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REMEDIAL INVESTIGATION HEALTH AND SAFETY PLAN SITE 4 FIRE FIGHTING
TRAINING UNIT AND SITE 12 HARBOR DREDGE SPOIL AREA NS GREAT LAKES IL
1/1/1993
HALIBURTON NUS

**Remedial Investigation
Health and Safety Plan
Site 4 - Fire Fighting Training Unit
Site 12 - Harbor Dredge Spoil Area
Naval Training Center
Great Lakes, Illinois**



**Northern Division
Naval Facilities Engineering Command
Contract No. N62472-90-D-1298
Contract Task Order 0071**

January 1993



HALLIBURTON NUS
Environmental Corporation

DRAFT
HEALTH AND SAFETY PLAN
REMEDIAL INVESTIGATION
SITE 4 AND SITE 12
NAVAL TRAINING CENTER
GREAT LAKES, ILLINOIS

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) PROGRAM

Submitted to:
Southern Division
Environmental Branch, Code 18
Naval Facilities Engineering Command
2155 Eagle Drive, Box 10068
Charleston, South Carolina 29411-0068

Submitted by:
HALLIBURTON NUS Environmental Corporation
993 Old Eagle School Road, Suite 415
Wayne, Pennsylvania 19087-1710

Contract No. N62472-90-D-1298
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REVIEWED BY:

APPROVED BY:

PAMELA B. MARKELZ, CSS, CET
CORPORATE HEALTH AND SAFETY MANAGER
SEC DONOHUE INC.
SHEBOYGAN, WISCONSIN
under subcontract to HALLIBURTON NUS

MATTHEW M. SOLTIS, CSP
HEALTH AND SAFETY MANAGER
HALLIBURTON NUS ENVIRONMENTAL CORP.

HEALTH AND SAFETY PLAN
REMEDIAL INVESTIGATION
SITE 4 AND SITE 12
NAVAL TRAINING CENTER
GREAT LAKES, ILLINOIS

Prepared by: _____ Date: _____
Anya Kirykowicz
SEC Donohue

Reviewed by: _____ Date: _____
Pamela B. Markelz, CSS, CET
Corporate Health and Safety Manager
SEC Donohue Inc.

Reviewed by: _____ Date: _____
Mansour Ghiasi, P.E.
Project Manager
SEC Donohue Inc.

Reviewed by: _____ Date: _____
IEPA

Reviewed by: _____ Date: _____
Todd Daniels
Remedial Project Manager
Department of the Navy
Southern Division
Naval Facilities Engineering Command

Reviewed by: _____ Date: _____
Matthew M. Soltis, CSP
CLEAN Health and Safety Manager
HALLIBURTON NUS Environmental Corporation

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LIST OF ACRONYMS/ABBREVIATIONS

ACBM	Asbestos Containing Building Material
ACGIH	American Conference of Governmental Industrial Hygienists
AST	Aboveground Storage Tank
BZ	Breathing Zone
CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CHSM	Corporate Health and Safety Manager
CLEAN	Comprehensive Long-Term Environmental Action Navy
CPR	Cardiopulmonary Resuscitation
CPTU	Cone Penetrometer Testing Unit
CRZ	Contamination Reduction Zone
CTO	Contract Task Order
CZ	Control Zone
EPA	Environmental Protection Agency
EZ	Exclusion Zone
FAR	Federal Acquisition Regulation
FFTU	Fire Fighting Training Unit
FID	Flame Ionization Detector
FS	Feasibility Study
HEPA	High Efficiency Particulate Air (Filter)
HSM	Health and Safety Manager
HASP	Health and Safety Plan
HR	Heart Rate
IAS	Initial Assessment Study
MCE	Mixed Cellulose Ester
MSDS	Material Safety Data Sheets
MSHA	Mining Safety and Health Administration
NAS	Naval Air Station
NAVFAC	Naval Facilities
NIOSH	National Institute for Occupational Safety and Health
NTC	Naval Training Center
OSHA	Occupational Safety and Health Administration
OVA	Organic Vapor Analyzer
PAMs	Personal Air Monitors
PEL	Permissible Exposure Limit
PID	Photoionization Detector
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RI	Remedial Investigation
SCBA	Self-Contained Breathing Apparatus

LIST OF ACRONYMS/ABBREVIATIONS (Continued)

SOP	Standard Operating Procedure
SSO	Site Health and Safety Officer
SZ	Support Zone
TWA	Time Weighted Average
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
UST	Underground Storage Tank
WBGT	Wet Bulb Globe Temperature (Index)
WZ	Work Zone

R/71HSPD/AA0

1.0 GENERAL

This Site-Specific Health and Safety Plan (HASP) was prepared for Site 4 (Fire Fighting Training Unit) and Site 12 (Harbor Dredge Spoil Area) at the Naval Training Center (NTC) in Great Lakes, Illinois, under Contract No. N62472-90-D-1298 to HALLIBURTON NUS Environmental Corporation for the U.S. Navy, Northern Division, Philadelphia, Pennsylvania, in accordance with the regulatory requirements of 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response." In addition, the scope of work shall comply with and reflect the following applicable regulations and appropriate guidance publications, as a minimum:

- Federal Acquisition Regulation, F.A.R. Clause 52.236-13: Accident Prevention.
- U.S. Army Corps of Engineers (USACE), Safety and Health Requirements Manual, EM 385-1-1 (latest revision, 1987).
- Occupational Safety and Health Administration (OSHA), Construction Industry Standards, 29 CFR 1926, and General Industry Standards, 29 CFR 1910.
- NIOSH/OSHA/USCG/EPA, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," October 1985.
- Environmental Protection Agency (EPA) 40 CFR, Part 61, "National Emission Standards for Hazardous Air Pollutants; Asbestos NESHAP Revision; Final Rule," November 20, 1990.
- Other applicable Federal, State, and local safety and health requirements.

The purpose of this HASP is to summarize the project organization and responsibilities; establish standard operating procedures (SOPs) for preventing accidents, injuries, and illnesses; identify hazards; discuss the personal protective equipment that may be used; identify personnel health and safety training requirements; summarize the monitoring techniques; establish emergency procedures; describe the medical surveillance program; provide appropriate first aid equipment for site activities; provide for accident recordkeeping; and establish a schedule for safety inspections.

This HASP addresses those activities associated with remedial investigation activities to be conducted at the NTC located in Shields Township, Lake County, Illinois, on the Shore of Lake Michigan (Figure 1-1). Specifically, field investigation activities will be conducted at two investigative areas, the Fire Fighting Training Unit and the Harbor Dredge Spoil Area (Figure 1-2).

This project is being performed under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract No. N62472-90-D-1298, Contract Task Order (CTO) No. 0071. The activities under the CLEAN Contract are performed by a team of contractors comprised of HALLIBURTON NUS Environmental Corporation (HALLIBURTON NUS), the prime contractor, and SEC Donohue Inc.

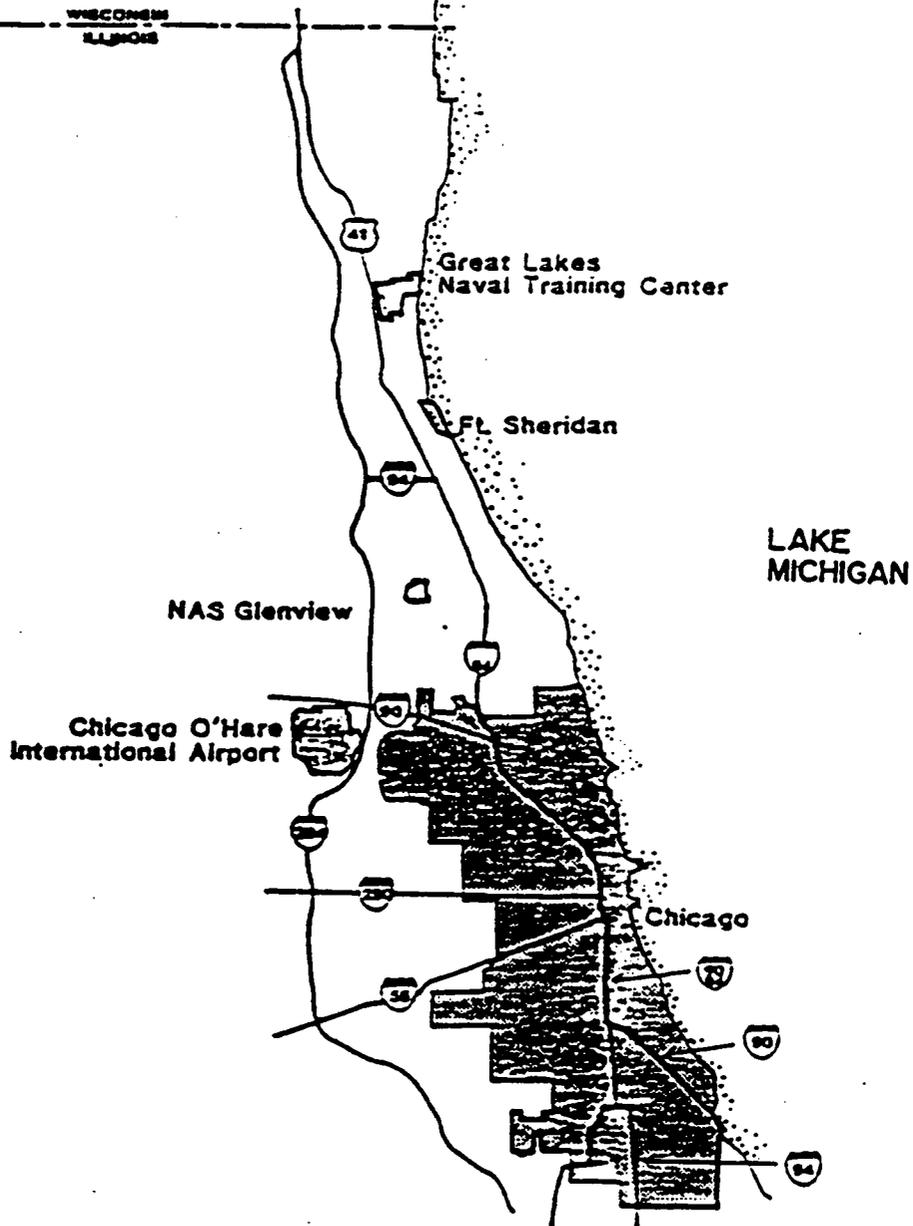
This HASP will be implemented by the SEC Donohue Corporate Health and Safety Manager (CHSM), CLEAN Health and Safety Health Manager (CLEAN HSM), and the Site Health and Safety Officer (SSO) during site work.

Compliance with this HASP is required of all personnel who enter the sites. Assistance in implementing this HASP can be obtained from the CHSM and the CLEAN HSM.

The content of this HASP may change or undergo revision based upon additional information made available to health and safety personnel through monitoring results or due to changes in the technical scope of work. Any changes proposed must be approved by the CHSM and the CLEAN HSM. A HASP Field Modification Form is presented in Appendix C.

1.1 SCOPE OF WORK

- Geophysical Survey
- Soil Borings/Subsurface Soil Sampling
- Hand Augering/Subsurface Soil Sampling
- Surface Soil Sampling
- Surface Water/Sediment Sampling
- Monitoring Well Installation
- Monitoring Well Development/Groundwater Sampling
- Asbestos Survey and Sampling
- Liquid Waste Sampling
- Solid Waste Sampling



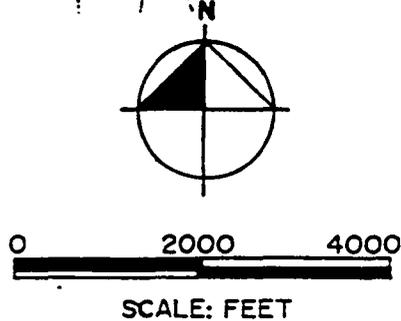
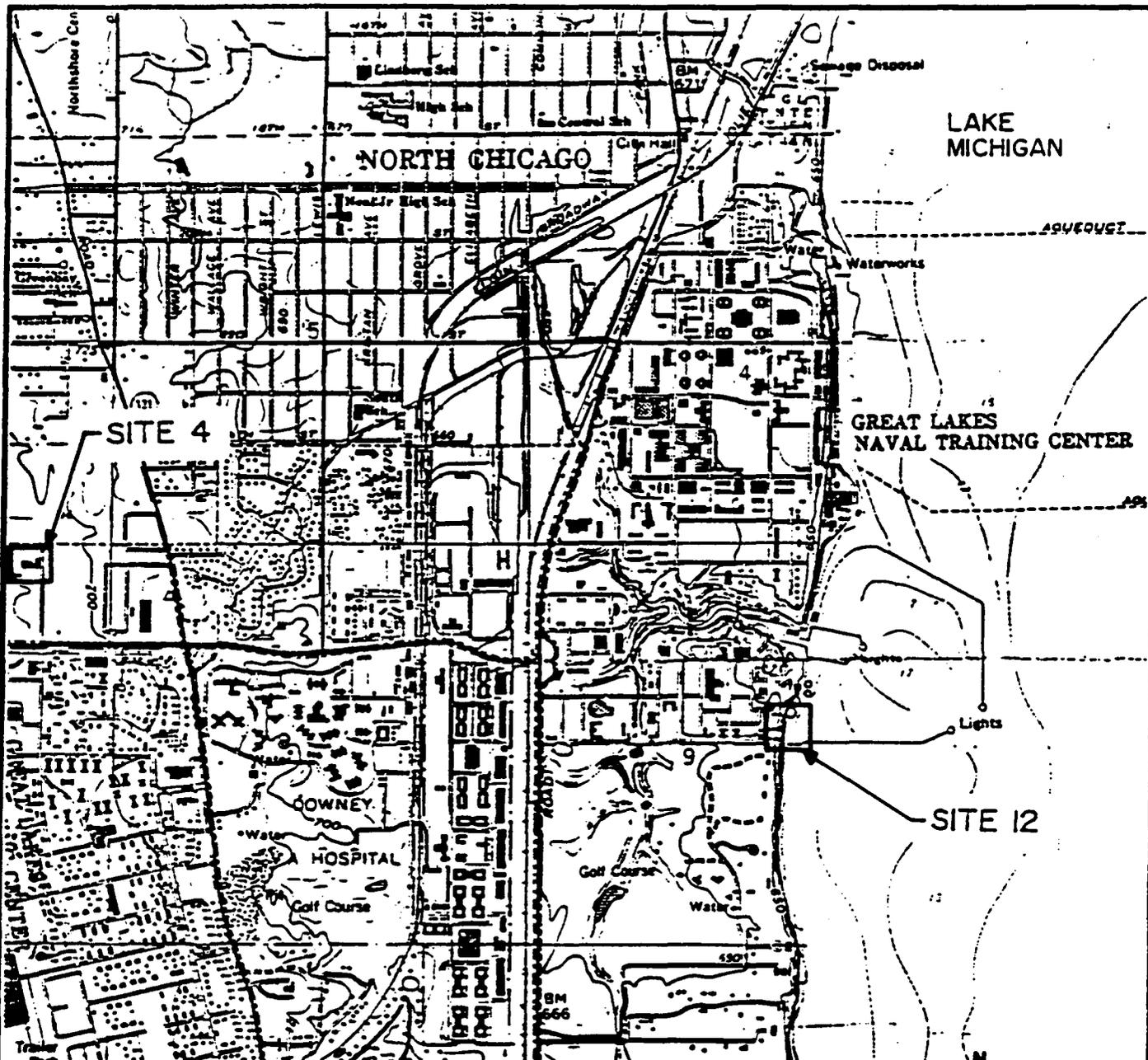
SOURCE:
 INITIAL ASSESSMENT STUDY
 ROGERS, GOLDEN, HALPERN, 1986

DUNCAN-PARNELL, INC. CHARLOTTE, NC 606-766-7766



FIGURE I-I
 GENERAL LOCATION MAP

NAVAL TRAINING CENTER
 GREAT LAKES, ILLINOIS



SOURCE:
USGS 7.5 MINUTE QUADRANGLE
WAUKEGAN, ILLINOIS 1960
PHOTOREVISED 1972 AND 1980

DUNCAN-PARNELL, INC. CHARLOTTE, NC 800-766-7766



FIGURE I-2
SITE LOCATION MAP

NAVAL TRAINING CENTER
GREAT LAKES, ILLINOIS

1.2 PROJECT PERSONNEL

<u>Name/Firm</u>	<u>Title</u>	<u>Work Phone</u>	<u>Home Phone</u>
Lorrie Ransome, Ph.D., SEC Donohue	Program Manager	414/458-8711	414/452-1368
Mansour Ghiasi, SEC Donohue	Project Manager	414/458-8711	708/827-1317
Pam Markelz, CSS, CET SEC Donohue	Corporate Health and Safety Manager	414/458-8711	414/457-4570
SEC Donohue	On-Site Health and Safety Officer	(To be determined before field activities are initiated)	
SEC Donohue	On-Site Health and Safety Officer (Alternate)	(To be determined before field activities are initiated)	

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2.0 ASSIGNMENT OF HASP RESPONSIBILITY

The following describes the health and safety designations and general responsibilities which will be implemented for field activities associated with the remedial investigation (RI) to determine the presence and extent of contamination at the NTC Site 4 and Site 12.

2.1 CORPORATE HEALTH AND SAFETY MANAGER

The CHSM and the CLEAN HSM have overall responsibility for development and implementation of this HASP. The HSMs shall approve any changes to this HASP due to modification of procedures or newly proposed site activities.

The HSMs will be responsible for the development of new company safety protocols and procedures necessary for field operations and will also be responsible for the resolution of any outstanding safety issues which arise during the site work. Health and safety-related duties and responsibilities will be assigned only to qualified individuals by the HSMs. Before personnel may work on-site, a current medical examination and acceptable health and safety training must be approved by the HSMs.

2.2 SITE SAFETY OFFICER

The HSMs shall direct the site health and safety efforts through an Assistant SSO as needed. The SSO will be responsible for implementing the HASP. The SSO may direct or participate in on-site activities as appropriate when this does not interfere with primary SSO responsibilities. The SSO has stop-work authorization which he/she will execute upon determination of an imminent safety hazard, emergency situation, or other potentially dangerous situations, such as detrimental weather conditions. Authorization to proceed with work will be issued by the HSMs in conjunction with the Project Manager.

2.3 SUBCONTRACTORS

Subcontracts will be issued for various tasks including drilling and use of a backhoe to remove asphalt. Other subcontracts may be issued for additional tasks for the RI at the NTC, however, none are anticipated. Subcontractors shall comply with the requirements outlined in this HASP and in accordance with OSHA 29 CFR 1910 and 29 CFR 1926; but, in all cases, subcontractors shall be responsible for site safety related to or affected by their own field operations (i.e., heavy equipment operations).

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3.0 SITE LOCATION AND DESCRIPTION

3.1 LOCATION

The NTC is located in Shields Township, Lake County, Illinois, on the shore of Lake Michigan. It is bounded on the west by Route 41, on the north by the City of North Chicago, and on the south by the Veterans Administration and Golf Course.

3.2 SITE 4 - FIRE FIGHTING TRAINING UNIT DESCRIPTION

Site 4, the Fire Fighting Training Unit (FFTU), is located about 0.5 mile northeast of the intersection of U.S. 41 and Buckley Road. The FFTU is a 10-acre, partially paved parcel surrounded on all sides by the Willow Glen Golf Course. The FFTU was in operation between 1942 and October 1990.

The primary features of the FFTU are discussed below. The discussion is based on information gathered during two site visits, a review of historical engineering drawings, and a conversation with Navy personnel.

1. Building 3304 - This building was used primarily for classrooms. Possible asbestos containing building materials (ACBMs) are present in this building.
2. Buildings 3304A, 3304B, 3304C and 3304D - These four buildings are referred to as the burn buildings. Certain rooms of these buildings were filled with diesel fuel and ignited with gasoline. Recruits would enter the buildings and extinguish the diesel fires.
3. Building 3305 - The gas chamber. Recruits would don breathing apparatus and enter this building which would be filled with various noxious gases.
4. Two 5,000 Gallon Aboveground Storage Tanks (ASTs) Southeast of Building 3305 - According to Navy personnel, these two tanks contained diesel which was piped via underground piping to the Fire Fighting Rings (discussed below).
5. Existing 5,000 Gallon Diesel Fuel Underground Storage Tank (UST) - This UST stored diesel fuel which, according to engineering drawings, was piped by a pump to the Fire Fighting Rings.
6. Former 5,000 Gallon Gasoline UST - This UST supplied gasoline via underground piping to the Christmas Tree Vaults (discussed below).

7. Seven Possible Gasoline and Diesel Fuel USTs - It is not known whether these USTs were ever installed.
8. Fire Fighting Rings FF1, FF2, FF3, FF4, FF5, FF6 - The Fire Fighting Rings (rings) were typically filled with diesel fuel and ignited with gasoline. Diesel fuel was transferred to the rings via underground piping. Recruits would then extinguish the fires.
9. Christmas Tree Vaults FC1, FC2, FC3, FC4, FC5 - Based on Yards and Docks Drawing No. 286,493, dated March 20, 1946, each of these square structures housed either a real or artificial tree which was ignited with gasoline. The gasoline was transferred to these vaults via underground piping. It is assumed that recruits would then enter the vaults and extinguish the fires. Soil borings will be conducted adjacent to the vaults and entry into the vaults are not anticipated.
10. Decant Ponds - Once a fire in the burn buildings, rings, or Christmas Tree Vaults had been successfully extinguished, the remaining liquids in these structures (unburned petroleum product, water, foam) were drained from the structures and transported via underground piping to the Decant Ponds where the liquid was discharged. This direct discharge to the Decant Ponds occurred through 1979, at which time an oil/water separator was installed. The HALLIBURTON NUS Team found no evidence that would indicate that these decant ponds were constructed with an engineered liner. According to Navy personnel, each pond contains a drain in its bottom which allows the accumulated liquid in the pond to drain to an underground pipeline. This pipeline ultimately discharges to Skokie Ditch about 250 feet west of the ponds.
11. Oil/Water Separator - In 1979, an oil/water separator was installed at the FFTU. All drainage from the burn buildings, the rings and the Christmas Tree Vaults passed through this separator. After petroleum product was recovered and containerized in drums, the remaining liquid was discharged to the Decant Ponds. The oil/water separator consists of three subsurface pits (the smothering pit, the separator pit and the overflow pit), two pumps (located in the smothering pit), and two oil water separators.
12. Drum Storage Area - Petroleum product recovered from the oil/water separator was containerized in 55-gallon drums and stored along the west fenceline of the FFTU in the Drum Storage Area. In addition, reportedly between 1942 and 1979, this area of the FFTU was used for storage of drums containing waste Solvent 144, turpentine, gasoline, crankcase motor oil and antifreeze. The source(s) of these other materials is unknown. Up to 300

55-gallon drums of such material were accumulated in this area by 1983. By the time of the HALLIBURTON NUS Team site visit on September 30, 1992, all of these drums had been removed from the FFTU. However, it was observed during this site visit that the ground surface in this area is stained.

13. Existing Gasoline AST Located North of the Decant Ponds - This AST is surrounded by a concrete dike. According to Chief Pleasant, gasoline was dispensed from this AST into 5-gallon cans and carried by hand to the burn buildings and rings where it was used to ignite diesel fuel in these structures.
14. Torch Shack FC6 - This shack was the storage place for metal torches which were used to ignite the gasoline and the diesel fuel in the burn buildings, rings and vaults.
15. Water Supply Stand Pipes - The recruits would attach fire fighting hoses to these stand pipes and use the water to extinguish set fires.
16. Suction Sumps - These sumps were filled with water and used as an emergency source of fire fighting water.
17. Drainage Ditch - This ditch contained water during a HALLIBURTON NUS site visit on September 30, 1992. Oil sheening or staining of the water or ditch shore was not observed during this site visit. Dames & Moore reported the water in this ditch to have an oily sheen during a site visit they conducted in December 1987.
18. Pad-Mounted Transformers - Four transformers are mounted on a concrete pad in the southeast corner of the site. According to the Activity Point of Contact these transformers do not currently contain polychlorinated biphenyl (PCB) dielectric fluid. It is unknown to the HALLIBURTON NUS Team whether these transformers contained PCB dielectric fluid in the past.
19. Monitoring Wells MW4-1, MW4-2, MW4-3A and MW4-4 - These four monitoring wells were installed by Dames & Moore in 1988.

Building 3311 is actively being used by the Willow Glen Golf Course as a maintenance shed and is not included as part of the FFTU.

3.3 SITE 12 - HARBOR DREDGE SPOIL AREA DESCRIPTION

During harbor dredging activities in 1952 and 1970, dredge spoils were reportedly disposed of at this site along the shore of Lake Michigan. In 1986, an Initial Assessment Study (IAS) of this site was performed. The IAS concluded that while the site poses no immediate threat to human health or the environment, further investigation was warranted. Dames & Moore conducted a verification study and the resultant 1991 technical memorandum indicated that heavy metals and pesticides were found in the spoil area. Of the heavy metals detected, lead and mercury are of greatest potential concern because both metals are toxic and were detected throughout the extent of the site. Pesticide concentrations were detected only within the upper 5 feet and at concentrations that should pose little or no human health risks based on comparison with published toxicological parameters.

The site is bounded by a bluff to the west and Lake Michigan to the east. Currently, the site is used for a boat landing, a picnic area and an archery range by base personnel and their families.

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4.0 HAZARD ASSESSMENT

4.1 WASTE DESCRIPTION/CHARACTERIZATION

The following chemical information is presented in order to identify the types of materials that may be encountered at Sites 4 and 12. Detailed information on these materials was obtained from:

- ACGIH, Threshold Limit Values and Biological Exposure Indices for 1992-93.
- Hazardlines.
- Chemical Data Sheets.
- NIOSH Pocket Guide to Chemical Hazards - 1990.

The following is a list of chemicals and compounds that are potentially found on-site. Chemical Data Sheets and/or Hazardlines for each compound listed below, providing information such as the chemical's characteristics, health hazards, protection, exposure limits, and first aid procedures are presented in Appendix A. These chemicals include:

Benzene	Asbestos	4,4'-DDE (a degradation product of DDT) (See 4,4'-DDT)
Ethyl benzene	PCB 1254	4,4'-DDD
Lead	Mercury	Gasoline
Toluene	4,4'-DDT	Diesel Fuel
Xylene		

Waste Types: Liquid X Solid X Gas X
Sludge X Semi-solid _____ Other X

Characteristics: Corrosive _____ Flammable X
Explosive _____ Volatile X
Radioactive _____ Inert _____
Other Toxic

Exposure limits for the chemicals of potential concern are presented in Table 4-1 and the tasks, hazards, and control measures are shown in Table 4-2.

4.2 DEGREE OF HAZARD

On-site hazards include physical and chemical hazards. No radiological, biological, or laboratory wastes are suspected on-site.

TABLE 4-1
EXPOSURE LIMITS
NAVAL TRAINING CENTER REMEDIAL INVESTIGATION
GREAT LAKES, ILLINOIS
JANUARY 1993

	OSHA PEL	ACGIH TLV	STEL (mg/m ³)	IP (eV)	Odor Thresholds (ppm)	NIOSH REL
Asbestos	0.2 f/cc	0.2 f/cc	-	-	-	0.1 f/cc
Lead (dust)	0.05 mg/m ³	0.15 mg/m ³	-	-	-	-
Mercury	0.01 mg/m ³	0.05 ppm	-	-	-	-
Benzene	1 ppm	10 ppm	-	9.25	4.68-12	-
Ethyl benzene	100 ppm	100 ppm	543	8.76	0.25-200	-
Toluene	100 ppm	100 ppm	8.82	8.82	0.17-40	-
Xylene	100 ppm	100 ppm	651	8.44-8.56	1.1	-
PCB as 1254	0.5 mg/m ³	0.5 mg/m ³	-	-	-	0.001 mg/m ³
4,4-DDT	1 mg/m ³	1 mg/m ³	-	-	-	0.5 mg/m ³
4,4-DDD	-	-	-	-	-	-
4,4-DDE	-	-	-	-	-	-
Gasoline	300 ppm	300 ppm	1,480	-	-	-
Diesel Fuel	-	5 mg/m ³	10	-	-	-

References:

American Conference of Governmental Hygienists (ACGIH) Threshold Limit Values (TLV) for 1992-93.
 1989 Amended Permissible Exposure Limits (PELs), U.S. Department of Labor, OSHA.

f/cc - fibers per cubic centimeter

IP - Ionization Potential

mg/m³ - Milligrams of substance per cubic meter of air

PEL - Permissible Exposure Limit

PPM - Parts Per Million

REL - Recommended Exposure Limit

STEL - Short-Term Exposure Limit

TLV - Threshold Limit Value

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TABLE 4-2

**TASK SPECIFIC HAZARD ASSESSMENT TABLE
 NAVAL TRAINING CENTER REMEDIAL INVESTIGATION
 GREAT LAKES, ILLINOIS
 JANUARY 1993**

TASK	SITE	HAZARD	CONTROL MEASURES
Geophysical Survey	4	Vehicular Traffic Slip, Trip, Fall Thermal Stress	Flagging, Access Controls Flagging, Mark Hazards Work/Rest Cycles, Fluids
Surface Water/Sediment Sampling	4-12	Slip, Trip, Fall Dermal Contact	Flagging, Mark Hazards PPE, Harness, and Rope
Soil Sampling	4-12	Slip, Trip, Fall Dermal Contact Inhalation Thermal Stress Toxic/Explosive Atmosphere Explosive Devices	General Awareness Flagging, Access Controls PPE Respiratory Protection Work/Rest Cycles, Fluids Continuous Monitoring Work Closely With UXO Team
Liquid/Solid Waste Sampling	4	Slip, Trip, Fall Dermal Contact Inhalation Thermal Stress	General Awareness Flagging, Access Controls PPE Respiratory Protection Work/Rest Cycles, Fluids
Soil Borings Well Installation/Groundwater Sample Collection	4-12	Drill Rig (Heavy Equipment) Dermal Contact Inhalation Thermal Stress Toxic/Explosive Atmosphere Explosive Devices	Hard Hat, General Awareness Access Controls PPE Respiratory Protection Work/Rest Cycles, Fluids Continuous Monitoring Work Closely With UXO Team
Asbestos Survey and Sampling	4	Dermal Contact Inhalation Thermal Stress	Double Tyvek, PPE Controls Respiratory Protection Work/Rest Cycles, Fluids

TABLE 4-2

**TASK SPECIFIC HAZARD ASSESSMENT TABLE
NAVAL TRAINING CENTER REMEDIAL INVESTIGATION
GREAT LAKES, ILLINOIS
JANUARY 1993**

TASK	SITE	HAZARD	CONTROL MEASURES
Equipment Decontamination	4-12	Dermal Contact Inhalation Thermal Stress Slip, Trip, Fall	PPE Respiratory Protection Work/Rest Cycles, Fluids Access Controls

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4.2.1 Chemical Hazards

The potential contaminants of concern at the sites can affect the body if they are inhaled, come in contact with the eyes or skin, or are ingested. These materials may be released during intrusive sampling and water sampling. The primary concern is for skin exposure and inhalation exposure to contaminated soils and water, and potential inhalation of organic vapors or dust released during soil intrusive activities or during and after building debris intrusive activities. Exposure to these substances by inhalation (in the breathing zone (BZ)) is not anticipated. Atmospheric monitoring in the worker's BZ, however, will be conducted during on-site activities to determine the need for upgrading to appropriate levels of respiratory protection. Atmospheric monitoring will be conducted during sampling of asbestos containing building material (ACBM) with personal air monitors (PAMs) using separate monitors for each contaminant. Exposure by skin absorption is a low to moderate possibility, but can be prevented by use of proper protective equipment and good hygiene practices.

Monitoring well installation, and soil boring activities provide potential for encountering buried hazards such as utilities. It shall be the subcontractor's responsibility to obtain "clearance" from the local utilities prior to initiating intrusive activities. Overhead electrical lines shall also be identified. If encountered, soil intrusive activities will be halted and the HSM's will be notified.

If dusty conditions exist during soil boring activities, the work zone area will be kept wet by spraying the work zone (WZ) with water to provide dust control.

