federal register

Friday
May 22, 1981

Part III

Environmental Protection Agency

Eighth Report of the Interagency Testing Committee to the Administrator; Request for Comments Regarding Priority List of Chemicals

ENVIRONMENTAL PROTECTION AGENCY

[OPTS 41007; TSH-FRL-1834-6]

Eighth Report of the Interagency Testing Committee to the Administrator; Receipt of Report and Request for Comments Regarding Priority List of Chemicals

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: The Interagency Testing Committee (ITC), established under section 4(e) of TSCA, transmitted its Eighth Report to the Administrator of EPA on April 24, 1981. This report, which revises and updates the Committee's priority list of chemicals, adds three chemicals to the list for priority consideration by EPA in the promulgation of test rules under section 4(a) of the Act. The Eighth Report is included in this Notice. The Agency invites interested persons to submit written comments on the Report and to participate in a scoping workshop.

DATES: Written comments should be submitted by June 22, 1981. The workshop will be held on July 15, 1981, from 9:00 a.m. to 4:00 p.m. and on July 16, 1981, from 9:00 a.m. to 12:00 p.m. The deadline for registration for the workshop is July 1, 1981. Documentation subsequent to the workshop should be submitted no later than August 17, 1981.

ADDRESSES: Send written submissions to: Document Control Officer (TS-793), Office of Pesticides and Toxic Substances, Environmental Protection Agency, Rm. E-401, 401 M St., SW., Washington, D.C. 20460.

Submissions should bear the Document Control Number OPTS-41007

The workshop will be held at Hospitality House Motor Inn, 2000 Jefferson Davis Highway, Arlington, VA 22202.

FOR FURTHER INFORMATION CONTACT: John B. Ritch, Jr., Director, Industry Assistance Office (TS-799), Office of Toxic Substances, Environmental Protection Agency, 401 M St., SW., Washington, D.C. 20460, Toll Free: (800-424-9065), In Washington, D.C., (554-1404), Outside the USA: (Operator-202-554-1404).

SUPPLEMENTARY INFORMATION:

I. Background

Sec. 4(a) of TSCA authorizes the Administrator of EPA to promulgate regulations requiring testing of chemical substances in order to develop data relevant to determining the risks that such chemical substances may present to health and the environment.

Sec. 4(e) of TSCA established an Interagency Testing Committee to make recommendations to the Administrator of EPA of chemical substances for priority consideration for proposing test rules under sec. 4(a). Sec. 4(e) directs the Committee to revise its list of recommendatons every six months as it determines to be necessary. The total number of chemicals designated by the ITC for priority consideration may not exceed 50 at any one time. Within 12 months of the date of designation, EPA must initiate rulemaking to require testing or publish in the **Federal Register** its reasons for not doing so.

The ITC's Eighth Report was received by the Acting Administrator on April 24, 1981, and follows this notice.

II. Written Comments

EPA invites interested persons to submit comments on the ITC's new recommendations. In particular, the Agency would be interested in receiving information concerning additional health and safety data on the subject chemicals. The Agency requests submissions be received no later than June 22, 1981. All submissions received by that date will be considered by the Agency in determining whether to propose test rules in response to the Committee's new recommendations. Submissions should bear the identifying Docket No. OPTS-41007

III. Scoping Workshop

EPA will conduct a scoping workshop on July 15 and 16, 1981, concerning the ITC's Eighth Report. The purpose of the scoping workshop is to provide an early opportunity for the academic community, labor, industry, environmental groups, and the general public to identify and discuss with EPA issues to be addressed by the agency in responding to the ITC's Eighth Report. In order that the workshop may focus on the issues of greatest concern, it is requested that comments submitted on the ITC Report include suggestions of the issues which should be highlighted in the scoping workshop.

