



INDUSTRIES

REC'D OCT 28 1974

PPG INDUSTRIES, INC. INDUSTRIAL CHEMICAL DIVISION P. O. BOX 1000 LAKE CHARLES, LA. 70601

October 28, 1974

Mud Movers, Inc.
P. O. Box 5622
Lake Charles, Louisiana 70601

Dear Sir:

This is a typical analysis of the bottoms stream you will be hauling. As may be seen about 40 percent is unknown. These are heavy chlorinated compounds.

In this packet are the present known dangers of each known compound. This does not mean the hazards are any worse or better than the sum of the compounds, we do not know. The data is available for toxicology only. There may be other dangers unknown to us.

All precautions should be made to prevent exposure to the fumes of the skin, eyes, or lungs. PPG will furnish hat, goggles, respirator, cartridge mask, and air line mask (for dump area only). The driver will wear the cartridge mask while loading and the air line mask while unloading. Slicker suit, gloves, and boots should be worn while connecting or disconnecting. Goggles will be required for all areas.

Very truly yours,

R. P. Lynch
Production Superintendent
Area B

RPL/cg

cc: L. W. Carter
J. H. Morgan
D. L. Duncan
C. Rhodes (Enclosure)
J. M. Davis (Enclosure)

SL 093226

Laboratory Department

Date: 8-12-74

Factory:

Analysis of Battoria Plant Sample

SL 093227

NAME: Ethylene Dichloride (EDC)

FORMULA: $\text{CH}_2\text{ClCH}_2\text{Cl}$

MOLECULAR WEIGHT: 98.97

BOILING POINT: 182.3°F

VAPOR PRESSURE @ 75°F : 75 mm

FREEZING POINT: -31.8°F

LIQUID DENSITY @ 68°F : 10.45 #/gal., 1.253 gm/mls

RELATIVE VAPOR DENSITY: 3.41 (air = 1.0)

FLASH POINT: 65°F Open Cup; 55°F Closed Cup

EXPLOSIVE LIMITS: 6.2 to 15.9% by vol. in air

MAXIMUM ALLOWABLE CONC: 75 to 100 ppm

DETECTABLE ODOR CONC: Unknown

HAZARDOUS PROPERTIES: Ethylene dichloride is a flammable liquid and a dangerous fire hazard. It is toxic by inhalation, by prolonged or repeated contact with the skin or mucous membranes, and by ingestion. Excessive contact gives rise to symptoms such as headache, depression, mental confusion, fatigue, loss of appetite, nausea, vomiting, cough, loss of sense of balance, and visual disturbances. It has an anesthetic effect, and, in high concentrations, is immediately irritating to the eyes, skin, nose, and throat. It can cause dermatitis upon prolonged or repeated contact with the skin. Ethylene dichloride can cause serious eye damage.

TREATMENT: Quick removal from exposure is important. Ethylene dichloride should be removed from the patient's person, his respiratory tract, skin, or gastrointestinal tract as quickly as possible. If breathing has ceased, start artificial respiration. If material gets in the eyes, wash promptly with copious quantities of water. If ingested, the patient should be made to vomit. Notify a physician.

NAME: 1,1,2-Trichloroethane (TCE)

FORMULA: $\text{CHCl}_2\text{CH}_2\text{Cl}$

MOLECULAR WEIGHT: 133.41

BOILING POINT: 237°F

VAPOR PRESSURE @ 75°F: 22 mm

FREEZING POINT: -34°F

LIQUID DENSITY @ 77°F: 11.93 #/gal., 1.4319 gm/ml

RELATIVE VAPOR DENSITY: 4.6 (air = 1.0)

FLASH POINT: None

EXPLOSIVE LIMITS: None

MAXIMUM ALLOWABLE CONC: 25 to 100 ppm

DETECTABLE ODOR CONC: Unknown

HAZARDOUS PROPERTIES: Trichloroethane can cause burns of the eyes and has a seriously harmful effect upon the liver. It has a local irritating effect upon the mucous membranes, particularly of the eyes and nose. All contact with the eyes and skin should be avoided. This material should generally be handled with caution, because its toxicological properties have not as yet been adequately evaluated.

