



The Dow Chemical Company

8EHQ-0392-28335 Init.

Midland, Michigan 48674

2030 Dow Center

March 18, 1992

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11-PP

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Document Processing Center (TS-790)
Office of Toxic Substances
U.S. Environmental Protection Agency
401 M Street, SW
Washington, D.C. 20460

Attn: 8(e) Coordinator

COMPANY SANITIZED

Re: Toxicity of Chloroacetaldehyde

Dear Sir/Madam:

The following information is being submitted by The Dow Chemical Company (Dow) pursuant to current guidance issued by EPA indicating EPA's interpretation of Section 8(e) of the Toxic Substance Control Act. Dow has made no determination as to whether a significant risk of injury to health or the environment is actually presented by the findings.

Upon review of archived reports, Dow has become newly aware of the following information.

Inhalation studies of the test material in rats gave the following results: 4-hour exposure at 50 ppm killed 18 of 20 rats; 3.5-hours exposure to 50 ppm killed 20 of 20 rats; and 7-hour exposure to 25 ppm killed 19 of 20 rats. A copy of the report is enclosed.

Sincerely,

Paul A. Wright
Paul A. Wright
Attorney
517/636-1853

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Biochemical Research Department
THE DOW CHEMICAL COMPANY

BLS
7-9-52

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Subject: RESULTS OF TOXICOLOGICAL TESTS
ON CHLOROACETALDEHYDE

File Financial Information
Chg. -
Rec'd 4-15-52
Fin'd 9-24-52
Rept. By

Personal Information

Signed _____ Date 10-2-52 Checked _____ Date 10-2-52

To:

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~~THE DOW CHEMICAL COMPANY~~

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UNIT INDEX

Chloroacetaldehyde is moderately toxic orally and markedly irritating to the skin and eyes. The material is highly toxic by inhalation and its vapors are very irritating to the eyes, nose, and throat. Labeling is discussed. Health hazards and precautions for safe handling are presented.

INDEX HEADINGS

Chloroacetaldehyde
Acetaldehyde: Chloro-,

PROBLEM

The subject material is being sold by The Dow Chemical Company. What are the toxicological properties and handling hazards of chloroacetaldehyde?

CONCLUSIONS

Chloroacetaldehyde is moderate in acute oral toxicity. A strong solution of chloroacetaldehyde in water (40% or greater by weight) is corrosive to the eyes and skin.

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The compound is highly toxic by inhalation.

The vapors of the material are markedly irritating to the eyes, nose, and throat.

Chloroacetaldehyde requires a "Poison" label.

In order to handle the material with safety, measures must be taken which will prevent contact with the material in the liquid or gaseous state.

In case of contact with the eyes or skin, prompt removal is essential if injury is to be minimized.

SAMPLE INFORMATION

C.R.I. Name: Acetaldehyde: Chloro-,

Common Name: Chloroacetaldehyde

Source: Personal Information

Boiling Point: 83°C. (approx.) at 760 mm. Hg. (Anhydrous)
90-100°C. at 760 mm. Hg. (40% Aqueous solution)

Specific Gravity: 1.19 at 25°C./25°C. (40% aqueous soln.)

Date Sample Rec'd: 4-15-52

Physical State: Liquid

Solubility: Soluble in water

B.R.D. K No.: K5963-7

Molecular Formula: C_2H_3ClO

Structural Formula: $Cl-CH_2-CHO$

Composition: Chloroacetaldehyde
Water

% by Wt.

Composition Information

SUMMARY OF HANDLING HAZARDS

Inhalation

Chloroacetaldehyde presents a serious vapor inhalation

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hazard. The vapors of chloroacetaldehyde are irritating to the eyes, nose, and throat, and any vapor concentration producing even slight irritation in humans is unsafe for single prolonged or repeated exposures. Vapor concentrations which produce irritation are readily attainable at room conditions. A vapor concentration which is dangerous to life in a short time will not be voluntarily tolerated. It is to be noted that the concentration of vapor which is safe for repeated daily 7 hour exposures is yet to be determined but lies below 5 p.p.m. and thus may be below the irritation threshold.