4.2.2 Physical Hazards

Primary physical hazards at the site are those associated with drilling and backhoe operations. Hazards that could be encountered during subsurface activities include falls and trips, injury from lifting heavy objects, falling objects, eye injuries, head injuries, and pinched or crushed hands and feet. Fire hazards may also be present due to the use of gasoline-powered heavy equipment, and the potential for explosive concentrations of vapors from flammable liquids in subsurface soils or volatile organic compounds associated with exposed wastes. During drilling operations, matting and planking may be needed around the drill rig to provide stability for the drill rig. The drilling contractor will make this decision. Also see Section 11.3 Safe Work Practices.

Depending on seasonal weather conditions, there is potential for workers on-site to be affected by heat stress or cold exposure. The SSO will monitor for heat stress or cold exposure in accordance with Section 12.7 of this HASP.

Noise related to soil boring operations during soil boring and monitoring well installations is expected to be minimal; however as a precaution, hearing protection will be available.

During soil, sediment, and surface water sampling activities in the two decant ponds, the south pond which is dry and the north pond which has approximately 6 inches of water, exhibits the potential for slips and falls associated with wet surfaces and soft unstable sediment surfaces. The sampling does not represent any significant drowning hazard, however, a lifebelt and lanyard may be worn by the sampler as determined by the SSO.

4.2.3 Natural Hazards

Natural hazards such as weather, poisonous plants, bites from poisonous or disease-carrying animals and insects (i.e., snakes, ticks), cannot always be avoided. Refer to Section 12.0 for precautions and emergency procedures.

4.2.4 Confined Space Entry

Confined space entry is not anticipated for RI field activities and is, therefore, not addressed in this HASP. If confined space entry is necessary, work will be halted and the HSMs will be notified to prepare a plan before work continues.

4.2.5 Spill Containment

RI field activities are unlikely to require spill containment and are, therefore, not addressed in this HASP.

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5.0 TRAINING REQUIREMENTS

5.1 BASIC TRAINING REQUIRED

Personnel who are required to work in areas where the potential for toxic exposure exists shall complete training and have site experience conforming to the requirements of 29 CFR 1910.120(e), 40 CFR, Part 61, and 29 CFR 1926.58. In keeping with 29 CFR 1910.20, medical records and exposure records will be available to workers or his/her designated representative upon request.

Training includes a 40-hour course which describes procedures for working at hazardous waste sites. The procedures include a safety and health program, medical surveillance, decontamination, site characterization and analysis, protective clothing and monitoring equipment, site control work documentation, emergency response, engineering and administrative control to reduce exposure, and site safety evacuation procedures.

Contractors/subcontractors shall provide written documentation that these training/experience requirements have been met. An example of a training documentation form is presented on Figure 5-1. Personnel shall also be trained in the contents of Appendix B, "Respiratory Protection Program."

5.2 SITE-SPECIFIC TRAINING

Site-specific training will be conducted by the SSO for on-site personnel and visitors to minimize exposure to potential of on-site hazards. Site-specific training will address the activities, procedures, monitoring, and equipment for the field operations at Site 4 and Site 12. This training will include identifying the names of personnel and alternate personnel responsible for site safety and NTC layout.

In addition, this training at a minimum will include the following:

1. Site description and history.
2. Project activities, including coordination with other contractors.
3. Hazard evaluation.
4. On-site safety responsibilities.
5. Site control and work zones.
6. Personnel training.
7. Medical monitoring.
8. Atmospheric monitoring.
9. Personal protection, clothing, and equipment.
10. Decontamination procedures.

FIGURE 5-1
OSHA TRAINING COMPLIANCE LETTER

Note: The following statements must be typed on company letterhead and signed by an officer of the company.

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555

Month, day, year

(Project Manager)
SEC Donohue Inc.
4738 North 40th Street
Sheboygan, Wisconsin 53083

Subject: OSHA Compliance and Testing

Dear (Project Manager):

As an officer of XYZ Corporation, I hereby state that I am aware of the potential hazardous nature of the subject project. I also understand that it is our responsibility to comply with all applicable occupational safety and health regulations including those stipulated in Title 29 of the Code of Federal Regulations (CFR), Parts 1900 through 1910 and Part 1926.

I also understand that Title 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response: Final Rule;" requires, but is not limited to, medical surveillance, for applicable employees, and appropriate level of training as required in paragraph (e) of 29 CFR 1910.120 for employees engaged in certain hazardous waste operations. Employees involved in any asbestos activities will also meet training requirements contained in 29 CFR 1926.58 Subpart D. I hereby state that I have reviewed these requirements; understand Title 29 of the CFR, Parts 1900 through 1910, and Part 1926; and that XYZ Corporation and all of its employees who will perform work at the _____ site are in full compliance.

The following employees have had 40 hours of introductory hazardous waste site training or equivalent work experience as required by 29 CFR 1910.120(e) and have had 8 hours of refresher training as required by 29 CFR 1910.120(e)(8).

LIST EMPLOYEE NAMES, TYPE(S) OF TRAINING RECEIVED, AND DATES OF TRAINING HERE

Sincerely,

(Name of Company Officer)
Title

11. Emergency procedures.
12. Review of site-specific material safety data sheets (MSDSs).
13. Safe work practices.
14. Other elements covered in this site-specific HASP.

This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safe operations. Training must include emergency preparedness, location of assembly areas, proper entry and exit procedures for exclusion zone (EZ), warning systems, location of emergency equipment, and route to the hospital.

5.3 SAFETY BRIEFINGS

Project personnel will be given briefings by the SSO on a daily or as-needed basis to further assist site personnel in conducting their activities safely. Briefings will be provided when new activities are to be conducted, changes in work practices must be implemented due to new information made available, or if site or environmental conditions change. Briefings will also be given to facilitate conformance with prescribed safety practices when performance deficiencies are identified during routine daily activities or as a result of safety audits.

5.4 SAFETY AUDITS

The CHSM, as necessary, will conduct regular safety audits of field operations and subcontractor performance to review for compliance with health and safety policies and procedures. Health and Safety audit findings will be documented and corrective action taken.

5.5 FIRST AID AND CPR

At least two individuals shall be trained and qualified to administer first aid and cardiopulmonary resuscitation (CPR).

The HSMs will identify the individuals possessing this training in order to ensure that emergency treatment is available during every workshift from a person qualified in first aid and CPR. These courses will be consistent with requirements of the American Red Cross and/or American Heart Association.

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6.0 MEDICAL SURVEILLANCE PROGRAM

All SEC Donohue personnel and subcontractors performing field work at Sites 4 and Sites 12 will be required to have passed a pre-assignment and/or periodic medical examination that is consistent with 29 CFR 1910.120(f) and 29 CFR 1926.58. Medical examinations shall be performed by or under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine. A release for work will be confirmed by the CHSM before an employee can begin hazardous site activities.

Additional medical testing may be required by the CHSM in consultation with the company physician if an overt exposure or accident occurs, or if other site conditions warrant further medical surveillance.

Contractors/subcontractors will maintain the medical records for their own employees, but shall also provide the SSO with written documentation certifying that each employee at the site has met the requirements of the Medical Surveillance Program. This documentation will be provided before the first day of work for each employee assigned to the site. An example of a medical documentation form is presented on Figure 6-1. The pre-assignment and annual examinations are essentially the same in content and are at the examining physician's discretion but generally include:

- An updated medical and occupational history
- A screening physical examination
- Blood and urine laboratory tests
- Chest X-ray
- Electrocardiogram
- Pulmonary function tests
- Audiometry
- Visual acuity test

At the end of employment or if deemed necessary after an employee's involvement in project-specific site work, he/she shall complete a medical examination. This examination may be limited to obtaining an internal medical history of the period since the last full examination (consisting of medical history, physical examination, and laboratory tests).

6.1 EMERGENCY MEDICAL TREATMENT

Provisions for emergency medical treatment shall be integrated with the overall Site Emergency Plan (see Section 12.0) and shall include:

- At least two individuals per shift qualified to render first aid and CPR.

MEDICAL SURVEILLANCE LETTER

Note: The following statements must be typed on company letterhead and signed by an officer of the company.

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555

Month, day, year

(Project Manager)
SEC Donohue Inc.
4738 North 40th Street
Sheboygan, Wisconsin 53083

Subject: Medical Surveillance

Dear (Project Manager):

As an officer of XYZ Corporation, I hereby state that the persons listed below participate in a medical surveillance program meeting the requirements contained in paragraph (f) of Title 29 of the Code of Federal Regulations, Part 1910.120 entitled "Hazardous Waste Operations and Emergency Response: Final Rule." Employees involved in asbestos activities must also meet medical requirements contained in 29 CFR 1926.58 Subpart D. I further state that the persons listed below have had physical examinations under this program within the last 12 months and that they have been cleared, by a licensed physician, to perform hazardous waste site work and to wear respiratory protection. I also state that, to my knowledge, no person listed below has any medical restrictions that would preclude him/her from performing their assigned activities at the _____ site.

LIST EMPLOYEE NAMES AND DATES OF MOST RECENT PHYSICAL EXAMS HERE

Should you have any questions, please contact me at 555/555-5555.

Sincerely,

(Name of Company Officer)
Title

- First aid kits in compliance with OSHA requirements and emergency first aid stations in the immediate work vicinity.
- Conspicuously posted phone numbers and procedures for contacting ambulance services, fire department, police, and medical facilities.
- Maps and directions to medical facilities.

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7.0 SITE CONTROL MEASURES

The purpose of the site control measures discussed in this section are to maintain order at the sites and to minimize chemical and physical hazards to on-site personnel, visitors, and the public. Site control zones will include an exclusion zone (EZ), a contamination reduction zone (CRZ), and a support zone (SZ). In addition, temporary activity-specific WZs will be established at specific locations.

7.1 SITE ACCESS

Access to NTC is controlled through the pass office located at the NTC Main Entrance on Sheridan Road. A driver's license and proof of vehicle registration and insurance are required to obtain a pass. Once a pass has been acquired, access to the Sites 4 and 12 is unrestricted.

7.2 EXCLUSION ZONE

The EZ is the area containing or suspected of containing contaminated materials. Since investigation activities will be conducted throughout the NTC each investigative area boundary shall be delineated as the EZ.

7.2.1 Work Zones

Temporary activity-specific WZs shall be established at each sampling activity. While completing soil borings and monitoring well installations the WZ shall be established and marked by safety rope or tape. The WZ shall be a radius large enough to encompass the drill rig and allow sufficient space for safe work practices. A CRZ shall be placed at the WZ perimeter at an upwind location. A portable eye wash unit, fire extinguisher, towels, plastic garbage bags, decontamination supplies, and a first aid kit (sufficient to accommodate the field team) shall be placed in this CRZ. These supplies may be located in the vehicle parked adjacent to the WZ.

A temporary WZ shall be established at each sampling location where surface soil samples are to be collected. These WZ areas shall be established by laying plastic sheeting of *adequate size* next to the sampling location for the placement of equipment and supplies. A portable eye wash, first aid kit (sufficient to accommodate the field team), towels, plastic garbage bags, fire extinguisher, and decontamination supplies are also required in this area, which may be located in the truck.

7.3 PERSONNEL DECONTAMINATION

Personnel decontamination areas will be established on-site. Personnel will decontaminate and/or dispose of soiled protective clothing (i.e., disposable boots and gloves, etc.) in the CRZ established next to the temporary WZ. A fixed personnel decontamination area will be established adjacent to the fixed equipment decontamination pad where, after equipment decontamination, personnel can decontaminate and dispose of protective clothing and equipment before exiting the base. Refer to Section 10.0 for further decontamination procedures.

7.4 EQUIPMENT DECONTAMINATION PAD

To prevent off-site transport of contamination, the backhoe, drill rig and associated equipment and vehicles will be decontaminated at a decontamination pad prior to exiting the EZ. This location will be selected by the SSO and Field Team Leader prior to start-up of field activities at the NTC. The decontamination pad will be located downwind of Sites 4 and 12. Drilling equipment (augers, rods, etc.) and the backhoe bucket will be steam-cleaned at the decontamination pad as necessary. Decontamination liquids will *not* be allowed to infiltrate into the soil. Refer to Section 10.0 for further decontamination procedures.

Sampling equipment such stainless steel hand augers, bowls, and spoons may be decontaminated at each sampling location. During decontamination, *all fluids will be collected for later discharge to the NTC sanitary sewer system, with prior permission.* Refer to Section 10.0 for further decontamination procedures.

7.5 SUPPORT ZONE

The SZ is considered the uncontaminated area and will be identified by the SSO before field activities begin. It will contain the Command Post which will provide for team communications and emergency response. A mobile telephone will be located in this area. Appropriate sanitary facilities, safety, medical, and support equipment will be identified. No potentially contaminated personnel or materials are allowed in the SZ except for appropriately packaged/decontaminated and labelled samples.

7.6 SITE VISITORS

Visitors are required to report to the Field Team Leader and the SSO prior to accessing the sites, although none are anticipated. The SSO will document decisions regarding their access to the sites. If granted limited access, visitors must provide the SSO with documented compliance with Section 5.0 of this HASP, comply with other applicable sections, and satisfy additional conditions placed on them as deemed appropriate by the SSO to ensure visitor safety. Visitors must sign in and out daily under the SSO's direction for the duration of their approved visit. Under no circumstances will visitors be allowed to interfere with, or participate in operations within the scope of the field investigation. All visitors shall be escorted throughout the sites by appropriately trained personnel.

As needed, the SSO will establish a designated Level D area as an observation point during intrusive activities. This designated area will be located to offer proximate viewing of site operations, and positioned such that visitors in no way may inhibit site access, logistics, or general operations. Further, the SSO will locate the viewing areas such that visitors present are at minimal risk of exposure to site hazards.

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8.0 PERSONAL PROTECTIVE EQUIPMENT

8.1 GENERAL

The level of protection to be worn by field personnel will be defined and controlled by the SSO. Personal protective equipment for general operations will be consistent with the requirements of 29 CFR 1910 Subpart I, "Personal Protective Equipment." Basic levels of protection for hazardous waste operations will be selected in accordance with the provisions of 29 CFR 1926.58(i), 29 CFR 1910.120(g)(3), "Personal Protective Equipment Selection," and Appendix A, "General Description and Discussion of the Levels of Protection and Protective Gear." Modification to basic protective equipment ensembles may be necessary for specific operations. In these cases, further definition will be provided by review of specific hazards, conditions, and proposed operational requirements, and by conducting air monitoring at the particular operation. Protection may be upgraded or downgraded, as deemed appropriate by the SSO and verified by the CHSM.

8.2 ANTICIPATED LEVELS OF PROTECTION FOR SITE OPERATIONS

- | | |
|----------------------------------------------------|-----------|
| • Asbestos Sampling | Level C |
| • Geophysical Survey | Level D |
| • Soil Boring/Subsurface Soil Sampling | Level D/C |
| • Hand Augering/Subsurface Soil Sampling | Level D/C |
| • Surface Soil Sampling | Level D |
| • Surface Water/Sediment Sampling | Level D |
| • Monitoring Well Installation | Level D/C |
| • Monitoring Well Development/Groundwater Sampling | Level D/C |

Action levels used to determine the need to upgrade or downgrade the levels of protection are described in Section 9.2 of this HASP.

Level D personal protective clothing and equipment includes:

- Disposable Tyvek® coveralls. (Polyethylene Coated Tyvek® required for soil sampling adjacent to transformers).
- Hardhat (when overhead hazards exist).
- Safety glasses or goggles.
- Steel toe, steel shank boots.

- Disposable latex gloves - required when handling and collecting soil, water and sediment samples.
- Outer neoprene gloves - required when handling and collecting soil, water, sediment, and transformer samples.
- Disposable outer boots - required.
- Noise protection - as warranted.
- Lifebelt and lanyard - as warranted.

Level C protective clothing and equipment includes:

- Full-face air-purifying respirator National Institute for Occupational Safety and Health (NIOSH), Mining Safety and Health Administration (MSHA) approved fitted with acid gas/organic vapor/High Efficiency Particulate Air (HEPA) filter cartridges. A powered air respirator fitted with a HEPA filter will be used during asbestos sampling activities.
- Disposable Tyvek coveralls. Double tyvek coveralls (hooded) for asbestos activities.
- Disposable latex inner gloves.
- Nitrile outer gloves.
- *Hardhat* (when overhead hazard exists).
- Steel toe, steel shank boots.
- Disposable outer boots.

Level B protective clothing and equipment includes the above Level C clothing with the addition of a self-contained breathing apparatus (SCBA) or supplied air-line respirator in place of an air-purifying respirator. If action levels are exceeded and based on evaluation of the conditions, and Level C protection is not sufficient and Level B respiratory protection is deemed necessary, work activities will be halted and arrangements for Level B equipment will be implemented.

The use and care of respiratory protection will be in accordance with the protocols described in Appendix B.

9.0 AIR MONITORING

9.1 GENERAL

It will be necessary to monitor the atmospheric conditions during on-site field sampling activities to determine the possible need to upgrade the personal protection of on-site workers. Atmosphere at the sample extraction point, soil cuttings, and fluids produced during drilling shall be monitored. In addition, air monitoring will be performed in the worker's BZ.

While inside of Building 3304, hazards will consist of asbestos fibers and potentially contaminated particulates from air entrained dust, therefore, time weighted average monitoring of the workers' BZ will be performed during sampling. A PAM pump (Alpha 1 or equivalent) equipped with a 25 millimeter diameter, 0.8 micron, mixed cellulose ester (MCE) filter cassette with antistatic extension cowl will be used. Personal air monitoring will be conducted in accordance with 29 CFR 1926.58 Appendix A and the NIOSH 7400 method.

9.1.1 Soil Boring Operations/Monitoring Well Installations

Soil boring, and well installation activities will be initiated in Level D personal protection with the contingency to upgrade the level of protection based on the action levels.

Air monitoring will be performed continuously throughout soil boring and well installation activities. Flame Ionization Detector (FID) or Photoionization Detector (PID) shall be used to monitor the worker's BZ and the geologic samples upon retrieval. Drill cuttings and fluids produced during drilling shall also be monitored. A Combustible Gas Indicator (CGI) equipped with an oxygen alarm will be used to monitor the borehole for the presence of combustible gases. Any soil cuttings or fluids produced during drilling shall also be monitored using the CGI. Radiological hazards are not anticipated to be encountered in the testing areas.

9.1.2 Monitoring Well Development and Groundwater Sample Collection

Monitoring well development and groundwater sample collection activities shall be initiated in Level D personal protection with the contingency to upgrade the level of protection based on the action levels.

The PID/FID shall be used to continuously monitor the worker's BZ and the well casing. Prior to initiating development, testing, or sampling activities, the field team will stand upwind of the well casing and remove the well cap, stand back, and allow the well casing to vent for about 5 minutes. If action levels are not exceeded in the worker's BZ, development, testing, and/or sampling activities may proceed.

9.1.3 Geophysical Survey/Hand Augering and Subsurface Soil Sampling

Hand augering/subsurface soil sampling and magnetometry survey activities shall be initiated in Level D personal protection with the contingency to upgrade the level of protection based on the action levels.

The PID/FID will be used to monitor the sample extraction point and the worker's BZ during hand augering/subsurface soil sampling activities. The PID/FID will be on-site but is not anticipated to be needed during the geophysical survey due to the lack of soil intrusive activities.

9.1.4 Surface Water/Sediment Sample Collection

Surface water/sediment sampling activities shall be conducted in Level D protection. Atmospheric monitoring will be unnecessary because organic emissions are not anticipated due to the wet nature of the samples to be collected.

9.1.5 Building 3304 Asbestos Sampling

Asbestos sampling will be conducted in Building 3304 in areas suspected to contain asbestos. Sampling activities will be performed in Level C, when necessary, which will require a powered air full-face respirator equipped with a HEPA filter. Two Tyvek® coveralls may be used to minimize secondary exposure to asbestos. Decontaminated PPE at this site will be bagged, tightly sealed, and properly marked.

9.2 ACTION LEVELS

Instrumentation will include a PID equipped with a 10.2 eV lamp and/or a Century OVA 128 FID. A CGI will be used to monitor for combustibles. The action levels in this HASP will apply to site work during the duration of activities at Sites 4 and 12. Asbestos sampling air monitoring will be consistent with the requirements of 29 CFR 1926.58 and Table 9-1. The asbestos-related action level is 0.1 fiber per cubic centimeter (f/cc 8-hour time weighted average (TWA)). The permissible exposure limit (PEL) is 0.2 f/cc TWA, and the excursion limit is 1.0 f/cc averaged over 30 minutes. Action levels for direct-reading instruments in the worker's general BZ are as follows:

TABLE 9-1

**RESPIRATORY PROTECTION FOR ASBESTOS
NAVAL TRAINING CENTER REMEDIAL INVESTIGATION
GREAT LAKES, ILLINOIS
JANUARY 1993**

<u>Airborne Concentrations of Asbestos, Tremolite, Anthophyllite, Actinolite or a Combination of these Materials</u>	<u>Required Respirator</u>
Not in excess of 2 f/cc (10 x PEL)	1. Half-mask air-purifying respirator, other than a disposable respirator, equipped with high efficiency filters.
Not in excess of 10 f/cc (50 x PEL)	1. Full facepiece air-purifying respirator equipped with high efficiency filters.
Not in excess of 20 f/cc (100 x PEL)	1. Any powered air-purifying respirator equipped with high efficiency filters. 2. Any supplied-air-respirator operated in continuous flow mode.
Not in excess of 200 f/cc (1,000 x PEL)	1. Full facepiece supplied-air respirator operated in pressure demand mode.
Greater than 200 f/cc (>1,000 x PEL) or unknown concentration	1. Full facepiece supplied air respirator operated in pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus.

- NOTES: a. Respirators assigned for higher environmental concentration may be used at lower concentrations.
b. A high-efficiency filter means a filter that is at least 99.97 percent efficient against mono-dispersed particles of 0.3 micrometers in diameter or larger.

TABLE REPRODUCED FROM OSHA 29 CFR 1926.58

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CTO71/GRLKSRI/HSPID/OCT92

<u>Instrument</u>	<u>Action Levels</u>	<u>Level of Respiratory Protection/Action</u>
PID/OVA	Continuous sustained readings to 1 ppm above background (typically to 0.2 ppm) in BZ	Level D
PID/OVA	Continuous sustained readings of 1 ppm to 5 ppm above background	Level C (based on identification of contaminant)
CGI	10% LEL	Proceed with caution
CGI	Greater than 20%	Cease work, vent, begin work only after levels return to 0%
	Asbestos (0.1 f/cc)	Level C

If visible dust is detected while working in Level D, upgrade to Level C respiratory protection is required. However, engineering controls, such as wetting the WZ area with water to control dust, will be implemented when feasible.

In the event any action levels are exceeded, work activities shall be halted, and an attempt will be made to identify the contaminants present using colorimeter indicator tubes for benzene so that correct respiratory protection can be selected and action levels may be adjusted higher or more conservatively. The SSO shall notify the HSMs immediately prior to upgrading the level of respiratory protection.

9.3 EXPOSURE MONITORING/AIR SAMPLING PROGRAM

9.3.1 Personal and Perimeter Monitoring

Personal and perimeter air monitoring will not be conducted unless Level D action levels are exceeded in the EZ. The determination to perform personal and perimeter air monitoring will be determined by the CHSM after discussions with SSO. If an air program is deemed necessary, work activities will be halted and a monitoring plan will be developed.

9.4 INSTRUMENT CALIBRATION AND MAINTENANCE

Instrument calibration and maintenance shall be performed according to manufacturer's specifications and documented on Field Instrument Calibration Logs. PID/FID calibration shall be completed on a daily basis. Combustible gas/oxygen meters shall be calibrated according to manufacturer's recommended frequency (i.e., daily or weekly).

Calibration of the Personal Air Monitoring Pumps (PAMs) will be conducted in accordance with the NIOSH Method 7400 (asbestos fibers). Calibration will be achieved by the use of a Mini Buck Calibration Unit before and after sampling use with a representative filter cassette installed between the pump and calibration unit. Each pump will be checked for calibration 5 times during pre- and post-calibration to determine flow average and assure accuracy is within 5 percent of desired flow rate.

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10.0 DECONTAMINATION PROCEDURES

The SSO shall determine the level of decontamination necessary based on the evaluation of specific work activities and the potential degree of contamination. Temporary CRZs shall be established at each sampling location.

10.1 EQUIPMENT

The backhoe, drill rig, associated equipment, and vehicles will be decontaminated at a location on-site selected by the SSO prior to start-up of field activities in the EZ. Drilling equipment (augers, rods, etc.) will be steam-cleaned between sampling locations. These decontaminations will be performed on the ground away from the drilling location.

Non-disposable sampling equipment will be decontaminated before use, between samples, and before leaving the sampling location.

Equipment that cannot be immersed in soap solution and water will be wiped clean and rinsed with distilled water.

10.2 PERSONNEL

Personnel will perform decontamination in the personal decontamination area. Decontamination of personnel in Level D will consist of removal and disposal of coveralls (when worn) disposable boots, and gloves. Decontamination of personnel using Level C protective equipment will consist of:

- Washing boots, waders, or other non-disposable protective equipment, (i.e., hard hat, safety glasses/goggles, etc.) suspected of being contaminated using soap solution followed by potable or distilled water rinse.
- Removal and disposal of boot covers and waders if worn.
- Removal and disposal of coveralls.
- Removal and disposal of outer gloves.
- Removal, cleaning, and storage of respiratory equipment.
- Removal and disposal of inner gloves.

10.3 CONTAMINATION PREVENTION

One of the most important aspects of decontamination is the prevention of contamination. Good contamination prevention should minimize worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include:

Personnel

- Know the limitations of all personal protective equipment being used.
- Do not walk through areas of obvious or known contamination.
- Do not handle or touch contaminated materials directly. Do not sit or lean on potentially contaminated surfaces.
- Make sure all personal protective equipment has no cuts or tears prior to donning.
- Fasten all closures on suits, covering with tape, if necessary.
- Particular care should be taken to protect any skin injuries.
- Stay upwind of airborne contaminants.
- Do not carry cigarettes, gum, food, or candy into contaminated areas.
- On-site personnel are encouraged to shower at the end of their work day.

Sampling/Monitoring

- Cover instruments with clear plastic, leaving openings for sampling ports, and sensor points.
- Bag sample containers prior to placement of sample material into containers.

Heavy Equipment

- Care should be taken to limit the surface area of equipment that comes into contact with contamination.

General

- If contaminated tools are to be placed on noncontaminated equipment for transport to the decontamination pad, plastic should be used to keep the equipment clean.
- Spoils from sampling work should be placed so as not to be in the expected paths of individuals.

10.4 DISPOSAL PROCEDURES

Waste materials and other field equipment/supplies shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left on-base. Potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary and segregated for disposal. All bags and drums generated during the RI will be labelled with date of waste generation, contents, and activity which generated the waste. Decontamination wash and rinse water and monitoring well development water will be containerized for disposal to the NTC sanitary sewer system, with prior permission. Cuttings will be spread on the ground away from the soil boring location unless there is evidence of contamination. Cuttings that show evidence of contamination based on visual or instrumental observations will be contained in drums. Disposal of drummed cuttings and other potentially contaminated materials will be coordinated by the HALLIBURTON NUS Team. However, the Navy will be the generator of the waste. Non-contaminated materials shall be collected, bagged, and placed in an on-site dumpster for appropriate disposal as normal domestic waste.

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11.0 GENERAL SAFE WORK PRACTICES AND COMMUNICATIONS

11.1 SAFETY EQUIPMENT

Basic emergency and first aid equipment will be available at the SZ and/or the CRZ, as appropriate. This shall include communications equipment, first aid kit (sufficient to accommodate field team), and an emergency eye wash. Fire extinguishers will be provided, inspected, and available on-site.

11.2 COMMUNICATIONS

Walkie-Talkies - Hand-held units shall be used as much as possible by field teams for communication between downrange operations and the Command Post base-station.

Telephones - A mobile telephone will be located in the Command Post area in the SZ for communication with emergency support services/facilities.

Hand Signals - Hand signals will be used by downrange field teams in conjunction with the buddy system. These signals are very important when working with heavy equipment. They shall be known by the entire field team before operations commence and reviewed during site-specific training.

<u>Signal</u>	<u>Meaning</u>
• Hand gripping throat	Out of air; can't breathe
• Grip partner's wrist	Leave area immediately; no debate
• Hands on top of head	Need assistance
• Thumbs up	OK; I'm all right; I understand
• Thumbs down	No; negative

11.3 SAFE WORK PRACTICES

The following safe work practices will be implemented during site operations:

- Only properly trained and equipped personnel will be allowed to work in potentially contaminated areas.

- The number of personnel and equipment in the sampling areas will be kept to a minimum, consistent with safe site operations.
- Workers shall adhere to the "buddy system" while working downrange and in designated EZs. Radio contact shall be maintained between pairs on-site in order to assist each other in case of emergencies.
- Workers shall not exit EZs until soiled equipment and clothing have been removed and decontaminated or properly disposed of.
- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer, ingestion, and inhalation of potentially contaminated materials is prohibited.
- Personnel will thoroughly wash their hands and faces upon leaving the investigation areas.
- Contact with potentially contaminated materials and surfaces shall be avoided. Personnel shall comply with contamination control measures.
- Personnel with facial hair or other facepiece seal obstructions will not be permitted to work where respirators are required.
- Work shall only be conducted if adequate illumination is provided, i.e., visual observation is not impaired due to loss of daylight conditions.

Drilling

While the drilling subcontractor is responsible for safe means and methods of operating their drill rigs, (refer to Section 2.3 of this HASP), personnel working near drill rig operations shall be aware of the following safe work practices:

- Drillers shall inform personnel working with drill rig activities, (i.e., soil boring operations) as to the location of the emergency stop device.
- No drilling within 20 feet in any direction of overhead power lines will be permitted. The locations of all underground utilities must be identified and marked prior to initiating any subsurface activities.

- In the event the drill rig would come in contact with an electrical source, do not touch any part of the equipment or attempt to enter or leave it. Do not touch any person who may be in contact with electrical current. If rescue is attempted, only use a dry, clean rope or unpainted wooden pole.
- Personnel must develop hand signals with equipment operators.
- A remote sampling device must be used to sample drill cutting if the tools are rotating or if the tools are readily capable of rotating. Samplers must not reach into or near the rotating equipment. If personnel must work near any tools which could rotate, the driller must shut down the rig prior to initiating such work.
- Drillers, helpers, and samplers must secure all loose clothing when in the vicinity of drilling operations.
- Compressed gas cylinders must be stored and used in an upright position, properly secured and protected from damage, and segregated and labeled as "full," "in use," or "empty."

Asphalt Removal

A backhoe contractor will be responsible for the safe means and methods of operations associated with asphalt removal activities. The Subcontractor's safety procedures are to be followed during operation of heavy equipment. SEC Donohue is responsible for all soil sampling activities.

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12.0 EMERGENCY PREPAREDNESS

12.1 EMERGENCY COORDINATOR

The Site Emergency Coordinator shall be the SSO. The SSO shall implement the emergency action plan as outlined in 29 CFR 1910.38. Although the following six items are typically more applicable to operating facilities, they will be implemented to the extent possible when applicable.

- Emergency escape procedures and routes.
- Procedures for those remaining for critical operations (this will not apply).
- Procedures to account for employees after evacuation.
- Rescue and medical duties.
- Preferred means of reporting fires and emergencies.
- Names, job titles, or departments to contact for additional information of duties outlined in this HASP.

12.2 EMERGENCY SERVICES CONTACTS

The Site Emergency Coordinator (SSO) shall verify appropriate emergency contacts and will make contact with them before beginning work on-site. The Site Emergency Coordinator (SSO) will inform the emergency contacts about the nature and duration of work expected on the base and the type of contaminants and possible health or safety effects of emergencies involving these contaminants. Also at this time, the Site Emergency Coordinator (SSO) and the emergency response units shall make arrangements to handle any emergencies that might be anticipated.