A. Registration and Participation

The scoping workshop will be open to all who wish to attend. Anyone who is interested in participating in or attending the workshop or in receiving subsequent materials on the workshop should contact the Industry Assistance Office (see "For Further Information Contact"). All further information on the scoping workshop will be disseminated through the mail or by telephone contact. Those who are interested in actively participating in the workshop (i.e., making a presentation or participating in the workshop discussion) should inform EPA by registering with the Industry Assistance Office no later than July 1, 1981.

B. Schedule and Agenda

The workshop will consist of three separate, half-day sessions as follows:

Session I—diethylenetriamine—9:00 a.m. to 12:00 p.m. on July 15, 1981;

Session II—hexachloroethane—1:00 p.m. to 4:00 p.m. on July 15, 1981;

Session III—2-chlorotoluene—9:00 a.m. to 12:00 p.m. on July 16, 1981;

Each session will consist of (1) EPA's preliminary views on testing needs and issues, (2) presentations by other workshop participants, (3) question and answer period, (4) discussion of the issues, and (5) summary of major points. A specific agenda will be available 1 week prior to the workshop.

C. Workshop Report

Following the workshop, 4 weeks will be allowed for submission of additional information or documentation for inclusion in the workshop record. A final report on the workshop will be prepared on the basis of minutes taken during the meeting; there will be no recording or verbatim transcript of the workshop proceedings.

The final report of the scoping workshop, together with all written comments and materials submitted in connection with this notice, will be available for inspection under Docket No. OPTS-41007 at the Document Control Office, Rm. E-107, Office of Pesticides and Toxic Substances, Environmental Protection Agency, 401 M St. SW., Washington, D.C. 20460, 8:00 a.m. to 4:00 p.m. weekdays, except legal holidays.

Dated: May 14, 1981.

Edwin H. Clark, II,

Acting Assistant Administrator for Pesticides and Toxic Substances.

Eighth Report of the TSCA Interagency Testing Committee to the Administrator, Environmental Protection Agency

Summary

Section 4 of the Toxic Substances Congrol Act of 1976 (TSCA, Pub. L. 94-469) provides for the testing of chemicals in commerce that may present an unreasonable risk of injury to health or the environment. It also provides for the establishment of a Committee, composed of representatives from eight designated Federal agencies, to recommend chemical substances or mixtures to which the Administrator of the U.S. Environmental Protection Agency (EPA) should give priority consideration for the promulgation of testing rules. The Committee makes such revisions in the List (the section 4(e) Priority List) as it determines to be necessary and transmits them to the EPA Administrator at least every 6 months.

As a result of its deliberations, the Committee is revising the TSCA section 4(e) Priority List by the addition of three chemicals. The chemicals being added to the List are presented alphabetically, together with the types of testing recommended, as follows:

Chemical and Recommended Studies

2-Chlorotoluene—Health Effects: Carcinogenicity/oncogenicity, mutagenicity, chronic effects, reproductive effects, teratogenicity. Environmental Effects: Chemical fate, bioconcentration, chronic toxicity to fish, chronic toxicity to aquatic invertebrates.

Diethylenetriamine—Health Effects: Chronic effects, reproductive effects, teratogenicity.

Hexachlorethane—Environmental Effects: Chemical fate, terrestrial plant uptake and toxicity, bioaccumulation, microbial toxicity, avian toxicity, toxicity to terrestrial invertebrates, chronic toxicity to fish and aquatic invertebrates.

Each of the new recommendations is being designated by the Committee for action by the EPA within 12 months of the date of this Eighth Report, as stipulated by section 4(e)(1)(B) of TSCA.

TSCA Interagency Testing Committee

Statutory Member Agencies and Their Representatives

COUNCIL ON ENVIRONMENTAL QUALITY

No Representative

DEPARTMENT OF COMMERCE

Orville E. Paynter, Member
Bernard Greifer, Alternate

ENVIRONMENTAL PROTECTION AGENCY

Joseph Seifter, Member
Carl R. Morris, Alternate

NATIONAL CANCER INSTITUTE

Richard Adamson, Member (*1*)
Elizabeth K. Weisburger, Alternate (*2*)
Jerrold Ward, Alternate (*3*)

NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES

Vacant, Member (*4*)
Dorothy Canter, Alternate

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

Vera W. Hudson, Member and Chairperson
Herbert E. Christensen, Alternate (*5*)

NATIONAL SCIENCE FOUNDATION

Winston C. Nottingham, Member (*6*)

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

Patricia Marlow, Member and Vice Chairperson
Lucille Adamson, Alternate

Liaison Agencies and Their Representatives

CONSUMER PRODUCT SAFETY COMMISSION

Arthur Gregory (*7*) and Lakshmi Mishra (*8*)

DEPARTMENT OF AGRICULTURE

Homer E. Fairchild and Fred W. Clayton

DEPARTMENT OF DEFENSE

Arthur H. McCreesh (*9*)

DEPARTMENT OF THE INTERIOR

Charles R. Walker

FOOD AND DRUG ADMINISTRATION

Allen H. Heim and Winston deMonsabert

NATIONAL TOXICOLOGY PROGRAM

Dorothy Canter

Committee Staff

Martin Greif, Executive Secretary
Vacant, Administrative Technician

Support Staff

Ellen Siegler—Office of the General Counsel, EPA
Edward Zillioux—Office of Toxic Substances, EPA

References

(*1*) Dr. Adamson replaced Dr. James M. Sontag, whose 4-year term as a Member expired on February 5, 1981.

(*2*) Dr. Weisburger joined the Committee as an Alternate member on February 5, 1981.

(*3*) Dr. Ward joined the Committee as an Alternate member on February 5, 1981.

(*4*) Dr. Warren T. Piver's 4-year term as a Member expired on February 5, 1981.

(*5*) Dr. Christensen replaced Dr. Alfred N. Milbert as an Alternate member on February 5, 1981.

(*6*) Dr. Nottingham replaced Dr. Sidney Draggan as a Member on November 4, 1980.

(*7*) Dr. Gregory replaced Dr. Joseph McLaughlin as a Liaison representative on December 29, 1980.

(*8*) Dr. Mishra was appointed a Liaison representative on January 8, 1981.

(*9*) Dr. McCreesh replaced Dr. Bernard P McNamara as a Liaison representative on December 29, 1980.

Chapter 1. Introduction

1.1 *Background.* The TSCA Interagency Testing Committee (Committee) was established under section 4(e) of the Toxic Substances Control Act of 1976 (TSCA, Public Law 94–469). The specific mandate of the Committee is to identify and recommend to the Administrator of the U.S. Environmental Protection Agency (EPA) chemical substances or mixtures in commerce that should be tested to determine their potential hazard to human health and/or the environment. The Act specifies that the Committee's recommendations shall be in the form of a Priority List, which is to be published in the **Federal Register.** The Committee is directed to make revisions to the List, as it determines to be necessary, and to transmit such revisions to the EPA Administrator at least every 6 months after submission of the Initial List.

The Committee is comprised of representatives from eight statutory member agencies, five liaison agencies, and one national program. The specific representatives and their affiliations are named in the front of this report. The Committee's chemical review procedures and prior recommendations are described in previous reports (Refs. *1* through *8*).

1.2 *Committee's activities during this reporting period.*

The Committee has continued to review chemicals from its second round of scoring and has begun to review those from the third scoring exercise, which are high-production chemicals (in excess of 2 million pounds annually) listed in the TSCA Chemical Substances Inventory (see Ref. *2* for methodology).

The following steps have been taken to expand the Committee's information-gathering activities in developing its recommendations to the EPA for testing.

a. The names and CAS numbers of all 107 chemicals selected in the third round of scoring were published in the **Federal Register.** A public meeting to receive written or verbal comments on these chemicals was held in Washington, D.C. (Ref. *9*).

b. The Committee has asked the public and private sectors to contribute relevant information, particularly unpublished data, on exposure and effects of chemicals selected in the third scoring exercise.

c. The technical support contractor is including summaries of information received from industry in the Hazard Information Reviews of chemicals being prepared for the Committee.

