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NAS FORT WORTH
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FINAL REMOVAL AND UPGRADE OF UNDERGROUND STORAGE TANK AND INTERIM REMEDIAL ACTION AT THE GOLF COURSE AND MAINTENANCE YARD HEALTH AND SAFETY PLAN NAS FORT WORTH TX

2/1/1996

JACOBS ENGINEERING

File: 17G
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NAVAL AIR STATION FORT WORTH JRB CARSWELL FIELD TEXAS

ADMINISTRATIVE RECORD COVER SHEET

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373

United States Air Force
Air Force Base
Conversion Agency

FINAL

NAS Fort Worth JRB, Texas
(Formerly Carswell AFB, Texas)

REMOVAL/UPGRADE OF
UNDERGROUND STORAGE TANKS
AND INTERIM REMEDIAL ACTION
AT THE GOLF COURSE
MAINTENANCE YARD

HEALTH AND SAFETY PLAN

FEBRUARY 1996

United States Air Force
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NAS Fort Worth JRB, Texas
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HEALTH AND SAFETY PLAN

CAR-J03-10K70200-M3-0002

FEBRUARY 1996

By:

JACOBS ENGINEERING GROUP INC.
600 17th Street, Suite 1100N
Denver, CO 80202

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ACRONYMS AND ABBREVIATIONS

ab	above background
ACC	Air Combat Command
ACGIH	American Conference of Governmental Industrial Hygienists
AFB	Air Force Base
AFBCA	Air Force Base Conversion Agency
AFCEE	Air Force Center for Environmental Excellence
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
BP	boiling point
CFR	Code of Federal Regulations
CGI	combustible gas indicator
CNS	central nervous system
COE	U.S. Army Corps of Engineers
COR	Contracting Officer's Representative
CPR	cardiopulmonary resuscitation
CQP	Construction Quality Plan
CRZ	Contamination Reduction Zone
CS	Construction Safety
CVS	cardiovascular system
DBCRA	Defense Base Closure and Realignment Act
DOT	U.S. Department of Transportation
dBA	decibels (on the A-weighted scale)
ECP	Environmental Cleanup Plan
EH&S	environmental health and safety
EPA	U.S. Environmental Protection Agency
eV	electron volts
EZ	exclusion zone
F	Fahrenheit
FID	flame ionization detector

ACRONYMS AND ABBREVIATIONS

FP	flash point
GI	gastrointestinal
HNu	photoionization meter
HSP	Health and Safety Plan
IDLH	immediately dangerous to life and health
IP	ionization potential
IRA	interim remedial action
IRP	Installation Restoration Program
I-30	Interstate Highway I-30
Jacobs	Jacobs Engineering Group Inc.
JRB	Joint Reserve Base
kV	kilovolts
LEL	lower explosive limit
L/min	liters per minute
mg/kg	milligrams per kilogram
mg/m^3	milligrams per cubic meter
MP	melting point
MSA	Mine Safety Appliance
MSDS	Material Safety Data Sheet
msl	mean sea level
N/A	not applicable
NAS	Naval Air Station
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
O_2	Oxygen
OMC	occupational medical consultant
OSHA	U.S. Occupational Safety and Health Administration
OVA	organic vapor analyzer
PAPR	powered air purifying respirator
PE	polyethylene

ACRONYMS AND ABBREVIATIONS

PEL	permissible exposure limit
PHSD	Project Health and Safety Director
PHSM	Project Health and Safety Manager
PID	photoionization detector
PjM	Project Manager
POC	point of contact
POL	petroleum, oils, and lubricants
PPE	personal protective equipment
ppm	parts per million
QPP	Quality Program Plan
RCRA	Resource Conservation and Recovery Act
reg	regulator
REL	recommended exposure limit
RI/FS	Remedial Investigation/Feasibility Study
SAC	Strategic Air Command
SAP	Sampling and Analysis Plan
SCBA	self-contained breathing apparatus
SHSC	Site Health and Safety Coordinator
SOPs	standard operating procedures
SPF	sun protection factor
STEL	short-term exposure limit
SWMU	solid waste management unit
SZ	support zone
TBD	to be determined
TLV	threshold limit value
TSDF	treatment, storage, and disposal facility
UEL	upper explosive limit
UL	Underwriter's Laboratories
USCG	United States Coast Guard
UST	underground storage tank

ACRONYMS AND ABBREVIATIONS

UV	ultraviolet
UVA	ultraviolet A
UVB	ultraviolet B
VP	vapor pressure
WBGT	wet bulb globe temperature (index)
WSA	Weapons Storage Area
yd^3	cubic yards
µg/L	micrograms per liter
°	degrees
>	greater than
%	percent
±	plus or minus

1.0 INTRODUCTION

This Health and Safety Plan (HSP) has been written for use by Jacobs Engineering Group Inc. (Jacobs) and any other individuals authorized to access areas where site control is established to conduct fieldwork. It may also be used as a guidance document by properly trained and experienced personnel. However, Jacobs does not guarantee the health and safety of any person entering this site. Because of the nature of this site and the activity occurring thereon, it is not possible to discover, evaluate, and provide protection for all possible hazards that may be encountered; however, a summary of suspected hazards is listed in Table 1-1. Strict adherence to the health and safety guidelines stated in this HSP will reduce, but not eliminate, the potential for injury on the site. The health and safety guidelines in this plan were prepared specifically for this site and should not be used on any other site without prior research by trained health and safety professionals.

This HSP has been prepared by Jacobs Engineering Group Inc. (Jacobs) for the remedial action for removal/upgrade of underground storage tanks (USTs) and interim remedial action (IRA) for the golf course maintenance yard at Naval Air Station (NAS) Fort Worth Joint Reserve Base (JRB), Carswell Field, Fort Worth, Texas (Figure 1-1). This station was formerly called Carswell Air Force Base (AFB), and will be referred to in this document as NAS Forth Worth. The HSP constitutes one of the planning documents required by the Statement of Work for Contract F41624-94-D-8116, Delivery Order 0003, issued to Jacobs by the Air Force Center for Environmental Excellence (AFCEE). Other planning documents prepared for this contract and delivery order include the Sampling and Analysis Plan (SAP), Construction Quality Plan (CQP), and the Work Plan.

This HSP will be kept onsite during field activities and will be reviewed and updated as necessary to reflect current site conditions and operations. This HSP requires that the Program Health and Safety Director (PHSD) and Project Health and Safety Manager

TABLE 1-1
Summary of Suspected Hazards

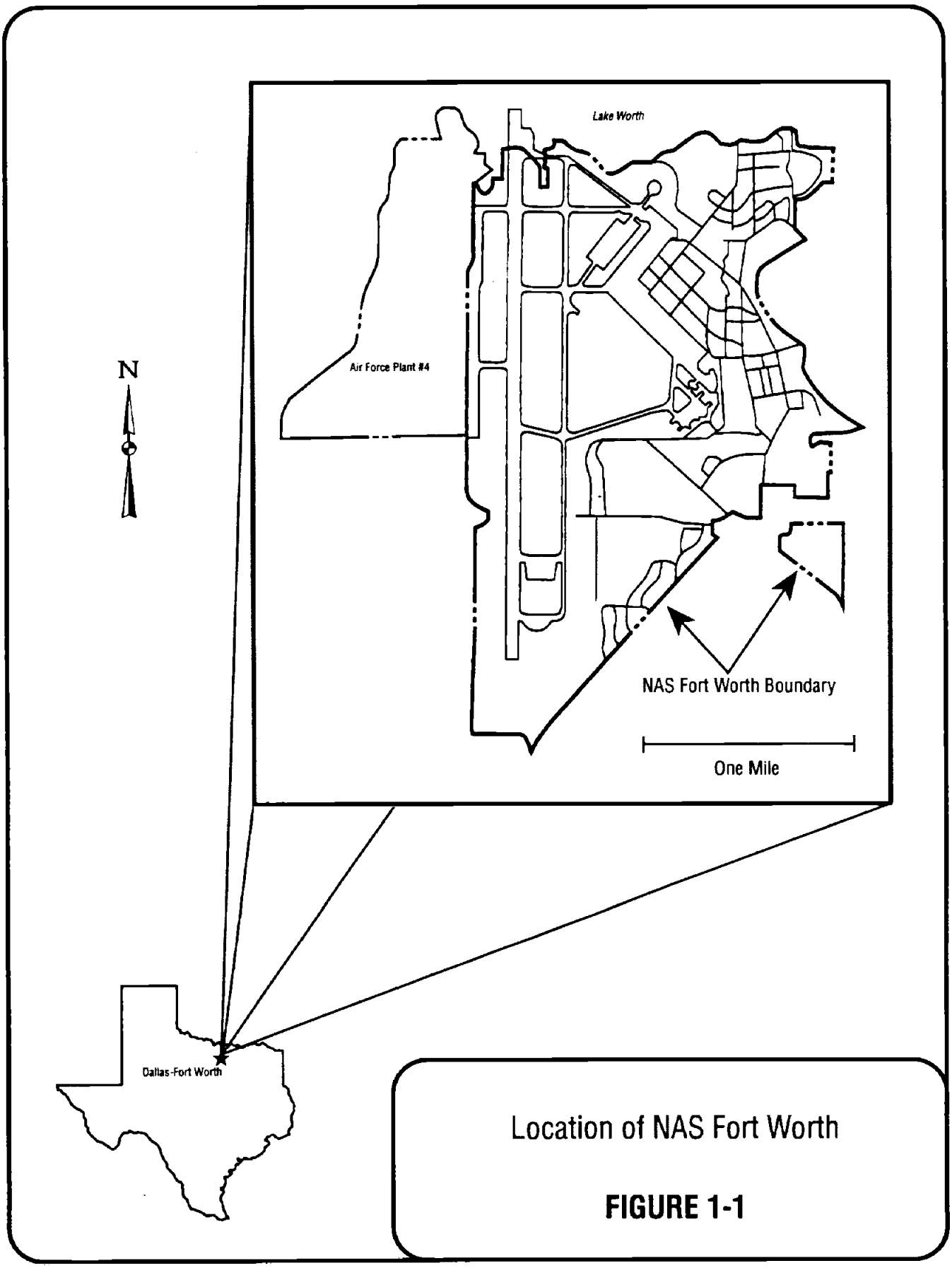
Tasks	Physical[1]	Chemical[2]	Biological[3]	Air Monitoring[4]	Initial Entry PPE[5]
Mobilization	• forklift hazards • manual lifting • uneven surfaces • overhead utilities • vehicle accidents	• not expected	• insects • rodents • reptiles	• possible screening	D
Utility Clearance • hand augering • asphalt or cement coring • geophysical tracing	• manual lifting • uneven surfaces • aboveground and belowground utilities • sunlight; UV exposure • flying objects/debris	• fuels • waste oils • chlordane[6]	• insects • rodents • reptiles	• initial screening with PID	D
Tank Removals • excavation • cleaning, inerting, removing tanks • cleaning, inerting, removing piping • stockpiling soils • area restoration	• jackhammer • uneven surfaces • sunlight; UV exposure • heavy equipment, possibly cranes • traffic • flying objects/debris • noise • high pressure hose • cave-in • hot work • explosions • possible confined space entry • musculoskeletal injuries (from improper use of hand tools like pipe wrenches) • compressed gases • fall hazards around open excavation	• fuels • waste oils (Tanks 1518-5, 4210-1, 4210-2, 4210-3)	• insects • rodents • reptiles	• PID • CGI/O2	D+
Tank Upgrades excavation	• uneven surfaces • sunlight; UV exposure • heavy equipment • traffic	• fuels	• insects • rodents • reptiles	• PID • CGI/O2	D

TABLE 1-1
Summary of Suspected Hazards

Tasks	Physical[1]	Chemical[2]	Biological[3]	Air Monitoring[4]	Initial Entry PPE[5]
Tank Upgrades (continued) • excavation	• flying objects/debris • noise • belowground utilities				
Building Demolition • cutting overhang • removing roof • knock-out of walls • cutting into smaller pieces	• uneven surfaces • heavy equipment • sunlight; UV exposure • noise • working at heights	• dust	• insects • rodents • reptiles	• dust	D
Building Restoration • pouring slab • erecting walls and roof	• hot work • uneven surfaces • heavy equipment • sunlight; UV exposure • noise • traffic • flying/falling objects; debris • cranes	• not expected	• insects • rodents • reptiles	• not required	D
Soil Sample Collection	• belowground utilities • uneven surfaces • sunlight; UV exposure • traffic • flying objects/debris • noise	• fuels • waste oils • chlordane[6]	• insects • rodents • reptiles	• PID	D
Soil Excavation	• overhead utilities • belowground utilities	• fuels • waste oils • chlordane[6]	• insects • rodents • reptiles	• PID	D

[1] Physical hazards and controls are listed in Table 3-2.
[2] Chemical hazards by sites and an exposure summary are in Tables 3-3 and 3-4.
[3] Additional information on the biological hazards is in Appendix D.
[4] Monitoring equipment and action levels are in Table 5-2.
[5] Personal Protective Equipment information can be found in Section 6.0.
[6] Chlordane may be present in the golf course maintenance yard.

CGI/O_2 = combustible gas indicator/oxygen
PID = photoionization detector
PPE = personal protective equipment
UV = ultraviolet



Location of NAS Fort Worth

FIGURE 1-1

(PHSM) shall be familiar with the following:

- applicable federal, state, and local regulations;
- standard operating procedures (SOPs) contained in the Jacobs Environmental Health and Safety (EH&S) Manual (Jacobs undated a) and Jacobs Corporate Safety Manual (Jacobs undated b) (these manuals will be available at the site office);
- requirements found in the AFCEE Handbook for the Installation Restoration Program (IRP) Remedial Investigations and Feasibility Studies (RI/FS) (U.S. Air Force 1993);
- requirements found in the U.S. Army Corps of Engineers (COE) Safety and Health Requirements Manual (COE 1992); and
- procedures contained in the Work Plan for this project and Quality Program Plan (QPP) documents for the project.

In addition to this HSP, each subcontractor is expected to have its own health and safety program covering its own specific operational activities; e.g., excavating, tank removal, et cetera. In any case where overlaps or conflicts occur between requirements in this HSP and a subcontractor's health and safety procedures, the requirement that is most protective of the employee's health and safety will take precedence.

The overall intent of this HSP is to create a site health and safety program that effectively identifies, evaluates, controls, and reduces health and safety hazards.

This HSP is written for the site conditions, purposes, dates, and personnel specified and must be amended if these conditions change. Jacobs claims no responsibility for use of this plan by others.

1.1 OBJECTIVES

Jacobs will remove 12 USTs, upgrade 11 USTs with spill and overfill protection, and conduct an IRA at the golf course maintenance yard. The IRA will include hand

augering, soil sampling, excavating and disposing of contaminated soil, demolishing an existing storage building, and erecting a new storage building.

1.2 NAS FORT WORTH DESCRIPTION AND HISTORY

The following sections include a site description and site history.

1.2.1 Site Description

NAS Fort Worth is located in north-central Texas in Tarrant County, 8 miles west of downtown Fort Worth. The station property, totaling 2,555 acres, consists of the main station and two noncontiguous parcels. The main station comprises 2,264 acres and is bordered by Lake Worth to the north, the West Fork of the Trinity River and Westworth Village to the east, Fort Worth to the northeast and southeast, White Settlement to the west and southwest, and Air Force Plant 4 to the west. The area surrounding NAS Fort Worth is mostly suburban, including the residential areas of the cities of Fort Worth, Westworth Village, and White Settlement.

The existing land uses in the immediate vicinity of the station include industrial, commercial, residential, and recreational. The land uses west of the station are predominantly residential and industrial. These include single-family residences, supporting commercial centers, Air Force Plant 4, and an industrial complex in White Settlement.

The predominant development south of the station is the commercial area located at the Interstate Highway I-30 (I-30) and State Highway 183 interchange. This area includes a discount-oriented retail center, a regional shopping mall, and a convenience center.

Various types of residential development occur southeast of the station, north of I-30. Single-family housing is also found on the eastern side of the station, from the Kings Branch housing tract north to Meandering Road.

Public/recreational land uses occur north of the station, surrounding Lake Worth. Public access along the southern shore of Lake Worth is currently restricted because of NAS Fort Worth activities. A fish hatchery, YMCA camp, and private recreation lands are located along the West Fork of the Trinity River, northeast of the station.

The area surrounding the Offsite Weapons Storage Area (WSA) is primarily rural. A residential development is located south of White Settlement Road.

NAS Fort Worth is located within the Grand Prairie section of the Central Lowlands Physiographic Province. The area is characterized by broad terrace surfaces sloping gently eastward, interrupted by westward-facing escarpments. The topography of the station is fairly flat, except for areas near Farmers Branch Creek and the Trinity River. Elevations average 650 feet above mean sea level (msl) and range from 550 feet above msl in the east to 690 feet above msl in the southwest.

The climate in the Fort Worth region is subhumid with mild winters and hot, humid summers. The average annual precipitation is 31.5 inches, with the majority falling between April and October. The average annual temperature is 66 degrees Fahrenheit (°F). July is the hottest month with an average monthly temperature of 86° F, while January is the coldest month with an average monthly temperature of 45° F. Temperature changes are rapid and often change 20° to 30° in several hours. The average annual relative humidity is 63 percent.

Prevailing winds are primarily southerly from March through November and northerly from December through February; the average wind speed is 8 knots. Severe thunderstorms with windspeeds of 65 knots and hail storms are common. Climate

conditions in summer make tornado formations possible, although there is more property damage each year as a result of hail than tornadoes.

1.2.2 Site History

In 1984, the IRP was initiated at NAS Fort Worth and began with a program records search conducted by CH2M Hill, Inc. Since 1984, Air Force IRP studies have been conducted by several contractors and have focused on the identification and characterization of waste disposal areas and solid waste management units (SWMUs) identified in the installation's Resource Conservation and Recovery Act (RCRA) Part B permit.

Pursuant to the Defense Base Closure and Realignment Act (DBCRA) of 1990, Carswell AFB was selected for closure and associated property disposal during Round II Base Closure Commission deliberations. This announcement initiated the closure and the disposal and rescue planning processes. Drawdown activities were initiated in 1992 and all 7 Bomb Wing aircraft were relocated by January 1993. The station officially closed on 30 September 1993. On 01 October 1994, the U.S. Navy assumed responsibility for the former Carswell AFB. The base was renamed NAS Fort Worth. The 1993 DBCRA decisions have further impact on the realignment and partial disposal of property.

The area now known as NAS Fort Worth was originally a modest dirt runway built to service an aircraft manufacturing plant located where Air Force Plant 4 is now. When it was established in 1942, the installation was referred to as the Tarrant Field Airdrome and was originally under the jurisdiction of the Gulf Coast Army Air Field Training Command. Its mission was to provide transition training for the B-24 bomber pilots, and served as a heavy bomber base until closure. The Strategic Air Command (SAC) assumed control of the installation in 1946 and the station served as headquarters for the Eighth Air Force. The station was renamed Carswell AFB in

1948 in honor of Fort Worth native, Major Horace S. Carswell. At that time, the 7 Bomb Wing became the base host unit. In 1951, Headquarters 19 Air Division was located at Carswell AFB where it remained until September 1988, the longest tenure of any air division in SAC. Carswell AFB became home base for its first B-52s and KC-135s in 1956. The Air Combat Command (ACC) assumed control of the base in 1992 with the disestablishment of SAC.

The majority of the station property was acquired in the 1940s with most of the property acquired from the city of Fort Worth in 1941; additional property including most of the south station, the hospital area, and the Offsite WSA was acquired during the 1950s. Kings Branch and south station residential areas were acquired in 1960. Several miscellaneous additional properties totaling less than 10 acres have been acquired since 1970.

1.3 DESCRIPTION OF FIELD ACTIVITIES

This project can be broken down into the following tasks:

- site mobilization;
- UST removal, including the following:
  - USTs gauging for quantity and quality of residual fuel;
  - inerting tanks (if necessary) and removing surface pumps and pipes;
  - excavating to 1 foot of the top of a tank;
  - shoveling to uncover tank;
  - removal of tanks;
  - sampling of soil beneath tanks (no one to enter excavation, samples to be collected from backhoe bucket) and along sidewalls of excavation;
  - offsite disposal;
  - cleaning, cutting up, and recycling of removed tanks; and
  - backfill and restore excavations.
- UST ugrade, which encompasses the following:
  - excavate around fill tube, if necessary;

- install below-ground or aboveground spill protection device and overfill shutoff device;
- test devices for tightness; and
- backfill and restore excavations.

- golf course maintenance yard, which includes the following:
  - install hand auger borings and collect soil samples;
  - demolish wooden pole barn and disassemble metal carpet;
  - excavate and dispose of contaminated soil;
  - backfill and restore excavation;
  - reassemble metal carport; and
  - build new storage building.

2.0 FIELD OPERATIONS ADMINISTRATION

The following sections describe the project organization and health and safety responsibilities.

2.1 PROJECT ORGANIZATION

Project Manager (PjM):	Lynn Schuetter	(303) 595-8855
AFCEE Contracting Officer's Representative (COR):	Charles Rice	(210) 536-6452
Base Conversion Activity Coordinator:	Olen Long	(817) 731-8284,
Base Engineering Technician:	Alan Flolo	(817) 731-8973, extension 18
Program Manager:	Lynn Schuetter	(303) 595-8855
PHSD	Terry Briggs	(303) 595-8855
PHSM	to be determined (TBD)	
Alternate (PHSM):	TBD	
Site Manager	John McManus	

2.2 FIELD TEAM PERSONNEL

The field team members will be listed in the HSP once they are determined.

2.3 PERSONNEL RESPONSIBILITIES

The following sections delineate the responsibilities of personnel associated with this project.

2.3.1 Project Personnel

The following personnel are directly responsible for health and safety procedures for this project.

Project Manager. The PjM Manager is responsible for coordinating overall planning of work and coordinating supervision of work.

Site Manager. The Site Manager promotes a safe working environment through a concerted effort with the PHSM and PHSD, implements the HSP, and has "stop-work authorization" when an imminent hazard or potentially dangerous work practice exists.

Project Health and Safety Manager. The PHSM has the following responsibilities:

- administers this HSP;
- verifies current certifications of individuals' medical fitness, training, and respirator fit per Section 2.4, before authorizing access to areas where site control is established;
- conducts emergency planning action items per Section 7.1;
- arranges for health and safety equipment to be available onsite in accordance with this HSP;
- conducts employee health and safety communications per Section 2.6 before the start of field activities;
- oversees the performance of site health and safety coordinators (SHSCs) who work with specific crews, e.g., the geologist at a drilling site may be an SHSC;
- establishes and enforces site controls per Section 4.0;
- conducts periodic inspections of work practices to determine effectiveness of this HSP (deficiencies are noted, reported to the Site Manager, PjM, and PHSD);
- assists in independent health and safety site audits conducted by Jacobs corporate personnel, the regulatory agencies, or the client;
- conducts accident investigations of injuries, illnesses, and other incidences;
- has "stop-work authorization" when an imminent hazard or potentially dangerous work practice exists; and
- completes and submits record keeping forms per this HSP and corporate SOPs.

Site Health and Safety Coordinator. The SHSC assists the PHSM and Site Manager in all duties related to the implementation of this HSP. The SHSC also serves as the alternate PHSM in his/her absence.

2.3.2 Staff Health and Safety Professionals

The following personnel will provide support for health and safety issues on this project.

Program Health and Safety Director. The PHSD is responsible for the following:

- oversees development and implementation of the health and safety program;
- provides project personnel with technical guidance for conducting fieldwork in a safe and healthful manner;
- assists with preparation and/or reviews and approves site-specific HSPs; and
- conducts field audits as necessary and in accordance with Jacobs policies and procedures.

Occupational Medical Consultant. The Occupational Medical Consultant (OMC) prescribes and interprets results of medical examination protocols and testing for Jacobs employees who participate in the Jacobs Occupational Medical Program.

2.4 EMPLOYEE MEDICAL SURVEILLANCE

The PHSM or Site Manager shall authorize individuals to access areas where site control is established (to conduct fieldwork in accordance with this HSP only) if current certification of medical fitness, training, and respirator fit are in accordance with 29 Code of Federal Regulations (CFR) 1910.120. Copies of certifications shall be on file. (Refer to Jacobs Corporate Health and Safety Manual [Jacobs undated a], Sections 3.0 and 5.0.)

Employees of teaming partners and subcontractors will provide documentation of their participation in a medical surveillance program before the start of fieldwork. Documentation will be maintained in the project files.

At this time, additional medical tests will not be performed before site entry.

2.4.1 Baseline or Preassignment Monitoring

Before being assigned to a hazardous or potentially hazardous activity involving exposure to toxic materials, each employee must receive a preassignment or baseline physical examination. The content of the examination is to be determined by the employers' medical consultant. As suggested by National Institute for Occupational Safety and Health (NIOSH)/Occupational Safety and Health Administration (OSHA)/U.S. Coast Guard/U.S. Environmental Protection Agency (EPA) *Occupational Safety & Health Guidance Manual for Hazardous Waste Site Activities* (U.S. Department of Health and Human Services 1985), the minimum medical monitoring requirements for work at NAS Fort Worth are as follows:

- complete medical and work histories;
- physical examination;
- pulmonary function test, forced vital capacity and forced expiratory volume;
- chest X-ray;
- electrocardiogram;
- eye examination and visual acuity;
- audiometry;
- urinalysis; and
- blood chemistry, including hematology and serum analyses.

At present, no additional testing for specific contaminant health effects is required.

The preassignment physical examination should categorize employees as fit for duty and able to wear respiratory protection.

2.4.2 Annual Monitoring

In addition to the baseline physical examination, all employees are required to obtain an annual physical exam, unless the advising physician believes a shorter interval is appropriate. The employers' medical consultant will prescribe an adequate physical examination that meets OSHA 29 CFR 1910.120 requirements. The preassignment medical monitoring criteria outlined previously may be applicable.

All personnel working in contaminated or potentially contaminated areas at NAS Fort Worth will verify that their medical monitoring is current (within 12 months). Jacobs' subcontractors will have documentation onsite specifying all employees are fit for duty. Each certificate will be signed by an attending physician.

2.4.3 Exit Physical

Enrollment in the medical monitoring program will end when the employee terminates the program or the company. At that time, an exit examination for the employee is required. Each employee will undergo an exit physical examination unless written documentation waiving this requirement is provided.

2.4.4 Exposure/Injury/Medical Support

As follow-up to an injury or a possible exposure above an established exposure limit, all employees are entitled and encouraged to seek medical attention and physical testing. Depending on the type of exposure, it is critical to perform follow-up testing within 24 to 48 hours. It will be up to the employers' medical consultant to advise the type of test or tests required to accurately monitor for exposure effects.

2.5 TRAINING

Training records and training content are maintained for Jacobs employees by the Jacobs Medical and Training Coordinator in Jacobs' Denver Office. Only personnel with documentation in compliance with the training requirements of 29 CFR 1910.120 will enter exclusion zones.

Employees of teaming partners and subcontractors will provide documentation of required training before the start of fieldwork. The PHSM will maintain onsite documentation of training status for each field worker including subcontractors and visitors to exclusion zones.

2.6 COMMUNICATION

If health and safety concerns arise during field activities, the steps below should be followed:

- Health and safety concerns in the field shall be brought to the attention of the PHSM and/or Site Manager.
- Health and safety field concerns that the PHSM and/or Site Manager are unable to address satisfactorily shall be brought to the attention of the PHSD.
- In the event of an accidental incident or emergency, responsible personnel shall be notified per Section 7.6.

2.6.1 Hazard Communication

To satisfy the training and hazard communication requirements of 29 CFR 1910.120, field team members shall be provided a copy of this HSP and agree to abide by it by signing the signoff sheet in Appendix A. A Hazard Communication Form shall also be signed by field team members. (Refer to Appendix B.)

2.6.2 Employee Health and Safety Briefing

The PHSM or Site Manager shall conduct a health and safety briefing before authorizing individual access to areas where site control is established. The PHSM or Site Manager shall document attendance and the topics discussed, including at least the following:

- work plan and individual assignments;
- potential hazards of the work to be performed (Section 3.0 and Appendices C and D);
- site controls and air monitoring action levels that will be in effect onsite;
- personal protective equipment (PPE) to be used;
- communication procedures, including evacuation/emergency signals; and
- emergency response/contingency plan and rescue operations.

2.6.3 Daily Tailgate Meetings

The PHSM or Site Manager shall conduct daily health and safety tailgate meetings before field team personnel perform fieldwork. The PHSM or Site Manager shall document attendance (using the form in Appendix E) and the topics discussed, including at least the following:

- any potential hazards of the work to be performed that were not previously discussed;
- discussion and resolution of any health and safety concerns or problems since the previous tailgate meeting; and
- evacuation routes and emergency signals warnings.

Daily meetings may be augmented by additional meetings if warranted. The daily meeting combines the pre- and post-workday meeting required by COE's Safety and Health Requirements (EM 385-1-1).

2.7 DESCRIPTION OF SUBCONTRACTORS

Specific subcontractors will be identified before the start of fieldwork. Subcontractors who will be working onsite must present certification to the PHSM that they are trained in accordance with hazardous waste laws, have been approved by a physician for hazardous waste work, and are fit to wear a respirator. A copy of this HSP will be given to potential subcontractors. Before working onsite, subcontractors shall agree to abide by this HSP by signing the signoff sheet in Appendix A.

The PHSM or Site Manager will inform the subcontractor's site manager of any health and safety violations. Under certain conditions, such as personnel not equipped with the proper protective equipment or personnel entering an unshored or sloped trench, the PHSM or Site Manager may stop subcontractors from working and may seek to terminate the contract.

2.8 VISITORS

Visitors to this site are required to read and understand this HSP, and to verify to the PHSM their training and participation in a medical surveillance program. Forms in Appendices A and F must be signed by each visitor.

Once this signing is complete and the visitor is wearing the required PPE, the visitor may enter the exclusion zone. However, in most cases visitors will be limited to the control zone or support zone. Visitors will be escorted by a site representative.

3.0 HAZARD EVALUATION AND CONTROL

The following sections describe the types of hazards expected on this project and the methods that will be used to control those hazards.

3.1 RISK ANALYSIS

This project is rated medium to high hazard because of the nature of the contaminants, the site locations, and fieldwork requiring excavations. Table 3-1 summarizes the project tasks, hazards, and controls. The remainder of this section will describe potential hazards and controls in greater detail.

3.2 PHYSICAL CONSTRUCTION/PHYSICAL HAZARDS

Potential safety hazards both specific to this site and general to most site work are shown in Table 3-2. General information has been provided as a reminder even though sunburn and heat stress may not be hazards during winter months. Refer to Appendix D for more detailed information concerning safety hazards and controls.

3.3 CHEMICAL HAZARDS AND CONTROL

The suspected contaminants onsite are listed in Table 3-3. The physical, chemical, and health effects of hazardous chemical substances are itemized in Table 3-4. Generic chemical hazard profiles of these substances by groups (e.g., metals, corrosives, petroleum-based hydrocarbons, and spent ordnance residues) are provided as Appendix C to this HSP. Refer also to Jacobs SOPs 7.0 through 7.9.

Generic chemical hazard profiles are provided in Appendix C for those chemicals that are typically used for sampling equipment decontamination and immunoassay test kit reagents. These chemicals are also listed in Table 3-5. More detailed Material Safety Data Sheet (MSDS) information specific to each chemical is provided in Appendix G.

TABLE 3-1
Project Hazard Analysis

Task/Activity	Potential Hazards	Controls/Jacobs SOPs
Site Mobilization		
Heavy equipment operation	• Equipment accidents, personal injuries, fall of suspended load, crushing injuries	• Operator certification: training must comply with EM385.1.1/18A
		• Comply with CS/SOP 10.13, Forklift Safety
	• Vehicle accidents	• Access restrictions, air monitoring
	• Dust generation	• Air monitoring, dust suppression procedure
Trailer installation	• Crushing injuries, vehicle accidents	• Enforce/train in code of safe practices
		• Vehicle safety procedures enforcement
Electrical hookups	• Utilities/electrocution	• Ground fault circuit interrupters on all circuits lockout tagout program
Tank Removal(s)		
Tank Removal	• Cryogenic (freezing skin) hazards if using dry ice for inerting	• Wear insulated gloves, face shield; protect exposed skin
	• Compressed gas hazards	• See Table 3-2
	• Hazards related to use of high-pressure spray unit	• See Table 3-2
Excavation	• Excavation hazards	• See Table 3-2 and Appendix D
	• Crane operation during tank removal	• Operator certification; comply with Jacobs CS/SOP 10.9: Cranes, Operation, and Control
Cleaning, inerting, and removing tanks	• Other heavy equipment operation	• Operator certification, training, equipment inspections; comply with EM385.1.1/18A
		• Enforce Jacobs CS/SOP 7.7: Utility Clearance
Cleaning and inerting piping	• Exposure to fuels (waste oil at Tanks 1518-5, 4210-1, 4210-2, 4210-3)	• Perform monitoring as described in Table 5-2. Wear PPE as required in Table 6-1
Stockpiling soils, segregating, and disposal	• Rigging accidents	• Enforce Jacobs CS/SOP 10.10: Rigging
Cutting (flame) or pneumatically cutting tanks and piping	• Cutting burns, fire, and metal fume fever	• Enforce Jacobs CS/SOP 10.8: Oxy Fuel Cutting/Heating/Welding and Jacobs CS/SOP 8.4.9: Respiratory Protection for Welding
	• Small-tool-use physical injury	• Enforce Jacobs CS/SOP 10.2: Small Tools and Equipment
Other tasks	• Fall hazards	• Fall protection above 6 feet elevation; train, enforce Jacobs CS/SOP 7.8: Fall Protection Policy
	• Materials handling physical injuries	• Enforce Jacobs CS/SOP 9.0: Shop and Storage Area Controls
	• Impact hazards	• Training, hard hat program
	• Noise	• See Table 3-2
	• Animal and plant hazards	• Enforce Jacobs EH&S/SOP 7.4: Biological Hazard Control, following operative instructions and training

TABLE 3-1
Project Hazard Analysis

Task/Activity	Potential Hazards	Controls/Jacobs SOPs
Soil Sampling Hand Augering	• Noise • Belowground utilities • Traffic • Dust exposure, fuels, waste oil, and chlordane • Flying objects	• See Table 3-2 • Utility clearance • Provide flag person or other control as required by EM385.1.1/8B. See Table 3-2 • Air monitoring, PPE, work practice controls, dust control • Wear hard hat and safety glasses when PHSM determines hazards to the head or eyes exist
Tank Upgrades	• Heavy Equipment • UV exposure/sunlight • Traffic • Flying objects • Noise • Belowground utilities • Fuels	• Ensure operator certification and training; comply with EM385.1.1/18A • See Table 3-2 • See Table 3-2 • Wear hard hat and safety glasses wherever hazards to the head or eyes exist • See Table 3-2 • Follow utility clearance procedure, Jacobs SOP 7.7 • Air monitoring and PPE
Building Demolition	• Heavy equipment • UV exposure/sunlight • Noise • Working at heights/falls • Flying and falling debris	• Ensure operator certification and training; enforce EM385.1.1/18A • See Table 3-2 • See Table 3-2 • See Table 3-2 • Wear hard hat and safety glasses when hazards to the head or eyes exist. Restrict access to areas where falling and flying debris presents a hazard
Building Restoration	• Hot work: cutting or welding • Heavy equipment • UV exposure/sunlight • Noise • Traffic	• Enforce Jacobs CS/SOP 10.8 Oxy Fuel Cutting/Heating/Welding or EM385.1.1/10E: Arc Welding and Cutting, as applicable. Comply with Jacobs CS/SOP 8.4.9: Respiratory Protection for Welding • Ensure operator certification and training; enforce EM385.1.1/18A • See Table 3-2 • See Table 3-2 • See Table 3-2

TABLE 3-1
Project Hazard Analysis

Task/Activity	Potential Hazards	Controls/Jacobs SOPs
Building Restoration (continued)	• Flying/falling objects • Cranes	• See Table 3-2 • Wear hard hat and safety glasses when hazards to the head or eyes exist. Restrict access to areas where falling and flying debris presents a hazard • Ensure operator certification; comply with Jacobs CS/SOP 10.9: Cranes, Operation and Control
Equipment Decontamination	• Fuels, waste oils, chlordane • Manual materials handling • High-pressure steam cleaning • Solvents for equipment decontamination	• Air monitoring, PPE, dust control • Comply with Jacobs CS/SOP 10.15, Materials Handling and Storage • See Table 3-2 • Air monitoring
Golf Course Maintenance Yard - Soil Excavation	• Fuels, waste oils, chlordane • Heavy equipment • Noise • Aboveground and belowground utilities	• Air monitoring, PPE, dust control • Ensure operator certification and training; comply with EM385.1.1/18A • See Table 3-2 • Comply with Jacobs SOP 7.7

Notes:

CS = Construction Safety
EH&S = Jacobs Environmental Health and Safety Manual
PHSM = Program Health and Safety Manager
PPE = personal protective equipment
SOP = standard operating procedure
UV = ultraviolet

TABLE 3-2

Physical Hazards and Controls

Hazard	Engineering or Administrative Controls
Flying debris/objects	Provide shielding and PPE. An emergency eye wash and shower must be available at work location.
Steep terrain/unstable surface	Brace and shore equipment.
Explosive gases	Provide 20-pound A:B:C fire extinguishers or equivalent, plus ventilation. Stop work when readings are greater than 10 percent of the lower explosive limit (LEL) and notify SHSC or PHSM.
Static electricity	Make certain there are no spark sources within 50 feet of an excavation, heavy equipment, or UST removal. Bonding and grounding are required when filling or removing flammable liquids from containers such as tanks or drums.
Gas cylinders	Make certain that gas cylinders are properly anchored, chained, and capped. Keep cylinders away from ignition sources and protected from direct sunlight.
High-pressure hose hazards	Check that fittings and pressurized lines are in good repair before using. Secure all lines to prevent whipping. Direct spray only at surfaces to be cleaned. Wear face shield and safety glasses to protect from spray and flying objects.
Electrical shock	Make certain that equipment is properly grounded. Do not modify electrical wiring unless qualified to do so. Follow lock-out/tag-out procedures discussed in Appendix D.
Underground utilities	Follow Jacobs SOP 7.7 (EH&S Manual), which requires hand augering to 7 feet and overreaming all drill holes, and probing all areas to be excavated with a nonconductive pole. Complete the Clearance Form found in SOP 7.7.
Overhead electrical wires	Heavy equipment must remain at least 15 feet from overhead powerlines of 50 kV or less. For each kV over 50, increase distance 0.5 foot.
Muddy, wet, or slippery work areas	Use wood pallets or similar devices in muddy work areas. Avoid these areas whenever possible.
Back injury	Use proper lifting techniques. Use mechanical lifting aids whenever possible.
Protruding objects	Flag and/or pad visible objects. Flatten or remove all protruding spikes, nails, and other sharp objects that may cause injury.
Suspended loads	Do not work under suspended loads. Barricade accessible areas under the swing radius of the load.

TABLE 3-2

Physical Hazards and Controls

Hazard	Engineering or Administrative Controls
Heavy equipment	A backup alarm is required for heavy equipment. Observer must remain in contact with operator, and will signal when backup is safe. All personnel must remain outside the equipment's turning radius. Make equipment operators aware of your presence: inform operators at the beginning of the day if you must work in their vicinity.
Fire protection	Keep fire extinguishers in the clear but near operations. Do not tamper with extinguishers. Maintain all firefighting equipment in operating condition. In case of fire, immediately activate the fire alarm, and then use the correct type of extinguisher. Use equipment correctly; do not delay.
Flammable and combustible liquids	Use only approved National Fire Protection Association (NFPA) or Underwriter's Laboratories (UL) containers, cabinets, and portable tanks for storage and dispensing. Keep flammable liquids in closed containers when they are not in use. Label all containers as to contents and directions for safe use. Refer to the MSDSs attached to this HSP for specific information on any chemicals brought to this site. Bonding and grounding are required during container filling and emptying.
Working from elevated surfaces or platforms	All platforms and elevated surfaces will be constructed in accordance with OSHA requirements. Employee shall use fall protection when working from unprotected elevations greater than 6 feet in height.
Welding/cutting	Move welding/cutting activities downwind from explosive atmosphere. Enforce Jacobs CS/SOP 10.8: Oxy Fuel Cutting/Heating/Welding or EM385.1.1/10E: Arc Welding and Cutting, as applicable. Comply with Jacobs CS/SOP 8.4.9: Respiratory Protection for Welding.
Trenches/excavations	If you must enter a trench/excavation, make sure the trench/excavation meets OSHA standards before you enter. All excavations 5 feet deep or more must be sloped or shored. Excavations 4 feet deep or more must have a ladder every 25 feet. If you work near a trench/excavation, remain 2 feet from the edge at all times. To enter a trench or excavation you must have a permit, and confined space entry procedures may also be necessary. Comply with Jacobs CS/SOP 8.10: Excavations
Traffic	Place warning signs. Employees exposed to the hazards of vehicular traffic are required to wear orange warning garments. During dusk, dawn, or dark times, employees must wear warning garments made of reflective material. See also Appendix D.
Inclement weather	Stop work during inclement weather. Notify SHSC, PHSM, and/or Site Manager.
Working alone	Do not work alone. The buddy system will be enforced.
Confined space entry	No one is to enter excavations or USTs.

TABLE 3-2

Physical Hazards and Controls

Hazard	Engineering or Administrative Controls
Sunburn	Wear long-sleeved shirts or use sunscreen (SPF 20 UVA & UVB) and provide a shady area.
Heat stress	Use wet bulb globe temperature (WBGT) monitoring guidelines. Check employee's pulse and temperature. See Section 3.5.
Falls	All work above 6 feet in elevation requires fall protection. Refer to Jacobs Corporate Safety Manual, SOP 7.8: Fall Protection Policy for additional information.
Noise	If noise levels are greater than 85 dBA or voices must be raised to be heard in normal conversation at 3 feet apart, hearing protection adequate to reduce exposures to below 85 dBA must be worn. Refer to Appendix D.

Notes:

dBA = decibels (on the A-weighted scale)
HSP = Health and Safety Plan
kV = kilovolt
MSDS = Material Safety Data Sheet
OSHA = Occupational Safety and Health Administration
PHSM = Project Health and Safety Manager
PPE = personal protective equipment
SHSC = Site Health and Safety Coordinator
SOP = standard operating procedure
SPF = sun protection factor
UST = underground storage tank
UVA = ultraviolet A
UVB = ultraviolet B
> = greater than

TABLE 3-3
Suspected Contaminants at
Underground Storage Tanks and
Golf Course Maintenance Yard

SUSPECTED CONTAMINANTS
Petroleum, Oils, and Lubricants
JP-4
Diesel Fuel/Fuel
Gasoline
Benzene
Toluene
Xylene
Ethylbenzene
Chlordane

TABLE 3-4
Hazardous Chemical Substances of Occupational Health Concern at NAS Fort Worth

CHEMICAL NAME	PEL/ TLV[1]	OTHER LIMITS[1]	CHEMICAL GROUP[2]	WARNING PROPERTIES	PHYSICAL PROPERTIES	TARGET ORGANS	ACUTE/CHRONIC HEALTH EFFECTS	CANCER
Kerosene (JP-4 and JP-5)	none	REL: 100 ppm	Petroleum based	odor threshold 20 ppm	LEL: 0.7% FP: 120° F	CNS, skin, respiratory system, kidneys, gastro-intestinal system	Chemical pneumonia	no
Benzene	1/1 ppm	IDLH: 3,000 ppm STEL: 5 ppm	Petroleum based	aromatic odor	LEL: 1.3% IP: 9.25 eV VP: 75 mm FP: 120° F	blood, CNS, skin, bone marrow, eyes, respiratory system	Irritated eyes, nose, and respiratory system; headache; nausea; staggered gait; fatigue; lassitude; dermatitis; bone marrow depression; abdominal pain; leukemia	yes
Fuel-gas	300/300 ppm	IDLH: 2,500-3,500 ppm	Petroleum based	sweet odor	LEL: 1.7%	skin, respiratory system	Irritating to eyes, nose, and throat; CNS	no
Toluene	200/100 ppm	IDLH: 2,000 ppm	Petroleum based	aromatic odor	LEL: 1.2% IP: 8.821 eV VP: 22 mm FP: 40° F	CNS, liver, kidney, skin	Fatigue, weakness; confusion, euphoria, dizziness; headache; dilated pupils, lacrimation; nervousness; muscle fatigue; insomnia; paresthesia; dermatitis; photophobia	no
Xylene	100/100 ppm	IDLH: 1,000 ppm STEL: 150 ppm	Petroleum based	aromatic odor	LEL: 1.1%; IP: 8.6 eV VP: 7 mm FP: 63° F	CNS, eyes, gastro-intestinal tract, blood, liver, kidneys, skin	Dizziness, excitement, drowsiness, incoordination, staggering gait; irritating eyes, nose, throat; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis	no
Chlordane	0.5 mg/m^3 (skin)	IDLH : 500 mg/m^3	Pesticide	pungent chlorine-like odor	LEL: NA VP: 0.00001 mm FP: NA	CNS, eyes, lungs, liver, kidneys, skin	Blurred vision; confusion; ataxia, delirium, cough; abdominal pain; nausea, vomiting, diarrhea; irritability; tremor; convulsions; anuria. In animals: lung, liver, kidney damage.	yes
Ethylbenzene	100/100 ppm	REL: 100 ppm STEL: 125ppm IDLH: 800 ppm	Petroleum based	aromatic odor	LEL: 0.8%; VP: 7 mm FP: 55° F	CNS, eyes, skin, lungs	Irritates eyes, skin, mucous membranes, headache, dermatitis, narcosis, coma	no
Gasoline	none 300 ppm	STEL: 500 ppm	Petroleum based	odor	LEL: 1.4% VP: 38-300 mm FP: -45° F	CNS, eyes, respiratory system, liver, kidneys	Irritates eyes, skin, mucous membranes, dermatitis, headache, fatigue, blurred vision, dizziness, slurred speech, confusion, convulsions, liver and kidney damage	yes

Notes:

1 The PEL/TLV and Other Limits columns include applicable exposure limits as prescribed in the *NIOSH Pocket Guide to Chemical Hazards.* U.S. Department of Health and Human Services. 1990 (June). Publication No-90-117.

2 The Chemical Group column is generic to facilitate referencing Appendices C and G.

CNS = central nervous system
eV = electron volt
FP = flash point
IDLH = immediately dangerous to life or health
IP = ionization potential
LEL = lower explosive limit
PEL = permissible exposure limit
ppm = parts per million
mg/m^3 = milligrams per cubic meter
mm = millimeter
NA = not applicable
REL = recommended exposure limit
STEL = short-term exposure limit
TLV = threshold limit value
VP = vapor pressure
° F = degrees Fahrenheit
% = percent

TABLE 3-5
Generic Chemicals That May Be Brought Onsite

Chemical	Generic Chemical Hazard Group
Methanol (methyl alcohol)	Solvents (nonhalogenated)
Hexane	Solvents (nonhalogenated)
Calibration Gases	Various
Immunoassay Test Kit Reagents • Methanol • Hydrogen peroxide • Sulfuric acid	• Solvents (nonhalogenated) • Oxidizers • Acids

Note: Anyone bringing chemicals to this site is required to provide an MSDS to the PHSM or Site Manager.

3.4 BIOLOGICAL HAZARDS AND CONTROLS

There is potential for bites from insects, snakes, and rodents, as well as possible contact with poisonous plants. More detailed information concerning biological hazards and controls are provided in Appendix D.

3.5 HEAT AND COLD STRESS

The Jacobs Environmental Health and Safety Manual, SOPs 7.1 and 7.2, outline exposure control methods for working in extreme temperatures. The PHSM will implement SOPs 7.1 and 7.2, including environmental and physiological monitoring requirements. Table 3-6 summarizes symptoms and treatment procedures for heat and cold stress.

3.6 RADIOLOGICAL HAZARDS

The presence of radiological hazards is not expected.

3.7 CONFINED SPACE HAZARD

The fieldwork (excavation) to be conducted may be classified as confined space entry. If entry is necessary, then the Site Manager and PHSM must ensure compliance with Jacobs CS/SOP 8.6: Confined Space Entry, and CS/SOP 8.10: Excavations.

TABLE 3-6
Symptoms and Treatment of Heat and Cold Stress

Condition	Symptoms	Treatment
Heat stroke	Red, hot dry skin; no perspiration; dizziness; confusion; rapid breathing and pulse; high body temperature.	This is a **MEDICAL EMERGENCY!** Cool victim rapidly by soaking in cool (not cold) water. Loosen restrictive clothing. **Get medical attention immediately!**
Heat exhaustion	Pale, clammy, moist skin; shallow breathing; profuse sweating; weakness; normal temperature; headache; dizziness; vomiting.	Move victim to a cool, air-conditioned area. Loosen clothing, place head in low position. Have victim drink cool (not cold) water.
Frostbite	Blanched, white, waxy skin, but resilient tissue; tissue cold and pale.	Move victim to a warm area. Warm area quickly in warm (not hot) water. Have victim drink warm fluids - not coffee or alcohol. Do not break any blisters. Elevate the injured area and **get medical attention.**
Hypothermia	Shivering, apathy, sleepiness, rapid drop in body temperature; glassy stare; slow pulse; slow respiration.	Move victim to a warm area. Have victim drink warm fluids - not coffee or alcohol. **Get medical attention.**

4.0 SITE CONTROL

The following sections describe site control procedures and practices.

4.1 SITE CONTROL PROCEDURES

The Site Manager and SHSC have the following site control responsibilities:

- Limit access to the sampling location(s) and post appropriate warning signs or caution tape.
- Ensure "buddy system" requirements of 29 CFR 1910.120 are followed.
- Keep a copy of this HSP readily available.
- Establish onsite communications. These should consist of the following:
  - line of sight;
  - agreed-upon hand signals or two-way radio; and
  - air horn.
- Establish offsite communications using two-way radio and/or telephone.
- Set a wind indicator to readily determine wind direction.
- Establish and delineate contiguous work zones (exclusion, contamination reduction, and support) per Jacobs EH&S/SOP 7.3: Work Zones. The latter two zones should be upwind of the exclusion zone unless obstacles make it infeasible.
- Establish decontamination and waste disposal procedures.

4.2 WORK PRACTICES

All personnel will be responsible for compliance with the following work practices:

- Post OSHA and other agency posters in a central and conspicuous location. (Refer to Section 9.2 for more details.)
- Suspend field operations if any unforeseen hazards become apparent in the field that require greater precautions other than those specified in the HSP. (These are responsibilities for the PHSM or Site Manager.)

- Meet the "buddy system" (working in teams of two people) requirements of 29 CFR 1910.120(d)(3) at all times.
- Maintain a copy of the site tailgate and exclusion zone entry log (Appendix E).
- Implement dust- or vapor-suppression methods to minimize unwanted emissions.
- Position all personnel upwind of sampling locations.
- Avoid visibly contaminated areas as much as possible place barriers or plastic to mark location.
- Prohibit eating, drinking, or smoking in exclusion zones or contamination reduction zones where access is restricted.
- Establish areas for eating, drinking, and smoking. Drinking water, juices, and cups are to be supplied in the support area.
- Store chemicals brought onsite in properly labeled containers and where they are unlikely to be accidentally disturbed.
- Perform work during daylight hours. (Night work requires modification to this HSP.)
- If toilet facilities are not located within a three-minute walk from the decontamination area, either provide a chemical toilet and hand-washing facility, or have a vehicle available (not the emergency vehicle) for transport to nearby facilities.

A copy of the HSP must be available in the control zone or the vehicle designated for emergencies.

4.3 DECONTAMINATION PROCEDURES

The following sections describe decontamination procedures for equipment and personnel.

4.3.1 Samples and Equipment

The PHSM or Site Manager shall verify that pieces of equipment going offsite are properly decontaminated according to the procedures outlined below. Decontamination must be documented in the field logbook that is a part of the permanent project file.

- Sampling Equipment. Follow detailed procedures in Appendix H.
- Samples. Wipe exterior of sample containers to remove visible contamination.
- Heavy Equipment. Scrape off dirt. Steam clean at the decontamination pad before moving to another site.
- Vehicles. Vehicles driven within the boundaries of the sites must be washed and the interior vacuumed before returning the vehicle to the office, rental agency, or to any person not named in this HSP. A commercial car wash is adequate for this purpose. Vehicles driven in the exclusion zone, extended into a part of the exclusion zone, or used to transport contaminated personnel or supplies must be steam cleaned inside and outside at the decontamination pad before going to another site. Vehicles do not have to be decontaminated between boreholes.

4.3.2 Personnel

Personnel decontamination procedures will depend on the level of PPE worn in the field.

Level D and D+ Personal Protective Equipment. Wash and rinse gloves and boots with soap and water. Remove and dispose of gloves and coveralls. Wash hands and face with soap and water. Figure 4-1 outlines a typical Level D and D+ decontamination layout.

Levels B and C Personal Protective Equipment. A decontamination schematic is provided in Figure 4-2; procedural details are described in Table 4-1.

4.4 SPILL CONTAINMENT PROCEDURES

Refer to the most current edition of the U.S. Department of Transportation (DOT) Emergency Response Guide Book (DOT P 5800.5), and to the Work Plan for this project.

The following are potential spills sources during field operations: hydraulic oil from vehicles, contaminated soils from excavation, decontamination liquids, and residual fuels from USTs or fuel lines. Containerizing materials as soon as possible will reduce

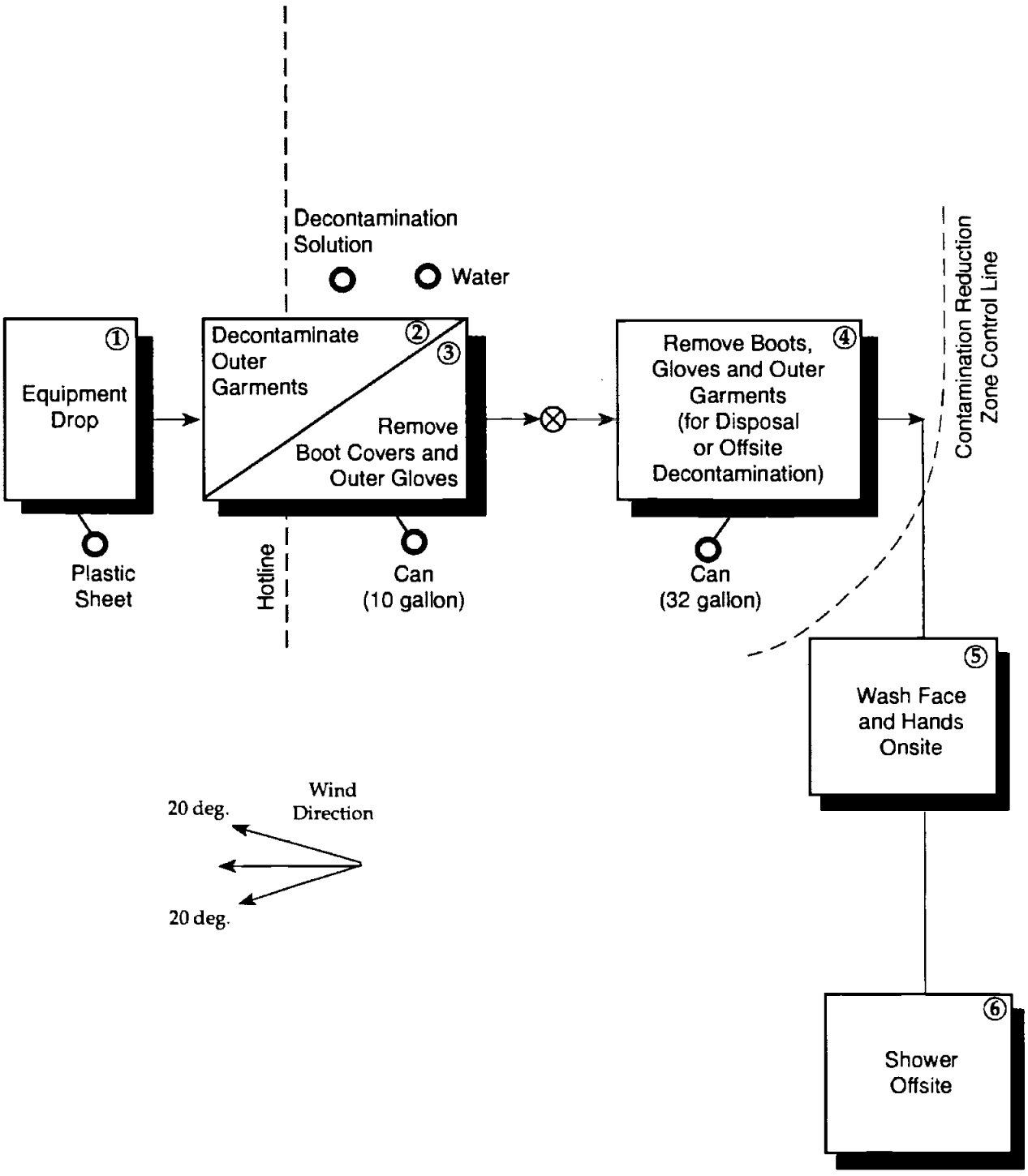


FIGURE 4-1
Typical Level D and D+
Decontamination Minimum Layout
NAS Fort Worth
Fort Worth, Texas

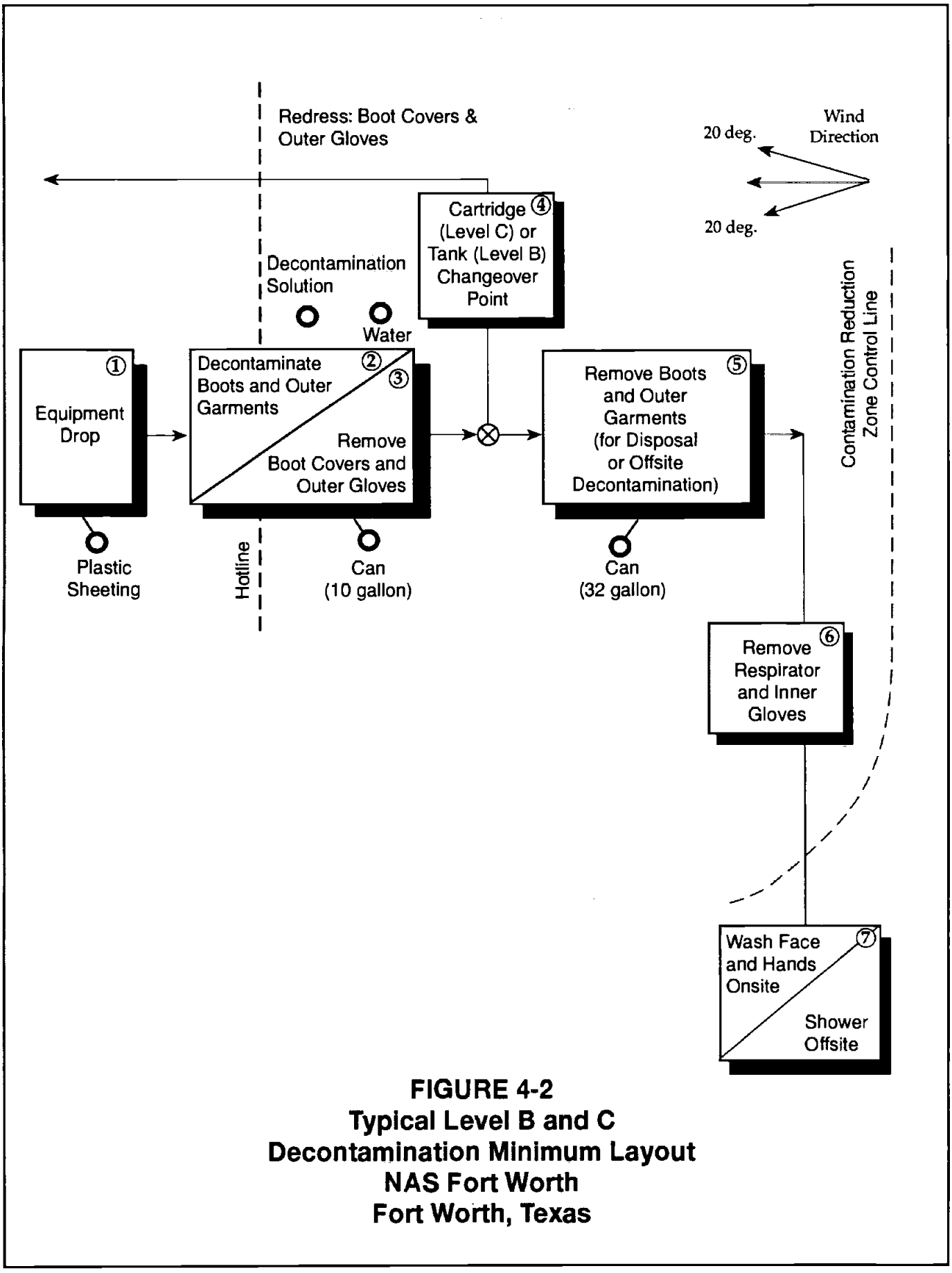


FIGURE 4-2
Typical Level B and C
Decontamination Minimum Layout
NAS Fort Worth
Fort Worth, Texas

TABLE 4-1

Decontamination Procedures

Station	Procedure	Equipment and Supplies
1. Equipment drop	Deposit equipment used onsite (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool-down station may be set up within this area.	a) various size containers b) plastic liners and drop cloths
2. Wash outer garments and boots	Scrub outer boots, outer gloves, and splash suit with an aqueous solution of Alconox® or other nonphosphate detergent. Rinse with copious amounts of water. Remove tape.	a) containers (20- to 30-gallon) b) decontamination solution (Alconox® or other non-phosphate detergent c) rinse water d) two to three long-handled, soft-bristled brushes
3. Remove outer boots and gloves	Remove outer boots and gloves. Deposit them in a plastic-lined container.	a) containers (20- to 30-gallon) b) plastic liners c) benches or stools and tables
4. Change air tank (Level B) or respirator cartridge (Level C)	If a worker leaves the exclusion zone to change the air tank or respirator cartridge, this is the last step in the decontamination procedure. Exchange air tank or respirator cartridge, don new outer gloves and boot covers, tape joints, and return to duty.	a) air tanks or respirator and cartridges, depending on level of protection b) tape c) boot covers d) gloves
5. Remove boots and outer garments	Remove boots, chemical-resistant splash suit, and outer garments and deposit in separate plastic-lined containers.	a) containers (20- to 30-gallon) b) plastic liners c) benches or stools and tables

TABLE 4-1

Decontamination Procedures

Station	Procedure	Equipment and Supplies
6. Respirator and inner glove removal	Remove respirator without touching face with inner gloves. Deposit respirator on plastic sheets and inner glove into lined container.	a) plastic sheets b) basin or bucket c) soap, water, and towels d) benches or stools and tables
7. Personnel wash	Wash hands and face thoroughly. Shower as soon as possible.	a) soap and water b) tables c) wash basin or bucket

the potential for spills. Handling of waste materials and containers will be in accordance with the Work Plan developed for NAS Fort Worth.

If spills occur, the PHSM and Site Manager are to be notified immediately. The PHSM or Site Manager will be responsible for ensuring necessary notifications are given to the PHSD and the AFCEE representative. The AFCEE representative will inform the station emergency responders if necessary. The AFCEE representative and Jacobs will determine the strategy for notifying regulatory agencies.

The following materials and equipment will be available for spill containment:

- additional drums;
- drum-patching kit;
- absorbent materials (granular, rolls, sheets, booms etc.);
- shovels and towels; and
- plastic sheeting.

4.5 DISPOSAL OF WASTE MATERIALS GENERATED ONSITE

Any site-derived materials such as decontamination fluids and soil samples shall be contained in separate 55-gallon drums, roll-off containers, or wastewater holding tanks. All PPE shall be contained in plastic bags and labeled with the site location. All containers will be inventoried and moved to the temporary staging area designated by the station point of contact (POC). Containers and/or roll-off bins may not be transported offsite for disposal until analytical results of samples collected at the boreholes have been received and the container contents have been classified.

Hazardous waste containers shall be transported by a registered hauler to a permitted treatment, storage, and disposal facility (TSDF). NAS Fort Worth representatives

must sign hazardous waste manifests. Solid trash and PPE that has been contaminated shall also be disposed of as hazardous waste.

Solid trash, i.e., disposable PPE and items used in the work zones that are not contaminated at concentrations sufficient to be classified as hazardous waste, shall be contained and disposed of as industrial solid waste with other trash generated at NAS Fort Worth.

Soils that are not classified as hazardous waste will be disposed of as designated by NAS Fort Worth.

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5.0 AIR MONITORING

Air monitoring will be conducted to prevent exposure to dust or hazardous chemicals, as described below.

5.1 ENVIRONMENTAL MONITORING

Air monitoring is required for work activities that disturb soil, when tanks that are not empty and clean are open, and during decontamination using hexane or methanol. Air monitoring during these activities shall be performed with a screening or direct reading instrument such as the organic vapor analyzer (OVA) 128 or photoionization detection (PID) (HNu) PI 101, a combustible gas indicator (CGI), an oxygen (O_2) analyzer and colorimetric tubes for specific compounds. Calibration specifications for instruments are displayed in Table 5-1. The monitoring frequency and action levels are contained in Table 5-2. Appendix I contains forms for recording air monitoring results and calibration data.

5.2 PERSONAL EXPOSURE MONITORING

If elevated levels of specific substances are detected using the instruments listed in Table 5-2, the PHSM shall be notified so that an evaluation can be made to determine whether personal monitoring will be performed.

If personal monitoring is performed, it shall be in accordance with the NIOSH standardized sampling and analytical methods or other equivalent methods. These methods specify quality assurance procedures for calibration, sample media, collection parameters, sampling, and analysis of samples. Samples shall be analyzed by a laboratory accredited by the American Industrial Hygiene Association (AIHA).

