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UNION CARBIDE CHEMICALS AND PLASTICS COMPANY INC.
HEALTH, SAFETY AND ENVIRONMENTAL AFFAIRS

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October 31, 1991

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Room L-100
Office of Toxic Substances
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Attn: Section 8(e) Coordinator (CAP Agreement)

Re: CAP Agreement Identification No. 8ECAP-0110

Dear Sir or Madam:

Union Carbide Corporation ("Union Carbide") herewith submits the following report pursuant to the terms of the TSCA §8(e) Compliance Audit Program and Union Carbide's CAP Agreement dated August 14, 1991 (8ECAP-0110). This report describes a range finding (acute) toxicity study with 1,3-propanediamine (CASRN 109-76-2).

"1,3-Propanediamine: Range Finding Toxicity Studies", Chemical Hygiene Fellowship (Carnegie-Mellon University), Project Report 40-102, August 17, 1977.

A complete summary of this report is attached.

Previous TSCA Section 8(e) or "FYI" Submission(s) related to this substance are:

(none)

Previous PMN submissions related to this substance are: (none)

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This information is submitted in light of EPA's current guidance. Union Carbide does not necessarily agree that this information reasonably supports the conclusion that the subject chemical presents a substantial risk of injury to health or the environment.

In the attached report the term "BUSINESS CONFIDENTIAL" is entered on the first page. This precautionary statement was for internal use at the time of issuance of the report. Confidentiality is hereby waived for purposes of the needs of the Agency in assessing health and safety information. The Agency is advised, however, that the publication rights to the contained information are the property of Union Carbide.

Yours truly,



William C. Kuryla, Ph.D.
Assistant Director
Product Safety
(203/794-5230)

WCK/cr

Attachment (3 copies of cover letter, summary, and report)

SUMMARY

40-102

1,3-Propanediamine

Range Finding Toxicity Studies

Sponsor: Union Carbide Corporation

Summary

Stomach Intubation, rat - LD50 = 0.616 ml/kg; dosed as received.

Skin Penetration, rabbit - LD50 = 0.400 ml/kg; dosed as received.

Inhalation, rat -

**Substantially saturated vapor, dynamic conditions at 23°C.
8 hours killed 0 of 6 (some skin irritation noted).**

Uncovered Skin Irritation, rabbit - Moderate, Grade 6.

Eye Injury, rabbit - Severe, Grade 9.

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CONFIDENTIAL: Not to be released
outside UCC without the written
consent of the C&P Medical Director,
Occupational Health Team Operations
Manager or Product Safety Director.

Report 40-102 **769**

4 Pages
August 17, 1977
Tel: (412) 327-1020

CHEMICAL HYGIENE FELLOWSHIP (CHF)
Carnegie-Mellon Institute of Research
Carnegie-Mellon University
4400 Fifth Avenue -
Pittsburgh, PA 15213

1,3-Propanediamine

Range Finding Toxicity Studies

Sponsor: *Union Carbide Corporation*

* * * * *

Summary

Stomach Intubation, rat - LD50 = 0.616 ml/kg; dosed as received.

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Substantially saturated vapor, dynamic conditions at 23°C.

8 hours killed 0 of 6 (some skin irritation noted).

Uncovered Skin Irritation, rabbit - Moderate, Grade 6.

Eye Injury, rabbit - Severe, Grade 9.

Interpretation

1,3-Propanediamine was moderately toxic following single stomach intubation and was highly toxic following single covered dermal application. Small quantities of the undiluted material applied to rabbit skin resulted in necrosis. Therefore, the CHF would rate this as a D.O.T. "corrosive" although the actual 4-hr. D.O.T. procedure was not performed. Application of a 10% dilution in distilled water resulted in minor skin irritation. Severe corneal injury, with iritis, resulted from instillation of the undiluted sample (with severe eyelid injury) or a dilution in distilled water. No hazard is anticipated from the infrequent inhalation of substantially saturated vapor generated at room temperature under normal handling conditions.

1,3-Propanediamine has been tested previously under the name of 1,3-diamino propane and the results appeared in CHF Report No. 21-27 (1958). The previous results indicate that the older sample was somewhat more toxic perorally and dermally (by about a factor of 2) and more irritating than the present sample. Previously, this material was rated as a D.O.T. Class B poison by skin penetration while the current study indicates that it is not a Class B poison.

