BOB N CORCORDALE

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PPG INDUSTRIES, INC.

WTU SURGE POND CLOSURE

SITE SAFETY PLAN

AUGUST 23, 1988

SL 048778

A. **Site Description**

**Date:** 8/23/88 **Location:** Lake Charles, LA.

**Hazards:** Contaminated sludge and solids - classified as hazardous

**Area Affected:** 150' x 210' pond with levees

**Additional Information:** The pond has an existing concrete decontamination pad with drain and an abandoned concrete sump on the west end and miscellaneous abandoned piping visible around the perimeter within the levees.

B. **Entry Objectives:** The objective of entry into the contaminated area initially will be to set up a pumping operation to pump contaminated sludge through an existing 4" carbon steel line into a manifold feeding into two existing 25,000 gallon storage tanks. The two tanks serve as holding reservoirs until the sludge is fed into and burned in an incinerator. After all pumpable sludge has been removed, contaminated soil or solids will be excavated and transported in a closed hopper to an existing solids holding bin until they too are fed into and burned in the incinerator. A listing of suspected contaminants is outlined in the following "Item E". Monitoring will be provided by PPG and will consist of both area monitoring as well as personnel monitors.

C. **Onsite Organization & Coordination:**
Project Team Leader (ITS): James Guessfeld
Project Team Leader (PPG): Larry Joiner
Site Safety Officer (ITS): James Guessfeld
Site Safety Officer (PPG): Arlen Gradehaus
Other Field Team Member (ITS): Charles Faulkenheiner
Other Field Team Member (PPG): Jim McMichaels

All personnel visiting the site should log in and out with the ITS Project Team Leader. All activities on the site must be first cleared through either Larry Joiner or Jim McMichaels prior to starting. The Buddy System will be used by ITS personnel working onsite.

D. **Onsite Control:**
James Guessfeld has been designated to coordinate access control onsite (within the contaminated reduction zone) during pumping or excavating operations. Site security will be provided by PPG. A safe perimeter has been established around the site and is reflected in greater detail in Appendix "A". No unauthorized personnel should be allowed within the contaminated reduction zone. The onsite command post or staging area will be located at the decontamination trailer. Control boundaries have been established and the exclusion zone (hot area), contaminated reduction zone (cool area), and the support zone (clean area) have been identified at th site by the red boundary tape surrounding the "hot area" and the yellow tape around the "cool area". Everything outside the "cool area" is considered as the support zone r "clean area".

E. **Hazard Evaluation:**
Based on analysis provided by PPG, the primary hazards and or substances are suspected to be within the confines of the pond levees and are described in greater detail Appendix "B". Concentrations of the various suspected substances is outlined in the sheet entitled "Waste Tech Incinerator Feed Analysis". Following that sheet is a complete run down on each of the primary substances along with the related effect of contact as well as safety precautions to be taken while working around same.

The following additional hazards are expected on site: Uneven terrain, heat stress, slippery ground.

F. Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work areas:

| Location | Level of Protection |
|---|---|
| Exclusion zone (hot area) | B |
| Contaminated reduction zone (cool area) | C* |

* Except air purifying respirator will be PPG's standard belt type for emergency use.

Special protective equipment for each level is as follows:

Level A - Full face mask supplied air with 5 min. escape pack
Tyvek suit with hood
Boots or disposable booties
Gloves or disposable gloves
Hard hat

Level B - Belt type emergency air purifying respirator
Tyvek suit
Boots or disposable booties
Gloves or disposable gloves
Hard hat

If after evaluation of the monitoring program over an agreed period of time, the results should indicate a greater or lesser degree of personal protection is needed. The plan and future implementation will be adjusted accordingly.

**NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE MUTUAL APPROVAL OF BOTH OF THE SITE SAFETY OFFICERS (PPG & ITS).**

G. **Onsite Work Plans:**

A work party consisting of two persons will perform the contaminated sludges pumping operation.

1. Project Team Leader & Safety Officer (ITS) - James Guessfeld

   Duties - Acting as Superintendent and Safety Administrator over the pumping and related decontamination operation. He is responsible for safe and timely completion of each pumping cycle.

2. Pumping Technician - Charles Falkenheiner

   Duties - Assist Project Team Leader/Superintendent in executing th pumping operations

A work party consisting of three people will perform the soils and or contaminated solids removal operation.

1. Project Team Leader & Safety Officer (ITS) - James Guessfeld

   Duties - Acting as Superintendent and Safety Administrator over the soils and or solids removal process. He is responsible for the safe and timely completion of the excavation, hauling, and dumping of contaminated solids.

2. Technician - Charles Falkenheiner

   Duties - Assist Project Team Leader/Superintendent and Heavy Equipment Operator in the excavation, hauling, and dumping of contaminated solids.

3. Heavy Equipment Operator - To be named later

   Duties - to run heavy equipment (ié. dozer, excavator, forklift as may be required to complete the excavation, hauling, and dumping of contaminated solids.

All of the above personnel have been briefed on the contents of this plan prior to starting any field activities.

H. **Communications:**

Personnel working in the xclusion zone (hot area) will always remain in visual contact with one another. Communications will normally be verbal, but should noise levels become excessive would then revert to standard

hand signals. If hand signals become necessary, the following will be used:

Hand griping throat . . . . . Out of air, can't breath

Grip partner's wrist or put both hands around waist . . . . . Leave area immediately

Both hands on top of head . . . . . Need assistance

Thumbs up . . . . . OK, I'm alright, or I understand

Thumbs down . . . . . No, negative, I don't understand

I. **Decontamination Procedures:**

Personnel leaving the exclusion zone (hot area) and entering the contaminated reduction zone (cool area) will be allowed to remove their supplied air equipment. This equipment will be stored in an easily accessible area usually in the vicinity of the air bottles until needed again. The air bottles will always remain in the "cool area" with hoses being run to the masks. After each dumping cycle has been completed, the entire breathing air set-up will be decontaminated in the decon area with detergent and water; then will be removed from the plant until ne ded again.

After the air equipment has been cleaned, the personnel will then go through a boot wash if wearing boots or will dispose of booties in a container located near the contaminated entrance to the decon trailer. The Tyvek suit could then be removed, followed by the gloves. Thes materials would also be disposed of in the disposal hopper. Each employee would then go into the shower room for a good shower with soap and washing of hair. At this point they will have been completely decontaminated and then may enter the clean room of the trailer for dressing into street clothes. PPG will supply the containers for disposal of disposable safety equipment and will handle disposal of same.

Emergency decontamination of personnel, should that become necessary, would be performed on the decon pad. In the case of severe heat stress, the Tyvek suit would be opened and cool clean water filled directly int the suit until the situation could be stabilized.

All equipment that had been used in the "hot area" will be decontaminated prior to leaving the plant. The piece of equipment would first be rinsed down with water to knock off any loose or clinging materials prior to rem ving from the "hot area". (Water from this operation would run back into the pond). It would then be moved to the decon pad for complet dec ntamination. This decon would be accomplished by again washing down with water, then with steam. Should additi nal cleaning be required, a

solution of detergent and water would be used until decontamination had been accomplished. Water from this operation would go to the decon pad drain.

J. **Safety and Health Plan:**

1. James Guessfeld is the designated Site Safety Officer (ITS) and is directly responsible for safety recommendations on site.

2. Emergency Medical Care:
PPG's emergency first aid facilities will be available for emergency treatment of the contractor's employees. The plant ambulance is also available in such emergency situations. Phone numbers for alerting the first aid facilities and ambulance are posted at the decon trailer.

Local ambulance service is also audible should the need arise. The name of the ambulance service and associated telephone number are posted at the decon trailer. Also posted at the decon trailer is the name of the ITS doctor, address, and his telephone numbers. The doctor has been notified of the substances ITS personnel will be exposed to, in order to assist him in his evaluation of any accident.

An emergency first aid kit is located in the decon trailer.

Emergency telephone numbers for police, fire, and hospital are posted in the decon trailer.

3. Environmental Monitoring

Environmental monitoring will be furnished and analyzed by PPG. In addition to site monitoring, personnel monitoring will also be utilized. Such monitoring will be continued throughout the course of this project unless exposure levels over a period of time find such monitoring is no longer required.