TABLE 5-1
Calibration Specification

Instrument	Gas	Span	Reading	Method
PID: HNu P1 101 (11.7 eV probe)	100 ppm isobutylene	9.8 ± 33	55 ppm	1.5 L/min reg.T-tubing or 0.25 L/min reg. direct tubing
CGI: MSA 260, 261, 360, or 361	For pentane: 0.75% or for hexane: 0.3% or for methane: 1.24%	N/A	For pentane: 50% ±5% LEL or for hexane: 27% ±5% LEL or for methane: 26% ±5% LEL	1.5 L/min reg. direct tubing

Notes:

CGI	=	combustible gas indicator
eV	=	electron volt
LEL	=	lower explosive limit
L/min	=	liters per minute
MSA	=	Mine Safety Appliance
N/A	=	not applicable
OVA	=	organic vapor analyzer
PID	=	photoionization detector
ppm	=	parts per million
reg.	=	regulator
±	=	plus or minus
%	=	percent

Note: Manufacturer's instruction or operating manual shall be available at the site.

TABLE 5-2

Equipment Specification and Action Levels

Instrument	Tasks	Action Levels	Frequency[1]	Calibration[2]
PID: HNu (10.2 or 11.7 eV or equivalent)	Removal of Tanks and Piping, Tank Upgrades, Soil Sampling, Equipment Decontamination	0-5.0 ppm[ab] Level D >5.0-100 ppm[ab] Level C >100-500 ppm[ab] Level B >500 ppm[ab] Stop work; reevaluate	In the breathing zone at the beginning of operations and a minimum of every 30 minutes. Levels C and B require continuous monitoring.	Daily - Pre and Post Use
Combustible Gas Meter	Removal of Tanks and Piping, Tank Upgrades	0<10% LEL Level D (potential explosion hazard) ≥10% LEL Stop work; reevaluate (explosion hazard)	Continuous monitoring during tank and piping removal. Continuous monitoring of a confined space. Screening during excavating or before entering an excavation/trench.	Daily - Pre and Post Use
Heat Stress Monitor and Physiological Monitor	When PPE is worn or Temperatures are elevated	Reference Jacobs SOP 7.1 this document	Per Subsection 3.5 and Appendix F	Not Applicable
Noise Level Monitor[3]	All Tasks	Noise measurements are required when voice must be raised to communicate at a distance of 3 feet or less	Initial measurement and at 30 minute intervals while readings are above 85 dBA.	Daily - Pre and Post Use
Oxygen Meter	Tank removals when excavations ≥4 feet deep	19.5% - 23.5% Level D & C <19.5% Level B >23.5% Stop work; reevaluate	Continuously during a confined space entry. Screening prior to entering an excavation/trench.	Daily - Pre and Post Use
Benzene colorimetric tubes	Removal of Tanks and Piping Tank Upgrades, Soil Sampling, Equipment Decontamination	> 1.0 ppm Level C	Whenever PID exceeds 1 ppm sustained above background.	Leak test daily

1. Air monitoring shall be documented using Exposure Form in Appendix I.
2. Calibrations shall be documented using calibration log in Appendix I.
3. Requirement to wear hearing protection when voices must be raised to be heard in normal conversation at 3 feet apart.

ab = above background
eV = electron volt
LEL = lower explosive limit
PID = photoionization detector
ppm = parts per million

References: American Conference of Government Industrial Hygienists 1994
US Department of Health and Human Services 1985, 1990
29 Code of Federal Regulations 1910

Personal air monitoring shall be documented and maintained in an employee's personnel file and in the site project files. Employees monitored shall receive a copy of the sampling results. The air monitoring record form is included in Appendix I.

6.0 PERSONAL PROTECTIVE EQUIPMENT

PPE ensembles for waste site activities are defined by the U.S. Environmental Protection Agency (EPA) and OSHA. Level D consists of a basic work uniform and common construction-related PPE that includes a hard hat, steel-toed safety boots, and safety glasses with side shields. Other PPE, such as leather or cotton gloves, are added as necessary. Level D+ adds a limited amount of chemical protection for the skin. Over the work uniform, chemical-resistant overshoes or boots, a Tyvek suit, and chemical-resistant gloves are added.

Level C adds an air-purifying respirator and specialized whole body clothing such as a coated Tyvek suit and two pairs of chemical-resistant gloves. The ankles, wrists, and seams may be taped. Level B replaces the air purifying respirator with one that provides a supplied air source: either an airline/Cascade System or a self-contained breathing apparatus (SCBA). Level A includes a totally encapsulating chemical-resistant whole body suit. SCBA is generally worn for Level A. Table 6-1 summarizes the PPE ensembles that are required for this project by work task.

The following EH&S SOPs provide specific information on the Jacobs PPE program:

- SOP 4.0 PPE Levels of Protection Selection Criteria;
- SOP 4.1 PPE Donning/Doffing Level A Ensemble;
- SOP 4.2 PPE Donning/Doffing Level B Ensemble;
- SOP 4.3 PPE Donning/Doffing Level C Ensemble;
- SOP 4.4 Respiratory Protection Program Inspection and Maintenance of Air Purifying Respirator;
- SOP 4.5 Respiratory Protection Program SCBA Checkout Procedures; and
- SOP 4.6 Respiratory Protection Program Respirator Fit Test.

TABLE 6-1
Personal Protective Equipment Specifications

Task	Level	Body	Foot (ANSI Z 41.1)	Head (ANSI Z 89.1)	Eye (ANSI Z 87)	Hand	Respirator (ANSI Z 88.2)	Hearing Protection
Minimum for field work outside EZ and CRZ	D	• None required	• Steel toe/shank leather safety shoes/boots	• Hard hat	• Safety glasses	• Work gloves may be used	• None required	• Within 20 feet of noise source that exceeds 85 dBA • Usually when, at 3 feet apart in normal conversation, voices must be raised to be heard
All, when solids or liquid samples are handled, handling contaminated soils.	D+	• Disposable Tyvek coveralls OR disposable polyethylene (PE) coated Tyvek coveralls	• Steel toe/shank leather safety boots with Tyvek, neoprene, or nitrile boot covers OR neoprene or nitrile boots with steel toe/shank	• Hard Hat	• Safety glasses or goggles	• Inner Gloves: N-Dex, Nitrile OR Latex Rubber • Outer Gloves: Nitrile:	• None required	• Within 20 feet of noise source that exceeds 85 dBA • Usually when, at 3 feet apart in normal conversation, voices must be raised to be heard
All, as determined by air monitoring results	C	• Same as Level D+	• Steel toe/shank leather safety boots with Tyvek, neoprene, or nitrile boot covers OR neoprene or nitrile boots with steel toe/shank	• Hard Hat		• Inner Gloves: N-Dex, Nitrile OR Latex Rubber • Outer Gloves: Nitrile:	• Full face air purifying respirator, North 7600-8A or equivalent equipped with cartridges for protection against organic vapors, acid gases, dusts, fumes and mists	• Within 20 feet of noise source that exceeds 85 dBA • Usually when, at 3 feet apart in normal conversation, voices must be raised to be heard
All, as determined by air monitoring results	B	• Limited use chemrel, barricade or responder suits as determined by PHSD	• Neoprene OR nitrile boots with steel shank	• Hard Hat		• Inner Gloves: N-Dex, Nitrile OR Latex Rubber • Outer Gloves: Nitrile:	• Full face pressure demand airline or self-contained breathing apparatus with Grade D or better breathing air for either respiratory system used.	• Within 20 feet of noise source that exceeds 85 dBA • Usually when, at 3 feet apart in normal conversation, voices must be raised to be heard

Notes:
dBA = decibels on the A-weighted scale
CRZ = contamination reduction zone
EZ = exclusion zone
PE = polyethylene
PHSM = Program Health and Safety Manager

PPE levels may be upgraded or downgraded based on the results of direct reading air monitoring equipment. Table 6-2 summarizes conditions that require an upgrade or that may indicate that a downgrade is possible.

PPE will be inspected and tested as required in Jacobs SOPs. Respirators will be inspected after each use, or monthly, whichever is more frequent.

TABLE 6-2
Reasons to Upgrade or Downgrade Level of Protection

Upgrade	Downgrade
• Request of individual performing task, with concurrence from Project Health and Safety Manager. • Change in work task will increase contact or potential contact with hazardous materials. • Occurrence or likely occurrence of gas or vapor emission. • Known or suspected presence of dermal hazards. • Personnel air monitoring results exceed 100 x PEL while full face respirator is worn. • Action levels described in Table 5-2 exceeded.	• New information indicating that situation is less hazardous than originally thought. • Change in site conditions that decreases the hazard. • Change in work task will reduce contact with hazardous materials.

PEL = permissible exposure limit

7.0 EMERGENCY RESPONSE/CONTINGENCY PLAN

The following sections describe emergency response activities.

7.1 EMERGENCY PLANNING

The PHSM or Site Manager performs the applicable emergency planning tasks before starting field activities and coordinates emergency response with the facility and local emergency service providers as appropriate. The PHSM or Site Manager is responsible for the following:

- evaluates and documents capabilities of local NAS Fort Worth emergency response teams, if any;
- verifies local emergency contacts, hospital routes, evacuation routes, and assembly points;
- notifies appropriate emergency responders listed in Section 7.6 before site mobilization;
- confirms and post(s) emergency telephone numbers and route to hospital;
- posts site map marked with location of emergency equipment and supplies;
- drives and verifies route to hospital; ensures employees drive route to hospital;
- designates one vehicle as the emergency vehicle; places a copy of this HSP, including the hospital directions and map, inside; keeps keys in ignition during field activities;
- inventories and checks site emergency equipment and supplies;
- establishes emergency signals, evacuation routes, and onsite and offsite assembly points;
- reviews emergency procedures for personnel injury (Section 7.3);
- reviews names of onsite personnel trained in first aid and CPR;
- reviews emergency response and post-emergency notification procedures;
- rehearses the emergency response plan once, before site activities;
- points out to field team members where emergency response equipment is located in the support area;

- briefs new workers on the emergency response plan; and
- refers also to Figure 7-1, which shows a typical emergency response operations flow diagram.

7.2 EMERGENCY EQUIPMENT AND SUPPLIES

The following emergency equipment and supplies will be kept onsite:

- 20-pound A:B:C fire extinguisher (or equivalent);
- industrial first aid kit (10-unit minimum);
- one-way breathing shield for CPR;
- rubber gloves (latex or other);
- stretcher or blanket;
- water and electrolyte replenishers (Gatorade®, etc.);
- two-way radio(s) or cellular phone;
- air horn;
- wind direction indicator;
- portable pressurized eyewash/shower;
- sorbent material or spill containment supplies; and
- red bag labeled with biohazard symbol for disposal of potentially infectious materials.

7.3 EMERGENCY PROCEDURES

The following procedures will be followed during a site emergency.

7.3.1 Emergency Medical Treatment

If a medical emergency occurs, the PHSM, SHSC, or Site Manager shall assume charge until ambulance arrives, or until injured person is admitted to the emergency room.

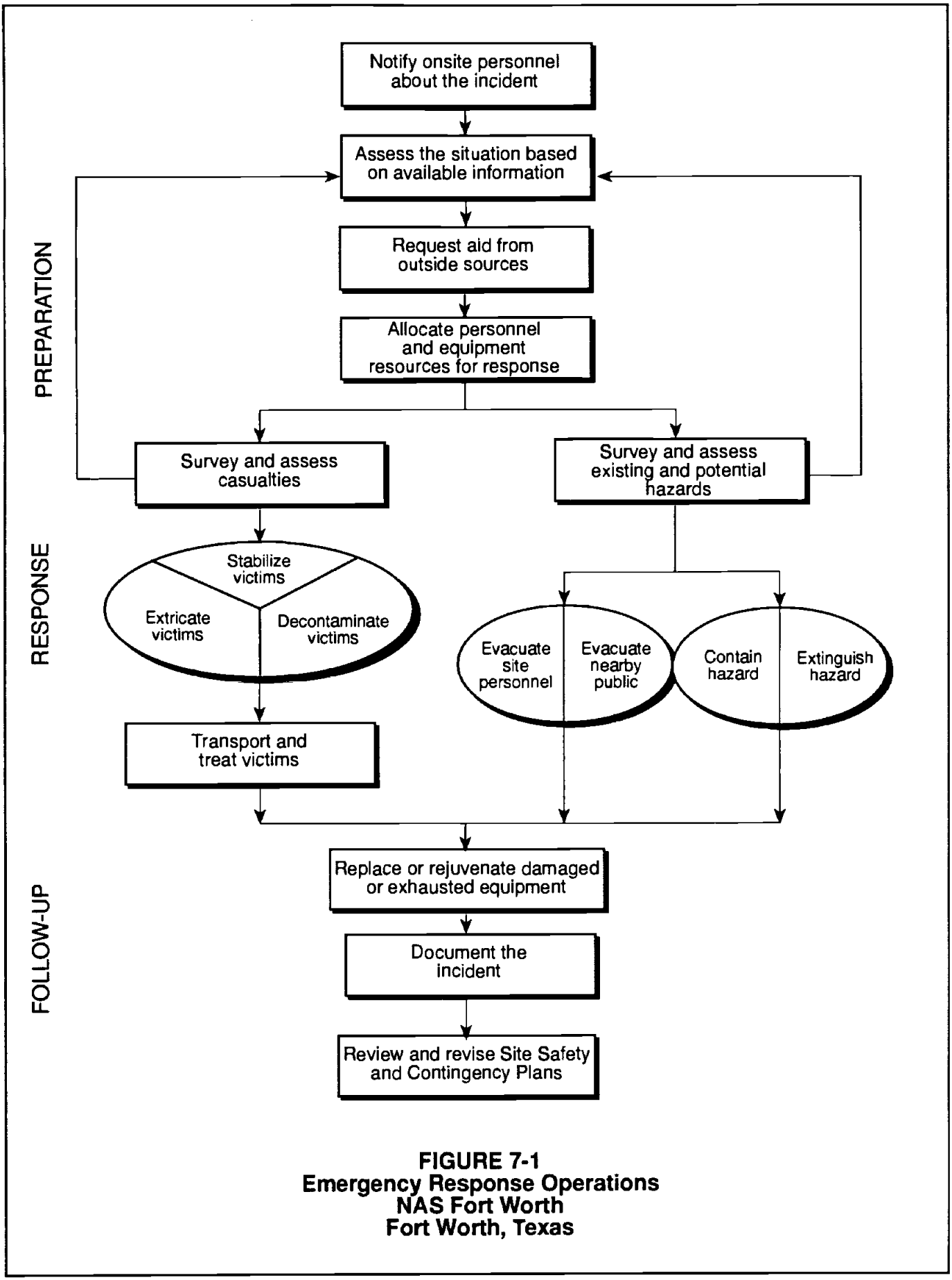

FIGURE 7-1
Emergency Response Operations
NAS Fort Worth
Fort Worth, Texas

Site personnel will prevent further injury by completing the actions listed below:

- Initiate first aid and CPR if certified. Refer to Section 7.4 for information on the bloodborne pathogen provision.
- Call ambulance and hospital as appropriate. Arrange with NAS Fort Worth for entry procedures.
- Determine if decontamination will make injury worse. If yes, seek medical treatment immediately.
- Make certain the injured person is accompanied to the emergency room by at least one field team member with the same employer.

Hospital emergency personnel will be provided with a copy of the HSP. An Authorization for Medical Treatment Form (Appendix J) shall be taken with the injured employee to the medical facility. The top portion of the form is completed by the PHSM or Site Manager, and the bottom portion is completed by the doctor at the medical facility. The completed form shall be forwarded as listed in Section 7.7.

7.3.2 Fire

Upon notification of a fire onsite, all site personnel will assemble at the decontamination line. The fire department will be alerted, and all personnel will move to a safe distance from the involved area.

7.3.3 Personal Protective Equipment Failure

If any site worker experiences a failure or alteration of PPE, that person and his/her buddy will immediately leave the exclusion zone through the decontamination line. Reentry will not be permitted until the equipment has been repaired or replaced.

7.3.4 Other Equipment Failure

If any other equipment onsite fails to operate properly, the PHSM or SHSC will be notified and will determine the effect of this failure on continuing operations onsite. If

the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel will leave the exclusion zone until the situation is evaluated and appropriate actions are taken.

7.3.5 *Spills*

Section 4.4 discusses measures to be taken if a spill occurs.

7.4 BLOODBORNE PATHOGEN PROVISION

The following procedures will be followed if a potential exposure to bloodborne pathogens occurs:

- A Hepatitis B vaccination must be offered to all employees who have occupational exposure to blood or other potentially infectious materials.
- The PHSM or Site Manager must be notified immediately during the work shift when a first aid incident occurs.
- The PHSM or Site Manager shall follow the required reporting procedures to the PHSD as listed in Section 7.7.
- The report shall include the names of all first aid providers who rendered assistance, regardless of whether PPE was used, and shall describe the first aid incident, including time and date.
- The description must include a determination if, in addition to the presence of blood or other potentially infectious material, an "exposure incident" (as defined by 29 CFR 1910.1030) occurred. This determination is necessary to ensure that the proper postexposure evaluation, prophylaxis, and follow-up procedures required by Bloodborne Pathogen SOP are made available immediately if there has been an "exposure incident" as defined by 29 CFR 1910.1030.
- The report shall be recorded on the First Aid Register (Appendix J).
- A one-way mouth shield must be included in or with all field first aid kits for use in CPR application to prevent transmission of body fluid between victim and rescuer.

For additional information, refer to SOP 7.6 in the Jacobs EH&S Manual (Jacobs undated a).

7.5 EVACUATION

If an evacuation is necessary, the steps below shall be followed:

- Personnel are to leave the work location (upwind) and assemble at a designated assembly point (if safe) upon detecting the emergency signal for evacuation.
- If an emergency situation is of concern to local station personnel, notify the local station contact(s) of the emergency situation.
- If appropriate and safe, the PHSM or SHSC and a "buddy" are to remain at or near the sampling location after the location has been evacuated to assist local responders and advise them of the nature and location of the incident.
- The PHSM, SHSC, or designee is to account for field team members at the assembly point.
- The PHSM, SHSC, or Site Manager is to complete an incident report (per Section 7.7) as soon as possible after occurrence.

7.5.1 Evacuation Routes and Assembly Points

Evacuation routes and assembly points will be documented by the PHSM or Site Manager during the employee health and safety briefing and daily tailgate meetings.

7.5.2 Hospital Location and Information

The station hospital is closed for use by site personnel. The following is hospital location and information:

- The Harris Methodist Fort Worth Hospital is the initial primary care facility in case of an accident. The hospital is located at 1300 Pennsylvania Avenue, Fort Worth, Texas 76104.

  - Hospital: (817) 882-2000
  - Emergency Room: (817) 882-2000
  - Route to Hospital: Refer to Figure 7-2.
  - Distance: Approximately 12 miles

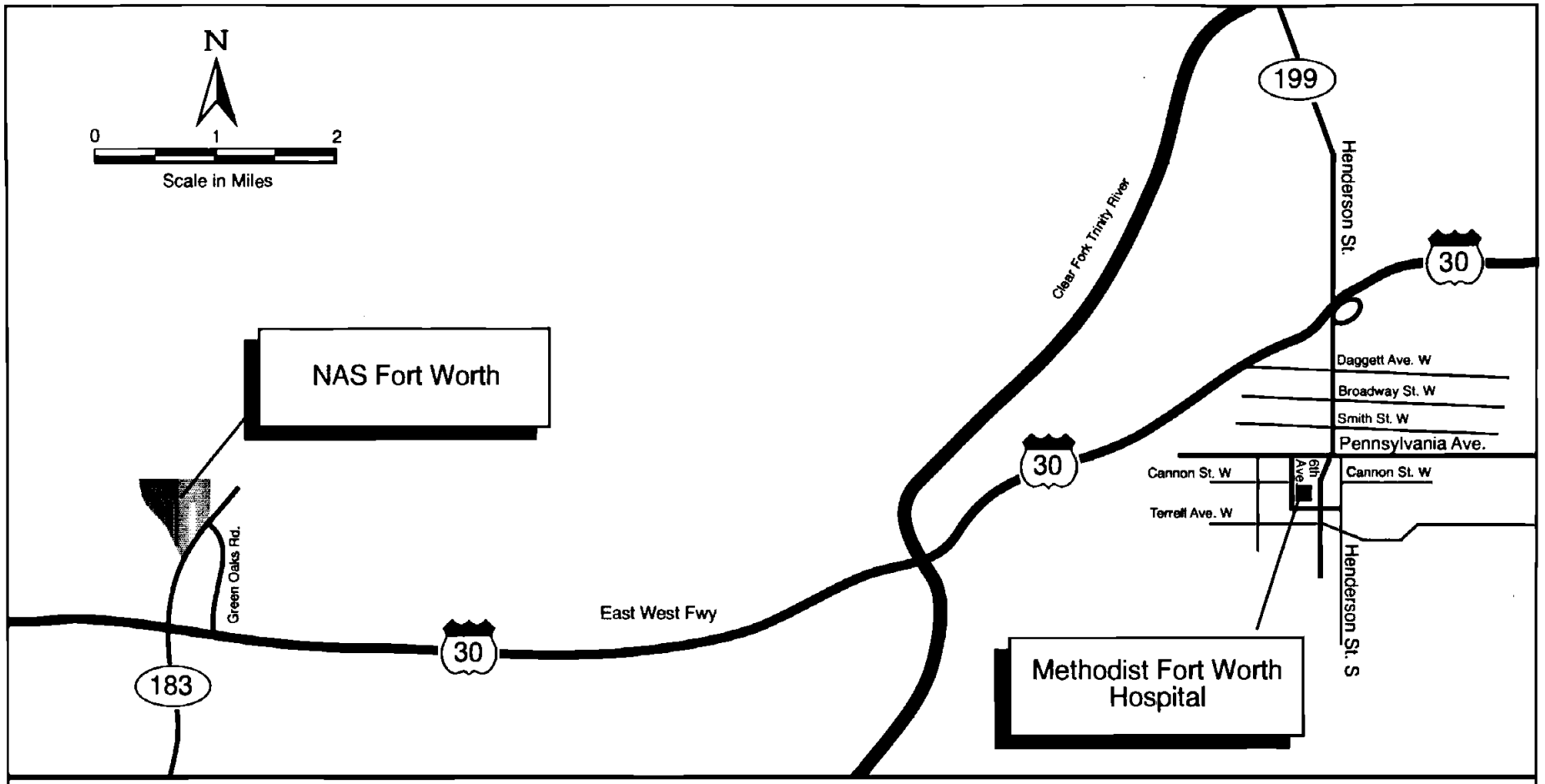

FIGURE 7-2
Emergency Route to Hospital
NAS Fort Worth
Fort Worth, Texas

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– Directions:	From NAS Fort Worth, take Highway 183 south to I-30 east. Exit at Henderson Street. Proceed south on Henderson Street to Pennsylvania Avenue. The hospital is on the corner of 6th Street and Pennsylvania Avenue.

7.6 EMERGENCY RESPONSE CONTACTS

Police:	911
Fire:	911
Ambulance:	911
North Texas Poison Control Center:	1 (800) 441-0040
CHEMTREC:	1 (800) 424-9300
Jacobs Emergency Medical Consultant:	Dr. Zavon(513) 421-3063

7.7 POSTINCIDENT OR EMERGENCY NOTIFICATIONS AND RECORD KEEPING

As soon as possible following an accidental incident or emergency, the PHSM or Site Manager, or designee, is to directly notify the PHSD, the PjM, who will notify AFCEE, and the Health and Safety Manager of employee(s) involved. Refer to SOP 9.1 in the EH&S Manual (Jacobs undated a).

The PHSM or Site Manager should be prepared to provide the following information:

- PHSM's name;
- Site Manager's name;
- station name and project number;
- exact location of incident;
- name and employer of victim(s);
- nature and extent of injuries;
- whether victim(s) was transported offsite for medical treatment; and
- telephone number where PHSM can be contacted during next 24 hours.

Refer to Appendix J for details of all other requirements within the Jacobs SOP for Accident Investigation and Notification.

7.8 VEHICLE ACCIDENT PROCEDURE

If a vehicle accident occurs, take the following steps:

1. Stop immediately.
2. Take steps to prevent another accident (safety cones, reflectors, flares, etc.).
3. Call a doctor or ambulance if necessary:

   Paramedics: 911; and

   Hospital: (817) 882-2000.
4. Notify police at 911.
5. DO NOT sign any papers or make any statement as to who was at fault (except to your supervisor or a federal government investigator).
6. Notify or page PHSM within 24 hours.
7. Complete the required forms, listed below, and submit them to the PHSM as soon as possible.
   - Operator's Report of Motor Vehicle Accident with Privacy Act (required) (Appendix J);
   - Investigative Report of Motor Vehicle Accident (required). Must be signed by supervisor (Appendix J);
   - Statement of Witness (required from each witness, if any) (Appendix J);
   - invoices, which includes towing charges, if any, and estimates as requested; and
   - information exchange, includes information about third-party driver and government driver.
8. Submit any other forms or documents (policy reports, third party claims, etc.) to the PHSM.
9. If damages occurred when vehicle was unattended (hit and run, etc.) or if incident did not involve another vehicle and there is no personal property damage or injuries, the driver of the vehicle must complete all forms.

For additional information, refer to SOP 9.1 in the EH&S Manual (Jacobs undated a).

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8.0 RECORD KEEPING

OSHA and Jacobs team record keeping requirements will be met. Jacobs team personnel are also required to maintain logs and daily reports (e.g., training logs, calibration logs, and daily tailgate information). The following forms are provided as attachments to this HSP and shall be maintained as documentation for demonstrating adherence to the HSP. (Refer also to Jacobs SOP 9.1 and EH&S Manual.)

- Appendix A — Employee Signoff;
- Appendix B — Hazard Communication Forms;
- Appendix E — Site Tailgate Meeting and Exclusion Zone Entry Log;
- Appendix F — Visitor's Log Safety Meeting Form;
- Appendix I — Health and Safety Forms, including the following:
  - Employee Physiological Monitoring Record for Heat Stress;
  - H&S Exposure Monitoring Log;
  - Field Calibration Log; and
  - Air Monitoring Record Form.
- Appendix J — Accident Investigation and Notification.

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9.0 SITE POSTINGS

The PHSM or Site Manager shall arrange to have all health and safety, and human resources posters and information conspicuously posted in a central location at the Jacobs field office. These shall include those listed below:

- Jacobs forms, including First Aid Register (Appendix J) and emergency phone numbers.
- OSHA forms and postings, including the following:
  - OSHA 200 Log (see Appendix J);
  - OSHA Safety and Health Poster;
  - Access to Medical and Exposure Records;
  - Forklift Operating Instructions; and
  - OSHA permits as applicable (excavations, scaffold erections, etc.).
- Human Resources forms and postings, including the following:
  - Notice of Workers' Compensation Insurance Provider;
  - Payroll Date Notification;
  - Equal Employment Opportunity is the Law;
  - Industrial Welfare Commission Order Regulating Wages;
  - Notice to Employees: Unemployment and Disability Poster;
  - Discrimination in Employment is Prohibited by Law;
  - Notice: Employee Polygraph Protection Act; and
  - Any other local required postings.

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10.0 PLAN APPROVAL

This HSP has been written for use by the Jacobs team and any others who are authorized by the PHSM or Site Manager to access NAS Fort Worth JRB to conduct fieldwork in accordance with this HSP. This HSP is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if these operations or conditions change.

Concurrence By: Date:

Lynn Schuetter
Jacobs Project Manager

Concurrence By: Date:

Project Health and Safety Manager

Plan Approved By: Date:

Terry M. Briggs, Ph.D., CIH
Program Health and Safety Director
Jacobs Engineering Group Inc.

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11.0 REFERENCES

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U.S. Department of Health and Human Services. 1990 (June). *NIOSH Pocket Guide to Chemical Hazards*. Publication No. 90-117.

U.S. Department of Health and Human Services. 1985 (October). *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*. Prepared by National Institute for Occupational Safety and Health (NIOSH), and U.S. Environmental Protection Agency (EPA), Washington, D.C.

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APPENDIX A
Employee Signoff

APPENDIX A

Employee Signoff

In accordance with 29 CFR 1910.120, the individuals listed below have read, understand, and agree to abide by the provisions of this project-specific Health and Safety Plan (HSP) for the site designated below. These individuals acknowledge they have been advised of the hazards present for the work being performed.

SITE:	PROJECT NUMBER:

EMPLOYEE NAME / EMPLOYER	EMPLOYEE SIGNATURE / DATE

APPENDIX B
Hazard Communication

HAZARD COMMUNICATION
AND
RIGHT TO KNOW STANDARDS

Name: _____ S.S. No.: _____

Company: _____

1. I have been informed about the Hazard Communication Program, Material Safety Data Sheets (MSDS), their use, location, and procedures for obtaining copies.

2. I have been informed that some of my work may involve exposure to toxic substances.

3. I have been informed about the right of employees to have access to relevant exposure and medical records, and the procedures for requesting access.

4. I understand that the employer must act upon a request in a reasonable amount of time to avoid the interruption of normal work operations but within 15 days.

Signature: _____

Date: _____

APPENDIX C
Generic Chemical Hazard Profiles

APPENDIX C

Generic Chemical Hazard Profiles

The following information is intended to be generic to provide a brief overview. Detailed information relevant to hazards associated with specific chemical substances of potential concern at this site are provided in Appendix G of this HSP.

Calibration Gases

Common pressurized gases used to calibrate air monitoring instrumentation include heptane, hexane, hydrogen, hydrogen sulfide, oxygen, and pentane. Under ambient conditions, these gases are flammable. The cylinders are pressurized; they can become mini-torpedoes if the valve stem is severed from the cylinder. Handle them carefully.

The primary routes of entry into the body are inhalation and skin absorption, so these substances should be handled in a well ventilated area. Symptoms of exposure include lightheadedness, nausea, headache, numb extremities, dermatitis, loss of appetite, chemical pneumonia, and giddiness. Exposure to elevated levels of such gases can damage the skin, eyes, and respiratory system, and can cause death.

Corrosives

Corrosives include acids, bases/caustics, and inorganic halogen salts. Some of the more common acids include acetic, citric, hydrochloric, hydrofluoric, nitric, perchloric, phosphoric, picric, and sulfuric acids. Some of the more common caustics include ammonia, ammonium hydroxide, potassium hydroxide, sodium hydroxide, and sodium hypochlorite. Inorganic halogen salts are compounds containing halogens (chlorine, bromine, fluorine) such as sodium chloride, potassium bromate, and sodium fluoride, which are corrosive to metals and finishes but are relatively insignificant health threats.

For the most part, corrosives are nonflammable, although the liquid forms are moderately to highly volatile. Perchloric acid (perchlorates) and picric acid when dry can be explosive.

The primary routes of entry into the body are by inhalation, ingestion, and skin contact. Symptoms of exposure include tissue burns, nose and throat inflammation, and pulmonary edema. Corrosives can cause extensive damage to the respiratory system, skin, and eyes.

Metals

Metals commonly associated with batteries, paints, plating operations, and petroleum-based products include lead, arsenic, cadmium (a probable human carcinogen), chromium (a probable human carcinogen), copper, nickel, silver, tin, and zinc compounds. Petroleum-based products such as lubricants, especially leaded gasolines, contain organic lead compounds such as tetraethyl and tetramethyl lead, as well as assorted inorganic metals mentioned above and others such as antimony, barium, beryllium, cobalt, magnesium, manganese, and vanadium. Explosive powders used in ordnances also contain aluminum.

Metals pose a health hazard in their solid form, especially as airborne dusts. The primary routes of entry into the body are by inhalation, ingestion, and skin contact. Organic compounds such as tributyltin may penetrate the skin without producing appreciable local injury. Symptoms of exposure include eye, skin, and upper respiratory system irritation; headaches; insomnia; metallic taste in the mouth; lassitude; pallor; anorexia; constipation; abdominal pain; anemia; and tremors. Heavy metals can cause damage to the central nervous system, kidneys, respiratory system, and liver. Cancers of the lungs and bones are associated with metal intoxication.

Petroleum-Based Hydrocarbons

Lubricants, oils, fuels, and gasoline contain petroleum-based hydrocarbons such as benzene and its derivatives, naphthas, toluene, xylenes, and coal tar pitch volatiles. Coal tar pitch volatiles are also known as polycyclic hydrocarbons (PCHs) or polynuclear aromatics (PNAs). Benzene and PNAs are known carcinogens. Petroleum-based hydrocarbon materials also generally contain metal contaminants. (Refer to the metals profile.) Lubricants and waste oils are slightly to highly volatile and flammable. Fuels and gasoline are extremely volatile and flammable.

The primary routes of entry into the body are by ingestion and skin contact or dermal absorption. Inhalation of the more volatile constituents, such as toluene, xylenes, naphthas, and benzene (a known human carcinogen) and its derivatives, can be toxic. Acute symptoms of exposure include eye, skin, and upper respiratory system irritation, giddiness, confusion, headache, nausea, staggered gait, and fatigue. High-level and chronic exposure can cause damage to the liver, kidneys, and bone marrow, and can cause skin cancer and leukemia.

Solvents (Nonhalogenated) and Paints

Some of the more common constituents of nonhalogenated solvents and paint wastes include acetone, methyl ethyl ketone (MEK), toluene, xylenes, alkyl acetates, acrylates, and alcohols. These substances are slightly to highly volatile and are moderately to highly flammable.

Primary routes of entry into the body are by inhalation, ingestion, and dermal absorption. Symptoms of exposure include irritation of the eyes, skin, or upper respiratory system, headaches, drowsiness, dermatitis, dizziness, confusion, giddiness, and euphoria. Higher levels of exposure can cause narcosis and damage to the kidneys and blood.

APPENDIX D
Detailed Biological, Physical (Safety), and Radiological Hazards and Controls

APPENDIX D

BIOLOGICAL HAZARDS AND CONTROLS

Poisonous Insects and Animals

Ants, Bees, Wasps, and Hornets

Stings from these insects are responsible for more deaths in the United States than bites and stings of all other venomous creatures. This is due to the victim's sensitization to the venom from repeated stings, which can result in anaphylactic reactions. The stinger may remain in the skin and should be removed by teasing or scraping rather than pulling. An ice cube placed over the sting will reduce pain. An analgesic-corticosteroid lotion is often useful. People with known hypersensitivity to such stings should carry a kit containing an antihistamine and epinephrine.

Recently African "killer" bees have been found in Texas. Fatalities associated with these bees have resulted when the victim has sustained incapacitating injuries from a fall or slip and cannot escape the bees. The "killer" bees have the ability to sting repeatedly. Their venom is no more potent than that of the common honey bee. Observe the same first aid procedures as those stated in the previous paragraph.

Poisonous Snakes

Avoid walking at night or in grass and underbrush. Do not climb rocky ledges without first visually inspecting them. Wear high-top boots and heavy pants; more than half of all bites are on the lower parts of the legs. Do not attempt to kill snakes unnecessarily; many people are bitten in such an attempt.

A snake may bite a person and not inject venom. Symptoms and signs of envenomation include the presence of fang marks; rapid and progressive swelling around the bitten area within five to 10 minutes; pain; weakness; faintness; nausea; vomiting; and alterations in temperature, pulse, and blood pressure. Emergency treatment does not include incision through the fang marks. Typically, that causes more harm than good. Immobilize the person and the bitten part in a horizontal position, with the bitten part lower than the heart. Wash the bitten area with water but avoid manipulation of the bitten area. Do not allow the person to walk, run, or drink alcoholic beverages or stimulants such as soda, coffee, or tea. Do not apply ice or give aspirin. Treat for shock and transport to the nearest medical facility. Death in humans can occur within less than one hour to several days, with most deaths occurring between 18 and 32 hours after the bite.

Spiders

Almost all of the 30,000 species of spiders are venomous, but only a relatively small number have fangs long and strong enough to penetrate the human skin. Spiders are generally found in dark protected areas such as access ways to sanitary sewers, under ledges, or in pump housings and buildings.

Black widow spiders range in color from gray to brown to black, depending on the species. The abdomen is shiny black with a red hourglass or red spots. Although both male and female are venomous, only the latter has fangs large and strong enough to penetrate human skin. Mature females range in body length from 10 to 18 mm. The person who was bitten may recall receiving a sharp, pinprick-like bite, but in some cases the bite is so minor that it goes unnoticed. Rarely is there any local skin reaction. The initial pain is sometimes followed by a dull, occasionally numbing pain in the affected extremity, and by pain and cramps in one or several of the large body muscles. Sweating, weakness, and varying degrees of headache and dizziness are common. The lymph nodes in the region of the bite will often be tender or painful. In severe cases, there is rigidity of the abdominal muscles and pain in the lower back, thighs, or abdomen. There is no effective first-aid treatment. Treat for shock and transport to the nearest medical facility.

Brown Recluse or Violin Spiders have abdomens that vary in color from grayish through orange and reddish-brown to dark brown. The back shell of the "violin" is brown to blackish and distinct from the pale yellow to reddish-brown background of the head and chest. This spider has 6 eyes grouped in 3 diads. Both male and female are venomous. They average 6 to 12 millimeters in body length. The bite of this spider produces about the same degree of pain as the sting of an ant, but sometimes the person is completely unaware of the bite. In most cases, a localized burning sensation develops, which may last for 30 to 60 minutes. The area often itches and becomes red and warm with a small blanched area around the immediate bite site. The reddened area enlarges and becomes purplish during the subsequent one to 8 hours. A small blister forms at the bite site, increases in size, and subsequently ruptures. The entire area may become swollen and painful. Other signs and symptoms include fever, malaise, stomach cramps, nausea, and vomiting. In severe cases, there may be breakdown of the red blood cells, renal failure, or death. All first aid measures should be avoided as the natural appearance of the bite is most important in determining the diagnosis. A cube of ice may be placed on the wound. Transport to the nearest medical facility.

Ticks

Ticks can carry many diseases. Transmission of Lyme disease from ticks to persons has been studied. There is evidence that symptoms of the disease are not immediately apparent but begin after a period of time has passed. When in the field, check often for ticks. Ticks are best removed by applying gasoline or by slowly withdrawing the tick with flat-tip tweezers. Care should be taken not to leave any part of the tick in the wound and

not to crush the tick. If the tick resists or cannot be completely removed, seek medical attention. The bite should be cleansed and a corticosteroid lotion should be applied.

One of the symptoms of Lyme disease is a rash that looks like a "bulls-eye" with a small welt in the center. The rash visually develops several days to several weeks after the tick bite. Rocky Mountain Spotted Fever, which is also transmitted by ticks, also causes a rash of red spots under the skin three to 10 days after the bite. Both diseases cause chills, fever, headache, fatigue, stiff neck, and bone pain. Seek medical attention.

Poisonous Plants

Poison oak and poison ivy are bush-like plants. Poison oak and poison ivy are identified by three or five leaves radiating from a stem. The plant tissues have an oleoresin that is active in live, dead, and dried parts. The oleoresin may be carried by smoke, dust, contaminated clothing, and animal hair. Signs and symptoms include redness, swelling, and sometimes intense itching. Blisters form during the subsequent 24 hours. Crusting and scaling occur within a few days. In the absence of complications, healing is complete in approximately 10 days. Wash any exposed skin with a mild soap and water but do not scrub the area.

Rodents

Recently, a fatal respiratory illness has been associated with a Hantavirus. This respiratory illness has symptoms similar to the flu. Without medical intervention, the victim experiences respiratory and cardiac failure. This virus is shed in the droppings and urine of infected rodents, mice, and rats.

Any droppings (small rod-like, dry material), nesting activities, or dead animals are to be reported immediately to the SHSC or SM. A decision will be made as to the proper method of eliminating the infestation and cleaning up droppings.

PHYSICAL (SAFETY) HAZARDS AND CONTROLS

Possible physical hazards associated with field activities at the site may include any of the hazards discussed below. The controls specified shall be implemented during site operations. For additional information, refer to the Corporate Health and Safety Manual for Environmental Field Program and the Corporate Safety Manual.

Noise

The main sources of noise for this project are industrial operations, vehicles, concrete cutters, drill rigs, generators. Hearing protection must be worn in areas where noise levels are at the permissible exposure limit (PEL) of 85 dBA or greater. Hearing protection is required when, at 3 feet apart in normal conversation, voices must be raised to be heard. A Type II sound level meter should be used to measure site noise to verify sound levels and determine the need for hearing protection. Hearing protection should be specified by the PHSM or SHSC based on measured levels at the site.

Precariously Positioned Objects

Field personnel shall become familiar with the general area and the potential physical hazards associated with debris or objects (e.g., drums, boards) that may be piled or scattered around the sites. If objects are stacked in an unsafe manner, the PHSM shall notify the client site contact. Field activities shall not begin until station personnel remove or safely restack the objects.

Walking and Working in Open Terrain

Field personnel shall become familiar with the general terrain of the site and potential physical hazards (evaporation ponds, uneven terrain, etc.) that would be associated with accidental slips, trips, and/or falls.

Tagging of Defective Tools, Materials, or Equipment

Defective tools, materials, and equipment that could impact personnel safety or the environment shall not be used. When a defective tool, material, or piece of equipment is found, the contractor shall take it out of service immediately by tagging, destroying, or removing it from the project. Danger tags shall be dated, sequentially numbered, and signed by the supervisor. A defective equipment log shall be maintained.

Housekeeping

The contractor will strictly enforce housekeeping. Poor housekeeping is a sign of a poorly managed project and is the root of many safety problems. All material, scrap, tools and toolboxes, and other equipment shall be stored in a neat and orderly fashion. Trash and scrap shall be removed from the work area on a regular basis (i.e., at least daily before the end of each work shift) and shall never be allowed to accumulate, especially in walkways, under stairs, at the bases and landings of stairs and ladders, and near flammable substances.

Housekeeping will receive a major emphasis during daily and weekly contractor inspections. If the contractor determines that housekeeping has become a problem, the contractor reserves the right to stop work and require a cleanup before work resumes.

Illumination

Adequate lighting is extremely important for the safe execution of work. The minimum illumination intensity shall be 5 foot-candles in all active work areas and accessways. In specified areas outlined in the OSHA standard, 29 CFR 1926.56, the required intensity ranges as high as 20 foot-candles. Lighting intensity will be surveyed during the regular contractor job site inspections.

Slip, Trip, and Fall Hazards

Falls as a result of slipping or tripping are the most common form of injury on construction sites. These injuries are a result of poor housekeeping, lack of attention to detail, or carelessness.

Slipping hazards such as grease, oil, water, ice, snow, or other liquids shall be cleaned up or eliminated on walkways, ladders, scaffolds, or other accessways or working areas. If slipping hazards cannot be eliminated completely, the area shall be barricaded and posted with applicable hazard postings.

The construction site, especially roadways, accessways, aisles, stairways, scaffolds, and ladders, shall be kept clean and clear of hoses, extension cords, welding leads, and other obstructions that may cause tripping or other accident hazards. If tripping hazards cannot be eliminated completely, the area shall be barricaded and posted with applicable hazard postings.

Fire Protection and Prevention

The subcontractor shall take all necessary and appropriate precautions to prevent fires. Sufficient water and fire fighting equipment shall be available at all times to control fires as specified below. All heavy equipment must be equipped with 5-pound dry chemical fire extinguishers rated A:B:C. A 10-pound dry chemical fire extinguisher rated A:B:C must

be located in all trailers per The National Fire Protection Association (NFPA) 10 Standard. A 20-pound fire extinguisher rated A:B:C must be provided within 50 feet, but no closer than 25 feet, to all fueling operations and flammable storage areas.

All fire extinguishers shall be mounted on walls or stands with a red background. Fire extinguishers shall not be mounted with the top less than 3 feet or greater than 5 feet above the floor. Access routes to fire extinguishers shall be kept clear at all times. All fire extinguishers shall be inspected monthly, annually, and every 6 years in accordance with the NFPA 10 Standard on fire extinguisher inspections.

Open burning of trash and debris shall not be permitted. If there is a danger of accidental fire, e.g., during cutting or welding operations, a person shall be designated as fire watch and shall be dedicated solely to this effort during that operation and shall continue this duty for 30 minutes after the operation is completed.

Internal combustion engines will not be permitted to operate in buildings unless authorized by the contractor. Engines shall be turned off while refueling. Storage of flammable fuels will be carefully monitored. All fuel storage areas and storage tanks must have written approval by the contractor. Marking and labeling of fuel tanks shall meet the requirements of OSHA 29 CFR 1926.59. All heating devices and their locations must be inspected by the Contractor Safety Department before use. Fueling areas and tanks shall comply with all applicable NFPA and OSHA requirements.

Flammable or combustible liquid storage shall comply with NFPA 30 and OSHA 1926.152. All fuel cans, such as 5-gallon gas cans, shall be free of deformities and constructed of metal, with self-closing lids and flame arresters. Fuel cans shall be labeled with their contents. All equipment shall be fueled through funnels or spouts to prevent spills.

Material Handling and Storage

All new material shall be stored on dunnage. All material shall be stored and secured as necessary to prevent blowing, falling, sliding, or collapsing. Debris and scrap material need not be stored on dunnage if the material will not be moved with rigging and can be maintained in a stable manner. Jacobs and all subcontractors shall ensure that material is stored properly to prevent scattering or lost equipment.

Walkways and aisles shall be kept clear at all times, and laydown areas shall be neat and orderly. Material shall be stored on level ground, and the boundaries of laydown areas shall be identified. Material shall not be stored within 6 feet of hoistways or floor openings, or within 10 feet of roof edges. Poles, pipe, and other stock that may roll shall be wedged to prevent spreading and rolling.

Nails shall be removed from lumber that is to be reused. Nails in scrap lumber that will not be rehandled shall be bent back.

No material, tools, or equipment shall be leaned against other objects or walls unless they are secured from movement. Employees moving material by hand shall use proper lifting techniques and gloves. Safe working load limits shall be labeled on all temporary elevated floors or platforms and these limits shall not be exceeded.

Tools

All tools shall be kept in good condition and properly stored. Tools shall not be altered, and they shall be used only for their intended purposes. Guards shall not be removed from tools, and all nip points, open drums, and fly wheels shall be guarded. All tools shall be inspected by the user before use, with special attention to power cords and the condition of teeth. If a power cord has been repaired more than once, the tool shall be tagged defective, and not used until a new power cord is installed. Drawings of job-built jigs and tools shall be submitted to the contractor. Owners' manuals shall be available to the contractor upon request, and subcontractor personnel shall be trained in the safe operation of all tools used.

Power tools shall be equipped with constant pressure switches that will shut the tool off when the switch is released. All power tools and electrical equipment shall be double insulated or be equipped with ground plugs.

Employees using powder-actuated tools shall be certified and have on their person a card stating such. The loads for powder-actuated tools shall be kept in a locked red box labeled "EXPLOSIVES", which shall be kept in a locked area with restricted access.

All bench-mounted and floor-mounted tools shall be secured. Bench-mounted grinders shall be set up and operated according to 29 CFR 1926.303. Tools equipped with handles shall have the handles installed. Cracked, splintered, or taped wooden handles shall be replaced. Cheater bars will not be permitted. Impact tools shall be free of mushroomed heads and cracks. Workbenches and sawhorses shall be provided when needed.

Torch/Plasma Arc Cutting, Welding, and Open Flame Requirements

The SM shall identify the need to conduct cutting, burning, or open flame work. When the need has been identified, the contractor supervisor shall complete Cutting/Welding/Open Flame Permit. The permit is then submitted to the SM for review.

At a minimum, fire prevention equipment shall consist of one 10-pound, dry chemical extinguisher rated A:B:C. A live water line meeting the requirements of OSHA 29 CFR 1926.150 or a water pump extinguisher may be used as a supplement to the dry

chemical extinguisher. The work area shall be barricaded and posted; the equipment shall be inspected and exits identified.

The approved permit shall be posted in the work area. Adjoining work areas shall be inspected and workers in the immediate vicinity shall be notified.

Upon completion of the above requirements and the precautionary items addressed in the permit, work may commence. The permit may be issued for more than 1 day; however, a daily safety checklist shall be completed by the subcontractor supervisor.

Upon completion of work activities, the permit and checklist shall be returned to the contractor construction engineer.

Torch/plasma arc cutting or welding on galvanized steel, stainless steel, or nonferrous metals shall not be permitted unless half-face or full-face air purifying respirators with high-efficiency particulate air (HEPA) cartridges or equivalent engineering controls (local exhaust with HEPA filtration) are provided. Full-face respirators with HEPA cartridges shall be required during torch cutting on radiologically contaminated metals and metal with lead or cadmium-bearing coatings.

Torch/plasma arc cutting shall not be used on wood, synthetic materials, rubber-lined pipe and vessels, or on any process piping, tanks, vessels or equipment containing significant radioactive material product residues unless approved by the contractor.

Any torch/plasma arc-cutting operation that may expose workers to contaminants in excess of the action level, without regard to the use of respirators, shall be controlled with the use of local exhaust ventilation in conjunction with a high-efficiency particulate collection system. If gaseous or vapor exposure limits are exceeded, respirators with appropriate cartridges shall be used.

Compressed gas cylinders shall be secured in an upright position at all times. Burning rigs shall be broken down at the end of each shift. Fuel gas hoses shall be stored in a ventilated area (never in gang boxes). Compressed fuel gas cylinders shall not be taken into confined spaces. All other rigs shall be stored in accordance with OSHA standards. Empty cylinders shall be removed at the end of each shift. Burning rigs shall be equipped with backflow preventers at the torch end of each hose.

If there is the potential for accidental fire during burning or welding operations, a fire watch shall be established and continued until 30 minutes after the work has been completed. When there is possibility of injury during burning or welding operations, overhead burning signs and welding blinds shall be installed. A 10-pound dry chemical fire extinguisher rated A:B:C must be readily available to any welder or employee operating a burning or welding rig.

Welding leads, including lugs on the welder and lead connections, shall be fully insulated at all times. Damaged leads and dry-rotted fuel hoses shall be removed from service.

The subcontractor shall notify the contractor if any welding or burning is to be done from a suspended platform. The subcontractor will be required to comply with contractor requirements during such operations. Requirements may include the use of multiple fire watches, covering flammable/combustible materials below the work platform, or other safety measures.

Electrical

Work on energized circuits will not be permitted at the site.

Ground fault circuit interrupters (GFCIs) will be required at all times. Lighting must be hooked up to a GFCI unless the electrical connections are different from all other electrical hookups and cannot be mistakenly exchanged.

Electrical panels, boxes, etc., with open knockouts through which no service has been installed must be covered. Electrical cords and equipment shall not be hung or tied to steel or hung with wire unless a nonconductive material is used to insulate the cord from the metal. Plastic coated wire shall not be used to hang electrical cords. All lights must be equipped with protective, nonconductive covers, and all light bulbs in light stringers must be shatterproof. Cords that pass through doorways or holes or are exposed to vehicle traffic shall be protected from damage. Flexible electrical cords shall not be spliced or have insulation repaired with tape. Only SO-type cords or equivalent shall be used for light stringers.

All breaker boxes, electrical receptacles, and feed lines shall be labeled to identify the "from" and "to" circuits. All breaker boxes and disconnects shall be provided with unobstructed access 36 inches in front of the unit. All 480-volt lines shall be labeled clearly. When passing over or through walkways, electrical cords shall be strung at least 7 feet above the walking surface. The subcontractor shall comply with codes in the current NFPA and National Electric Codes (NEC).

Ladders

All ladders shall be inspected before use and stored on dunnage or ladder racks. Tools and material shall not be left on top platforms of unattended ladders, and material shall never be stored on ladders. All ladders shall be labeled with legible manufacturer instructions and warning labels. Ladders shall not be painted except for identification marks.

All ladders shall be type 1A and shall be wooden or have fiberglass siderails with metal rungs. The bases and landings of all ladders shall be kept clear of obstacles. Stepladders shall not be used as straight ladders, and extension ladders shall not be separated for use.

All ladders shall be equipped with skid-resistant feet. If a ladder is used in a doorway, the doorway must be barricaded. Ladders shall not be used in lieu of elevated work platforms.

Employees shall never carry material when climbing ladders, nor shall tools or equipment be thrown to or from personnel on ladders. Handlines shall always be used to hoist material. Personnel shall not climb to the top step or top platform of any ladder. When in use, ladders shall be held or secured by tying off. Personnel working on ladders shall not straddle the ladder or overreach so that the body is no longer between the siderails.

Job-built ladders shall be inspected by a competent person and shall meet the OSHA standard. In addition, all job-built ladders shall have a furring strip attached over the filler block and rung.

Scaffolding

Scaffolding shall be erected and used according to the most stringent interpretation of the applicable safety regulations. Only heavy-duty (75 pounds per square foot [psf]) scaffolds will be permitted. All scaffolding shall be erected and inspected by a competent person. Samples of the Stationary Scaffolding Inspection Checklist and Rolling Tower Inspection Checklist are provided. All scaffolding shall be built as completely as possible. This means all decks must be complete (e.g., if a handrail can be installed, it must be installed, and the scaffold must have ladder access and gates).

If a chain or slide bar is used as a gate, a landing between the ladder and the gate shall be erected so that personnel can leave the ladder safely before unchaining the gate or moving the slide bar. All scaffolds shall be equipped with handrails (if possible), regardless of the height of the scaffold. If personnel are required to work under or pass under a scaffold, the area between the guardrail and toeboard shall be screened with No. 18 gauge 0.5-inch mesh wire or equivalent.

Aluminum scaffold boards shall be used whenever possible. Scaffold boards shall not be notched, nailed, used as bearers, or used on the ground as walkways. All scaffold boards shall be cleated and tied with No. 9 gauge wire to prevent displacement. Scaffold boards shall be placed together tightly with a maximum space of 0.25 inch between the planking and toeboard. Crawling boards and chicken ladders are prohibited.

The subcontractor shall submit to the contractor a tagging and inspection system for scaffolds and other elevated work platforms. This system shall include the method of determining if scaffolding is under construction or unsafe, requires a safety harness, or is approved for use. It shall also include the date on which the scaffolding was last inspected and the name of the inspector. The subcontractor may elect to use the contractor's procedure, *Scaffold Inspection Tagging*, by indicating this intention in writing to the contractor. A copy of the procedure will then be provided by the contractor. All scaffolds shall be equipped with legs and base plates and shall be placed on mud sills.

Parts from scaffolds made by different manufacturers shall not be interchanged. Welded frame scaffolding shall not be repaired or altered. **Anti-sway bars shall be installed on all rolling scaffolds;** only welded frame scaffolds may be used as rolling scaffolds. Personnel shall not ride on rolling scaffolds.

All scaffolds must be plumb and tied off every 15 feet or three times the minimum base dimension, whichever is the most conservative. Scaffolding without handrails shall be placed no more than 4 inches from a wall. Drawings of all two-point suspended scaffolds and needle beam scaffolds shall be submitted to the contractor before such scaffolding is erected.

All scaffolding higher than 50 feet, as measured from the base plate, shall be designed by a registered professional engineer. Such designs shall be submitted to the contractor for review and approval.

Power-Driven Staging and Platforms

All equipment discussed in this section must be inspected by the contractor before initial use and by the subcontractor prior to every use. In addition, a documented inspection by a competent person must be conducted quarterly.

All operators of power-driven staging and platforms shall be trained in their use, and the training records shall be submitted to the contractor. Owners' manuals and drawings of connection methods for all such equipment shall also be submitted to the contractor. A copy of the owner's manual shall also be kept on each platform. All power-driven staging and platforms shall be placarded properly, and controls shall be labeled clearly.

Operators shall use a check sheet during pre-operational inspections and shall verify the inspection by signing the sheet. The subcontractor shall keep these check sheets on file. All manufacturer's recommendations for inspections and operation shall be followed. The contractor will provide a check sheet if requested.

Handrails and complete midrails shall be kept in good repair. Secondary lifelines shall always be used on power staging, and all personnel on power platforms shall be tied off.

Power platforms shall not be used to hoist material nor shall personnel exit platforms except when the platform is on the ground. If welding or cutting operations are performed on a power platform, the loadlines and lifelines shall be protected.

Manbaskets

Manbaskets shall not be used except when the total exposure of performing the task by another method would be more hazardous. The contractor will inspect manbaskets before initial use, and the subcontractor will inspect them prior to each use. Test lifts and crane

requirements will be enforced strictly. Manbasket design shall be approved by the contractor.

A checklist shall be completed and signed during pre-lift meetings, and safety instructions shall be read by personnel entering the basket as well as by the crane operator. Copies of this checklist may be obtained from the contractor.

All manbaskets shall be equipped with overhead protection. When cutting or welding is being done from a manbasket, the rigging shall be protected. During welding, a nonconductive link shall be installed on the load line. Only rigging that has never been used for any other purpose shall be used with the manbasket.

Signs, Barricades, Guardrails, Handrails, Covers, Stairs, Decks, and Ramps

All signs shall be colored properly and labeled as prescribed by the OSHA standard. Signs shall be constructed of metal, fiberglass, or plastic and shall be removed promptly when no longer needed.

The types of barricades permitted on the project include rope, tape, and hard barricades. The color of the barricades shall coincide with the OSHA color classifications. If hazard information is not provided on a barricade, signs or tags shall be attached to it at 20-foot intervals. If hazard information is not printed on barricades at doorways, signs or tags shall be attached to the doorways. Rope, tape, chain, and similar barriers used to designate the boundaries of posted radiological areas shall be yellow and magenta. Construction fences are physical barriers and need not be yellow and magenta.

Tape barricades shall be installed at a height of 42 inches and at a distance of 5 feet from the hazard. If a hazard is more than 10 feet high, the barricade shall be 1 foot farther away for each additional 5 feet of hazard height. Hard barricades may be adjacent to hazards unless the hazard is elevated. Hard barricades shall be 42 inches high, include midrails, and be capable of withstanding a 200-pound force in any direction. If work is taking place beneath a barricaded area, hard barricades shall be equipped with toeboards. If the area below is a walkway or passageway, the area between the barricade midrail and toeboard shall be screened or blocked. All areas where there is a potential for falling objects shall be barricaded.

Turnbuckles shall be used when a barricade is constructed of wire rope.

Guardrails shall be erected whenever a walking surface changes elevation by more than 2 feet. Tape barricades may be used for this purpose, but such a barricade must be 5 feet from the change in elevation. All changes in elevation shall be marked with some kind of warning such as yellow and black tape or fluorescent orange paint. Handrails shall have smooth surfaces or be taped to prevent splinters. All wall openings shall be guarded.

When a door opens onto a platform, the width of the door shall not reduce the effective width of the platform to less than 20 inches.

Runs and risers on all stairs shall be constructed in accordance with OSHA regulations. Ramps shall have a maximum angle of 7 degrees.

Stairs leading to office and warehouse trailers shall be anchored firmly and equipped with handrails. Risers, including the top and bottom steps, shall be of equal height.

Floor hole covers shall be labeled "WARNING – TEMPORARY HOLE COVER – DO NOT REMOVE OR STORE MATERIAL." Hole covers shall be cleated and constructed of 0.75-inch plywood with supports 18 inches on center or less.

Roofs

Before any maintenance work is done on roofing, a solid working surface shall be provided with all the openings guarded and skylights protected. A tape barricade shall be erected 6 feet from the edge of any unprotected roof edge. Personnel crossing barricades shall wear a full body harness attached to retractable block lifelines.

Before any demolition work is done on roofing, the subcontractor shall have an engineering survey performed by a registered Professional Engineer.

Rigging

General

All rigger's signal men shall be trained properly and provided with a rigging handbook. Documentation of training shall be provided to the contractor. All rigging shall be performed in accordance with the *Department of Energy Hoisting and Rigging Program Manual* (Ref. 6), which will be available from the contractor upon request. Major rigging operations must be planned and supervised by competent personnel to ensure that the best methods and most suitable equipment are employed.

The contractor shall have the authority to cancel hoisting and rigging operations based on consideration of weather, condition of lifting hardware, electrical line clearances, or any other factor that, in the judgment of the contractor, may adversely affect the successful conclusion of the lift. All rigging must be protected from flame cutting and electric welding operations and from contact with solvents and chemicals.

Equipment Inspection and Testing

When specially fabricated devices are required for hoisting and rigging operations (e.g., lifting beams, material baskets, and spreader beams), the design and calculations for the device shall be reviewed and approved by the contractor.

All rigging shall be inspected by a competent person before each use and marked as inspected at least annually. All rigging shall be labeled clearly with its capacity. All rigging shall be stored in a rigging loft or an equivalent area where it will not be exposed to the elements.

Job-built rigging and hoisting equipment shall be tested onsite at 125 percent capacity, and such tests shall be observed and documented by the contractor. In addition, drawings of such rigging showing weld details and load capacities shall be submitted to the contractor and approved before the rigging is used.

Hoisting and rigging equipment for material handling shall be inspected visually prior to use on each shift, and as necessary during its use to ensure that it is safe. Hoisting and rigging equipment shall be load-tested at least annually by a competent person, who, by training and experience, is capable of recognizing defects and taking the appropriate action to correct or eliminate them. Inspections shall be documented and made available to the contractor.

Safe Working Loads

Hoisting and rigging equipment shall not be loaded in excess of its recommended safe working load, as prescribed in Tables H-1 through H-20 of OSHA 29 CFR 1926, Subpart H, (1926.251, *Rigging Equipment for Material Handling*). Special hoisting devices, slings, chokers, hooks, clamps, or other lifting accessories shall be marked to indicate the safe working loads and shall be proof-tested prior to initial use to 125 percent of their rated load.

The load weight must be determined before it is rigged. The gross load which is the sum of the weight of the rigging, block, hooks, lifting beam, stowed or erected jibs, headache ball, other elements of rigging or equipment and the load, must be accounted for when determining hoisting equipment. Safe working loads of hoisting equipment apply only to freely suspended loads on plumb hoist lines. If hoist line is not plumb, additional side loads will compromise the stability and introduce stresses which exceed equipment designs. Rapid swinging of loads also adds additional stresses and minimizes stability. The load must always be directly below the boom point or upper load block.

The center of gravity must be below the hook and below the lowest point of attachment to ensure stability. Softeners must be used to protect slings at sharp corners. Sharp bends, pinching, and crushing should be avoided. The eye section of wire rope slings must not be bent around corners.

Alloy Steel Chains

Chains shall not be used for lifting except as part of a chainfall or come-along device.

Wire Ropes

Wire ropes shall be kept in good repair and without deformities. Wire ropes with visual signs of kinking, crushing, unstranding, birdcaging, main strand displacement, core protrusion, loss of rope diameter, unevenness of outer strands, corrosion, heat damage, abrasion, broken wires or strands and cracked, worn, or deformed end attachments should be considered in evaluation of sling replacement. Wire rope shall not be used if in one rope lay there are 10 randomly distributed broken wires or five broken wires in one strand.

Tables H-3 through H-14 of OSHA 29 CFR 1926, Subpart H, (1926.251, *Rigging Equipment for Materials Handling*) shall be used to determine the safe working loads of various sizes and classifications of improved plow steel wire rope and wire rope slings with various types of terminals. For sizes, classifications, and grades not included in these tables, the safe working load recommended by the manufacturer for specific, identifiable products shall be followed, provided that a safety factor of not less than 5 is maintained. Wire rope with protruding ends of strands in splices on slings and bridles shall be covered or blunted. Wire rope application use limitations shall be in accordance with 29 CFR 1926.251(c)(4). When U-bolt wire rope clips are used to form eyes, Table H-20 of OSHA 29 CFR 1926, Subpart H, (1926.251, *Rigging Equipment for Materials Handling*) shall be used to determine the number and spacing of clips. A minimum of three clips shall always be used. More clips may be needed when large-dimension wire is used.

Slings

Synthetic slings shall be maintained carefully. Any synthetic sling with the red warning line exposed is to be removed immediately regardless of the extent of the exposure and the use of the sling.

Slings should not be dragged from beneath loads. Knotted and kinked slings will be considered permanently damaged and shall be removed from the site. When estimating sling capacity using multi-legged slings, only two of the legs shall be considered to carry the full load. All loose pieces of material shall be removed from the load prior to moving. Gloves shall be worn when handling wire rope. Hands shall be kept free from pinch points as slack is taken up. The load shall be controlled at all times. Personnel shall keep body parts out of pinch points. Tag lines shall be used.

Tables H-15 through H-18 of OSHA 29 CFR 1926, Subpart H, (1926.251, *Rigging Equipment for Materials Handling*), shall apply when using natural or synthetic fiber rope slings.

All splices in rope slings shall be made in accordance with fiber rope manufacturer's recommendations and 29 CFR 1926.251(d)(2).

Synthetic webbing (nylon, polyester, and polypropylene) shall be identified by the name of the manufacturer, the rated capacities for the type of hitch, and the type of material.

Synthetic web slings shall be removed from operation immediately if there are signs of acid or caustic burns, melting or charring of any part of the sling surface, snags, punctures, tears or cuts, broken or worn stitches, distortion of fittings, discoloration or rotting, or red warning line showing.

Shackles, Hooks, and Bolts

Table H-19 of OSHA 29 CFR 1926, Subpart H, (1926.251, *Rigging Equipment for Materials Handling*) shall be used to determine the safe working loads of various sizes of shackles.

Only one-eye hooks shall be used, and hooking back to the load line will not be permitted in either mechanical rigging or hand rigging. Only one eye of a sling shall be used in a hook. A shackle shall be used to hold two or more eyes. The pin of the shackle should be placed in the hook with the eyes of chokers bearing on the shank.

Only shouldered eyebolts shall be used, except where it is not possible due to the configuration of the item to which the eyebolt is attached. Unshouldered eyebolts shall not be used when the load is to be lifted at an angle, because they are subjected to bending, and the load they can safely carry is severely reduced. Eyebolts should never be welded. Shouldered eyebolts must be installed with the shoulder at a right angle to the axis of the hole and must contact the working surface to keep bending to a minimum; the loads should be applied to the plane of the eye. The tapped hole for screwed eyebolts shall have a minimum depth of one and one-half times the bolt diameter. The point of a hook must never be inserted in an eyebolt; a shackle must be used instead. A sling must not be reeved through pairs of eyebolts. One single leg should be attached to each eyebolt.

The manufacturer's recommendations shall be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks. All hooks for which no applicable manufacturer's recommendations are available shall not be used.