TREATMENT: Remove patient from toxic area. Remove all contaminated clothing and wash all exposed skin surfaces thoroughly with soap and water. Flush eyes with copious quantities of water. Notify a physician.

NAME:

PERCHLOROETHYLENE

2-47

FORMULA:

C_2Cl_4

MOLECULAR WEIGHT:

165.83

BOILING POINT:

121.2°C

VAPOR PRESSURE:

17.3 mm at 22°C

FREEZING POINT:

-23.3°C

LIQUID DENSITY:

1.6311 at 15^o/4^oC

VAPOR DENSITY:

5.3

FLASH POINT:

None

EXPLOSIVE LIMITS:

Non-explosive

MAX. ALLOWABLE CONCENTRATION (OR THRESHOLD LIMIT):

200 ppm

DETECTABLE ODOR CONCENTRATION:

Chloroform-like odor

HAZARDOUS PROPERTIES:

Perchloroethylene affects the nervous system, lungs, and mucous membranes. Dangerous disaster hazard. Non-flammable and non-explosive. It will not support combustion. When heated to decomposition, it emits highly toxic fumes of chlorides.

TREATMENT:

- Inhalation: Remove contaminated clothing and wash with soap and water. Apply lanolin ointment.
- Eyes: Flush with water for at least 15 minutes. Call a specialist. Report to First Aid.
- Swallowing: Induce vomiting by drinking soapy or salt water. Induce vomiting three times. Follow with a tablespoon of epsom salt in a glass of water. Call a physician. Report to First Aid.
- Inhalation: Remove patient from contaminated area. Keep quiet and warm. Give artificial respiration. Give oxygen if necessary. If conscious, give tea or coffee. Call a physician. Report to First Aid.

NAME: Symmetrical and Assymmetrical Tetrachloroethane (S.TeCE & A.TeCE)

FORMULA: $\text{CHCl}_2\text{CHCl}_2$ and $\text{CCl}_3\text{CH}_2\text{Cl}$

MOLECULAR WEIGHT: 167.86

BOILING POINT: S.TeCE 295°F; A.TeCE 267°F

VAPOR PRESSURE @ 75°F: S.TeCE 4mm; A.TeCE 13 mm

FREEZING POINT: S.TeCE -47°F; A.TeCE -97°F

LIQUID DENSITY @ 77°F: S.TeCE 1.588 gm/ml; A.TeCE 1.533 gm/ml

RELATIVE VAPOR DENSITY: 5.78 (air = 1.0)

FLASH POINT: None

EXPLOSIVE LIMITS: None

MAXIMUM ALLOWABLE CONC: 5 ppm for 8 hour exposure

DETECTABLE ODOR CONC: Approximately 5 ppm

HAZARDOUS PROPERTIES: The tetrachloroethanes are not flammable or explosive but are the most toxic of the chlorinated ethanes that will be handled in the plant.

The tetrachloroethanes are toxic by inhalation, by prolonged and repeated contact with skin or mucous membranes or by oral intake. Although toxic, tetrachloroethanes may be handled safely if proper precautions are constantly observed. Prolonged or repeated exposures to the product in any form are hazardous.

The signs and symptoms of excessive absorption usually appear gradually and only after repeated exposures. In order of appearance they commonly are unusual fatigue, loss of appetite and weight, sick stomach and vomiting, constipation, abdominal pain, jaundice, drowsiness, going on in severe cases to unconsciousness and death. Some cases show marked involvement of the nervous system with headache, numbness and tingling in fingers and toes, trembling and twitching of muscles and even paralysis of some muscles.

