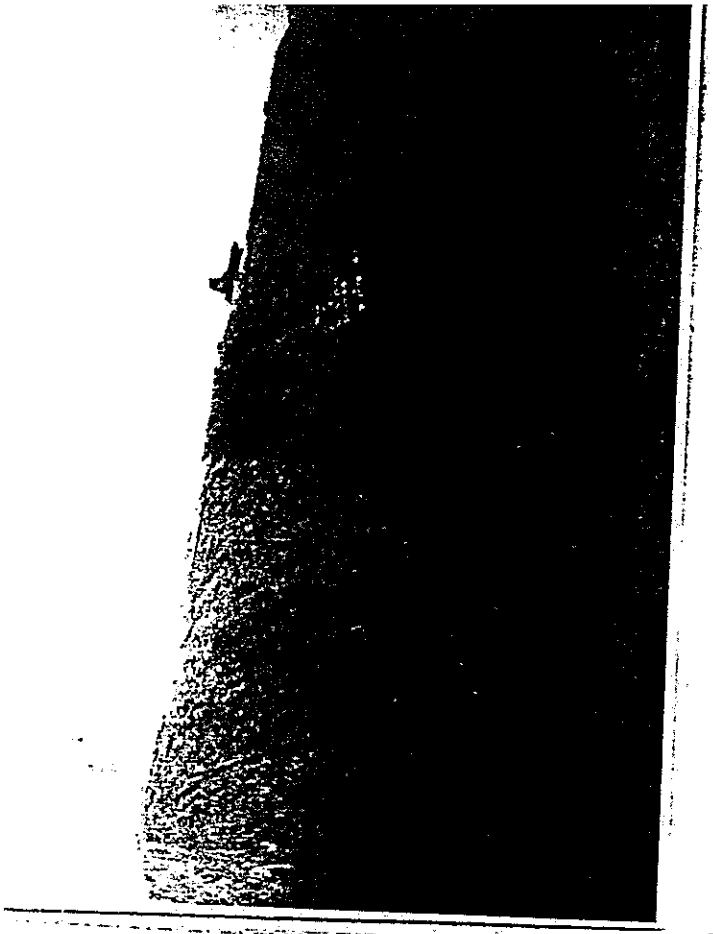


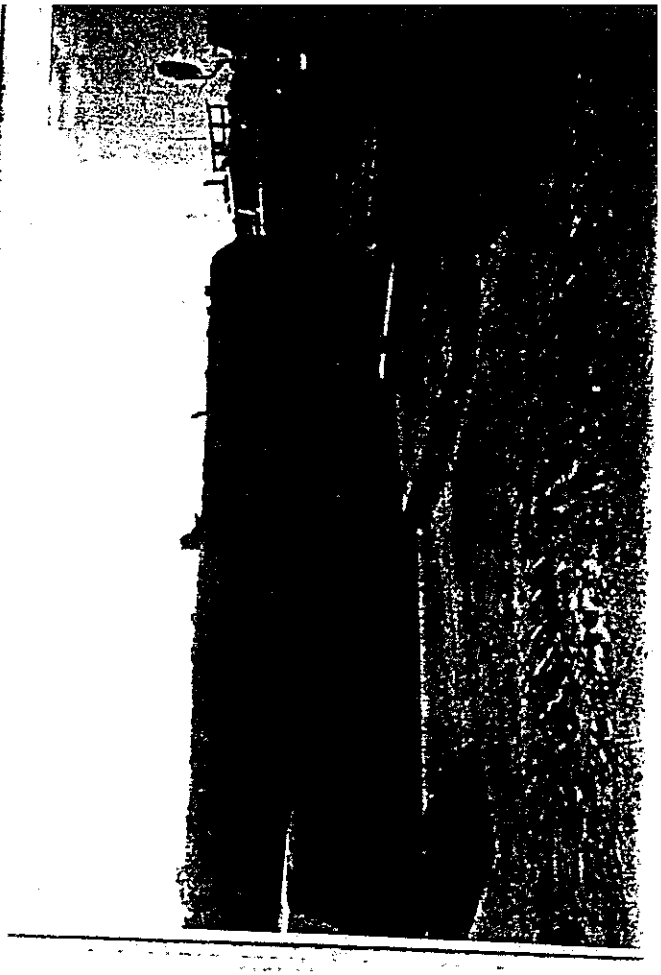
BUILDING 15016 TANK1



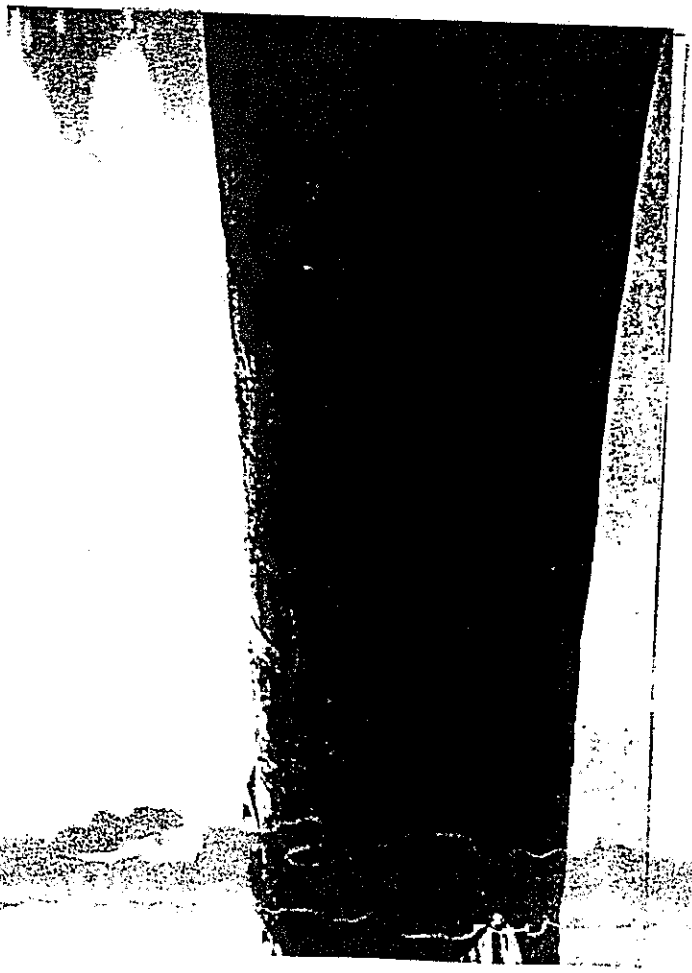


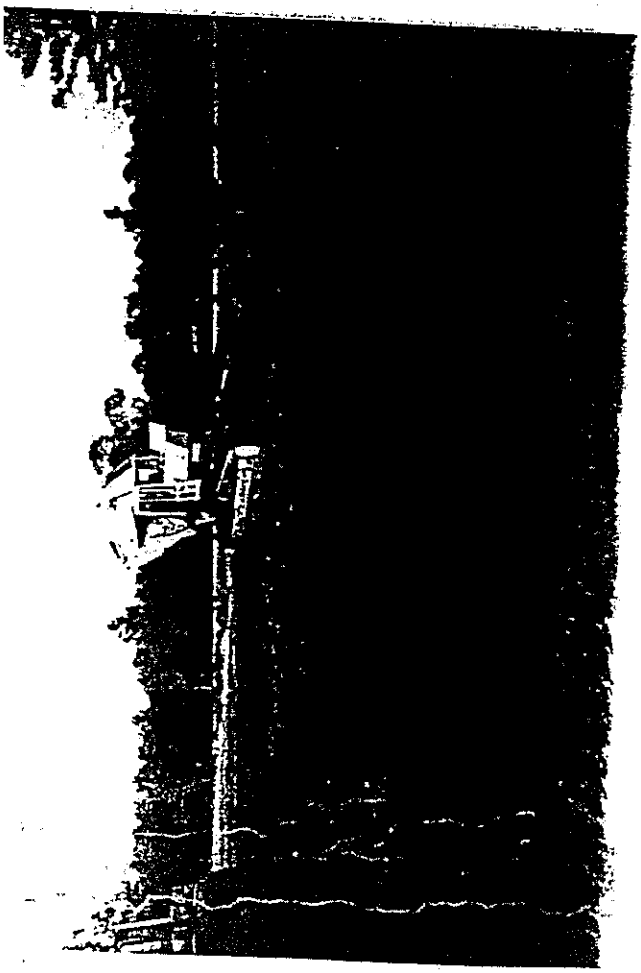
BUILDING 15016 TANK-2



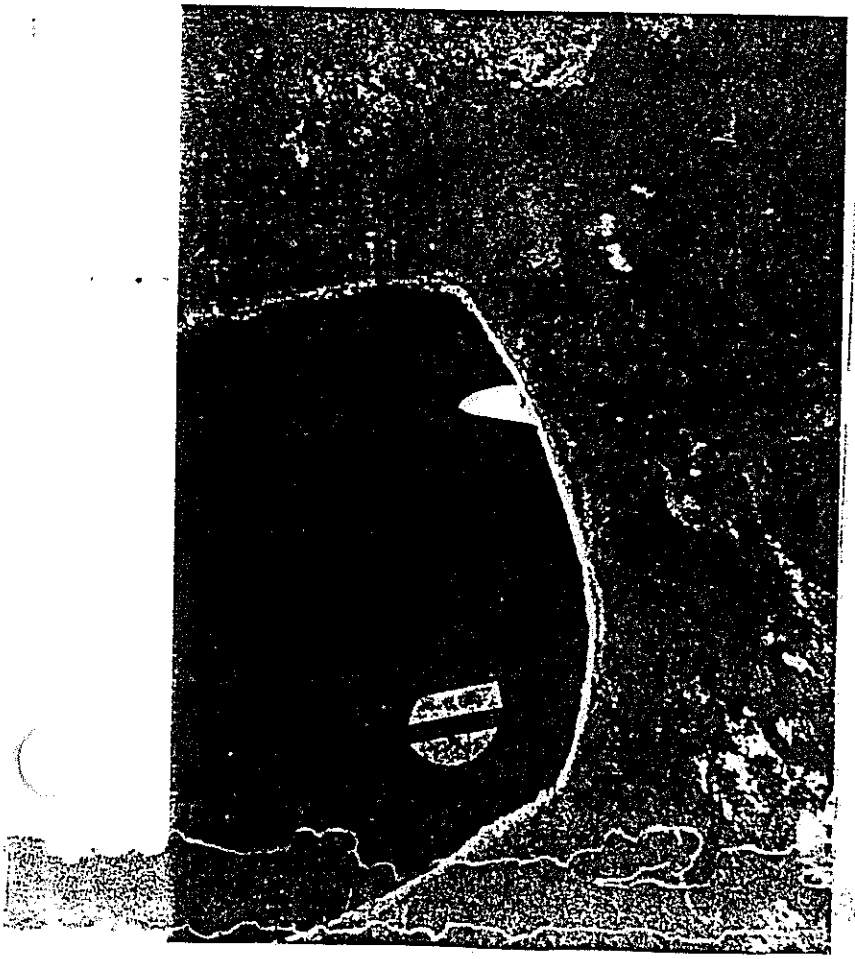


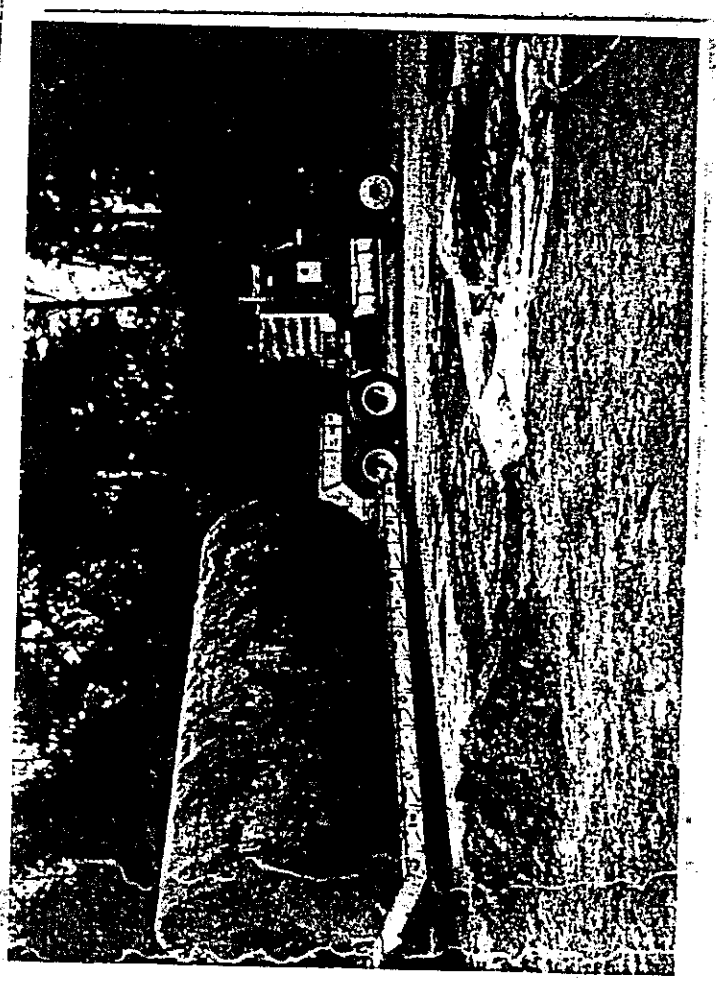
BUILDING 15016 TANK-1

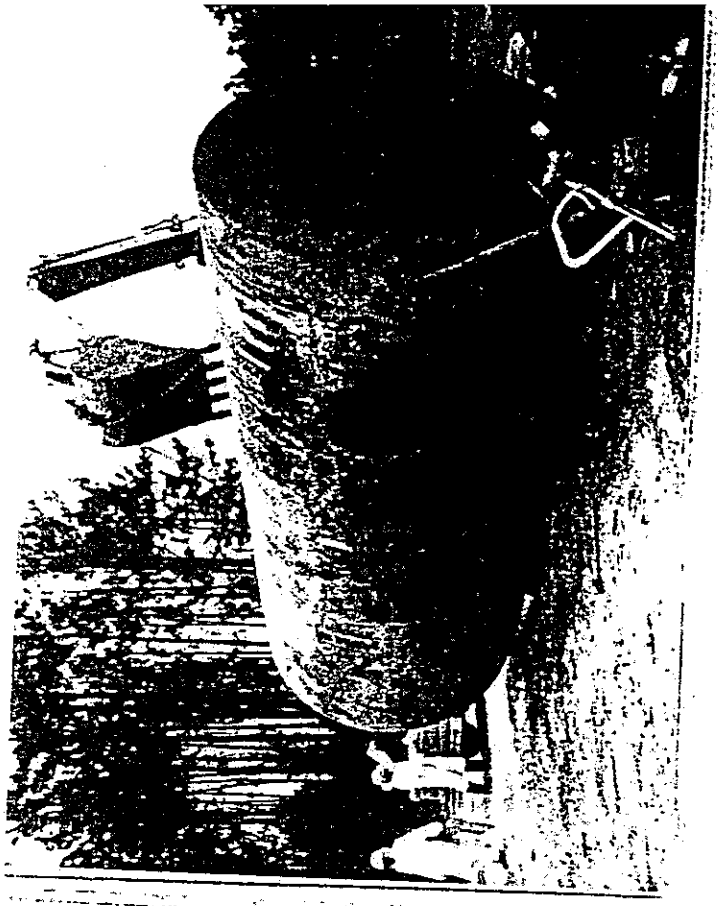


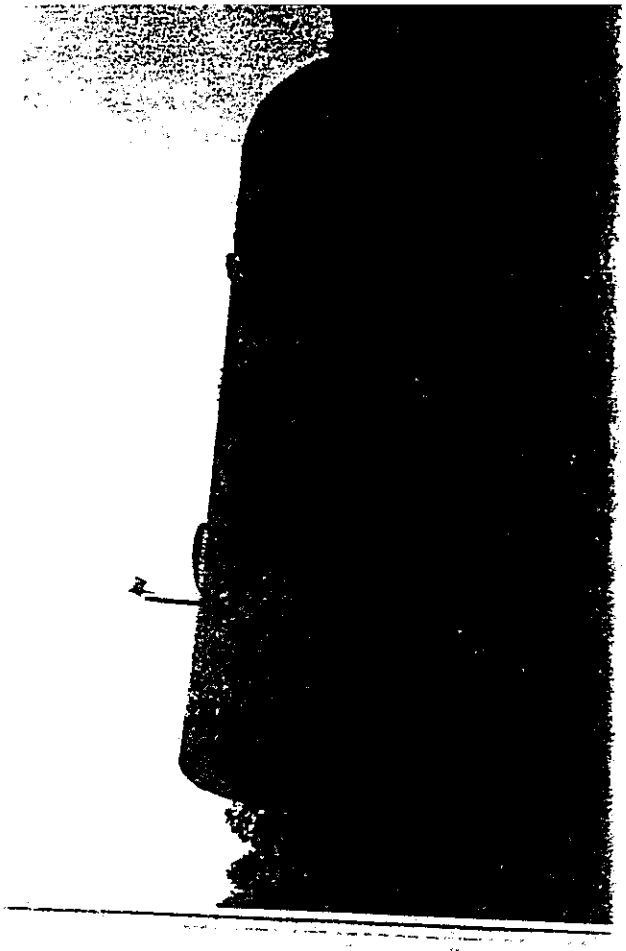


BUILDING 16012 TANKS 1 & 2



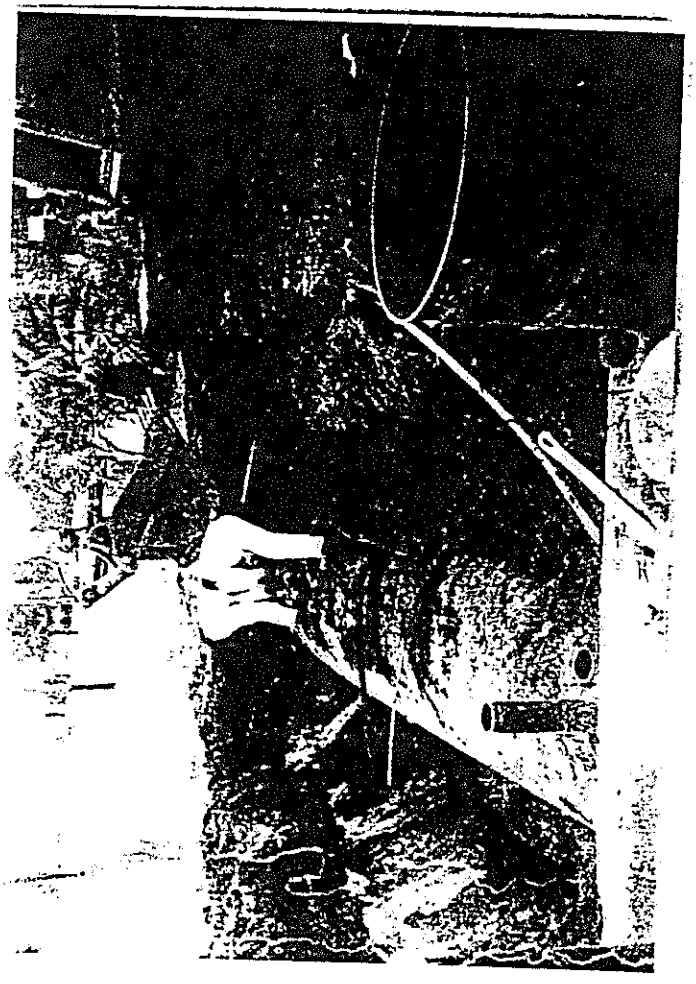


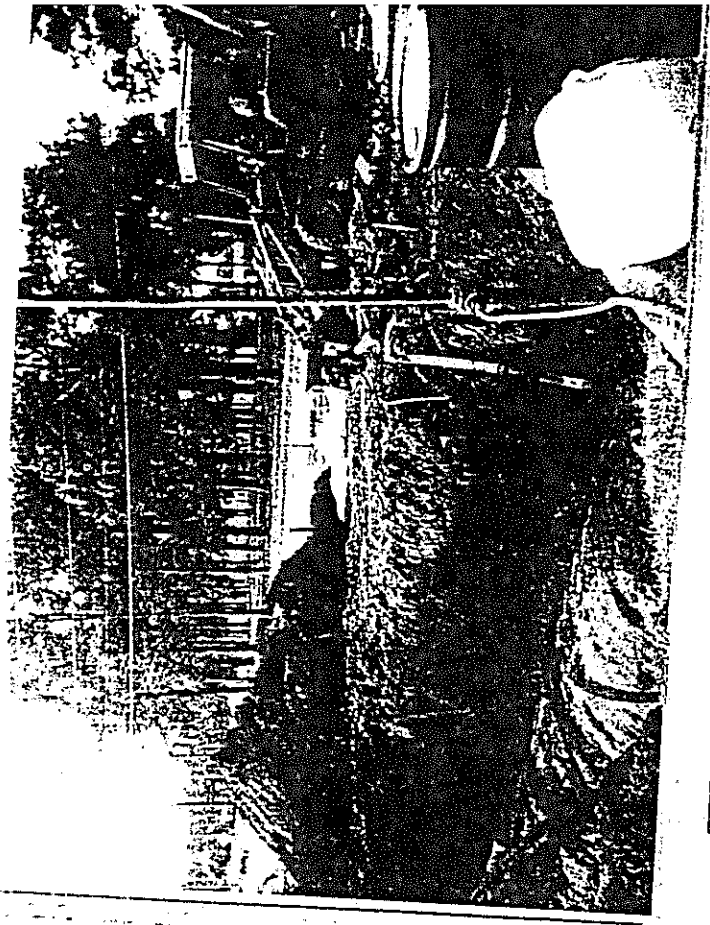




BUILDING #16012 TANKS 1&2

BUILDING 430





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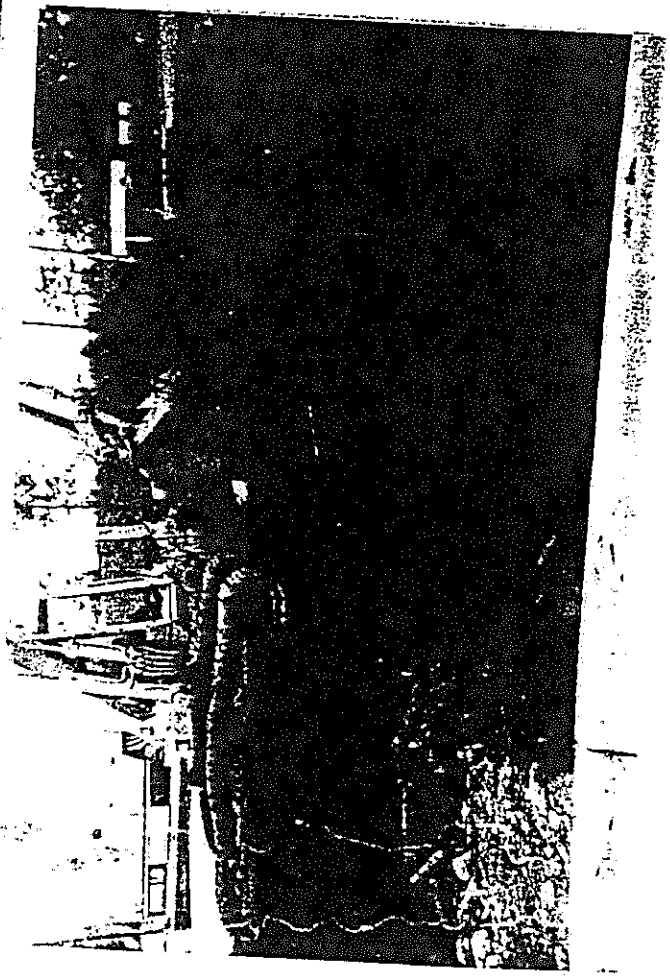

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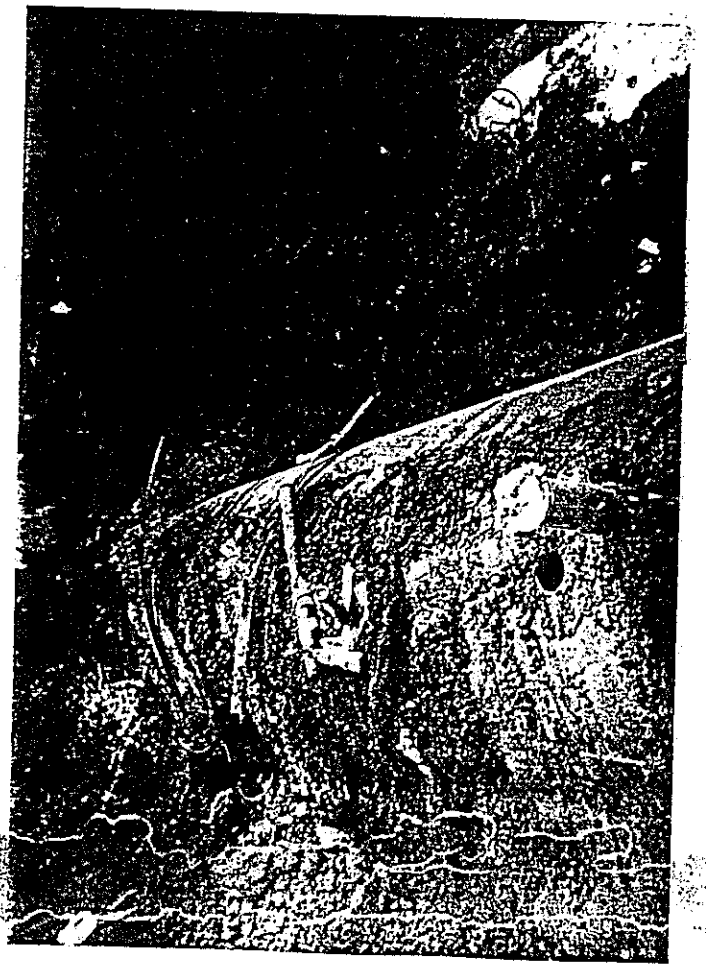

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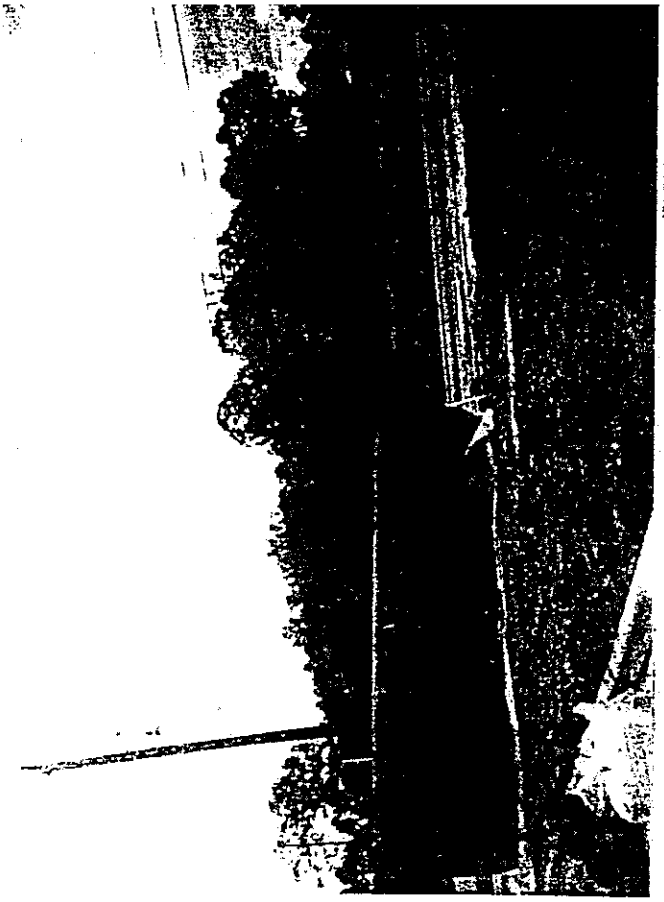

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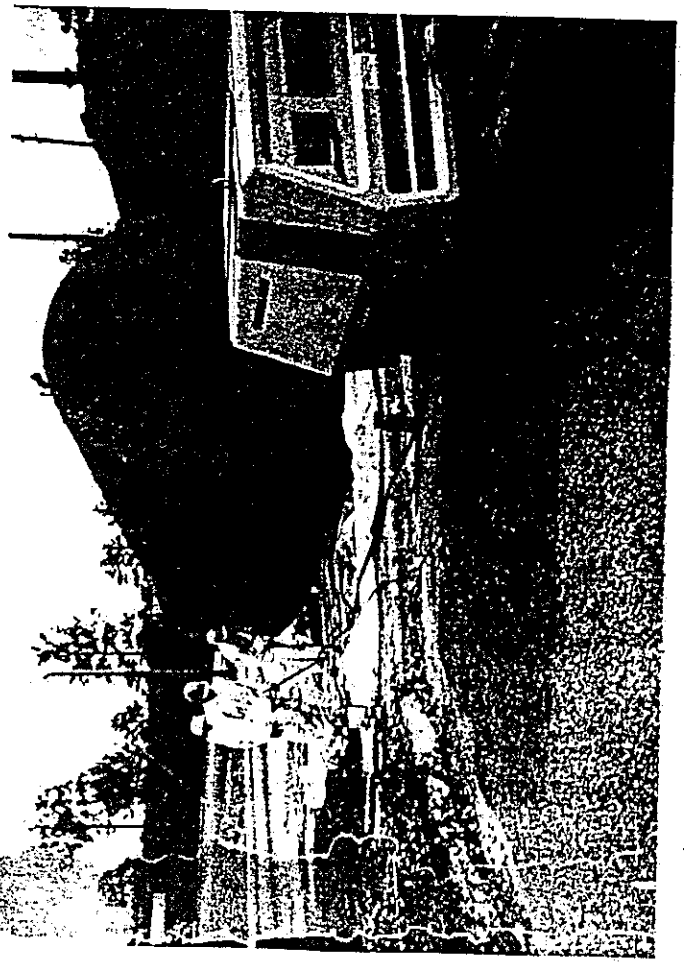

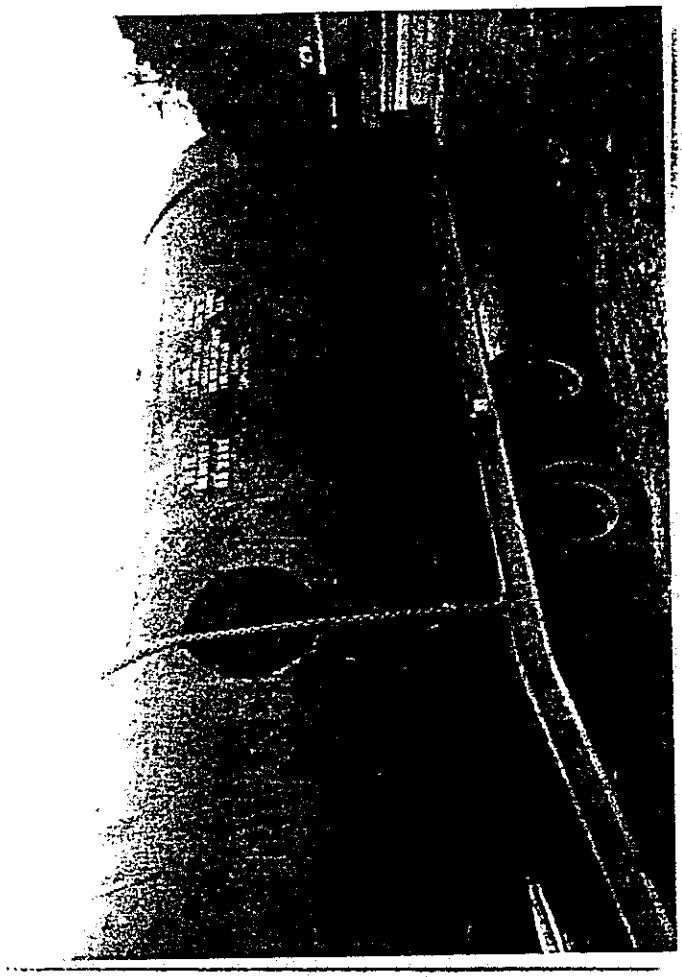

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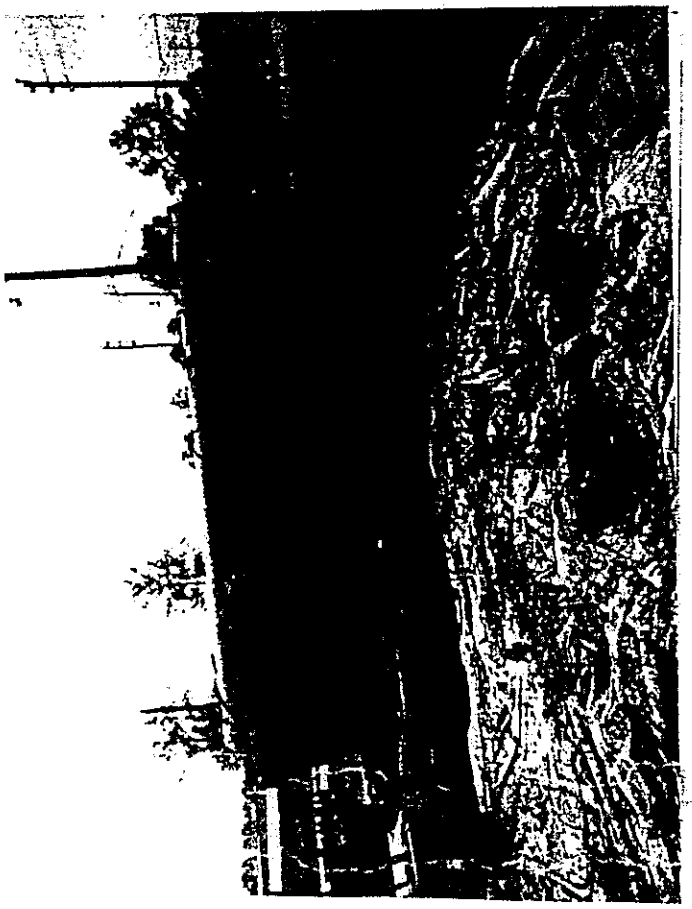


2.0 TABLE OF CONTENTS

2.1 LIST OF TABLES

3.0 Introduction

Anderson Columbia Environmental's (ACE) Work Plan (WP) for the subject project is written in accordance with the United States Army Corps of Engineers' (COE) Specifications for Contract Number DACA21-92-D-0002.

This WP has been prepared for review by the COE for tank removal operations at Ft. Stewart, Hinesville, Ga.

The scope of services for this delivery order includes the sampling, cleaning, testing, removal and disposal of 13 tanks at various location on the base. The tanks contain(ed) aviation fuel, gasoline diesel, and water.
To complete the scope of services as outlined, ACE will perform the following general tasks and activities:

- Perform site investigation and assessment
- Coordinate initial site mobilization activities
- Conduct sampling and analyses
- Conduct tank pumping operations, if product is present
- Coordinate subcontracted services
- Perform tank removals
- Demobilize equipment and materials
- Complete documentation of activities

All work to be performed under this plan will be conducted in accordance with the contract requirements of the U.S. Army Corps of Engineers. In addition, the ACE Sampling/Analysis QC/QA Plan, Safety and Health Program requirements, Management Plan and Site Specific Health and Safety Plan will be followed in completion of this work plan.

4.0 Construction Schedule

ACE's Construction Schedule is presented in Table 3-1.

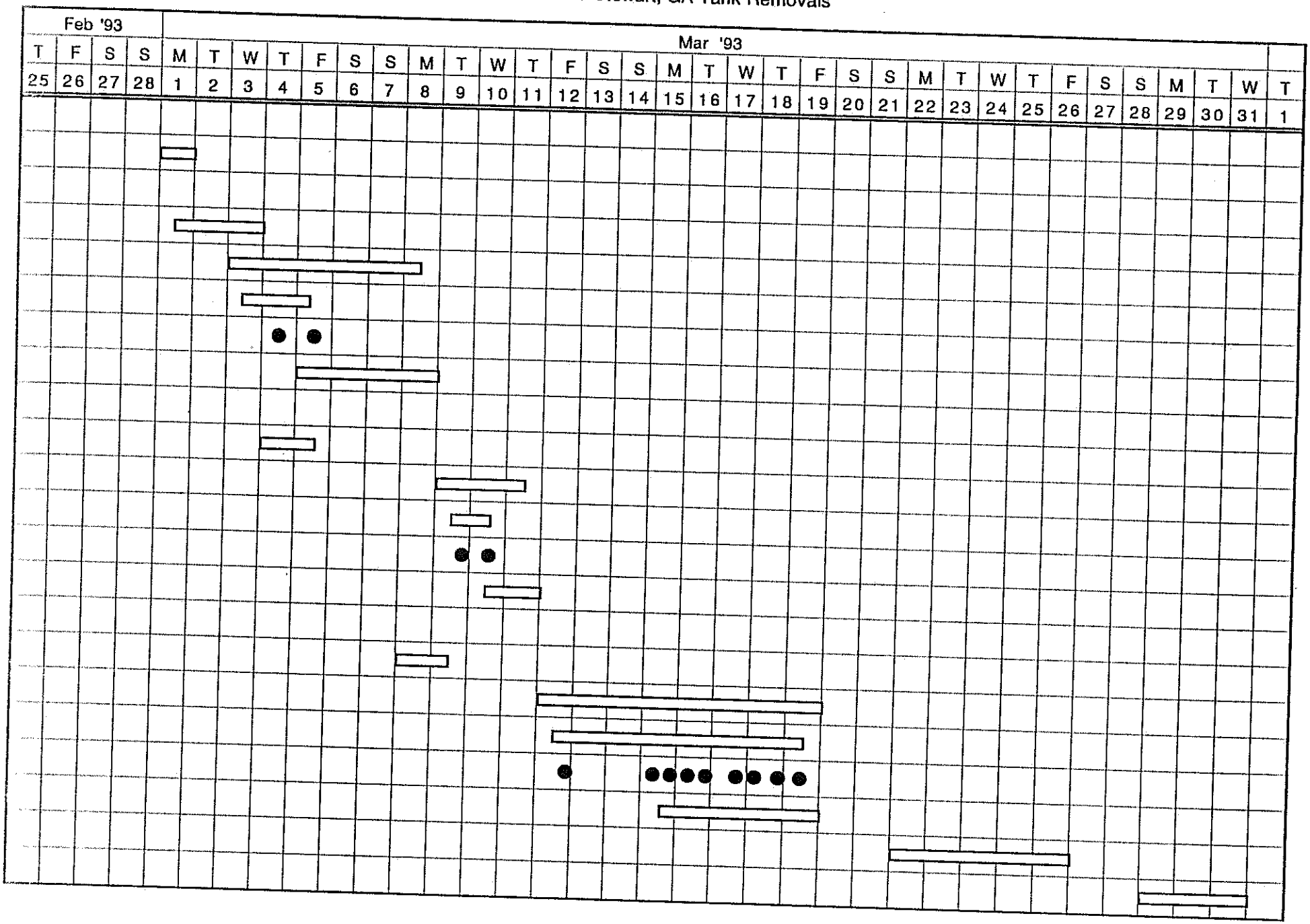
Table 3-1, Construction Schedule

Ft. Stewart, GA Tank Removals

	Dec '92				Jan '93																		
	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T
	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Sampling and Analysis																							
Mobilization																							
Camp Oliver - (2) 25,000 gallon UST's																							
Pump, Transport & Disposal of Contents																							
Tank Removal, Cleaning and Disposal																							
Soil Screening																							
Tank Closure Sampling																							
Backfill Excavation																							
Taylor Creek - (2) .12,500 gallon UST's																							
Pump, Transport & Disposal of Contents																							
Tank Removal, Cleaning and Disposal																							
Soil Screening																							
Tank Closure Sampling																							
Backfill Excavation																							
Main Base - (4) 10,000 & (5) 1-2,000 gal. UST's																							
Pump, Transport & Disposal of Contents																							
Tank Removal, Cleaning and Disposal																							
Soil Screening																							
Tank Closure Sampling																							
Backfill Excavation																							
Restoration of Concrete/Asphalt Surfaces																							
Cleanup & Demobilization																							

Table 3-1, C[illegible]truction Schedule

Ft. Stewart, GA Tank Removals



5.0 Petroleum and Hazardous Substance Underground Storage Tank (UST) and/or Piping Integrity Testing

The subject delivery order does not require tank tightness testing on any of the tank systems prior to removal. However, should a modification require this scope of work the following procedures will be followed.

Tank integrity testing shall comply with current Environmental Protection Agency regulations for underground storage tanks. The tank testing method shall be capable of detecting leaks to 0.1 gallons per hour, with a probability of detection of 0.95 and a probability of false alarm of 0.05. In addition, the method shall account for the effects of thermal expansion or contraction of the product, vapor pockets, tank deformation, evaporation or condensation, and water table level. ACE will obtain water table elevations through the use of available public records.

A written report of test results shall be submitted to the COE. A certification and statement of compliance with USEPA regulations shall be provided for all tested tanks found to be leak free.

All tank integrity tests shall include line testing which shall meet the same requirements as the tank integrity testing at one and one-half the operating pressure.

If a pipe line is found to be leaking, ACE will immediately notify the COE. When the COE has repaired the line, ACE will conduct an additional line test to verify that the line has been repaired.

In the event a tank tightness test indicates a leak, ACE will conduct a second tank tightness test for confirmation of the leak.

ACE will coordinate test dates, times, and locations with the Contracting Officer's Representative (COR). The Government will fill the tanks to the level specified by ACE prior to mobilization to the site. ACE will inform the Government of any special testing requirements, such as temperature stabilization time, when coordinating with the COR.

6.0 Sampling and Analysis of Tank Contents

ACE will conduct sampling and analyses as required to dispose of or recycle the petroleum products contained in the tanks. ACE will provide samples to facilities requesting pre-acceptance samples for their analysis.

In general, ACE anticipates that sampling and analysis will preceed tank removal operation mobilization by approximately three to six weeks, depending on the number of tanks to be removed. All sampling shall be conducted in accordance with ACE's Comprehensive Quality Assurance Plan. Air monitoring shall be performed during sampling activities to ensure that action levels for potential airborne contaminants are not exceeded and if present, appropriate respiratory protection shall be worn. Specific personal protective equipment shall be included in the Site Specific Health and Safety Plan for each facility.

Chain of custody forms will be prepared for every sampling event and indicate ultimate disposition. ACE's copy of a chain of custody record is included in the Comprehensive Quality Assurance Plan on page 8 of Section 7 and is listed as Figure 7-3. ACE Environmental Technicians are responsible for taking samples and providing proper chain of custody records. Chain of custody records will be provided for required samples for each site.

7.0 Pumping, Transportation and Disposal of Tank Contents

An ACE representative will be on-site during all pumping operations. ACE will provide air monitoring during these activities and will insure that spill prevention methods and techniques are used to avoid releases of contaminants during these operations. Absorbant pads and other materials will be used to reduce drips and spillage during transfer hose connections and disconnections. When pumping flammable and/or combustible liquids, the tank truck will be grounded.

ACE will verify that vehicles are the appropriate D.O.T. class for transporting any hazardous materials. Placards will be provided by the transporter and affixed to vehicles as per 49 CFR Parts 100 to 177. Other requirements

under these regulations for transporting hazardous materials shall also be followed, such as shipping papers, bills of lading etc. ACE and its subcontractors shall have the appropriate licenses and insurance for transporting such materials.

ACE will provide for disposal of bulk materials at facilities permitted to accept them. Off-specification used fuel oils, hazardous waste used oils, product specification used oils and contaminated waters will be disposed of in accordance with State and Federal requirements. The determination if a waste oil is recyclable will be made per the current regulatory requirements imposed upon facilities permitted to accept these materials as either a recyclable product or as a type of waste. Both product and waste disposal activities conducted through ACE will be included in the field report information and documented by bills of lading and either non-hazardous or hazardous waste manifests, as appropriate. All manifests will be signed by either Kathy Gazette or Christopher Damour, ENRMO, Ft. Gordon.

8.0 Excavation Plan

Safety fences will be erected at each site prior to commencing excavation. Concrete or asphalt overburden will be sawcut and properly disposed of prior to excavation. After removal of concrete/asphalt, excavation at each site will begin with stripping the site of topsoil with a front end loader or excavator. This material will be stockpiled away from the excavation for reuse at the conclusion of the backfilling operations. Soil overburden will be removed with a hydraulic excavator to the top of the tank then proceed along all four sides.