Eye

Chloroacetaldehyde presents a serious hazard of eye injury. Direct contact with a strong solution is likely to result in tissue destruction leading to permanent impairment of vision. Low concentrations of the vapors of the material are sufficient to produce eye irritation, and if this eye irritation is ignored for any prolonged period, the probable consequence will be sore eyelids for several days.

Skin

Chloroacetaldehyde is corrosive to the skin. A single short exposure to a strong solution of the material is capable of causing marked to severe damage.

Oral

Chloroacetaldehyde has a moderate oral toxicity. There is no problem from ingestion incidental to the handling and industrial use of this substance. It should be borne in mind,

however, that serious injury may result from the accidental or willful swallowing of moderate amounts of this material.

PRECAUTIONS FOR SAFE HANDLING AND USE

Precautions should be taken to avoid vapor exposure to chloroacetaldehyde. Good ventilation should be provided. When small quantities of the material are handled, the use of a hood is strongly advised. Plant equipment should be designed and engineered in such a manner that contamination of the work-room atmosphere does not occur from small leaks such as are common to production equipment. If significant contamination occurs despite the precautions taken, everyone should leave the area until the leak is repaired by personnel provided with suitable protective equipment. For cleaning up accidental spills or contaminated areas where the vapor concentrations are irritating (painful) to the eyes, it is recommended that a full face gas mask equipped with a charcoal filter for organic vapors or a self-contained breathing apparatus be used.

Special and particular precautions must be taken to prevent any and all contact of the liquid material with the eyes. A face shield which is riveted onto a rainhat will afford the best protection available. It is recommended that safety glasses with side shields be the minimum eye protection required of anyone entering the operating area of the plant for any reason.

Precaution must be taken to prevent skin contact. Rubber gloves, a light weight rubber raincoat and foundrymen shoes

should be worn. Clothing or shoes contaminated with the material must be promptly removed and thoroughly cleaned before re-use, or discarded.

FIRST AID MEASURES

Serious injury is to be expected from contact with the eyes, but this injury can be minimized by flushing the eyes with plenty of water for at least 15 minutes. Medical attention should be obtained as soon as possible.

In case of contact with the skin, prompt removal is essential if injury is to be avoided. Flush the contaminated area with copious amounts of water, then remove clothing and shoes and thoroughly cleanse exposed areas with soap and water. Wash clothing and shoes thoroughly before re-use. Any injuries or irritations which may develop should receive medical attention promptly.

If a person should accidentally be overcome from breathing the vapors of this material or experience any ill effects whatsoever, he should be removed to fresh air, his eyes washed out with water, be made to rest, kept warm, and medical attention should be obtained immediately. If breathing stops, artificial respiration should be administered.

If the material is swallowed, vomiting should be induced by tickling the back of the tongue with the finger or by giving an emetic such as 2 tablespoonfuls of table salt in a glass of warm water. Medical attention should be obtained immediately.

SUGGESTED PRECAUTIONARY STATEMENT FOR LABELING PURPOSES

Danger! Vapors Hazardous and Very Irritating
Liquid Causes Severe Burns

Do not get in the eyes, on the skin, clothing or shoes.
Do not breathe the vapor.
Do not take internally.

POISON

In case of contact with the eyes, immediately flush the eyes with plenty of water for at least 15 minutes, and obtain medical attention as soon as possible.

In case of contact with the skin, immediately flush the skin with plenty of water, and at the same time quickly remove all contaminated clothing, including shoes. Wash contaminated skin with soap and water. Obtain medical attention promptly if the skin is injured.