Shackles and hooks shall be constructed of forged alloy steel with the identifiable load rating and manufacturer on the shackle or hook. All hooks except for sorting hooks and sliding choker hooks shall be equipped with a safety latch.

Knots

Knots shall not be tied in rigging for any purpose, and all rigging shall be used only for its intended purpose. Rigging used to hoist manbaskets shall be identified as such and not used for any other purpose.

Weather Conditions

No rigging or hoisting operation shall be carried out when weather conditions could cause the operation to be hazardous to personnel or property. The size and shape of loads must be examined to determine if a hazard exists during high winds. Wind loading may not exceed equipment capacity. When wind speeds reach 25 to 30 mph, or when visibility is impaired by darkness, snow, fog, or rain, the operation shall be suspended.

When the temperature is below freezing, caution must be used to ensure that no part of the hoisting equipment is shock loaded, as steel fracture can result. Stress factors that reduce rigging capacity and safe working load must be considered when using slings at angles or when slings are choked.

Motor Vehicles and Heavy Equipment

Drivers and/or operators of vehicles and heavy equipment must have the appropriate state license certifying their qualifications to drive or operate each piece of equipment or vehicle. When state certification is not available for a piece of heavy equipment, the subcontractor shall submit to the contractor a certificate of operator qualification for each operator, listing each piece of heavy equipment that the operator is qualified to operate.

Drivers shall be responsible for the safety of all passengers and the stability of materials being hauled. Personnel shall not mount or dismount moving vehicles. Personnel shall not ride in the bed of any vehicle. Every passenger in a motor vehicle shall have a safe place to ride. The use of seat belts shall be mandatory when operating or riding in vehicles.

Unattended vehicles and heavy equipment shall not be left running. If the operator is to get out of or off of the equipment, it must be shut down properly.

All blades and buckets shall be lowered when the operator leaves the cab unless physically locked or properly blocked.

Heavy equipment shall be maintained in proper operating condition at all times. All machines shall be equipped with roll-over protective structure (ROPS) cabs. Operators shall be trained in the proper method of working on slopes.

All heavy equipment with ROPS cabs shall be labeled as required by 29 CFR 1926.1000. Seat belts shall be installed and used in all equipment with ROPS attachments except for compactors and rubber-tired skid steer equipment. All heavy equipment shall be equipped with functioning back-up alarm systems that are clearly audible above surrounding noise.

All equipment and tools shall be subject to an inspection, conducted by the contractor, upon arrival at the site and prior to being placed into service. Operators shall perform daily inspections of machinery and equipment. Records of these inspections shall be made and kept by the subcontractor. These records shall be available to the contractor upon request. Defective equipment that could endanger personnel or the environment shall be tagged defective, and repaired immediately or removed from service. All machinery shall be subject to inspection by the Contractor Safety Department. Owners' manuals shall be made readily available upon contractor request.

Oils or other fluids (except water) that leak onto the ground shall be cleaned up by the subcontractor, and the contaminated soil shall be disposed of in accordance with the Environmental Cleanup Plan.

All equipment is designed for a particular function and shall be operated according to the manufacturer's recommendations and within the manufacturer's limitations. For lifting operations with equipment other than cranes, prior written approval must be obtained from the contractor.

Documenting Task Completion

Upon completion of the excavation, the subcontractor shall prepare as-builts and transmit them along with the completed permit, SWPs, and/or TaSSAs to the construction engineer.

Enforcing Permit Requirements

Failure to obtain a permit, or noncompliance with the conditions required by the approved permit, may result in an operational suspension of the activity until an approved permit is issued and/or a CAS-21 Safety Violation Notice is completed.

Demolition

All personnel safeguards that apply to the construction of a building will be required during demolition. If a worker is exposed to a hazard, the hazard shall be abated or personnel shall be removed from the hazard area. Fall hazards — such as floor openings, unprotected platforms, and wall openings — to which employees will be exposed shall be mitigated.

An engineering survey must accompany the Safe Work Plan. However, this survey is not a substitute for the Safe Work Plan. The professional engineer who authors the engineering survey must tour all the buildings that are included in the survey.

Use of explosives may be permitted for demolition of uncontaminated structures; however, a detailed Safe Work Plan will be required before such use is approved.

As indicated in the subcontract specifications, the subcontractor shall use water spraying or other contractor-approved methods as necessary to suppress dust emissions.

Traffic Control

The subcontractor shall be responsible for orderly traffic control on the job site. All traffic control measures on public roadways shall be in accordance with Transportation Department regulations for use of flagmen, construction barriers, and appropriate distance requirements. The subcontractor shall provide traffic signs and/or signalmen where and when necessary to protect personnel and/or the general public.

APPENDIX E
Site Tailgate Meeting and Exclusion Zone Entry Log

APPENDIX E
SITE TAILGATE MEETING and EXCLUSION ZONE ENTRY LOG

Facility: _____
Date: _____
Client: _____ Time: _____ Project Number: _____
Specific Location: _____
Type of Work: _____
Chemicals Brought to Site: _____
_____

MSDSs Available: Yes ____ No ____

HEALTH AND SAFETY TOPICS PRESENTED

Protective Clothing/Equipment: _____
_____
Chemical Hazards: _____
_____
Physical Hazards: _____
_____
Emergency Procedures: Apply First Aid and notify Health and Safety immediately
_____
Hospital/Clinic: _____
Hospital Address: _____
Special Equipment: _____
_____
Evacuation Route: _____
_____
_____

ATTENDEES

Entered Exclusion Zone? (Y/N)	NAME (Printed)	SS#	COMPANY	SIGNATURE

MEETING CONDUCTED BY:
NAME (printed) _____

(signature) _____

APPENDIX F
Visitor's Log

JACOBS ENGINEERING GROUP INC.

SITE PERSONNEL/VISITOR LOG

Project Name:	Project No.:	Date:
OU No.:	Site No.:	

Name	Representing	Function	Exclusion Zone Entry?	Time (24-Hour) IN	OUT

APPENDIX G
Material Safety Data Sheet (MSDS) Information

APPENDIX G - MSDS INFORMATION

Benzene

Chlordane

Diesel Fuel No. 1-D

Diesel Fuel No. 2-D

Ethylbenzene

Gasoline

Hexane

1-Hexene

Hydrochloric Acid

Hydrogen

Isobutylene

Kerosene

Methane

Methanol

Nitric Acid

Sodium Hydroxide

Sulfuric Acid

Toluene

Xylene

Benzene

CHEMICAL NAME
BENZENE

FORMULA
C6H6

SYNONYMS
BENZOL
CYCLOHEXATRIENE
COAL TAR NAPHTHA
PHENYL HYDRIDE
NCI-C55276
BENZINE
BENZOLE
UN 1114
(6)ANNULENE
BENZIN
BENZOLENE
BICARBURET OF HYDROGEN
CARBON OIL
COAL NAPHTHA
MINERAL NAPHTHA
MOTOR BENZOL
NITRATION BENZENE
PHENE
PYROBENZOL
PYROBENZOLE
OHS02610

PERMISSIBLE EXPOSURE LIMIT
10 PPM OSHA TWA; 10 PPM (30 MG/M3) ACGIH TWA
25 PPM (75 MG/M3) ACGIH STEL (NOTICE OF INTENDED CHANGE 85-86)
25 PPM OSHA CEILING; 50 PPM/10 MINUTES OSHA PEAK
10 PPM/60 MINUTES NIOSH RECOMMENDED CEILING
HUMAN CARCINOGEN (NTP, IARC, OSHA); SUSPECT HUMAN CARCINOGEN (ACGIH)
ANIMAL CARCINOGEN (IARC); POSITIVE CARCINOGEN IN RATS/MICE (NCI)
MUTAGENIC DATA (RTEC); TERATOGENIC DATA (RTEC)
AQUATIC TOXICITY RATING 2 (TLM96 10-100 PPM)
TLM96 - FATHEADS 32-33.47 PPM, BLUEGILLS 22.49 PPM, GUPPIES 36.60 PPM
TLM96 - GAMBUSIA AFFINIS 386; TLM - RAINBOW TROUT 15.4 PPM
KILL, 1HR - LEPOMIS HUMILIS 35-37 PPM
CERCLA HAZARD RATINGS - TOXICITY 3 - IGNITABILITY 3 - REACTIVITY 0 - PERSISTENCE 1

TOXICOLOGY: BENZENE IS A PRIMARY SKIN IRRITANT, CENTRAL NERVOUS SYSTEM DEPRESSANT, BONE MARROW DEPRESSANT, AND LEUKEMOGEN.

ACUTE BENZENE INTOXICATION FROM INHALATION OR INGESTION INITIALLY PRODUCES EXCITATION AND EUPHORIA, FOLLOWED BY HEADACHE, DROWSINESS, DIZZINESS, VOMITING, DELIRIUM, AND UNCONSCIOUSNESS. SEVERE EXPOSURE CAUSES BLURRED VISION, TREMORS, SHALLOW AND RAPID RESPIRATION, VENTRICULAR FIBRILLATION, PARALYSIS, AND CONVULSIONS. LIVER AND KIDNEY DAMAGE MAY OCCUR.

CHRONIC INHALATION POSES THE GREATEST HAZARD. SYMPTOMS ARE ANOREXIA, DROWSINESS, NERVOUSNESS, PALLOR, ANEMIA, BLEEDING UND SKIN AND EYES, AND REDUCED CLOTTING ABILITY. BONE MARROW DAMAG EVIDENT. BENZENE WORKERS ARE 5 TO 10 TIMES AS LIKELY TO DEVEI MIA.

SKIN CONTACT WITH BENZENE DEGREASES THE SKIN, CAUSING CRACKIN SCALING. EXPOSURE HAS PRODUCED OPTIC NEURITIS, ATROPHY, VISUA MENT, EDEMA, AND CATARACTS. DIRECT CONTACT CAUSES TRANSIENT IN

THE ODOR AND IRRITATION PROPERTIES DO NOT PROVIDE ADEQUATE WA TOXIC CONCENTRATIONS.

THE THRESHOLD LIMIT VALUE IS BASED ON THE LOWEST LEVEL ACHIE

ORL-HMN TDLO:	130 MG/KG	UNK-MAN LDLO:	194 MG/KG
IHL-HMN LCLO:	20000 PPM/5 MIN	ORL-RAT LD50:	4894 MG/KG
IHL-HMN TCLO:	210 PPM	ORL-MUS LD50:	4700 MG/KG
IHL-HMN TCLO:	100 PPM	IHL-RAT LC50:	10000 PPM/7 Hr

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONCENTRATION
2000 PPM
OSHA/NIOSH

PHYSICAL DESCRIPTION
COLORLESS TO LIGHT-YELLOW, MOBILE, NON-POLAR LIQUID; AROMATIC

CHEMICAL AND PHYSICAL PROPERTIES
MOLECULAR WEIGHT: 78.08
BOILING POINT AT 1 ATM, F: 176 F
SOLUBILITY IN WATER, G/100 G WATER AT 20C: 820 PPM
FLASH POINT, CLOSED CUP, F (OR OPEN CUP IF 0C): 12 F
VAPOR PRESSURE @ 20 C, MMHG: 75 MM
MELTING POINT, F: 42 F
UPPER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 7.1%
LOWER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 1/3%
AUTOIGNITION TEMPERATURE: 928 F
SPECIFIC GRAVITY: 0.8765
VAPOR DENSITY (AIR=1): 2.8
ODOR THRESHOLD: 1.5-5 PPM
OCTANOL/WATER PARTITION COEFFICIENT: 2.13

INCOMPATIBILITIES
STRONG OXIDIZERS
ZINC IN PRESENCE OF STEAM
CHLORINE TRIFLUORIDE
OZONE
SULFURIC ACID
POTASSIUM
CHROMIC ANHYDRIDE
DUST/VAPORS MAY FORM EXPLOSIVE MIXTURE WITH AIR

PERSONAL PROTECTIVE EQUIPMENT
EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE APPROPRI PROTECTIVE CLOTHING AND EQUIPMENT NECESSARY TO PREVENT REPEATF PROLONGED SKIN CONTACT WITH THIS SUBSTANCE. FACE SHIELDS SHAL WITH 29CFR1910.133(A)(2), (A)(4), (A)(5), AND (A)(6).

EMPLOYERS SHALL ENSURE THAT CLOTHING WET WITH THIS SUBSTANCE IS PLACED IN CLOSED CONTAINERS FOR STORAGE UNTIL IT CAN BE DISCARDED OR UNTIL THE EMPLOYER PROVIDES FOR THE REMOVAL OF THE CONTAMINANT FROM THE CLOTHING. IF THE CLOTHING IS TO BE LAUNDERED OR OTHERWISE CLEANED TO REMOVE THE CONTAMINANT, THE EMPLOYER SHALL INFORM THE PERSON PERFORMING THE CLEANING OPERATION OF THE HAZARDOUS PROPERTIES OF THE SUBSTANCE. PROTECTIVE CLOTHING AND EQUIPMENT NECESSARY TO PREVENT REPEATED OR

— — —

ACGIH "GUIDELINES FOR SELECTION OF CHEMICAL PROTECTIVE CLOTHING" INDICATES THE FOLLOWING MATERIALS AND PROTECTIVE RATINGS BY INDEPENDENT VENDORS AGAINST BENZENE:

EXCELLENT/GOOD:
VITON

GOOD/FAIR:
POLYVINYL ALCOHOL

FAIR/POOR:
BUTYL RUBBER
NATURAL RUBBER
NEOPRENE
NEOPRENE/NATURAL RUBBER
NITRILE
POLYETHYLENE
CHLORINATED POLYETHYLENE
POLYURETHANE
POLYVINYL CHLORIDE

FAIR/GOOD:
NEOPRENE/STYRENE-BUTADIENE
NITRILE/POLYVINYL CHLORIDE
STYRENE-BUTADIENE RUBBER
FLUORINATED ETHYLENE PROPYLENE POLYMER OR POLYTETRAFLUOROETHYLENE
CHLORINATED NATURAL RUBBER
SARANEX

GOGGLES

EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE SPLASH-PROOF SAFETY GOGGLES WHICH COMPLY WITH 29CFR1910.133(A)(2)-(A)(6) WHERE THIS LIQUID MAY CONTACT THE EYES.

WASHING CHEMICALS FROM THE SKIN

EMPLOYERS SHALL ENSURE THAT EMPLOYEES WHOSE SKIN BECOMES CONTAMINATED WITH THIS SUBSTANCE PROMPTLY WASH OR SHOWER WITH SOAP OR MILD DETERGENT AND WATER TO REMOVE ANY CONTAMINANT FROM THE SKIN.

ROUTINE CHANGING OF WORK CLOTHING

NOT REQUIRED

CLOTHING REMOVAL FOLLOWING ACCIDENTAL CONTAMINATION
EMPLOYERS SHALL ENSURE THAT ANY CLOTHING WHICH BECOMES WET WITH FLAMMABLE LIQUID BE REMOVED IMMEDIATELY AND NOT REWORN UNTIL THE SUBSTANCE IS REMOVED FROM THE CLOTHING.

SPECIFIC EMERGENCY PROVISIONS
NONE REQUIRED

RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED)

10 PPM
- SUPPLIED-AIR RESPIRATOR
- SELF-CONTAINED BREATHING APPARATUS

50 PPM
- SELF-CONTAINED BREATHING APPARATUS
  WITH A FULL FACE-PIECE
- SUPPLIED-AIR RESPIRATOR
  WITH A FULL FACE-PIECE, HELMENT, OR HOOD

ESCAPE
- GAS MASK
  PROVIDING PROTECTION AGAINST SPECIFIC COMPOUND OF CONCERN
  (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER)
- SELF-CONTAINED BREATHING APPARATUS

1000 PPM
- SUPPLIED-AIR RESPIRATOR
- TYPE 'C' SUPPLIED-AIR RESPIRATOR
- SUPPLIED-AIR RESPIRATOR
  OPERATED IN PRESSURE-DEMAND, POSITIVE-PRESSURE, OR CONTINU
  MODE

FIREFIGHTING
- SELF-CONTAINED BREATHING APPARATUS
  WITH A FULL FACE-PIECE
  OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE

2000 PPM
- TYPE 'C' SUPPLIED-AIR RESPIRATOR
- SUPPLIED-AIR RESPIRATOR
  WITH A FULL FACE-PIECE
  OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE
  WITH A FULL FACE-PIECE, HELMENT, OR HOOD
  OPERATED IN CONTINUOUS-FLOW MODE

ROUTE OF ENTRY INTO BODY
- INHALATION
- SKIN ABSORPTION
- INGESTION
- SKIN OR EYE CONTACT

SYMPTOMS
- EYE IRRITATION
- RESPIRATORY IRRITATION
- PURPURA
- DERMATITIS
- VESICULATION
- ERYTHEMA
- EPISTAXIS
- PHARYNGITIS
- RESPIRATORY EDEMA
- CENTRAL NERVOUS SYSTEM STIMULATION
- RAPID RESPIRATION
- NERVOUSNESS
- DELIRIUM
- EUPHORIA
- VERTIGO
- CENTRAL NERVOUS SYSTEM DEPRESSION
- HEADACHE
- FATIGUE
- WEAKNESS
- DIZZINESS
- DROWSINESS
- CONFUSION
- ANGINA
- PALLOR
- STRABISMUS
- LEUKOPENIA
- MYDRIASIS
- NAUSEA
- VOMITING
- ANOREXIA
- WEIGHT LOSS
- TREMORS
- COMATOSE
- VENTRICULAR FIBRILLATION
- CARDIAC PARALYSIS
- RESPIRATORY PARALYSIS
- CONVULSIONS
- LEUKOCYTOSIS
- MONOCYTOSIS
- THROMBOCYTOPENIA
- HEMOLYTIC ANEMIA
- HEMATURIA
- BONE MARROW DEPRESSION
- BONE MARROW HYPERPLASIA

LEUKEMIA
APLASTIC ANEMIA
KIDNEY DAMAGE
LIVER DAMAGE
BRAIN DAMAGE
REPRODUCTIVE EFFECTS

FIRST AID PROCEDURES FOLLOWING EXPOSURE

IF THIS CHEMICAL GETS INTO THE EYES, IMMEDIATELY WASH THE EYES WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING THE LOWER AN UPPER LIDS. GET MEDICAL ATTENTION IMMEDIATELY. CONTACT LENSE SHOULD NOT BE WORN WHEN WORKING WITH THIS CHEMICAL.

IF THIS CHEMICAL GETS ON THE SKIN, IMMEDIATELY WASH CONTAMINAT SKIN WITH SOAP OR MILD DETERGENT & WATER. IF THIS CHEMICAL SOAKS CLOTHING, IMMEDIATELY REMOVE CLOTHING & WASH SKIN WITH SOAP OR MILD DETERGENT & WATER. GET MEDICAL ATTENTION PROMPTL

IF A PERSON BREATHES IN LARGE AMOUNTS OF THIS CHEMICAL, MOVE TH EXPOSED PERSON TO FRESH AIR AT ONCE. IF BREATHING HAS STOPPED PERFORM ARTIFICIAL RESPIRATION. KEEP THE AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION AS SOON AS POSSIBLE.

WHEN THIS CHEMICAL HAS BEEN SWALLOWED, DO NOT INDUCE VOMITING. REMOVE BY GASTRIC LAVAGE AND CATHARSIS.

BENZENE/TOLUENE/XYLENE EXPOSURE:
EMERGENCY TREATMENT - REMOVE FROM EXPOSURE. GIVE ARTIFICIAL RESPIRATION WITH OXYGEN. REMOVE BY GASTRIC LAVAGE. AVOID ASPIRATION.
FURTHER TREATMENT - CONTROL EXCITEMENT OR CONVULSIONS WITH DIAZEPAM, 0.1 MG/KG, SLOWLY INTRAVENOUSLY. KEEP PATIENT AT REST UNTIL RESPIRATION IS NORMAL. DO NOT GIVE EPINEPHRINE OR EPHEDRINE OR RELATED DRUGS. MONITOR ECG FOR VENTRICULAR ABNORMALITIES INDICATING CARDIAC ARREST.
SPECIAL TREATMENT - TREAT ANEMIA WITH REPEATED BLOOD TRANS-FUSIONS. TREAT KIDNEY OR LIVER DAMAGE.
(MEDICATION MUST BE GIVEN BY QUALIFIED MEDICAL PERSONNEL)
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

GASTRIC LAVAGE - GIVE PATIENT GLASS OF WATER PRIOR TO PASSING OF STOMACH TUBE. LAY PATIENT ON ONE SIDE, WITH HEAD LOWER THAN WAIST. IMMOBILIZE A STRUGGLING PATIENT WITH A SHEET OR BLANKET. MEASURE DISTANCE ON TUBE FROM MOUTH TO EPIGASTRIUM, MARK TUBE WITH INDELIBLE MARKING OR TAPE. REMOVE DENTURES AND OTHER FOREIGN OBJECTS FROM MOUTH. OPEN MOUTH, USE GAG IF NECESSARY. EXTEND HEAD BY LIFTING THE CHIN. PASS TUBE OVER TONGUE AND TOWARD BACK OF THROAT WITHOUT EXTENDING HEAD OR NECK. IF OBSTRUCTION IS MET BEFORE THE MARK ON TUBE REACHES LEVELS OF TEETH, DO NOT FORCE, BUT REMOVE TUBE AND REPEAT PROCEDURE UNTIL TUBE PASSES TO MARK. PLACE END OF TUBE IN GLASS OF WATER. IF TUBE IS OBSTRUCTED WHEN INTRODUCED ABOUT HALFWAY TO THE MARK, IT MAY HAVE ENTERED TRACHEA.

AFTER TUBE IS PLACED IN STOMACH, ASPIRATE FIRST TO REMOVE STOMACH CONTENTS BY IRRIGATION SYRINGE. SAVE STOMACH CONTENTS FOR EXAMINATION, AND REPEAT INTRODUCTION AND WITHDRAWAL OF 100-300 ML WARM WATER UNTIL AT LEAST 3 LITERS OF CLEAR RETURN ARE OBTAINED. USE ACTIVATED CHARCOAL AT BEGINNING OF LAVAGE TO AID IN POISON INACTIVATION. LEAVE 50 GRAMS OF CHARCOAL SUSPENDED IN WATER IN THE STOMACH. IF INTRODUCTION AND REMOVAL OF LAVAGE FLUID BY GRAVITY REQUIRES MORE THAN FIVE MINUTES, ASSIST WITH ASEPTO SYRINGE. PREVENT ASPIRATION WITH CUFFED ENDOTRACHEAL TUBE. AVOID GIVING LARGE QUANTITIES OF WATER.

MASSAGE OF EPIGASTRIUM WHILE STOMACH TUBE IS BEING ASPIRATED MAY AID IN POISON REMOVAL.

IF PATIENT COMATOSE, INTUBATE TRACHEA WITH CUFFED ENDOTRACHEAL TUBE. SUCCINYLCHLORINE MAY BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL TO EASE INSERTION OF TRACHEAL CATHETER PRIOR TO PASSAGE OF STOMACH TUBE.
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

CONVULSIONS - GIVE ARTIFICIAL RESPIRATION BY MOUTH-TO-MOUTH INSUFFLATION. RESTRAIN THE PATIENT DURING CONVULSIONS TO PREVENT INJURY. DO NOT ATTEMPT EMESIS OR GASTRIC LAVAGE WHILE THE PATIENT IS TWITCHING OR HYPERIRRITABLE UNLESS THE AIRWAY IS CONTROLLED AND REMOVAL OF DRUG IS IMPERATIVE.

ADMINISTER ANTICONVULSANTS. MAINTAIN HYDRATION BY ORAL OR INTRAVENOUS FLUID ADMINISTRATION. MAINTAIN AN ADEQUATE AIRWAY. TREAT HYPOGLYCEMIA BY GIVING GLUCOSE. REDUCE ELEVATED TEMPERATURE BY USING TEPID SPONGES. REMOVE SECRETIONS FROM THE PHARYNX BY SUCTION. GIVE POSITIVE-PRESSURE RESPIRATION WITH OXYGEN DURING CONVULSIONS.
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

ACUTE RENAL FAILURE - TREAT SHOCK. FOR HEMOLYTIC REACTIONS, GIVE SODIUM BICARONATE, 5 G EVERY 1-2 HOURS AS NECESSARY TO MAINTAIN AN ALKALINE URINE.
(MEDICATION MUST BE GIVEN BE QUALIFIED MEDICAL PERSONNEL)
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

LIVER DAMAGE - REMOVE FROM EXPOSURE TO ALL CHEMICALS AND DRUGS. MAINTAIN COMPLETE BED REST. AVOID ANESTHESIA OR SURGICAL PROCEDURES. AVOID DEHYDRATION OR OVERHYDRATION. IF VOMITING SEVERE AND ORAL FLUIDS NOT RETAINED, REPLACE VOMITUS WITH AN EQUAL QUANTITY OF 100% DEXTROSE IN NORMAL SALINE. IN RENAL FUNCTION ADEQUATE, GIVE 1 LITER OF 5% DEXTROSE OR INVERT SUGAR IN NORMAL SALINE PLUS 1-3 LITERS OF 10% DEXTROSE OR INVERT SUGAR IN DISTILLED WATER INTRAVENOUSLY EVERY TWENTY-FOUR HOURS.
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

ORGANS
BLOOD
CENTRAL NERVOUS SYSTEM
SKIN
BONE MARROW
EYES
RESPIRATORY SYSTEM

STATUS OF REGULATORY ENFORCEMENT
OSHA STANDARD 29CFR1910.1200 HAZARD COMMUNICATION
REQUIRES CHEMICAL MANUFACTURERS AND IMPORTERS TO ASSESS THE
OF CHEMICALS WHICH THEY PRODUCE OR IMPORT, AND ALL EMPLOYERS HA
WORKPLACES IN THE MANUFACTURING DIVISION, STANDARD INDUSTRIAL C
IFICATION CODES 20 THROUGH 39, TO PROVIDE INFORMATION TO THEIR
CONCERNING HAZARDOUS CHEMICALS BY MEANS OF HAZARD COMMUNICATIO
INCLUDING LABELS, MATERIAL SAFETY DATA SHEETS, TRAINING, AND AC
WRITTEN RECORDS
48FR53280 11/25/83

FOLLOWING OSHA STANDARDS APPLICABLE TO SUBSTANCES LISTED 29CFR
OTHERWISE ADVISE:
OSHA STANDARD 29CFR1910.1000 AIR CONTAMINANTS
TABLE Z-2

OSHA STANDARD 29CFR1910.94 VENTILATION

OSHA STANDARD 29CFR1910.134 RESPIRATORY PROTECTION

OSHA STANDARD 29CFR1910.20 ACCESS TO EMPLOYEE EXPOSURE AND M
RECORDS

OSHA STANDARD 29CFR1910.132 PERSONAL PROTECTIVE EQUIPMENT

OSHA STANDARD 29CFR1910.141 SANITATION

OSHA STANDARD 29CFR1910.151 MEDICAL SERVICES AND FIRST AID

OSHA STANDARD 29CFR1910.133 EYE AND FACE PROTECTION

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUB
CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONME
REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL S
AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS
OR THE ENVIRONMENT ALLEGED TO HAVE BEEN CAUSED BY A SUBSTANCE
MIXTURE. EPA MAY INSPECT AND REQUIRE REPORTING OF SUCH RECOR
48FR38178 08/22/83

OSHA STANDARD 29CFR1910.106 FLAMMABLE AND COMBUSTIBLE LIQUIDS
APPLIES TO THE HANDLING, STORAGE, AND USE OF FLAMMABLE AND
LIQUIDS WITH A FLASH POINT BELOW 200 F

SUBSTANCE ESTABLISHED AS CONFIRMED OR SUSPECTED CARCINOGEN (POTENTIAL CARCINOGEN) BY THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC)

SUBSTANCE LISTED AS 'KNOWN TO BE CARCINOGENIC' OR 'MAY REASONABLY BE ANTICIPATED TO BE CARCINOGENIC' IN NATIONAL TOXICOLOGY PROGRAM (NTP) THIRD ANNUAL REPORT ON CARCINOGENS

SUBSTANCE LISTED AS TOXIC POLLUTANT UNDER CLEAN WATER ACT (CWA) SECTION 307(A)

40CFR116 DESIGNATION OF HAZARDOUS SUBSTANCES
DESIGNATED AS HAZARDOUS SUBSTANCE IN ACCORDANCE WITH SECTION 311(B)(2)(A) OF THE FEDERAL WATER POLLUTION CONTROL ACT, AS AMENDED. INCLUDES ANY ISOMERS AND HYDRATES, AS WELL AS ANY SOLUTIONS AND MIXTURES CONTAINING THIS SUBSTANCE.
43FR10747 03/13/78
43FR27533 06/26/78
44FR10266 02/16/79 (AMENDMENT)
44FR10268 02/16/79 (AMENDMENT)
44FR65400 11/13/79 (AMENDMENT)
44FR66602 11/20/79 (AMENDMENT)

40CFR261.33(F) DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINERS, AND SPILL RESIDUES THEREOF
COMMERCIAL CHEMICAL PRODUCT OR MANUFACTURING CHEMICAL INTERMEDIATE IDENTIFIED AS TOXIC WASTE UNLESS OTHERWISE DESIGNATED.
45FR33084 05/19/80

49CFR172.101 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN HAZARDOUS MATERIALS TABLE AS HAZARDOUS MATERIAL FOR THE PURPOSE OF TRANSPORTATION.
41FR15996 04/15/76
45FR34588 05/22/80 (AMENDMENT)
45FR46420 07/10/80 (AMENDMENT)
45FR62080 09/18/80 (AMENDMENT)
45FR74649 11/10/80 (AMENDMENT)
46FR17739 03/19/81 (AMENDMENT)
46FR19235 03/30/81 (AMENDMENT)

49CFR172.102 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN OPTIONAL HAZARDOUS MATERIALS TABLE WITH ALTERNATIVES TO CORRESPONDING REQUIREMENTS IN 49CFR172.101 FOR INTERNATIONAL SHIPMENTS AS AUTHORIZED BY 49CFR171.12
41FR15996 04/15/76
46FR29393 06/01/81 (AMENDMENT)
46FR32250 06/22/81 (AMENDMENT)

40CFR61 - NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUT
SUBPART J - NATIONAL EMISSION STANDARD FOR EQUIPMENT LEAKS (FUG
EMISSION SOURCES) OF BENZENE

APPLIES TO EACH OF THE FOLLOWING SOURCES THAT ARE INTENDED T
IN BENZENE SERVICES: PUMPS, COMPRESSORS, PRESSURE RELIEF DEVIC
SAMPLING CONNECTIONS, SYSTEMS, OPEN-ENDED VALVES OR LINES, VAL
FLANGES AND OTHER CONNECTORS, PRODUCT ACCUMULATOR VESSELS, AND
DEVICES OR SYSTEMS REQUIRED BY THIS SUBPART.
THE PROVISIONS OF THIS SUBPART DO NOT APPLY TO SOURCES LOCATE
BYPRODUCT PLANTS.
49FR23498 06/06/84

SUBSTANCE LISTED AS A HAZARDOUS AIR POLLUTANT UNDER CLEAN AIR
SECTION 112

THIS SUBSTANCE TESTED FOR PHARMACOKINETICS/METABOLISM
BY THE CENTERS FOR DISEASE CONTROL/NATIONAL INSTITUTE FOR
OCCUPATIONAL SAFETY AND HEALTH (CDC)

SUBSTANCE SUBJECT TO REQUIREMENTS OF GENERAL INDUSTRY SAFETY O
(GISO) 5194 OR TITLE 8 OF CALIFORNIA ADMINSTRATIVE CODE AND DI
CHAPTER 2.5 OF CALIFORNIA LABOR CODE

SUBSTANCE LISTED HAZARDOUS
STATE OF CALIFORNIA ADMINISTRATIVE CODE
TITLE 22. SOCIAL SECURITY
DIVISION 4. ENVIRONMENTAL HEALTH
CHAPTER 30. MINIMUM STANDARDS FOR MANAGEMENT OF HAZARDOUS AND
EXTREMELY HAZARDOUS WASTES

TOXIC SUBSTANCE CONTROL ACT (TSCA) SECTION 8(E) INITIAL
EVALUATION OF SUBSTANTIAL RISK SUBMITTED TO EPA, 1982

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.32 EPA HAZARDOUS WASTE NO. K025: DISTILLATION BOTTOMS
FROM THE PRODUCTION OF NITROBENZENE BY THE NITRATION OF BENZE
(T)

COMMENT REVIEW COMPLETED/PUBLISHED CLEAN AIR ACT (CAA)

REGULATION PROMULGATED CLEAN WATER ACT (CWA) SECTION 311
40CFR117

REGULATION IN DEVELOPMENT/PROGRESS COMPREHENSIVE ENVIRONMENTAL
RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA) SECTION 101

TECHNICAL ASSISTANCE DATA COMPLETED/PUBLISHED FEDERAL
INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT (FIFRA)

TECHNICAL ASSISTANCE DATA COMPLETED/PUBLISHED CLEAN WATER ACT
(CWA) SECTION 311
RISK DOCUMENTATION/ASSESSMENT IN DEVELOPMENT/PROGRESS CLEAN AI
ACT (CAA)

MONITORING/LEVELS MEASUREMENT COMPLETED/PUBLISHED CLEAN WATER ACT (CWA)

CRITERIA DOCUMENT IN DEVELOPMENT/PROGRESS SAFE DRINKING WATER ACT (SDWA)

OSHA STANDARD 29CFR1910.1002 COAL TAR PITCH VOLATILES

REGULATION COMPLETED/PUBLISHED FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT (FIFRA) SECTION 6

MATERIALS BALANCE STUDY COMPLETED/PUBLISHED TOXIC SUBSTANCES CONTROL ACT (TSCA)

REGULATION PROMULGATED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR260

REBUTTABLE PRESUMPTION AGAINST REGISTRATION (RPAR) OR ADVANCED NOTICE OF PROPOSED RULEMAKING (ANPR) COMPLETED/ PUBLISHED FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT (FIFRA) SECTION 6

PREREGULATORY ASSESSMENT COMPLETED/PUBLISHED TOXIC SUBSTANCES CONTROL ACT (TSCA)

40CFR122, APPENDIX D - NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT APPLICATION TESTING REQUIREMENTS
TABLE II - ORGANIC TOXIC POLLUTANTS IN EACH OF FOUR FRACTIONS IN ANALYSIS BY GAS CHROMATOGRAPHY/MASS SPECTROSCOPY (GS/MS)
48FR14153 04/01/83

16CFR1500.14 PRODUCTS REQUIRING SPECIAL LABELING UNDER SECTION 3(B) OF THE FEDERAL HAZARDOUS SUBSTANCES ACT
38FR27012 09/27/73
41FR22934 06/08/76
48FR16 01/03/83

THIS SUBSTANCE TESTED FOR CARCINOGENESIS BY THE NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES (NIEHS)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.32 EPA HAZARDOUS WASTE NO. K085: DISTILLATION OR FRACTIONATION COLUMN BOTTOMS FROM THE PRODUCTION OF CHLOROBENZENES.((T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.31 EPA HAZARDOUS WASTE NO. F024: WASTES, INCLUDING BUT
LIMITED TO, DISTILLATION RESIDUES, HEAVY ENDS, TARS, AND REACTO
CLEANOUT WASTES FROM THE PRODUCTION OF CHLORINATED ALIPHATIC HY
CARBONS, HAVING CARBON CONTENT FROM ONE TO FIVE, UTILIZING FREE
CATALYZED PROCESSES. (THIS LIST DOES NOT INCLUDE LIGHT ENDS, S
FILTERS AND FILTER AIDS, SPENT DESSICANTS, WASTEWATER, WASTEWA
MENT SLUDGES, SPENT CATALYSTS, AND WASTES LISTED IN 40CFR261.32
49FR5308 02/10/84

SUBSTANCE LISTED TOXIC SUBSTANCES CONTROL ACT INVENTORY

PREPACKAGED LIQUID SOLVENTS FOR PAINTS OR OTHER SIMILAR
SURFACE-COATING MATERIALS THAT CONTAIN 10% OR MORE BY
WEIGHT OF BENZENE, TOLUENE, XYLENE, PETROLEUM DISTALLATES,
OR COMBINATIONS THEREOF, AND THAT HAVE A VISCOSITY OF LESS
THAN 100 SAYBOLT UNIVERSAL SECONDS AT 100 F, REQUIRE SPECIAL
PACKAGING TO PROTECT CHILDREN FROM SERIOUS PERSONAL INJURY
OR SERIOUS ILLNESS RESULTING FROM HANDLING, USE, OR INGESTION.
16CFR1700.14
PRODUCTS CONTAINING 5% OR MORE BY WEIGHT OF BENZENE REQUIRE
SPECIAL PACKAGING TO PROTECT CHILDREN FROM SERIOUS PERSONAL
INJURY OR SERIOUS ILLNESS RESULTING FORM HANDLING, USE, OR
INGESTION. 16CFR1700.14

MEDICAL SURVEILLANCE REQUIRED
GENERAL MEDICAL HISTORY
40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBS
CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONME
TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRE
MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AN
TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE H
30 YEARS
48FR38187 08/22/83
48FR39225 08/30/83 (EFFECTIVE DATE CORRECTION)
RESPIRATORY HISTORY
BLOOD DISEASE
DIFFERENTIAL BLOOD CELL MORPHOLOGY
COMPLETE BLOOD COUNT
INDICES
PHYSICIAN EXAMINATION
INDUSTRIAL EXPOSURE HISTORY
14 BY 17 CHEST P.A. X-RAY
VISION TEST
PULMONARY FUNCTIONS
URINALYSIS
RETICULOCYTE COUNT
PLATELET COUNT
SKIN EXAM
ATTENTION TO SMOKING, ALCOHOL, MEDICATION, AND EXPOSURE TO CARC

CERTIFICATIONS
HEALTH STATUS CLASSIFICATION

NUCLEAR REG. 0041

OSHA RESPIRATOR CERTIFICATION 29CFR1910.134

DEPARTMENT OF TRANSPORTATION IF OPERATES HEAVY EQUIPMENT

EMPLOYEE HAZARDOUS MATERIALS EDUCATION RECEIPT

EMPLOYEE MEDICAL RECORDS RECEIPT

TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS. CONTACT: JACK P. MCCARTHY, OFFICE OF TOXIC SUBSTANCES, EPA (800)424-1404. 48FR38178 8/22/83

MEDICAL WARNING REQUIRED FOR MEDICAL EXAM REFUSAL SIGNED BY EMPLOYEE

SPECIAL DIAGNOSTIC TESTS
URINE PHENOL BEFORE WORK SHIFT ENDS, LIMIT LIQUID INTAKE
URINE PHENOL
MORPHOLOGICAL BLOOD SLIDE
COMPLETE BLOOD COUNT
DIFFERENTIAL WHITE BLOOD CELL COUNT

LEAKS AND SPILL PROCEDURES
A REPORTABLE QUANTITY OF ONE THOUSAND POUNDS APPLIES TO THIS SUBSTANCE ESTABLISHED BY SECTIONS 101(14) AND 102(B) OR ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA). SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THAT SUBSTANCE IMMEDIATELY NOTIFY THE NATIONAL RESPONCE CENTER (800) 424-8802; IN THE WASHINGTON, D.C. METROPOLITAN AREA (202) 426-2675
50FR13456 04/04/85

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DEPARTMENT OF TRANSPORTATION HAZARD CLASS
49CFR172.101 HAZARDOUS MATERIALS TABLE

FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS
49CFR172.101 (SUBJECT TO ADDITIONAL LABELING REQUIREMENTS OF 49CFR172.402)

FLAMMABLE LIQUID

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INTERGOVERNMENTAL MARITIME ORGANIZATION HAZARD CLASS
49CFR172.102 OPTIONAL HAZARDOUS MATERIALS TABLE

CLASS 3.2-INFLAMMABLE LIQUIDS

INTERGOVERNMENTAL MARITIME ORGANIZATION LABELING SPECIFICATIONS
DOMESTIC AND EXPORT SHIPMENTS
49CFR172.102

FLAMMABLE LIQUID

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FOLLOWING INFORMATION FROM BUREAU OF EXPLOSIVES "EMERGENCY HANDL
HAZARDOUS MATERIALS":

IF MATERIAL ON FIRE OR INVOLVED IN FIRE:
* DO NOT EXTINGUISH FIRE UNLESS FLOW CAN BE STOPPED
* USE WATER IN FLOODING QUANTITIES AS FOG
* SOLID STREAM OF WATER MAY SPREAD FIRE
* COOL ALL AFFECTED CONTAINERS WITH FLOODING QUANTITIES OF WATE
* APPLY WATER FROM AS FAR A DISTANCE AS POSSIBLE
* USE ALCOHOL FOAM OR CO2 OR DRY CHEMICAL EXTINGUISHERS

IF MATERIAL IS NOT ON FIRE AND IS NOT INVOLVED IN FIRE:
* KEEP SPARKS, FLAMES AND OTHER IGNITION SOURCES AWAY
* KEEP MATERIAL OUT OF WATER SOURCES AND SEWERS
* BUILD DIKES TO CONTAIN FLOW AS NECESSARY
* USE WATER SPRAY TO KNOCK DOWN VAPORS

PERSONNEL PROTECTION:
* AVOID BREATHING DUST/VAPORS/FUMES FROM MATERIAL
* KEEP UPWIND
* WEAR BOOTS, PROTECTIVE GLOVES AND GAS TIGHT GOGGLES
* DO NOT HANDLE BROKEN PACKAGES WITHOUT PROTECTIVE EQUIPMENT
* WASH AWAY ANY MATERIALS WHICH MAY HAVE CONTACTED THE BODY W
COPIOUS AMOUNTS OF WATER OR SOAP AND WATER

EVACUATION PROCEDURE:
* IF FIRE UNCONTROLLABLE OR CONTAINER EXPOSED TO DIRECT FLAME,
FOR A RADIUS OF 1500 FEET
* IF MATERIAL LEAKING (NOT ON FIRE), DOWNWIND EVACUATION MUST
CONSIDERED

LAND SPILL:
* DIG A PIT, POND, LAGOON OR HOLDING AREA TO CONTAIN LIQUID OR SOLID MATERIAL
* DIKE SURFACE FLOW USING SOIL, SANDBAGS, FOAMED POLYURETHANE OR FOAMED CONCRETE
* ABSORB BULK LIQUID WITH FLY ASH OR CEMENT POWDER
* APPLY FLUOROCARBON WATER FOAM TO DIMINISH VAPOR AND FIRE HAZARD

WATER SPILL:
* USE NATURAL BARRIERS OR OIL SPILL CONTROL BOOMS TO LIMIT SPILL MOTION
* USE SURFACE ACTIVE AGENT, DETERGENTS, SOAPS, ALCOHOLS TO COMPRESS AND THICKEN SPILLED MATERIAL
* INJECT UNIVERSAL GELLING AGENT TO SOLIDIFY ENCIRCLED SPILL AND INCREASE EFECTIVENESS OF BOOMS
* IF DISSOLVED, APPLY ACTIVATED CARBON AT 10 TIMES SPILLED AMOUNT AT 10PPM OR GREATER CONCENTRATION
* REMOVE TRAPPED MATERIAL WITH SUCTION HOSES
* USE MECHANICAL DREDGES OR LIFTS TO REMOVE IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES

AIR SPILL:
* APPLY WATER SPRAY TO KNOCK DOWN VAPORS

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FOLLWING INFORMATION FROM DEPARTMENT OF TRANSPORTATION/U.S. COAST GUARD "CHEMICAL RESPONSE INFORMATION SYSTEM", REGARDING WATER SPILLS:

* RESTRICT ACCESS OF GENERAL PUBLIC WHEN APPRECIABLE DANGER ARISES FROM SPILL
* RESTRICT IGNITION SOURCES WHEN SUBSTANCE INVOLVED
* RESTRICT HUMAN USE WHEN SUBSTANCE INVOLVED
* RESTRICT INDUSTRIAL USE WHEN SPILLED SUBSTANCE COULD CORRODE MACHINERY OR IF POSSIBILITY OF IGNITION FROM HIGHLY FLAMMABLE VAPORS DEVELOPS
* CONTAIN SURFACE SLICKS
* SKIM SURFACE SLICK
* HIGHLY VOLATILE, AVOID INHALATION, VAPORS OR DUST ARE IRRITATING OR TOXIC
* HIGHLY CORROSIVE, AVOID DIRECT CONTACT, CONTACT WITH SKIN OR EYES CAN CAUSE IRRITATION OR BURNS
* BURNING MAY BE PROHIBITED BY ANTI-POLLUTION LAWS AND REGULATIONS
* SUBSTANCE HAS SOOTY BURNING
* SUBSTANCE FLOATS ON WATER

LISTED BY U.S. COAST GUARD UNDER CARGO COMPATIBILITY GROUP AROMATIC HYDROCARBONS, INCOMPATIBLE WITH NITRIC ACID
* U.S. COAST GUARD REQUIRES 24 HOUR ADVANCE NOTICE TO CAPTAIN OF THE PORT WHEN THIS SUBSTANCE IS SCHEDULED TO ARRIVE AT PORT WHEN TRANSPORTED IN BULK QUANTITY

WASTE
THIS MATERIAL LISTED AS HAZARDOUS SUBSTANCE, AS DEFINED IN SECT
101(14) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSTAT
LIABILITY ACT (CERCLA) OF 1980, PURSUANT TO ONE OR MORE OF THE
FOLLOWING:

* FEDERAL WATER POLLUTION CONTROL ACT (FWPCA) SECTION 311(B)
* SOLID WASTE DISPOSAL ACT SECTION 3001
* CLEAN WATER ACT (CWA) SECTION 307(A)
* CLEAN AIR ACT (CAA) SECTION 112
* TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 7
* COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIA
  ACT (CERCLA) SECTION 102

EPA HAZARDOUS WASTE NUMBER U019
BENZENE (I,T)

40CFR260 HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

PROVIDES DEFINITIONS OF TERMS, GENERAL STANDARDS, AND OVERVI
INFORMATION APPLICABLE TO 40CFR PARTS 260-265

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

IDENTIFIES THOSE SOLID WASTES WHICH ARE SUBJECT TO REGULATI
HAZARDOUS WASTES UNDER 40CFR PARTS 262-265, 270, 271, AND 124 A
ARE SUBJECT TO THE NOTIFICATION REQUIREMENTS OF SECTION 3010 O
RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AND IDENTIFIES C
OF THE MATERIALS WHICH ARE HAZARDOUS WASTES UNDER SECTIONS 300
OF RCRA

40CFR262 STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WAST
ESTABLISHES STANDARDS FOR GENERATORS OF HAZARDOUS WASTE

40CFR263 STANDARDS APPLICABLE TO TRANSPORTERS OF HAZARDOUS WA

ESTABLISHES STANDARDS WHICH APPLY TO PERSONS TRANSPORTING HA
WASTE WITHIN THE UNITED STATES IF THE TRANSPORTATION REQUIRES A
UNDER 40CFR262

40CFR264 STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WAS
TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCE
MANAGEMENT OF HAZARDOUS WASTE

40CFR265 INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE DURING THE PERIOD OF INTERIM STATUS

40CFR267 INTERIM STANDARDS FOR OWNERS AND OPERATORS OF NEW HAZARDOUS WASTE LAND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS THAT DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE FOR NEW LAND DISPOSAL FACILITIES

40CFR270 EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

ESTABLISHES PROVISIONS FOR THE HAZARDOUS WASTE PERMIT PROGRAM UNDER SUBTITLE C OF THE SOLID WASTE DISPOSAL ACT, AS AMENDED BY THE RESOURCE CONSERVATION AND RECOVERY ACT

40CFR271 REQUIREMENT FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

SPECIFIES THE PROCEDURES EPA WILL FOLLOW IN APPROVING, REVISING, AND WITHDRAWING APPROVAL OF STATE PROGRAMS AND THE REQUIREMENTS STATE PROGRAMS MUST MEET TO BE APPROVED BY THE ADMINISTRATION UNDER SECTION 3006(B) OF RCRA

CAS NUMBER
71-43-2

REGISTRY TOXIC CHEMICALS NUMBER
CY1400000

BULLETINS

SPECIAL INFORMATION
BENZENE MAY EXIST AT MUCH HIGHER CONCENTRATIONS IN VAPORS THAN IN BENZENE-CONTAINING LIQUIDS.

Chlordane

MATERIAL SAFETY DATA SHEET

MDL INFORMATION SYSTEMS, INC.
14600 CATALINA STREET
SAN LEANDRO, CA 94577
1-800-635-0064 OR
1-510-895-1313

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000 USA

SUBSTANCE IDENTIFICATION

CAS NUMBER: 12789-03-6
RTECS NUMBER: PB9800000

SUBSTANCE: CHLORDANE (COMMERCIAL)

TRADE NAMES/SYNONYMS:
1,2,4,5,6,7,8,8-OCTACHLORO-2,3,3A,4,7,7A-HEXAHYDRO-4,7-METHANO-1H -INDENE;
1,2,4,5,6,7,8,8-OCTACHLORO-3A,4,7,7A-TETRAHYDRO-4,7-METHANOINDAN; CHLORINDAN; CHLORDAN; CHLORDANE; CORTILAN-NEU; HCS 3260; TAT; TOXICHLOR; ENT 9,932; ENT 25,552-X; RCRA U036; NCI-C00099; NA 2762; C10H6CL8; OHS71948

CHEMICAL FAMILY:
HALOGEN COMPOUND, ALICYCLIC

MOLECULAR FORMULA: C10-H6-CL8

MOLECULAR WEIGHT: 409.76

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=3
NFPA RATINGS (SCALE 0-4): HEALTH=4 FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: CHLORDANE PERCENT: 60.0-75.0
CAS# 57-74-9

COMPONENT: HEPTACHLOR PERCENT: 0-10.0
CAS# 76-44-8

COMPONENT: RELATED COMPOUNDS PERCENT: 1-30.0

EXPOSURE LIMITS:
CHLORDANE:
0.5 MG/M3 OSHA TWA (SKIN)
0.5 MG/M3 ACGIH TWA (SKIN)
0.5 MG/M3 NIOSH RECOMMENDED 10 HOUR TWA (SKIN)
0.5 MG/M3 DFG MAK TWA (TOTAL DUST, SKIN);
5 MG/M3 DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 1 TIME/SHIFT

MEASUREMENT METHOD: PARTICULATE FILTER/CHROMOSORB(R) 102 TUBE; TOLUENE; GAS CHROMATOGRAPHY WITH ELECTRON CAPTURE DETECTION; (NIOSH III # 5510).

1000 POUNDS SARA SECTION 302 THRESHOLD PLANNING QUANTITY
1 POUND SARA SECTION 304 REPORTABLE QUANTITY
1 POUND CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING
SUBJECT TO CALIFORNIA PROPOSITION 65 CANCER AND/OR REPRODUCTIVE TOXICITY

WARNING AND RELEASE REQUIREMENTS- (JULY 1, 1988)

HEPTACHLOR:
0.5 MG/M3 OSHA TWA (SKIN)
0.05 MG/M3 ACGIH TWA (SKIN);
ACGIH A3-ANIMAL CARCINOGEN
0.5 MG/M3 NIOSH RECOMMENDED 10 HOUR TWA (SKIN)
0.5 MG/M3 DFG MAK TWA (TOTAL DUST) (SKIN);
5.0 MG/M3 DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 1 TIME/SHIFT

MEASUREMENT METHOD: CHROMOSORB-102(R) TUBE; TOLUENE; GAS CHROMATOGRAPHY WITH ELECTRON CAPTURE DETECTION; (NIOSH II(5) # S287).

1 POUND CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING
SUBJECT TO CALIFORNIA PROPOSITION 65 CANCER AND/OR REPRODUCTIVE TOXICITY
WARNING AND RELEASE REQUIREMENTS- (JULY 1, 1988)

PHYSICAL DATA

DESCRIPTION: VISCOUS, AMBER-COLORED LIQUID.

BOILING POINT: 347 F (175 C) @ 2 MMHG (DECOMPOSES)

SPECIFIC GRAVITY: 1.59-1.63 VISCOSITY: 6900 CP @ 25 C

VAPOR PRESSURE: 0.00001 MMHG @ 25 C EVAPORATION RATE: NOT AVAILABLE

SOLUBILITY IN WATER: 0.1 PPM @ 25 C VAPOR DENSITY: 14

SOLVENT SOLUBILITY: SOLUBLE IN ALIPHATIC AND AROMATIC HYDROCARBON SOLVENTS INCLUDING KEROSENE .

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FIREFIGHTING MEDIA:
DRY CHEMICAL, WATER SPRAY OR REGULAR FOAM
(1993 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.6).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1993 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.6).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. FIGHT FIRE FROM MAXIMUM DISTANCE. STAY AWAY FROM ENDS OF TANKS. DIKE FIRE-CONTROL WATER FOR LATER DISPOSAL; DO NOT SCATTER THE MATERIAL (1993 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.6, GUIDE PAGE 55).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED. EXTINGUISH USING AGENT INDICATED. USE FLOODING AMOUNTS OF WATER AS A FOG. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING

POISONOUS VAPORS, KEEP UPWIND. CONSIDER EVACUATION OF DOWNWIND AREA IF MATERIAL IS LEAKING.

TOXICITY

CHLORDANE (COMMERCIAL):
TOXICITY DATA: 283 MG/KG ORAL-RAT LD50; MUTAGENIC DATA (RTECS).
CARCINOGEN STATUS: HUMAN INADEQUATE EVIDENCE, ANIMAL SUFFICIENT EVIDENCE (IARC GROUP-2B).
ACUTE TOXICITY LEVEL: TOXIC BY INGESTION.
TARGET EFFECTS: POISONING MAY AFFECT THE LIVER, KIDNEYS, AND BLOOD.

CHLORDANE:
TOXICITY DATA: 100 MG/M3/4 HOURS INHALATION-CAT LC50; 428 MG/KG SKIN-HUMAN LDLO; 780 MG/KG SKIN-RABBIT LD50; 690 MG/KG SKIN-RAT LD50; 29 MG/KG ORAL-HUMAN LDLO; 3071 UG/KG ORAL-MAN TDLO; 120 UG/KG ORAL-WOMAN LDLO; 200 MG/KG ORAL-RAT LD50; 145 MG/KG ORAL-MOUSE LD50; 100 MG/KG ORAL-RABBIT LD50; 1720 MG/KG ORAL-HAMSTER LD50; 180 MG/KG ORAL-MAMMAL LD50; 50 MG/KG ORAL-DOMESTIC ANIMAL LD50; 100 MG/KG INTRAVENOUS-MOUSE LD50; 10 MG/KG INTRAVENOUS-RABBIT LDLO; 343 MG/KG INTRAPERITONEAL-RAT LD50; 240 MG/KG INTRAPERITONEAL-MOUSE LDLO; 118 MG/KG UNREPORTED-MAN LDLO; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS); TUMORIGENIC DATA (RTECS).
CARCINOGEN STATUS: HUMAN INADEQUATE EVIDENCE; ANIMAL SUFFICIENT EVIDENCE (IARC GROUP-2B). EXPOSURE TO CHLORDANE IN DOMESTIC SITUATIONS HAS BEEN ASSOCIATED WITH THE DEVELOPMENT OF LEUKEMIA AND OTHER BLOOD DYSCRASIAS. A COHORT STUDY OF PESTICIDE APPLICATORS AND CHLORDANE MANUFACTURERS SHOWED A SLIGHT ELEVATION OF LUNG CANCER. SMALL EXCESS RISKS FOR OTHER CANCERS INCLUDING LEUKEMIA, NON-HODGKIN'S LYMPHOMA AND SOFT-TISSUE SARCOMA AND CANCERS OF THE BRAIN, SKIN, BLADDER AND STOMACH WERE OBSERVED WITH LITTLE CONSISTENCY AMONG STUDIES. ORAL ADMINISTRATION IN MICE AND RATS SHOWED AN INCREASE IN THE INCIDENCE OF HEPATOCELLULAR NEOPLASMS IN BOTH MALE AND FEMALE MICE, OF THYROID FOLLICULAR-CELL NEOPLASMS IN RATS AND OF MALIGNANT FIBROUS HISTIOCYTOMAS IN MALE RATS. MALE RATS TREATED WITH TECHNICAL-GRADE CHLORDANE SHOWED A SMALL INCREASE IN THE INCIDENCE OF LIVER ADENOMAS.
ACUTE TOXICITY LEVEL: HIGHLY TOXIC BY INHALATION; TOXIC BY DERMAL ABSORPTION AND INGESTION.
TARGET EFFECTS: CONVULSANT. POISONING MAY ALSO AFFECT THE LIVER, KIDNEYS, AND BLOOD.

AT INCREASE RISK FROM EXPOSURE: PERSONS WITH CONVULSIVE DISORDERS.
ADDITIONAL DATA: CHLORDANE MAY BE STORED IN ADIPOSE TISSUE; INTENSE ACTIVITY AND STARVATION MAY MOBILIZE THE PESTICIDE RESULTING IN THE REAPPEARANCE OF TOXIC SYMPTOMS. IT CROSSES THE PLACENTA AND MAY BE EXCRETED IN HUMAN MILK. STUDIES OF 2 GROUPS OF WORKERS, ONE INVOLVED IN THE MANUFACTURE OF CHLORDANE, HEPTACHLOR, AND ENDRIN AND THE OTHER OF CHLORDANE AND HEPTACHLOR, REVEALED A STATISTICALLY SIGNIFICANT INCREASE IN DEATHS FROM CEREBROVASCULAR DISEASE IN THE FORMER BUT NOT THE LATTER; THE FORMER STUDY HAD METHODOLOGICAL DEFICIENCIES.

HEPTACHLOR:
TOXICITY DATA: 150 MG/M3/4 HOURS INHALATION-CAT LCLO; 200 MG/M3/4 HOURS INHALATION-MAMMAL LCLO; >2 GM/KG SKIN-RABBIT LD50; 119 MG/KG SKIN-RAT LD50; 1 GM/KG SKIN-GUINEA PIG LDLO; 40 MG/KG ORAL-RAT LD50; 116 MG/KG ORAL-GUINEA PIG LD50; 68 MG/KG ORAL-MOUSE LD50; 100 MG/KG ORAL-HAMSTER LD50; 50 MG/KG ORAL-CAT LDLO; 20 MG/KG INTRAVENOUS-MOUSE LDLO; 27 MG/KG INTRAPERITONEAL-RAT LD50; 130 MG/KG INTRAPERITONEAL-MOUSE LD50; 60 MG/KG UNREPORTED-MAMMAL LD50; MUTAGENIC DATA (RTECS); TUMORIGENIC DATA (RTECS).

CARCINOGEN STATUS: HUMAN INADEQUATE EVIDENCE, ANIMAL SUFFICIENT EVIDENCE (IARC GROUP-2B). IN DOMESTIC SITUATIONS, HEPTACHLOR/CHLORDANE HAS BEEN ASSOCIATED WITH THE OCCURENCE OF LEUKEMIA AND OTHER BLOOD DYSCRASIAS. AN INCREASED INCIDENCE OF LUNG CANCER WAS SEEN IN HEPTACHLOR/CHLORDANE MANUFACTURERS AND PESTICIDE APPLICATORS. MALE AND FEMALE MICE SHOWED AN INCREASE IN THE INCIDENCE OF HEPATOCELLULAR NEOPLASMS WHEN ADMINISTERED ORALLY. ORAL ADMINISTRATION OF TECHNICAL-GRADE HEPTACHLOR IN RATS SHOWED AN INCREASED INCIDENCE OF THYROID FOLLICULAR-CELL NEOPLASMS.
ACUTE TOXICITY LEVEL: HIGHLY TOXIC BY INGESTION; SLIGHTLY TOXIC BY DERMAL ABSORPTION.
TARGET EFFECTS: CONVULSANT; HEPATOTOXIN.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH CONVULSIVE DISORDERS AND LIVER DAMAGE.
ADDITIONAL DATA: HEPTACHLOR AND ITS METABOLITE, HEPTACHLOR EPOXIDE, ACCUMULATE IN ADIPOSE TISSUE; INTENSE ACTIVITY AND STARVATION MAY MOBILIZE THE PESTICIDE RESULTING IN THE REAPPEARANCE OF TOXIC SYMPTOMS. HEPTACHLOR CROSSES THE PLACENTA AND IS EXCRETED IN HUMAN MILK. STUDIES OF 2 GROUPS OF WORKERS, ONE INVOLVED IN THE MANUFACTURE OF CHLORDANE, HEPTACHLOR, AND ENDRIN AND THE OTHER OF CHLORDANE AND HEPTACHLOR, REVEALED A STATISTICALLY SIGNIFICANT INCREASE IN DEATHS FROM CEREBROVASCULAR DISEASE IN THE FORMER BUT NOT THE LATTER; THE FORMER STUDY HAD METHODOLOGICAL DEFICIENCIES. STIMULANTS SUCH AS EPINEPHRINE MAY INDUCE VENTRICULAR FIBRILLATIONS.

HEALTH EFFECTS AND FIRST AID

INHALATION:
CHLORDANE:
CONVULSANT/HIGHLY TOXIC.
100 MG/M3 IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- SYMPTOMS OF BLURRED VISION, COUGH, CONFUSION, ATAXIA, HEADACHE, WEAKNESS, DIZZINESS, AND DELIRIUM WERE REPORTED FROM INHALATION EXPOSURE TO CHLORDANE. SYMPTOMS OF CENTRAL NERVOUS SYSTEM STIMULATION MAY ALSO OCCUR AS DETAILED IN ACUTE INGESTION.
CHRONIC EXPOSURE- HUMAN EXPOSURE TO VAPORS OF 7 PERCENT CHLORDANE FOR 15 MINUTES AT 3-DAY INTERVALS FOR PERIODS OF 15 WEEKS AND REPEATED A YEAR LATER, DID NOT RESULT IN SYMPTOMS OF TOXICITY. IN ADDITION TO THE SYMPTOMS OF ACUTE EXPOSURE, CHRONIC EXPOSURE OF HUMANS TO TECHNICAL CHLORDANE CONTAINING HEPTACHLOR AND OTHER CHEMICALS HAS CAUSED LIGHTHEADEDNESS,

NAUSEA, COUGH, CHEST COMPLAINTS, TREMORS, ARTHRALGIAS, FATIGUE, THROMBOCYTOPENIC PURPURA, AND MARKED BRUISING. PANCYTOPENIA, APLASTIC, HEMOLYTIC, AND MEGALOBLASTIC ANEMIAS, LEUKEMIA, AND DEATH HAVE ALSO BEEN REPORTED. EXPOSURE OF MONKEYS TO 100-1,000 UG/M3 FOR 90 DAYS INDUCED A STATISTICALLY SIGNIFICANT INCIDENCE OF LEUKOPENIA AND THROMBOCYTOPENIA, WITH EFFECTS OCCURRING AT THE LOWEST DOSE TESTED.

HEPTACHLOR:
CONVULSANT. 35 MG/M3 IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- MAY BE ABSORBED THROUGH THE LUNGS TO PRODUCE SYMPTOMS CHARACTERISTIC OF CHLORINATED CYCLODIENE PESTICIDES INCLUDING MUSCLE TWITCHING, MYOCLONIC JERKING, AND CONVULSIVE SEIZURES. THE CONVULSIONS MAY OCCUR WITH PERIODS OF UNCONSCIOUSNESS. OTHER SYMPTOMS MAY INCLUDE HEADACHE, NAUSEA, VOMITING, MALAISE, AND DIZZINESS. IN CASES OF GROSS OVEREXPOSURE, CONVULSIONS MAY OCCUR WITHOUT ANY PRIOR SYMPTOMS. ABNORMAL EEG PATTERNS MAY BE OBSERVED AND MAY PERSIST FOR WEEKS OR MONTHS WHILE NO OTHER OBSERVABLE SIGNS OF POISONING MAY EXIST.
CHRONIC EXPOSURE- IN ADDITION TO THE SYMPTOMS OF ACUTE EXPOSURE, CHRONIC EXPOSURE OF HUMANS TO TECHNICAL CHLORDANE CONTAINING HEPTACHLOR AND OTHER

CHEMICALS HAS CAUSED LIGHTHEADEDNESS, NAUSEA, COUGH, CHEST COMPLAINTS, TREMORS, ARTHRALGIAS, FATIGUE, THROMBOCYTOPENIC PURPURA, AND MARKED BRUISING. PANCYTOPENIA, APLASTIC, HEMOLYTIC, AND MEGALOBLASTIC ANEMIAS, LEUKEMIA, AND DEATH HAVE ALSO BEEN REPORTED.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. PERFORM ARTIFICIAL RESPIRATION IF NECESSARY. MAINTAIN AIRWAY, BLOOD PRESSURE AND RESPIRATION. KEEP WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY. QUALIFIED MEDICAL PERSONNEL SHOULD CONSIDER ADMINISTERING OXYGEN.

SKIN CONTACT:
CHLORDANE:
CONVULSANT/TOXIC.
ACUTE EXPOSURE- MAY BE IRRITATING. SKIN ABSORPTION HAS CAUSED BLURRED VISION, CONFUSION, ATAXIA, HEADACHE, DIZZINESS, WEAKNESS, AND DELIRIUM. IN SEVERE POISONING, CONVULSIONS MAY DEVELOP AND COMA AND DEATH ARE POSSIBLE. IN ONE CASE OF OCCUPATIONAL EXPOSURE, A WOMAN BECAME CONFUSED AND DEVELOPED CONVULSIONS 40 MINUTES AFTER SPILLING A SOLUTION CONTAINING 25% CHLORDANE AND 26% DDT ON HER CLOTHING. SHE DIED SHORTLY THEREAFTER FROM RESPIRATORY FAILURE.
CHRONIC EXPOSURE- REPEATED CONTACT CAUSED EPISODES OF PARESTHESIA, TWITCHING OF THE RIGHT HAND AND ARM, GRAND MAL SEIZURES, AND UNCONSCIOUSNESS. OTHER EFFECTS MAY OCCUR AS DETAILED IN CHRONIC INHALATION. REPEATED APPLICATION OF 50 MG/KG TO THE SKIN OF RATS FOR 3 OR 4 DAYS CAUSED 100% FATALITIES.