ACE will perform contaminated soil screening with an OVA as the soil is being removed. Topsoil will be separately stockpiled from soil excavated from around and below the tank and associated piping. Head space analysis will be used to determine if excavated material is contaminated. ACE will fill a clean 8 oz. jar one half full of soil. Next, aluminum foil will be placed over the jar, the lid fastened, and then shaken.

The contents of the jar will be allowed to equillibrate for a period of approximately 5 minutes, after which time a probe will be carefully inserted

through the aluminum foil, and the headspace sampled. A flame ionization detector (FID), shall be used for head space analysis, and the contract specified FID reading of twenty (20) ppm or the State requirement, whichever is greater, shall be the action level which will define excavated material as contaminated.

For tank removals involving hazardous materials or other non-petroleum containing tanks, the COE will establish field screening methods for contaminants, which may include collecting samples for laboratory analysis.

Clean excavated soils will be stockpiled near the edge of the excavation so that they are conveniently located for backfilling. ACE personnel will not enter the excavation. Contaminated soils will be stored in a secure location near the tank area, and will be placed on an impervious surface and covered, pending sampling, analysis, and disposal.

ACE will excavate five (5) feet beyond the perimeter of the UST to insure detection of potentially contaminated soil.

Immediately after removal of each tank and piping ACE will collect the following samples:

(1) Two soil samples at the lowest point of the excavation at each end of the tanks

(2) One soil sample from each of the excavation walls, four (4) per tank

(3) One soil sample every 20 feet along pipe runs and suspected worst case locations. Worst case locations are defined as any soil being visibly stained or displaying a high organic vapor reading. Up to five (5) trench samples can be composited, but worst case samples shall not be composited.

(4) A minimum of one five point composite soil sample of any contaminated soil. More samples may be required depending on the volume of contaminated soil generated at each discreet tank site.

(5) If groundwater is exposed, two water samples shall be taken. ACE shall collect a sample of any sheen on the water, and a sample of the water without the sheen.

(6) One background soil sample from each site.

In cases where the state tank closure requirements differ from the above contract requirements, the state requirements will be followed.

At each soil sample location the first inch of covering soil will be removed and discarded prior to placing the sample in the collection container. ACE will document the location, matrix, and analysis of any sample collected, including documentation of organic vapor reading, visible appearance of stains, appearance of sheen on water, and other relevant field conditions in the field notes.

8.1 Inerting UST's

Due to the residual product and/or sludge in some USTs, coupled with the impracticality of adequately purging the UST's vapors through small holes at the top of the tank, some UST's will be inerted to displace the oxygen prior to removal. ACE will employ the following inerting procedures:

- Measure the atmosphere in the tanks (top, middle, and bottom) for flammable vapors and oxygen with a combination Combustible Gas/Oxygen meter. If the oxygen level is over 10% and the combustible gas meter indicates vapors are above 10% of the lower explosive limit, use an inert gas (dry ice or nitrogen) to reduce the oxygen level to below 8% (50% of the O_2 concentration required to support combustion). If dry ice is used, crush the ice and introduce into as many holes as possible to maximize the dispersion of the vapors. If nitrogen is used, the bottle valve must be grounded or bonded prior to opening to prevent the potential for static discharge. Lower the hose to the bottom of the tank and start the gas flow by opening the valve very slowly at first to minimize rapid movement of air in the tank.

- Once the tank atmospheres are below 8% O_2, remove the tanks from the excavation and set them on the ground with blocking to prevent their movement. Place barricades and caution tape around the excavation and tanks when the site is not attended.

- As soon as possible after removal of the tanks from the excavation, recheck the tank atmosphere. If non-flammable as described above, use pneumatic drill and high-speed steel hole-saw to cut a pilot hole in the side and both ends of the tanks. Use a non-sparking pneumatic nibbler to cut larger holes (approximately 2' by 2') in one end and the side and cut the other end out of the tank. Once the first large hole is completed in the side of the tank, the explosion hazard is virtually eliminated; however, the fire hazard may still be present. Maintain a fire watch until the cutting operation is complete.

9.0 Removal, Cleaning, and Disposal of UST's

Prior to removal of tanks, product and vent lines will be drained and flushed into the tanks. Any collected product or waste material will be removed from the tank prior to excavation. Product and/or waste material will be pumped from the tanks using pneumatic driven pumps and placed into properly labelled 55-gallon drums. This material will be disposed of in a similar manner as the original tank contents.

Just prior to excavation, the tank atmosphere will be tested for flammable vapors at the top, middle, and bottom of the tank. The tank will be purged or inerted (see Section 8.1) if vapors are above 10% LEL. Once the tank atmosphere is below 10% of LEL, the excavator will break the hold down straps and a wire rope cable will be connected from the tank lifting lugs to the excavator bucket. The excavator will lift one end of the tank and slide it out of the excavation. Water present in the excavation will help lift the tank as the excavator lifts it out. The tank will be removed to a location topside of the excavation where it will be cleaned and stenciled prior to off-site disposal.

If more than one tank is to be excavated, the excavator will excavate the next tank and repeat the removal process.

Tanks will have one end slightly elevated and destroyed by cutting minimum one foot diameter holes in both ends. Approximately two feet at the bottom of each end will be left in place to prevent any residual liquids from spilling out of the tank. An air blower will be used to blow air into the tank from the manway at the end that was not cut out to keep the tank ventilated as it is being cleaned. Percent LEL and oxygen levels will be monitored prior to cutting and during cleaning operations to ensure that the levels remain within safe ranges. The tanks will be cleaned with a 3,000 psi pressure washer and the rinsates will be containerized in properly labelled 55-gallon USDOT approved drums provided by ACE.

The collected rinseates will be sampled, analyzed, and disposed of in accordance with Federal, state, and local regulations. If the rinseate is determined to be a hazardous waste, ACE will coordinate with the COR for any special disposal and transportation requirements.

When the tank destruction is complete, ACE shall furnish the COE site representative with a Certificate of Destruction stipulating that the tank(s) have been destroyed in accordance with contract specifications. ACE shall forward a duplicate signed copy of the Certificate of Destruction not later than than ten (10) working days following destruction of the tanks(s) to:

U.S. Army Engineer District, Savannah
U.S. Army Corps of Engineers
ATTN: CESAS-EN-GH
P.O. Box 889
Savannah, Georgia 31402-0889

ACE will label all USTs after removal and cleaning prior to transportation. The following information shall be contained on the label on each tank in minimum 2 inch high lettering:

(1) Former contents, i.e. leaded gas, unleaded gas, diesel, specific chemical, etc.

(2) Present vapor state including method of vapor freeing and date of removal.

(3) Tank shall be labelled with the following:

NOT SUITABLE FOR STORAGE OF FOOD OR LIQUIDS FOR HUMAN OR ANIMAL CONSUMPTION

(4) If the tank contained leaded gasoline, the following shall be noted on the label:

TANK HAS CONTAINED LEADED GASOLINE. LEAD VAPORS MAY BE RELEASED IF HEAT IS APPLIED TO THE SHELL OF THIS TANK.

(5) Appropriate State notification ID # (as specified by the COR)

ACE shall photograph (35 mm color slides) all tanks immediately after labels have been placed on tank(s) for identification.

State and local agency inspectors wishing to be present during the tank removal operation will be accommodated by ACE after coordination with the COR representative on site.

10.0 Excavation Closure

Pursuant to contract specifications, ACE will not close the tank and/or piping excavation until the CO gives permission to proceed.

If no contaminated soil is encountered, the excavation will be backfilled as as soon as possible after the tanks and piping are pulled in order to minimize the size of the excavation and the amount of groundwater seepage into the excavation.

Backfill will be conducted as per contract requirements. Compaction tests will be taken as required during the backfilling process.

11.0 Sampling QA/QC

The Government will be responsible for analysis of the soil and water samples taken from outside the tank and/or piping lines. The Government will provide ACE with the name of the QA and analytical laboratory to be used for Government provided analysis. ACE will collect, prepare and ship all samples to that laboratory.

For all samples for which ACE is responsible for analysis, ACE will use a laboratory certified by the state in which the samples were collected.

All sample collections and subsequent sample handling procedures will be conducted in accordance with ACE's Sampling/Analysis QA/QC Plan. This includes standard field quality control samples. One field blank for each day of sampling, one travel blank for every cooler containing volatile organic sample, and a duplicate sample on a 20 percent basis will be submitted as field quality control samples.

12.0 Documentation

ACE will provide all required reports and information as per Contract Specifications. Field notes and reports will be maintained in a bound book. The following project specific forms and submittals for each site, as appropriate, are to be completed by ACE:

- Site Specific Health and Safety Plan
- Daily Field Report Forms
- Air Monitoring Log , if required
- Subcontractor H & S Acknowledgement, if required
- Sampling Checklist
- Site Entry/Exit Form
- Accident Report Forms, if appropriate
- Hazardous Waste Profile Form, if required
- Chain of Custody Record
- Bills of Lading/Manifests
- Analytical Data
- SB/SDB Subcontractor Forms

Additionally, ACE will prepare, for the Project Officer, a draft and final field report for each delivery. The report will include an assessment of the site based on field work and analysis conducted. At a minimum, the Field report will include a photographic history and narrative description of the work, and analytical results emphasizing the significance of detected concentrations relative to Federal and state criteria. The report will contain a conclusions and recommendations section where ACE will provide a preliminary determination, if supportable by documentable evidence, whether contaminated soil is a result of leaking underground tank systems.

13.0 Coordination of Work

Upon acceptance of the D.O. and approval of the site specific WP which includes a construction schedule with proposed mobilization dates for various scope of work tasks, ACE will obtain all necessary permits for the DO scope of work. The 30 calender day UST closure notification (to the state agency designated by the USEPA to receive notification) will be the responsibility of the Government. ACE will coordinate with the Government in preparing and signing the state closure form(s).

ACE will notify the COR 48 hours in advance of actual site mobilization. ACE will mobilize to the project site within 5 calender days of approval of the addendum to the management plan for a specific site. The ACE Supervisor shall meet the designated COE site representative to determine on-site logistics and personnel responsibilities during field work. Final site safety information should be gathered and incorporated into the Site Specific Health and Safety Plans for each facility. Included in this information shall be the proximity of the tanks to active uses, location of overhead lines, utilities, pipes, etc. and any lock out/tag out requirements for each tank location.

For a given site where two or more USTs are scheduled to be removed at the same time and in the same general area, ACE will assign a foreman to be directly responsible for coordinating and directing all the work for the operations.

ACE will coordinate with the Government on adjusting work schedules and/or tasks regarding concurrent work of other contractors on an as needed basis.

All ACE vehicles carry long range two way radios that can be used to communicate when off of the site. ACE supervisor vehicles carry cellular telephones.

Prior to commencing any excavation at a site, ACE will contact the utility locating agent, review the government provided utility maps and attempt to locate existing underground utilities.

The installation fire department will be notified at the start of each day of the sites at which ACE crews will be working.

ACE shall coordinate and arrange for subcontractor services as per the ACE Subcontracting and Affirmative Action Plan as submitted to the Corps of Engineers.

ACE will utilize Small Business and Small Disadvantaged Business (SB/SDB) firms, as appropriate. Forms which are included in the Subcontracting and Affirmative Action Plan shall be prepared to document and support ACE's efforts in subcontracting SB/SDB qualified firms under this contract.

ACE work schedules will be arranged to support subcontracting activities. ACE will require bills of lading or manifests and other related documentation for subcontracted activities. Quantities of materials removed from each site shall be documented, as appropriate.

14.0 Demobilization

Upon completion of the scope of work activities, ACE shall insure that all equipment and materials are promptly and properly removed from the site. Demobilization activities shall be conducted in orderly fashion and in a manner such that care is taken not to damage Government property. Any debris or other materials generated as a result of this work shall be removed from the site daily and the area inspected prior to demobilization to insure

that the site is in clean and neat order. Care shall be exercised so as not to create or leave any harmful or dangerous condition following demobilization activities.

Following project completion, ACE equipment shall be returned to the office of origin and properly stowed. Expended items should be noted for re-ordering. Tools and other equipment shall be cleaned and repaired as needed. The ACE Supervisor shall insure that all items used to complete the scope of services are returned to the appropriate party. Subcontractors shall be reminded not to leave anything on-site without ACE's approval.

ANDERSON COLUMBIA
ENVIRONMENTAL, INC.

SITE SPECIFIC HEALTH AND SAFETY PLAN*

1. SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION:

1.1 Background Information

Site/Project Name: Ft. Stewart
Street Address: Building #1139
City: Hinesville County: Liberty
State: Ga. Zip:
Site Contact: Tommy Houston Phone: (912) 767-1077
ACE Project No: 8030 DO No.: 0030

Directions to Site: See attached map

Approximate Size of Site: 1-5 acres Map Attached x Yes ____ No
Latitude: Longitude:
Topography: Flat

Land Use:

	Urban		Rural
	Residential		Industrial
	Commercial	X	Other(specify):

Property Ownership:

	Private		County
	City		State
X	Federal		Other(specify):

Secure Facility(e.g. Fenced): x Yes ____ No
General Site History/Prior Use(s): Ft. Stewart Military Installation

General Scope of Work/Site Tasks to be Performed:

x	Site Visit/Inspection						
x	Assessment						
x	Sampling						
x	Clean-up/Removal:	x	UST	X	AST	X	SOIL
	Emergency Response						
	Construction/Installation						
	Other (Specify):						

Estimated Duration of Site Activities: 20-30 days

*NOTE: This Plan must be on-site and available for all ACE projects involving suspected or

known contamination or hazardous materials incidents. Exclusions to this requirement for certain types of work are referenced in the Corporate Health and Safety Plan. This plan must be completed and reviewed prior to commencing field activities. All persons on-site must review and sign this plan.

1.2 Contamination Characterization

List all contaminants, identified in previous studies or other relevant information sources, that can be expected to be present in areas where work is to be performed.

TABLE 1

Contaminant Chemical Names 1	Expected Concentration Ranges	Matrix 2	On-site Location	Quantities
Kerosene	0 to 500 ppm	S/GW	Various Tank Sites	Unknown
Fuel Oil	0 to 500 ppm	S/GW	Various Tank Sites	Unknown
Gasoline	0 to 500 ppm	S/GW	Various Tank Sites	Unknown
Benzene	0 to 500 ppm	S/GW	Various Tank Sites	Unknown
Toluene	0 to 500 ppm	S/GW	Various Tank Sites	Unknown
Xylenes	0 to 500 ppm	S/GW	Various Tank Sites	Unknown
Ethyl benzene	0 to 500 ppm	S/GW	Various Tank Sites	Unknown
Tetraethyl lead	0 to 500 ppm	S/GW	Various Tank Sites	Unknown
Napthalene	0 to 500 ppm	S/GW	Various Tank Sites	Unknown
MTBE	0 to 500 ppm	S/GW	Various Tank Sites	Unknown
Methyl Ethyl Ketone	0 to 500 ppm	S/GW	Various Tank Sites	Unknown

1 For Petroleum sites, include benzene, toluene, xylenes, ethyl benzene, tetraethyl lead, paraffins (Alkanes), naphthalene, and methyl tert-butyl ether (MTBE) as appropriate for the type of petroleum products.

2 Matrix: S=Soil; GW=Groundwater; A=Air;SW=Surface Water

1.3 Petroleum Site Information:

For sites or incidents involving petroleum materials or contaminants, check the appropriate types of petroleum hydrocarbons and estimated quantities or the estimated number of tanks and tank capacities on-site.

Contents	No. of Tanks	Capacity
Lubricating Oils (turbine oil, paraffin motor oil)	[ ]	[ ] gallons
Heating Oils:		
Fuel Oil No. 4	[ ]	[ ] gallons

Fuel Oil No. 5			gallons
Fuel Oil No. 6			gallons
High Test Fuels/Solvents:			
Stoddard Safety Solvent			gallons
Mineral Spirits			gallons
Fuel Oil No. 1 (kerosene, range oil, coal oil)			gallons
Fuel Oil No. 2			gallons
Diesel Oil	1	25000	gallons
Jet Fuel (JP-4,5,6, Jet A,A-1,B)	6	2-25000	gallons
Low Test Fuels/Solvents:			
Gasoline(unleaded)			gallons
Gasoline(leaded)	4	10000	gallons
Petroleum Ether			gallons
Naphtha(regular, high flash)			gallons
Crude Oil			gallons
Waste Oils	2	1000	gallons
Other oil-based material (specify):			gallons

Note: Refer to detailed tank list attached to this plan for individual sizes and locations.

Material Safety Data Sheets attached to this Plan: [x] YES [ ] NO

List below the chemical names for which MSD Sheets are provided:

Diesel Fuel No. 2	Unleaded Gasoline	Acetylene
Compressed Air	Nitrogen	Kerosene
Leaded Gasoline	Oxygen	Diesel Fuel No. 4
Benzene	Ethyl Benzene	Toluene
Xylene	Methyl-tert-Butyl Ether	Tetraethyl Lead

2. HAZARD ASSESSMENT AND RISK ANALYSIS:

2.1 Site Tasks and Codes

Check the appropriate chemical, physical, biological and safety hazards for each site task or operation to be performed. Chemical hazard indicators are based upon media concentrations listed above, the chemical toxicity, volatility, risk potential for posing a flammable or explosive atmosphere (e.g. contaminant is lighter or heavier than air) and its explosive ranges and the frequency of detection. Provide additional task elements in spaces below with corresponding hazards.

1	X		Site Investigation, Sampling and Assessments
2	X		Mobilization of Equipment, Materials, and Personnel
3	X		Site Preparation
		A	X	Locating and Disconnecting Utilities
		B	X	Locating Site Drainage Areas & Establishing Contaminant Control

			Measures
		C	X	Installing Security Fencing
		D	X	Placing Backfill Materials
		E	X	Staging Equipment
4	X	Cleanup and Removal Activities	
		A	X	Removing Asphalt, Concrete, etc.
		B	X	Draining and Disconnecting Product Lines
		C	X	Pumping-off Liquids and Sludges
		D	X	Excavating
		E	X	Purging
		F.	X	Cutting
		G	X	Inerting
		H	X	Rinsing and Spray Washing
		I	X	Tank or Container Removal
		J	X	Cleaning, Torch Cutting, Tank Dismantling
		K	X	Handling of Drums and Containers
		L	X	Placing and Compacting Fill Materials
		M	X	Removal of Contaminated Soils and Other Materials
5	X	Monitoring and Sampling Activities	
6	X	Restoration of Work Area	
		A	X	Pouring Concrete
		B	X	Laying Asphalt
		C		Laying Sod
		D	X	Removal of Equipment and Temporary Fencing
7		Construction/Installation Activities	
8	X	Demobilization of Equipment, Materials, and Personnel	
9		Other:	

2.2 Type of Hazards (Check appropriate items)

Routes of Exposure:

Chemical:	Inhalation (INH)	X
	Skin absorption (ABS)	X
	Ingestion (ING)	
	Skin and/or eye contact (CON)	X
Biological:	Poisonous plants and animals (PPA)	X
	Disease producing organisms (DPO)	X
Radiological:	Nonionizing radiation (NIR)	N/A
	Ionizing radiation-alpha emitter (IRA)	N/A
	Ionizing radiation-beta emitter (IRB)	N/A
	Ionizing radiation-gamma emitter(IRG)	N/A
	Ionizing radiation-other (IRO)	N/A

Physical (including Safety Hazards):

Mechanical Kinetic (MCH): [X]

Including striking or being struck, injuries, slips, trips and falls, flying particles or objects, pressurized airlines and cylinders, ladders scaffolds, sharp objects, heavy equipment, unsecured flooring, unguarded openings, etc.

Thermal (THM): [X]

Includes fires, explosions, hot or cold working environments.

Fire (FIR) [X]
Explosion (EXP) [X]
Heat Stress (HTS) [X]

Electrical (ELC): [ ]

Includes faulty wiring, downed power lines, overhead utilities and shocks

Acoustic (ACU): [X]

Includes explosions, loud machinery or equipment, and other sources of excessive noise.

When completing Table 2 and the other task risk analysis tables, insert the appropriate codes for tasks from Section 2.1 and types of hazards from Section 2.2.

2.3 Task Risk Analysis: Representative Chemical Hazards of Concern

TABLE 2

Chemical Hazard of Concern	Fuel Oil	Gasoline	Benzene	Toluene
Task Number(s)	1 thru 8	1 thru 8	1 thru 8	1 thru 8
PEL	no standard	no standard	1 ppm	100 ppm
TLV (TWA)	300 ppm	300 ppm	10 ppm	100 ppm
IDLH	5000 ppm	5000 ppm	3000 ppm	2000 ppm
Ceiling	not indicated	not indicated	5 ppm	150 ppm
Source Contamination On-site	Tanks, Soil	Tanks, Soil	Tanks, Soil	Tanks, Soil
Route of Exposure	INH,ABS,CON	INH,ABS,CON	INH,ABS,CON	INH,ABS,CON
Symptoms of Acute Exposure	Dizzy,Headache	Dizzy,Headache	Dizzy,Headache	Dizzy,Headache
Monitoring Device or Prevention or Control Technique	CGI, O2 Meter OVA, Wear PPE	CGI, O2 Meter OVA, Wear PPE	CGI, O2 Meter OVA, Wear PPE	CGI, O2 Meter OVA, Wear PPE

Chemical Hazard of Concern	Xylenes	Ethyl benzene	MTBE	Tetraethyl Lead
Task Number(s)	1 thru 8	1 thru 8	1 thru 8	1 thru 8
PEL	100 ppm	100 ppm	not indicated	0.75 mg/m3
TLV (TWA)	100 ppm	100 ppm	not indicated	0.1 mg/m3
IDLH	1000 ppm	2000 ppm	not indicated	40 mg/m3
Ceiling	200 ppm	125 ppm STEL	not indicated	not indicated
Source Contamination On-site	Tanks, Soil,GW	Tanks, Soil,GW	Tanks, Soil,GW	Tanks, Soil,GW
Route of Exposure	INH,ABS,CON	INH,ABS,CON	INH,ABS,CON	INH,ABS,CON
Symptoms of Acute Exposure	Dizzy,Headache	Dizzy,Headache	Dizzy,Headache	Dizzy,Headache
Monitoring Device or Prevention or Control Technique	CGI, O2 Meter OVA, Wear PPE	CGI, O2 Meter OVA, Wear PPE	CGI, O2 Meter OVA, Wear PPE	CGI, O2 Meter OVA, Wear PPE

Chemical Hazard of Concern	Napthalene			
Task Number(s)	1 thru 8			
PEL	10 ppm			
TLV (TWA)	10 ppm			
IDLH	500 ppm			
Ceiling	not indicated			
Source Contamination On-site	Tanks, Soil,GW			
Route of Exposure	INH,ABS,CON			
Symptoms of Acute Exposure	Dizzy,Headache			
Monitoring Device or Prevention or Control Technique	CGI, O2 Meter OVA, Wear PPE			

TABLE 3

Contaminant	Flash Point Explosive Range 1	Route of Exposure 2	Off-site Potential 3
Fuel Oil	100 F/NA	INH,ABS,CON	M
Gasoline	(-45) C/1.4 to 7.6%	INH,ABS,CON	M

1 - Insert flash point, % LEL, pH, if applicable

2 - Refer to Section 2.2

3 - Potential for off-site migration: High, Moderate, Low, None, Unknown

The following ACTION LEVELS shall be strictly adhered to at all times:

O2 Concentration (O2 Meter):	At or below 19.5%, SCBA is mandatory. Greater than 24%, leave area immediately!
Combustibility (CGI):	For confined spaces at or above 10% LEL, or open spaces at or above 20% LEL, immediate site exit is required. For removing USTs, tanks must be purged to less than 10% LEL or less than 8% O2. If tanks cannot be purged to less than 10% LEL, they must be inerted.
Organic Vapors (FID/PID):	0-100 ppm above background, APR may be required. At 5 ppm reading check for Benzene with a short term Draeger tube. If Benzene is present in the breathing zone, donn APR. SCBA is conditional upon specific contaminant. 100 - 500 ppm, APR or SCBA is mandatory. Check reference manual for toxicity data and physical properties. 500 ppm or greater, SCBA mandatory. Greater than 1,000 ppm, recheck for %LEL.
Colorimetric Tubes:	Depends on chemical (e.g. Benzene is 1 ppm). Check reference manuals for toxicity information.
Radiation:	1 mR/hr or greater, exit site immediately! Consult a qualified person.

2.4 Task Risk Analysis: Physical and Safety Hazards of Concern

TABLE 4

List Task Codes (from Section 2.1)	Applicable Hazard Codes (from Section 2.2)	Prevention, Monitoring and Control Technique
1 thru 8	MCH-Trip/fall	Awareness/avoidance, stage equipment and materials and secure loose items. Secure ladders and other equipment.
1 thru 8	MCH-Debris	Awareness/avoidance, place wastes in containers.
1 thru 8	MCH-Heavy Equip.	Awareness, wear hardhats, earplugs and safety shoes. Lockout/tagout machinery where needed.
1 thru 8	Lifting	Avoidance, lift with legs or use proper equipment.
1 thru 8	Severe Weather	Obtain weather reports, stop work, secure loose items.

1 thru 8	Heat/Cold Stress	Awareness, provide breaks, fluids and monitor temperature and pulse rate.

1 For Thermal Hazards, include Percent LEL/Oxygen Readings and under description provide the source and monitoring device (i.e. CGI/Oxygen Meter).

2.5 Task Risk Analysis: Biological Hazards of Concern

TABLE 5

Biological Hazards (Add Other Hazards)	Hazard Code/Action	Prevention/Contol Techniques
Snake bites	PPA/Call 911;Perfrom CPR/First Aid, ID animal	Awareness/avoidance, wear leg protection devices
Insect bites	PPA/Call 911; Perfrom CPR/First Aid, ID insect	Awareness/avoidance, repellants
Poison ivy/Poison sumac/Poison oak	PPA/Perform First Aid;Refer to physician	Recognition and avoidance, wear long sleeves and pants
Biological wastes	DPO/Stop work/Activate emergency response plan	Awareness/avoidance
Sick personnel	DPO/Isolate from other workers	Awareness/avoidance, send ill person home, keep away from other personnel

2.6 Task Risk Analysis: Radiological Hazards of Concern

TABLE 6

Radiation Hazard	Hazard Code/Action*	Prevention/Contol Technique

* Action for IRA, IRB, IRG, and IRO sources is to STOP WORK and obtain qualified personnel to perfrom assessment.

s and Risk Analysis Summary

TABLE 7

ection D)

derate, L=Low, None, N/A)*

Biological		Radiological		Physical/Safety	
	L	NIR	NA	MCH	M
	L	IRA	NA	THM	M
		IRB	NA	ELC	L
		IRG	NA	ACU	M
		IRO	NA		

, include an estimated risk. If none or not applicable
N/A at the top of the heading.

Pre tion Plan provisions (See Chapter 3 of the
nalysis prior to commencing on-site work. At a

ntinued/Procedural Checks

TABLE 8

	Check Appropriate Box			
s checked:	X	YES		NO
procedures checked:	X	YES		NO
cedures reviewed:	X	YES		NO
	X	YES		NO
lures checked:	X	YES		NO
lemented:	X	YES		NO
reviewed:	X	YES		NO
ures completed:	X	YES		NO
set:	X	YES		NO

special accident prevention procedures needed to be followed:

ation or data on Form 8, Air Monitoring Log.

	Nitrile
	Viton
	Other: _____

List any changes to PPE used during on-site activities in Table 8.

7. MEDICAL SURVEILLANCE:

Attach physician's certificate of competency for work on hazardous waste site for each ACE employee expected to be working on-site where required.

Medical clearances for ACE personnel are contained in the Corporate Health and Safety Plan and should be checked prior to mobilization. Do not attach if already submitted to client.

8. EXPOSURE MONITORING / AIR SAMPLING:

CONFINED SPACES

Confined spaces on this project are tanks, excavations or low lying areas that have very limited ventilation and in which either a lack of sufficient oxygen may exist or vapors may be present in sufficient concentrations to produce serious injury or death. All confined spaces must be considered to be immediately dangerous to life or health (IDLH), unless proven otherwise. Before any personnel are allowed to enter a confined space, tests shall be carried out to determine the oxygen concentration and the concentration of any known or suspected contaminants. Even if the concentrations of contaminants are found to be below TLV values and sufficient oxygen is present, the space must be continuously monitored as long as personnel are present.

Benzene monitoring shall be performed for gasoline and benzene tanks:

(i) While working in the tanks
(ii) Cutting the tank
(iii) Prior to entering the tank
(iv) Whenever welding on the tank

Include monitoring results on Air Monitoring Log form.

Tanks contain leaded fuels?	x	YES		NO
If yes, in-line filters added to:		CGI/O2 meter		x
		P.I.D.		
		F.I.D.		

9. STANDARD OPERATING SAFETY PROCEDURES, ENGINEERING CONTROLS, WORK PRACTICES:

9.1 General Safety Requirement

All personnel will receive instruction on the suspected health and safety concerns of all aspects of the project at the health and safety meeting prior to initial work commencement. In addition, a safety and health meeting will be conducted daily, prior to work starting, to cover the suspected hazards expected for that day's work, and the precautions necessary to deal with these hazards. All personnel are to attend.

A All trenching and excavation work will comply with all regulatory agency rules.

1. Before any excavation work begins, the existence and location of underground pipe, electrical conductors, etc., must be determined. Utilities and utility locating services will be contacted to mark the locations of utilities.

2 The walls and spaces of all excavations and trenches more than five feet deep shall be guarded by shoring, sloping of the ground, or some other equivalent means should entry of personnel be necessary.

3 Daily inspections of excavations shall be made. If there is evidence of possible cave-ins or slides, all work in the excavation shall cease until the necessary safeguards have been taken.

4 Trenches more than four feet deep shall have ladders or steps located so as to require no more than 25 feet of lateral travel between means of access, should personnel be required to enter.

5 All trenches shall be backfilled as soon as practical after work is completed and all associated equipment removed.

6 All equipment such as pipe, rebar, etc., shall be kept out of traffic lanes and accessways. Equipment shall be stored so as not to endanger personnel at any time.

7 All trenches shall be completely guarded on all sides. A minimum of two feet from edges will be maintained.

8 Trench guarding shall consist of wooden or metal barricades spaced no further apart than 20 feet. Such barricades shall be not less than 36 inches high when erected.

9 In locations where oxygen deficiency or gaseous conditions are possible, air in the excavation shall be tested and steps taken to assure acceptable atmospheric conditions prior to entry of personnel.

10 Perform air testing prior to entry into any excavation with a depth greater than 4 feet when the presence of petroleum products is known or suspected and follow established ACE procedures based on concentrations.

B A decontamination line will be set up at the entrance to the contamination reduction zone if this zone is required. All personnel entering or leaving the contamination

reduction zone will pass through this area to don or doff protective equipment. The decontamination line will consist of a series of buckets set up in series for the purpose of removing or cleaning personnel and gear in a logical flow pattern. An employee entering the decontamination line will step into a boot wash, rinse, discard Tyveks and gloves into a plastic lined drum or plastic trash bag, wash hands and face in a separate wash basin, rinse, dry off with paper towels, discarding them into a trash bag.

Wash and rinse solutions (Use soap and water only) will be changed out as needed and dirty solutions shall be discharged to the sanitary sewer.

All eating, drinking, smoking and application of cosmetics will be restricted to the clean zone. All employees shall be required to wash their face and hands in the specified decontamination area before eating, drinking, smoking or applying cosmetics.

C All personnel shall avoid contact with potentially contaminated substances. Walking through puddles or mud, kneeling on the ground or leaning against drums should be avoided whenever possible.

D Monitoring equipment shall not be placed on potentially contaminated surfaces. Use clean sheets of visqueen to protect equipment.

9.2 PROCEDURES FOR GASES AND VOLATILE ORGANICS DURING EXCAVATION

ACE activities may include excavating in hazardous areas where explosive and/or flammable gases and vapors may be encountered. While it is not anticipated that excavating should produce flammable or explosive atmospheres in the holes, unknown factors warrant the precautionary procedures outlined below:

A. FLAMMABILITY

1 Check each area during excavating with a CGI to obtain a percentage value of the Lower Explosive Limit (LEL).

2 Ten percent (10%) of the LEL requires continuous monitoring and twenty percent requires discontinuation of excavation to allow the hole to vent and the posting of no-smoking signs. See ACTION LEVELS on page 7.

3 Resampling shall be conducted after an appropriate venting period and prior to resuming excavation operations.

4 Any hole that does not vent shall have the SHSO or his designee present during further excavation.

B. PERSONNEL EXPOSURE

1 Survey each work area around the hole, down wind and in the workers' area with a Flame Ionization Detector (FID) for gas/vapor concentration.

2 The FID can be used to give quantitative information on the total concentration of detectable organic vapors. Actual concentration of specific volatile organics must be measured by other means. FID readings of 10ppm or greater above background will initiate work stoppage and notification of the government inspector or representative.

10. SITE CONTROL MEASURES:

10.1 Site Map/Work Zones

Attach site map with work zones and access points, where appropriate.

10.2 Communication Procedures (where requir

(i) Channel 3 has been designated as the radio frequency for personnel in the Exclusion Zone. All other on site communications will use channel

(ii) Personnel in the Exclusion Zone should remain in constant radio communication or within sight of the Project Team Leader. Any failure of radio communication requires an evaluation of whether personnel should leave the Exclusion Zone.

(iii) Horn blast, siren or AIR HORN is the emergency signal to indicate that all personnel should leave the Exclusion Zone. In addition, a loud hailer is available, if required.

(iv) The following standard hand signals will be used in case of failure of radio communications:

Hand gripping throat	Out of air, can't breathe
Grip partner's wrist or both hands around waist	Leave area immediately
Hands on top of head	Need Assistance
Thumbs up	OK, I am alright, I understand
Thumbs down	No, Negative

(v) Telephone communication to the Command Post should be established as soon as possible. The phone number is:

10.3 Security:

Site Fenced:	X	YES		NO
Security Guard:		YES	X	NO

All Site visitors will required approval of the Porject Manager or designated representative for site entry. Before site entry the SHSO or designated representative will brief the visitor(s) on site safety and health procedures and when appropriate, determine that visitors have all required personal protective equipment and training.

Specify any special site security needs: _____

11. PERSONAL HYGIENE AND DECONTAMINATION PROCEDURES:

(i) Personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated. The standard level A, B, C, D (circle one) decontamination protocol shall be used.

(ii) Check for basic type of decon method used: [ ] Wet [X] Dry
For dry decontamination, include container(s) for disposables. For wet decontamination, the following decon solution will be used: _____

(iii) For disposal of decon water, solutions, and contaminated materials, complete Forms 13 and 14, as appropriate. Label all containers.

12. EQUIPMENT DECONTAMINATION:

(i) Exclusion Zone equipment being left on-site daily: [X] YES [ ] NO
If no, list equipment being removed and specify decontamination procedures:

_____

(ii) Final decontamination methods of equipment will follow Standard Field Standard Operating contained in Appendix J.

(iii) Label all contaminated decon water and complete Forms 13 and 14, as appropriate.

13. EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS:

(i) Check items required for site work:

1)	First aid equipment/kits	X
2)	Emergency eyewash/emergency showers	X
3)	Spill control materials/equipment	X
4)	Fire extinguishers	X

(ii) If any of these items are not located in the required places or special equipment is required, specify type, size, and location(s) of items 1 thru 4 above:

1
2
3
4

14. EMERGENCY RESPONSE PLAN AND CONTINGENCY PROCEDURES:

14.1 General Emergency Procedures

The following standard emergency procedures will be used by on-site personnel. The Site Safety Officer shall be notified of any on-site emergencies and be responsible for ensuring

that the appropriate procedures are followed. In event of evacuation, evacuees must meet at a place designated by the SSO so that all personnel can be accounted for.

The SHSO established emergency evacuation meeting location is: Site entrance to buildings

14.2 Personnel Injury in the Exclusion Zone

Upon notification of an injury in the Exclusion Zone, the designated emergency signal shall be sounded. All site personnel shall assemble at the decontamination line. The rescue team will enter the Exclusion Zone (if required) to remove the injured person to the hotline. The Site Safety Officer and the Project Supervisor shall evaluate the nature of the injury, and the affected person shall be decontaminated to the extent possible prior to movement to the Support Zone. The on-site EMT shall initiate the appropriate first aid, and contact shall be made for an ambulance and with the designated medical facility (if required). No persons shall re-enter the Exclusion Zone until the cause of the injury or symptoms is determined. Emergency signal is: 3 Quick Blasts of the Air Horn.

14.3 Personnel Injury in the Support Zone

Upon notification of an injury in the Support Zone, the Project Supervisor and Site Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue with the on-site EMT initiating the appropriate first aid and ncecessary follow-up as stated above. If injury increases the risk to others, the deignated emergency signal shall be sounded and all site personnel shall move to the decontmaination line for further instructions. Activities on-site will stop until the added risk is removed or minimized.

14.4 Incident Involving Fire/Explosion

Upon notification of a fire or explosion on site, the designated emergency signal shall be sounded and all site personnel assembled at the decontamination line. The fire department shall be alerted and all personnel moved to a safe distance from the involved area.

14.5 Personal Protective Equipment Failure

If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his/her buddy shall immediately leave the Exclusion Zone. Re-entry shall not be permitted until the equipment has been repaired or replaced.

14.6 Other Equipment Failure

If any other equipment on-site fails to operate properly, the Project Supervisor and Site Safety Officer shall be notified and then determine the effect of this failure on continuing operations on site. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

14.7 Emergency Escape Route(s

An emergency escape route shall be designated for use in those situations where egress from the Exclusion Zone cannot through the decontamination line. This route will be depicted on the site map. In all situations, when an on-site emergency results in evacuation of the Exclusion Zone, personnel sahll not re-enter until:

i) The conditions resulting in the emergency have been corrected.
ii) The hazards have been reassessed.
iii) The Site Safety Plan has been reviewed.
iv) Site personnel have been briefed on any changes in the Site Safety Plan.

In the event of an evacuation, the Site Safety Officer will designate a specific area where all personnel will meet a safe distance from the emergency. In order to account for all personnel, each employee must, where practical, evacuate to the designated area.

14.8 List of Specific Emergency Phone Numbers

Table 11

Agency/Facility	Phone Number	Contact Person	Instructions
Police	(912) 767-2822	DUTY OFFICER	Military Police
Fire	(912) 767-1711	DUTY OFFICER	Military Fire Dept.
Hospital	(912) 369-9400	DUTY OFFICER	E.R.
Alternate Med. Facility			E.R.
Ambulance Service			
Public Health Advisor			
Government Rep	(912) 767-1077	Tommy Houston	COE on-site rep
Other Officials	(912)652-5639	Brent Rose	COE POC

14.9 Hotlines for Special Emergencies/Spills

CHEMTREC	1-800-424-9300
National Response Center	1-800-424-8802
U.S.E.P.A. Region IV Emergency Response	1-404-347-4062

14.10 General ACE Contacts

Name	Office	Home	Mobile

Mike McRae	(904) 755-1196	(904) 755-9308	(904) 868-0237
John Fulkerson	(904) 755-1196	(904) 472-6824	(904) 868-0235
Jerry Fletcher	(904) 755-1196	(904) 755-3523	(904) 868-0234
Eddie Dykes	(904) 755-1196	(904) 758-0986	(904) 397-5084
Lake City	1-800-749-0343		

14.11 Emergency Medical Information for Substance(s) Present

TABLE 12

Substance	Exposure Symptoms	First Aid Instructions
Fuel Oil	see MSDS attached	
Gasoline	see MSDS attached	

See Sections 13 and 14 of Manual for Specific Requirements and Procedures. Keep these emergency phone numbers POSTED on the job site. Complete this table only if there is an exposure and EMS is activated. Also, obtain call back number and name of medical personnel providing first aid instructions.

15. HEAT/COLD STRESS MONITORING:

15.1 Monitoring Frequency

Heat stress monitoring will be administered by the Site Safety Officer as per the appropriate schedule for those individuals performing continuous work under the conditions listed below:

Temperature (Degrees F)	Level D	Level C or B
>90	Every 45 minutes	Every 20 minutes
85-90	Every 60 minutes	Every 30 minutes
80-85	Every 90 minutes	Every 60 minutes
70-80	Every 120 minutes	Every 90 minutes

15.2 Anticipated Conditions

The expected ambient temperatures for this site work are in the range: 65F to 85F

Wind chill or wind speed a factor?		YES	x	NO
Relative humidity a factor?	x	YES		NO

Specify any changes in monitoring frequency: _____

15.3 General Heat Stress Monitoring Activities

Monitoring personnel shall include body temperature, pulse rate, and signs and symptoms as noted in Section 15 of the Field Manual and in Appendix J, Standard Field Operating Procedures.

Provide fluids and frequent work breaks for any personnel showing signs of heat cramps or heat exhaustion as per monitoring frequency.

For cold stress monitoring requirements, refer to Section 15 of the Field Manual.

16. LOGS, REPORTS AND RECORDKEEPING:

Check manual for list of FORMS to be completed and refer to Appendices for appropriate references. Attach MSD's, maps and other information to this Plan as required.

ACKNOWLEDGEMENT

All on-site personnel have read the above Health and Safety Plan and are familiar with its provisions. Provide your signature below:

Plan Prepared By: _____ _____ 12/15/92
Signature Title Date

Plan Reviewed By: Mark G. Badden CIH 1-3-93
Signature Title Date

Plan Approved By: _____
Signature Title Date

Received by Site Manager: _____

Date: _____

MATERIAL SAFETY DATA SHEET

The Coastal Corporation

Coastal Oil New York, Inc.
Coastal Oil New England, Inc.
Coastal Fuels Marketing, Inc.
Coastal Mobile Refining Company
Coastal Derby Refining Company
Coastal Eagle Point Oil Company
Coastal Mart, Inc.
Coastal Refining & Marketing, Inc.
Coastal States Crude Gathering Co.
Coastal States Trading, Inc.
Coastal Unilube, Inc.
Coscol Marine Corporation
Coscol Petroleum Corporation
Pacific Refining Company
Western Fuel Oil Company
Coastal Fuel Terminals, Inc.

Address: 9 Greenway Plaza
Houston, TX 77046

Info Phone: (713) 877-1400
Emergency Phone: (713) 877-1400

PRODUCT IDENTIFICATION

Trade Name: Unleaded Gasoline Date Revised: 03-28-90

Synonyms: Unleaded Regular, Petro, Motor Spirits
Chemical Name and/or Family Description: A volatile blend of paraffinic, olefinic, and aromatic hydrocarbons for automotive fuel.
DOT Hazard Class: Flammable liquid; UN 1203.

COMPOSITION

			Occupational Exposure Limits*			
			OSHA	ACGIH		
Product	CAS Number	%, Wt	PEL	TLV	Other	Units
Gasoline, Unleaded	Mixture	100	300	300	500 STEL	ppm
Ingredient(s):						
Benzene	71-43-2	0-5.0	1	10	5 STEL	ppm
Toluene	108-88-3	0-25.0	100	100	150 STEL	ppm
Xylene	1330-20-7	0-25.0	100	100	150 STEL	ppm
Ethylbenzene	100-41-4	0-5.0	100	100	125 STEL	ppm
n-Hexane	110-54-3	< 3.5	50	50		ppm
Hexane (other isomers)	N.A.	< 9.0	500	500	1000 STEL	ppm
1,2,4-Trimethyl Benzene	95-63-6	0-5.0	25	25		ppm
Cumene	98-82-8	~2	50	50	SKIN	ppm
Butane	106-97-8	<9.0	800	800		ppm
Pentane	109-66-0	<6.5	600	600	750 STEL	ppm
t-Butyl Alcohol	75-65-0	0-10.0	100	100	150 STEL	ppm
Methyl t-butyl Ether (MTBE)	1634-04-4	0-15.0	N.A.	N.A.		

* = 8-Hr. TWA unless otherwise specified.
N.A. = Not Available.
STEL = Short Term Exposure Limit; 15 minutes
SKIN = May be skin absorbed.

PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point 760 mmHg:	80-430°F	Melting Point: Variable	
Vapor Pressure mmHg @ 20C:	325-525	Vapor Density (Air=1):	3-4
Solubility in H20 %:	Negligible	pH:	N.A.
Specific Gravity 60/60F:	0.7-0.77	Evaporation Rate	N.A.
% Volatile by Volume:	100	Odor: Aromatic odor	
Viscosity (method, temp.):	1.4 @40C cSt	Appearance: Bronze Fluid	

FIRE AND EXPLOSION DATA

Flash Point: -45° F (TCC)
Flammable Limits in Air % by Vol. Lower: 1.4 Upper: 7.6
Autoignition Temperature: 495-850°F
Extinguishing Media: Dry chemical, foam, or carbon dioxide.
Special Fire Fighting Procedure: Use a smothering technique for extinguishing fire of this flammable liquid. Do not use a forced water stream directly on gasoline fires as this will scatter the fire. Use a water spray to cool fire-exposed containers. Firefighters should wear self-contained breathing apparatus and full protective clothing.
Unusual Fire or Explosion Hazard: Flowing gasoline can be ignited by self-generated static electricity; containers should be grounded and bonded. Runoff to sewer may create fire or explosion hazard well downstream from the source.

REACTIVITY DATA

Stability: Stable
Hazardous Polymerization: Will not occur.
Conditions to Avoid/Incompatibility: Strong oxidizing agents, heat, spark, flame and build-up of static electricity, halogens, strong acids and alkalies.
Hazardous Decomposition Products: CO, CO_2, and hydrocarbons.

HEALTH HAZARD DATA

Note: This product has not been tested by Coastal Corporation to determine its specific health hazards. Therefore, the information provided in this section includes health hazard information on the product components.

Carcinogenicity:	NTP:	IARC Monographs:	OSHA Regulated:
Unleaded Gasoline	No	No	No
Benzene	Yes	Yes	Yes

Occupational Exposure Limits: See COMPOSITION section.
Effects of Overexposure:

Acute:
Eyes: Slight to moderate eye irritation.
Skin: Moderately irritating; causing redness, drying of skin.
Inhalation: Irritating to mucous membranes and respiratory tract. Can act as a simple asphyxiant. Overexposure to vapors may lead to headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, central nervous system depression, coma and respiratory arrest.

Ingestion: Possible effects are stomach irritation, gastritis. headache, nausea, drowsiness, loss of consciousness, convulsions, cyanosis, pneumonitis, pulmonary edema, central nervous system depression and capillary hemorrhaging of the lung and internal organs. Aspiration hazard if vomiting occurs.

Chronic: Skin and eye irritation. May affect the respiratory and central nervous system. Recent studies indicate kidney damage and kidney cancer in rats and liver cancer in mice.

Additional Medical and Toxicological Information: Contact with full strength or even dilute formulations of this product or exposure above and/or below the TLV may aggravate pre-existing dermatitis or respiratory disorders in certain individuals. There is sufficient evidence for the carcinogenicity of benzene in humans. Benzene may cause degeneration in blood forming organs leading to anemia which may further degrade to leukemia.

EMERGENCY FIRST AID PROCEDURES

Eye Contact: Flush thoroughly with water for at least 15 minutes, including under the eyelids. Contact a physician immediately, preferably an Ophthalmologist. Speed and thoroughness in rinsing eyes are important to avoid permanent injury.

Skin Contact: Remove contaminated clothing and shoes. Wash affected areas with soap and flush with large amounts of water for 15 to 20 minutes. Get immediate medical attention.

Inhalation: Remove to fresh air. If breathing has stopped, apply artificial respiration. Get immediate medical attention.

Ingestion: Do not induce vomiting. If spontaneous vomiting occurs hold the victim's head lower than hips to prevent aspiration.

SPECIAL PROTECTION INFORMATION

Eye Protection: Remove contact lenses and wear chemical safety glasses or goggles where contact with liquid or mist may occur.

Skin Protection: Wear impervious gloves when contact with skin may occur. Wear protective clothing to avoid skin contact.

Inhalation: Use approved respiratory protective equipment in situations where airborne concentrations may exceed occupational exposure levels.

Ventilation: Provide adequate general and local ventilation (1) to keep mist or vapors below allowable exposure levels, (2) to prevent formation of explosive atmosphere and (3) to prevent oxygen deficient atmospheres, especially in confined spaces.

SPILL OR LEAK AND DISPOSAL PROCEDURES

Spill Procedures: Remove sources of heat or ignition including internal combustion engines and power tools. Clean-up spill, but do not flush to sewer or surface water. Ventilate area and avoid breathing vapors or mists.

Waste Disposal: Dispose through a licensed waste disposal company. Follow federal, state and local regulations.

SPECIAL PRECAUTIONS AND COMMENTS

orage Requirements: Store in tightly closed containers in a dry cool place, away from incompatible materials or sources of heat and ignition. Ground and bond all transfer and storage equipment to prevent static sparks and equip with self closing valves, pressure vacuum bungs and flame arrestors. Empty containers may contain residue (liquid/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition; they may explode and cause injury or death.

Other: Gasoline is to be used as motor fuel only. Never use as a cleaning solvent or degreaser. Use explosion-proof electrical equipment. No smoking should be allowed in area of use.

EPA SARA TITLE III INFORMATION

Section 311/312 Hazard Categorization

Acute	Chronic	Fire	Pressure	Reactive
X	X	X		

SARA Hazardous Substances

Ingredient	CAS No.	%, Wt	Sec 313	Sec 302	RQ, lb	TPQ, lb
Benzene	71-43-2	0-5.0	X			
Toluene	108-88-3	0-25.0	X			
Xylene	1330-20-7	0-25.0	X			
Ethylbenzene	100-41-4	0-5.0	X			
Cumene	98-82-8	~2	X			
t-Butyl Alcohol	75-65-0	0-10.0	X			
Methyl t-Butyl Ether (MTBE)	1634-04-4	0-15.0	X			

Key: Sec 313 = Toxic Chemicals, Section 313
Sec 302 = Extremely Hazardous Substances (EHS), Section 302
RQ = Reportable Quantity of EHS
TPQ = Threshold Planning Quantity of EHS

CALIFORNIA PROPOSITION 65 WARNING

Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm may be found in crude oil and petroleum products. Although it is possible to sufficiently refine a crude oil or its end products to remove the potential for cancer, we are advising that one or more of the listed chemicals may be present in some detectable quantities. Read and follow directions and use care when handling crude oil and petroleum products.

Industrial Hygiene Review: Delno D. Malzahn, CIH
Date Prepared: 10/05/85

MATERIAL SAFETY DATA SHEET

The Coastal Corporation

Coastal Oil New York, Inc.
Coastal Oil New England, Inc.
Coastal Fuels Marketing, Inc.
Coastal Mobile Refining Company
Coastal Derby Refining Company
Coastal Eagle Point Oil Company
Coastal Mart, Inc.
Coastal Refining & Marketing, Inc.
Coastal States Crude Gathering Co.
Coastal States Trading, Inc.
Coastal Unilube, Inc.
Coscol Marine Corporation
Coscol Petroleum Corporation
Pacific Refining Company
Western Fuel Oil Company
Coastal Fuel Terminals, Inc.

Address: 9 Greenway Plaza
Houston, TX 77046

Info Phone: (713) 877-1400
Emergency Phone: (713) 877-1400

PRODUCT IDENTIFICATION

Trade Name: Regular Gasoline Date Revised: 03-28-90

Synonyms: Leaded Gasoline, Petro, Motor Spirits
Chemical Name and/or Family Description: A volatile blend of paraffinic, olefinic, and aromatic hydrocarbons for automotive fuel.
DOT Hazard Class: Flammable liquid; UN 1203.

COMPOSITION

			Occupational Exposure Limits*			
			OSHA	ACGIH		
Product	CAS Number	%, Wt	PEL	TLV	Other	Units
Gasoline, Regular	Mixture	100	300	300	500 STEL	ppm
Ingredient(s):						
Benzene	71-43-2	0-5.0	1	10	5 STEL	ppm
Toluene	108-88-3	0-25.0	100	100	150 STEL	ppm
Xylene	1330-20-7	0-25.0	100	100	150 STEL	ppm
Ethylbenzene	100-41-4	0-5.0	100	100	125 STEL	ppm
n-Hexane	110-54-3	0-3.0	50	50		ppm
Hexane (other isomers)	N.A.	<8.5	500	500	1000 STEL	ppm
1,2,4-Trimethyl Benzene	95-63-6	0-5.0	25	25		ppm
Cumene	98-82-8	1.0	50	50	SKIN	ppm
Cyclohexane	110-82-7	1.0	300	300		ppm
Butane	106-97-8	<9.0	800	800		ppm
Pentane	109-66-0	<5.0	600	600	750 STEL	ppm
t-Butyl Alcohol	75-65-0	0-10.0	100	100	150 STEL	ppm
Tetraethyl Lead & Tetramethyl Lead	Mixture	<0.0038	0.075	0.1	SKIN	mg/m^3
			0.075	0.15	SKIN	mg/m^3
Methyl t-butyl Ether (MTBE)	1634-04-4	0-15.0	N.A.	N.A.		

* = 8-Hr. TWA unless otherwise specified. SKIN = May be skin absorbed.
STEL = Short Term Exposure Limit; 15 minutes. N.A. = Not Available.

PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point 760 mmHg:	80-430°F	Melting Point:	Variable
r Pressure mmHg @ 20C:	325-525	Vapor Density (Air=1):	3-4
.bility in H2O %:	Negligible	pH:	N.A.
Specific Gravity 60/60F:	0.7-0.77	Evaporation Rate	N.A.
% Volatile by Volume:	100	Odor: Aromatic odor	
Viscosity (method, temp.):	1.4 @40C cSt	Appearance: Bronze Fluid	

FIRE AND EXPLOSION DATA

Flash Point: -45°F (TCC)
Flammable Limits in Air % by Vol. Lower: 1.4 Upper: 7.6
Autoignition Temperature: 495-850°F
Extinguishing Media: Dry chemical, foam, or carbon dioxide.
Special Fire Fighting Procedure: Use a smothering technique for extinguishing fire of this flammable liquid. Do not use a forced water stream directly on gasoline fires as this will scatter the fire. Use a water spray to cool fire-exposed containers. Firefighters should wear self-contained breathing apparatus and full protective clothing.
Unusual Fire or Explosion Hazard: Flowing gasoline can be ignited by self-generated static electricity; containers should be grounded and bonded. Runoff to sewer may create fire or explosion hazard well downstream from the source.

REACTIVITY DATA

Stability: Stable
Hazardous Polymerization: Will not occur.
iitions to Avoid/Incompatibility: Strong oxidizing agents, heat, spark, flame and build-up of static electricity, halogens, strong acids and alkalies.
Hazardous Decomposition Products: CO, CO_2, hydrocarbons and lead oxides.

HEALTH HAZARD DATA

Note: This product has not been tested by Coastal Corporation to determine its specific health hazards. Therefore, the information provided in this section includes health hazard information on the product components.

Carcinogenicity:	NTP:	IARC Monographs:	OSHA Regulated:
Regular Gasoline	No	No	No
Benzene	Yes	Yes	Yes

Occupational Exposure Limits: See COMPOSITION section.

Effects of Overexposure:
Acute:
Eyes: Slight to moderate eye irritation.
Skin: Moderately irritating; causing redness, drying of skin.
Inhalation: Irritating to mucous membranes and respiratory tract. Can act as a simple asphyxiant. Overexposure to vapors may lead to headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, central nervous system depression, coma and respiratory arrest.

Ingestion: Possible effects are stomach irritation, gastritis. headache, nausea, drowsiness, loss of consciousness, convulsions, cyanosis, pneumonitis, pulmonary edema, central nervous system depression, and capillary hemorrhaging of the lung and internal organs. Aspiration hazard if vomiting occurs.

Chronic: Skin and eye irritation. May affect the respiratory and central nervous system. Recent studies indicate kidney damage and kidney cancer in rats and liver cancer in mice.

Additional Medical and Toxicological Information: Contact with full strength or even dilute formulations of this product or exposure above and/or below the TLV may aggravate pre-existing dermatitis or respiratory disorders in certain individuals. There is sufficient evidence for the carcinogenicity of benzene in humans. Benzene may cause degeneration in blood forming organs leading to anemia which may further degrade to leukemia.

EMERGENCY FIRST AID PROCEDURES

Eye Contact: Flush thoroughly with water for at least 15 minutes, including under the eyelids. Contact a physician immediately, preferably an Ophthalmologist. Speed and thoroughness in rinsing eyes are important to avoid permanent injury.

Skin Contact: Remove contaminated clothing and shoes. Wash affected areas with soap and flush with large amounts of water for 15 to 20 minutes. Get immediate medical attention.

Inhalation: Remove to fresh air. If breathing has stopped, apply artificial respiration. Get immediate medical attention.

Ingestion: Do not induce vomiting. If spontaneous vomiting occurs hold the victim's head lower than hips to prevent aspiration.

SPECIAL PROTECTION INFORMATION

Eye Protection: Remove contact lenses and wear chemical safety glasses or goggles where contact with liquid or mist may occur.

Skin Protection: Wear impervious gloves when contact with skin may occur. Wear protective clothing to avoid skin contact.

Inhalation: Use approved respiratory protective equipment for cleaning large spills or upon entry into large tanks, vessels, and other designated confined spaces or in any situations where airborne concentrations may exceed occupational exposure limits.

Ventilation: Provide adequate general and local ventilation (1) to keep mist or vapors below allowable exposure levels, (2) to prevent formation of explosive atmosphere and (3) to prevent oxygen deficient atmospheres, especially in confined spaces.

SPILL OR LEAK AND DISPOSAL PROCEDURES

Spill Procedures: Remove sources of heat or ignition including internal combustion engines and power tools. Clean-up spill, but do not flush to sewer or surface water. Ventilate area and avoid breathing vapors or mists.

Waste Disposal: Dispose through a licensed waste disposal company. Follow federal, state and local regulations.

SPECIAL PRECAUTIONS AND COMMENTS

Storage Requirements: Store in tightly closed containers in a dry cool place, away from incompatible materials or sources of heat and ignition. Ground and bond all transfer and storage equipment to prevent static sparks and equip with self closing valves, pressure vacuum bungs and flame arrestors. Empty containers may contain residue (liquid/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition; they may explode and cause injury or death.

Other: Gasoline is to be used as motor fuel only. Never use as a cleaning solvent or degreaser. Use explosion-proof electrical equipment. No smoking should be allowed in area of use.

EPA SARA TITLE III INFORMATION

Section 311/312 Hazard Categorization

Acute	Chronic	Fire	Pressure	Reactive
	X	X		

SARA Hazardous Substances

Ingredient	CAS No.	%, wt	Sec 313	Sec 302	RQ, lb	TPQ, lb
Benzene	71-43-2	0-5.0	X			
Toluene	108-88-3	0-25.0	X			
Xylene	1330-20-7	0-25.0	X			
Ethylbenzene	100-41-4	0-5.0	X			
Cumene	98-82-8	1.0	X			
Cyclohexane	110-82-7	1.0	X			
t-Butyl Alcohol	75-65-0	0-10.0	X			
Tetramethyl Lead	75-74-1	<0.0038		X	1	100
Tetraethyl Lead	78-00-2	<0.0038		X	10	100
Methyl t-Butyl Ether (MTBE)	1634-04-4	0-15.0	X			

Key: Sec 313 = Toxic Chemicals, Section 313
Sec 302 = Extremely Hazardous Substances (EHS), Section 302
RQ = Reportable Quantity of EHS
TPQ = Threshold Planning Quantity of EHS

CALIFORNIA PROPOSITION 65 WARNING

Chemicals known to the State of California to cause cancer, birth defects, other reproductive harm may be found in crude oil and petroleum products. Although it is possible to sufficiently refine a crude oil or its end products to remove the potential for cancer, we are advising that one or more of the listed chemicals may be present in some detectable quantities. Read and follow directions and use care when handling crude oil and petroleum products.

Industrial Hygiene Review: Delno D. Malzahn, CIH
Date Prepared: 10/05/85

MATERIAL SAFETY DATA SHEET

The Coastal Corporation

tal Oil New York, Inc.	Coastal States Crude Gathering Co.
tal Oil New England, Inc.	Coastal States Trading, Inc.
Coastal Fuels Marketing, Inc.	Coastal Unilube, Inc.
Coastal Mobile Refining Company	Coscol Marine Corporation
Coastal Derby Refining Company	Coscol Petroleum Corporation
Coastal Eagle Point Oil Company	Pacific Refining Company
Coastal Mart, Inc.	Western Fuel Oil Company
Coastal Refining & Marketing, Inc.	Coastal Fuel Terminals, Inc.

Address: 9 Greenway Plaza
Houston, TX 77046

Info Phone: (713) 877-1400
Emergency Phone: (713) 877-1400

PRODUCT IDENTIFICATION

Trade Name: Super Unleaded Gasoline Date Revised: 04-02-90

Synonyms: Unleaded Premium, Petrol, Motor Spirits
Chemical Name and/or Family Description: A volatile blend of paraffinic, olefinic, and aromatic hydrocarbons for automotive fuel.
DOT Hazard Class: Flammable liquid; UN 1203

COMPOSITION

			Occupational Exposure Limits*			
			OSHA	ACGIH		
Product	CAS Number	%, Wt	PEL	TLV	Other	Units
Gasoline, Super Unleaded	Mixture	100	300	300	500 STEL	ppm
Ingredient(s):						
Benzene	71-43-2	0-5.0	1	10	5 STEL	ppm
Toluene	108-88-3	0-25.0	100	100	150 STEL	ppm
Xylene	1330-20-7	0-25.0	100	100	150 STEL	ppm
Ethylbenzene	100-41-4	0-5.0	100	100	125 STEL	ppm
n-Hexane	110-54-3	< 3.0	50	50		ppm
Hexane (other isomers)	N.A.	< 6.5	500	500	1000 STEL	ppm
1,2,4-Trimethyl Benzene	95-63-6	0-5.0	25	25		ppm
Butane	106-97-8	<9.0	800	800		ppm
Pentane	109-66-0	<2.0	600	600	750 STEL	ppm
t-Butyl Alcohol	75-65-0	0-10.0	100	100	150 STEL	ppm
Methyl t-butyl Ether (MTBE)	1634-04-4	0-15.0	N.A.	N.A.		

N.A. = Not Applicable
* = 8-Hr. TWA unless otherwise specified
STEL = Short Term Exposure Limit; 15 minutes.

PHYSICAL AND CHEMICAL PROPERTIES

iling Point 760 mmHg:	80-430° F	Melting Point: Variable	
›or Pressure mmHg @ 20C:	325-525	Vapor Density (Air=1):	3-4
olubility in H2O %:	Negligible	pH:	N.A.
Specific Gravity 60/60F:	0.7-0.77	Evaporation Rate	N.A.
% Volatile by Volume:	100	Odor: Aromatic odor	
Viscosity (method, temp.):	1.4 @40C cSt	Appearance: Bronze Fluid	

N.A. = Not Available

FIRE AND EXPLOSION DATA

Flash Point: -45° F (TCC)
Flammable Limits in Air % by Vol. Lower: 1.4 Upper: 7.6
Autoignition Temperature: 495-850° F
Extinguishing Media: Dry chemical, foam, or carbon dioxide.

Special Fire Fighting Procedure: Use a smothering technique for extinguishing fire of this flammable liquid. Do not use a forced water stream directly on gasoline fires as this will scatter the fire. Use a water spray to cool fire-exposed containers. Firefighters should wear self-contained breathing apparatus and full protective clothing.
Unusual Fire or Explosion Hazard: Flowing gasoline can be ignited by self-generated static electricity. Runoff to sewer may create fire or explosion hazard well downstream from the source.

REACTIVITY DATA

Stability: Stable
Hazardous Polymerization: Will not occur
Conditions to Avoid/Incompatibility: Strong oxidizing agents, heat, spark, flame and build-up of static electricity, halogens, strong acids and alkalies.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide and hydrocarbons.

HEALTH HAZARD DATA

Note: This product has not been tested by Coastal Corporation to determine its specific health hazards. Therefore, the information provided in this section includes health hazard information on the product components.

Carcinogenicity:	NTP:	IARC Monographs:	OSHA Regulated:
Super Unleaded Gasoline	No	No	No
Benzene	Yes	Yes	Yes

Threshold Limit Value: See Composition section.

Effects of Overexposure:

Acute:
Eyes: Slight to moderate eye irritation.
Skin: Moderately irritating; causing redness, drying of skin.
Inhalation: Irritating to mucous membranes and respiratory tract. Can act as a simple asphyxiant. Overexposure to vapors may lead to headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, central nervous system depression, coma and respiratory arrest.

Ingestion: Possible effects are stomach irritation, gastritis, headache, nausea, drowsiness, loss of conciousness, convulsions, cyanosis, pneumonitis, pulmonary edema, central nervous system depression and capillary hemorrhaging of the lung and internal organs. Aspiration hazard if vomiting occurs.

Chronic: Skin and eye irritation. May affect the respiratory and central nervous system. Recent studies indicate kidney damage and kidney cancer in rats and liver cancer in mice.

Additional Medical and Toxicological Information: Contact with full strength or even dilute formulations of this product or exposure above and/or below the TLV may aggravate pre-existing dermatitis or respiratory disorders in certain individuals. There is sufficient evidence for the carcinogenicity of benzene in humans. Benzene may cause degeneration in blood forming organs leading to anemia which may further degrade to leukemia.

EMERGENCY FIRST AID PROCEDURES

Eye Contact: Flush thoroughly with water for at least 15 minutes, including under the eyelids. Contact a physician immediately, preferably an Ophthalmologist. Speed and thoroughness in rinsing eyes are important to avoid permanent injury.
Skin Contact: Remove contaminated clothing and shoes. Wash affected areas with soap and flush with large amounts of water for 15 to 20 minutes. Get immediate medical attention.
Inhalation: Remove to fresh air. If breathing has stopped, apply artificial respiration. Get immediate medical attention.
Ingestion: Do not induce vomiting. If spontaneous vomiting occurs hold the victim's head lower than hips to prevent aspiration. Get medical attention.

SPECIAL PROTECTION INFORMATION

Eye Protection: Remove contact lenses and wear chemical safety glasses or goggles where contact with liquid or mist may occur.
Skin Protection: Wear impervious gloves when contact with skin may occur. Wear protective clothing to avoid skin contact.
Inhalation: Use approved respiratory protective equipment in situations where airborne concentrations may exceed occupational exposure levels.
Ventilation: Provide adequate ventilation (1) to keep mist or vapors below allowable exposure levels, (2) to prevent formation of explosive atmosphere and (3) to prevent oxygen deficient atmospheres, especially in confined spaces.

SPILL OR LEAK AND DISPOSAL PROCEDURES

Spill Procedures: Remove sources of heat or ignition including internal combustion engines and power tools. Clean-up spill, but do not flush to sewer or surface water. Ventilate area and avoid breathing vapors or mists.

Waste Disposal: Dispose through a licensed waste disposal company. Follow federal, state and local regulations.

SPECIAL PRECAUTIONS AND COMMENTS

Storage Requirements: Store in tightly closed containers in a dry cool place, away from incompatible materials or sources of heat or ignition. Ground and bond all transfer and storage equipment to prevent static sparks and equip with self closing valves, pressure vacuum bungs and flame arrestors. Empty containers may contain residue (liquid and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition; they may explode and cause injury or death.

Other: Gasoline is to be used as motor fuel only. Never use as a cleaning solvent or degreaser. Use explosion-proof electrical equipment. No smoking should be allowed in area of use.

SARA TITLE III INFORMATION

Section 311/312 Hazard Categorization

Acute	Chronic	Fire	Pressure	Reactive
X	X	X		

SARA Hazardous Substances

Ingredient	CAS No.	%, Wt	Sec 313	Sec 302	RQ, lb	TPQ, lb
Benzene	71-43-2	0-5.0	X			
Toluene	108-88-3	0-25.0	X			
Xylene	1330-20-7	0-25.0	X			
Ethylbenzene	100-41-4	0-5.0	X			
t-Butyl Alcohol	75-65-0	0-10.0	X			
Methyl t-Butyl Ether (MTBE)	1634-04-4	0-15.0	X			

Key: Sec 313 = Toxic Chemicals, Section 313
Sec 302 = Extremely Hazardous Substances (EHS), Section 302
RQ = Reportable Quantity of EHS
TPQ = Threshold Planning Quantity of EHS

CALIFORNIA PROPOSITION 65 WARNING

Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm may be found in crude oil and petroleum products. Although it is possible to sufficiently refine a crude oil or its end products to remove the potential for cancer, we are advising that one or more of the listed chemicals may be present in some detectable quantities. Read and follow directions and use care when handling crude oil and petroleum products.

Industrial Hygiene Review: Delno D. Malzahn, CIH
Date Prepared: 10/05/85

MATERIAL SAFETY DATA SHEET

The Coastal Corporation

Coastal Oil New York, Inc.
Coastal Oil New England, Inc.
Coastal Fuels Marketing, Inc.
Coastal Mobile Refining Company
Coastal Derby Refining Company
Coastal Eagle Point Oil Company
Coastal Mart, Inc.
Coastal Refining & Marketing, Inc.
Coastal States Crude Gathering Co.
Coastal States Trading, Inc.
Coastal Unilube, Inc.
Coscol Marine Corporation
Coscol Petroleum Corporation
Pacific Refining Company
Western Fuel Oil Company
Coastal Fuel Terminals, Inc.

Address: 9 Greenway Plaza
Houston, TX 77046

Info Phone: (713) 877-1400
Emergency Phone: (713) 877-1400

PRODUCT IDENTIFICATION

Trade Name: Diesel Fuel No. 2 Date Revised: 02-07-90

Synonyms: Petroleum Distillate, Diesel
Chemical Name and/or Family Description: A complex mixture of paraffinic, olefinic, naphthenic and aromatic hydrocarbons. A distillate of low sulfur content.
DOT Hazard Class: Combustible liquid; NA 1993.

COMPOSITION

Product	CAS Number	Wt%	Occupational Exposure Limits* PEL	TLV	Other	Units
Diesel Fuel No. 2	68476-34-6	100	5	5	10 STEL	mg/m³**

* = 8-Hr. TWA unless otherwise specified.
** = As oil mist.
STEL = Short Term Exposure Limit; 15 minutes.

PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point 760 mmHg:	300-675°F	Melting Point:	N.A.
Vapor Pressure mmHg @ 20C:	1.6	Vapor Density (Air=1):	8
Solubility in H2O %:	Insoluble	pH:	N.A.
Specific Gravity 60/60F:	0.87	Evaporation Rate:	0.01
% Volatile by Volume @ 20C:	N.A.	Odor:	Mild petroleum odor
Viscosity (method, temp.):	1.9-4.1 @40C cSt		
Appearance:	Clear to light amber liquid		

N.A. = Not Available

FIRE AND EXPLOSION DATA

Flash Point: 125° F (PM)
Flammable Limits in Air % by Vol. Lower: 0.6 Upper: 7.5
Autoignition Temperature: 495 °F
Extinguishing Media: Dry chemical, carbon dioxide, foam, and water spray.

Special Fire Fighting Procedure: Use a water spray to cool fire-exposed containers. Use a smothering technique for extinguishing fire of this combustible liquid. Do not use a forced water stream directly on oil fires as this will scatter the fire. Firefighters should wear self-contained breathing apparatus and full protective clothing.

Unusual Fire or Explosion Hazard: Flowing oil can be ignited by self-generated static electricity.

REACTIVITY DATA

Stability: Stable
Hazardous Polymerization: Will not occur
Conditions to Avoid/Incompatibility: Strong oxidizing agents, heat, spark, flame and build-up of static electricity.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, sulfur dioxide, and hydrocarbons.

HEALTH HAZARD DATA

Carcinogenicity: NTP: No IARC Monographs: No OSHA Regulated: No

Occupational Exposure Limits: See Composition section

Effects of Overexposure

Acute:

Eyes: Slight to moderate eye irritation.

Skin: Moderately to extremely irritating; causing redness, drying to burns or blistering of skin.

Inhalation: Irritating to mucous membranes and respiratory tract. Will produce symptoms of intoxication such as headache, dizziness nausea, vomiting and loss of coordination.

Ingestion: Stomach irritation, gastritis, mild excitation, loss of conciousness, convulsions, cyanosis, congestion and capillary hemorrhaging of the lung and internal organs. Aspiration hazard if vomiting occurs.

Chronic: Prolonged or repeated skin contact may cause dermatitis.

Additional Medical and Toxicological Information: May aggravate pre-existing dermatitis. Middle distillates have caused skin cancer and kidney damage in laboratory animals. The National Institute for Occupational Safety and Health (NIOSH), based on findings of carcinogenic and tumorigenic responses of mice and rats exposed to whole diesel exhaust, recommends that whole diesel exhaust be regarded as a "potential occupational carcinogen".

EMERGENCY FIRST AID PROCEDURES

Eye Contact: Flush thoroughly with water for at least 15 minutes. Get medical attention.

Skin Contact: Cool the exposed area immediately. Remove contaminated clothing. Immediately wash affected areas with soap and water.

Inhalation: Remove to fresh air. Apply artificial respiration if not breathing. Get medical attention.

Ingestion: Do not induce vomiting. If spontaneous vomiting occurs, hold the victim's head lower than hips to prevent aspiration.

SPECIAL PROTECTION INFORMATION

Eye Protection: Remove contact lenses and wear chemical safety glasses or goggles where contact with liquid or mist may occur.

Skin Protection: Wear impervious gloves when contact with skin may occur.

Inhalation: Use approved respiratory protective equipment for cleaning large spills or entry into large tanks, vessels or other confined spaces.

Ventilation: Provide adequate ventilation: (1) to meet occupational exposure limits, (2) to prevent the formation of explosive atmospheres and (3) to prevent oxygen deficient atmospheres, especially in confined spaces.

SPILL OR LEAK AND DISPOSAL PROCEDURES

Spill Procedures: Remove sources of heat or ignition including internal combustion engines and power tools. Clean-up spill, but do not flush to sewer or surface water. Ventilate area and avoid breathing vapors or mists.

Waste Disposal: Dispose through a licensed waste disposal company. Follow federal, state and local regulations.

SPECIAL PRECAUTIONS AND COMMENTS

orage Requirements: Store in tightly closed containers in a dry cool place, away from sources of heat or ignition. Ground and bond all transfer and storage equipment to prevent static sparks and equip with self closing valves, pressure vacuum bungs and flame arrestors. Empty containers may contain residue (liquid/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition; they may explode and cause injury or death.

SARA TITLE III INFORMATION

Section 311/312 Hazard Categorization

Acute	Chronic	Fire	Pressure	Reactive
X	X	X		

SARA Hazardous Substances

Ingredient	CAS No.	%, wt	Sec 313	Sec 302	RQ, lb	TPQ, lb

e Identified

Key: Sec 313 = Toxic Chemicals, Section 313
Sec 302 = Extremely Hazardous Substances (EHS), Section 302
RQ = Reportable Quantity of EHS
TPQ = Threshold Planning Quantity of EHS

CALIFORNIA PROPOSITION 65 WARNING

Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm may be found in crude oil and petroleum products. Although it is possible to sufficiently refine a crude oil or its end products to remove the potential for cancer, we are advising that one or more of the listed chemicals may be present in some detectable quantities. Read and follow directions and use care when handling crude oil and petroleum products.

Industrial Hygiene Review: Delno D. Malzahn, CIH
Date Prepared: 10/07/85

MATERIAL SAFETY DATA SHEET

The Coastal Corporation

.stal Oil New York, Inc.
Coastal Oil New England, Inc.
Coastal Fuels Marketing, Inc.
Coastal Mobile Refining Company
Coastal Derby Refining Company
Coastal Eagle Point Oil Company
Coastal Mart, Inc.
Coastal Refining & Marketing, Inc.
Coastal States Crude Gathering Co.
Coastal States Trading, Inc.
Coastal Unilube, Inc.
Coscol Marine Corporation
Coscol Petroleum Corporation
Pacific Refining Company
Western Fuel Oil Company
Coastal Fuel Terminals, Inc.

Address: 9 Greenway Plaza
Houston, TX 77046

Info Phone: (713) 877-1400
Emergency Phone: (713) 877-1400

PRODUCT IDENTIFICATION

Trade Name: Fuel Oil No. 6 Date Revised: 02-07-90

Synonyms: Fuel Oil C, Bunker Fuel, Residual Fuel Oil
Chemical Name and/or Family Description: A complex mixture of paraffinic, olefinic, naphthenic and aromatic hydrocarbons. A distillate of crude oil of low sulfur content.
Hazard Class: Combustible liquid; NA 1993.

COMPOSITION

			Occupational Exposure Limits*			
Product	CAS Number	Wt%	PEL	TLV	Other	Units
Fuel Oil 6	68553-00-4	100	5	5	10 STEL	mg/m³**

* = 8-Hr. TWA unless otherwise specified.
** = As oil mist.
STEL = Short Term Exposure Limit; 15 minutes.

PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point 760 mmHg: 500°F
Vapor Pressure mmHg @ 20C: 0.2
Solubility in H2O % : Insoluble
Specific Gravity 60/60F: 0.97
% Volatile by Volume @ 20 C: Negligible
Viscosity (method,temp): 150 @50C SFc
Appearance: Black liquid to heavy paste.

Melting Point: -20°F
Vapor Density (Air=1): 8
pH: N.A.
Evaporation Rate (n-Butyl Acetate = 1): 0.01
Odor: Mild petroleum odor

N.A. = Not Available

FIRE AND EXPLOSION DATA

Flash Point: 140° F (PMCC)
Flammable Limits in Air % by Vol. Lower: 1.0 Upper: 5.0
Autoignition Temperature: 765° F
Extinguishing Media: Dry chemical, carbon dioxide, foam, and water spray.

Special Fire Fighting Procedure: Use a water spray to cool fire-exposed containers. Use a smothering technique for extinguishing fire of this combustible liquid. Do not use a forced water stream directly on oil fires as this will scatter the fire. Firefighters should wear self-contained breathing apparatus and full protective clothing.

Unusual Fire or Explosion Hazard: Flowing oil can be ignited by self-generated static electricity; Check for combustible vapors prior to and during welding and torch cutting on tanks and vessels.

REACTIVITY DATA

Stability: Stable
Hazardous Polymerization: Will not occur.
Conditions to Avoid/Incompatability: Strong oxidizing agents, heat, spark, flame and build-up of static electricity.
Hazardous Decomposition Products: CO, CO_2, SO_2, reactive hydrocarbons.

HEALTH HAZARD DATA

Carcinogenicity: NTP: No IARC Monographs: No OSHA Regulated: No

Occupational Exposure Limits: See COMPOSITION section.

Effects of Overexposure

Acute:

Eyes: Slight to moderate eye irritation.

Skin: Moderately irritating; causing redness, drying of skin.

Inhalation: Irritating to mucous membranes and respiratory tract. Will produce symptoms of intoxication such as headache, dizziness, nausea, vomiting and loss of coordination.

Ingestion: Mild excitation, loss of conciousness, convulsions, cyanosis, congestion and capillary hemorrhaging of the lung and internal organs.

Chronic: Prolonged or repeated skin contact may cause dermatitis.

Additional Medical and Toxicological Information: May aggravate pre-existing dermatitis. Middle distillates have caused skin cancer and kidney damage in laboratory animals.

EMERGENCY FIRST AID PROCEDURES

Contact: Flush thoroughly with water for at least 15 minutes. Get medical attention.

Skin Contact: Cool the exposed area immediately. Remove contaminated clothing. Immediately wash affected areas with soap and water.

Inhalation: Remove to fresh air. Apply artificial respiration if not breathing. Get medical attention.

Ingestion: Do not induce vomiting. If spontaneous vomiting occurs, hold the victim's head lower than hips to prevent aspiration.

SPECIAL PROTECTION INFORMATION

Eye Protection: Remove contact lenses and wear chemical safety glasses or goggles where contact with liquid or mist may occur.

Skin Protection: Wear impervious gloves when contact with skin may occur.

Inhalation: Use approved respiratory protective equipment for cleaning large spills or entry into large tanks, vessels or other confined spaces.

Ventilation: Provide adequate ventilation: (1) to meet occupational exposure limits, (2) to prevent the formation of explosive atmospheres and (3) to prevent oxygen deficient atmospheres, especially in confined spaces.

SPILL OR LEAK AND DISPOSAL PROCEDURES

Spill Procedures: Remove sources of heat or ignition including internal combustion engines and power tools. Clean-up spill, but do not flush to sewer or surface water. Ventilate area and avoid breathing vapors or mists.

Waste Disposal: Dispose through a licensed waste disposal company. Follow federal, state and local regulations.

SPECIAL PRECAUTIONS AND COMMENTS

Storage Requirements: Store in tightly closed containers in a dry cool place, away from sources of heat or ignition. Ground and bond all transfer and storage equipment to prevent static sparks and equip with self closing valves, pressure vacuum bungs and flame arrestors. Empty containers may contain residue (liquid/vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks, or other sources of ignition; they may explode and cause injury or death.

EPA SARA TITLE III INFORMATION

Section 311/312 Hazard Categorization

Acute	Chronic	Fire	Pressure	Reactive
X	X	X		

SARA Hazardous Substances

Ingredient	CAS No.	%, wt	Sec 313	Sec 302	RQ, lb	TPQ, lb

None Identified

Key: Sec 313 = Toxic Chemicals, Section 313
Sec 302 = Extremely Hazardous Substances (EHS), Section 302
RQ = Reportable Quantity of EHS
TPQ = Threshold Planning Quantity of EHS

CALIFORNIA PROPOSITION 65 WARNING

Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm may be found in crude oil and petroleum products. Although it is possible to sufficiently refine a crude oil or its end products to remove the potential for cancer, we are advising that one or more of the listed chemicals may be present in some detectable quantities. Read and follow directions and use care when handling crude oil and petroleum products.

Industrial Hygiene Review: Delno D. Malzahn, CIH
Date Prepared: 10/07/85

MATERIAL SAFETY DATA SHEET

The Coastal Corporation

Coastal Oil New York, Inc.	Coastal States Crude Gathering Co.
Coastal Oil New England, Inc.	Coastal States Trading, Inc.
Coastal Fuels Marketing, Inc.	Coastal Unilube, Inc.
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Coastal Eagle Point Oil Company	Pacific Refining Company
Coastal Mart, Inc.	Western Fuel Oil Company
Coastal Refining & Marketing, Inc.	Coastal Fuel Terminals, Inc.

Address: 9 Greenway Plaza
Houston, TX 77046

Info Phone: (713) 877-1400
Emergency Phone: (713) 877-1400

PRODUCT IDENTIFICATION

Trade Name: Fuel Oil No. 2 Date Revised: 02-07-90

Synonyms: No. 2 Heating Oil, Fuel Chief 2
Chemical Name and/or Family Description: A complex mixture of paraffinic, olefinic, naphthenic and aromatic hydrocarbons. A distillate of low sulfur content.
Hazard Class: Combustible liquid; NA 1993.

COMPOSITION

			Occupational Exposure Limits*			
Product	CAS Number	Wt%	PEL	TLV	Other	Units
Fuel Oil #2	68476-30-2	100	5	5	10 STEL	mg/m³**

* = 8-Hr. TWA unless otherwise specified.
** = As oil mist.
STEL = Short Term Exposure Limit; 15 minutes.

PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point @ 760 mmHg: 340-700°F
Vapor Pressure mmHg @ 20C: 1.6
Solubility in H2O %: Insoluble
Specific Gravity 60/60F: 0.87
% Volatile by Volume @ 20C: N.A.
Viscosity (method,temp): 2.0-3.6 @40C cSt
Appearance: Clear to light amber liquid.

Melting Point: -20°F
Vapor Density (Air=1): 8
pH: N.A.
Evaporation Rate (Butyl Acetate=1): 0.01
Odor: Mild petroleum odor

N.A. = Not Available

FIRE AND EXPLOSION DATA

sh Point: 145°F (COC)
mmable Limits in Air % by Vol. Lower: 0..52 Upper: 7.5
Autoignition Temperature: 495 °F
Extinguishing Media: Dry chemical, carbon dioxide, foam, and water spray.

Special Fire Fighting Procedure: Use a water spray to cool fire-exposed containers. Use a smothering technique for extinguishing fire of this combustible liquid. Do not use a forced water stream directly on oil fires as this will scatter the fire. Firefighters should wear self-contained breathing apparatus and full protective clothing.

Unusual Fire or Explosion Hazard: Flowing oil can be ignited by self-generated static electricity; Check for combustible vapors prior to and during welding and torch cutting on tanks and vessels.

REACTIVITY DATA

Stability: Stable
Hazardous Polymerization: Will not occur
Conditions to Avoid/Incompatability: Strong oxidizing agents, heat, spark, flame and build-up of static electricity.

Hazardous Decomposition Products: CO, CO_2, SO_2, reactive hydrocarbons.

HEALTH HAZARD DATA

Carcinogenicity: NTP: No IARC Monographs: No OSHA Regulated: No

Occupational Exposure Limits: See Composition section

Effects of Overexposure

Acute:

Eyes: Slight to moderate eye irritation.

Skin: Moderately to extremely irritating; causing redness, drying to burns or blistering of skin.

Inhalation: Irritating to mucous membranes and respiratory tract. Will produce symptoms of intoxication such as headache, dizziness nausea, vomiting and loss of coordination.

Ingestion: Stomach irritation, gastritis, mild excitation, loss of conciousness, convulsions, cyanosis, congestion and capillary hemorrhaging of the lung and internal organs. Aspiration hazard if vomiting occurs.

Chronic: Prolonged or repeated skin contact may cause dermatitis.

Additional Medical and Toxicological Information: May aggravate pre-existing dermatitis. Middle distillates have caused skin cancer and kidney damage in laboratory animals. The National Institute for Occupational Safety and Health (NIOSH), based on findings of carcinogenic and tumorigenic responses of mice and rats exposed to whole diesel exhaust, recommends that whole diesel exhaust be regarded as a "potential occupational carcinogen".

EMERGENCY FIRST AID PROCEDURES

Eye Contact: Flush thoroughly with water for at least 15 minutes. Get medical attention.

Skin Contact: Cool the exposed area immediately. Remove contaminated clothing. Immediately wash affected areas with soap and water.

Inhalation: Remove to fresh air. Apply artificial respiration if not breathing. Get medical attention.

Ingestion: Do not induce vomiting. If spontaneous vomiting occurs, hold the victim's head lower than hips to prevent aspiration.

SPECIAL PROTECTION INFORMATION

Protection: Remove contact lenses and wear chemical safety glasses or goggles where contact with liquid or mist may occur.

Skin Protection: Wear impervious gloves when contact with skin may occur.

Inhalation: Use approved respiratory protective equipment for cleaning large spills or entry into large tanks, vessels or other confined spaces.

Ventilation: Provide adequate ventilation (1) to keep mist or vapors below occupational exposure limits, (2) to prevent the formation of explosive atmospheres and (3) to prevent oxygen deficient atmospheres, especially in confined spaces.

SPILL OR LEAK AND DISPOSAL PROCEDURES

Spill Procedures: Remove sources of heat or ignition including internal combustion engines and power tools. Clean-up spill, but do not flush to sewer or surface water. Ventilate area and avoid breathing vapors or mists.

Waste Disposal: Dispose through a licensed waste disposal company. Follow federal, state and local regulations.

SPECIAL PRECAUTIONS AND COMMENTS

orage Requirements: Store in tightly closed containers in a dry cool place, away from sources of heat or ignition and incompatible substances. Ground and bond all transfer and storage equipment to prevent static sparks and equip with self closing valves, pressure vacuum bungs and flame arrestors. Empty containers may contain residue (liquid/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition; they may explode and cause injury or death.

SARA TITLE III INFORMATION

Section 311/312 Hazard Categorization

Acute	Chronic	Fire	Pressure	Reactive
X	X	X		

SARA Hazardous Substances

Ingredient	CAS No.	%, wt	Sec 313	Sec 302	RQ, lb	TPQ, lb

ne Identified

Key: Sec 313 = Toxic Chemicals, Section 313
Sec 302 = Extremely Hazardous Substances (EHS), Section 302
RQ = Reportable Quantity of EHS
TPQ = Threshold Planning Quantity of EHS

CALIFORNIA PROPOSITION 65 WARNING

Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm may be found in crude oil and petroleum products. Although it is possible to sufficiently refine a crude oil or its end products to remove the potential for cancer, we are advising that one or more of the listed chemicals may be present in some detectable quantities. Read and follow directions and use care when handling crude oil and petroleum products.