4. Emergency Procedures

The following emergency procedures will be used on site:

Personnel Injury in the "Hot Area": The person should try to get to the "cool area" if he can do so without further injury. His buddy should help to get the injured person to the "cool area" if he feels he can do so without inducing further injury. If it is deemed the injured person cannot be moved to the "cool area", his buddy should evaluate the situation to determine if anything should be done to the injured person to avoid any further injuries, then go for help. A rescue team would have to be assembled to bring the person out of

the "hot area" to medical treatment. All work activities on the site would be stopped until the situation has been taken care of.

Personnel Injury in the "Cool Area":

The nature of the injury will be assessed by the Site Safety Officer. If the cause of the injury does not affect the performance of site personnel, then operations may continue with the Site Safety Officer initiating the necessary first aid and or follow-up requirements. If the injury increases the risk to others, then operations should be shut down until the risk is removed or minimized.

Fire/Explosion - Upon notification of a fire or explosion all personnel should move to the decon trailer and await further instructions from the Site Safety Officer, or if serious enough proceed with the PPG evacuation plan. Small fires occurring within the jobsite area may be extinguished with fire extingushers.

Personal Protection Equipment Failure - If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his buddy should leave the "hot area" immediately. Re-entry shall not be permitted until the faulty equipment is either repaired or replaced.

Other Equipment Failure - If any other equipment on site fails to operate properly, the Project Team Leader should be notified and then determine the effect of this failure on continuing operations on site. If the failure affects the safety personnel or prevents completion of the work task, then personnel should leave th "hot area" until the situation is evaluated and appropriate actions taken.

In all situations when an onsite emergency results in evaluation of the "hot area", personnel should not re-enter until:

1. The condition resulting in the emergency is corrected.
2. The hazard has been reassessed
3. The Site Safety Plan has been reviewed
4. Personnel have been briefed on resulting changes in the Site Safety Plan.

5. Personal Monitoring:

Personal monitoring will be handled by PPG, and will be carried out

on all site personnel entering the "cool area". Sampling may be by either sampling pumps, air monitors, or other similar sampling device.

Medical Monitoring: Prior to starting work all field personnel will have blood scans and drug testing to be used as guide indicators of levels at the start of work. When the project is complete or a person leaves the company, exit testing will again be utilized to check against initial test results. Such testing is also required once a year if the project is not complete. During hot summer months, heat stress monitoring will be utilized. At each work break, all field personnel will have their temperature and body weight checked and recorded. These people will be encouraged to take plenty of liquids or neutrolytes during hot days.

All site personnel have read the above plan and are familiar with it's provisions.

| | Name | Signature |
|---|---|---|
| Site Safety Officer | James Guessfeld | _____ |
| Other | Charles Faldenheiner | _____ |
| | Roy Blalock | _____ |
| | Ben Files | _____ |
| | _____ | _____ |
| | _____ | _____ |
| | _____ | _____ |

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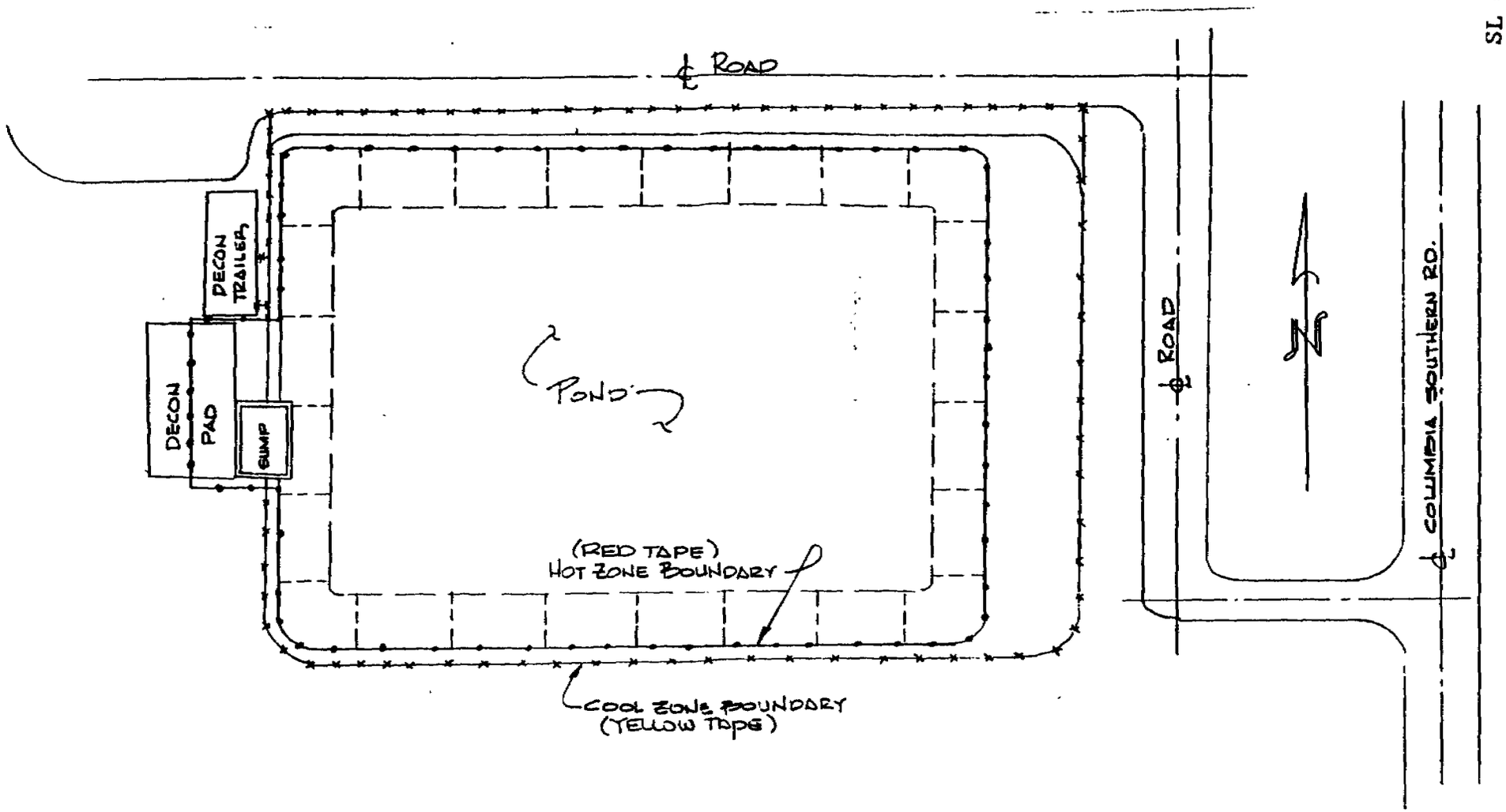


APPENDIX - "A"

APPENDIX "B"

PPG INDUSTRIES. INC.
LAKE CHARLES, LA 70602

# WASTE TECH INCINERATOR FEED ANALYSIS

SAMPLE DATE: 7/18/88 SAMPLE: 7218023
SAMPLE DESCRIPTION: LLOG 774 SURGE PD BT

| IMSDS # | COMPONENT | | Weight % | Heat Value | Chlorine % | |
|---|---|---|---|---|---|---|
| 184 | Chloroethane | EtCl | 0.08 | 6.3 | 0.04 | |
| 2057 | 1,1-Dichloroethane | 1,1-EDC | 0.27 | 14.8 | 0.20 | |
| 1591 | Chloroform | CHCL3 | 0.79 | 10.7 | 0.70 | |
| 2776 | 1,2-Dichloroethane | 1,2-EDC | 7.19 | 388.5 | 5.16 | |
| 1589 | Carbon Tetrachloride | CCL4 | 0.41 | 1.8 | 0.38 | |
| 712 | Trichloroethene | TRICHLOR | 1.83 | 57.3 | 1.48 | |
| | 1-Bromo, 2-Chloroethane | ECB | | 0.0 | 0.00 | have dichloro but not mono |
| 1577 | 1,1,2-Trichloroethane | TCE | 1.17 | 41.9 | 0.93 | |
| 1427 | Tetrachloroethene | PERCHLOR | 7.19 | 154.0 | 6.15 | |
| 1612 | 1,1,1,2-Tetrachloroethane | UNSYM | 0.42 | 10.6 | 0.36 | |
| 1587 | 1,1,2,2-Tetrachloroethane | SYM | 1.30 | 32.5 | 1.10 | |
| 1670 | Pentachloroethane | PENTA | 0.65 | 6.2 | 0.57 | |
| 1418 | para-Dichlorobenzene | p-DCB | 0.02 | 1.9 | 0.01 | |
| 1599 | Hexachloroethane | HEXA | 0.63 | 52.1 | 0.31 | |
| 1668 | Hexachlorobutadiene-1,3 | HCBD | 0.98 | 37.3 | 0.80 | |
| | Total Unknowns * | | 4.84 | 103.6 | 4.14 | |
| | | CLHC TOTALS-> | 27.78 | 919.5 BTU/LB | 22.31 % Chlorine | |

| | |
|---|---|
| pH | 2.3 |
| Water, wt % | 45.94 |
| Density, g/mL | 1.272 |
| Sodium, wt % | |
| Ash, wt% | 16.8 |

K. Kaub
Approv d
7/26/88
Date

* NOTE: H.V. and % Cl2 calculated using Perchlor factors.