The Committee believes that this process will broaden the data base relied upon for making recommendations to the EPA Administrator.

1.3 *Committee's previous reports.* Seven previous reports to the EPA Administrator have been issued by the Committee and published in the **Federal Register** (Refs. *2* through *8*). Forty-three entries (i.e., chemical substances and categories of chemicals) have been designated for priority consideration by the EPA Administrator. One entry, chloromethane, was subsequently removed (Ref. *8*) after the EPA responded to the Committee's recommendation for testing.

1.4 *The TSCA section 4(e) priority 'st.* The entries and the dates of their esignation by the Committee are resented in Table 1. With the additions 'om this report, and the deletion of hloromethane under Table 2, 45 entries ow appear on the Priority List. The 'ommittee considers each entry to be of qual priority.

'able 1.—*The TSCA Section 4(e) Priority List*

Entry	Date of designation
l. Acetonitrile	April 1979.
2. Acrylamide	April 1978[1,2].
3. Alkyl opoxides	October 1977[3].
4. Alkyl phthalates	October 1977[3].
5. alkyltin compounds	October 1980.
6. Aniline and bromo, chloro and/or nitro anilines.	April 1979.
7. Antimony (metal)	April 1979.
8. antimony sulfide	April 1979.
9. antimony trioxide	April 1979.
0. Aryl phosphates	April 1978[1].
1. Benzidine-based dyes	November 1979.
2. Benzyl butyl phthalate	October 1980.
3. Butyl glycolyl butyl phthalate.	October 1980.
4. Chlorinated benzenes, mono- and di-.	October 1977[3,4].
5. Chlorinated benzenes, tri-, tetra-, and Penta-.	October 1978[4].
6. Chlorinated naphthalenes	April 1978[1].
7. Chlorinated paraffins	October 1977[3].
8. 2-Chlorotoluene	April 1981.
9. Cresols	October 1977[3].
0. Cyclohexanone	April 1979.
1. o-Dianisidine-based dyes	November 1979.
2. Dichloromethane	April 1978[1].
3. 1,2-dichloropropane	October 1978.
4. Diethylenetriamine	April 1981.
5. Fluoroalkenes	October 1980.
6. Glycidol and its derivatives.	October 1978.
7. Halogenated alkyl epoxides.	April 1978[1].
8. Hexachloro-1,3-butadiene	October 1977[3].
9. Hexachlorocyclo- pentadiene.	April 1979.
0. Hexachloroethane	April 1981.
1. Hydroquinone	November 1979.
2. Isophorone	April 1979.
3. Mesityl oxide	April 1979.
4. 4,4'-Methylenedianiline	April 1979.
5. Methyl ethyl ketone	April 1979.
6. Methyl isobutyl ketone	April 1979.
7. Nitrobenzene	October 1977[3].
8. Phenylenediamines	April 1980.
9. Polychlorinated terphenyls.	April 1978[1].
0. Pyridine	April 1978[1].
1. Quinone	November 1979.
2. *o*-Tolidine-based dyes	November 1979.
3. Toluene	October 1977[3].
4. 1,1,1-Trichloroethane	April 1978[1].
5. Xylene	October 1977[3].

[1] Responded to by the EPA Administrator in 44 FR 28095-8097.
[2] Responded to by the EPA Administrator in 45 FR 48510-8512.
[3] Responded to by the EPA Administrator in 43 FR 50134-0138.
[4] Responded to by the EPA Administrator in 45 FR 48524-8564.

Table 2.—*Removal from the TSCA Section 4(e) Priority List*

Removal	Date of removal
. Chloromethane	October 1980[1].

[1] Responded to by the EPA Administrator in 45 FR 48524-8564.

References

(*1*) Preliminary List of Chemical Substances 'or Further Evaluation. Toxic Substances Control Act Interagency Testing Committee, July 1977.