Industrial Hygiene Review: Delno D. Malzahn, CIH
Date Prepared: 10/07/85

MATERIAL SAFETY DATA SHEET

The Coastal Corporation

Coastal Oil New York, Inc.
Coastal Oil New England, Inc.
Coastal Fuels Marketing, Inc.
Coastal Mobile Refining Company
Coastal Derby Refining Company
Coastal Eagle Point Oil Company
Coastal Mart, Inc.
Coastal Refining & Marketing, Inc.
Coastal States Crude Gathering Co.
Coastal States Trading, Inc.
Coastal Unilube, Inc.
Coscol Marine Corporation
Coscol Petroleum Corporation
Pacific Refining Company
Western Fuel Oil Company
Coastal Fuel Terminals, Inc.

Address: 9 Greenway Plaza
Houston, TX 77046

Info Phone: (713) 877-1400
Emergency Phone: (713) 877-1400

PRODUCT IDENTIFICATION

Trade Name: AV Jet

Date Revised: 02-07-90

Synonyms: Jet Fuel, Dual Purpose Kerosene, Jet A
Chemical Name and/or Family Description: Kerosene
DOT Hazard Class: Combustible liquid; UN 1863.

COMPOSITION

Product	CAS Number	Wt%	Occupational Exposure Limits* PEL	TLV	Other	Units
AV Jet	N.A.	100	N.A.	N.A.		
Ingredient(s)						
Kerosene	8008-20-6	100	N.A.	N.A.		

* = 8-Hr. TWA unless otherwise specified.
N.A. = Not Available

PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point @ 760 mmHg: 310°F
Vapor Pressure, psia : N.A.
Solubility in H20 % : Insoluble
Specific Gravity 60/60F: 0.807
% Volatile by Volume: 100
Viscosity (method, temp.): 30 SUS @ 40C
Appearance: Water clear to light amber liquid.

Melting Point: N.A.
Vapor Density (Air=1): N.A.
pH: N.A.
Evaporation Rate: N.A.
Odor: Mild petroleum odor

FIRE AND EXPLOSION DATA

Vol. Lower: 0.7 Upper: 5.0

410° F

y chemical, carbon dioxide, foam, and water spray.

Procedure: Use a water spray to cool fire-exposed
smothering technique for extinguishing fire of this
. Do not use a forced water stream directly on
as this will scatter the fire. Firefighters should wear
reathing apparatus and full protective clothing.

on Hazard: Flowing fuel can be ignited by self-generated static electricity.

REACTIVITY DATA

ion: Will not occur

ncompatibility: Strong oxidizing agents, heat, spark, flame and build-up of static electricity.

on Products: Carbon monoxide, carbon dioxide, and hydrocarbons.

EALTH HAZARD DATA

No IARC Monographs: No OSHA Regulated: No

limits: See COMPOSITION section.

re

erate eye irritation.

ritating; causing redness and drying of skin.

ing to mucous membranes and respiratory tract. Will
symptoms of intoxication such as headache, dizziness,
, vomiting, loss of coordination and loss of
sness.

irritating to the mouth, throat, and digestive tract.
ion into the lungs through vomiting may cause
ging, pulmonary edema, and chemical pneumonitis.

reduction of erythrocytes, marrow hypoplasia, and
formed elements of the blood.

cological Information: May aggravate
ermatitis. Middle distillates have caused
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SARA TITLE III INFORMATION

Section 311/312 Hazard Categorization

Acute	Chronic	Fire	Pressure	Reactive
X	X	X		

SARA Hazardous Substances

Ingredient	CAS No.	%. wt	Sec 313	Sec 302	RQ. lb	TPQ. lb
None Identified						

Key: Sec 313 = Toxic Chemicals, Section 313
Sec 302 = Extremely Hazardous Substances (EHS), Section 302
RQ = Reportable Quantity of EHS
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CALIFORNIA PROPOSITION 65 WARNING

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Industrial Hygiene Review: Delno D. Malzahn, CIH
Date Prepared: 10/07/85

MATERIAL SAFETY DATA SHEET

The Coastal Corporation

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Coastal Fuels Marketing, Inc.
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Coastal Eagle Point Oil Company
Coastal Mart, Inc.
Coastal Refining & Marketing, Inc.
Coastal States Crude Gathering Co.
Coastal States Trading, Inc.
Coastal Unilube, Inc.
Coscol Marine Corporation
Coscl Petroleum Corporation
Pacific Refining Company
Western Fuel Oil Company
Coastal Fuel Terminal, Inc.

Address: 9 Greenway Plaza
Houston, TX 77046

Info Phone: (713) 877-1400
Emergency Phone: (713) 877-1400

PRODUCT IDENTIFICATION

Trade Name: Fuel Oil No. 4 Date Revised: 02-07-90

Synonyms: Light Residual Fuel, Petroleum Distillate
Chemical Name and/or Family Description: A combination of parafinic, olefinic, and aromatic hydrocarbons produced by distillation of crude oil.
`T Hazard Class: Combustible liquid; NA 1993.

COMPOSITION

Product	CAS Number	%. Wt	Occupational Exposure Limits* OSHA PEL	ACGIH TLV	Other	Units
Fuel Oil No. 4	68476-31-3	100	5	5	10 STEL	mg/m³ **

* = 8-Hr. TWA unless otherwise specified.
** = As oil mist.
STEL = Short Term Exposure Limit; 15 minutes.

PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point 760 mmHg: 400-1000°F
Vapor Pressure mmHg @ 20C: N.A.
Solubility in H2O % : Insoluble
Specific Gravity 60/60F: 0.90-1.0
% Volatile by Volume @20C: N.A.
scosity (method,temp):90-120 @100C SUS
pearance: Black liquid

Melting Point: N.A.
Vapor Density (Air=1): N.A.
pH: N.A.
Evaporation Rate (Butyl Acetate=1): <0.01
Odor: Mild petroleum odor

N.A. = Not Available

FIRE AND EXPLOSION DATA

Flash Point: >140°F (PM)
Flammable Limits in Air % by Vol. Lower: 1.0 Upper: 5.0
Autoignition Temperature: 765°F
Extinguishing Media: Water spray, dry chemical, foam of carbon dioxide.

Special Fire Fighting Procedure: Use a water spray to cool fire-exposed containers. Use a smothering technique for extinguishing fire of this combustible liquid. Do not use a forced water stream directly on oil fires as this will scatter the fire. Firefighters should wear self-contained breathing apparatus and full protective clothing.

Unusual Fire or Explosion Hazard: Flowing oil can be ignited by self-generated static electricity; containers should be grounded and bonded. Check for combustible vapors prior to and during welding and torch cutting on tanks and vessels.

REACTIVITY DATA

Stability: Stable
Hazardous Polymerization: Will not occur.

Conditions to Avoid/Incompatability: Strong oxidizing agents, heat, spark, flame and build-up of static electricity.

Hazardous Decomposition Products: CO, CO_2, SO_2, reactive hydrocarbons.

HEALTH HAZARD DATA

Carcinogenicity: NTP: No IARC Monographs: No OSHA Regulated: No
Occupational Exposure Limits: See COMPOSITION section.
Effects of Overexposure

Acute:

Eyes: Slight to moderate eye irritation.

Skin: Moderately irritating; causing redness, drying of skin.

Inhalation: Irritating to mucous membranes and respiratory tract. Over-exposure may lead to symptoms of headache, drowsiness, fatigue, nausea, vomiting and loss of coordination.

Ingestion: Stomach irritation, gastritis. Possible effects are headache, nausea, convulsions, cyanosis, congestion and capillary hemorrhaging of the lung and internal organs. Aspiration hazard if vomiting occurs.

Chronic: Prolonged or repeated skin contact may cause dermatitis.

Additional Medical and Toxicological Information: May aggravate pre-existing dermatitis. Middle distillates have caused skin cancer and kidney damage in laboratory animals.

EMERGENCY FIRST AID PROCEDURES

ve Contact: Flush thoroughly with water for at least 15 minutes. Get medical attention.

Skin Contact: Cool the exposed area immediately. Remove contaminated clothing. Immediately wash affected areas with soap and water. Seek medical attention.

Inhalation: Remove to fresh air. Apply artificial respiration if not breathing. Get medical attention.

Ingestion: Do not induce vomiting. If spontaneous vomiting occurs, hold the victim's head lower than hips to prevent aspiration.

SPECIAL PROTECTION INFORMATION

Eye Protection: Remove contact lenses and wear chemical safety glasses or goggles where contact with liquid or mist may occur.

Skin Protection: Wear impervious gloves when contact with skin may occur. Wear appropriate protective clothing to avoid skin contact.

Inhalation: Use approved respiratory protective equipment in situations where airborne concentrations may exceed occupational exposure levels.

Ventilation: Provide adequate ventilation: (1)to meet occupational exposure limits, (2) to prevent the formation of explosive atmospheres and (3) to prevent oxygen deficient atmospheres, especially in confined spaces.

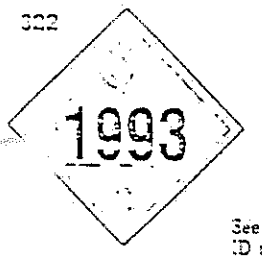
SPILL OR LEAK AND DISPOSAL PROCEDURES

Spill Procedures: Remove sources of heat or ignition including internal combustion engines and power tools. Clean-up spill, but do not flush to sewer or surface water. Ventilate area and prevent skin contact.

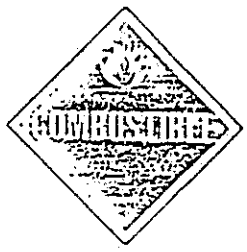
Waste Disposal: Dispose through a licensed waste disposal company. Follow federal, state and local regulations.

SPECIAL PRECAUTIONS AND COMMENTS

Storage Requirements: Store in tightly closed containers in a dry cool place, away from sources of heat or ignition. Ground and bond all transfer and storage equipment to prevent static sparks and equip with self closing valves, pressure vacuum bungs and flame arrestors. Empty containers may contain residue (liquid/vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition; they may explode and cause injury or death.



FUEL OIL NO. 1
Combustible Liquid



See "UN/NA Designation" for other ID numbers.

POTENTIAL HAZARDS

GENERAL HAZARDS

Threshold Odor Concentration: 0.11 ppm
Unusual Hazards: None
Short Term Exposure Limits(STEL): Unavailable
Time Weighted Average(TLV-TWA): 14 ppm over each 8 hours of a 40 hour work week.(NIOSH recommendation)
Conditions to Avoid: Heat, fire, and sparks; contact with incompatible materials; runoff to sewers or water bodies; inhalation, ingestion, or direct physical contact.

HEALTH HAZARDS

Public Health Hazards: Health hazards are generally low unless the product is ingested in significant quantities. Nevertheless, all major exposures should be avoided.
Hazards of Skin or Eye Contact: Prolonged or repeated skin contact with fuel oils may cause drying and cracking of the skin due to the defatting action of these products, as well as the possibility of blisters. Contact with the eyes results in mild or negligible irritation in most cases.
Hazards of Inhalation: Prolonged exposure to high vapor concentrations in air may cause headache, drowsiness, irritation of the eyes and nose, and lung irritation. Such concentrations are generally unlikely outdoors, however, except in the immediate vicinity of the spilled product.
Hazards of Ingestion: Ingestion may cause irritation of the gastrointestinal tract, nausea, vomiting, cramping, and possible central nervous system depression with symptoms ranging from headache to anesthesia, coma, and death. Aspiration into the lungs during vomiting may result in coughing, gagging, difficult breathing, substernal distress, rapidly developing pulmonary edema, and delayed brochopneumonia and pneumonitis with possibly severe consequences.

RE HAZARDS

wer Flammable Limit: 0.7%
Upper Flammable Limit: 5%
Behavior in Fire: Combustible liquid. Will burn but may be difficult to ignite unless warmed. There is some limited possibility that containers may rupture violently in fire.
Hazardous Combustion Products: Not well-defined, may include toxic constituents.

EXPLOSION HAZARDS

Lower Explosive Limit: Unavailable
Upper Explosive Limit: Unavailable
Explosiveness: Explosions may result if vapors of warm liquid are ignited in a confined area. There is some limited possibility that containers may rupture in fire.

PROTECTIVE CLOTHING AND EQUIPMENT

Protective Clothing Required: Equipment should prevent repeated or prolonged skin contact and any reasonable probability of eye contact with the spilled product. This may include rubber boots, gloves, face shields, splash-proof safety goggles, and other impervious and resistant clothing. Compatible materials may include neoprene, nitrile rubber, nitrile rubber/polyvinyl chloride, polyethylene, polyurethane, polyvinyl alcohol, Viton, and nitrile-butadiene rubber.
Respiratory Protection: For unknown concentrations, fire fighting, or high concentrations, a self-contained breathing apparatus (SCBA) with full facepiece (or the equivalent).

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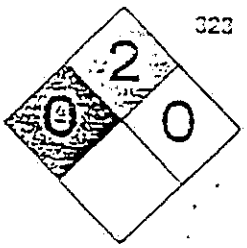
FUEL OIL NO. 1
Combustible Liquid



FIRST AID

Nonspecific symptoms: Irritation of the eyes, skin, or respiratory tract; other symptoms of exposure.
First Aid for Inhalation: Remove victim to fresh air and keep warm and at rest. If breathing becomes difficult or if breathing has stopped, administer artificial respiration. Get medical attention immediately. (Caution: Administration of mouth-to-mouth resuscitation may expose the first aid provider to chemical within the victim's lungs or vomit.)
First Aid for Skin and Eye Contact: Flush eyes immediately with water for at least 15 minutes, occasionally lifting the eyelids. Remove all contaminated clothing. Wash affected body areas with large amounts of soap and water. Get medical attention if irritation persists after washing.
First Aid for Ingestion: Do not induce vomiting. Keep victim warm and at rest. Get medical attention immediately.

FIRE RESPONSE

Extinguishing Materials: Foam, dry chemical, carbon dioxide, water spray. Water may be ineffective.
Extinguishing Techniques: Stay upwind. Wear breathing apparatus and appropriate protective clothing. Move container from fire area if no risk. Do not extinguish burning cargo unless flow can be stopped safely. Be alert to the possibility that the container may tear or rupture and suddenly release massive amounts of product when exposed to high heat (over 800°F), such as from a direct flame. Use water from side and from safe distance to keep fire exposed containers cool. For massive fire in cargo area, use unmanned hose holder or monitor nozzles. Withdraw immediately in case of rising sound from venting safety device or discoloration of tank.

SPILL RESPONSES

General Information: Restrict access to area. Keep unprotected personnel upwind of spill area. Eliminate ignition sources. Prevent liquid from entering sewers and confined spaces. Protect sewers and waterways from contaminated runoff. Notify proper authorities, downstream sewer and water treatment operations, and other downstream users of potentially contaminated water. Note that intake of fuel oils may result in rupture, explosion, or fire involving boilers or industrial process equipment. Choose equipment, where possible, that is not corroded or otherwise damaged by the spilled product.

AIR SPILL

TECHNIQUE

MONITOR THE SITUATION . . . Fuel oil no. 1 may not evolve large amounts of hazardous airborne contaminants in many outdoor spill situations. It may be advisable in some cases to simply monitor the situation until the spilled product is removed.

CONSEQUENCE

Hazardous levels of fuel oil no. 1 in air may be found in the local spill area and immediately downwind.

MITIGATION

Remove the spilled product as soon as possible. Restrict access to the local spill area and areas immediately downwind by unprotected personnel.

TECHNIQUE

WATER FOG OR SPRAY . . . Water fog or spray applied to fuel oil no. 1 vapors or fumes may accelerate their dispersal in the atmosphere (where necessary).

CONSEQUENCE

Water runoff may contain a small amount (if any) of fuel oil no. 1 from contact with airborne vapors or fumes.

MITIGATION

Contain contaminated water and remove as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may add to spill volume and overfill impoundments.

FUEL OIL NO. 1
Combustible Liquid

TECHNIQUE

FOAM . . . Firefighting foam applied to the surface of liquid pools may slow the release of fuel oil no. 1 vapors into the atmosphere (where necessary.)

CONSEQUENCE

The effects of foam may be short term. As the foam breaks down, release of vapors will increase. Products of foam breakdown will add to the volume of spilled material.

MITIGATION

Continue foam applications until spilled product is removed. Contain increased volume.

LAND SPILL

TECHNIQUE

CONTAINMENT DIKES . . . Fuel oil no. 1 may be contained by building dikes or barriers using soil, sand or other materials.

CONSEQUENCE

Contained fuel oil no. 1 may percolate into soil or seep through dike material. This may result in loss of contained product and spread of contamination..

MITIGATION

Remove contained product as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may overfill impoundments. Where possible, line collection basins with compatible impervious material.

TECHNIQUE

EXCAVATION . . . A trench or ditch may be excavated to contain leaking product.

CONSEQUENCE

There may be increased potential for groundwater contamination in some cases.

MITIGATION

Remove contained products as soon as possible to prevent spread of contamination. Use surface dikes or barriers where groundwater contamination is possible or line collection basin with compatible impervious material.

TECHNIQUE

PUMPING/VACUUM SUCTION . . . Accumulated liquid pools may be recovered using appropriate hoses, pumps and storage containers or vacuum trucks.

CONSEQUENCE

Equipment that is incompatible with the spilled product may become damaged or develop leaks.

MITIGATION

Use equipment compatible with spilled product.

TECHNIQUE

ABSORPTION . . . Spreading of spilled product may be controlled by absorbing liquid with sand, earth, clay, fly ash, cement powder, peat moss, saw dust, straw, commercial sorbents, or other compatible substances.

CONSEQUENCE

Once used, sorbent materials pose the same hazards as the spilled product. Their use adds to the overall volume of contaminated material.

MITIGATION

Deplete accumulated liquid pools with pumps or vacuum trucks if possible before applying sorbents. Remove contaminated sorbents to safe storage by mechanical means.

FUEL OIL NO. 1
Combustible Liquid

TECHNIQUE

DIVERSION . . . Where other means are unavailable, floating slicks may be temporarily herded, diverted, or controlled using water hose streams, small boat propeller wash or chemical surface tension modifiers known as spill herders.

CONSEQUENCE

Hose streams and propeller washes have limited applicability and effectiveness. The latter may cause undesired mixing of spilled product and water due to extreme agitation. Chemical spill herders should not be used until approval is obtained from authorized environmental officials.

MITIGATION

Use other means if available.

TECHNIQUE

SURFACE SKIMMING . . . Oil spill skimming devices may be deployed to recover floating fuel oil no. 1.

CONSEQUENCE

Incompatible equipment may be damaged. Equipment may be contaminated and pose hazard to future users. Fire hazard may pose risk to response personnel and equipment.

MITIGATION

Decontaminate equipment after use. Use compatible equipment. Store recovered product in safe and secure location. Eliminate ignition sources.

TECHNIQUE

ABSORPTION . . . Straw, hay, peat, or commercial sorbent materials compatible with fuel oil no. 1 may be used to absorb spilled product from the water surface, preferably after the spill has been contained.

CONSEQUENCE

Once used, sorbent materials pose the same hazards as the spilled product. Their use adds to the overall volume of contaminated material. Deployment and recovery can be difficult. Fire hazards pose risk to response personnel and equipment.

MITIGATION

Proceed with caution. Decontaminate equipment after use. Store and dispose of waste materials in proper and safe manner. Use compatible equipment. Eliminate ignition sources.

FUEL OIL NO. 1
Combustible Liquid

TECHNIQUE

MECHANICAL REMOVAL . . . Contaminated soil and any remaining chemical residue may be removed with shovels or motorized graders, scrapers, loaders, bulldozers, or draglines.

CONSEQUENCE

Removal equipment may become contaminated and present a hazard to later users. Incompatible equipment may be damaged or corroded. Improper storage of removed materials may result in future spread of contamination. Any flammable vapors or gases present in the area may be ignited by motorized removal equipment.

MITIGATION

Decontaminate all equipment after use. Use equipment compatible with spilled product. Store contaminated materials in a safe and secure location. Do not operate motorized equipment in potentially flammable atmospheres. Consult qualified experts for advice where necessary.

WATER SPILL

TECHNIQUE

STOP USE . . . Notify downstream industrial, municipal, and public users to stop water intake or to monitor water for contamination.

CONSEQUENCE

Alternative water supplies may be needed to accommodate users.

MITIGATION

Provide alternative water supplies as needed until water supply is declared safe.

TECHNIQUE

FLOATING BOOMS/BARRIERS . . . Oil spill containment booms of compatible material may be deployed. Alternatively, mesh or nets may be strung across stream and anchored every 6-8 feet. Straw or peat placed on upstream side of mesh should absorb and retard spreading of spilled product.

CONSEQUENCE

Leakage may occur under or through barrier if high waves or current present or if not properly deployed. Incompatible materials may be damaged by spilled product. Booms, barrier materials, and deployment equipment may be contaminated. Fire hazards pose risk to response personnel and equipment.

MITIGATION

Proceed with caution. Stage barriers in series where necessary. Recover spilled product as soon as possible. Decontaminate equipment after use. Dispose of waste materials in proper and safe manner. Use compatible equipment. Eliminate ignition sources.

TECHNIQUE

WATER BY-PASS DAMS . . . Streams may be provided with a by-pass dam. This is a dam made of compacted earth, clay, or other material with open tubes or pipes passing through under water. Upstream ends of pipes or tubes should be well below the layer of floating contaminant. Downstream ends should be at a higher elevation but still below the floating layer. Valves may be installed on downstream ends to control water flow.

CONSEQUENCE

Earthen dams may become saturated with water and seep through or collapse. An insufficient number of by-pass tubes or pipes or additional water may cause overflow.

MITIGATION

Use sufficient number and capacity of tubes or pipes. Be alert to conditions that may lead to dam overflow or collapse. Remove spilled product as soon as possible.

GASOLINE
Flammable Liquid

GENERAL INFORMATION

Gasoline is a volatile colorless to amber or pale brown liquid hydrocarbon that may also be dyed various colors. It is most commonly used as fuel but also has uses as a diluent and solvent in industry. Essentially insoluble in water and lighter, gasoline will float to form a surface slick. Its flash point may be as low as −50°F and indicates that the product is easily ignited under all ambient temperature conditions. Vapors of gasoline are heavier than air, may travel a considerable distance to a source of ignition and flash back, and may persist in pits, hollows, and depressions. Accumulations of vapor in confined spaces such as buildings or sewers may explode if ignited. Containers of liquid may rupture violently if exposed to fire or excessive heat for sufficient time duration. The product weighs approximately 5.9-6.1 pounds per gallon.

Gasoline does not react with water or many other common materials and is stable in normal transportation. It is a relatively noncorrosive substance and is primarily incompatible with oxidizing materials that may cause its ignition. Toxicity of the product ranges from low to high depending on the route of exposure. Products of combustion may include toxic products from lead compounds and other additives as well as other toxic constituents.

If the material is leaking (not on fire) and generating vapors or fumes, downwind evacuation of the immediate spill area should be considered until properly equipped responders have evaluated the hazard. (Note: Data given below are for automotive gasoline but are also mostly applicable to other types not containing alcohols.)

CHEMICAL/PHYSICAL DATA

Solubility in Water: Practically insoluble, 100-600 ppm
Solubility in Other Chemicals: Soluble in other hydrocarbons
Specific Gravity (Liquid): 0.73 at 68°F (20°C)
Boiling Point: 140-390°F (60-199°C) at 1 atm.
Melting Point: See freezing point
Freezing Point: −131 to −140°F (−90.6 to −95.6°C)
Molecular Weight: Mixture, 72-142 (est.)
Heat of Combustion: −10,400 cal/g
Vapor Pressure: 190 mm Hg (3.67 psia) at 68°F (20°C)
Flash Point: −38 to −50°F (−38.9 to −45.6°C), closed cup
Autoignition Temperature: Min. 536°F (280°C); max. 853°F (456°C); varies with grade.
Burning Rate: 4 mm/minute
Stability: Stable
Corrosiveness: Noncorrosive, but may attack some forms of plastics, rubbers, or coatings.
Reactivity with Water: No reaction
Reactivity with Other Chemicals: Reacts with oxidizing materials.

IDENTIFICATION

Shipping Names: Gasoline (USDOT and IMO); petrol (IMO).
Synonyms and Tradenames: Light gasoline; natural gasoline; petrol; motor spirit; motor fuel; casing head gasoline; blended gasoline; automotive or aviation gasoline; benzin.
Chemical Formula: C_5-C_{10} hydrocarbon mixture
Constituent Components(% each): Complex hydrocarbon mixture; may contain small amounts of lead compounds and other additives.
49 STCC: 49 081 78; 49 081 77; 49 081 76
UN/NA Designation: UN1203
IMO Designation: 3.1, flammable liquid
Physical State as Shipped: Liquid
Physical State as Released: Liquid
Color of the Shipped Material: Colorless to amber or brown; may be dyed other colors.
Odor Characteristics: Like typical gasoline
Common Uses: Solvent or diluent; finishing agent for artificial leather; motor fuel; portable stove and lantern fuel.

FOR ADDITIONAL ASSISTANCE OR INFORMATION CALL:
CHEMTREC (800)424-9300 OR (202)483-7616 OR
THE AAR BUREAU OF EXPLOSIVES (202)835-9500

GASOLINE
Flammable Liquid

POTENTIAL HAZARDS

GENERAL HAZARDS

Threshold Odor Concentration: 0.25 ppm

Unusual Hazards: Volatile flammable liquid with heavier than air vapors that may travel to a source of ignition or persist in low areas. May contain lead compounds or other toxic additives.

Short Term Exposure Limits(STEL): 500 ppm for 15 minutes. (ACGIH)

Time Weighted Average(TLV-TWA): 300 ppm over each 8 hours of a 40 hour work week.(ACGIH)

Conditions to Avoid: Heat, fire, and sparks; contact with incompatible materials; runoff to sewers or water bodies; inhalation, ingestion, or direct physical contact.

HEALTH HAZARDS

Public Health Hazards: Major hazard to public is from prolonged exposure to the significant vapor concentrations that may be present in air after major spills. Ingestion and physical contact should also be avoided.

Hazards of Skin or Eye Contact: Repeated or prolonged contact with gasoline may cause drying and cracking of the skin due to the defatting action of the product (and possible blistering or lesion formation). Certain individuals may develop hypersensitivity. Contact with the eyes may result in smarting and pain, but only slight and temporary injury.

Hazards of Inhalation: Vapors act as a central nervous system depressant and may be irritating. Low concentrations in air may cause flushing of the face, staggering gait, headache, dizziness, slurred speech, and mental confusion. High levels may cause convulsions, unconsciousness, coma, pulmonary edema, and possibly death from respiratory failure or asphyxiation. There may also be damage to the pancreas, liver, kidneys, and spleen.

Hazards of Ingestion: Ingestion may result irritation of the mouth, throat and stomach; irregular heartbeat; stimulation and later depression of the central nervous system (see above). Aspiration into the lungs during vomiting may result in severe lung irritation with coughing, gagging, difficult breathing, substernal distress, rapidly developing pulmonary edema, and possibly delayed bronchopneumonia and pneumonitis with severe consequences.

FIRE HAZARDS

Lower Flammable Limit: 1.2-1.4%

Upper Flammable Limit: 7.1-7.6%

Behavior in Fire: Flammable liquid. Will generate large quantities of flammable vapor upon release. Vapors are heavier than air and may travel considerable distance to a source of ignition and flash back. Containers may rupture violently in fire.

Hazardous Combustion Products: Not well-defined, may include toxic products from additives like lead compounds as well as other toxic constituents.

EXPLOSION HAZARDS

Lower Explosive Limit: Unavailable

Upper Explosive Limit: Unavailable

Explosiveness: Explosion may result if vapors are ignited in a confined area. Containers may rupture violently in fire.

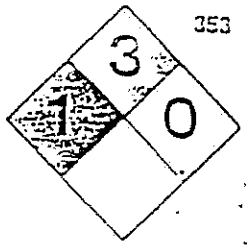
PROTECTIVE CLOTHING AND EQUIPMENT

Protective Clothing Required: Equipment should prevent repeated or prolonged skin contact and any reasonable probability of eye contact with the spilled product. This may include rubber boots, gloves, face shields, splash-proof safety goggles, and other impervious and resistant clothing. Compatible materials may include neoprene, nitrile rubber, chlorinated polyethylene, polyurethane, polyvinyl alcohol, Viton, and nitrile-butadiene rubber.

Respiratory Protection: For unknown concentrations, fire fighting, or high concentrations, a self-contained breathing apparatus (SCBA) with full facepiece (or the equivalent).

1203

GASOLINE
Flammable Liquid



FIRST AID

Nonspecific symptoms: Irritation of the eyes, skin, or respiratory tract; other symptoms of inhalation or ingestion.
First Aid for Inhalation: Remove victim to fresh air and keep warm and at rest. If breathing becomes difficult or if breathing has stopped, administer artificial respiration. Get medical attention immediately. (Caution: Administration of mouth-to-mouth resuscitation may expose the first aid provider to chemical within the victim's lungs or vomit.)
First Aid for Skin and Eye Contact: Flush eyes immediately with water for at least 15 minutes, occasionally lifting the eyelids. Remove all contaminated clothing. Wash affected body areas with large amounts of soap and water. Get medical attention if irritation persists after washing.
First Aid for Ingestion: Do not induce vomiting. Keep victim warm and at rest. Get medical attention immediately.

FIRE RESPONSE

Extinguishing Materials: Foam, carbon dioxide, dry chemical, water spray. Water may be ineffective.
Extinguishing Techniques: Stay upwind. Avoid all bodily contact. Wear breathing apparatus and appropriate protective clothing. Move container from fire area if no risk. Do not extinguish cargo unless flow can be stopped safely. Be alert to the possibility that the container may tear or rupture and suddenly release massive amounts of product when exposed to high heat (over 800°F), such as from a direct flame. Use water from side and from safe distance to keep fire exposed containers cool. For massive fire in cargo area, use unmanned hose holder or monitor nozzles. Withdraw immediately in case of rising sound from venting safety device or discoloration of tank.

SPILL RESPONSES

General Information: Proceed with caution. Restrict access to area. Keep unprotected personnel upwind of spill area. Avoid contact with spilled product. Eliminate ignition sources. Prevent liquid from entering sewers and confined spaces. Protect sewers and waterways from contaminated runoff. Notify proper authorities, downstream sewer and water treatment operations, and other downstream users of potentially contaminated water. Note that intake of gasoline may result in rupture or explosion of boilers or industrial process equipment. Use explosion-proof equipment where necessary. Choose equipment, where possible, that is not corroded or otherwise damaged by the spilled product. Take the volatile and flammable nature of gasoline into account while planning the response.

AIR SPILL

TECHNIQUE

EVACUATION . . . Evacuate local and downwind areas as conditions warrant to prevent exposure and to allow vapors or fumes to dissipate. Gasoline spills may expose downwind areas to toxic or flammable concentrations over considerable distances in some cases, particularly if large quanitites have spilled in warm weather.

CONSEQUENCE

Need to notify, organize, transport and house displaced persons.

MITIGATION

Stop leak if without risk and if proper equipment available. Allow vapors and fumes to dissipate completely before reentering spill area without special protective gear. Consult qualified experts for assistance.

TECHNIQUE

MONITOR THE SITUATION . . . Gasoline may not evolve large amounts of hazardous airborne contaminants in many outdoor spill situations. It may be advisable in some cases to simply monitor the situation until the spilled product is removed, particularly if only small amounts have spilled.

CONSEQUENCE

Hazardous levels of gasoline in air may be found in the local spill area and immediately downwind.

MITIGATION

Remove the spilled product as soon as possible. Restrict access to the local spill area and areas immediately downwind by unprotected personnel.

GASOLINE
Flammable Liquid

TECHNIQUE

WATER FOG OR SPRAY . . . Water fog or spray applied to gasoline vapors or fumes may accelerate their dispersal in the atmosphere.

CONSEQUENCE

Water runoff may contain a small amount (if any) of gasoline from contact with airborne vapors or fumes.

MITIGATION

Contain contaminated water and remove as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may add to spill volume and overfill impoundments.

TECHNIQUE

FOAM . . . Firefighting foam applied to the surface of liquid pools may slow the release of gasoline vapors into the atmosphere.

CONSEQUENCE

The effects of foam may be short term. As the foam breaks down, release of vapors will increase. Products of foam breakdown will add to the volume of spilled material.

MITIGATION

Continue foam applications until spilled product is removed. Contain increased volume.

LAND SPILL

TECHNIQUE

CONTAINMENT DIKES . . . Gasoline may be contained by building dikes or barriers using soil, sand or other materials.

CONSEQUENCE

Contained gasoline may percolate into soil or seep through dike material. This may result in loss of contained product and spread of contamination.

MITIGATION

Remove contained product as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may overfill impoundments. Where possible, line collection basins with compatible impervious material.

TECHNIQUE

EXCAVATION . . . A trench or ditch may be excavated to contain leaking product.

CONSEQUENCE

There may be increased potential for groundwater contamination in some cases.

MITIGATION

Remove contained products as soon as possible to prevent spread of contamination. Use surface dikes or barriers where groundwater contamination is possible or line collection basin with compatible impervious material.

TECHNIQUE

PUMPING/VACUUM SUCTION . . . Accumulated liquid pools may be recovered using appropriate hoses, pumps and storage containers or vacuum trucks.

CONSEQUENCE

Equipment that is incompatible with the spilled product may become damaged or develop leaks.

MITIGATION

Use equipment compatible with spilled product.

GASOLINE
Flammable Liquid

TECHNIQUE

ABSORPTION . . . Spreading of spilled product may be controlled by absorbing liquid with sand, earth, clay, fly ash, cement powder, peat moss, saw dust, straw, commercial sorbents, or other compatible substances.

CONSEQUENCE

Once used, sorbent materials pose the same hazards as the spilled product. Their use adds to the overall volume of contaminated material.

MITIGATION

Deplete accumulated liquid pools with pumps or vacuum trucks if possible before applying sorbents. Remove contaminated sorbents to safe storage by mechanical means.

TECHNIQUE

MECHANICAL REMOVAL . . . Contaminated soil and any remaining chemical residue may be removed with shovels or motorized graders, scrapers, loaders, bulldozers, or draglines.

CONSEQUENCE

Removal equipment may become contaminated and present a hazard to later users. Incompatible equipment may be damaged or corroded. Improper storage of removed materials may result in future spread of contamination. Any flammable vapors or gases present in the area may be ignited by motorized removal equipment.

MITIGATION

Decontaminate all equipment after use. Use equipment compatible with spilled product. Store contaminated materials in a safe and secure location. Do not operate motorized equipment in potentially flammable atmospheres. Consult qualified experts for advice where necessary.

WATER SPILL

TECHNIQUE

STOP USE . . . Notify downstream industrial, municipal, and public users to stop water intake or to monitor water for contamination.

CONSEQUENCE

Alternative water supplies may be needed to accommodate users.

MITIGATION

Provide alternative water supplies as needed until water supply is declared safe.

TECHNIQUE

FLOATING BOOMS/BARRIERS . . . Oil spill containment booms of compatible material may be deployed. Alternatively, mesh or nets may be strung across stream and anchored every 6-8 feet. Straw or peat placed on upstream side of mesh should absorb and retard spreading of spilled product.

CONSEQUENCE

Leakage may occur under or through barrier if high waves or current present or if not properly deployed. Incompatible materials may be damaged by spilled product. Booms, barrier materials, and deployment equipment may be contaminated. Fire hazards pose risk to response personnel and equipment.

MITIGATION

Proceed with caution. Stage barriers in series where necessary. Recover spilled product as soon as possible. Decontaminate equipment after use. Dispose of waste materials in proper and safe manner. Use compatible equipment. Eliminate ignition sources.

GASOLINE
Flammable Liquid

TECHNIQUE

WATER BY-PASS DAMS . . . Streams may be provided with a by-pass dam. This is a dam made of compacted earth, clay, or other material with open tubes or pipes passing through under water. Upstream ends of pipes or tubes should be well below the layer of floating contaminant. Downstream ends should be at a higher elevation but still below the floating layer. Valves may be installed on downstream ends to control water flow.

CONSEQUENCE

Earthen dams may become saturated with water and seep through or collapse. An insufficient number of by-pass tubes or pipes or additional water may cause overflow.

MITIGATION

Use sufficient number and capacity of tubes or pipes. Be alert to conditions that may lead to dam overflow or collapse. Remove spilled product as soon as possible.

TECHNIQUE

DIVERSION . . . Where other means are unavailable, floating slicks may be temporarily herded, diverted, or controlled using water hose streams, small boat propeller wash or chemical surface tension modifiers known as spill herders.

CONSEQUENCE

Hose streams and propeller washes have limited applicability and effectiveness. The latter may cause undesired mixing of spilled product and water due to extreme agitation. Chemical spill herders should not be used until approval is obtained from authorized environmental officials.

MITIGATION

Use other means if available.

TECHNIQUE

SURFACE SKIMMING . . . Oil spill skimming devices may be deployed to recover floating gasoline.

CONSEQUENCE

Incompatible equipment may be damaged. Equipment may be contaminated and pose hazard to future users. Fire hazard may pose risk to response personnel and equipment.

MITIGATION

Decontaminate equipment after use. Use compatible equipment. Store recovered product in safe and secure location. Eliminate ignition sources.

TECHNIQUE

ABSORPTION . . . Straw, hay, peat, or commercial sorbent materials compatible with gasoline may be used to absorb spilled product from the water surface, preferably after the spill has been contained.

CONSEQUENCE

Once used, sorbent materials pose the same hazards as the spilled product. Their use adds to the overall volume of contaminated material. Deployment and recovery can be difficult. Fire hazards pose risk to response personnel and equipment.

MITIGATION

Proceed with caution. Decontaminate equipment after use. Store and dispose of waste materials in proper and safe manner. Use compatible equipment. Eliminate ignition sources.

BENZENE
Flammable Liquid
RQ 1000 Lb/454 Kg*

GENERAL INFORMATION

Benzene is a colorless, fairly volatile liquid with an aromatic odor resembling gasoline. It is a component of motor fuel, has wide uses as a solvent, and is used to make detergents, explosives, dyes, plastics, pesticides, and other chemicals. It is very slightly soluble in water and lighter, so may be expected to form a floating surface slick. Its flash point of 12°F indicates that the product can be easily ignited under a wide range of ambient temperature conditions. Vapors of benzene may be heavier than air at times and may travel to a source of igniton and flash back. Accumulations of vapor in confined spaces such as sewers or buildings may explode if ignited. Containers of liquid may rupture violently if exposed to fire or excessive heat for sufficient time duration. The product weighs approximately 7.3 pounds per gallon.

Benzene does not react with water or many other common materials and is stable in normal transportation. It is, however reactive with a variety of chemicals and can be expected to attack some forms of plastics, rubber, and coatings. The product is generally considered to be of low to moderate toxicity in acute exposures, but long term occupational exposures are suspected to induce cancer. Products of combustion are not well-defined and may include toxic constituents.

Downwind evacuation should be considered on a case by case basis if benzene is leaking but not on fire.

CHEMICAL/PHYSICAL DATA

Solubility in Water: Practically insoluble, 0.18 g/100 g water at 77°F (25°C)
Solubility in Other Chemicals: Soluble in acetone, alcohol, and ether.
Specific Gravity (Liquid): 0.88 at 68°F (20°C)
Boiling Point: 176.2°F (80.1°C)
Melting Point: 41.9°F (5.5°C)
Freezing Point: 41.9°F (5.5°C)
Molecular Weight: 78.12
Heat of Combustion: −9698 cal/g
Vapor Pressure: 95.2 mm Hg (1.84 psia) at 77°F (25°C)
Flash Point: 12°F (−11.1°C), closed cup
Autoignition Temperature: 1097°F (591.7°C)
Burning Rate: 6.0 mm/minute
Stability: Stable
Corrosiveness: May attack some forms of plastics, rubber, and coatings.
Reactivity with Water: No reaction
Reactivity with Other Chemicals: Reacts with chlorine, oxygen, ozone, permanganates and sulfuric acid, peroxides, perchlorates, strong oxidizing agents, bromine with iron, and certain other chemicals.

IDENTIFICATION

Shipping Names: Benzene (USDOT and IMO)
Synonyms and Tradenames: Benzol; phenyl hydride; coal naphtha; phene; cyclohexatriene; pyrobenzol; pyrobenzole; benzole; annulene.
Chemical Formula: C_6H_6
Constituent Components(% each): 85% to more than 99% pure with remainder being toluene, xyiene, and other substances.
49 STCC: 49 081 10
UN/NA Designation: UN1114
IMO Designation: 3.2, flammable liquid
Physical State as Shipped: Liquid
Physical State as Released: Liquid (freezes below 42°F)
Color of the Shipped Material: Colorless
Odor Characteristics: Pleasant aromatic; like gasoline
Common Uses: Component of motor fuels; solvent for paint remover and oils; mfg. of detergents, explosives, dyestuffs, plastics, pesticides, and other chemicals.

*Reportable quantity (RQ) subject to change—refer to current EPA regulations.

FOR ADDITIONAL ASSISTANCE OR INFORMATION CALL:
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THE AAR BUREAU OF EXPLOSIVES (202)835-9500

BENZENE
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CHEMICAL/PHYSICAL DATA

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Molecular Weight: 78.12
Heat of Combustion: −9698 cal/g
Vapor Pressure: 95.2 mm Hg (1.84 psia) at 77°F (25°C)
Flash Point: 12°F (−11.1°C), closed cup
Autoignition Temperature: 1097°F (591.7°C)
Burning Rate: 6.0 mm/minute
Stability: Stable
Corrosiveness: May attack some forms of plastics, rubber, and coatings.
Reactivity with Water: No reaction
Reactivity with Other Chemicals: Reacts with chlorine, oxygen, ozone, permanganates and sulfuric acid, peroxides, perchlorates, strong oxidizing agents, bromine with iron, and certain other chemicals.

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49 STCC: 49 081 10
UN/NA Designation: UN1114
IMO Designation: 3.2, flammable liquid
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Physical State as Released: Liquid (freezes below 42°F)
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Common Uses: Component of motor fuels; solvent for paint remover and oils; mfg. of detergents, explosives, dyestuffs, plastics, pesticides, and other chemicals.

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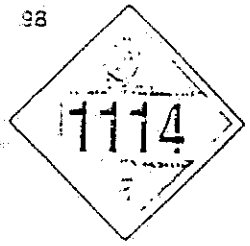

BENZENE
Flammable Liquid

POTENTIAL HAZARDS

GENERAL HAZARDS

Threshold Odor Concentration: 0.16-320 ppm; reported values vary widely

Unusual Hazards: Volatile flammable liquid with possibly heavier than air vapors. Suspected to be a human carcinogen.

Short Term Exposure Limits(STEL): 25 ppm for 15 minutes. (ACGIH)

Time Weighted Average(TLV-TWA): 10 ppm over each 8 hours of a 40 hour work week.(ACGIH)

Conditions to Avoid: Heat, fire, and sparks; contact with incompatible materials; runoff to sewers or water bodies; inhalation, ingestion, or direct physical contact.

HEALTH HAZARDS

Public Health Hazards: Major hazard is from inhalation of the high vapor concentrations in air that may be present but all exposures should be avoided due to the potential carcinogenicity of the product.

Hazards of Skin or Eye Contact: Benzene has a relatively strong irritating effect on the skin and may cause redness or blistering; prolonged or repeated contact may cause dry, scaly skin, possibility of secondary infection, and possibility of absorption through the skin in significant amounts. Contact with the eyes may cause primary irritation.

Hazards of Inhalation: Benzene vapors may irritate the skin and eyes. High concentrations may result in depression of the central nervous system with symptoms including euphoria, headache, dizziness, nausea, convulsions, coma, and possibly death as a result of ventricular fibrillation, probably due to heart sensitization to epinephrine. Levels of 20,000 ppm in air may be fatal in 5-10 minutes; 250-500 ppm may produce less severe symptoms.

Hazards of Ingestion: Ingestion may cause gastrointestinal irritation and vomiting. Aspiration into the lungs during vomiting may result in pulmonary edema (possibly delayed) and lung hemorrhage.

FIRE HAZARDS

Lower Flammable Limit: 1.3-1.4%

Upper Flammable Limit: 7.1-7.9%

Behavior in Fire: Flammable liquid. Vapors may be heavier than air and may travel some distance to a source of ignition and flash back. Containers may rupture violently in fire. May generate large quantities of flammable vapor upon release.