EMERGENCY PHONE NUMBERS:

Police Department:	911
Fire Department:	911
Hospital:	Great Lakes Naval Hospital 708/688-5618
Hospital Address:	Sheridan Road and South Gate entrance of Naval Base
National Response Center:	1-800-424-8802
Poison Control Center:	1-800-942-5969
CHSM:	Pamela B. Markelz 1-800-242-7601 (work) 414/457-4570 (home)
SSO:	To be determined before field activities begin

HOSPITAL ROUTE:

A hospital route map and written description depicting the route to the hospital from the investigation area is presented on Figure 12-1.

Once the SZ is established, and before field activity start-up, the Site Emergency Coordinator (SSO) shall drive the route to the hospital, post directions and/or a map to the hospital, and set up the first aid station including a 10-pound Type A/B/C fire extinguisher.

12.3 IMPLEMENTATION

The Site Emergency Coordinator (SSO) shall implement the emergency action procedures whenever conditions at the site warrant such action. The Site Emergency Coordinator (SSO) will be responsible for coordinating the evacuation, emergency treatment, and emergency transport of site personnel as necessary, and for notification of emergency response units and the appropriate management staff. In the event an evacuation is necessary, the SSO will take a role count at the designated gathering location with the use of the daily sign in and out sheet. The following conditions may require implementation of emergency action procedures:

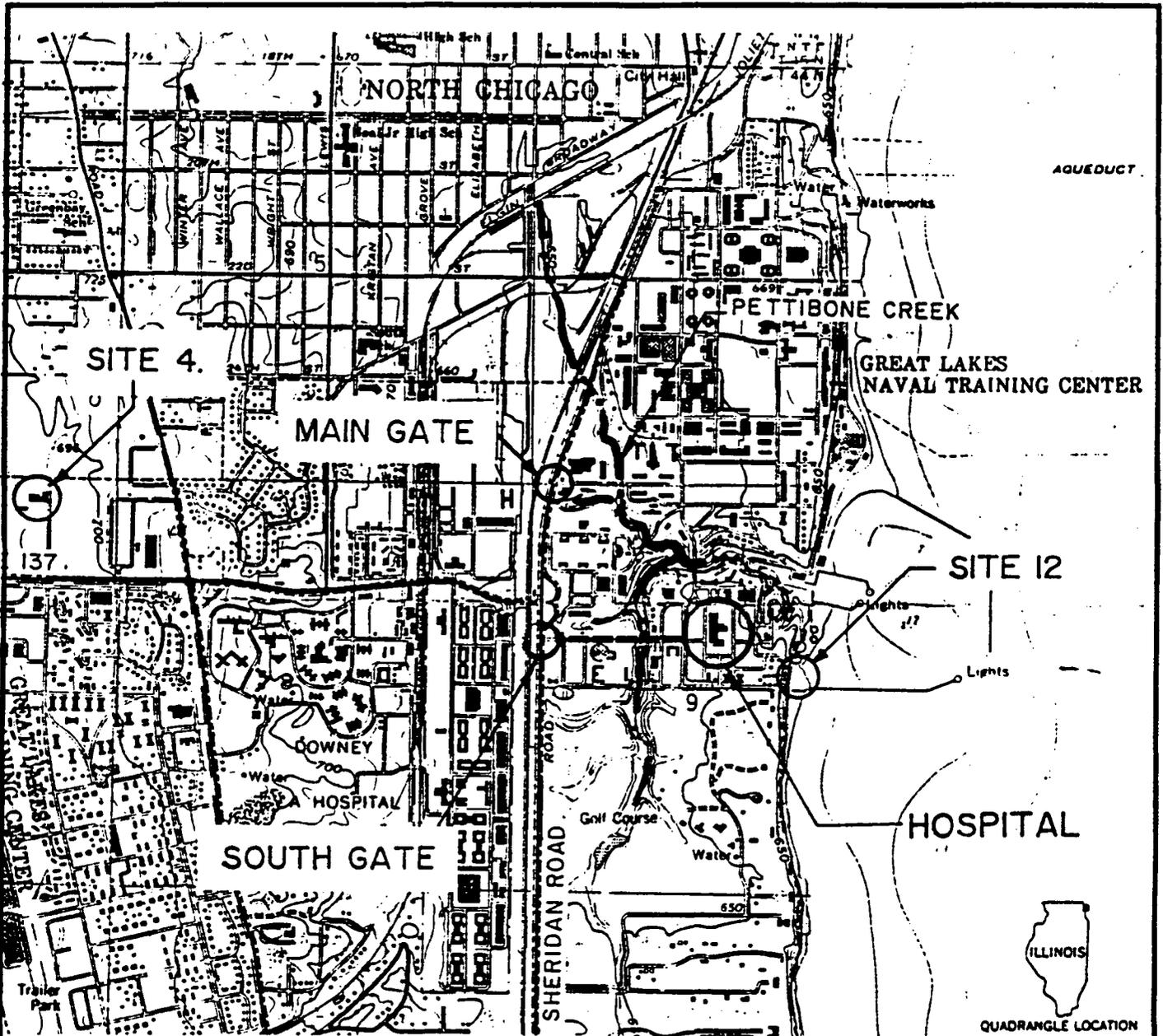
- Fire or explosion on-site.
- Serious personal injury.
- Release of hazardous materials, including gases or vapors at levels greater than the maximum use concentrations of respirators.
- Unsafe working conditions, such as inclement weather.

12.4 FIRE OR EXPLOSION

If an actual fire or explosion has taken place, emergency steps will include 1) evacuation of work area and venting, and 2) notification of the fire department and other appropriate emergency response groups if necessary.

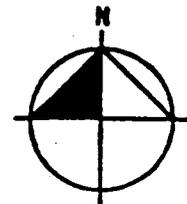
12.5 PERSONAL INJURY

Emergency first aid will be administered on-site as appropriate. Then the individual will be decontaminated if possible, depending on the severity of the injury, and transported to the nearest medical facility if needed.



DIRECTIONS:
 FROM SHERIDAN ROAD
 USE SOUTH GATE
 ENTRANCE OF
 NAVAL BASE

GREAT LAKES NAVAL
 HOSPITAL
 AMBULANCE 688 - 5555
 EMERGENCY 688 - 5618



0 2000 4000

SCALE: FEET
 SCALE IS APPROXIMATE

SOURCE:
 USGS 7.5 MINUTE QUADRANGLE
 WAUKEGAN, ILLINOIS 1960
 PHOTOREVISED 1972 AND 1980

DUNCAN-PARNELL, INC. CHARLOTTE, NC 800-768-7786



FIGURE 12-I.
 HOSPITAL ROUTE MAP

CTO #0071
 20611

NAVAL TRAINING CENTER
 GREAT LAKES, ILLINOIS

12.6 OVERT CHEMICAL EXPOSURE

Typical response procedures include:

SKIN CONTACT: Use copious amounts of soap and water. Wash/rinse affected area thoroughly, then provide appropriate medical attention. Eye wash will be provided on-site at the CRZ and/or SZ. Eyes should be rinsed for 15 minutes upon chemical contamination.

INHALATION: Move to fresh air and/or, if necessary, decontaminate/transport to hospital.

INGESTION: Decontaminate and transport to emergency medical facility.

**PUNCTURE
WOUND OR
LACERATION:** Decontaminate and transport to emergency medical facility. The SSO will provide medical data sheets to medical personnel as requested.

12.7 ADVERSE WEATHER CONDITIONS

In the event of adverse weather conditions, the SSO will determine if work can continue without endangering the health and safety of field workers. Some items to be considered before determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related working conditions.
- Limited visibility.
- Potential for electrical storms.

12.7.1 Heat Stress

The SSO shall visually monitor personnel to note for signs of heat stress. Field personnel will also be instructed to observe for symptoms of heat stress and methods on how to control it. One or more of the following control measures can be used to help control heat stress:

- Provide adequate liquids to replace lost body fluids. Personnel must replace water and salt lost from sweating. Personnel must be encouraged to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement.
- Replacement fluids can be commercial mixes such as Gatorade®.

- Establish a work regime that will provide adequate rest periods for cooling down. This may require additional shifts of workers.
- Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.
- Breaks are to be taken in a cool rest area (77° F is best).
- Personnel shall remove impermeable protective garments during rest periods.
- Personnel shall not be assigned other tasks during rest periods.
- Personnel shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

The heat stress of personnel on-site may be monitored utilizing biological monitoring or the Wet Bulb Globe Temperature Index (WBGT) technique when workers are not wearing protective coveralls (i.e., Tyvek®). This method will require the use of a heat stress monitoring device.

One of the following biological monitoring procedures shall be followed when the workplace temperature is 70° F or above.

- Heart rate (HR) shall be measured by the pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/minute. If the HR is higher, the next work period should be shortened by 10 minutes (or 33 percent), while the length of rest period stays the same. If the pulse rate is 100 beats/minute at the beginning of the next rest period, the following work cycle should be shortened by 33 percent. The length of the initial work period will be determined by using the table below.

PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUES

<u>Work-Rest Regimen</u>	<u>Work Load</u>		
	<u>Light</u>	<u>Moderate</u>	<u>Heavy</u>
Continuous Work	80.0° F	80.0° F	77.0° F
75% Work - 25% Rest, Each Hour	87.0° F	82.4° F	78.6° F
50% Work - 50% Rest, Each Hour	88.5° F	85.0° F	82.2° F
25% Work - 75% Rest, Each Hour	90.0° F	88.0° F	86.0° F

- Body temperature shall be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the beginning of the rest period should not exceed 99° F. If it does, the next work period should be shortened by 10 minutes (or 33 percent), while the length of the rest period stays the same. However, if the oral temperature exceeds 99.7° F at the beginning of the next rest period, the following work cycle shall be further shortened by 33 percent. OT should be measured at the end of the rest period to make sure that it has dropped below 99° F. At no time shall work begin with the oral temperature above 99° F.

12.7.2 Cold Exposure

If field activities occur during a period when temperatures average below freezing, the following guidelines will be followed.

Persons working outdoors in temperatures at or below freezing may be subject to frostbite. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling of the body core, resulting in coma and death. Areas of the body which have high surface area-to-volume ratio such as fingers, toes, and ears are the most susceptible.

Two factors influence the development of a cold injury; ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10° F with a 15-mile per hour (mph) wind is equivalent to chilling still air to -18° F.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration-soaked.

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost nip or incipient frostbite: Characterized by sudden blanching or whitening of skin.
- Superficial frostbite: Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep frostbite: Tissue is cold, pale, and solid; extremely serious injury.

Prevention of frostbite is vital. Keep the extremities warm. Wear insulated clothing as part of one's protective gear during extremely cold conditions. Check for symptoms of frostbite at every break. The onset is painless and gradual--you may never know you have been injured until it is too late.

To administer first aid for frostbite, bring the victim indoors and rewarm the areas quickly in water between 39° C and 41° C (102° F to 105° F). Give a warm drink--not coffee, tea, or alcohol. The victim should not smoke. Keep the frozen parts in warm water or covered with warm clothes for 30 minutes, even though the tissue will be very painful as it thaws. Then elevate the injured area and protect it from injury. Do not allow blisters to be broken. Use sterile, soft, dry material to cover the injured areas. Keep victim warm and get immediate medical care.

After thawing, the victim should try to move the injured areas a little, but no more than can be done alone (without help).

- Do not rub the frostbitten part (this may cause gangrene).
- Do not use ice, snow, gasoline, or anything cold on frostbite.
- Do not use heat lamps or hot water bottles to rewarm the frostbitten area.
- Do not place the body part near a hot stove.

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages: 1) shivering; 2) apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95° F; 3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate; 4) freezing of the extremities; and, finally, 5) death.

Effects arising from cold exposure will be minimized by providing workers with insulated clothing when the equivalent chill temperature is less than 30° F as defined and presented in the ACGIH booklet in Table 5. Furthermore, field activities will generally be curtailed or halted if the equivalent chill temperature is below -20° F. The ultimate responsibility for delaying work at a site due to inclement weather rests with the SSO.

12.8 POISON IVY

If personnel come in contact with poison ivy, the individual should immediately wash the affected area with Ivy Cleaner provided in the first aid kit. If a rash develops, it should be treated at a medical facility as soon as possible.

12.9 SNAKES AND TICKS

12.9.1 Snake Bite Prevention and First Aid

On project sites, precautions against the possible presence of snakes should be taken when walking through overgrown vegetation and when moving debris (i.e. lumber, scrap metal, etc.). If someone is bitten by a snake, and the snake bite occurs in a location that is within a 1-hour drive of a medical facility, a conservative approach is safest. Keeping the victim quiet, lying or sitting, and reassuring him/her is all that is required. He/she should be transported safely (no speeding) to the nearest medical facility. For the reassurance of both the victim and the first aider, a snake bite is not nearly as dangerous as popular mythology would suggest. In North America, death from snake bite to healthy adults is very rare. Many bites, even from known poisonous snakes, do not result in a significant amount of venom being injected. Even when significant envenom occurs, symptoms develop slowly over many hours and can be controlled with appropriate treatment. Field treatments advised against include ice, cutting and suction around the wound, and tourniquets. Studies indicate that ice leads to increased tissue destruction. Cutting and sucking out the wound can be shown to offer some help if it is done with the correct technique and equipment and if the victim has received a large dose of venom. In light of the damage that can be done, the risk of such a procedure is too high. It is best to transport the person immediately to a medical facility.

12.9.2 Tick Bite Prevention and First Aid

Routinely check for ticks after being outdoors. Remove ticks as soon as possible before they embed. To minimize exposure, wear light-colored clothing so ticks can be detected. Tuck pants into boots or socks and wear longsleeved shirts. Apply tick/insect repellent to clothing.

When a tick is found embedded, remove it by grasping it with a tweezers as close to the skin as possible and gently pull it straight out. Do not twist or jerk the tick because the head may remain embedded. Once the tick is removed, wash the bite area and your hands with soap and water and apply an antiseptic to the bite. Save the tick in a jar labeled with the date and the place where the tick was acquired. A physician may find this information and the tick specimen helpful in diagnosis if an infection results.

12.10 ACCIDENT/INJURY REPORTING AND RECORDKEEPING

The SSO shall maintain logs and reports covering health and safety aspects of the project throughout the duration of work activities. In the event of an on-site accident resulting in an exposure or injury, the SSO shall immediately complete an Accident/Injury Report form and send a copy to the SEC Donohue CHSM. In the event of an accident or injury, the SEC Donohue CHSM and Project Manager shall notify the Navy. The SSO shall be responsible for maintaining on-site, the routinely completed records and forms listed in Section 14.0 of this HASP.

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13.0 AUTHORIZATIONS AND FIELD TEAM REVIEW

13.1 AUTHORIZED PERSONNEL

Personnel entering the NTC investigation areas while field activities are being conducted must be authorized by the HSMs. Authorization will involve completion of appropriate training courses and medical examination requirements as required by OSHA 29 CFR 1910.120 and 1926.58, current fit-testing and review and sign-off of this HASP. All personnel must be escorted by appropriately trained personnel, and check in with the Field Team Leader at the Command Post.

PERSONNEL AUTHORIZED TO PERFORM WORK ON-SITE:

1. Mansour Ghiasi
2. Patricia Bryan
3. Bill Schaefer
4. Tracey Koach
5. Personnel Authorized by the SEC Donohue CHSM and the CLEAN HSM

OTHER PERSONNEL AUTHORIZED TO ENTER SITE:

1. U.S. Navy Representatives
2. HALLIBURTON NUS Personnel
3. Subcontractor Personnel

13.2 FIELD TEAM REVIEW

Each field team member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read and understand this Health and Safety Plan. I will comply with the provisions contained therein.

**Site/Project: NAVAL TRAINING CENTER
SITE 4 - FIRE FIGHTING TRAINING UNIT
SITE 12 - HARBOR DREDGE SPOIL AREA
GREAT LAKES, ILLINOIS**

<u>Name Printed</u>	/	<u>Signature</u>	/	<u>Date</u>
_____	/	_____	/	_____
_____	/	_____	/	_____
_____	/	_____	/	_____
_____	/	_____	/	_____
_____	/	_____	/	_____
_____	/	_____	/	_____
_____	/	_____	/	_____
_____	/	_____	/	_____

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14.0 RECORDKEEPING

The following records and reports will be established and kept as appropriate for the NTC remedial investigation:

- Accident/Incident Reports
- Daily Sign In/Sign Out Log
- Air Monitoring Records
- Sample Chain of Custody Form
- Personnel Training Certificates
- Personnel Exposure Record
- Site-Safety Orientation Log
- Health and Safety Audit Reports
- Instrumentation Calibration Logs
- Material Safety Data Sheets/Chemical Data Sheets/Hazardlines
- Medical Data Sheets (to be sent with injured personnel to hospital)
- Medical Examination Reports (Physician's Written Opinion)
- Respirator Fit Test Records
- Respirator Inspection Records

A blank Medical Data Sheet is included as the next page of this document. A Medical Data Sheet will be completed for each person working at the site.

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MEDICAL DATA SHEET

Project Name/Location: _____

Employee Name: _____ Home Telephone: _____

Address: _____

Birthdate: _____ Height: _____ Weight: _____

Drug and Other Allergies: _____

Notable Medical Conditions/Medical Restrictions:

Do You Wear Contact Lenses? Yes No
Dentures? Yes No

Are you using any medications? Yes No Please list:

Emergency Contact: _____ Relationship: _____
Address: _____ Phone: () _____

Personal Physician: _____ Phone: () _____
Address: _____

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APPENDIX A

CHEMICAL DATA SHEETS/HAZARDLINES

1

AN ACCESSION NUMBER: 844. 9205.
 CN CHEMICAL NAME: DDD.
 SY SYNONYMS: NCI-C00475. DICHLORODIPHENYL DICHLOROETHANE. DILENE.
 RHOTHANE D-3. TDE. ME-1700. ENT 4,225. ETHANE,
 1,1-DICHLORO-2,2-BIS(P-CHLOROPHENYL)-,
 1,1-BIS(P-CHLOROPHENYL)-2,2-DICHLOROETHANE.
 1,1-BIS(4-CHLOROPHENYL)-2,2-DICHLOROETHANE.
 2,2-BIS(P-CHLOROPHENYL)-1,1-DICHLOROETHANE.
 2,2-BIS(4-CHLOROPHENYL)-1,1-DICHLOROETHANE.
 1,1-DICHLORO-2,2-BIS(P-CHLOROPHENYL)ETHANE.
 1,1-DICHLORO-2,2-BIS(PARACHLOROPHENYL)ETHANE.
 1,1-DICHLORO-2,2-BIS(4-CHLOROPHENYL)ETHANE.
 P,P'-DICHLORODIPHENYLDICHLOROETHANE. RHOTHANE. ROTHANE. P,P'-TDE.
 RCRA U060.

RN CAS NUMBER: 72-54-8.
 REG. TOXIC NUMBER: KI0700000.

PD CHEMICAL FORMULA: C14H10CL4.

PHYSICAL DESCRIPTION:
 COLORLESS CRYSTALS.

MOL WT:	320.1
BOILING PT:	DECOMPOSES
SOLUBILITY:	INSOLUBLE
FLASH PT:	150 F
VAPOR PRES:	N/A
MELT PT:	228 F
UEL IN AIR:	COMBUSTIBLE
LEL IN AIR:	COMBUSTIBLE
MEC IN AIR:	
SPEC GRAVITY:	1.476 AT 68 F
VAPOR DENSITY:	
ODOR THRESHOLD:	
OCTANOL/WATER CO-EFFICIENT:.	

EL PERMISSABLE EXPOSURE:
 NONE ESTABLISHED
 PROBABLE HUMAN CARCINOGEN (EPA - CATEGORY B)
 INDEFINITE CARCINOGEN IN RATS (NCI)
 NEGATIVE CARCINOGEN IN MICE (NCI)
 MUTAGENIC DATA (RTEC)
 CERCLA HAZARD RATINGS - TOXICITY 2 - IGNITABILITY 0 - REACTIVITY 0 -
 PERSISTENCE 3
 CROP TOLERANCES (40CFR180.187) PPM - APPLES 7, APRICOTS 7, BEANS 7,
 BLACKBERRIES 3.5, BLUEBERRIES 7, BOYSENBERRIES 3.5, BROCCOLI 1, BRUSSEL
 SPROUTS 1, CABBAGE 1, CARROTS 1, CAULIFLOWER 1, CHERRIES 3.5, PEAS 1

OSHA STANDARD 1910.1200 HAZARD COMMUNICATION 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.

DANGEROUS EXPOSURE:
 NONE SPECIFIED
 COLORLESS CRYSTALS.

INCOMPATIBILITIES:
STRONG ALKALIES. PEROXIDES.

CL

CLOTHING:

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 UNTIL
LAUNDERED OR DISCARDED
IF CLOTHING IS TO BE LAUNDERED, INFORM PERSON PERFORMING OPERATION OF
CONTAMINANT'S HAZARDOUS PROPERTIES
-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.) -
POLYNUCLEAR AROMATIC HALOGEN COMPOUNDS: EXCELLENT/GOOD; POLYVINYL ALCOHOL
FAIR/POOR; NATURAL RUBBER POLYVINYL CHLORIDE A WIDE VARIATION IN RATINGS
IS INDICATED FOR THE FOLLOWING MATERIALS: BUTYL RUBBER NEOPRENE
NEOPRENE/NATURAL RUBBER.

WEAR EYE PROTECTION TO PREVENT:
NO OSHA STANDARD, NIOSH CRITERIA DOCUMENT ADVISES:
WEAR FACE SHIELD OR VENTED GOGGLES.

EMPLOYEE SHOULD WASH:
NO OSHA STANDARD, NIOSH CRITERIA DOCUMENT ADVISES:
PROMPTLY WHEN SKIN BECOMES CONTAMINATED AND AT END OF EACH WORK SHIFT
SHOWER AT END OF EACH SHIFT.

WORK CLOTHING SHOULD BE CHANGED DAILY:
NO OSHA STANDARD, NIOSH CRITERIA DOCUMENT ADVISES:
IF THERE IS ANY POSSIBILITY THAT CLOTHING MAY BE CONTAMINATED
LEAVE CLOTHING & EQUIPMENT FOR DECONTAMINATION & DISPOSAL.

REMOVE CLOTHING:
NO OSHA STANDARD, NIOSH CRITERIA DOCUMENT ADVISES:
PROMPTLY IF IT IS NON-IMPERVIOUS AND CONTAMINATED
SHOWER AFTER EACH SHIFT PRIOR TO LEAVING PREMISES.

THE FOLLOWING EQUIPMENT SHOULD BE AVAILABLE:
NO OSHA STANDARD, NIOSH CRITERIA DOCUMENT ADVISES:
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.

RP

RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED):
NO SPEC ADVISE:
- CHEMICAL CARTRIDGE RESPIRATOR
WITH AN ORGANIC VAPOR CARTRIDGE

HIGH LEVELS:
- DUST, MIST AND FUME RESPIRATOR
INCLUDING PESTICIDE RESPIRATORS
WITH HALF-MASK

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

MS

MEDICAL SURVEILLANCE:

NO OSHA STANDARD, NIOSH CRITERIA DOCUMENT ADVISES: 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.
CENTRAL NERVOUS SYSTEM TESTS, PERIPHERAL NEUROPATHY.
BLOOD CHEMISTRY.

COMPLETE BLOOD COUNT.
PULMONARY FUNCTIONS.
RESPIRATORY HISTORY.
URINALYSIS.

VISION TEST.

PRE-EMPLOYMENT ERYTHROCYTE CHOLINESTERASE, TWO TESTS TO DETERMINE MEAN NORMAL LEVEL; TEST MUST NOT DIFFER BY MORE THAN 15%.

ATTENTION TO SMOKING, ALCOHOL, MEDICATION, AND EXPOSURE TO CARCINOGENS.
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).

RE

ROUTE OF ENTRY:
INHALATION. INGESTION. SKIN ABSORPTION.

TO

TARGET ORGANS:
SKIN. LUNGS. RESPIRATORY SYSTEM. MUCOUS MEMBRANES. LIVER.
CHOLINESTERASE. CENTRAL NERVOUS SYSTEM.

SF

SYMPTOMS:

SKIN, COVERING OF BODY (SC0174);
IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).
CENTRAL NERVOUS SYSTEM, PERTAINING TO NEURAL BODY SYSTEM (SC0028);
DEPRESSION, DECREASE IN ACTIVITY/FUNCTION (SC0043). HEADACHE, PAIN IN HEAD OR CRANIUM AREA (SC0075). NAUSEA, SICKNESS AT THE STOMACH (SC0115).
MUSCULAR, ORGAN RESPONSIBLE FOR MOTION (SC0110);
SPASM, CONVULSIVE MUSCULAR CONTRACTION (SC0153). VOMITING, PERTAINING TO NAUSEA (SC0166). ABDOMINAL CRAMPS, PAINFUL SPASMS OF ABDOMINAL AREA (SC0218). WEAKNESS, LACK OF STRENGTH (SC0167). DROOLING/FROTHING OF MOUTH & NOSE, EXCESS SALIVA FROM MOUTH, NOSE (SC0277). VISUAL DISTURBANCE, UPSET IN SIGHT (SC0165). COMATOSE, STATE OF DEEP UNCONSCIOUSNESS (SC0186). RESPIRATORY DISTRESS, DIFFICULTY BREATHING (SC0219). LACRIMATION, DISCHARGE OF TEARS (SC0096). DYSPNEA, DIFFICULTY IN BREATHING (SC0052). SWEATING, EXCRETING MOISTURE THROUGH THE SKIN (SC0156). NERVOUSNESS, STATE OF UNREST, UNEASINESS (SC0118).
CONVULSIONS, SUDDEN MUSCLE CONTRACTIONS (SC0034).
HEPATIC, PERTAINING TO THE LIVER (SC0081);
NEOPLASM, ABNORMAL TISSUE FORMATION (SC0272).
RESPIRATORY, PERTAINING TO THE LUNGS (SC0142);
NEOPLASM, ABNORMAL TISSUE FORMATION (SC0272). LIVER DAMAGE, INJURY TO THE LIVER (SC0221). CHLORACNE, REDDISH DERMATOLOGICAL CONDITION (SC0276). EMACIATION, MALNUTRITION (SC0299). WEIGHT LOSS, DROP IN BODY WEIGHT (SC0104). FASCICULATION, TWITCHING OF GROUPS OF MUSCLE FIBERS (SC0063). DYSPNEA, DIFFICULTY IN BREATHING (SC0052). TREMORS, TREMBLING, SHAKING (SC0197). LASSITUDE, A SENSE OF WEARINESS (SC0098). MALAISE, UNEASINESS, DISCOMFORT, FEELING BAD (SC0106).
CHOLINESTERASE, ENZYME FOR NERVE CELL SIGNALS (SC0025);
INHIBITION, REPRESSION OF FUNCTION (SC0387).

FA

FIRST AID.

(1 OF 4)

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.

(2 OF 4)

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.

(3 OF 4)

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.

(4 OF 4)

HALOGENATED PESTICIDE INGESTION: REMOVE INGESTED PESTICIDE BY IPECAC EMESIS OR GIVE ACTIVATED CHARCOAL FOLLOWED BY GASTRIC LAVAGE WITH 2-4 LITERS OF TAP WATER. FOLLOW WITH A SALINE CATHARTIC. DO NOT GIVE FATS OR OILS. INTESTINAL LAVAGE WITH 20% MANNITOL (200 ML) BY STOMACH TUBE IS ALSO USEFUL. MAINTAIN RESPIRATION; GIVE OXYGEN IF RESPIRATION IS DEPRESSED. GET MEDICAL ATTENTION IMMEDIATELY. GENERAL MEASURES: GIVE DIAZEPAM, 10 MG VERY SLOWLY AS AN ANTICONVULSANT. IF CONVULSIONS PERSIST, USE A NEUROMUSCULAR BLOCKING AGENT AND CONTROLLED RESPIRATION. FOR HYPERACTIVITY OR TREMORS, GIVE PHENOBARBITAL SODIUM, 100 MG SUBCUTANEOUSLY HOURLY UNTIL CONVULSIONS ARE CONTROLLED OR UNTIL 0.5 G HAS BEEN GIVEN. DO NOT GIVE STIMULANTS. ALL PROCEDURES MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL ONLY. (DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

DT

SPECIAL DIAGNOSTIC TESTS AND INDEXES OF EXPOSURE:
TRUE ACETYLCHOLINESTERASE.
PSEUDO OR BUTYRYLCHOLINESTERASE.

RS

REGULATORY STATUS.

COMMUNICATION REQUIRES CHEMICAL
MANUFAC

ENTER DOCUMENT SELECTION._:

END OF DOCUMENTS IN LIST_:

BRS SEARCH MODE - ENTER QUERY

3_: ..OFF

*CONNECT TIME 0:04:13 HH:MM:SS 0.070 DEC HRS SESSION 159
*SIGN OFF 8:55:19 06/10/92708 154B DISCONNECTED 00 40 00:00:04:31 395

@

GET MEDICAL ATTENTION IMMEDIATELY.

6

AN ACCESSION NUMBER: 822. 9112.

CN CHEMICAL NAME: DDT.

SY SYNONYMS: NCI-C00464. ENT 1,506. ESTONATE.

DICHLORODIPHENYLTRICHLOROETHANE. PENTECH. SANTOBANE. GENITOX. NA

2761. ETHANE, 1,1,1-TRICHLORO-2,2-BIS(P-CHLOROPHENYL)-. BENZENE,

1,1'-(2,2,2-TRICHLOROETHYLIDENE) BIS(4-CHLORO-

1,1-BIS(P-CHLOROPHENYL)-2,2,2-TRICHLOROETHANE.

2,2-BIS(P-CHLOROPHENYL)-1,1,1-TRICHLOROETHANE.

P,P'-DICHLORODIPHENYLTRICHLOROETHANE.
4,4'-DICHLORODIPHENYLTRICHLOROETHANE.
TRICHLOROBIS(4-CHLOROPHENYL) ETHANE.
1,1,1-TRICHLORO-2,2-BIS(P-CHLOROPHENYL) ETHANE. AGRITAN. AZOTOX. CITOX.
RCRA U061.

RN CAS NUMBER: 50-29-3.

REG. TOXIC NUMBER: KJ3325000.

CHEMICAL FORMULA: C14H9CL5.

PD

PHYSICAL DESCRIPTION:
TASTELESS, ALMOST ODORLESS, WHITE CRYSTALLINE POWDER.

MOL WT: 354.49
BOILING PT: 500 F (260C)
SOLUBILITY: ALMOST INSOLUBLE
FLASH PT: N/A
VAPOR PRES: NEGLIGIBLE
MELT PT: 225-228 F (107-109C)
UEL IN AIR:
LEL IN AIR:
MEC IN AIR: 300 F
SPEC GRAVITY: 1.56 @ 15 C
VAPOR DENSITY:
ODOR THRESHOLD:
OCTANOL/WATER CO-EFFICIENT: 6.19.

EL

PERMISSABLE EXPOSURE:
1 MG/M3 OSHA TWA (SKIN NOTATION)
1 MG/M3 ACGIH TWA
NIOSH RECOMMENDED LOWEST DETECTABLE LIMIT (0.5 MG/M3 TWA)
HUMAN INADEQUATE EVIDENCE FOR CARCINOGENICITY (IARC GROUP-2B)
ANIMAL SUFFICIENT EVIDENCE FOR CARCINOGENICITY (IARC GROUP-2B)
ANTICIPATED HUMAN CARCINOGEN (NTP)
PROBABLE HUMAN CARCINOGEN (EPA - CATEGORY B)
TUMORIGENIC DATA (RTECS)
REPRODUCTIVE EFFECTS DATA (RTECS); MUTAGENIC DATA (RTECS)
ACCEPTABLE DAILY INTAKE (WHO/FAO): 0.01 MG/KG
AQUATIC TOXICITY RATING 4 (TLM96 <1 MG/L)
CERCLA HAZARD RATINGS - TOXICITY 3 - IGNITABILITY 1 - REACTIVITY 0 - PERSISTENCE 3

TOXICOLOGY: DDT IS TOXIC BY INGESTION AND SKIN ABSORPTION. IT IS A CONVULSANT. POISONING MAY AFFECT THE PERIPHERAL NERVOUS SYSTEM AND LIVER. ORAL ADMINISTRATION TO MICE PRODUCED BENIGN AND MALIGNANT LIVER NEOPLASMS AND LYMPHOMAS AND LUNG NEOPLASMS. ORAL ADMINISTRATION TO RATS CAUSED LIVER NEOPLASMS. EFFECTS OF POISONING MAY BE DELAYED SEVERAL HOURS AND ARE CHARACTERIZED BY PARESTHESIAS OF THE TONGUE, LIPS AND FACE, FOLLOWED BY A SENSE OF APPREHENSION, MALAISE AND HYPEREXCITABILITY. CONVULSIONS MAY ALTERNATE WITH PERIODS OF COMA AND PARTIAL PARALYSIS.

