PHILIPS DISPLAY COMPONENTS COMPANY
SENECA FALLS, NEW YORK

RCRA FACILITY ASSESSMENT
SAMPLING VISIT WORK PLAN/
RCRA FACILITY INVESTIGATION
OF THE MW-1 AREA

VOLUME III
HEALTH AND SAFETY PLAN

Prepared by:

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
3000 TECH CENTER DRIVE
MONROEVILLE, PA 15146

PROJECT NO. 288788-13

JUNE 1990

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KEYSTONE ENVIRONMENTAL RESOURCES, INC.

1.0 OVERVIEW

This site-specific Health and Safety Plan (HASP) was developed to provide guidance for employees of Keystone Environmental Resources, Inc. (Keystone) and other personnel (Subcontractors, etc.) who may encounter hazardous materials while performing work activities at the former Philips Display Components Company, Seneca Falls, New York. The HASP addresses potential problems which may occur through contact with hazardous materials while performing a particular set of tasks. The HASP provides:

- o on-site organization;
- o coordination and control;
- o hazard evaluation;
- o equipment and monitoring recommendations; and,
- o emergency procedures.

Any changes to the HASP must be approved by the Project Manager and Occupational Health and Safety Manager. A copy of the HASP must be kept on-site and be available for reference and inspection.

2.0 SUMMARY

Level D personal protective equipment (PPE; see Table 7-1) shall be worn while observing any activity where soil is disturbed, such as soil and well borings. Modified Level D PPE is recommended while performing soil and groundwater sampling activities, or any activity where contact with soil and groundwater is likely. Action levels for respiratory protection are contained in Section 9.0. Ambient air should be monitored every 30 minutes with an HNU meter. No respirator is required to be worn when the HNU reading is less than 5 ppm above background. When HNU reading are between 5-10 ppm above background, a full face Air Purifying Respirator (APR) with organic vapor cartridges shall be worn, and the monitoring frequency shall be determined by the Site Health and Safety Officer (SHSO) (see Section 5.0).

3.0 SITE DESCRIPTION

3.1 Location: Philips Display Components Company, Seneca Falls, New York

3.2 Potential Hazards:

1. Dermal contact with potentially contaminated soil, water, and groundwater.

2. Inhalation of organic vapors encountered while sampling soil and groundwater.

3. Underground and overhead hazards encountered in drilling.

4. General physical hazards (slips, trips, falls, etc.).

5. Confined Space Entry.

3.3 Work Areas: (See Figure 1)

1. Primary, interim and satellite container storage areas.

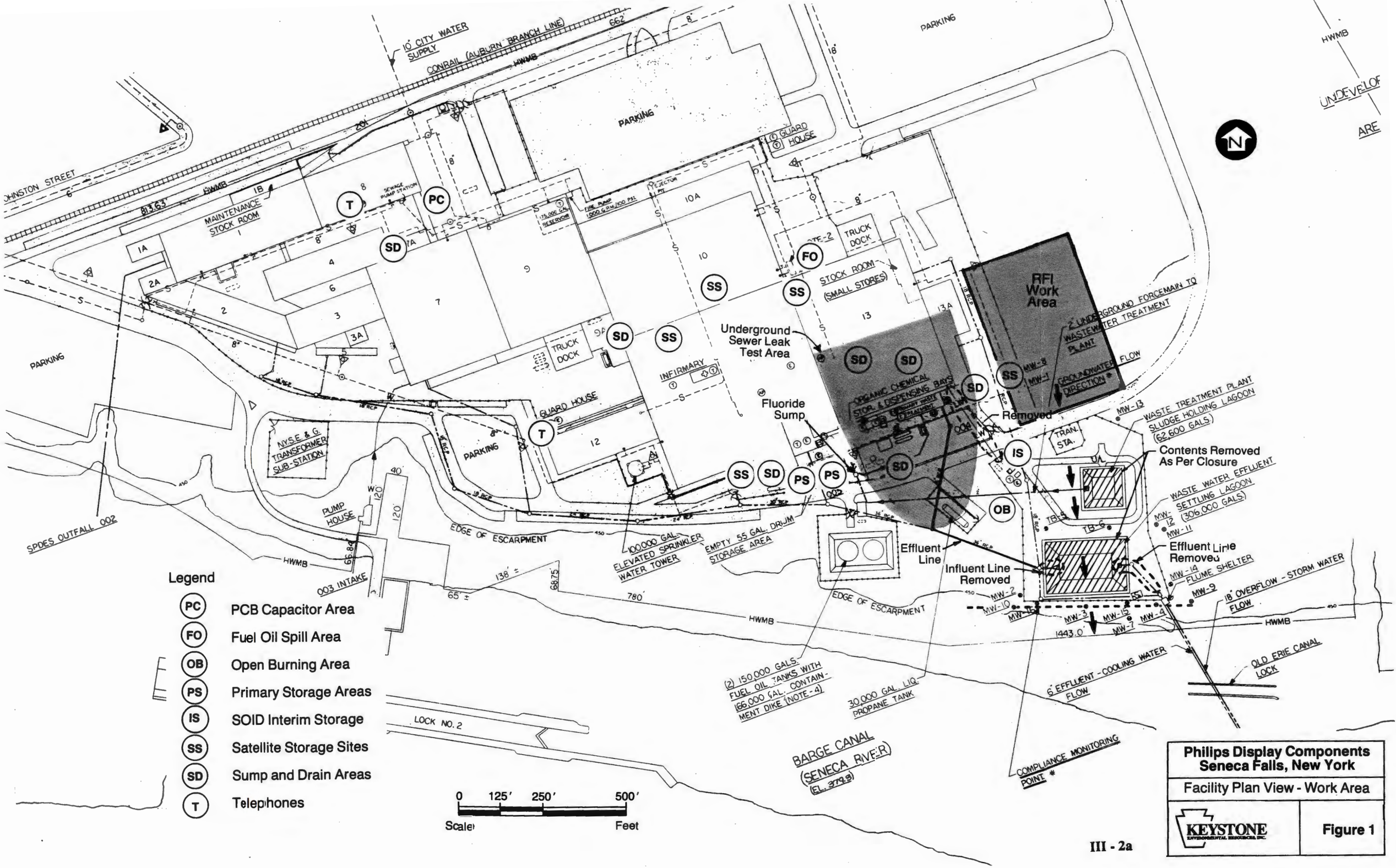
2. Former open burning area.

3. Fuel oil release area.

4. Existing and new monitoring wells for groundwater sampling.

5. Process areas inside plant buildings.

6. PCB capacitor storage area.



Philips Display Components
Seneca Falls, New York

Facility Plan View - Work Area

KEYSTONE ENVIRONMENTAL RESOURCES, INC.

Figure 1

7. Area surrounding MW-1 for RCRA Facility Investigation (RFI).

4.0 OBJECTIVES

Keystone has been retained to coordinate the RCRA Facility Assessment Sampling Visit for the former Philips Display Components Company (Philips) facility in Seneca Falls, New York. Keystone personnel assigned to the investigation will observe soil boring activities inside and outside plant buildings and perform groundwater, water, and soil sampling.

The Resource Conservation and Recovery Act (RCRA) requires a Corrective Action Program for all releases of hazardous waste or constituents from any solid waste management unit (SWMU). Philips is engaged in the RCRA Facility Assessment (RFA) phase of the Corrective Action Program to identify sources of release from their SWMUs. The RFA phase requires the implementation of a Sampling Visit at the site. The RCRA Facility Assessment Sampling Visit fulfills this aspect of the RFA.

Philips is also engaged in the RCRA Facility Investigation (RFI) phase of the Corrective Action Program to fully characterize the extent of releases in the MW-1 Area (See Figure 1). This Health and Safety Plan also fulfills this aspect of the RFI.

5.0 ON-SITE ORGANIZATION AND RESPONSIBILITIES

5.1 Organization

Project Manager	Henry Owoc	412-825-9821
Team Leader/Coordinator	Gianni Chieruzzi	412-825-9820
Health and Safety Officer	James M. Thomas,II	412-825-9639
Philips Contact	William M. Rupert	419-523-4321

5.2 Responsibilities

5.2.1 Project Manager

The Project Manager is ultimately responsible for the implementation, maintenance, and compliance with the site HASP. This responsibility may be delegated to the SHSO.

He/she directs and approves all plans and schedules for on-site activities and has primary authority for all site decisions.

5.2.2 Health and Safety Officer

A Site Health and Safety Officer (SHSO), who will be designated, will be responsible for all health and safety activities for air monitoring activities, for overseeing the decontamination of equipment and materials leaving the contaminated area, and for providing and enforcing the use of personal protective equipment and clothing. The SHSO will have experience in field operations with air monitoring equipment, personal protective equipment and clothing, decontamination procedures and emergency response procedures. A Health and Safety professional will be responsible for the training of on-site personnel. The SHSO will also work with health and safety personnel of subcontractors in the implementation of this site health and safety plan. The SHSO has the authority to stop any operation that threatens the health or safety of the team or surrounding populace. The daily health and safety activities may be conducted by the SHSO or his/her designee.

The SHSO has completed 40 hour OSHA training and 8 hours OSHA Manager training. He/she has authority to implement the HASP and verify compliance and to direct on-site safety operations on a daily basis. The SHSO reports to Project Manager.

5.2.3 Team Leader/Coordinator

The On-site Supervisor is responsible for field implementation of the health and safety program when the SHSO is not present. This responsibility includes advising site workers of the specific health and safety requirements and consulting with the SHSO or a Health and Safety professional regarding appropriate changes to the health and safety plan.

5.2.4 Philips Contact

The Philips Project Manager is located at the Philips facility in Ottawa, Ohio (Refer to table 11-1 for phone numbers). He should be immediately notified of any plant or environmental problem or emergency.

5.3 Site Personnel

All site personnel will be responsible for working in a safe and healthful manner. They will be required to comply with all applicable local, state and federal health and safety rules, regulations, and standards. Field sampling personnel will be responsible for knowing of and complying with all aspects of the HASP.

Subcontractors will be provided with a copy of this HASP for reference purposes.

6.0 ON-SITE CONTROL

The purpose of site control is to minimize potential contamination of workers, and protect the public from the site's hazards. The site work areas shown on Figure 1 will be established by using flagging or barrier tape to prevent bystanders and non essential personnel from entering the active work areas.

All personnel will enter the facility at the "B Guard House" on Johnston Street north of Building 12 (see Figure 1).

7.0 HAZARD EVALUATION

7.1. Dermal Hazards

7.1.1 Groundwater

The organic compounds which were detected in previous groundwater samples from the Philips facility are considered to be of moderate to slight dermal toxicity in their pure forms. In the concentrations detected at the Seneca Falls facility, their dermal hazard is negligible.

Volatile organic analysis of groundwater samples from upgradient monitoring well MW-1 taken quarterly from August 1986 to April 1990 exhibited detectable concentrations of 1,1-dichloroethane, 1,1-dichloroethylene, and 1,1,1-trichloroethane at frequencies greater than 60 percent. Concentrations of these compounds and other compounds which were infrequently detected (less than 25% are presented in the RFI, Section 4.0. Various volatile organic compounds were detected infrequently in other wells close to the wastewater impoundment. These compounds and their respective concentrations are also presented in the RFI, Section 4.0.

7.1.2 Soils

Evaluation of the dermal contact hazard from soils within the target work areas is based on the assumption that there may exist in the soil detectable concentrations of organic compounds as a result of prior site activities. No analysis of organic compounds was performed on previous soil samples.

Solvents which may have been released during spill episodes between 1978 and 1980 in the container storage areas are: trichloroethylene, 1,1,1-trichloroethane, perchloroethylene, methylene chloride and mineral spirits. These compounds may be present in soil samples from spill areas. The potential for adverse human health effects from low levels of these compounds in soil is very low.

The dermal hazard posed by potential metal contamination is low to negligible. Lead carbonate filter cake waste was stored in the container storage area. Inorganic lead compounds may be absorbed by the skin when applied in high concentrations. The amounts of lead expected to be in soil samples are very low, and do not have a high dermal toxicity potential.

Chromium compounds primarily exert their toxic effects when exposure is by inhalation. Exposure to certain hexavalent chromium compounds has been associated with increased risk of lung cancer. The Philips facility had a chromium treatment system which reduced hexavalent chromium to the less toxic trivalent form. At the Philips facility, chromium compounds were sometimes associated with organic solvents, such as the methanol-chromium photoresist solution. No hexavalent chromium or EP Toxicity metals were detected in any of the soil samples taken from inside of the waste water lagoons in December 1987. Levels of total chromium and lead were less than 25 ppm. The amounts of chromium expected to be in soil samples are very low, and do not have a high dermal toxicity potential.

Dermal PPE recommendations (see Table 7-1) are based on the potential for low level organic solvent exposure. Protective equipment shall be worn to avoid contact with soil and groundwater. Care should be taken not to eat, drink, smoke or apply cosmetics during work hours after handling soil or groundwater samples. Personnel are strongly encouraged to shower after the day's activities.

7.2 Inhalation Hazards

The inhalation hazards associated with observing soil drilling and performing soil and groundwater sampling at the Philips facility are low to negligible. Dust respirators may be worn under dusty conditions.

Inhalation hazards associated with soil and groundwater sampling is low. Sampling personnel should monitor the sample area air with an HNU meter according to the monitoring recommendations (see Table 8-1).

TABLE 7-1

PERSONAL PROTECTIVE EQUIPMENT FOR SOIL BORING AND SAMPLING

Modified Level D

Eye protection (mandatory)
Tyvek coveralls
Hard hat
Steel toe/shank work boots
Hearing protection (as needed)
Neoprene outer gloves
Latex inner gloves (as needed)
Water resistant outerboots (as needed)

Level D

Eye protection (mandatory)
Coveralls (as needed)
Hard hat
Steel toe/shank work boots
Hearing protection (as needed)
Gloves (as needed)

Respiratory Protection

a. Full facepiece Air Purifying Respirator (APR) Cartridge types: organic vapor (OV) or combination OV/filter (MSA types GMA or GMA-F)

b. Disposable dust respirator (optional).

Level D personal protective equipment shall be worn while observing any activity where soil is disturbed such as soil and well borings.

Modified Level D personal protective equipment shall be worn while performing soil, water, and groundwater sampling activities.

Respiratory protective equipment is recommended based on air monitoring readings. Respirators will be available to all personnel at all times. Please refer to Table 9-1, "Action Levels and Monitoring Recommendations" for respirator use guidance. Under dusty conditions, disposable dust respirators are optional.

If during the course of the project air quality monitoring data indicates that the level of air quality readings are below established action levels ,consistently, at the descression of the site health and safety officer after consultation with the Manager of Occupational Health and Safety, the level of protection can be downgraded.