Hazardous Combustion Products: Not well-defined, may include toxic constituents.

EXPLOSION HAZARDS

Lower Explosive Limit: 1.4-1.5%

Upper Explosive Limit: 7.1-8%

Explosiveness: Containers may rupture violently in fire. Explosion may result if vapors are ignited in a confined area.

PROTECTIVE CLOTHING AND EQUIPMENT

Protective Clothing Required: Equipment should prevent repeated or prolonged skin contact and any reasonable probability of eye contact with the spilled product. This may include rubber boots, gloves, face shields, splash-proof safety goggles, and other impervious and resistant clothing. Compatible materials may include polyvinyl alcohol and Viton for prolonged exposures.

Respiratory Protection: For unknown concentrations, fire fighting, or high concentrations (above 10 ppm), a self-contained breathing apparatus (SCBA) with full facepiece (or the equivalent).

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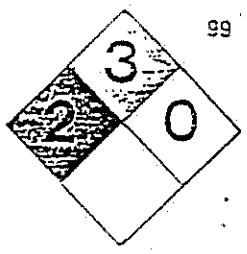
BENZENE
Flammable Liquid



FIRST AID

Nonspecific symptoms: Irritation of the eyes or skin; other symptoms of inhalation or ingestion.
First Aid for Inhalation: Remove victim to fresh air and keep warm and at rest. If breathing becomes difficult or if breathing has stopped, administer artificial respiration. Get medical attention immediately. (Caution: Administration of mouth-to-mouth resuscitation may expose the first aid provider to chemical within the victim's lungs or vomit.) Do not give adrenalin.
First Aid for Skin and Eye Contact: Flush eyes immediately with water for at least 15 minutes, occasionally lifting the eyelids. Remove all contaminated clothing. Wash affected body areas with large amounts of soap and water. Get medical attention if irritation persists after washing.
First Aid for Ingestion: Do not induce vomiting. Keep victim warm and at rest. Get medical attention immediately.

FIRE RESPONSE

Extinguishing Materials: Foam, dry chemical, carbon dioxide, water spray or fog. Water may be ineffective.
Extinguishing Techniques: Stay upwind. Avoid all bodily contact. Wear breathing apparatus and appropriate protective clothing. Move container from fire area if no risk. Do not extinguish burning cargo unless flow can be stopped safely. Be alert to the possibility that the container may tear or rupture and suddenly release massive amounts of product when exposed to high heat (over 800°F), such as from a direct flame. Use water from side and from safe distance to keep fire exposed containers cool. For massive fire in cargo area, use unmanned hose holder or monitor nozzles. Withdraw immediately in case of rising sound from venting safety device or discoloration of tank.

SPILL RESPONSES

General Information: Restrict access to area. Keep unprotected personnel upwind of spill area. Avoid contact with spilled product. Eliminate ignition sources. Prevent liquid from entering sewers and confined spaces. Protect sewers and waterways from contaminated runoff. Notify proper authorities, downstream sewer and water treatment operations, and other downstream users of potentially contaminated water. Use explosion-proof equipment where necessary. Choose equipment, where possible, that is not corroded or otherwise damaged by the spilled product. Take into account while planning the response that benzene is a fairly volatile, toxic, and flammable liquid.

AIR SPILL

TECHNIQUE

EVACUATION . . . Evacuate local and downwind areas as conditions warrant to prevent exposure and to allow vapors or fumes to dissipate. Benzene spills may expose downwind areas to toxic or flammable concentrations over considerable distances in some cases.

CONSEQUENCE

Need to notify, organize, transport and house displaced persons.

MITIGATION

Stop leak if without risk and if proper equipment available. Allow vapors and fumes to dissipate completely before reentering spill area without special protective gear. Consult qualified experts for assistance.

TECHNIQUE

WATER FOG OR SPRAY . . . Water fog or spray applied to benzene vapors or fumes may accelerate their dispersal in the atmosphere.

CONSEQUENCE

Water runoff may contain a small amount (if any) of benzene from contact with airborne vapors or fumes.

MITIGATION

Contain contaminated water and remove as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may add to spill volume and overfill impoundments.

BENZENE
Flammable Liquid

'HNIQUE

.M . . . Firefighting foam applied to the surface of liquid pools may slow the release of benzene vapors into the atmosphere.

CONSEQUENCE

The effects of foam may be short term. As the foam breaks down, release of vapors will increase. Products of foam breakdown will add to the volume of spilled material.

MITIGATION

Continue foam applications until spilled product is removed. Contain increased volume.

LAND SPILL

TECHNIQUE

CONTAINMENT DIKES . . . Benzene may be contained by building dikes or barriers using soil, sand or other materials.

CONSEQUENCE

Contained benzene may percolate into soil or seep through dike material. This may result in loss of contained product and spread of contamination.

MITIGATION

Remove contained product as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may overfill impoundments. Where possible, line collection basins with compatible impervious material.

TECHNIQUE

EXCAVATION . . . A trench or ditch may be excavated to contain leaking product.

CONSEQUENCE

There may be increased potential for groundwater contamination in some cases.

MITIGATION

Remove contained products as soon as possible to prevent spread of contamination. Use surface dikes or barriers where groundwater contamination is possible or line collection basin with compatible impervious material.

INIQUE

.PING/VACUUM SUCTION . . . Accumulated liquid pools may be recovered using appropriate hoses, pumps and storage containers or vacuum trucks.

CONSEQUENCE

Equipment that is incompatible with the spilled product may become damaged or develop leaks.

MITIGATION

Use equipment compatible with spilled product.

TECHNIQUE

ABSORPTION . . . Spreading of spilled product may be controlled by absorbing liquid with sand, earth, clay, fly ash, cement powder, peat moss, saw dust, straw, commercial sorbents, or other compatible substances.

CONSEQUENCE

Once used, sorbent materials pose the same hazards as the spilled product. Their use adds to the overall volume of contaminated material.

MITIGATION

Deplete accumulated liquid pools with pumps or vacuum trucks if possible before applying sorbents. Remove contaminated sorbents to safe storage by mechanical means.

TECHNIQUE

MECHANICAL REMOVAL . . . Contaminated soil and any remaining chemical residue may be removed with shovels or motorized graders, scrapers, loaders, bulldozers, or draglines.

CONSEQUENCE

Removal equipment may become contaminated and present a hazard to later users. Incompatible equipment may be damaged or corroded. Improper storage of removed materials may result in future spread of contamination. Any flammable vapors or gases present in the area may be ignited by motorized removal equipment.

MITIGATION

Decontaminate all equipment after use. Use equipment compatible with spilled product. Store contaminated materials in a safe and secure location. Do not operate motorized equipment in potentially flammable atmospheres. Consult qualified experts for advice where necessary.

BENZENE
Flammable Liquid

WATER SPILL

TECHNIQUE

STOP USE . . . Notify downstream industrial, municipal, and public users to stop water intake or to monitor water for contamination.

CONSEQUENCE

Alternative water supplies may be needed to accommodate users.

MITIGATION

Provide alternative water supplies as needed until water supply is declared safe.

TECHNIQUE

FLOATING BOOMS/BARRIERS . . . Oil spill containment booms of compatible material may be deployed. Alternatively, mesh or nets may be strung across stream and anchored every 6-8 feet. Straw or peat placed on upstream side of mesh should absorb and retard spreading of spilled product.

CONSEQUENCE

Leakage may occur under or through barrier if high waves or current present or if not properly deployed. Incompatible materials may be damaged by spilled product. Booms, barrier materials, and deployment equipment may be contaminated. Fire hazards pose risk to response personnel and equipment.

MITIGATION

Proceed with caution. Stage barriers in series where necessary. Recover spilled product as soon as possible. Decontaminate equipment after use. Dispose of waste materials in proper and safe manner. Use compatible equipment. Eliminate ignition sources.

TECHNIQUE

WATER BY-PASS DAMS . . . Streams may be provided with a by-pass dam. This is a dam made of compacted earth, clay, or other material with open tubes or pipes passing through the dam under water. Upstream ends of pipes or tubes should be well below the layer of floating contaminant. Downstream ends should be at a higher elevation but still below the floating layer. Valves may be installed on downstream ends to control water flow.

CONSEQUENCE

Earthen dams may become saturated with water and seep through or collapse. An insufficient number of by-pass tubes or pipes or additional water may cause overflow.

MITIGATION

Use sufficient number and capacity of tubes or pipes. Be alert to conditions that may lead to dam overflow or collapse. Remove spilled product as soon as possible.

TECHNIQUE

DIVERSION . . . Where other means are unavailable, floating slicks may be temporarily herded, diverted, or controlled using water hose streams, small boat propeller wash or chemical surface tension modifiers known as spill herders.

CONSEQUENCE

Hose streams and propeller washes have limited applicability and effectiveness. The latter may cause undesired mixing of spilled product and water due to extreme agitation. Chemical spill herders should not be used until approval is obtained from authorized environmental officials.

MITIGATION

Use other means if available.

TECHNIQUE

SURFACE SKIMMING . . . Oil spill skimming devices may be deployed to recover floating benzene.

CONSEQUENCE

Incompatible equipment may be damaged. Equipment may be contaminated and pose hazard to future users. Fire hazard may pose risk to response personnel and equipment.

MITIGATION

Decontaminate equipment after use. Use compatible equipment. Store recovered product in safe and secure location. Eliminate ignition sources.

BENZENE
Flammable Liquid

TECHNIQUE

ABSORPTION . . . Straw, hay, peat, or commercial sorbent materials compatible with benzene may be used to absorb spilled product from the water surface, preferably after the spill has been contained.

CONSEQUENCE

Once used, sorbent materials pose the same hazards as the spilled product. Their use adds to the overall volume of contaminated material. Deployment and recovery can be difficult. Fire hazards pose risk to response personnel and equipment.

MITIGATION

Proceed with caution. Decontaminate equipment after use. Store and dispose of waste materials in proper and safe manner. Use compatible equipment. Eliminate ignition sources.

TECHNIQUE

CONTAINMENT DIKES . . . Water with dissolved chemical may be contained for diverted to impoundment area by diking upper and or lower bounds to limit volume of water affected and spread of contamination.

CONSEQUENCE

Earthen dikes may become saturated with water and seep through or collapse. Additional water may cause overflow of diked area or water body boundaries.

MITIGATION

Reinforce or modify dikes as necessary. Be alert to conditions that may lead to overflow or dike collapse. Remove contaminated water to impoundment or storage area for later treatment or disposal.

TECHNIQUE

ADSORPTION . . . Addition of activated carbon to the contaminated water, followed by effective mixing, may capture spilled product that has dissolved in water. Adsorbent materials may later be removed by mechanical means.

CONSEQUENCE

Recovery of activated carbon may require dredging in a process that poses risk of environmental damage. Recovered adsorbent materials will be contaminated with spilled product, as may recovery equipment.

MITIGATION

Consult qualified experts for safe adsorption techniques. Consider pumping water through tank containing adsorbent on land. Handle and store recovered materials safely. Decontaminate equipment as necessary.

TECHNIQUE

AERATION . . . Water containing dissolved volatile chemicals may be decontaminated to some degree by aeration, air stripping, or air sparging techniques. These involve the use of air compressors and perforated piping to bubble large quantities of air through the contaminated water body.

CONSEQUENCE

The air bubbles entering the atmosphere will be contaminated with some amount of chemical vapors if the technique is effective.

MITIGATION

Consult qualified experts for advice and assistance in obtaining and deploying necessary equipment. Apply alternative techniques where air emissions may pose a downwind hazard.

TOLUENE
Flammable Liquid
RQ 1000 Lb/454 Kg*

GENERAL INFORMATION

Toluene is a colorless aromatic hydrocarbon liquid with a pungent pleasant odor resembling benzene or model glue. It is used as a solvent, is a common component of hydrocarbon fuels, and is a raw material for making explosives, dyes, benzene, and various other organic chemicals. It is very slightly soluble in water and lighter, so may be expected to form a floating surface slick that dissolves at a very slow rate. Its flash point of 40°F indicates that the product can be easily ignited under a wide variety of ambient temperature conditions. Vapors are somewhat heavier than air at warmer temperatures and may travel some distance to a source of ignition and flash back. Accumulations of vapor in confined spaces such as buildings or sewers may explode if ignited. Containers have some limited potential to rupture violently if exposed to fire or excessive heat for sufficient time duration. The product weighs approximately 7.2 pounds per gallon.

Toluene does not react with water or many other common materials and is stable in normal transportation. It is primarily incompatible with strong oxidizers that may cause its ignition. Although it is relatively noncorrosive to most metals, the liquid may attack some forms of plastics, rubber, and coatings. Toxicity is low to moderate via the various potential routes of exposure. Products of combustion may include toxic constituents.

CHEMICAL PHYSICAL DATA

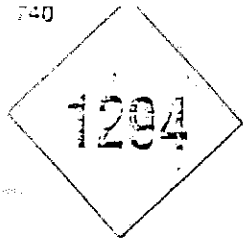
Solubility in Water: Barely soluble, 0.05 g/100 g water at 68°F (20°C)
Solubility in Other Chemicals: Soluble in acetic acid, acetone, alcohol, benzene, ether, ligroin, and other hydrocarbons.
Specific Gravity (Liquid): 0.867 at 68°F (20°C)
Boiling Point: 231.1°F (110.6°C) at 1 atm.
Melting Point: −139°F (−95°C)
Freezing Point: −139°F (−95°C)
Molecular Weight: 92.14
Heat of Combustion: −9686 cal/g
Vapor Pressure: 22 mm Hg (0.425 psia) at 68°F (20°C)
Flash Point: 40°F (4.4°C), closed cup; 55°F (12.8°C), open cup.
Autoignition Temperature: 997°F (536°C)
Burning Rate: 5.7 mm/minute
Stability: Stable.
Corrosiveness: May attack some plastics, rubber, and coatings; noncorrosive to most metals.
Reactivity with Water: No reaction
Reactivity with Other Chemicals: Reacts with strong oxidizing materials.

IDENTIFICATION

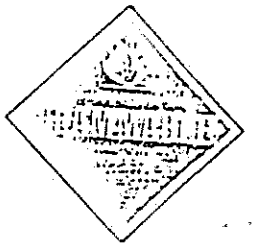
Shipping Names: Toluene (USDOT and IMO)
Synonyms and Tradenames: Methylbenzene; methylbenzol; phenylmethane; toluol; methacide.
Chemical Formula: $C_6H_5CH_3$
Constituent Components(% each): 94% or more pure (typically) with remainder xylene, some benzene, and other hydrocarbons.
49 STCC: 49 093 05
UN/NA Designation: UN1294
IMO Designation: 3.2, flammable liquid
Physical State as Shipped: Liquid
Physical State as Released: Liquid
Color of the Shipped Material: Colorless
Odor Characteristics: Pungent, pleasant, aromatic, like benzene or model glue.
Common Uses: Solvent in paints, coatings, lacquers, glues, and other products; hydrocarbon fuel component; mfg. of explosives, dyes, benzene, and other organic chemicals.

*Reportable quantity (RQ) subject to change—refer to current EPA regulations.

FOR ADDITIONAL ASSISTANCE OR INFORMATION CALL:
CHEMTREC (800)424-9300 OR (202)483-7616 OR
THE AAR BUREAU OF EXPLOSIVES (202)835-9500



TOLUENE
Flammable Liquid



POTENTIAL HAZARDS

GENERAL HAZARDS

Threshold Odor Concentration: 0.17-40 ppm; reported values vary.
Unusual Hazards: Somewhat volatile flammable hydrocarbon with heavier than air vapors that may travel to a source of ignition at warmer temperatures.
Short Term Exposure Limits(STEL): (Skin) 150 ppm for 15 minutes. (ACGIH)
Time Weighted Average(TLV-TWA): (Skin) 100 ppm over each 8 hours of a 40 hour work week.(ACGIH)
Conditions to Avoid: Heat, fire, or sparks; contact with incompatible materials; runoff to sewers or water bodies; inhalation, ingestion, or direct physical contact.

HEALTH HAZARDS

Public Health Hazards: Major hazard is from inhalation of high vapor concentrations that may be present in the spill area and immediately downwind. Ingestion and direct contact should also be avoided. Be alert to hazards of any benzene (see separate guide) that may be present.
Hazards of Skin or Eye Contact: Repeated or prolonged contact with liquid toluene may cause drying, cracking, and inflammation of the skin due to the defatting action of the product. Some amount may be absorbed through the skin. Contact with the eyes may cause irritation and temporary corneal injury.
Hazards of Inhalation: Vapors of toluene may cause irritation of the eyes, mucous membranes, and upper respiratory tract. High concentrations may cause narcosis and central nervous system depression with symptoms including fatigue, weakness, confusion, headache, dizziness, drowsiness, incoordination, peculiar skin sensation or numbness, unconsciousness, and possibly death. Exposure to only 200 ppm for 8 hours may cause mild fatigue, weakness, and confusion.
Hazards of Ingestion: Ingestion in significant amounts may result in vomiting, diarrhea, griping, depressed respiration, and possibly death. Aspiration into the lungs during vomiting may cause gagging, coughing, distress, and rapidly developing pulmonary edema with possibly severe consequences.

E HAZARDS

...er Flammable Limit: 1.27-1.4%
Upper Flammable Limit: 6.7-7.0%
Behavior in Fire: Flammable liquid. There is some limited potential that containers may rupture violently in fire. May generate significant quantities of flammable vapors upon release. Vapors may be heavier than air and may travel to a source of ignition and flash back.
Hazardous Combustion Products: Not well-defined, may include toxic constituents.

EXPLOSION HAZARDS

Lower Explosive Limit: Unavailable
Upper Explosive Limit: Unavailable
Explosiveness: There is some limited potential that containers may rupture violently in fire. Explosion may result if vapors are ignited in a confined area.

PROTECTIVE CLOTHING AND EQUIPMENT

Protective Clothing Required: Equipment should prevent repeated or prolonged skin contact and any reasonable probability of eye contact with the spilled product. This may include rubber boots, gloves, face shields, splash-proof safety goggles, and other impervious and resistant clothing. Compatible materials may include polyurethane, polyvinyl alcohol, Viton, nitrile-butadiene rubber, Saranex, and fluorine/chloroprene.
Respiratory Protection: For unknown concentrations, fire fighting, or high concentrations (above 2000 ppm), a self-contained breathing apparatus (SCBA) with full facepiece (or the equivalent). For lesser concentrations, a gas mask with chin-style or front or back mounted organic vapor canister (2000 ppm or less) or an organic vapor cartridge respirator with a full facepiece (1000 ppm or less) within the use limitations of these devices.

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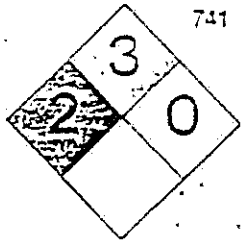
TOLUENE
Flammable Liquid



FIRST AID

Nonspecific symptoms: Irritation of the eyes, skin, mucous membranes, or respiratory tract; other symptoms of exposure.

First Aid for Inhalation: Remove victim to fresh air and keep warm and at rest. If breathing becomes difficult or if breathing has stopped, administer artificial respiration. Get medical attention immediately. (Caution: Administration of mouth-to-mouth resuscitation may expose the first aid provider to chemical within the victim's lungs or vomit.)

First Aid for Skin and Eye Contact: Flush eyes immediately with water for at least 15 minutes, occasionally lifting the eyelids. Remove all contaminated clothing. Wash affected body areas with large amounts of soap and water. Get medical attention if irritation persists after washing.

First Aid for Ingestion: Do not induce vomiting. Keep victim warm and at rest. Get medical attention immediately.

FIRE RESPONSE

Extinguishing Materials: Carbon dioxide, dry chemical, foam, water spray. Water may be ineffective.

Extinguishing Techniques: Stay upwind. Avoid all bodily contact. Wear breathing apparatus and appropriate protective clothing. Move container from fire area if no risk. Do not extinguish burning cargo unless flow can be stopped safely. Be alert to the possibility that the container may tear or rupture and suddenly release massive amounts of product when exposed to high heat (over 300°F), such as from a direct flame. Use water from side and from safe distance to keep fire exposed containers cool. For massive fires in cargo area, use unmanned hose holder or monitor nozzles. Withdraw immediately in case of rising sound from venting safety device or discoloration of tank.

SPILL RESPONSES

General Information: Proceed with caution. Restrict access to area. Keep unprotected personnel upwind of spill area. Avoid contact with spilled product. Eliminate ignition sources. Prevent liquid from entering sewers and confined spaces. Protect sewers and waterways from contaminated runoff. Notify proper authorities, downstream sewer and water treatment operations, and other downstream users of potentially contaminated water. Note that intake of toluene may result in rupture or explosion of boilers or industrial process equipment. Use explosion-proof equipment where necessary. Choose equipment, where possible, that is not corroded or otherwise damaged by the spilled product. Take the volatility and flammability of toluene into account while planning the response.

AIR SPILL

TECHNIQUE

EVACUATION . . . Evacuate local and downwind areas as conditions warrant to prevent exposure and to allow vapors or fumes to dissipate. Toluene spills may expose downwind areas to toxic or flammable concentrations over considerable distances, particularly if large quantities have spilled in warm weather.

CONSEQUENCE

Need to notify, organize, transport and house displaced persons.

MITIGATION

Stop leak if without risk and if proper equipment available. Allow vapors and fumes to dissipate completely before reentering spill area without special protective gear. Consult qualified experts for assistance.

TECHNIQUE

MONITOR THE SITUATION . . . Toluene may not evolve large amounts of hazardous airborne contaminants in many outdoor spill situations. It may be advisable in some cases to simply monitor the situation until the spilled product is removed, particularly for small spills or in cold weather.

CONSEQUENCE

Hazardous levels of toluene in air may be found in the local spill area and immediately downwind.

MITIGATION

Remove the spilled product as soon as possible. Restrict access to the local spill area and areas immediately downwind by unprotected personnel.

TOLUENE
Flammable Liquid

TECHNIQUE

WATER FOG OR SPRAY . . . Water fog or spray applied to toluene vapors or fumes may accelerate their dispersal in the atmosphere.

CONSEQUENCE

Water runoff may contain a small amount (if any) of toluene from contact with airborne vapors or fumes.

MITIGATION

Contain contaminated water and remove as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may add to spill volume and overfill impoundments.

TECHNIQUE

FOAM . . . Firefighting foam applied to the surface of liquid pools may slow the release of toluene vapors into the atmosphere.

CONSEQUENCE

The effects of foam may be short term. As the foam breaks down, release of vapors will increase. Products of foam breakdown will add to the volume of spilled material.

MITIGATION

Continue foam applications until spilled product is removed. Contain increased volume.

LAND SPILL

TECHNIQUE

CONTAINMENT DIKES . . . Toluene may be contained by building dikes or barriers using soil, sand or other materials.

CONSEQUENCE

Contained toluene may percolate into soil or seep through dike material. This may result in loss of contained product and spread of contamination.

MITIGATION

Remove contained product as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may overfill impoundments. Where possible, line collection basins with compatible impervious material.

TECHNIQUE

EXCAVATION . . . A trench or ditch may be excavated to contain leaking product.

CONSEQUENCE

There may be increased potential for groundwater contamination in some cases.

MITIGATION

Remove contained products as soon as possible to prevent spread of contamination. Use surface dikes or barriers where groundwater contamination is possible or line collection basin with compatible impervious material.

TECHNIQUE

PUMPING/VACUUM SUCTION . . . Accumulated liquid pools may be recovered using appropriate hoses, pumps and storage containers or vacuum trucks.

CONSEQUENCE

Equipment that is incompatible with the spilled product may become damaged or develop leaks.

MITIGATION

Use equipment compatible with spilled product.

TECHNIQUE

ABSORPTION . . . Spreading of spilled product may be controlled by absorbing liquid with sand, earth, clay, fly ash, cement powder, peat moss, saw dust, straw, commercial sorbents, or other compatible substances.

CONSEQUENCE

Once used, sorbent materials pose the same hazards as the spilled product. Their use adds to the overall volume of contaminated material.

MITIGATION

Deplete accumulated liquid pools with pumps or vacuum trucks if possible before applying sorbents. Remove contaminated sorbents to safe storage by mechanical means.

TOLUENE
Flammable Liquid

TECHNIQUE

MECHANICAL REMOVAL . . . Contaminated soil and any remaining chemical residue may be removed with shovels or motorized graders, scrapers, loaders, bulldozers, or draglines.

CONSEQUENCE

Removal equipment may become contaminated and present a hazard to later users. Incompatible equipment may be damaged or corroded. Improper storage of removed materials may result in future spread of contamination. Any flammable vapors or gases present in the area may be ignited by motorized removal equipment.

MITIGATION

Decontaminate all equipment after use. Use equipment compatible with spilled product. Store contaminated materials in a safe and secure location. Do not operate motorized equipment in potentially flammable atmospheres. Consult qualified experts for advice where necessary.

WATER SPILL

TECHNIQUE

STOP USE . . . Notify downstream industrial, municipal, and public users to stop water intake or to monitor water for contamination.

CONSEQUENCE

Alternative water supplies may be needed to accommodate users.

MITIGATION

Provide alternative water supplies as needed until water supply is declared safe.

TECHNIQUE

FLOATING BOOMS/BARRIERS . . . Oil spill containment booms of compatible material may be deployed. Alternatively, mesh or nets may be strung across stream and anchored every 6-8 feet. Straw or peat placed on upstream side of mesh should absorb and retard spreading of spilled product.

CONSEQUENCE

Leakage may occur under or through barrier if high waves or current present or if not properly deployed. Incompatible materials may be damaged by spilled product. Booms, barrier materials, and deployment equipment may be contaminated. Fire hazards pose risk to response personnel and equipment.

MITIGATION

Proceed with caution. Stage barriers in series where necessary. Recover spilled product as soon as possible. Decontaminate equipment after use. Dispose of waste materials in proper and safe manner. Use compatible equipment. Eliminate ignition sources.

TECHNIQUE

WATER BY-PASS DAMS . . . Streams may be provided with a by-pass dam. This is a dam made of compacted earth, clay, or other material with open tubes or pipes passing through under water. Upstream ends of pipes or tubes should be well below the layer of floating contaminant. Downstream ends should be at a higher elevation but still below the floating layer. Valves may be installed on downstream ends to control water flow.

CONSEQUENCE

Earthen dams may become saturated with water and seep through or collapse. An insufficient number of by-pass tubes or pipes or additional water may cause overflow.

MITIGATION

Use sufficient number and capacity of tubes or pipes. Be alert to conditions that may lead to dam overflow or collapse. Remove spilled product as soon as possible.

TECHNIQUE

DIVERSION . . . Where other means are unavailable, floating slicks may be temporarily herded, diverted, or controlled using water hose streams, small boat propeller wash or chemical surface tension modifiers known as spill herders.

CONSEQUENCE

Hose streams and propeller washes have limited applicability and effectiveness. The latter may cause undesired mixing of spilled product and water due to extreme agitation. Chemical spill herders should not be used until approval is obtained from authorized environmental officials.

MITIGATION

Use other means if available.

TOLUENE
Flammable Liquid

TECHNIQUE

SURFACE SKIMMING . . . Oil spill skimming devices may be deployed to recover floating toluene.

CONSEQUENCE

Incompatible equipment may be damaged. Equipment may be contaminated and pose hazard to future users. Fire hazard may pose risk to response personnel and equipment.

MITIGATION

Decontaminate equipment after use. Use compatible equipment. Store recovered product in safe and secure location. Eliminate ignition sources.

TECHNIQUE

ABSORPTION . . . Straw, hay, peat, or commercial sorbent materials compatible with toluene may be used to absorb spilled product from the water surface, preferably after the spill has been contained.

CONSEQUENCE

Once used, sorbent materials pose the same hazards as the spilled product. Their use adds to the overall volume of contaminated material. Deployment and recovery can be difficult. Fire hazards pose risk to response personnel and equipment.

MITIGATION

Proceed with caution. Decontaminate equipment after use. Store and dispose of waste materials in proper and safe manner. Use compatible equipment. Eliminate ignition sources.

TECHNIQUE

CONTAINMENT DIKES . . . Water with dissolved chemical may be contained (or diverted to impoundment area) by diking upper and/or lower bounds to limit volume of water affected and spread of contamination.

CONSEQUENCE

Earthen dikes may become saturated with water and seep through or collapse. Additional water may cause overflow of diked area or water body boundaries.

MITIGATION

Reinforce or modify dikes as necessary. Be alert to conditions that may lead to overflow or dike collapse. Remove contaminated water to impoundment or storage area for later treatment or disposal.

TECHNIQUE

ADSORPTION . . . Addition of activated carbon or peat moss to the contaminated water, followed by effective mixing, may capture spilled product that has dissolved in water. Adsorbent materials may later be removed by mechanical means.

CONSEQUENCE

Recovery of activated carbon may require dredging in a process that poses risk of environmental damage. Recovered adsorbent materials will be contaminated with spilled product, as may recovery equipment.

MITIGATION

Consult qualified experts for safe adsorption techniques. Consider pumping water through tank containing adsorbent on land. Handle and store recovered materials safely. Decontaminate equipment as necessary.

TECHNIQUE

AERATION . . . Water containing dissolved volatile chemicals may be decontaminated to some degree by aeration, air stripping, or air sparging techniques. These involve the use of air compressors and perforated piping to bubble large quantities of air through the contaminated water body.

CONSEQUENCE

The air bubbles entering the atmosphere will be contaminated with some amount of chemical vapors if the technique is effective.

MITIGATION

Consult qualified experts for advice and assistance in obtaining and deploying necessary equipment. Apply alternative techniques where air emissions may pose a downwind hazard.

XYLENE
Flammable Liquid
RQ 1000 Lb/454 Kg*

GENERAL INFORMATION

Commercially available xylene is typically a mixture of three isomeric forms called ortho-, meta-, and para-xylene, with the meta– isomer usually being predominant. All are colorless aromatic hydrocarbon liquids with an odor resembling benzene or gasoline. The mixture is widely used as a solvent and for making pharmaceuticals, epoxy resins, perfumes, insect repellants, dyes, and a variety of other chemicals and products. It is almost completely insoluble in water and lighter, so may be expected to form a floating surface slick. Flash points ranging from 63-84°F for the various isomers indicate that the mixture can be easily ignited at warm ambient temperatures. Vapors may be slightly heavier than air at these or higher temperatures and may travel some distance to a source of ignition and flash back. Accumulations of vapor in buildings or sewers may explode if ignited. There is some limited potential for containers to rupture violently if exposed to fire or excessive heat for sufficient time duration. The isomers weigh approximately 7.2-7.3 pounds per gallon.

Xylenes do not react with water or many other common materials and are stable in normal transportation. They are primarily incompatible with strong oxidizers that may cause their ignition. Although they are noncorrosive to most metals, they may attack some forms of plastics, rubber, and coatings. Toxicity is generally low to moderate via the various routes of exposure. Products of combustion may include toxic constituents.

CHEMICAL/PHYSICAL DATA

Solubility in Water: Insoluble, 0.00003 g/100 g water at 68°F (20°C)
Solubility in Other Chemicals: Soluble in carbon tetrachloride, alcohol, ether, petroleum ether, and organic solvents.
Specific Gravity (Liquid): 0.861-0.880 at 68°F (20°C)
Boiling Point: 269.4-291.9°F (131.9-144.4°C) at 1 atm
Melting Point: 55.9°F (13.3°C) for para–
Freezing Point: −54.2°F (−47.9°C) for meta–; −13.3°F (−25.2°C) for ortho–
Molecular Weight: 106.16
Heat of Combustion: −9752 to −9755 cal/g
Vapor Pressure: 7-9 mm Hg (0.135-0.174 psia) at 68°F (20°C)
Flash Point: 63°F (17.2°C) for ortho–; 81°F (27.2°C) for para–; 84°F (28.9°C) for meta–; all closed cup
Autoignition Temperature: 867-984°F (464-529°C)
Burning Rate: 5.8 mm/minute
Stability: Stable
Corrosiveness: Noncorrosive to most metals; may attack some plastics, rubber, and coatings.
Reactivity with Water: No reaction
Reactivity with Other Chemicals: Reacts with strong oxidizers.

IDENTIFICATION

Shipping Names: Xylene (USDOT); xylenes (IMO)
Synonyms and Tradenames: Xylol; o-xylene, ortho-xylene, 1,2-dimethylbenzene; m-xylene, meta-xylene, 1,3-dimethylbenzene; p-xylene, para-xylene, 1,4-dimethylbenzene.
Chemical Formula: $C_6H_4(CH_3)_2$
Constituent Components(% each): Commercial mixtures contain small amounts ethylbenzene, toluene, trimethylbenzene, phenol, thiophene, pyridine, and other nonaromatic hydrocarbons.
49 STCC: 49 093 50 (mixture); 49 093 51 (para–)
UN/NA Designation: UN1307
IMO Designation: 3.2 or 3.3, flammable liquid
Physical State as Shipped: Liquid
Physical State as Released: Liquid (pure para– freezes at 55.9°F)
Color of the Shipped Material: Colorless
Odor Characteristics: Aromatic, characteric, sweet, like benzene or gasoline
Common Uses: Solvent in paints, lacquers, varnishes, inks, dyes, adhesives, cements, cleaning fluids; fuel component; mfg. dyes, insecticides, resins and fibers, pharmaceuticals, quartz crystal oscillators, perfumes, insect repellants, leather, and numerous other chemicals.

*Reportable quantity (RQ) subject to change—refer to current EPA regulations.

FOR ADDITIONAL ASSISTANCE OR INFORMATION CALL:
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THE AAR BUREAU OF EXPLOSIVES (202)835-9500

V. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method)	Not applicable	AUTOIGNITION TEMPERATURE	Not applicable
FLAMMABLE LIMITS IN AIR, % by volume	LOWER: Not applicable	UPPER	Not applicable

EXTINGUISHING MEDIA: Vigorously accelerates combustion. Use media appropriate for surrounding fire. Water is generally considered the preferred extinguishing media for clothing fires.

SPECIAL FIRE FIGHTING PROCEDURES: Evacuate all personnel from danger area. Immediately cool containers with water spray from maximum distance until cool, then move containers away from fire area if without risk.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Oxidizing agent, vigorously accelerates combustion. Contact with flammable materials may cause fire or explosion. Container may rupture due to heat of fire. No part of a container should be subjected to a temperature higher than 52°C (approximately 125°F). Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature. Smoking, flames and electric sparks in the presence of enriched oxygen atmospheres are potential explosion hazards.

VI. REACTIVITY DATA

STABILITY	
UNSTABLE	STABLE
	X

CONDITIONS TO AVOID: See Section IX.

INCOMPATIBILITY (materials to avoid): Combustible materials, asphalt, flammable materials, especially oils and greases.

HAZARDOUS DECOMPOSITION PRODUCTS: None.

HAZARDOUS POLYMERIZATION	
May Occur	Will not Occur
	X

CONDITIONS TO AVOID: None currently known.

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Shut off leak if without risk. Ventilate area of leak or move leaking container to well-ventilated area. Remove all flammable materials from vicinity. Oxygen must never be permitted to strike an oily surface, greasy clothes, or other combustible material.

WASTE DISPOSAL METHOD: Slowly release into atmosphere, in an open, outdoors area. Remove all flammable materials from vicinity.

VIII. SPECIAL PROTECTION INFORMATION

SPIRATORY PROTECTION (specify type): Not required

VENTILATION

LOCAL EXHAUST — Not applicable

MECHANICAL (general) — Acceptable

SPECIAL — Not applicable

OTHER — Not applicable.

PROTECTIVE GLOVES: Preferred for cylinder handling.

EYE PROTECTION: Select in accordance with OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133.

IX. SPECIAL PRECAUTIONS

WARNING: High pressure gas. Vigorously accelerates combustion. Avoid contact with oils, greases and other flammable materials. Never use manifolds for oxygen cylinders unless specifically designed for such use. Use only with equipment conditioned for oxygen service. Use piping and equipment adequately designed to withstand pressures to be encountered. Protect container against physical damage. Isolate from combustible gas installations and combustible materials by acequate distance or by gas-tight, fire-resistive barriers. Protect against over-heating. Never use an oxygen jet for cleaning purposes of any sort, especially clothing, as it increases the likelihood of an enguifing fire. Note: Reverse flow into cylinder may cause rupture. Use a check valve or other protective apparatus in any line or piping from the cylinder to prevent reverse flow.

MIXTURES: When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death. Be sure to read and understand all labels and other instructions supplied with all containers of this product.

NOTE: Compatibility with plastics should be confirmed prior to use. For safety information on general handling of compressed gas cylinders, obtain a copy of pamphlet P-1, "Safe Handling of Compressed Gases in Containers" from the Compressed Gas Association Inc., 1235 Jefferson Davis Highway, Arlington, VA 22202.

OTHER HANDLING AND STORAGE CONDITIONS: Never work on a pressurized system. If there is a leak, close the cylinder valve blow down the system by venting to a safe place, then repair the leak. Never lubricate oxygen valves, regulators, etc., with any combustible substance.

The opinions expressed herein are those of qualified experts within Union Carbide. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and these opinions and the conditions of use of the product are not within the control of Union Carbide, it is the user's obligation to determine the conditions of safe use of the product.

LINDE
UNION CARBIDE

GENERAL OFFICES

IN THE USA
Union Carbide Corporation
Linde Division
39 Old Ridgebury Road
Danbury, CT 06817-0001

IN CANADA
Union Carbide Canada Limited
Linde Division
123 Eglinton Avenue East
Toronto, Ontario M4P 1J3

Other offices in principal cities all over the world.

MATERIAL SAFETY DATA SHEET

An explanation of the terms used herein may be found in OSHA 29 CFR 1910.1200, available from OSHA regional or area offices
(Similar to U.S. Department of Labor Form OMB No. 1218-0072
and generally accepted in Canada for information purposes)
Do Not Duplicate This Form. Request an Original.

LINDE UNION CARBIDE

I. PRODUCT IDENTIFICATION

PRODUCT	Nitrogen		
CHEMICAL NAME	Nitrogen	SYNONYMS	Not applicable
FORMULA	N_2	CHEMICAL FAMILY	Not applicable
		MOLECULAR WEIGHT	28.01
TRADE NAME	Nitrogen		

II. HAZARDOUS INGREDIENTS

For mixtures of this product request the respective component Material Safety Data Sheets. See Section IX.

MATERIAL (CAS NO.)	Wt (%)	1984-1985 ACGIH TLV-TWA (OSHA-PEL)
Nitrogen (7727-37-9)	100	Simple asphyxiant (None currently established)

III. PHYSICAL DATA

BOILING POINT, 760 mm. Hg	−195.8°C (−320.46°F)	FREEZING POINT	−210°C (−345.8°F)
SPECIFIC GRAVITY (H_2O = 1)	Gas	VAPOR PRESSURE AT 20°C	Gas
VAPOR DENSITY (air = 1)	0.967	SOLUBILITY IN WATER, % by wt.	Negligible
PERCENT VOLATILES BY VOLUME	100	EVAPORATION RATE (Butyl Acetate = 1)	Not applicable

APPEARANCE AND ODOR Colorless, odorless gas at normal temperature and pressure.

IV. EMERGENCY AND FIRST AID PROCEDURES

IN CASE OF EMERGENCIES involving this material, further information is available at all times:
In the USA 1-800-UCC-HELP (1-800-822-4357) In Canada 514-640-6400
For routine information contact your local supplier

Union Carbide Industrial Gases Inc. requests the users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

UNION CARBIDE INDUSTRIAL GASES INC.
LINDE DIVISION

ESHOLD LIMIT VALUE: See Section II.

EFFECTS OF SINGLE (ACUTE) OVEREXPOSURE:

SWALLOWING—This product is a gas at normal temperature and pressure.

SKIN ABSORPTION—No evidence of adverse effects from available information.

INHALATION—Asphyxiant. Moderate concentrations may cause headache, drowsiness, dizziness, excitation, excess salivation, vomiting, and unconsciousness. Lack of oxygen can cause death.

SKIN CONTACT—No harmful effect expected from vapor. Liquid may cause frostbite.

EYE CONTACT—No harmful effect expected from vapor.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: No evidence of adverse effects from available information.

OTHER EFFECTS OF OVEREXPOSURE: Contact with liquid may cause frostbite.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: The toxicology and the physical and chemical properties of the material do not suggest that overexposure is likely to aggravate existing medical conditions.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: None currently known.

EMERGENCY AND FIRST AID PROCEDURES:

SWALLOWING—This product is a gas at normal temperature and pressure.

SKIN CONTACT—For exposure to liquid, immediately warm frostbite area with warm water (not to exceed 105°F). In case of massive exposure, remove clothing while showering with warm water. Call a physician.

INHALATION—Remove to fresh air. Give artificial respiration if not breathing. Give oxygen if breathing is difficult. Call a physician.

EYE CONTACT—In case of splash contamination, immediately flush eyes thoroughly with water for at least 15 minutes. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN: There is no specific antidote. Treatment should be directed at the control of symptoms and the clinical condition.

NOTE: Suitability for use as a component in underwater breathing gas mixtures is to be determined by or under the supervision of personnel experienced in the use of underwater breathing gas mixtures and familiar with the effects, methods, frequency and duration of use, hazards, side effects and precautions to be taken.

FLASH POINT (test method)	Not applicable	AUTOIGNITION TEMPERATURE	Not applicable
FLAMMABLE LIMITS IN AIR, % by volume LOWER	Not applicable	UPPER	Not applicable

EXTINGUISHING MEDIA: Nitrogen cannot catch fire. Use media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: Evacuate all personnel from danger area. Immediately deluge containers with water spray from maximum distance until cool, then move containers away from fire area if without risk.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Gas cannot catch fire. Container may rupture due to heat of fire. No part of a container should be subjected to a temperature higher than 52°C (approximately 125°F). Most containers are designed to vent contents when they are exposed to elevated temperature.

STABILITY	
UNSTABLE	STABLE
	X

CONDITIONS TO AVOID: See Section IX.

INCOMPATIBILITY (materials to avoid): Under certain conditions, nitrogen can react violently with lithium, neodymium, titanium, ozone.

HAZARDOUS DECOMPOSITION PRODUCTS: None.

HAZARDOUS POLYMERIZATION	
May Occur	Will not Occur
	X

CONDITIONS TO AVOID: None currently known.

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Shut off leak if without risk. Ventilate area of leak or move leaking container to well-ventilated area. Test area, especially confined areas, for sufficient oxygen content prior to permitting re-entry of personnel.

WASTE DISPOSAL METHOD: Slowly release into atmosphere. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with Federal, state and local regulations.

RESPIRATORY PROTECTION (specify type): Select in accordance with OSHA 29 CFR 1910.134. Respirators shall be acceptable to OSHA and NIOSH.

VENTILATION	LOCAL EXHAUST — Preferred.
	MECHANICAL (general) — Acceptable.
	SPECIAL — Not applicable.
	OTHER — Not applicable.

PROTECTIVE GLOVES: Preferred for cylinder handling.

EYE PROTECTION: Select in accordance with OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133.

CAUTION: High pressure gas. Use piping and equipment adequately designed to withstand pressures to be encountered. Can cause rapid suffocation due to oxygen deficiency. Store and use with adequate ventilation. Close valve when not in use and when empty.

MIXTURES: When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death. Be sure to read and understand all labels and other instructions supplied with all containers of this product. For safety information of general handling of compressed gas cylinders, it is recommended that a copy of pamphlet P-1, "Safe Handling of Compressed Gases in Containers," be obtained from the Compressed Gas Association, Inc., 1235 Jefferson Davis Highway, Arlington, VA 22202.

OTHER HANDLING AND STORAGE CONDITIONS: Never work on a pressurized system. If there is a leak, close the cylinder valve, blow down the system by venting to a safe place, then repair the leak.

UNION CARBIDE INDUSTRIAL GASES INC.
LINDE DIVISION

IN USA: 39 Old Ridgebury Rd.
Danbury, CT 06817-0001

IN CANADA: 123 Eglinton Avenue East
Toronto, Ontario M4P 1J3

Other offices in principal cities all over the world.

MATERIAL SAFETY DATA SHEET

UNION CARBIDE

An explanation of the terms used herein may be found in OSHA 29 CFR 1910.1200, available from OSHA regional or area offices.
(Similar to U.S. Department of Labor Form OMB No. 1218-0072
and generally accepted in Canada for information purposes)
Do Not Duplicate This Form. Request an Original.