DISTRIBUTION:

J. Williams/B. Reynolds
K. V. Kaub
W. Cooper
G. Brunet
I. Perez
Lab File D29.1

SL 048787

## I. CHEMICAL IDENTITY

Common name: 1,1,2-Trichloroethane
Formula: $CHCl_2CH_2Cl$
Synonyms: Vinyl trichloride; beta-trichloroethane
CAS No.: 79-00-5
Carcinogen: NCI

## II. REGULATORY INFORMATION

Hazardous substance: No
Hazardous waste: EPA
DOT Hazard Class: N/A

## III. PHYSICAL CHARACTERISTICS

Boiling point: 113 C (236 F)
Specific gravity: 1.43
Vapor density: 4.55
Melting point: −37 C (−34 F)
Vapor pressure: 18.8 mm Hg
Solubility in water: 0.45
Evaporation rate: Data not available
Appearance and odor: Colorless liquid with a sweet odor, like chloroform

## IV. PHYSICAL HAZARDS

Flash point: None in normal test method
Autoignition temperature: Data not available
Flammable limits in air (% by vol.): Lower: 6.0; Upper: 15.5
Extinguishants: Foam carbon dioxide, dry chemical

## V. HEALTH HAZARDS

Can affect the body if it is inhaled, if it comes in contact with the eyes or skin, or if it is swallowed. Effects of short-term overexposure: May cause irritation of the eyes and nose, drowsiness, incoordination, unconsciousness, and death. Effects of long-term overexposure: May cause liver or kidney damage.

## VI. EMERGENCY FIRST AID

Eyes: Irrigate immediately
Skin: Wash with soap and water
Breathing: Move affected to fresh air at once. If necessary, perform artificial respiration and get medical attention immediately.
Swallowing: Give large quantities of water. Induce vomiting and get medical attention immediately.

## VII. PERMISSIBLE EXPOSURE LIMIT

OSHA TWA: 10 ppm (45 mg/m³) with skin caution
ACGIH STEL: 20 ppm
IDLH: 500 ppm

## VIII. PRECAUTIONS FOR USE AND SAFE HANDLING

Conditions contributing to instability: Heat
Incompatibilities: Contact with strong oxidizers, strong caustics, and chemically active metals such as aluminum and magnesium powders, sodium or postassium may cause fires and explosions.
Hazardous decomposition products: Toxic gases and vapors may be released in a fire involving 1, 1,2-trichloroethane.
Special precautions: Will attack some forms of plastics, rubber, and coatings.

## IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Protective equipment and clothing must be used. In the case of spills, ventilate area. Collect for reclamation or absorb in vermiculite, dry sand, or a similar material.

## X. PROTECTIVE EQUIPMENT

Provide employees and require the use of impervious clothing, gloves, face shields (eight-inch minimum), splash-proof safety goggles, and other appropriate protectiveclothing necessary to prevent repeated or prolonged skin contact.

***Respirators–***

(Required above 10 ppm)
500 SAF;SCBAF
Escape: GMOV;SCBA

## I. CHEMICAL IDENTITY

Common name: Ethyl chloride
Formula: $C_2H_5Cl$
Synonyms: Chloroethane; monochloroethane; hydrochloric ether; muriatic ether
CAS No.: 75-00-3
Carcinogen: N/A

## II. REGULATORY INFORMATION

Hazardous substance: No
Hazardous waste: No
DOT Hazard Class: Flammable liquid

## III. PHYSICAL CHARACTERISTICS

Boiling point: 12.2 C (54 F)
Specific gravity: 0.92
Vapor density: At boiling point, 2.2
Melting point: −139 C (−218 F)
Vapor pressure: At 20 C, 1064 mm Hg
Solubility in water: 0.57 g/100g water
Evaporation rate: Much higher than 1
Appearance and odor: Colorless liquid or gas with a pungent, ether-like odor

## IV. PHYSICAL HAZARDS

Flash point: −50 C (−58 F)
Autoignition temperature: 519 C (966 F)
Flammable limits in air (% by vol.): Lower: 3.8; Upper: 15.4
Extinguishants: Stop flow of gas. Use carbon dioxide, dry chemical, or foam for small fires.

## V. HEALTH HAZARDS

May cause drowsiness, unconsciousness, irregular heart beat, and death. Irritation of eyes and abdominal cramps. Spilled on skin, frostbite. Long-term exposure may cause liver and kidney damage.

## VI. EMERGENCY FIRST AID

Eyes: Wash with large amounts of water, lifting the lids occasionally. Get medical attention as soon as possible. Do not wear contacts when working with the substance.
Skin: Flush with cold water, if compound has not already evaporated. Rem ve contaminated clothing. If there is skin irritation, get medical attention.

Breathing: Move patient to fresh air. Perform artificial respiration if needed. Keep patient warm and at rest. Get medical attention as soon as possible.
Swallowing: Get medical attention immediately. Give large quantities of water, and induce vomiting mechanically with finger or with syrup of ipecac.

## VII. PERMISSIBLE EXPOSURE LIMIT

OSHA TWA: 1,000 ppm (2,600 mg/m³)
ACGIH STEL: 1,250 ppm (3,250 mg/m³)
IDLH: 20,000 ppm

## VIII. PRECAUTIONS FOR USE AND SAFE HANDLING

Conditions contributing to instability: Heat.
Incompatibilities: Contact with chemically active metals such as sodium, potassium, calcium, powdered aluminum, zinc, and magnesium may cause fires and explosions.
Hazardous decomposition products: Toxic gases (such as hydrogen chloride, phosgene, and carbon monoxide) may be released in a fire.
Special precautions: Will attack some forms of plastics, rubber, and coatings.

## IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Persons not wearing protective equipment and clothing should stay out of spill area. Remove all ignition sources. Ventilate area. Small quantities may be absorbed on paper towels and evaporated in a hood. Do not allow to enter confined space, such as a sewer. Larger quantities may be reclaimed or collected and atomized in a suitable combustion chamber.

## X. PROTECTIVE EQUIPMENT

Impervious clothing, gloves, face shields (eight-inch minimum) to prevent prolonged or repeated skin contact. Contaminated clothing should be placed in closed containers pending disposal or cleaning. Splash-proof safety goggles where there is danger of eye contact.

***Respirators–***

< 10,000 ppm: SA; SCBA
< 20,000 ppm: SAF; SCBAF; SAF:PD,PP,CF
> 20,000 ppm: SCBAF:PD, PP; comb SAF:PD, PP,CF w/ SCBA:PD, PP
Fire fighting: SCBAF:PD, PP
Escape: Any gas mask providing protection against organic vapors; escape SCBA.

Swallowing: Get medical attention immediately. Induce vomiting mechanically with finger or with syrup of ipecac.

## VII. PERMISSIBLE EXPOSURE LIMIT

OSHA TWA: 100 ppm (400 mg/m³)
ACGIH TLV: 200 ppm (810 mg/m³)
ACGIH STEL: 250 ppm (1,010 mg/m³)
IDLH: 4,000 ppm

## VIII. PRECAUTIONS FOR USE AND SAFE HANDLING

Conditions contributing to instability: Heat
Incompatibilities: Contact with strong oxidizers may cause fires and explosions. Contact with strong caustics will cause formation of flammable and toxic acetylene gas.
Hazardous decomposition products: Toxic gases (such as vinyl chloride, hydrogen chloride, phosgene, and carbon monoxide) may be released in a fire.
Special precautions: Will attack some forms of plastics, rubber, and coatings.

## IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Persons not wearing protective equipment and clothing should stay out of spill area. Remove all ignition sources. Ventilate area. Small quantities may be absorbed on paper towels and evaporated in a safe place. Larger quantities may be reclaimed or collected and atomized in a suitable combustion chamber. Do not allow to enter a confined space, such as a sewer.

## X. PROTECTIVE EQUIPMENT

Impervious clothing, gloves, face shields (eight-inch minimum) to prevent prolonged or repeated skin contact. Contaminated clothing should be placed in closed containers pending disposal or cleaning. Splash-proof safety goggles where there is danger of eye contact.

***Respirators-***

< 1000 ppm: CCROV; SA; SCBA
< 4000 ppm: GMOV; SAF; SCBAF; SAF:PD, PP, CF
> 4000 ppm: SCBAF:PD, PP; comb SAF:PD, PP,CF w/ SCBA:PD, PP
Fire fighting: SCBAF:PD, PP
Escape: Any gas mask providing protection against organic vapors; escape SCBA.

## I. CHEMICAL IDENTITY

Common name: 1,1-Dichloroethane
Formula: $CH_3CHCl_2$
Synonyms: Asymmetrical dichloroethane; ethylidene chloride; 1,1-ethylidene dichloride
CAS No.75-34-3:
Carcinogen: N/A

## II. REGULATORY INFORMATION

Hazardous substance: EPA
Hazardous waste: EPA
DOT Hazard Class: Flammable liquid

## III. PHYSICAL CHARACTERISTICS

Boiling point: 57.3 C (135 F)
Specific gravity: 1.2
Vapor density: At boiling point, 3.4
Melting point: −96.7 C (−142 F)
Vapor pressure: At 20 C, 182 mm Hg
Solubility in water: At 20 C, less than 0.1
Evaporation rate: 11.6
Appearance and odor: Colorless liquid with a chloroform-like odor

## IV. PHYSICAL HAZARDS

Flash point: −8.5 C (17 F)
Autoignition temperature: Data not available
Flammable limits in air (% by vol.): Lower: 5.9; Upper: 15.9
Extinguishants: Foam, dry chemical, carbon dioxide

## V. HEALTH HAZARDS

Drowsiness and unconsciousness; possible damage to liver, kidneys, and lungs; liquid in eyes may cause irritation. Prolonged or repeated skin contact can cause slight burn.

## VI. EMERGENCY FIRST AID

Eyes: Wash with large amounts of water, lifting the lids occasionally. Get medical attention as soon as possible. Do not wear contacts when working with the substance.
Skin: Flush skin, using soap or mild detergent. Remove contaminated clothing. If there is skin irritation, get medical attention.
Breathing: Move patient to fresh air. Perform artificial respiration if needed. Keep patient warm and at rest. Get medical attention as soon as possible.

## I. CHEMICAL IDENTITY

Common name: Chloroform
Formula: $CHCl_3$
Synonyms: Trichloromethane
CAS No.: 67-66-3
Carcinogen: IARC animal suspected

## II. REGULATORY INFORMATION

Hazardous substance: EPA
Hazardous waste: EPA
DOT Hazard Class: ORM-A, poison

## III. PHYSICAL CHARACTERISTICS

Boiling point: 61 C (142 F)
Specific gravity: 1.49
Vapor density: 4.1
Melting point: −63.5 C (−82 F)
Vapor pressure:at 20 C, 160 mm Hg
Solubility in water: at 20 C, 0.8 g/100g water
Evaporation rate: 11.6
Appearance and odor: Colorless liquid with a pleasant sweet odor.

## IV. PHYSICAL HAZARDS

Flash point: N/A
Autoignition temperature: N/A
Flammable limits in air (% by vol.): Not combustible.
Extinguishants: N/A

## V. HEALTH HAZARDS

May cause headache, drowsiness, vomiting, dizziness, unconsciousness, irregular heart beat, and death. Vapor exposure may cause liver and kidney damage. In the eye, causes pain and irritation. Swallowing followed immediately by severe burning of mouth and throat, pain in chest and abdomen, and vomiting. Large amounts may cause loss of consciousness, and liver damage may follow.

## VI. EMERGENCY FIRST AID

Eyes: Wash with large amounts of water, lifting the lids occasionally. Get medical attention as soon as possible. Do not wear contacts when working with the substance.

Skin: Wash with soap or mild detergent. Remove contaminated clothing. If there is skin irritation, get medical attention.

Breathing: Move patient to fresh air. Perform artificial respiration if needed. Keep patient warm and at rest. Get medical attention as soon as possible.
Swallowing: Get medical attention immediately. Induce vomiting mechanically with finger or with syrup of ipecac.

## VII. PERMISSIBLE EXPOSURE LIMIT

OSHA TWA: 50 ppm (240 mg/m$^3$)
ACGIH STEL: 50 ppm (225 mg/m$^3$)
IDLH: 1,000 ppm

## VIII. PRECAUTIONS FOR USE AND SAFE HANDLING

Conditions contributing to instability: In the presence of air and light, slowly reacts to form phosgene and hydrochloric acid gases.
Incompatibilities: Reacts with strong caustics and chemically active metals such as aluminum, magnesium powder, sodium, or potassium.
Hazardous decomposition products: Toxic gases (such as hydrogen chloride, chlorine, phopsgene, and carbon monoxide) may be released on decomposition.
Special precautions: Will attack some forms of plastic, rubber, and coatings.

## IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Persons not wearing protective equipment and clothing should stay out of spill area. Ventilate area. Collect for reclamation or absorb in vermiculite, dry sand, or earth.

## X. PROTECTIVE EQUIPMENT

Impervious clothing, gloves, face shields (eight-inch minimum) to prevent prolonged or repeated skin contact. Contaminated clothing should be placed in closed containers pending disposal or cleaning. Splash-proof safety goggles where there is danger of eye contact. Emergency eye-wash fountains should be provided in the workplace if there is a possibility of eye exposure.

***Respirators–***

< 500 ppm: SA; SCBA
< 1000 ppm: SAF; SCBAF
> 1000 ppm: SCBAF:PD, PP; comb SAF:PD, PP,CF w/SCBA:PD, PP
Fire fighting: SCBAF:PD, PP
Escape: Any gas mask providing protection against organic vapors; escape SCBA.

## I. CHEMICAL IDENTITY

Common name: Ethylene dichloride
Formula: $ClCH_2CH_2Cl$
Synonyms: 1,2-Dichloroethane, glycol dichloride, brocide, alpha,beta-dichloroethane, Freon 150
CAS No.: 107-06-2
Carcinogen: IARC, NCI, animal positive; NTP, IARC suspect human

## II. REGULATORY INFORMATION

Hazardous substance: EPA
Hazardous waste: EPA
DOT Hazard Class: Flammable liquid

## III. PHYSICAL CHARACTERISTICS

Boiling point: 83 C (181 F)
Specific gravity: 1.26
Vapor density: 3.4
Melting point: −40 C (−40 F)
Vapor pressure: At 20 C, 87 mm Hg
Solubility in water: 0.8 g/100g water
Appearance and odor: Colorless, oily liquid; chloroform-like odor; sweet taste; irritating vapors

## IV. PHYSICAL HAZARDS

Flash point: 13.3 C (55.9 F)
Autoignition temperature: 413 C (775 F)
Flammable limits in air (% by vol.): Lower: 6.2; Upper: 16
Extinguishants: Dry chemical, carbon dioxide, foam

## V. HEALTH HAZARDS

Skin and eye irritation. Evaporation can cause frostbite. Headache, dizziness, unconsciousness. Long-term exposures can lead to liver and kidney damage.

## VI. EMERGENCY FIRST AID

Eyes: Wash with large amounts of water, lifting the lids occasionally. Get medical attention as soon as possible.
Skin: Flush with water. Remove contaminated clothing. If there is skin irritation, get medical attention.
Breathing: Move patient to fresh air. Perform artificial respiration if needed. Keep patient warm and at rest. Get medical attention as soon as possible.

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Swallowing: Get medical attention immediately. Give large quantities of water, and then induce vomiting (mechanically with finger).