HEPTACHLOR:
CONVULSANT.
ACUTE EXPOSURE- A LETHAL DOSE IN RABBITS FROM DERMAL ABSORPTION OF DRY POWDER WAS 2000 MG/KG; REPORTED SYMPTOMS WERE SEVERE ANOREXIA, HYPEREXCITABILITY, CONVULSIONS, AND DEATH. THE LETHAL DOSE IN RATS FROM DERMAL ABSORPTION OF HEPTACHLOR IN XYLENE WAS 195 MG/KG. CHLORINATED CYCLODIENE PESTICIDES ARE ABSORBED FROM THE SKIN AND MAY PRODUCE CENTRAL NERVOUS SYSTEM EFFECTS WITH SYMPTOMS OF MOTOR HYPEREXCITABILITY THAT MAY INCLUDE MUSCLE TWITCHING, MYOCLONIC JERKING, AND CONVULSIVE SEIZURES. THE CONVULSIONS MAY OCCUR WITH PERIODS OF UNCONSCIOUSNESS. OTHER SYMPTOMS MAY INCLUDE HEADACHE, NAUSEA, VOMITING, MALAISE, AND DIZZINESS. IN

CASES OF GROSS OVEREXPOSURE, CONVULSIONS MAY OCCUR WITHOUT ANY PRIOR SYMPTOMS. ABNORMAL EEG PATTERNS MAY BE OBSERVED; THESE CHANGES IN EEG PATTERNS MAY PERSIST FOR WEEKS OR MONTHS WHILE NO OTHER OBSERVABLE SIGNS OF POISONING MAY EXIST.

CHRONIC EXPOSURE- PROLONGED OR REPEATED EXPOSURE MAY CAUSE EFFECTS AS DETAILED IN CHRONIC INHALATION. WHEN APPLIED TO RABBITS AS A 20% SOLUTION IN DIMETHYL PHTHALATE, THE APPROXIMATE LETHAL DOSE WAS LESS THAN 780 MG/KG BUT WHEN IT WAS APPLIED IN REPEATED SMALLER DOSES, THE APPROXIMATE LD50 WAS LESS THAN 20 MG/KG PER DAY AND THERE WERE NO SURVIVORS AFTER 14 DOSES OF 28 MG/KG.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
CHLORDANE:
ACUTE EXPOSURE- MAY BE IRRITATING.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

HEPTACHLOR:
ACUTE EXPOSURE- NO DATA AVAILABLE.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
CHLORDANE:
CONVULSANT/CARCINOGEN/TOXIC.
ACUTE EXPOSURE- MAY CAUSE ABDOMINAL PAIN, NAUSEA, VOMITING, AND DIARRHEA. CHLORDANE MAY STIMULATE THE CENTRAL NERVOUS SYSTEM WITH CONVULSIONS SOMETIMES APPEARING AS THE FIRST SYMPTOM OF POISONING. SYMPTOMS OF HEADACHE, BLURRED VISION, HYPEREXCITABILITY, MUSCLE TWITCHING, TREMOR, INCOORDINATION, AND ATAXIA MAY ALSO OCCUR. IN SEVERE CASES OF POISONING, COMA AND DEATH ARE POSSIBLE. EEG PATTERNS SUGGEST THAT DEATH IS DUE TO RESPIRATORY ARREST BETWEEN OR DURING CONVULSIVE EPISODES. CHLORDANE MAY BE EXCRETED SLOWLY FROM THE BODY; THE SERUM HALF-LIFE IN ONE CHILD WAS 88 DAYS. MICE GIVEN CHLORDANE IN PEANUT OIL SHOWED SIGNS OF ATAXIA, CONVULSIONS, RESPIRATORY FAILURE, CYANOSIS AND DEATH.

CHRONIC EXPOSURE- IN A TWO-YEAR FEEDING STUDY IN RATS, A DIETARY CONCENTRATION OF 150 PPM PRODUCED A NOTED RETARDATION OF GROWTH, LIVER AND KIDNEY DAMAGE, MYOCARDIAL DAMAGE, AND MILD INJURY TO THE LUNGS; MARKED DAMAGE TO THE LUNGS AND INCREASED MORTALITY WERE OBSERVED AT DIETARY CONCENTRATIONS OF 300 PPM. SIMILAR EFFECTS WERE REPORTED IN RABBITS ADMINISTERED 5 MG/KG/DAY. CHLORDANE PRODUCED LIVER NEOPLASMS IN MICE FOLLOWING ORAL ADMINISTRATION. AN INCREASED INCIDENCE OF THYROID FOLLICULAR-CELL NEOPLASMS AND MALIGNANT FIBROUS HISTIOCYTOMAS HAVE BEEN REPORTED IN RATS. ORAL ADMINISTRATION OF CHLORDANE ENHANCED THE INCIDENCE OF LIVER TUMORS INDUCED IN MICE BY ORAL ADMINISTRATION OF N-NITROSODIETHYLAMINE. REPRODUCTIVE EFFECTS REPORTED IN ANIMALS INCLUDE DECREASED VIABILITY OF OFFSPRING IN MICE FED 100 MG/KG/DAY FOR 4 MONTHS; DECREASED FERTILITY IN RATS AND MICE; AND EXCITABILITY AND TREMORS IN OFFSPRING WHEN KEPT WITH TREATED MOTHER, BUT NOT WITH UNTREATED FEMALES.

ORAL ADMINISTRATION IN RATS AND MICE SHOWED AN INCREASE IN THE INCIDENCE OF HEPATOCELLULAR NEOPLASMS IN BOTH MALE AND FEMALE MICE, OF THYROID FOLLICULAR-CELL NEOPLASMS IN RATS AND OF MALIGNANT FIBROUS HISTIOCYTOMAS IN MALE RATS. MALE RATS TREATED WITH TECHNICAL-GRADE CHLORDANE SHOWED A SMALL INCREASE IN THE INCIDENCE OF LIVER ADENOMAS.

HEPTACHLOR:
CONVULSANT/HEPATOTOXIN/HIGHLY TOXIC/CARCINOGEN.
ACUTE EXPOSURE- MAY CAUSE NAUSEA, VOMITING, DIARRHEA, AND GASTROINTESTINAL IRRITATION. IN ANIMAL STUDIES, INGESTION PRODUCED NEUROTOXIC EFFECTS OF HYPOACTIVITY, ATAXIA, TREMORS AND CONVULSIONS, CHANGES IN EEG PATTERNS, AND DEATH. SIMILAR EFFECTS HAVE BEEN OBSERVED IN HUMANS EXPOSED TO CHLORINATED CYCLODIENE PESTICIDES. IN RATS, ACUTE ORAL DOSES PRODUCED LIVER NECROSIS, CELL VACUOLIZATION, LIVER STEATOSIS, AND INCREASED RELATIVE LIVER WEIGHT. OTHER EFFECTS INCLUDED ELEVATED SERUM LEVELS OF ALDOLASE, GLUTAMIC-PYRUVIC TRANSAMINASE, BILIRUBIN, ALKALINE PHOSPHATASE, AND CHOLESTEROL.
CHRONIC EXPOSURE- LONG-TERM EXPOSURES PRODUCED RENAL TOXICITY, HEMATOLOGIC EFFECTS, AND ADRENOTOXICITY IN ANIMALS. REPEATED ADMINISTRATION TO RATS PRODUCED CHRONIC CONVULSIONS, OPISTHOTONOS, HYPERREFLEXIA, RAPID RESPIRATION, AND CATARACTS. HISTOLOGIC EVIDENCE OF SEVERE LIVER

DAMAGE, INCREASED LIVER WEIGHT, INCREASED LEVELS OF SERUM COMPONENTS INDICATIVE OF HEPATIC DAMAGE, AND DECREASED BODY WEIGHTS WERE ALSO OBSERVED IN ANIMAL STUDIES. A DAILY INTAKE OF 1 MG/KG FOR ALMOST A YEAR WAS LETHAL IN DOGS. MALE AND FEMALE MICE THAT RECEIVED HEPTACHLOR IN THE DIET FOR 10 WEEKS WERE UNABLE TO PRODUCE A NEW GENERATION. DECREASED PREGNANCY RATES WERE REPORTED FOLLOWING ORAL ADMINISTRATION OF HEPTACHLOR TO MALE AND FEMALE RATS FOR TWO GENERATIONS. IN MALE AND FEMALE RATS FED HEPTACHLOR, HEPTACHLOR EPOXIDE, OR A MIXTURE OF THE TWO FOR THREE GENERATIONS, THE NUMBER OF RESORBED FETUSES INCREASED AND FERTILITY DECREASED WITH SUCCEEDING GENERATIONS. AN ECOLOGICAL STUDY IN HAWAII FOUND AN INCREASED INCIDENCE OF CARDIOVASCULAR MALFORMATIONS AND HIP DISLOCATIONS IN INFANTS FOLLOWING AN ACCIDENTAL CONTAMINATION OF MILK ON OAHU. MALE AND FEMALE RATS SHOWED AN INCREASED INCIDENCE OF HEPATOCELLULAR NEOPLASMS. RATS GIVEN TECHNICAL-GRADE HEPTACHLOR SHOWED AN INCREASED INCIDENCE OF THYROID FOLLICULAR-CELL NEOPLASMS.

FIRST AID- IF THE PERSON IS CONSCIOUS AND NOT CONVULSING, REMOVE BY GIVING SYRUP OF IPECAC (IF VOMITING OCCURS, KEEP THE HEAD BELOW THE HIPS TO PREVENT ASPIRATION). GIVE ACTIVATED CHARCOAL FOLLOWED BY GASTRIC LAVAGE. FOLLOW WITH A SALINE CATHARTIC. DO NOT GIVE FATS OR OILS. INTESTINAL LAVAGE WITH 20% MANNITOL (200 ML) BY STOMACH TUBE IS ALSO USEFUL. GIVE ARTIFICIAL RESPIRATION WITH OXYGEN IF RESPIRATION IS DEPRESSED (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). TREAT SYMPTOMATICALLY AND SUPPORTIVELY. LAVAGE AND ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
CHLORDANE:
ALKALIES (WEAK): DECOMPOSES.
OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.

PLASTICS, RUBBER, COATINGS: MAY BE ATTACKED.

HEPTACHLOR:
ALKALI (STRONG): INCOMPATIBLE.
IRON AND RUST: CONTACT WITH MELTED HEPTACHLOR MAY PRODUCE TOXIC HYDROGEN CHLORIDE GAS.
METALS: CORROSIVE.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE HIGHLY TOXIC FUMES OF PHOSGENE, TOXIC AND CORROSIVE FUMES OF CHLORIDES, AND OXIDES OF CARBON.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE.

STORAGE

STORE IN ACCORDANCE WITH 40 CFR 165 RECOMMENDED PROCEDURES FOR THE DISPOSAL AND STORAGE OF PESTICIDES AND PESTICIDE CONTAINERS.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

THRESHOLD PLANNING QUANTITY (TPQ):
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 302 REQUIRES THAT EACH FACILITY WHERE ANY EXTREMELY HAZARDOUS SUBSTANCE IS PRESENT IN A QUANTITY EQUAL TO OR GREATER THAN THE TPQ ESTABLISHED FOR THAT SUBSTANCE NOTIFY THE STATE EMERGENCY RESPONSE COMMISSION FOR THE STATE IN WHICH IT IS LOCATED. SECTION 303 OF SARA REQUIRES THESE FACILITIES TO PARTICIPATE IN LOCAL EMERGENCY RESPONSE PLANNING (40 CFR 355.30).

DISPOSAL

DISPOSAL MUST BE IN ACCORDANCE WITH 40 CFR 165 RECOMMENDED PROCEDURES FOR THE DISPOSAL AND STORAGE OF PESTICIDES AND PESTICIDE CONTAINERS.

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40CFR 262. EPA HAZARDOUS WASTE NUMBER U036.

HEPTACHLOR (AND ITS HYDROXIDE) - REGULATORY LEVEL: 0.008 MG/L (TCLP- 40 CFR 261 APPENDIX II)
MATERIALS WHICH CONTAIN THE ABOVE SUBSTANCE AT OR ABOVE THE TCLP REGULATORY LEVEL MEET THE EPA TOXICITY CHARACTERISTIC, AND MUST BE DISPOSED OF IN ACCORDANCE WITH 40 CFR PART 262. EPA HAZARDOUS WASTE NUMBER D031.

CHLORDANE - REGULATORY LEVEL: 0.03 MG/L (40 CFR 261 APPENDIX II)
MATERIALS WHICH CONTAIN THE ABOVE SUBSTANCE AT OR ABOVE THE TCLP REGULATORY LEVEL MEET THE EPA TOXICITY CHARACTERISTIC, AND MUST BE DISPOSED OF IN ACCORDANCE WITH 40 CFR PART 262. EPA HAZARDOUS WASTE NUMBER D020.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. CONTAINERS MAY EXPLODE IN HEAT OF FIRE.

SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG A HOLDING AREA SUCH AS A PIT, POND OR LAGOON TO CONTAIN SPILL AND DIKE SURFACE FLOW USING BARRIER OF SOIL, SANDBAGS, FOAMED POLYURETHANE OR FOAMED CONCRETE. ABSORB LIQUID MASS WITH FLY ASH OR CEMENT POWDER.

IMMOBILIZE SPILL WITH UNIVERSAL GELLING AGENT.

AIR SPILL:
KNOCK DOWN VAPORS WITH WATER SPRAY. KEEP UPWIND.

COMBUSTION PRODUCTS INCLUDE CORROSIVE OR TOXIC VAPORS.

WATER SPILL:
TRAP SPILLED MATERIAL AT BOTTOM IN DEEP WATER POCKETS, EXCAVATED HOLDING AREAS

OR WITHIN SAND BAG BARRIERS.

USE ACTIVATED CARBON TO ABSORB SPILLED SUBSTANCE THAT IS DISSOLVED.

USE MECHANICAL DREDGES OR LIFTS TO EXTRACT IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES.

THE CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (PROPOSITION 65) PROHIBITS CONTAMINATING ANY KNOWN SOURCE OF DRINKING WATER WITH SUBSTANCES KNOWN TO CAUSE CANCER AND/OR REPRODUCTIVE TOXICITY.

OCCUPATIONAL SPILL:
DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH A CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINERS AND COVER. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY. VENTILATE CLOSED SPACES BEFORE ENTERING.

REPORTABLE QUANTITY (RQ): 1 POUND
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION AND/OR GENERAL DILUTION VENTILATION TO MEET

PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

CHLORDANE:
AT ANY DETECTABLE CONCENTRATION:
ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.
ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A 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, FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER HAVING A HIGH-EFFICIENCY PARTICULATE FILTER.

ANY APPROPRIATE ESCAPE-TYPE, SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A 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.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

EMERGENCY WASH FACILITIES:
WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

CREATION DATE: 04/15/87 REVISION DATE: 07/08/95

Citranox

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List) CITRANOX	Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name	Emergency Telephone Number
ALCONOX, INC.	(212)473-1300
Address (Number, Street, City, State, and ZIP Code)	Telephone Number for Information
215 PARK AVENUE SOUTH	(212)473-1300
NEW YORK, NY 10003	Date Prepared: FEB. 1, 1991
	Signature of Preparer (optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
THERE ARE NO INGREDIENTS IN CITRANOX WHICH APPEARED ON THE OSHA STANDARD 29 CFR 1910 SUBPART Z.				

Section III — Physical/Chemical Characteristics

Boiling Point	217°F	Specific Gravity (H_2O = 1)	1.120
Vapor Pressure (mm Hg.)	NO DATA	Melting Point	N.A.
Vapor Density (AIR = 1)	NO DATA	Evaporation Rate (Butyl Acetate = 1)	NO DATA

Solubility in Water: COMPLETELY SOLUBLE IN ALL PROPORTIONS

Appearance and Odor: PALE LIQUID - NEARLY ODORLESS

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
NONE (OPEN CUP)		N.A.	N.A.

Extinguishing Media: WATER SPRAY, DRY CHEMICAL, FOAM, CARBON DIOXIDE

Special Fire Fighting Procedures: FOR FIRES INVOLVING THIS MATERIAL DO NOT ENTER WITHOUT PROTECTIVE EQUIPMENT AND SELF CONTAINED BREATHING APPARATUS.

Unusual Fire and Explosion Hazards: NONE

Section V — Reactivity Data

Stability	Unstable		Conditions to Avoid: NONE
	Stable	XX	

Incompatibility (*Materials to Avoid*): NONE

Hazardous Decomposition or Byproducts: SO_2 MAY BE RELEASED ON BURNING

Hazardous Polymerization	May Occur		Conditions to Avoid: NONE
	Will Not Occur	XX	

Section VI — Health Hazard Data

Route(s) of Entry: Inhalation? NO Skin? YES Ingestion?

Health Hazards (*Acute and Chronic*)
SKIN CONTACT MAY PROVE LOCALLY IRRITATING, INGESTION MAY CAUSE DIS(
AND/OR DIARRHEA.

Carcinogenicity: NTP? NO IARC Monographs? NO OSHA Regulated?

Signs and Symptoms of Exposure
PROLONGED SKIN CONTACT MAY CAUSE DRYING AND/OR CHAPPING

Medical Conditions Generally Aggravated by Exposure: NONE

Emergency and First Aid Procedures
EYES - FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. SKIN-FLUSH WITH
INGESTION - DRINK LARGE QUANTITIES OF WATER. GET MEDICAL ATTENTI(

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled
MATERIAL FOAMS PROFUSELY. RECOVER AS MUCH AS POSSIBLE WITH ABSORI
MATERIAL AND RINSE REMAINDER TO SEWER, MATERIAL IS COMPLETELY BIO

Waste Disposal Method
SMALL QUANTITIES MAY BE DISPOSED OF IN SEWER. LARGE QUANTITIES SH
SOAKED UP WITH ABSORBENT MATERIAL AND DISPOSED OF ACCORDING TO L(

Precautions to Be Taken in Handling and Storing
NON REQUIRED - VISCOSITY OF MATERIAL INCREASE AT VERY LOW TEMPERA

Other Precautions
NO SPECIAL REQUIREMENTS OTHER THAN THE GOOD INDUSTRIAL HYGIENE AN
PRACTICES EMPLOYED WITH ANY INDUSTRIAL CHEMICAL.

Section VIII — Control Measures

Respiratory Protection (*Specify Type*)
NOT REQUIRED

Ventilation	Local Exhaust	NORMAL	Special	N.A.
	Mechanical (General)	N.A.	Other	N.A.

Protective Gloves	RECOMMENDED	Eye Protection	RECOMMENDED

Other Protective Clothing or Equipment: NOT REQUIRED

Work/Hygienic Practices: NO SPECIAL PRACTICES REQUIRED.

Diesel Fuel No. 1-D

SODIUM BICARB IS NOT IN DATABASE.

ENTER NAME, KEYWORD, SYMPTOM, STLA, NAMELIST, HELP, OR QUIT.
name

ENTER CHEMICAL NAME
diesel

DIESEL IS NOT IN DATABASE.

ENTER NAME, KEYWORD, SYMPTOM, STLA, NAMELIST, HELP, OR QUIT.
name

ENTER CHEMICAL NAME
diesel fuel

DIESEL FUEL IS A SYNONYM OF DIESEL FUEL NO. 1-D
TYPE WHAT INFORMATION YOU REQUIRE
ALL, EMER, SPECIFIC INFORMATION (BY 4-LETTER COMMAND), HELP, OR NONE
all

CHEMICAL NAME
DIESEL FUEL NO. 1-D

CHEMICAL ABSTRACTS SERVICE REGISTRY NUMBER
68334-30-5

REGISTRY OF TOXIC EFFECTS OF CHEMICALS NUMBER
NONE

CHEMICAL FORMULA
VARIES, SEE SPECIAL

SYNONYMS
DIESEL FUEL
DIESEL OIL
DIESEL OIL, LIGHT
NO. 1-D FUEL OIL
FUEL OIL NO 1-D
NA 1993
PETROLEUM PRODUCTS, DIESEL OIL
PETROLEUM DIESEL OIL PRODUCTS
DIESEL OIL PETROLEUM PRODUCTS
FUELS, DIESEL
DIESEL OIL (PETROLEUM)
DIESEL TEST FUEL
OHS07090

PHYSICAL DESCRIPTION
YELLOW-BROWN OILY LIQUID
MILD PETROLEUM ODOR

CHEMICAL AND PHYSICAL PROPERTIES
MOLECULAR WEIGHT: VARIES
BOILING POINT AT 1 ATM, F: 380 TO 560 F
SOLUBILITY IN WATER, G/100 G WATER AT 20C: INSOLUBLE
FLASH POINT, CLOSED CUP, F (OR OPEN CUP IF OC): 100 F
VAPOR PRESSURE @ 20 C, MMHG: NA
MELTING POINT, F: -30 F

UPPER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 6
LOWER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 1.3
AUTOIGNITION TEMPERATURE: 350-625 F
SPECIFIC GRAVITY: 0.81 TO 0.85
ODOR THRESHOLD: 0.7 PPM

FIRE AND EXPLOSION
FIRE AND EXPLOSION HAZARDS
MODERATE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

FIREFIGHTING MEDIA
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. APPLY (WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL IS OUT. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRE IN CARGO ARE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITI AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUN VENTING SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO FIRE. ISC 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOL (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 27).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE FLOODING AMOUNTS OF WAT FOG, SOLID STREAMS MAY BE INEFFECTIVE. COOL CONTAINERS WITH FLOODIN AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID F VAPORS, KEEP UPWIND.

INCOMPATIBILITIES
STRONG OXIDIZERS
HEAT
THERMAL DECOMPOSITION PRODUCTS ARE HAZARDOUS AND/OR TOXIC

PERMISSIBLE EXPOSURE LIMIT AND TOXICOLOGY
NONE ESTABLISHED
ODOR THRESHOLD 0.08 PPM
CERCLA HAZARD RATINGS - TOXICITY U - IGNITABILITY 2 - REACTIVITY PERSISTENCE 2

TOXICOLOGY: DIESEL FUEL NO. 1 IS A SKIN AND MUCOUS MEMBRANE IRR AND A CENTRAL NERVOUS SYSTEM DEPRESSANT. DIRECT CONTACT MAY CAU BLISTERING AND OPEN SORES. POISONING MAY AFFECT THE KIDNEYS, LI RESPIRATORY SYSTEM.
REPEATED APPLICATION TO MOUSE SKIN WITH UNREFINED PETROLEUM DISTILLATES CAUSED A LOW INCIDENCE OF SKIN TUMORS.

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONCENTRATION
NONE SPECIFIED

ROUTE OF ENTRY INTO BODY
INHALATION
SKIN OR EYE CONTACT
INGESTION

GANS AFFECTED BY THE SUBSTANCE
LUNGS
RESPIRATORY SYSTEM
MUCOUS MEMBRANES
SKIN
CENTRAL NERVOUS SYSTEM
EYES

SYMPTOMS
HEADACHE
DIARRHEA
VOMITING
ABDOMINAL CRAMPS
SKIN ERUPTION
PULMONARY IRRITATION
NERVOUSNESS
INCOORDINATION
NARCOSIS
PERIPHERAL NUMBNESS
PARESTHESIA
COMA

FIRST AID PROCEDURES
IF THIS CHEMICAL GETS INTO THE EYES, WASH THE EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL GETS ON THE SKIN, REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL HAS BEEN INHALED, REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL HAS BEEN SWALLOWED, DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION IMMEDIATELY.

MEDICAL SURVEILLANCE
NO INFORMATION AVAILABLE FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS"; ADVISE:
EKG RECOMMENDED IF EMPLOYEE TO WEAR FULL-FACE RESPIRATOR
GENERAL MEDICAL HISTORY
40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS.

PHYSICIAN PRE-PLACEMENT AND ANNUAL EXAMS
MEDICAL WARNING FOR REFUSAL OF MEDICAL EXAMINATION
CENTRAL NERVOUS SYSTEM EXAMINATION
BLOOD CHEMISTRY
WHEN BENZENE PRESENT
29CFR1910.20 OSHA STANDARD
SUBPART C - GENERAL SAFETY AND HEALTH PROVISIONS
PROVIDES FOR EMPLOYEE, DESIGNATED REPRESENTATIVE, AND OSHA ACCESS TO EMPLOYER-MAINTAINED EXPOSURE AND MEDICAL RECORDS RELEVANT TO EMPLOYEES EXPOSED TO TOXIC SUBSTANCES AND HARMFUL PHYSICAL AGENTS.
53FR38140 9/29/88 (AMENDED)

SPECIAL DIAGNOSTIC TESTS
IF SYMPTOMS OF CENTRAL NERVOUS SYSTEM OCCUR, OBTAIN BLOOD GLUCOSE RECTAL TEMPERATURE. PERFORM COMPLETE NEUROLOGIC EXAMINATION AN OTHER SPECIFIC NEUROLOGIC TESTS AS APPLICABLE
CONVULSIONS - BLOOD ANALYSIS FOR GLUCOSE, CALCIUM, UREA NITROGEN A CARBON DIOXIDE

CERTIFICATIONS
NO FEDERAL AGENCY REQUIREMENT, BUT DUE TO HAZARDOUS NATURE OF SUBSTANCE, ADVISE FOLLOWING:

HEALTH STATUS CLASSIFICATION

OSHA RESPIRATOR CERTIFICATION 29CFR1910.134

DEPARTMENT OF TRANSPORTATION IF OPERATES HEAVY EQUIPMENT

EMPLOYEE HAZARDOUS MATERIALS EDUCATION RECEIPT

EMPLOYEE MEDICAL RECORDS RECEIPT

TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS. CONTACT: CHARLES L. ELKINS, OFFICE C TOXIC SUBSTANCES, EPA (202) 382-3813.

MEDICAL WARNING REQUIRED FOR MEDICAL EXAM REFUSAL SIGNED BY EMPLOYEE

PROTECTIVE CLOTHING AND EQUIPMENT
NO NIOSH/OSHA DATA; RECOMMEND
PREVENT REPEATED OR PROLONGED SKIN CONTACT
WEAR IMPERVIOUS CLOTHING
WEAR GLOVES
WEAR FACESHIELD (8 INCH MINIMUM)

PLACE CONTAMINATED CLOTHING IN CLOSED CONTAINERS FOR STORAGE UNTI LAUNDERED OR DISCARDED
IF CLOTHING IS TO BE LAUNDERED, INFORM PERSON PERFORMING OPERATION CONTAMINANT'S HAZARDOUS PROPERTIES

EYE PROTECTION
NO STANDARD REQUIREMENT, BUT ADVISE EYE PROTECTION TO

PREVENT REASONABLE PROBABILITY OF EYE CONTACT
WEAR FACE SHIELD OR VENTED GOGGLES

SHING CHEMICALS FROM THE SKIN
NO STANDARD REQUIREMENT, BUT ADVISE WASHING
PROMPTLY WHEN SKIN BECOMES CONTAMINATED AND AT END OF EACH WORK SHIFT

UTINE CHANGING OF WORK CLOTHING
NO STANDARD REQUIREMENT, BUT ADVISE CHANGING
IF IT IS REASONABLY PROBABLE THAT CLOTHING IS CONTAMINATED
LEAVE CLOTHING & EQUIPMENT FOR DECONTAMINATION & DISPOSAL

OTHING REMOVAL FOLLOWING ACCIDENTAL CONTAMINATION
NO STANDARD REQUIREMENT, BUT ADVISE REMOVING
PROMPTLY IF IT IS NON-IMPERVIOUS AND CONTAMINATED

ECIFIC EMERGENCY PROVISIONS
NO NIOSH/OSHA DATA, ADVISE:
EYE-WASH FOUNTAIN WITHIN IMMEDIATE WORK AREA WHERE EMPLOYEES' EYES MAY BE EXPOSED TO SUBSTANCE
QUICK DRENCHING FACILITIES WITHIN IMMEDIATE WORK AREA WHERE EMPLOYEES MAY BE EXPOSED TO SUBSTANCE

SPIRATOR SELECTION

O SPEC ADVISE
- CHEMICAL CARTRIDGE RESPIRATOR
WITH AN ORGANIC VAPOR CARTRIDGE

GH LEVELS
- GAS MASK
WITH AN ORGANIC VAPOR CANISTER
- SUPPLIED-AIR RESPIRATOR
- SELF-CONTAINED BREATHING APPARATUS

CAPE
- GAS MASK
WITH AN ORGANIC VAPOR CANISTER
- SELF-CONTAINED BREATHING APPARATUS

REFIGHTING
- SELF-CONTAINED BREATHING APPARATUS
WITH A FULL FACE-PIECE
OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE

ATUS OF REGULATORY ENFORCEMENT
29CFR1910.1200 OSHA HAZARD COMMUNICATION STANDARD
REQUIRES CHEMICAL MANUFACTURERS AND IMPORTERS TO ASSESS THE HAZARDS OF CHEMICALS WHICH THEY PRODUCE OR IMPORT, AND ALL EMPLOYERS TO PROVIDE INFORMATION TO THEIR EMPLOYEES CONCERNING HAZARDOUS CHEMICALS BY MEANS OF A HAZARD COMMUNICATION PROGRAM, LABELS AND OTHER FORMS OF WARNING, MATERIAL SAFETY DATA SHEETS, AND INFORMATION AND TRAINING. REQUIRES

DISTRIBUTORS TO TRANSMIT REQUIRED INFORMATION TO EMPLOYEES.

OSHA STANDARD 29CFR1910.20 ACCESS TO EMPLOYEE EXPOSURE AND MEDIC
RECORDS

OSHA STANDARD 29CFR1910.132 PERSONAL PROTECTIVE EQUIPMENT

OSHA STANDARD 29CFR1910.141 SANITATION

OSHA STANDARD 29CFR1910.151 MEDICAL SERVICES AND FIRST AID

OSHA STANDARD 29CFR1910.133 EYE AND FACE PROTECTION

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTAN
CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
SECTION 8(C) OF THE TOXIC SUBSTANCES CONTROL ACT (TSCA) REQUIRES
MANUFACTURERS, PROCESSORS, AND DISTRIBUTORS OF CHEMICAL SUBSTANCES
AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO
HEALTH OR THE ENVIRONMENT ALLEGED TO HAVE BEEN CAUSED BY THE SUBST.
OR MIXTURE. EPA MAY INSPECT AND REQUIRE REPORTING OF SUCH RECORDS.

49CFR172.101 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION, P
SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN HAZARDOUS MATERIALS TABLES AS HAZARDOUS MATERIAL
THE PURPOSE OF TRANSPORTATION.

INTERNATIONAL MARITIME ORGANIZATION (IMO) - DANGEROUS GOODS CODE
SUBSTANCE REGULATED BY N.O.S. CATEGORY FOR INTERNATIONAL SHIPMEI

OSHA STANDARD 29CFR1910.94 VENTILATION

OSHA STANDARD 29CFR1910.134 RESPIRATORY PROTECTION

16CFR1500.14 PRODUCTS REQUIRING SPECIAL LABELING UNDER SECTION
3(B) OF THE FEDERAL HAZARDOUS SUSBSTANCES ACT

40CFR370 SARA TITLE III SECTION 311 HAZARDOUS CHEMICAL REPORTING
COMMUNITY RIGHT-TO-KNOW
SUBPART B - REPORTING REQUIREMENTS

40CFR370 SARA TITLE III SECTION 312 HAZARDOUS CHEMICAL REPORTING
COMMUNITY RIGHT-TO-KNOW
SUBPART D - INVENTORY FORMS

29CFR1910.1450 SUBJECT TO OSHA STANDARD REGULATING OCCUPATIONAL
EXPOSURE TO HAZARDOUS CHEMICALS IN LABORATORIES.
EFFECTIVE DATE: 5/1/90
55FR3300 1/31/90

46CFR30.25 COMMODITIES REGULATED BY THE COAST GUARD
SUBSTANCE LISTED UNDER FLAMMABLE AND COMBUSTIBLE BULK LIQUID CA

40CFR268 LAND DISPOSAL RESTRICTIONS

TRANSPORTATION
DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49-CFR 172.101:
COMBUSTIBLE LIQUID

PARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49-CFR 172.101 AND UBPART E:
NONE

EPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: NONE
XCEPTIONS: 49-CFR 173.118A

INAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180), OCKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204. FECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS THORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90)

CEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE FECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO CTOBER 1, 1993. (56 FR 47158, 09/18/91)

S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
ESEL FUEL-NA 1993

S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
FLAMMABLE LIQUID

S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
III

S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101 AND SUBPART E:
NE

S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS:
CEPTIONS: 49 CFR 173.150
ON-BULK PACKAGING: 49 CFR 173.203
ULK PACKAGING: 49 CFR 173.241

S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
ASSENGER AIRCRAFT OR RAILCAR: 60 L
RGO AIRCRAFT ONLY: 220 L

AK AND SPILL PROCEDURES

A REPORTABLE QUANTITY OF ONE HUNDRED POUNDS APPLIES TO THIS SUBSTANCE ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA) BY EXHIBITING ONE OR MORE OF THE CHARACTERISTICS OF IGNITABILITY, CORROSIVITY, OR REACTIVITY IDENTIFIED IN 40CFR261.21 THROUGH 261.23. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THAT SUBSTANCE IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER (800) 424-8802; IN THE WASHINGTON, D.C. METROPOLITAN AREA (202) 426-2675
50FR13456 04/04/85

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FOLLOWING INFORMATION RECOMMENDED FOR THE EMERGENCY HANDLING OF HAZARDOUS MATERIALS INVOLVED IN A LEAK OR SPILL INCIDENT:

IF MATERIAL ON FIRE OR INVOLVED IN FIRE:

* EXTINGUISH FIRE ONLY IF FLOW CAN BE STOPPED
* APPLY FLOODING QUANTITIES OF WATER AS FOG
* SOLID STREAM OF WATER MAY SPREAD FIRE
* USE FLOODING QUANTITIES OF WATER TO COOL ALL AFFECTED CONTAINER
* WATER SHOULD BE APPLIED FROM AS FAR A DISTANCE AS POSSIBLE
* USE ALCOHOL FOAM OR CO2 OR DRY CHEMICAL EXTINGUISHERS

IF MATERIAL IS NOT ON FIRE AND IS NOT INVOLVED IN FIRE:
* KEEP AWAY FROM SPARKS, FLAMES AND OTHER SOURCES OF IGNITION
* DO NOT ALLOW MATERIAL TO CONTAMINATE WATER SOURCES AND SEWERS
* CONTAIN FLOW WITH DIKES AS NECESSARY
* CONTROL VAPORS WITH WATER SPRAY

PERSONNEL PROTECTION:
* AVOID BREATHING DUST/VAPORS/FUMES FROM MATERIAL
* KEEP UPWIND
* AVOID SKIN CONTACT WITH MATERIAL
* DO NOT HANDLE BROKEN PACKAGES WITHOUT PROTECTIVE EQUIPMENT
* WASH CONTAMINATED SKIN WITH COPIOUS AMOUNTS OF WATER OR SOAP AN WATER
* WEAR SELF-CONTAINED BREATHING APPARATUS WHEN FIGHTING FIRES IN THIS MATERIAL
* IF CONTACT WITH MATERIAL ANTICIPATED, WEAR FULL PROTECTIVE CLOT

WASTE DISPOSAL

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OBSERVE ALL FEDERAL, STATE OR LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. CONTACT LOCAL AND/OR STATE ENVIRONME AUTHORITIES TO INSURE PROPER COMPLIANCE.

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40CFR261.21 CHARACTERISTIC OF IGNITABILITY
EPA HAZARDOUS WASTE NUMBER D001

THIS SUBSTANCE MEETS THE DEFINITION OF A HAZARDOUS WASTE AS DEFIN THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) (40CFR260) AND I SUBJECT TO THE FOLLOWING CONSIDERATIONS:

40CFR260 HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

PROVIDES DEFINITIONS OF TERMS, GENERAL STANDARDS, AND OVERVIEW INFORMATION APPLICABLE TO 40CFR PARTS 260-265

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

IDENTIFIES THOSE SOLID WASTES WHICH ARE SUBJECT TO REGULATION AS HAZARDOUS WASTES UNDER 40CFR PARTS 262-265, 270, 271, AND 124 AND ARE SUBJECT TO THE NOTIFICATION REQUIREMENTS OF SECTION 3010 OF T RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AND IDENTIFIES ONLY OF THE MATERIALS WHICH ARE HAZARDOUS WASTES UNDER SECTIONS 3007 AN OF RCRA

40CFR262 STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS FOR GENERATORS OF HAZARDOUS WASTE

40CFR263 STANDARDS APPLICABLE TO TRANSPORTERS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS WHICH APPLY TO PERSONS TRANSPORTING HAZARDOUS WASTE WITHIN THE UNITED STATES IF THE TRANSPORTATION REQUIRES A MANIFEST UNDER 40CFR262

40CFR264 STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE

40CFR265 INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE DURING THE PERIOD OF INTERIM STATUS

40CFR267 INTERIM STANDARDS FOR OWNERS AND OPERATORS OF NEW HAZARDOUS WASTE LAND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS THAT DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE FOR NEW LAND DISPOSAL FACILITIES

40CFR268 LAND DISPOSAL RESTRICTIONS

IDENTIFIES HAZARDOUS WASTES THAT ARE RESTRICTED FROM LAND DISPOSAL AND DEFINES THOSE LIMITED CIRCUMSTANCES UNDER WHICH AN OTHERWISE PROHIBITED WASTE MAY CONTINUE TO BE LAND DISPOSED.

40CFR268.35 WASTE SPECIFIC PROHIBITIONS - THIRD THIRD WASTES
55FR22520 6/1/90

40CFR270 EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

ESTABLISHES PROVISIONS FOR THE HAZARDOUS WASTE PERMIT PROGRAM UNDER SUBTITLE C OF THE SOLID WASTE DISPOSAL ACT, AS AMENDED BY THE RESOURCE CONSERVATION AND RECOVERY ACT

40CFR271 REQUIREMENT FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

SPECIFIES THE PROCEDURES EPA WILL FOLLOW IN APPROVING, REVISING, AND WITHDRAWING APPROVAL OF STATE PROGRAMS AND THE REQUIREMENTS STATE PROGRAMS MUST MEET TO BE APPROVED BY THE ADMINISTRATION UNDER SECTION 3006(B) OF RCRA

40CFR148 HAZARDOUS WASTE INJECTION RESTRICTIONS

THIS SUBSTANCE DOES NOT MEET THE DEFINITION OF A HAZARDOUS WASTE A
DEFINED BY THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) (40CF

BULLETINS

SPECIAL INFORMATION
TYPE WHAT INFORMATION YOU REQUIRE
ALL, EMER, SPECIFIC INFORMATION (BY 4-LETTER COMMAND), HELP, OR NONE
none

SODIUM BICARBONATE - NO MORE HITS IN DATABASE.

ENTER NAME, KEYWORD, SYMPTOM, STLA, NAMELIST, HELP, OR QUIT.
quit

ENTER WHICH OHS SERVICE YOU WISH TO ACCESS.
> TO ACCESS HAZARDLINE, TYPE: HAZARD
> TO ACCESS ENVIRONMENTAL HEALTH NEWS, TYPE: EHN
> TO ACCESS MATERIAL SAFETY DATA SHEET, TYPE: MSDS
> TO ACCESS MSDS SUMMARY SHEET, TYPE: SUM
> TO ACCESS PESTLINE, TYPE: PEST
> TO EXIT THE SYSTEM, TYPE: LOGOFF
PRESS ENTER KEY AFTER TYPING COMMAND.
logoff

THANK YOU FOR USING OHS ONLINE SYSTEMS.
LOGGED OFF LINE # 01 DATE = 06/28/93 TIME = 12:08:38
LOGOFF COMPLETED - GOODBYE FOR NOW.
gzI

OSHA STANDARD 29CFR1910.141 SANITATION

OSHA STANDARD 29CFR1910.151 MEDICAL SERVICES AND FIRST AID

OSHA STANDARD 29CFR1910.133 EYE AND FACE PROTECTION

29CFR1910.1450 SUBJECT TO OSHA STANDARD REGULATING OCCUPATIONAL EXPOSURE TO HAZARDOUS CHEMICALS IN LABORATORIES.
EFFECTIVE DATE: 5/1/90
55FR3300 1/31/90

40CFR370 SARA TITLE III SECTION 311 HAZARDOUS CHEMICAL REPORTING: COMMUNITY RIGHT-TO-KNOW
SUBPART B - REPORTING REQUIREMENTS

REPORTING THRESHOLD: 10,000 LBS. (4540 KG)

40CFR370 SARA TITLE III SECTION 312 HAZARDOUS CHEMICAL REPORTING: COMMUNITY RIGHT-TO-KNOW
SUBPART D - INVENTORY FORMS

SUBSTANCE LISTED TOXIC SUBSTANCES CONTROL ACT INVENTORY

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
SECTION 8(C) OF THE TOXIC SUBSTANCES CONTROL ACT (TSCA) REQUIRES MANUFACTURERS, PROCESSORS, AND DISTRIBUTORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT ALLEGED TO HAVE BEEN CAUSED BY THE SUBSTANCE OR MIXTURE. EPA MAY INSPECT AND REQUIRE REPORTING OF SUCH RECORDS.

21CFR184 DIRECT FOOD SUBSTANCES AFFIRMED AS GENERALLY RECOGNIZED AS AS SAFE
LISTS DIRECT HUMAN FOOD INGREDIENTS THAT HAVE BEEN REVIEWED BY THE FOOD AND DRUG ADMINISTRATION AND DETERMINED TO BE GENERALLY RECOGNIZED AS SAFE (GRAS) FOR THE PURPOSES AND UNDER THE CONDITIONS PRESCRIBED

ANSPORTATION

* NO DATA AVAILABLE FOR THIS SECTION *

AK AND SPILL PROCEDURES

OCCUPATIONAL SPILL:
SWEEP UP AND PLACE IN A SUITABLE CLEAN, DRY CONTAINER FOR LATER DISPOSAL. DO NOT FLUSH WITH WATER. KEEP UNNECESSARY PEOPLE AWAY.

STE DISPOSAL

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OBSERVE ALL FEDERAL, STATE OR LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. CONTACT LOCAL AND/OR STATE ENVIRONMENTAL AUTHORITIES TO INSURE PROPER COMPLIANCE.

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SPECIFIC EMERGENCY PROVISIONS
NO SPECIFIC REQUIREMENT. IF INDICATED BY THE NATURE OF THE SUBST AND THE PROBABILITY OF EXPOSURE, PROVIDE AN EYE WASH AND FACILITI QUICK DRENCHING OF THE BODY WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

RESPIRATOR SELECTION

NO SPECIFIC; ADVISE:
- DUST AND MIST RESPIRATOR
- AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FI
- POWERED AIR-PURIFYING RESPIRATOR WITH A DUST AND MIST FILTER
- POWERED AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTIC FILTER

HIGH LEVELS
- TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACE-PIECE OPERATI PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE WITH A FULL FACE-PI HELMET, OR HOOD OPERATED IN CONTINUOUS-FLOW MODE
- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE OPER PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE

FIREFIGHTING
- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE OPE PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE
- SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE WITH AUXILIA SELF-CONTAINED BREATHING APPARATUS OPERATED IN POSITIVE PRES MODE

STATUS OF REGULATORY ENFORCEMENT

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FEDERAL REGULATIONS

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29CFR1910.1200 OSHA HAZARD COMMUNICATION STANDARD
REQUIRES CHEMICAL MANUFACTURERS AND IMPORTERS TO ASSESS THE HAZ CHEMICALS WHICH THEY PRODUCE OR IMPORT, AND ALL EMPLOYERS TO PRO INFORMATION TO THEIR EMPLOYEES CONCERNING HAZARDOUS CHEMICALS BY OF A HAZARD COMMUNICATION PROGRAM, LABELS AND OTHER FORMS OF WARN MATERIAL SAFETY DATA SHEETS, AND INFORMATION AND TRAINING. REQUIR DISTRIBUTORS TO TRANSMIT REQUIRED INFORMATION TO EMPLOYEES.

OSHA STANDARD 29CFR1910.94 VENTILATION

OSHA STANDARD 29CFR1910.134 RESPIRATORY PROTECTION

OSHA STANDARD 29CFR1910.20 ACCESS TO EMPLOYEE EXPOSURE AND MED RECORDS

OSHA STANDARD 29CFR1910.132 PERSONAL PROTECTIVE EQUIPMENT

CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS.

NO INFORMATION AVAILABLE FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS"; ADVISE:
GENERAL MEDICAL HISTORY
PHYSICIAN PRE-PLACEMENT AND ANNUAL EXAMS

SPECIAL DIAGNOSTIC TESTS
NONE IN COMMON USE

CERTIFICATIONS
NO FEDERAL AGENCY REQUIREMENT, BUT DUE TO HAZARDOUS NATURE OF SUBSTANCE, ADVISE FOLLOWING:

HEALTH STATUS CLASSIFICATION

OSHA RESPIRATOR CERTIFICATION 29CFR1910.134

DEPARTMENT OF TRANSPORTATION IF OPERATES HEAVY EQUIPMENT

EMPLOYEE HAZARDOUS MATERIALS EDUCATION RECEIPT

EMPLOYEE MEDICAL RECORDS RECEIPT

TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS. CONTACT: CHARLES L. ELKINS, OFFICE OF TOXIC SUBSTANCES, EPA (202) 382-3813.

MEDICAL WARNING REQUIRED FOR MEDICAL EXAM REFUSAL SIGNED BY EMPLOYEE

PROTECTIVE CLOTHING AND EQUIPMENT
NO SPECIFIC REQUIREMENT. USE APPROPRIATE PROTECTIVE CLOTHING AS INDICATED BY THE NATURE OF THE CONTAMINANT AND PROBABILITY OF EXPOSURE.

E PROTECTION
NO SPECIFIC REQUIREMENT. USE APPROPRIATE SAFETY GOGGLES, AS INDICATED BY THE NATURE OF THE CONTAMINANT AND THE LIKELIHOOD OF EXPOSURE.

SHING CHEMICALS FROM THE SKIN
NO SPECIFIC REQUIREMENT. WASH APPROPRIATELY AS INDICATED BY THE NATURE OF THE CONTAMINANT AND THE CONDITIONS OF EXPOSURE.

OUTINE CHANGING OF WORK CLOTHING
NO SPECIFIC REQUIREMENT. IF INDICATED BY THE NATURE OF THE CONTAMINANT AND THE EXTENT OF EXPOSURE, CHANGE INTO UNCONTAMINATED CLOTHING BEFORE LEAVING THE WORK PREMISES.

LOTHING REMOVAL FOLLOWING ACCIDENTAL CONTAMINATION
NO SPECIFIC REQUIREMENT. IF INDICATED BY THE NATURE OF THE CONTAMINANT AND THE EXTENT OF EXPOSURE, REMOVE CLOTHING AND DO NOT WEAR AGAIN UNTIL SUBSTANCE HAS BEEN REMOVED FROM CLOTHING.

SKIN ABSORPTION
INGESTION
SKIN OR EYE CONTACT

ORGANS AFFECTED BY THE SUBSTANCE
GASTROINTESTINAL

SYMPTOMS
EYE IRRITATION
SKIN IRRITATION
MUCOUS MEMBRANE IRRITATION
PHARYNGITIS
COUGHING
PULMONARY IRRITATION
NASAL IRRITATION
THROAT IRRITATION
MOUTH IRRITATION
ESOPHAGEAL IRRITATION
STOMACH IRRITATION
ERUCTATION
ALKALOSIS
EDEMA
HYPOGLYCEMIA
CARDIOPULMONARY
WEIGHT GAIN
HEMATURIA
ALBUMINURIA

FIRST AID PROCEDURES
IF THIS CHEMICAL GETS INTO THE EYES, WASH THE EYES IMMEDIATELY WIT LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPP LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL GETS ON THE SKIN, REMOVE CONTAMINATED CLOTHING A SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL HAS BEEN INHALED, REMOVE FROM EXPOSURE AREA TO FR AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL IS INGESTED, TREAT SYMPTOMATICALLY AND SUPPORTIV GET MEDICAL ATTENTION IMMEDIATELY. IF VOMITING OCCURS, KEEP HEAD I THAN HIPS TO PREVENT ASPIRATION.

MEDICAL SURVEILLANCE
29CFR1910.20 OSHA STANDARD
SUBPART C - GENERAL SAFETY AND HEALTH PROVISIONS
PROVIDES FOR EMPLOYEE, DESIGNATED REPRESENTATIVE, AND OSHA ACCESS TO EMPLOYER-MAINTAINED EXPOSURE AND MEDICAL RECORDS RELEVANT TO EMPLOYEES EXPOSED TO TOXIC SUBSTANCES AND HARMFUL PHYSICAL AGENTS.
53FR38140 9/29/88 (AMENDED)

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTAN

SOLUBILITY IN WATER, G/100 G WATER AT 20C: 10%
FLASH POINT, CLOSED CUP, F (OR OPEN CUP IF OC): NONCOMBUSTIBLE SOLID
MELTING POINT, F: NOT AVAILABLE
SPECIFIC GRAVITY: 2.159

TRE AND EXPLOSION
IRE AND EXPLOSION HAZARDS
EGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

IREFIGHTING MEDIA
RY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM

R LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM

IREFIGHTING
ACUTE HAZARD. MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. AVOID BREATHING
APORS OR DUSTS; KEEP UPWIND.

NCOMPATIBILITIES
SODIUM BICARBONATE:
ACIDS (STRONG): MAY REACT VIOLENTLY AND RELEASE CARBON DIOXIDE.
2-FURALDEHYDE: POSSIBLE IGNITION HAZARD.
MONOAMMONIUM PHOSPHATE: SELF-PROPAGATING REACTION WITH RAPID BUILD-UP PRESSURE.
SODIUM-POTASSIUM ALLOY: VIOLENT REACTION.

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

ERMISSIBLE EXPOSURE LIMIT AND TOXICOLOGY
NO OCCUPATIONAL EXPOSURE LIMITS ESTABLISHED BY OSHA, ACGIH OR NIOSH
REPRODUCTIVE EFFECTS DATA (RTECS)
MUTAGENIC DATA (RTECS)
CERCLA HAZARD RATINGS - TOXICITY 1 - IGNITABILITY 0 - REACTIVITY 0 - PERSISTENCE 0

TOXICOLOGY: SODIUM BICARBONATE MAY BE IRRITATING TO THE SKIN, EYES AND MUCOUS MEMBRANES. IT IS MODERATELY TOXIC BY INGESTION. EXPOSURE MAY CAUSE SORE THROAT, COUGHING AND STOMACH IRRITATION. IN THE STOMACH, CARBON DIOXIDE GAS MAY BE RELEASED CAUSING DISTENTION, BELCHING AND POSSIBLY RUPTURE OF THE STOMACH. DOSES GREATER THAN 5 GM/KG MAY CAUSE ALKALOSIS AND EDEMA. INGESTION OF UP TO 40 GM/DAY FOR THREE WEEKS CAUSED CONSIDERABLE WEIGHT GAIN DUE TO FLUID RETENTION, AND IN ONE CASE ALBUMINURIA AND HEMATURIA.
PERSONS WITH RENAL DISORDERS OR HYPERTENSION MAY BE AT AN INCREASED RISK FROM EXPOSURE. INTERACTIONS WITH MEDICATIONS HAVE BEEN REPORTED.
ORL-INF TDLO: 1260 MG/KG ORL-RAT LD50: 4220 MG/KG
ORL-MUS LD50: 3360 MG/KG
SKIN AND EYE IRRITATION DATA (RTECS)
SKN-HMN 30 MG/3D I MLD EYE-RBT 100 MG/30 SEC MLD

MMEDIATELY DANGEROUS TO LIFE OR HEALTH CONCENTRATION
NONE SPECIFIED

OUTE OF ENTRY INTO BODY
INHALATION

HAZARDOUS MATERIALS INVOLVED IN A LEAK OR SPILL INCIDENT:

COMBUSTIBLE LIQUID, N.O.S.
IF MATERIAL ON FIRE OR INVOLVED IN FIRE:
* DO NOT EXTINGUISH FIRE UNLESS FLOW CAN BE STOPPED
* USE WATER IN FLOODING QUANTITIES AS A FOG
* SOLID STREAMS OF WATER MAY BE INEFFECTIVE
* COOL ALL AFFECTED CONTAINERS WITH FLOODING QUANTITIES OF WATER
* APPLY WATER FROM AS FAR A DISTANCE AS POSSIBLE
* USE ALCOHOL FOAM, CARBON DIOXIDE, OR DRY CHEMICAL
IF MATERIAL NOT ON FIRE AND NOT INVOLVED IN FIRE:
* KEEP SPARKS, FLAMES, AND OTHER SOURCES OF IGNITION AWAY
* KEEP MATERIAL OUT OF WATER SOURCES AND SEWERS
* BUILD DIKES TO CONTAIN FLOW AS NECESSARY
* USE WATER SPRAY TO KNOCK-DOWN VAPORS
PERSONNEL PROTECTION:
* AVOID BREATHING VAPORS
* KEEP UPWIND
* AVOID BODILY CONTACT WITH THE MATERIAL
* DO NOT HANDLE BROKEN PACKAGES WITHOUT PROTECTIVE EQUIPMENT
* WASH AWAY ANY MATERIAL WHICH MAY HAVE CONTACTED THE BODY WITH COPIOUS AMOUNTS OF WATER OR SOAP AND WATER
* WEAR SELF-CONTAINED BREATHING APPARATUS WHEN FIGHTING FIRES INV(THIS MATERIAL
* IF CONTACT WITH MATERIAL ANTICIPATED, WEAR FULL PROTECTIVE CLO

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FOLLWING INFORMATION FROM DEPARTMENT OF TRANSPORTATION/U.S. COAST "CHEMICAL RESPONSE INFORMATION SYSTEM", REGARDING WATER SPILLS:

* RESTRICT ACCESS OF GENERAL PUBLIC WHEN APPRECIABLE DANGER ARIS SPILL
* RESTRICT IGNITION SOURCES WHEN SUBSTANCE INVOLVED
* CONTAIN SURFACE SLICKS
* SKIM SURFACE SLICK
* HIGHLY CORROSIVE, AVOID DIRECT CONTACT, CONTACT WITH SKIN OR E CAN CAUSE IRRITATION OR BURNS
* BURNING MAY BE PROHIBITED BY ANTI-POLLUTION LAWS AND REGULATIO
* SUBSTANCE HAS SOOTY BURNING

LISTED BY U.S. COAST GUARD UNDR CARGO COMPATIBILITY GROUP MISCELL HYDROCARBON MIXTURES, INCOMPATIBLE WITH NITRIC ACID

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING OR FLAMES IN HAZARD STOP LEAK IF YOU CAN DO IT WITHOUT RISK. WATER SPRAY MAY REDUCE VA BUT IT MAY NOT PREVENT IGNITION IN CLOSED SPACES. FOR SMALL SPILL UP WITH SAND OR OTHER NONCOMBUSTIBLE ABSORBENT MATERIAL AND PLACE CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD C LIQUID SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY; IS HAZARD AREA AND DENY ENTRY.

WASTE DISPOSAL

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OBSERVE ALL FEDERAL, STATE OR LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. CONTACT LOCAL AND/OR STATE ENVIRONME

Diesel Fuel No. 2-D

IDENTIFIES HAZARDOUS WASTES THAT ARE RESTRICTED FROM DISPOSAL INTO CLASS I HAZARDOUS WASTE INJECTION WELLS AND DEFINES THOSE CIRCUMSTANCES UNDER WHICH A WASTE, OTHERWISE PROHIBITED FROM INJECTION, MAY BE INJECTED.
53FR28118 7/26/88
53FR30908 8/16/88
54FR25416 6/14/89
54FR26594 6/23/89

40CFR148.16 WASTE SPECIFIC PROHIBITIONS - THIRD THIRD WASTES

BULLETINS
THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH) RECOMMENDS THAT DIESEL EXHAUST SHOULD BE REGARDED AS A POTENTIAL OCCUPATIONAL CARCINOGEN ON THE BASIS OF EVIDENCE FROM AVAILABLE STUDIES, AND EMPLOYERS SHOULD TAKE STEPS TO LIMIT WORKER EXPOSURE TO THE GREATEST FEASBILE LIMIT. (NIOSH INTELLIGENCE BULLETIN, JULY 26, 1988).

SPECIAL INFORMATION
MIXTURE OF PARAFFINIC, OLEFINIC, NAPHTHENIC, AND AROMATIC HYDROCARBONS
TYPE WHAT INFORMATION YOU REQUIRE
SYN, EMER, SPECIFIC INFORMATION (BY 4-LETTER COMMAND), HELP, OR NONE
none

DIESEL FUEL IS A SYNONYM OF DIESEL FUEL NO. 2-D
TYPE WHAT INFORMATION YOU REQUIRE
SYN, EMER, SPECIFIC INFORMATION (BY 4-LETTER COMMAND), HELP, OR NONE
1

CHEMICAL NAME
DIESEL FUEL NO. 2-D

CHEMICAL ABSTRACTS SERVICE REGISTRY NUMBER
68476-34-6

REGISTRY OF TOXIC EFFECTS OF CHEMICALS NUMBER
NOT FOUND

CHEMICAL FORMULA
VARIES

SYNONYMS
DIESEL OIL
DIESEL FUEL
DIESEL OIL, MEDIUM
DIESEL OIL NO. 2-D
DIESEL FUEL OIL NO. 2-D
WINTER DIESEL
NO. 2 DIESEL FUEL
DHS07100

PHYSICAL DESCRIPTION
COLORLESS TO YELLOW-BROWN LIQUID WITH A MILD PETROLEUM ODOR.

CHEMICAL AND PHYSICAL PROPERTIES
MOLECULAR WEIGHT: VARIES

BOILING POINT AT 1 ATM, F: 350-680 F (177-360C)
SOLUBILITY IN WATER, G/100 G WATER AT 20C: INSOLUBLE
FLASH POINT, CLOSED CUP, F (OR OPEN CUP IF 0C): >125 F (>52 C)
VAPOR PRESSURE @ 20 C, MMHG: 1 MMHG
MELTING POINT, F: 0 F (-18 C)
UPPER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 7.5
LOWER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 0.6
AUTOIGNITION TEMPERATURE: >475 F (>246 C)
SPECIFIC GRAVITY: 0.87 TO 0.90
VAPOR DENSITY (AIR=1): >1

FIRE AND EXPLOSION
FIRE AND EXPLOSION HAZARDS
MODERATE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO
OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

FIREFIGHTING MEDIA
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. APPLY C
WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL A
IS OUT. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRE IN CARGO AREA
UNMANNED HOSE HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITH
AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND
VENTING SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO FIRE. ISOL
1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOLV
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 27).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE FLOODING AMOUNTS OF WATE
FOG, SOLID STREAMS MAY BE INEFFECTIVE. COOL CONTAINERS WITH FLOODING
AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BR
VAPORS, KEEP UPWIND.

INCOMPATIBILITIES
STRONG OXIDIZERS
THERMAL DECOMPOSITION PRODUCTS ARE HAZARDOUS AND/OR TOXIC
VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT!
VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE
SOURCE OF IGNITION AND FLASH BACK.

PERMISSIBLE EXPOSURE LIMIT AND TOXICOLOGY
MINERAL OIL MIST:
5 MG(MINERAL OIL MIST)/M3 OSHA TWA
5 MG(MINERAL OIL MIST)/M3 ACGIH TWA
10 MG(MINERAL OIL MIST)/M3 ACGIH STEL
HYDROGEN SULFIDE:
10 PPM (14 MG/M3) OSHA TWA; 15 PPM (21 MG/M3) OSHA STEL
10 PPM (14 MG/M3) ACGIH TWA; 15 PPM (21 MG/M3) ACGIH STEL

10 PPM (15 MG/M3) NIOSH RECOMMENDED 10 MINUTE CEILING
HUMAN INADEQUATE EVIDENCE FOR CARCINOGENICITY (IARC GROUP-2B)
ANIMAL LIMITED EVIDENCE FOR CARCINOGENICITY (IARC GROUP-2B)
CERCLA HAZARD RATINGS - TOXICITY 3 - IGNITABILITY 2 - REACTIVITY 0 - PERSISTENCE 1

TOXICOLOGY: DIESEL FUEL NO. 2-D IS A SKIN AND MUCOUS MEMBRANE IRRITANT. IT IS SLIGHTLY TOXIC BY SKIN ABSORPTION AND RELATIVELY NON-TOXIC BY INGESTION. IT IS A CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY AFFECT THE LIVER AND KIDNEYS. HUMAN EXPOSURE HAS RESULTED IN IMMEDIATE COUGH, DYSPNEA, CYANOSIS AND UNCONSCIOUSNESS FOR ONE HOUR. A PRODUCTIVE COUGH WITH SPTUTUM SMELLING OF DIESEL FUEL PERSISTED FOR 37 DAYS. HIGH LEVELS MAY CAUSE CENTRAL NERVOUS SYSTEM EXCITATION FOLLOWED BY DEPRESSSION. CUTANEOUS HYPERKERATOSIS HAS BEEN DESCRIBED IN ENGINE DRIVERS WITH OCCUPATIONAL EXPOSURE TO DIESEL FUEL. TWO INDIVIDUALS WITH TOPICAL EXPOSURE FROM WASHING HAIR OR HANDS WITH DIESEL FUEL DEVELOPED ACUTE RENAL FAILURE; ONE ALSO HAD GASTROINTESTINAL SYMPTOMS. ANIMAL STUDIES HAVE CONFIRMED AN ASSOCIATION BETWEEN THE INDUCTION OF CANCER, PRIMARILY OF THE LUNG, AND INHALATION EXPOSURE TO WHOLE DIESEL EXHAUST. LIMITED EPIDEMIOLOGIC EVIDENCE ALSO SUGGESTS AN ASSOCIATION BETWEEN OCCUPATIONAL EXPOSURE TO DIESEL ENGINE EMISSIONS AND LUNG CANCER. (NIOSH 1988).

THE THRESHOLD LIMIT VALUE FOR MINERAL OIL MIST WAS ESTABLISHED TO PROVIDE A CONSIDERABLE MARGIN OF SAFETY AGAINST EVEN RELATIVELY MINOR CHANGES IN THE LUNGS..

ORL-RAT LD50: 7.5 GM/KG (AETODY) SKN-RBT LD50: >5 ML/KG (AETODY)

MEDIATELY DANGEROUS TO LIFE OR HEALTH CONCENTRATION
NONE SPECIFIED

UTE OF ENTRY INTO BODY
INHALATION
SKIN ABSORPTION
INGESTION
SKIN OR EYE CONTACT

GANS AFFECTED BY THE SUBSTANCE
LUNGS
RESPIRATORY SYSTEM
MUCOUS MEMBRANES
SKIN
CENTRAL NERVOUS SYSTEM
KIDNEYS
LIVER

SYMPTOMS
SKIN IRRITATION
EYE IRRITATION
MUCOUS MEMBRANE IRRITATION
ERYTHEMA
SKIN EDEMA
VESICULATION
DERMATITIS
CENTRAL NERVOUS SYSTEM DEPRESSION
HEADACHE
DIZZINESS
GIDDINESS
ANOREXIA
NAUSEA
VOMITING

WEAKNESS
INCOORDINATION
STUPOR
DIARRHEA
ABDOMINAL CRAMPS
COUGHING
DYSPNEA
PULMONARY EDEMA
PULMONARY HEMORRHAGE
KIDNEY DAMAGE
LIVER DAMAGE

FIRST AID PROCEDURES

IF THIS CHEMICAL GETS INTO THE EYES, WASH THE EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL GETS ON THE SKIN, REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT A LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL HAS BEEN INHALED, REMOVE FROM EXPOSURE AREA TO FRI AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AN SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION OF PETROLEUM DISTILLATES/HYDROCARBONS:
EMERGENCY TREATMENT - PREVENT ASPIRATION. IF AMOUNT INGESTED EXCEED 1 ML/KG, OR IF TOXIC INGREDIENT IS PRESENT, SUBSTANCE MUST BE REMO GASTRIC LAVAGE WITH ACTIVATED CHARCOAL AND CUFFED ENDOTRACHEAL TUBE TO PREVENT ASPIRATION SHOULD BE PERFORMED 15 MINUTES. IN ABSENCE OF DEPRESSION, CONVULSIONS OR GAG REFLEX, IPECAC EMESIS CAN ALSO BE D WITHOUT INCREASING ASPIRATION HAZARD. WHEN VOMITING OCCURS, HOLD P WITH HEAD LOWER THAN HIPS TO PREVENT ASPIRATION. AFTER VOMITING CEA GIVE 30-60 ML OF FLEET'S PHOSPHO-SODA DILUTED 1:4 IN WATER.
FURTHER TREATMENT: GIVE ARTIFICIAL RESPIRATION WITH OXYGEN IF NECE
SPECIAL TREATMENT: TREAT BACTERIAL ASPIRATION PNEUMONIA BY ORGANISM SPECIFIC CHEMOTHERAPY. TREAT PULMONARY EDEMA.
(DREISBACH, HANDBOOK OF POISONING, 12TH ED.)