(*2*) Initial Report to the Administrator, Environmental Protection Agency, TSCA Interagency Testing Committee, October 1, 1977. Published in the **Federal Register** of Wednesday, October 12, 1977, 42 FR 55026–55080. Corrections published in the **Federal Register** of November 11, 1977, 42 FR 58777–58778. The report and supporting dossiers also were published by the Environmental Protection Agency, EPA 560–10–78/001, January 1978.

(*3*) Second Report of the TSCA Interagency Testing Committee to the Administrator, Environmental Protection Agency. TSCA Interagency Testing Committee, April 1978. Published in the **Federal Register** of Wednesday, April 19, 1978, 43 FR 16684–16688. The report and supporting dossiers also were published by the Environmental Protection Agency, EPA 560–10–78/002, July 1978.

(*4*) Third Report of the TSCA Interagency Testing Committee to the Administrator, Environmental Protection Agency. TSCA Interagency Testing Committee, October 1978. Published in the **Federal Register** Monday, October 10, 1978, 43 FR 50630–50635. The report and supporting dossiers also were published by the Environmental Protection Agency, EPA 560–10–79/001, January 1979.

(*5*) Fourth Report of the TSCA Interagency Testing Committee to the Administrator, Environmental Protection Agency. TSCA Interagency Testing Committee, April 1979. Published in the **Federal Register** of Friday, June 1, 1979, 44 FR 31866–31889.

(*6*) Fifth Report of the TSCA Interagency Testing Committee to the Administrator, Environmental Protection Agency. TSCA Interagency Testing Committee, November 1979. Published in the **Federal Register** of Friday, December 7, 1979, 44 FR 70664–70674.

(*7*) Sixth Report of the TSCA Interagency Testing Committee to the Administrator, Environmental Protection Agency. TSCA Interagency Testing Committee, April 1980. Published in the **Federal Register** of Wednesday, May 28, 1980, 45 FR 35897–35910.

(*8*) Seventh Report of the TSCA Interagency Testing Committee to the Administrator, Environmental Protection Agency. TSCA Interagency Testing Committee, October 1980. Published in the **Federal Register** of Tuesday, November 25, 1980, 45 FR 78432–78446.

(*9*) Toxic Substances Control Act Interagency Testing Committee; Chemicals to be Reviewed by the TSCA Interagency Testing Committee; Notice of Public Meeting. Published in the **Federal Register**, Tuesday, October 7, 1980, 45 FR 66506–66513.

Chapter 2. Recommendations of the Committee

2.1 *Chemical substances designated for action by the EPA Administrator.* As directed by section 4(e)(1)(B) of TSCA, the Committee is adding the following three chemical substances to the section 4(e) Priority List: 2-chlorotoluene, diethylenetriamine, and hexachloroethane. The designation of these entries was determined after considering the factors identified in section 4(e)(1)(A) and other available relevant information, as well as the professional judgment of Committee members.

The studies recommended for these entries and the rationales to support the recommendations are given in section 2.2 of this report. In accordance with section 4(e) of TSCA, the Committee designates these entries for action by the EPA within 12 months of the date of issuance of this Eighth Committee Report.

2.2 *Recommendation and rationales*

2.2.a *2-Chlorotoluene*

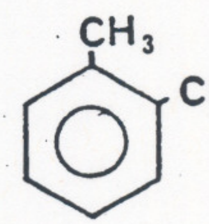
Summary of recommended studies. It is recommended that 2-chlorotoluene be tested for the following:

A. Health Effects:
Carcinogenicity/oncogenicity
Mutagenicity
Chronic effects
Reproductive effects
Teratogenicity

B. Environmental Effects:
Chemical fate studies
Bioconcentration studies
Chronic toxicity to fish
Chronic toxicity to aquatic invertebrates

Physical and Chemical Information

CAS Number: 95–49–8
Structural Formula:



Empirical Formula: C_7H_7Cl
Molecular Weight: 126.59
Melting Point: −37°C

Vapor Pressure: 2.7 mm Hg at 20°C; 5.0 mm Hg at 30°C

Log Octanol/Water Partition Coefficient: 3.42 Description of Chemical: 2-Chlorotoluene is a colorless aromatic, liquid at room temperature (22°C). It has a low solubility in water and is soluble in most organic solvents. Impurities that may be found with this chemical include other chlorotoluenes and toluene.