## VII. PERMISSIBLE EXPOSURE LIMIT

OSHA TWA: 50 ppm; ceiling 100 ppm
OSHA maximum acceptable peak: 200 ppm for five minutes
ACGIH TWA: 10 ppm
ACGIH STEL: 15 ppm
IDLH: 1,000 ppm

## VIII. PRECAUTIONS FOR USE AND SAFE HANDLING

Incompatibilities: Caustics, active metals, aluminum powder, magnesium, sodium, potassium

## IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Persons not wearing protective equipment and clothing should stay out of spill area. Remove all ignition sources. Ventilate area. May be atomized in a suitable combustion chamber.

## X. PROTECTIVE EQUIPMENT

Impervious clothing, gloves, face shields (eight-inch minimum) to prevent prolonged or repeated skin contact. Remove contaminated clothing immediately. Contaminated clothing should be placed in closed containers pending disposal or cleaning. Splash-proof safety goggles required where there is danger of eye contact.

***Respirators–***

50 ppm: SA; SCBA
250 ppm: SAF; SCBAF
Escape: GMOV; escape SCBA.

## I. CHEMICAL IDENTITY

Common name: Carbon tetrachloride
Formula: $CCl_4$
Synonyms: Tetrachloromethane; perchloromethane
CAS No.: 56-23-5
Carcinogen: IARC animal positive

## II. REGULATORY INFORMATION

Hazardous substance: EPA
Hazardous Waste: EPA
DOT Hazard Class: ORM-A

## III. PHYSICAL CHARACTERISTICS

Boiling point: 76.8 C (170 F)
Specific gravity: 1.59
Vapor density: 5.3
Melting point: −23 C (−9 F)
Vapor pressure: at 20 C, 91 mm Hg
Solubility in water: at 20 C, 0.08 g/100 g water
Evaporation rate: 12.8
Appearance and odor: Colorless liquid with an ether-like odor

## IV. PHYSICAL HAZARDS

Flammability: Not combustible.

## V. HEALTH HAZARDS

May cause drowsiness, dizziness, incoordination, and unconsciousness. Delayed effects may include damage to heart, liver (shown by yellow jaundice and dark urine), and kidneys. Eye contact causes burning and intense irritation.

Prolonged or repeated exposure may cause liver and kidney damage. Exposure to liquid may cause skin irritation

## VI. EMERGENCY FIRST AID

Eyes: Wash with large amounts of water, lifting the lids occasionally. Get medical attention as soon as possible. Do not wear contacts when working with the substance.

Skin: Wash with soap or mild detergent. Remove contaminated clothing. If there is skin irritation, get medical attention.

Breathing: Move patient to fresh air. Perform artificial respiration if needed. Keep patient warm and at rest. Get medical attention as soon as possible.

Swallowing: Get medical attention immediately. Induce vomiting mechanically with finger or with syrup of ipecac.

## VII. PERMISSIBLE EXPOSURE LIMIT

OSHA TWA: 10 ppm

## VIII. PRECAUTIONS FOR USE AND SAFE HANDLING

Conditions contributing to instability: None.
Incompatibilities: Reacts with chemically active metals such as sodium, potassium, and magnesium.
Hazardous decomposition products: Toxic gases (such as hydrogen chloride, chlorine, phosgene, and carbon monoxide) may be released upon decomposition.
Special precautions: Liquid will attack some forms of plastic, rubber, and coatings.

## IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Persons not wearing protective equipment and clothing should stay out of spill area. Ventilate area. Collect for reclamation or absorb on vermiculite, dry sand, or earth and secured sanitary landfill.

## X. PROTECTIVE EQUIPMENT

Impervious clothing, gloves, face shields (eight-inch minimum) to prevent prolonged or repeated skin contact. Contaminated clothing should be placed in closed containers pending disposal or cleaning. Splash-proof safety goggles where there is danger of eye contact.

***Respirators–***

< 100 ppm: SA; SCBA
< 300 ppm: SAF; SCBAF
> 300 ppm: SCBAF:PD, PP; comb SAF:PD, PP,CF w/SCBA:PD, PP
Fire fighting: SCBAF:PD, PP
Escape: Any gas mask providing protection against organic vapors; escape SCBA.

## I. CHEMICAL IDENTITY

Common name: Tetrachloroethylene
Formula: $CCl_2=CCl_2$
Synonyms: Perchloroethylene; perchlorethylene; tetrachlorethylene; tetrachloroethene; perk; carbon dichloride, ethylene tetrachloride; Percelene, PCE
CAS No.: 127-18-4
Carcinogen: NCI positive

## II. REGULATORY INFORMATION

Hazardous substance: No
Hazardous waste: EPA
DOT Hazard Class: ORM-A

## III. PHYSICAL CHARACTERISTICS

Boiling point: 121.2 C (250 F)
Specific gravity: 1.62
Vapor density: 5.83
Melting point: -22.4 C (-8 F)
Vapor pressure: 14 mm Hg
Solubility in water: 0.015
Evaporation rate: 2.8
Appearance and odor: Colorless liquid with an odor like chloroform or ether

## IV. PHYSICAL HAZARDS

Flash point: N/A
Autoignition temperature: Not combustible
Flammable limits in air (% by vol.): N/A
Extinguishants: N/A

## V. HEALTH HAZARDS

Can affect the body if it is inhaled, swallowed, or comes in contact with the eyes or skin.
Effects of short-term overexposure: May cause headache, nausea, drowsiness, dizziness, incoordination, and unconsciousness. It may also cause irritation of the eyes, nose, and throat and flushing of the face and neck. In addition, it might cause liver damage with such findings as yellow jaundice and dark urine. Liver damage may become evident several weeks after exposure.
Effects of long-term overexposure: May cause irritation of the skin, and damage to the liver and kidneys.

## VI. EMERGENCY FIRST AID

Eyes: Wash with large amounts of water, lifting the lids occasionally. Get medical attention if irritation persists after washing. Do not wear contacts when working with the substance.

Skin: Wash with soap and water. Remove contaminated clothing. Get medical attention if irritation persists after washing.

Breathing: Move patient to fresh air. Perform artificial respiration if needed. Keep patient warm and at rest. Get medical attention as soon as possible.

Swallowing: Get medical attention immediately. If medical help is not available quickly, induce vomiting.

## VII. PERMISSIBLE EXPOSURE LIMIT

OSHA TWA: 100 ppm with a ceiling of 200 ppm
NIOSH recomendation: 50 ppm with a 100 ppm ceiling
ACGIH TWA: 50 ppm with skin caution

## VIII. PRECAUTIONS FOR USE AND SAFE HANDLING

Conditions contributing to instability: Heat.

Incompatibilities: Reacts with strong oxidizers and chemically active metals such as barium, lithum, and beryllium.

Hazardous decomposition products: Toxic gases and vapors (such as hydrogen chloride, phosgene, and carbon monoxide) may be released when it decomposes.

Special precautions: Liquid will attack some forms of plastics, rubber, and coatings.

## IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Persons not wearing protective equipment and clothing should stay out of spill area. Ventilate area. Collect for reclamation or absorb in vermiculite, dry sand, or earth and dispose of in a secured sanitary landfill.

## X. PROTECTIVE EQUIPMENT

Impervious clothing, gloves, face shields (eight-inch minimum) to prevent prolonged or repeated skin contact. Contaminated clothing should be placed in closed containers pending disposal or cleaning (persons performing the cleaning should be informed of the chemical's hazardous properties). Splash-proof safety goggles where there is danger of eye contact.

***Respirators–***

500 ppm: CCROVF;GMOV;SAF;SCBAF
Firefighting: SCBAF:PD, PP
Escape: GMOV;SCBA.

## I. CHEMICAL IDENTITY

Common name: 1,1,2-Trichloroethane
Formula: $CHCl_2CH_2Cl$
Synonyms: Vinyl trichloride; beta-trichloroethane
CAS No.: 79-00-5
Carcinogen: NCI

## II. REGULATORY INFORMATION

Hazardous substance: No
Hazardous waste: EPA
DOT Hazard Class: N/A

## III. PHYSICAL CHARACTERISTICS

Boiling point: 113 C (236 F)
Specific gravity: 1.43
Vapor density: 4.55
Melting point: −37 C (−34 F)
Vapor pressure: 18.8 mm Hg
Solubility in water: 0.45
Evaporation rate: Data not available
Appearance and odor: Colorless liquid with a sweet odor, like chloroform

## IV. PHYSICAL HAZARDS

Flash point: None in normal test method
Autoignition temperature: Data not available
Flammable limits in air (% by vol.): Lower: 6.0; Upper: 15.5
Extinguishants: Foam carbon dioxide, dry chemical

## V. HEALTH HAZARDS

Can affect the body if it is inhaled, if it comes in contact with the eyes or skin, or if it is swallowed. Effects of short-term overexposure: May cause irritation of the eyes and nose, drowsiness, incoordination, unconsciousness, and death. Effects of long-term overexposure: May cause liver or kidney damage.