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*Note: Glove (protective clothing) material selection is based on best judgment, considering all potential solvent contacts, but, no one glove (protective clothing) material is resistant to permeation and degradation by all solvents. Thus, care must be taken to examine the gloves (protective clothing) while being worn and when removed for physical condition (tears, holes, split seams, etc.) and signs of liquid permeation/degradation.

Threshold Limit Value - Time Weighted Average (TLV-TWA) represents the time-weighted average concentration for an eight hour workday and a forty hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. The TLV-Short Term Exposure Limit (STEL) is defined as a fifteen minute time-weighted average exposure which should not be exceeded at any time during a work day even if the eight-hour time-weighted average is within the TLV/TWA. The OSHA Permissible Exposure Limits (PELs) are those TLV-TWAs which have been adopted by OSHA under 29 CFR 1910.1000 (see Table 7-2).

The applicable OSHA PELs from 29 CFR 1910.1000, TLV-TWAs and TLV-STELs from the American Conference of Governmental Industrial Hygienist (ACGIH) are listed in Table 7-2, where available. Additional data on occupational health effects of these compounds is included as Appendix A.

7.3 Physical Hazards

There are physical hazards associated with drilling. Drilling may not proceed without prior clearance from Philips personnel. Location of overhead power lines should be noted prior to drilling. Avoid working in areas where encounters with overhead power lines are possible.

The drilling location must be cleared and checked for buried power lines, pipes, utilities, tanks and other underground hazards. If any underground hazards are encountered while drilling, stop work immediately and notify the Project Manager and SHSO. Work may only resume when it is determined by qualified Philips personnel that the safety of personnel involved and the integrity of the equipment and underground utilities will not be endangered.

7.4 Confined Space Entry

If the need arises, work in a confined space, such as sampling in a sewer line, entering a manhole, shall follow the procedures outlined in Appendix B Confined Space Entry Procedures. A confined space as defined by the National Institute for

Table 7-2

Threshold Limit Values

	CAS #	TLV[1]	STEL[1]	PEL[2]
1,1-Dichloroethane	75-34-3	200 ppm	250 ppm	100 ppm
1,1-Dichloroethylene[3]	75-35-4	5ppm	20 ppm	N/E
1,1,1-Trichloroethane[3]	79-01-6	50 ppm	200 ppm	50 ppm
Perchloroethylene	127-18-4	50 ppm	200 ppm	25 ppm
Methylene Chloride	75-09-2	50 ppm	N/E	N/E
Mineral Spirits	8030-30-6	100 ppm	200 ppm	500 ppm
Chromium	7440-47-3	.05 mg/m^3	N/E	1 mg/m^3

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1 Source: Threshold Limit Values and Biological Indices for 1989-90 American Conference of Governmental Industrial Hygienist(ACGIH)

2 Source: OSHA 29 CFR 1910.1000

3 Suspected or confirmed human carcinogen (ACGIH)

TABLE 8-1

ACTION LEVELS AND MONITORING RECOMMENDATIONS

HNU Reading (ppm)	Action	Reason
<5	No APR; monitoring frequency determined by SHSO	Organic constituent level detected in samples from this site indicated low hazard from inhalation
>5-10	Wear APR, organic vapor cartridge	Protection factor of APR's makes safe work possible
	NOTIFY PROJECT MANAGER OF CHANGING SITE CONDITIONS	
>10-25	Monitoring frequency increase as determined by SHSO	Monitoring frequency required due to changing field conditions
>25-50	Monitor continuously	Monitoring frequency required due to changing field conditions
>50	Stop activities and Notify Project Manager of potential hazardous conditions.	Unexpected encounter with contamination at the site requires reassessment of risk.

Abbreviation: SHSO - Site Health and Safety Officer
APR - Air Purifying Respirator

KEYSTONE ENVIRONMENTAL RESOURCES, INC

Occupational Safety and Health "refers to a space which by design has limited openings for entry and exit; unfavorable natural ventilation which could contain or produce dangerous air contaminants, and which is not intended for continuous occupancy."

8.0 ACTION LEVELS AND MONITORING RECOMMENDATIONS FOR ON-SITE OPERATIONS

The HNU meter will be used to determine when respiratory protection is necessary at the Philips Seneca Falls facility. Monitoring shall be performed during work activities. Readings above the stated action levels (Table 8-1) indicate potential airborne organic vapor hazards. Air Purifying Respirators shall be donned or personnel shall leave the area until air readings fall below action levels. HNU readings and the time of reading shall be recorded in the field book.

Monitoring frequencies for all field activities shall be based on the field conditions and the recommendations made by the SHSO. Initial HNU readings will be taken in each work area prior to each separate event. Boring locations will be monitored prior to soil penetration. Monitoring well headspace readings shall be made after allowing the well to vent for a few minutes. A suggested interval for initial HNU reading frequency is 20-30 minutes apart. Based upon the initial readings, the Site Safety Officer shall determine the frequency of the readings for each work activity.

If HNU readings greater than 25 ppm are observed initially or during the work activities, the SHSO will reassess the monitoring frequency. Based on the changing field conditions, an upgrade in monitoring frequency appropriate to the task will be made. A suggested upgrade frequency for HNU readings is 5-15 minutes. Increased monitoring will continue until HNU readings return to levels less than 25 ppm or upon suggestion of the SHSO.

9.0 COMMUNICATION PROCEDURES

There are only two telephones on the site that are operational (see Figure 1). They are located in the Guardhouse (315-568-5119) and Charles Uplinger's Office in the

Maintenance Department (315-568-4139). Site workers should locate the nearest telephone to there work area before work begins. There is a 24 hour Security Surveillance System which is maintained and operated by ADT for Maintenance, Police and Fire emergencies. All emergencies should be reported to this number Area Code 315-568-5119. This security system is connected to ADT's main security office in Rochester, New York. Additionally, in cases of fire or injury go to the guard house or Maintenance Department and telephone the appropriate emergency provider listed in Table 11-1 and the 24 hour Surveillance System at 8-5119. There is also an entire plant paging system that is activated from the Guardhouse.

In the event that work team members are separated by distance or if noisy conditions interfere with hearing, a special set of emergency signals should be arranged. These should be different from ordinary signals and easily remembered. Visual signals such as flagging or hand and body movements may also be used if the work team has previously been briefed on the meaning of the signals. Emergency signals include: stop, evacuate, help, telephone for assistance, all clear.

Emergency telephone numbers and hospital directions are provided in Table 11-1.

10.0 DECONTAMINATION

Sampling equipment, drilling equipment and personnel protective equipment shall be subject to full decontamination at the end of each workday or when leaving the work area. Disposable items must be discarded in a plant approved disposal container. Decontamination rinse solutions will be disposed in a manner approved by the SHSO.

10.1 Personal Protective Equipment

The following equipment for use in decontamination of personnel protective equipment is suggested for work activities at the Philips facility: long-handled, soft-bristled brushes; plastic disposal bags; 5 gallon buckets; paper towels; non-phosphate detergent; boxes for storage of decontaminated items; potable water for rinsing equipment.

Air Purifying Respirators must be decontaminated and sanitized after each use. Discard used cartridges. Use a manufacturer recommended CleanerSanitizer solution and clean according to directions. Allow the respirator to air dry.

Tyvek coveralls and outer gloves shall be discarded after each use. Boots will also be decontaminated after each use. Use care in removing the garment to avoid dislodging dusts or soil and subsequently contaminating clothing.

Air Purifying Respirator cartridges shall be replaced if one or more of the following occurs during use: detection of odor, vapor or gas; resistance to breathing; suggestion by the SHSO. Do not reuse cartridges.

11.0 EMERGENCY PROCEDURES

In an emergency, immediately notify the SHSO, who in turn will notify the appropriate emergency provider and Keystone management (see Table 11-1). Describe the nature of the emergency (medical, fire, etc.), the location, your name and affiliation, number of people involved and any measures which have been taken to control the situation.

For environmental emergencies, contact William M. Rupert (Work 419-523-4321 and Home 419-823-3084).

Keystone employees should carry identification at all times while on site. In case of an incapacitating injury, it will enable the rescuer to identify you as a Keystone employee and notify the Project Manager.

11.1 Certain Standard Emergency Procedures Should Be Observed:

- Call for help before attempting an emergency rescue. Do not attempt a rescue unless someone else knows you are going to do so;

Table 11-1

EMERGENCY TELEPHONE NUMBERS

FOR ALL PLANT EMERGENCIES, TELEPHONE 8-5119 IN PLANT

Project Manager	Henry Owoc	412 - 825-9821
Team Leader/Coordinator	Gianni Chieruzzi	412 - 825-9820
Health and Safety Officer	James M. Thomas,II	412 - 825-9639

ADT Security System (Monitored 24 hours by recorder in Rochester N.J.)
Maintenance/Plant Fire/Police Emergencies ..... 315 - 568-5119

Seneca Falls Fire Department ..... 315 568-5853 or 568-5994

Seneca Falls Police Department ..... 315 568-5358 or 568-5994

Taylor Brown Memorial Hospital
369 E. Main Street
Waterloo, NY ..... 315 - 539-9204

HOSPITAL DIRECTIONS: Leave the plant by Johnston Street. Turn left onto Route NY 5/US 20 (5/20). Travel west through Seneca Falls to the outskirts of Waterloo. The entrance to the Hospital is on Route 5/20, approximately 4 miles from the plant.

Keystone Contacts

Dennis A.Middleton	412 - 825-9804
Linda K. Scholl	412 - 825-9714
James M. Thomas,II	412 - 825-9639

Philips Contact Person

William M. Rupert	Home	419 - 823-3084
	Work	**419 - 523-4321**

Contact William M. Rupert in the event of all plant and environmental emergencies

- Assess the situation prior to entry;

- Stay calm. If there are injured people, calm the victims. Do not panic;

- Do not enter a confined space. Wait for help to arrive and direct emergency personnel (see Appendix B for Confined Space Entry Procedures).

11.2 Personnel Injuries Should Be Treated According To The Following Priorities:

- Rescue from a life-threatening situation. Otherwise, do not move an injured person;

- Check for pulse and an open airway;

- Call for medical assistance;

- Give CPR or artificial respiration (if trained) as necessary;

- Avoid moving or manipulating the victim. Keep the victim in a position suited to his condition or the injuries;

- Control severe bleeding;

- Stabilize the victim;

- Keep the victim warm. If exposed to cold or dampness, place blankets or additional clothing under and over the victim;

- Watch for signs of shock; and

- If the injury does not affect the performance of site personnel, operations may continue.

IN ALL CASES OF INJURY TO KEYSTONE EMPLOYEES, NOTIFY THE PROJECT MANAGER AS SOON AS POSSIBLE.

11.3 Fire/Explosion

Determine the severity of the situation. Call Fire and Police Departments from the Guard House or closest phone (see Table 11-1). Remove injured personnel from immediate danger and initiate first aid as necessary. If possible, control the fire with an extinguisher (if trained) until assistance arrives. If an explosion hazard is imminent, leave the area immediately. Avoid becoming trapped in a life-threatening situation.

Fire extinguishers shall be located on or near (within 25 feet) of any operating equipment. All on-site job trailers will be provided with 20# dry chemical fire extinguishers.

11.4 Emergency Site Evacuation Procedures

11.4.1 Evacuation Plan

In the event that an emergency arises, including but not limited to fire, explosion or significant toxic gas release into the ambient atmosphere due to work related activities, an air horn will be activated. The horn will sound continuously for approximately 15 seconds. All personnel will evacuate the site and assemble at location to be determined later. Necessary instructions concerning the evacuation will be given at that time. After the emergency has been resolved, the Site Health and Safety Officer will indicate that work can be resumed.

Under no circumstances will incoming visitors be allowed to proceed to the fire area once an alarm has been sounded. Visitors or other persons present in the area of the emergency shall be instructed to evacuate the area.

All project personnel will be instructed on proper emergency responses and how to contact facility personnel in case of an emergency.

Front-end loaders, drill rigs and/or other combustion apparatus shall be shut down once an alarm has been sounded. Operators and other support personnel will then proceed to the site assembly location immediately for further instructions.

11.5 Personal Protective Equipment Failure

If a failure or alteration occurs in personnel protective equipment that affects the protective factor, leave the area and replace faulty equipment.

11.6 Other Comments

In all situations, when an on-site emergency results in evacuation of an area, personnel shall not reenter until:

- The conditions resulting in the emergency have been corrected.
- The hazards have been reassessed.
- The Site HASP has been reviewed.
- Site personnel have been briefed on any changes in the HASP.

12.0 MEDICAL SURVEILLANCE

Workers may be exposed to toxic chemicals, hazardous materials, biological, physical, and safety hazards and many levels of stress while working on a hazardous waste site. Therefore a medical surveillance program is important to assess and monitor site workers' health and fitness prior to and after work is completed.

12.1 Purpose

The purpose of the medical surveillance program is to insure, to the extent possible, that all persons participating in field activities at the Philips Display Components

site are in good health and capable of performing the field activities and verify that such work has not resulted in any health problems.

A medical surveillance program has been implemented for all Keystone employees involved in on-site operations.

All personnel, including subcontractors, subject to occupational exposure at the site may be required to have had a medical examination within the past year prior to the beginning of field operations. Protocols will be approved by a Health and Safety professional in consultation with an occupational physician. The medical examination as a minimum will consist of the following:

- Review and documentation of medical records
- General Physical
- Pulmonary Function Test (FVC and FEV_1)
- SMA 24 Blood Chemistry
- Complete Blood Count (CBC)
- Chest X-Ray (if medically indicated)
- Heavy Metals Screen (urine analysis) only if medically indicated

Medical surveillance report will include a judgment by the examining physician of the ability of the employee to use a negative or positive pressure respirator and a positive pressure breathing apparatus. Those individuals determined to have a medical condition which could directly or indirectly be aggravated by exposure to chemical substances within the site environment or the use of respiratory equipment will not be employed on this project.

13.0 COMMUNICATIONS

If communication at the work site is necessary, it may be done via 2-way radio communications. Verbal communication at the site can be impacted by the on-site background noise and the use of personal protective equipment. For effective communications, commands can be prearranged and additional audio or visual cues

will help convey the messages. There is also a paging system for the entire plant that is activated from the Guardhouse.

At the site, personnel could use one of the following means of communication:

DEVICE	TYPE OF COMMUNICATIONS	SIGNAL
2-Way Radio	To each other	Assigned radio No.
	To field HQ/ non-emergency	Assigned radio No.
	To field HQ/emergency	Code Red/assigned No.
Compressed Air Horn	To Field/non-emergency	One long, one short blast.
	To Field/emergency	3 long blasts
	Evacuation	Continuous blast. (15 seconds)
Visual	To each other distress/need help	Arms waved in circle over head
	Break, lunch, end of day break apart	Two hands together
	Contaminated air strong odor	Hands clutching throat
	To field/evacuate area	Arms waved in crisscross over head

14.0 SIGNATURES

All site personnel have read the above HASP and are familiar with its provisions.