THE THRESHOLD LIMIT VALUE WAS ESTABLISHED TO PREVENT ACUTE POISONING BY A LARGE MARGIN OF SAFETY TO PREVENT SIGNIFICANT ACCUMULATION IN BODY STORES.

PERSONS WITH DISEASES OF THE NERVOUS SYSTEM, LIVER OR BLOOD MAY BE AT AN INCREASED RISK FROM EXPOSURE.

ORGANIC SOLVENTS MAY DECREASE THE CONVULSIVE EFFECTS OF DDT AND INCREASE THE TOXICITY. DDT MAY CAUSE THE PLACENTA AND BE EXCRETED IN

BREAST MILK.

ORL-HMN LDLO: 500 MG/KG ORL-INF LDLO: 150 MG/KG
ORL-HMN TDLO: 5 MG/KG ORL-MSN TDLO: 6 MG/KG
ORL-HMN TDLO: 16 MG/KG ORL-RAT LD50: 87 MG/KG
ORL-MUS LD50: 135 MG/KG SKN-RBT LD50: 300 MG/KG
SKN-RAT LD50: 1931 MG/KG SCU-RAT LD50: 1500 MG/KG
INV-RAT LD50: 68 MG/KG IPR-RAT LD50: 9100 UG/KG

OSHA STANDARD 1910.1200 HAZARD COMMUNICATION 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.

DANGEROUS EXPOSURE:

POTENTIAL CARCINOGENNIOSH
TASTELESS, ALMOST ODORLESS, WH.

IC
INCOMPATIBILITIES:

DDT: ALKALIES: MAY CAUSE DECOMPOSITION ALKALOID NICOTINE: MAY CAUSE DECOMPOSITION ALUMINUM SALTS: INCOMPATIBLE BORDEAU MIXTURE: MAY CAUSE DECOMPOSITION CLAY: MAY CAUSE DECOMPOSITION DOLOMITE: MAY CAUSE DECOMPOSITION FERBAM: MAY CAUSE DECOMPOSITION IRON: INCOMPATIBLE OXIDIZERS (STRONG): MAY CAUSE FIRE AND EXPLOSION HAZARD.

CL
CLOTHING:

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

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 WHICH HAS HAD ANY POSSIBILITY OF BEING CONTAMINATED 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 OPERATION OF THE HAZARDOUS PROPERTIES OF THE SUBSTANCE.

WEAR EYE PROTECTION TO PREVENT:

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

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

EMPLOYEE SHOULD WASH:

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 WITH SOAP OR MILD DETERGENT AND WATER TO REMOVE ANY CONTAMINANT FROM THE SKIN.

EMPLOYERS SHALL ENSURE THAT ALL EMPLOYEES SUBJECT TO SKIN CONTACT WITH THIS SUBSTANCE WASH WITH SOAP OR MILD DETERGENT AND WATER ANY AREAS OF THE BODY WHICH MAY HAVE CONTACTED THE SUBSTANCE AT THE END OF EACH WORK

DAY.

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

WORK CLOTHING SHOULD BE CHANGED DAILY:

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL ENSURE THAT EMPLOYEES WHOSE CLOTHING MAY HAVE BECOME CONTAMINATED WITH THIS SUBSTANCE CHANGE INTO UNCONTAMINATED CLOTHING BEFORE LEAVING THE WORK PREMISES.

REMOVE CLOTHING:

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.

THE FOLLOWING EQUIPMENT SHOULD BE AVAILABLE:

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL ENSURE THAT EMPLOYEES DO NOT EAT OR SMOKE IN AREAS WHERE THIS SUBSTANCE IS HANDLED, PROCESSED OR STORED.

RP

RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED):
ANY DETECTABLE CONC

- 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

ESCAPE

- AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONTOR BACK-MOUNTED ORGANIC VAPOR CANISTER HAVING A HIGH EFFICIENCY PARTICULATE FILTER

- 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.

IS

MEDICAL SURVEILLANCE:

GENERAL MEDICAL HISTORY.

EKG RECOMMENDED IF EMPLOYEE TO WEAR FULL-FACE RESPIRATOR.

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.

EYE DISEASE.

SKIN EXAM.

LIVER FUNCTION.

REPRODUCTIVE ORGANS EXAMINATION.

CENTRAL NERVOUS SYSTEM TESTS, PERIPHERAL NEUROPATHY.

KIDNEY FUNCTION.

FOOD AND AGRICULTURE ORGANIZATION/WORLD HEALTH ORGANIZATION (FAO/WHO)
ACCEPTABLE DAILY INTAKE ESTABLISHED.

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).

RE

ROUTE OF ENTRY:

INHALATION. SKIN ABSORPTION. INGESTION. SKIN OR EYE CONTACT.

TO

TARGET ORGANS:

CENTRAL NERVOUS SYSTEM. KIDNEYS. LIVER. SKIN. PERIPHERAL NERVOUS
SYSTEM.

SP

SYMPTOMS:

MUCOUS MEMBRANE, MEMBRANE LINING PASSAGES/CAVITIES (SC0109);
IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).
EYE, ORGAN OF SIGHT (SC0170);
IRRITATION, EXTREME REACTION TO A CONDITION (SC0090). PARESTHESIA,
ABNORMAL SENSATION WITHOUT CAUSE (SC0125). TREMORS, TREMBLING, SHAKING
(SC0197). APPREHENSION, FEELING OF UNEASINESS, FEAR, ANXIETY (SC0073).
DIZZINESS, FEELING FAINT, LIGHT-HEADED, UNSTEADY(SC0048). CONFUSION, IN
A BEWILDERED STATE (SC0030). MALAISE, UNEASINESS, DISCOMFORT, FEELING
BAD (SC0106). HEADACHE, PAIN IN HEAD OR CRANIUM AREA (SC0075). FATIGUE
TIREDNESS, SLUGGISH (SC0066). WEAKNESS, LACK OF STRENGTH (SC0167).
ATAXIA, MUSCULAR INCOORDINATION (SC0013). NYSTAGMUS, RHYTHMICAL
OSCILLATION OF EYEBALLS (SC0443). TACHYPNEA, RAPID RESPIRATION (SC0384).
EXCITABILITY, SENSITIVITY TO EMOTIONAL STIMULATION (SC0592). VOMITING,
PERTAINING TO NAUSEA (SC0166). NAUSEA, SICKNESS AT THE STOMACH (SC0115).
DIARRHEA, UNCONTROLLED LOOSE BOWELS (SC0046). PARALYSIS, LOSS OF POWER
OF VOLUNTARY MOVEMENT (SC0124). ATAXIA, MUSCULAR INCOORDINATION
(SC0013). ARRHYTHMIA, ABSENCE OF RHYTHM; IRREGULARITY (SC0010).
TACHYCARDIA, ABNORMAL RAPID HEARTBEAT (SC0158). ANEMIA, RED BLOOD CELLS
LESS THAN NORMAL (SC0004). BLOOD CHANGES, CHANGES IN BLOOD CELLS OR
MORPHOLOGY (SC0227). WEIGHT LOSS, DROP IN BODY WEIGHT (SC0104).
ANOREXIA, DIMINISHED APPETITE (SC0006). ANXIETY, A TROUBLED FEELING
(SC0009).
KIDNEY, POST-PERITONEUM ORGAN FOR URINE WASTE(SC0094);
EFFECTS, SIGNS AND SYMPTOMS (SC0579). CONVULSIONS, SUDDEN MUSCLE
CONTRACTIONS (SC0034). IMMUNOSUPPRESSION, SUPPRESSION OF IMMUNE
RESPONSES (SC0630).
LIVER, BILE-SECRETING GLANDULAR ORGAN (SC0620);
TUMORS, BENIGN OR CANCEROUS ENLARGEMENTS (SC0578).
LUNG, RESPIRATORY ORGAN (SC0377);
NEOPLASM, ABNORMAL TISSUE FORMATION (SC0272).
REPRODUCTIVE EFFECTS, BIRTH DEFECTS (SC0281);
IN EXPERIMENTAL ANIMALS, (SC0212).

FA

FIRST AID.

(1 OF 4)

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.

(2 OF 4)

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.

(3 OF 4)

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.

(4 OF 4)

HALOGENATED PESTICIDE INGESTION: REMOVE INGESTED PESTICIDE BY IPECAC EMESIS OR GIVE ACTIVATED CHARCOAL FOLLOWED BY GASTRIC LAVAGE WITH 2-4 LITERS OF TAP WATER. FOLLOW WITH A SALINE CATHARTIC. DO NOT GIVE FATS OR OILS. INTESTINAL LAVAGE WITH 20% MANNITOL (200 ML) BY STOMACH TUBE IS ALSO USEFUL. MAINTAIN RESPIRATION, GIVE OXYGEN IF RESPIRATION IS DEPRESSED. GET MEDICAL ATTENTION IMMEDIATELY. GENERAL MEASURES: GIVE DIAZEPAM, 10 MG VERY SLOWLY AS AN ANTICONVULSANT. IF CONVULSIONS PERSIST, USE A NEUROMUSCULAR BLOCKING AGENT AND CONTROLLED RESPIRATION. FOR HYPERACTIVITY OR TREMORS, GIVE PHENOBARBITAL SODIUM, 100 MG SUBCUTANEOUSLY HOURLY UNTIL CONVULSIONS ARE CONTROLLED OR UNTIL 0.5 G HAS BEEN GIVEN. DO NOT GIVE STIMULANTS. ALL PROCEDURES MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL ONLY. (DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

MATERIAL SAFETY DATA SHEET

CORPORATE RESEARCH & DEVELOPMENT

SCHENECTADY, N. Y. 12305

Phone: (518) 385-4085

DIAL COMM: 8*235-4085



NO. 317

TOLUENE

Revision C

Date August 1979

SECTION I. MATERIAL IDENTIFICATION				
<p>MATERIAL NAME: TOLUENE OTHER DESIGNATIONS: Toluol, Methylbenzene, Phenylmethane, CH₃C₆H₅, GE Material D5B11, ASTM D362 and D841, CAS# 000 108 883 MANUFACTURER: Available from many suppliers, including Shell Chemical Co. and Sun Oil Co.</p>				
SECTION II. INGREDIENTS AND HAZARDS		Z	HAZARD DATA	
Toluene		ca 100	8-hr TWA 100 ppm (skin)* or 375 mg/m ³ Human, inhalation TLCLo 200 ppm (central nervous syst.) Rat, inhalation LCLo 4000 ppm/4 hr Rat, oral LD ₅₀ 5000 mg/kg	
<p>*ACGIH (1978); (skin) notation indicates a potential contribution to overall exposure via skin absorption. OSHA/NIOSH (1976) proposed an 8-hr TWA of 100 ppm, with a 15-minute ceiling of 200 ppm, and an action level of 50 ppm. Current OSHA TLV is 200 ppm.</p>				
SECTION III. PHYSICAL DATA				
Boiling point, 1 atm, deg F (C) — 231 (110.6)	Specific gravity (Water=1) — 0.866			
Vapor pressure @ 25 C, mm Hg — 28	Volatiles, % — 100			
Vapor density (Air=1) — 3.2	Evaporation rate (BuAc=1) — 1.9			
Solubility in water, % — 0.05	Molecular weight — 92.15			
<p>Appearance & Odor: Water white liquid with a characteristic aromatic odor, whose recognition threshold (unfatigued) is 2-5 ppm (100% of test panel). Odor detection is unsatisfactory for safety because of fatigue.</p>				
SECTION IV. FIRE AND EXPLOSION DATA			LOWER	UPPER
Flash Point and Method	Autoignition Temp.	Flammability Limits In Air		
40 F (4.4 C) Closed cup	(536 C) 997 F	% by volume	1.2	7
<p>Extinguishing Media: Carbon dioxide, dry chemical, foam, and water fog. Water may be ineffective for putting out fire, but use spray to cool fire-exposed containers. At room temperature, toluene emits vapors that can form flammable mixtures with air. It is a dangerous fire hazard and a moderate explosion hazard when exposed to heat and flame. Vapors can flow along surfaces to distant ignition sources, then flash back. Firefighters should wear self-contained breathing apparatus and eye protection when fighting toluene fires.</p>				
SECTION V. REACTIVITY DATA				
<p>Toluene is a stable material under normal storage and handling. It does not undergo hazardous polymerization. Since toluene is a flammable liquid, avoid contact with heat, sparks or open flames. Avoid contact with strong oxidizing agents. Nitric acid and toluene, especially in combination with sulfuric acid, will produce nitrated compounds which are dangerously explosive. Oxidation in air can form oxides of carbon and nitrogen.</p>				

SECTION VI. HEALTH HAZARD INFORMATION	TLV 100 ppm (skin) (See Sect. II)
<p>Vapor inhalation can produce headache and slight drowsiness at 100 ppm, fatigue, nausea and itching skin at 100-200 ppm, anesthetic effects and respiratory tract and eye irritation above 200 ppm. Absorption can occur through the skin, and liquid contact will cause defatting of the skin, with possible dermatitis from repeated or prolonged contact. Eye contact is irritating and can be damaging (corneal burns). Ingestion irritates the digestive tract and results in systemic effects from absorption.</p> <p>FIRST AID: <u>Eye Contact:</u> Immediately irrigate with water for 15 minutes. Get medical help. <u>Skin Contact:</u> Wash area with soap & water; remove contaminated clothing promptly. Get medical help if irritation persists or if large areas of skin were exposed. <u>Inhalation:</u> Remove to fresh air; restore breathing and give oxygen if needed. Get medical help! <u>Ingestion:</u> Get medical help as soon as possible! When victim is conscious, give USP mineral oil to drink. (Aspiration is a potential hazard if vomiting occurs!)</p>	
SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES	
<p>Report large spills to safety personnel. Remove ignition sources; provide explosion-proof ventilation. Those involved in clean-up must use protection against liquid contact and vapor inhalation. Pick up liquid when feasible, or absorb on vermiculite or sand and scoop up with nonsparking tools into a metal container with cover. Liquid can be flushed with a water spray to an open holding area for handling. Do not flush to sewer, to a confined space, or to a watercourse!</p> <p>DISPOSAL: Consider reclaiming by distillation or disposal via a licensed waste disposal company. Scrap may be incinerated under properly controlled conditions. Follow Federal, State and local regulations.</p>	
SECTION VIII. SPECIAL PROTECTION INFORMATION	
<p>Provide general and exhaust ventilation to meet TLV requirements. Ventilation fans & other electrical service must be nonsparking and explosion proof. Exhaust hoods should have >100 fpm face velocity and be designed to capture heavy vapors. Exposure above the TLV for nonroutine and emergency situations requires use of an organic chemical cartridge respirator up to 200 ppm; above 200 ppm a full face piece is required with an approved canister-type gas mask or self-contained breathing equipment. Safety goggles or glasses should be worn in areas of use. Impermeable (neoprene has been recommended) gloves and apron, face shield, and other protective clothing may be needed to prevent skin contact during use, especially where splashing may occur. An eyewash station should be available if splashing is possible. A safety shower and washing facilities should be available.</p>	
SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS	
<p>Store in cool, clean, well-ventilated area away from sources of heat and ignition and away from oxidizing agents. Area must meet requirements of OSHA Class IB liquid. No smoking in areas of storage or use. Nonsparking tools should be used near toluene. Use safety cans for handling small amounts. Ground and bond metal containers for liquid transfers to prevent static sparks. Protect containers from physical damage. Preplacement and periodic medical exams emphasizing the liver, kidneys, nervous system, lungs, heart and blood should be provided. At least an annual exam is recommended for workers exposed above the <u>action level</u> (50 ppm). Use of alcohol can aggravate the narcotic effect and blood effects of toluene.</p>	
<p>DATA SOURCE(S) CODE: 1-9.12.20.21.24.26</p>	<p>APPROVALS: MIS. <i>J. M. Nielsen</i> CRD Industrial Hygiene and Safety <i>[Signature]</i></p>
<p>Assignments as to the suitability of information herein for purchaser's purposes are necessary purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of such information, General Electric Company extends no warranties, makes no representations and assumes no responsibility as to the accuracy or suitability of such information for application to purchaser's intended purposes or for consequences of its use.</p>	<p>MEDICAL REVIEW: 12/79</p>

AN ACCESSION NUMBER: 1171. 9112.
CN CHEMICAL NAME: ETHYL BENZENE.
SY SYNONYMS: PHENYLETHANE. ETHYLBENZOL. NCI-C56393. UN 1175.
ETHYLBENZENE. BENZENE, ETHYL. EB. ALPHA-METHYLTOLUENE. STCC 4909163.
RN CAS NUMBER: 100-41-4.

REG. TOXIC NUMBER: DA0700000.

CHEMICAL FORMULA: C8H10.

PD

PHYSICAL DESCRIPTION:
CLEAR, COLORLESS LIQUID WITH AN AROMATIC ODOR.

MOL WT:	106.17
BOILING PT:	277 F (136 C)
SOLUBILITY:	0.015%
FLASH PT:	59 F (15 C)
VAPOR PRES:	7.1 MMHG
MELT PT:	-139 F (-95 C)
UEL IN AIR:	6.7%
LEL IN AIR:	0.8%
MEC IN AIR:	810 F (432 C)
SPEC GRAVITY:	0.867
VAPOR DENSITY:	3.7
ODOR THRESHOLD:	140 PPM
OCTANOL/WATER CO-EFFICIENT:	3.15.

EL

PERMISSABLE EXPOSURE:

100 PPM OSHA TWA; 125 PPM OSHA STEL
100 PPM ACGIH TWA; 125 PPM ACGIH STEL
100 PPM NIOSH RECOMMENDED 10 HR TWA; 125 PPM 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. SYMPTOMS MAY INCLUDE A SENSE OF
CHEST CONSTRICTION AND FUNCTIONAL NERVOUS DISORDERS. SKIN CONTACT MAY
RESULT IN FIRST AND SECOND DEGREE BURNS.

THE ODOR CAN BE DETECTED AT 140 PPM AND IRRITATION OCCURS AT
200 PPM; THESE ARE CONSIDERED TO BE ADEQUATE WARNING PROPERTIES. THE
THRESHOLD LIMIT VALUE WAS SET TO PREVENT SKIN AND EYE IRRITATION.
PERSONS WITH PRE-EXISTING SKIN DISORDERS OR IMPAIRED PULMONARY,
KIDNEY OR LIVER FUNCTION MAY BE AT INCREASED RISK FROM EXPOSURE.

ETHYL BENZENE MAY CROSS THE PLACENTA.
IHL-HMN TCLO: 100 PPM/8H ORL-RAT LD50: 3500 MG/KG
SKN-RBT LD50: 17,800 MG/KG IPR-MUS LD50: 2272 MG/KG
IHL-RAT LCLO: 4000 PPM/4H IHL-MUS LDLO: 50 GM/M3/2H
IHL-GPG LCLO: 10,000 PPM
SKIN AND EYE IRRITATION DATA (RTECS)
SKN-RBT 15 MG/24H MLD EYE-RBT 100 MG

OSHA STANDARD 1910.1200 HAZARD COMMUNICATION 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.

DANGEROUS EXPOSURE:
2000 PPM OSHA/NIOSH
CLEAR, COLORLESS LIQUID WITH A.

IC
INCOMPATIBILITIES:
ETHYL BENZENE: ACIDS (STRONG): POSSIBLE VIOLENT REACTION. AMMONIA: POSSIBLE VIOLENT REACTION. 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.

CL
CLOTHING:
FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":
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.
-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.) -
AROMATIC HYDROCARBONS: EXCELLENT/GOOD: VITON GOOD/FAIR: CHLORINATED POLYETHYLENE VITON/NEOPRENE POOR/FAIR: BUTYL/NEOPRENE POOR: NATURAL RUBBER NEOPRENE NITRILE+POLYVINYL CHLORIDE POLYETHYLENE POLYVINYL CHLORIDE *** THERE IS A WIDE VARIATION IN RATINGS FOR THE FOLLOWING MATERIALS *** BUTYL RUBBER NITRILE RUBBER POLYVINYL ALCOHOL.

WEAR EYE PROTECTION TO PREVENT:

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.

EMPLOYEE SHOULD WASH:

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.

WORK CLOTHING SHOULD BE CHANGED DAILY:

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.

REMOVE CLOTHING:

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.

THE FOLLOWING EQUIPMENT SHOULD BE AVAILABLE:

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 (UPPER LIMIT DEVICES PERMITTED):

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 FRONTOR 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 FRONTOR 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.

MS

MEDICAL SURVEILLANCE:

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.

OSHA: 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.

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).

RE

ROUTE OF ENTRY:

INHALATION. INGESTION. SKIN ABSORPTION. SKIN OR EYE CONTACT.

TO

TARGET ORGANS:

EYES. SKIN. RESPIRATORY SYSTEM. CENTRAL NERVOUS SYSTEM.

GASTROINTESTINAL. LIVER.

SP

SYMPTOMS:

SKIN, COVERING OF BODY (SC0174);

IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).

EYE, ORGAN OF SIGHT (SC0170);

IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).

MUCOUS MEMBRANE, MEMBRANE LINING PASSAGES/CAVITIES (SC0109);

IRRITATION, EXTREME REACTION TO A CONDITION (SC0090). COUGHING, FORCEFUL EXPIRATION (SC0173). FATIGUE, TIREDNESS, SLUGGISH (SC0066). DEPRESSION

DECREASE IN ACTIVITY/FUNCTION (SC0043). DIZZINESS, FEELING FAINT,

LIGHT-HEADED, UNSTEADY(SC0048). VERTIGO, FEELING OF WHIRLING MOTION

(SC0163). DYSPNEA, DIFFICULTY IN BREATHING (SC0052). HEADACHE, PAIN IN

HEAD OR CRANIUM AREA (SC0075). NARCOSIS, STUPOR OR SLEEP DUE TO NARCOTIC

(SC0113). SLEEPINESS, DROWSINESS (SC0150). IRRITABILITY, QUICK

EXCITABILITY TO ANNOYANCE (SC0091).

SKIN, COVERING OF BODY (SC0174);

INFLAMMATION, EXTREME INFLAMMATORY TISSUE REACTION (SC0086).

SKIN, COVERING OF BODY (SC0174);

BURNS, TISSUE DAMAGE FROM HEAT (SC0175). LACRIMATION, DISCHARGE OF TEARS (SC0096).

ABDOMINAL, SECTION BETWEEN THORAX AND PELVIS (SC0750);

PAIN, SUFFERING, EITHER PHYSICAL OR MENTAL (SC0182). NAUSEA, SICKNESS AT THE STOMACH (SC0115). VOMITING, PERTAINING TO NAUSEA (SC0166).

PULARY, PERTAINING TO THE RESPIRATORY TRACT (SC0500);

HEMORRHAGE, BLEEDING (SC0080).
PULMONARY, PERTAINING TO THE RESPIRATORY TRACT (SC0500);
EDEMA, FLUID RETENTION WITH SWELLING (SC0181). COMA, STATE OF DEEP
UNCONSCIOUSNESS (SC0583).
RESPIRATORY, PERTAINING TO THE LUNGS (SC0142);
PARALYSIS, LOSS OF POWER OF VOLUNTARY MOVEMENT (SC0124).
LIVER, BILE-SECRETING GLANDULAR ORGAN (SC0620);
EFFECTS, SIGNS AND SYMPTOMS (SC0579).
KIDNEY, POST-PERITONEUM ORGAN FOR URINE WASTE(SC0094);
EFFECTS, SIGNS AND SYMPTOMS (SC0579).
BLOOD, FLUID WHICH CARRIES NUTRIMENT AND OXYGEN TO BODY CELLS (SC0769);
EFFECTS, SIGNS AND SYMPTOMS (SC0579).
REPRODUCTIVE EFFECTS, BIRTH DEFECTS (SC0281);
IN EXPERIMENTAL ANIMALS, (SC0212).

FA

FIRST AID.

(1 OF 6)

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.

(2 OF 6)

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.

(3 OF 6)

IF THIS CHEMICAL HAS BEEN INHALED, REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

(4 OF 6)

INGESTION OF PETROLEUM DISTILLATES/HYDROCARBONS: EMERGENCY TREATMENT - PREVENT ASPIRATION. IF AMOUNT INGESTED EXCEEDS 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.).

(5 OF 6)

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.

ENTER DOCUMENT SELECTION. : 2-14

2

IN ACCESSION NUMBER: 322. 9112.

CN CHEMICAL NAME: BENZENE.

SY SYNONYMS: BENZOL. CYCLOHEXATRIENE. COAL TAR NAPHTHA. PHENYL HYDRIDE.

NCI-C55276. BENZINE. BENZOLE. ANNULENE. (6)ANNULENE. UN 1114.

BENZOLENE. BICARBURET OF HYDROGEN. CARBON OIL. COAL NAPHTHA. STCC

4908110. MOTOR BENZOL. RCRA U019. PHENE. PYROBENZOL. PYROBENZOLE.

RN CAS NUMBER: 71-43-2.

REG. TOXIC NUMBER: CY1400000.

CHEMICAL FORMULA: C6H6.

PHYSICAL DESCRIPTION:

COLORLESS TO LIGHT YELLOW LIQUID WITH AN AROMATIC ODOR.

MOL WT:	78.08
BOILING PT:	176 F (80 C)
SOLUBILITY:	0.18% @ 25 C
FLASH PT:	12 F (-11 C)
VAPOR PRES:	74.6 MMHG
MELT PT:	42 F (6 C)
UEL IN AIR:	7.9%
LEL IN AIR:	1.3%
MEC IN AIR:	928 F (498 C)
SPEC GRAVITY:	0.877
VAPOR DENSITY:	2.8
ODOR THRESHOLD:	1.5 - 5 PPM
OCTANOL/WATER CO-EFFICIENT:	2.13.

PERMISSABLE EXPOSURE:

1 PPM OSHA TWA; 5 PPM OSHA 15 MIN STEL; 0.5 PPM OSHA ACTION LEVEL
10 PPM ACGIH TWA; (NOIC 90-91); ACGIH A2 - SUSPECTED HUMAN CARCINOGEN
0.1 PPM NIOSH RECOMMENDED 10 HR TWA; 1 PPM NIOSH RECOMMENDED STEL
OSHA CARCINOGEN; KNOWN HUMAN CARCINOGEN (NTP)

HUMAN SUFFICIENT EVIDENCE FOR CARCINOGENICITY (IARC GROUP-1)

ANIMAL SUFFICIENT EVIDENCE FOR CARCINOGENICITY (IARC GROUP-1)

HUMAN CARCINOGEN (EPA - CATEGORY A)

REPRODUCTIVE EFFECTS DATA (RTECS); MUTAGENIC DATA (RTECS)

TUMORIGENIC DATA (RTECS)

AQUATIC TOXICITY RATING 2 (TLM96 10-100 PPM)

BLUEGILLS 24.49 PPM

CERCLA HAZARD RATINGS - TOXICITY 3 - IGNITABILITY 3 - REACTIVITY 0 -
PERSISTENCE 1TOXICOLOGY: BENZENE IS A SKIN AND EYE IRRITANT. IT IS MODERATELY
TOXIC BY INGESTION AND SLIGHTLY TOXIC BY INHALATION. BENZENE IS A
CENTRAL NERVOUS SYSTEM DEPRESSANT AND BONE MARROW DEPRESSANT.POISONING MAY ALSO AFFECT THE IMMUNE, HEMATOPOIETIC AND NERVOUS
SYSTEMS. EXPOSURE MAY CAUSE WEAKNESS, SOMETIMES PRECEDED BY A BRIEF
PERIOD OF EUPHORIA, CARDIAC ARRHYTHMIAS AND COMA. CHRONIC EXPOSURE
MAY CAUSE DECREASED BLOOD PRESSURE, INCREASED SERUM BILIRUBIN LEVELS,
APLASTIC ANEMIA AND IMMUNOSUPPRESSION. EPIDEMIOLOGICAL STUDIES HAVE
ESTABLISHED A RELATIONSHIP BETWEEN PROLONGED BENZENE EXPOSURE AND
LEUKEMIA.

THE THRESHOLD LIMIT VALUE WAS ESTABLISHED TO PREVENT TOXIC EFFECTS.

PERSONS WITH CERTAIN IMMUNOLOGICAL TENDENCIES MAY BE AT INCREASED RISK.

ALCOHOLIC BEVERAGES MAY INCREASE TOXIC EFFECTS. STIMULANTS, SUCH AS EPINEPHRINE, MAY CAUSE CARDIAC ARRHYTHMIAS.

ORL-MAN LDLO: 50 MG/KG IHL-MAN TCLO: 150 PPM/1Y-I
IHL-MAN LCLO: 2 PPH/5M IHL-HMN LCLO: 2000 PPM/5M
IHL-HMN TCLO: 100 PPM IHL-HMN LCLO: 65 MG/M3/5Y
ORL-RAT LD50: 3306 MG/KG ORL-MUS LD50: 4700 MG/KG
IHL-RAT LC50: 10,000 PPM/7H IHL-MUS LC50: 9980 PPM
IPR-RAT LD50: 2890 UG/KG IPR-MUS LD50: 340 MG/KG
ORL-DOG LDLO: 2000 MG/KG IHL-CAT LCLO: 170,000 MG/KG

OSHA STANDARD 1910.1200 HAZARD COMMUNICATION 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.

DANGEROUS EXPOSURE:
3000 PPM POTENTIAL
CARCINOGENOSHA/NIOSH
COLORLESS TO LIGHT YELLOW LIQU.

INCOMPATIBILITIES:
SEND BACK AREA EXCEEDED. ACIDS (STRONG): INCOMPATIBLE ALLYL CHLORIDE WITH DICHLOROETHYL ALUMINUM OR ETHYLALUMINUM SESQUICHLORIDE: POSSIBLE EXPLOSION ARSENIC PENTAFLUORIDE + POTASSIUM METHOXIDE: EXPLOSIVE INTERACTION BASES (STRONG): INCOMPATIBLE BROMINE PENTAFLUORIDE: FIRE AND EXPLOSION HAZARD BROMINE TRIFLUORIDE: POSSIBLE EXPLOSION OR IGNITION BROMINE + IRON: INCOMPATIBLE CHLORINE: EXPLOSION IN THE PRESENCE OF LIGHT CHLORINE TRIFLUORIDE: VIOLENT REACTION WITH POSSIBLE EXPLOSION CHROMIC ANHYDRIDE (POWDERED): IGNITION DIBORANE: SPONTANEOUSLY EXPLOSIVE REACTION IN AIR DIOXYGEN DIFLUOROBORATE: IGNITION REACTION DIOXYGENYL TETRAFLUOROBORATE: IGNITION REACTION INTERHALOGEN COMPOUNDS: IGNITION OR EXPLOSION IODINE HEPTAFLUORIDE: IGNITION ON CONTACT IODINE PENTAFLUORIDE: VIOLENT INTERACTION ABOVE 50 C NITRIC ACID: VIOLENT OR EXPLOSIVE UNLESS PROPERLY AGITATED AND COOLED NITRYL PERCHLORATE: EXPLOSIVE INTERACTION OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD OXYGEN (LIQUID): EXPLOSIVE MIXTURE OZONE: FORMATION OF GELATINOUS OZONIDE PERCHLORATES (METAL): FORMATION OF EXPLOSIVE COMPLEX.

CLOTHING:

29CFR1910.1028 BENZENE PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT SHALL BE WORN WHERE APPROPRIATE TO PREVENT EYE CONTACT AND LIMIT DERMAL EXPOSURE TO LIQUID BENZENE. PROTECTIVE CLOTHING AND EQUIPMENT SHALL BE PROVIDED BY THE EMPLOYER AT NO COST TO THE EMPLOYEE AND THE EMPLOYER SHALL ASSURE ITS USE WHERE APPROPRIATE.