Rationale for Recommendations

I. *Exposure information*—A. *Production/use/disposal information.* Between 11 and 60 million pounds of 2-chlorotoluene was produced in the

United States in 1977 (EPA, 1980). Mixtures with a high content of this chemical are used in solvent applications such as carriers for reaction mixtures, dye carrier formulations, and sludge solvents, as well as paint and rubber-stripping formulations. These use patterns suggest that human exposures may occur in the workplace as well as in consumer applications.

A threshold limit value (TLV[R]) of 50 ppm for skin exposure has been established by the American Conference of Governmental Industrial Hygienists (ACGIH) based upon the analogy of this chemical with other chlorinated aromatic compounds such as the chlorinated benzenes (ACGIH, 1980). 2-Chlorotoluene is expected to escape to the atmosphere and/or be discharged to aquatic systems in effluents as a result of solvent usage within chemical plants. Terrestrial nonhuman exposure is expected to be slight.

B. *Chemical fate information.* Little information on the transport or persistence of 2-chlorotoluene has been found. In water, some photolysis is anticipated at the surface and some biodegradation by bacteria and fungi is expected.

II. *Human population studies.* Human monitoring has been carried out in a limited study. Isomers of 2-chlorotoluene were reported in the breath of two of nine people (range 261–338 ng/m^3) in Niagara Falls, New York (Pellizzari et al., 1979).

III. *Biological effects of concern to human health—A. Toxicokinetic/metabolism studies.* Studies in the rat suggest that 2-chlorotoluene is metabolized and excreted in the urine as several metabolites, most notably as a glucuronide conjugate of a phenolic hydroxylation product of 2-chlorotoluene (Wold and Emmerson, 1974). No unchanged 2-chlorotoluene was present in the urine. These phenolic hydroxylation products may be produced via arene oxide intermediates of the parent compound. These latter intermediates have been associated with certain cellular mechanisms that produce tissue damage (necrosis) and, in some cases, carcinogenicity (Jerina and Daly, 1974).

B. *Short-term (acute) effects.* Little information has been identified concerning the short-term effects of 2-chlorotoluene.

C. *Long-term (subchronic/chronic) effects.* No information has been identified concerning the long-term effects of 2-chlorotoluene either in humans or experimental animals. However, the analog chlorobenzene is being tested for carcinogenicity in a 2-year gavage study by the National Toxicology Program (NTP).

D. *Teratogenicity/reproductive effects studies.* No information has been identified concerning either teratogenic or reproductive effects of 2-chlorotoluene.

E. *Mutagenicity studies.* No information has been identified concerning the mutagenicity of 2-chlorotoluene; however, the analog chlorobenzene has been tested by the NTP in two independent laboratories and found to be negative by both (NTP, 1980).

F. *Rationale for health effects recommendations.* Due to the lack of health-related data and the high human exposure potential within the workplace and in consumer applications, testing of 2-chlorotoluene is recommended for the following health effects: carcinogenicity/oncogenicity, mutagenicity, chronic effects, reproductive effects, and teratogenicity. The bioconcentration factor (see section IV.D.) suggests that delayed chronic toxicity may be of concern and, therefore, testing for chronic effects should be carried out to assess this potential hazard adequately.

IV. *Environmental considerations—A. Short-term (acute) effects.* The acute toxicity of 2-chlorotoluene appears to be quite low. The LC_{50} for a freshwater fish, the golden orfe (*Leuciscus idus melantus),* was reported at 78 mg/l (Juhnke and Luedemann, 1978) and the 24-hour LC_{50} for *Daphnia magna* was reported at 74 mg/l (Bringmann and Kuehn, 1977a). No acute toxicity data on terrestrial species have been identified.