Project Manager _____

Team Leader/Coordinator _____

Site Health and Safety Officer _____

Other Site Personnel _____

_____

_____

_____

_____

RCRA Facility Assessment
Sampling Visit Work Plan
Philips Display Components Company
288788-13

The health and safety plan has been prepared, reviewed and accepted by:

Prepared By: James M. Thomas/JKS
James M. Thomas,II
Manager, Occupational Health & Safety

Reviewed By: Linda K. Scholl
Linda K. Scholl
Manager, Environmental Health Department

Accepted By: Henry Owoc
Henry Owoc
Project Manager

A

APPENDIX A
MATERIAL SAFETY DATA SHEETS

CUSTOMER P.O. NO. 4703.

DATE 4/12/90 **MATERIAL SAFETY DATA SHEET** PAGE 1

SECTION I -GENERAL INFORMATION

CATALOG NO 48512 (REORDER PRODUCT BY THIS NO.)
PRODUCT NAME 1,1-DICHLOROETHANE 500MG
DATA SHEET NO R430130
1,1-DICHLOROETHANE
CHEMICAL NAME ETHANE, 1,1-DICHLORO-
FORMULA C2H4CL2 FORMULA WEIGHT 99
CAS 75-34-3 NRTECS K10175000
SYNONYM ETHANE, 1,1-DICHLORO-
MANUFACTURER SUPELCO INC. PHONE 814-359-3441
ADDRESS SUPELCO PARK, BELLEFONTE, PA 16823-0048

SECTION II - HAZARDOUS INGREDIENTS OF MIXTURES

CHEMICAL NAME
COMMON NAME - PERCENTAGE - CAS #
(FORMULA) - PEL(UNITS) - TLV(UNITS)
LD50 VALUE - CONDITIONS

FPD EVALUATION STANDARD			3		
MIXTURE		N/A		N/A	
ETHANE, 1,1-DICHLORO-					
1,1-DICHLOROETHANE			97		75-34-
C2H4CL2		100	PPM	200	PPM
725	MG/KG ORAL RAT				

SECTION III - PHYSICAL DATA

BOILING POINT 57 C MM MELTING POINT -97 C
VAPOR PRESSURE N/A VAPOR DENSITY N/A
SPECIFIC GRAVITY 1.177 G/ML C (WATER=1) PERCENT VOLATILE BY VOLUME N
WATER SOLUBILITY N/A EVAPORATION RATE N/A
APPEARANCE CLEAR COLORLESS LIQUID
ODOR CHLOROFORM-LIKE ODOR

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 17 F FLAMMABLE LIMITS LEL 6.0 UEL 16

EXTINGUISHING MEDIA

WATER
C02
DRY CHEMICAL
ALCOHOL FOAM.

SPECIAL FIRE FIGHTING PROCEDURES

WEAR SELF CONTAINED BREATHING APPARATUS WHEN FIGHTING A CHEMICAL FIRE.

UNUSUAL FIRE AND EXPLOSION HAZARDS

VAPORS FORM EXPLOSIVE MIXTURES WITH AIR.
THE FOLLOWING TOXIC VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

ATALOG NO 48512 (REORDER PRODUCT BY THIS NO.)
ODUCT NAME 1,1-DICHLOROETHANE 500MG
DATA SHEET NO R430130
1,1-DICHLOROETHANE
* CONTINUED *
HYDROGEN CHLORIDE GAS AND PHOSGENE GAS

SECTION V - HEALTH HAZARD DATA

LD50 725 MG/KG ORAL RAT TLV 200 PPM
PEL 100 PPM

EMERGENCY AND FIRST AID PROCEDURES

EYES
FLUSH EYES WITH WATER FOR 15 MINUTES.

SKIN
FLUSH SKIN WITH LARGE VOLUMES OF WATER.
REMOVE CONTAMINATED CLOTHING.

INHALATION
IMMEDIATELY MOVE TO FRESH AIR.
GIVE OXYGEN IF BREATHING IS LABORED
IF BREATHING STOPS, GIVE ARTIFICIAL RESPIRATION
CONTACT A PHYSICIAN

NGESTION
N/A

EFFECTS OF OVEREXPOSURE

HARMFUL IF ABSORBED THROUGH SKIN
HARMFUL IF INHALED
HARMFUL IF SWALLOWED
IRRITATES SKIN
DERMATITIS
DEPRESSES CENTRAL NERVOUS SYSTEM
NARCOSIS
LIVER DAMAGE
KIDNEY DAMAGE
CARCINOGENICITY - INDEFINITE IN ANIMALS.

SECTION VI - REACTIVITY DATA

STABILITY STABLE.

CONDITIONS TO AVOID

CAUTION: WILL RELEASE FLAMMABLE AND TOXIC ACETALDEHYDE GAS ON CONTACT WITH STRONG CAUSTIC.

COMPATIBILITY

OXIDIZING AGENTS

.TALOG NO 48512 (REORDER PRODUCT BY THIS NO.)
.ODUCT NAME 1,1-DICHLOROETHANE 500MG
DATA SHEET NO R430130
1,1-DICHLOROETHANE

SECTION VI - REACTIVITY DATA

* CONTINUED *

HAZARDOUS DECOMPOSITION PRODUCTS

HYDROGEN CHLORIDE GAS AND PHOSGENE GAS

HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

CONDITIONS TO AVOID

N/A

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

TAKE UP WITH ABSORBENT MATERIAL.
VENTILATE AREA.
ELIMINATE ALL IGNITION SOURCES.
'LUSH AREA WITH WATER.

WASTE DISPOSAL METHOD

COMPLY WITH ALL APPLICABLE FEDERAL, STATE, OR LOCAL REGULATIONS

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFIC TYPE)

WEAR SELF CONTAINED BREATHING APPARATUS.

PROTECTIVE GLOVES

WEAR GLOVES.

EYE PROTECTION

WEAR PROTECTIVE GLASSES.

VENTILATION

USE ONLY IN WELL VENTILATED AREA.

ECIAL

N/A

TALOG NO 48512 (REORDER PRODUCT BY THIS NO.)
.ODUCT NAME 1,1-DICHLOROETHANE 500MG
DATA SHEET NO R430130
1,1-DICHLOROETHANE

SECTION VIII - SPECIAL PROTECTION INFORMATION

* CONTINUED *

OTHER PROTECTIVE EQUIPMENT

N/A

SECTION IX - SPECIAL PRECAUTIONS

STORAGE AND HANDLING

STORE IN SEALED CONTAINER IN COOL, DRY LOCATION.
KEEP AWAY FROM IGNITION SOURCES.
STABILIZED WITH 3% DIOXANE, A RECOGNIZED CARCINOGEN.

OTHER PRECAUTIONS

AVOID EYE OR SKIN CONTACT.
AVOID BREATHING VAPORS.

'LE THE INFORMATION AND RECOMMENDATIONS SET FORTH HEREIN ARE BELIEVED TO BE .. CURATE AS OF THE DATE HEREOF, SUPELCO, INC. MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

LAST REVISED 1/08/90

1,1-DICHLOROETHYLENE

1,1-DICHLOROETHYLENE IS A SYNONYM OF VINYLIDENE CHLORIDE

CHEMICAL NAME
  VINYLIDENE CHLORIDE

FORMULA
  C2H2CL2

SYNONYMS
  1,1-DICHLOROETHYLENE
  1,1-DCE
  SCONATEX
  VDC
  NCI-C54262
  VINYLIDINE CHLORIDE
  UN 1303
  1,1-DICHLOROETHENE
  ETHYLENE, 1,1-DICHLORO-
  ETHENE, 1,1-DICHLORO-
  VINYLIDENE CHLORIDE(II)
  OHS25070

PERMISSIBLE EXPOSURE LIMIT
  5 PPM (20 MG/M3) ACGIH TWA
  20 PPM (80 MG/M3) ACGIH STEL
  INDEFINITE HUMAN CARCINOGEN (IARC)
  ANIMAL CARCINOGEN (IARC)
  NEGATIVE CARCINOGEN IN RATS/MICE (NCI, TR 288)
  TERATOGENIC DATA (RTEC)
  MUTAGENIC DATA (RTEC)
  AQUATIC TOXICITY RATING 1/Z (TLM96 100 - 1000 PPM)
    NO DATA LOCATED - RATED BY THE NATIONAL ACADEMY OF SCIENCES
  CERCLA HAZARD RATINGS - TOXICITY 2 - IGNITABILITY 3 - REACTIVITY 2 -
    PERSISTENCE 1

  TOXICOLOGY: VINYLIDENE CHLORIDE IS AN IRRITANT. EXCESSIVE EXPOSURE MAY
  AFFECT THE NERVOUS SYSTEM, LIVER AND KIDNEYS.
    INGESTION OR INHALATION CAUSES COUGHING, DIZZINESS, DROWSINESS, AND
  UNCONSCIOUSNESS. ALCOHOLIC BEVERAGES ENHANCE THE TOXIC EFFECTS.
    VINYLIDENE CHLORIDE PRODUCES MALIGNANT TUMORS IN MICE AND RATS, SOME
  OF WHICH ARE SIMILAR TO THOSE PRODUCED BY VINYL CHLORIDE.
    THE THRESHOLD LIMIT VALUE IS BELIEVED LOW ENOUGH TO PREVENT OVERT
  TOXICITY IN EXPOSED WORKERS.
  IHL-HMN TCLO: 25 PPM
  IHL-RAT LCLO:10000 PPM/24 HR
  IHL-MUS LC50:   98 PPM/22 HR
  ORL-RAT LD50:   200 MG/KG
  ORL-DOG LDLO: 5750 MG/KG
  IVN-DOG LDLO: 225 MG/KG
  SCU-RBT LDLO: 3700 MG/KG

  MEDIATELY DANGEROUS TO LIFE OR HEALTH CONCENTRATION
  NONE SPECIFIED

1,1-DICHLOROETHYLENE

ROUTINE CHANGING OF WORK CLOTHING
NOT REQUIRED

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

SPECIFIC EMERGENCY PROVISIONS

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)

10 PPM
- TYPE 'C' SUPPLIED-AIR RESPIRATOR
- SUPPLIED-AIR RESPIRATOR
  WITH HALF-MASK
  OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE
- AUXILIARY SELF-CONTAINED BREATHING APPARATUS
- CHEMICAL CARTRIDGE RESPIRATOR
  WITH AN ORGANIC VAPOR CANISTER
  PROVIDING PROTECTION AGAINST SPECIFIC COMPOUND OF CONCERN

25 PPM
- POWERED AIR-PURIFYING RESPIRATOR
  WITH A FULL FACE-PIECE, HELMENT, OR HOOD
  PROVIDING PROTECTION AGAINST SPECIFIC COMPOUND OF CONCERN
- GAS MASK
  (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER)
  PROVIDING PROTECTION AGAINST SPECIFIC COMPOUND OF CONCERN

100 PPM
- TYPE 'C' SUPPLIED-AIR RESPIRATOR
- SUPPLIED-AIR RESPIRATOR
  WITH A FULL FACE-PIECE
- AUXILIARY SELF-CONTAINED BREATHING APPARATUS
- SELF-CONTAINED BREATHING APPARATUS
  WITH A FULL FACE-PIECE
  OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE
- TYPE 'C' SUPPLIED-AIR RESPIRATOR
- SUPPLIED-AIR RESPIRATOR
  WITH A FULL FACE-PIECE
  OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE

100 PPM
- TYPE 'C' SUPPLIED-AIR RESPIRATOR
- SUPPLIED-AIR RESPIRATOR

1,1-DICHLOROETHYLENE

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

IF THIS HALOGENATED HYDROCARBON HAS BEEN SWALLOWED. REMOVE BY GASTRIC LAVAGE OR EMESIS. MAINTAIN BLOOD PRESSURE BY ADMINISTERING 5% GLUCOSE INTRAVENOUSLY. DO NOT GIVE STIMULANTS. GET FURTHER MEDICAL TREATMENT IMMEDIATELY.
(DREISBACH - HANDBOOK OF POISONING. 11TH ED.)

ORGANS
EYES
SKIN
MUCOUS MEMBRANES
RESPIRATORY SYSTEM
CENTRAL NERVOUS SYSTEM
RESPIRATORY SYSTEM
KIDNEYS
LIVER

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

FOLLOWING OSHA STANDARDS APPLICABLE TO SUBSTANCES LISTED 29CFR1910, OTHERWISE ADVISE:

OSHA STANDARD 29CFR1910.1000 AIR CONTAMINANTS
TABLE Z-1

OSHA STANDARD 29CFR1910.94 VENTILATION

OSHA STANDARD 29CFR1910.134 RESPIRATORY PROTECTION

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

OSHA STANDARD 29CFR1910.132 PERSONAL PROTECTIVE EQUIPMENT

OSHA STANDARD 29CFR1910.141 SANITATION

OSHA STANDARD 29CFR1910.151 MEDICAL SERVICES AND FIRST AID

1,1-DICHLORDETHYLENE

SOURCE/EXPOSURE ASSESSMENT COMPLETED/PUBLISHED CLEAN AIR ACT (CAA)

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

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

SUBSTANCE SUBJECT TO REQUIREMENTS OF GENERAL INDUSTRY SAFETY ORDER (GISO) 5194 OR TITLE 8 OF CALIFORNIA ADMINSTRATIVE CODE AND DIVISION 5. CHAPTER 2.5 OF CALIFORNIA LABOR CODE

SUBSTANCES LISTED APPENDIX A - CONSENT DECREE LIST OF INDUSTRIES AND TOXIC POLLUTANTS. SETTLEMENT AGREEMENT BETWEEN U.S. EPA AND NATIONAL RESOURCES DEFENSE COUNCIL, ET AL U.S. DISTRICT COURT DISTRICT OF COLUMBIA, JUNE 7, 1976. SITE 8ERC2120, DDC 1976. MODIFIED MARCH 9, 1979. SITE 12ERC1833, DDC 1979 AND AGAIN ON OCTOBER 26, 1982.