-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.) -

BENZENE: EXCELLENT/GOOD: NONE INDICATED GOOD/FAIR: VITON/NEOPRENE BUTYL/NEOPRENE POLYVINYL ACETATE SILVERSHIELD POOR/FAIR: CHLORINATED

POLYETHYLENE VITON NEOPRENE+STYRENE-BUTADIENE RUBBER STYRENE-BUTADIENE RUBBER/NEOPRENE POOR: BUTYL RUBBER NEOPRENE NATURAL RUBBER POLYVINYL ALCOHOL POLYVINYL CHLORIDE EVA TEFLON POLYURETHANE NONWOVEN POLYETHYLENE SARANEX STYRENE-BUTADIENE RUBBER NEOPRENE/NATURAL RUBBER NITRILE+POLYVINYL CHLORIDE NITRILE RUBBER POLYETHYLENE.

WEAR EYE PROTECTION TO PREVENT:

29CFR1910.1028 BENZENE EYE AND FACE PROTECTION SHALL MEET THE REQUIREMENTS OF 29CFR1910.133.

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.

EMPLOYEE SHOULD WASH:

NO SPECIFIC REGULATIONS UNDER 29CFR1910.

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

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

WORK CLOTHING SHOULD BE CHANGED DAILY:

NO SPECIFIC REGULATIONS UNDER 29CFR1910.

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

NOT REQUIRED.

REMOVE CLOTHING:

NO SPECIFIC REGULATIONS UNDER 29CFR1910.

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

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.

THE FOLLOWING EQUIPMENT SHOULD BE AVAILABLE:

NO SPECIFIC REGULATIONS UNDER 29CFR1910.

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 (UPPER LIMIT DEVICES PERMITTED):

BENZENE

THE FOLLOWING RESPIRATORS ARE THE MINIMUM LEGAL REQUIREMENT AS SET FORTH BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION FOUND IN 29CFR1910, SUBPART Z. LESS THAN OR EQUAL TO 10 PPM - HALF-MASK

AIR-PURIFYING RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE LESS THAN OR EQUAL TO 50 PPM - FULL FACEPIECE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGES -

FULL FACEPIECE GAS MASK WITH CHIN-STYLE CANISTER LESS THAN OR EQUAL TO 100 PPM - FULL FACEPIECE POWERED AIR-PURIFYING RESPIRATOR WITH ORGANIC

VAPOR CANISTER LESS THAN OR EQUAL TO 1000 PPM - SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE IN POSITIVE-PRESSURE MODE GREATER THAN 1000 PPM OR

UNKNOWN CONCENTRATION - SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE IN POSITIVE PRESSURE MODE - FULL FACEPIECE POSITIVE PRESSURE

SUPPLIED-AIR RESPIRATOR WITH AUXILIARY SELF-CONTAINED AIR SUPPLY ESCAPE - ANY ORGANIC VAPOR GAS MASK - ANY SELF-CONTAINED BREATHING APPARATUS

WITH A FULL FACEPIECE FIREFIGHTING - FULL FACEPIECE SELF-CONTAINED BREATHING APPARATUS IN POSITIVE PRESSURE MODE 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 OR NIOSH CRITERIA DOCUMENTS.

ANY DETECTABLE CONC

- 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

ESCAPE

- GAS MASK WITH AN ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONTOR 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.

MS

MEDICAL SURVEILLANCE:

BENZENE 29CFR1910.1028(I) MEDICAL SURVEILLANCE THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REQUIRES EMPLOYERS TO PROVIDE A MEDICAL SURVEILLANCE PROGRAM FOR EMPLOYEES. (1) EMPLOYEES COVERED. (A) EMPLOYEES WHO ARE OR MAY BE EXPOSED TO BENZENE AT OR ABOVE THE ACTION LEVEL 30 OR MORE DAYS PER YEAR. (B) EMPLOYEES WHO ARE OR MAY BE EXPOSED TO BENZENE AT OR ABOVE THE PELS 10 OR MORE DAYS A YEAR. (C) EMPLOYEES WHO HAVE BEEN EXPOSED TO MORE THAN 10 PPM OF BENZENE FOR 30 OR MORE DAYS IN A YEAR PRIOR TO THE EFFECTIVE DATE OF THE STANDARD. (D) EMPLOYEES INVOLVED IN THE TIRE BUILDING OPERATIONS CALLED TIRE BUILDING MACHINE OPERATORS, WHO USE SOLVENTS CONTAINING GREATER THAN 0.1 PERCENT BENZENE. (2) INITIAL EXAMINATION. (A) A DETAILED OCCUPATIONAL HISTORY WHICH INCLUDES: (1) PAST WORK EXPOSURE TO BENZENE AND OTHER HEMATOLOGICAL TOXINS; (2) A FAMILY HISTORY OF BLOOD DYSCRASIAS INCLUDING HEMATOLOGICAL NEOPLASMS; (3) A HISTORY OF BLOOD DYSCRASIAS INCLUDING GENETIC HEMOGLOBIN ABNORMALITIES, BLEEDING ABNORMALITIES, ABNORMAL FUNCTION OF FORMED BLOOD ELEMENTS; (4) A HISTORY OF RENAL OR LIVER DYSFUNCTION; (5) A HISTORY OF MEDICINAL DRUGS ROUTINELY TAKEN; (6) A HISTORY OF PREVIOUS EXPOSURE TO IONIZING RADIATION, AND (7) EXOSURE TO MARROW TOXINS OUTSIDE OF THE ORK SITUATION. (B) COMPLETE PHYSICAL EXAMINATION. (C) LABORATORY TESTS (1) A COMPLETE BLOOD COUNT INCLUDING A LEUKOCYTE COUNT WITH DIFFERENTIAL (2) QUANTITATIVE THROMBOCYTE COUNT (3) HEMATOCRIT (4) HEMOGLOBIN (5) ERYTHROCYTE COUNT (6) ERYTHROCYTE INDICES (MCV,MCH,MCHC) (D) ADDITIONAL TEST AS NECESSARY IN THE OPINION OF THE EXAMINING PHYSICIAN AND; (E) FOR ALL WORKERS REQUIRED TO WEAR RESPIRATORS AT LEAST 30 DAYS OR MORE A YEAR, THE PHYSICAL EXAM SHALL PAY SPECIAL ATTENTION TO THE CARDIOPULMONARY SYSTEM AND SHALL INCLUDE A PULMONARY FUNCTION TEST. (3) PERIODIC EXAMINATIONS. (A) THE EMPLOYER SHALL PROVIDE EACH COVERED EMPLOYEE WITH A MEDICAL EXAM ANNUALLY FOLLOWING THE PREVIOUS EXAM. THESE PERIODIC EXAMS SHALL INCLUDE AT LEAST THE FOLLOWING: (1) BRIEF HISTORY REGARDING NEW EXPOSURE TO POTENTIAL MARROW TOXINS, CHANGES IN DRUG USE AND THE APPEARANCE OF PHYSICAL SIGNS RELATING TO BLOOD DISORDERS; (2) A COMPLETE BLOOD COUNT INCLUDING A LEUKOCYTE COUNT WITH DIFFERENTIAL; (3)

QUANTITATIVE THROMBOCYTE COUNT; (4) HEMOGLOBIN; (5) HEMATOCRIT; (6) ERYTHROCYTE COUNT; (7) ERYTHROCYTE INDICES (MCV, MCH, MCHC) AND (8) APPROPRIATE ADDITIONAL TESTS AS NECESSARY, IN THE OPINION OF THE EXAMINING PHYSICIAN, IN CONSEQUENCE OF. (A) ALTERATIONS IN BLOOD COMPONENTS OR OTHER SIGNS WHICH MAY BE RELATED TO BENZENE EXPOSURE; (B) THE EMPLOYEE DEVELOPING SIGNS AND SYMPTOMS ASSOCIATED WITH BENZENE POISONING; (C) REQUIRED USE OF RESPIRATORS FOR AT LEAST 30 DAYS A YEAR, PULMONARY FUNCTION TEST SHALL BE PERFORMED EVERY 3 YEARS ALONG WITH A SPECIFIC EVALUATION OF THE CARDIOVASCULAR SYSTEM. (4) EMERGENCY EXAMINATIONS. IF AN EMPLOYEE IS EXPOSED TO BENZENE IN AN EMERGENCY SITUATION, THE EMPLOYEE SHALL PROVIDE A URINE SAMPLE AT THE END OF THE SHIFT AND HAVE A URINE PHENOL TEST PERFORMED ON THE SAMPLE WITHIN 72 HOURS. (A) IF THE RESULT OF THE TEST IS BELOW 75 MG PHENOL/L OF URINE, NO FURTHER TESTING IS REQUIRED. (B) IF THE RESULT OF THE URINARY PHENOL TEST IS EQUAL TO OR GREATER THAN 75 MG PHENOL/L OF URINE, THE EMPLOYER SHALL PROVIDE THE EMPLOYEE WITH: (1) A COMPLETE BLOOD COUNT INCLUDING AN ERYTHROCYTE COUNT; (2) A LEUKOCYTE COUNT WITH DIFFERENTIAL AND (3) A THROMBOCYTE COUNT AT MONTHLY INTERVALS FOR A DURATION OF THREE MONTHS FOLLOWING THE EMERGENCY EXPOSURE. (5) ADDITIONAL EXAMINATIONS AND REFERRALS. (A) WHERE THE COMPLETE BLOOD COUNT RESULTS INDICATE ANY OF THE FOLLOWING ABNORMAL CONDITIONS EXIST, THEN THE BLOOD COUNT SHALL BE REPEATED WITHIN TWO WEEKS. (1) IF THE HEMOGLOBIN LEVEL OR HEMATOCRIT FALLS BELOW THE NORMAL LIMIT AND/OR THESE INDICES SHOW A PERSISTENT DOWNWARD TREND FROM PRE-EXPOSURE NORMS; (2) THE THROMBOCYTE COUNT VARIES MORE THAN 20 PERCENT BELOW THE MOST RECENT VALUE OR FALLS OUTSIDE THE NORMAL LIMIT; (3) THE LEUKOCYTE COUNT IS BELOW 4,000 MM3 OR THERE IS AN ABNORMAL DIFFERENTIAL COUNT;

(A) IF THE ABNORMALITY PERSISTS, THE PHYSICIAN SHALL REFER THE EMPLOYEE TO A HEMATOLOGIST/ INTERNIST FOR FURTHER EVALUATION UNLESS THE PHYSICIAN BELIEVES SUCH A REFERRAL IS UNNECESSARY. (B) THE EMPLOYER SHALL PROVIDE THE HEMATOLOGIST/INTERNIST WITH ALL AVAILABLE MEDICAL RECORDS ON THE EMPLOYEE. (C) THE HEMATOLOGIST'S OR INTERNIST'S EVALUATION SHALL INCLUDE A DETERMINATION AS TO THE NEED FOR ADDITIONAL TESTS AND THE EMPLOYER SHALL ASSURE THESE TESTS ARE PROVIDED.

(6) INFORMATION PROVIDED TO THE PHYSICIAN. (A) A COPY OF THIS REGULATION AND ITS APPENDICES; (B) A DESCRIPTION OF THE AFFECTED EMPLOYEE'S DUTIES AS THEY RELATE TO EXPOSURE; (C) THE EMPLOYEE'S ACTUAL OR REPRESENTATIVE EXPOSURE LEVEL; (D) A DESCRIPTION OF ANY PERSONAL PROTECTIVE EQUIPMENT USED OR TO BE USED AND (E) INFORMATION FROM PREVIOUS EMPLOYMENT-RELATED MEDICAL EXAMS OF THE AFFECTED EMPLOYEE WHICH IS NOT OTHERWISE AVAILABLE TO THE EXAMINING PHYSICIAN. (7) PHYSICIANS WRITTEN OPINION. FOR EACH EXAM THE EMPLOYER SHALL OBTAIN AND PROVIDE THE EMPLOYEE WITH A COPY OF THE PHYSICIANS WRITTEN OPINION WITHIN 15 DAYS OF THE EXAM. THE WRITTEN OPINION SHALL BE LIMITED TO THE FOLLOWING: (A) THE OCCUPATIONALLY PERTINENT RESULTS OF THE MEDICAL EXAM AND TESTS; (B) PHYSICIANS OPINION CONCERNING WHETHER THE EMPLOYEE HAS ANY DETECTED MEDICAL CONDITIONS WHICH WOULD PLACE THE EMPLOYEE AT INCREASED RISK FROM EXPOSURE; (C) PHYSICIANS RECOMMENDED LIMITATIONS UPON THE EMPLOYEE'S EXPOSURE TO BENZENE OR UPON THE EMPLOYEE'S USE OF PROTECTIVE CLOTHING OR EQUIPMENT AND RESPIRATORS; AND (D) A STATEMENT THAT THE EMPLOYEE HAS BEEN INFORMED BY THE PHYSICIAN OF THE RESULTS OF THE EXAM AND ANY MEDICAL CONDITION RESULTING FROM BENZENE EXPOSURE WHICH REQUIRE FURTHER EXPLANATION OR TREATMENT. THIS STATEMENT SHALL NOT REVEAL SPECIFIC RECORDS, FINDINGS AND DIAGNOSES THAT HAVE NO BEARING ON THE EMPLOYEE'S ABILITY TO WORK IN A BENZENE-EXPOSED WORKPLACE. (8) MEDICAL REMOVAL PLAN. (A) WHEN AN EMPLOYEE HAS BEEN REFERRED TO A HEMATOLOGIST/INTERNIST THE EMPLOYEE SHALL BE REMOVED FROM AREAS WHERE EXPOSURES MAY EXCEED THE ACTION LEVEL UNTIL A DECISION IS MADE BY THE PHYSICIAN IN CONSULTATION WITH THE HEMATOLOGIST/INTERNIST TO

ALLOW THE EMPLOYEE TO RETURN. THIS DECISION SHALL BE GIVEN IN WRITING TO THE EMPLOYER AND EMPLOYEE. IN CASE OF REMOVAL, THE PHYSICIAN SHALL STATE THE PROBABLE DURATION OF REMOVAL AND THE REQUIREMENTS FOR FUTURE MEDICAL EXAMS TO REVIEW THE DECISION. (B) FOR ANY EMPLOYEE WHO IS REMOVED, THE EMPLOYER SHALL PROVIDE A FOLLOW-UP EXAM. WITHIN SIX MONTHS A DECISION SHALL BE MADE BY THE PHYSICIAN, IN CONSULTATION WITH THE HEMATOLOGIST/INTERNIST AS TO WHETHER THE EMPLOYEE SHALL BE RETURNED TO THE USUAL JOB OR SHOULD BE REMOVED PERMANENTLY. (C) IF AN EMPLOYEE IS TEMPORARILY REMOVED, THE EMPLOYER SHALL TRANSFER THE EMPLOYEE TO A COMPARABLE JOB THAT IS EXPOSED IN NO EVENT TO BENZENE LEVELS HIGHER THAN THE ACTION LEVEL. THE EMPLOYER SHALL MAINTAIN THE EMPLOYEE'S CURRENT WAGE RATE, SENIORITY AND OTHER BENEFITS. IF NO SUCH JOB IS AVAILABLE THE EMPLOYER SHALL PROVIDE MEDICAL REMOVAL PROTECTION BENEFITS UNTIL SUCH A JOB BECOMES AVAILABLE OR FOR SIX MONTHS, WHICHEVER COMES FIRST. (D) IF AN EMPLOYEE IS PERMANENTLY REMOVED FROM BENZENE EXPOSURE, THE EMPLOYEE SHALL BE GIVEN THE OPPORTUNITY TO TRANSFER TO ANOTHER POSITION WHICH IS AVAILABLE OR SHORTLY BECOMES AVAILABLE FOR WHICH THE EMPLOYEE IS QUALIFIED (OR CAN BE TRAINED FOR IN A SHORTTIME) AND WHERE BENZENE EXPOSURE IS AS LOW AS POSSIBLE - IN NO EVENT HIGHER THAN THE ACTION LEVEL. THE EMPLOYEE SHALL SUFFER NO REDUCTION IN CURRENT WAGE RATE, SENIORITY OR OTHER BENEFITS AS A RESULT OF THE TRANSFER. (9) MEDICAL REMOVAL PROTECTION BENEFITS. (A) THE EMPLOYEE SHALL RECEIVE SIX MONTHS OF MEDICAL REMOVAL PROTECTION BENEFITS IMMEDIATELY FOLLOWING EACH OCCASION AN EMPLOYEE IS REMOVED FROM EXPOSURE BECAUSE OF HEMATOLOGICAL FINDINGS UNLESS THE EMPLOYEE HAS BEEN TRANSFERRED TO A COMPARABLE JOB WHERE BENZENE EXPOSURE IS BELOW ACTION LEVEL. (B) FOR THE PURPOSES OF THIS SECTION, THE REQUIREMENT THAT AN EMPLOYER PROVIDE MEDICAL REMOVAL PROTECTION BENEFITS MEANS THAT THE EMPLOYER SHALL MAINTAIN THE WAGE RATE, SENIORITY AND OTHER BENEFITS OF AN EMPLOYEE AS THOUGH THE EMPLOYEE HAD NOT BEEN REMOVED. (C) THE EMPLOYERS OBLIGATION TO PROVIDE MEDICAL REMOVAL PROTECTION BENEFITS TO A REMOVED EMPLOYEE SHALL BE REDUCED TO THE EXTENT THAT THE EMPLOYEE RECEIVES COMPENSATION FOR LOST EARNINGS FROM A PUBLICLY OR AN EMPLOYER-FUNDED COMPENSATION PROGRAM, OR FROM EMPLOYMENT WITH ANOTHER EMPLOYER MADE POSSIBLE BY VIRTUE OF THE EMPLOYEE'S REMOVAL. ACGIH BIOLOGICAL EXPOSURE INDICES FOR BENZENE: 50 MG/L TOTAL PHENOL IN URINE / TIMING -END OF SHIFT 0.08 PPM BENZENE IN MIXED EXHALED AIR / TIMING --PRIOR TO NEXT SHIFT 0.12 PPM BENZENE IN EXHALED AIR / TIMING -PRIOR TO NEXT SHIFT.

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).

ROUTE OF ENTRY:

INHALATION. SKIN ABSORPTION. INGESTION. SKIN OR EYE CONTACT.

TARGET ORGANS:

BLOOD. CENTRAL NERVOUS SYSTEM. SKIN. BONE MARROW. EYES. RESPIRATORY SYSTEM.

SYMPTOMS:

SKIN, COVERING OF BODY (SC0174);
IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).
EYE, ORGAN OF SIGHT (SC0170);
IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).
MUCOUS MEMBRANE, MEMBRANE LINING PASSAGES/CAVITIES (SC0109);
IRRITATION, EXTREME REACTION TO A CONDITION (SC0090). NAUSEA, SICKNESS

AT THE STOMACH (SC0115). VOMITING, PERTAINING TO NAUSEA (SC0166). HEADACHE, PAIN IN HEAD OR CRANIUM AREA (SC0075). DIZZINESS, FEELING FAINT, LIGHT-HEADED, UNSTEADY (SC0048). DROWSINESS, FALLING ASLEEP (SC0049). WEAKNESS, LACK OF STRENGTH (SC0167). EUPHORIA, AN EXAGGERATED FEELING OF WELL-BEING (SC0061). IRRITABILITY, QUICK EXCITABILITY TO ANNOYANCE (SC0091). MALAISE, UNEASINESS, DISCOMFORT, FEELING BAD (SC0106). CONFUSION, IN A BEWILDERED STATE (SC0030). ATAXIA, MUSCULAR INCOORDINATION (SC0013). INCOORDINATION, LACK OF COORDINATION (SC0085). CHEST, THE THORAX (SC0754); PAIN, SUFFERING, EITHER PHYSICAL OR MENTAL (SC0182). DYSPNEA, DIFFICULTY IN BREATHING (SC0052). PALLOR, PALENESS, AS OF THE SKIN (SC0122). CYANOSIS, DARK BLUE/PURPLE SKIN COLOR (SC0038). TINNITUS, RINGING IN EARS (SC0308). BLURRED VISION, (SC0015). DELIRIUM, STATE OF DISORIENTATION, CONFUSION (SC0288). CARDIAC, PERTAINING TO HEART (SC0023); ARRHYTHMIA, ABSENCE OF RHYTHM; IRREGULARITY (SC0010). ANESTHESIA, LOSS OF SENSATION (SC0005). PARALYSIS, LOSS OF POWER OF VOLUNTARY MOVEMENT (SC0124). TREMORS, TREMBLING, SHAKING (SC0197). CONVULSIONS, SUDDEN MUSCLE CONTRACTIONS (SC0034). POLYNEURITIS, INFLAMMATION OF MANY NERVES (SC0624). ANOREXIA, DIMINISHED APPETITE (SC0006). INSOMNIA, INABILITY TO OBTAIN NORMAL SLEEP (SC0088). AGITATION, JERKING OF ARMS (SC0003). ERYTHEMA, REDNESS, SPOTS ON SKIN (SC0060). APLASTIC ANEMIA, ANEMIA FROM BONE MARROW DAMAGE (SC0285). ASPHYXIA, SUFFOCATION (SC0011). CENTRAL NERVOUS SYSTEM, PERTAINING TO NEURAL BODY SYSTEM (SC0028); DEPRESSION, DECREASE IN ACTIVITY/FUNCTION (SC0043). VENTRICULAR FIBRILLATION, RAPID CONTRACTIONS OF VENTRICLES (SC0162). FATIGUE, TIREDNESS, SLUGGISH (SC0066). FEVER, BODY TEMPERATURE ABOVE NORMAL (SC0067). HYPOTENSION, LOW BLOOD PRESSURE (SC0180). TACHYCARDIA, ABNORMAL RAPID HEARTBEAT (SC0158). CEREBRAL, PERTAINING TO CEREBRUM (BRAIN) (SC0024); ATROPHY, WASTING FROM MALNUTRITION (SC0196). BLOOD CHANGES, CHANGES IN BLOOD CELLS OR MORPHOLOGY (SC0227). BRUISE, IMPACT INJURY WITHOUT LACERATION (SC0779). HEMOLYSIS, BLOOD DISSOLUTION, DESTRUCTION (SC0195). LEUKEMIA, CANCER OF BLOOD CELL PRODUCTION (SC0100). CARCINOMA, MALIGNANT CANCEROUS GROWTH (SC0365); IN EXPERIMENTAL ANIMALS, (SC0212). MENSTRUAL DISORDERS, DISTURBANCE IN MENSES (SC0752). REPRODUCTIVE EFFECTS, BIRTH DEFECTS (SC0281); IN EXPERIMENTAL ANIMALS, (SC0212). RESPIRATORY, PERTAINING TO THE LUNGS (SC0142); FAILURE, LOSS OF FUNCTION (SC0386). CIRCULATORY, PERTAINING TO CIRCULATION (SC0613); COLLAPSE, EXTREME PROSTRATION (SC0029).

A
FIRST AID.

(1 OF 5)

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.

(2 OF 5)

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.

OF POISONING, 12TH ED.) .

3

AN ACCESSION NUMBER: 265. 9112.

CN CHEMICAL NAME: ASBESTOS.

SY SYNONYMS: CHRYSOTILE. CROCIDOLITE. ACTINOLITE. AMOSITE.

ANTHOPHYLLITE. TREMOLITE. STCC 4945705. UN 2212. UN 2590.

RN CAS NUMBER: 1332-21-4.

REG. TOXIC NUMBER: CI6475000.

CHEMICAL FORMULA: VARIES.

PD
PHYSICAL DESCRIPTION:

FIBERS OR FILAMENTS WHICH MAY BE WHITE, BLUE, BROWN, GRAY, GREEN OR YELLOW IN COLOR.

MOL WT:	VARIES
BOILING PT:	NOT AVAILABLE
SOLUBILITY:	INSOLUBLE
FLASH PT:	NONCOMBUSTIBLE SOLID
VAPOR PRES:	NOT AVAILABLE
MELT PT:	>1832 F (>1000 C)
UEL IN AIR:	NONFLAMMABLE
LEL IN AIR:	NONFLAMMABLE
MEC IN AIR:	
SPEC GRAVITY:	2.4-3.3
VAPOR DENSITY:	
ODOR THRESHOLD:	
OCTANOL/WATER CO-EFFICIENT:.	

EL
PERMISSABLE EXPOSURE:

0.2 FIBER(>5 MICRONS IN LENGTH)/CC OSHA TWA (ALL FORMS)

0.1 FIBER (>5 MICRONS IN LENGTH)/CC OSHA ACTION LEVEL (ALL FORMS)
1 FIBER (>5 MICRONS IN LENGTH)/CC OSHA EXCURSION LIMIT
0.5 FIBER(>5 MICRONS IN LENGTH)/CC ACGIH TWA (AMOSITE)
2 FIBERS(>5 MICRONS IN LENGTH)/CC ACGIH TWA (CHRYSOTILE)
0.2 FIBER(>5 MICRONS IN LENGTH)/CC ACGIH TWA (CROCIDOLITE)
2 FIBERS(>5 MICRONS IN LENGTH)/CC ACGIH TWA (OTHER FORMS)
0.1 FIBER(>5 MICRONS IN LENGTH)/CC NIOSH REC 8 HOUR TWA (ALL FORMS)
0.5 FIBER(>5 MICRONS IN LENGTH)/CC NIOSH REC 15 MIN CEILING (ALL FORMS)
0.2 F/CC ACGIH TWA (NOTICE OF INTENDED CHANGES 1991-1992)
TUMORIGENIC DATA (RTECS); MUTAGENIC DATA (RTECS)
CERCLA HAZARD RATINGS - TOXICITY 3 - IGNITABILITY 0 - REACTIVITY 0 -
PERSISTENCE 3

OSHA CARCINOGEN; KNOWN HUMAN CARCINOGEN (NTP)
ACGIH A1-CONFIRMED HUMAN CARCINOGEN
HUMAN SUFFICIENT EVIDENCE FOR CARCINOGENICITY (IARC GROUP-1)
ANIMAL SUFFICIENT EVIDENCE FOR CARCINOGENICITY (IARC GROUP-1)
ACGIH A1-CONFIRMED HUMAN CARCINOGEN (NOTICE OF INTENDED CHANGES 91-92)
TOXICOLOGY: ASBESTOS MAY BE IRRITATING TO THE EYES, SKIN AND MUCOUS
MEMBRANES. THERE IS INSUFFICIENT DATA TO QUANTIFY THE TOXICITY.
POISONING MAY AFFECT THE LUNGS. REPEATED OR PROLONGED EXPOSURE TO
ASBESTOS MAY CAUSE ASBESTOSIS, AN INTERSTITIAL FIBROSIS OF THE LUNG
TISSUE WHICH MAY DEVELOP FULLY WITHIN 7-9 YEARS, BUT ONSET IS
TYPICALLY DELAYED 20-40 YEARS AFTER THE FIRST EXPOSURE. THE INITIAL
SYMPTOM IS A PROGRESSIVE EXERTIONAL DYSPNEA. OCCUPATIONAL EXPOSURE
TO CHRYSOTILE, AMOSITE, MIXTURES CONTAINING CROCIDOLITE, AND OTHER
FORMS OF ASBESTOS HAS RESULTED IN A HIGH INCIDENCE OF LUNG CANCER AND
PLEURAL AND PERITONEAL MESOTHELIOMAS. GASTROINTESTINAL CANCERS WERE
INCREASED IN WORKERS EXPOSED TO AMOSITE, CHRYSOTILE, OR MIXED FIBERS
CONTAINING CROCIDOLITE. THE LATENT PERIOD FOR MESOTHELIOMAS IS 3.5-
30 YEARS; FOR LUNG CANCER, 15-30 YEARS.
THE THRESHOLD LIMIT VALUE WAS ESTABLISHED BASED ON HEALTH EFFECTS
DATA.
SMOKING ENHANCES THE RISK OF LUNG CANCER.
IHL-HMN TCLO: 1.2 FIBERS/CC/19 YRS-C

OSHA STANDARD 1910.1200 HAZARD COMMUNICATION 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.

DANGEROUS EXPOSURE:
POTENTIAL CARCINOGENNIOSH
FIBERS OR FILAMENTS WHICH MAY.

INCOMPATIBILITIES:
HYDROFLUORIC ACID.

CLOTHING:
29CFR1910.1001(H) ASBESTOS THE EMPLOYER SHALL PROVIDE FOR THE EMPLOYEE,
IF EXPOSED TO ASBESTOS ABOVE THE PERMISSIBLE EXPOSURE LIMIT OR IF THE
POSSIBILITY OF EYE IRRITATION EXISTS, APPROPRIATE PROTECTIVE WORK
CLOTHING AND EQUIPMENT SUCH AS COVERALLS OR SIMILAR FULL-BODY WORK
CLOTHING, FACESHIELDS, VENTED GOGGLES OR OTHER APPROPRIATE PROTECTIVE
EQUIPMENT WHICH COMPLIES WITH 29CFR1910.133.
EMPLOYERS SHALL ENSURE THAT CLOTHING WHICH HAS HAD ANY POSSIBILITY OF

BEING CONTAMINATED 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 OPERATION OF THE HAZARDOUS PROPERTIES OF THE SUBSTANCE.

WEAR EYE PROTECTION TO PREVENT:

29CFR1910.1001(H) ASBESTOS THE EMPLOYER SHALL PROVIDE, WHERE THERE IS ANY POSSIBILITY OF EYE IRRITATION FROM ASBESTOS OCCURRING, FACESHIELDS, VENTED GOGGLES OR OTHER APPROPRIATE PROTECTIVE EQUIPMENT WHICH COMPLIES WITH 29CFR 1910.133.

EMPLOYEE SHOULD WASH:

29CFR1910.1001(H) ASBESTOS THE EMPLOYER SHALL ENSURE THAT EMPLOYEES WHO WORK IN AREAS WHERE THE AIRBORNE EXPOSURE IS ABOVE THE PERMISSIBLE EXPOSURE LIMIT TO SHOWER AT THE END OF EACH WORK SHIFT. THE EMPLOYER SHALL ENSURE THAT EMPLOYEES WHO HANDLE THIS SUBSTANCE WASH THEIR HANDS AND FACES PRIOR TO EATING, DRINKING OR SMOKING.

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 WITH SOAP OR MILD DETERGENT AND WATER TO REMOVE ANY CONTAMINANT FROM THE SKIN.

WORK CLOTHING SHOULD BE CHANGED DAILY:

29CFR1910.1001(H) ASBESTOS THE EMPLOYER SHALL PROVIDE CLEAN CHANGE ROOMS FOR EMPLOYEES WHO WORK IN AREA WHERE THEIR AIRBORNE EXPOSURE TO ASBESTOS IS ABOVE THE PERMISSIBLE EXPOSURE LIMIT. THE EMPLOYER SHALL ENSURE THAT CHANGE ROOMS ARE IN ACCORDANCE WITH 29CFR1910.141(E) AND ARE EQUIPPED WITH TWO SEPERATE LOCKERS OR STORAGE FACILITIES, SO SEPERATED AS TO PREVENT CONTAMINATION OF THE EMPLOYEE'S STREET CLOTHES FROM HIS PROTECTIVE WORK CLOTHING AND EQUIPMENT.

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL ENSURE THAT EMPLOYEES WHOSE CLOTHING MAY HAVE BECOME CONTAMINATED WITH THIS SUBSTANCE CHANGE INTO UNCONTAMINATED CLOTHING BEFORE LEAVING THE WORK PREMISES.

REMOVE CLOTHING:

29CFR1910.1001(H) ASBESTOS THE EMPLOYER SHALL ENSURE THAT EMPLOYEES REMOVE WORK CLOTHING CONTAMINATED WITH ASBESTOS ONLY IN CHANGE ROOMS PROVIDED. THE EMPLOYER SHALL ENSURE THAT NO EMPLOYEE TAKES CONTAMINATED WORK CLOTHING OUT OF THE CHANGE ROOM, EXCEPT THOSE EMPLOYEES AUTHORIZED TO DO SO FOR THE PURPOSE OF LAUNDERING, MAINTENANCE OR DISPOSAL.