If material is swallowed, vomiting should be induced by tickling the back of the tongue with the finger or by administering an emetic such as 2 tablespoonfuls of table salt in a glass of warm water; then

Get Medical Attention

In cleaning up spills or contaminated areas where the vapor concentrations are irritating (painful) to the eyes, a full face gas mask equipped with a charcoal filter for organic vapors should be worn.

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SUMMARY OF VAPOR INHALATION DATA OBTAINED TO DATE

Acute Vapor Toxicity

Concentration in P.P.M. by Analysis	Duration of Exposure in Hours	Mortality Ratio = $\frac{\text{No. of animals dead}}{\text{No. of animals exposed}}$	
		Rats	Guinea Pigs
400	0.5	19/20	7/10
	0.25	20/20	
	0.1	1/20	
100	2.0	20/20	0/10
	0.2	0/19	
50	4.0	18/20	0/10
	3.5	20/20	
	1.0	0/20	
25	7.0	19/20	0/10
10	7.0	0/20	

Symptomatology observed in the animals included eye and nasal irritation very early in the exposure period at all concentrations, with the degree of irritation increasing as the concentration or duration of exposure increased. Also labored breathing was observed at the higher concentrations, and slight drowsiness was apparent at some concentrations and for some exposure periods.

Every concentration employed including the lowest (10 p.p.m.) produced lachrymation and nasal irritation in humans within a few minutes.

Semichronic Vapor Toxicity

Groups of 5 male and 5 female rats, 5 male guinea pigs, 5 female mice and 1 female rabbit were exposed repeatedly 7 hours a day, 5 days per week to 5 p.p.m. of chloroacetaldehyde vapor for a total of 8 exposures in 10 days with similar groups of matched animals being

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maintained in the animal room as unexposed controls. At the end of the exposure period, all animals were autopsied and gross pathology and organ weight data were obtained with tissues being saved for histopathological examination.

During the course of the experiment the exposed rats and mice exhibited slight nasal irritation, also the rabbit displayed slight eye irritation and the rats showed very slight eye irritation. The growth of the male rats was slightly depressed while the growth of the female rats, mice, and rabbit and male guinea pigs compared favorably with that of the control animals. Organ weight and gross pathology data were negative, being essentially the same for the experimental and control groups of animals. Histopathological data is not yet obtained. It is to be noted that the concentration of chloroacetaldehyde vapor safe for repeated daily 7 hour exposures is yet to be determined, but a preliminary semichronic vapor experiment suggests that this concentration will be below 5 p.p.m.

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SUMMARY OF RANGE FINDING TOXICOLOGICAL DATA OBTAINED IN 1947 and
REPORTED IN BIOCHEMICAL RESEARCH DEPARTMENT REPORT NO.

<u>ACUTE ORAL TOXICITY</u>			No. Died	<u>Response-Remarks</u>
<u>Animal</u>	<u>Prep. Fed.</u>	<u>Dose(g./kg.)</u>	<u>No. Fed</u>	
Rat	5% solution of chloro- acetaldehyde in water	0.1	0/2	Rats dead within 24 hours after feeding.
		0.3	2/2	

Skin Irritation - Rabbits

<u>Material</u>	<u>Condition of Skin</u>	<u>No. of Appl.</u>	<u>Site</u>	<u>Treatment</u>	<u>Response-Remarks</u>
55% soln. in water	Intact	1	Abdomen	None	Severe burn with de- naturation and final death.
10% soln. in water	Intact	4	Abdomen	No bandage	Severe irritation, edema, and necrosis.
1% soln. in water	Intact	20	Ear	None	Few excoriated areas. Severe irritation, edema, and necrosis.
	Intact	4	Abdomen	None	
0.1% soln. in water	Intact	10	Abdomen	None	Some excoriated areas

As a control, formaldehyde was tested as a 0.1 and 1.0% aqueous solution bandaged onto the shaven abdomen. The 1.0% solution caused excoriations to appear and with prolonged aggravation (7 applications) the treated area was all denatured. The 0.1% solution failed to cause any irritation when repeatedly bandaged on.

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