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.32 EPA HAZARDOUS WASTE NO. K020: HEAVY ENDS FROM THE DISTILLATION OF VINYL DICHLORIDE IN VINYL CHLORIDE MONOMER PRODUCTION. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.32 EPA HAZARDOUS WASTE NO. K019: HEAVY ENDS FROM THE DISTILLATION OF ETHYLENE DICHLORIDE IN ETHYLENE CHLORIDE PRODUCTION. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.32 EPA HAZARDOUS WASTE NO. K029: WASTE FROM THE PRODUCT STEAM STRIPPER IN THE PRODUCTION OF 1,1,1-TRICHLORDETHANE. (T)

SUBSTANCE LISTED RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40CFR261.32 EPA HAZARDOUS WASTE NO. K073: CHLORINATED HYDRO-CARBON WASTE FROM THE PURIFICATION STEP OF THE DIAPHRAM CELL PROCESS USING GRAPHITE ANODES IN CHLORINE PRODUCTION. (T)

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

1,1-DICHLOROETHYLENE

SGPT
DIRECT BILIRUBIN
DIRECT BILIRUBIN
LDH

CERTIFICATIONS
NUCLEAR REG. 0041

HEALTH STATUS CLASSIFICATION

OSHA RESPIRATOR CERTIFICATION 29CFR1910.134

DEPARTMENT OF TRANSPORTATION IF OPERATES HEAVY EQUIPMENT

EMPLOYEE HAZARDOUS MATERIALS EDUCATION RECEIPT

EMPLOYEE MEDICAL RECORDS RECEIPT

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

SPECIAL DIAGNOSTIC TESTS
NONE IN COMMON USE

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

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

FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS

TRANSPORTED IN BULK QUANTITY
* SUBSTANCE SINKS IN WATER
* RESTRICT ACCESS OF GENERAL PUBLIC WHEN APPRECIABLE DANGER ARISES FROM SPILL
* RESTRICT IGNITION SOURCES WHEN SUBSTANCE INVOLVED
* RESTRICT HUMAN USE WHEN SUBSTANCE INVOLVED
* PUMP SINKING LIQUID OR FINELY DIVIDED SOLIDS
* USE MECHANICAL DREDGES OR LIFTS TO REMOVE IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES
* HIGHLY VOLATILE. AVOID INHALATION. VAPORS OR DUST ARE IRRITATING OR TOXIC
* HIGHLY CORROSIVE. AVOID DIRECT CONTACT. CONTACT WITH SKIN OR EYES CAN CAUSE IRRITATION OR BURNS
* BURNING NOT RECOMMENDED, FIRE DIFFICULT TO CONTROL AND/OR POISONOUS GAS IS FORMED

LISTED BY U.S. COAST GUARD UNDER CARGO COMPATIBILITY GROUP VINYL HALIDES. INCOMPATIBLE WITH ORGANIC ACIDS AND CAPROLACTAM SOLUTION

WASTE

SUBSTANCE IS GAS AT NORMAL PRESSURE AND TEMPERATURE BELOW 95 F. CLASSIFIED AS SOLID AND/OR HAZARDOUS WASTE ONLY IF CONTAINED.
THIS MATERIAL LISTED AS HAZARDOUS SUBSTANCE, AS DEFINED IN SECTION 101(14) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE. COMPENSTATION. AND LIABILITY ACT (CERCLA) OF 1980, PURSUANT TO ONE OR MORE OF THE FOLLOWING:

* FEDERAL WATER POLLUTION CONTROL ACT (FWPCA) SECTION 311(B)(2)(A)
* SOLID WASTE DISPOSAL ACT SECTION 3001
* CLEAN WATER ACT (CWA) SECTION 307(A)
* CLEAN AIR ACT (CAA) SECTION 112
* TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 7
* COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA) SECTION 102

EPA HAZARDOUS WASTE NUMBER U078
1,1-DICHLORDETHYLENE

40CFR260 HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

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

40CFR261 IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

IDENTIFIES THOSE SOLID WASTES WHICH ARE SUBJECT TO REGULATION AS HAZARDOUS WASTES UNDER 40CFR PARTS 262-265. 270. 271, AND 124 AND WHICH ARE SUBJECT TO THE NOTIFICATION REQUIREMENTS OF SECTION 3010 OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AND IDENTIFIES ONLY SOME OF THE MATERIALS WHICH ARE HAZARDOUS WASTES UNDER SECTIONS 3001 AND 7003

1,1-DICHLOROETHYLENE

75-35-4

REGISTRY TOXIC CHEMICALS NUMBER
KV9275000

DATE: 12/14/89 ACCT: 434800-01
INDEX: 018934?0001 CAT NO: D1434 PO NBR: S/O B-1292

METHYLENE CHLORIDE
METHYLENE CHLORIDE
METHYLENE CHLORIDE

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS:
GASTON L. PILLORI: (201) 796-7100
AFTER BUSINESS HOURS, HOLIDAYS:
(201) 796-7523
CHEMTREC ASSISTANCE: (800) 424-9300

THE INFORMATION BELOW IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST INFORMATION CURRENTLY AVAILABLE TO US. HOWEVER, WE MAKE NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO SUCH INFORMATION, AND WE ASSUME NO LIABILITY RESULTING FROM ITS USE. USERS SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE INFORMATION FOR THEIR PARTICULAR PURPOSES.

SUBSTANCE IDENTIFICATION

CAS-NUMBER 75-09-2

SUBSTANCE: **METHYLENE CHLORIDE**

TRADE NAMES/SYNONYMS:
METHANE, DICHLORO-; METHYLENE CHLORIDE; METHYLENE DICHLORIDE; METHANE DICHLORIDE; SOLAESTHIN; NARKOTIL; SOLMETHINE; RCRA U080; STCC 4941132; UN 1593; D150; D151; D143; D142; D123; D35; D37; D37S; D37SK; BP1186; CH2CL2; ACC14930

CHEMICAL FAMILY:
HALOGEN COMPOUND, ALIPHATIC

MOLECULAR FORMULA: C-H2-CL2

MOLECULAR WEIGHT: 84.93

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=1 REACTIVITY=0 PERSISTENCE=1
NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=1 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: METHYLENE CHLORIDE PERCENT: 100.0

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
DICHLOROMETHANE (METHYLENE CHLORIDE):
500 PPM OSHA TWA; 1000 PPM OSHA CEILING; 2000 PPM/5 MIN IN 2 HOURS OSHA PEAK
50 PPM (174 MG/M3) ACGIH TWA
ACGIH A2- SUSPECTED HUMAN CARCINOGEN.
LOWEST FEASIBLE LIMIT NIOSH RECOMMENDED EXPOSURE CRITERIA

1000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING
SUBJECT TO CALIFORNIA PROPOSITION 65 CANCER AND/OR REPRODUCTIVE TOXICITY WARNING AND RELEASE REQUIREMENTS- (APRIL 1, 1988)

PHYSICAL DATA

DESCRIPTION: CLEAR, COLORLESS LIQUID WITH AN MILD, CHLOROFORM-LIKE ODOR

BOILING POINT: 104 F (40 C) MELTING POINT: -139 F (-95 C)

SPECIFIC GRAVITY: 1.3266 VOLATILITY: 100%

VAPOR PRESSURE: 400 MMHG @ 24 C EVAPORATION RATE: (BUTYL ACETATE=1) 27.5

SOLUBILITY IN WATER: 1.32% @ 20 C ODOR THRESHOLD: 25-50 PPM

VAPOR DENSITY: 2.9

SOLVENT SOLUBILITY: SOLUBLE IN ALCOHOL, ETHER, DIMETHYLFORMAMIDE, PHENOLS, ALDEHYDES, KETONES, GLACIAL ACETIC ACID, TRIETHYL PHOSPHATE, ACETOACETIC ACID, CYCLOHEXYLAMINE, CHLORINATED SOLVENTS.

VISCOSITY: 0.441 CPS @ 20 C

FIRE AND EXPLOSION DATA

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

UPPER EXPLOSIVE LIMIT: 22% LOWER EXPLOSIVE LIMIT: 14%

AUTOIGNITION TEMP.: 1033 F (556 C) FLAMMABILITY CLASS(OSHA): IIIS

DATE: 12/14/89 ACCT: 434800-01
INDEX: 01893470001 CAT NO: D1434 PO NBR: S/O B-1292

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE OR HALON
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR STANDARD FOAM
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FIREFIGHTING:
STAY AWAY FROM STORAGE TANK ENDS. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4, GUIDE PAGE 74).

EXTINGUISH USING AGENTS SUITABLE FOR SURROUNDING FIRE. USE FLOODING QUANTITIES OF WATER TO COOL AFFECTED CONTAINERS, APPLYING FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING HAZARDOUS VAPORS, KEEP UNWIND.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49CFR172.101:
ORM-A

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49CFR172.101 AND SUBPART E:
NONE

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49CFR173.605
EXCEPTIONS: 49CFR173.505

TOXICITY

DICHLOROMETHANE (METHYLENE CHLORIDE):
IRRITATION DATA: 162 MG EYE-RABBIT MODERATE; 10 MG EYE-RABBIT MILD; 500 MG/24 HOURS EYE-RABBIT MILD; 810 MG/24 HOURS SKIN-RABBIT SEVERE; 100 MG/24 HOURS SKIN-RABBIT MODERATE.
TOXICITY DATA: 500 PPM/1 YEAR-INTERMITTENT INHALATION-HUMAN TCLO; 500 PPM/8 HOURS INHALATION-HUMAN TCLO; 88000 MG/M3/30 MINUTES INHALATION-RAT LC50; 14400 PPM/7 HOURS INHALATION-MOUSE LC50; 10000 PPM/7 HOURS INHALATION-RABBIT LCLO; 5000 PPM/2 HOURS INHALATION-GUINEA PIG LCLO; 14108 PPM/7 HOURS INHALATION-DOG LCLO; 43400 MG/M3/4.5 HOURS INHALATION-CAT LCLO; 357 MG/KG ORAL-HUMAN LDLO; 1600 MG/KG ORAL-RAT LD50; 1900 MG/KG ORAL-RABBIT LDLO; 3 GM/KG ORAL-DOG LDLO; 6460 MG/KG SUBCUTANEOUS-MOUSE LD50; 2700 MG/KG SUBCUTANEOUS-RABBIT LDLO; 2700 MG/KG SUBCUTANEOUS-DOG LDLO; 200 MG/KG INTRAVENOUS-DOG LDLO; 916 MG/KG INTRAPERITONEAL-RAT LD50; 950 MG/KG INTRAPERITONEAL-DOG LDLO; 437 MG/KG INTRAPERITONEAL-MOUSE LD50; 4770 MG/KG UNREPORTED-MOUSE LD50; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS); TUMORIGENIC DATA (RTECS).
CARCINOGEN STATUS: HUMAN INADEQUATE EVIDENCE, ANIMAL SUFFICIENT EVIDENCE (IARC CLASS-2B). EXPOSURE BY INHALATION INCREASED THE INCIDENCE OF BENIGN AND MALIGNANT LUNG AND LIVER TUMORS IN MICE OF EACH SEX AND THE INCIDENCE OR MULTIPLICITY OF BENIGN MAMMARY TUMORS IN RATS OF EACH SEX; IN MALE RATS, AN INCREASED INCIDENCE OF SARCOMAS LOCATED IN THE NECK WAS ALSO OBSERVED.
LOCAL EFFECTS: IRRITANT- INHALATION, SKIN, EYE.
ACUTE TOXICITY LEVEL: MODERATELY TOXIC BY INHALATION AND INGESTION.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT; CHEMICAL ASPHYXIANT. POISONING MAY AFFECT THE BLOOD, LIVER AND KIDNEYS.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH SKIN, LIVER, KIDNEY, CARDIOVASCULAR DISEASE OR ANEMIA.
ADDITIONAL DATA: CONCURRENT EXPOSURE TO OTHER SOURCES OF CARBON MONOXIDE, SMOKING, OR PHYSICAL ACTIVITY MAY INCREASE THE LEVEL OF CARBOXYHEMOGLOBIN IN THE BLOOD RESULTING IN ADDITIVE EFFECTS. ALCOHOLIC BEVERAGES MAY ENHANCE THE TOXIC EFFECTS. STIMULANTS SUCH AS EPINEPHRINE MAY INDUCE CARDIAC ARRHYTHMIAS. ONE STUDY INDICATED THAT CHRONIC EXPOSURE MAY BE ASSOCIATED WITH AN INCREASED RISK OF SPONTANEOUS ABORTION. DICHLOROMETHANE CROSSES THE PLACENTAL BARRIER AND IS EXCRETED IN HUMAN MILK.

HEALTH EFFECTS AND FIRST AID

INHALATION:
DICHLOROMETHANE (METHYLENE CHLORIDE):
IRRITANT/NARCOTIC/CHEMICAL ASPHYXIANT/CARCINOGEN.
ACUTE EXPOSURE- HUMAN EXPOSURE TO 100 PPM HAS RESULTED IN UPPER RESPIRATORY TRACT IRRITATION; CONCENTRATIONS AS LOW AS 200 PPM HAVE PRODUCED TEMPORARY NEUROBEHAVIOURAL EFFECTS; 500-1000 PPM FOR 1-2 HOURS HAS CAUSED LIGHTHEADEDNESS AND ELEVATED CARBOXYHEMOGLOBIN LEVEL; 2300 PPM FOR 30 MINUTES HAS CAUSED NAUSEA AND NARCOSIS; 5000 PPM HAS CAUSED HEADACHE, FATIGUE, NEURASTHENIC DISORDERS AND DIGESTIVE DISTURBANCES. OTHER SYMPTOMS MAY INCLUDE DIZZINESS, TINGLING, NUMBNESS OF THE EXTREMITIES, A SENSATION OF HEAT, A SENSATION OF FULLNESS IN THE HEAD, DRUNKENNESS, STUPOR, DULLNESS AND MENTAL CONFUSION. MASSIVE EXPOSURE MAY CAUSE PHARYNGEAL EROSION, PULMONARY EDEMA, STAGGERING, HEMOLYSIS WITH GROSS HEMATURIA, RAPID UNCONSCIOUSNESS AND DEATH. RECOVERY IS GENERALLY COMPLETE IF EXPOSURE IS TERMINATED BEFORE ANESTHETIC DEATH. EXPOSURE TO HIGH LEVELS MAY ALSO CAUSE CARDIAC ARRHYTHMIAS.
CHRONIC EXPOSURE- MORE THAN 100 WORKERS EXPOSED TO LEVELS BELOW 500 PPM HAVE DEVELOPED HEALTH PROBLEMS INCLUDING SIGNIFICANT UPPER RESPIRATORY IRRITATION, EXACERBATION OF CORONARY ARTERY DISEASE, AND A HIGH INCIDENCE

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OF NEUROTOXICITY, INCREASED COMPLAINTS OF CHEST PAINS WERE REPORTED AT CONCENTRATIONS OF 10 TO 35 PPM. REPEATED HUMAN EXPOSURE TO 500-3600 PPM HAS CAUSED SIGNS OF TOXIC ENCEPHALOPATHY WITH ACOUSTICAL AND OPTICAL DELUSIONS AND HALLUCINATIONS. A CASE OF SERIOUS CEREBRAL DETERIORATION WAS OBSERVED IN AN INDIVIDUAL EXPOSED FOR SEVERAL YEARS TO DICHLOROMETHANE. IN A MORTALITY STUDY OF TWO GROUPS OF WORKERS, ONE EXPOSED TO ACETONE AND THE OTHER TO DICHLOROMETHANE AND ACETONE, A STATISTICALLY SIGNIFICANT DIFFERENCE IN DEATHS FROM DISEASES OF THE CIRCULATORY SYSTEM AND FROM ISCHEMIC HEART DISEASE WERE REPORTED FROM THE DICHLOROMETHANE AND ACETONE GROUP. IN ANOTHER MORTALITY STUDY OF WORKERS EXPOSED TO DICHLOROMETHANE, A SIGNIFICANT INCREASE IN HYPERTENSIVE DISEASE AND A "SUGGESTIVE EXCESS" OF PANCREATIC CANCER WERE REPORTED. LIVER DISEASE HAS BEEN REPORTED IN WORKERS. IN ONE STUDY, AN INCREASE IN SERUM BILIRUBIN WAS OBSERVED IN EXPOSED WORKERS, BUT NO OTHER SIGN OF LIVER INJURY OR HEMOLYSIS WAS REPORTED. ADVERSE LIVER EFFECTS WERE OBSERVED IN SEVERAL ANIMAL SPECIES CHEMICALLY EXPOSED. TESTICULAR ATROPHY WAS REPORTED IN MICE EXPOSED TO 4000 PPM OVER 2 YEARS. REPEATED INHALATION BY RODENTS PRIOR TO AND/OR DURING GESTATION CAUSED FETAL SKELETAL ABNORMALITIES AND BEHAVIORAL EFFECTS IN NEWBORN OFFSPRING. REPEATED INHALATION INCREASED THE INCIDENCE OF BENIGN AND MALIGNANT LUNG AND LIVER TUMORS IN MICE OF EACH SEX AND THE INCIDENCE OR MULTIPLICITY OF BENIGN MAMMARY TUMORS IN RATS OF EACH SEX, IN MALE RATS, AN INCREASED INCIDENCE OF SARCOMAS LOCATED IN THE NECK WAS ALSO OBSERVED.