THE FOLLOWING EQUIPMENT SHOULD BE AVAILABLE:

29CFR1910.1001(H) ASBESTOS WARNING SIGNS SHALL BE PROVIDED AND DISPLAYED AT EACH REGULATED AREA. IN ADDITION, WARNING SIGNS SHALL BE POSTED AT ALL APPROACHES TO REGULATED AREAS SO THAT AN EMPLOYEE MAY READ THE SIGNS AND TAKE NECESSARY PROTECTIVE STEPS BEFORE ENTERING THE AREA. THE WARNING SIGNS SHALL BEAR THE FOLLOWING INFORMATION: DANGER ASBESTOS CANCER AND LUNG DISEASE HAZARD AUTHORIZED PERSONNEL ONLY RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA WARNING LABELS SHALL BE AFFIXED TO ALL RAW MATERIALS, MIXTURES, SCRAP, WASTE, DEBRIS AND OTHER PRODUCTS CONTAINING ASBESTOS AND CONTAIN THE FOLLOWING INFORMATION: DANGER CONTAINS ASBESTOS FIBERS AVOID CREATING DUST CANCER AND LUNG DISEASE HAZARD.

RP

RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED):
ASBESTOS

THE FOLLOWING RESPIRATORS ARE THE MINIMUM LEGAL REQUIREMENTS AS SET FORTH BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION FOUND IN 29CFR1910, SUBPART Z NOT IN EXCESS OF 2 FIBERS/CC TWA - HALF-MASK AIR-PURIFYING RESPIRATOR EQUIPPED WITH HIGH-EFFICIENCY FILTERS NOT IN EXCESS OF 10 FIBERS/CC TWA - FULL FACEPIECE AIR-PURIFYING RESPIRATOR EQUIPPED WITH HIGH-EFFICIENCY FILTERS NOT IN EXCESS OF 20 FIBERS/CC TWA - ANY POWERED AIR-PURIFYING RESPIRATOR EQUIPPED WITH HIGH-EFFICIENCY FILTERS - ANY SUPPLIED-AIR RESPIRATOR OPERATED IN CONTINUOUS FLOW MODE NOT IN EXCESS OF 200 FIBERS/CC TWA - FULL FACEPIECE SUPPLIED-AIR RESPIRATOR OPERATED IN PRESSURE DEMAND MODE GREATER THAN 200 FIBERS/CC TWA OR UNKNOWN CONCENTRATION - FULL FACEPIECE SUPPLIED-AIR RESPIRATOR OPERATED IN PRESSURE DEMAND MODE AND EQUIPPED WITH AN AUXILIARY POSITIVE PRESSURE SELF-CONTAINED BREATHING APPARATUS NOTE: RESPIRATORS ASSIGNED FOR HIGHER ENVIRONMENTAL CONCENTRATIONS MAY BE USED AT LOWER CONCENTRATIONS. 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 OR NIOSH CRITERIA DOCUMENTS.

ANY DETECTABLE CONC

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

ESCAPE

- AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER
- 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.

MS

MEDICAL SURVEILLANCE:

29CFR1910.1001 THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REQUIRES EMPLOYERS TO PROVIDE A MEDICAL SURVEILLANCE PROGRAM FOR ALL EMPLOYEES WHO ARE OR WILL BE EXPOSED TO AIRBORNE CONCENTRATIONS OF FIBERS OF ASBESTOS, TREMOLITE, ANTHOPHYLLITE, ACTINOLITE, OR A COMBINATION OF THE MINERALS AT OR ABOVE THE ACTION LEVEL. THIS MEDICAL SURVEILLANCE PROGRAM SHALL CONSIST OF: (1) INITIAL (PRE-PLACEMENT) MEDICAL EXAMINATION INCLUDING: (A) MEDICAL AND WORK HISTORY (B) COMPLETE PHYSICAL EXAMINATION BY A LICENSED PHYSICIAN WITH EMPHASIS ON: (1) RESPIRATORY SYSTEM (2) CARDIOVASCULAR SYSTEM (3) DIGESTIVE TRACT (C) COMPLETION OF THE RESPIRATORY DISEASE STANDARDIZED QUESTIONNAIRE (D) CHEST ROENTGENOGRAM (P.A. OR 14" X 17") (E) PULMONARY FUNCTION TESTS INCLUDING: (1) FORCED VITAL CAPACITY (2) FORCED EXPIRATORY VOLUME (F) ADDITIONAL EXAMS DEEMED APPROPRIATE BY THE EXAMINING PHYSICIAN (2) PERIODIC EXAMINATIONS (A) ANNUAL EXAMS FOR ALL EMPLOYEES INCLUDING ALL THE TESTS IN THE INITIAL EXAM EXCEPT THE FREQUENCY OF THE CHEST ROENTGENOGRAM (B) ABBREVIATED STANDARDIZED RESPIRATORY QUESTIONNAIRE (C) CHEST ROENTGENOGRAM SHALL BE CONDUCTED IN ACCORDANCE WITH THE FOLLOWING TABLE: FREQUENCY OF CHEST ROENTGENOGRAM: AGE OF EMPLOYEE: YEARS SINCE FIRST EXPOSURE:

-----: 15-35: 35+ - 45: 45+:

0-10 YEARS: EVERY 5 YRS: EVERY 5 YRS: EVERY 5 YRS:

10+: EVERY 5 YRS: EVERY 2 YRS: EVERY 1 YR:

(3)
TERMINATION OF EMPLOYMENT EXAM - AVAILABLE UPON TERMINATION OF EMPLOYMENT GIVEN TO THE EMPLOYEE WITHIN 30 CALENDER DAYS BEFORE OR AFTER THE DATE OF TERMINATION OF EMPLOYMENT AND INCLUDING THE REQUIREMENTS OF THE PERIODIC EXAMINATION LISTED ABOVE.

OTHER MEDICAL SURVEILLANCE RECOMMENDED: 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.

ATTENTION TO SMOKING, ALCOHOL, MEDICATION, AND EXPOSURE TO CARCINOGENS. MEDICAL WARNING FOR REFUSAL OF MEDICAL EXAMINATION. SPUTUM CYTOLOGY.

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).

RE

ROUTE OF ENTRY:

INHALATION. INGESTION. SKIN OR EYE CONTACT.

TO

TARGET ORGANS:

LUNGS. RESPIRATORY SYSTEM. GASTROINTESTINAL. SKIN.

SP

SYMPTOMS:

EYE, ORGAN OF SIGHT (SC0170);

IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).

SKIN, COVERING OF BODY (SC0174);

IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).

MUCOUS MEMBRANE, MEMBRANE LINING PASSAGES/CAVITIES (SC0109);

IRRITATION, EXTREME REACTION TO A CONDITION (SC0090). COUGHING, FORCEFUL EXPIRATION (SC0173).

CHEST, THE THORAX (SC0754);

PAIN, SUFFERING, EITHER PHYSICAL OR MENTAL (SC0182).

LUNG, RESPIRATORY ORGAN (SC0377);

FIBROSIS, FIBROUS SCARS (SC0064). DYSPNEA, DIFFICULTY IN BREATHING

(SC0052). DECREASED VITAL CAPACITY, DECREASED PULMONARY FUNCTION

(SC0546). TACHYPNEA, RAPID RESPIRATION (SC0384). PULMONARY RALES,

ABNORMAL RESPIRATORY SOUNDS (SC0206). CYANOSIS, DARK BLUE/PURPLE SKIN

COLOR (SC0038). ANOREXIA, DIMINISHED APPETITE (SC0006). WEAKNESS, LACK OF STRENGTH (SC0167). WEIGHT LOSS, DROP IN BODY WEIGHT (SC0104). FINGER

CLUBBING, ROUNDED ENDS AND SWOLLEN FINGERS (SC0245). FATIGUE, TIREDNESS, SLUGGISH (SC0066). DERMATITIS, INFLAMMATION OF SKIN (SC0044).

CONJUNCTIVITIS, INFLAMMATION OF EYES (SC0031).

GASTROINTESTINAL, PERTAINING TO STOMACH & INTESTINE (SC0070);

IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).

PLEURAL, LINING OF THORACIC CAVITY (SC0759);

MESOTHELIOMA, CANCER OF PLEURA (SC0260).

UREMIA, NITROGEN IN BLOOD FROM RENAL FAILURE (SC0310);

MESOTHELIOMA, CANCER OF PLEURA (SC0260).

LUNG, RESPIRATORY ORGAN (SC0377);

CANCER, MALIGNANT TUMOR OR NEOPLASM (SC0020).

GASTROINTESTINAL, PERTAINING TO STOMACH & INTESTINE (SC0070);

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CANCER, MALIGNANT TUMOR OR NEOPLASM (SC0020).
LARYNX, VOICE ORGAN (SC0256);
CANCER, MALIGNANT TUMOR OR NEOPLASM (SC0020).

FA

FIRST AID.

(1 OF 4)

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.

(2 OF 4)

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.

(3 OF 4)

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.

(4 OF 4)

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

AN ACCESSION NUMBER: 3305. 9112.
CN CHEMICAL NAME: XYLENE.
SY SYNONYMS: DIMETHYLBENZENE. BENZENE, DIMETHYL-. XYLOL. DILAN.
NCI-C55232. UN 1307. STCC 4904350. RCRA U239.
RN CAS NUMBER: 1330-20-7.

REG. TOXIC NUMBER: ZE2100000.

CHEMICAL FORMULA: C8H10.

PD

PHYSICAL DESCRIPTION:
LIGHT-COLORED OR COLORLESS, MOBILE LIQUID WITH AN AROMATIC ODOR.

MOL WT:	106.16
BOILING PT:	280-291 F (138-144C)
SOLUBILITY:	0.00003%
FLASH PT:	81-90 F (27-32 C)
VAPOR PRES:	7-9 MMHG
MELT PT:	-54-55 F (-48-13 C)
UEL IN AIR:	7%
LEL IN AIR:	1.0%
MEC IN AIR:	867-984 F (464-529C)
SPEC GRAVITY:	0.86

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VAPOR DENSITY: 3.7
ODOR THRESHOLD: 0.5 PPM
OCTANOL/WATER CO-EFFICIENT: .

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EL

PERMISSABLE EXPOSURE:

100 PPM OSHA TWA; 150 PPM OSHA STEL

100 PPM ACGIH TWA

150 PPM ACGIH STEL

100 PPM NIOSH RECOMMENDED TWA

150 PPM NIOSH RECOMMENDED STEL

REPRODUCTIVE EFFECTS DATA (RTECS)

AQUATIC TOXICITY RATING 2 (TLM96 10 - 100 PPM)

TLM96 - BLUEGILL 20.87 PPM, FATHEAD 26.7-28.77 PPM, GUPPIES 34.37 PPM

KILL, 1HR - LEPOMIS HUMILIS 47.48 PPM

TLM24 DAPHNIA MAGNA >100 - <1000 PPM

CERCLA HAZARD RATINGS - TOXICITY 2 - IGNITABILITY 3 - REACTIVITY 0 - PERSISTENCE 1

TOXICOLOGY: XYLENE IS AN EYE, SKIN AND MUCOUS MEMBRANE IRRITANT. IT IS MODERATELY TOXIC BY INHALATION AND INGESTION. IT IS A CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY AFFECT THE LIVER AND KIDNEYS. CONCENTRATIONS OF 200 PPM MAY RESULT IN IRRITATION OF THE UPPER RESPIRATORY TRACT. INITIALLY, CENTRAL NERVOUS SYSTEM EXCITATION MAY OCCUR FOLLOWED BY DEPRESSION WITH TRANSIENT EUPHORIA, EMOTIONAL INSTABILITY, DROWSINESS AND ATAXIA. A GROUP OF SUBJECTS WHO INHALED 12.3 UMOL/L OF XYLENE WHILE EXERCISING BECAME SIGNIFICANTLY IMPAIRED ON 3 NEUROPSYCHOLOGICAL TESTS. PROLONGED EXPOSURE TO VAPORS ABOVE 200 PPM MAY LEAD TO NAUSEA, VOMITING, ABDOMINAL PAIN AND ANOREXIA. WOMEN MAY DEVELOP MENSTRUAL DISORDERS, INFERTILITY AND PATHOLOGICAL PREGNANCY CONDITIONS.

PREGNANT WOMEN MAY BE AT AN INCREASED RISK FROM EXPOSURE.

ALCOHOLIC BEVERAGES MAY ENHANCE THE TOXIC EFFECTS. STIMULANTS SUCH AS EPINEPHRINE OR EPHEDRINE MAY INCLUDE VENTRICULAR FIBRILLATION.

IHL-MAN LCLO: 10,000 PPM/6 HR IHL-HMN TCLO: 200 PPM

ORL-HMN LDLO: 50 MG/KG ORL-RAT LD50: 4300 MG/KG

IHL-RAT LD50: 5000 PPM/4 HR SCU-RAT LD50: 1700 MG/KG

IPR-RAT LD50: 2459 MG/KG IPR-MUS LD50: 1548 MG/KG

SKIN AND EYE IRRITATION DATA (RTECS)

EYE-HMN 200 PPM SKN-RBT 100% MOD

SKN-RBT 500 MG/24 HR MOD EYE-RBT 87 MG MLD

OSHA STANDARD 1910.1200 HAZARD COMMUNICATION 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.

DANGEROUS EXPOSURE:

1000 PPM OSHA/NIOSH

LIGHT-COLORED OR COLORLESS, MO.

IC

INCOMPATIBILITIES:

NITRIC ACID. STRONG OXIDIZERS. PLASTICS. RUBBER. HYDROGEN SULFIDE.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT!.

CL

CLOTHING:

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR

CHEMICAL HAZARDS":

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 CONTAMINATED 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 OF THE HAZARDOUS PROPERTIES OF THE SUBSTANCE.

-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.) -

XYLENE: EXCELLENT/GOOD: POLYVINYL ALCOHOL GOOD/FAIR: VITON/NEOPRENE VITON TEFLON POOR/FAIR: BUTYL CHLORINATED POLYETHYLENE BUTYL/NEOPRENE STYRENE-BUTADIENE RUBBER POOR: NATURAL RUBBER NEOPRENE NITRILE + POLYVINYL ALCOHOL NITRILE POLYETHYLENE POLYVINYL CHLORIDE NEOPRENE + NATURAL RUBBER NEOPRENE/NATURAL RUBBER.

WEAR EYE PROTECTION TO PREVENT:

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.

EMPLOYEE SHOULD WASH:

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 WITH SOAP OR MILD DETERGENT AND WATER TO REMOVE ANY CONTAMINANT 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.

WORK CLOTHING SHOULD BE CHANGED DAILY:

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.

REMOVE CLOTHING:

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

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.

THE FOLLOWING EQUIPMENT SHOULD BE AVAILABLE:

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.

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RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED):
1000 PPM

- CHEMICAL CARTRIDGE RESPIRATOR WITH AN ORGANIC VAPOR CARTRIDGE
- POWERED AIR-PURIFYING RESPIRATOR WITH AN ORGANIC VAPOR CARTRIDGE
- SUPPLIED-AIR RESPIRATOR
- SELF-CONTAINED BREATHING APPARATUS

ESCAPE

- GAS MASK WITH AN ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONTOR 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.

MS

MEDICAL SURVEILLANCE:

GENERAL MEDICAL HISTORY.

EKG RECOMMENDED IF EMPLOYEE TO WEAR FULL-FACE RESPIRATOR.

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.

OSHA: CENTRAL NERVOUS SYSTEM TESTS, PERIPHERAL NEUROPATHY.

VISION TEST.

EYE DISEASE.

GASTROINTESTINAL.

LIVER FUNCTION.

KIDNEY FUNCTION.

SKIN EXAM.

COMPLETE BLOOD COUNT.

URINALYSIS.

ACGIH BIOLOGICAL EXPOSURE INDICES FOR XYLENES: 1.5 G/G CREAT.

METHYLHIPURIC ACIDS IN URINE /TIMING-END OF SHIFT 2 MG/MIN

METHYLHIPURIC ACIDS IN URINE /TIMING--LAST 4 HRS OF SHIF.

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).

RE

ROUTE OF ENTRY:

INHALATION. SKIN ABSORPTION. INGESTION. SKIN OR EYE CONTACT.

TO

TARGET ORGANS:

CENTRAL NERVOUS SYSTEM. EYES. GASTROINTESTINAL. BLOOD. LIVER. SKIN.

KIDNEYS. RESPIRATORY SYSTEM.

SP

SYMPTOMS:

SKIN, COVERING OF BODY (SC0174);

IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).

EYE, ORGAN OF SIGHT (SC0170);
 IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).
 MUCOUS MEMBRANE, MEMBRANE LINING PASSAGES/CAVITIES (SC0109);
 IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).
 CENTRAL NERVOUS SYSTEM, PERTAINING TO NEURAL BODY SYSTEM (SC0028);
 EXCITATION, CENTRAL NERVOUS SYSTEM STIMULATION (SC0289).
 CENTRAL NERVOUS SYSTEM, PERTAINING TO NEURAL BODY SYSTEM (SC0028);
 DEPRESSION, DECREASE IN ACTIVITY/FUNCTION (SC0043). EUPHORIA, AN
 EXAGGERATED FEELING OF WELL-BEING (SC0061). NYSTAGMUS, RHYTHMICAL
 OSCILLATION OF EYEBALLS (SC0443). HEADACHE, PAIN IN HEAD OR CRANIUM AREA
 (SC0075). NAUSEA, SICKNESS AT THE STOMACH (SC0115). VOMITING,
 PERTAINING TO NAUSEA (SC0166). ANOREXIA, DIMINISHED APPETITE (SC0006).
 ABDOMINAL, SECTION BETWEEN THORAX AND PELVIS (SC0750);
 PAIN, SUFFERING, EITHER PHYSICAL OR MENTAL (SC0182). DIZZINESS, FEELING
 FAINT, LIGHT-HEADED, UNSTEADY (SC0048). DROWSINESS, FALLING ASLEEP
 (SC0049). ATAXIA, MUSCULAR INCOORDINATION (SC0013). INCOORDINATION,
 LACK OF COORDINATION (SC0085). SALIVATION, EXCESS DISCHARGE OF SALIVA
 (SC0146). SPEECH DIFFICULTIES, TROUBLES WITH VERBAL EXPRESSION (SC0614).
 BLURRED VISION, (SC0015). ERYTHEMA, REDNESS, SPOTS ON SKIN (SC0060).
 TINNITUS, RINGING IN EARS (SC0308). TREMORS, TREMBLING, SHAKING
 (SC0197). CONFUSION, IN A BEWILDERED STATE (SC0030). FACE/NECK FLUSHED
 VASODILATION WITH HEAT OF FACE/NECK (SC0215). STUPOR, LETHARGY,
 UNCONSCIOUSNESS (SC0214). ANESTHESIA, LOSS OF SENSATION (SC0005).
 AMNESIA, LOSS OF MEMORY (SC0438). HYPOTHERMIA, LOWERED BODY TEMPERATURE
 (SC0211).
 LUNG, RESPIRATORY ORGAN (SC0377);
 CONGESTION, ACCUMULATION OF BLOOD OR FLUID (SC0607). FATIGUE, TIREDNESS,
 SLUGGISH (SC0066). LASSITUDE, A SENSE OF WEARINESS (SC0098).
 IRRITABILITY, QUICK EXCITABILITY TO ANNOYANCE (SC0091). DYSPNEA,
 DIFFICULTY IN BREATHING (SC0052). FLATULENCE, EXCESSIVE GAS IN
 STOMACH/INTESTINES (SC0751). PARESTHESIA, ABNORMAL SENSATION WITHOUT
 CAUSE (SC0125). APPREHENSION, FEELING OF UNEASINESS, FEAR, ANXIETY
 (SC0073). VESICULATION, BLISTERING (SC0164). PHOTOPHOBIA, INTOLERANCE
 TO LIGHT (SC0131).
 TRANSIENT, PASSING QUICKLY (SC0731);
 CORNEAL, TRANSPARENT MEMBRANE OVER EYE (SC0035).
 DAMAGE, PERMANENT INJURY (SC0287).
 MENSTRUAL DISORDERS, DISTURBANCE IN MENSES (SC0752). VENTRICULAR
 FIBRILLATION, RAPID CONTRACTIONS OF VENTRICLES (SC0162). INSOMNIA,
 INABILITY TO OBTAIN NORMAL SLEEP (SC0088). VERTIGO, FEELING OF WHIRLING
 MOTION (SC0163). THIRST, DESIRE FOR WATER (SC0210). ANEMIA, RED BLOOD
 CELLS LESS THAN NORMAL (SC0004). UNCONSCIOUSNESS, NOT AWAKE; INSENSIBLE
 (SC0198). COMA, STATE OF DEEP UNCONSCIOUSNESS (SC0583). LIVER DAMAGE,
 INJURY TO THE LIVER (SC0221). KIDNEY DAMAGE, INJURY TO THE KIDNEY
 (SC0220).
 REPRODUCTIVE EFFECTS, BIRTH DEFECTS (SC0281);
 IN EXPERIMENTAL ANIMALS, (SC0212).

FA

FIRST AID.

(1 OF 5)

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.

(2 OF 5)

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.

(3 OF 5)

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.

(4 OF 5)

BENZENE/TOLUENE/XYLENE INGESTION: REMOVE BY GASTRIC LAVAGE BEING CAREFUL TO AVOID ASPIRATION. GENERAL MEASURES - CONTROL EXCITEMENT OR CONVULSIONS WITH DIAZEPAM, 0.1 MG/KG SLOW INTRAVENOUSLY. KEEP AT COMPLETE BED REST UNTIL RESPIRATION IS NORMAL. DO NOT GIVE EPINEPHRINE OR EPHEDRINE OR RELATED DRUGS. THEY MAY INDUCE FATAL VENTRICULAR FIBRILLATION. MONITOR ECG TO DETECT VENTRICULAR ABNORMALITIES FORESHADOWING POSSIBLE CARDIAC ARREST. SPECIAL PROBLEMS - TREAT ANEMIA BY REPEATED BLOOD TRANSFUSIONS. TREAT RESPIRATORY OR PULMONARY PROBLEMS. TREAT KIDNEY OR LIVER DAMAGE. GET MEDICAL ATTENTION IMMEDIATELY. TREATMENT MUST BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL. (DREISBACH, HANDBOOK OF POISONING, 12TH ED.).

(5 OF 5)

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.).

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SY SYNONYMS: AROCHLOR 1254. CHLORODIPHENYL 54% CL. UN 2315. NCI-C02664.
PCB. POLYCHLORINATED BIPHENYL. POLYCHLORINATED BIPHENYL (AROCLOR 1254).
RN CAS NUMBER: 11097-69-1.

REG. TOXIC NUMBER: TQ1360000.

CHEMICAL FORMULA: NONE.

PD

PHYSICAL DESCRIPTION:
LIGHT YELLOW, VISCOUS LIQUID
MILD HYDROCARBON ODOR.

MOL WT:	326
BOILING PT:	689 F
SOLUBILITY:	INSOLUBLE
FLASH PT:	432 F
VAPOR PRES:	0.00006 MM
MELT PT:	50 F
UEL IN AIR:	COMBUSTIBLE
LEL IN AIR:	COMBUSTIBLE
MEC IN AIR:	
SPEC GRAVITY:	1.495 TO 1.505
VAPOR DENSITY:	
ODOR THRESHOLD:	
OCTANOL/WATER CO-EFFICIENT:.	

EL

PERMISSABLE EXPOSURE:

0.5 MG/M3 OSHA TWA (SKIN)

0.5 MG/M3 ACGIH TWA

1.0 UG/M3 NIOSH RECOMMENDED 10 HOUR TWA

LOWEST FEASIBLE LIMIT NIOSH RECOMMENDED EXPOSURE CRITERIA

HUMAN LIMITED EVIDENCE FOR CARCINOGENICITY (IARC GROUP-2A)

ANTICIPATED HUMAN CARCINOGEN (NTP)

PROBABLE HUMAN CARCINOGEN (EPA - CATEGORY B)

REPRODUCTIVE EFFECTS DATA (RTECS); MUTAGENIC DATA (RTECS)

AQUATIC TOXICITY RATING 2-4/+ (TLM96 <1 - 100 PPM)

ANIMAL SUFFICIENT EVIDENCE FOR CARCINOGENICITY (IARC GROUP-2A)

CERCLA HAZARD RATING - TOXICITY 3 - IGNITABILITY 1 - REACTIVITY 0 -
PERSISTENCE 3

TOXICOLOGY: AROCLOR 1254 IS AN EYE, SKIN AND MUCOUS MEMBRANE IRRITANT.
IT IS A HEPATOTOXIN. POISONING BY POLYCHLORINATED BIPHENYLS MAY AFFECT
TISSUES AND ORGANS, ESPECIALLY THOSE RICH IN LIPIDS, DUE TO
ACCUMULATION AS A RESULT OF POOR METABOLISM. EPIDEMIOLOGICAL DATA
PROVIDE EVIDENCE OF A RELATIONSHIP BETWEEN EXPOSURE TO POLYCHLORINATED
BIPHENYLS AND THE DEVELOPMENT OF MALIGNANT MELANOMAS. CERTAIN PCB'S
ARE CARCINOGENIC TO MICE AND RATS AFTER ORAL ADMINISTRATION, PRODUCING
BENIGN AND MALIGNANT LIVER NEOPLASMS. ORAL ADMINISTRATION OF PCB'S
INCREASED THE INCIDENCE OF LIVER NEOPLASMS IN RATS PREVIOUSLY EXPOSED
TO N-NITROSODIETHYLAMINE.

POLYCHLORINATED BIPHENYLS ARE TREATED AS MATERIALS WITH POOR WARNING
PROPERTIES, AS NO QUANTITATIVE DATA ARE AVAILABLE CONCERNING ITS ODOR
AND IRRITATION THRESHOLDS.

THE THRESHOLD LIMIT VALUE OF 0.5 MG/M3 IS RECOMMENDED AT THIS TIME,
HOWEVER, THIS COMPOUND IS UNDER REVIEW.

ORL-RAT LD50: 1010 MG/KG INV-RAT LD50: 358 MG/KG

IPR-MUS LD50: 2840 MG/KG

OSHA STANDARD 1910.1200 HAZARD COMMUNICATION REQUIRES CHEMICAL

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7

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.

DANGEROUS EXPOSURE:

5 MG/M3 POTENTIAL
CARCINOGENNIOSH
LIGHT YELLOW, VISCOUS LIQUID.

IC

INCOMPATIBILITIES:

THERMAL DECOMPOSITION PRODUCTS ARE HAZARDOUS AND/OR TOXIC. STRONG OXIDIZERS.

CL

CLOTHING:

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT NECESSARY TO PREVENT ANY POSSIBILITY OF 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 CONTAMINATED 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 OF THE HAZARDOUS PROPERTIES OF THE SUBSTANCE.

-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.) -

POLYCHLORINATED BIPHENYLS (UNDILUTED): EXCELLENT/GOOD: SARANEX GOOD/FAIR: POLYVINYL ALCOHOL VITON TEFLON POOR/FAIR: BUTYL RUBBER POLYETHYLENE NEOPRENE POLYVINYL CHLORIDE POOR: NATURAL RUBBER POLYETHYLENE.

WEAR EYE PROTECTION TO PREVENT:

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL PROVIDE AND ENSURE THAT EMPLOYEES USE SPLASH-PROOF GOGGLES WHICH COMPLY WITH 29CFR1910.133(A)(2)-(A)(6) WHERE THERE IS ANY POSSIBILITY OF THIS LIQUID CONTACTING THE EYES.

EMPLOYEE SHOULD WASH:

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 WITH SOAP OR MILD DETERGENT AND WATER TO REMOVE ANY CONTAMINANT 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.

WORK CLOTHING SHOULD BE CHANGED DAILY:

REMOVE CLOTHING:

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 IMMEDIATELY AND NOT REWORN UNTIL THE SUBSTANCE IS REMOVED FROM THE CLOTHING.

THE FOLLOWING EQUIPMENT SHOULD BE AVAILABLE:

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL ENSURE THAT EMPLOYEES DO NOT EAT OR SMOKE IN AREAS WHERE THIS SUBSTANCE IS HANDLED, PROCESSED OR STORED.

EMPLOYERS SHALL ENSURE THAT AREAS IN WHICH EXPOSURE TO THIS SUBSTANCE MAY OCCUR BE IDENTIFIED BY SIGNS OR OTHER APPROPRIATE MEANS, AND THAT ACCESS TO THESE AREAS BE LIMITED TO AUTHORIZED PERSONS.

RP

RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED):
ANY DETECTABLE CONC

- 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

ESCAPE

- AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONTOR BACK-MOUNTED ORGANIC VAPOR CANISTER HAVING A HIGH EFFICIENCY PARTICULATE FILTER
- 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.

MS

MEDICAL SURVEILLANCE:

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.

RESPIRATORY HISTORY.

BLOOD CHEMISTRY.

RENAL AND LIVER FUNCTIONS.

LDH.

SGOT.

SGPT.

SKIN EXAM.

VISION TEST.

PULMONARY FUNCTIONS.

ATTENTION TO SMOKING, ALCOHOL, MEDICATION, AND EXPOSURE TO CARCINOGENS.

29CFR1910.20 OSHA STANDARD SUBPART C - GENERAL SAFETY AND HEALTH

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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).

RE ROUTE OF ENTRY:
SKIN OR EYE CONTACT. INGESTION. INHALATION.

TO TARGET ORGANS:
SKIN. EYES. LIVER. CENTRAL NERVOUS SYSTEM. KIDNEYS. HEART.

SP SYMPTOMS:
SKIN, COVERING OF BODY (SC0174);
IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).
EYE, ORGAN OF SIGHT (SC0170);
IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).
MUCOUS MEMBRANE, MEMBRANE LINING PASSAGES/CAVITIES (SC0109);
IRRITATION, EXTREME REACTION TO A CONDITION (SC0090). HEADACHE, PAIN IN HEAD OR CRANIUM AREA (SC0075). NAUSEA, SICKNESS AT THE STOMACH (SC0115). VOMITING, PERTAINING TO NAUSEA (SC0166). ABDOMINAL CRAMPS, PAINFUL SPASMS OF ABDOMINAL AREA (SC0218). EDEMA, FLUID RETENTION WITH SWELLING (SC0181). ANOREXIA, DIMINISHED APPETITE (SC0006). FATIGUE, TIREDNESS, SLUGGISH (SC0066). JAUNDICE, YELLOWING OF SKIN, EYES (SC0092). CHLORACNE, REDDISH DERMATOLOGICAL CONDITION (SC0276).
EXTRA, ADDITIONAL (SC0191);
PIGMENTATION, COLORATION (SC0132). EDEMA OF THE EYELIDS, SWELLING OF EYELIDS (SC0512). CONJUNCTIVITIS, INFLAMMATION OF EYES (SC0031). BLURRED VISION, (SC0015). DIARRHEA, UNCONTROLLED LOOSE BOWELS (SC0046). ANALGESIA, ABSENCE OF NORMAL SENSE OF PAIN (SC0453). CENTRAL NERVOUS SYSTEM, PERTAINING TO NEURAL BODY SYSTEM (SC0028);
DEPRESSION, DECREASE IN ACTIVITY/FUNCTION (SC0043). PERIPHERAL NEUROPATHY, NERVE DISORDER OF EXTREMITIES (SC0128).
LIVER, BILE-SECRETING GLANDULAR ORGAN (SC0620);
TUMORS, BENIGN OR CANCEROUS ENLARGEMENTS (SC0578). COMA, STATE OF DEEP UNCONSCIOUSNESS (SC0583).
LUNG, RESPIRATORY ORGAN (SC0377);
INJURY, DAMAGE OR HURT SUFFERED (SC0087).
STOMACH, DIGESTIVE ORGAN (SC0358);
HEMORRHAGE, BLEEDING (SC0080).
PANCREAS, INSULIN PRODUCING GLAND (SC0262);
INJURY, DAMAGE OR HURT SUFFERED (SC0087).
KIDNEY, POST-PERITONEUM ORGAN FOR URINE WASTE(SC0094);
INJURY, DAMAGE OR HURT SUFFERED (SC0087). NEOPLASM, ABNORMAL TISSUE FORMATION (SC0272).