## VI. EMERGENCY FIRST AID

Eyes: Irrigate immediately
Skin: Wash with soap and water
Breathing: Move affected to fresh air at once. If necessary, perform artificial respiration and get medical attention immediately.
Swallowing: Give large quantities of water. Induce vomiting and get medical attention immediately.

## VII. PERMISSIBLE EXPOSURE LIMIT

OSHA TWA: 10 ppm (45 mg/m$^3$) with skin caution
ACGIH STEL: 20 ppm
IDLH: 500 ppm

## VIII. PRECAUTIONS FOR USE AND SAFE HANDLING

Conditions contributing to instability: Heat
Incompatibilities: Contact with strong oxidizers, strong caustics, and chemically active metals such as aluminum and magnesium powders, sodium or postassium may cause fires and explosions.
Hazardous decomposition products: Toxic gases and vapors may be released in a fire involving 1, 1,2-trichloroethane.
Special precautions: Will attack some forms of plastics, rubber, and coatings.

## IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Protective equipment and clothing must be used. In the case of spills, ventilate area. Collect for reclamation or absorb in vermiculite, dry sand, or a similar material.

## X. PROTECTIVE EQUIPMENT

Provide employees and require the use of impervious clothing, gloves, face shields (eight-inch minimum), splash-proof safety goggles, and other appropriate protectiveclothing necessary to prevent repeated or prolonged skin contact.

***Respirators--***

(Required above 10 ppm)
500 SAF;SCBAF
Escape: GMOV;SCBA

# 1,1,2,2-TETRACHLOROETHANE

CAS Registry Number: 79-34-5

Material Name: 1,1,2,2-TETRACHLOROETHANE

Chemical Formula: C2H2CL4

General Storage Procedure: KEEP CONTAINERS CLOSED. STORE IN A COOL, DARK PLACE. (THIDD6 0002)

General Handling Procedure: INDIVIDUALS WITH DISEASES OF THE CENTRAL NERVOUS SYSTEM, LIVER, OR KIDNEYS SHOULD NOT HANDLE THIS MATERIAL. NO EATING OR DRINKING SHOULD TAKE PLACE IN THE WORK AREA. EXPOSED PERSONNEL SHOULD BE GIVEN MEDICAL EXAMINATIONS ANNUALLY, INCLUDING A COMPLETE BLOOD COUNT AND TESTS FOR PROPER LIVER AND KIDNEY FUNCTION. (THIDD6 0002) HIGHLY TOXIC BY INGESTION, INHALATION, AND SKIN ABSORPTION. (CCDCDS 0001)

Binary Reactants: IN THE PRESENCE OF MOISTURE, THE MATERIAL GRADUALLY DECOMPOSES. AS THIS BREAKDOWN OCCURS, HYDROCHLORIC ACID IS EVOLVED AND METALS IN CONTACT WITH THE MATERIAL MAY SUFFER CORROSIVE DAMAGE. OTHER BINARY REACTANTS INCLUDE: 2,4-DINITROPHENYL DISULFIDE, POTASSIUM, SODIUM, POTASSIUM HYDROXIDE, SODIUM-POTASSIUM ALLOY AND BROMOFORM, NITROGEN TETROXIDE. (NFICAM 0001) MIXTURES OF COMPOUND AND POTASSIUM, SODIUM, NITROGEN TETROXIDE, MAY EXPLODE, COMPOUND MIXED WITH SOLID POTASSIUM HYDROXIDE AND HEATED FORMS A SPONTANEOUSLY FLAMMABLE GAS.

Corrosiveness: IN THE PRESENCE OF MOISTURE, THE MATERIAL GRADUALLY DECOMPOSES. AS THIS BREAKDOWN OCCURS, HYDROCHLORIC ACID IS EVOLVED AND METALS IN CONTACT WITH THE MATERIAL MAY SUFFER CORROSIVE DAMAGE. (NFC*** 13,80/NPA)

Standard Codes: SUPERFUND DESIGNATED (HAZARDOUS SUBSTANCES) LIST; UN NO. 1702, GUIDE NO. 55 (85EWAF 0001)

Flammability: NONFLAMMABLE (CCDCDS 0001)

Melting Point (C.): -44

Boiling Point (C.): 146.5

Specific Gravity: 1.86 (25/4) (THIDD6 0002); 1.596 (AWQCD* 0015)

Vapor Pressure (mm Hg): 16; 5; 8.5

Vapor Density: 5.79 (85FHA9 0001)

Persistency: PERSISTS IN ENVIRONMENT AND IS NOT DEGRADED BIOLOGICALLY. (AWQCD* 0015) UNDERGOES HYDROLYSIS IN ENVIRONMENT SLOWLY, ESTIMATED HALF-LIFE OF SEVERAL MONTHS TO A FEW YEARS. PHOTOOXIDATION AND PHOTODISSOCIATION OCCUR IN STRATOSPHERE. (USPEDU 0001)

Potential for Accumulation: HAS AN ELIMINATION HALF-LIFE OF LESS THAN TWO DAYS AS MEASURED BY WHOLE BODY LEVELS IN EXPOSED BLUEGILL. HUMANS IN TESTS RETAINED 94 TO 97% OF INHALED TETRACHLOROETHANE AND EXHALED ONLY 3.3 TO 6% OF RETAINED CHEMICAL IN FIRST HOUR AFTER EXPOSURE HIGHEST ABSORPTION RATE AND LOWER ELIMINATION RATE OF HALOGENATED HYDROCARBONS TESTED. MICE EXCRETED 84% OF ADMINISTERED DOSE IN FIRST 72 HOUR. (AWQCD* 0015) EXPOSURE OF BLUEGILL SUNFISH FOR 14 DAYS TO WATER CONTAINING 9.62 +/- 1.09 PPB 1,1,2,2-TETRACHLOROETHANE RESULTED IN A BIOCONCENTRATION FACTOR OF 8. THE HALF-LIFE IN THE TISSUES WAS <1 DAY. THE LOG OF THE OCTANOL/ WATER PARTITION COEFFICIENT IS 2.39. (ASTM STP 707, 801/VEI)

Etiological Potential: TOXIC EFFECTS ON BODY INCLUDE ACUTE YELLOW ATROPHY AND CIRRHOSIS OF LIVER, FATTY DEGENERATION OF KIDNEYS AND HEART, HEMORRHAGE INTO LUNGS AND SEROUS MEMBRANES. OTHER EFFECTS REPORTED INCLUDE EDEMA OF BRAIN, DAMAGE TO CNS WITH CHANGES IN BRAIN AND PERIPHERAL NERVES AND HEMOLYSIS OF BLOOD (DPMADX 0001)

Carcinogenicity: IN A STUDY OF 50 MALE AND 50 FEMALE RATS DOSED BY GAVAGE WITH RATES OF 43-108 MG/KG/DAY FOR 78 WEEKS, SOME HEPATOCELLULAR CARCINOMAS WERE REPORTED ALTHOUGH NOT ENOUGH TO BE STATISTICALLY SIGNIFICANT. OPPOSITE RESULTS WERE REPORTED FOR MICE. AGAIN 50 MALES AND 50 FEMALES WERE DOSED WITH 142 AND 282 MG/KG/DAY FOR 72 WEEKS. AT THE HIGH DOSE LEVEL 44 MALES AND 43 FEMALES DEVELOPED HEPATOCELLULAR CARCINOMAS, INCIDENCE OF TUMORS WAS ALSO STATISTICALLY SIGNIFICANT AT LOWER LEVEL. (AWQCD* 0015)

Mutagenicity: MODERATELY MUTAGENIC IN AMES ASSAY. (AWQCD* 0015)

Inhalation Limit (Value): 150 (PPM; IDLH)

Inhalation Limit (Text): REGULATIONS--OSHA PEL (TWA) (SKIN) 35 MG/M3 5 PPM (29CFR* 1910) RECOMMENDATIONS--NIOSH PEL 6.87 MG/M3 1 PPM (CRSOE* 77-121,76/NIOSH) NIOSH IDLH 150 PPM (PKTGD* 80/MAC) ACGIH TLV (TWA) (SKIN) 7 MG/M3 1 PPM (TLVADM 83/ACGIH) ACGIH STEL 35 MG/M3 5 PPM (TLVADM 83/ACGIH) UPDATED 3/84.