GASTRIC LAVAGE - GIVE PATIENT GLASS OF WATER PRIOR TO PASSING OF STOMACH TUBE. LAY PATIENT ON ONE SIDE, WITH HEAD LOWER THAN WAIST. IMMOBILIZE A STRUGGLING PATIENT WITH A SHEET OR BLANKET. MEASURE DISTANCE ON TUBE FROM MOUTH TO EPIGASTRIUM, MARK TUBE WITH INDELIBLE MARKING OR TAPE. REMOVE DENTURES AND OTHER FOREIGN OBJECTS FROM THE MOUTH. OPEN MOUTH, USE GAG IF NECESSARY. EXTEND HEAD BY LIFTING CHIN. PASS TUBE OVER TONGUE AND TOWARD BACK OF THROAT WITHOUT EXTENDING HEAD OR NECK. IF OBSTRUCTION IS MET BEFORE THE MARK ON TUBE REACHES LEVELS OF THE TEETH, DO NOT FORCE, BUT REMOVE TUBE AND REPEAT PROCEDURE UNTIL TUBE PASSES TO MARK. PLACE END OF TUBE IN GLASS OF WATER. IF TUBE IS OBSTRUCTED WHEN INTRODUCED ABOUT HALFWAY TO THE MARK, IT MAY HAVE ENTERED TRACHEA.
AFTER TUBE IS PLACED IN STOMACH, ASPIRATE FIRST TO REMOVE STOMAC CONTENTS BY IRRIGATION SYRINGE. SAVE STOMACH CONTENTS FOR EXAMINATI AND REPEAT INTRODUCTION AND WITHDRAWL OF 100-300 ML WARM WATER UNT AT LEAST 3 LITERS OF CLEAR RETURN ARE OBTAINED. USE ACTIVATED CHAR AT BEGINNING OF LAVAGE TO AID IN POISON INACTIVATION. LEAVE 50 GRA CHARCOAL SUSPENDED IN WATER IN THE STOMACH. IF INTRODUCTION AND RE

OF LAVAGE FLUID BY GRAVITY REQUIRES MORE THAN FIVE MINUTES, ASSIST WITH ASEPTO SYRINGE. PREVENT ASPIRATION WITH CUFFED ENDOTRACHEAL TUBE. AVOID GIVING LARGE QUANTITIES OF WATER.
IF PATIENT COMATOSE, INTUBATE TRACHEA WITH CUFFED ENDOTRACHEAL TUBE. SUCCINYLCHLORINE MAY BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL TO EASE INSERTION OF TRACHEAL CATHETER PRIOR TO PASSAGE OF STOMACH TUBE. PROCEDURE MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL. (DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

ACTIVATED CHARCOAL - GIVE ACTIVATED CHARCOAL WITHIN THE FIRST FEW MINUTES OF POISONING. GIVE PORTIONS EQUIVALENT TO ABOUT 5 ML FOR EACH KILOGRAM OF BODY WEIGHT, ORALLY OR BY GASTRIC LAVAGE. REMOVE BY SUCTION OR EMESIS, AND REPEAT THE PROCEDURE UNTIL A TOTAL OF 100 GM OF CHARCOAL HAS BEEN INTRODUCED AND RECOVERED. EACH GRAM OF ACTIVATED CHARCOAL WILL ADSORB 100-1000 MG OF POISON. DO NOT MIX CHARCOAL WITH OTHER AGENTS TO INCREASE PALATABILITY.
GASTRIC LAVAGE MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL. (DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

SYRUP OF IPECAC - GIVE 15 ML (ONE TABLESPOON) OF SYRUP OF IPECAC FOLLOWED BY ONE-HALF GLASS OF WATER. IF EMESIS DOES NOT OCCUR IN THIRTY MINUTES, REPEAT WITH SAME DOSE. IF PATIENT MUST BE MOVED, KEEP IN HEAD DOWN POSITION TO FACILITATE EMESIS AND PREVENT ASPIRATION OF VOMITUS. IF EMESIS DOES NOT OCCUR AFTER SYRUP OF IPECAC IS GIVEN, PERFORM GASTRIC LAVAGE TO PREVENT EMETINE POISONING. SAVE SPECIMENS OF EMESIS FOR ANALYSIS.(DREISBACH, HANDBOOK OF POISONING, 12TH ED.)

DICAL SURVEILLANCE
29CFR1910.20 OSHA STANDARD
SUBPART C - GENERAL SAFETY AND HEALTH PROVISIONS
PROVIDES FOR EMPLOYEE, DESIGNATED REPRESENTATIVE, AND OSHA ACCESS TO EMPLOYER-MAINTAINED EXPOSURE AND MEDICAL RECORDS RELEVANT TO EMPLOYEES EXPOSED TO TOXIC SUBSTANCES AND HARMFUL PHYSICAL AGENTS.
53FR38140 9/29/88 (AMENDED)

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS.

NO INFORMATION AVAILABLE FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS"; ADVISE:
GENERAL MEDICAL HISTORY
PHYSICIAN PRE-PLACEMENT AND ANNUAL EXAMS

PECIAL DIAGNOSTIC TESTS
ELECTROCARDIOGRAM
URINALYSIS
COMPLETE BLOOD COUNT

CERTIFICATIONS
NO FEDERAL AGENCY REQUIREMENT, BUT DUE TO HAZARDOUS NATURE OF SUBSTANCE, ADVISE FOLLOWING:

HEALTH STATUS CLASSIFICATION

TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABI MANAGEMENT OF HAZARDOUS WASTE

40CFR265 INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZ WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABI MANAGEMENT OF HAZARDOUS WASTE DURING THE PERIOD OF INTERIM STATUS

40CFR267 INTERIM STANDARDS FOR OWNERS AND OPERATORS OF NEW HAZARD WASTE LAND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS THAT DEFINE THE ACCEPTABL MANAGEMENT OF HAZARDOUS WASTE FOR NEW LAND DISPOSAL FACILITIES

40CFR268 LAND DISPOSAL RESTRICTIONS

IDENTIFIES HAZARDOUS WASTES THAT ARE RESTRICTED FROM LAND DISPOS AND DEFINES THOSE LIMITED CIRCUMSTANCES UNDER WHICH AN OTHERWISE PROHIBITED WASTE MAY CONTINUE TO BE LAND DISPOSED.

40CFR268.35 WASTE SPECIFIC PROHIBITIONS - THIRD THIRD WASTES
55FR22520 6/1/90

40CFR148 HAZARDOUS WASTE INJECTION RESTRICTIONS

IDENTIFIES HAZARDOUS WASTES THAT ARE RESTRICTED FROM DISPOSAL INT CLASS I HAZARDOUS WASTE INJECTION WELLS AND DEFINES THOSE CIRCUMST UNDER WHICH A WASTE, OTHERWISE PROHIBITED FROM INJECTION, MAY BE INJECTED.
53FR28118 7/26/88
53FR30908 8/16/88
54FR25416 6/14/89
54FR26594 6/23/89

40CFR148.16 WASTE SPECIFIC PROHIBITIONS - THIRD THIRD WASTES

40CFR270 EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PE PROGRAM

ESTABLISHES PROVISIONS FOR THE HAZARDOUS WASTE PERMIT PROGRAM UN SUBTITLE C OF THE SOLID WASTE DISPOSAL ACT, AS AMENDED BY THE RESO CONSERVATION AND RECOVERY ACT

40CFR271 REQUIREMENT FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

SPECIFIES THE PROCEDURES EPA WILL FOLLOW IN APPROVING, REVISING, WITHDRAWING APPROVAL OF STATE PROGRAMS AND THE REQUIREMENTS STATE PROGRAMS MUST MEET TO BE APPROVED BY THE ADMINISTRATION UNDER SECT 3006(B) OF RCRA

OF AIR TRANSPORTATION.

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ADDITIONAL INFORMATION
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SUBSTANCE ESTABLISHED AS CONFIRMED OR SUSPECTED CARCINOGEN (POTENTIAL CARCINOGEN) BY THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC)

RANSPORTATION
PARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49-CFR 172.101:
COMBUSTIBLE LIQUID

PARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49-CFR 172.101 AND
BPART E:
NONE

PARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: NONE
CEPTIONS: 49-CFR 173.118A

NAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180),
CKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204.
FFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS
UTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90)

CEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE
FFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO
TOBER 1, 1993. (56 FR 47158, 09/18/91)

S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
ESEL FUEL-NA 1993

S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
- FLAMMABLE LIQUID

S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
G III

S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101
AND SUBPART E:
ONE

S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS:
XCEPTIONS: 49 CFR 173.150
N-BULK PACKAGING: 49 CFR 173.203
LK PACKAGING: 49 CFR 173.241

S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
SSENGER AIRCRAFT OR RAILCAR: 60 L
ARGO AIRCRAFT ONLY: 220 L

AK AND SPILL PROCEDURES

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FOLLOWING INFORMATION RECOMMENDED FOR THE EMERGENCY HANDLING OF

53FR30908 8/16/88
54FR25416 6/14/89
54FR26594 6/23/89

40CFR370 SARA TITLE III SECTION 311 HAZARDOUS CHEMICAL REPORTING: COMMUNITY RIGHT-TO-KNOW
SUBPART B - REPORTING REQUIREMENTS

REPORTING THRESHOLD: 10,000 LBS. (4540 KG)

HAZARD CATEGORIES:

ACUTE HAZARD

CHRONIC HAZARD

FIRE HAZARD

40CFR370 SARA TITLE III SECTION 312 HAZARDOUS CHEMICAL REPORTING: COMMUNITY RIGHT-TO-KNOW
SUBPART D - INVENTORY FORMS

SUBSTANCE LISTED TOXIC SUBSTANCES CONTROL ACT INVENTORY

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTA CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
SECTION 8(C) OF THE TOXIC SUBSTANCES CONTROL ACT (TSCA) REQUIRE MANUFACTURERS, PROCESSORS, AND DISTRIBUTORS OF CHEMICAL SUBSTANCE AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT ALLEGED TO HAVE BEEN CAUSED BY THE SUBS OR MIXTURE. EPA MAY INSPECT AND REQUIRE REPORTING OF SUCH RECORDS

49CFR172.101 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION, PF SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN HAZARDOUS MATERIALS TABLE AS HAZARDOUS MATERIAL (N.O.S. CATEGORY) FOR THE PURPOSE OF TRANSPORTATION.

INTERNATIONAL MARITIME ORGANIZATION (IMO) - DANGEROUS GOODS CODE
SUBSTANCE REGULATED BY N.O.S. CATEGORY FOR INTERNATIONAL SHIPME

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA) - TABLE 4.2
DANGEROUS GOODS LIST: THEIR DESCRIPTION, PROPER SHIPPING NAME, CL LABEL, PACKAGING AND OTHER REQUIREMENTS.
DESIGNATED AS A DANGEROUS GOOD (UNDER N.O.S. CATEGORY) FOR THE OF AIR TRANSPORTATION.

46CFR30.25 COMMODITIES REGULATED BY THE COAST GUARD
SUBSTANCE LISTED UNDER FLAMMABLE AND COMBUSTIBLE BULK LIQUID CA

16CFR1500.14 PRODUCTS REQUIRING SPECIAL LABELING UNDER SECTION 3(B) OF THE FEDERAL HAZARDOUS SUSBSTANCES ACT

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INTERNATIONAL REGULATIONS
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INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA) - TABLE 4.2
DANGEROUS GOODS LIST: THEIR DESCRIPTION, PROPER SHIPPING NAME, CL LABEL, PACKAGING AND OTHER REQUIREMENTS.
DESIGNATED AS A DANGEROUS GOOD (UNDER N.O.S. CATEGORY) FOR THE

AUTHORITIES TO INSURE PROPER COMPLIANCE.

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THIS SUBSTANCE MEETS THE DEFINITION OF A HAZARDOUS WASTE AS DEFINED BY THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) (40CFR260) AND IS SUBJECT TO THE FOLLOWING CONSIDERATIONS:

40CFR260 HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

PROVIDES DEFINITIONS OF TERMS, GENERAL STANDARDS, AND OVERVIEW INFORMATION APPLICABLE TO 40CFR PARTS 260-265

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

IDENTIFIES THOSE SOLID WASTES WHICH ARE SUBJECT TO REGULATION AS HAZARDOUS WASTES UNDER 40CFR PARTS 262-265, 270, 271, AND 124 AND WHICH ARE SUBJECT TO THE NOTIFICATION REQUIREMENTS OF SECTION 3010 OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AND IDENTIFIES ONLY SOME OF THE MATERIALS WHICH ARE HAZARDOUS WASTES UNDER SECTIONS 3007 AND 7003 OF RCRA

THIS COMPOUND, DEPENDING ON THE CHARACTERISTIC, CONCENTRATION AND/OR SOURCE OF THE WASTE, MAY BE REGULATED UNDER THE FOLLOWING WASTE NUMBER(S) AND, IN TURN, SUBJECT TO THE CORRESPONDING REPORTABLE QUANTITY (RQ) (IF APPLICABLE):

40CFR261.21 CHARACTERISTIC OF IGNITABILITY
EPA HAZARDOUS WASTE NUMBER D001
REPORTABLE QUANTITY (RQ) : 100 LBS.
A REPORTABLE QUANTITY OF 100 LBS. APPLIES TO THIS WASTE ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA) BY EXHIBITING ONE OR MORE OF THE CHARACTERISTICS OF IGNITABILITY, CORROSIVITY OR REACTIVITY IDENTIFIED IN 40CFR261.21 THROUGH 261.23. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER (800) 424-8802; IN WASHINGTON, D.C. METROPOLITAN AREA (202) 426-2675.
50FR13456 4/4/85

40CFR262 STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS FOR GENERATORS OF HAZARDOUS WASTE

40CFR263 STANDARDS APPLICABLE TO TRANSPORTERS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS WHICH APPLY TO PERSONS TRANSPORTING HAZARDOUS WASTE WITHIN THE UNITED STATES IF THE TRANSPORTATION REQUIRES A MANIFEST UNDER 40CFR262

40CFR264 STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE

FIREFIGHTING
- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE OPERA PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE
- SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE WITH AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN POSITIVE PRESSU_ MODE

STATUS OF REGULATORY ENFORCEMENT

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FEDERAL REGULATIONS
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29CFR1910.1200 OSHA HAZARD COMMUNICATION STANDARD
REQUIRES CHEMICAL MANUFACTURERS AND IMPORTERS TO ASSESS THE HAZA CHEMICALS WHICH THEY PRODUCE OR IMPORT, AND ALL EMPLOYERS TO PROVI_ INFORMATION TO THEIR EMPLOYEES CONCERNING HAZARDOUS CHEMICALS BY M: OF A HAZARD COMMUNICATION PROGRAM, LABELS AND OTHER FORMS OF WARNI MATERIAL SAFETY DATA SHEETS, AND INFORMATION AND TRAINING. REQUIRI DISTRIBUTORS TO TRANSMIT REQUIRED INFORMATION TO EMPLOYEES.

OSHA STANDARD 29CFR1910.94 VENTILATION

OSHA STANDARD 29CFR1910.134 RESPIRATORY PROTECTION

OSHA STANDARD 29CFR1910.20 ACCESS TO EMPLOYEE EXPOSURE AND MEDI(RECORDS

OSHA STANDARD 29CFR1910.132 PERSONAL PROTECTIVE EQUIPMENT

OSHA STANDARD 29CFR1910.141 SANITATION

OSHA STANDARD 29CFR1910.151 MEDICAL SERVICES AND FIRST AID

OSHA STANDARD 29CFR1910.133 EYE AND FACE PROTECTION

OSHA STANDARD 29CFR1910.106 FLAMMABLE AND COMBUSTIBLE LIQUIDS
APPLIES TO THE HANDLING, STORAGE, AND USE OF FLAMMABLE AND COMBI LIQUIDS WITH A FLASH POINT BELOW 200 F

29CFR1910.1450 SUBJECT TO OSHA STANDARD REGULATING OCCUPATIONAL EXPOSURE TO HAZARDOUS CHEMICALS IN LABORATORIES.
EFFECTIVE DATE: 5/1/90
55FR3300 1/31/90

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTES

40CFR268 LAND DISPOSAL RESTRICTIONS

40CFR148 HAZARDOUS WASTE INJECTION RESTRICTIONS.
53FR28118 7/26/88

OSHA RESPIRATOR CERTIFICATION 29CFR1910.134

DEPARTMENT OF TRANSPORTATION IF OPERATES HEAVY EQUIPMENT

EMPLOYEE HAZARDOUS MATERIALS EDUCATION RECEIPT

EMPLOYEE MEDICAL RECORDS RECEIPT

TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS. CONTACT: CHARLES L. ELKINS, OFFICE OF TOXIC SUBSTANCES, EPA (202) 382-3813.

MEDICAL WARNING REQUIRED FOR MEDICAL EXAM REFUSAL SIGNED BY EMPLOYEE

OTECTIVE CLOTHING AND EQUIPMENT
EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT NECESSARY TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE. FACE SHIELDS SHALL COMPLY WITH 29CFR1910.133(A)(2), (A)(4), (A)(5), AND (A)(6).

E PROTECTION
NO SPECIFIC REQUIREMENT. USE APPROPRIATE SAFETY GOGGLES, AS INDICATED BY THE NATURE OF THE CONTAMINANT AND THE LIKELIHOOD OF EXPOSURE.

SHING CHEMICALS FROM THE SKIN

EMPLOYERS SHALL ENSURE THAT EMPLOYEES WHO HANDLE THIS SUBSTANCE WASH THEIR HANDS THOROUGHLY WITH SOAP OR MILD DETERGENT AND WATER BEFORE EATING, SMOKING, OR USING TOILET FACILITIES.

UTINE CHANGING OF WORK CLOTHING
NO SPECIFIC REQUIREMENT. IF INDICATED BY THE NATURE OF THE CONTAMINANT AND THE EXTENT OF EXPOSURE, CHANGE INTO UNCONTAMINATED CLOTHING BEFORE LEAVING THE WORK PREMISES.

LOTHING REMOVAL FOLLOWING ACCIDENTAL CONTAMINATION
NO SPECIFIC REQUIREMENT. IF INDICATED BY THE NATURE OF THE CONTAMINANT AND THE EXTENT OF EXPOSURE, REMOVE CLOTHING AND DO NOT WEAR AGAIN UNTIL SUBSTANCE HAS BEEN REMOVED FROM CLOTHING.

ECIFIC EMERGENCY PROVISIONS
NO SPECIFIC REQUIREMENT. IF INDICATED BY THE NATURE OF THE SUBSTANCE AND THE PROBABILITY OF EXPOSURE, PROVIDE AN EYE WASH AND FACILITIES FOR QUICK DRENCHING OF THE BODY WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

ESPIRATOR SELECTION

GH LEVELS
- TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACE-PIECE OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE WITH A FULL FACE-PIECE, HELMET, OR HOOD OPERATED IN CONTINUOUS-FLOW MODE
- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE

Ethylbenzene

CONSERVATION AND RECOVERY ACT

40CFR271 REQUIREMENT FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

SPECIFIES THE PROCEDURES EPA WILL FOLLOW IN APPROVING, REVISING, AND WITHDRAWING APPROVAL OF STATE PROGRAMS AND THE REQUIREMENTS STATE PROGRAMS MUST MEET TO BE APPROVED BY THE ADMINISTRATION UNDER SECTION 3006(B) OF RCRA

BULLETINS

SPECIAL INFORMATION
TYPE WHAT INFORMATION YOU REQUIRE
ALL, EMER, SPECIFIC INFORMATION (BY 4-LETTER COMMAND), HELP, OR NONE
none

TOLUENE - NO MORE HITS IN DATABASE.

ENTER NAME, KEYWORD, SYMPTOM, STLA, NAMELIST, HELP, OR QUIT.
name

ENTER CHEMICAL NAME
ethylbenzene

ETHYLBENZENE IS A SYNONYM OF ETHYL BENZENE
TYPE WHAT INFORMATION YOU REQUIRE
ALL, EMER, SPECIFIC INFORMATION (BY 4-LETTER COMMAND), HELP, OR NONE
all

CHEMICAL NAME
ETHYL BENZENE

CHEMICAL ABSTRACTS SERVICE REGISTRY NUMBER
100-41-4

REGISTRY OF TOXIC EFFECTS OF CHEMICALS NUMBER
DA0700000

CHEMICAL FORMULA
C8H10

SYNONYMS
PHENYLETHANE
ETHYLBENZOL
NCI-C56393
UN 1175
ETHYLBENZENE
BENZENE, ETHYL
EB
ALPHA-METHYLTOLUENE
STCC 4909163
OHS08780

PHYSICAL DESCRIPTION
CLEAR, COLORLESS LIQUID WITH AN AROMATIC ODOR.

CHEMICAL AND PHYSICAL PROPERTIES
  MOLECULAR WEIGHT: 106.17
  BOILING POINT AT 1 ATM, F: 277 F (136 C)
  SOLUBILITY IN WATER, G/100 G WATER AT 20C: 0.015%
  FLASH POINT, CLOSED CUP, F (OR OPEN CUP IF GC): 59 F (15 C)
  VAPOR PRESSURE @ 20 C, MMHG: 7.1 MMHG
  MELTING POINT, F: -139 F (-95 C)
  UPPER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 6.7%
  LOWER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 0.8%
  AUTOIGNITION TEMPERATURE: 810 F (432 C)
  SPECIFIC GRAVITY: 0.867
  VAPOR DENSITY (AIR=1): 3.7
  ODOR THRESHOLD: 140 PPM
  OCTANOL/WATER PARTITION COEFFICIENT: 3.15

FIRE AND EXPLOSION
 FIRE AND EXPLOSION HAZARDS
DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPOR-AIR MIXTURES ARE EXPLOSIVE.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

DUE TO LOW ELECTROCONDUCTIVITY OF THE SUBSTANCE, FLOW OR AGITATION MAY GENERATE ELECTROSTATIC CHARGES RESULTING IN SPARKS WITH POSSIBLE IGNITION.

 FIREFIGHTING MEDIA
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM (1993 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.6).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM (1993 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.6).

 FIREFIGHTING
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. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOLVED IN FIRE (1993 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.6, GUIDE PAGE 27).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE FLOODING AMOUNTS OF WATER AS A FOG, SOLID STREAMS MAY BE INEFFECTIVE. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING VAPORS, KEEP UPWIND.

BASES (STRONG): POSSIBLE VIOLENT REACTION.
OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.
PLASTICS: MAY BE ATTACKED.

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

VAPOR-AIR MIXTURES ARE EXPLOSIVE.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

DUE TO LOW ELECTROCONDUCTIVITY OF THE SUBSTANCE, FLOW OR AGITATION MAY GENERATE ELECTROSTATIC CHARGES RESULTING IN SPARKS WITH POSSIBLE IGNITION.

PERMISSIBLE EXPOSURE LIMIT AND TOXICOLOGY
100 PPM (434 MG/M3) OSHA TWA; 125 PPM (543 MG/M3) OSHA STEL
100 PPM (434 MG/M3) ACGIH TWA; 125 PPM (543 MG/M3) ACGIH STEL
100 PPM (434 MG/M3) NIOSH RECOMMENDED 10 HR TWA
125 PPM (543 MG/M3) NIOSH RECOMMENDED STEL
REPRODUCTIVE EFFECTS DATA (RTECS); MUTAGENIC DATA (RTECS)
AQUATIC TOXICITY RATING 2 (TLM96 10 - 100 PPM)
TLM96 - BLUEGILL 32 PPM (SOFT WATER), FATHEAD 48.51 PPM (SOFT WATER) - FATHEAD 42.33 PPM (HARD WATER)
CERCLA HAZARD RATINGS - TOXICITY 2 - IGNITABILITY 3 - REACTIVITY 0 - PERSISTENCE 3

TOXICOLOGY: ETHYL BENZENE IS A SKIN, EYE AND MUCOUS MEMBRANE IRRITANT. IT IS MODERATELY TOXIC BY INGESTION AND SLIGHTLY TOXIC BY SKIN ABSORPTION. ETHYL BENZENE IS A CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY AFFECT THE LIVER. EXPOSURE TO HIGH CONCENTRATIONS MAY CAUSE COUGH, FATIGUE, A SENSE OF CHEST CONSTRICTION, NARCOSIS AND POSSIBLY DEATH DUE TO RESPIRATORY PARALYSIS. EYE IRRITATION AND LACRIMATION MAY OCCUR ABOVE 1000 PPM WITH TOLERANCE DEVELOPING QUICKLY AND MAY BE SEVERE ABOVE 2000 PPM. AT 5000 PPM IRRITATION IS INTOLERABLE. THE LIQUID MAY BE ABSORBED THROUGH THE SKIN AT A RATE OF 22-33 MG/CM2/HOUR AND POSSIBLY CAUSE SYSTEMIC TOXICITY. REPEATED EXPOSURE MAY CAUSE SLEEPINESS, IRRITABILITY AND FUNCTIONAL NERVOUS DISORDERS.

THE ODOR CAN BE DETECTED BELOW IRRITATION BEGINS AND, THEREFORE, IS CONSIDERED TO HAVE ADEQUATE WARNING PROPERTIES. THE THRESHOLD LIMIT VALUE WAS ESTABLISHED TO PREVENT EYE AND SKIN IRRITATION.

PERSONS WITH PRE-EXISTING SKIN DISORDERS OR IMPAIRED PULMONARY, RENAL, OR LIVER FUNCTION MAY BE AT AN INCREASED RISK FROM EXPOSURE.

ETHYL BENZENE MAY CROSS THE PLACENTA.

IHL-HMN TCLO: 100 PPM/8 H ORL-RAT LD50: 3500 MG/KG
SKN-RBT LD50: 17,800 MG/KG IPR-MUS LD50: 2272 MG/KG
IHL-RAT LCLO: 4000 PPM/4 H IHL-GPG LCLO: 10,000 PPM

SKIN AND EYE IRRITATION DATA (RTECS)
SKN-RBT 15 MG/24 H OPEN MLD EYE-RBT 100 MG

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONCENTRATION
2000 PPM
OSHA/NIOSH

ROUTE OF ENTRY INTO BODY
INHALATION
INGESTION
SKIN ABSORPTION
SKIN OR EYE CONTACT

ORGANS AFFECTED BY THE SUBSTANCE
EYES
SKIN
RESPIRATORY SYSTEM
CENTRAL NERVOUS SYSTEM
GASTROINTESTINAL
LIVER

SYMPTOMS
SKIN IRRITATION
EYE IRRITATION
MUCOUS MEMBRANE IRRITATION
COUGHING
FATIGUE
DEPRESSION
DIZZINESS
VERTIGO
DYSPNEA
HEADACHE
NARCOSIS
SLEEPINESS
IRRITABILITY
SKIN INFLAMMATION
SKIN BURNS
LACRIMATION
ABDOMINAL PAIN
NAUSEA
VOMITING
PULMONARY HEMORRHAGE
PULMONARY EDEMA
COMA
RESPIRATORY PARALYSIS
LIVER EFFECTS
KIDNEY EFFECTS
BLOOD EFFECTS
REPRODUCTIVE EFFECTS IN EXPERIMENTAL ANIMALS

FIRST AID PROCEDURES
IF THIS CHEMICAL GETS INTO THE EYES, WASH THE EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

IF THIS CHEMICAL GETS ON THE SKIN, REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER AREA WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION IMMEDIATELY.

1 ML/KG, OR IF TOXIC INGREDIENT IS PRESENT, SUBSTANCE MUST BE REMOVED. GASTRIC LAVAGE WITH ACTIVATED CHARCOAL AND CUFFED ENDOTRACHEAL TUBE TO PREVENT ASPIRATION SHOULD BE PERFORMED 15 MINUTES. IN ABSENCE OF DEPRESSION, CONVULSIONS OR GAG REFLEX, IPECAC EMESIS CAN ALSO BE DONE WITHOUT INCREASING ASPIRATION HAZARD. WHEN VOMITING OCCURS, HOLD PATIENT WITH HEAD LOWER THAN HIPS TO PREVENT ASPIRATION. AFTER VOMITING CEASES, GIVE 30-60 ML OF FLEET'S PHOSPHO-SODA DILUTED 1:4 IN WATER.
FURTHER TREATMENT: GIVE ARTIFICIAL RESPIRATION WITH OXYGEN IF NECESSARY.
SPECIAL TREATMENT: TREAT BACTERIAL ASPIRATION PNEUMONIA BY ORGANISM SPECIFIC CHEMOTHERAPY. TREAT PULMONARY EDEMA.
(DREISBACH, HANDBOOK OF POISONING, 12TH ED.)

GASTRIC LAVAGE - GIVE PATIENT GLASS OF WATER PRIOR TO PASSING OF STOMACH TUBE. LAY PATIENT ON ONE SIDE, WITH HEAD LOWER THAN WAIST. IMMOBILIZE A STRUGGLING PATIENT WITH A SHEET OR BLANKET. MEASURE DISTANCE ON TUBE FROM MOUTH TO EPIGASTRIUM, MARK TUBE WITH INDELIBLE MARKING OR TAPE. REMOVE DENTURES AND OTHER FOREIGN OBJECTS FROM THE MOUTH. OPEN MOUTH, USE GAG IF NECESSARY. EXTEND HEAD BY LIFTING CHIN. PASS TUBE OVER TONGUE AND TOWARD BACK OF THROAT WITHOUT EXTENDING HEAD OR NECK. IF OBSTRUCTION IS MET BEFORE THE MARK ON TUBE REACHES LEVELS OF THE TEETH, DO NOT FORCE, BUT REMOVE TUBE AND REPEAT PROCEDURE UNTIL TUBE PASSES TO MARK. PLACE END OF TUBE IN GLASS OF WATER. IF TUBE IS OBSTRUCTED WHEN INTRODUCED ABOUT HALFWAY TO THE MARK, IT MAY HAVE ENTERED TRACHEA.
AFTER TUBE IS PLACED IN STOMACH, ASPIRATE FIRST TO REMOVE STOMACH CONTENTS BY IRRIGATION SYRINGE. SAVE STOMACH CONTENTS FOR EXAMINATION, AND REPEAT INTRODUCTION AND WITHDRAWL OF 100-300 ML WARM WATER UNTIL AT LEAST 3 LITERS OF CLEAR RETURN ARE OBTAINED. USE ACTIVATED CHARCOAL AT BEGINNING OF LAVAGE TO AID IN POISON INACTIVATION. LEAVE 50 GRAMS OF CHARCOAL SUSPENDED IN WATER IN THE STOMACH. IF INTRODUCTION AND REMOVAL OF LAVAGE FLUID BY GRAVITY REQUIRES MORE THAN FIVE MINUTES, ASSIST WITH ASEPTO SYRINGE. PREVENT ASPIRATION WITH CUFFED ENDOTRACHEAL TUBE. AVOID GIVING LARGE QUANTITIES OF WATER.
IF PATIENT COMATOSE, INTUBATE TRACHEA WITH CUFFED ENDOTRACHEAL TUBE. SUCCINYLCHLORINE MAY BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL TO EASE INSERTION OF TRACHEAL CATHETER PRIOR TO PASSAGE OF STOMACH TUBE. PROCEDURE MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.
(DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

ACTIVATED CHARCOAL - GIVE ACTIVATED CHARCOAL WITHIN THE FIRST FEW MINUTES OF POISONING. GIVE PORTIONS EQUIVALENT TO ABOUT 5 ML FOR EACH KILOGRAM OF BODY WEIGHT, ORALLY OR BY GASTRIC LAVAGE. REMOVE BY SUCTION OR EMESIS, AND REPEAT THE PROCEDURE UNTIL A TOTAL OF 100 GM OF CHARCOAL HAS BEEN INTRODUCED AND RECOVERED. EACH GRAM OF ACTIVATED CHARCOAL WILL ADSORB 100-1000 MG OF POISON. DO NOT MIX CHARCOAL WITH OTHER AGENTS TO INCREASE PALATABILITY.
GASTRIC LAVAGE MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.
(DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

MEDICAL SURVEILLANCE
29CFR1910.20 OSHA STANDARD
SUBPART C - GENERAL SAFETY AND HEALTH PROVISIONS
PROVIDES FOR EMPLOYEE, DESIGNATED REPRESENTATIVE, AND OSHA ACCESS TO EMPLOYER-MAINTAINED EXPOSURE AND MEDICAL RECORDS RELEVANT TO EMPLOYEES EXPOSED TO TOXIC SUBSTANCES AND HARMFUL PHYSICAL AGENTS.
53FR38140 9/29/88 (AMENDED)

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS.

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS"
GENERAL MEDICAL HISTORY
PHYSICIAN PRE-PLACEMENT AND ANNUAL EXAMS
CHRONIC RESPIRATORY DISEASE
KIDNEY FUNCTION
LIVER FUNCTION
SKIN DISEASE

OTHER MEDICAL SURVEILLANCE RECOMMENDED:

BLOOD DISEASE
EYE DISEASE

ACGIH BIOLOGICAL EXPOSURE INDICES FOR ETHYL BENZENE:
2 G/L MANDELIC ACID IN URINE / TIMING--END OF SHIFT AND END OF WORKWEEK
1.5 G/G CREAT. MANDELIC ACID IN URINE / TIMING -- END OF SHIFT AND END OF WORKWEEK
2 PPM ETHYL BENZENE IN END-EXHALED AIR /TIMING--PRIOR TO NEXT SHIFT

SPECIAL DIAGNOSTIC TESTS
RED BLOOD CELL COUNT
URINALYSIS

CERTIFICATIONS
NO FEDERAL AGENCY REQUIREMENT, BUT DUE TO HAZARDOUS NATURE OF SUBSTANCE, ADVISE FOLLOWING:

HEALTH STATUS CLASSIFICATION

OSHA RESPIRATOR CERTIFICATION 29CFR1910.134

DEPARTMENT OF TRANSPORTATION IF OPERATES HEAVY EQUIPMENT

EMPLOYEE HAZARDOUS MATERIALS EDUCATION RECEIPT

EMPLOYEE MEDICAL RECORDS RECEIPT

TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS. CONTACT: CHARLES L. ELKINS. OFFICE OF

EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT NECESSARY TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE. FACE SHIELDS SHALL COMPLY WITH 29CFR1910.133(A)(2), (A)(4), (A)(5), AND (A)(6).

EMPLOYERS SHALL ENSURE THAT CLOTHING WET WITH THIS SUBSTANCE IS PLACED IN CLOSED CONTAINERS FOR STORAGE UNTIL IT CAN BE DISCARDED OR UNTIL THE EMPLOYER PROVIDES FOR THE REMOVAL OF THE CONTAMINANT FROM THE CLOTHING. IF THE CLOTHING IS TO BE LAUNDERED OR OTHERWISE CLEANED TO REMOVE THE CONTAMINANT, THE EMPLOYER SHALL INFORM THE PERSON PERFORMING THE CLEANING OPERATION OF THE HAZARDOUS PROPERTIES OF THE SUBSTANCE.

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ACGIH "GUIDELINES FOR THE SELECTION OF CHEMICAL PROTECTIVE CLOTHING" INDICATED THE FOLLOWING PROTECTIVE RATINGS FOR MATERIALS COMMONLY USED FOR PROTECTIVE CLOTHING. THESE RATINGS ARE BASED PRIMARILY ON QUANTITATIVE TEST RESULTS AND QUALITATIVE RESISTANCE INFORMATION. (THE RECOMMENDATIONS APPLY TO THE PURE SUBSTANCE ONLY; BREAKTHROUGH-TIME MAY VARY FOR MIXTURES.) (A "+" DESIGNATES A BLEND OF MATERIALS, WHILE A "/" DESIGNATES A COATED OR LAMINATED MATERIAL.)

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ETHYL BENZENE:

EXCELLENT/GOOD:

NONE INDICATED

GOOD/FAIR:

VITON/NEOPRENE

TEFLON

POOR/FAIR:

NEOPRENE

POLYVINYL ALCOHOL

POLYVINYL CHLORIDE

BUTYL/NEOPRENE

POOR:

NONE INDICATED

EYE PROTECTION

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE SPLASH-PROOF SAFETY GOGGLES WHICH COMPLY WITH 29CFR1910.133(A)(2)-(A)(6) WHERE THIS LIQUID MAY CONTACT THE EYES.

WASHING CHEMICALS FROM THE SKIN

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL ENSURE THAT EMPLOYEES WHOSE SKIN BECOMES CONTAMINATED WITH THIS SUBSTANCE PROMPTLY WASH OR SHOWER TO REMOVE ANY CONTAMINANT FROM THE SKIN.

ROUTINE CHANGING OF WORK CLOTHING

NO SPECIFIC REQUIREMENT. IF INDICATED BY THE NATURE OF THE CONTAMINANT AND THE EXTENT OF EXPOSURE, CHANGE INTO UNCONTAMINATED CLOTHING BEFORE LEAVING THE WORK PREMISES.

CLOTHING REMOVAL FOLLOWING ACCIDENTAL CONTAMINATION

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL ENSURE THAT NON-IMPERVIOUS CLOTHING WHICH BECOMES CONTAMINATED WITH THIS SUBSTANCE BE REMOVED PROMPTLY AND NOT REWORN UNTIL THE SUBSTANCE IS REMOVED FROM THE CLOTHING.
EMPLOYERS SHALL ENSURE THAT ANY CLOTHING WHICH BECOMES WET WITH THIS FLAMMABLE LIQUID BE REMOVED IMMEDIATELY AND NOT REWORN UNTIL THE SUBSTANCE IS REMOVED FROM THE CLOTHING.

SPECIFIC EMERGENCY PROVISIONS

NO SPECIFIC REQUIREMENT. IF INDICATED BY THE NATURE OF THE SUBSTANCE AND THE PROBABILITY OF EXPOSURE, PROVIDE AN EYE WASH AND FACILITIES FOR QUICK DRENCHING OF THE BODY WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

RESPIRATOR SELECTION

1000 PPM

- POWERED AIR-PURIFYING RESPIRATOR WITH AN ORGANIC VAPOR CARTRIDGE
- SUPPLIED-AIR RESPIRATOR
- SELF-CONTAINED BREATHING APPARATUS
- CHEMICAL CARTRIDGE RESPIRATOR WITH AN ORGANIC VAPOR CARTRIDGE

2000 PPM

- GAS MASK WITH AN ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER)
- SUPPLIED-AIR RESPIRATOR WITH A FULL FACE-PIECE
- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE

ESCAPE

- GAS MASK WITH AN ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER)
- APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS

FIREFIGHTING

- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE
- SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE WITH AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN POSITIVE PRESSURE MODE

CHEMICALS WHICH THEY PRODUCE OR IMPORT, AND ALL EMPLOYERS TO PROVIDE INFORMATION TO THEIR EMPLOYEES CONCERNING HAZARDOUS CHEMICALS BY MEANS OF A HAZARD COMMUNICATION PROGRAM, LABELS AND OTHER FORMS OF WARNING, MATERIAL SAFETY DATA SHEETS, AND INFORMATION AND TRAINING. REQUIRES DISTRIBUTORS TO TRANSMIT REQUIRED INFORMATION TO EMPLOYEES.

OSHA STANDARD 29CFR1910.1000 AIR CONTAMINANTS
TABLE Z-1

OSHA STANDARD 29CFR1910.106 FLAMMABLE AND COMBUSTIBLE LIQUIDS
APPLIES TO THE HANDLING, STORAGE, AND USE OF FLAMMABLE AND COMBUSTIBLE LIQUIDS WITH A FLASH POINT BELOW 200 F

OSHA STANDARD 29CFR1910.94 VENTILATION

OSHA STANDARD 29CFR1910.134 RESPIRATORY PROTECTION

OSHA STANDARD 29CFR1910.20 ACCESS TO EMPLOYEE EXPOSURE AND MEDICAL RECORDS

OSHA STANDARD 29CFR1910.132 PERSONAL PROTECTIVE EQUIPMENT

OSHA STANDARD 29CFR1910.141 SANITATION

OSHA STANDARD 29CFR1910.151 MEDICAL SERVICES AND FIRST AID

OSHA STANDARD 29CFR1910.133 EYE AND FACE PROTECTION

29CFR1910.1450 SUBJECT TO OSHA STANDARD REGULATING OCCUPATIONAL EXPOSURE TO HAZARDOUS CHEMICALS IN LABORATORIES.
EFFECTIVE DATE: 5/1/90
55FR3300 1/31/90

40CFR60 STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES
SUBPART VV - STANDARDS OF PERFORMANCE FOR EQUIPMENT LEAKS OF VOLATILE ORGANIC COMPOUNDS IN THE SYNTHETIC ORGANIC CHEMICALS MANUFACTURING INDUSTRY

40CFR117 DETERMINATION OF REPORTABLE QUANTITIES FOR HAZARDOUS SUBSTANCES
QUANTITIES, AS LISTED IN TABLE 302.4 40CFR302, THAT MAY BE HARMFUL AND WHICH THE DISCHARGE IS A VIOLATION OF THE CLEAN WATER ACT SECTION 311(B)(3) AND REQUIRES NOTICE AS SET FORTH IN SECTIONS 103(A) AND 103(B) OF CERCLA.

40CFR401.15 GENERAL PROVISIONS
SUBCHAPTER N - EFFLUENT GUIDELINES AND STANDARDS
THIS SUBSTANCE LISTED AS A TOXIC POLLUTANT DESIGNATED PURSUANT TO SECTION 307(A)(1) OF THE CLEAN WATER ACT

40CFR122 EPA ADMINISTERED PERMIT PROGRAMS: THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
APPENDIX D - NPOES PERMIT APPLICATION TESTING REQUIREMENTS
TABLE II - ORGANIC TOXIC POLLUTANTS IN EACH OF FOUR FRACTIONS IN ANALYSIS BY GAS CHROMATOGRAPHY/MASS SPECTROSCOPY (GS/MS)

40CFR141.40 NATIONAL PRIMARY DRINKING WATER REGULATIONS
SPECIAL MONITORING FOR ORGANIC CHEMICALS

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTES

40CFR268 LAND DISPOSAL RESTRICTIONS

40CFR148 HAZARDOUS WASTE INJECTION RESTRICTIONS.
53FR28118 7/26/88
53FR30908 8/16/88
54FR25416 6/14/89
54FR26594 6/23/89

40CFR302 CERCLA SECTION 103 DESIGNATION, REPORTABLE QUANTITIES AND NOTIFICATION
REPORTABLE QUANTITY (RQ) : 1000 LBS. (454 KG)

40CFR370 SARA TITLE III SECTION 311 HAZARDOUS CHEMICAL REPORTING: COMMUNITY RIGHT-TO-KNOW
SUBPART B - REPORTING REQUIREMENTS

REPORTING THRESHOLD: 10,000 LBS. (4540 KG)

HAZARD CATEGORIES:

ACUTE HAZARD

FIRE HAZARD

40CFR372 SARA TITLE III SECTION 313 TOXIC CHEMICAL RELEASE REPORTING: COMMUNITY RIGHT-TO-KNOW

SUBSTANCE LISTED TOXIC SUBSTANCES CONTROL ACT INVENTORY

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
SECTION 8(C) OF THE TOXIC SUBSTANCES CONTROL ACT (TSCA) REQUIRES MANUFACTURERS, PROCESSORS, AND DISTRIBUTORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT ALLEGED TO HAVE BEEN CAUSED BY THE SUBSTANCE OR MIXTURE. EPA MAY INSPECT AND REQUIRE REPORTING OF SUCH RECORDS.

TOXIC SUBSTANCE CONTROL ACT (TSCA) SECTION 8(E) INITIAL EVALUATION OF SUBSTANTIAL RISK SUBMITTED TO EPA, 1982

40CFR716 THIS SUBSTANCE LISTED IN THE HEALTH AND SAFETY DATA REPORTING RULE UNDER SECTION 8(D) OF THE TOXIC SUBSTANCES CONTROL ACT (TSCA) REQUIRING PAST, CURRENT AND PROSPECTIVE MANUFACTURERS, IMPORTERS AND PROCESSORS TO SUBMIT TO THE ENVIRONMENTAL PROTECTION AGENCY (EPA) COPIES AND LISTS OF UNPUBLISHED HEALTH AND SAFETY STUDIES ON THE LISTED CHEMICALS THAT THEY MANUFACTURE, IMPORT OR PROCESS.
56FR42688

THIS SUBSTANCE TESTED FOR EPIDEMIOLOGY BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA)

33CFR160.211 AND 213 U.S. COAST GUARD REQUIRES 24 HOURS ADVANCE NOTICE TO CAPTAIN OF THE PORT WHEN THIS SUBSTANCE IS SCHEDULED TO ARRIVE AT OR DEPART FROM PORT.

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INTERNATIONAL REGULATIONS
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SUBSTANCE LISTED UNDER THE STATE OF CALIFORNIA HAZARDOUS SUBSTANCES INFORMATION AND TRAINING ACT, CALIFORNIA LABOR CODE, DIVISION 5, CHAPTER 2.5

SUBSTANCE LISTED BY THE NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW ACT, P.L. 1983, CHAPTER 315, N.J.S.A. 34: A-1. EMPLOYERS COVERED: SIC CODES 20-39, 46-49, 51, 75, 76, 80, 82, AND 84.

SUBSTANCE LISTED UNDER THE STATE OF FLORIDA TOXIC SUBSTANCES IN THE WORKPLACE RIGHT TO KNOW LAW, CHAPTER 442 OF THE FLORIDA STATUTES.

SUBSTANCE LISTED UNDER THE STATE OF PENNSYLVANIA WORKER AND COMMUNITY RIGHT TO KNOW ACT, P.L. 734, NO. 159.

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INTERNATIONAL REGULATIONS
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INTERNATIONAL MARITIME ORGANIZATION (IMO) - DANGEROUS GOODS CODE
SUBSTANCE SPECIFICALLY REGULATED FOR INTERNATIONAL SHIPMENTS

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA) - TABLE 4.2
DANGEROUS GOODS LIST: THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING AND OTHER REQUIREMENTS.
DESIGNATED AS A DANGEROUS GOOD FOR THE PURPOSE OF AIR TRANSPORTATION.

CANADA: THIS SUBSTANCE SUBJECT TO REQUIREMENTS OF CANADA'S WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS). THE REGULATIONS REQUIRE SUPPLIERS OF HAZARDOUS MATERIALS TO PROVIDE ADEQUATE LABELS AND MATERIAL SAFETY DATA SHEETS (MSDS'S) AS CONDITIONS OF SALE AND IMPORTATION. EMPLOYERS MUST PROVIDE LABELS, MSDS'S AND WORKER EDUCATION PROGRAMS IN THE WORKPLACE.

GERMANY (DFG): MAXIMUM CONCENTRATION VALUES IN THE WORKPLACE (MAK)
ETHYL BENZENE:
100 PPM (440 MG/M3) DFG MAK TWA
200 PPM (880 MG/M3) DFG MAK 5 MINUTE PEAK,
MOMENTARY VALUE, 8 TIMES/SHIFT

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ADDITIONAL INFORMATION
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CERCLA SECTION 104(I) PRIORITY LIST OF HAZARDOUS SUBSTANCES FOUND AT SUPERFUND SITES.
52FR12866 4/17/87
53FR41280 10/20/88
54FR43615 10/26/89
55FR42067 10/17/90

TWO YEAR STUDIES: HISTOPATHOLOGY IN PROGRESS BY THE NATIONAL

TOXICOLOGY PROGRAM (NTP).

CHEMICAL ASSIGNED TO LABORATORY FOR TOXICOLOGY STUDY BY THE NATIONAL TOXICOLOGY PROGRAM (NTP).

THIS SUBSTANCE TESTED FOR CARCINOGENESIS BY THE NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES (NIEHS)

NATIONAL TOXICOLOGY PROGRAM (NTP) TECHNICAL REPORT AVAILABLE ON THIS SUBSTANCE.

SHORT TERM TOXICITY STUDIES SCHEDULED FOR PEER REVIEW BY THE NATIONAL TOXICOLOGY PROGRAM (NTP).

NATIONAL TOXICOLOGY PROGRAM (NTP) TECHNICAL REPORT AVAILABLE ON THIS SUBSTANCE.

TRANSPORTATION
U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
ETHYLBENZENE-UN 1175

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
3 - FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
PG II

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101 AND SUBPART E:
FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS:
EXCEPTIONS: 49 CFR 173.150
NON-BULK PACKAGING: 49 CFR 173.202
BULK PACKAGING: 49 CFR 173.242

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 5 L
CARGO AIRCRAFT ONLY: 60 L

LEAK AND SPILL PROCEDURES
REPORTABLE QUANTITY (RQ) 1000 LB. (454 KG)
A REPORTABLE QUANTITY OF ONE THOUSAND POUNDS APPLIES TO THIS SUBSTANCE ESTABLISHED BY SECTIONS 101(14) AND 102(B) OR ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESOPNSE, COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA). SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OF FACILITY FROM WHICH A HAZARDOUS
STAN[illegible]S BE[illegible]EASE[illegible]A QU[illegible]EQU[illegible]OR[illegible]R TH[illegible]E

FOLLOWING INFORMATION RECOMMENDED FOR THE EMERGENCY HANDLING OF HAZARDOUS MATERIALS INVOLVED IN A LEAK OR SPILL INCIDENT:

IF MATERIAL ON FIRE OR INVOLVED IN FIRE:
* EXTINGUISH FIRE ONLY IF FLOW CAN BE STOPPED
* APPLY FLOODING QUANTITIES OF WATER AS FOG
* SOLID STREAM OF WATER MAY SPREAD FIRE
* USE FLOODING QUANTITIES OF WATER TO COOL ALL AFFECTED CONTAINERS
* WATER SHOULD BE APPLIED FROM AS FAR A DISTANCE AS POSSIBLE
* USE ALCOHOL FOAM OR CO2 OR DRY CHEMICAL EXTINGUISHERS

IF MATERIAL IS NOT ON FIRE AND IS NOT INVOLVED IN FIRE:
* KEEP AWAY FROM SPARKS, FLAMES AND OTHER SOURCES OF IGNITION
* DO NOT ALLOW MATERIAL TO CONTAMINATE WATER SOURCES AND SEWERS
* CONTAIN FLOW WITH DIKES AS NECESSARY
* ATTEMPT TO STOP LEAK IF WITHOUT HAZARD
* CONTROL VAPORS WITH WATER SPRAY

PERSONNEL PROTECTION:
* AVOID BREATHING DUST/VAPORS/FUMES FROM MATERIAL
* KEEP UPWIND
* WEAR BOOTS, PROTECTIVE GLOVES AND GAS TIGHT GOGGLES
* DO NOT HANDLE BROKEN PACKAGES WITHOUT PROTECTIVE EQUIPMENT
* WASH CONTAMINATED SKIN WITH COPIOUS AMOUNTS OF WATER OR SOAP AND WATER

LAND SPILL:
* DIG A HOLDING AREA SUCH AS A PIT, POND, OR LAGOON TO CONTAIN LIQUID OR SOLID MATERIAL
* DIKE FLOW OF SPILLED MATERIAL USING SOIL OR SANDBAGS OR FOAMED BARRIERS SUCH AS POLYURETHANE OR CONCRETE
* USE CEMENT POWDER OR FLY ASH TO ABSORB LIQUID MASS
* IMMOBILIZE SPILL WITH UNIVERSAL GELLING AGENT
* REDUCE VAPOR AND FIRE HAZARD WITH FLUOROCARBON WATER FOAM

WATER SPILL:
* LIMIT SPILL MOTION WITH NATURAL BARRIERS OR OIL SPILL CONTROL BOOMS
* USE SURFACE ACTIVE AGENT, DETERGENTS, SOAPS, ALCOHOLS TO COMPRESS AND THICKEN SPILLED MATERIAL
* USE UNIVERSAL GELLING AGENT TO SOLIDIFY ENCIRCLED SPILL AND INCREASE EFFECTIVENESS OF BOOMS
* IF DISSOLVED, APPLY ACTIVATED CARBON AT 10 TIMES SPILLED AMOUNT IN THE REGION OF 10 PPM OR GREATER CONCENTRATION
* USE SUCTION HOSES TO REMOVE TRAPPED MATERIAL
* REMOVE IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES WITH MECHANICAL DREDGES OR LIFTS

AIR SPILL:
* KNOCK DOWN VAPORS WITH WATER SPRAY

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FOLLWING INFORMATION FROM DEPARTMENT OF TRANSPORTATION/U.S. COAST GUARD "CHEMICAL RESPONSE INFORMATION SYSTEM", REGARDING WATER SPILLS:

* SUBSTANCE FLOATS ON WATER
* RESTRICT ACCESS OF GENERAL PUBLIC WHEN APPRECIABLE DANGER ARISES FROM SPILL
* RESTRICT IGNITION SOURCES WHEN SUBSTANCE INVOLVED

* RESTRICT HUMAN USE WHEN SUBSTANCE INVOLVED
* CONTAIN SURFACE SLICKS
* SKIM SURFACE SLICK
* HIGHLY VOLATILE, AVOID INHALATION, VAPORS OR DUST ARE IRRITATING OR TOXIC
* HIGHLY CORROSIVE, AVOID DIRECT CONTACT, CONTACT WITH SKIN OR EYES CAN CAUSE IRRITATION OR BURNS
* FIRST ATTEMPT TO CONTAIN AND SKIM, DILUTE AND DISPERSE WHAT HAS DISSOLVED IN WATER

LISTED BY U.S. COAST GUARD UNDER CARGO COMPATIBILITY GROUP AROMATIC HYDROCARBONS, INCOMPATIBLE WITH NITRIC ACID

OCCUPATIONAL SPILL:
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 VAPOR, BUT IT MAY NOT PREVENT IGNITION IN CLOSED SPACES. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER NONCOMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF LIQUID SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND DENY ENTRY.

WASTE DISPOSAL

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OBSERVE ALL FEDERAL, STATE OR LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. CONTACT LOCAL AND/OR STATE ENVIRONMENTAL AUTHORITIES TO INSURE PROPER COMPLIANCE.

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THIS SUBSTANCE MEETS THE DEFINITION OF A HAZARDOUS WASTE AS DEFINED BY THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) (40CFR260) AND IS SUBJECT TO THE FOLLOWING CONSIDERATIONS:

40CFR260 HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

PROVIDES DEFINITIONS OF TERMS, GENERAL STANDARDS, AND OVERVIEW INFORMATION APPLICABLE TO 40CFR PARTS 260-265

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

IDENTIFIES THOSE SOLID WASTES WHICH ARE SUBJECT TO REGULATION AS HAZARDOUS WASTES UNDER 40CFR PARTS 262-265, 270, 271, AND 124 AND WHICH ARE SUBJECT TO THE NOTIFICATION REQUIREMENTS OF SECTION 3010 OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AND IDENTIFIES ONLY SOME OF THE MATERIALS WHICH ARE HAZARDOUS WASTES UNDER SECTIONS 3007 AND 7003

40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NO. K052: TANK BOTTOMS (LEADED) FROM THE PETROLEUM REFINING INDUSTRY. (T)
REPORTABLE QUANTITY (RQ) : 10 LBS.
A REPORTABLE QUANTITY OF 10 LBS. APPLIES TO THIS HAZARDOUS WASTE FROM NON-SPECIFIC SOURCES ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) OF 1980 IDENTIFIED IN 40CFR261.31. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER AT (800) 424-8802; OR IN THE METROPOLITAN WASHINGTON, D.C. AREA (202) 426-2675.

40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NO. K086: SOLVENT WASHES AND SLUDGES, CAUSTIC WASHES AND SLUDGES, OR WATER WASHES AND SLUDGES FROM CLEANING TUBS AND EQUIPMENT USED IN THE FORMULATION OF INK FROM PIGMENTS, DRIERS, SOAPS AND STABILIZERS CONTAINING CHROMIUM AND LEAD. (T)
40CFR261.32 HAZARDOUS WASTE FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NO. K048: DISSOLVED AIR FLOTATION (DAF) FLOAT FROM PETROLEUM REFINING INDUSTRY. (T)
40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NO. K049: SLOP OIL EMULSION SOLIDS FROM PETROLEUM REFINING INDUSTRY. (T)
40CFR261.32 HAZARDOUS WASTE FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NO. K051: API SEPARATOR SLUDGE FROM THE PETROLEUM REFINING INDUSTRY. (T)
40CFR261.32 HAZARDOUS WASTES FROM SPECIFIC SOURCES
EPA HAZARDOUS WASTE NO. K052: TANK BOTTOMS (LEADED) FROM THE PETROLEUM REFINING INDUSTRY. (T)

40CFR261.21 CHARACTERISTIC OF IGNITABILITY
EPA HAZARDOUS WASTE NUMBER D001
REPORTABLE QUANTITY (RQ) : 100 LBS.
A REPORTABLE QUANTITY OF 100 LBS. APPLIES TO THIS WASTE ADJUSTED UNDER SECTION 102(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA) BY EXHIBITING ONE OR MORE OF THE CHARACTERISTICS OF IGNITABILITY, CORROSIVITY OR REACTIVITY IDENTIFIED IN 40CFR261.21 THROUGH 261.23. SECTIONS 103(A) AND 103(B) REQUIRE THAT PERSONS IN CHARGE OF A VESSEL OR FACILITY FROM WHICH A HAZARDOUS SUBSTANCE HAS BEEN RELEASED IN A QUANTITY EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER (800) 424-8802; IN WASHINGTON, D.C. METROPOLITAN AREA (202) 426-2675.
50FR13456 4/4/85

40CFR262 STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS FOR GENERATORS OF HAZARDOUS WASTE

40CFR263 STANDARDS APPLICABLE TO TRANSPORTERS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS WHICH APPLY TO PERSONS TRANSPORTING HAZARDOUS WASTE WITHIN THE UNITED STATES IF THE TRANSPORTATION REQUIRES A MANIFEST UNDER 40CFR262

40CFR264 STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE

40CFR265 INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE DURING THE PERIOD OF INTERIM STATUS

40CFR267 INTERIM STANDARDS FOR OWNERS AND OPERATORS OF NEW HAZARDOUS WASTE LAND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS THAT DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE FOR NEW LAND DISPOSAL FACILITIES

40CFR268 LAND DISPOSAL RESTRICTIONS

IDENTIFIES HAZARDOUS WASTES THAT ARE RESTRICTED FROM LAND DISPOSAL AND DEFINES THOSE LIMITED CIRCUMSTANCES UNDER WHICH AN OTHERWISE PROHIBITED WASTE MAY CONTINUE TO BE LAND DISPOSED.