I. PRODUCT IDENTIFICATION

PRODUCT	Acetylene		
CHEMICAL NAME	Acetylene	SYNONYMS	Acetylen, Ethine, Ethyne, Narcylene
FORMULA	C_2H_2	CHEMICAL FAMILY	Alkyne
		MOLECULAR WEIGHT	26.038

TRADE NAME Acetylene (This product is intended for welding and cutting use.)

II. HAZARDOUS INGREDIENTS

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding and cutting with the normal use of this product are covered by Section VI. The term "hazardous" should be interpreted as a term required and defined in OSHA 29 CFR 1910.1200 and does not necessarily imply the existence of any hazard.

MATERIAL (CAS NO.)	Vol (%)	1986-1987 ACGIH TLV-TWA (OSHA-PEL)
Acetylene (74-86-2)	100	Simple asphyxiant (None currently established) Acetylene cylinders are filled with a porous material containing acetone into which the acetylene is dissolved. ACGIH has established a TLV-TWA of 750 ppm for acetone and a STEL of 1000 ppm.

III. PHYSICAL DATA

BOILING POINT, 760 mm. Hg	Not Applicable	SUBLIMATION POINT	-84°C (-119.2°F) @ 760mm Hg
SPECIFIC GRAVITY (H_2O = 1)	Not Applicable	VAPOR PRESSURE AT 21°C.	635 psig
VAPOR DENSITY (air = 1)	0.91	SOLUBILITY IN WATER, % by wt.	Slight
PERCENT VOLATILES BY VOLUME	100	EVAPORATION RATE (Butyl Acetate = 1)	Not Applicable

APPEARANCE AND ODOR Colorless gas at normal temperature and pressure; garlic-like odor.

EMERGENCY PHONE NUMBER

IN CASE OF EMERGENCIES involving this material, further information is available at all times:
In the USA 1-800-UCC-HELP (1-800-822-4357) In Canada 514-645-5311
For routine information contact your local supplier

Union Carbide requests the users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

UNION CARBIDE CORPORATION ☐ LINDE DIVISION
UNION CARBIDE CANADA LIMITED ☐ LINDE DIVISION

IV. HEALTH HAZARD DATA

ESHOLD LIMIT VALUE: Acetylene - Simple asphyxiant ACGIH 1986-87; Acetone, 750ppm ACGIH 1986-87

EFFECTS OF SINGLE (ACUTE) OVEREXPOSURE

SWALLOWING — An unlikely route of exposure, but frostbite of the lips and mouth may result from contact with the liquid. If the liquid is swallowed, may cause nausea.

SKIN ABSORPTION — No evidence of adverse effects from available information.

INHALATION — Asphyxiant. Moderate concentrations of vapor may cause headache, drowsiness, dizziness, nausea, vomiting, excitation, excess salivation, and unconsciousness.

SKIN CONTACT — No harmful effects expected from vapor. Liquid may cause frostbite.

EYE CONTACT — Vapor may cause irritation. Liquid may cause irritation and frostbite.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: No evidence of adverse effects from available information.

OTHER EFFECTS OF OVEREXPOSURE: None currently known.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: A knowledge of the available toxicology information and of the physical and chemical properties of the material suggest that overexposure is unlikely to aggravate existing medical conditions.

EMERGENCY AND FIRST AID PROCEDURES:

SWALLOWING — If liquid is swallowed, do not induce vomiting. Call a physician.

SKIN — For exposure to liquid, flush with water and warm frostbite area with warm water (not to exceed 105°F). In case of massive exposure, remove clothing while showering with warm water. Call a physician.

INHALATION — Remove to fresh air. If breathing has stopped, give artificial respiration; if breathing is difficult, oxygen may be given; call a physician.

EYES — In case of splash contamination, immediately flush eyes thoroughly with water for at least 15 minutes. Seek the advice a physician, preferably an ophthalmologist, urgently.

NOTES TO PHYSICIAN: Aspirated acetone may cause severe lung damage. If a large quantity of material has been swallowed, stomach contents should be evacuated quickly in a manner which avoids aspiration. Otherwise, treatment should be directed at the control of symptoms and the clinical condition. No specific antidote is known.

WORKING WITH WELDING AND CUTTING MAY CREATE ADDITIONAL HEALTH HAZARDS.

FUMES AND GASES can be dangerous to your health and may cause serious lung disease.*

Keep your head out of the fumes. Do not breathe fumes and gases caused by the process. Use enough ventilation, local exhaust, or both to keep fumes and gases from your breathing zone and the general area. The type and amount of fumes and gases depend on the equipment and supplies used. Possibly dangerous materials may be found in fluxes, coatings, gases, metals etc. Get a Material Safety Data Sheet (MSDS) for every material used. Air samples can be used to find out what respiratory protection is needed.

Short term overexposure to fumes may result in discomfort such as dizziness, nausea, or dryness or irritation of nose, throat, or eyes.

*NOTES TO PHYSICIAN:

Acute —Gases, fumes, and dusts may cause irritation to the eyes, lungs, nose, and throat. Some toxic gases associated with welding and related processes may cause pulmonary edema, asphyxiation, and death. Acute overexposure may include signs and symptoms such as watery eyes, nose and throat irritation, headache, dizziness, difficulty breathing, frequent coughing, or chest pains.

Chronic —Protracted inhalation of air contaminants may lead to their accumulation in the lungs, a condition which may be seen as dense areas on chest x-rays. The severity of change is proportional to the length of exposure. The changes seen are not necessarily associated with symptoms or signs of reduced lung function or disease. In addition, the changes on x-rays may be caused by non-work related factors such as smoking, etc.

A detailed description of the Health Hazards and their consequences may be found in Linde's free publication "Precautions and Safe Practices for Electric Welding and Cutting," L52-529. You may obtain copies from your local supplier, or by writing to Union Carbide Corporation, Linde Division, Communications Department, 39 Old Ridgebury Road, Danbury, Connecticut, 06817-0001.

TURES: When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, ipected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

V. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method)	-17.8°C (0°F) T.C.C.	AUTOIGNITION TEMPERATURE	299°C (571°F)
FLAMMABLE LIMITS IN AIR, % by volume	LOWER 2.3%	UPPER	100%

EXTINGUISHING MEDIA

See paragraphs below.

SPECIAL FIRE FIGHTING PROCEDURES

Refer to CGA pamphlet SB-4, "Handling Acetylene Cylinders in Fire Situations."

Evacuate all personnel from danger area. Immediately cool containers with water spray from maximum distance taking care not to extinguish flames. Remove ignition sources if without risk. If flames are accidentally extinguished, explosive re-ignition may occur. Use self-contained breathing apparatus. Stop flow of gas if without risk while contining cooling water spray. Remove all containers from area of fire if without risk. Allow fire to burn out. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Extremely flammable gas. Forms explosive mixtures with air and oxidizing agents. Container may rupture due to heat of fire. Do not extinguish flames due to possibility of explosive re-ignition. Flammable vapors may spread from leak. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with approved explosion meter. No part of a container should be subjected to a temperature higher than 52°C (approximately 125°F). All containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature. Contact with copper, silver, or mercury or their alloys or halogens can cause explosion and be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge or other ignition sources at locations distant from product handling point.

VI. REACTIVITY DATA

STABILITY	
UNSTABLE	STABLE
X	

CONDITIONS TO AVOID
Stable as shipped. Avoid use at pressures above 15 psig.

INCOMPATIBILITY (materials to avoid)
Copper, silver, mercury or their alloys, oxidizing agents, acids, halogens, moisture.

HAZARDOUS DECOMPOSITION PRODUCTS
Thermal decomposition or burning may produce CO/CO_2H_2. The welding and cutting process may form reaction products such as carbon monoxide and carbon dioxide. Other decomposition products of normal operation originate from the volatilization, reaction or oxidation of the material being worked.

HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID
May Occur	Will not Occur	Elevated temperature and pressure and/or the presence of a catalyst.
X		

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Forms explosive mixtures with air (See Section V). Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if without risk. Reduce vapors with fog or fine water spray. Shut off leak if without risk. Ventilate area of leak or move leaking container to well-ventilated area. Flammable gas may spread from leak. Before entering area, especially confined areas, check atmosphere with appropriate device.

WASTE DISPOSAL METHOD: Prevent waste from contaminating surrounding environment. Keep personnel away. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with Federal, State and local regulations.

VIII. SPECIAL PROTECTION INFORMATION

PIRATORY PROTECTION (specify type) — Use respirable fume respirator or air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select as per OSHA29 CFR1910.134

VENTILATION	LOCAL EXHAUST — Use enough ventilation, local exhaust or both, to keep the fumes and gases below TLV's in the worker's breathing zone and the general area. Train the worker to keep his head out of the fumes.	
	MECHANICAL (general)	ALWAYS WORK WITH ENOUGH VENTILATION
	SPECIAL	Not applicable
	OTHER Depends on specific use conditions, and location. Use adequate ventilation or personal respiratory protection. See Section IX and OSHA29 CFR1910.252.	
PROTECTIVE GLOVES		Welding gloves recommended

EYE PROTECTION — Wear goggles with filter lens selected as per ANSI Z49.1. Provide protective screens and goggles, if necessary, to protect others. Select as per OSHA29 CFR1910.133.

OTHER PROTECTIVE EQUIPMENT — As needed, wear hand, head, and body protection which help to prevent injury from radiation and sparks. See ANSI Z49.1. At a minimum this includes welder's gloves and protective goggles, and may include arm protectors, aprons, hats, shoulder protection, as well as substantial clothing. Train the worker not to touch live electrical parts.

IX. SPECIAL PRECAUTIONS

Fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being worked, the process, procedure and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being worked (such as paint, plating, or galvanizing), the number of workers and the volume of the work area, the quality and amount of ventilation, the position of the worker's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities).

One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample from inside the worker's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1, available from the American Welding Society, 550 N.W. Le Jeune Rd., Miami, FL 33126.

Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1, "Safety In Welding And Cutting" published by the American Welding Society and OSHA Publication 2206 (29CFR1910), U.S. Government Printing Office, Washington, D.C. 20402 for more details. For further safety and health information refer to Linde's free safety booklet L-2035.

OTHER HANDLING AND STORAGE CONDITIONS
Heat and sparks during use could be the source of ignition of combustible materials. Prevent fires.
Refer to NFPA 51B "Cutting and Welding Processes" and NFPA 50 "Oxygen-Fuel Gas Systems." Use piping and equipment adequately designed to withstand pressures to be encountered. Gas can cause rapid suffocation due to oxygen deficiency. Store and use with adequate ventilation. Close valve when not in use and when empty. Never work on a pressurized system. Do not strike arc on cylinder. The defect produced by an arc burn could lead to cylinder rupture. Do not ground cylinder. Store in cool, dry, well ventilated area. Do not store near open flames. Electrical equipment should be explosion proof. Do not store with oxygen or other oxidizers. Protect cylinders from physical damage. Store cylinders in upright position secured to prevent falling over. Refer to CGA Pamphlets P-1 and G-1 for recommendations.

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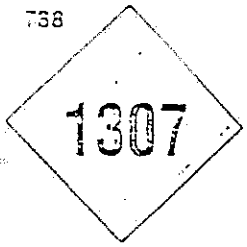
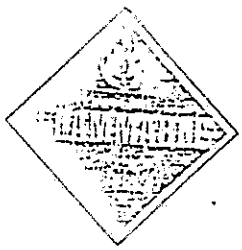


XYLENE
Flammable Liquid



POTENTIAL HAZARDS

GENERAL HAZARDS

Threshold Odor Concentration: 0.2 to 4 ppm
Unusual Hazards: Vapors may be heavier than air and travel to a source of ignition at warmer temperatures.
Short Term Exposure Limits(STEL): (Skin) 150 ppm for 15 minutes. (ACGIH)
Time Weighted Average(TLV-TWA): (Skin) 100 ppm over each 8 hours of a 40 hour work week.(ACGIH)
Conditions to Avoid: Heat, fire, or sparks; contact with incompatible materials; runoff to sewers or water bodies; inhalation, ingestion, or direct physical contact.

HEALTH HAZARDS

Public Health Hazards: Major hazard is from inhalation of high vapor concentrations in air near the spill site. Ingestion and physical contact should also be avoided.
Hazards of Skin or Eye Contact: Repeated or prolonged contact with liquid xylenes may cause drying, cracking, and inflammation of the skin due to the defatting action of the product. Some amount may be absorbed through the skin and blisters may occur. Contact of the liquid or high vapor concentrations in air with the eyes may cause irritation and temporarily corneal injury.
Hazards of Inhalation: Vapors of xylenes are irritating to the eyes, nose, and throat. High concentrations may cause narcosis and central nervous system depression with symptoms including dizziness, staggering, drowsiness, nausea, vomiting, abdominal pain, temporary damage to kidneys and liver, delayed pulmonary edema, loss of appetite, unconsciousness, and possibly death. Some symptoms may appear at levels as low as 200 ppm in air in acute exposures.
Hazards of Ingestion: Ingestion of xylenes may result in nausea, vomiting, cramps, headache, kidney and liver injury, coma, and possibly death. Aspiration into the lungs during vomiting may cause coughing, distress, rapidly developing pulmonary edema, chemical pneumonitis, and hemorrhage with possibly severe consequences.

RE HAZARDS

Lower Flammable Limit: 1.0-1.1%
Upper Flammable Limit: 6-7%
Behavior in Fire: Flammable liquid. There is some limited potential that containers may rupture violently in fire. May generate flammable vapors upon release. Vapors may be heavier than air and may travel to a source of ignition and flash back.
Hazardous Combustion Products: Not well-defined, but may include toxic constituents.

EXPLOSION HAZARDS

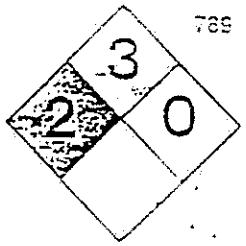
Lower Explosive Limit: Unavailable
Upper Explosive Limit: Unavailable
Explosiveness: There is some limited potential that containers may rupture violently in fire. Explosion may result if vapors are ignited in a confined area.

PROTECTIVE CLOTHING AND EQUIPMENT

Protective Clothing Required: Equipment should prevent repeated or prolonged skin contact and any reasonable probability of eye contact with the spilled product. This may include rubber boots, gloves, face shields, splash-proof safety goggles, and other impervious and resistant clothing. Compatible materials may include nitrile rubber, polyurethane, polyvinyl alcohol, and Viton.
Respiratory Protection: For unknown concentrations, fire fighting, or high concentrations (above 5000 ppm), a self-contained breathing apparatus (SCBA) with full facepiece (or the equivalent). For lesser concentrations, a gas mask with chin-style or front or back mounted organic vapor canister (5000 ppm or less) or an organic vapor cartridge respirator with a full facepiece (1000 ppm or less) within the use limitations of these devices.

1307

XYLENE
Flammable Liquid



FIRST AID

Nonspecific symptoms: Irritation of the eyes, skin, nose, or respiratory tract; symptoms of narcosis.
First Aid for Inhalation: Remove victim to fresh air and keep warm and at rest. If breathing becomes difficult or if breathing has stopped, administer artificial respiration. Get medical attention immediately. (Caution: Administration of mouth-to-mouth resuscitation may expose the first aid provider to chemical within the victim's lungs or vomit.)
First Aid for Skin and Eye Contact: Flush eyes immediately with water for at least 15 minutes, occasionally lifting the eyelids. Remove all contaminated clothing. Wash affected body areas with large amounts of soap and water. Get medical attention if eye contact has occurred or if skin irritation persists after washing.
First Aid for Ingestion: Do not induce vomiting. Keep victim warm and at rest. Get medical attention immediately.

FIRE RESPONSE

Extinguishing Materials: Carbon dioxide, dry chemical, foam, water spray. Water may be ineffective.
Extinguishing Techniques: Stay upwind. Avoid all bodily contact. Wear breathing apparatus and appropriate protective clothing. Move container from fire area if no risk. Do not extinguish burning cargo unless flow can be stopped safely. Be alert to the possibility that the container may tear or rupture and suddenly release massive amounts of product when exposed to high heat (over 800°F), such as from a direct flame. Use water from side and from safe distance to keep fire exposed containers cool. For massive fire in cargo area, use unmanned hose holder or monitor nozzles. Withdraw immediately in case of rising sound from venting safety device or discoloration of tank.

SPILL RESPONSES

General Information: Proceed with caution. Restrict access to area. Keep unprotected personnel upwind of spill area. Avoid contact with spilled product. Eliminate ignition sources. Prevent liquid from entering sewers and confined spaces. Protect sewers and waterways from contaminated runoff. Notify proper authorities, downstream sewer and water treatment operations, and other downstream users of potentially contaminated water. Note that intake of xylenes may result in rupture or explosion of boilers or industrial process equipment. Use explosion-proof equipment where necessary. Choose equipment, where possible, that is not corroded or otherwise damaged by the spilled product. Take the flammability of xylenes into account while planning the response.

AIR SPILL

TECHNIQUE

MONITOR THE SITUATION . . . Xylene may not evolve large amounts of hazardous airborne contaminants in many outdoor spill situations. It may be advisable in some cases to simply monitor the situation until the spilled product is removed.

CONSEQUENCE

Hazardous levels of xylene in air may be found in the local spill area and immediately downwind.

MITIGATION

Remove the spilled product as soon as possible. Restrict access to the local spill area and areas immediately downwind by unprotected personnel.

TECHNIQUE

WATER FOG OR SPRAY . . . Water fog or spray applied to xylene vapors or fumes may accelerate their dispersal in the atmosphere.

CONSEQUENCE

Water runoff may contain a small amount (if any) of xylene from contact with airborne vapors or fumes.

MITIGATION

Contain contaminated water and remove as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may add to spill volume and overfill impoundments.

XYLENE
Flammable Liquid

TECHNIQUE

FOAM . . . Firefighting foam applied to the surface of liquid pools may slow the release of xylene vapors into the atmosphere.

CONSEQUENCE

The effects of foam may be short term. As the foam breaks down, release of vapors will increase. Products of foam breakdown will add to the volume of spilled material.

MITIGATION

Continue foam applications until spilled product is removed. Contain increased volume.

LAND SPILL

TECHNIQUE

CONTAINMENT DIKES . . . Xylene may be contained by building dikes or barriers using soil, sand or other materials.

CONSEQUENCE

Contained xylene may percolate into soil or seep through dike material. This may result in loss of contained product and spread of contamination.

MITIGATION

Remove contained product as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may overfill impoundments. Where possible, line collection basins with compatible impervious material.

TECHNIQUE

EXCAVATION . . . A trench or ditch may be excavated to contain leaking product.

CONSEQUENCE

There may be increased potential for groundwater contamination in some cases.

MITIGATION

Remove contained products as soon as possible to prevent spread of contamination. Use surface dikes or barriers where groundwater contamination is possible or line collection basin with compatible impervious material.

TECHNIQUE

PUMPING/VACUUM SUCTION . . . Accumulated liquid pools may be recovered using appropriate hoses, pumps and storage containers or vacuum trucks.

CONSEQUENCE

Equipment that is incompatible with the spilled product may become damaged or develop leaks.

MITIGATION

Use equipment compatible with spilled product.

TECHNIQUE

ABSORPTION . . . Spreading of spilled product may be controlled by absorbing liquid with sand, earth, clay, fly ash, cement powder, peat moss, saw dust, straw, commercial sorbents, or other compatible substances.

CONSEQUENCE

Once used, sorbent materials pose the same hazards as the spilled product. Their use adds to the overall volume of contaminated material.

MITIGATION

Deplete accumulated liquid pools with pumps or vacuum trucks if possible before applying sorbents. Remove contaminated sorbents to safe storage by mechanical means.

XYLENE
Flammable Liquid

TECHNIQUE

MECHANICAL REMOVAL . . . Contaminated soil and any remaining chemical residue may be removed with shovels or motorized graders, scrapers, loaders, bulldozers, or draglines.

CONSEQUENCE

Removal equipment may become contaminated and present a hazard to later users. Incompatible equipment may be damaged or corroded. Improper storage of removed materials may result in future spread of contamination. Any flammable vapors or gases present in the area may be ignited by motorized removal equipment.

MITIGATION

Decontaminate all equipment after use. Use equipment compatible with spilled product. Store contaminated materials in a safe and secure location. Do not operate motorized equipment in potentially flammable atmospheres. Consult qualified experts for advice where necessary.

WATER SPILL

TECHNIQUE

STOP USE . . . Notify downstream industrial, municipal, and public users to stop water intake or to monitor water for contamination.

CONSEQUENCE

Alternative water supplies may be needed to accommodate users.

MITIGATION

Provide alternative water supplies as needed until water supply is declared safe.

TECHNIQUE

FLOATING BOOMS/BARRIERS . . . Oil spill containment booms of compatible material may be deployed. Alternatively, mesh or nets may be strung across stream and anchored every 6-8 feet. Straw or peat placed on upstream side of mesh should absorb and retard spreading of spilled product.

CONSEQUENCE

Leakage may occur under or through barrier if high waves or current present or if not properly deployed. Incompatible materials may be damaged by spilled product. Booms, barrier materials, and deployment equipment may be contaminated. Fire hazards pose risk to response personnel and equipment.

MITIGATION

Proceed with caution. Stage barriers in series where necessary. Recover spilled product as soon as possible. Decontaminate equipment after use. Dispose of waste materials in proper and safe manner. Use compatible equipment. Eliminate ignition sources.

TECHNIQUE

WATER BY-PASS DAMS . . . Streams may be provided with a by-pass dam. This is a dam made of compacted earth, clay, or other material with open tubes or pipes passing through under water. Upstream ends of pipes or tubes should be well below the layer of floating contaminant. Downstream ends should be at a higher elevation but still below the floating layer. Valves may be installed on downstream ends to control water flow.

CONSEQUENCE

Earthen dams may become saturated with water and seep through or collapse. An insufficient number of by-pass tubes or pipes or additional water may cause overflow.

MITIGATION

Use sufficient number and capacity of tubes or pipes. Be alert to conditions that may lead to dam overflow or collapse. Remove spilled product as soon as possible.

XYLENE
Flammable Liquid

TECHNIQUE

DIVERSION . . . Where other means are unavailable, floating slicks may be temporarily herded, diverted, or controlled using water hose streams, small boat propeller wash or chemical surface tension modifiers known as spill herders.

CONSEQUENCE

Hose streams and propeller washes have limited applicability and effectiveness. The latter may cause undesired mixing of spilled product and water due to extreme agitation. Chemical spill herders should not be used until approval is obtained from authorized environmental officials.

MITIGATION

Use other means if available.

TECHNIQUE

SURFACE SKIMMING . . . Oil spill skimming devices may be deployed to recover floating xylene.

CONSEQUENCE

Incompatible equipment may be damaged. Equipment may be contaminated and pose hazard to future users. Fire hazard may pose risk to response personnel and equipment.

MITIGATION

Decontaminate equipment after use. Use compatible equipment. Store recovered product in safe and secure location. Eliminate ignition sources.

TECHNIQUE

ABSORPTION . . . Straw, hay, peat, or commercial sorbent materials compatible with xylene may be used to absorb spilled product from the water surface, preferably after the spill has been contained.

CONSEQUENCE

Once used, sorbent materials pose the same hazards as the spilled product. Their use adds to the overall volume of contaminated material. Deployment and recovery can be difficult. Fire hazards pose risk to response personnel and equipment.

MITIGATION

Proceed with caution. Decontaminate equipment after use. Store and dispose of waste materials in proper and safe manner. Use compatible equipment. Eliminate ignition sources.

TECHNIQUE

CONTAINMENT DIKES . . . Water with dissolved chemical may be contained (or diverted to impoundment area) by diking upper and/or lower bounds to limit volume of water affected and spread of contamination.

CONSEQUENCE

Earthen dikes may become saturated with water and seep through or collapse. Additional water may cause overflow of diked area or water body boundaries.

MITIGATION

Reinforce or modify dikes as necessary. Be alert to conditions that may lead to overflow or dike collapse. Remove contaminated water to impoundment or storage area for later treatment or disposal.

TECHNIQUE

ADSORPTION . . . Addition of activated carbon to the contaminated water, followed by effective mixing, may capture spilled product that has dissolved in water. Adsorbent materials may later be removed by mechanical means.

CONSEQUENCE

Recovery of activated carbon may require dredging in a process that poses risk of environmental damage. Recovered adsorbent materials will be contaminated with spilled product, as may recovery equipment.

MITIGATION

Consult qualified experts for safe adsorption techniques. Consider pumping water through tank containing adsorbent on land. Handle and store recovered materials safely. Decontaminate equipment as necessary.

CHEMTOX DATA

---------- IDENTIFIERS ----------

CHEMTOX RECORD 106 LAST UPDATE OF THIS RECORD: 08/03/93

NAME: ETHYL BENZENE

SYNONYMS: AETHYLBENZOL (German); EB; ETHYLBENZEEN (Dutch); ETHYL BENZENE; ETHYL BENZENE (DOT); ETHYLBENZOL; ETILBENZENE (Italian); ETYLOBENZEN (Polish); NCI-C56393; PHENYLETHANE

CAS:	100-41-4	RTECS:	DA0700000
FORMULA:	C8H10	MOL WT:	106.18
WLN:	1R		

CHEMICAL CLASS: Aromatic hydrocarbon

See other identifiers listed below under Regulations.

---------- PROPERTIES ----------

PHYSICAL DESCRIPTION: colorless liquid with a sweet, gasoline-like odor.

BOILING POINT:	409.2 K	136 C	276.8 F
MELTING POINT:	178.15 K	-95 C	-139 F
FLASH POINT:	294.26 K	21.1 C	69.9 F
AUTO IGNITION:	733 K	459.8 C	859.7 F
CRITICAL TEMP:	617.1 K	343.95 C	651.11 F
CRITICAL PRESS:	3.61 kN/M2	35.5 atm	523 psia
HEAT OF VAP:	144 Btu/lb	79.97 cal/g	3.346x E5 J/kg
HEAT OF COMB:	-17780 Btu/lb	-9885 cal/g	-413x E5 J/kg

VAPOR PRESSURE:	10mm @ 25.9 C
UEL:	6.7 %
LEL:	1.0 %
IONIZATION POTENTIAL (eV):	8.76
VAPOR DENSITY:	3.7 (air=1)
SPECIFIC GRAVITY:	0.867 20C
DENSITY:	0.866 g/mL @ 20 C
WATER SOLUBILITY:	0.015%
INCOMPATIBILITIES:	strong oxidizers
REACTIVITY WITH WATER:	No data on water reactivity
REACTIVITY WITH COMMON MATERIALS:	OXIDIZING MATERIALS Source: SAX
STABILITY DURING TRANSPORT:	No Data
NEUTRALIZING AGENTS:	No data
POLYMERIZATION POSSIBILITIES:	No data
TOXIC FIRE GASES:	None reported other than possible unburned vapors
ODOR DETECTED AT (ppm):	140
ODOR DESCRIPTION:	AROMATIC Source:CHRIS
100 % ODOR DETECTION:	No data

---------- REGULATIONS ----------

DOT hazard class:	3 FLAMMABLE LIQUID
DOT guide:	26

Identification number: UN1175
DOT shipping name: Ethylbenzene
Packing group: II
Label(s) required: FLAMMABLE LIQUID
Special provisions: T1
Packaging exceptions: 150
Non bulk packaging: 202
Bulk packaging: 242
Quantity limitations-
Passenger air/rail: 5 L
Cargo aircraft only: 60 L
Vessel stowage: B
Other stowage provisions:

STOC NUMBER: 4909163

CLEAN WATER ACT Sect.307: Yes
CLEAN WATER ACT Sect.311: Yes
National Primary Drinking Water Regulations
Maximum Contaminant Levels (MCL): 0.7 mg/mL²(07/30/92)
Maximum Contaminant Level Goals (MCLG): 0.7 mg/mL²(07/30/92)
CLEAN AIR ACT: CAA '90 Listed
EPA WASTE NUMBER: None
CERCLA REF: Y
RQ DESIGNATION: C 1000 pounds (454 kg) CERCLA
SARA TPQ VALUE: Not listed
SARA Sect. 312 categories:
Acute toxicity: Irritant
Acute toxicity: adverse effect to target organs.
Chronic toxicity: mutagen.
Chronic toxicity: reproductive toxin.
Fire hazard: flammable.
LISTED IN SARA Sect 313: Yes
de minimus CONCENTRATION: 1.0 percent

UNITED STATED POSTAL SERVICE MAILABILITY:
Hazard class: Flammable liquid - Mailable as ORM-D
Mailability: Domestic surface mail only
Max per parcel: 1 QT METAL; 1 PT OTHER

NFPA CODES:
HEALTH HAZARD (BLUE): (2) Hazardous to health. Area may be entered with self-contained breathing apparatus.
FLAMMABILITY (RED) : (3) This material can be ignited under almost all temperature conditions.
REACTIVITY (YELLOW): (0) Stable even under fire conditions.
SPECIAL : Unspecified

---------- TOXICITY DATA ----------

SHORT TERM TOXICITY: INHALATION: 200 ppm for 30 minutes can cause irritation of the nose and throat, dizziness,

TABLE 1. Radiofrequency/Microwave Threshold Limit Values

Frequency	Power Density (mW/cm²)	Electric Field Strength Squared (V²/m²)	Magnetic Field Strength Squared (A²/m²)
30 kHz to 3 MHz	100	377,000	2.65
3 MHz to 30 MHz	900/f²*	3770 (900/f²)	900/(37.7 × f²)
30 MHz to 100 MHz	1	3770	0.027
100 MHz to 1000 MHz	f/100	3770 (f/100)	f/(37.7 × 100)
1 GHz to 300 GHz	10	37,700	0.265

*f = frequency in MHz.

ed if the output power of a radiating device is 7 watts or less. For example, if a hand-held transmitter operating at 27 MHz has a maximum output of 5 watts, it would be excluded from any further field measurements.

5. The TLVs in Table 1 may be exceeded if the exposure conditions can be demonstrated to produce a SAR of less than 0.4 W/kg as averaged over the whole body and spatial peak SAR values less than 8.0 W/kg as averaged over any 1.0 gram of tissue. For example, for frequencies from 3 to 30 MHz, the equivalent power density can be increased by a factor of 10 up to a limit of 100 mW/cm², if it can be assured that exposed individuals are not in contact with the ground plate.
6. No measurement should be made within 5 cm of any object.
7. All exposures should be limited to a maximum (peak) electric field intensity of 100 kV/m.

MATERIAL SAFETY DATA SHEET

The Coastal Corporation

astal Oil New York, Inc.
Coastal Oil New England, Inc.
Coastal Fuels Marketing, Inc.
Coastal Mobile Refining Company
Coastal Derby Refining Company
Coastal Eagle Point Oil Company
Coastal Mart, Inc.
Coastal Refining & Marketing, Inc.
Coastal States Crude Gathering Co.
Coastal States Trading, Inc.
Coastal Unilube, Inc.
Coscol Marine Corporation
Coscol Petroleum Corporation
Pacific Refining Company
Western Fuel Oil Company
Coastal Fuel Terminals, Inc.

Address: 9 Greenway Plaza
Houston, TX 77046

Info Phone: (713) 877-1400
Emergency Phone: (713) 877-1400

PRODUCT IDENTIFICATION

Trade Name: Midgrade Unleaded 89 Octane Date Revised: 04-30-90

Synonyms: 89 Octane Unleaded Gasoline, Petrol, Midgrade Gasoline
Chemical Name and/or Family Description: A volatile blend of paraffinic, olefinic, and aromatic hydrocarbons for automotive fuel.
DOT Hazard Class: Flammable liquid; UN 1203.

COMPOSITION

			Occupational Exposure Limits*			
			OSHA	ACGIH		
Product	CAS Number	%, Wt	PEL	TLV	Other	Units
Midgrade Unleaded 89 Octane	Mixture	100	300	300	500 STEL	ppm
Ingredient(s):						
Benzene	71-43-2	0-5.0	1	10	5 STEL	ppm
Toluene	108-88-3	0-25.0	100	100	150 STEL	ppm
Xylene	1330-20-7	0-25.0	100	100	150 STEL	ppm
Ethylbenzene	100-41-4	0-5.0	100	100	125 STEL	ppm
n-Hexane	110-54-3	< 3.3	50	50		ppm
Hexane (other isomers)	N.A.	< 8.0	500	500	1000 STEL	ppm
1,2,4-Trimethyl Benzene	95-63-6	0-5.0	25	25		ppm
Cumene	98-82-8	1.0-2.0	50	50	SKIN	ppm
Butane	106-97-8	<9.0	800	800		ppm
Pentane	109-66-0	<4.7	600	600	750 STEL	ppm
t-Butyl Alcohol	75-65-0	0-10.0	100	100	150 STEL	ppm
Methyl t-butyl Ether (MTBE)	1634-04-4	0-15.0	N.A.	N.A.		

* = 8-Hr. TWA unless otherwise specified.
N.A. = Not Available.
STEL = Short Term Exposure Limit; 15 minutes
SKIN = May be skin absorbed.

PHYSICAL AND CHEMICAL PROPERTIES

ing Point 760 mmHg:	80-430° F	Melting Point: Variable	
..or Pressure mmHg @ 20C:	325-525	Vapor Density (Air=1):	3-4
Solubility in H2O %:	Negligible	pH:	N.A.
Specific Gravity 60/60F:	0.7-0.77	Evaporation Rate	N.A.
% Volatile by Volume:	100	Odor: Aromatic odor	
Viscosity (method, temp.):	1.4 @40C cSt	Appearance: Bronze Fluid	

FIRE AND EXPLOSION DATA

Flash Point: -45° F (TCC)
Flammable Limits in Air % by Vol. Lower: 1.4 Upper: 7.6
Autoignition Temperature: 495-850° F
Extinguishing Media: Dry chemical, foam, or carbon dioxide.
Special Fire Fighting Procedure: Use a smothering technique for extinguishing fire of this flammable liquid. Do not use a forced water stream directly on gasoline fires as this will scatter the fire. Use a water spray to cool fire-exposed containers. Firefighters should wear self-contained breathing apparatus and full protective clothing.
Unusual Fire or Explosion Hazard: Flowing gasoline can be ignited by self-generated static electricity; containers should be grounded and bonded. Runoff to sewer may create fire or explosion hazard well downstream from the source.

REACTIVITY DATA

bility: Stable
ardous Polymerization: Will not occur.
Conditions to Avoid/Incompatibility: Strong oxidizing agents, heat, spark, flame and build-up of static electricity, halogens, strong acids and alkalies.
Hazardous Decomposition Products: CO, CO_2, and hydrocarbons.

HEALTH HAZARD DATA

Note: This product has not been tested by Coastal Corporation to determine its specific health hazards. Therefore, the information provided in this section includes health hazard information on the product components.

Carcinogenicity:	NTP:	IARC Monographs:	OSHA Regulated:
Midgrade Unleaded 89 Octane	No	No	No
Benzene	Yes	Yes	Yes

Occupational Exposure Limits: See COMPOSITION section.
Effects of Overexposure:

Acute:
Eyes: Slight to moderate eye irritation.
Skin: Moderately irritating; causing redness, drying of skin.
Inhalation: Irritating to mucous membranes and respiratory tract. Can act as a simple asphyxiant. Overexposure to vapors may lead to headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, central nervous system depression, coma and respiratory arrest.

Ingestion: Possible effects are stomach irritation, gastritis. headache, nausea, drowsiness, loss of consciousness, convulsions, cyanosis, pneumonitis, pulmonary edema, central nervous system depression and capillary hemorrhaging of the lung and internal organs. Aspiration hazard if vomiting occurs.

Chronic: Skin and eye irritation. May affect the respiratory and central nervous system. Recent studies indicate kidney damage and kidney cancer in rats and liver cancer in mice.

Additional Medical and Toxicological Information: Contact with full strength or even dilute formulations of this product or exposure above and/or below the TLV may aggravate pre-existing dermatitis or respiratory disorders in certain individuals. There is sufficient evidence for the carcinogenicity of benzene in humans. Benzene may cause degeneration in blood forming organs leading to anemia which may further degrade to leukemia.

EMERGENCY FIRST AID PROCEDURES

Eye Contact: Flush thoroughly with water for at least 15 minutes, including under the eyelids. Contact a physician immediately, preferably an Ophthalmologist. Speed and thoroughness in rinsing eyes are important to avoid permanent injury.

Skin Contact: Remove contaminated clothing and shoes. Wash affected areas with soap and flush with large amounts of water for 15 to 20 minutes. Get immediate medical attention.

Inhalation: Remove to fresh air. If breathing has stopped, apply artificial respiration. Get immediate medical attention.

Ingestion: Do not induce vomiting. If spontaneous vomiting occurs hold the victim's head lower than hips to prevent aspiration.

SPECIAL PROTECTION INFORMATION

Eye Protection: Remove contact lenses and wear chemical safety glasses or goggles where contact with liquid or mist may occur.

Skin Protection: Wear impervious gloves when contact with skin may occur. Wear protective clothing to avoid skin contact.

Inhalation: Use approved respiratory protective equipment in situations where airborne concentrations may exceed occupational exposure levels.

Ventilation: Provide adequate general and local ventilation (1) to keep mist or vapors below allowable exposure levels, (2) to prevent formation of explosive atmosphere and (3) to prevent oxygen deficient atmospheres, especially in confined spaces.

SPILL OR LEAK AND DISPOSAL PROCEDURES

Spill Procedures: Remove sources of heat or ignition including internal combustion engines and power tools. Clean-up spill, but do not flush to sewer or surface water. Ventilate area and avoid breathing vapors or mists.

Waste Disposal: Dispose through a licensed waste disposal company. Follow federal, state and local regulations.

SPECIAL PRECAUTIONS AND COMMENTS

Storage Requirements: Store in tightly closed containers in a dry cool place, away from incompatible materials or sources of heat and ignition. Ground and bond all transfer and storage equipment to prevent static sparks and equip with self closing valves, pressure vacuum bungs and flame arrestors. Empty containers may contain residue (liquid/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition; they may explode and cause injury or death.

Other: Gasoline is to be used as motor fuel only. Never use as a cleaning solvent or degreaser. Use explosion-proof electrical equipment. No smoking should be allowed in area of use.

EPA SARA TITLE III INFORMATION

Section 311/312 Hazard Categorization

Acute	Chronic	Fire	Pressure	Reactive
X	X	X		

SARA Hazardous Substances

Ingredient	CAS No.	%, Wt	Sec 313	Sec 302	RQ, lb	TPQ, lb
Benzene	71-43-2	0-5.0	X			
Toluene	108-88-3	0-25.0	X			
Xylene	1330-20-7	0-25.0	X			
Ethylbenzene	100-41-4	0-5.0	X			
Cumene	98-82-8	~1.2	X			
t-Butyl Alcohol	75-65-0	0-10.0	X			
Methyl t-Butyl Ether (MTBE)	1634-04-4	0-15.0	X			

Key: Sec 313 = Toxic Chemicals, Section 313
Sec 302 = Extremely Hazardous Substances (EHS), Section 302
RQ = Reportable Quantity of EHS
TPQ = Threshold Planning Quantity of EHS

CALIFORNIA PROPOSITION 65 WARNING

Chemicals known to the State of California to cause cancer, birth defects, other reproductive harm may be found in crude oil and petroleum products. Although it is possible to sufficiently refine a crude oil or its end products to remove the potential for cancer, we are advising that one or more of the listed chemicals may be present in some detectable quantities. Read and follow directions and use care when handling crude oil and petroleum products.

Industrial Hygiene Review: Delno D. Malzahn, CIH
Date Prepared: 03-30-90

MATERIAL SAFETY DATA SHEET

An explanation of the terms used herein may be found in OSHA 29 CFR 1910.1200, available from OSHA regional or area offices
(Essentially similar to U.S. Department of Labor Form OSHA-20 and generally accepted in Canada for information purposes)
Do Not Duplicate This Form. Request an Original.

I. PRODUCT IDENTIFICATION

PRODUCT	Oxygen		
CHEMICAL NAME	Oxygen	SYNONYMS	Not applicable
FORMULA	O_2	CHEMICAL FAMILY	Not applicable
		MOLECULAR WEIGHT	32.00
TRADE NAME	Oxygen		

II. HAZARDOUS INGREDIENTS

For mixtures of this product request the respective component Material Safety Data Sheets. See Section IX.

MATERIAL (CAS NO.)	Wt (%)	1984-1985 ACGIH TLV-TWA (OSHA-PEL)
Oxygen (7782-44-7)	100	None currently established (None currently established)

III. PHYSICAL DATA

BOILING POINT, 760 mm. Hg	-183°C / -297.4°F	FREEZING POINT	-218.4°C / -361.1°F
SPECIFIC GRAVITY (H_2O = 1)	Gas	VAPOR PRESSURE AT 20° C.	Gas
VAPOR DENSITY (air = 1)	1.105 @ 25° C	SOLUBILITY IN WATER, % by wt.	Negligible
PERCENT VOLATILES BY VOLUME	100	EVAPORATION RATE (Butyl Acetate = 1)	Not applicable

APPEARANCE AND ODOR: Colorless, odorless gas at normal temperature and pressure.

EMERGENCY PHONE NUMBER

IN CASE OF EMERGENCIES involving this material, further information is available at all times:
In the USA 304 — 744-3467 In Canada 514 — 645-8311
For routine information contact your local supplier

Union Carbide requests the users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product a user should: (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

UNION CARBIDE CORPORATION, LINDE DIVISION
UNION CARBIDE CANADA LIMITED, LINDE DIVISION

difficult breathing and depression. very high levels can cause unconsciousness. SKIN: can cause irritation, inflammation, blisters and burns. Eyes: 200 ppm can cause irritation. higher levels can cause burning, tearing and injury. INGESTION: can cause headache, sleepiness and coma.(NYDH)

LONG TERM TOXICITY: may cause skin rash and irritation of eyes, nose and throat.(NYDH)

TARGET ORGANS: eyes, upper resp sys, skin, CNS

SYMPTOMS: Inhalation may cause irritation of nose, dizziness, depression. Moderate irritation of eye with corneal injury possible. Irritates skin and may cause blisters. Source: CHRIS

CONC IDLH: 2000PPM

NIOSH REL:

ACGIH TLV: TLV = 100 ppm(435 mg/M3)
ACGIH STEL: STEL = 125 ppm(545 mg/M3)

OSHA PEL: Transitional Limits:
PEL = 100 ppm(435mg/M3)
Final Rule Limits:
TWA = 100 ppm (435 mg/M3)
STEL = 125 ppm(545 mg/M3)

MAK INFORMATION: 100 ppm
440 mG/M3
Local irritant: Peak = 2xMAK for 5 minutes, 8 times per shift.
Danger of cutaneous absorption

CARCINOGEN?: N STATUS: See below

CARCINOGEN LISTS:
IARC: Not listed
MAK: Not listed
NIOSH: Not listed
NTP: Not listed
ACGIH: Not listed
OSHA: Not listed

HUMAN TOXICITY DATA: (Source: NIOSH RTECS)
ihl-hmn TCLo:100 ppm/8H AIHAAP 31,206,70
SENSE ORGANS
Eye
Other
BEHAVIORAL
Sleep
LUNGS, THORAX, OR RESPIRATION

Other changes

LD50 value: orl-rat LD50:3500 mg/ kg

ER SPECIES TOXICITY DATA: (Source: NIOSH RTECS 1991)

orl-rat LD50:3500 mg/kg
ihl-rat LCLo:4000 ppm/4H
ihl-mus LDLo:50 gm/m3/2H
ipr-mus LD50:2270 mg/kg
skn-rbt LD50:17800 mg/kg
ihl-gpg LCLo:10000 ppm

IRRITATION DATA: (Source: NIOSH RTECS 1991)

skn-rbt 15 mg/24H open MLD
eye-rbt 100 mg

Reproductive toxicity (1991 RTECS):
This chemical is a mammalian reproductive toxin.