FIRST AID- 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. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
DICHLOROMETHANE (METHYLENE CHLORIDE):
IRRITANT.
ACUTE EXPOSURE- MAY CAUSE EFFECTS RANGING FROM MILD IRRITATION TO SEVERE PAIN, PARESTHESIAS, AND POSSIBLY BURNS, DEPENDING ON THE INTENSITY OF CONTACT.
CHRONIC EXPOSURE- PROLONGED OR REPEATED CONTACT MAY CAUSE A DRY, SCALY AND FISSURED DERMATITIS DUE TO DEFATTING ACTION OF LIQUID ON SKIN.

FIRST AID- 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.

EYE CONTACT:
DICHLOROMETHANE (METHYLENE CHLORIDE):
IRRITANT.
ACUTE EXPOSURE- VAPOR CONCENTRATIONS ABOVE 2000 PPM MAY CAUSE IRRITATION. DIRECT CONTACT MAY CAUSE PAIN AND EXTREME IRRITATION, BUT IT IS NOT LIKELY TO CAUSE SERIOUS INJURY. 10 MG APPLIED TO RABBIT EYES PRODUCED KERATITIS, IRITIS, INCREASED CORNEAL THICKNESS, AND INFLAMMATION OF THE CONJUNCTIVA AND EYELIDS WITH SOME EFFECTS LASTING UP TO TWO WEEKS.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO IRRITANTS MAY CAUSE CONJUNCTIVITIS.

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

INGESTION:
DICHLOROMETHANE (METHYLENE CHLORIDE):
NARCOTIC/CHEMICAL ASPHYXIANT.
ACUTE EXPOSURE: MAY CAUSE RAPID, THEN SLOWED RESPIRATION, GLOTTAL AND PHARYNGEAL EDEMA, INTRAVASCULAR HEMOLYSIS WITH GROSS HEMATURIA, GASTROINTESTINAL ULCERATION AND HEMORRHAGE, AND CARBOXYHEMOGLOBINEMIA. THESE SYMPTOMS MAY PROGRESS RAPIDLY TO UNCONSCIOUSNESS AND LACK OF RESPONSE TO PAINFUL STIMULI. PHARYNGEAL EROSIONS MAY DISTURB THE SWALLOWING MECHANISM RESULTING IN ASPIRATION PNEUMONIA. IN ADDITION, SYMPTOMS OF CENTRAL NERVOUS SYSTEM DEPRESSION MAY OCCUR FOLLOWED BY CONVULSIONS AND PARESTHESIA OF THE EXTREMITIES. LARGE DOSES MAY CAUSE LIVER AND KIDNEY DAMAGE. THE ESTIMATED LETHAL DOSE FOR AN ADULT IS 25 GRAMS.
CHRONIC EXPOSURE- REPEATED INGESTION BY RATS AND MICE RESULTED IN HISTOMORPHOLOGICAL CHANGES IN THE LIVER.

FIRST AID- 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 (DREISBACH, HANDBOOK OF POISONING, 11TH ED.). ADMINISTRATION OF GASTRIC LAVAGE OR OXYGEN SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

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REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
DICHLOROMETHANE (METHYLENE CHLORIDE):
ALKALI METALS: POSSIBLE EXPLOSIVE REACTION.
ALUMINUM: VIOLENT, UNCONTROLLABLE REACTION ABOVE 95 C.
CAUSTICS (STRONG): VIGOROUS, POSSIBLY VIOLENT REACTION.
COPPER: MAY CORRODE AT ELEVATED TEMPERATURES IN THE PRESENCE OF MOISTURE.
DINITROGEN PENTOXIDE: POSSIBLE EXPLOSION.
DINITROGEN TETROXIDE: FORMS SHOCK-SENSITIVE MIXTURE.
IRON: MAY CORRODE AT ELEVATED TEMPERATURES IN THE PRESENCE OF MOISTURE.
LITHIUM: FORMS SHOCK-SENSITIVE MIXTURE.
MAGNESIUM: POSSIBLE EXPLOSION.
NICKEL: MAY CORRODE AT ELEVATED TEMPERATURES IN THE PRESENCE OF MOISTURE.
NITRIC ACID: EXOTHERMIC REACTION YIELDING DETONABLE SOLUTION.
OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.
OXYGEN (LIQUID): EXPLOSIVE REACTION ON IGNITION.
PLASTICS, RUBBER, AND COATINGS: MAY BE ATTACKED.
POTASSIUM: EXPLOSIVE REACTION.
POTASSIUM HYDROXIDE + N-METHYL-N-NITROSO UREA: POSSIBLE EXPLOSION.
POTASSIUM TERT-BUTOXIDE: IGNITION REACTION.
SODIUM: FORMS SHOCK-SENSITIVE MIXTURE.
SODIUM-POTASSIUM ALLOY: FORMS SHOCK-SENSITIVE MIXTURE.
STAINLESS STEEL: MAY CORRODE AT ELEVATED TEMPERATURES IN THE PRESENCE OF MOISTURE.
TITANIUM: POSSIBLE VIOLENT REACTION.
ZINC: POSSIBLE VIOLENT REACTION.

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

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

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

PROTECT AGAINST PHYSICAL DAMAGE. STORE IN COOL, DRY, WELL VENTILATED LOCATION, AWAY FROM ANY AREA WHERE THE FIRE HAZARD MAY BE ACUTE (NFPA 49, HAZARDOUS CHEMICALS DATA, 1975).

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

DISPOSAL

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40CFR 262. EPA HAZARDOUS WASTE NUMBER U080.

****

CONDITIONS TO AVOID

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

****

SPILL AND LEAK PROCEDURES

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

AIR SPILL:
APPLY WATER SPRAY TO KNOCK DOWN VAPORS.

WATER SPILL:
TRAP SPILLED MATERIAL AT BOTTOM IN DEEP WATER POCKETS, EXCAVATED HOLDING AREAS OR WITHIN SAND BAG BARRIERS.

USE SUCTION HOSES TO REMOVE TRAPPED SPILL MATERIAL.

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

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL LIQUID SPILLS, TAKE UP WITH SAND, EARTH OR OTHER ABSORBENT MATERIAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES

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OR FLARES IN HAZARD AREA! KEEP UNNECESSARY PEOPLE AWAY.

.EPORTABLE QUANTITY (RQ): 1000 POUNDS
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION AND/OR GENERAL DILUTION VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29CFR1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

FOR DICHLOROMETHANE (METHYLENE CHLORIDE):
AT ANY DETECTABLE CONCENTRATION:

ANY SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.
ANY SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH ORGANIC VAPOR CANISTER.
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

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

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

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

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

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

AUTHORIZED - FISHER SCIENTIFIC GROUP, INC.
CREATION DATE: 09/26/84 REVISION DATE: 10/13/89

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TRICHLOROETHYLENE
TRICHLOROETHYLENE
TRICHLOROETHYLENE

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS:
GASTON L. PILLORI
(201) 796-7100

DATE: 02/15/89
PO NBR: REL#2-8-89-3
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SUBSTANCE IDENTIFICATION

CAS-NUMBER 79-01-6

SUBSTANCE: **TRICHLOROETHYLENE**

TRADE NAMES/SYNONYMS:
ACETYLENE TRICHLORIDE; ETHYLENE TRICHLORIDE; ALGYLEN; 1-CHLORO-2,2-DICHLOROETHYLENE; 1,1-DICHLORO-2-CHLOROETHYLENE; TCE; ANAMENTH; ETHINYL TRICHLORIDE; TRICHLOROETHENE; 1,1,2-TRICHLOROETHYLENE; TRI; CHLORYLEN; 1,1,2-TRICHLOROETHENE; DENSINFLUAT; CHLORILEN; TRILEN; UN 1710; U228; STCC 4941171; T-340; T-341; T-403; ACC23850

CHEMICAL FAMILY:
HALOGEN COMPOUND, ALIPHATIC

MOLECULAR FORMULA: C2-H-CL3 MOL WT: 131.40

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=1 REACTIVITY=0 PERSISTENCE=3
NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=1 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: TRICHLOROETHYLENE PERCENT: >99

OTHER CONTAMINANTS: MAY CONTAIN ANTIOXIDANTS SUCH AS AMINES OR EPOXIDES AND ESTERS TO STABILIZE

EXPOSURE LIMITS:
TRICHLOROETHYLENE:
100 PPM OSHA TWA; 200 PPM OSHA CEILING; 300 PPM/5 MINUTE OSHA PEAK IN ANY 2 HOURS
50 PPM ACGIH TWA; 200 PPM ACGIH STEL
25 PPM NIOSH RECOMMENDED 10 HOUR TWA

1000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING
SUBJECT TO CALIFORNIA PROPOSITION 65 CANCER AND/OR REPRODUCTIVE TOXICITY WARNING AND RELEASE REQUIREMENTS- (APRIL 1, 1988)

PHYSICAL DATA

DESCRIPTION: COLORLESS, HEAVY, MOBILE LIQUID WITH A MILD CHLOROFORM-LIKE ODOR

BOILING POINT: 188 F (87 C) MELTING POINT: -99 F (-73 C)

SPECIFIC GRAVITY: 1.5 VAPOR PRESSURE: 58 MMHG @ 20 C

EVAPORATION RATE: (CCL4=1) 0.69 SOLUBILITY IN WATER: 0.1%

ODOR THRESHOLD: 20 PPM VAPOR DENSITY: 4.5

SOLVENT SOLUBILITY: ALCOHOL, ETHER, ACETONE, CHLOROFORM, BENZENE

FIRE AND EXPLOSION DATA

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

UPPER EXPLOSIVE LIMIT: 10.5 @ 25 C LOWER EXPLOSIVE LIMIT: 8.0 @ 25 C

AUTOIGNITION TEMP.: 770 F (410 C) FLAMMABILITY CLASS(OSHA): IC

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE OR HALON
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR STANDARD FOAM
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FIREFIGHTING:
STAY AWAY FROM STORAGE TANK ENDS. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4, GUIDE PAGE 74).

USE AGENT SUITABLE FOR TYPE OF FIRE. AVOID BREATHING TOXIC VAPORS. KEEP UPWIND.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49CFR172.101:
ORM-A

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49CFR172.101 AND 172.402:
NONE

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49CFR173.505
EXCEPTIONS: 49CFR173.505

TOXICITY

TRICHLOROETHYLENE:
IRRITATION DATA: 2 MG/24 HOURS SKIN-RABBIT SEVERE; 20 MG/24 HOURS EYE-RABBIT MODERATE.
TOXICITY DATA: 6900 MG/M3/10 MINUTES INHALATION-HUMAN TCLO; 160 PPM/83 MINUTES INHALATION-HUMAN TCLO; 812 MG/KG INHALATION-HUMAN TDLO; 110 PPM/8 HOURS INHALATION-HUMAN TCLO; 2900 PPM INHALATION-HUMAN LCLO; 8000 PPM/4 HOURS INHALATION-RAT LCLO; 8450 PPM/4 HOURS INHALATION-MOUSE LC50; 11,000 PPM INHALATION-RABBIT LCLO; 32,500 MG/M3/2 HOURS INHALATION-CAT LCLO; 37,200 PPM/40 MINUTES INHALATION-GUINEA PIG LCLO; 7 GM/KG ORAL-HUMAN LDLO; 2143 MG/KG ORAL-HUMAN TDLO; 2402 MG/KG ORAL-MOUSE LD50; 7330 MG/KG ORAL-RABBIT LDLO; 5864 MG/KG ORAL-CAT LDLO; 16 GM/KG SUBCUTANEOUS-MOUSE LD50; 1800 MG/KG SUBCUTANEOUS-RABBIT LDLO; 150 MG/KG SUBCUTANEOUS-DOG LDLO; 34 MG/KG INTRAVENOUS-MOUSE LD50; 150 MG/KG INTRAVENOUS-DOG LDLO; 1282 MG/KG INTRAPERITONEAL-RAT LD50; 1900 MG/KG INTRAPERITONEAL-DOG LD50; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS); TUMORIGENIC DATA (RTECS).
CARCINOGEN STATUS: HUMAN INADEQUATE EVIDENCE (IARC); ANIMAL LIMITED EVIDENCE (IARC). TRICHLOROETHYLENE PRODUCED LIVER AND LUNG NEOPLASMS IN MICE AFTER ORAL ADMINISTRATION. ADMINISTRATION BY INHALATION WAS ASSOCIATED WITH AN INCREASED INCIDENCE OF LYMPHOMAS IN FEMALE MICE, BUT NOT IN RATS OR HAMSTERS.
LOCAL EFFECTS: IRRITANT-SKIN, EYE, MUCOUS MEMBRANES.
ACUTE TOXICITY LEVEL: INSUFFICIENT DATA.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY EFFECT THE LIVER, KIDNEYS, LUNGS AND HEART.
ADDITIONAL DATA: THE PRESENCE OF TETRACHLOROETHANE AS AN IMPURITY, OR THE CONSUMPTION OF ALCOHOLIC BEVERAGES MAY ENHANCE THE SYSTEMIC TOXICITY. EPINEPHINE OR OTHER STIMULANTS MAY INDUCE VENTRICULLAR ARRHYTHMIAS.