40CFR268.35 WASTE SPECIFIC PROHIBITIONS - THIRD THIRD WASTES
55FR22520 6/1/90

40CFR148 HAZARDOUS WASTE INJECTION RESTRICTIONS

IDENTIFIES HAZARDOUS WASTES THAT ARE RESTRICTED FROM DISPOSAL INTO CLASS I HAZARDOUS WASTE INJECTION WELLS AND DEFINES THOSE CIRCUMSTANCES UNDER WHICH A WASTE, OTHERWISE PROHIBITED FROM INJECTION, MAY BE INJECTED.
53FR28118 7/26/88
53FR30908 8/16/88
54FR25416 6/14/89
54FR26594 6/23/89

40CFR148.16 WASTE SPECIFIC PROHIBITIONS - THIRD THIRD WASTES

40CFR270 EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

ESTABLISHES PROVISIONS FOR THE HAZARDOUS WASTE PERMIT PROGRAM UNDER SUBTITLE C OF THE SOLID WASTE DISPOSAL ACT, AS AMENDED BY THE RESOURCE CONSERVATION AND RECOVERY ACT

Gasoline

40CFR263 STANDARDS APPLICABLE TO TRANSPORTERS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS WHICH APPLY TO PERSONS TRANSPORTING HAZARDOUS WASTE WITHIN THE UNITED STATES IF THE TRANSPORTATION REQUIRES A MANIFEST UNDER 40CFR262

45FR33151 05/19/80
45FR86968 12/31/80
48FR14294 12/31/80

40CFR264 STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE

45FR33221 05/19/80
45FR76075 11/17/80
45FR86968 12/31/80
45FR86970 12/31/80
45FR86974 12/31/80
46FR2848 01/12/81
46FR2849 01/12/81
46FR2866 01/12/81
46FR2867 01/12/81
46FR7678 01/23/81
46FR27480 05/20/81
46FR35249 07/07/81
46FR55112 11/06/81
46FR57285 11/23/81
47FR953 01/08/82
47FR8306 02/25/82
47FR15047 04/07/82
47FR15059 04/07/82
47FR16554 04/16/82
47FR16556 04/16/82
47FR17989 04/27/82
47FR19995 05/10/82
47FR27532 06/24/82
47FR27533 06/24/82
47FR28627 07/01/82
47FR32349 07/26/82
47FR32350 07/26/82
47FR32356 07/26/82
47FR32357 07/26/82
47FR32359 07/26/82
47FR32361 07/26/82
47FR32365 07/26/82
47FR32384 07/26/82
47FR30447 07/13/82
48FR2511 01/19/83
48FR3982 01/28/83
48FR14294 04/01/83
48FR14295 04/01/83
48FR30115 06/30/83

40CFR265 INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS WHICH DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE DURING THE PERIOD OF INTERIM STATUS

45FR33232 05/19/80
45FR76075 11/17/80
45FR78529 11/25/80
45FR86968 12/31/80
47FR12318 03/22/82
47FR15064 04/07/82
47FR16558 04/16/82
47FR27533 06/24/82

45FR86970 12/31/80 47FR28627 07/01/82
45FR86974 12/31/80 47FR30447 07/13/82
46FR2875 01/12/81 47FR32367 07/26/82
46FR7680 01/23/81 47FR32368 07/26/82
46FR27480 05/20/81 47FR32369 07/26/82
46FR35249 07/07/81 48FR2511 01/19/83
46FR56596 11/17/81 48FR3982 01/28/83
47FR1255 01/11/82 48FR14295 04/01/83
47FR8306 02/25/82 48FR30115 06/30/83

40CFR267 INTERIM STANDARDS FOR OWNERS AND OPERATORS OF NEW HAZARDOUS WASTE LAND DISPOSAL FACILITIES

ESTABLISHES MINIMUM NATIONAL STANDARDS THAT DEFINE THE ACCEPTABLE MANAGEMENT OF HAZARDOUS WASTE FOR NEW LAND DISPOSAL FACILITIES
46FR12429 02/13/81

40CFR270 EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

ESTABLISHES PROVISIONS FOR THE HAZARDOUS WASTE PERMIT PROGRAM UNDER SUBTITLE C OF THE SOLID WASTE DISPOSAL ACT, AS AMENDED BY THE RESOURCE CONSERVATION AND RECOVERY ACT
48FR14228 04/01/83
48FR30113 06/30/83
48FR30114 06/30/83

40CFR271 REQUIREMENT FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

SPECIFIES THE PROCEDURES EPA WILL FOLLOW IN APPROVING, REVISING, AND WITHDRAWING APPROVAL OF STATE PROGRAMS AND THE REQUIREMENTS STATE PROGRAMS MUST MEET TO BE APPROVED BY THE ADMINISTRATOR UNDER SECTION 3006(B) OF RCRA
48FR14248 04/01/83
48FR30114 06/30/83
48FR30115 06/30/83

CAS NUMBER
108-88-3

REGISTRY TOXIC CHEMICALS NUMBER
XS5250000

BULLETINS

SPECIAL INFORMATION

LAND SPILL:
* DIG A PIT, POND, LAGOON OR HOLDING AREA TO CONTAIN LIQUID OR SOLID MATERIAL
* DIKE SURFACE FLOW USING SOIL, SANDBAGS, FOAMED POLYURETHANE OR FOAMED CONCRETE
* ABSORB BULK LIQUID WITH FLY ASH OR CEMENT POWDER
* APPLY UNIVERSAL GELLING AGENT TO IMMOBILIZE SPILL
* APPLY FLUOROCARBON WATER FOAM TO DIMINISH VAPOR AND FIRE HAZARD

WATER SPILL:
* USE NATURAL BARRIERS OR OIL SPILL CONTROL BOOMS TO LIMIT SPILL MOTION
* USE SURFACE ACTIVE AGENT, DETERGENTS, SOAPS, ALCOHOLS TO COMPRESS AND THICKEN SPILLED MATERIAL
* INJECT UNIVERSAL GELLING AGENT TO SOLIDIFY ENCIRCLED SPILL AND INCREASE EFECTIVENESS OF BOOMS
* REMOVE TRAPPED MATERIAL WITH SUCTION HOSES
* USE MECHANICAL DREDGES OR LIFTS TO REMOVE IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES

AIR SPILL:
* APPLY WATER SPRAY TO KNOCK DOWN VAPORS

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FOLLOWING INFORMATION FROM DEPARTMENT OF TRANSPORTATION/U.S. COAST GUARD "CHEMICAL RESPONSE INFORMATION SYSTEM", REGARDING WATER SPILLS:

* SUBSTANCE FLOATS ON WATER
* RESTRICT ACCESS OF GENERAL PUBLIC WHEN APPRECIABLE DANGER ARISES FROM SPILL
* RESTRICT IGNITION SOURCES WHEN SUBSTANCE INVOLVED
* RESTRICT HUMAN USE WHEN SUBSTANCE INVOLVED
* CONTAIN SURFACE SLICKS
* SKIM SURFACE SLICK
* HIGHLY VOLATILE, AVOID INHALATION, VAPORS OR DUST ARE IRRITATING OR TOXIC
* HIGHLY CORROSIVE, AVOID DIRECT CONTACT, CONTACT WITH SKIN OR EYES CAN CAUSE IRRITATION OR BURNS
* BURNING MAY BE PROHIBITED BY ANTI-POLLUTION LAWS AND REGULATIONS
* SUBSTANCE HAS SOOTY BURNING

WASTE
THIS MATERIAL LISTED AS HAZARDOUS SUBSTANCE, AS DEFINED IN SECTION 101(14) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA) OF 1980, PURSUANT TO ONE OR MORE OF THE FOLLOWING:

- FEDERAL WATER POLLUTION CONTROL ACT (FWPCA) SECTION 311 (B)(2)(A)
- SOLID WASTE DISPOSAL ACT SECTION 3001 40CFR261
- CLEAN WATER ACT (CWA) SECTION 307(A) 40CFR129

- CLEAN AIR ACT (CAA) SECTION 112 40CFR61
- TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 7
- COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA) SECTION 102

EPA HAZARDOUS WASTE NUMBER U220
TOLUENE
40CFR260 HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

PROVIDES DEFINITIONS OF TERMS, GENERAL STANDARDS, AND OVERVIEW INFORMATION APPLICABLE TO 40CFR PARTS 260-265

45FR76075 11/17/80
45FR76630 11/19/80
45FR86968 12/31/80
46FR2348 01/09/81
46FR27476 05/20/81
46FR35247 07/07/81
47FR32349 07/26/82
47FR41563 09/21/82
48FR2511 01/16/83
48FR14293 04/01/83

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

IDENTIFIES THOSE SOLID WASTES WHICH ARE SUBJECT TO REGULATION AS HAZARDOUS WASTES UNDER 40CFR PARTS 262-265, 270, 271, AND 1[illegible] AND WHICH ARE SUBJECT TO THE NOTIFICATION REQUIREMENTS OF SECTION 3010 OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AND IDENTIFIES ONLY SOME OF THE MATERIALS WHICH ARE HAZARDOUS WASTES UNDER SECTIONS 3007 AND 7003 OF RCRA

45FR33119 05/19/80 46FR27477 05/20/81
45FR72037 10/30/80 46FR29708 06/03/81
45FR74892 11/12/80 46FR34587 07/02/81
45FR76620 11/19/80 46FR35247 07/07/81
45FR76623 11/19/80 46FR47429 09/25/81
45FR78529 11/25/80 46FR56588 11/11/81
45FR78531 11/25/80 47FR36097 08/18/82
45FR80287 12/04/80 48FR14293 04/01/83
46FR4618 01/16/81 48FR14294 04/01/83
46FR4619 01/16/81 48FR15257 04/08/83
46FR27476 05/20/81 48FR30115 06/30/83

40CFR262 STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE

ESTABLISHES STANDARDS FOR GENERATORS OF HAZARDOUS WASTE

45FR33142 05/19/80
45FR78529 11/25/80
45FR86970 12/31/80
45FR86973 12/31/80
47FR1251 01/11/82
48FR3981 01/28/83
48FR14294 04/01/83
48FR13028 04/29/83

RESPIRATORY HISTORY
VISION TEST
URINALYSIS
PULMONARY FUNCTIONS
PHYSICIAN EXAMINATION
INDUSTRIAL EXPOSURE HISTORY
ELECTROCARDIOGRAM
SKIN EXAM
SPECIAL ATTENTION TO SKIN
WEIGHT

CERTIFICATIONS
HEALTH STATUS CLASSIFICATION

OSHA RESPIRATOR CERTIFICATION 29CFR1910.134

DEPARTMENT OF TRANSPORTATION IF OPERATES HEAVY EQUIPMENT

EMPLOYEE HAZARDOUS MATERIALS EDUCATION RECEIPT

EMPLOYEE MEDICAL RECORDS RECEIPT

TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE
REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL
SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT
ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS.
CONTACT: JACK P. MCCARTHY, OFFICE OF TOXIC SUBSTANCES,
EPA (800)424-1404. 48FR38178 8/22/83

MEDICAL WARNING REQUIRED FOR MEDICAL EXAM REFUSAL SIGNED
BY EMPLOYEE

SPECIAL DIAGNOSTIC TESTS
HIPPURIC ACID URINE > 5G/LITER
URINE PHENOL
COMPLETE NEUROLOGIC EXAM
BLOOD CHEMISTRY
URINALYSIS
COMPLETE BLOOD COUNT
DIFFERENTIAL WHITE BLOOD CELL COUNT
LIVER PROFILE BLOOD TESTS
IF SYMPTOMS OF CENTRAL NERVOUS SYSTEM OCCUR, OBTAIN BLOOD GLUCOSE AND
RECTAL TEMPERATURE. PERFORM COMPLETE NEUROLOGIC EXAMINATION AND ANY
OTHER SPECIFIC NEUROLOGIC TESTS AS APPLICABLE
PULMONARY FUNCTION

LEAKS AND SPILL PROCEDURES

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DEPARTMENT OF TRANSPORTATION HAZARD CLASS
49CFR172.101 HAZARDOUS MATERIALS TABLE

FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS
49CFR172.101 (SUBJECT TO ADDITIONAL LABELING REQUIREMENTS OF 49CFR172.402)

FLAMMABLE LIQUID

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INTERGOVERNMENTAL MARITIME ORGANIZATION HAZARD CLASS
49CFR172.102 OPTIONAL HAZARDOUS MATERIALS TABLE

CLASS 3.2-INFLAMMABLE LIQUIDS

INTERGOVERNMENTAL MARITIME ORGANIZATION LABELING SPECIFICATIONS DOMESTIC AND EXPORT SHIPMENTS
49CFR172.102

FLAMMABLE LIQUID

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FOLLOWING INFORMATION FROM BUREAU OF EXPLOSIVES "EMERGENCY HANDI HAZARDOUS MATERIALS":

IF MATERIAL ON FIRE OR INVOLVED IN FIRE:
* DO NOT EXTINGUISH FIRE UNLESS FLOW CAN BE STOPPED
* USE WATER IN FLOODING QUANTITIES AS FOG
* SOLID STREAM OF WATER MAY SPREAD FIRE
* COOL ALL AFFECTED CONTAINERS WITH FLOODING QUANTITIES OF WAT
* APPLY WATER FROM AS FAR A DISTANCE AS POSSIBLE
* USE ALCOHOL FOAM OR CO2 OR DRY CHEMICAL EXTINGUISHERS

IF MATERIAL IS NOT ON FIRE AND IS NOT INVOLVED IN FIRE:
* KEEP SPARKS, FLAMES AND OTHER IGNITION SOURCES AWAY
* KEEP MATERIAL OUT OF WATER SOURCES AND SEWERS
* BUILD DIKES TO CONTAIN FLOW AS NECESSARY
* ATTEMPT TO STOP LEAK IF WITHOUT HAZARD
* USE WATER SPRAY TO KNOCK DOWN VAPORS

PERSONNEL PROTECTION:
* KEEP UPWIND
* DO NOT HANDLE BROKEN PACKAGES WITHOUT PROTECTIVE EQUIPMENT
* WEAR BOOTS, PROTECTIVE GLOVES AND GAS TIGHT GOGGLES
* WASH AWAY ANY MATERIALS WHICH MAY HAVE CONTACTED THE BODY WIT COPIOUS AMOUNTS OF WATER OR SOAP AND WATER
* AVOID BREATHING DUST/VAPORS/FUMES FROM MATERIAL

40CFR122, APPENDIX D - NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT APPLICATION TESTING REQUIREMENTS
TABLE II - ORGANIC TOXIC POLLUTANTS IN EACH OF FOUR FRACTIONS IN ANALYSIS BY GAS CHROMATOGRAPHY/MASS SPECTROSCOPY (GS/MS)
48FR14153 04/01/83

TECHNICAL ASSISTANCE DATA COMPLETED/PUBLISHED CLEAN WATER ACT (CWA) SECTION 311

WATER QUALITY CRITERIA COMPLETED/PUBLISHED CLEAN WATER ACT (CWA) SECTION 304(A) 45CFR231

WATER QUALITY CRITERIA DOCUMENT COMPLETED/PUBLISHED CLEAN WATER ACT (CWA) SECTION 304(A)

40CFR261.33(F) DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINERS, AND SPILL RESIDUES THEREOF
COMMERCIAL CHEMICAL PRODUCT OR MANUFACTURING CHEMICAL INTERMEDIATE IDENTIFIED AS TOXIC WASTE UNLESS OTHERWISE DESIGNATED.
45FR33084 05/19/80

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.31 EPA HAZARDOUS WASTE NO. F005: SPENT NON-HALOGENATED SOLVENT AND STILL BOTTOMS FROM THE RECOVERY OF THIS SOLVENT. (I,T)
SENATE BILL S.575 WOULD DIRECT EPA TO REVIEW, BY 7/1/85, DISPOSAL OF WASTES CONTAINING THIS SUBSTANCE TO DETERMINE WHETHER IT SHOULD BE BANNED FROM LAND DISPOSAL

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.32 EPA HAZARDOUS WASTE NO. K036: STILL BOTTOMS FROM TOLUENE RECLAMATION DISTILLATION IN THE PRODUCTION OF DISULFOTON. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
40CFR261.31 EPA HAZARDOUS WASTE NO. F024: WASTES, INCLUDING BUT NOT LIMITED TO, DISTILLATION RESIDUES, HEAVY ENDS, TARS, AND REACTOR CLEANOUT WASTES FROM THE PRODUCTION OF CHLORINATED ALIPHATIC HYDROCARBONS, HAVING CARBON CONTENT FROM ONE TO FIVE, UTILIZING FREE RADICAL CATALYZED PROCESSES. (THIS LIST DOES NOT INCLUDE LIGHT ENDS, SPENT FILTERS AND FILTER AIDS, SPENT DESSICANTS, WASTEWATER, WASTEWATER TREATMENT SLUDGES, SPENT CATALYSTS, AND WASTES LISTED IN 40CFR261.32)
49FR5308 02/10/84

SOURCE/EXPOSURE ASSESSMENT COMPLETED/PUBLISHED CLEAN AIR ACT (CAA)

RISK DOCUMENTATION/ASSESSMENT COMPLETED/PUBLISHED CLEAN WATER ACT (CWA)

SUMMARY REVIEW COMPLETED/PUBLISHED TOXIC SUBSTANCES CONTROL ACT (TSCA)

TOXIC SUBSTANCE CONTROL ACT (TSCA) SECTION 8(E) INITIAL EVALUATION OF SUBSTANTIAL RISK SUBMITTED TO EPA, 1982

CHEMICAL HAZARD INFORMATION PROFILE (CHIP) PUBLISHED BY EPA OFFICE OF PESTICIDES AND TOXIC SUBSTANCES

EPA HAS DECIDED NOT TO DEVELOP A TEST RULE UNDER TOXIC SUBSTANC CONTROL ACT SECTION 4(A) FOR TOLUENE AT THIS TIME BECAUSE THE I FROM COMPLETED TESTING AND PLANNED TESTING PROGRAMS WILL SUPPLY FICIENT INFORMATION TO CHARACTERIZE OR REASONABLY PREDICT THE H EFFECTS RECOMMENDED FOR CONSIDERATION BY THE INTERAGENCY TESTI COMMITTEE
47FR56391 10/16/82

SUBSTANCE LISTED HAZARDOUS
STATE OF CALIFORNIA ADMINISTRATIVE CODE
TITLE 22. SOCIAL SECURITY
DIVISION 4. ENVIRONMENTAL HEALTH
CHAPTER 30. MINIMUM STANDARDS FOR MANAGEMENT OF HAZARDOUS AND EXTREMELY HAZARDOUS WASTES

SUBSTANCE SUBJECT TO REQUIREMENTS OF GENERAL INDUSTRY SAFETY O (GISO) 5194 OR TITLE 8 OF CALIFORNIA ADMINSTRATIVE CODE AND DIV CHAPTER 2.5 OF CALIFORNIA LABOR CODE

SUBSTANCE LISTED WEST VIRGINIA DEPARTMENT OF LABOR LISTING OF HAZARDOUS SUBSTANCES

THIS SUBSTANCE TESTED FOR CARCINOGENESIS BY THE NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES (NIEHS)

THIS SUBSTANCE TESTED FOR MUTAGENESIS/GENETIC TOXICITY BY THE NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES (NIEHS)

MEDICAL SURVEILLANCE REQUIRED
EKG RECOMMENDED IF EMPLOYEE TO WEAR FULL-FACE RESPIRATOR
GENERAL MEDICAL HISTORY
40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBS CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONML
TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIR MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AR TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE H 30 YEARS
48FR38187 08/22/83
38FR38225 08/30/83 (EFFECTIVE DATE CORRECTION)
PHYSICIAN EXAMINATION
INDUSTRIAL EXPOSURE HISTORY
PRE-PLACEMENT AND ANNUAL EXAMS
MEDICAL WARNING FOR REFUSAL OF MEDICAL EXAMINATION
BLOOD CHEMISTRY
COMPLETE BLOOD COUNT

ORGANS
CENTRAL NERVOUS SYSTEM
LIVER
KIDNEYS
SKIN
EYES
REPRODUCTIVE SYSTEM
BONE MARROW
CARDIOVASCULAR SYSTEM
RESPIRATORY SYSTEM
MUCOUS MEMBRANES

STATUS OF REGULATORY ENFORCEMENT
OSHA STANDARD 29CFR1910.1200 HAZARD COMMUNICATION
REQUIRES CHEMICAL MANUFACTURERS AND IMPORTERS TO ASSESS THE HAZARDS OF CHEMICALS WHICH THEY PRODUCE OR IMPORT, AND ALL EMPLOYERS HAVING WORKPLACES IN THE MANUFACTURING DIVISION, STANDARD INDUSTRIAL CLASSIFICATION CODES 20 THROUGH 39, TO PROVIDE INFORMATION TO THEIR EMPLOYEES CONCERNING HAZARDOUS CHEMICALS BY MEANS OF HAZARD COMMUNICATION PROGRAMS INCLUDING LABELS, MATERIAL SAFETY DATA SHEETS, TRAINING, AND ACCESS TO WRITTEN RECORDS
48FR53280 11/25/83.

FOLLOWING OSHA STANDARDS APPLICABLE TO SUBSTANCES LISTED 29CFR1910, OTHERWISE ADVISE:

OSHA STANDARD 29CFR1910.1000 AIR CONTAMINANTS
TABLE Z-2

OSHA STANDARD 29CFR1910.94 VENTILATION

OSHA STANDARD 29CFR1910.134 RESPIRATORY PROTECTION

OSHA STANDARD 29CFR1910.20 ACCESS TO EMPLOYEE EXPOSURE AND MEDICAL RECORDS

OSHA STANDARD 29CFR1910.132 PERSONAL PROTECTIVE EQUIPMENT

OSHA STANDARD 29CFR1910.141 SANITATION

OSHA STANDARD 29CFR1910.151 MEDICAL SERVICES AND FIRST AID

OSHA STANDARD 29CFR1910.133 EYE AND FACE PROTECTION

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT ALLEGED TO HAVE BEEN CAUSED BY A SUBSTANCE OR MIXTURE. EPA MAY INSPECT AND REQUIRE REPORTING OF SUCH RECORDS.
48FR38178 08/22/83

OSHA STANDARD 29CFR1910.106 FLAMMABLE AND COMBUSTIBLE LIQUIDS
APPLIES TO THE HANDLING, STORAGE, AND USE OF FLAMMABLE AND CO-
LIQUIDS WITH A FLASH POINT BELOW 200 F

SUBSTANCE LISTED TOXIC SUBSTANCES CONTROL ACT INVENTORY

49CFR172.101 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION, PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN HAZARDOUS MATERIALS TABLE AS HAZARDOUS MATERIAL FOR THE PURPOSE OF TRANSPORTATION.
41FR15996 04/15/76
45FR34588 05/22/80 (AMENDMENT)
45FR46420 07/10/80 (AMENDMENT)
45FR62080 09/18/80 (AMENDMENT)
45FR74649 11/10/80 (AMENDMENT)
46FR17739 03/19/81 (AMENDMENT)
46FR19235 03/30/81 (AMENDMENT)

49CFR172.102 TABLES OF HAZARDOUS MATERIALS, THEIR DESCRIPTION. PROPER SHIPPING NAME, CLASS, LABEL, PACKAGING, AND OTHER REQUIREMENTS
DESIGNATED IN OPTIONAL HAZARDOUS MATERIALS TABLE WITH ALTERNATIVES TO CORRESPONDING REQUIREMENTS IN 49CFR172.101 FOR INTERNATIONAL SHIPMENTS AS AUTHORIZED BY 49CFR171.12
41FR15996 04/15/76
46FR29393 06/01/81 (AMENDMENT)
46FR32250 06/22/81 (AMENDMENT)

16CFR1500.14 PRODUCTS REQUIRING SPECIAL LABELING UNDER SECTION 3(B) OF THE FEDERAL HAZARDOUS SUBSTANCES ACT
38FR27012 09/27/73
41FR22934 06/08/76
48FR16 01/03/83

SUBSTANCE LISTED AS TOXIC POLLUTANT UNDER CLEAN WATER ACT (CWA) 307(A)

40CFR116 DESIGNATION OF HAZARDOUS SUBSTANCES
DESIGNATED AS HAZARDOUS SUBSTANCE IN ACCORDANCE WITH SECTION 311(B)(2)(A) OF THE FEDERAL WATER POLLUTION CONTROL ACT, AS AMENDED. INCLUDES ANY ISOMERS AND HYDRATES, AS WELL AS ANY SOLUTIONS AND MIXTURES CONTAINING THIS SUBSTANCE.
43FR10747 03/13/78
43FR27533 06/26/78
44FR10266 02/16/79 (AMENDMENT)
44FR10268 02/16/79 (AMENDMENT)
44FR65400 11/13/79 (AMENDMENT)
44FR66602 11/20/79 (AMENDMENT)

SPECIFIC EMERGENCY PROVISIONS

NO NIOSH/OSHA DATA, ADVISE:
EYE-WASH FOUNTAIN WITHIN IMMEDIATE WORK AREA WHERE EMPLOYEES' EYES MAY BE EXPOSED TO SUBSTANCE
QUICK DRENCHING FACILITIES WITHIN IMMEDIATE WORK AREA WHERE EMPLOYEES MAY BE EXPOSED TO SUBSTANCE
EATING AND SMOKING SHOULD NOT BE PERMITTED IN IMMEDIATE WORK AREA
WATER FOUNTAIN PROHIBITED IN WORK AREA
CLOSED SYSTEM IF SUBSTANCE TO BE USED

RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED)

500 PPM
- CHEMICAL CARTRIDGE RESPIRATOR WITH AN ORGANIC VAPOR CARTRIDGE
- SUPPLIED-AIR RESPIRATOR
- SELF-CONTAINED BREATHING APPARATUS

1000 PPM
- CHEMICAL CARTRIDGE RESPIRATOR WITH AN ORGANIC VAPOR CARTRIDGE WITH A FULL FACE-PIECE

2000 PPM
- GAS MASK WITH AN ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER)
- SUPPLIED-AIR RESPIRATOR WITH A FULL FACE-PIECE, HELMENT, OR HOOD
- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE

>2000 PPM
- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE
- TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACE-PIECE OPERATED IN PRESSURE-DEMAND, POSITIVE-PRESSURE, OR CONTINUOUS-FLOW MODE AND
- AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE

ESCAPE
- GAS MASK WITH AN ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER)
- SELF-CONTAINED BREATHING APPARATUS

FIREFIGHTING
- SELF-CONTAINED BREATHING APPARATUS
WITH A FULL FACE-PIECE
OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE

ROUTE OF ENTRY INTO BODY
INHALATION
SKIN ABSORPTION
INGESTION
SKIN OR EYE CONTACT

SYMPTOMS
MUCOUS MEMBRANE IRRITATION
RESPIRATORY IRRITATION
SKIN IRRITATION
EYE IRRITATION
FATIGUE
WEAKNESS
EUPHORIA
CONFUSION
LACRIMATION
HEADACHE
DIZZINESS
SKIN IRRITATION
DROWSINESS
NUMBNESS
CONJUNCTIVITIS
ANOREXIA
WEIGHT LOSS
IRRITABILITY
TINNITUS
MUSCULAR FATIGUE
INSOMNIA
PARESTHESIA
DERMATITIS
PHOTOPHOBIA
REPRODUCTIVE EFFECTS IN EXPERIMENTAL ANIMALS
CENTRAL NERVOUS SYSTEM DEPRESSION
RESPIRATORY EDEMA
NUMBNESS EXTREMITIES
INCOORDINATION
TREMORS
COLLAPSE
ATAXIA
LEUKOPENIA
HEMATOPOIETIC BLOOD CHANGES
NAUSEA
KIDNEY DAMAGE

LIVER DAMAGE
FASCICULATION
KERATITIS
NERVOUSNESS
DILATED
CENTRAL NERVOUS SYSTEM DAMAGE

FIRST AID PROCEDURES FOLLOWING EXPOSURE
IF THIS CHEMICAL GETS INTO THE EYES, IMMEDIATELY WASH THE EYES WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING THE LOWER AND UPPER LIDS. GET MEDICAL ATTENTION IMMEDIATELY. CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH THIS CHEMICAL.

IF THIS CHEMICAL GETS ON THE SKIN, IMMEDIATELY WASH CONTAMINATED SKIN WITH SOAP OR MILD DETERGENT & WATER. IF THIS CHEMICAL SOAKS CLOTHING, IMMEDIATELY REMOVE CLOTHING & WASH SKIN WITH SOAP OR MILD DETERGENT & WATER. GET MEDICAL ATTENTION PROMPTLY.

IF A PERSON BREATHES IN LARGE AMOUNTS OF THIS CHEMICAL, MOVE THE EXPOSED PERSON TO FRESH AIR AT ONCE. IF BREATHING HAS STOPPED PERFORM ARTIFICIAL RESPIRATION. KEEP THE AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION AS SOON AS POSSIBLE.

WHEN THIS CHEMICAL HAS BEEN SWALLOWED, DO NOT INDUCE VOMITING. REMOVE BY GASTRIC LAVAGE AND CATHARSIS.

BENZENE/TOLUENE/XYLENE EXPOSURE:
EMERGENCY TREATMENT - REMOVE FROM EXPOSURE. GIVE ARTIFICIAL RESPIRATION WITH OXYGEN. REMOVE BY GASTRIC LAVAGE. AVOID ASPIRATION.
FURTHER TREATMENT - CONTROL EXCITEMENT OR CONVULSIONS WITH DIAZEPAM, 0.1 MG/KG, SLOWLY INTRAVENOUSLY. KEEP PATIENT AT REST UNTIL RESPIRATION IS NORMAL. DO NOT GIVE EPINEPHRINE OR EPHEDRINE OR RELATED DRUGS. MONITOR ECG FOR VENTRICULAR ABNORMALITIES INDICATING CARDIAC ARREST.
SPECIAL TREATMENT - TREAT ANEMIA WITH REPEATED BLOOD TRANSFUSIONS. TREAT KIDNEY OR LIVER DAMAGE.
(MEDICATION MUST BE GIVEN BY QUALIFIED MEDICAL PERSONNEL)
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

GASTRIC LAVAGE - GIVE PATIENT GLASS OF WATER PRIOR TO PASSING OF STOMACH TUBE. LAY PATIENT ON ONE SIDE, WITH HEAD LOWER THAN WAIST. IMMOBILIZE A STRUGGLING PATIENT WITH A SHEET OR BLANKET. MEASURE DISTANCE ON TUBE FROM MOUTH TO EPIGASTRIUM, MARK TUBE WITH INDELIBLE MARKING OR TAPE. REMOVE DENTURES AND OTHER FOREIGN OBJECTS FROM MOUTH. OPEN MOUTH, USE GAG IF NECESSARY. EXTEND HEAD BY LIFTING THE CHIN. PASS TUBE OVER TONGUE AND TOWARD BACK OF THROAT WITHOUT EXTENDING HEAD OR NECK. IF OBSTRUCTION IS MET BEFORE THE MARK ON TUBE REACHES LEVELS OF TEETH, DO NOT FORCE, BUT REMOVE TUBE AND REPEAT PROCEDURE UNTIL TUBE PASSES TO MARK. PLACE END OF TUBE IN GLASS OF WATER. IF TUBE IS OBSTRUCTED WHEN INTRODUCED ABOUT HALFWAY TO THE MARK, IT MAY HAVE ENTERED TRACHEA.

AFTER TUBE IS PLACED IN STOMACH, ASPIRATE FIRST TO REMOVE STOMACH CONTENTS BY IRRIGATION SYRINGE. SAVE STOMACH CONTENTS FOR EXAMINATION, AND REPEAT INTRODUCTION AND WITHDRAWAL OF 100-300 ML WARM WATER UNTIL AT LEAST 3 LITERS OF CLEAR RETURN ARE OBTAINED. USE ACTIVATED CHARCOAL AT BEGINNING OF LAVAGE TO AID IN POISON INACTIVATION. LEAVE 50 GRAMS OF CHARCOAL SUSPENDED IN WATER IN THE STOMACH. IF INTRODUCTION AND REMOVAL OF LAVAGE FLUID BY GRAVITY REQUIRES MORE THAN FIVE MINUTES, ASSIST WITH ASEPTO SYRINGE. PREVENT ASPIRATION WITH CUFFED ENDOTRACHEAL TUBE. AVOID GIVING LARGE QUANTITIES OF WATER.

MASSAGE OF EPIGASTRIUM WHILE STOMACH TUBE IS BEING ASPIRATED MAY AID IN POISON REMOVAL.

IF PATIENT COMATOSE, INTUBATE TRACHEA WITH CUFFED ENDOTRACHEAL TUBE. SUCCINYLCHLORINE MAY BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL TO EASE INSERTION OF TRACHEAL CATHETER PRIOR TO PASSAGE OF STOMACH TUBE.
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

CONVULSIONS - GIVE ARTIFICIAL RESPIRATION BY MOUTH-TO-MOUTH INSUFFLATION. RESTRAIN THE PATIENT DURING CONVULSIONS TO PREVENT INJURY. DO NOT ATTEMPT EMESIS OR GASTRIC LAVAGE WHILE THE PATIENT IS TWITCHING OR HYPERIRRITABLE UNLESS THE AIRWAY IS CONTROLLED AND REMOVAL OF DRUG IS IMPERATIVE.

ADMINISTER ANTICONVULSANTS. MAINTAIN HYDRATION BY ORAL OR INTRAVENOUS FLUID ADMINISTRATION. MAINTAIN AN ADEQUATE AIRWAY. TREAT HYPOGLYCEMIA BY GIVING GLUCOSE. REDUCE ELEVATED TEMPERATURE BY USING TEPID SPONGES. REMOVE SECRETIONS FROM THE PHARYNX BY SUCTION. GIVE POSITIVE-PRESSURE RESPIRATION WITH OXYGEN DURING CONVULSIONS.
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

ACUTE RENAL FAILURE - TREAT SHOCK. FOR HEMOLYTIC REACTIONS, GIVE SODIUM BICARONATE, 5 G EVERY 1-2 HOURS AS NECESSARY TO MAINTAIN AN ALKALINE URINE.
(MEDICATION MUST BE GIVEN BE QUALIFIED MEDICAL PERSONNEL)
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

LIVER DAMAGE - REMOVE FROM EXPOSURE TO ALL CHEMICALS AND DRUGS. MAINTAIN COMPLETE BED REST. AVOID ANESTHESIA OR SURGICAL PROCEDURES. AVOID DEHYDRATION OR OVERHYDRATION. IF VOMITING SEVERE AND ORAL FLUIDS NOT RETAINED, REPLACE VOMITUS WITH AN EQUAL QUANTITY OF 100% DEXTROSE IN NORMAL SALINE. IN RENAL FUNCTION ADEQUATE, GIVE 1 LITER OF 5% DEXTROSE OR INVERT SUGAR IN NORMAL SALINE PLUS 1-3 LITERS OF 10% DEXTROSE OR INVERT SUGAR IN DISTILLED WATER INTRAVENOUSLY EVERY TWENTY-FOUR HOURS.
(DREISBACH, HANDBOOK OF POISONING, 11TH ED.)

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONCENTRATION
2000 PPM
OSHA/NIOSH

PHYSICAL DESCRIPTION
COLORLESS LIQUID, BENZENE-LIKE ODOR.

CHEMICAL AND PHYSICAL PROPERTIES
MOLECULAR WEIGHT: 92
BOILING POINT AT 1 ATM, F: 231 F
SOLUBILITY IN WATER, G/100 G WATER AT 20C: 0.05 G
FLASH POINT, CLOSED CUP, F (OR OPEN CUP IF 0C): 40 F
VAPOR PRESSURE @ 20 C, MMHG: 22 MM
MELTING POINT, F: -139 F
UPPER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 7.1%
LOWER EXPLOSIVE LIMIT IN AIR, % BY VOLUME: 1.3%
AUTOIGNITION TEMPERATURE: 896 F
SPECIFIC GRAVITY: 0.866
VAPOR DENSITY (AIR=1): 3.2
ODOR THRESHOLD: 2 PPM
OCTANOL/WATER PARTITION COEFFICIENT: 2.69

INCOMPATIBILITIES
STRONG OXIDIZERS
NITRIC ACID
SULFURIC ACID
OXYGEN
PEROXIDES
DUST/VAPORS MAY FORM EXPLOSIVE MIXTURE WITH AIR
HEAT
THERMAL DECOMPOSITION PRODUCTS ARE HAZARDOUS AND/OR TOXIC
PLASTICS

PERSONAL PROTECTIVE EQUIPMENT
FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

PREVENT REPEATED OR PROLONGED SKIN CONTACT
WEAR IMPERVIOUS CLOTHING
WEAR GLOVES
WEAR FACESHIELD (8 INCH MINIMUM)

PLACE CONTAMINATED CLOTHING IN CLOSED CONTAINERS FOR STORAGE UNTIL LAUNDERED OR DISCARDED
IF CLOTHING IS TO BE LAUNDERED, INFORM PERSON PERFORMING OPERATION OF CONTAMINANT'S HAZARDOUS PROPERTIES

— — —

ACGIH "GUIDELINES FOR SELECTION OF CHEMICAL PROTECTIVE CLOTHING" INDICATES THE FOLLOWING MATERIALS AND PROTECTIVE RATINGS BY INDEPENDENT VENDORS AGAINST TOLUENE:

EXCELLENT/GOOD:
VITON
FLUORINE/CHLOROPRENE

GOOD/FAIR:
POLYURETHANE
POLYVINYL ALCOHOL

NEOPRENE/STYRENE-BUTADIENE RUBBER
NITRILE RUBBER
CHLORINATED POLYETHYLENE
STYRENE-BUTADIENE RUBBER
SARANEX

FAIR/POOR:
BUTYL RUBBER
NATURAL RUBBER
NEOPRENE
NITRILE/POLYVINYL CHLORIDE
POLYETHYLENE
POLYVINYL CHLORIDE

GOGGLES
PREVENT ANY POSSIBILITY OF EYE CONTACT
WEAR FACE SHIELD OR VENTED GOGGLES

WASHING CHEMICALS FROM THE SKIN
PROMPTLY WHEN SKIN BECOMES CONTAMINATED
NO STANDARD REQUIREMENT, BUT ADVISE WASHING
SHOWER AT END OF EACH SHIFT

ROUTINE CHANGING OF WORK CLOTHING
NO STANDARD REQUIREMENT, BUT ADVISE CHANGING
IF THERE IS ANY POSSIBILITY THAT CLOTHING MAY BE CONTAMINATED

CLOTHING REMOVAL FOLLOWING ACCIDENTAL CONTAMINATION
IMMEDIATELY IF IT BECOMES CONTAMINATED TO PREVENT FLAMMABILITY
IVITY HAZARD
NO STANDARD REQUIREMENT, BUT ADVISE REMOVING
SHOWER AFTER EACH SHIFT PRIOR TO LEAVING PREMISES
DRY SWEEPING AREA OR DRY MOPPING PROHIBITED - CARCINOGEN

5.2 Chemical Hazard Information

Onsite personnel may be exposed to chemical hazards while observing or participating in surface soil sampling. There is potential for dermal contact of the constituents outlined below.

Diesel Fuel Oil and Heating Oil: *Diesel Fuel Oil is a complex petroleum mixture of* paraffinic, olefinic, naphthenic, and aromatic hydrocarbons. The benzene content is typically less than 100 ppm in the source product. Excessive inhalation exposure may cause respiratory irritation, headache, dizziness, nausea, vomiting, and loss of coordination. Prolonged skin contact may lead to irritation of hair follicles and blockage of the sebaceous glands. Good personal hygiene will prevent this. There is no OSHA permissible exposure limit for diesel Fuel Oil.

Gasoline: *Gasoline is a variable mixture of paraffins, aromatics, and olefins.* Acute toxicity includes anesthetic effects and mucus membrane irritation. Symptoms of acute exposure include headache, blurred vision, dizziness, and nausea. The major toxicity concern is benzene, a known human carcinogen through inhalation. Gasoline typically contains 0.7 to 1.0 percent benzene. The OSHA time weighted average (TWA) for benzene is currently 1 ppm.

Gasoline also contains lead, which has adverse health effects if inhaled. The OSHA TWA for lead is 50 micrograms per cubic meter (ug/m^3); however, lead is not readily volatilized. The overall threshold limit value (TLV) for gasoline is 300 ppm, based largely upon assumptions about the hydrocarbon content of gasoline.

Skin contact with gasoline can produce immediate or delayed symptoms of dryness or irritation. If skin comes in contact with gasoline, remove clothing from affected skin area and wash promptly with soap and water. Dry the skin carefully with a clean towel. If skin is inflamed, painful or blistered, seek medical attention. If ingestion occurs, do not induce vomiting. Get medical help. Be prepared to administer artificial respiration.

Kerosene: Kerosene is a refined petroleum distillate consisting primarily of C10 to C16 hydrocarbons. It is a variable mixture of paraffins, naphthenes, olefins, and aromatics. The vapor pressure at $20^{\circ}C$ is approximately 5 millimeters (mm) mercury (Hg). There is no OSHA permissible exposure level (PEL), but the National Institute of Occupational Safety and Health (NIOSH) recommends an exposure limit (REL) of 100 milligrams per cubic meter (mg/m^3). (This is approximately 14 ppm.) Overexposure may cause headaches, dizziness, nausea, stupor, and respiratory tract and eye irritation. The primary health hazard is skin irritation and dermatitis from prolonged or repeated skin contact. Ingestion can be irritating to the mouth, throat, and digestive tract with the hazard of aspiration into the lungs.

Hexane

Baxter

Baxter Healthcare Corporation
Burdick & Jackson Division
1953 South Harvey Street
Muskegon, MI 49442 USA

373 208

information/emergency telephone no. 616.726.3171
chemtrec telephone no. 800.424.9300
canadian emergency telephone no. 613.996.6666

MATERIAL SAFETY DATA SHEET

HEXANE

I. Identification

chemical name Hexane molecular weight 86.18
chemical family Aliphatic Hydrocarbon formula C_6H_{14}
synonyms n-Hexane
DOT proper shipping name Hexane
DOT hazard class Flammable Liquid
DOT identification no. UN1208 CAS no. 110-54-3

II. Physical and Chemical Data

boiling point, 760mm Hg. 68.7°C freezing point -95.3°C evaporation rate (BuAc=1) ca 10
vapor pressure at 20°C 124 mm Hg vapor density (air=1) 3.0 solubility in water @ 20°C 0.014%
% volatiles by volume ca 100 specific gravity (H_2O=1) @ 20°C 0.659 stability Stable
hazardous polymerization Not expected to occur.
appearance and odor Clear, colorless liquid with a mild hydrocarbon odor.
conditions to avoid Heat, sparks, open flame, open containers, and poor ventilation.

materials to avoid Strong oxidizing agents.

hazardous decomposition products Incomplete combustion can generate carbon monoxide and other toxic vapors.

III. Fire and Explosion Hazard Data

flash point, (test method) -26°C (Tag closed cup) auto ignition temperature 225°C
flammable limits in air % by volume: lower limit 1.1 upper limit 7.5
unusual fire and explosion hazards Very volatile and extremely flammable.

extinguishing media Carbon dioxide, dry chemical or foam.

special fire fighting procedures Water will not be effective in extinguishing a fire and may spread it, but a water spray can be used to cool exposed containers. Wear full protective clothing and self-contained breathing apparatus. Heat will build pressure and may rupture closed storage containers.

IV. Hazardous Components

Hexane and isomers	% ca 100	TLV 50 ppm	CAS no. 110-54-3

V. Health Hazards

Occupational Exposure Limits

OSHA	TWA	- 50 ppm
	STEL	- not listed
	Ceiling	- not listed
ACGIH	TLV-TWA	- 50 ppm
	TLV-STEL (15-min)	- not listed
NIOSH	10 hour TWA	- 100 ppm
	15 min Ceiling	-510 ppm

Concentration Immediately Dangerous to Health

OSHA/NIOSH	5,000 ppm

Odor Threshold

NSC	not listed
NIOSH	not listed

Carcinogenic Data

Hexane is not listed as a carcinogen by IARC, NTP, OSHA, or ACGIH.

Primary Routes of Entry

Hexane may exert its effects through inhalation, skin absorption, and ingestion.

Industrial Exposure: Route of Exposure/Signs and Symptoms

Inhalation:	Exposure can cause dizziness, numbness of extremities, and intoxication.
Eye Contact:	Liquid and high vapor concentration can be irritating.
Skin Contact:	Prolonged or repeated skin contact can cause irritation and dermatitis through defatting of skin.
Ingestion:	Can cause gastrointestinal tract discomfort.

Effects of Overexposure

Hexane is a mild eye and mucous membrane irritant, primary skin irritant, central nervous system depressant and neurotoxin. Acute exposure causes irritation, narcosis, and gastrointestinal tract irritation. Chronic inhalation causes peripheral neuropathy. No systemic toxicity has been reported.

Medical Condition Aggravated by Exposure

Preclude from exposure those individuals susceptible to dermatitis.

Emergency First Aid

Inhalation:	Immediately remove to fresh air. If not breathing, administer mouth-to-mouth rescue breathing. If there is no pulse administer cardiopulmonary resuscitation (CPR). Contact physician immediately.
Eye Contact:	Rinse with copious amounts of water for at least 15 minutes. Get emergency medical assistance.
Skin Contact:	Flush thoroughly for at least 15 minutes. Wash affected skin with soap and water. Remove contaminated clothing and shoes. Wash clothing before re-use, and discard contaminated shoes. Get emergency medical assistance.
Ingestion:	Call local Poison Control Center for assistance. Contact physician immediately. Aspiration Hazard - Do not induce vomiting.

VI. Safety Measures and Equipment

Ventilation:	Adequate ventilation is required to protect personnel from exposure to chemical vapors exceeding the PEL and to minimize fire hazards. The choice of ventilation equipment, either local or general, will depend on the conditions of use, quantity of material, and other operating parameters.
Respiratory:	Use approved respirator equipment. Follow NIOSH and equipment manufacturer's recommendations to determine appropriate equipment (air-purifying, air-supplied, or self-contained breathing apparatus).
Eyes:	Safety glasses are considered minimum protection. Goggles or face shield may be necessary depending on quantity of material and conditions of use.
Skin:	Protective gloves and clothing are recommended. The choice of material must be based on chemical resistance and other user requirements. Generally, neoprene or nitrile rubber offer acceptable chemical resistance. Individuals who are acutely and specifically sensitive to hexane may require additional protective equipment.

Storage: Hexane should be protected from temperature extremes and direct sunlight. Proper storage of hexane must be determined based on other materials stored and their hazards and potential chemical incompatibility. In general, hexane should be stored in an acceptably protected and secure flammable liquid storage room.

Other: Emergency eye wash fountains and safety showers should be available in the vicinity of any potential exposure. Ground and bond metal containers to minimize static sparks.

VII. Spill and Disposal Data

Spill Control: Protect from ignition. Wear protective clothing and use approved respirator equipment. Absorb spilled material in an absorbent recommended for solvent spills and remove to a safe location for disposal by approved methods. If released to the environment, comply with all regulatory notification requirements.

Waste Disposal: Dispose of hexane as an EPA hazardous waste. Contact state environmental agency for listing of licensed hazardous waste disposal facilities and applicable regulations. Hazardous waste number: D001(Ignitable).

VIII. SARA/Title III Data

Hazard Classification	
Immediate Health	Yes (irritant)
Delayed Health	Yes
Fire	Yes
Sudden Release	No
Reactive	No

Chemical Listings	
Extremely Hazardous Substances	No
CERCLA Hazardous Substances	No
Toxic Chemicals	No

Hexane is not subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40CFR Part 372. This product does not contain any other toxic chemical above 1% concentration or a carcinogen above 0.1% concentration.

Revision Date: July, 1989

KEY

ca	Approximately
na	Not applicable
C	Ceiling
STEL	Short Term Exposure Level (15 minutes)
TLV	Threshold Limit Value
TWA	Time Weighted Average (8 hours)
BuAc	Butyl Acetate

CERCLA Comprehensive Environmental Response, Compensation and Liability Act
NSC National Safety Council ("Fundamentals of Industrial Hygiene," 3rd. Ed., 1988)

1-Hexene

NEW JERSEY HAZARDOUS SUBSTANCE FACT SHEETS

Topic: 1-HEXENE

Hexylene; Butylethylene; Hexene; 1-n-Hexene

NEW JERSEY DEPARTMENT OF HEALTH
Right to Know Program CN 368, Trenton, NJ 08625-0368 (609) 984-2202

Produced by Micromedex, Inc. Vol. 18 Expires 10/31/93

NEW JERSEY HAZARDOUS SUBSTANCE FACT SHEETS

Topic: 1-HEXENE

Common Name: 1-HEXENE
DOT Number: UN 2370
DOT Emergency Guide code: 27
CAS Number: 592-41-6

Hazard rating	NJ DOH	NFPA
FLAMMABILITY	-	3
REACTIVITY	-	0
POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* 1-Hexene is a flammable liquid.
* Use dry chemical, CO2, water spray, or foam extinguishers.
* POISONOUS GAS IS PRODUCED IN FIRE.
* CONTAINERS MAY EXPLODE IN FIRE.
* Vapors may travel to a source of ignition and flash back.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If 1-Hexene is spilled or leaked, take the following steps:

* Restrict persons not wearing protective equipment from area of spill or leak until clean-up is complete.
* Remove all ignition sources.
* Ventilate area of spill or leak.
* Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
* Keep 1-Hexene out of a confined space, such as a sewer, because of the possibility of an explosion, unless the sewer is designed to prevent the build-up of explosive concentrations.
* It may be necessary to contain and dispose of 1-Hexene as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300

Topic: 1-HEXENE

* Wash thoroughly immediately after exposure to 1-Hexene.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of 1-Hexene to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

3.0 HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to 1-Hexene:

* Exposure can cause you to feel dizzy, nauseous and to pass out.
* Contact can irritate the skin and eyes.
* Breathing 1-Hexene can irritate the nose and throat.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to 1-Hexene and can last for months or years:

Cancer Hazard

* According to the information presently available to the New Jersey Department of Health, 1-Hexene has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

* According to the information presently available to the New Jersey Department of Health, 1-Hexene has not been tested for its ability to adversely affect reproduction.

Other Long-Term Effects

* 1-Hexene has not been tested for other long-term health effects.

MEDICAL

Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and

present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.
Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

WORKPLACE CONTROLS AND PRACTICES
Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.
In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.
In addition, the following controls are recommended:
* Where possible, automatically pump liquid 1-Hexene from drums or other storage containers to process containers.
* Before entering a confined space where 1-Hexene may be present, check to make sure that an explosive concentration does not exist.

Good WORK PRACTICES can help to reduce hazardous exposures.
The following work practices are recommended:
* Workers whose clothing has been contaminated by 1-Hexene should change into clean clothing promptly.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to 1-Hexene.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* On skin contact with 1-Hexene, immediately wash or shower to remove the chemical.

4.0 PERSONAL PROTECTIVE EQUIPMENT
WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.
The following recommendations are only guidelines and may not apply to every situation.

Clothing
* Avoid skin contact with 1-Hexene. Wear solvent-resistant gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* ACGIH recommends Neoprene, Nitrile Rubber, Polyurethane, Polyvinyl Alcohol, or Viton as protective materials.

Eye Protection
* Wear splash-proof chemical goggles and face shield when working with liquid, unless full facepiece respiratory protection is worn.

Respiratory Protection
IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.
* Engineering controls must be effective to ensure that exposure to 1-Hexene does not occur.
* Where the potential for high exposures exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in the positive pressure mode or with a full facepiece, hood, or helmet in the continuous flow mode, or use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.

5.0 QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

NEW JERSEY HAZARDOUS SUBSTANCE FACT SHEETS

Topic: 1-HEXENE

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. Because of this, and because of exposure of children or people who are already ill, community exposures may cause health problems.

The following information is available from:

New Jersey Department of Health
Occupational Health Service Trenton, NJ 08625-0360 (609) 984-1863

Industrial Hygiene Information
Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation
If you think you are becoming sick because of exposure to chemicals at your workplace, you may call a Department of Health physician who can help you find the services you need.

Public Presentations
Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources
The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health,

references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-5627.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

CAG is the Carcinogens Assessment Group of the federal EPA.

A carcinogen is a substance that causes cancer.

The CAS number is assigned by the Chemical Abstracts Service to identify a specific chemical.

A combustible substance is a solid, liquid or gas that will burn.

A corrosive substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A fetus is an unborn human or animal.

A flammable substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The flash point is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A miscible substance is a liquid or gas that will evenly dissolve in another.

mg/m3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A mutagen is a substance that causes mutations. A mutation is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A reactive substance is a solid, liquid or gas that can cause an explosion under certain conditions or on contact with other specific substances.

A teratogen is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The vapor pressure is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

6.0 EMERGENCY INFORMATION

NEW JERSEY HAZARDOUS SUBSTANCE FACT SHEETS

Topic: 1-HEXENE

NJDEP HOTLINE: (609) 292-7172 Other:

HANDLING AND STORAGE

* Prior to working with 1-Hexene you should be trained on its proper handling and storage.
* Store in tightly closed containers in a cool well-ventilated area away from STRONG OXIDIZERS such as CHLORINE, BROMINE, and FLUORINE.
* Sources of ignition such as smoking and open flames are prohibited where 1-Hexene is handled, used, or stored.
* Metal containers involving the transfer of 5 gallons or more of 1-Hexene should be grounded and bonded. Drums must be equipped with self-closing valves, pressure vacuum bungs, and flame arresters.
* Use only non-sparking tools and equipment, especially when opening and closing containers of 1-Hexene.
* Wherever 1-Hexene is used, handled, manufactured, or stored, use explosion-proof electrical equipment and fittings.

FIRST AID

In NJ, POISON INFORMATION 1-800-962-1253 Other:

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact

* Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Breathing

* Remove the person from exposure.
* Begin rescue breathing if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Vapor Pressure: 100 mm Hg at 55 degrees F (12.8 degrees C), 310 mm Hg at 100 degrees F (37.8 degrees C) Flash Point: -15 degrees F (-26.1 degrees C) Water Solubility: Insoluble

OTHER COMMONLY USED NAMES

Chemical Name:
1-Hexene

Other Names and Formulations:

Hydrochloric Acid

CHRIS

Topic: HYDROCHLORIC ACID

VERVIEW
Material name:
HYDROCHLORIC ACID
Common synonyms:
Muriatic Acid
Characteristics:
Watery liquid Colorless Sharp, irritating odor
Sinks and mixes with water. Irritating vapor is produced.
Emergency actions:
AVOID CONTACT WITH LIQUID AND VAPOR. Keep people away.
Wear chemical protective suit with self-contained breathing apparatus.
Stop discharge if possible.
Stay upwind and use water spray to ''knock down'' vapor.
Isolate and remove discharged material.
Notify local health and pollution control agencies.
Fire:
Not flammable.
Flammable gas may be produced on contact with metals.
Wear chemical protective suit with self-contained breathing apparatus.
Exposure:
CALL FOR MEDICAL AID.
VAPOR
Irritating to eyes, nose and throat.
If inhaled, will cause coughing or difficult breathing.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.
LIQUID
Will burn skin and eyes.
Harmful if swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water
or milk.
DO NOT INDUCE VOMITING.
Water pollution:
Dangerous to aquatic life in high concentrations.
May be dangerous if it enters water intakes.
Notify local health and wildlife officials.
Notify operators of nearby water intakes.
RESPONSE TO DISCHARGE
Issue warning-corrosive Restrict access Disperse and flush
LABEL
Category: Corrosive
Class: 8
CHEMICAL DESIGNATIONS
CG compatibility class: Non-oxidizing mineral acid
Formula: HCl-H(2)O
IMO/UN designation: 8.0/1789
DOT id no.: 1789

CHRIS

Topic: HYDROCHLORIC ACID

CAS registry no.: 7647-01-0

OBSERVABLE CHARACTERISTICS

Physical state: Liquid

Color: Colorless to light yellow

Odor: Pungent; sharp, pungent, irritating

HEALTH HAZARDS

Personal protective equipment: Self-contained breathing equipment, air-line mask, or industrial canister-type gas mask; rubber or rubber-coated gloves, apron, coat, overalls, shoes.

Symptoms following exposure: Inhalation of fumes results in coughing and choking sensation, and irritation of nose and lungs. Liquid causes burns.

Treatment of exposure: INHALATION: remove person to fresh air; keep him warm and quiet and get medical attention immediately; start artificial respiration if breathing stops. INGESTION: have person drink water or milk; do NOT induce vomiting. EYES: immediately flush with plenty of water for at least 15 min. and get medical attention; continue flushing for another 15 min. if physician does not arrive promptly. SKIN: immediately flush skin while removing contaminated clothing; get medical attention promptly; use soap and wash area for at least 15 min.

Threshold limit value: 5 ppm

Short term inhalation limits: 5 ppm for 5 min.

Toxicity by ingestion: Data not available

Late toxicity: None

Vapor (gas) irritant characteristics: Vapor is moderately irritating such that personnel will not usually tolerate moderate or high vapor concentrations.

Liquid or solid irritant characteristics: Fairly severe skin irritant; may cause pain and second- degree burns after a few minutes' contact.

Odor threshold: 1-5 ppm

IDLH value: 100 ppm

FIRE HAZARDS

Flash point: Not flammable

Flammable limits in air: Not flammable

Fire extinguishing agents: Not pertinent

Fire extinguishing agents NOT to be used: Not pertinent

Special hazards of combustion products: Toxic and irritating vapors are generated when heated.

Behavior in fire: Not pertinent

Ignition temperature: Not flammable

Electrical hazard: Not pertinent

Burning rate: Not flammable

Adiabatic flame temperature: Data not available

Stoichiometric air to fuel ratio: Data not available

Flame temperature: Data not available

CHEMICAL REACTIVITY

Reactivity with water: No reaction

Reactivity with common materials: Corrosive to most metals with evolution of hydrogen gas, which may form explosive mixtures with air.

Stability during transport: Stable

Topic: HYDROCHLORIC ACID

Neutralizing agents for acids and caustics: Flush with water; apply powdered limestone, slaked lime, soda ash, or sodium bicarbonate.
Polymerization: Not pertinent
Inhibitor of polymerization: Not pertinent
Molar ratio (reactant to product): Data not available
Reactivity group: 1

WATER POLLUTION

Aquatic toxicity: 282 ppm/96 hr/mosquito fish/TLm/fresh water 100-330 ppm/48 hr/shrimp/LC(50)/salt water
Waterfowl toxicity: Data not available
Biological oxygen demand (BOD): None
Food chain concentration potential: None

SHIPPING INFORMATION

Grades of purity: Food processing or technical: 18 degrees Be-27.9%, 20 Be-31.5%, 22 degrees Be-35.2%; Reagent, ACS, and USP: 23 degrees Be-37.1%
Storage temperature: Ambient
Inert atmosphere: No requirement
Venting: Open

HAZARD CLASSIFICATIONS

Code of federal regulations: Corrosive material
NAS HAZARD RATING FOR BULK WATER TRANSPORTATION:

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

NFPA HAZARD CLASSIFICATION:

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

PHYSICAL AND CHEMICAL PROPERTIES

Physical state at 15 degrees C. and 1 ATM: Liquid
Molecular weight: 36.46
Boiling point at 1 ATM: 123 degrees F = 50.5 degrees C = 323.8 degrees K
Freezing point: Not pertinent
Critical temperature: Not pertinent
Critical pressure: Not pertinent
Specific gravity: 1.19 at 20 degrees C (liquid)
Liquid surface tension: Not pertinent
Liquid water interfacial tension: Not pertinent
Vapor (gas) specific gravity: Not pertinent
Ratio of specific heats of vapor (gas): Not pertinent

CHRIS

Topic: HYDROCHLORIC ACID

Latent heat of vaporization: 178 Btu/lb = 98.6 cal/g = 4.13 X 10(5) J/kg
Heat of combustion: Not pertinent
Heat of decomposition: Not pertinent
Heat of solution: -860 Btu/lb = -480 cal/g = -20 X 10(5) J/kg
Heat of polymerization: Not pertinent
Heat of fusion: 13.0 cal/g
Limiting value: Data not available

Hydrogen

NEW JERSEY HAZARDOUS SUBSTANCE FACT SHEETS

Topic: HYDROGEN

1.0 IDENTIFIERS

CAS Number: 1333-74-0
DOT Number: Gas UN 1049/Liquid UN 1966

RTK Substance number: 1010
Date: March 1989 Revision: First

2.0 HAZARD SUMMARY

* Hydrogen can affect you when breathed in.
* Exposure to high levels can cause suffocation from lack of oxygen.
* Contact with liquid Hydrogen can cause frostbite.
* Hydrogen is a HIGHLY FLAMMABLE LIQUID or GAS and a DANGEROUS FIRE and EXPLOSION HAZARD.

IDENTIFICATION

Hydrogen is a colorless gas or compressed liquid. It is used in welding, thermonuclear reactions and in making ammonia hydrocarbon chemicals, vegetable oils, and in many other industrial operations.

REASON FOR CITATION

* Hydrogen is on the Hazardous Substance List because it is cited by ACGIH, DOT, and NFPA.
* This chemical is on the Special Health Hazard Substance List because it is FLAMMABLE.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been determined for this substance. This does not mean that this substance is not harmful. Safe work practices should always be followed.

* Large amounts of Hydrogen will decrease the amount of available oxygen. Oxygen content should be tested to ensure that it is at least 19% by volume in confined spaces.
* The health effects caused by exposure to Hydrogen are much less serious than its fire and explosion hazard.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective gloves and clothing to avoid contact with cold liquid Hydrogen.
* Monitors can be worn which indicate low oxygen levels. Continuous analyzers can be installed to monitor for a dangerous release of Hydrogen gas.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Hydrogen to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

3.0 HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to Hydrogen:

* Exposure to high levels can cause suffocation from lack of oxygen.
* Contact with liquid Hydrogen can cause frostbite.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to Hydrogen and can last for months or years:

Cancer Hazard

* According to the information presently available to the New Jersey Department of Health, Hydrogen has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

* According to the information presently available to the New Jersey Department of Health, Hydrogen has not been tested for its ability to affect reproduction.

Other Long-Term Effects

* Hydrogen has not been tested for other chronic (long-term)

health effects.

MEDICAL

Medical Testing
There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.
Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.
Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

WORKPLACE CONTROLS AND PRACTICES
Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.
In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.
In addition, the following controls are recommended:
* Where possible, automatically pump liquid Hydrogen from drums or other storage containers to process containers.
* Specific engineering controls are required for this chemical by OSHA. Refer to OSHA standard 1910.103.
* Before entering a confined space where Hydrogen is present, check to make sure sufficient (19%) oxygen exists.
* Before entering a confined space where Hydrogen may be present, check to make sure that an explosive concentration does not exist.

Good WORK PRACTICES can help to reduce hazardous exposures.
The following work practices are recommended:
* Do not smoke in work areas.
* Do not damage containers or use these containers for other substances.

4.0 PERSONAL PROTECTIVE EQUIPMENT
WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE

EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.
The following recommendations are only guidelines and may not apply to every situation.

Clothing
* Avoid skin contact with Hydrogen. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/ clothing material for your operation.
* Where exposure to cold equipment, vapors, or liquid may occur, employees should be provided with special clothing designed to prevent the freezing of body tissues.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection
* Wear splash-proof chemical goggles and face shield when working with liquid, unless full facepiece respiratory protection is worn.

Respiratory Protection
IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.
* Exposure to Hydrogen is dangerous because it can replace oxygen and lead to suffocation. Only MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in positive pressure mode should be used in oxygen deficient environments.

5.0 QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been

exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. Because of this, and because of exposure of children or people who are already ill, community exposures may cause health problems.

The following information is available from:

New Jersey Department of Health
Occupational Health Service Trenton, NJ 08625-0360 (609) 984-1863

Industrial Hygiene Information
Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation
If you think you are becoming sick because of exposure to chemicals at your workplace, you may call a Department of Health physician who can help you find the services you need.

Public Presentations
Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions,

trade associations and other groups.

Right to Know Information Resources
The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-5627.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

CAG is the Carcinogens Assessment Group of the federal EPA.

A carcinogen is a substance that causes cancer.

The CAS number is assigned by the Chemical Abstracts Service to identify a specific chemical.

A combustible substance is a solid, liquid or gas that will burn.

A corrosive substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A fetus is an unborn human or animal.

A flammable substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The flash point is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a

scientific group that classifies chemicals according to their cancer-causing potential.

A miscible substance is a liquid or gas that will evenly dissolve in another.

mg/m3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A mutagen is a substance that causes mutations. A mutation is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A reactive substance is a solid, liquid or gas that can cause an explosion under certain conditions or on contact with other specific substances.

A teratogen is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The vapor pressure is a measure of how readily a liquid or a

solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

6.0 EMERGENCY INFORMATION

Common Name: HYDROGEN
DOT Number: Gas UN 1049/Liquid UN 1966
DOT Emergency Guide code: 22/22
CAS Number: 1333-74-0

Hazard rating	NJ DOH	NFPA
FLAMMABILITY	-	4
REACTIVITY	-	0

HIGHLY FLAMMABLE GAS AND EXPLOSIVE
ASPHYXIANT
CONTAINERS MAY EXPLODE IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS
* Hydrogen is a flammable gas/LIQUID.
* CONTAINERS MAY EXPLODE IN FIRE.
* STOP FLOW OF GAS. Vapors may travel to a source of ignition and flash back.
* Use dry chemical, CO2, water spray, or foam extinguishers.
* Use water spray to keep fire exposed containers cool.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES
If Hydrogen gas is leaked, take the following steps:
* Restrict persons not wearing protective equipment from area of leak until clean-up is complete. Gas build-up may cause suffocation.
* Remove all ignition sources.
* Ventilate area of leak to disperse the gas.
* Stop flow of gas. If source of leak is a cylinder and the leak cannot be stopped in place, remove the leaking cylinder to a safe place in the open air, and repair leak or allow cylinder to empty.

If liquid Hydrogen is spilled or leaked, take the following steps:
* Restrict persons not wearing protective equipment from area of spill or leak until cleanup is complete.

NEW JERSEY HAZARDOUS SUBSTANCE FACT SHEETS

Topic: HYDROGEN

* Remove all ignition sources.
* Stop the leak or move the container to a safe area and allow the liquid to evaporate.
* Keep Hydrogen out of a confined space, such as a sewer, because of the possibility of an explosion, unless the sewer is designed to prevent the build-up of explosive concentrations.
* It may be necessary to contain and dispose of Hydrogen as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: (609) 292-7172 Other:

HANDLING AND STORAGE

* Prior to working with Hydrogen you should be trained on its proper handling and storage.
* Procedures for the handling, use, storage, and inspection of Hydrogen cylinders should be in compliance with OSHA 1910.103 and Subpart M and follow the recommendations of the Compressed Gas Association.
* Hydrogen must be stored to avoid contact with HEAT, FLAMES, SPARKS, and OXYGEN since it is a violent explosive.
* Sources of ignition such as smoking and open flames are prohibited where Hydrogen is used, handled, or stored.
* Metal containers involving the transfer of 5 gallons or more of Hydrogen should be grounded and bonded. Drums must be equipped with self-closing valves, pressure vacuum bungs, and flame arresters.
* Use only non-sparking tools and equipment, especially when opening and closing containers of Hydrogen.
* Wherever Hydrogen is used, handled, manufactured, or stored, use explosion proof electrical equipment and fittings.
* Piping should be electrically bonded and grounded.

FIRST AID

In NJ, POISON INFORMATION 1-800-962-1253 Other:

Contact With Liquid Hydrogen

* Put affected part of body into warm water. Seek medical attention.