REPRODUCTIVE TOXICITY DATA (1991 RTECS)
ihl-rat TCLo:97 ppm/7H (18D pre) NTIS** PB83-208074
EFFECTS ON FERTILITY
Female fertility index

ihl-rat TCLo:985 ppm/7H (1-19D preg) NTIS** PB83-208074
EFFECTS ON EMBRYO OR FETUS
Fetotoxicity(except death,e.g.,stunted fetus)

ihl-rat TCLo:96 ppm/7H (1-19D preg) NTIS** PB83-208074
SPECIFIC DEVELOPMENTAL ABNORMALITIES
Musculoskeletal system

ihl-rat TCLo:600 mg/m3/24H (7-15D preg) ATSUDG 8,425,85
EFFECTS ON FERTILITY
Post-implantation mortality
EFFECTS ON EMBRYO OR FETUS
Fetal death
SPECIFIC DEVELOPMENTAL ABNORMALITIES
Musculoskeletal system

ihl-rat TCLo:2400 mg/m3/24H (7-15D preg) ATSUDG 8,425,85
EFFECTS ON EMBRYO OR FETUS
Fetotoxicity(except death,e.g.,stunted fetus)

ihl-rbt TCLo:99 ppm/7H (1-18D preg) NTIS** PB83-208074
EFFECTS ON FERTILITY
Litter size(# fetuses per litter;measured before birth)

ihl-rbt TCLo:500 mg/m3/24H (7-20D preg) ATSUDG 8,425,85
EFFECTS ON EMBRYO OR FETUS
Fetotoxicity(except death,e.g.,stunted fetus)

---------- PROTECTION AND FIRST AID ----------

PROTECTION SUGGESTED
IN THE CHRIS MANUAL:
Self-contained breathing apparatus; safety goggles.

NIOSH POCKET GUIDE TO CHEMICAL HAZARDS:

** WEAR APPROPRIATE EQUIPMENT TO PREVENT:
Repeated or prolonged skin contact.

** WEAR EYE PROTECTION TO PREVENT:
Reasonable probability of eye contact.

** EXPOSED PERSONNEL SHOULD WASH:
Promptly when skin becomes contaminated.

** REMOVE CLOTHING:
Immediately remove any clothing that becomes wet to avoid any flammability hazard.

** REFERENCE: NIOSH

RECOMMENDED RESPIRATION PROTECTION Source: NIOSH POCKET GUIDE (85-114)
OSHA (ETHYL BENZENE)
1000 ppm: Any powered air-purifying respirator with organic vapor cartridge(s). * Substance reported to cause eye irritation or damage may require eye protection. / Any supplied-air respirator. * Substance reported to cause eye irritation or damage may require eye protection. / Any self-contained breathing apparatus. * Substance reported to cause eye irritation or damage may require eye protection. / Any chemical cartridge respirator with organic vapor cartridge(s). * Substance reported to cause eye irritation or damage may require eye protection.
2000 ppm: Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted organic vapor canister. / Any supplied-air respirator with a full facepiece. / Any self-contained breathing apparatus with a full facepiece.
EMERGENCY OR PLANNED ENTRY IN UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS.: Any self-contained breathing apparatus with full facepiece and operated in a pressure-demand or other positive pressure mode. / Any supplied-air respirator with a full facepiece and operated in pressure-demand or other positive pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
ESCAPE: Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted organic vapor canister. / Any appropriate escape-type self-contained breathing apparatus.

FIRST AID SOURCE: CHRIS Manual 1991
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
promptly flush with plenty of water (15 min. for eyes) and get

medical attention; remove and wash contaminated clothing before reuse.

FIRST AID SOURCE: DOT Emergency Response Guide 1990.
ve victim to fresh air and call emergency medical care; if not
eathing, give artificial respiration; if breathing is difficult, give
oxygen. In case of contact with material, immediately flush eyes with
running water for at least 15 minutes. Wash skin with soap and water.
Remove and isolate contaminated clothing and shoes at the site.

---------- INITIAL INCIDENT RESPONSE ----------

FIRE EXTINGUISHMENT: Foam (most effective), water fog, carbon dioxide or dry chemical. CHRIS91

US Department of Transportation Guide to Hazardous Materials Transport Information - Publication DOT 5800.5 (1990).
DOT SHIPPING NAME: Ethylbenzene
DOT ID NUMBER: UN1175

ERG90 GUIDE 26

* POTENTIAL HAZARDS *

*FIRE OR EXPLOSION
Flammable/combustible material; may be ignited by heat, sparks or flames.
Vapors may travel to a source of ignition and flash back.
Container may explode in heat of fire.
Vapor explosion hazard indoors, outdoors or in sewers.
Runoff to sewer may create fire or explosion hazard.
ALTH HAZARDS
May be poisonous if inhaled or absorbed through skin.
Vapors may cause dizziness or suffocation.
Fire may produce irritating or poisonous gases.
Runoff from fire control or dilution water may cause pollution.

* EMERGENCY ACTION *

Keep unnecessary people away; isolate hazard area and deny entry.
Stay upwind; keep out of low areas.
Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.

Isolate for 1/2 mile in all directions if tank, rail car or tank truck is involved in fire.
CALL CHEMTREC AT 1-800-424-9300 FOR EMERGENCY ASSISTANCE. If water pollution occurs, notify the appropriate authorities.
*FIRE
Small Fires: Dry chemical, CO_2 or Halon, water spray or alcohol-resistant foam.
Large Fires: Water spray, fog or alcohol-resistant foam.
Move container from fire area if you can do it without risk.
Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.
For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
Withdraw immediately in case of rising sound from venting safety device or

any discoloration of tank due to fire.

*SPILL OR LEAK

Shut off ignition sources; no flares, smoking or flames in hazard area.
Stop leak if you can do it without risk.
Water spray may reduce vapors; but it may not prevent ignition in closed spaces.
Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal.
Large Spills: Dike far ahead of liquid spill for later disposal.

*FIRST AID

Move victim to fresh air and call emergency medical care; if not breathing, give artificial respiration; if breathing is difficult, give oxygen.
In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water.
Remove and isolate contaminated clothing and shoes at the site.

MOTOR FUEL ANTIKNOCK COMPOUND

October 1984

Poison B

RQ Varies*

GENERAL INFORMATION

Motor fuel antiknock compounds considered here are variable mixtures of tetramethyl lead, tetraethyl lead, ethylene dibromide, ethylene dichloride, toluene, and other solvents or dyes. They have a sweet, musty and fruity odor and are used to increase the octane of gasoline. The mixtures are barely soluble in water and heavier, so may be expected to sink and dissolve at a slow rate. Depending on the specific mixture, flash points may vary from 30-264°F. Those mixtures with lower flash points may be ignited under a wide range of ambient temperature conditions. Their vapors may travel to a source of ignition and flash back. Accumulations of vapor in confined spaces such as buildings or sewers may explode if ignited. Regardless of the specific mixture involved, containers may rupture or explode if exposed to fire or excessive heat for sufficient time duration. The mixtures weigh approximately 12.5-14.2 pounds per gallon. Reportable quantities range from 100 lb (45.4 kg) for tetraethyl lead to 5000 lb (2270 kg) for ethylene dichloride.

Motor fuel antiknock compounds do not react with water but do react with oxidizing materials, active metals and rust, and concentrated acids. Temperatures above 212°F may initiate a self-sustaining decomposition that may lead to an explosion of containers if the hot compound is ignited by a flame or hot metal surface. The presence of ethylene dibromide in a specific mixture may, however, render it stable at temperatures as high as 300°F for 15 hours. All mixtures should be considered highly toxic and all exposures should be avoided. Products of combustion are also toxic and may include gases containing lead as well as several other toxic or irritating substances.

If motor fuel antiknock compound is leaking (not on fire) and generating vapors or fumes, downwind evacuation of the immediate spill area should be considered until properly equipped responders have evaluated the hazard. If a fire becomes uncontrollable or a container is exposed to direct flame, evacuate for a radius of at least 1500 feet for protection from flying debris if the container should rupture violently.

CHEMICAL/PHYSICAL DATA

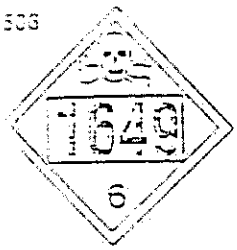
Solubility in Water: 28-55 ppm at 60°F (15.6°C)
Solubility in Other Chemicals: Soluble in alcohol, benzene, ether, and petroleum ether.
Specific Gravity (Liquid): 1.5-1.7
Boiling Point: 200-300°F (93.3-148.9°C) at 1 atm; may decompose and explode
Melting Point: −63.4 to 15.8°F (−53 to −9°C)
Freezing Point: −63.4 to 15.8°F (−53 to −9°C)
Molecular Weight: Unavailable (mixture)
Heat of Combustion: −10100 cal/g (est.)
Vapor Pressure: 5.2-35.7 mm Hg (0.101-0.690 psia) at 68°F (20°C)
Flash Point: 30-228°F (−1.1 to 109°C) or more, closed cup; 89-265°F (31.7-129.4°C), open cup.
Autoignition Temperature: Begins to decompose above 212°F (100°C).
Burning Rate: Unavailable
Stability: Decomposes above 212°F (100°C) or 300°F (149°C) if ethylene dibromide present; may explode under such conditions.
Corrosiveness: Lead allyls may attack some forms of plastics, rubber, and coatings.
Reactivity with Water: No reaction
Reactivity with Other Chemicals: Reacts with oxidizing materials, active metals and rust, and concentrated acids.

IDENTIFICATION

Shipping Names: Motor fuel antiknock compound (USDOT); antiknock compound (USDOT); motor fuel anti-knock mixtures (IMO).
Synonyms and Tradenames: Antiknock compound
Chemical Formula: Mixture
Constituent Components(% each): 50-60% lead allyls; 18-36% ethylene dibromide; 0-19% ethylene dichloride; 2-12% toluene, other solvents, and dyes.
49 STCC: 49 214 45
UN/NA Designation: UN1649
IMO Designation: 6.1, poisonous substance
Physical State as Shipped: Liquid
Physical State as Released: Liquid
Color of the Shipped Material: Red, orange, or blue (dyed)
Odor Characteristics: Sweet, musty, fruity
Common Uses: Gasoline antiknock additive

*Reportable quantity (RQ) subject to change—refer to current EPA regulations.

FOR ADDITIONAL ASSISTANCE OR INFORMATION CALL:
CHEMTREC (800)424-9300 OR (202)483-7616 OR
THE AAR BUREAU OF EXPLOSIVES (202)835-9500



MOTOR FUEL ANTIKNOCK COMPOUND

Poison B

POTENTIAL HAZARDS

GENERAL HAZARDS

Threshold Odor Concentration: Unavailable

Unusual Hazards: Highly toxic combustible or flammable liquid. Containers may explode or detonate if product is heated to decomposition.

Short Term Exposure Limits(STEL): Unavailable

Time Weighted Average(TLV-TWA): 0.1-0.15 mg/m^3 (as lead) over each 8 hours of a 40 hour work week for lead alkyls.(ACGIH)

Conditions to Avoid: Heat, fire, or sparks; contact with incompatible materials; runoff to sewers or water bodies; inhalation, ingestion, or direct physical contact.

HEALTH HAZARDS

Public Health Hazards: Motor fuel antiknock compounds are highly toxic via all routes of exposure including skin absorption. Lead compounds may accumulate in the bodies of humans and animals.

Hazards of Skin or Eye Contact: Motor fuel antiknock compounds may be absorbed through the skin in toxic amounts. Eye contact may cause irritation and possibly other effects.

Hazards of Inhalation: Excessive exposure to motor fuel antiknock compounds may cause insomnia, anxiety, tiredness, paleness, nausea, loss of appetite, trembling, excitability, delirium, convulsive seizures, coma, and possibly death. Symptoms may be delayed in onset for up to eight days.

Hazards of Ingestion: See hazards of inhalation.

FIRE HAZARDS

Lower Flammable Limit: Unavailable

per Flammable Limit: Unavailable

navior in Fire: Flammable or combustible liquid. May generate significant quantities of flammable and toxic vapors upon release. Vapors of some mixtures may be heavier than air and may travel to a source of ignition and flash back. Containers may explode or rupture violently in fire.

Hazardous Combustion Products: Toxic; may include carbon monoxide, and gases containing lead, chlorides, bromides, and other hazardous substances.

EXPLOSION HAZARDS

Lower Explosive Limit: Unavailable

Upper Explosive Limit: Unavailable

Explosiveness: Explosion may result if vapors are ignited in a confined area. Containers may explode or rupture violently in fire.

PROTECTIVE CLOTHING AND EQUIPMENT

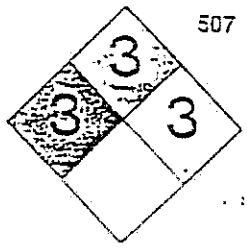
Protective Clothing Required: Equipment should prevent any reasonable probability of eye contact and any possibility of skin contact with the spilled product. This may include rubber boots, gloves, face shields, splash- proof safety goggles, and other impervious and resistant clothing. Fully encapsulating suits with self-contained breathing apparatus (SCBA) may be necessary to prevent contact with high vapor or fume concentrations in air.

Respiratory Protection: For unknown concentrations, fire fighting, or high concentrations, a self-contained breathing apparatus (SCBA) with full facepiece (or the equivalent)

1649

MOTOR FUEL ANTIKNOCK COMPOUND

Poison B



FIRST AID

Nonspecific symptoms: See hazards of inhalation above.

First Aid for Inhalation: Remove victim to fresh air and keep warm and at rest. If breathing becomes difficult or if breathing has stopped, administer artificial respiration. Get medical attention immediately. (Caution: Administration of mouth-to-mouth resuscitation may expose the first aid provider to chemical within the victim's lungs or vomit.)

First Aid for Skin and Eye Contact: Flush eyes immediately with water for at least 15 minutes, occasionally lifting the eyelids. Remove all contaminated clothing. Wash affected body areas with kerosene or similar product followed by copious amounts of soap and water. Get medical attention immediately.

First Aid for Ingestion: If victim is conscious, administer large quantities of water immediately and induce vomiting. Do not make an unconscious person vomit. Get medical attention immediately.

FIRE RESPONSE

Extinguishing Materials: Carbon dioxide, dry chemical, foam, water spray.

Extinguishing Techniques: Unusual toxicity and explosion hazard. Stay upwind. Avoid all bodily contact. Wear breathing apparatus and appropriate protective clothing. Wear full chemical protective suit if contact with material or dense fumes/smoke anticipated. Move container from fire area if no risk. Do not extinguish burning cargo unless flow can be stopped safely. Be alert to the possibility that the container may tear or rupture and suddenly release massive amounts of product when exposed to high heat (over 300°F), such as from a direct flame. Use water from side and from safe distance to keep fire exposed containers cool. For massive fire in cargo area, use unmanned hose holder or monitor nozzles. Withdraw immediately in case of rising sound from venting safety device or discoloration of tank.

SPILL RESPONSES

General Information: Proceed with caution. Restrict access to area. Keep unprotected personnel upwind of spill area. Avoid contact with spilled product. Eliminate ignition sources. Prevent liquid from entering sewers and confined spaces. Protect sewers and waterways from contaminated runoff. Notify proper authorities, downstream sewer and water treatment operations, and other downstream users of potentially contaminated water. Use explosion-proof equipment where necessary. Choose equipment, where possible, that is not corroded or otherwise damaged by the spilled product. Take the toxicity and properties of motor fuel antiknock compounds into account while planning the response.

AIR SPILL

TECHNIQUE

EVACUATION . . . Evacuate local and downwind areas as conditions warrant to prevent exposure and to allow vapors or fumes to dissipate. Motor fuel antiknock compound spills may expose downwind areas to toxic or flammable concentrations over considerable distances in some cases.

CONSEQUENCE

Need to notify, organize, transport and house displaced persons.

MITIGATION

Stop leak if without risk and if proper equipment available. Allow vapors and fumes to dissipate completely before reentering spill area without special protective gear. Consult qualified experts for assistance.

TECHNIQUE

WATER FOG OR SPRAY . . . Water fog or spray applied to motor fuel antiknock compound vapors or fumes may accelerate their dispersal in the atmosphere.

CONSEQUENCE

Water runoff may contain a small amount of motor fuel antiknock compound from contact with airborne vapors or fumes.

MITIGATION

Contain contaminated water and remove as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may add to spill volume and overfill impoundments.

MOTOR FUEL ANTIKNOCK COMPOUND
Poison B

TECHNIQUE

FOAM . . . Firefighting foam applied to the surface of liquid pools may slow the release of motor fuel antiknock compound vapors into the atmosphere.

CONSEQUENCE

The effects of foam may be short term. As the foam breaks down, release of vapors will increase. Products of foam breakdown will add to the volume of spilled material.

MITIGATION

Continue foam applications until spilled product is removed. Contain increased volume.

TECHNIQUE

COVERAGE . . . The application of water spray to the surface of contained liquid pools may slow the release of vapors into the atmosphere. Water should float on top of the spilled product.

CONSEQUENCE

Addition of water will increase the volume of material requiring recovery.

MITIGATION

Contain spilled product and remove as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may add to spill volume and overfill impoundments.

LAND SPILL

TECHNIQUE

CONTAINMENT DIKES . . . Motor fuel antiknock compound may be contained by buildingdikes or barriers using soil, sand or other materials.

CONSEQUENCE

Contained motor fuel antiknock compound may percolate into soil or seep through dike material. This may result in loss of contained product and spread of contamination.

MITIGATION

Remove contained product as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may overfill impoundments. Where possible, line collection basins with compatible impervious material.

TECHNIQUE

EXCAVATION . . . A trench or ditch may be excavated to contain leaking product.

CONSEQUENCE

There may be increased potential for groundwater contamination in some cases.

MITIGATION

Remove contained products as soon as possible to prevent spread of contamination. Use surface dikes or barriers where groundwater contamination is possible or line collection basin with compatible impervious material.

TECHNIQUE

PUMPING/VACUUM SUCTION . . . Accumulated liquid pools may be recovered using appropriate hoses, pumps and storage containers or vacuum trucks.

CONSEQUENCE

Equipment that is incompatible with the spilled product may become damaged or develop leaks.

MITIGATION

Use equipment compatible with spilled product.

MOTOR FUEL ANTIKNOCK COMPOUND
Poison B

TECHNIQUE

ABSORPTION . . . Spreading of spilled product may be controlled by absorbing liquid with sand, earth, clay, fly ash, cement powder, peat moss, saw dust, commercial sorbents, or other compatible substances.

CONSEQUENCE

Once used, sorbent materials pose the same hazards as the spilled product. Their use adds to the overall volume of contaminated material.

MITIGATION

Deplete accumulated liquid pools with pumps or vacuum trucks if possible before applying sorbents. Remove contaminated sorbents to safe storage by mechanical means.

TECHNIQUE

MECHANICAL REMOVAL . . . Contaminated soil and any remaining chemical residue may be removed with shovels or motorized graders, scrapers, loaders, bulldozers, or draglines.

CONSEQUENCE

Removal equipment may become contaminated and present a hazard to later users. Incompatible equipment may be damaged or corroded. Improper storage of removed materials may result in future spread of contamination. Any flammable vapors or gases present in the area may be ignited by motorized removal equipment.

MITIGATION

Decontaminate all equipment after use. Use equipment compatible with spilled product. Store contaminated materials in a safe and secure location. Do not operate motorized equipment in potentially flammable atmospheres. Consult qualified experts for advice where necessary.

WATER SPILL

TECHNIQUE

STOP USE . . . Notify downstream industrial, municipal, and public users to stop water intake or to monitor water for contamination.

CONSEQUENCE

Alternative water supplies may be needed to accommodate users.

MITIGATION

Provide alternative water supplies as needed until water supply is declared safe.

TECHNIQUE

CONTAINMENT . . . Spilled product will sink in water. Use natural deep water pockets, excavated lagoons, or sand bag barriers to trap material on bottom and limit spread of contamination.

CONSEQUENCE

Excavation of deep water pocket or lagoon downstream of spill area may be difficult and may have adverse environmental impacts.

MITIGATION

Excavate as last resort.

TECHNIQUE

DREDGING/PUMPING . . . Stream or lake beds may be dredged to remove heavier- than-water spilled products and contaminated bottom sediments. Contaminated materials may be deposited in a barge or pumped ashore. Alternatively, where pools or spilled product have accumulated, hoses and pumps or vacuum trucks may be used for product recovery.

CONSEQUENCE

Dredging may accelerate dispersal of spilled product through the water body and cause other environmental damage. Incompatible equipment may be damaged. Dredged or pumped materials brought to the surface may emit toxic vapors if exposed to the open air.

MITIGATION

Consult qualified experts for guidance.

MOTOR FUEL ANTIKNOCK COMPOUND
Poison B

TECHNIQUE

CONTAINMENT DIKES . . . Water with dissolved chemical may be contained (or diverted to impoundment area) by diking upper and or lower bounds to limit volume of water affected and spread of contamination.

CONSEQUENCE

Earthen dikes may become saturated with water and seep through or collapse. Additional water may cause overflow of diked area or water body boundaries.

MITIGATION

Reinforce or modify dikes as necessary. Be alert to conditions that may lead to overflow or dike collapse. Remove contaminated water to impoundment or storage area for later treatment or disposal.

TECHNIQUE

ADSORPTION . . . Addition of activated carbon to the contaminated water, followed by effective mixing, may capture spilled product that has dissolved in water. Adsorbent materials may later be removed by mechanical means.

CONSEQUENCE

Recovery of activated carbon may require dredging in a process that poses risk of environmental damage. Recovered adsorbent materials will be contaminated with spilled product, as may recovery equipment.

MITIGATION

Consult qualified experts for safe adsorption techniques. Consider pumping water through tank containing adsorbent on land. Handle and store recovered materials safely. Decontaminate equipment as necessary.

TECHNIQUE

AERATION . . . Water containing dissolved volatile chemicals may be decontaminated to some degree by aeration, air stripping, or air sparging techniques. These involve the use of air compressors and perforated piping to bubble large quantities of air through the contaminated water body.

CONSEQUENCE

The air bubbles entering the atmosphere will be contaminated with some amount of chemical vapors if the technique is effective.

MITIGATION

Consult qualified experts for advice and assistance in obtaining and deploying necessary equipment. Apply alternative techniques where air emissions may pose a downwind hazard.

CHEMTOX DATA

IDENTIFIERS

TOX RECORD 5460 LAST UPDATE OF THIS RECORD: 03/03/92

NAME: METHYL tert-BUTYL ETHER
SYNONYMS: tert-BUTYL METHYL ETHER
CAS: 1634-04-4 RTECS: KN5250000
FORMULA: C5H12O MOL WT:
UN:
CHEMICAL CLASS: Ether

See other identifiers listed below under Regulations.

PROPERTIES

PHYSICAL DESCRIPTION:			
BOILING POINT:	326 K	52.8 C	127.1 F
MELTING POINT:	88.15 K	-185 C	-301 F
FLASH POINT:	263 K	-10.3 C	13.7 F
AUTO IGNITION:	NA		
VAPOR PRESSURE:			
UEL:	NA		
LEL:	NA		
VAPOR DENSITY:	No data		
SPECIFIC GRAVITY:	0.758		
DENSITY:	0.758		
WATER SOLUBILITY:			
INCOMPATIBILITIES:	oxidizing agents and strong acids		
REACTIVITY WITH WATER:	No data on water reactivity		
REACTIVITY WITH COMMON MATERIALS:	No data		
STABILITY DURING TRANSPORT:	No Data		
NEUTRALIZING AGENTS:	No data		
POLYMERIZATION POSSIBILITIES:	No data		
TOXIC FIRE GASES:	None reported other than possible unburned vapors		
ODOR DETECTED AT (ppm):	Unknown		
ODOR DESCRIPTION:	No data		
100 % ODOR DETECTION:	No data		

REGULATIONS

DOT hazard class:	3 FLAMMABLE LIQUID
DOT guide:	26
Identification number:	UN2398
DOT shipping name:	Methyl-tert-butylether
Packing group:	II
Label(s) required:	FLAMMABLE LIQUID
Special provisions:	T14
Packaging exceptions:	150
Non bulk packaging:	202

Bulk packaging: 240
Quantity limitations-
Passenger air/rail: 5 L
Cargo aircraft only: 60 L
Vessel stowage: E
Other stowage provisions:

CAS NUMBER: Not listed

CLEAN WATER ACT Sect.307: No
CLEAN WATER ACT Sect.311: No
CLEAN AIR ACT: CAA '90 Listed
EPA WASTE NUMBER: None
CERCLA REF: Not listed
RQ DESIGNATION: Not listed
SARA TPQ VALUE: Not listed
SARA Sect. 312
categories:
Fire hazard: flammable.
LISTED IN SARA Sect 313: Yes
de minimus CONCENTRATION: 1.0 percent

UNITED STATES POSTAL SERVICE MAILABILITY:
Not given

---------- TOXICITY DATA ----------

SHORT TERM TOXICITY: Unknown

LONG TERM TOXICITY: unknown

TARGET ORGANS:

SYMPTOMS: Source:

NIOSH IDLH: Unknown

NIOSH REL: Not given

ACGIH TLV: Not listed
ACGIH STEL: Not listed

OSHA PEL: Not in Table Z-1-A

PEL INFORMATION: Not listed

CARCINOGEN?: N STATUS: See below

CARCINOGEN LISTS:
IARC: Not listed

MAK: Not listed
NIOSH: Not listed
NTP: Not listed
ACGIH: Not listed
OSHA: Not listed

LD50 value: orl-rat LD50:4 gm/ kg

OTHER SPECIES TOXICITY DATA: (Source: NIOSH RTECS 1991)

orl-rat LD50:4 gm/kg
ihl-rat LC50:23576 ppm/4H
ihl-mus LC50:141 mg/m3/15M

IRRITATION DATA: (Source: NIOSH RTECS 1991)

Reproductive toxicity (1991 RTECS):
This chemical has no known mammalian reproductive toxicity.

REPRODUCTIVE TOXICITY DATA (1991 RTECS)

---------- PROTECTION AND FIRST AID ----------

PROTECTION SUGGESTED
FROM THE CHRIS MANUAL:

FIRST AID SOURCE: DOT Emergency Response Guide 1990.
Move victim to fresh air and call emergency medical care; if not breathing, give artificial respiration; if breathing is difficult, give oxygen. In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water. Remove and isolate contaminated clothing and shoes at the site.

---------- INITIAL INCIDENT RESPONSE ----------

US Department of Transportation Guide to Hazardous Materials Transport Information - Publication DOT 5800.5 (1990).
DOT SHIPPING NAME: Methyl-tert-butylether
DOT ID NUMBER: UN2398

ERG90 GUIDE 26

* POTENTIAL HAZARDS *

*FIRE OR EXPLOSION
Flammable/combustible material; may be ignited by heat, sparks or flames.
Vapors may travel to a source of ignition and flash back.
Container may explode in heat of fire.
Vapor explosion hazard indoors, outdoors or in sewers.
Runoff to sewer may create fire or explosion hazard.

*HEALTH HAZARDS

May be poisonous if inhaled or absorbed through skin.
Vapors may cause dizziness or suffocation.
Fire may produce irritating or poisonous gases.
Runoff from fire control or dilution water may cause pollution.

* EMERGENCY ACTION *

Keep unnecessary people away; isolate hazard area and deny entry.
Stay upwind; keep out of low areas.
Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.

Isolate for 1/2 mile in all directions if tank, rail car or tank truck is involved in fire.
CALL CHEMTREC AT 1-800-424-9300 FOR EMERGENCY ASSISTANCE. If water pollution occurs, notify the appropriate authorities.

*FIRE

Small Fires: Dry chemical, CO2 or Halon, water spray or alcohol-resistant foam.
Large Fires: Water spray, fog or alcohol-resistant foam.
Move container from fire area if you can do it without risk.
Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.
For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

*SPILL OR LEAK

Shut off ignition sources; no flares, smoking or flames in hazard area.
Stop leak if you can do it without risk.
Water spray may reduce vapors; but it may not prevent ignition in closed spaces.
Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal.
Large Spills: Dike far ahead of liquid spill for later disposal.

*FIRST AID

Move victim to fresh air and call emergency medical care; if not breathing, give artificial respiration; if breathing is difficult, give oxygen.
In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water.
Remove and isolate contaminated clothing and shoes at the site.

SYNS:
ACETIC ACID-3-METHOXYBUTYL ESTER
BUTOXYL
3-METHOXYBUTYL ACETATE

TOXICITY DATA:	CODEN:
skn-rbt 10 mg/24H open MLD	AMIHBC 10,61,54
eye-rbt 20 mg open	AMIHBC 10,61,54
ori-rat LD50:4210 mg/kg	AMIHBC 10,61,54

Reported in EPA TSCA Inventory.

DOT Classification: Flammable or Combustible Liquid; Label: Flammable Liquid

THR: Mildly toxic by ingestion. A skin and eye irritant. Combustible when exposed to heat or flame; can react with oxidizing materials. To fight fire, use alcohol foam, CO_2, dry chemical. When heated to decomposition it emits acrid smoke and irritating fumes.

MHV859 *HR: 2*

METHYL tert-BUTYL ETHER

CAS: 1634-04-4 NIOSH: KN 5250000
DOT: 2398
mf: $C_5H_{12}O$ mw: 88.17

SYNS:
METHYL 1,1-DIMETHYLETHYL ETHER
PROPANE, 2-METHOXY-2-METHYL (9CI)

Community Right To Know List. Reported in EPA TSCA Inventory.

DOT Classification: Flammable Liquid; Label: Flammable Liquid

THR: Flammable when exposed to heat or flame. When heated to decomposition it emits acrid smoke and irritating fumes. See also ETHERS.

MHW000 *HR: 3*

METHYLBUTYL HYDRAZINE

CAS: 20240-62-4 NIOSH: MV 0900000
mf: $C_5H_{14}N_2$ mw: 102.21

TOXICITY DATA:	CODEN:
ori-rat TDLo:1425 mg/kg/57W-I:ETA	PPTCBY 2,73,72
scu-rat TDLo:1500 mg/kg/60W-I:ETA	PPTCBY 2,73,72

THR: An experimental tumorigen. When heated to decomposition it emits toxic fumes of NO_x. See also HYDRAZINE.

MHW250 *HR: 3*

1-METHYL-2-BUTYL-HYDRAZINE DIHYDROCHLORIDE

CAS: 7345-79-2 NIOSH: MV 0905000
mf: $C_5H_{14}N_2 \cdot 2ClH$ mw: 175.13

SYN: 1-BUTYL-2-METHYL-HYDRAZINE DIHYDROCHLORIDE

TOXICITY DATA:	CODEN:
ori-rat TDLo:1425 mg/kg/57W-I:ETA	23HZAR -,267,70
scu-rat TDLo:1275 mg/kg/51W-I:ETA	23HZAR -,267,70
unr-rat LD50:600 mg/kg	23HZAR -,267,70

THR: An experimental tumorigen. Moderately toxic unspecified route. When heated to decomposition it very toxic fumes of Cl⁻ and NO_x.

MHW350

N-3-METHYLBUTYL-N-1-METHYL ACETONITROSAMINE

CAS: 71016-15-4 NIOSH: EL 8[illegible]
mf: $C_9H_{18}N_2O_2$ mw: 186.29

SYNS:
3-((ISOPENTYL)NITROSOAMINO)-2-BUTANONE
MAMBNA

TOXICITY DATA:	CODEN:
mma-sat 2 g/L	CRNGDP 1,867,8
otr-ham:ing 500 mg/L	SSBSEF 25,738,8
ori-rat TDLo:27 g/kg/74W-C:ETA	CMJODS 97,311,
ori-mus TDLo:8400 mg/kg/19W-C:ETA	CMJODS 97,311,

THR: An experimental tumorigen. Many nitrosamine carcinogens. Mutagenic data. When heated to decomposition it emits toxic fumes of NO_x. See also NITROSAMINES.

MHW500

METHYLBUTYLNITROSAMINE

CAS: 7068-83-9 NIOSH: EO 5[illegible]
mf: $C_5H_{12}N_2O$ mw: 116.19

SYNS:
MBNA
METHYL-BUTYL-NITROSAMIN (GERMAN)
METHYL-N-BUTYLNITROSAMINE
N-METHYL-N-NITROSOBUTYLAMINE
N-NITROSO-N-BUTYLMETHYLAMINE
N-NITROSOMETHYL-N-BUTYLAMINE
NMBA

TOXICITY DATA:	CODEN:
mmo-sat 1 mg/plate	TCMUD8 1,295,[illegible]
mma-sat 10 µmol/plate	TCMUE9 1,13,8[illegible]
mma-esc 100 µmol/L	MUREAV 26,36[illegible]
pic-esc 100 mg/L	TCMUE9 1,91,8[illegible]
ori-rat TDLo:128 mg/kg/20W-I:ETA	CRNGDP 1,157,[illegible]
ihl-rat TDLo:31 mg/kg/30W-I:ETA	ZEKBAI 75,221,
scu-rat TDLo:150 mg/kg/30W-I:ETA	IJPBAR 17,180,[illegible]
ori-mus TDLo:182 mg/kg/1Y-C:CAR	85DUA4 -,129,[illegible]
scu-mus TDLo:90 mg/kg/50W-I:ETA	85DUA4 -,129,[illegible]
ihl-rat TD :69 mg/kg/23W:ETA	ARZNAD 19,10[illegible]

FUEL OIL NO. 4
Combustible Liquid

GENERAL INFORMATION

Fuel oil no. 4 is a brownish liquid used primarily as a commercial or industrial heating fuel and having a characteristic fuel oil or kerosene odor. It is essentially insoluble in water and lighter, so may be expected to form a floating oil slick. Its minimum flash point of about 142°F indicates that some degree of preheating is necessary before the product can be ignited easily. Accumulations of vapor from heated liquid in confined spaces may result in explosions if ignited. There is a limited potential for containers of liquid to rupture violently if exposed to fire or excessive heat for sufficient time duration. The product weighs approximately 7.5 pounds per gallon.

Fuel oil no. 4 does not react with water or many other common materials and is stable in normal transportation. It is a relatively noncorrosive substance and is primarily incompatible with strong oxidizing materials that may cause its ignition. Toxicity via potential routes of exposure is low to moderate. Products of combustion may include toxic constituents.

CHEMICAL/PHYSICAL DATA

Solubility in Water: Essentially insoluble
Solubility in Other Chemicals: Soluble in other hydrocarbons
Specific Gravity (Liquid): 0.904 at 59°F (15°C)
Boiling Point: 214-1092°F (101-589°C) or higher at 1 atm.
Melting Point: See freezing point
Freezing Point: −20 to 15°F (−29 to −9°C)
Molecular Weight: Mixture
Heat of Combustion: −9,700 cal/g

Vapor Pressure: Approx 2 mm HG (0.04 psia), at 68°F (20°C)
Flash Point: 142-240°F (61-116°C), closed cup
Autoignition Temperature: 505°F (263°C)
Burning Rate: 4 mm/minute
Stability: Stable
Corrosiveness: Noncorrosive
Reactivity with Water: No reaction
Reactivity with Other Chemicals: Reacts with strong oxidizing materials.

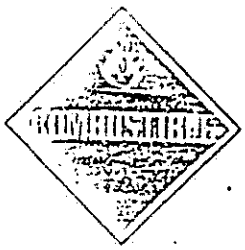
IDENTIFICATION

Shipping Names: Fuel oil, no. 4 (USDOT); flammable liquids, N.O.S. (IMO).
Synonyms and Tradenames: Residual fuel no. 4; cat cracker feedstock
Chemical Formula: Hydrocarbon mixture
Constituent Components(% each): Complex mixture
49 STCC: 49 151 12

UN/NA Designation: NA1993; UN1993
IMO Designation: 3.3, flammable liquid
Physical State as Shipped: Liquid
Physical State as Released: Liquid
Color of the Shipped Material: Brown
Odor Characteristics: Like kerosene or fuel oil
Common Uses: Commercial and industrial burner fuel.

FOR ADDITIONAL ASSISTANCE OR INFORMATION CALL:
CHEMTREC (800)424-9300 OR (202)483-7616 OR
THE AAR BUREAU OF EXPLOSIVES (202)835-9500

FUEL OIL NO. 4
Combustible Liquid



POTENTIAL HAZARDS

GENERAL HAZARDS

Threshold Odor Concentration: 0.11 ppm
Unusual Hazards: None
Short Term Exposure Limits(STEL): Unavailable
Time Weighted Average(TLV-TWA): Unavailable
Conditions to Avoid: Heat, fire, and sparks; contact with incompatible materials; runoff to sewers or water bodies; inhalation, ingestion, or direct physical contact.

HEALTH HAZARDS

Public Health Hazards: Health hazards are generally low unless the product is ingested in significant quantities. Nevertheless, all major exposures should be avoided.
Hazards of Skin or Eye Contact: Prolonged or repeated skin contact with fuel oils may cause drying and cracking of the skin due to the defatting action of these products, as well as the possibility of blisters. Contact with the eyes should result in little or no injury in most cases.
Hazards of Inhalation: Prolonged exposure to high vapor concentrations evolved from fuel oils may case headache, slight giddiness, and possibly irritation of the eyes, nose, and lungs. Such concentrations are generally unlikely outdoors.however, except in the immediate vicinity of the spilled product.
Hazards of Ingestion: By analogy with other fuel oils, ingestion may cause nausea, vomiting, cramping, and possible central nervous system depressionresulting in symptoms ranging from headache to anesthesia, coma, and death. Aspiration into the lungs during vomiting may result in coughing, gagging, difficult breathing, substernal distress, rapidly developing pulmonary edema, and delayed brochopneumonia and pneumonitis with possibly severe consequences.

FIRE HAZARDS

Lower Flammable Limit: 1.0%
Upper Flammable Limit: 5.0%
Behavior in Fire: Combustible liquid. Will burn but may be difficult to ignite unless warmed. There is some limited possibility that containers may rupture violently in fire.
Hazardous Combustion Products: Not well-defined, may include toxic constituents.

EXPLOSION HAZARDS

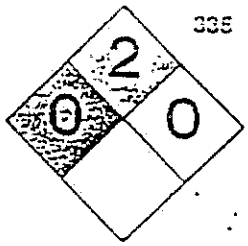
Lower Explosive Limit: Unavailable
Upper Explosive Limit: Unavailable
Explosiveness: Explosions may result if vapors of heated liquid are ignited in a confined area. There is some limited possibility that containers may rupture in fire.

PROTECTIVE CLOTHING AND EQUIPMENT

Protective Clothing Required: Equipment should prevent repeated or prolonged skin contact and any reasonable probability of eye contact with the spilled product. This may include rubber boots, gloves, face shields, splash-proof safety goggles, and other impervious and resistant clothing. Compatible materials may include neoprene, nitrile rubber, nitrile rubber/polyvinyl chloride, polyethylene, polyurethane, polyvinyl alcohol, Viton, and nitrile-butadiene rubber.
Respiratory Protection: For unknown concentrations, fire fighting, or high concentrations, a self-contained breathing apparatus (SCBA) with full facepiece (or the equivalent).

1993

FUEL OIL NO. 4
Combustible Liquid



FIRST AID

Nonspecific symptoms: Irritation of the eyes, skin, or respiratory tract; other symptoms of exposure.
First Aid for Inhalation: Remove victim to fresh air and keep warm and at rest. If breathing becomes difficult or if breathing has stopped, administer artificial respiration. Get medical attention immediately. (Caution: Administration of mouth-to-mouth resuscitation may expose the first aid provider to chemical within the victim's lungs or vomit.)
First Aid for Skin and Eye Contact: Flush eyes immediately with water for at least 15 minutes, occasionally lifting the eyelids. Remove all contaminated clothing. Wash affected body areas with large amounts of soap and water. Get medical attention if irritation persists after washing.
First Aid for Ingestion: Do not induce vomiting. Keep victim warm and at rest. Get medical attention immediately.

FIRE RESPONSE

Extinguishing Materials: Foam, dry chemical, carbon dioxide, water spray. Water may be ineffective.
Extinguishing Techniques: Stay upwind. Wear breathing apparatus and appropriate protective clothing. Move container from fire area if no risk. Do not extinguish burning cargo unless flow can be stopped safely. Be alert to the possibility that the container may tear or rupture and suddenly release massive amounts of product when exposed to high heat (over 800°F), such as from a direct flame. Use water from side and from safe distance to keep fire exposed containers cool. For massive fire in cargo area, use unmanned hose holder or monitor nozzles. Withdraw immediately in case of rising sound from venting safety device or discoloration of tank.

SPILL RESPONSES

General Information: Restrict access to area. Keep unprotected personnel upwind of spill area. Eliminate ignition sources. Prevent liquid from entering sewers and confined spaces. Protect sewers and waterways from contaminated runoff. Notify proper authorities, downstream sewer and water treatment operations, and other downstream users of potentially contaminated water. Note that intake of fuel oil may result in rupture or explosion of boilers or industrial process equipment. Choose equipment, where possible, that is not corroded or otherwise damaged by the spilled product.

AIR SPILL

TECHNIQUE

MONITOR THE SITUATION . . . Fuel oil no. 4 may not evolve large amounts of hazardous airborne contaminants in many outdoor spill situations. It may be advisable in some cases to simply monitor the situation until the spilled product is removed.

CONSEQUENCE

Hazardous levels of fuel oil no. 4 in air may be found in the local spill area and immediately downwind.

MITIGATION

Remove the spilled product as soon as possible. Restrict access to the local spill area and areas immediately downwind by unprotected personnel.

TECHNIQUE

WATER FOG OR SPRAY . . . Water fog or spray applied to fuel oil no. 4 vapors or fumes may accelerate their dispersal in the atmosphere (where necessary).

CONSEQUENCE

Water runoff may contain a small amount (if any) of fuel oil no. 4 from contact with airborne vapors or fumes.

MITIGATION

Contain contaminated water and remove as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may add to spill volume and overfill impoundments.

FUEL OIL NO. 4
Combustible Liquid

TECHNIQUE

FOAM . . . Firefighting foam applied to the surface of liquid pools may slow the release of fuel oil no. 4 vapors into the atmosphere (where necessary.)

CONSEQUENCE

The effects of foam may be short term. As the foam breaks down, release of vapors will increase. Products of foam breakdown will add to the volume of spilled material.

MITIGATION

Continue foam applications until spilled product is removed. Contain increased volume.

LAND SPILL

TECHNIQUE

CONTAINMENT DIKES . . . Fuel oil no. 4 may be contained by building dikes or barriers using soil, sand or other materials.

CONSEQUENCE

Contained fuel oil no. 4 may percolate into soil or seep through dike material. This may result in loss of contained product and spread of contamination.

MITIGATION

Remove contained product as soon as possible to prevent spread of contamination. Be alert to conditions such as fire hose runoff or rainwater that may overfill impoundments. Where possible, line collection basins with compatible impervious material.

TECHNIQUE

EXCAVATION . . . A trench or ditch may be excavated to contain leaking product.

CONSEQUENCE

There may be increased potential for groundwater contamination in some cases.

MITIGATION

Remove contained products as soon as possible to prevent spread of contamination. Use surface dikes or barriers where groundwater contamination is possible or line collection basin with compatible impervious material.

TECHNIQUE

PUMPING/VACUUM SUCTION . . . Accumulated liquid pools may be recovered using appropriate hoses, pumps and storage containers or vacuum trucks.

CONSEQUENCE

Equipment that is incompatible with the spilled product may become damaged or develop leaks.

MITIGATION

Use equipment compatible with spilled product.

TECHNIQUE

ABSORPTION . . . Spreading of spilled product may be controlled by absorbing liquid with sand, earth, clay, fly ash, cement powder, peat moss, saw dust, straw, commercial sorbents, or other compatible substances.

CONSEQUENCE

Once used, sorbent materials pose the same hazards as the spilled product. Their use adds to the overall volume of contaminated material.

MITIGATION

Deplete accumulated liquid pools with pumps or vacuum trucks if possible before applying sorbents. Remove contaminated sorbents to safe storage by mechanical means.

FUEL OIL NO. 4
Combustible Liquid

TECHNIQUE

MECHANICAL REMOVAL . . . Contaminated soil and spilled product may be removed by shovels, motorized graders and scrapers, loaders, bulldozers, and draglines.

CONSEQUENCE

Removal equipment may become contaminated and present a hazard to later users. Incompatible equipment may be damaged or corroded. Improper storage of removed materials may result in future spread of contamination.

MITIGATION

Decontaminate all equipment after use. Use equipment compatible with spilled product. Store contaminated materials in safe and secure location.

WATER SPILL

TECHNIQUE

STOP USE . . . Notify downstream industrial, municipal, and public users to stop water intake or to monitor water for contamination.

CONSEQUENCE

Alternative water supplies may be needed to accommodate users.

MITIGATION

Provide alternative water supplies as needed until water supply is declared safe.