The signs and symptoms of tetrachloroethane poisoning given above are due to systematic poisoning characterized by marked damage to the liver, kidneys, heart, blood cells, and nervous system. The clinical picture varies with the type of exposure and the amount of the material which has been absorbed either at one time or at repeated times. Most serious effects are usually on the liver and the blood. The principal route of absorption is by breathing the vapor, although it may be absorbed by the skin. Tetrachloroethane is currently considered the most toxic of the chlorinated hydrocarbon solvents in industrial use.

Continued exposure to high concentrations of the tetrachloroethanes leads to local irritation of the eyes and nose. There may be sick stomach and vomiting, but since tetrachloroethane is less volatile than other hydrocarbon solvents, it does not often have an anesthetic effect.

Subacute tetrachloroethane poisoning is the form usually encountered. This develops gradually as a result of prolonged or repeated work in an atmosphere containing more than 5 parts of tetrachloroethane per million parts of air but under conditions where the amount absorbed causes no immediate reaction. Repeated exposure even to low concentrations seems to increase sensitivity, and may lead to subacute poisoning.

For some time, workers with subacute poisoning may show only such signs and symptoms as unusual fatigue, loss of appetite and weight, constipation and abdominal distress or pain. At any time they may develop more severe evidence of absorption such as vomiting, dizziness, tenderness and pain over the liver, and jaundice. Even if removed from further exposure, the illness may persist and grow worse over a period of days, weeks or even months, and may finally even end in death. However, if after a few months there has been steady improvement, complete recovery is the rule.

Some conditions under which subacute poisoning may occur in employees are as follows:

- (a) Where the ventilation is inadequate, resulting in high concentrations of more than 5 parts of tetrachloroethane per million of air.
- (b) Where the vapor concentrations are high intermittently, due to faulty handling of the liquid.
- (c) Failure of the individual to observe precautionary measures.

Tetrachloroethane is absorbed through the skin so that systemic poisoning can occur by this route with the same signs and symptoms as described above.

Tetrachloroethane may cause dermatitis after repeated or prolonged contact with the skin, such as that which might occur in the handling of rags wet with the chemical product, dipping hands into the liquid, or wearing clothing saturated with it. Reddening, burning, and, rarely, blisters may follow such exposure. In certain rare cases, the dermatitis may be caused by hypersensitivity to tetrachloroethane. The skin becomes rough, red and dry due to the removal of skin oils. It cracks easily and is readily susceptible to infection. The skin has a chapped appearance.

Tetrachloroethane may enter the eyes either as a vapor or as liquid (spray or splash). The resultant irritation produces lacrimation, burning and other symptoms of inflammation. It can cause serious eye damage if immediate care is neglected.

The first symptoms after toxic amounts of tetrachloroethane are taken by mouth are those of irritation of stomach and bowels, such as sick stomach, vomiting, and diarrhea with bloody stools. It is absorbed very rapidly and even a small amount may go on to produce unconsciousness and a deep flushing of the skin. Death is apt to occur before such systemic changes as liver and kidney damage occur.

TREATMENT: Most important in the case of any poisoning is quick removal from exposure. In the case of tetrachloroethane poisoning, this means first removing the patient from the contaminated atmosphere and, insofar as possible, removing the tetrachloroethane from the patient's skin, or gastrointestinal tract, if those areas are involved.

The patient should be kept quiet and comfortably warm, but not hot.

A physician should be called immediately. He should be told briefly and clearly what has happened and the exact location of the patient.

A person showing symptoms of tetrachloroethane vapor poisoning should be removed promptly from the contaminated area. In case breathing has stopped, effective artificial respiration, such as that obtained by the orone pressure method or the Eve rocking method should be started immediately. If oxygen inhalation apparatus is available, oxygen should be administered, but only if one familiar with the operation of the apparatus is present to administer it. If the patient is conscious, hot tea or coffee may be given as a stimulant. A physician should be called at once.