Topic: HYDROGEN

Breathing
* Remove the person from exposure.
* Begin rescue breathing if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Water Solubility: Slightly soluble

NEW JERSEY DEPARTMENT OF HEALTH
Right to Know Program CN 368, Trenton, NJ 08625-0368 (609) 984-2202

Isobutylene

P 5800.4. Washington, DC: U.S. Government Printing Office, 1987.,p. G-22

3. Emergency Action: Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Self-contained breathing apparatus (SCBA) and structural firefighter's protective clothing will provide limited protection. Isolate for 1/2 mile in all directions if tank car or truck is involved in fire. CALL CHEMTREC AT 1-800-424-9300 AS SOON AS POSSIBLE, especially if there is no local hazardous materials team available. **QC REVIEWED** [Department of Transportation. Emergency Response Guidebook 1987. DOT P 5800.4. Washington, DC: U.S. Government Printing Office, 1987.,p. G-22
4. Fire: Let tank car, tank truck or storage tank burn unless leak can be stopped; with smaller tanks or cylinders, extinguish/isolate from other flammables. Small Fires: Dry chemical, CO2 or Halon. Large Fires: Water spray or fog. Move container from fire area if you can do it without risk. Cool containers that are exposed to flames with water from the side 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. **QC REVIEWED** [Department of Transportation. Emergency Response Guidebook 1987. DOT P 5800.4. Washington, DC: U.S. Government Printing Office, 1987.,p. G-22
5. Spill or Leak: Shut off ignition sources; no flares, smoking or flames in hazard area. Do not touch spilled material; stop leak if you can do it without risk. Use water spray to reduce vapors; isolate area until gas has dispersed. **QC REVIEWED** [Department of Transportation. Emergency Response Guidebook 1987. DOT P 5800.4. Washington, DC: U.S. Government Printing Office, 1987.,p. G-22
6. 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 frostbite, thaw frosted parts with water. Keep victim quiet and maintain normal body temperature. **QC REVIEWED** [Department of Transportation. Emergency Response Guidebook 1987. DOT P 5800.4. Washington, DC: U.S. Government Printing Office, 1987.,p. G-22

Flammable Properties

Fire Potential:

1. VERY DANGEROUS, WHEN EXPOSED TO HEAT OR FLAME. **PEER REVIEWED** [Sax, N.I. Dangerous Properties of Industrial

Topic: ISOBUTYLENE

4. MASS: 26 (Atlas of Mass Spectral Data, John Wiley & Sons, New York) **QC REVIEWED** [Weast, R.C. and M.J. Astle. CRC Handbook of Data on Organic Compounds. Volumes I and II. Boca Raton, FL: CRC Press Inc. 1985.,p. V1 355

Vapor Density:

1. 1.94 **PEER REVIEWED** [Sax, N.I. Dangerous Properties of Industrial Materials. 5th ed. New York: Van Nostrand Rheinhold, 1979. 750

Vapor Pressure:

1. 3290 MM HG @ 40.5 DEG C **PEER REVIEWED** [Sax, N.I. Dangerous Properties of Industrial Materials. 4th ed. New York: Van Nostrand Reinhold, 1975. 840

Other Chemical/Physical Properties:

1. REACTS EASILY WITH NUMEROUS MATERIALS, POLYMERIZES EASILY **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical Dictionary. 9th ed. New York: Van Nostrand Reinhold Co., 1977. 477
2. TASTELESS & ODORLESS /ISOBUTYLENE POLYMERS/ **PEER REVIEWED** [Lefaux, R. Practical Toxicology of Plastics. Cleveland: CRC Press Inc., 1968. 34
3. MASS: 184 (Aldermaston, Eight Peak Index of Mass Spectra, UK) /Tetraisobutylene/ **QC REVIEWED** [Weast, R.C. and M.J. Astle. CRC Handbook of Data on Organic Compounds. Volumes I and II. Boca Raton, FL: CRC Press Inc. 1985.,p. V1 356
4. IR: 2383 (Coblentz Society Spectral Collection) /Triisobutylene/ **QC REVIEWED** [Weast, R.C. and M.J. Astle. CRC Handbook of Data on Organic Compounds. Volumes I and II. Boca Raton, FL: CRC Press Inc. 1985.,p. V1 356
5. MASS: 1114 (Atlas of Mass Spectral Data, John Wiley & Sons, New York) /Triisobutylene/ **QC REVIEWED** [Weast, R.C. and M.J. Astle. CRC Handbook of Data on Organic Compounds. Volumes I and II. Boca Raton, FL: CRC Press Inc. 1985.,p. V1 356

SAFETY & HANDLING

Emergency Guidelines

DOT Emergency Guidelines:

1. Fire or Explosion: Extremely flammable; 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. **QC REVIEWED** [Department of Transportation. Emergency Response Guidebook 1987. DOT P 5800.4. Washington, DC: U.S. Government Printing Office, 1987.,p. G-22
2. Health Hazards: Vapors may cause dizziness or suffocation. Contact will cause severe frostbite. Fire may produce irritating or poisonous gases. **QC REVIEWED** [Department of Transportation. Emergency Response Guidebook 1987. DOT

Topic: ISOBUTYLENE

1. (1972) ND **PEER REVIEWED** [SRI
2. (1975) ND **PEER REVIEWED** [SRI
3. (1985) ND **QC REVIEWED**

CHEMICAL & PHYSICAL PROPERTIES

Color/Form:

1. COLORLESS LIQUID OR EASILY LIQUEFIED GAS **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical Dictionary. 9th ed. New York: Van Nostrand Reinhold Co., 1977. 477

Odor:

1. COAL GAS ODOR **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical Dictionary. 9th ed. New York: Van Nostrand Reinhold Co., 1977. 477

Boiling Point:

1. -6.9 DEG C **PEER REVIEWED** [Weast, R.C. (ed.). Handbook of Chemistry and Physics. 60th ed. Boca Raton, Florida: CRC Press Inc., 1979.,p. C-464

Melting Point:

1. -140.35 DEG C **PEER REVIEWED** [Weast, R.C. (ed.). Handbook of Chemistry and Physics. 60th ed. Boca Raton, Florida: CRC Press Inc., 1979.,p. C-464

Molecular Weight:

1. 56.10 **PEER REVIEWED** [The Merck Index. 9th ed. Rahway, New Jersey: Merck & Co., Inc., 1976. 674

Density/Specific Gravity:

1. 0.5942 @ 20 DEG C/4 DEG C **PEER REVIEWED** [Weast, R.C. (ed.). Handbook of Chemistry and Physics. 60th ed. Boca Raton, Florida: CRC Press Inc., 1979.,p. C-464

Solubilities:

1. PRACTICALLY INSOL IN WATER; VERY SOL IN ALCOHOL, ETHER **PEER REVIEWED** [The Merck Index. 9th ed. Rahway, New Jersey: Merck & Co., Inc., 1976. 674
2. SOL IN BENZENE, PETROLEUM ETHER, SULFURIC ACID **PEER REVIEWED** [Weast, R.C. (ed.). Handbook of Chemistry and Physics. 60th ed. Boca Raton, Florida: CRC Press Inc., 1979.,p. C-464

Spectral Properties:

1. INDEX OF REFRACTION: 1.3926 @ -25 DEG C; SADTLER REF NUMBER: 7858 (IR, PRISM) **QC REVIEWED** [Weast, R.C. (ed.). Handbook of Chemistry and Physics. 60th ed. Boca Raton, Florida: CRC Press Inc., 1979.,p. C-464
2. MAX ABSORPTION: 159 NM (LOG E= 3.9); 184 NM, 188 NM (LOG E= 4.1); 192 NM SHOULDER (LOG E= 3.9); 200 NM SHOLDER (LOG E= 3.9) **PEER REVIEWED** [Weast, R.C. (ed.). Handbook of Chemistry and Physics. 60th ed. Boca Raton, Florida: CRC Press Inc., 1979.,p. C-464
3. IR: 8514 (Sadtler Research Laboratories IR Grating Collection) **QC REVIEWED** [Weast, R.C. and M.J. Astle. CRC Handbook of Data on Organic Compounds. Volumes I and II. Boca Raton, FL: CRC Press Inc. 1985.,p. V1 355

Topic: ISOBUTYLENE

MONITORING AND ANALYSIS METHODS

Analytic Laboratory Methods:

1. SIMPLE, RAPID & SENSITIVE COLORIMETRIC METHOD WAS DEVELOPED TO DETERMINE ISOBUTYLENE IN AIR. **PEER REVIEWED** [LIPINA TG; GIG TR PROF ZABOL 17(1) 45 (1973)
2. GAS CHROMATOGRAPHY WAS USED TO STUDY DISTRIBUTION OF 6 VOLATILE HYDROCARBONS IN MOUSE & RAT BODY TISSUES. **PEER REVIEWED** [SHUGAEV BB; FARMAKOL TOKSIKOL (MOSCOW) 31(3) 360 (1968)

ADDITIONAL REFERENCES

Test Status:

1. The NTP Toxicology Research and Testing Program releases a Management Status Report on a quarterly basis. This report gives the status of chemicals studied, under study, or proposed for study by NTP. The mid-1993 issue indicates that two year study is in progress for isobutylene. Route: inhalation; Species: rats and mice. **QC REVIEWED** [NTP; Division of Toxicology Research and Testing; Management Status Report; 07/07/93; p.17

Dictionary. 9th ed. New York: Van Nostrand Reinhold Co., 1977. 477

Storage Conditions:

1. ...MATERIALS WHICH ARE TOXIC AS STORED OR WHICH CAN DECOMPOSE INTO TOXIC COMPONENTS...SHOULD BE STORED IN A COOL, WELL VENTILATED PLACE, OUT OF THE DIRECT RAYS OF THE SUN, AWAY FROM AREAS OF HIGH FIRE HAZARD, AND SHOULD BE PERIODICALLY INSPECTED. INCOMPATIBLE MATERIALS SHOULD BE ISOLATED... **PEER REVIEWED** [Sax, N.I. Dangerous Properties of Industrial Materials. 4th ed. New York: Van Nostrand Reinhold, 1975. 841

TOXICITY/BIOMEDICAL EFFECTS

Toxicity Excerpts

Human Toxicity Excerpts:

1. BUTYLENE ISOMERS ARE SIMILAR IN PHARMACOLOGICAL ACTIVITY AS ASPHYXIANTS & WEAK ANESTHETICS. ...ABOUT 4.5 TIMES AS TOXIC AS ETHYLENE. /BUTYLENE ISOMERS/ **PEER REVIEWED** [Patty, F. (ed.). Industrial Hygiene and Toxicology: Volume II: Toxicology. 2nd ed. New York: Interscience Publishers, 1963. 1204

Pharmacokinetics

Absorption, Distribution and Excretion:

1. FASTED RATS EXHALE THE HYDROCARBONS @ RATE OF APPROX 1.7 NMOL/KG/HR. THROUGH AN IMPROVED ANALYTICAL PROCEDURE OTHER VOLATILE HYDROCARBONS COULD BE DETECTED IN BREATH OF ANIMALS. **PEER REVIEWED** [FRANK H ET AL; TOXICOL APPL PHARMACOL 56(3) 337 (1980)

Interactions:

1. GAS-LIQUID CHROMATOGRAPHY WAS USED TO STUDY BRAIN HYDROCARBON CONTENT IN RATS & MICE INHALING MIXTURES OF BUTANE & ISOBUTYLENE. THERE WAS SUMMATION OF CNS DEPRESSANT EFFECTS OF BUTANE & ISOBUTYLENE TOWARD POTENTIATION RATHER THAN ANTAGONISM. **PEER REVIEWED** [SHUGAEV BB; FARMAKOL TOKSIKOL (MOSCOW); 30(1) 102 (1967)

ENVIRONMENTAL FATE/EXPOSURE POTENTIAL

Pollution Sources

Natural Occurring Sources:

1. ISOBUTYLENE IS A COMPONENT OF PETROLEUM AND NATURAL GAS **QC REVIEWED** [USITC. SYN ORG CHEM-U.S. PROD/SALES 1984

Human Exposure

Probable Exposures:

1. UNLESS ENCOUNTERED IN SUFFICIENT CONCN TO CAUSE ASPHYXIA, THESE OLEFINS DO NOT APPEAR TO WARRANT SERIOUS CONSIDERATION FOR THEIR EFFECTS ON HEALTH OF WORKMEN EXPOSED TO LOW CONCN FOR PROLONGED PERIODS OR TO HIGHER CONCN FOR...SHORT PERIODS... **PEER REVIEWED** [Patty, F. (ed.). Industrial Hygiene and Toxicology: Volume II: Toxicology. 2nd ed. New York: Interscience Publishers, 1963. 1204

Topic: ISOBUTYLENE

Materials. 5th ed. New York: Van Nostrand Rheinhold, 1979. 750

Flash Point:

1. -105 DEG F **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical Dictionary. 9th ed. New York: Van Nostrand Reinhold Co., 1977. 477

Autoignition Temperature:

1. 869 DEG F **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical Dictionary. 9th ed. New York: Van Nostrand Reinhold Co., 1977. 477

Fire Fighting Information

Explosive Limits and Potential:

1. EXPLOSIVE LIMITS IN AIR 1.8% TO 8.8% **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical Dictionary. 9th ed. New York: Van Nostrand Reinhold Co., 1977. 477

Hazardous Reactions

Reactivities and Incompatibilities:

1. CAN REACT VIGOROUSLY WITH OXIDIZING MATERIALS. **PEER REVIEWED** [Sax, N.I. Dangerous Properties of Industrial Materials. 5th ed. New York: Van Nostrand Rheinhold, 1979. 750

Preventive Measures

Protective Equipment and Clothing:

1. PROTECTIVE CLOTHING, BARRIER CREAMS...MEDICAL CONTROL... **PEER REVIEWED** [Sax, N.I. Dangerous Properties of Industrial Materials. 4th ed. New York: Van Nostrand Reinhold, 1975. 841

Other Protective Measures:

1. VENTILATION CONTROL: THE BASIC VENTILATION METHODS ARE LOCAL EXHAUST VENTILATION AND DILUTION OR GENERAL VENTILATION. **PEER REVIEWED** [Sax, N.I. Dangerous Properties of Industrial Materials. 4th ed. New York: Van Nostrand Reinhold, 1975. 841
2. ...SUBSTITUTION OF LESS IRRITATING SUBSTANCES...REDESIGN OF OPERATIONS...PREVENT CONTACT, PROVISION OF A PHYSICAL BARRIER AGAINST CONTACT, PROPER WASHING FACILITIES, WORK CLOTHING AND STORAGE FACILITIES... **PEER REVIEWED** [Sax, N.I. Dangerous Properties of Industrial Materials. 4th ed. New York: Van Nostrand Reinhold, 1975. 841

Other Safety & Handling

Stability/Shelf Life:

1. VOLATILE **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical Dictionary. 9th ed. New York: Van Nostrand Reinhold Co., 1977. 477

Shipment Methods and Regulations:

1. CONTAINERS: TANK CARS; CYLINDERS. ... SHIPPING REGULATIONS: (RAIL) RED GAS LABEL. (AIR) FLAMMABLE GAS LABEL. NOT ACCEPTABLE ON PASSENGER PLANES. **PEER REVIEWED** [Hawley, G.G. The Condensed Chemical

Kerosene

5.2 Chemical Hazard Information

Onsite personnel may be exposed to chemical hazards while observing or participating in surface soil sampling. There is potential for dermal contact of the constituents outlined below.

Diesel Fuel Oil and Heating Oil: Diesel Fuel Oil is a complex petroleum mixture of paraffinic, olefinic, naphthenic, and aromatic hydrocarbons. The benzene content is typically less than 100 ppm in the source product. Excessive inhalation exposure may cause respiratory irritation, headache, dizziness, nausea, vomiting, and loss of coordination. Prolonged skin contact may lead to irritation of hair follicles and blockage of the sebaceous glands. Good personal hygiene will prevent this. There is no OSHA permissible exposure limit for diesel Fuel Oil.

Gasoline: Gasoline is a variable mixture of paraffins, aromatics, and olefins. Acute toxicity includes anesthetic effects and mucus membrane irritation. Symptoms of acute exposure include headache, blurred vision, dizziness, and nausea. The major toxicity concern is benzene, a known human carcinogen through inhalation. Gasoline typically contains 0.7 to 1.0 percent benzene. The OSHA time weighted average (TWA) for benzene is currently 1 ppm.

Gasoline also contains lead, which has adverse health effects if inhaled. The OSHA TWA for lead is 50 micrograms per cubic meter (ug/m^3); however, lead is not readily volatilized. The overall threshold limit value (TLV) for gasoline is 300 ppm, based largely upon assumptions about the hydrocarbon content of gasoline.

Skin contact with gasoline can produce immediate or delayed symptoms of dryness or irritation. If skin comes in contact with gasoline, remove clothing from affected skin area and wash promptly with soap and water. Dry the skin carefully with a clean towel. If skin is inflamed, painful or blistered, seek medical attention. If ingestion occurs, do not induce vomiting. Get medical help. Be prepared to administer artificial respiration.

Kerosene: Kerosene is a refined petroleum distillate consisting primarily of C10 to C16 hydrocarbons. It is a variable mixture of paraffins, naphthenes, olefins, and aromatics. The vapor pressure at $20^{\circ}C$ is approximately 5 millimeters (mm) mercury (Hg). There is no OSHA permissible exposure level (PEL), but the National Institute of Occupational Safety and Health (NIOSH) recommends an exposure limit (REL) of 100 milligrams per cubic meter (mg/m^3). (This is approximately 14 ppm.) Overexposure may cause headaches, dizziness, nausea, stupor, and respiratory tract and eye irritation. The primary health hazard is skin irritation and dermatitis from prolonged or repeated skin contact. Ingestion can be irritating to the mouth, throat, and digestive tract with the hazard of aspiration into the lungs.

Methane

NEW JERSEY HAZARDOUS SUBSTANCE FACT SHEETS

Topic: METHANE

1.0 IDENTIFIERS

CAS Number: 74-82-8
DOT Number: UN 1971/UN 1972

RTK Substance number: 1202
Date: January 1986

2.0 HAZARD SUMMARY

* Methane can affect you when breathed in.
* Very high levels can cause suffocation from lack of oxygen.
* Chemical cartridge repirators should not be used where Methane exposure occurs. For high exposures use air supplied respirators.
* Contact with liquified Methane can cause frostbite.
* Methane is a HIGHLY FLAMMABLE Gas and a dangerous FIRE and EXPLOSION HAZARD.

IDENTIFICATION

Methane is an odorless, colorless gas used as a fuel and in the manufacture of organic chemicals, acetylene, hydrogen cyanide, and hydrogen. It may also be a cold liquid.

REASON FOR CITATION

* Methane is on the Hazardous Substance List because it is cited by ACGIH, DOT and NFPA.
* This chemical is on the Special Health Hazard Substance List because it is FLAMMABLE.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

* No exposure limits have been determined for this chemical.
* The health effects caused by exposure to Methane are much less serious than its fire and explosion risk.
* Large amounts of Methane will decrease the amount of available oxygen. Oxygen content should be tested to ensure that it is at least 19% by volume.

WAYS OF REDUCING EXPOSURE

NEW JERSEY HAZARDOUS SUBSTANCE FACT SHEETS

Topic: METHANE

Compressed Gas Association.
* Methane must be stored to avoid contact with OXIDIZERS (such as OXYGEN, CHLORINE, BROMINE, PERCHLORATES, PEROXIDES, NITRATES, and PERMANGANATES) since violent reactions occur.
* Sources of ignition such as smoking and open flames are prohibited where Methane is handled, used, or stored.
* Use only non-sparking tools and equipment, especially when opening and closing containers of Methane.
* Wherever Methane is used, handled, manufactured, or stored, use explosion-proof electrical equipment and fittings.

FIRST AID
In NJ, POISON INFORMATION 1-800-962-1253 Other:

Breathing
* Remove the person from exposure.
* Begin rescue breathing if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.

If frostbite occurs:
* Immerse affected part in warm (not hot) water. Seek medical attention.

PHYSICAL DATA
Flash Point: -306 degrees F (-187.7 degrees C) Water
Solubility: Soluble

OTHER COMMONLY USED NAMES

Chemical Name:
Methyl Hydride

Other Names and Formulations:
Natural Gas; Marsh Gas; Biogas

NEW JERSEY DEPARTMENT OF HEALTH
Right to Know Program CN 368, Trenton, NJ 08625-0368 (609) 984-2202

NEW JERSEY HAZARDOUS SUBSTANCE FACT SHEETS

Topic: METHANE

CONTAINERS MAY EXPLODE IN FIRE ASPHYXIANT GAS

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS
* Methane is a flammable gas.
* CONTAINERS MAY EXPLODE IN FIRE.
* THE FLAME MAY BE INVISIBLE.
* Stop the flow of gas.
* Use water spray to disperse the vapors.
* For small fires use dry chemical or carbon dioxide extinguishers.
* For large fires use water spray, fog,or foam.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES
If Methane is leaked, take the following steps:
* Restrict persons not wearing protective equipment from area of leak until cleanup is complete.
* Remove all ignition sources.
* Ventilate area of leak to disperse the gas.
* Stop flow of gas. If source of leak is a cylinder and the leak cannot be stopped in place, remove the leaking cylinder to a safe place in the open air, and repair leak or allow cylinder to empty.
* Use water spray to reduce vapor.
* It may be necessary to contain and dispose of Methane as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: (609) 292-7172 Other:

HANDLING AND STORAGE
* Prior to working with Methane you should be trained on its proper handling and storage.
* Procedures for handling, use, and storage of Methane cylinders should be in compliance with OSHA 1910.101 and subpart "M" and follow the recommendations of the

Eye Protection
* Wear gas-proof goggles, unless full facepiece respiratory protection is worn.

Respiratory Protection
IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.
* Exposure to Methane is dangerous because it can replace oxygen and lead to suffocation. Only MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in positive pressure mode should be used in oxygen deficient environments.

5.0 QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases

of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. Because of this, and because of exposure of children or people who are already ill, community exposures may cause health problems.

The following information is available from:

New Jersey Department of Health
Occupational Health Service Trenton, NJ 08625-0360 (609) 984-1863

Industrial Hygiene Information
Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation
If you think you are becoming sick because of exposure to chemicals at your workplace, you may call a Department of Health physician who can help you find the services you need.

Public Presentations
Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources
The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-5627.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

NEW JERSEY HAZARDOUS SUBSTANCE FACT SHEETS

Topic: METHANE

CAG is the Carcinogens Assessment Group of the federal EPA.

A carcinogen is a substance that causes cancer.

The CAS number is assigned by the Chemical Abstracts Service to identify a specific chemical.

A combustible substance is a solid, liquid or gas that will burn.

A corrosive substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A fetus is an unborn human or animal.

A flammable substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The flash point is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A miscible substance is a liquid or gas that will evenly dissolve in another.

mg/mJ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A mutagen is a substance that causes mutations. A mutation is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NCI is the National Cancer Institute, a federal agency that

determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A reactive substance is a solid, liquid or gas that can cause an explosion under certain conditions or on contact with other specific substances.

A teratogen is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The vapor pressure is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

6.0 EMERGENCY INFORMATION

Common Name: METHANE
DOT Number: UN 1971/UN 1972
DOT Emergency Guide code:
CAS Number: 74-82-8

Hazard rating	NJ DOH	NFPA
FLAMMABILITY		4
REACTIVITY		0

HIGHLY FLAMMABLE GAS

Methanol

Occupational Health Guideline for Methyl Alcohol

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

- Formula: CH_3OH
- Synonyms: Methanol; wood alcohol; Columbian spirits; carbinol
- Appearance and odor: Colorless liquid with a characteristic, pungent odor.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for methyl alcohol is 200 parts of methyl alcohol per million parts of air (ppm) averaged over an eight-hour work shift. This may also be expressed as 260 milligrams of methyl alcohol per cubic meter of air (mg/m^3). NIOSH has recommended that the permissible exposure limit be changed to 200 ppm averaged over a work shift of up to 10 hours per day, 40 hours per week, with a ceiling of 800 ppm averaged over a 15-minute period. The NIOSH Criteria Document for Methyl Alcohol should be consulted for more detailed information.

HEALTH HAZARD INFORMATION

- **Routes of exposure**

Methyl alcohol can affect the body if it is swallowed, is inhaled, or comes in contact with the skin or eyes.

- **Effects of overexposure**

1. Short-term Exposure: Swallowing methyl alcohol or breathing very high concentrations of methyl alcohol may produce headache, weakness, drowsiness, lightheadedness, nausea, vomiting, drunkenness, and irritation of the eyes, blurred vision, blindness, and death. A person may get better and then worse again up to 30 hours later.

2. Long-term Exposure: Prolonged exposure to higher concentrations of methyl alcohol may result in headaches, burning of the eyes, dizziness, sleep problems, digestive disturbances, and failure of vision. Repeated or prolonged skin exposure may cause skin irritation.

3. Reporting Signs and Symptoms: A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to methyl alcohol.

- **Recommended medical surveillance**

The following medical procedures should be made available to each employee who is exposed to methyl alcohol at potentially hazardous levels:

1. Initial Medical Examination:

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the employee at increased risk, and to establish a baseline for future health monitoring. Examination of the skin, liver, kidneys, and eyes should be stressed.

—Skin disease: Methyl alcohol is a defatting agent and can cause dermatitis on prolonged exposure. Persons with pre-existing skin disorders may be susceptible to the effects of this agent.

—Liver function tests: Methyl alcohol may cause liver damage. A profile of liver function should be obtained by utilizing a medically acceptable array of biochemical tests.

—Kidney disease: Although methyl alcohol has not been proven to be kidney toxin in humans, the importance of this organ in the elimination of toxic substances justifies special consideration in those with impaired renal function.

—Eye disease: Because methyl alcohol may cause optic atrophy and blindness, those with pre-existing eye diseases may be at increased risk from exposure.

2. Periodic Medical Examination: The aforementioned medical examinations should be repeated on an annual basis. In addition, anyone developing the above-listed conditions or who has been splashed in the eyes with,

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These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service Centers for Disease Control
National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.

• In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

PERSONAL PROTECTIVE EQUIPMENT

• Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent repeated or prolonged skin contact with liquid methyl alcohol.

• Clothing wet with liquid methyl alcohol should be placed in closed containers for storage until it can be discarded or until provision is made for the removal of methyl alcohol from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the methyl alcohol, the person performing the operation should be informed of methyl alcohol's hazardous properties.

• Any clothing which becomes wet with liquid methyl alcohol should be removed immediately and not reworn until the methyl alcohol is removed from the clothing.

• Employees should be provided with and required to use splash-proof safety goggles where liquid methyl alcohol may contact the eyes.

SANITATION

• Skin that becomes wet with liquid methyl alcohol should be promptly washed or showered to remove any methyl alcohol.

• Eating and smoking should not be permitted in areas where liquid methyl alcohol is handled, processed, or stored.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to methyl alcohol may occur and control methods which may be effective in each case:

Operation	Controls
Liberation during application of surface coatings such as shellac, wood dyes, nitrocellulose lacquers, water-proofing formulations, and phenolic resins	Local exhaust ventilation; general dilution ventilation; personal protective equipment
Use as a solvent for rotogravure inks, aniline dyes, and duplicator fluids	General dilution ventilation
Liberation during manual application of methanol as a cleaner for coated surfaces, leather, gloves, and metal and resins surfaces prior to further treatment	General dilution ventilation; personal protective equipment
Liberation during manufacture of formaldehyde by oxidation or dehydrogenation	Local exhaust ventilation; general dilution ventilation
Use in plastics industry to produce plasticizers, softening agents, and acrylic resins	Local exhaust ventilation; general dilution ventilation; personal protective equipment
Liberation during use as an intermediate in the preparation of methacrylates, methyl chlorides, methyl ethers, dimethyl sulfate, methyl formate, and methyl bromide	Local exhaust ventilation; general dilution ventilation; personal protective equipment
Liberation during application as an extractant in industrial chemical processes such as refinery gasoline and oils and purifying pharmaceuticals such as steroids and hormones	Local exhaust ventilation; general dilution ventilation
Use as a solvent in rubber industry	Local exhaust ventilation; general dilution ventilation; personal protective equipment

Baxter Healthcare Corporation
Burdick & Jackson Division
1953 South Harvey Street
Muskegon, MI 49442 USA

information/emergency telephone no. 616.726.3171
chemtrec telephone no. 800.424.9300
canadian emergency telephone no. 613.996.6666

MATERIAL SAFETY DATA SHEET

METHANOL

I. Identification

chemical name Methanol — molecular weight 32.04
chemical family Alcohol — formula CH_4O
synonyms Carbinol, Methyl Alcohol, Wood Alcohol
DOT proper shipping name Methyl Alcohol or Methanol
DOT hazard class Flammable Liquid
DOT identification no. UN1230 — CAS no. 67-56-1

II. Physical and Chemical Data

boiling point, 760mm Hg 64.7°C — freezing point -97.7°C — evaporation rate (BuAc=1) ca 5
vapor pressure at 20°C 97 mm Hg — vapor density (air = 1) 1.11 — solubility in water @ 20°C complete
% volatiles by volume ca 100 — specific gravity (H_2O=1) @ 20°C 0.792 — stability Stable
hazardous polymerization Not expected to occur.
appearance and odor A clear, colorless liquid with a slight alcoholic odor.
conditions to avoid Heat, sparks, open flame, open containers, and poor ventilation.

materials to avoid Strong oxidizing agents and reactive metals which will displace hydrogen.

hazardous decomposition products Incomplete combustion can generate carbon monoxide and other toxic vapors such as formaldehyde.

III. Fire and Explosion Hazard Data

flash point, (test method) 12°C (Tag closed cup) — auto ignition temperature 385°C
flammable limits in air % by volume: lower limit 6.7 — upper limit 36.5
unusual fire and explosion hazards May burn with an invisible flame. Mixtures with water as low as 21% by volume are still flammable (flash point below 37.8°C). Under some circumstances can corrode certain metals, including aluminum and zinc, and generate hydrogen gas.
extinguishing media Carbon dioxide, dry chemical, alcohol foam, water mist or fog.
special fire fighting procedures Wear full protective clothing and self-contained breathing apparatus. Heat will build pressure and may rupture closed storage containers. Keep fire-exposed containers cool with water spray.

IV. Hazardous Components

	%	TLV	CAS no.
Methanol	ca 100	200 ppm (skin)	67-56-1

Emergency First Aid:

Inhalation: Immediately remove to fresh air. If not breathing, administer mouth-to-mouth rescue breathing. If there is no pulse administer cardiopulmonary resuscitation (CPR). Contact physician immediately.

Eye Contact: Rinse with copious amounts of water for at least 15 minutes. Get emergency medical assistance.

Skin Contact: Flush thoroughly for at least 15 minutes. Wash affected skin with soap and water. Remove contaminated clothing and shoes. Wash clothing before re-use, and discard contaminated shoes. Get emergency medical assistance.

Ingestion: Call local Poison Control Center for assistance. Contact physician immediately. Never induce vomiting or give anything by mouth to a victim unconscious or having convulsions.

Note to Physician

In case of ingestion or massive inhalation, observe victim as an inpatient because slow metabolism causes a latent period of 24 hours between exposure and acidosis and blindness.

VI. Safety Measures and Equipment

Ventilation: Adequate ventilation is required to protect personnel from exposure to chemical vapors exceeding the PEL and to minimize fire hazards. The choice of ventilation equipment, either local or general, will depend on the conditions of use, quantity of material, and other operating parameters.

Respiratory: Use approved respirator equipment. Follow NIOSH and equipment manufacturer's recommendations to determine appropriate equipment (air-purifying, air-supplied, or self-contained breathing apparatus).

Eyes: Safety glasses are considered minimum protection. Goggles or face shield may be necessary depending on quantity of material and conditions of use.

Skin: Protective gloves and clothing are recommended. The choice of material must be based on chemical resistance and other user requirements. Generally, neoprene, nitrile rubber, or rubber offer acceptable chemical resistance. Individuals who are acutely and specifically sensitive to methanol may require additional protective equipment.

Condition	Minimum Respiratory Protection* Required Above 200 ppm
Vapor Concentration	
2000 ppm or less	Any supplied-air respirator. Any self-contained breathing apparatus.
10,000 ppm or less	Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
25,000 ppm or less	A Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure mode or with a full facepiece, helmet, or hood operated in continuous-flow mode.
Greater than 25,000 ppm or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
Escape	Any escape self-contained breathing apparatus.

*Only NIOSH-approved or MSHA-approved equipment should be used.

Nitric Acid

TRADE NAMES

Canadian Centre for Occupational Health and Safety

*** IDENTIFICATION ***

RECORD NUMBER : 240411
LANGUAGE : ENGLISH
TRADE NAME(S) : NITRIC ACID
PRODUCT IDENTIFICATION DATA : J.T. BAKER MSDS NUMBER: N3660 PRODUCT CODES: 9597,6901,9602,9616,9605,5113,5371,4801,9604,9601,9600,9606 9598
DATE OF MSDS : 1989-05-01

*** MANUFACTURER INFORMATION ***

MANUFACTURER : J T BAKER CHEMICAL CO
ADDRESS : 222 RED SCHOOL LANE
PHILLIPSBURG NEW JERSEY
U.S.A. 08865
EMERGENCY TELEPHONE NO.(S) : 201-859-2151
800-424-9300 (CHEMTREC)
800-424-8802 (NATIONAL RESPONSE CENTER)

*** MATERIAL SAFETY DATA ***

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: NITRIC ACID
COMMON SYNONYMS: HYDROGEN NITRATE; AZOTIC ACID
CHEMICAL FAMILY: INORGANIC ACIDS
FORMULA: HNO3
FORMULA WT.: 63.01
CAS NO.: 7697-37-2
NIOSH/RTECS NO.: QU5775000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 9597,6901,9602,9616,9605,5113,5371,4801,9604,9601,9600,9606 9598

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	3	SEVERE (OXIDIZER)
CONTACT	-	4	EXTREME (CORROSIVE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

POISON DANGER

SPILLAGE MAY CAUSE FIRE OR LIBERATE DANGEROUS GAS. HARMFUL IF INHALED AND MAY CAUSE DELAYED LUNG INJURY. STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. LIQUID AND VAPOR CAUSE SEVERE BURNS. MAY BE FATAL IF SWALLOWED OR INHALED.
KEEP FROM CONTACT WITH CLOTHING AND OTHER COMBUSTIBLE MATERIALS. DO NOT STORE NEAR COMBUSTIBLE MATERIALS. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE WATER SPRAY. IN CASE OF SPILL, NEUTRALIZE WITH SODA ASH OR LIME.

CONTINUED ON PAGE: 2

PRECAUTIONARY LABELING (CONTINUED)

INTERNATIONAL LABELING

CAUSES SEVERE BURNS.
KEEP OUT OF REACH OF CHILDREN. DO NOT BREATHE VAPOUR. IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE. TAKE OFF IMMEDIATELY ALL CONTAMINATED CLOTHING.

SAF-T-DATA* STORAGE COLOR CODE: YELLOW (REACTIVE)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
NITRIC ACID	7697-37-2	65-71	2 PPM	2 PPM
WATER	7732-18-5	29-35	N/E	N/E

SECTION III - PHYSICAL DATA

BOILING POINT: 121 C (249 F) (AT 760 MM HG)

VAPOR PRESSURE (MMHG): 9 (20 C)

MELTING POINT: -42 C (-43 F) (AT 760 MM HG)

VAPOR DENSITY (AIR=1): N/A

SPECIFIC GRAVITY: 1.41 (H2O=1)

EVAPORATION RATE: N/A

SOLUBILITY(H2O): COMPLETE (100%)

% VOLATILES BY VOLUME: 100 (21 C)

PH: 1.0 (0.1M SOLUTION)

ODOR THRESHOLD (P.P.M.): N/A

PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. SUFFOCATING ODOR.

CONTINUED ON PAGE: 3

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A

NFPA 704M RATING: 3-0-0 OXY

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LIMITS: UPPER - N/A LOWER - N/A

FIRE EXTINQUISHING MEDIA

USE WATER SPRAY.

SPECIAL FIRE-FIGHTING PROCEDURES

CARCINOGENICITY: NTP: NO IARC: NO I LIST: NO OSHA REG: NO

CARCINOGENICITY

NONE IDENTIFIED.

REPRODUCTIVE EFFECTS

NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: SEVERE IRRITATION OR BURNS OF RESPIRATORY SYSTEM, COUGHING, DIFFICULT BREATHING, CHEST PAINS, PULMONARY EDEMA, LUNG INFLAMMATION, UNCONSCIOUSNESS, AND MAY BE FATAL

SKIN CONTACT: SEVERE IRRITATION OR BURNS

EYE CONTACT: SEVERE IRRITATION OR BURNS

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: NAUSEA, VOMITING, SEVERE BURNS, ULCERATION - MOUTH, THROAT, STOMACH, AND MAY BE FATAL

CHRONIC EFFECTS: DAMAGE TO LUNGS, TEETH

TARGET ORGANS

EYES, SKIN, MUCOUS MEMBRANES, RESPIRATORY SYSTEM, LUNGS, TEETH, GI TRACT

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

DAMAGED SKIN, EYE DISORDERS, CARDIOPULMONARY DISEASE, LUNG DISEASE

PRIMARY ROUTES OF ENTRY

INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

CONTINUED ON PAGE: 5

SECTION V - HEALTH HAZARD DATA (CONTINUED)

EMERGENCY AND FIRST AID PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE EXPOSED CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL; DO NOT GET WATER INSIDE CONTAINERS.

UNUSUAL FIRE & EXPLOSION HAZARDS

STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. REACTS WITH MOST METALS TO PRODUCE HYDROGEN GAS, WHICH CAN FORM AN EXPLOSIVE MIXTURE WITH AIR. A VIOLENT EXOTHERMIC REACTION OCCURS WITH WATER. SUFFICIENT HEAT MAY BE PRODUCED TO IGNITE COMBUSTIBLE MATERIALS.

TOXIC GASES PRODUCED

OXIDES OF NITROGEN, HYDROGEN

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA):	5 MG/M3	(2 PPM)
SHORT-TERM EXPOSURE LIMIT (STEL):	10 MG/M3	(4 PPM)
PERMISSIBLE EXPOSURE LIMIT (PEL):	5 MG/M3	(2 PPM)

CONTINUED ON PAGE: 4

SECTION V - HEALTH HAZARD DATA (CONTINUED)

TOXICITY OF COMPONENTS

INHALATION-1HR RAT LC50 FOR NITRIC ACID	2500 PPM
INTRAPERITONEAL MOUSE LD50 FOR WATER	190 G/KG
INTRAVENOUS MOUSE LD50 FOR WATER	25 G/KG

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: YES PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE:	YES	CONTAINS NITRIC ACID (RQ = 1,000 LBS, TPQ = 1,000 LBS)
CERCLA HAZARDOUS SUBSTANCE:	YES	CONTAINS NITRIC ACID (RQ = 1000 LBS)
SARA 313 TOXIC CHEMICALS:	YES	CONTAINS NITRIC ACID
GENERIC CLASS:		C16
TSCA INVENTORY:	YES	

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, LIGHT, MOISTURE

INCOMPATIBLES: STRONG BASES, CARBONATES, SULFIDES, CYANIDES, COMBUSTIBLE MATERIALS, ORGANIC MATERIALS, STRONG REDUCING AGENTS, MOST COMMON METALS, POWDERED METALS, CARBIDES, AMMONIUM HYDROXIDE, WATER, ALCOHOLS

DECOMPOSITION PRODUCTS: OXIDES OF NITROGEN, HYDROGEN

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SECTION VII - SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. NEUTRALIZE SPILL WITH SODA ASH OR LIME. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER: REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.
KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL.

J. T. BAKER NEUTRASORB(R) OR TEAM(R) 'LOW NA-' ACID NEUTRALIZERS ARE FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D001, D002 (IGNITABLE, CORROSIVE WASTE)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION:	USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.
RESPIRATORY PROTECTION:	RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 100 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ACID CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.
EYE/SKIN PROTECTION:	SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, NEOPRENE GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: YELLOW (REACTIVE)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. STORE SEPARATELY AND AWAY FROM FLAMMABLE AND COMBUSTIBLE MATERIALS. ISOLATE FROM INCOMPATIBLE MATERIALS. KEEP PRODUCT OUT OF LIGHT.

CONTINUED ON PAGE: 7

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: NITRIC ACID (OVER 40%)
HAZARD CLASS: OXIDIZER
UN/NA: UN2031 REPORTABLE QUANTITY: 1000 LBS.
LABELS: OXIDIZER, CORROSIVE
REGULATORY REFERENCES: 49CFR 172.101; 173.268

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: NITRIC ACID
HAZARD CLASS: 8 I.M.O. PAGE: 8185
UN: UN2031 MARINE POLLUTANTS: NO PACKAGING GROUP: II
LABELS: CORROSIVE
REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

AIR (I.C.A.O.)

PROPER SHIPPING NAME: NITRIC ACID
HAZARD CLASS: 8
UN: UN2031 PACKAGING GROUP: II
LABELS: CORROSIVE
REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA

U.S. CUSTOMS HARMONIZATION NUMBER: 28080000000

N/A = NOT APPLICABLE OR NOT AVAILABLE
N/E = NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.
EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES

CONTINUED ON PAGE: 8

ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.
THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. IF YOU HAVE ANY QUESTIONS, PLEASE CALL CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

APPROVED BY QUALITY ASSURANCE DEPARTMENT.

-- LAST PAGE --

Sodium Hydroxide

CHRIS

Topic: SODIUM HYDROXIDE

IMO/UN designation: 8.0/1823
DOT id no.: 1823
CAS registry no.: 1310-73-2
OBSERVABLE CHARACTERISTICS
Physical state: Solid
Color: White
Odor: Odorless
HEALTH HAZARDS
Personal protective equipment: Chemical safety goggles; face shield; filter or dust-type respirator; rubber boots; rubber gloves.
Symptoms following exposure: Strong corrosive action on contacted tissues. INHALATION: dust may cause damage to upper respiratory tract and lung itself, producing from mild nose irritation to pneumonitis. INGESTION: severe damage to mucous membranes; severe scar formation or perforation may occur. EYE CONTACT: produces severe damage.
Treatment of exposure: INHALATION: remove from exposure; support respiration; call physician. INGESTION: give water or milk followed by dilute vinegar or fruit juice; do NOT induce vomiting. SKIN: wash immediately with large quantities of water under emergency safety shower while removing clothing; continue washing until medical help arrives; call physician. EYES: irrigate immediately with copious amounts of water for at least 15 min.; call physician.
Threshold limit value: 2 mg/m(3)
Short term inhalation limits: Not pertinent
Toxicity by ingestion: (10% solution) oral rabbit LDLo = 500 mg/kg
Late toxicity: None
Vapor (gas) irritant characteristics: Non-volatile
Liquid or solid irritant characteristics: Severe skin irritant. Causes second-and third-degree burns on short contact and is very injurious to the eyes.
Odor threshold: Not pertinent
IDLH value: 200 mg/m(3)
FIRE HAZARDS
Flash point: Not flammable
Flammable limits in air: Not flammable
Fire extinguishing agents: Not pertinent
Fire extinguishing agents NOT to be used: Not pertinent
Special hazards of combustion products: Not pertinent
Behavior in fire: Not pertinent
Ignition temperature: Not flammable
Electrical hazard: Not pertinent
Burning rate: Not flammable
Adiabatic flame temperature: Data not available
Stoichiometric air to fuel ratio: Data not available
Flame temperature: Data not available
CHEMICAL REACTIVITY
Reactivity with water: Dissolves with liberation of much heat; may steam and splatter
Reactivity with common materials: When wet, attacks metals such as aluminum, tin, lead, and zinc to produce flammable

CHRIS

Topic: SODIUM HYDROXIDE

VERVIEW
Material name:
SODIUM HYDROXIDE
Common synonyms:
Caustic soda
Lye
Characteristics:
Solid flakes or pellets White Odorless
Sinks and mixes with water.
Emergency actions:
Avoid contact with solid and dust. Keep people away.
Wear rubber overclothing (including gloves).
Stop discharge if possible.
Isolate and remove discharged material.
Notify local health and pollution control agencies.
Fire:
Not flammable.
May cause fire on contact with combustibles.
Flammable gas may be produced on contact with metals.
Wear rubber overclothing (including gloves).
Flood discharge area with water.
Cool exposed containers with water.
Exposure:
CALL FOR MEDICAL AID.
DUST
Irritating to eyes, nose and throat.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.
IF IN EYES, hold eyelids open and flush with plenty of water.
SOLID
Will burn skin and eyes.
Harmful if swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water
or milk.
DO NOT INDUCE VOMITING.
Water pollution:
Dangerous to aquatic life in high concentrations.
May be dangerous if it enters water intakes.
Notify local health and wildlife officials.
Notify operators of nearby water intakes.
ESPONSE TO DISCHARGE
Issue warning-corrosive Restrict access Disperse and flush
BEL
ategory: Corrosive
Class: 8
HEMICAL DESIGNATIONS
G compatibility class: Caustics
Formula: NaOH

Sulfuric Acid

NEW JERSEY HAZARDOUS SUBSTANCE FACT SHEETS

Topic: SULFURIC ACID

1.0 IDENTIFIERS

CAS Number: 7664-93-9
DOT Number: UN 1830

RTK Substance number: 1761
Date: January 1986

2.0 HAZARD SUMMARY

* Sulfuric Acid can affect you when breathed in.
* Sulfuric Acid is a CORROSIVE CHEMICAL and can severely burn the skin and eyes. It can cause third-degree skin burns and blindness on contact.
* Exposure to mist can irritate the eyes, nose, throat, and lungs, causing coughing, chest tightness and sneezing. Higher levels can cause a build-up of fluid in the lungs, (pulmonary edema) which can be fatal.
* Repeated exposures can cause permanent lung damage and damage teeth.
* Sulfuric Acid is a REACTIVE CHEMICAL and is an EXPLOSION HAZARD.

IDENTIFICATION

Sulfuric Acid is an oily liquid. It is used in fertilizers, chemicals, dyes, petroleum refining, etching, analytical chemistry and in making iron, steel and industrial explosives.

REASON FOR CITATION

* Sulfuric Acid is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT and NIOSH and EPA.
* This chemical is also on the Special Health Hazard Substance List because it is REACTIVE and CORROSIVE.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is 1 mg/m3 averaged over an 8-hour workshift.

Topic: SULFURIC ACID

NIOSH: The recommended airborne exposure limit is 1 mg/m3 averaged over a 10-hour workshift.
ACGIH: The recommended airborne exposure limit is 1 mg/m3 averaged over an 8-hour workshift.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to Sulfuric Acid and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Sulfuric Acid to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

3.0 HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to Sulfuric Acid:

* Contact can severely burn the skin and eyes causing permanent damage.
* Exposure to Sulfuric Acid mist or fumes can irritate the eyes, causing tearing; the nose and throat causing sneezing; and can irritate the lungs causing chest tightness, coughing and shortness of breath.
* High levels can burn the lungs and cause a build-up of fluid (pulmonary edema). This can cause death.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to Sulfuric Acid and can last for months or years:

Cancer Hazard

* According to the information presently available to the New Jersey Department of Health, Sulfuric Acid has not been tested for its ability to cause cancer in animals.

Toluene

CHEMICAL NAME
TOLUENE

FORMULA
C7H8

SYNONYMS
TOLUOL
METHYL BENZENE
NCI-C07272
PHENYL METHANE
METHACIDE
METHYLBENZOL
ANTISAL 1A
UN 1294
BENZENE, METHYL-
METHANE, PHENYL-
METHYLBENZENE
PHENYLMETHANE
OHS23590

PERMISSIBLE EXPOSURE LIMIT
200 PPM OSHA TWA - 300 PPM OSHA CEILING
500 PPM OSHA 10 MINUTE PEAK
100 PPM ACGIH TWA (SKIN NOTATION)
150 PPM ACGIH STEL
100 PPM NIOSH RECOMMENDED TWA
200 PPM NIOSH RECOMMENDED 10 MINUTE CEILING
EXPERIMENTAL CARCINOGEN (NTP)
ANIMAL TERATOGEN (RTEC) - POSITIVE MUTAGEN (RTEC)
REPORTABLE QUANTITIES - 1000 LB CWA 311(B)(4) - 1 LB CWA 307(A) - 1 LB RCRA 3001 - 1 LB PROPOSED RQ
CERCLA HAZARD RATINGS - TOXICITY 2 - IGNITABILITY 3 - REACTIVITY 0 - PERSISTENCE 1

TOXICOLOGY: ACUTE POISONING VIA INHALATION OR INGESTION DEPRESSES THE CENTRAL NERVOUS SYSTEM, LEADING TO COMA. LIVER AND KIDNEY DAMAGE IS POSSIBLE. CARDIAC SENSITIZATION HAS BEEN REPORTED.

CHRONIC EXPOSURE DEPRESSES THE BONE MARROW, BUT WITHOUT THE SEVERE OR FATAL DAMAGE PRESENT IN BENZENE POISONING.

PROLONGED SKIN CONTACT CAUSES DEFATTING, LEADING TO DERMATITIS. EYE AND RESPIRATORY IRRITATION OCCURS AT ELEVATED CONCENTRATIONS.

THE ODOR THRESHOLD IS BELOW THE PERMISSIBLE EXPOSURE LIMIT, THUS TOLUENE IS CONSIDERED TO HAVE GOOD WARNING PROPERTIES.

IHL-HMN TCLO: 200 PPM
IHL-MAN TCLO: 100 PPM
IHL-RAT LCLO:4000 PPM/4 HR
IHL-MUS LC50:5320 PPM/8 HR
ORL-RAT LD50:5000 MG/KG
SKN-RBT LD50: 14 GM/KG

Xylene

MATERIAL SAFETY DATA SHEET

MDL INFORMATION SYSTEMS, INC.
14600 CATALINA STREET
SAN LEANDRO, CA 94577
1-800-635-0064 OR
1-510-895-1313

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000 USA

SUBSTANCE IDENTIFICATION

CAS NUMBER: 1330-20-7
RTECS NUMBER: ZE2100000

SUBSTANCE: XYLENE

TRADE NAMES/SYNONYMS:
BENZENE, DIMETHYL-; DILAN; DIMETHYLBENZENE; XYLOL;
HUMISEAL THINNER NO.33 (HUMISEAL DIV.);
HUMISEAL THINNER NO.SP 420 (HUMISEAL DIV.);
SOLVESSO XYLENE (HUMBLE OIL AND REFINING COMPANY);
TT-X-9166 REDUCER (ADVANCED COATINGS AND CHEMICALS);
DYNACHEM (R) DEVELOPER DCR (THIOKOL/DYNACHEM CORPORATION);
THINNER 2000 (KOP-COAT); SOL 9050 XYLENE (CHEMTECH INDUSTRIES, INC.);
HUMISEAL THINNER NO. 521 (M.W. RIEDEL AND COMPANY);
NEGATIVE TYPE DEVELOPING SOLUTION (GC ELECTRONICS); C8H10;
ULTRADEL R750 RINSE SOLUTION; 1200 THINNER; RCRA U239; UN 1307;
STCC 4904350; OHS25150

CHEMICAL FAMILY:
HYDROCARBON, AROMATIC

MOLECULAR FORMULA: C6-H4-(C-H3)2

MOLECULAR WEIGHT: 106.16

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=3 REACTIVITY=0 PERSISTENCE=1
NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=3 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: XYLENE PERCENT: 100
CAS# 1330-20-7

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
XYLENE:
100 PPM (434 MG/M3) OSHA TWA; 150 PPM (651 MG/M3) OSHA STEL
100 PPM (434 MG/M3) ACGIH TWA; 150 PPM (651 MG/M3) ACGIH STEL
100 PPM (434 MG/M3) NIOSH RECOMMENDED 10 HOUR TWA;
150 PPM (651 MG/M3) NIOSH RECOMMENDED STEL
100 PPM (434 MG/M3) DFG MAK TWA;
200 PPM (868 MG/M3) DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 4 TIMES/SHIFT

MEASUREMENT METHOD: CHARCOAL TUBE; CARBON DISULFIDE; GAS CHROMATOGRAPHY WITH FLAME IONIZATION DETECTION; (NIOSH III # 1501, AROMATIC HYDROCARBONS).

100 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

OSHA REVOKED THE FINAL RULE LIMITS OF JANUARY 19, 1989 IN RESPONSE TO THE 11TH CIRCUIT COURT OF APPEALS DECISION (AFL-CIO V. OSHA) EFFECTIVE JUNE 30, 1993. SEE 29 CFR 1910.1000 (58 FR 35338)

PHYSICAL DATA

DESCRIPTION: LIGHT COLORED OR COLORLESS MOBILE LIQUID WITH AN AROMATIC

ODOR. BOILING POINT: 280-291 F (138-144 C)

MELTING POINT: -54-55 F (-48-13 C) SPECIFIC GRAVITY: 0.8611-0.8802

VOLATILITY: 100% VAPOR PRESSURE: 7-9 MMHG @ 20 C

EVAPORATION RATE: (BUTYL ACETATE=1) 0.6 SOLUBILITY IN WATER: 0.00003%

ODOR THRESHOLD: 0.3 PPM VAPOR DENSITY: 3.7

SOLVENT SOLUBILITY: SOLUBLE IN ALCOHOL, ETHER, ACETONE, PETROLEUM ETHER, BENZENE, CARBON TETRACHLORIDE, ORGANIC SOLVENTS.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

DUE TO LOW ELECTROCONDUCTIVITY OF THE SUBSTANCE, FLOW OR AGITATION MAY GENERATE ELECTROSTATIC CHARGES RESULTING IN SPARKS WITH POSSIBLE IGNITION.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE.

FLASH POINT: 81-90 F (27-32 C) (CC) UPPER EXPLOSIVE LIMIT: 7.0%

LOWER EXPLOSIVE LIMIT: 1.0% AUTOIGNITION TEMP.: 867-984 F (464-529 C)

FLAMMABILITY CLASS(OSHA): IC

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM (1993 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.6).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM (1993 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.6).

FIREFIGHTING:
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. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOLVED IN FIRE (1993 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.6, GUIDE PAGE 27).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE WATER IN FLOODING AMOUNTS AS FOG, SOLID STREAMS MAY SPREAD FIRE. COOL CONTAINERS WITH FLOODING QUANTITIES OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING TOXIC VAPORS, KEEP UPWIND.

WATER MAY BE INEFFECTIVE. (NFPA 325, FIRE HAZARD PROPERTIES OF FLAMMABLE LIQUIDS, GASES, AND VOLATILE SOLIDS, 1994).

TRANSPORTATION DATA

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
XYLENES-UN 1307

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
3 - FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
PG II

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101 AND SUBPART E:
FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS:
EXCEPTIONS: 49 CFR 173.150
NON-BULK PACKAGING: 49 CFR 173.202
BULK PACKAGING: 49 CFR 173.242

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 5 L
CARGO AIRCRAFT ONLY: 60 L

TOXICITY

XYLENE:
IRRITATION DATA: 200 PPM EYE-HUMAN; 87 MG EYE-RABBIT MILD; 5 MG/24 HOURS EYE-RABBIT SEVERE; 100% SKIN-RABBIT MODERATE; 500 MG/24 HOURS SKIN-RABBIT MODERATE.
TOXICITY DATA: 10000 PPM/6 HOURS INHALATION-MAN LCLO; 200 PPM INHALATION-HUMAN TCLO; 5000 PPM/4 HOURS INHALATION-RAT LC50; 450 PPM INHALATION-GUINEA PIG LCLO; 30 GM/M3 INHALATION-MAMMAL LC50; 1600 PPM/20 HOURS/7 DAYS-INTERMITTENT INHALATION-RAT TCLO; >1700 MG/KG SKIN-RABBIT LD50; 50 MG/KG ORAL-HUMAN LDLO; 4300 MG/KG ORAL-RAT LD50; 6 GM/KG ORAL-MOUSE LDLO; 4300 MG/KG ORAL-MAMMAL LD50; 28 GM/KG/14 DAYS-CONTINUOUS ORAL-RAT TDLO; 28 GM/KG/14 DAYS-CONTINUOUS ORAL-MOUSE TDLO; 63 GM/KG/90 DAYS-INTERMITTENT ORAL-RAT TDLO; 1700 MG/KG SUBCUTANEOUS-RAT LD50; 129 MG/KG INTRAVENOUS-RABBIT LDLO; 2 GM/KG INTRAPERITONEAL-MAMMAL LDLO; 2459 MG/KG INTRAPERITONEAL-RAT LD50; 1548 MG/KG INTRAPERITONEAL-MOUSE LD50; 2 GM/KG INTRAPERITONEAL-GUINEA PIG LDLO; 12740 UG/KG/30 DAYS-INTERMITTENT INTRAPERITONEAL-RAT TDLO; 4128 MG/KG/3 DAYS-INTERMITTENT INTRAPERITONEAL-RAT TDLO; REPRODUCTIVE EFFECTS DATA

(RTECS), (DPIRDU), (85IFAI), (38MKAJ).
CARCINOGEN STATUS: HUMAN INADEQUATE EVIDENCE, ANIMAL INADEQUATE EVIDENCE, (IARC GROUP-3).

LOCAL EFFECTS: IRRITANT- INHALATION, SKIN, EYE.
ACUTE TOXICITY LEVEL: MODERATELY TOXIC BY INHALATION, DERMAL ABSORPTION AND INGESTION.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY ALSO AFFECT THE NERVOUS SYSTEM, LIVER AND KIDNEYS.
AT INCREASED RISK FROM EXPOSURE: PREGNANT WOMEN.
ADDITIONAL DATA: ALCOHOL MAY ENHANCE THE TOXIC EFFECTS. STIMULANTS SUCH AS EPINEPHRINE OR EPHEDRINE MAY INDUCE VENTRICULAR FIBRILLATION.

HEALTH EFFECTS AND FIRST AID

INHALATION:
XYLENE:
IRRITANT/NARCOTIC. 900 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- IRRITATION OF THE UPPER RESPIRATORY TRACT MAY OCCUR AT 200 PPM. EXPOSURE TO HIGHER CONCENTRATIONS MAY CAUSE MORE SEVERE IRRITATION AND INITIAL CENTRAL NERVOUS SYSTEM EXCITATION FOLLOWED BY DEPRESSION. SIGNS AND SYMPTOMS MAY INCLUDE RESPIRATORY DIFFICULTY AND SUBSTERNAL PAIN, TRANSIENT EUPHORIA AND EMOTIONAL LABILITY, HEADACHE, NAUSEA, VOMITING, ANOREXIA, ABDOMINAL PAIN, DIZZINESS, DROWSINESS, ATAXIA, AND STAGGERING. THERE MAY BE SALIVATION, SLURRED SPEECH, BLURRED VISION, NYSTAGMUS, TINNITUS, TREMORS, CONFUSION, AND FLUSHING OF THE FACE AND A FEELING OF INCREASED BODY HEAT. IN SEVERE EXPOSURES, THERE MAY BE STUPOR, ANESTHESIA, UNCONSCIOUSNESS, AND COMA WHICH MAY BE PUNCTUATED BY EPISODES OF NEUROIRRITABILITY, BUT RARELY FRANK CONVULSIONS, EXCEPT IN TERMINAL ASPHYXIA. LIVER AND KIDNEY DAMAGE MAY OCCUR, BUT ARE USUALLY MILD AND TRANSIENT. A GROUP OF SUBJECTS WHO INHALED 12.3 UMOL/L OF XYLENE WHILE EXERCISING BECAME SIGNIFICANTLY IMPAIRED ON 3 NEUROPSYCHOLOGICAL TESTS. EXPOSURE OF 3 PAINTERS TO APPROXIMATELY 10,000 PPM FOR 18.5 HOURS RESULTED IN 1 DEATH FROM PULMONARY EDEMA AND PETECHIAL BRAIN HEMORRHAGE. BOTH SURVIVORS WERE UNCONSCIOUS FOR 19-24 HOURS AND EXPERIENCED RETROGRADE AMNESIA, HYPOTHERMIA, AND LUNG CONGESTION. RENAL AND HEPATIC IMPAIRMENT ALSO DEVELOPED. COMPLETE RECOVERY TOOK 15 DAYS. HIGH CONCENTRATIONS MAY CAUSE DEATH FROM SUDDEN VENTRICULAR FIBRILLATION, BUT MORE FREQUENTLY DEATH OCCURS FROM RESPIRATORY ARREST.
CHRONIC EXPOSURE- REPEATED OR PROLONGED INHALATION OF VAPORS ABOVE 200 PPM MAY CAUSE NAUSEA, VOMITING, ABDOMINAL PAIN, AND ANOREXIA. OTHER COMMON COMPLAINTS INCLUDE HEADACHE, FATIGUE, LASSITUDE, IRRITABILITY, BREATHING DIFFICULTIES, AND FLATULENCE. EFFECTS ON THE NERVOUS SYSTEM MAY RESULT IN EXCITATION, FOLLOWED BY DEPRESSION, PARESTHESIAS, TREMORS, APPREHENSION, IMPAIRED MEMORY, INSOMNIA, VERTIGO, AND TINNITUS. EFFECTS ON REACTION TIME, MANUAL COORDINATION, BODY BALANCE AND EEG OCCURRED WITH REPEATED EXPOSURE TO 90 PPM OF M-XYLENE. SWEETISH TASTE IN THE MOUTH, DRY NOSE AND THROAT, STRONG THIRST, MUCOSAL HEMORRHAGE, AND ANEMIA HAVE BEEN REPORTED. EFFECTS ON THE LIVER, KIDNEY, CARDIOVASCULAR SYSTEM, AND THE BONE MARROW HAVE ALSO BEEN REPORTED, ALTHOUGH THE LATTER HAS BEEN QUESTIONED. EXPOSURE OF RABBITS TO 1150 PPM FOR 40-55 DAYS RESULTED IN A REVERSIBLE DECREASE IN THE RED AND WHITE CELL COUNTS AND AN INCREASE IN THE PLATELETS. ONE CASE OF AN APPARENT EPILEPTIFORM SEIZURE FOLLOWING A RELATIVELY BRIEF EXPOSURE HAS OCCURRED. WOMEN MAY DEVELOP MENSTRUAL DISORDERS, SUCH AS MENORRHAGIA OR METRORRHAGIA, INFERTILITY, AND PATHOLOGICAL PREGNANCY CONDITIONS INCLUDING TOXICOSIS, DANGER OF MISCARRIAGE, AND HEMORRHAGING DURING DELIVERY. REPEATED EXPOSURE OF PREGNANT MICE, RATS AND RABBITS TO THE

INDIVIDUAL OR THE MIXED ISOMERS HAS RESULTED IN MATERNAL EFFECTS AND EFFECTS ON FERTILITY, ON THE EMBRYO OR FETUS, AND SPECIFIC DEVELOPMENTAL ABNORMALITIES. INCLUDED AMONG THESE EFFECTS ARE FETAL DEATH, FETOTOXICITY, PRE- AND POST-IMPLANTATION MORTALITY, ABORTION, CRANIOFACIAL AND

MUSCULOSKELETAL ABNORMALITIES, AND EXTRA EMBRYONIC STRUCTURES.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. PERFORM ARTIFICIAL RESPIRATION IF NECESSARY. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
XYLENE:
IRRITANT.
ACUTE EXPOSURE- LIQUID XYLENE IS A DEFATTING AGENT AND MAY CAUSE A BURNING SENSATION, DRYING, VASODILATION, ERYTHEMA, AND POSSIBLY BLISTERING. THE LIQUID IS READILY ABSORBED THROUGH INTACT OR BROKEN SKIN AT A RATE OF APPROXIMATELY 4-10 MG/CM2/HOUR, BUT SYSTEMIC EFFECTS HAVE NOT BEEN REPORTED.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE DEFATTING OF THE SKIN WITH DRYING, ERYTHEMA, CRACKING, THICKENING AND BLISTERING. REPEATED APPLICATION OF 95% XYLENE TO RABBIT SKIN CAUSED MODERATE TO MARKED IRRITATION WITH ERYTHEMA AND MODERATE NECROSIS. ONE CASE OF ALLERGIC CONTACT URTICARIA HAS BEEN REPORTED.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
XYLENE:
IRRITANT.
ACUTE EXPOSURE- 200 PPM HAS CAUSED CONJUNCTIVAL IRRITATION IN HUMANS; AT HIGHER CONCENTRATIONS, IRRITATION MAY BE SEVERE. VAPOR EXPOSURE HAS ALSO CAUSED TEARING AND PHOTOPHOBIA. AN ACCIDENTAL SPLASH IN THE HUMAN EYE CAUSED TRANSIENT SUPERFICIAL DAMAGE WITH RAPID RECOVERY, ALTHOUGH REVERSIBLE CORNEAL BURNS HAVE ALSO BEEN REPORTED.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO HIGH VAPOR CONCENTRATIONS MAY CAUSE A BURNING SENSATION, CONJUNCTIVITIS AND BLURRED VISION; REVERSIBLE VACUOLAR, EPITHELIAL KERATOPATHY HAS BEEN REPORTED IN SOME WORKERS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
XYLENE:
NARCOTIC.
ACUTE EXPOSURE- MAY CAUSE A BURNING SENSATION IN THE MOUTH AND STOMACH, SALIVATION, SEVERE GASTROINTESTINAL DISTRESS WITH NAUSEA AND VOMITING, POSSIBLY HEMATEMESIS, AND TOXIC EFFECTS INCLUDING SIGNS OF CENTRAL NERVOUS SYSTEM DEPRESSION AND OTHER SYMPTOMS AS IN ACUTE INHALATION, INCLUDING VENTRICULAR FIBRILLATION AND LIVER AND KIDNEY INJURY. INGESTION OF SMALL QUANTITIES OF 90% XYLENE PLUS TOLUENE PRODUCED URINARY DEXTROSE AND UROBILINOGEN EXCRETION WITH TOXIC HEPATITIS, WHICH WAS REVERSIBLE IN 20 DAYS. A DOSE OF 15-30 MILLILITERS (ABOUT 1/2-1 OUNCE) IS THE EXPECTED

HUMAN LETHAL DOSE. WITH ASPIRATION OF EVEN A FEW MILLILITERS INTO THE LUNGS, SEVERE COUGHING, DISTRESS, CHEMICAL PNEUMONITIS, RAPIDLY DEVELOPING PULMONARY EDEMA, AND HEMORRHAGE MAY OCCUR.
CHRONIC EXPOSURE- NO DATA AVAILABLE ON THE ORTHO-ISOMER. REPEATED INGESTION OF THE MIXED, META-, OR PARA-ISOMERS BY PREGNANT MICE RESULTED IN EFFECTS

ON FERTILITY, ON THE EMBRYO OR FETUS, OR SPECIFIC DEVELOPMENTAL ABNORMALITIES. INCLUDED AMONG THESE EFFECTS WERE FETOTOXICITY, LITTER SIZE, CRANIOFACIAL AND MUSCULOSKELETAL SYSTEM ABNORMALITIES, AND POST-IMPLANTATION MORTALITY.

FIRST AID- EXTREME CARE MUST BE USED TO PREVENT ASPIRATION. GASTRIC LAVAGE WITH A CUFFED ENDOTRACHEAL TUBE IN PLACE TO PREVENT FURTHER ASPIRATION SHOULD BE DONE WITHIN 15 MINUTES. IN THE ABSENCE OF DEPRESSION OR CONVULSIONS OR IMPAIRED GAG REFLEX, EMESIS CAN ALSO BE INDUCED USING SYRUP OF IPECAC WITHOUT INCREASING THE HAZARD OF ASPIRATION (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GASTRIC LAVAGE SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
XYLENE:
NITRIC ACID: EXOTHERMIC REACTION.
OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.
PLASTICS, RUBBER, COATINGS: MAY BE ATTACKED.
SULFURIC ACID: EXOTHERMIC REACTION.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE.

****STORAGE****

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

BONDING AND GROUNDING: SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH MAY BE IGNITED BY ELECTROSTATIC SPARKS, SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NFPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

PROTECT AGAINST PHYSICAL DAMAGE. OUTSIDE OR DETACHED STORAGE IS PREFERABLE. INSIDE STORAGE SHOULD BE IN A STANDARD FLAMMABLE LIQUIDS STORAGE ROOM OR CABINET. SEPARATE FROM OXIDIZING MATERIALS (NFPA 49, HAZARDOUS CHEMICALS DATA, 1975).

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

DISPOSAL

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40CFR 262. EPA HAZARDOUS WASTE NUMBER U239.

CONDITIONS TO AVOID

AVOID CONTACT WITH HEAT, SPARKS, FLAMES, OR OTHER SOURCES OF IGNITION. VAPORS MAY BE EXPLOSIVE. AVOID OVERHEATING OF CONTAINERS; CONTAINERS MAY VIOLENTLY RUPTURE IN HEAT OF FIRE. AVOID CONTAMINATION OF WATER SOURCES.

SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG A HOLDING AREA SUCH AS A PIT, POND OR LAGOON TO CONTAIN SPILL AND DIKE SURFACE FLOW USING BARRIER OF SOIL, SANDBAGS, FOAMED POLYURETHANE OR FOAMED CONCRETE. ABSORB LIQUID MASS WITH FLY ASH OR CEMENT POWDER.

IMMOBILIZE SPILL WITH UNIVERSAL GELLING AGENT.

REDUCE VAPOR AND FIRE HAZARD WITH APPROPRIATE FOAM.

AIR SPILL:
KNOCK DOWN VAPORS WITH WATER SPRAY. KEEP UPWIND.

WATER SPILL:
LIMIT SPILL MOTION AND DISPERSION WITH NATURAL BARRIERS OR OIL SPILL CONTROL BOOMS.

APPLY DETERGENTS, SOAPS, ALCOHOLS OR ANOTHER SURFACE ACTIVE AGENT.

APPLY UNIVERSAL GELLING AGENT TO IMMOBILIZE TRAPPED SPILL AND INCREASE EFFICIENCY OF REMOVAL.

IF DISSOLVED, AT A CONCENTRATION OF 10 PPM OR GREATER, APPLY ACTIVATED CARBON AT TEN TIMES THE AMOUNT THAT HAS BEEN SPILLED.

USE SUCTION HOSES TO REMOVE TRAPPED SPILL MATERIAL.

USE MECHANICAL DREDGES OR LIFTS TO EXTRACT IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES.

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE

FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND RESTRICT ENTRY.

REPORTABLE QUANTITY (RQ): 1000 POUNDS
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE

AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR GENERAL DILUTION VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT SHOULD BE EXPLOSION-PROOF IF EXPLOSIVE CONCENTRATIONS OF DUST, VAPOR OR FUME ARE PRESENT.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

XYLENE (O-, M-, AND P-ISOMERS):
900 PPM- ANY CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE(S).
ANY POWERED, AIR-PURIFYING RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE(S).
ANY SUPPLIED-AIR RESPIRATOR.
ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

ESCAPE- ANY AIR-PURIFYING, FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE, FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER.
ANY APPROPRIATE ESCAPE-TYPE, SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A 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.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS

SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH

FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

CREATION DATE: 11/14/84 REVISION DATE: 10/09/95

00 SUMMARY ITEMS AVAILABLE TO LIST
=> ENTER OHS NUMBER FROM SUMMARY LIST TO PRINT MSDS, OR
=> ENTER SEARCH (FOR NEW SEARCH TYPE), OR
=> ENTER QUIT, HELP, OR LOGOFF

APPENDIX H
Equipment Decontamination Procedures

APPENDIX H

EQUIPMENT DECONTAMINATION PROCEDURES

The following procedures will be used to decontaminate soil and groundwater sampling equipment to prevent cross contamination of samples. The following procedures meet applicable EPA protocols for sampling equipment decontamination.

I. FIELD SETUP

To prevent cross contamination from decontamination washing and rinsing overspray during the procedure, the following field setup protocol will be followed.

- One 5-foot folding table, covered in sheet plastic draping down onto the ground to provide a walking area will be used for washing and rinsing activities.
- One 5-foot folding table, covered in sheet plastic draping down onto the ground to provide a walking area will be used for air drying and temporary storage activities.
- A plastic tub can be used for non-phosphate detergent washes.
- Stiff long-handled nonmetallic bristle scrub brushes will be used.
- Stainless steel pans with perforated trays will be used for tap water draining, methanol and hexane rinsing, and American Society for Testing and Materials (ASTM) Type II water rinsing (one each - three total), and will be used exclusively for each activity.
- Small laboratory rinse bottles will be used for pesticide grade solvent rinsing.
- Stainless steel sprayers (up to 5 gallon capacity) will be used for tap water and ASTM Type II water rinsing, and will be used exclusively for each activity.
- Potable water (tap water) must come from a single source and must be subjected to periodic QC analysis; the single source location for the potable water will be from the location directed by the site manger or designee.

II. SAMPLING EQUIPMENT - METAL

All metal sampling equipment, including stainless steel bailers, split-spoon samplers, sample sleeves, hand augers and sample cutting knives used to collect samples for organics

or metals analysis will be decontaminated according to the following procedure before each sample is taken.

1. Knock off or prescrub with tap water in a plastic tub.

2. Discard prescrub tap water and replace with clean tap water when it becomes visibly dirty and discolored.

3. Scrub clean with a stiff, long-handled, nonmetallic scrub brush and a non-phosphate detergent and tap water solution (Liquinox or equivalent) in a plastic tub.