HEALTH EFFECTS AND FIRST AID

INHALATION:
TRICHLOROETHYLENE:
IRRITANT/NARCOTIC.
1000 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
- ACUTE EXPOSURE- LEVELS OF 90-130 PPM FOR 8 HOURS HAVE RESULTED IN DECREASED PERFORMANCE IN TESTS OF PERCEPTION, MEMORY, COMPLEX REACTION TIME AND MANUAL DEXTERITY. ADDICTION HAS OCCURRED FROM DELIBERATE INHALATION OF MODERATE AMOUNTS WHICH CAUSE EUPHORIA, DISORIENTATION, VISUAL HALLUCINATIONS, DELUSIONS, AND OTHER PSYCHOTIC SYMPTOMS. AT LOW CONCENTRATIONS MILD RESPIRATORY IRRITATION, DROWSINESS, DIZZINESS, HEADACHE, EXCITATION, NAUSEA, VOMITING, ABDOMINAL CRAMPS, AND FLUSHED SKIN MAY OCCUR. AT HIGHER CONCENTRATIONS PALLOR, PROFUSE PERSPIRATION, PULMONARY EDEMA, NARCOSIS, FACIAL NERVE DYSFUNCTION, ANESTHESIA, UNCONSCIOUSNESS, AND COMA ARE POSSIBLE. IF CONSCIOUSNSESS IS REGAINED, NAUSEA AND VOMITING MAY FOLLOW FOR SEVERAL HOURS. ANEMIA AND DAMAGE TO THE LIVER, KIDNEYS, AND LUNGS MAY OCCUR. ANIMAL STUDIES HAVE SHOWN SPLEEN DAMAGE ALSO. DEATH MAY OCCUR FROM RESPIRATORY ARREST OR VENTRICULLAR FIBRILLATION AND PRIMARY CARDIAC FAILURE.
- CHRONIC EXPOSURE- REPEATED EXPOSURE TO LEVELS BELOW 300 PPM MAY CAUSE NAUSEA, VOMITING, ABDOMINAL CRAMPS, SLEEPINESS, DRUNKENNESS, FLUSHING, ANOREXIA, SWELLING OF THE EYES, FACE, AND HANDS, AND MILD CARDIAC ARRYTHMIA. OTHER POSSIBLE SYMPTOMS MAY BE WHEEZING, FACIAL NERVE PARALYSIS, LOSS OF COORDINATION AND SENSE OF SMELL AND TASTE, IMPAIRMENT OF TACTILE AND AUDITORY SENSES, DOUBLE VISION, CHANGES IN COLOR PERCEPTION, BLINDNESS AND JOINT AND MUSCLE PAIN. INTOLERANCE TO ALCOHOL, TREMOR, GIDDINESS, BRADYCARDIA, AND ANXIETY HAVE BEEN FOUND IN WORKERS CHRONICALLY EXPOSED TO 5-630 PPM. LIVER, KIDNEY, AND BRAIN DAMAGE MAY ALSO OCCUR. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS. ADMINISTRATION BY INHALATION WAS ASSOCIATED WITH AN INCREASED INCIDENCE OF LYMPHOMAS IN FEMALE MICE, BUT NOT IN RATS OR HAMSTERS.

FIRST AID- 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.

SKIN CONTACT:
TRICHLOROETHYLENE:
IRRITANT.
- ACUTE EXPOSURE- MAY CAUSE IRRITATION AND CAUSE CONTACT DERMATITIS. MAY ACT AS A SENSITIZER IN PREVIOUSLY EXPOSED INDIVIDULALS AND CAUSE GENERALIZED EXFOLIATAVE DERMATITIS, ERYTHRODERMA, OR PAPULOVESICULAR DERMATITIS. WHEN SKIN IS IN CONTACT WITH TRICHLOROETHYLENE SOAKED CLOTHING FOR A LONG PERIOD OF TIME, BLISTERING MAY OCCUR. MAY BE ABSORBED THROUGH THE SKIN, HOWEVER, DERMAL ABSORPTION IS NOT LIKELY TO BE OF TOXICOLOGICAL SIGNIFICANCE UNDER NORMAL USE.
- CHRONIC EXPOSURE- MAY CAUSE A DEFATTING TYPE OF DERMATITIS RSULTING IN ROUGHNESS, CHAPPING, VESICULATION AND SECONDARY INFECTION. REPEATED

CONTACT MAY RESULT IN PARALYSIS OF THE FINGERS. SENSITIZATION MAY OCCUR IN PREVIOUSLY EXPOSED INDIVIDUALS. CHRONIC LOW DOSE EXPOSURE MAY CAUSE SENSE OF INEBRIATION, IRRITABILITY AND PERSONALITY CHANGES. CHRONIC ABSORPTION MAY ALSO PRODUCE WEIGHT LOSS, NAUSEA, ANOREXIA, FATIGUE, VISUAL IMPAIRMENT, JOINT PAIN AND WHEEZING. JAUNDICE IS RARE.

FIRST AID- 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.

EYE CONTACT:
TRICHLOROETHYLENE:
IRRITANT.
ACUTE EXPOSURE- DIRECT CONTACT WITH VAPOR OR LIQUID MAY CAUSE BURNS OF THE LIDS, CONJUNCTIVA AND CORNEA WITH SYMPTOMS OF REDNESS, TEARING AND BLURRED VISION. A SPLASH IN THE EYE MAY CAUSE SMARTING PAIN AND INJURED CORNEAL EPITHELIUM. EPITHELIUM MAY BE LOST BUT RAPIDLY REGENERATES AND COMPLETE RECOVERY IS USUAL. ACUTE EXPOSURE MAY RESULT IN LOSS OF SENSATION IN THE DISTRIBUTION OF THE TRIGEMINAL NERVE ON ONE OR BOTH SIDES. THIS MAY BE COMPLICATED BY CORNEAL EPITHELEAL ULCERATION, WHICH DOES NOT CAUSE DISCOMFORT BECAUSE OF THE CORNEAL ANESTHESIA DUE TO PARALYSIS OF THE SENSORY NERVE. OCULOMOTOR PARALYSIS MAY ACCOMPANY THE TRIGEMINAL PALSIES.
CHRONIC EXPOSURE- REPEATED AND PROLONGED EXPOSURE MAY CAUSE CONJUNCTIVITIS AND CORNEAL INFLAMMATION. CHRONIC INTOXICATION MAY CAUSE OPTIC NEURITIS, DOUBLE VISION, NYSTAGMUS, CHANGES IN COLOR PERCEPTION AND BLINDNESS.

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

INGESTION:
TRICHLOROETHYLENE:
NARCOTIC/CARCINOGEN.
ACUTE EXPOSURE- MAY CAUSE SEVERE BURNING SENSATION IN THE MOUTH, THROAT, ESOPHAGUS, AND STOMACH, DIARRHEA, INEBRIATION, CONFUSION, TACHYCARDIA, AND CENTRAL NERVOUS SYSTEM DEPRESSION WITH DIZZINESS, NAUSEA, VOMITING, HEADACHE, COLLAPSE, CONVULSIONS, AND COMA FOLLOWED BY DEATH FROM RESPIRATORY, CARDIAC OR HEPATORENAL FAILURE. LOW-LEVEL CONCENTRATIONS MAY CAUSE HEADACHE, AMNESIA, NUMBNESS, WEAKNESS OF THE EXTREMITIES, HEMIPARESIS AND PSYCHOSIS.
CHRONIC EXPOSURE- MAY CAUSE IRRITATION OF MUCOUS MEMBRANES, HEADACHE, DROWSINESS, FATIGUE, GIDDINESS, EXCITABILITY, INDIGESTION, NAUSEA, DISTURBANCES OF SENSATIONS IN THE EXTREMETIES AND OTHER SYMPTOMS NOTED IN CHRONIC INHALATION. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS. REPEATED ORAL ADMINISTRATION PRODUCED LIVER AND LUNG NEOPLASMS IN MICE.

FIRST AID- GET MEDICAL ATTENTION IMMEDIATELY. IF MEDICAL ATTENTION IS NOT IMMEDIATELY AVAILABLE, AND IF VICTIM IS CONSCIOUS AND NOT CONVULSIVE, ATTEMPT TO INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT. GIVE OXYGEN IF RESPIRATION IF DEPRESSED. DO NOT GIVE STIMULANTS, PARTICULARLY EPINEPHRINE.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES IN A CLOSED CONTAINER. UNINHIBITED MATERIAL, ON HEATING OR EXPOSURE TO LIGHT, MAY DECOMPOSE OR POLYMERIZE, RELEASING HYDROGEN CHLORIDE.

INCOMPATIBILITIES:
TRICHLOROETHYLENE:
ALKALI: FORMS EXPLOSIVE MIXTURE.
ALUMINUM + DILUTE HYDROCHLORIC ACID: VIOLENT POYMERIZATION.
ALUMINUM: VIOLENT DECOMPOSITION MAY OCCUR.
BARIUM: POSSIBLE DETONATION.
BERYLLIUM: FORMS IMPACT-SENSITIVE MIXTURE.
BORON: FORMS EXPLOSIVE OR IGNITABLE COMPOUND.
1-CHLORO-2,3-EPOXYPROPANE: FORMS EXPLOSIVE MIXTURE.
2,4-BIS(4(2',3'-EPOXYPROPOXY)PHENYL)PROPANE: FORMS EXPLOSIVE MIXTURE.
DI-2,3-EPOXYPROPYL ETHER OF 1,4-BUTANEDIOL: FORMS EXPLOSIVE MIXTURE.
EPOXIDES: POSSIBLE EXPLOSION.
LITHIUM: FORMS IMPACT-SENSITIVE MIXTURE.
MAGNESIUM: FORMS IMPACT-SENSITIVE MIXTURE.
METALS (POWDERED): FORMS EXPLOSIVE OR IGNITABLE COMPOUND.
MONO-2,3-EPOXYPROPYL ETHER OF 1,4-BUTANEDIOL: FORMS EXPLOSIVE MIXTURE.
NITROGEN TETRAOXIDE: FORMS EXPLOSIVE MIXTURE.
OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.
OXYGEN (LIQUID): EXPLODES WHEN INITIATED WITH A BLASTING CAP.
OXYGEN (GAS): EXPLODES UNDER PRESSURE AT ROOM TEMPERATURE.
PERCHLORIC ACID: VIOLENT REACTION.
POTASSIUM: FORMS EXPLOSIVE CHLOROACETYLENES.
POTASSIUM HYDROXIDE: FORMS EXPLOSIVE DICHLOROACETYLENE WHEN HEATED.
SODIUM: FORMS EXPLOSIVE CHLOROACETYLENES.
SODIUM HYDROXIDE: FORMS EXPLOSIVE CHLOROACETYLENES.
TITANIUM: FORMS IMPACT-SENSITIVE MIXTURE.

DECOMPOSITION:
TRICHLOROETHYLENE:
UPON CONTACT WITH CERTAIN METALS, HIGH TEMPERATURES, OPEN FLAME, OR ULTRAVIOLET LIGHT, DECOMPOSES INSTANTLY TO HIGHLY TOXIC AND CORROSIVE FUMES OF PHOSGENE AND/OR HYDROGEN CHLORIDE, CHLORINE, AND DICHLOROACETYL CHLORIDE.

ABOVE 700 C VAPORS DECOMPOSE TO A MIXTURE OF DICHLORETHYLENE, TETRACHLORETHYLENE, CARBON TETRACHLORIDE, CHLOROFORM, AND METHYLCHLORIDE.

POLYMERIZATION:
MAY POLYMERIZE WHEN CATALYZED BY ALUMINUM CHLORIDE IN A SELF-SUSTAINING REACTION WHICH MAY DEVELOP TEMPERATURES UP TO 1350 C. A STABILIZER IS REQUIRED TO PREVENT POLYMERIZATION WHEN HEATED OR EXPOSED TO SUNLIGHT.

STORAGE AND DISPOSAL

STORE IN A COOL, DRY, WELL-VENTILATED LOCATION, AWAY FROM ANY AREA WHERE THE FIRE HAZARD MAY BE ACUTE (NFPA 49, HAZARDOUS CHEMICALS DATA, 1975).

****

CONDITIONS TO AVOID

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

STORE IN A COOL, DRY, WELL-VENTILATED LOCATION, AWAY FROM ANY AREA WHERE THE FIRE HAZARD MAY BE ACUTE. (NFPA, FIRE PROTECTION GUIDE ON HAZARDOUS MATERIALS, 8TH ED.)

****

SPILL AND LEAK PROCEDURES

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

AIR SPILL:
APPLY WATER SPRAY TO KNOCK DOWN AND REDUCE VAPORS. KNOCK-DOWN WATER IS CORROSIVE AND TOXIC AND SHOULD BE DIKED FOR CONTAINMENT.

WATER SPILL:
USE ACTIVATED CARBON TO ABSORB SPILLED SUBSTANCE THAT IS DISSOLVED.

USE SUCTION HOSES TO REMOVE TRAPPED SPILL MATERIAL.

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

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL LIQUID SPILLS, TAKE UP WITH SAND, EARTH OR OTHER ABSORBENT MATERIAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA! KEEP UNNECESSARY PEOPLE AWAY.

REPORTABLE QUANTITY (RQ): 1000 POUNDS
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS OR NIOSH CRITERIA DOCUMENTS; OR DEPARTMENT OF LABOR, 29CFR1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION.

TRICHLOROETHYLENE:
AT ANY DETECTABLE CONCENTRATION:
- ANY SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.
- ANY SUPPLIED-AIR RESPIRATOR WITH A FULLFACE-PIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ESCAPE-ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A
- CHIN-STYLE OR FRONT- OR BACKMOUNTED ORGANIC VAPOR CANISTER.
- ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

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

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

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

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE. CONTACT LENSES SHOULD NOT BE WORN.

AUTHORIZED - FISHER SCIENTIFIC GROUP, INC.
CREATION DATE: 10/24/84 REVISION DATE: 10/31/88

-ADDITIONAL INFORMATION-

MATERIAL SAFETY DATA SHEET

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

GENIUM PUBLISHING CORP.

NO. 334
MINERAL SPIRITS
TYPE I
Revision B
DATE July 1984

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: MINERAL SPIRITS, TYPE I
DESCRIPTION: Refined distillate of petroleum. Hydrocarbon mixture (see Sect II) with a controlled distillation range and a flash point >100 F.
OTHER DESIGNATIONS: Stoddard Solvent; Petroleum Distillate, Naphtha or Spirits, (combustible); White Spirits; ASTM D235, Type I; GE Material D5B8; CAS #008 052 413; C_9H_{20}.
MANUFACTURER: Available from many suppliers.