Direct Contact: HIGHLY TOXIC BY INGESTION, INHALATION, AND SKIN ABSORPTION. (CCDCDS 0001)

General Sensation: SYMPTOMS OF EXPOSURE: CONJUNCTIVITIS, INFLAMMATION OF THE SKIN, IRRITATION OF RESPIRATORY TRACT, HEADACHE, DIZZINESS, EXTREME EXHAUSTION, ENLARGED LIVER AND JAUNDICE, OLIGURIA, HEMATURIA, ALBUMINURIA, MENTAL UNSTABILITY AND DROWSINESS, PARALYSIS AND COMA, CARDIAC IRREGULARITY, TREMORS, LACK OF APPETITE, NAUSEA, VOMITING, EPIGASTRALGIA, ESPECIALLY POLYNEURITIS (INFLAMMATION OF THE NERVES) OF FINGERS AND TOES. (THIDD6 0002) INITIAL SYMPTOMS OF EXPOSURE ARE LACRIMATION, SALIVATION, AND IRRITATION OF NOSE AND THROAT. CONTINUED EXPOSURE TO HIGH CONCENTRATIONS RESULTS IN RESTLESSNESS, DIZZINESS, NAUSEA, AND VOMITING AND NARCOSIS. WITH LESS SEVERE EXPOSURE VAGUE DIGESTIVE AND NERVOUS SYSTEMS COMPLAINTS ARE COMMON. (DPMADX 0001)

Odor Threshold, Lower (ppm): 3

Personal Safety Precautions: WEAR SAFETY GLASSES, GAS MASK, RUBBER PROTECTIVE CLOTHING. 50 PPM-CHEMICAL CARTRIDGE RESPIRATOR WITH AN ORGANIC VAPOR CARTRIDGE OR SUPPLIED AIR RESPIRATOR OR SELF-CONTAINED BREATHING APPARATUS. 150 PPM-SAME AS FOR 50 PPM BUT WITH A FULL FACEPIECE ON EACH OR GAS MASK WITH AN ORGANIC VAPOR CANISTER OR TYPE C SUPPLIED-AIR RESPIRATOR OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE OR CONTINUOUS-FLOW MODE. (PKTGD* 0001)

Disposal Method: PRODUCT RESIDUES AND SORBENT MEDIA MAY BE PACKAGED IN 17H EPOXY-LINED DRUMS AND DISPOSED OF AT AN EPA APPROVED DISPOSAL SITE OR HIGH TEMPERATURE DESTRUCTION USING INCINERATORS WITH SCRUBBING EQUIPMENT. CONFIRM DISPOSAL PROCEDURES WITH RESPONSIBLE ENVIRONMENTAL ENGINEER AND REGULATORY OFFICIALS.

## I. CHEMICAL IDENTITY

Common name: Pentachlorophenol
Formula: $C_6Cl_5OH$
Synonyms: PCP; penta
CAS No.: 87-86-5
Carcinogen: N/A

## II. REGULATORY INFORMATION

Hazardous substance: EPA
Hazardous waste: EPA
DOT Hazard Class: ORM-E

## III. PHYSICAL CHARACTERISTICS

Boiling point: 311 C (592 F) (decomposes)
Specific gravity: 2.0
Vapor density: At boiling point, N/A
Melting point: 182-190 C (360-374 F)
Vapor pressure: At 20 C, 0.00017 mm Hg
Solubility in water: At 20 C, 0.002 g/100g water
Evaporation rate: N/A
Appearance and odor: Light brown solid with a pungent odor when hot

## IV. PHYSICAL HAZARDS

Flash point: N/A
Autoignition temperature: N/A
Flammable limits in air (% by vol.): Not combustible
Extinguishants: N/A

## V. HEALTH HAZARDS

Irritation of the eyes, nose, and throat; bronchitis. Weakness, loss of appetite, nausea, vomiting, shortness of breath, chest pain, excessive sweating, headache, and dizziness. In fatal cases the temperature is often very high, and death may occur as early as three hours from the onset of symptoms. Risk is greater in hot weather. Persons with decreased kidney or liver function are at higher risk. Repeated long-term exposure may cause an acne-like skin rash. Commercial product may be contaminated with with dioxin compounds, which are are much more toxic than pentachlorphenol.

## VI. EMERGENCY FIRST AID

Eyes: Wash with large amounts of water, lifting the lids occasionally. Get medical attention as soon as possible. Do not wear contacts when working with the substance.

Skin: Wash, using soap or mild detergent. Remove contaminated clothing. If there is skin irritation, get medical attention.
Breathing: Move patient to fresh air. Perform artificial respiration if needed. Keep patient warm and at rest. Get medical attention as soon as possible.
Swallowing: Get medical attention immediately. Give large quantities of water, and then induce vomiting.

## VII. PERMISSIBLE EXPOSURE LIMIT

OSHA TWA: 0.5 $mg/m^3$
ACGIH STEL: 1.5 $mg/m^3$ with skin caution
IDLH: 150 $mg/m^3$

## VIII. PRECAUTIONS FOR USE AND SAFE HANDLING

Conditions contributing to instability: None.
Incompatibilities: Contact with strong oxidizers may cause fires and explosions.
Hazardous decomposition products: Toxic gases (such as hydrogen chloride, chlorinated phenols, and carbon monoxide) may be released on decomposition.
Special precautions: None

## IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Persons not wearing protective equipment and clothing should stay out of spill area. Ventilate area. Collect spilled material and deposit in sealed containers for disposal in a secured sanitary landfill. Liquids should be absorbed on vermiculite, dry sand, or earth, or similar material.

## X. PROTECTIVE EQUIPMENT

Impervious clothing, gloves, face shields (eight-inch minimum) to prevent any skin contact. Remove contaminated clothing immediately. If there is possiblity of contamination, employees should change to clean clothing before leaving the work premises. Contaminated clothing should be placed in closed containers pending disposal or cleaning. Splash-proof safety goggles where there is danger of eye contact. Emergency showers and eye-wash fountains should be provided in the immediate workplace.

***Respirators–***

$< 2.5$ $mg/m^3$: CCROVDMFuPest; SA; SCBA
$< 25$ $mg/m^3$: CCROVFDMFuPest; GMOVDMFuPest; SAF; SCBAF
150 $mg/m^3$: PAPOVFHiEPPest;SAF:PD,PP,CF
Escape: GMOVP;SCBA

## I. CHEMICAL IDENTITY

Common name: p-Dichlorobenzene
Formula: 1,4-$C_6H_4Cl_2$
Synonyms: 1,4-Dichlorobenzene; dichlorocide; PDCB
CAS No.: 106-46-7
Carcinogen: N/A

## II. REGULATORY INFORMATION

Hazardous substance: EPA
Hazardous waste: EPA
DOT Hazard Class: ORM-A

## III. PHYSICAL CHARACTERISTICS

Boiling point: 174 C (345 F)
Specific gravity: 1.46
Vapor density: At boiling point, 5.1
Melting point: 53 C (127 F)
Vapor pressure: At 20 C, 0.4 mm Hg
Solubility in water: At 20 C, 0.008 g/100g water
Evaporation rate: N/A
Appearance and odor: Colorless solid with a mothball-like odor

## IV. PHYSICAL HAZARDS

Flash point: 65.6 C (150 F)
Autoignition temperature: Data not available
Flammable limits in air (% by vol.): Lower: 2.5 (calculated at flash point)
Extinguishants: Foam, carbon dioxide, dry chemical

## V. HEALTH HAZARDS

Irritation of eyes, nose, and throat; headache, swelling around eyes, runny nose; may cause loss of appetite, nausea, vomiting, weight loss, liver damage with yellow jaundice and death. Skin contact may cause irritation.