Sample

Quantity: 4 oz.

Date Received: 4-4-77

CHF Sample No.: 40-140

Submitted By: D. F. Marples

Division: Chemicals and Plastics
South Charleston, WV

Identification: Ref. #38-DFM-21
Reg. #1757

Charge No.: 03099

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Peroral, Single Dose to Rats

LD50 - 0.616 (0.382 to 0.992) ml/kg; dosed as received.

Conditions - Standard.

Dosage; ml/kg	Dead Dosed	Days to Death	Weight Change	Signs and/or Symptoms
4.0	3/3	0,0,0	-	Death 2 hr
2.0	5/5	0,0,0,0,0	-	Heavy breathing, piloerection 1 hr; death 4.5 hr
1.0	4/5	0,0,1,1	-4 gm	Piloerection 2 days; high wt loss 3 through 6 days; fur orange 6 days; death of 2 at 4.5 hr
0.5	2/5	8,9	103 to 112 gm	-
0.25	0/5	-	-20 to 93 gm	-

Gross Pathology - In victims, petechial hemorrhages to solid hemorrhage of the lungs; livers pale, mottled, acini prominent; spleens mottled; kidneys pale, mottled, sections congested; adrenals congested; stomachs distended, transparent, liquid-filled; pylori hemorrhaged; intestines opaque, gas- or liquid-filled, yellow, pink to hemorrhaged. In survivors, acini of livers prominent; kidneys pale; stomachs shrunken, opaque, gas-filled; intestines gas- and liquid-filled, yellow, pink.

Conclusions - Moderately toxic following acute peroral intubation.

Skin Penetration, Single Dose to Rabbits

LD50 - 0.400 (0.245 to 0.653) ml/kg; dosed as received.

Conditions - Standard. Dosed in fume hood under polyethylene sheeting.

Dosage; ml/kg	Dead Dosed	Days to Death	Weight Change	Skin Irritation	Signs and/or Symptoms
0.80	4/4	1,1,1,1	-	Edema, necrosis	-
0.40	2/4	1,6	-444, -158 gm	Necrosis; scabs at 14 days	-
0.20	0/4	-	-254,62, 301,365 gm	As above	-

Gross Pathology - In victims, lungs congested; livers pale and mottled; kidneys mottled. In survivors, kidneys pale and mottled.

Conclusions - Highly toxic following acute covered dermal application.

Inhalation, Single, by Rats

Conditions - Vapor dynamically generated at 23°C; chamber temperature at 23°C.
Procedure A of standard test procedures.

Procedure	Time	Concentration	Dead/ Dosed	Death	Weight Change	Signs and/or Symptoms
A	8 hr	Substantially saturated vapor	0/6	-	52 to 63 gm	Fur wet within 1.5 hr; extremities red within 3 hr

Gross Pathology - Nothing remarkable.

Conclusions - No hazard is anticipated from the infrequent exposure to substantially saturated vapor generated at room temperature under normal handling conditions although some skin irritation may result.

Skin Irritation, Rabbit, Uncovered

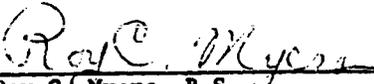
Conditions - Standard. Applied undiluted or in distilled water.

Conclusions - Necrosis on 2 of 2 rabbits from the undiluted material; marked capillary injection on 3, marked erythema on one, moderate edema on one from a 10% dilution in distilled water. Grade 6.

Eye Irritation, Rabbit

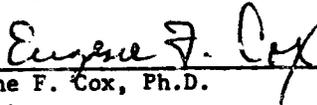
Conditions - Standard. Instilled undiluted or in distilled water.

Conclusions - Severe corneal injury, iritis and eyelid injury (edema, hemorrhage, pus, necrosis) from 0.005 ml undiluted per eye; severe corneal injury, with iritis, from 0.5 ml per eye of a 5% dilution in distilled water; no corneal injury on 5 eyes from 1% in distilled water. Grade 9.