SECTION II. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Mineral Spirits, Type I		8-hr TWA 100 ppm* (or 525 mg/m^3)
Typical composition:		
Paraffinic hydrocarbons	30-50	
Naphthenic hydrocarbons (Cycloparaffins)	30-40	
Aromatic and olefinic hydrocarbons	10-20	Eye, Human 470 ppm/15M (Irritation Effect)

*ACGIH (1983) TLV; STEL is 200 ppm. NIOSH has recommended a 10-hr TWA of 60 ppm or 350 mg/m^3. The "action level" is also recommended to be 350 mg/m^3.
Current OSHA PEL for Stoddard Solvent is 500 ppm.

SECTION III. PHYSICAL DATA

Boiling point, 1 atm, deg F ----- 300-407
Vapor pressure @ 25 C, mm Hg ---- ca 5
Vapor density (Air=1) (average) - ca 4.8
Solubility in water, 20C -------- Insoluble

Specific gravity 60/60 F ---- ca 0.79
Volatiles, % ---------- ca 100
Evaporation rate (BuAc=1) --- ca 0.08

Appearance & Odor: Clear, colorless liquid with a kerosine-like odor that is usually perceptible to humans at about 1 ppm in air.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits in Air	Lower	Upper
100 F min. (TCC)	450-500 F	% by volume	0.8	~6

Extinguishing media: Foam, dry chemical, carbon dioxide, and water spray or fog. Use of a direct stream of water on burning liquid can scatter flames.
This liquid is near its lower flammability limit at room temperature (saturated air at 25 C contains about 0.5 volume % of Stoddard Solvent). In a fire situation or when heated or misted, it becomes a hazardous, highly flammable material.
Use self-contained breathing apparatus for respiratory protection in fighting fires in enclosures.

SECTION V. REACTIVITY DATA

This material is stable in closed containers under its normal handling and storage conditions. It does not polymerize.
As a combustible hydrocarbon liquid (OSHA Class II), it can react violently with strong oxidizing agents such as chlorine, oxygen, or such strong oxidizing acids as nitric and sulfuric.
Thermal-oxidative degradation can produce carbon monoxide and partially oxidized hydrocarbons.

NO. 334

SECTION VI. HEALTH HAZARD INFORMATION

TLV 100 ppm (See Sect II)

This material is a central nervous system depressant and a mucous membrane irritant. Symptoms of overexposure include dizziness, headache, intoxication with euphoria leading to unconsciousness. Nose and throat irritation may occur from inhalation. Prolonged or repeated skin contact will cause defatting, irritation and dermatitis. Eye contact with liquid can cause conjunctivitis. Eye irritation can also occur after 15 minutes exposure to vapors at 470 ppm. A fatal ingestion dosage for humans is estimated at 3-4 ounces. Aspiration into the lungs after ingestion can cause edema; and one ounce aspirated may be fatal.

FIRST AID:

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

Skin Contact: Promptly remove solvent wet clothing and wash contact area with soap and water. Get medical help if irritation persists or if large body area contacted.

Inhalation: Remove to fresh air. Restore and/or support breathing as needed. (If breathing is difficult, give oxygen therapy.) Get medical help.

Ingestion: Contact physician! Aspiration a hazard! Give 3 oz of USP white mineral oil or edible vegetable oil to drink. Do not induce vomiting unless medical help is not available, the victim is alert, and >1-2 oz has been ingested.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel of large spills. Eliminate sources of heat or ignition. Provide adequate ventilation. Clean-up personnel need protection against skin contact and inhalation of vapors. Contain spill. Recover liquid when possible. Absorb small spills and residues with vermiculite, dry sand, or similar material. Pick up and place in suitable containers. Avoid discharging Mineral Spirits directly into a sewer or surface waters!

DISPOSAL: Absorbed material can be buried in an approved landfill, incinerated, or removed via a licensed solvent disposal company. Follow Federal, State and Local regulations.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general ventilation and, especially when heated or misted, local exhaust ventilation (explosion-proof) to meet TLV requirements. A chemical cartridge respirator with organic vapor cartridge and a full facepiece can be used below 1000 ppm. Self-contained breathing apparatus with a full facepiece has been recommended for use up to 5000 ppm.

Approved protective gloves should be used to prevent prolonged or repeated skin contact.

Chemical safety goggles and/or face shield should be used where splashing is possible. An eyewash station and washing facilities should be accessible.

Remove contaminated clothing (fire and health hazard); thoroughly dry or launder before reuse.

Preplacement and periodic medical exams should emphasize skin, liver, kidney, central nervous system, and respiratory diseases for those regularly exposed. Individuals with such problems may be at an increased risk from exposure.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in a cool, clean, well-ventilated, fire resistant storage area away from oxidizing agents and sources of heat and ignition. Use a solvent storage room or cabinet that meets requirements for an OSHA Class II Combustible liquid. Store in closed metal drums or safety cans with identifying labels. Prevent physical damage to containers.

Bond and ground containers for transfers of liquid to prevent static sparks. Use non-sparking tools and follow electrical codes in areas of use and storage. No smoking in areas of use or storage.

Use with good ventilation. Avoid inhalation of mist or vapors. Prevent eye contact and repeated or prolonged skin contact.

DOT Classification: PETROLEUM NAPHTHA I.D. No. UN1255 Label: (None)
PETROLEUM DISTILLATE I.D. No. UN1268 Label: (None)

DATA SOURCE(S) CODE: 2-7,9,11,12,14,16,27,31,38,47

APPROVALS: MIS/CRD J. G. Nielsen

INDUST. HYGIENE SAFETY 7-23-84

MEDICAL REVIEW: 1 August 1984

MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION
1145 CATALYN ST., SCHENECTADY, NY 12303 USA (518) 377-8854

From Genium's MSDS Collection, to be used as a reference.

MSDS # 5

CHROMIC ACID, SOLID
Revision B

Issued:
Revised: August 1985

SECTION 1. MATERIAL IDENTIFICATION

MATERIAL NAME: CHROMIC ACID, SOLID

Other designations: Chromium Trioxide, Chromic Anhydride, Chromium (VI) Oxide, CrO_3, CAS #1333-82-0

Manufacturer: Available from many sources, including: American Chrome and Chemicals, Inc.
PO Box 9912
Buddy Lawrence Dr.
(512)883-3202 Corpus Christi, TX 78469

SECTION 2. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Chromium Trioxide, CrO_3	ca 100	8hr TWA: 0.05 mg/m^3* as Cr
*Current (1985-1986) ACGIH TLV for water-soluble chromium VI compounds		Ceiling limit: 0.1 mg/m^3**
**Current OSHA PEL (ceiling limit) from chromic acid and chromates		Dog, subcutaneous: LDLo: 330 mg/kg
NOTE: the NIOSH-recommended exposure limit for Chromium VI Oxide is 0.025 mg Cr(VI)/m^3 average over a work shift of up to 10 hours, with ceiling level of 0.05 mg Cr(VI)/m^3 (15 minute period)		

SECTION 3. PHYSICAL DATA

Melting point ..... 197°C
Boiling point ..... decomposes @ 250°C to $Cr_2O_3 + O_2$
Specific gravity 2.7

Solubility in water, gm/100cc @ 20°C 63
Molecular weight 99.99

Appearance and odor: dark red flakes or crystals which are deliquescent. No odor.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits in Air	Lower	Upper
Not combustible	NA	NA		

Chromic anhydride is not flammable but is a strong oxidizing agent and can ignite many hydrocarbons, such as acetic acid and alcohol, when brought into direct contact. Certain inorganic chemicals will produce incandescence when mixed with chromic anhydride; i.e. arsenic, ammonia gas, hydrogen sulfide, phosphorus, potassium, sodium and selenium. Flammable materials near these reactions could be easily ignited.

Firefighters should wear self-contained breathing apparatus and full protective gear to prevent contact when fighting fires involving this material.

SECTION 5. REACTIVITY DATA

This material is stable when properly stored and handled. It is a strong oxidizing agent and will react with many oxidizable substances such as oils, grease, paper and plastics. The reacions can be rapid enough to ignite these materials. Chromic anhydride will ignite many hydrocarbons from direct contact. Incandescence is also produced from contact with the inorganics mentioned in Section 4.

SECTION 6. HEALTH HAZARD INFORMATION

TLV See Section 2

Inhalation of dust or mist can cause irritation of the respiratory tract due to high acidity and tissue oxidation. Ulceration of mucous membranes of the nose and mouth can result from inhalation. Skin contact with acid solutions or the solid may cause irritation. However, the major damage occurs up to 48 hrs. after contact. The chromates slowly dissolve the skin, forming ulcers. Secondary infections can then occur on the broken skin. Chromic acid is also a sensitizer and may cause allergic skin rash. Eye contact may result in severe burns with loss of vision. Ingestion may cause severe burns of the intestinal tract with internal damage. Ingestion of 5 grams or less may be lethal for an adult. Long-term absorption may cause liver damage. Increased instances of respiratory cancers have been reported in the chromate-producing industry. In its 1975 criteria document, NIOSH identified chromium trioxide as a "noncarcinogenic chromium IV." The IARC has classified "chromium and certain chromium compounds" as being carcinogenic to humans. The specific chromium compounds responsible for the carcinogenic effects are not identified.

FIRST AID: INHALATION: Remove person to fresh air. If necessary, aid breathing and seek medical attention*. EYE CONTACT: Immediately flush eyes, including under the eyelids, with running water for at least 15 minutes. Obtain medical assistance promptly*. SKIN CONTACT: Promptly remove contaminated clothing and wash infected area with soap and water. Seek medical attention* if irritation persists or other symptoms develop. INGESTION: Give person large quantities of milk or water to drink. Then induce vomiting. Get prompt medical attention*. (Never induce vomiting or give anything by mouth to an unconscious person.)

* GET MEDICAL ASSISTANCE = Inplant, Paramedic, Community.

SECTION 7. SPILL, LEAK AND DISPOSAL PROCEDURES

Notify safety/environmental personnel of spills. Clean-up personnel should wear respirators and protective gloves and clothing to prevent inhalation and skin contact. Provide adequate ventilation. Spread a reducing agent, such as sodium sulfite or ferrous sulfate, on liquid acid spills. Scoop up the resulting slurry into a container of water and neutralize with soda ash. Solid spills may be carefully scooped into containers taking care to minimize dust generation.

Disposal: Solutions containing this material should be chemically treated with reducing agents and pH-adjusted to precipitate chromium. The precipitate and other solids containing this material should be disposed of in an approved chemical waste landfill. Follow applicable local, state, and federal regulations.

EPA Hazardous Waste Number: D007(EP Toxicity--40 CFR Part 261)

Reportable Spill Quantity: 1000 lbs. (454 kg)

SECTION 8. SPECIAL PROTECTION INFORMATION

Provide general and local exhaust ventilation to meet TLV requirements. NIOSH-approved high-efficiency dust/mist respirators with full facepiece should be used during non-routine/emergency operations and whenever the TLV may be exceeded. Self-contained breathing apparatus or supplied air respirators (both in positive pressure mode) should be worn under severe exposure conditions (75 mg/m^3). Tanks of chromic acid must be adequately exhausted, with chemically resistant duct work and fans. Employees should wear chemical safety goggles to prevent eye contact. Faceshields should also be worn where splashing can occur. Neoprene or other synthetic rubber gloves and apron or protective clothing should be worn (caution: chromic acid may attack some of these materials). If clothing becomes contaminated, fresh clothing should be obtained immediately. Launder contaminated clothing before reuse. Eyewash stations and safety showers should be readily accessible in areas of use.

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

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Store in closed containers away from oxidizable materials and other incompatible materials. Protect containers from physical damage. Maintain good housekeeping procedures. Avoid breathing dusts and mists. Avoid skin contact. Follow good personal hygiene practices. Wash hands thoroughly before eating and smoking. Wash all areas of the body which may have come in contact with this material at the end of each workday. Eating and smoking should not be permitted in areas where this material is handled.

DOT CLASSIFICATION: Oxidizer LABEL: Oxidizer, solid

DOT ID NO.: NA 1463

DATA SOURCE(S) CODE (See Glossary) 2,4,9,12,19,20,27,58,60,61, V.

APPROVALS

INDUST. HYGIENE/SAFETY 1-86

MEDICAL REVIEW: 1-86

GENIUM PUBLISHING

Material Safety Data Sheet

From Genium's Reference Collection
Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

No. 313

PERCHLOROETHYLENE
(Revision D)
Issued: November 1978
Revised: August 1988

SECTION 1. MATERIAL IDENTIFICATION

Material Name: PERCHLOROETHYLENE

Description (Origin/Uses): Used in commercial dry cleaning and metal-degreasing operations; used to a lesser extent in home products and in veterinary anthelmintics (worming).

Other Designations: Ethylene Tetrachloride; Tetrachloroethylene; C_2Cl_4; CAS No. 0127-18-4

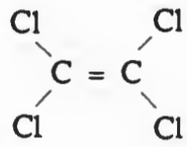
Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.

NFPA

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

SECTION 2. INGREDIENTS AND HAZARDS

	%	EXPOSURE LIMITS
Perchloroethylene, CAS No. 0127-18-4	Ca 100	**OSHA PEL** 8-Hr TWA: 100 ppm Ceiling: 200 ppm Maximum Peak above the Ceiling: 300 ppm for 5 min. in any 3 Hrs **ACGIH TLVs, 1987-88** TLV-TWA: 50 ppm, 340 mg/m³ TLV-STEL: 200 ppm, 1340 mg/m³ **Toxicity Data*** Human, Inhalation, TC_{Lo}: 96 ppm/7 Hrs



*See NIOSH, *RTECS* (No. KX3850000), for additional data with references to reproductive, irritative, tumorigenic, and mutagenic effects.

SECTION 3. PHYSICAL DATA

Boiling Point: 250°F (121°C)
Specific Gravity (H_2O = 1): 1.623
% Volatile by Volume: 100
Water Solubility (%): Insoluble
Molecular Weight: 166 Grams/Mole
Vapor Pressure: 19 Torrs at 77°F (25°C)
Vapor Density (Air = 1): 5.83

Appearance and Odor: A clear, colorless liquid; ethereal odor.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temperature	Flammability Limits in Air	LOWER	UPPER
*	*	% by Volume	*	*

Extinguishing Media: *Perchloroethylene does not burn. Use extinguishing agents that will put out the surrounding fire.

Unusual Fire or Explosion Hazards: Perchloroethylene vapor is heavier than air and it collects in low-lying areas such as sumps, wells, and underground piping systems. Enter these low-lying areas with appropriate caution.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode. Use care in selecting safety equipment (see sect. 5, Conditons to Avoid).

SECTION 5. REACTIVITY DATA

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

Chemical Incompatibilities: Hazardous chemical reactions involving perchloroethylene and barium, beryllium, or lithium are reported in Genium reference 84, page 491M-208.

Conditions to Avoid: Prevent contact with incompatible chemicals. Avoid exposure to direct sunlight. Monitor the stabilizer level in the perchloroethylene product; get specifications from your supplier for the proper inhibitor levels. This material forms hydrochloric acid (HCl) if the inhibitor level becomes too low. Do not mix perchloroethylene with caustic soda or potash. This material may degrade or attack rubber and some plastics and coatings, so select protective gear and handling equipment carefully.