## VI. EMERGENCY FIRST AID

Eyes: Wash with large amounts of water, lifting the lids occasionally. Get medical attention as soon as possible. Do not wear contacts when working with the substance.
Skin: Wash using soap or mild detergent. Remove contaminated clothing. If there is skin irritation, get medical attention.
Breathing: Move patient to fresh air. Perform artificial respiration if needed. Keep patient warm and at rest. Get medical attention as soon as possible.

Swallowing: Get medical attention immediately. Give large quantities of water immediately, then induce vomiting mechanically with finger.

## VII. PERMISSIBLE EXPOSURE LIMIT

OSHA TWA: 75 ppm (450 mg/m$^3$)
ACGIH STEL: 110 ppm (675 mg/m$^3$)
IDLH: 1,000 ppm

## VIII. PRECAUTIONS FOR USE AND SAFE HANDLING

Conditions contributing to instability: None.
Incompatibilities: None.
Hazardous decomposition products: Toxic gases (such as hydrogen chloride and carbon monoxide) may be released in a fire.
Special precautions: Will attack some forms of plastics, rubber, and coatings.

## IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Persons not wearing protective equipment and clothing should stay out of spill area. Ventilate area. Small quantities may be swept onto paper towels and burned in a safe place. Larger quantities may be reclaimed or collected and disposed of in suitable combustion chamber.

## X. PROTECTIVE EQUIPMENT

Impervious clothing, gloves, face shields (eight-inch minimum) to prevent prolonged or repeated skin contact. Splash- and dust-proof safety goggles where there is danger of eye contact.

***Respirators–***

< 1000 ppm: CCROVF; GMOVc; SAF; SCBAF
> 1000 ppm: SCBAF:PD, PP; comb SAF:PD, PP,CF w/ SCBA:PD, PP
Fire fighting: SCBAF:PD, PP
Escape: Any gas mask providing protection against organic vapors; escape SCBA.

## I. CHEMICAL IDENTITY

Common name: Hexachloroethane
Formula: $CCl_3CCl_3$
Synonyms: Perchloroethane
CAS No.: 67-72-1
Carcinogen: NCI

## II. REGULATORY INFORMATION

Hazardous substance: No
Hazardous waste: EPA
DOT Hazard Class: ORM-A

## III. PHYSICAL CHARACTERISTICS

Boiling point: 189 C (372 F)
Specific gravity: 2.1
Vapor density: At boiling point, 8.2
Melting point: 189 C (372 F)
Vapor pressure: At 20 C, 0.22 mm Hg
Solubility in water: At 20 C, 0.005 g/100g water
Evaporation rate: N/A
Appearance and odor: Colorless solid with a camphor-like odor

## IV. PHYSICAL HAZARDS

Flash point: N/A
Autoignition temperature: N/A
Flammable limits in air (% by vol.): Not combustible
Extinguishants: N/A

## V. HEALTH HAZARDS

Hot fumes may cause irritation of the eyes.

## VI. EMERGENCY FIRST AID

Eyes: Wash with large amounts of water, lifting the lids occasionally. Get medical attention as soon as possible. Do not wear contacts when working with the substance.
Skin: Wash with soap or mild detergent. Remove contaminated clothing. If there is skin irritation, get medical attention.
Breathing: Move patient to fresh air. Perform artificial respiration if needed. Keep patient warm and at rest. Get medical attention as soon as possible.
Swallowing: Get medical attention immediately. Give large quantities of water, and then induce vomiting.

## VII. PERMISSIBLE EXPOSURE LIMIT

OSHA TWA: 1 ppm (10 mg/m³)
IDLH: 300 ppm

## VIII. PRECAUTIONS FOR USE AND SAFE HANDLING

Conditions contributing to instability: Heat.
Incompatibilities: Reacts with hot iron, zinc, and aluminum. Dehalogenation by reaction with alkalies will produce spontaneously explosive chloroacetylene.
Hazardous decomposition products: Toxic gases (such as phosgene, chlorine, carbon tetrachloride, and tetrachloroethylene) may be released on decomposition.
Special precautions: Liquid will attack some forms of plastics, rubber, and coatings.

## IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Persons not wearing protective equipment and clothing should stay out of spill area. Ventilate area. Collect for reclamation disposal in a secured sanitary landfill. Larger quantities may be absorbed on vermiculite, dry sand, or earth and disposed of in secured sanitary landfill.

## X. PROTECTIVE EQUIPMENT

Impervious clothing, gloves, face shields (eight-inch minimum) to prevent prolonged or repeated skin contact. Contaminated clothing should be placed in closed containers pending disposal or cleaning.

***Respirators–***

< 10 ppm: SA; SCBA
< 50 ppm: SAF; SCBAF
< 300 ppm: SA:PD, PP, CF
> 300 ppm: SCBAF:PD, PP; comb SAF:PD, PP,CF w/ SCBA:PD, PP
Fire fighting: SCBAF:PD, PP
Escape: Any pesticide respirator providing protection against pesticides; escape SCBA.

## HEXACHLOROBUTADIENE

| Chemical Name | IDLH (PPM) | Odor Threshold (PPM) | TLV (PPM) | Synonyms | Respirator Recommended (to 10X TLV or 1,000 PPM) | Comments |
|---|---|---|---|---|---|---|
| Hexachlorobutadiene | | | 0.02<br>A2<br>-skin- | Hexachloro-1,3-butadiene; perchlorobutadiene | SA (F) | Warning Unknown |

- An **A2 designation** indicates the substance is a suspected human carcinogen.
- **Skin notations** indicate that the substance can be absorbed through the skin. In these cases, appropriate measures must be taken to prevent skin and eye contact to avoid invalidating the TLV.

SA - supplied air respirator

**In cases where an air purifying respirator is not available for all of the substances of concern in a mixture, a supplied air respirator may be required. In some cases, the respirator is preceded by an "(F)" designation. The Identification Key lists these respirators as full facepiece air purifying respirators.**

## Format Explanation

### Chemical Name
Chemical names listed in this Guide are generally those used in the Threshold Limit Values and Biological Exposure Indexes for 1987-1988 published by the American Conference of Governmental Industrial Hygienists (ACGIH). Pesticides and chemicals without established occupational exposure limits are not included. Call 3M for assistance in selecting respirators for these chemicals.

### IDLH Level
This is the concentration considered Immediately Dangerous to Life or Health (IDLH), as published by the National Institute of Occupational Safety and Health (NIOSH) (DHHS [NIOSH] Publication No. 78-210, 5th Printing). It specifically refers to the acute respiratory exposure that poses an immediate threat of loss of life, immediate or delayed irreversible adverse effects on health, or acute eye exposure that would prevent escape from a hazardous atmosphere. For those substances with no IDLH listed, the manufacturer or supplier may have additional information. The Chemical Referral Center operated by the Chemical Manufacturers Association can provide telephone numbers for obtaining information from

### Odor Threshold
Ranges of reported odor thresholds are listed. These have been obtained from a variety of publications (see references below). The method of defining and determining odor thresholds varies widely, thereby giving rise to a significant range of concentrations for many substances. Individuals may also respond differently to the same odor. At a given concentration, one person may smell and recognize the odor, while another person may barely notice it. The odor thresholds reported in the literature are typically determined for a single chemical constituent, with no other chemicals present in the air. Workplace exposures are likely to be different. Therefore, caution must be exercised in using these numbers. They may not be representative of odor detection capabilities of individual workers in your facilities.

### TLV
- The exposure limits listed are 1987-88 ACGIH **Threshold Limit Values** (TLVs), unless otherwise stated. The concentrations are expressed in ppm—parts per million (parts of contaminant per million parts of air) —unless specifically stated as mg/m³ (milligrams of contaminant per cubic meter of air) or some other unit.
- Asterisk(*) on chart indicates that TLV is lower than PEL.
- The OSHA **Permissible Exposure Limit** (PEL) is listed when it is more stringent than the current TLV.
- The **Workplace Environmental Exposure Level** (WEEL) from the American Industrial Hygiene Association is listed for substances without a TLV or PEL.
- The exposure limits refer to **Time Weighted Average** (TWA) concentrations for a normal eight (8) hour workday and a forty (40) hour workweek, unless referenced as a ceiling.
- **Ceiling TLVs** refer to concentrations that should n t be exceeded during any part of the working exposure.

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