4. Replace the non-phosphate detergent and tap water solution when it becomes visibly dirty and discolored.

5. Rinse with tap water.

6. Rinse with ASTM Type II water.

7. Rinse with methanol (methyl alcohol, pesticide grade or equivalent).

8. Rinse with pesticide grade hexane.

Place clean sampling equipment in a clean area on the drying table and allow it to air dry. If the decontaminated sampling equipment will not be used immediately, place it in suitably sized plastic bags. Seal with a signed, dated custody seal. Label the plastic bags "clean" and store in a contaminant-free environment.

III. SAMPLING EQUIPMENT - TEFLON AND OTHER PLASTICS

Teflon bailers or any other plastic equipment used to collect samples for organics or metals analysis will be decontaminated as follows.

1. Scrub with a non-phosphate detergent and tap water solution (Liquinox or equivalent) in a plastic tub.

2. Replace the non-phosphate detergent and tap water solution when it becomes dirty and discolored.

3. Rinse with tap water.

4. Rinse with ASTM Type II water.

5. Rinse with methanol (methyl alcohol, pesticide grade or equivalent).

6. Rinse with pesticide grade hexane.

Place clean sampling equipment in a clean area on the drying table and allow it to air dry. If the decontaminated sampling equipment will not be used immediately, place it in suitably sized plastic bags. Seal with a signed, dated custody seal. Label the plastic bags "clean" and store in a contaminant-free environment.

IV. DOCUMENTATION

The following information (at a minimum) must be logged into a field notebook to demonstrate that the decontamination procedure was performed properly.

1. Date
2. Site Location
3. Decontamination procedures and solutions used
4. Type of equipment decontaminated (manufacturer's name, model, and serial number as applicable)
5. Special or unusual conditions or problems (e.g., wind, ambient air conditions, etc.)
6. Storage location for clean equipment not immediately used.

V. SAFETY CONSIDERATIONS

1. Proper precautions must be taken when using solvents. Refer to the applicable site safety and health procedure before using. Make sure the correct personal protective equipment is available, and is used when handling solvents.
2. Decontaminate equipment and clean up the site in accordance with approved project procedures.
3. Dispose of the waste waters, solvents, and PPE in accordance with approved project waste management procedures when sampling and decontamination are complete.

APPENDIX I
Health and Safety Forms

HEALTH & SAFETY EXPOSURE MONITORING

PROJECT #: _____

PROJECT LOCATION : _____

PROJECT ACTIVITY: _____

DATE _____

LOCATION MONITORED: _____

ACTIVITY MONITORED: _____

DRILL RIG TYPE/NO: _____

PERSONNEL AT THIS LOCATION: _____

PERSONNEL AFFECTED BY H&S MONITORING: _____

TIME (24 hr clock)	BACK-GROUND	MONITOR INTERVAL (borehole depth)	PID (ppm)	PID (ppm)	%O2 (%)	% LEL (%)	H2S (ppm)	RAM (ppm)	OTHER	SAMPLES INITIALS

INSTRUMENT	MFGR/ MODEL #	SERIAL #	CALIBRATION STANDARD CAL GAS	CALIBRATION STANDARD STD (ppm)	INITIAL CALIBRATION CHECK	END OF DAY CALIBRATION CHECK
PID						
PID						
%O2						
%LEL						
H2S						
RAM						

FIELD TEAM LEADER SIGNATURE _____

EMPLOYEE PHYSIOLOGICAL MONITORING RECORD FOR HEAT STRE

Employee Name: _____ Employee SSN: _____

Division: _____ Location: _____

Date: _____ Job Number: _____

Start Time: _____ Stop Time: _____

Health & Safety Officer: _____ Supervisor: _____

TEMPERATURES

A. INITIAL READING
1. Ambient Air Temperature _____
2. Baseline Oral Temperature _____
3. WBGT _____

B. AFTER FIRST WORK PERIOD
1. Ambient Air Temperature _____
2. Oral Temperature _____
3. WBGT _____

C. AFTER SECOND WORK PERIOD
1. Ambient Air Temperature _____
2. Oral Temperature _____
3. WBGT _____

D. AFTER THIRD WORK PERIOD
1. Ambient Air Temperature _____
2. Oral Temperature _____
3. WBGT _____

E. AFTER FOURTH WORK PERIOD
1. Ambient Air Temperature _____
2. Oral Temperature _____
3. WBGT _____

F. AFTER FIFTH WORK PERIOD
1. Ambient Air Temperature _____
2. Oral Temperature _____
3. WBGT _____

HEART RATE

A. INITIAL READING
1. Baseline Heart Rat

B. AFTER FIRST WOR
1. Heart Rate _____

C. AFTER SECOND WC
1. Heart Rate _____

D. AFTER THIRD WOR
1. Heart Rate _____

E. AFTER FOURTH WC
1. Heart Rate _____

F. AFTER FIFTH WOR
1. Heart Rate _____

This completed form should be retained in project file.

B/min

AIR MONITORING RECORD

Employee Name _____ Company Name _____

Social Security No. _____ Date Sampled _____

Employee No. _____ Shift _____

Job Title _____ Sampled By _____

Calibration Data _____ Date of Calibration _____

Instrument Serial No. _____ Flow Rate _____

_____ Calibrated By _____

Model No. _____ Method _____

Sample Type/Analyte	Collection Media
_ Personal - TWA	_ Charcoal Tube
_ Personal - Peak	_ Filter (Resp.)
_ Area	_ Filter (Total)
_ Blank	_ Impinger
_ Bulk	_ Passive Dosimeter
_ Lab Control	_ Silica Gel
_ Source	_ Chromosorb
_____	_____
_____	_____

Description of Collector - Mfg., Lot #, Type of Filter, etc.

_____

_____

_____

Length of Time on this Job _____

Does Sample Represent Typical Exposure? _____

_____

Describe any personal protection used or the type of operation (if area monitoring only)

_____

_____

_____

Sampling Data ___ Temp ___ Barometer ___ Humidity ___ Wind ___

EQUIP-MENT NO.	SAMPLE NO.	TIME ON	TIME OFF	TOTAL TIME	FLOW SAMPLE VOLUME	ANALYTICAL RESULT	TWA

DESCRIPTIVE DATA: Work task, unusual events, engineering controls, sample interferences, etc.

_____

_____

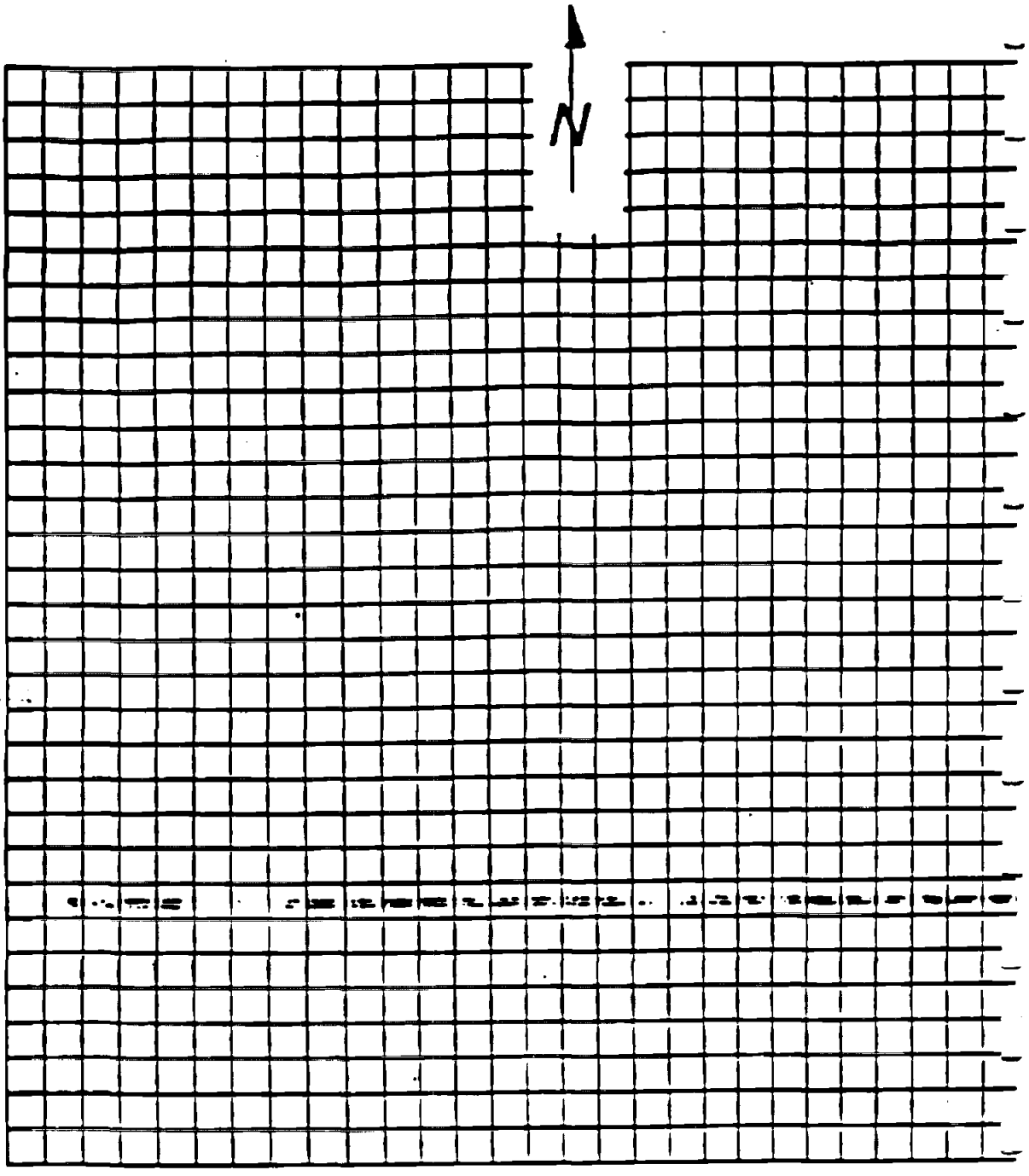
_____

_____

_____

_____

Date: _____ Signature: _____



WEATHER:

WIND SPEED:

TEMPERATURE:

WIND DIRECTION:

APPENDIX J
Accident Investigation and Notification

ACCIDENT INVESTIGATION AND NOTIFICATION

1.0 OBJECTIVE

1.1 This Standard Operating Procedure provides the following:

1.1.1 Effective investigation and analysis of accidents/post-accident procedures

1.1.2 Reporting and recording procedures for accidents, injuries, and hazardous chemical releases and exposures

1.1.3 Applicable site postings

1.1.4 Accident response procedures

2.0 APPLICABILITY

2.1 This procedure applies to all employees covered by the Jacobs Environmental Health and Safety Program. The information herein will be included in the Emergency Preparedness Section of site health and safety plans.

2.2 This SOP shall apply to near miss incidents that can be considered as having the potential for significant injury and/or property loss.

3.0 SCOPE

3.1 The scope of this SOP is intended to cover accident investigation and notification of all accidents and/or incidents including "near misses." This SOP further covers procedure, reporting, and record keeping requirements for personal injury, illness, and exposure. Also covered are any accidental releases of hazardous chemicals and/or property damage occurring as a consequence of site activity.

4.0 PROGRAM ADMINISTRATION DEFINITIONS

4.1 The *Corporate Health and Safety Manager* (CHSM) is responsible for reviewing all occupationally-related injuries, illnesses, and exposures, including First Aid only and OSHA reportable incidents, and hazardous chemical releases. The CHSM is also responsible for taking necessary corrective action based on submitted reports and notifications.

4.2 The *Corporate Health and Safety Administrator* (CHSA) is responsible for maintenance for all corporate health and safety files and collecting all occupationally-related injury, illness, exposure, and hazardous chemical release information.

4.3 The *Site Manager* (SM) is responsible for conducting investigations of accidents/incidents and "near misses." After identification of problems, corrective actions will be instituted. All findings and corrective actions will be documented on the Site Manager's Investigation Report.

4.3.1 The SM is also responsible for coordinating with the Corporate Health & Safety Office, local Jacobs Human Resources Department, and Regional Safety Department to insure completion, filing, and posting of all OSHA forms 200 and 101 for reportable site injuries, illnesses, and exposures.

4.3.2 The SM shall notify the CHSM and Regional or Regional Safety Department Representative of all occupationally-related injuries, illnesses, and exposures, including First Aid only and OSHA reportable incidents, and hazardous chemical releases.

4.4 The *Site Health and Safety Officer* (SHSO) is responsible for assisting the SM in the above listed responsibilities.

4.4.1 If a SHSO is not appointed, a designated personnel may be delegated to assist the Site Manager in the reporting and record keeping responsibilities.

4.5 The *Local Human Resources Representative* (LHRR) is responsible for: processing workmans' compensation claims and coordinating approved company doctor, hospital, or clinic for office injuries/exposures. The LHRR is also responsible for following Jacobs Safety Department *and* Corporate Health and Safety Department procedures for office injuries and exposures. In addition, the LHRR shall complete, file, and post OSHA Forms 200 and 101 for reportable office injuries and exposures. This includes injuries while traveling for business.

4.6 The *Regional Safety Department Representative* (RSDR) is responsible for administering the Jacobs Safety Program. Therefore, reporting procedures include notifying the primary contacts designated in attachment A.

5.0 PROCEDURE - GENERAL

5.1 The following information will be obtained as appropriate:

5.1.1 Approved Company Doctor, Clinic, or Hospital
Prior to initiation of any onsite activities requiring health and safety plans, the SHSO will contact the Coordinator in the Corporate Risk Management Department in Pasadena at (818) 578-6886 to obtain a list of approved medical facilities for the site location.

6.0 PROCEDURE - ACCIDENT RESPONSE

6.1 Injured/ill employees shall be taken to approved facilities. To obtain a list of approved doctors, clinics, or hospital, see 5.1.1.

6.1.1 An Authorization for Medical Treatment Form (attachment B) is to accompany each injured/ill employee. The top portion of the form is to be completed by job site personnel and the attending physician is to complete the bottom portion. The completed form must be forwarded to the appropriate regional contact (See attachment A) within 48 hours of each visit. A Workers' Compensation Form (completed by LHRR) may also be required.

7.0 PROCEDURE - POST-ACCIDENT

7.1 After the employee has received treatment, the Site Health and Safety Officer will arrange for a post-accident drug screen for all injured employees immediately following an accident. Hepatitis B vaccine may need to be offered to employees who were exposed to blood during responding to an incident. Review SOP 7.6 Bloodborne Pathogens.

7.2 Initial accident investigation shall begin at the discretion of the Site Health and Safety Officer and/or the Site Manager. At a minimum, the scene shall be secured (no movement of material or equipment shall be made until a review of the accident is completed) and signed statements from witnesses shall be obtained.

8.0 REPORTING

All occupationally-related injuries, illnesses, accidents, exposures, hazardous chemical releases, and property damage will be appropriately reported. Completion of this activity is imperative to detecting trends and establishing actions to prevent recurrence.

8.1 A verbal report must be made to the CHSM *and* RSDR as soon as possible for all occupationally-related injuries (including First Aid only incidents,) illnesses, exposures, and hazardous chemical releases.

8.2 Serious or fatal injuries are to be reported *immediately* to the CHSM, the RSDR, the appropriate Operations Manager, and the appropriate Group Vice President.

8.3 The following must be reported to the CHSM, RSDR, and the appropriate Operations Manager with the appropriate form(s) (See Section 9.0 Record Keeping): All job related injuries and illnesses requiring a doctors visit, all exposures, and hazardous material releases in potentially reportable quantities (by EPA-RCRA definitions.)

8.4 The following information must be made available:

8.4.1 Name, social security number, office location, job title

8.4.2 Date and location of accident or incident

8.4.3 Description of the event/and injury - (extent)

8.4.4 Potential for lost time

8.4.5 What medical facility was used and when

8.4.6 Who rendered First Aid/CPR

8.5 The Corporate Risk Management Department in Pasadena will be contacted to report all property damage. (See attachment A)

8.6 The Project Manager will contact the client

9.0 RECORD KEEPING

All occupationally-related injuries, illnesses, accidents, and hazardous chemical release (exposure) incidents will be appropriately recorded. The following reports will be made and submitted:

9.1 Site Managers Investigation Report (See attachment F)
To be completed by the first line Site Manager as soon as possible following the incident. Return completed form to the RSDR. A copy *must* also be sent to the CHSM.

9.2 Witness Statement (See attachment G)
To be used to obtain a signed statement from witnesses of their complete (factual) observations. Names and permanent addresses shall be secured for future reference. Return to the RSDR. A copy *must* also be sent to the CHSM.

9.3 Employee's Report of Occupational Injury or Disease (See attachment H)
This form is state specific. This form must be completed for all injuries, illnesses, and exposures requiring a doctor's visit. The location code (project number) will be used as the form of identification. Return this form to the RSDR within 24 hours of initial doctor's visit. A copy *must* also be sent to the CHSM.

9.4 Employee Exposure/Hazardous Chemical Release Report Form 9-1 (See attachment C)

9.4.1 All incidents involving exposure to potentially hazardous materials while working, including incidents onsite, in the office, during company travel, and hazardous material releases in potentially reportable quantities (by EPA-RCRA definitions) must be reported to CHSM. Document the incident on Employee Exposure/Hazardous Chemical Release Report, Form 9-1.

9.4.1.1 Further notification procedures i.e., agency notifications, shall be followed as outlined in the site specific health and safety plan.

9.4.2 The SM shall complete and return Form 9-1 to the CHSM as soon as possible. A copy of this form *must* also be sent to the RSDR. This form is to be completed for all hazardous chemical exposure and release incidents *only*.

9.4.3 It is important to report all exposures even though the incident is not considered serious or no adverse health effects or symptoms are apparent at the time.

9.4.4 The employee must be given a copy of the report. Additional copies must be placed in the employee's corporate health and safety medical file and exposure file.

9.5 First Aid Register (See attachment E)
This is the primary project injury log. All injuries/illness, treated or reported (actual or alleged), shall be entered into the log. This register is to be used no matter how minor the event may be. *There are no exceptions to this reporting requirement*. The register is kept at the project site.

9.6 Vehicle Accident Reporting Procedure (See attachment I)
For any vehicle accident or injuries involving a vehicle, please follow and complete necessary forms dictated by the Vehicle Accident Reporting Procedures.

10.0 OSHA REPORTING/RECORD KEEPING PROCEDURES

10.1 Preparation and Maintenance of records relating to occupational injuries, illnesses, and exposures required by OSHA will be maintained by:

Office-related This includes injuries or accidents while on company-related travel.	LHRR
Project Site-related	SHSO or designated personnel

10.2 Log and Summary of Occupational Injuries and Illnesses Form - OSHA Form 200 (See attachment D)

10.2.1 All occupational injuries and illnesses that require treatment other than First Aid are reported on OSHA Form 200 - Log and Summary of Occupational Injuries and Illnesses. Information for each "recordable case" of occupational injury or illness shall be entered on the form within six (6) work days after learning of its occurrence.

10.2.1.1 A "recordable case" is defined on the front of OSHA Form 200 as "...every occupational death, every nonfatal occupational illness, and those nonfatal occupational injuries which involve one or more of the following: loss of consciousness, restriction of work or motion, transfer to another job, or medical treatment (other than first aid)..." Further definitions and instructions are provided on the back of the form.

10.2.1.2 OSHA's record keeping and reporting requirements differ from those under the various State Workers' Compensation laws. Because they differ, employers must not substitute Workers' Compensation criteria for determining whether or not a case should be recorded for OSHA.

10.2.2 All entries on OSHA Form 200 must be identified by a case or file number. Entry numbers must be non-duplicating to facilitate comparison with OSHA Form 101, Supplementary Record of Occupational Injuries and Illnesses (described in section 10.3).

10.2.3 One OSHA Form 200 is used at the project site or office location per year. Each incident is added to the same form on a separate line.

10.2.4 A copy of OSHA Form 200 with injury/illness information recorded shall be sent to the CHSM and RSDR within 45 calendar days of its recording.

10.2.5 At the beginning of each calendar year, a summary of all injuries and illnesses recorded on OSHA Form 200 for the preceding year must be made. Instructions on the back of Form 200 describe how the summary is compiled. Even if

there were no injuries or illnesses during the year, zeros must be entered on the totals line, and the form posted.

10.2.5.1 The OSHA 200 Form must be posted with summary information for the preceding year where notices to employees are commonly posted ***no later than February 1 and must remain in place until March 1.***

10.2.5.2 A copy of the summary OSHA Form 200 *must* be sent to the CHSA and RSDR at year end no later than January 15.

10.3 Supplementary Record of Occupational Injuries and Illness - OSHA Form 101. (See attachment K)

10.3.1 To supplement the Log and Summary of Occupational Injuries and Illnesses - OSHA Form 200, each establishment must maintain a record of each recordable occupational injury or illness. If no suitable report is made for other purposes, the Supplementary Record OSHA No. 101 may be used.

10.3.1 Or, the record may consist of the one or more of the documents listed below.

10.3.1.1 Workers' Compensation, insurance, or other reports are also acceptable as records if they contain all facts listed below *or* are supplemented to do so.

10.3.1.2 The record may also be listed on a plain sheet of paper containing the following facts. For further information, please see Definitions on the back of OSHA Form 200:

1) *About the employer*-name, mail address, and location if different from mail address.

2) *About the injured or ill employee*-name, social security number, home address, age, sex, occupation, and department.

3) *About the accident or exposure to occupational illness*-place of accident or exposure, whether it was on employer's premises, what the employee was doing

when injured, and how the accident occurred.

4) *About the occupational injury or illness*-description of the injury or illness, including part of body affected, name of the object or substance which directly injured the employee, and date of injury or diagnosis of illness.

5) *Other*-name and address of physician; if hospitalized, name and address of hospital, date of report, and name and position of person preparing the report.

10.3.2 These records must also be available without delay and at reasonable times for examination by representatives of the Department of Labor and the Department of Health, Education and Welfare, and States accorded jurisdiction under the Act.

10.3.3 The records must be maintained for a period of not less than five years following the end of the calendar year to which they relate.

11.0 SITE POSTINGS

11.1 The following forms will be posted for all on-going field projects. Contact your Regional Safety Department or local OSHA office to obtain these forms and postings.

11.1.1	Jacobs Forms:	First Aid Register Emergency Phone Numbers Specific to the Site
11.1.2	OSHA Forms:	OSHA 200 Log OSHA Health and Safety Poster (or State Equivalent) Access to Medical and Exposure Records OSHA Permits Forklift Operating Instructions

11.1.3 Human resource forms and postings appropriate to each job site will be obtained from regional contacts and kept onsite as required. (See attachment J)

12.0 ATTACHMENTS

The following attachments are included with this SOP:

Attachment A	Primary Contacts
Attachment B	Authorization For Medical Treatment
Attachment C	Supervisor's Personnel Accident or Exposure Investigation Report
Attachment D	Witness Statement
Attachment E	OSHA Form 200 - Log and Summary of Occupational Injuries and Illnesses
Attachment F	OSHA Form 101 - Supplementary Record of Occupational Injuries and Illness
Attachment G	First Aid Register
Attachment H	Employee's Report of Occupational Injury or Disease
Attachment I	Vehicle Accident Reporting Procedure
Attachment J	Human Resources Contacts

Attachment A

PRIMARY CONTACTS

Corporate Environmental Health and Safety Department
Jacobs Engineering Group, Inc.
600 Seventeenth Street, Suite 1100N
Denver, Colorado 80202
Attention: Terry Briggs
Office Phone: (303) 595-8855
FAX Machine: (303) 595-8857

Pasadena Risk Management (Safety) Department
Jacobs Engineering Group, Inc.
251 S. Lake Avenue
Pasadena, California 91101
Attention: Pat Costamagna
Office Phone: (818) 578-6886
FAX Machine: (818) 578-6837

Central Region Safety Department
Jacobs Engineering Group, Inc.
4848 Loop Central Drive
Houston, Texas 77081-2211
Attention: Steve Pianalto
Office Phone: (713) 669-2200
FAX Machine: (713) 669-0045

Southern Region (Including Louisiana) Safety Department
Jacobs Engineering Group, Inc.
4949 Essen Lane
Baton Rouge, Louisiana 70809
Attention: C.J. Beysellance
Office Phone: (504) 769-7700
FAX Machine: (504) 768-5228

Northern Region Safety Department
Jacobs Engineering Group, Inc.
1880 Waycross Road
Cincinnati, Ohio 45240
Attention: Ken Wilkenson
Office Phone: (513) 595-7500
FAX Machine: (513) 595-7717

Western Region Safety Department
Jacobs Engineering Group, Inc.
251 S. Lake Avenue
Pasadena, California 91101
Attention: Jeff Wahl
Office Phone: (818) 449-2171
FAX Machine: (818) 578-6827
Home Phone: (805) 255-6973

Attachment B

JACOBS ENGINEERING GROUP INC.

____
(Division)

AUTHORIZATION FOR MEDICAL TREATMENT

TO: Dr.____________________ Address:__________________ Date___/___/___

This form signed by our representative is your authority to render treatment to:

____
(Employee)

in accordance with the provisions of and under the conditions prescribed by the ?Workmens' Compensation Act. Unless the case is an emergency, kindly obtain authorization for surgery, radical procedures, or hospitalization from the insurance carrier. Send your bill and report to us at the address listed below.

____
Authorized Representative

Date of Injury___/___/___ Location____________________ Job No.____________

How Injury Occurred____

Please complete and return by mail to the following address to insure prompt payment of charges.

Pat Costamagna, Jacobs Engineering Group
251 S. Lake Avenue, Pasadena, CA 91101 (818) 578-6886

= =

FOR DOCTOR'S USE ONLY

Diagnosis of Injury:____

Disposition of Patient:

______Occupational ________Non-Occupational ________Unable to Determine

______Able to resume regular duties

______Able to resume regular duties next workday

______Able to resume restricted duties with the following limitations:

____

______Unable to return to work, estimated length of disability:

____

Return for follow-up visit on ____/____/____ (Date)

____
(Doctor's Signature)

ATTACHMENT C

SUPERVISOR'S PERSONNEL ACCIDENT OR EXPOSURE INVESTIGATION REPORT

Employee _____ SSN _____ Job Title _____

Home Office _____ Division/Department _____

Client _____ Project Number _____

Project Manager _____ Site Manager _____

Location of Accident _____

Person To Whom Accident or Exposure Was Reported _____

Witnesses _____

Date & Time of Incident _____

Nature of Exposure or Injury? _____

_____

_____

Hospitalized ☐ Doctor Case ☐ First Aid Only ☐ Near Incident ☐

Body Parts Affected _____

Engaged in What Activity When Injured? _____

_____

_____

_____

Weather Conditions _____

Chemicals Encountered _____

_____

Form of Chemicals (liquid, solid, gas, vapor, mist, fume) _____

Oescribe Radiological Materials _____

Volume or Quantity Released _____

List/Describe All Personal Protective Equipment In Use By Person Exposed or Injured _____

_____

Name of First Aid Provider _____ Phone Number _____

Name of Medical Service Provider _____ Phone Number _____

Name of Agency Reps. Contacted _____ Phone Number _____

Name of Client Reps. Contacted _____ Phone Number _____

Will Lost Time Occur? _____ How Long? _____ Date Lost Time Began _____

Name Any Other Persons Involved or Injured? _____

_____

How Did the Accident Occur? _____

What Could Be Done to Prevent Recurrence of the Accident? _____

What Actions Have You Taken Thus Far to Prevent Recurrence? _____

Additional Comments or Information _____

Supervisor's Name Printed _____ Title _____

Supervisor's Signature _____ Date _____

Reviewer's Name Printed _____ Title _____

Reviewer's Signature _____ Date _____

H&S Officer's Name Printed _____ Title _____

H&S Officer's Signature _____ Date _____

IF THE SPACE PROVIDED ON THIS FORM IS INSUFFICIENT, PROVIDE ADDITIONAL INFORMATION ON SEPARATE PAPER AND ATTACH. THE COMPLETED ACCIDENT INVESTIGATION REPORT MUST BE SUBMITTED TO THE REGIONAL H&S MANAGER AS SOON AS PRACTICAL AFTER OCCURRENCE OF THE ACCIDENT.

Copies To: Regional H&S Manager, Corporate Environmental Health & Safety, Project Manager, Project File, Workers' Compensation Representative

Attachment D 373 312

WITNESS STATEMENT

DATE: ___/___/___

NAME:_____ TITLE:_____

SOCIAL SECURITY NUMBER:_____-_____-_____

TEMPORARY ADDRESS:_____ PHONE (____) ____-_____

_____

LOCATION AT TIME OF ACCIDENT:_____

DESCRIBE, TO THE BEST OF YOUR KNOWLEDGE, HOW THE ACCIDENT HAPPENED:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Signature

Bureau of Labor Statistics
Log and Summary of Occupational
Injuries and Illnesses

U.S. Department of Labor

For Calendar Year 19 ____ Page __ of __

Form Approved
O.M.B. No. 1220-0029
See OMB Disclosure Statement on reverse

NOTE: [illegible]

RECORDABLE CASES: [illegible]

Company Name
Establishment Name
Establishment Address

Case or File Number	Date of Injury or Onset of Illness	Employee's Name	Occupation	Department	Description of Injury or Illness	Extent of and Outcome of INJURY						Type, Extent of, and Outcome of ILLNESS						
(A)	(B)	(C)	(D)	(E)	(F)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
					PREVIOUS PAGE TOTALS													
					TOTALS (Instructions on other side of form.)													

INJURIES

ILLNESSES

OSHA No. 200

Certification of Annual Summary Totals By ______ Title ______ Date ______

OSHA No. 200

POST ONLY THIS PORTION OF THE LAST PAGE NO LATER THAN FEBRUARY 1.

ATTACHMENT B
Page 1 of

OMB DISCLOSURE STATEMENT

We estimate that it will take from 4 minutes to 30 minutes to complete a log entry on this form, including time for reviewing instructions, searching, gathering and maintaining the data needed, and completing and reviewing the entry. If you have any comments regarding this estimate or any other aspect of this recordkeeping system, send them to the Bureau of Labor Statistics, Division of Management Systems (1220-0029), Washington, D.C. 20212 and to the Office of Management and Budget, Paperwork Reduction Project (1220-0029), Washington, D.C. 20503

Instructions for OSHA No. 200

I Log and Summary of Occupational Injuries and Illnesses

Each employer who is subject to the recordkeeping requirements of the Occupational Safety and Health Act of 1970 must maintain for each establishment a log of all recordable occupational injuries and illnesses. This form (OSHA No. 200) may be used for this purpose. A substitute for the OSHA No. 200 is acceptable if it is as detailed, easily readable, and understandable as the OSHA No. 200.

Enter each recordable case on the log within six (6) workdays after learning of its occurrence. Although other records may be maintained at the establishment to which they relate, it is possible to prepare and maintain the log at another location, using data processing equipment, if desired. If the log is prepared elsewhere, a copy updated to within 45 calendar days must be present at all times in the establishment.

Logs must be maintained and retained for five (5) years following the end of the calendar year to which they relate. Logs must be available (normally at the establishment) for inspection and copying by representatives of the Department of Labor, or the Department of Health and Human Services, or States accorded jurisdiction under the Act. Access to the log is also provided to employees, former employees, and their representatives.

II Changes in Extent of or Outcome of Injury or Illness

If, during the 5-year period the log must be retained, there is a change in an extent and outcome of an injury or illness which affects entries in columns 1, 2, 6, 8, 9, or 10, the first entry should be lined out and a new entry made. For example, if an injured employee at first required only medical treatment, but later lost workdays away from work, the check in column 6 should be lined out, and checks entered in columns 2 and 3 and the number of lost workdays entered on column 4.

In another example, if an employee with an occupational illness lost workdays, returned to work, and then died of the illness, any entries in columns 9 through 12 should be lined out and the date of death entered in column 8.

The entire entry for an injury or illness should be lined out if later found to be nonrecordable. For example, an injury which at later date proved not to be work related, or which was initially thought to involve medical treatment but later was determined to have involved only first aid.

III Posting Requirements

A copy of the totals and information following the fold line of the last page for the year must be posted at each establishment in the place or places where notices to employees are customarily posted. This copy must be posted no later than *February 1* and must remain in place until *March 1*.

Even though there were no injuries or illnesses during the year, zeroes must be entered on the totals line, and the form posted.

The person responsible for the annual summary totals shall certify that the totals are true and complete by signing at the bottom of the form.

IV Instructions for Completing Log and Summary of Occupational Injuries and Illnesses

Column A - CASE OR FILE NUMBER. Self-explanatory.

Column B - DATE OF INJURY OR ONSET OF ILLNESS
For occupational injuries enter the date of the work accident which resulted in injury. For occupational illnesses enter the date of initial diagnosis of illness or if absence from work occurred before diagnosis, enter the first day of the absence attributable to the illness which was later diagnosed or recognized.

Columns
C through F - Self-explanatory.

Columns
1 and 8 - INJURY OR ILLNESS RELATED DEATHS
Self-explanatory.

Columns
2 and 8 - INJURIES OR ILLNESSES WITH LOST WORKDAYS
Self-explanatory.

Any injury which involves days away from work, or days of restricted work activity, or both must be recorded since it always involves one or more of the criteria for recordability.

Columns
3 and 10 - INJURIES OR ILLNESSES INVOLVING DAYS AWAY FROM WORK. Self-explanatory.

Columns
4 and 11 - LOST WORKDAYS--DAYS AWAY FROM WORK
Enter the number of workdays (consecutive or not) on which the employee would have worked but could not because of occupational injury or illness. The number of lost workdays should not include the day of injury or onset of illness or any days on which the employee would not have worked even though able to work.
NOTE: For employees not having a regularly scheduled shift, such as certain truck drivers, construction workers, farm labor, casual labor, part time employees, etc., it may be necessary to estimate the number of lost workdays. Estimates of lost workdays shall be based on prior work history of the employee AND days worked by employees doing the same or similar work at the establishment where the employee normally works or, if not employed at the establishment, in the community.

Columns
5 and 12 - LOST WORKDAYS--DAYS OF RESTRICTED WORK ACTIVITY.
Enter the number of workdays (consecutive or not) on which because of injury or illness:
(1) the employee was assigned to another job on a temporary basis, or
(2) the employee worked at a permanent job less than full time, or
(3) the employee worked at a permanently assigned job but could not perform all duties normally connected with it.

The number of lost workdays should not include the day of injury or onset of illness or any days on which the employee would not have worked even though able to work.

Columns
8 and 13 - INJURIES OR ILLNESSES WITHOUT LOST WORKDAYS. Self-explanatory.

Columns 7a
through 7g - TYPE OF ILLNESS
Enter a check in only one column for each illness.

TERMINATION OR PERMANENT TRANSFER. Place an entry in the right of the entry in columns 7a through 7g (type of illness) which represented a termination of employment or permanent transfer.

V Totals

Add number of entries in columns 1 and 8.
Add number of checks in columns 2, 3, 6, 7, 9, 10 and 13.
Add number of days in columns 4, 5, 11, and 12.
Yearly totals for each column (1-13) are required for posting. Running or page totals may be generated at the discretion of the employer.

If an employee's loss of workdays is continuing at the time the totals are summarized, estimate the number of future workdays the employee will lose and add that estimate to the workdays already lost and include the figure in the annual totals. No further entries are to be made with respect to such cases in the next year's log.

VI Definitions

OCCUPATIONAL INJURY is any injury such as a cut, fracture, sprain, amputation, etc., which results from a work accident or from an exposure involving a single incident in the work environment.
NOTE: Conditions resulting from animal bites, such as insect or snake bites or from one time exposure to chemicals, are considered to be injuries.

OCCUPATIONAL ILLNESS of an employee is any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors associated with employment. It includes acute and chronic illnesses or diseases which may be caused by inhalation, absorption, ingestion, or direct contact.

The following listing gives the categories of occupational illnesses and the codes that will be utilized for the purpose of classifying recordable illnesses. For purposes of information, examples of each category are given. These are typical examples, however, and are not to be considered the complete listing of the types of illnesses and disorders that are to be counted under each category.

7a Occupational Skin Diseases or Disorders
Examples: Contact dermatitis, eczema, or rash caused by dermatitis, primary irritants and sensitizers or poisonous plants; oil acne; chrome ulcers; chemical burns or inflammations; etc.

7b Dust Diseases of the Lungs (Pneumoconioses)
Examples: Silicosis, asbestosis and other asbestos related diseases; coal worker's pneumoconiosis; byssinosis, siderosis, and other pneumoconioses.

7c Respiratory Conditions Due to Toxic Agents
Examples: Pneumonitis, pharyngitis, rhinitis or acute congestion due to chemicals, dusts, gases or fumes; farmer's lung; etc.

7d Poisoning (Systemic Effect of Toxic Materials)
Examples: Poisoning by lead, mercury, cadmium, arsenic, or other metals; poisoning by carbon monoxide, hydrogen sulfide or other gases; poisoning by benzol, carbon tetrachloride or other organic solvents; poisoning by insecticide sprays such as parathion, lead arsenate; poisoning by other chemicals such as formaldehyde, plastics and resins, etc.

7e Disorders Due to Physical Agents (Other than Toxic Materials)
Examples: Heatstroke, sunstroke, heat exhaustion and other effects of environmental heat; freezing, frostbite and effects of exposure to low temperatures; caisson disease; effects of ionizing radiation (isotopes, X-rays, radium); effects of nonionizing radiation (welding flash, ultraviolet rays, microwaves, sunburn), etc.

7f Disorders Associated With Repeated Trauma
Examples: Noise-induced hearing loss; synovitis, tenosynovitis and bursitis; Raynaud's phenomena; and other conditions due to repeated motion, vibration or pressure.

7g All Other Occupational Illnesses
Examples: Anthrax, brucellosis, infectious hepatitis, malignant and benign tumors; food poisoning; histoplasmosis; coccidioidomycosis, etc.

MEDICAL TREATMENT includes treatment (other than first aid) administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does NOT include first aid treatment (one time treatment and subsequent observation of minor scratches, cuts, burns, splinters, and so forth, which do not ordinarily require medical care) even though provided by a physician or registered professional personnel.

ESTABLISHMENT: A single physical location where business is conducted or where services or industrial operations are performed (for example: a factory, mill, store, hotel, restaurant, movie theater, farm, ranch, bank, sales office, warehouse, or central administrative office). Where distinctly separate activities are performed at a single physical location, such as construction activities operated from the same physical location as a lumber yard, each activity shall be treated as a separate establishment.

For firms engaged in activities which may be physically dispersed, such as agriculture, construction, transportation, communications, and electric, gas, and sanitary services, records may be maintained at a place to which employees report each day.

Records for personnel who do not primarily report or work at a single establishment, such as traveling salesmen, technicians, engineers, etc., shall be maintained at the location from which they are paid or the base from which personnel operate to carry out their activities.

WORK ENVIRONMENT is composed of the physical location, equipment, materials, processes and the kinds of operations performed in the course of an employee's work, whether on or off the employer's premises.

ATTACHMENT F

SUPPLEMENTARY RECORD OF OCCUPATIONAL INJURIES AND ILLNESSES

To supplement the Log and Summary of Occupational Injuries and Illnesses (OSHA No. 200), each establishment must maintain a record of each recordable occupational injury or illness. Worker's compensation, insurance, or other reports are acceptable as records if they contain all facts listed below or are supplemented to do so. If no suitable report is made for other purposes, this form (OSHA No. 101) may be used or the necessary facts can be listed on a separate plain sheet of paper. These records must also be available in the establishment without delay and at reasonable times for examination by representatives of the Department of Labor and the Department of Health, Education and Welfare, and States accorded jurisdiction under the Act. The records must be maintained for a period of not less than five years following the end of the calendar year to which they relate.

Such records must contain at least the following facts:

1) *About the employer*—name, mail address, and location if different from mail address.

2) *About the injured or ill employee*—name, social security number, home address, age, sex, occupation, and department.

3) *About the accident or exposure to occupational illness*—place of accident or exposure, whether it was on employer's premises, what the employee was doing when injured, and how the accident occurred.

4) *About the occupational injury or illness*—description of the injury or illness, including part of body affected; name of the object or substance which directly injured the employee; and date of injury or diagnosis of illness.

5) *Other*—name and address of physician; if hospitalized, name and address of hospital; date of report; and name and position of person preparing the report.

SEE *DEFINITIONS* ON THE BACK OF OSHA FORM 200.

ATTACHMENT F

OSHA No. 101
Case or File No. .....

Form approved
OMB No. 44R 1453

Supplementary Record of Occupational Injuries and Illnesses

EMPLOYER

1. Name .....
2. Mail address .....
(No. and street) (City or town) (State)
3. Location, if different from mail address .....

INJURED OR ILL EMPLOYEE

4. Name ..... Social Security No. .....
(First name) (Middle name) (Last name)
5. Home address .....
(No. and street) (City or town) (State)
6. Age ..... 7. Sex: Male..... Female..... (Check one)
8. Occupation .....
(Enter regular job title, *not* the specific activity he was performing at time of injury.)
9. Department .....
(Enter name of department or division in which the injured person is regularly employed, even though he may have been temporarily working in another department at the time of injury.)

THE ACCIDENT OR EXPOSURE TO OCCUPATIONAL ILLNESS

10. Place of accident or exposure .....
(No. and street) (City or town) (State)
If accident or exposure occurred on employer's premises, give address of plant or establishment in which it occurred. Do not indicate department or division within the plant or establishment. If accident occurred outside employer's premises at an identifiable address, give that address. If it occurred on a public highway or at any other place which cannot be identified by number and street, please provide place references locating the place of injury as accurately as possible.
11. Was place of accident or exposure on employer's premises? ..... (Yes or No)
12. What was the employee doing when injured? .....
(Be specific. If he was using tools or equipment or handling material, name them and tell what he was doing with them.)
13. How did the accident occur? .....
(Describe fully the events which resulted in the injury or occupational illness. Tell what happened and how it happened. Name any objects or substances involved and tell how they were involved. Give full details on all factors which led or contributed to the accident. Use separate sheet for additional space.)

OCCUPATIONAL INJURY OR OCCUPATIONAL ILLNESS

14. Describe the injury or illness in detail and indicate the part of body affected. .....
(e.g.: amputation of right index finger at second joint; fracture of ribs; lead poisoning; dermatitis of left hand, etc.)
15. Name the object or substance which directly injured the employee. (For example, the machine or thing he struck against or which struck him; the vapor or poison he inhaled or swallowed; the chemical or radiation which irritated his skin; or in cases of strains, hernias, etc., the thing he was lifting, pulling, etc.)
16. Date of injury or initial diagnosis of occupational illness .....
(Date)
17. Did employee die? ..... (Yes or No)

OTHER

18. Name and address of physician .....
19. If hospitalized, name and address of hospital .....

Date of report ..... Prepared by .....
Official position .....

ATTACHMENT G

FIRST AID REGISTRE OR

FROM: _____ PAGE _____ OF _____

TO: _____ DATE: _____/_____/_____

LOCATION: _____ JOB NUMBER: _____

DATE TIME	NAME	FOREMAN	TYPE OF INJURY/ BODY PART	TYPE OF ACCIDENT	LEGEND* FAV	RTW	DV	LTA

*FAV-First Aid Visit *RTW-Return to Work *DV-Doctor Visit *LTA-Lost Time Accident

THE USE OF THIS FORM IS REQUIRED UNDER THE PROVISIONS OF THE ALABAMA WORKERS' COMPENSATION LAW

Alabam
(Appendix 2-

WCC Form 2
Rev. 1985

STATE OF ALABAMA
EMPLOYER'S FIRST REPORT OF INJURY OR OCCUPATIONAL DISEASE

Send to: Your workers' compensation insurance carrier, in duplicate

OSHA CASE OR FILE NUMBER

PRINT OR TYPE

Carrier's File No. _____

EMPLOYER

1. EMPLOYER'S NAME AND MAILING ADDRESS (No. & Street, City, County, State, ZIP)

LOCATION, IF DIFFERENT FROM MAILING ADDRESS

TELEPHONE NUMBER

2. EMPLOYER IDENTIFICATION (U.C. ACCOUNT) NUMBER

3. CARRIER OR SELF-INSURANCE REGISTRATION NUMBER

4. NATURE OF BUSINESS (Manufacturing, Trade, Transportation, etc.)

SPECIFIC PRODUCTS

5. WORKERS' COMPENSATION PROVIDED BY: INSURANCE CARRIER ( ) SELF-INSURANCE ( ) GROUP FUND ( )
IF INSURANCE CARRIER, GIVE NAME AND ADDRESS:

EMPLOYEE

6. EMPLOYEE'S NAME (Last) (First) (Middle)

7. SEX MALE ( ) FEMALE ( )

8. AGE

9. SOCIAL SECURITY NO.

10. EMPLOYEE'S HOME ADDRESS (No. & Street or RFD, City, County, State, ZIP)

11. MARITAL STATUS: SINGLE ( ) MARRIED ( ) DIVORCED ( ) SEPARATED ( ) WIDOWED ( )

12. HOME TELEPHONE

13. REGULAR OCCUPATION

14. WORKING IN WHAT DEPARTMENT WHEN HURT

INJURY OR ILLNESS

15. PLACE OF ACCIDENT OR EXPOSURE (Address or location, include County)

16. ON EMPLOYER'S PREMISES? YES ( ) NO ( )

17. Date of Occurrence

18. TIME OF DAY a.m. ( ) p.m. ( )

19. Date Disability Began

20. Date Employer Notified

21. DESCRIBE THE INJURY OR ILLNESS IN DETAIL AND INDICATE THE PART OF THE BODY AFFECTED.
(e.g., amputation of right index finger at second joint, fracture of 2 ribs, lead poisoning, dermatitis of left hand, etc.)

22. IF FATAL, GIVE DATE OF DEATH

23. WHAT THING DIRECTLY PRODUCED THIS INJURY OR ILLNESS?
(Name object struck against or struck by; vapor, poison, chemical or radiation; if strain or hernia, the thing being lifted, pulled pushed, etc.; if injury resulted solely from bodily motion, the stretching, bending, etc. which resulted in injury.)

24. HOW DID THE ACCIDENT OR EXPOSURE OCCUR?
(Begin by telling what the employee was doing just before the accident or exposure. Be specific. If employee was using tools or equipment, or handling material, name them and tell what employee was doing with them.)

(Now describe fully the events which resulted in injury or illness. Tell what happened and how it happened. Specify how objects or substances were involved. Give full details of all factors which led or contributed to the accident or exposure.)

25. NAME AND ADDRESS OF TREATING PRACTITIONER

NAME AND ADDRESS OF HOSPITAL

HOSPITALIZED ( )
OUT-PATIENT ( )
EMERGENCY TREATMENT ( )

WAGE INFORMATION

26. Has Injured Returned to Work? Yes ( ) No ( )

27. If so, Date

28. At What Wage?

29. At What Occupation?

30. LENGTH OF TIME IN YOUR EMPLOY?

31. LENGTH OF TIME IN PRESENT JOB

32. NUMBER OF DEPENDENTS

33. Average Weekly Wage

34. Weekly Value of Remuneration Other Than Wages-(Food, Lodging, etc.)
$

35. DID EMPLOYEE RECEIVE FULL PAY FOR DAY OF INJURY? YES ( ) NO ( )

36. Date of This Report

37. Signed by

38. Signature

39. Official Position or Title

JF-I (82b Prd. in U.S.A.

Do Not Write In The Space Be

Employer U.C

Carrier Name

SIC

Carrier-Fund

Soc. Sec. N

Sex

Marital Stat

Dependents

Age

Occupation

Even

On Premises

Event Dat

Employer N

Injury Source

Accident Ty

Nature of Inju

Part of Bo

Date of Do

Stopped Wo

Time Empl

Time on Job

Weekly Wa

Report Date

Report Rec

Base

Case Cla

Attachment I

VEHICLE ACCIDENT REPORTING PROCEDURE

1.0 Purpose

To set for the minimum requirements for the timely and accurate reporting of vehicular accidents.

2.0 Scope

This procedure applies to all Region operations and projects.

3.0 Responsibilities

3.1 Operations Managers are responsible for assuring that their respective department, project and other managers, and supervisors fully understand and comply with this procedure and any supplementary procedure(s).

3.2 All managers and supervisors are responsible for assuring that all employees reporting to them fully understand and comply with this procedure and any supplementary procedure(s).

3.3 Any employee involved in an accident while using a Jacobs pool car, rental car on company business, or other company owned, rented, or operated vehicle or heavy equipment, shall comply with this procedure and any supplementary procedure(s).

4.0 Requirements

4.1 Each office and project site shall develop a supplementary vehicle accident reporting procedure to address any applicable local and state requirements and/or client requirements.

4.2 At a minimum, the police will be notified and a police accident report filed for any accident involving another vehicle or property when damages are estimated to be greater than $500.00 or when there is allegedly bodily injury (more stringent requirements by local, state or client shall be addressed by a supplementary office or project procedure).

4.3 All vehicle and/or equipment accidents shall be verbally reported to the Pasadena Risk Management Department and Western Region Safety Department (see Exhibit A) within 24 hours of the accident.

4.4 The employee assigned to the vehicle or equipment, or who holds the vehicle rental agreement, shall be responsible for completing and returning the following to the Pasadena Risk Management Department:

- Cigna "Notice of Automobile Accident" (Exhibit B);
- Copies of any completed local, state or client required forms.

4.5 If the vehicle involved in the accident is a Jacobs pool car, the employee assigned to the vehicle is responsible for obtaining two written estimates for repair of the Jacobs vehicle and obtaining a copy of the police investigation report (when applicable). All information is to be sent to the Pasadena Risk Management Department.

4.6 If the vehicle involved in the accident is a rental vehicle, the rental company will normally take care of the repair estimates. However, the employee shall be responsible for obtaining a copy of the police investigation report (when applicable) and forwarding a copy of the Pasadena Risk Management Department.

4.7 All Jacobs vehicles that are non-driveable, due to an accident, are to be towed to the nearest garage that will hold them until further instructions are received.

4.8 All questions regarding vehicle insurance shall be directed to the Pasadena Risk Management Department.

4.9 In the event that the employee responsible for the vehicle is, due to the accident, unable to complete the foregoing requirements, it shall be the responsibility of the respective Operations Manager or his/her designate to do so.

5.0 Attachments

5.2 Exhibit B - Cigna "Notice of Automobile Accident"

JACOBS ENGINEERING GROUP INC.
AUTO ACCIDENT REPORT

Date of Accident _____ Time of Accident _____
Location of Accident _____

Driver of Company Vehicle
Name _____ Date of Birth _____
Address _____
Home Phone No. _____ Driver's License No. _____
License Number _____
Serial Number of Vehicle _____
Name of Other Passengers in Vehicle _____
Equipment Number _____

Driver of Other Vehicle
Name of Driver _____
Home Address of Driver _____
Phone Number Home _____ Work _____
Driver's License Number (Including State) _____
Employer _____
Owner of Vehicle _____
Serial Number of Vehicle _____
Make and Model of Car _____
Relation of Driver to Owner of Vehicle _____
Insurance Company of Owner _____
Insurance Company of Driver & Policy Number _____

Description of Accident - _____

Description of Damage to Vehicles
Company Vehicle _____

Other Vehicle _____

Place Where Damaged Vehicles Can Be Seen _____

Injuries (Explain) _____

Name of Law Enforcement Body Investigating Accident _____
Name, Address & Phone No. of Witnesses _____

Signature _____ Date _____

Job Name: _____ Job Number: _____

Approved by:

AUTOMOBILE ACCIDENT OR LOSS NOTICE

ESIS, Inc.
a CIGNA company

EXHIBIT 3

CIGNA

CONTRACT #	NAME OR COMPANY	FILE NO. (ESIS/INA USE ONLY)

LOCATION CODES			
1	2	3	4

(1) COMPANY

NAME — PHONE

ADDRESS

(2) TIME & PLACE

DATE & TIME OF LOSS OR ACCIDENT ☐ A.M. ☐ P.M. — LOCATION

(3) AUTO USED OR OCCUPIED BY CLIENT

MUST GIVE DRIVER'S AGE

YEAR	MAKE	MODEL	SERIAL NUMBER	MOTOR NUMBER	LICENSE NO., YEAR & STATE

NAME OF OWNER — ADDRESS — ☐ HOME ☐ BUS. PHONE

NAME OF DRIVER — ADDRESS — ☐ HOME ☐ BUS. PHONE

RELATION TO OWNER (EMPLOYEE, ETC.) — WAS CAR USED WITH OWNER'S PERMISSION? — OTHER INSURANCE ☐ YES ☐ NO

FOR WHAT PURPOSE WAS AUTO BEING USED AT TIME OF ACCIDENT

WHERE MAY AUTO BE SEEN (ADDRESS)? — ESTIMATED COST OF REPAIRS

IF THEFT, SPECIFY PROPERTY STOLEN. IF COLLISION OR COMPREHENSIVE, SPECIFY DAMAMGE

DATE, LOCATION & BADGE NO. OR NAME OF POLICE AUTHORITY TO WHOM ACCIDENT WAS REPORTED

(4) DAMAGE TO PROPERTY OF OTHERS

Use Additional Sheet If Necessary

OWNER — ADDRESS — ☐ HOME ☐ BUS. PHONE

OTHER DRIVER — SAME AS ABOVE ☐ — ADDRESS — OPERATOR LICENSE # — ☐ HOME ☐ BUS. PHONE

LIST DAMAGE. IF AUTO, MAKE YEAR, LICENSE NUMBER, YEAR & STATE — ESTIMATED COST OF REPAIRS

WAS OTHER CAR INSURED? ☐ YES ☐ NO — NAME OF COMPANY & POLICY NUMBER

(5) PERSONS INJURED

NAME	ADDRESS	PHONE	AGE	PASSENGER IN CLIENT CAR	PASSENGER IN OTHER CAR		EXTENT OF INJURIES

"It is unlawful to

For your protection California law requires the following to appear on this form. Section 556 of the Insurance Code reads as follows:

(a) Present or cause to be presented any false or fraudulent claim for the payment of a loss under a contract of insurance

(b) Prepare, make, or subscribe any writing, with intent to present or use the same or to allow it to be presented or used in support of any such claim

Every person who violates any provision of this section is punishable by imprisonment in the State prison not exceeding three years, or by fine not exceeding one thousand dollars or by both

SEE REVERSE SIDE FOR ACCIDENT DESCRIPTION AND OTHER INFORMATION

DATE

SIGNATURE OF CLIENT OR DRIVER

E-1J49b Prd in U.S.A.

(6) NAMES AND ADDRESSES OF UNINJURED OCCUPANTS AND WITNESSES

OCCUPANTS OF CLIENT'S CAR	ADDRESS	PHONE
		☐ HOME ☐ BUS.

OCCUPANTS OF OTHER CAR	ADDRESS	PHONE
		☐ HOME ☐ BUS.

OTHER WITNESSES OR PERSONS PRESENT	ADDRESS	PHONE
		☐ HOME ☐ BUS.

(7) DESCRIPTION OF ACCIDENT

(8) AUTOMOBILE SEAT BELTS

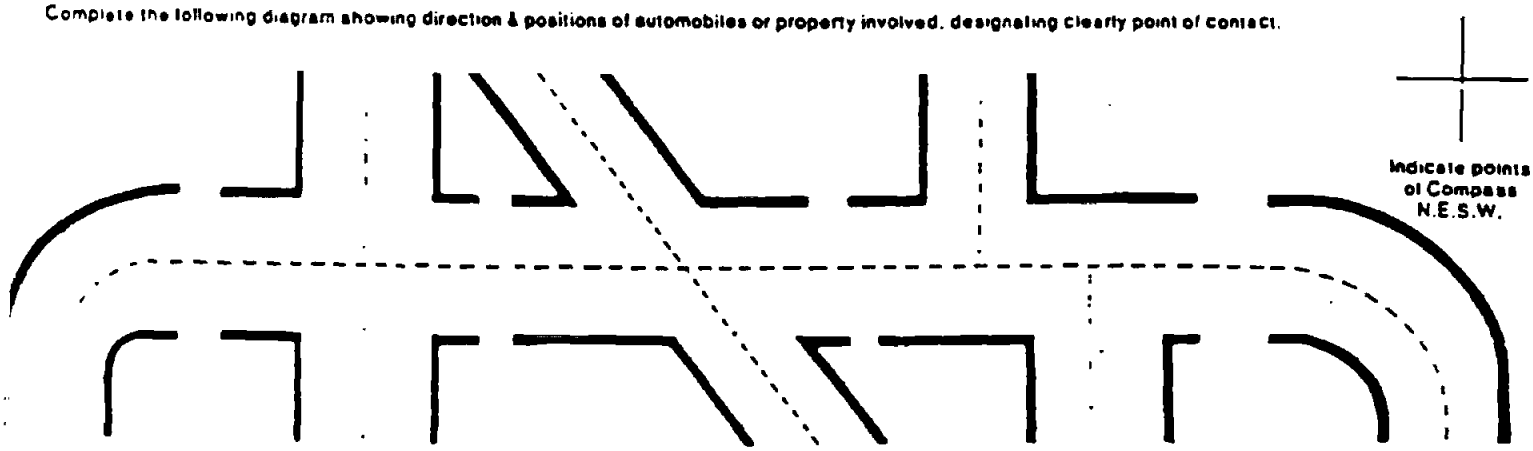
INSTALLED IN CLIENT'S CAR (CHECK ONE) ☐ YES ☐ NO

USED AT TIME OF ACCIDENT (CHECK ONE) ☐ YES ☐ NO

HELPFUL IN MINIMIZING INJURIES INCLUDING PASSENGERS (CHECK ONE) ☐ YES ☐ NO

EXPLAIN

Complete the following diagram showing direction & positions of automobiles or property involved, designating clearly point of contact.



INSTRUCTIONS

GIVE STREET NAMES, DIRECTIONS AND LOCATIONS OF OBJECTS INVOLVED

(1) Number each vehicle and show direction of travel by arrow → 1 2 ←

(2) Use solid line to show path of each vehicle before accident → 1 dotted line after accident .... → 1

(3) Show motorcycle or bicycle by → O-O (4) Show pedestrian by → O (5) Show railroad by

2.4 VEHICLE ACCIDENTS

2.4.1 Reporting

- An Auto Accident Form (Appendix 2-7) shall be kept in all Company vehicles utilized for offsite service.
- The form shall be completed by the driver of the vehicle in conjunction with his Supervisor and the Project Superintendent and forwarded within 24 hours after an accident to the Corporate Safety Department.

2.4.2 Requirements

- The report shall be filed when a Company vehicle is involved in any type of accident.
- The form shall also be used in filing reports of accidents involving equipment vehicles (onsite or offsite) such as cher.y pickers, backhoes, trucks, cars, etc.

2.4.3 Distribution

- The report shall be distributed as follows:
  - Equipment Yard - 1 Copy
  - Site File - 1 Copy
  - Corporate Insurance - Original
  - Corporate Safety Department - 1 Copy

Attachment J

PRIMARY CONTACTS

Central Region Human Resources Department
Jacobs Engineering Group, Inc.
4848 Loop Central Drive
Houston, Texas 77081-2211
Attention: R. Barry Rogers
Office Phone: (713) 669-2200
FAX Machine: (713) 669-0045

Southern Region Human Resources Department
Jacobs Applied Technology, Inc.
1525 Charleston Hwy.
Post Office Box 1327
Orangeburg, South Carolina 29115
Attention: Jerry D. Brezeale
Office Phone: (803) 534-2424
FAX Machine: (803) 534-2457

Northern Region Human Resources Department
Jacobs Engineering Group, Inc.
1880 Waycross Road
Cincinnati, Ohio 45240
Attention: John S. Kadash
Office Phone: (513) 595-7500
FAX Machine: (513) 595-7717

Western Region Human Resources Department
Jacobs Engineering Group, Inc.
2155 Louisiana, N.E. Suite 10,000
Albuquerque, New Mexico 87110
Attention: Maureen M. Mendez
Office Phone: (505) 888-1300
FAX Machine: (505) 880-2555

Corporate Human Resources Department
Jacobs Engineering Group, Inc.
251 S. Lake Avenue
Pasadena, California 91101
Attention: William Gebhardt
Office Phone: (818) 578-6886
FAX Machine: (818) 578-6837

APPENDIX K
Code of Safe Practices

CODE OF SAFE PRACTICES

A. Following is the basic Code of Safe Practices that applies at all times to all work being conducted on this Project.

1. These safety rules are not inclusive, and all Federal and State safety regulations shall also be applicable.

2. Where a conflict exists between a Federal, State, and/or other applicable safety rule, the more restrictive requirement shall be in force on the job site.

B. This is a recommended format. It is general in nature and intended as a basis for the preparation of a code of safe practices by the contractor that fits his/her operation more exactly. As a minimum performance standard, it shall be adopted and enforced by each contractor performing construction work on this project.

1. Hard hats shall be worn at all times in construction areas.

2. Sleeved shirts shall be worn at all times.

3. Long pants shall be worn at all times.

4. Leather shoes shall be worn at all times; no tennis or running shoes will be allowed.

5. Adequate eye protection shall be worn when cutting, grinding, sawing or conducting any other activity that poses a potential eye hazard.

6. Safety belts with lanyards shall be used at unprotected heights of more than 6'-0"; this includes working on a ladder when more than 6'-0" above the ground or floor.

7. Hearing protection shall be worn when employees are exposed to noise levels requiring hearing protection as defined by Federal or State health and safety standards.

8. Illegal drugs, alcohol, fire arms, or other dangerous substances shall not be allowed on the job site.

9. Good housekeeping practices shall be maintained continually.

10. Any time work is performed overhead, the contractor conducting such work shall erect a barricade.

    a. The barricade shall consist of caution or danger barricade tape and appropriate warning signs.

    b. All barricades shall be removed when not in use.

    c. Contractor employees shall be required to honor the barricades erected by other contractors on the job site.

11. All persons shall follow these safe practices rules, render every possible aid to safe operations and report all unsafe conditions or practices to the supervisor.

12. Foremen shall ensure that employees observe and obey every applicable Company, State, or Federal regulation and order as is necessary to the safe conduct of the work, and shall take such action as is necessary to obtain compliance.

13. All employees shall be given frequent accident prevention instruction. Instruction shall be given at least every five work days.

14. Anyone known to be under the influence of drugs or an intoxicating substance that impairs the employee's ability to safely perform the assigned duties shall not be allowed on the job while in that condition.

15. Horseplay, scuffling, and other acts which tend to have an adverse influence on the safety or well-being of the employees shall be prohibited.

16. Work shall be well planned and supervised to prevent injuries in the handling of materials and in working together with equipment.

17. No employee shall knowingly be permitted or required to work while his/her ability or alertness is so impaired by fatigue, illness, or other causes that the employee or others might be exposed to injury unnecessarily.

18. Employees shall not enter manholes, underground vaults, chambers, tanks, silos, or other similar spaces unless it has been determined that it is safe to enter.

19. Employees shall be instructed to ensure that all guards and other protective devices are proper and adjusted and shall report deficiencies promptly to the supervisor.

20. Electric cords shall not be exposed to potential damage from vehicles.

21. In locations where the use of a portable power tool is difficult, the tool shall be supported by means of a rope or similar support of adequate strength.

22. Only trained and authorized persons shall operate machinery or equipment.

23. Loose or frayed clothing, loose or hanging long hair, dangling ties, finger rings, etc., shall not be worn around moving machinery or other areas where they may become entangled.

24. Machinery shall not be serviced, repaired, or adjusted while in operation, nor shall oiling of moving parts be attempted, except on equipment that is designed or fitted with safeguards to protect the person performing the work.

25. Where appropriate, lock-out procedures shall be used.

26. Employees shall not work under vehicles supported by jacks or chain hoists without protective blocking that will prevent injury if jacks or hoists should fail.

27. Air hoses shall not be disconnected compressors until the hose line has been bled.

28. Excavating, trenching, and shoring operations shall be supervised by a "competent person" (refer to OSHA and/or Jacobs during all stages of field activity).

29. All excavations shall be inspected visually before backfilling to ensure that it is safe to backfill.

30. Excavating equipment shall not be operated near tops of cuts, banks, or cliffs if employees are working below.

31. Tractors, bulldozers, scrapers, and carryalls shall not operate where there is a possibility of overturning in dangerous areas like edges of deep fills, cut banks, and steep slopes.

32. When loading where there is a probability of dangerous slides or movement of material, the wheels or treads of loading equipment, other than that riding on rails, should be turned in the direction which will facilitate escape in case of danger, except in a situation where this position of the wheels or treads would cause a greater operational hazard.

33. Workers shall not handle or tamper with any electric equipment in a manner not within the scope of their duties, unless they have received instructions from a qualified, licensed electrician.

34. All injuries shall be reported promptly to the foreman and the Prime Contractor so that arrangements can be made for medical or first aid treatment.

35. No burning, welding, or other source of ignition shall be applied to any enclosed tank or vessel, even if there are some openings, until it has first been determined that no possibility of explosion exists and authority for the work is obtained from the foreman or superintendent.

ACKNOWLEDGMENT OF RECEIPT AND REVIEW OF CODE OF SAFE PRACTICES

TO ALL EMPLOYEES:

ATTACHED IS A COPY OF THE CODE OF SAFE PRACTICES. THESE GUIDELINES ARE PROVIDED FOR YOUR SAFETY.

IT IS THE RESPONSIBILITY OF _____ TO PROVIDE AND
(name of contractor)

REVIEW THIS CODE WITH EACH EMPLOYEE. IT IS THE EMPLOYEE'S RESPONSIBILITY TO READ AND COMPLY WITH THIS CODE.

THE ATTACHED COPY OF THE CODE OF SAFE PRACTICES IS FOR YOU TO KEEP. PLEASE SIGN AND DATE BELOW AND RETURN ONLY THIS PAGE TO

_____
(name)

I HAVE READ AND UNDERSTAND THE CODE OF SAFE PRACTICES.

_____ _____
Date Employee

_____ _____
Social Security Number Signature

FINAL PAGE

ADMINISTRATIVE RECORD

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