Hazardous Products of Decomposition: Although perchloroethylene itself does not burn, it can be very hazardous in fires because of thermooxidative degradation at high temperatures to very toxic phosgene and corrosive hydrogen chloride. Electric arcs and perchloroethylene vapor may also produce these products of hazardous decomposition.

SECTION 6. HEALTH HAZARD INFORMATION

Perchloroethylene is not listed as a carcinogen by the NTP, IARC, or OSHA.

Summary of Risks: Perchloroethylene affects the central nervous system (CNS), causing incoordination, headache, vertigo, light narcosis, dizziness, unconsciousness, and even death. All of these can occur as the level and duration of exposure continues.

Medical Conditions Aggravated by Long-Term Exposure: None reported. **Target Organs:** CNS, eyes, skin.
Primary Entry: Inhalation, skin. **Acute Effects:** Irritation of the skin, eyes, and upper respiratory tract (URT); CNS effects.
Chronic Effects: None reported.

FIRST AID
Eyes: Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes.
Skin: Immediately wash the affected area with soap and water.
Inhalation: Remove the exposed person to fresh air; restore and/or support his or her breathing as needed.
Ingestion: Never give anything by mouth to someone who is unconscious or convulsing. Do not induce vomiting.

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

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

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

OSHA Designations
Air Contaminant (29 CFR 1910.1000 Subpart Z)

EPA Designations (40 CFR 302.4)
RCRA Hazardous Waste, No. U210
CERCLA Hazardous Substance, Reportable Quantity: 1 lb (0.454 kg), per Clean Water Act (CWA), section 307 (a) and Resource Conservation and Recovery Act (RCRA), section 3001

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing of perchloroethylene solution may occur, wear a full face shield/splash guard. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133). **Respirator:** Consult the *NIOSH Pocket Guide to Chemical Hazards* for general recommendations on respirator protection. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine use (e.g., cleaning reactor vessels or storage tanks), wear an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, and gauntlets, etc., to prevent prolonged or repeated skin contact with perchloroethylene. Suggested material includes polyvinyl alcohol, polyethylene, or neoprene. Leather shoes are also appropriate. **Ventilation:** Install and operate general and local ventilation systems that are powerful enough to maintain airborne levels of perchloroethylene dust below the OSHA PEL standard cited in section 2. **Safety Stations:** Make eyewash stations, washing facilities, and safety showers available in areas of use and handling. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from shoes and equipment.
Comments: Practice good personal hygiene; always wash thoroughly after using this material. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do *not* eat, drink, or smoke in any work area. Avoid inhaling perchloroethylene vapor. Select safety equipment carefully (see sect. 5, Conditions to Avoid).

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store perchloroethylene in a cool, dry, well-ventilated area away from barium, beryllium, and lithium.

Special Handling/Storage: Protect containers from physical damage. Fit all holding tanks with an air-drying venting system that prevents moist air from entering the tank and allows for perchloroethylene vapor expansion and contraction; airtight storage facilities are not recommended. Aluminum is not recommended for storage facilities.

Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: Tetrachloroethylene	**DOT Label:** None	**IMO Label:** Saint Andrew's Cross (X)*
DOT ID No. UN1897	**DOT Hazard Class:** ORM-A	**IMO Class:** 6.1

*Harmful-Stow away from Foodstuffs (Materials of IMO Class 6.1, Packaging Group III).

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

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Industrial Hygiene Review: DJ Wilson, CIH
Medical Review: MJ Hardies, MD

APPENDIX B
CONFINED SPACE ENTRY PROCEDURES

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
MONROEVILLE, PENNSYLVANIA
SAFETY WORK PERMIT PROCEDURES

Experience has shown that the use of the safety work permit Procedure is essential in ensuring adequate safety control on job assignments that require extra precautionary measures. The permit form serves as a checklist and greatly assists those responsible for insuring a safe and healthful work environment. Where there are unusual conditions or hazards not covered by this standard permit form, modifications will be necessary.

1.0 SCOPE

The purpose of safety work permits is to protect employees against exposure to injuries where the likelihood of an accident is greater than that on normal routine work, and as a precaution against fires and other damage to property and equipment.

Permits are to be used for all work done by facility personnel or outside contractors which involve:

- o entering vessels, tanks, pits, or other confined spaces.
- o cutting, welding, lead burning or other similar hot work, or the use of any portable spark or heat-producing equipment.
- o exposure to toxic or hazardous material or to abnormal temperatures or pressures.
- o any work requiring special precautions to ensure personnel safety or protection or equipment, materials and property.

2.0 POLICY

Through the permit system, emphasis is placed on the responsibility of Facility or Site Management to protect employees. Equal responsibility is placed on the person in charge of the operation and the person in charge of the employees doing the work. The former is responsible for inspecting the work site to make certain that conditions are safe and for the actual issuing of the permit. The latter is responsible for seeing that a permit is obtained before starting hazardous work, that they perform their work in a safe manner, and that they leave the area in a safe condition.

3.0 PERMIT FORM

A safety work permit form is provided. A copy of the permit shall be sent to the Health and Safety Manager. The original must be displayed at the job site, or in case of burning or welding, in the possession of the individual during the entire course of the job. The permit should provide the following information:

- The name of the individual(s) doing the work.
- Description of the work to be done.
- Location of work including building, floor, section, and room.
- Date and shift for which the permit is valid.
- A checklist is to be used during inspection of the area which shall include reference to removal of any materials from the area, isolation of the confined space to be entered, cleaning and ventilation of the confined space, locking out of all electrical switches, attachment of appropriate safety tags, provisions for personal protective equipment such as respirators or special clothing, inspection of adjacent equipment on the same level as well as upper and lower floors, where applicable, and the necessity for a fire watch. Refer to the safety work permit checklist questions.
- Specific listing of any special precautions, which must be taken into account in order to make the work area safe, may be written in the margin or where space is available.
- Where a gas test is required, the form should be signed by the person making the test and should indicate test for combustible-atmosphere, oxygen deficiency, and oxygen excess as well as the exact time at which the test was made.

- The safety work permit contains a statement to the effect that the work has been personally inspected and approved by the supervisor having jurisdiction over the work that the permit is to cover. In areas where there may be joint operations, all supervisors in the area will be advised of the work being performed.

4.0 AUTHORIZED SIGNERS

Persons given authority to issue and sign safety work permits are carefully chosen and will include only those who have direct responsibility for the work area and have been qualified by the Health and Safety Manager.

5.0 VALIDITY OF PERMIT

The permit is valid only during an eight-hour period commencing at the time of the inspection. Should work continue beyond eight hours, it will be necessary to have a new permit prepared. In some cases, the permit may be valid for less than eight hours requiring reinspection several times during the eight hour work period.

A safety work permit is valid only for the specific work outlined and exact location described. It does not extend beyond these limits.

Full signatures are required. Initials are unacceptable.

All invalid safety tags shall be removed after work has been completed.

6.0 GAS TEST APPROVAL

The responsibility for determining whether a gas test is necessary rests with the site supervisor.

Test should be made only by specified personnel, duly trained by the Health and Safety Department.

Test should include a determination of the presence of combustibles in the atmosphere, oxygen deficiency and oxygen excess. In some cases, test for known

Test should include a determination of the presence of combustibles in the atmosphere, oxygen deficiency and oxygen excess. In some cases, test for known contaminants, such as hydrogen sulfide or carbon monoxide, must also be made.

Gas test should be made immediately prior to the commencement of work. Any undue delay in the start of a job will necessitate retesting to make certain the confined space atmosphere is safe.

If there is any reason to believe that the composition of the atmosphere might change during the course of the work, periodic gas test at frequent intervals should be made.

When a gas test has been indicated as necessary on the safety work permit, no tank will be entered until the gas tester has made his test and affixed his approval signature to the permit. The time of the test must be indicated on the permit.

7.0 EXCEPTIONS TO THE USE OF THE PERMITS

Safety work permits usually are not required in definite maintenance shop areas or similar locations.

8.0 MULTIPLE CRAFTS

When multiple crafts are needed on a job, each craft must obtain its own safety work permit unless the entire crew is working under the same supervisor.

9.0 DISAGREEMENT ON SAFETY OF WORK AREA

If there is any question as to the safety of the area or procedure, and the person performing the work takes exception to the reliability or validity of the permit, the matter should be referred to the Project Manager or to the Health and Safety Manager.

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
SAFETY WORK PERMIT FORM

DATE:_____ **ISSUED TO:** _____

LOCATION:_____ **FLOOR/AREA**_____ **TIME:**_____

DESCRIBE WORK TO BE DONE:

_____

_____

_____

FOR ALL WORK TO BE DONE BY KEYSTONE OR CONTRACTORS, INVOLVING:

(a) Hot work -any open flame, such as lead burning or welding. (If welding, specify above [gas or electric]).

(b) Entering a closed vessel, tank, pit, sewers, or confined space.

(c) All work requiring special precautions to insure personnel safety.

1. Can the job be done outside in a safe area rather than in a building?.....Y N
2. Have all connections been blanked off or broken?.....Y N
3. Have switches been locked in open position?.....Y N
4. Have safety tags been attached?.....Y N
5. Has equipment and attached piping been cleaned?.....Y N

   If "YES" - Specify how_____

   _____
6. Have all materials (solid, liquids, gases) and/or residues been removed?.....
7. Has equipment been adequately ventilated?.....Y N
8. Are test necessary for the following?
   (1) Flammable or explosive mixtures?.....Y N
   (2) Oxygen deficiency or excess?.....Y N
   (3) Other? (Specify)_____
9. Are any special precautions necessary regarding?
   (1) Electrical grounding of equipment?.....Y N
   (2) Special protective clothing? Tools?.....Y N
   Specify_____
   (3) Respiratory protective equipment?.....Y N
   (4) Explosion proof light?.....Y N
   (5) Safety harness and life line?.....Y N
10. Is adjacent equipment and area safe?.....Y N

11. Should a fire watch or other be assigned?..... Y N

12. Has the Safety Department been notified? ..... Y N

I have answered the above questions from personal knowledge and after inspecting the area where the work is to be done, I am Satisfied that the work can be _____ cannot be_____ done without additional atmospheric testing.

_____
Signature of Tester

I have conducted test for:

(1) Flammable or explosive mixtures..... Y N
(2) Oxygen deficiency or excess ..... Y N
(3) Other (Specify)..... Y N

I have checked for:

(1) Inert gas line disconnected & capped?..... Y N
(2) Raw material lines blanked off..... Y N

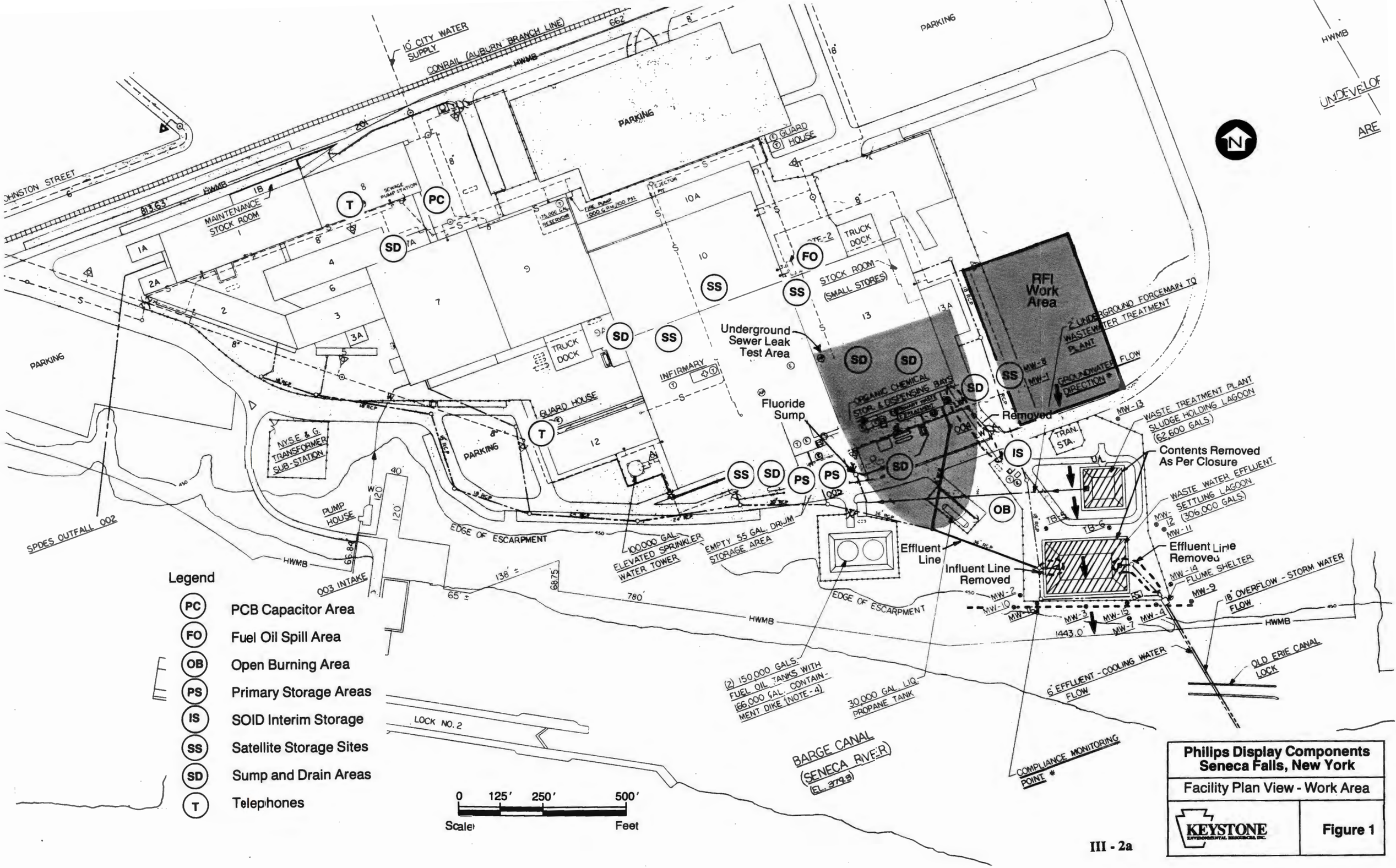
The results are satisfactory for:

(1) Hot work ..... Y N
(2) Entering confined space ..... Y N
(3) Other work (Specify)_____
_____

Date & Time of Test_____

Signature of Tester

Original to person doing work. Copy to be sent to the Health and Safety Manager in Monroeville.



Philips Display Components
Seneca Falls, New York

Facility Plan View - Work Area

KEYSTONE ENVIRONMENTAL RESOURCES, INC.

Figure 1