TECHNIQUE

FLOATING BOOMS/BARRIERS . . . Oil spill containment booms of compatible material may be deployed. Alternatively, mesh or nets may be strung across stream and anchored every 6-8 feet. Straw or peat placed on upstream side of mesh should absorb and retard spreading of spilled product.

CONSEQUENCE

Leakage may occur under or through barrier if high waves or current present or if not properly deployed. Incompatible materials may be damaged by spilled product. Booms, barrier materials, and deployment equipment may be contaminated. Fire hazards pose risk to response personnel and equipment.

MITIGATION

Proceed with caution. Stage barriers in series where necessary. Recover spilled product as soon as possible. Decontaminate equipment after use. Dispose of waste materials in proper and safe manner. Use compatible equipment. Eliminate ignition sources.

TECHNIQUE

WATER BY-PASS DAMS . . . Streams may be provided with a by-pass dam. This is a dam made of compacted earth, clay, or other material with open tubes or pipes passing through under water. Upstream ends of pipes or tubes should be well below the layer of floating contaminant. Downstream ends should be at a higher elevation but still below the floating layer. Valves may be installed on downstream ends to control water flow.

CONSEQUENCE

Earthen dams may become saturated with water and seep through or collapse. An insufficient number of by-pass tubes or pipes or additional water may cause overflow.

MITIGATION

Use sufficient number and capacity of tubes or pipes. Be alert to conditions that may lead to dam overflow or collapse. Remove spilled product as soon as possible.

TECHNIQUE

DIVERSION . . . Where other means are unavailable, floating slicks may be temporarily herded, diverted, or controlled using water hose streams, small boat propeller wash or chemical surface tension modifiers known as spill herders.

CONSEQUENCE

Hose streams and propeller washes have limited applicability and effectiveness. The latter may cause undesired mixing of spilled product and water due to extreme agitation. Chemical spill herders should not be used until approval is obtained from authorized environmental officials.

MITIGATION

Use other means if available.

FUEL OIL NO. 4
Combustible Liquid

TECHNIQUE

SURFACE SKIMMING . . . Oil spill skimming devices may be deployed to recover floating fuel oil no. 4.

CONSEQUENCE

Incompatible equipment may be damaged. Equipment may be contaminated and pose hazard to future users. Fire hazard may pose risk to response personnel and equipment.

MITIGATION

Decontaminate equipment after use. Use compatible equipment. Store recovered product in safe and secure location. Eliminate ignition sources.

TECHNIQUE

ABSORPTION . . . Straw, hay, peat, or commercial sorbent materials compatible with fuel oil no. 4 may be used to absorb spilled product from the water surface, preferably after the spill has been contained.

CONSEQUENCE

Once used, sorbent materials pose the same hazards as the spilled product. Their use adds to the overall volume of contaminated material. Deployment and recovery can be difficult. Fire hazards pose risk to response personnel and equipment.

MITIGATION

Proceed with caution. Decontaminate equipment after use. Store and dispose of waste materials in proper and safe manner. Use compatible equipment. Eliminate ignition sources.

****

SECTION I

****

MSDS NUMBER	01771-OSX
PART NUMBER	
MSDS CODE	
MSDS OTHER CODE ...	
SYNONYMS	
MANUFACTURER	AIRCO
MFG PART NUMBER ...	
VENDOR	
EMERGENCY PHONE ...	800-424-9300 (CHEMTREC)
OTHER CALLS	201-464-8100
ADDRESS	575 MOUNTAIN AVENUE
CITY	MURRAY HILL STATE ...NJ ZIP ...07974
MSDS PREPARED BY ..	
DATE PREPARED	08/03/89

****

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

****

TRADE NAME ....: OXYGEN

INGREDIENT NAME	CAS	OSHA PEL	ACGIH TLV	OTHER	%
OXYGEN	7782-44-7				99.[illegible] 100

****

SECTION III - CHEMICAL CHARACTERISTICS

****

BOILING POINT	MELTING POINT	FREEZING POINT	SPECIFIC GRAVITY (H2O = 1)
-297.3 F TO -182.9 C			1.11 (GAS, AIR=1.0)

PERCENT VOLATILE by VOLUME	THEORETICAL VOC CONTENT (percent of WEIGHT)	WEIGHT PER GALLON

pH:
Conc:

VAPOR PRESSURE (mm of Hg) ABOVE CRITICAL TEMP.

VAPOR DENSITY (Air = 1)

DENSITY

EVAPORATION RATE
Basis ( )=1
Rate

SOLUBILITY IN WATER

REACTIVITY IN WATER

APPEARANCE AND ODOR:
COLORLESS GAS, ODORLESS.

****

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

****

FLASH POINT
N/A

METHOD

FLAMMABLE LIMITS IN AIR (%)
UPPER = N/A LOWER = N/A

AUTOIGNITION TEMPERATURE

NFPA CODES: HEALTH ....:
FLAMMABILITY ....:
REACTIVITY ......:
OTHER ....:

HMIS CODES: HEALTH ....:
FLAMMABILITY ....:
REACTIVITY ......:
PROTECTION ......:

EXTINGUISHER MEDIA: COPIOUS QUANTITIES OF WATER (OR THE SUITABLE EXTINGUISHING AGENT FOR THE COMBUSTIBLE MATERIAL) FOR FIRES WITH OXYGEN AS THE OXIDIZER.

SPECIAL FIRE FIGHTING PROCEDURES:
IF POSSIBLE, STOP THE FLOW OF OXYGEN WHICH IS SUPPORTING THE FIRE.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
ELECTRICAL CLASSIFICATION: NONHAZARDOUS VIGOROUSLY ACCELERATES COMBUSTION.

****

SECTION V - REACTIVITY DATA

****

IS THIS CHEMICAL STABLE UNDER NORMAL CONDITIONS OF HANDLING/STORAGE (Y/N)? Y

CONDITIONS TO AVOID (REGARDING STABILITY):
CONTACT WITH ALL FLAMMABLE MATERIALS.

INCOMPATIBILITY (MATERIALS TO AVOID):
ALL FLAMMABLE MATERIALS.

HAZARDOUS DECOMPOSITION PRODUCTS:

[illegible]DOUS POLYMERIZATION POSSIBLE (Y/N) ? N

[illegible] TO AVOID (REGARDING POLYMERIZATION):

SECTION VI - HEALTH HAZARDS

[illegible]TES OF ENTRY: INHALATION, SKIN, EYES.

SIGNS AND SYMPTOMS OF -
ACUTE OVEREXPOSURE:
INHALATION: HIGH CONCENTRATIONS (GREATER THAN 75%) CAUSES SYMPTOMS OF HYPEROXIA WHICH INCLUDED CRAMPS, NAUSEA, DIZZINESS, HYPTHERMIA, AMBYLOPIA, RESPIRATION DIFFICULTIES, BRADYCARDIA, FAINTING SPELLS AND CONVULSIONS CAPABLE OF LEADING TO DEATH. THE PROPERTY IS THAT OF HYPEROXIA WHICH LEADS TO PNEUMONIA. CONCENTRATIONS BETWEEN 25 AN 75 PERCENT PRESENT A RISK OF INFLAMMATION OF ORGANIC MATTER IN THE BODY. SKIN: CONTACT WITH LIQUID PRODUCT MAY CAUSE TISSUE FREEZING. EYES: CONTACT WITH LIQUID PRODUCT MAY CAUSE TISSUE FREEZING.

CHRONIC OVEREXPOSURE:
CHEMICAL LISTED AS A CARCINOGEN OR POTENTIAL CARCINOGEN

NATIONAL TOXICOLOGY PROGRAM	IARC MONOGRAPHS	OSHA
(Y/N): N	(Y/N): N	(Y/N): N

[illegible]EDICAL CONDITIONS GENERALLY
AGGRAVATED BY EXPOSURE:

EMERGENCY AND FIRST AID PROCEDURES

EMERGENCY PHONE NUMBER OF MANUFACTURER: 800-424-9300 (CHEMTREC)

1. INHALATION: PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO OXYGEN. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. VICTIMS SHOULD BE ASSISTED TO AN UNCONTAMINATED AREA AND INHALE FRESH AIR. QUICK REMOVAL FROM THE CONTAMINATED AREA IS MOST IMPORTANT. UNCONSCIOUS PERSONS SHOULD BE MOVED TO AN UNCONTAMINATED AREA, AND IF BREATHING HAS STOPPED, ADMINISTER ARTIFICIAL RESUSCITATION AND SUPPLEMENTAL OXYGEN. FURTHER TREATMENT SHOULD BE SYMPTOMATIC AND SUPPORTIVE. THE PHYSICIAN SHOULD BE INFORMED THAT THE VIITIM COULD BE EXPERIENCING HYPEROXIA.

[illegible] ON OIL INTO THE EYES WITHOUT
MEDICAL ADVICE. IN CASE OF FREEZING OR CRYOGENIC "BURNS"
CAUSED BY RAPIDLY EVAPORATING LIQUID, DO NOT WASH THE EYES

WITH HOT OR EVEN TEPID WATER. REMOVE VICTIM FROM THE SOURCE OF CONTAMINATION. OPEN EYELIDS WIDE TO ALLOW LIQUID TO EVAPORATE. IF PAIN IS PRESENT, REFER THE VICTIM TO AN OPTHALMOLOGIST FOR TREATMENT AND FOLLOW UP. IF THE VICTIM CANNOT TOLERATE LIGHT, PROTECT THE EYES WITH A LIGHT BANDAGE.

C. SKIN CONTACT: FOR DERMAL CONTACT OR FROSTBITE: REMOVE CONTAMINATED CLOTHING AND FLUSH AFFECTED AREAS WITH LUKEWARM WATER. DO NOT USE HOT WATER. A PHYSICIAN SHOULD SEE THE PATIENT PROMPTLY IF THE CRYOGENIC "BURN" HAS RESULTED IN BLISTERING OF THE DERMAL SURFACE OR DEEP TISSUE FREEZING.

D. INGESTION:

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

HAZARD CLASS ....:
U.S. DOT ID .....:
UN NUMBER ....:
  NUMBER ....:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
USE ONLY IN WELL-VENTILATED AREAS. VALVE PROTECTION CAPS MUST REMAIN IN PLACE UNLESS CONTAINER IS SECURED WITH VALVE OUTLET PIPED TO USE POINT. DO NOT DRAG, SLIDE OR ROLL CYLINDERS. USE A SUITABLE HAND TRUCK FOR CYLINDER MOVEMENT. USE A PRESSURE REDUCING REGULATOR WHEN CONNECTING CYLINDER TO LOWER PRESSURE (<3000 PSIG) PIPING OR SYSTEMS. DO NOT HEAT CYLINDER BY ANY MEANS TO INCREASE THE DISCHARGE RATE OF PRODUCT FROM THE CYLINDER. USE A CHECK VALVE OR TRAP IN THE DISCHARGE LINE TO PREVENT HAZARDOUS BACK FLOW INTO THE SYSTEM. PROTECT CYLINDERS FROM PHYSICAL DAMAGE. STORE IN COOL, DRY, WELL-VENTILATED AREA AWAY FROM HEAVILY TRAFFICKED AREAS AND EMERGENCY EXITS. DO NOT ALLOW THE TEMPERATURE WHERE CYLINDERS ARE STORED TO EXCEED 130 DEGREES F (54 DEGREES C). CYLINDERS SHOULD BE STORED UPRIGHT AND FIRMLY SECURED TO PREVENT FALLING OR BEING KNOCKED OVER. FULL AND EMPTY CYLINDERS SHOULD BE SEGREGATED. USE A "FIRST IN-FIRST OUT" INVENTORY SYSTEM TO PREVENT FULL CYLINDERS BEING STORED FOR EXCESSIVE PERIODS OF TIME. POST "NO SMOKING OR OPEN FLAMES" SIGNS IN THE STORAGE AREA OR USE AREA. THERE SHOULD BE NO SOURCES OF IGNITION IN THE STORAGE OR USE AREA. FOR ADDITIONAL STORAGE RECOMMENDATIONS, CONSULT COMPRESSED GAS ASSOCIATION'S PAMPHLETS P-1, P-14, AND SAFETY BULLETIN SB-2. NEVER CARRY A COMPRESSED GAS CYLINDER OR A CONTAINER OF A GAS IN CRYOGENIC LIQUID FORM IN AN ENCLOSED SPACE SUCH AS A CAR TRUNK, VAN OR STATION WAGON. A LEAK CAN RESULT IN A FIRE, EXPLOSION, ASPHYXIATION OR A TOXIC EXPOSURE.

[illegible] IF MATERIAL IS RELEASED OR SPILLED:
[illegible] CUSTOMER SITE VESSELS SHOULD OPERATE IN ACCORDANCE WITH THE

[illegible] AIRCO'S INSTRUCTIONS. DO NOT ATTEMPT TO REPAIR, ADJUST OR [illegible] OTHER WAY MODIFY THE OPERATION OF THESE VESSELS. IF THERE IS A [illegible] OR OTHER TYPE OF OPERATIONS PROBLEM WITH THE VESSEL, CONTACT THE [illegible] AIRCO LOCATION IMMEDIATELY.

WASTE DISPOSAL METHODS:
DO NOT ATTEMPT TO DISPOSE OF WASTE OR UNUSED QUANTITIES. RETURN IN THE SHIPPING CONTAINER PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE TO AIRCO FOR PROPER DISPOSAL.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION:

VENTILATION REQUIREMENTS:
USE LOCAL EXHAUST TO PREVENT ACCUMULATION OF HIGH CONCENTRATIONS THAT INCREASE THE OXYGEN LEVEL IN AIR TO MORE THAN 25%.

LOCAL EXHAUST:

MECHANICAL:

SPECIAL:

OTHER:

PROTECTIVE GLOVES:

EYE PROTECTION:
SAFETY GOGGLES OR GLASSES PLUS A FACE-SHIELD.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
SKIN PROTECTION: LOOSE FITTING AND INSULATED. OTHER PROTECTION: SAFETY SHOES, SAFETY SHOWER.

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

TRADE NAME ..... GASOLINE - REGULAR

INGREDIENT NAME	CAS	OSHA PEL	ACGIH TLV	OTHER	%
PETROLEUM DISTILLATE			300 PPM -		95)
TETRAETHYL LEAD			.75 MG/M3		< 1.0)
			SKIN		

[illegible]

[illegible] PRESSURE	[illegible] DENSITY	DENSITY	EVAPORATION [illegible]
(mm Hg)	(AIR = 1)		Basis (ETHER = 1)
[illegible] @68F	HEAVIER		Rate SLOWER

SOLUBILITY IN WATER

REACTIVITY IN WATER

APPEARANCE AND ODOR:

SECTION III - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT — METHOD — FLAMMABLE LIMITS IN AIR (%) UPPER = LOWER = 1.4% — AUTOIGNITION TEMPERATURE

NFPA CODES: HEALTH ....:
FLAMMABILITY ....:
REACTIVITY ......:
OTHER ....:

HMIS CODES: HEALTH ....:
FLAMMABILITY ....:
REACTIVITY ......:
PROTECTION ......:

EXTINGUISHER MEDIA: REGULAR FOAM OR CARBON DIOXIDE OR DRY CHEMICAL.

SPECIAL FIRE FIGHTING PROCEDURES:
WATER MAY BE INEFFECTIVE. SELF-CONTAINED BREATING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE

UNUSUAL FIRE AND EXPLOSION HAZARDS:
PRODUCT IGNITES EXPLOSIVELY. VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL ALONG THE GROUND [illegible] MOVED BY VENTILATION AND IGNITED BY PILOT LIGHTS, OTHER FLAMES, [illegible], HEATERS, SMOKING, ELECTRIC MOTORS OR OTHER [illegible] [illegible] FROM [illegible] POINT. NEVER USE [illegible] [illegible] [illegible]

SECTION IV - REACTIVITY DATA

IS CHEMICAL STABLE UNDER NORMAL CONDITIONS OF HANDLING/STORAGE (Y/N)? Y

[illegible]

CONDITIONS TO AVOID REGARDING STABILITY: [illegible]

INCOMPATIBILITY (MATERIALS TO AVOID):
AVOID CONTACT WITH: STRONG OXIDIZING AGENTS (E.G. NITRIC ACID, PERMANGANATES, ETC.)

HAZARDOUS DECOMPOSITION PRODUCTS:
MAY FORM TOXIC MATERIALS, SUCH AS: CARBON MONOXIDE, CARBON DIOXIDE, VARIOUS HYDROCARBONS

HAZARDOUS POLYMERIZATION POSSIBLE (Y/N)? N

CONDITIONS TO AVOID (REGARDING POLYMERIZATION):

SECTION VI - HEALTH HAZARDS

ROUTES OF ENTRY: SKIN, EYES, INGESTION, INHALATION

SIGNS AND SYMPTOMS OF -
ACUTE OVEREXPOSURE:
EYES: CAN CAUSE SEVERE IRRITAITON, REDNESS, TEARING BLURRED VISION. SKIN: PROLONGED OR REPEATED CONTACT CAN CAUSE MODERATE IRRITATION, DEFATTING, DERMATITIS. BREATHING: EXCESSIVE INHALATION OF VAPORS CAN CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS, AND EVEN ASPHYXIATION. SWALLOWING: CAN CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, DIARRHEA. ASPIRATION OF MATERIAL INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

CHRONIC OVEREXPOSURE:
THE ATLANTIC RICHFIELD COMPANY FILED A TSCA 8(e) NOTICE WITH THE ENVIRONMENTAL PROTECTION AGENCY ON [illegible] CONCERNING AN AMERICAN PETROLEUM INSTITUTE SPONSORED CHRONIC INHALATION STUDY. THE STUDY HAS SHOWN CHRONIC EXPOSURE TO UNLEADED GASOLINE VAPOR HAS CAUSED ADVERSE HEALTH EFFECTS IN [illegible] [illegible] YEARS [illegible] UNLEADED GASOLINE [illegible] SHOWED INCREASED [illegible] [illegible] [illegible] MALE AND FEMALE [illegible] [illegible] FEMALE [illegible] UNLEADED GASOLINE [illegible] [illegible]

[illegible] LISTED AS A CARCINOGEN OR POTENTIAL CARCINOGEN

[illegible]

[illegible]

[illegible] CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:

EMERGENCY AND FIRST AID PROCEDURES

EMERGENCY PHONE NUMBER OF MANUFACTURER: [illegible] (24 HOUR)

1. INHALATION: IF AFFECTED, REMOVE INDIVIDUAL TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN. IF BREATHING HAS STOPED, GIVE ARTIFICIAL RESPIRATION. KEEP PERSON WARM, QUIET, AND GET MEDICAL ATTENTION.

2. EYE CONTACT: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER AND LOWER LIDS OCCASIONALLY. GET MEDICAL ATTENTION.

3. SKIN CONTACT: THOROUGHLY WASH EXPOSED AREA WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.

4. INGESTION: DO NOT INDUCE VOMITING. KEEP PERSON WARM, QUIET, AND GET MEDICAL ATTENTION. ASPIRATION OF MATERIAL INTO THE LUNGS DUE TO VOMITING CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

HAZARD CLASS ....:
U.S. DOT ID .....:
UN NUMBER ....:
NA NUMBER ....:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED. SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THIS DATA SHEET MUST BE OBSERVED.

OTHER PRECAUTIONS:

[illegible] TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
[illegible] SPILL: ELIMINATE ALL SOURCES OF IGNITION. [illegible] LIQUID [illegible] VERMICULITE, FLOOR ABSORBENT OR OTHER ABSORBENT MATERIAL AND TRANSFER TO [illegible] LARGE SPILL: ELIMINATE ALL IGNITION SOURCES [illegible]

[illegible] INCLUDING PILOT LIGHTS, ELECTRICAL SPARKS). PERSONS NOT WEARING [illegible] EQUIPMENT SHOULD BE EXCLUDED FROM AREA OF SPILL UNTIL CLEAN-UP HAS BEEN COMPLETED. STOP SPILL AT SOURCE, DIKE AREA OF SPILL TO PREVENT [illegible] PUMP LIQUID TO SALVAGE TANK. REMAINING LIQUID MAY BE TAKEN UP ON [illegible] OR SORBENT, OR OTHER MATERIAL AND DISPOSED OF [illegible].

[illegible]

TIME FOR VAPORS TO COMPLETELY CLEAR HOOD DUCT WORK. DESTROY REMAINING MATERIAL BY BURNING IN AN IRON PAN. LARGE SPILL: DESTROY BY LIQUID INCINERATION.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION:
IF TLV OF THE PRODUCT OR ANY COMPONENT IS EXCEEDED, A NIOSH/MESA JOINTLY APPROVED SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IS ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MESA RESPIRATORS UNDER SPECIFIED CONDITIONS. (SEE YOUR SAFETY EQUIPMENT SUPPLIER).

VENTILATION REQUIREMENTS:
PROVIDE SUFFICIENT MECHANICAL (GENERAL) AND/OR LOCAL EXHAUST VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).
LOCAL EXHAUST:

MECHANICAL:

SPECIAL:

OTHER:

PROTECTIVE GLOVES:
[illegible] RESISTANT GLOVES SUCH AS: NEOPRENE [illegible].

EYE PROTECTION:
[illegible] SHOULD BE WORN IN COMPLIANCE WITH OSHA REGULATIONS WHERE EYE CONTACT IS POSSIBLE. CONSULT OSHA REGULATIONS FOR EXACT SPECIFICATIONS. CONSULT A SAFETY EQUIPMENT SUPPLIER.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WEAR IMPERVIOUS CLOTHING AND boots.

MATERIAL SAFETY DATA SHEET - ACE MSDS - JET FUEL JP-4
TRADE NAME: JET FUEL - GRADE JP-4 TURBINE FUEL

SECTION I

MSDS NUMBER .....: ACE MSDS - JET FUEL JP-4
PART NUMBER .....:
MSDS CODE .....:
MSDS OTHER CODE ..:
SYNONYMS .....:

MANUFACTURER .....: MAPCO PETROLEUM INC.
DIVISION .....:
MFG PART NUMBER ..:
VENDOR .....:
EMERGENCY PHONE ..: (901) 774-3100
OTHER CALLS .....: (901) 774-3100
ADDRESS .....: 543 WEST MALLORY AVENUE
CITY .....: MEMPHIS STATE ..:TN ZIP ..:38109
MSDS PREPARED BY .:
DATE PREPARED ....: 11-14-85

********** ADDITIONAL INFORMATION **********
CHEMICAL NAME AND SYNONYMS: AVIATION TURBINE FUEL
CHEMICAL FAMILY: HYDROCARBONS

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

TRADE NAME .....: JET FUEL - GRADE JP-4 (TURBINE FUEL)

INGREDIENT NAME	CAS	OSHA PEL	ACGIH TLV	OTHER	%
PETROLEUM DISTILLATE			200 PPM		100
(FLAMMABLE LIQUID)**					

********** ADDITIONAL INFORMATION **********

** CONTAINS ANTIOXIDANT AND CORROSION INHIBITOR AND FUEL SYSTEM ICING INHIBITOR AS ADDITIVES.

SECTION III - CHEMICAL CHARACTERISTICS

BOILING POINT	MELTING POINT	FREEZING POINT	SPECIFIC GRAVITY (H2O = 1)
130-460 F			0.780

PERCENT VOLATILE by VOLUME	THEORETICAL VOC CONTENT (percent of WEIGHT)	WEIGHT PER GALLON
100		

pH:
Conc:

VAPOR PRESSURE (mm of Hg)	VAPOR DENSITY (Air = 1)	DENSITY	EVAPORATION RATE Basis (N-BUTYLACE)=1
103-155	4		Rate 0.1

SOLUBILITY IN WATER
NIL

REACTIVITY IN WATER

APPEARANCE AND ODOR:
CLEAR WATER WHITE TO STRAW COLORED LIQUID - HYDROCARBON ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	METHOD	FLAMMABLE LIMITS IN AIR (%)	AUTOIGNITION TEMPERATURE
0 F*	PMCC	UPPER = 8.0 LOWER = 1.3	

NFPA CODES: HEALTH .....:
FLAMMABILITY ...:
REACTIVITY .....:
OTHER .....:

HMIS CODES: HEALTH .....:
FLAMMABILITY ...:
REACTIVITY .....:
PROTECTION .....:

EXTINGUISHER MEDIA: FOAM, WATER F[illegible]

SPECIAL FIRE FIGHTING PROCEDURES:

UNUSUAL FIRE AND EXPLOSION HAZARDS:
AVOID CONTACT WITH STRONG OXIDANTS SUCH AS CHLORINE, HYPOCHLORITES AND CONCENTRATED OXYGEN.

********** ADDITIONAL INFORMATION **********

ESTIMATE

SECTION V - REACTIVITY DATA

IS THIS CHEMICAL STABLE UNDER NORMAL CONDITIONS OF HANDLING/STORAGE (Y/N)? Y

CONDITIONS TO AVOID (REGARDING STABILITY):

INCOMPATIBILITY (MATERIALS TO AVOID):
STRONG OXIDANTS

HAZARDOUS DECOMPOSITION PRODUCTS:
CARBON MONOXIDE. SMOKE. FUMES IN CASES OF INCOMPLETE COMBUSTION.

HAZARDOUS POLYMERIZATION POSSIBLE (Y/N) ? N

CONDITIONS TO AVOID (REGARDING POLYMERIZATION):

SECTION VI - HEALTH HAZARDS

ROUTES OF ENTRY: INHALATION, INGESTION, SKIN, EYES

SIGNS AND SYMPTOMS OF -
ACUTE OVEREXPOSURE:
INHALATION OF HIGH VAPOR CONCENTRATIONS MAY RESULT IN DIZZINESS, RESPIRATORY IRRITATION AND UNCONSCIOUSNESS. REPEATED SKIN CONTACT MAY RESULT IN IRRITATION AND DERMATITIS.

CHRONIC OVEREXPOSURE:

CHEMICAL LISTED AS A CARCINOGEN OR POTENTIAL CARCINOGEN
NATIONAL TOXICOLOGY PROGRAM IARC MONOGRAPHS OSHA
Y N: Y N Y N

MEDICAL CONDITIONS GENERALLY

********** ADDITIONAL INFORMATION **********
THRESHOLD LIMIT VALUE: 200 PPM TWA

EMERGENCY AND FIRST AID PROCEDURES
EMERGENCY PHONE NUMBER OF MANUFACTURER: (801) 374-3100

1. INHALATION: REMOVE TO FRESH AIR. ADMINISTER ARTIFICIAL RESUSCITATION. CONTACT PHYSICIAN.

2. EYE CONTACT: FLUSH WITH CLEAN WATER FOR 15 MINUTES. CONTACT PHYSICIAN.

3. SKIN CONTACT: WASH THOROUTHLY WITH SOAP AND WATER. REMOVE AND WASH SOILED CLOTHING.

4. INGESTION: DO NOT INDUCE VOMITING. CONTACT PHYSICIAN.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

HAZARD CLASS ...:
U.S. DOT ID ....:
UN NUMBER .....:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
DO NOT HANDLE OR STORE NEAR FLAME, HEAT, SPARKS OR STORNG OXIDANTS. STORE AS NFPA CLASS I B LIQUID.

OTHER PRECAUTIONS:
REMOVE CONTAMINATED CLOTHING AND SHOES. AVOID BREATHING VAPORS AVOID REPEATED SKIN CONTACT.

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
STOP LEAK. CONTAIN SPILL. AVOID BREATHING VAPORS. RECOVER LIQUID. ABSORB REMAINING LIQUID. NOTIFY PROPER AUTHORITIES IF PRODUCT ENTERS SEWERS AND WATERWAYS.

WASTE DISPOSAL METHODS:
FEDERAL, STATE AND LOCAL REGULATIONS GOVERN DISPOSAL OF WASTE.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION:
FULL FACE MASK WITH HYDROCARBON CANISTER OR BY UNVENTED HOSE WITH ALL VAPOR CONCENTRATION USE SELF-CONTAINED BREATHING APPARATUS.

VENTILATION REQUIREMENTS:

LOCAL EXHAUST:
FACE VELOCITY. 100 FPM MIN.

MECHANICAL:
GENERAL

SPECIAL:

OTHER:

PROTECTIVE GLOVES: CHEMICAL RESISTANT

EYE PROTECTION: SPLASH GOGGLES OR FACE SHIELD

PROTECTIVE GLOVES:
CHEMICAL RESISTANT

EYE PROTECTION:
SPLASH GOGGLES OR FACE SHIELD

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
CHEMICAL RESISTANT APRON IN CASES OF POSSIBLE ANTICIPATED SKIN CONTACT. DO NOT WEAR STATIC ELECTRICITY PRODUCING CLOTHING WHEN HANDLING FUELS.

WORK/HYGIENIC PRACTICES:

MATERIAL SAFETY DATA SHEET - ACE MSDS - JET FUEL A
TRADE NAME: JET FUEL GRADE JET A (TURBINE FUEL

SECTION I

MSDS NUMBER .....: ACE MSDS - JET FUEL A
PART NUMBER .....:
MSDS CODE .....:
MSDS OTHER CODE ..:
SYNONYMS .....:

MANUFACTURER .....: MAPCO PETROLEUM INC.
DIVISION .....:
MFG PART NUMBER ..:
VENDOR .....:
EMERGENCY PHONE ..: (901) 774-3100
OTHER CALLS .....: (901) 774-3100
ADDRESS .....: 543 WEST MALLORY AVENUE
CITY .....: MEMPHIS STATE ..:TN ZIP ..:38109
MSDS PREPARED BY .:
DATE PREPARED ....: 11-14-85

********** ADDITIONAL INFORMATION **********
CHEMICAL NAME AND SYNONYMS: AVIATION TURBINE FUEL
CHEMICAL FAMILY: HYDROCARBONS

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

TRADE NAME .....: JET FUEL GRADE JET A (TURBINE FUEL

INGREDIENT NAME	CAS	OSHA PEL	ACGIH TLV	OTHER	%
PETROLEUM DISTILLATE			200 PPM		100

(COMBUSTIBLE LIQUID)

********** ADDITIONAL INFORMATION **********

SECTION III - CHEMICAL CHARACTERISTICS

BOILING POINT	MELTING POINT	FREEZING POINT	SPECIFIC GRAVITY

PERCENT VOLATILE BY VOLUME	THEORETICAL VOC CONTENT percent of WEIGHT	WEIGHT PER GALLON
100		

pH:
Conc:

VAPOR PRESSURE (mm of Hg)	VAPOR DENSITY Air = 1.	DENSITY	EVAPORATION RATE Basis (N-BUTYLACE)=1
2-8	4		Rate 3.04

SOLUBILITY IN WATER
NIL

REACTIVITY IN WATER

APPEARANCE AND ODOR:
CLEAR WATER WHITE TO LIGHT STRAW LIQUID - HYDROCARBON ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	METHOD	FLAMMABLE LIMITS IN AIR (%)	AUTOIGNITION TEMPERATURE
100 F*	TCC	UPPER = 6.0 LOWER = 1.0	

NFPA CODES: HEALTH .....:
FLAMMABILITY ...:
REACTIVITY .....:
OTHER .....:

HMIS CODES: HEALTH .....:
FLAMMABILITY ...:
REACTIVITY .....:
PROTECTION .....:

EXTINGUISHER MEDIA: FOAM, WATER FOG, CO2 OR DRY CHEMICAL

SPECIAL FIRE FIGHTING PROCEDURES:
USE WATER TO KEEP FIRE EXPOSED CONTAINERS COOL. IF LEAK OR SPILL HAS NOT IGNITED, USE WATER SPRAY TO DISPERSE VAPORS AND TO PROVIDE PROTECTION FOR MEN ATTEMPTING TO STOP LEAK. WATER SPRAY MAY BE USED TO FLUSH SPILLS AWAY FROM EXPOSURE.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
AVOID CONTACT WITH STRONG OXIDANTS SUCH AS CHLORINE, HYPOCHLORITES AND CONCENTRATED OXYGEN.

ADDITIONAL INFORMATION:

SECTION V - REACTIVITY DATA

IS THIS CHEMICAL STABLE UNDER NORMAL CONDITIONS OF HANDLING, STORAGE (Y/N)? Y

CONDITIONS TO AVOID (REGARDING STABILITY):

INCOMPATIBILITY (MATERIALS TO AVOID):
STRONG OXIDANTS SUCH AS CHLORINE, HYPOCHLORITES, CONCENTRATED OXYGEN.

HAZARDOUS DECOMPOSITION PRODUCTS:
FUMES, SMOKE AND CARBON MONOXIDE IN CASE OF INCOMPLETE COMBUSTION.

HAZARDOUS POLYMERIZATION POSSIBLE (Y/N) ? N

CONDITIONS TO AVOID (REGARDING POLYMERIZATION):

SECTION VI - HEALTH HAZARDS

ROUTES OF ENTRY: INHALATION, INGESTION, SKIN, EYES

SIGNS AND SYMPTOMS OF -
ACUTE OVEREXPOSURE:
OVER-EXPOSURE TO HIGH VAPOR CONCENTRATIONS MAY RESULT IN DIZZINESS, EYE AND RESPIRATORY IRRITATION, POSSIBLY UNCONSCIOUSNESS. REPEATED OR PROLONGED SKIN EXPOSURE MAY RESULT IN IRRITATION AND DERMATITIS.

CHRONIC OVEREXPOSURE:

CHEMICAL LISTED AS A CARCINOGEN OR POTENTIAL CARCINOGEN

NATIONAL TOXICOLOGY PROGRAM (Y/N):	IARC MONOGRAPHS (Y/N):	OSHA (Y/N):

MEDICAL CONDITIONS GENERALLY
AGGRAVATED BY EXPOSURE:

********** ADDITIONAL INFORMATION **********
THRESHOLD LIMIT VALUE: 200 PPM TWA

EMERGENCY AND FIRST AID PROCEDURES
EMERGENCY PHONE NUMBER OF MANUFACTURER: 801 [illegible]

INHALATION: REMOVE TO FRESH AIR. ADMINISTER ARTIFICIAL RESPIRATION. CONTACT PHYSICIAN.

CLOTHING WITH SOAP AND WATER BEFORE REUSE.

c. INGESTION: DO NOT INDUCE VOMITING. CONTACT PHYSICIAN.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

HAZARD CLASS ...:
U.S. DOT ID ....:
UN/NA NUMBER ...:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
DO NOT HANDLE OR STORE NEAR FLAME, HEAT, SPARKS OR STRONG OXIDANTS. AVOD BREATHING VAPORS. STORE AS NFPA CLASS II LIQUID. STORAGE AREA SHOULD BE WELL VENTILATED.

OTHER PRECAUTIONS:

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
REMOVE SOURCES OF IGNITION. STOP LEAK. CONTAIN SPILL BY DIKING IF POSSIBLE. AVOID BREATHING VAPORS. VENTILATE AREA IF POSSIBLE. KEEP PRODUCT OUT OF SEWERS AND WATERWAYS. NOTIFY AUTHORITIES.

WASTE DISPOSAL METHODS:
FEDERAL, STATE AND LOCAL REGULATIONS GOVERN DISPOSAL OF WASTE.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION:
FULL FACE MASK WITH HYDROCARBON CANISTER. IN CASE OF HIGH VAPOR CONCENTRATION, IN CONFINED AREAS, USE SELF-CONTAINED BREATHING APPARATUS.

VENTILATION REQUIREMENTS:

LOCAL EXHAUST:

MECHANICAL:
GENERAL

SPECIAL:

OTHER:

PROTECTIVE GLOVES:
CHEMICAL RESISTANT

EYE PROTECTION:
SPLASH GOGGLES OR FACE SHIELD

TRADE NAME: TOTAL JET FUEL (Q GRADE)

SECTION I

MSDS NUMBER .....: ACE MSDS - JET FUEL Q
PART NUMBER .....:
MSDS CODE .....:
MSDS OTHER CODE ..:
SYNONYMS .....:

MANUFACTURER .....: TOTAL PETROLEUM, INC.
DIVISION .....:
MFG PART NUMBER ..:
VENDOR .....:
EMERGENCY PHONE ..: 800-424-9300 (CHEMTREC)
OTHER CALLS .....: 517-463-1164 (EMERGENCY)
ADDRESS .....: E. SUPERIOR STREET
CITY .....: ALMA STATE ..:MI ZIP ..:48802
MSDS PREPARED BY .: M. N. MARTIN
DATE PREPARED ....: 02/09/89

********** ADDITIONAL INFORMATION **********
SYNONYMS: KEROSENE

ADDRESS:	EMERGENCY PHONE NUMBER
P.O. BOX 857, ARKANSAS CITY, KS. 67005	(316) 442-5100
P.O. BOX 188, ARDMORE, OK. 73401	(405) 221-6222
COLORADO REFINING COMPANY (A WHOLLY-OWNED SUBSIDIARY)	
5800 BRIGHTON BLVD, COMMERCE CITY, CO. 88022	(303) 295-4500

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

TRADE NAME .....: TOTAL JET FUEL (Q GRADE)

INGREDIENT NAME	CAS	OSHA PEL	ACGIH TLV	OTHER	%
KEROSENE	8008-20-6	NA	NA	100 MG/M3	100

********** ADDITIONAL INFORMATION **********

HAZARDOUS COMPONENT	TLV*	PEL*	OTHER LIMITS
KEROSENE	NA	NA	100 MG/M3 **

** FOR KEROSENE BY OSHA

*** [illegible]

VOLUME (PPM). "OTHER LIMITS" ARE RECOMMENDED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH) AND ARE TIME-WEIGHTED OVER TEN HOURS UNLESS OTHERWISE SPECIFIED.

NFPA 704M RATING

HEALTH = 1 FLAMMABILITY = 2 REACTIVITY = 0 OTHER = BLANK

0 = INSIGNIFICANT
1 = SLIGHT
2 = MODERATE
3 = HIGH
4 = EXTREME

SECTION III - CHEMICAL CHARACTERISTICS

BOILING POINT	MELTING POINT	FREEZING POINT	SPECIFIC GRAVITY (H2O = 1)
INITIAL 325: FINAL 540	-35 F		0.8

PERCENT VOLATILE by VOLUME	THEORETICAL VOC CONTENT (percent of WEIGHT)	WEIGHT PER GALLON

pH:
Conc:

VAPOR PRESSURE (mm of Hg)	VAPOR DENSITY (Air = 1)	DENSITY	EVAPORATION RATE Basis (ETHER)=1
< 50 @ 100 F	4.5		Rate NA

SOLUBILITY IN WATER
INSOLUBLE

REACTIVITY IN WATER

APPEARANCE AND ODOR:
CLEAR LIQUID WITH CHARACTERISTIC ODOR OF KEROSENE

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	METHOD	FLAMMABLE LIMITS IN AIR %	AUTOIGNITION TEMPERATURE
115 F TO 130 F	PM	UPPER = 6.0 LOWER = 1.1	

NFPA CODES: HEALTH .....:
FLAMMABILITY ...:
REACTIVITY .....:
OTHER .....:

HMIS CODES: HEALTH .....:
FLAMMABILITY ...:
REACTIVITY .....:
PROTECTION .....:

EXTINGUISHER MEDIA: DRY CHEMICAL, FOAM OR CARBON DIOXIDE. WATER SPRAY OR FOG TO COOL SURROUNDING CONTAINERS.

SPECIAL FIRE FIGHTING PROCEDURES:
SELF CONTAINED BREATHING APPARATUS MAY BE REQUIRED.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
NA

SECTION V - REACTIVITY DATA

IS THIS CHEMICAL STABLE UNDER NORMAL CONDITIONS OF HANDLING/STORAGE (Y/N)? Y

CONDITIONS TO AVOID (REGARDING STABILITY):
HEAT AND FLAMES

INCOMPATIBILITY (MATERIALS TO AVOID):
OXIDIZERS

HAZARDOUS DECOMPOSITION PRODUCTS:
CARBON MONOXIDE AND OTHER PETROLEUM DECOMPOSITION PRODUCTS.

HAZARDOUS POLYMERIZATION POSSIBLE (Y/N) ? N

CONDITIONS TO AVOID (REGARDING POLYMERIZATION):
NA

SECTION VI - HEALTH HAZARDS

ROUTES OF ENTRY: INHALATION, SKIN, INGESTION

SIGNS AND SYMPTOMS OF -
ACUTE OVEREXPOSURE:
ACUTE: CENTRAL NERVOUS SYSTEM DEPRESSION, PERIPHERAL NERVOUS SYSTEM DEPRESSION, NARCOSIS, ASPHYXIATION, GASTROINTESTINAL DISTURBANCE, EYE AND SKIN IRRITATION. SIGNS AND SYMPTOMS OF OVEREXPOSURE: HEADACHE, DIZZINESS, EYE, RESPIRATORY [illegible]

CHRONIC OVEREXPOSURE:
DERMATITIS, PNEUMONITIS, PULMONARY EDEMA, AND KIDNEY DAMAGE.

CHEMICAL LISTED AS A CARCINOGEN OR POTENTIAL CARCINOGEN

NATIONAL TOXICOLOGY PROGRAM	IARC MONOGRAPHS	OSHA
(Y/N): N	(Y/N): N	(Y/N): N

MEDICAL CONDITIONS GENERALLY
AGGRAVATED BY EXPOSURE:
IMPAIRED PULMONARY FUNCTION, ESPECIALLY THOSE WITH OBSTRUCTIVE AIRWAY DISEASES.

********** ADDITIONAL INFORMATION **********
STUDIES WITH RODENTS HAVE SHOWN THAT PETROLEUM DISTILLATES HAVE CAUSED KIDNEY DAMAGE AND KIDNEY OR LIVER TUMORS. MOUSE SKIN PAINTING STUDIES HAVE SHOWN THAT PETROLEUM DISTILLATES WHICH ARE SIMILAR TO THIS PRODUCT CAUSED A LOW INCIDENT OF SKIN TUMORS.

EMERGENCY AND FIRST AID PROCEDURES
EMERGENCY PHONE NUMBER OF MANUFACTURER: 800-424-9300 (CHEMTREC)

1. INHALATION: REMOVE FROM CONTAMINATED ATMOSPHERE.

2. EYE CONTACT:

3. SKIN CONTACT: REMOVE CONTAMINATED CLOTHING. FLUSH AFFECTED AREAS THOROUGHLY WITH WATER.

4. INGESTION: IF SWALLOWED, DO NOT INDUCE VOMITING. SEEK MEDICAL ATTENTION IMMEDIATELY.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

HAZARD CLASS ...:
U.S. DOT ID ....:
UN/NA NUMBER ...:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
KEEP AWAY FROM ALL IGNITION SOURCES (E.G. HEAT, FLAME, SPARKS, STRONG OXIDIZERS). BOND AND GROUND CONTAINER.

OTHER PRECAUTIONS:
NA

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
ELIMINATE ALL SOURCES OF IGNITION. CONTAIN WITH EARTHEN DIKE OR PETROLEUM ABSORBENT MATERIAL. REMOVE WITH GROUNDED SPOTTER PUMP TO SALVAGE CONTAINER. REMOVE ALL CONTAMINATED MATERIALS.

WASTE DISPOSAL METHODS:
[illegible]

********** ADDITIONAL INFORMATION **********

SHIPPING NAME - KEROSENE
HAZARD CLASS - COMBUSTIBLE LIQUID
ID NUMBER - UN 1223

SARA

HAZARD CLASS:
FLAMMABLE: NO
ACUTE: YES
CHRONIC: YES
STORED PRESSURE: NO
REACTIVE: NO

SECTION 313 LISTED COMPONENTS - NONE

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION:
ORGANIC VAPOR RESPIRATOR APPROVED BY NIOSH.

VENTILATION REQUIREMENTS:

LOCAL EXHAUST:
TO CONTROL VAPORS

MECHANICAL:
FOR CONFINED SPACES

SPECIAL:
USE EXPLOSION PROOF EQUIPMENT

OTHER:
NA

PROTECTIVE GLOVES:
PVC OR EQUIVALENT RESISTANT GLOVE.

EYE PROTECTION:
CHEMICAL GOGGLES OR FACE SHIELD.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:
PVC OR EQUIVALENT CLOTHING IF SPLASHING IS LIKELY.

WORK/HYGIENIC PRACTICES:
KEEP BODY CONTACT AND SPLASH TO A MINIMUM.

********** ADDITIONAL INFORMATION **********

NA = NO APPLICABLE INFORMATION WAS FOUND

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE. BUT IS NOT WARRANTED TO BE. WHETHER ORIGINATED WITH TOTAL PETROLEUM OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT. APPLICABLE. AND SUITABLE TO THEIR CIRCUMSTANCES.