Roy C. Myers, B.S.
Research Associate


Charles P. Carpenter, Ph.D.
Advisory Fellow

Approved:


Eugene F. Cox, Ph.D.
Director

Acknowledgments:

Single Peroral Tests

Linda J. Calisti, B.S.
Research Associate

Skin Penetration, Irritation Tests

Naomi I. Condra, B.S.
Fellow

Inhalation Studies

Donald J. Nac'ainer, B.S.
Research Associate

Date: August 18, 1977

Typed: ...

Standard Test Procedure:

In all tests, the nonfasted animals are maintained on appropriate Wayne diets and water *ad lib* except during period of manipulation or confinement. Dosage levels differ by a factor of 2 in a geometric series. LD50s or LC50s are calculated by the moving average method based on a 14-day observation period.

Toxicity Terminology for Peroral and 24-Hr Dermal LD50s (A)/Inhalation 4-Hr LC50 (B)

	A, gm/kg	B, ppm		A, gm/kg	B, ppm
Extremely low order	> 15	> 100M	Highly	0.05-0.5	100-1
Slightly	5-15	10M-100M	Seriously	0.01-0.05	10-10
Moderately	0.5-5	1M-10M	Dangerously	< 0.001	< 10

Peroral. Compounds administered by stomach intubation to Wistar derived male rats, 90-120 grams in weight and 3 to 4 weeks of age, reared in our own colony

Skin Penetration. Male albino rabbits, 3 to 5 months of age, are immobilized during the 24-hour contact period with the compound retained under impervious sheeting on the clipped intact skin of the trunk. Thereafter, excess fluid is removed to prevent ingestion. Maximum dosage that can be retained is 16 to 20 ml/kg.

Inhalation. Procedure A. Concentrated vapor is generated in a gas wash bottle by passing dried air at 2.5 liters/min through a fritted glass disc immersed to a depth of at least 1-1/2 inches in the chemical which is delivered to rats in a 9-liter glass exposure chamber. Mean vapor concentration is calculated from the loss in weight of the liquid or estimated from the vapor pressure at the actual temperature of the chemical during aeration.

Procedure B. Substantially saturated vapor is prepared by spreading 50 grams of chemical over 200 cm² area on shallow tray placed near the top of a 120-liter glass chamber which is then sealed for at least 16 hours while an intermittently operated fan agitates the internal chamber atmosphere. Rats are then introduced in a gasketed drawer-type cage designed and operated to minimize vapor loss.

Procedure C. Mist vapor and any oxidation or decomposition products of the chemical held at 170°C are generated and delivered as in A.

Procedure D. Vapor at metered concentration, not checked analytically, is generated by feeding the liquid at a constant rate down the inside of a spirally corrugated surface of a minimally heated one-inch Pyrex tube, through which metered air is passed. Resultant vapor is delivered as in A.

Procedure E. Spray - Solutions or suspensions are atomized in a glass VAPONEFRIN nebulizer using dried compressed air at 9 liters/min (corrected) and 22 psi. The resultant aerosol of droplets averaging 2 microns in diameter is conducted directly into a 60-liter cubic glass chamber containing rats. Mean aerosol concentration is calculated from the amount of material atomized.

Procedure F. Dust - Dust clouds are generated by a baffled Wright Dust Feed through which air is passed at 14 liters/min (uncorrected) at 5 psi. The dust is delivered directly to a 120-liter plexiglas chamber containing rats. Airborne dust concentrations are measured gravimetrically every half hour.

Skin Irritation. Chemical is applied in 0.01 ml amounts to clipped, uncovered intact skin of 5 rabbit bellies either undiluted or in progressive dilutions of 10, 1, 0.1, and 0.01% in solvent. Ten grades are recognized based on appearance of moderate or marked capillary injection, erythema, edema or necrosis within 24 hours. No injury from undiluted = Grade 1.

Eye Irritation. Eyes not staining with 5% fluorescein in 20 seconds contact are accepted. Single instillation of 0.005, 0.02, 0.10 or 0.5 ml undiluted or of 0.5 ml of 40, 15, 5 and 1% dilutions are made into conjunctival sac of 5 rabbits. Read immediately unstained and after fluorescein at 24 hours, with ten grades recognized. Trace or no injury from 0.5 ml undiluted = Grade 1.

CERTIFICATE OF AUTHENTICITY

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