All contaminated clothing should be removed at once. Clothing, including shoes, soaked in tetrachloroethane should be removed and not worn again until thoroughly free from tetrachloroethane. All affected areas should be washed thoroughly with warm water and soap. After this, an ointment containing lanolin should be applied in order to help in replacing the natural skin oils. For serious or persistent cases of skin trouble, and for signs and symptoms of generalized poisoning, a physician should be consulted.

If liquid tetrachloroethane has entered the eyes, they should be washed promptly with copious quantities of water for at least 15 minutes. (It is advisable to irrigate the eyes gently with water at room temperature in order to minimize additional pain or discomfort.) Medical attention should be obtained in all cases involving contact with the eyes.

If a person has swallowed tetrachloroethane he should be made to vomit, if conscious, by having him drink a glassful or more of lukewarm water in which a teaspoonful of salt to the glassful has been dissolved; a similar amount of warm soapy water may be used. If necessary, the patient should be encouraged to stick his finger down his throat to induce vomiting. When possible, vomiting should be induced at least three times. Following this a tablespoonful of Epsom Salt dissolved in a glass of water should be given. A physician should be called at once.

NAME: PENTACHLOROETHANE

2-46

FORMULA: C_2HCl_5

MOLECULAR WEIGHT: 202.31

BOILING POINT: 162°C

VAPOR PRESSURE: 10 mm at 39.3°C

FREEZING POINT: -29°C

LIQUID DENSITY: 1.6728 at $25^\circ/\text{H}^\circ\text{C}$

VAPOR DENSITY: d_{25}^{25} 1.6712

FLASH POINT:

EXPLOSIVE LIMITS:

MAX. ALLOWABLE CONCENTRATION (OR THRESHOLD LIMIT): Safe concentration below 121 ppm

DETECTABLE ODOR CONCENTRATION: Sweetish Odor. Chloroform-like odor

HAZARDOUS PROPERTIES: Dangerous disaster hazard. Moderate fire hazard when exposed to heat or flame. PCE can cause chronic intoxication. It has an irritating effect upon the mucous membranes. Moderate explosive hazard by spontaneous chemical reaction. When heated to decomposition it emits highly toxic fumes of chlorides.

TREATMENT:

Skin: Remove contaminated clothing. Wash with soap and water. Apply lanolin ointment.

Eyes: Flush with water for at least 15 minutes. Call a specialist. Report to First Aid.

Swallowing: Induce vomiting by drinking soapy or salt water. Induce vomiting three times. Follow with a tablespoon of epsom salt in a glass of water. Call a physician. Report to First Aid.

Inhalation: Remove patient from contaminated area. Keep quiet and warm. Give artificial respiration. Give oxygen if necessary. If conscious, give tea or coffee. Call a physician. Report to First Aid.

Fire: Use water, carbon dioxide, dry chemical or carbon tetrachloride.

NAME: HEXACHLOROETHANE

2-33

FORMULA: C_2Cl_6

MOLECULAR WEIGHT: 236.76

BOILING POINT: $367^{\circ}F$

VAPOR PRESSURE: 1 mm at $32.7^{\circ}C$

FREIZING POINT: $186.6^{\circ}C$ (sublimes)

LIQUID DENSITY: 2.091

VAPOR DENSITY:

FLASH POINT:

EXPLOSIVE LIMITS:

MAX. ALLOWABLE CONCENTRATION (OR THRESHOLD LIMIT):

DETECTABLE ODOR CONCENTRATION: Camphor-like odor

HAZARDOUS PROPERTIES: Dangerous disaster hazard. Slight explosive hazard by spontaneous chemical reaction with alkalis, metals, etc. When heated to decomposition, it emits highly toxic fumes of phosgene.

TREATMENT:

Skin: Remove contaminated clothing. Wash with soap and water.

Eyes: Flush with copious quantities of water for at least 15 minutes.

Inhalation: Remove patient from contaminated area. Give artificial respiration. Give oxygen if necessary. Keep quiet and warm. Report to First Aid.