FA FIRST AID.

(1 OF 5)
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.

(2 OF 5)
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). FOLLOW WITH APPLICATION OF CASTOR OIL OR 10% ETHYL

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Donohue & Assoc.
WTS Search #97300

HZDB DEC 1991 (9112)

1

AN ACCESSION NUMBER: 1655. 9112.
CN CHEMICAL NAME: LEAD.
SY SYNONYMS: C.I. PIGMENT METAL 4. C.I. 77575. LEAD FLAKE. KS-4.
LEAD S2. SI. SO. S 1. PLUMBUM. PB-S 100. LEAD ELEMENT. L-18.
L-24. L-29. L-27. T-134.
RN CAS NUMBER: 7439-92-1.

REG. TOXIC NUMBER: OF7525000.

CHEMICAL FORMULA: PB.

PD

PHYSICAL DESCRIPTION:
BLUISH-WHITE, SILVERY GRAY, HEAVY MALLEABLE METAL.

MOL WT:	207.19
BOILING PT:	3164 F (1740 C)
SOLUBILITY:	INSOLUBLE
FLASH PT:	NONCOMBUSTIBLE SOLID
VAPOR PRES:	1.3 MMHG @ 970 C
MELT PT:	622 F (328 C)
UEL IN AIR:	NOT AVAILABLE
LEL IN AIR:	NOT AVAILABLE
MEC IN AIR:	
SPEC GRAVITY:	11.3
VAPOR DENSITY:	
ODOR THRESHOLD:	
OCTANOL/WATER CO-EFFICIENT:.	

EL

PERMISSABLE EXPOSURE:
50 UG(PB)/M3 OSHA TWA; 30 UG(PB)/M3 OSHA TWA ACTION LEVEL
IF AN EMPLOYEE IS EXPOSED TO LEAD FOR MORE THAN 8 HOURS PER DAY THE
FOLLOWING FORMULA IS USED:
MAXIMUM PERMISSIBLE LIMIT (IN UG/M3) = 400 DIVIDED BY HOURS WORKED
0.15 MG(PB)/M3 ACGIH TWA
<0.10 MG(PB)/M3 NIOSH RECOMMENDED 10 HOUR TWA
HUMAN INADEQUATE EVIDENCE FOR CARCINOGENICITY (IARC GROUP-2B)
ANIMAL SUFFICIENT EVIDENCE FOR CARCINOGENICITY (IARC GROUP-2B)
REPRODUCTIVE EFFECTS DATA (RTECS); MUTAGENIC DATA (RTECS)
CERCLA HAZARD RATINGS - TOXICITY 3 - IGNITABILITY 0 - REACTIVITY 0 -
PERSISTENCE 3

TOXICOLOGY: LEAD MAY BE IRRITATING TO THE EYES AND SKIN. THERE IS
INSUFFICIENT DATA TO QUANTIFY THE TOXICITY. IT IS A NEUROTOXIN,
NEPHROTOXIN AND TERATOGEN. POISONING MAY ALSO AFFECT THE BLOOD, HEART,
ENDOCRINE AND IMMUNE SYSTEMS. THE FATAL DOSE OF ABSORBED LEAD IS
APPROXIMATELY 0.5 GRAMS. ACUTE EXPOSURES MAY RESULT IN METAL FUME FEVER
WHILE CHRONIC EXPOSURE MAY RESULT IN "PLUMBISM" AND AN ACCUMULATION IN
BODY TISSUES. REPRODUCTIVE EFFECTS HAVE BEEN EXHIBITED IN BOTH MALES
AND FEMALES. PATERNAL EFFECTS MAY INCLUDE DECREASED SEX DRIVE,
IMPOTENCE, STERILITY AND ADVERSE EFFECTS ON THE SPERM WHICH MAY
INCREASE THE RISK OF BIRTH DEFECTS. MATERNAL EFFECTS MAY INCLUDE
MISCARRIAGE AND STILLBIRTHS IN EXPOSED WOMEN OR WOMEN WHOSE HUSBANDS

WERE EXPOSED, ABORTION, STERILITY OR DECREASED FERTILITY, AND ABNORMAL MENSTRUAL CYCLES. RENAL TUMORS WERE PRODUCED IN ANIMALS BY LEAD ACETATE, SUBACETATE AND PHOSPHATE WHEN GIVEN ORALLY. NO EVALUATION COULD BE MADE OF THE CARCINOGENICITY OF POWDERED LEAD. DUE TO THE LACK OF INFORMATION ON ODOR THRESHOLD AND EYE IRRITATION LEVELS, INORGANIC LEAD IS TREATED AS A MATERIAL WITH POOR WARNING PROPERTIES. THE THRESHOLD LIMIT VALUE WAS ESTABLISHED BASED ON SYSTEMIC EFFECTS.

PERSONS WITH NERVOUS SYSTEM OR GASTROINTESTINAL DISORDERS, ANEMIA OR CHRONIC BRONCHITIS MAY BE AT AN INCREASED RISK FROM EXPOSURE. LEAD MAY CROSS THE PLACENTA AND AFFECT THE FETUS CAUSING BIRTH DEFECTS. ORL-WMN TDLO: 450 MG/KG/6 Y IHL-HMN TDLO: 10 UG/M3

OSHA STANDARD 1910.1200 HAZARD COMMUNICATION 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.

DANGEROUS EXPOSURE:

700 MG/M3 OSHA/NIOSH
BLuish-WHITE, SILVERY GRAY, HE.

IC

INCOMPATIBILITIES:

LEAD: AMMONIUM NITRATE: VIOLENT OR EXPLOSIVE REACTION. CHLORINE TRIFLUORIDE: VIOLENT REACTION. DISODIUM ACETYLIDE: TRITURATION IN MORTAR MAY BE VIOLENT AND LIBERATE CARBON. HYDROGEN PEROXIDE (52% OR GREATER): VIOLENT DECOMPOSITION. HYDROGEN PEROXIDE (60% SOLUTION) AND TRIOXIANE: SPONTANEOUSLY DETONABLE. METALS (ACTIVE): INCOMPATIBLE. NITRIC ACID: LEAD-CONTAINING RUBBER MAY IGNITE. OXIDIZERS (STRONG): INCOMPATIBLE. SODIUM AZIDE: FORMS LEAD AZIDE AND COPPER AZIDE IN COPPER PIPE. SODIUM CARBIDE: VIGOROUS REACTION. SULFURIC ACID (HOT): REACTS. ZIRCONIUM-LEAD ALLOYS: IGNITION ON IMPACT.

CL

CLOTHING:

29CFR1910.1025 LEAD THE EMPLOYERS SHALL ASSURE THAT EMPLOYEES WHO ARE EXPOSED TO LEAD ABOVE THE PERMISSIBLE EXPOSURE LEVEL, WITHOUT REGARD TO THE USE OF RESPIRATORS OR WHERE THE POSSIBILITY OF SKIN OR EYE IRRITATION EXISTS, BE PROVIDED WITH COVERALLS OR SIMILAR FULL-BODY WORK CLOTHING, GLOVES, HATS AND SHOES OR DISPOSABLE SHOE COVERLETS, FACESHIELDS, VENTED GOGGLES OR OTHER APPROPRIATE PROTECTIVE EQUIPMENT.

WEAR EYE PROTECTION TO PREVENT:

29CFR1910.1025 LEAD THE EMPLOYERS SHALL ASSURE THAT EMPLOYEES WEAR FACESHIELDS, VENTED GOGGLES OR OTHER APPROPRIATE PROTECTIVE EQUIPMENT WHICH COMPLIES WITH 29CFR1910.133.

EMPLOYEE SHOULD WASH:

29CFR1910.1025 LEAD THE EMPLOYER SHALL ASSURE THAT EMPLOYEES WHO WORK IN AREAS WHERE THEIR AIRBORNE EXPOSURE TO LEAD IS ABOVE THE PERMISSIBLE EXPOSURE LEVEL, WITHOUT REGARD TO THE USE OF A RESPIRATOR, WASH THEIR HANDS AND FACE PRIOR TO EATING, DRINKING OR APPLYING COSMETICS AND SHOWER AT THE END OF THE WORKSHIFT.

WORK CLOTHING SHOULD BE CHANGED DAILY:

29CFR1910.1025 LEAD THE EMPLOYER SHALL ASSURE THAT ALL PROTECTIVE CLOTHING IS REMOVED AT THE COMPLETION OF A WORKSHIFT ONLY IN CHANGE ROOMS PROVIDED FOR THAT PURPOSE.

REMOVE CLOTHING:

NO SPECIFIC REGULATIONS UNDER 29CFR1910.

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.

THE FOLLOWING EQUIPMENT SHOULD BE AVAILABLE:

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.

RP RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED):
LEAD

THE FOLLOWING RESPIRATORS ARE THE MINIMUM LEGAL REQUIREMENTS AS SET FORTH BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION FOUND IN 29CFR1910, SUBPART Z. NOT IN EXCESS OF 0.5 MG/M3 (10X PEL) - HALF-MASK, AIR-PURIFYING RESPIRATOR EQUIPPED WITH HIGH-EFFICIENCY FILTERS NOT IN EXCESS OF 2.5 MG/M3 (50X PEL) - FULL FACEPIECE, AIR-PURIFYING RESPIRATOR WITH HIGH-EFFICIENCY FILTERS NOT IN EXCESS OF 50 MG/M3 - ANY POWERED AIR-PURIFYING RESPIRATOR WITH HIGH-EFFICIENCY FILTERS - HALF-MASK SUPPLIED-AIR RESPIRATOR OPERATED IN POSITIVE PRESSURE MODE NOT IN EXCESS OF 100 MG/MG (2000X PEL) - SUPPLIED-AIR RESPIRATORS WITH FULL FACEPIECE, HOOD OR HELMET OR SUIT, OPERATED IN POSITIVE PRESSURE MODE GREATER THAN 100 MG/M3, UNKNOWN CONCENTRATIONS OR FIREFIGHTING - FULL FACEPIECE, SELF-CONTAINED BREATHING APPARATUS OPERATED IN POSITIVE PRESSURE MODE (RESPIRATORS SPECIFIED FOR HIGHER CONCENTRATIONS CAN BE USED AT LOWER CONCENTRATIONS OF LEAD). (FULL FACEPIECE IS REQUIRED IF THE LEAD AEROSOLS CAUSE EYE AND SKIN IRRITATION AT THE USE CONCENTRATIONS.) (A HIGH EFFICIENCY PARTICULATE FILTER MEANS 99.97% EFFICIENT AGAINST 0.3 MICRON PARTICLES) 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 OR NIOSH CRITERIA DOCUMENTS.

0.5 MG (PB) /M3

- SUPPLIED-AIR RESPIRATOR
- AIR-PURIFYING RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER
- SELF-CONTAINED BREATHING APPARATUS

1.25 MG (PB) /M3

- POWERED AIR-PURIFYING RESPIRATOR WITH A TIGHT-FITTING FACEPIECE AND HIGH-EFFICIENCY PARTICULATE FILTER
- SUPPLIED-AIR RESPIRATOR OPERATED IN CONTINUOUS FLOW MODE

2.5 MG (PB) /M3

- AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER
- POWERED AIR-PURIFYING RESPIRATOR WITH A TIGHT-FITTING FACEPIECE AND HIGH-EFFICIENCY PARTICULATE FILTER
- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE
- SUPPLIED-AIR RESPIRATOR WITH A FULL FACE-PIECE

- SUPPLIED-AIR RESPIRATOR WITH A TIGHT-FITTING FACEPIECE OPERATED IN A CONTINUOUS FLOW MODE

50 MG(PB)/M3

- SUPPLIED-AIR RESPIRATOR WITH HALF-MASK OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE

100 MG(PB)/M3

- SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE

ESCAPE

- AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER

- 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.

MS

MEDICAL SURVEILLANCE:

29CFR1910.1025 THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REQUIRES EMPLOYERS TO PROVIDE A MEDICAL SURVEILLANCE PROGRAM FOR ALL EMPLOYEES WHO ARE OR MAY BE EXPOSED TO LEAD ABOVE THE ACTION LEVEL FOR MORE THAN 30 DAYS PER YEAR THIS MEDICAL SURVEILLANCE PROGRAM SHALL CONSIST OF: (1) INITIAL MEDICAL EXAMINATION INCLUDING: (A) WORK HISTORY (B) MEDICAL HISTORY WITH PARTICULAR ATTENTION TO: (1) PAST LEAD EXPOSURE (OCCUPATIONAL AND NON-OCCUPATIONAL) (2) PERSONAL HABITS (SMOKING, HYGIENE) (3) PAST GASTROINTESTINAL, HEMATOLOGIC, RENAL, REPRODUCTIVE, CARDIOVASCULAR AND NEUROLOGIC PROBLEMS (C) PHYSICAL EXAMINATION (1) WITH PARTICULAR ATTENTION TO: (A) TEETH AND GUMS (B) HEMATOLOGIC SYSTEM (C) GASTROINTESTINAL SYSTEM (D) KIDNEYS (E) CARDIOVASCULAR SYSTEM (F) NEUROLOGICAL SYSTEM (G) PULMONARY STATUS IF RESPIRATORY PROTECTION WILL BE USED (2) BLOOD PRESSURE MEASUREMENT (3) BLOOD SAMPLE AND ANALYSIS DETERMINING: (A) BLOOD LEAD LEVEL (B) HEMOGLOBIN AND HEMATOCRIT DETERMINATIONS, RED CELL INDICES, EXAM OF PERIPHERAL SMEAR MORPHOLOGY (C) ZINC PROTOPORPHYRIN (D) BLOOD UREA NITROGEN (E) SERUM CREATININE (4) URINALYSIS WITH MICROSCOPIC EXAM (5) ANY LABORATORY OR OTHER TEST DEEMED NECESSARY BY THE PHYSICIAN (2) PERIODIC EXAMINATIONS (A) BLOOD LEAD AND ZPP LEVEL TESTS AND ANALYSIS: (1) EVERY 6 MONTHS FOR EACH EMPLOYEE EXPOSED ABOVE THE ACTION LEVEL FOR MORE THAN 30 DAYS PER YEAR (2) AT LEAST EVERY 2 MONTHS FOR EACH EMPLOYEE WHOSE LAST BLOOD SAMPLING AND ANALYSIS INDICATED A BLOOD LEVEL AT OR ABOVE 40 UG/100 G OF WHOLE BLOOD. THIS FREQUENCY SHALL CONTINUE UNTIL 2 CONSECUTIVE BLOOD SAMPLES AND ANALYSES INDICATE A BLOOD LEAD LEVEL BELOW 40 UG/100 G OF WHOLE BLOOD (3) AT LEAST MONTHLY DURING THE REMOVAL PERIOD OF EACH EMPLOYEE REMOVED FROM EXPOSURE TO LEAD DUE TO AN ELEVATED BLOOD LEAD LEVEL (B) ALL TESTS CONDUCTED IN INITIAL EXAMINATION: (1) AT LEAST ANNUALLY FOR EACH EMPLOYEE FOR WHOM A BLOOD SAMPLING TEST CONDUCTED AT ANY TIME DURING THE PRECEDING 12 MONTHS INDICATED A BLOOD LEAD LEVEL AT OR ABOVE 400 UG/100 G (2) PRIOR TO ASSIGNMENT FOR EACH EMPLOYEE BEING ASSIGNED FOR THE FIRST TIME TO AN AREA IN WHICH AIRBORNE CONCENTRATIONS OF LEAD ARE AT OR ABOVE THE ACTION LEVEL (3) AS SOON AS POSSIBLE, UPON NOTIFICATION BY AN EMPLOYEE HAS DEVELOPED SIGNS OR SYMPTOMS ASSOCIATED WITH LEAD INTOXICATION, THAT THE EMPLOYEE DESIRES MEDICAL ADVICE CONCERNING THE EFFECTS OF CURRENT OR PAST EXPOSURE TO LEAD ON THE EMPLOYEES ABILITY TO PROVIDE A HEALTHY CHILD, OR THAT EMPLOYEE HAS DEMONSTRATED DIFFICULTY IN BREATHING DURING A RESPIRATORY FITTING TEST OR DURING USE (4) AS MEDICALLY APPROPRIATE FOR EACH EMPLOYEE

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EITHER REMOVED FROM EXPOSURE TO LEAD DUE TO A RISK OF SUSTAINING MATERIAL IMPAIRMENT TO HEALTH, OR OTHERWISE LIMITED PURSUANT TO A FINAL MEDICAL DETERMINATION.

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.

OTHER MEDICAL SURVEILLANCE RECOMMENDED: ACGIH BIOLOGICAL EXPOSURE INDICES FOR LEAD: 50 UG/100 ML LEAD IN BLOOD / TIMING -NOT CRITICAL 150 UG/G CREATINE LEAD IN URINE / TIMING -NOT CRITICAL 250 UG/100 ML ERYTHROCYTES OF 100 UG/100 ML BLOOD ZINC PROTOPORPHYRIN IN BLOOD / TIMING -AFTER ONE MONTH EXPOSURE.

RE

ROUTE OF ENTRY:

INHALATION. INGESTION. SKIN OR EYE CONTACT.

TO

TARGET ORGANS:

CENTRAL NERVOUS SYSTEM. CARDIOVASCULAR SYSTEM. GASTROINTESTINAL. KIDNEYS. REPRODUCTIVE SYSTEM. GINGIVAL TISSUE. BLOOD.

SP

SYMPTOMS:

SKIN, COVERING OF BODY (SC0174);

IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).

EYE, ORGAN OF SIGHT (SC0170);

IRRITATION, EXTREME REACTION TO A CONDITION (SC0090). SALIVATION, EXCESS DISCHARGE OF SALIVA (SC0146). VOMITING, PERTAINING TO NAUSEA (SC0166).

DIARRHEA, UNCONTROLLED LOOSE BOWELS (SC0046). CONSTIPATION, DIFFICULT, INFREQUENT DEFECATION (SC0032). FATIGUE, TIREDNESS, SLUGGISH (SC0066).

SLEEP DISORDERS, CHANGE IN NORMAL SLEEP PATTERNS (SC0599). IRRITABILITY QUICK EXCITABILITY TO ANNOYANCE (SC0091). MEMORY DEFECTS, IMPERFECTION IN RECOLLECTION ABILITY (SC0585). INABILITY TO CONCENTRATE, INABILITY TO FOCUS ONE'S THOUGHTS (SC0586). DELIRIUM, STATE OF DISORIENTATION, CONFUSION (SC0288). PARESTHESIA, ABNORMAL SENSATION WITHOUT CAUSE (SC0125).

MUSCLE, TISSUE RESPONSIBLE FOR MOTION (SC0623);

PAIN, SUFFERING, EITHER PHYSICAL OR MENTAL (SC0182). WEAKNESS, LACK OF STRENGTH (SC0167).

LIVER, BILE-SECRETING GLANDULAR ORGAN (SC0620);

EFFECTS, SIGNS AND SYMPTOMS (SC0579). THIRST, DESIRE FOR WATER (SC0210).

LETHARGY, SLUGGISHNESS (SC0595). HEADACHE, PAIN IN HEAD OR CRANIUM AREA (SC0075). SWEATING, EXCRETING MOISTURE THROUGH THE SKIN (SC0156).

EXCESSIVE, SUPERFLUOUS (SC0737);

URINATION, DISCHARGE OF URINE FROM BODY (SC0617). PROSTRATION, MARKED LOSS OF STRENGTH, EXHAUSTION (SC0139). FEVER, BODY TEMPERATURE ABOVE NORMAL (SC0067). CHILLS, A SHIVERING OR SHAKING (SC0736). PALLOR,

PALENESS, AS OF THE SKIN (SC0122). FATIGUE, TIREDNESS, SLUGGISH (SC0066).

WEIGHT LOSS, DROP IN BODY WEIGHT (SC0104). APATHY, LACK OF FEELING OR EMOTION (SC0008). GINGIVAL BLACK LINE, BLACK LINE ON GUMS (SC0207).

ANEMIA, RED BLOOD CELLS LESS THAN NORMAL (SC0004). MYALGIA, MUSCLE PAIN OR TENDERNESS (SC0526).

ABDOMINAL, SECTION BETWEEN THORAX AND PELVIS (SC0750);

PAIN, SUFFERING, EITHER PHYSICAL OR MENTAL (SC0182). ATAXIA, MUSCULAR INCOORDINATION (SC0013). STUPOR, LETHARGY, UNCONSCIOUSNESS (SC0214). VISUAL DISTURBANCE, UPSET IN SIGHT (SC0165). ENCEPHALOPATHY, BRAIN DYSFUNCTION; BRAIN DISEASE (SC0336). DELIRIUM, STATE OF DISORIENTATION, CONFUSION (SC0288). MENTAL DISORDER, PSYCHIC DISTURBANCE (SC0608). SEIZURE, CONVULSION (SC0149). HYPERTENSION, HIGH BLOOD PRESSURE (SC0177).
CRANIAL NERVE, NERVE ARISING FROM THE BRAIN (SC0342);
PARALYSIS, LOSS OF POWER OF VOLUNTARY MOVEMENT (SC0124). KIDNEY DAMAGE INJURY TO THE KIDNEY (SC0220). CONVULSIONS, SUDDEN MUSCLE CONTRACTIONS (SC0034). REPRODUCTIVE EFFECTS, BIRTH DEFECTS (SC0281).
KIDNEY, POST-PERITONEUM ORGAN FOR URINE WASTE(SC0094);
TUMORS, BENIGN OR CANCEROUS ENLARGEMENTS (SC0578).

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FIRST AID.

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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.

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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.

(3 OF 5)

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.

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INGESTED LEAD COMPOUNDS: REMOVE INGESTED POISON BY GASTRIC LAVAGE WITH DILUTE MAGNESIUM SULFATE OR SODIUM SULFATE SOLUTION OR BY EMESIS. TREAT CEREBRAL EDEMA WITH MANNITOL AND PREDNISOLONE OR OTHER CORTICOSTEROID. GET MEDICAL ATTENTION IMMEDIATELY. ANTIDOTE: INITIATE URINE FLOW. GIVE 10% DEXTROSE IN WATER INTRAVENOUSLY, 10-20 ML/KG, FOR ONE TO TWO HOURS. IF URINE FLOW DOES NOT START, GIVE 20% SOLUTION OF MANNITOL, 5-10 ML/KG INTRAVENOUSLY, OVER TWENTY MINUTES. LIMIT FLUID TO REQUIREMENTS, AND CATHETERIZATION MAY BE NECESSARY IN COMA. DAILY URINE OUTPUT SHOULD BE 350-500 ML/M2/24 HOURS. EXCESSIVE FLUIDS FURTHER INCREASE CEREBRAL EDEMA. FOR ADULTS WITH ACUTE ENCEPHALOPATHY, GIVE DIMERCAPROL, 4 MG/KG, INTRAMUSCULARLY EVERY 4 HOURS FOR 30 DOSES. BEGINNING 4 HOURS LATER, GIVE CALCIUM DISODIUM EDETATE AT A SEPERATE INJECTION SITE, 12.5 MG/KG INTRAMUSCULARLY EVERY 4 HOURS AS A 20% SOLUTION, WITH 0.5% PROCAINE ADDED, FOR A TOTAL OF 30 DOSES. IF SIGNIFICANT IMPROVEMENT HAS NOT OCCURRED BY THE FOURTH DAY, INCREASE THE NUMBER OF INJECTIONS BY 10 FOR EACH DRUG. FOR SYMPTOMATIC ADULTS, THE COURSE OF DIMERCAPROL AND CALCIUM DISODIUM EDETATE CAN BE SHORTENED OR CALCIUM DISODIUM EDETATE ONLY CAN BE GIVIN IN A DOSAGE OF 50 MG/KG INTRAVENOUSLY AS 0.5% SOLUTION IN 5% DEXTROSE IN WATER OR NORMAL SAILINE BY INFUSION OVER NOT LESS THAN 8 HOURS FOR NOT MORE THAN 5 DAYS. FOLLOW WITH PENICILLAMINE, 500-750 MG/DAY, ORALLY FOR 1-2 MONTHS OR UNTIL URINE LEAD LEVELS DROPS BELOW 0.3 MG/24 HOURS. (DREISBACH, HANDBOOK OF POISONING, 12TH EDITION.) PROCEDURE MUST BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.

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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.).

DT

SPECIAL DIAGNOSTIC TESTS AND INDEXES OF EXPOSURE:

COMPLETE BLOOD COUNT.

URINALYSIS.

BLOOD LEAD.

URINE LEAD AS EXPOSURE INDEX.

BLOOD ERYTHROCYTE PROTOPORPHYRIN BLOOD ERYTHROCYTE GAMMA-AMINOLEVULINIC ACID DEHYDRATASE URINE LEAD EXCRETION >0.08 MG/DAY URINE COPROPORPHYRIN >0.8 MG/L URINE GAMMA-AMINOLEVULINIC ACID >6 MG/L.

RS

REGULATORY STATUS.

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FEDERAL REGULATIONS

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OSHA STANDARD 1910.1200 HAZARD COMMUNICATION 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.

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OSHA STANDARD 29CFR1910.1025 LEAD.

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OSHA STANDARD 29CFR1910.252 WELDING, CUTTING, AND BRAZING.

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MERCURY, INORGANIC. QUICKSILVER. NA 2809. COLLOIDOL MERCURY.
NCI-C60399. QUICK SILVER. HYDRARGYRUM. RCRA U151. UN 2809. ELEMENTAL
MERCURY.

RN CAS NUMBER: 7439-97-6.

REG. TOXIC NUMBER: OV4550000.

CHEMICAL FORMULA: HG.

PD

PHYSICAL DESCRIPTION:

ODORLESS, SILVERY LIQUID WITH A METALLIC LUSTER.

MOL WT:	200.59
BOILING PT:	674 F (357 C)
SOLUBILITY:	INSOLUBLE
FLASH PT:	NONCOMBUSTIBLE SOLID
VAPOR PRES:	0.002 MMHG @ 25 C
MELT PT:	-38 F (-39 C)
UEL IN AIR:	
LEL IN AIR:	NOT APPLICABLE
MEC IN AIR:	
SPEC GRAVITY:	13.5939
VAPOR DENSITY:	7.0
ODOR THRESHOLD:	
OCTANOL/WATER CO-EFFICIENT:.	

EL

PERMISSABLE EXPOSURE:

0.05 MG(HG)/M3 OSHA TWA (VAPOR); 0.1 MG(HG)/M3 OSHA CEILING (SKIN)

0.05 MG(HG)/M3 ACGIH TWA (VAPOR); 0.1 MG(HG)/M3 ACGIH TWA (SKIN)

0.05 MG(HG)/M3 NIOSH RECOMMENDED 10 HR TWA (SKIN)

TUMORIGENIC DATA (RTECS)

REPRODUCTIVE EFFECTS DATA (RTECS)

MUTAGENIC DATA (RTECS)

CERCLA HAZARD RATINGS - TOXICITY 3 - IGNITABILITY 0 - REACTIVITY 0 -
PERSISTENCE 3

TOXICOLOGY: MERCURY IS A MUCOUS MEMBRANE IRRITANT AND A SKIN AND
PULMONARY SENSITIZER. THERE IS INSUFFICIENT DATA TO FULLY QUANTIFY THE
TOXICITY. IT IS A NEUROTOXIN AND NEPHROTOXIN. POISONING MAY ALSO AFFECT
THE RESPIRATORY AND GASTROINTESTINAL SYSTEMS. METAL FUME FEVER, AN
INFLUENZA-LIKE ILLNESS, MAY OCCUR DUE TO THE INHALATION OF FRESHLY
FORMED METAL OXIDE PARTICLES SIZED USUALLY BETWEEN 0.02-0.05 MICRONS.
SYMPTOMS MAY BE DELAYED 4-12 HOURS AND BEGIN WITH A SUDDEN ONSET.
REPEATED EXPOSURE MAY CAUSE MERCURIALISM, WHICH IS CHARACTERIZED BY
FINE TREMORS AND ERETHISM. TREMORS MAY AFFECT THE HANDS FIRST, BUT THEN
BECOME EVIDENT IN THE FACE, ARMS AND LEGS. ERETHISM MAY BE MANIFESTED
BY ABNORMAL SHYNESS, BLUSHING, RESENTMENT OF CRITICISM AND IRRITABILITY
OR EXCITABILITY.

THE THRESHOLD LIMIT VALUE WAS ESTABLISHED BASED ON THE ABILITY OF
MERCURY ABSORBED IN THE BRAIN TO REMAIN.

PERSONS WITH NERVOUS SYSTEM DISORDERS, CHRONIC RESPIRATORY DISEASE
AND KIDNEYS DISEASE MAY BE AT AN INCREASED RISK FROM EXPOSURE.

IHL-WMN TCLO: 1500 UG/M3/46 D IHL-MAN TCLO: 44,300 UG/M3/8 HR

SKN-MAN TDLO: 129 MG/KG/5 HR C IHL-RBT LCLO: 29 MG/M3/30 HR

OSHA STANDARD 1910.1200 HAZARD COMMUNICATION 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.

DANGEROUS EXPOSURE:

28 MG/M3 OSHA/NIOSH
ODORLESS, SILVERY LIQUID WITH.

IC

INCOMPATIBILITIES:

SEND BACK AREA EXCEEDED. ACETYLENE: FORMATION OF EXPLOSIVE COMPOUND. ACETYLINIC COMPOUNDS: FORMATION OF EXPLOSIVE COMPOUND. ALUMINUM: CORRODES. AMINES: MAY FORM EXPLOSIVE COMPOUNDS. AMMONIA + MOISTURE: FORMS EXPLOSIVE COMPOUND. BORON DIIODOPHOSPHIDE: IGNITES ON CONTACT WITH MERCURY VAPORS. BROMINE: VIOLENT REACTION. 3-BROMOPROPYNE: EXPLOSION HAZARD. CALCIUM: AMALGAM FORMATION @ 390 C IS VIOLENT. CHLORINE: IGNITES @ 200-300 C. CHLORINE DIOXIDE: EXPLODES. COPPER (AND ALLOYS): MAY BE ATTACKED. ETHYLENE OXIDE + TRACES OF ACETYLENE: MAY FORM EXPLOSIVE ACETYLIDES. LITHIUM: AMALGAM FORMATION IS VIOLENTLY EXOTHERMIC AND MAY BE EXPLOSIVE. METHYL AZIDE: PRODUCES SHOCK SENSITIVE MIXTURE. METHYLSILANE + OXYGEN: PRODUCES SHOCK SENSITIVE MIXTURE. NITRIC ACID + ALCOHOLS: FORMS FULMINATES CAPABLE OF DETONATION. OXALIC ACID: FORMS SHOCK SENSITIVE COMPOUND. OXIDANTS: VIOLENT REACTION. PEROXYFORMIC ACID: EXPLOSIVE REACTION. POTASSIUM: AMALGAM FORMATION IS VIGOROUSLY EXOTHERMIC AND MAY BE EXPLOSIVE.

CL

CLOTHING:

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

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 CONTAMINATED 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 OF THE HAZARDOUS PROPERTIES OF THE SUBSTANCE.

WEAR EYE PROTECTION TO PREVENT:

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

EMPLOYEE SHOULD WASH:

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL ENSURE THAT ALL EMPLOYEES SUBJECT TO SKIN CONTACT WITH THIS SUBSTANCE WASH WITH SOAP OR MILD DETERGENT AND WATER ANY AREAS OF THE BODY WHICH MAY HAVE CONTACTED THE SUBSTANCE AT THE END OF EACH WORK DAY.

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.

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.

WORK CLOTHING SHOULD BE CHANGED DAILY:

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL ENSURE THAT EMPLOYEES WHOSE CLOTHING MAY HAVE BECOME CONTAMINATED WITH THIS SUBSTANCE CHANGE INTO UNCONTAMINATED CLOTHING BEFORE LEAVING THE WORK PREMISES.

REMOVE CLOTHING:

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.

THE FOLLOWING EQUIPMENT SHOULD BE AVAILABLE:

FOLLOWING INFORMATION FROM NIOSH/OSHA "OCCUPATIONAL HEALTH GUIDELINES FOR CHEMICAL HAZARDS":

EMPLOYERS SHALL ENSURE THAT EMPLOYEES DO NOT EAT OR SMOKE IN AREAS WHERE THIS SUBSTANCE IS HANDLED, PROCESSED OR STORED.

RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED):

0.5 MG/M3

- CHEMICAL CARTRIDGE RESPIRATOR PROVIDING PROTECTION AGAINST SPECIFIC COMPOUND OF CONCERN
- SUPPLIED-AIR RESPIRATOR
- SELF-CONTAINED BREATHING APPARATUS

1.25 MG/M3

- SUPPLIED-AIR RESPIRATOR OPERATED IN CONTINUOUS FLOW MODE
- POWERED AIR-PURIFYING RESPIRATOR WITH CARTRIDGE PROVIDING PROTECTION AGAINST THE COMPOUND OF CONCERN

2.5 MG/M3

- SUPPLIED-AIR RESPIRATOR WITH A FULL FACE-PIECE
- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE-PIECE
- SUPPLIED-AIR RESPIRATOR WITH A TIGHT-FITTING FACEPIECE OPERATED IN A CONTINUOUS FLOW MODE
- CHEMICAL CARTRIDGE RESPIRATOR PROVIDING PROTECTION AGAINST SPECIFIC COMPOUND OF CONCERN WITH A FULL FACE-PIECE
- GAS MASK WITH A CANISTER PROVIDING PROTECTION AGAINST SPECIFIC COMPOUND OF CONCERN (CHIN-STYLE OR FRONTOR BACK-MOUNTED CANISTER)
- POWERED AIR-PURIFYING RESPIRATOR WITH A TIGHT-FITTING FACEPIECE AND CARTRIDGE PROVIDING PROTECTION AGAINST COMPOUND OF CONCERN

28 MG/M3

- SUPPLIED-AIR RESPIRATOR WITH HALF-MASK OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE

ESCAPE

- GAS MASK WITH A CANISTER PROVIDING PROTECTION AGAINST SPECIFIC COMPOUND OF CONCERN (CHIN-STYLE OR FRONTOR 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.

MS

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.

HISTORY OF ASTHMA OR ALLERGIES.

RESPIRATORY HISTORY.

PULMONARY FUNCTIONS.

CENTRAL NERVOUS SYSTEM TESTS, PERIPHERAL NEUROPATHY.

KIDNEY FUNCTION.

URINALYSIS.

NOTICE OF INTENT TO ESTABLISH: ACGIH BIOLOGICAL EXPOSURE INDICIES FOR MERCURY: 35 UG/G CREATININE TOTAL INORGANIC MERCURY IN URINE / TIMING -PRE-SHIFT 15 UG/L TOTAL INORGANIC MERCURY IN BLOOD / TIMING -END OF SHIFT AT END OF WORKWEEK.

RE

ROUTE OF ENTRY:

INHALATION. SKIN ABSORPTION. INGESTION. SKIN OR EYE CONTACT.

TO

TARGET ORGANS:

SKIN. RESPIRATORY SYSTEM. CENTRAL NERVOUS SYSTEM. KIDNEYS. EYES.

SP

SYMPTOMS:

SKIN, COVERING OF BODY (SC0174);

IRRITATION, EXTREME REACTION TO A CONDITION (SC0090).

EYE, ORGAN OF SIGHT (SC0170);

IRRITATION, EXTREME REACTION TO A CONDITION (SC0090). DYSPNEA, DIFFICULTY IN BREATHING (SC0052). COUGHING, FORCEFUL EXPIRATION (SC0173). FEVER, BODY TEMPERATURE ABOVE NORMAL (SC0067). NAUSEA, SICKNESS AT THE STOMACH (SC0115). VOMITING, PERTAINING TO NAUSEA (SC0166). DIARRHEA, UNCONTROLLED LOOSE BOWELS (SC0046). HEADACHE, PAIN IN HEAD OR CRANIUM AREA (SC0075). STOMATITIS, INFLAMMATION OF THE MOUTH (SC0395). SALIVATION, EXCESS DISCHARGE OF SALIVA (SC0146). METALLIC TASTE, TASTE RESEMBLING METAL IN MOUTH (SC0216).

SKIN, COVERING OF BODY (SC0174);

SENSITIZATION, ALLERGIC REACTION (SC0148). DERMATITIS, INFLAMMATION OF SKIN (SC0044).

PULMONARY, PERTAINING TO THE RESPIRATORY TRACT (SC0500);

SENSITIZATION, ALLERGIC REACTION (SC0148). BRONCHITIS, INFLAMED BRONCHIAL MUCOUS MEMBRANES (SC0017). PNEUMONITIS, LOCALIZED INFLAMMATION OF LUNG (SC0137). ENCEPHALITIS, INFLAMMATION OF THE BRAIN (SC0307).

TREMORS, TREMBLING, SHAKING (SC0197). ERETHISM, EXCESSIVE SENSIBILITY TO STIMULATION (SC0729). MENTAL DEPRESSION, ABSENCE OF CHEERFULNESS (SC0280). IRRITABILITY, QUICK EXCITABILITY TO ANNOYANCE (SC0091).

EXCITABILITY, SENSITIVITY TO EMOTIONAL STIMULATION (SC0592). FATIGUE,

TIREDDNESS, SLUGGISH (SC0066). INSOMNIA, INABILITY TO OBTAIN NORMAL SLEEP (SC0088). HALLUCINATIONS, PERCEPTIONS OF WHAT DOES NOT EXIST (SC0074). MEMORY DEFECTS, IMPERFECTION IN RECOLLECTION ABILITY (SC0585). MENTAL DISORDER, PSYCHIC DISTURBANCE (SC0608). PROTEINURIA, PROTEIN IN URINE, OFTEN ALBUMIN (SC0140). ALBUMINURIA, ALBUMIN (PROTEIN) IN URINE (SC0002). ANURIA, COMPLETE LACK OF URINATION (SC0304). GINGIVITIS, GUM INFLAMMATION (SC0515). GINGIVAL BLUE LINE, BLUE LINE ON GUMS (SC0575). EXTREMITIES, ARMS OR LEGS (SC0062); PAIN, SUFFERING, EITHER PHYSICAL OR MENTAL (SC0182). EXTREMITIES, ARMS OR LEGS (SC0062); NUMBNESS, COMBINED ANESTHESIA AND PARESTHESIA (SC0120). WEIGHT LOSS, DROP IN BODY WEIGHT (SC0104). ANOREXIA, DIMINISHED APPETITE (SC0006). SPEECH DIFFICULTIES, TROUBLES WITH VERBAL EXPRESSION (SC0614). ACIDOSIS ACID IMBALANCE (SC0290). PULMONARY, PERTAINING TO THE RESPIRATORY TRACT (SC0500); EDEMA, FLUID RETENTION WITH SWELLING (SC0181). DIARRHEA, UNCONTROLLED LOOSE BOWELS (SC0046). INCOORDINATION, LACK OF COORDINATION (SC0085). ANEMIA, RED BLOOD CELLS LESS THAN NORMAL (SC0004). KIDNEY DAMAGE, INJURY TO THE KIDNEY (SC0220). NERVE, BUNDLE OF NERVE FIBERS (SC0726); DAMAGE, PERMANENT INJURY (SC0287). REPRODUCTIVE EFFECTS, BIRTH DEFECTS (SC0281); IN EXPERIMENTAL ANIMALS, (SC0212). HEMATURIA, RED BLOOD CELLS IN URINE (SC0076). ALBUMINURIA, ALBUMIN (PROTEIN) IN URINE (SC0002). FEVER, BODY TEMPERATURE ABOVE NORMAL (SC0067). BLINDNESS, INABILITY TO SEE (SC0223);.

FA

FIRST AID.

(1 OF 5)

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.

(2 OF 5)

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.

(3 OF 5)

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.

(4 OF 5)

INGESTED MERCURY: REMOVE BY GASTRIC LAVAGE OR EMESIS. MAINTAIN BLOOD PRESSURE AND AIRWAY. GIVE OXYGEN IF RESPIRATION IS DEPRESSED. DO NOT PERFORM GASTRIC LAVAGE OR EMESIS IF VICTIM IS UNCONSCIOUS. GET MEDICAL ATTENTION IMMEDIATELY. ADMINISTRATION OF GASTRIC LAVAGE OR OXYGEN SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL. ANTIDOTE: GIVE DIMERCAPROL, 3 MG/KG (OR 0.3 ML/KG) EVERY 4 HOURS FOR THE FIRST 2 DAYS AND THEN 2 MG/KG EVERY 12 HOURS FOR A TOTAL OF 10 DAYS. DIMERCAPROL IS AVAILABLE AS A 10% SOLUTION IN OIL FOR INTRAMUSCULAR ADMINISTRATION. HEMODIALYSIS WILL SPEED THE REMOVAL OF THE MERCURY-DIMERCAPROL COMPLEX. PENICILLAMINE IS ALSO EFFECTIVE. GIVE UP TO 100 MG/KG/DAY (MAXIMUM 1 GM/DAY) DIVIDED



Genium Publishing Corporation

1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8854

Sheet No. 470
Diesel Fuel Oil No. 2-D

Issued: 10/81

Revision: A, 11/90

Section 1. Material Identification

33

Diesel Fuel Oil No. 2-D Description: Diesel fuel is obtained from the middle distillate in petroleum separation; a distillate oil of low sulfur content. It is composed chiefly of unbranched paraffins. Diesel fuel is available in various grades, one of which is synonymous with fuel oil No. 2-D. This diesel fuel oil requires a minimum Cetane No. (efficiency rating for diesel fuel comparable to octane number ratings for gasoline) of 40 (ASTM D613). Used as a fuel for trucks, ships, and other automotive engines; as mosquito control (coating on breeding waters); and for drilling muds.

Other Designations: CAS No. 68334-30-5, diesel fuel.

Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*^(TM) for a suppliers list.

R 1
I -
S 2
K 2



HMIS
H 0
F 2
R 0
PPG*
* Sec. 8

Cautions: Diesel fuel oil No. 2-D is a skin irritant and central nervous depressant with high mist concentrations. It is an environmental hazard and moderate fire risk.

Section 2. Ingredients and Occupational Exposure Limits

Diesel fuel oil No. 2-D*

1989 OSHA PEL
None established

1990-91 ACGIH TLV
Mineral Oil Mist
TWA: 5 mg/m³†
STEL: 10 mg/m³

1988 NIOSH REL
None established

1985-86 Toxicity Data‡
Rat, oral, LD₅₀: 9 g/kg produces gastrointestinal (hypermotility, diarrhea) effects

* Diesel fuel No. 2-D tends to be low in aromatics and high in paraffinics. This fuel oil is complex mixture of: 1) >95% paraffinic, olefinic, naphthenic, and aromatic hydrocarbons, 2) sulfur (<0.5%), and 3) benzene (<100 ppm). [A low benzene level reduces carcinogenic risk. Fuel oils can be exempted under the benzene standard (29 CFR 1910.1028)]. Although low in the fuel itself, benzene concentrations are likely to be much higher in processing areas.

† As sampled by nonvapor-collecting method.

‡ Monitor NIOSH, RTECS (HZ1800000), for future toxicity data.

Section 3. Physical Data

Boiling Point Range: 340 to 675 °F (171 to 358 °C)

Specific Gravity: <0.86

Viscosity: 1.9 to 4.1 centistoke at 104 °F (40 °C)

Water Solubility: Insoluble

Appearance and Odor: Brown, slightly viscous liquid.

Section 4. Fire and Explosion Data

Flash Point: 125 °F (52 °C) min.

Autoignition Temperature: >500 °F (932 °C)

LEL: 0.6% v/v

UEL: 7.5% v/v

Extinguishing Media: Use dry chemical, carbon dioxide, or foam to fight fire. Use a water spray to cool fire exposed containers. Do not use a forced water spray directly on burning oil since this will scatter the fire. Use a smothering technique for extinguishing fire.

Unusual Fire or Explosion Hazards: Diesel fuel oil No. 2-D is a OSHA Class II combustible liquid. Its volatility is similar to that of gas oil. Vapors may travel to a source of ignition and flash back.

Special Fire-fighting Procedures: Isolate hazard area and deny entry. Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode and full protective clothing. If feasible, remove containers from fire. Be aware of runoff from fire control methods. Do not release to sewers or waterways due to pollution and fire or explosion hazard.

Section 5. Reactivity Data

Stability/Polymerization: Diesel fuel oil No. 2-D is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.

Chemical Incompatibilities: It is incompatible with strong oxidizing agents; heating greatly increases the fire hazard.

Conditions to Avoid: Avoid heat and ignition sources.

Hazardous Products of Decomposition: Thermal oxidative decomposition of diesel fuel oil No. 2-D can produce various hydrocarbons and hydrocarbon derivatives, and other partial oxidation products such as carbon dioxide, carbon monoxide, and sulfur dioxide.

Section 6. Health Hazard Data

Carcinogenicity: Although the IARC has not assigned an overall evaluation to diesel fuels as a group, it has evaluated occupational exposures in petroleum refining as an IARC probable human carcinogen (Group 2A). It has evaluated distillate (light) diesel oils as not classifiable as human carcinogens (Group 3).

Summary of Risks: Although diesel fuel's toxicologic effects should resemble kerosine's, they are somewhat more pronounced due to additives such as sulfurized esters. Excessive inhalation of aerosol or mist can cause respiratory tract irritation, headache, dizziness, nausea, vomiting, and loss of coordination, depending on concentration and exposure time. When removed from exposure area, affected persons usually recover completely. If vomiting occurs after ingestion and if oil is aspirated into the lungs, hemorrhaging and pulmonary edema, progressing to renal involvement and chemical pneumonitis, may result. A comparative ratio of oral to aspirated lethal doses may be 1 pt vs. 5 ml. Aspiration may also result in transient CNS depression or excitement. Secondary effects may include hypoxia (insufficient oxygen in body cells), infection, pneumatocele formation, and chronic lung dysfunction. Inhalation may result in euphoria, cardiac dysrhythmias, respiratory arrest, and CNS toxicity. Prolonged or repeated skin contact may irritate hair follicles and block sebaceous glands, producing a rash of acne pimples and spots, usually on arms and legs.

Medical Conditions Aggravated by Long-Term Exposure: None reported.

Target Organs: Central nervous system, skin, and mucous membranes.

Primary Entry Routes: Inhalation, ingestion.

Acute Effects: Systemic effects from ingestion include gastrointestinal irritation, vomiting, diarrhea, and in severe cases central nervous system depression, progressing to coma or death. Inhalation of aerosols or mists may result in increased rate of respiration, tachycardia (excessively rapid heart beat), and cyanosis (dark purplish discoloration of the skin and mucous membranes caused by deficient blood oxygenation).

Chronic Effects: Repeated contact with the skin causes dermatitis.

FIRST AID

Eyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.

Skin: Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. If large areas of the body have been exposed or if irritation persists, get medical help immediately. Wash affected area with soap and water.

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, do not induce vomiting due to aspiration hazard.

Contact a physician immediately. Position to avoid aspiration.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Gastric lavage is contraindicated due to aspiration hazard. Preferred antidotes are charcoal and milk. In cases of severe aspiration pneumonitis, consider monitoring arterial blood gases to ensure adequate ventilation. Observe the patient for 6 hr. If vital signs become abnormal or symptoms develop, obtain a chest x-ray.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, evacuate area for large spills, remove all heat and ignition sources, and provide maximum explosion-proof ventilation. Cleanup personnel should protect against vapor inhalation and liquid contact. Clean up spills promptly to reduce fire or vapor hazards. Use a noncombustible absorbent material to pick up small spills or residues. For large spills, dike far ahead to contain. Pick up liquid for reclamation or disposal. Do not release to sewers or waterways due to health and fire and/or explosion hazard. Follow applicable OSHA regulations (29 CFR 1910.120). Diesel fuel oil No. 2-D spills may be environmental hazards. Report large spills.

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

EPA Designations

RCRA Hazardous Waste (40 CFR 261.21): Ignitable waste

CERCLA Hazardous Substance (40 CFR 302.4): Not listed

SARA Extremely Hazardous Substance (40 CFR 355): Not listed

SARA Toxic Chemical (40 CFR 372.65): Not listed

OSHA Designations

Air Contaminant (29 CFR 1910.1000, Subpart Z): Not listed

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).

Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use a NIOSH-approved respirator with a mist filter and organic vapor cartridge. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.*

Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact.

Ventilation: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations that promote worker safety and productivity. Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.^(M)

Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.

Contaminated Equipment: Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Use and storage conditions should be suitable for a OSHA Class II combustible liquid. Store in closed containers in a well-ventilated area away from heat and ignition sources and strong oxidizing agents. Protect containers from physical damage. To prevent static sparks, electrically ground and bond all containers and equipment used in shipping, receiving, or transferring operations. Use nonsparking tools and explosion-proof electrical equipment. No smoking in storage or use areas.

Engineering Controls: Avoid vapor or mist inhalation and prolonged skin contact. Wear protective rubber gloves and chemical safety glasses where contact with liquid or high mist concentration may occur. Additional suitable protective clothing may be required depending on working conditions. Institute a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Practice good personal hygiene and housekeeping procedures. Do not wear oil contaminated clothing. At least weekly laundering of work clothes is recommended. Do not put oily rags in pockets. When working with this material, wear gloves or use barrier cream.

Transportation Data (49 CFR 172.101)

DOT Shipping Name: Fuel oil

DOT Hazard Class: Combustible liquid

ID No.: NA1993

DOT Label: None

DOT Packaging Exceptions: 173.118a

DOT Packaging Requirements: None

MSDS Collection References: 1, 6, 7, 12, 73, 84, 101, 103, 126, 127, 132, 133, 136, 143, 146

Prepared by: MJ Allison, BS; Industrial Hygiene Review: DJ Wilson, CIH; Medical Review: AC Darlington, MD; Edited by: JR Stuart, MS



Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8854

Material Safety Data Sheets Collection:

Sheet No. 467
Automotive Gasoline, Lead-free

Issued: 10/81 Revision: A, 9/91

Section 1. Material Identification

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Automotive Gasoline, Lead-free, Description: A mixture of volatile hydrocarbons composed mainly of branched-chain paraffins, cycloparaffins, olefins, naphthenes, and aromatics. In general, gasoline is produced from petroleum, shale oil, Athabasca tar sands, and coal. Motor gasolines are made chiefly by cracking processes, which convert heavier petroleum fractions into more volatile fractions by thermal or catalytic decomposition. Widely used as fuel in internal combustion engines of the spark-ignited, reciprocating type. Automotive gasoline has an octane number of approximately 90. A high content of aromatic hydrocarbons and a consequent high toxicity are also associated with a high octane rating. Some gasolines sold in the US contain a minor proportion of tetraethyllead, which is added in concentrations not exceeding 3 ml per gallon to prevent engine "knock." However, methyl-tert-butyl ether (MTBE) has almost completely replaced tetraethyllead.

R 1
I 2
S 2*
K 4
* Skin absorption

NFPA

3	0
1	0

HMIS
H 2
F 3
R 1
PPG†
† Sec. 8

Other Designations: CAS No. 8006-61-9, benzin, gasoline, gasolene, motor spirits, natural gasoline, petrol.
Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*^(TM) for a suppliers list.

Cautions: Inhalation of automotive gasoline vapors can cause intense burning in throat and lungs, central nervous system (CNS) depression, and possible fatal pulmonary edema. Gasoline is a dangerous fire and explosion hazard when exposed to heat and flames.

Section 2. Ingredients and Occupational Exposure Limits

Automotive gasoline, lead-free*

1990 OSHA PELs

8-hr TWA: 300 ppm, 900 mg/m³

15-min STEL: 500 ppm, 1500 mg/m³

1990-91 ACGIH TLVs

TWA: 300 ppm, 890 mg/m³

STEL: 500 ppm, 1480 mg/m³

1990 NIOSH REL

None established

1985-86 Toxicity Data*

Man, inhalation, TC_L: 900 ppm/1 hr; toxic effects include sense organs and special senses (conjunctiva irritation), behavioral (hallucinations, distorted perceptions), lungs, thorax, or respiration (cough)

Human, eye: 140 ppm/8 hr; toxic effects include mild irritation

Rat, inhalation, LC₅₀: 300 g/m³/5 min

* A typical modern gasoline composition is 80% paraffins, 14% aromatics, and 6% olefins. The mean benzene content is approximately 1%. Other additives include sulfur, phosphorus, and MTBE.

† See NIOSH, RTECS (LX3300000), for additional toxicity data.

Section 3. Physical Data

Boiling Point: Initially, 102 °F (39 °C); after 10% distilled, 140 °F (60 °C); after 50% distilled, 230 °F (110 °C); after 90% distilled, 338 °F (170 °C); final boiling point, 399 °F (204 °C)

Vapor Density (air = 1): 3.0 to 4.0

Density/Specific Gravity: 0.72 to 0.76 at 60 °F (15.6 °C)

Water Solubility: Insoluble

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

Section 4. Fire and Explosion Data

Flash Point: -45 °F (-43 °C)

Autolignition Temperature: 536 to 853 °F (280 to 456 °C)

LEL: 1.3% v/v

UEL: 6.0% v/v

Extinguishing Media: Use dry chemical, carbon dioxide, or alcohol foam as extinguishing media. Use of water may be ineffective to extinguish fire, but use water spray to knock down vapors and to cool fire-exposed drums and tanks to prevent pressure rupture. Do not use a solid stream of water since it may spread the fuel.

Unusual Fire or Explosion Hazards: Automobile gasoline is an OSHA Class IB flammable liquid and a dangerous fire and explosion hazard when exposed to heat and flames. Vapors can flow to an ignition source and flash back. Automobile gasoline can also react violently with oxidizing agents.

Special Fire-fighting Procedures: Isolate hazard area and deny entry. Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode, and full protective clothing. When the fire is extinguished, use nonsparking tools for cleanup. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Automotive gasoline is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.

Chemical Incompatibilities: Automotive gasoline can react with oxidizing materials such as peroxides, nitric acid, and perchlorates.

Conditions to Avoid: Avoid heat and ignition sources.

Hazardous Products of Decomposition: Thermal oxidative decomposition of automotive gasoline can produce oxides of carbon and partially oxidized hydrocarbons.

Section 6. Health Hazard Data

Carcinogenicity: In 1990 reports, the IARC list gasoline as a possible human carcinogen (Group 2B). Although the IARC has assigned an overall evaluation to gasoline, it has not assigned an overall evaluation to specific substances within this group (inadequate human evidence).

Summary of Risks: Gasoline vapors are considered moderately poisonous. Vapor inhalation can cause central nervous system (CNS) depression and mucous membrane and respiratory tract irritation. Brief inhalations of high concentrations can cause a fatal pulmonary edema. Reported responses to gasoline vapor concentrations are: 160 to 270 ppm causes eye and throat irritation in several hours; 500 to 900 ppm causes eye, nose, and throat irritation, and dizziness in 1 hr; and 2000 ppm produces mild anesthesia in 30 min. Higher concentrations are intoxicating in 4 to 10 minutes. If large areas of skin are exposed to gasoline, toxic amounts may be absorbed. Repeated or prolonged skin exposure causes dermatitis. Certain individuals may develop hypersensitivity. Ingestion can cause CNS depression. Pulmonary aspiration after ingestion can cause severe pneumonitis. In adults, ingestion of 20 to 50 g gasoline may produce severe symptoms of poisoning.

Medical Conditions Aggravated by Long-Term Exposure: None reported.

Target Organs: Skin, eye, respiratory and central nervous systems.

Primary Entry Routes: Inhalation, ingestion, skin contact.

Acute Effects: Acute inhalation produces intense nose, throat, and lung irritation; headaches; blurred vision; conjunctivitis; flushing of the face; mental confusion; staggering gait; slurred speech; and unconsciousness, sometimes with convulsions. Ingestion causes inebriation (drunkenness), vomiting, dizziness, fever, drowsiness, confusion, and cyanosis (a blue to dark purplish coloration of skin and mucous membrane caused by lack of oxygen). Aspiration causes choking, cough, shortness of breath, increased rate of respiration, excessively rapid heartbeat, fever, bronchitis, and pneumonitis. Other symptoms following acute exposure include acute hemorrhage of the pancreas, fatty degeneration of the liver and kidneys, and passive congestion of spleen.

Chronic Effects: Chronic inhalation results in appetite loss, nausea, weight loss, insomnia, and unusual sensitivity (hyperesthesia) of the distal extremities followed by motor weakness, muscular degeneration, and diminished tendon reflexes and coordination. Repeated skin exposure can cause blistering, drying, and lesions.

FIRST AID

Eyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.

Skin: Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. For reddened or blistered skin, consult a physician. Wash affected area with soap and water.

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, *do not induce vomiting* due to aspiration hazard.

Give conscious victim a mixture of 2 tablespoons of activated charcoal mixed in 8 oz of water to drink. Consult a physician immediately.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, evacuate all unnecessary personnel, remove heat and ignition sources, and provide maximum explosion-proof ventilation. Cleanup personnel should protect against vapor inhalation and liquid contact. Use nonsparking tools. Take up small spills with sand or other noncombustible adsorbent. Dike storage areas to control leaks and spills. Follow applicable OSHA regulations (29 CFR 1910.120).

Aquatic Toxicity: Bluegill, freshwater, LC₅₀ 8 ppm/96 hr.

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

EPA Designations

RCRA Hazardous Waste (40 CFR 261.21): Characteristic of ignitability

CERCLA Hazardous Substance (40 CFR 302.4): Not listed

SARA Extremely Hazardous Substance (40 CFR 355): Not listed

SARA Toxic Chemical (40 CFR 372.65): Not listed

OSHA Designations

Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Since contact lens use in industry is controversial, establish your own policy.

Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. There are no specific NIOSH recommendations. However, for vapor concentrations not immediately dangerous to life or health, use chemical cartridge respirator equipped with organic vapor cartridge(s), or a supplied-air respirator. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.*

Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Materials such as neoprene or polyvinyl alcohol provide excellent/good resistance for protective clothing. Note: Resistance of specific materials can vary from product to product.

Ventilation: Provide general and local explosion-proof exhaust ventilation systems to maintain airborne concentrations below the OSHA PELs (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.⁽⁹⁹⁾

Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.

Contaminated Equipment: Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

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

Engineering Controls: Avoid vapor inhalation and skin or eye contact. Consider a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Indoor use of this material requires explosion-proof exhaust ventilation to remove vapors. Only use gasoline as a fuel source due to its volatility and flammable/explosive nature. Practice good personal hygiene and housekeeping procedures. Wear clean work clothing daily.

Transportation Data (49 CFR 172.101, .102)

DOT Shipping Name: Gasoline (including casing-head and natural)

DOT Hazard Class: Flammable liquid

ID No.: UN1203

DOT Label: Flammable liquid

DOT Packaging Exceptions: 173.118

DOT Packaging Requirements: 173.119

IMO Shipping Name: Gasoline

IMO Hazard Class: 3.1

ID No.: UN1203

IMO Label: Flammable liquid

IMDG Packaging Group: II

MSDS Collection References: 26, 73, 89, 100, 101, 103, 124, 126, 127, 132, 133, 136, 138, 140, 143, 146, 153, 159

Prepared by: M Allison, BS, Industrial Hygiene Review: DJ Wilson, CIH; Medical Review: W Silverman, MD; Edited by: JR Stuart, MS

APPENDIX B

RESPIRATORY PROTECTION PROGRAM

APPENDIX B

RESPIRATORY PROTECTION PROGRAM FOR NAVAL TRAINING CENTER SITE 4 AND SITE 12 GREAT LAKES, ILLINOIS

The following respirator program is in accordance with OSHA 29 CFR 1910.134 and 29 CFR 1926.58 Subpart D Respiratory Protection Program requirements. These govern the selection and use of respirators on the sites.

Respirators for the SEC Donohue field sampling team will be provided by SEC Donohue Inc. The respirator protection program will be administered by, and is the responsibility of the Corporate Health and Safety Manager (CHSM) and/or Site Safety Officer (SSO) for the site. Subcontractors, if any, will furnish their own respirators and medical surveillance for their employees. The CHSM and/or SSO will be responsible for determining if they are in compliance with this respirator program before work begins.

The respirators will be selected according to the hazard and level of protection determined by air monitoring, action levels, and the decision of the CHSM and/or the SSO. The respirators and levels are:

<u>Level</u>	<u>Respirator</u>
C	Full-face air purifying respirator with combination dust (HEPA) and organic vapor/acid gas cartridge. This is also used with the power air equipment. Level C is greater than 0.1 f/cc for asbestos. The full facepiece respirator with combination dust and organic vapor/acid gas cartridge will be appropriate for the dust conditions, asbestos, and lead that may be encountered.
D	No respirator required. Level D is 0.1 f/cc or less for asbestos.

Level C Respiratory Protection for asbestos sampling activities will be conducted with use of a PAPR power flow respirator.

The respirator users will be fit-tested with the size, style, and make of the respirator they will be using on-site. The fit-test will be recorded and these Fit-Test Records will be maintained at the Command Post.

Employee respirator training is provided on an annual basis or at six-month intervals for those working with asbestos and at site-specific training sessions. This training includes:

- A discussion of the nature of the respiratory hazards and the dangers if the respirator is not used properly.
- The reasons that respirators are required for protection, along with any engineering controls that may be used.
- Instruction in the selection, use, sanitary care, maintenance, proper storage, and limitation of the full facepiece respirator with combination cartridge.
- Practice in proper fitting, wearing, adjusting, and checking the face seal of a respirator.
- An opportunity to handle the respirator.
- Instruction on how to recognize and cope with emergency situations requiring respiratory protection.
- Explanation of the medical surveillance program and how it relates to respirator use.
- Explanation of the requirements for maintaining a tight seal, why beard and facial hair, chewing gum, or tobacco or smoking is prohibited, and why use of contact lenses while wearing respirators is prohibited.

Respirators will be assigned to individual workers. Each individual shall be responsible for cleaning and maintaining their assigned respirator. They will be cleaned and disinfected before being reassigned. Respirators will be cleaned after each day of work according to manufacturer's instruction or more frequently as needed. The cleaning will be done at the Command Post. Used cartridges will be properly disposed of and replaced with new ones.

After cleaning, the respirators will be inspected and checked for defects such as excessive dirt, cracks or other distortions, scratches, incorrectly mounted lens, broken or worn cartridge holders on the facepiece, breaks, loss of elasticity, broken buckles, and excessively worn serrations on head harness that may cause slippage on the headstraps or head harness.

Further checks include:

- A check of the tightness of the connections.
- A check of the facepiece, valves, connecting tube, and canisters.
- For air purifying:
 - Check the exhalation valve after removing its cover for:
 - Foreign material, such as detergent residue, dust particles, or human hair under the valve seat.
 - Cracks, tears, or distortion in the valve material.
 - Improper insertion of the valve body in the facepiece.
 - Cracks, breaks, or chips in the valve body, particularly in the sealing surface.
 - Missing or defective valve cover.
 - Improper installation of the valve in the valve body.
 - Check the air purifying elements for:
 - Incorrect cartridges, canister, or filter for the hazard.
 - Incorrect installation, loose connections, missing or worn gaskets, or cross threading in holder.
 - Expired shelf life of cartridge or canister.
 - Cracks, dents, or breaks in the cartridge or canisters case.
 - Evidence of prior use of cartridge or canister, such as broken seal tape foil or other sealing material.
 - Check the breathing tube on supplied air units for:
 - Broken or missing end connectors, gaskets, or O-rings.
 - Missing or loose hose clamp.
 - Deterioration (done by stretching hose and looking for cracks).

Air monitoring of the work zone will be performed and the results will be used to select the appropriate level of protection. Refer to the air monitoring section of the Health and Safety Plan (HASP, Section 9.0).

The respiratory protection program will be re-evaluated and revisions and updates added regularly.

Persons will not be assigned to tasks requiring the use of respirators unless it has been determined by a physician that they are physically able to perform the work and use the equipment. SEC Donohue personnel will be examined by the SEC Donohue contracted physician who will determine what health and physical conditions are pertinent.

Only those respirators jointly approved by NIOSH/MSHA shall be used. All component parts (i.e., canister, replacement straps, etc.) will be of the same manufacturer.

R/71HSPD/AA2

APPENDIX C

HEALTH AND SAFETY FIELD MODIFICATION FORM