B. *Long-term (subchronic/chronic) effects.* No studies on the long-term effects of 2-chlorotoluene have been found for either aquatic or terrestrial species.

C. *Other effects (physiological/behavioral/ecosystem processes).* Toxicity threshold values (from the cell multiplication inhibition and analogous tests) have been reported for bacteria (*Pseudomonas putida*) at 15 mg/l, blue-green algae (*Microcystis aeruginosa*) at 31 mg/l, and green algae (*Scenedesmus quadricauda*) at greater than 100 mg/l (Bringmann and Kuehn, 1977b; 1978).

D. *Bioaccumulation and food-chain transport.* The log of the octanol/water partition coefficient is 3.42, as measured by Leo et al. (1976). Using the method of Veith et al. (1980), the bioconcentration factor (BCF) is calculated to be 234. This potential for 2-chlorotoluene to bioaccumulate may lead to substantial chronic effects and food-chain transport. No information has been identified relating to either of these concerns.

E. *Rationale for specific environmental effects recommendations.* Chemical fate studies are recommended because of the paucity of chemical fate test data on 2-chlorotoluene. No toxicity tests are recommended for terrestrial animals or plants at this time because there is no indication that substantial terrestrial exposure exists. Industrial releases to the atmosphere should result in moderately rapid degradation by photo-oxidation. Bioaccumulation tests and chronic toxicity tests to fish and aquatic invertebrates are recommended because of the substantial aquatic exposure anticipated, the calculated bioconcentration factor, and the consequent potential for effects in aquatic organisms due to chronic exposure.

References

(*1*) ACGIH. 1980. American Conference of Governmental Industrial Hygienists. Documentation of Threshold Limit Values, 4th ed. Cincinnati, OH: American Conference of Governmental Industrial Hygienist.

(*2*) Bringmann G, Kuehn R. 1977a. Results of the damaging effects of water pollutants on *Daphnia magna.* Z. Wasser Abwasser Forsch. 10(5):161–166.

(*3*) Bringmann G, Kuehn R. 1977b. Limiting values for the damaging action of water pollutants to bacteria (*Pseudomonas putida*) and green algae (*Scenedesmus quadricauda*) in the cell multiplication inhibition test. Z. Wasser Abwasser Forsch. 10(3–4):87–98.

(*4*) Bringmann G, Kuehn R. 1978. Limiting values for the noxious effects of water pollutant material to blue-green algae (*Microcystis aeruginosa*) and green algae (*Scenedesmus quadricauda*) in cell propagation inhibition tests. Vom Wasser 50:45–60.

(*5*) EPA. 1980. Environmental Protection Agency. TSCA Chemical Substances Inventory (public portion). Washington, D.C.: Environmental Protection Agency.

(*6*) Jerina DM, Daly JW. Arene oxides: A new aspect of drug metabolism. Science 1985:573–582.

(*7*) Juhnke I, Luedemann D. 1978. Results of the study of 200 chemical compounds on acute fish toxicity using the Golden Orfe test. Z. Wasser Abwasser Forsch. 11(5):161–164.

(*8*) Leo A, Hansch C, Jow PVC. 1976. Dependence of hydrophobicity of apolar molecules on their molecular volume. J. Med. Chem. 19:611–615.

(*9*) NTP. 1980. National Toxicology Program. Fiscal Year 1981 Annual Plan. Washington, DC: Department of Health and Human Services, Public Health Service, National Toxicology Program, NTP–80–62.

(*10*) Pellizzari ED, Erickson MD, Zweidinger RA. 1979. Formulation of a preliminary assessment of halogenated organic compounds in man and environmental media. Washington, D.C.: Environmental Protection Agency. EPA 560/13–79–006.

(*11*) Veith GD, Macek KJ, Petrocellie SR, Carroll J. An evaluation of using partition coefficients and water solubility to estimate bioconcentration factors for organic chemicals in fish. Eaton JG, Parrish PR, Hendricks AC, eds. 1980. *Aquatic Toxicology:* proceedings of the third annual symposium on aquatic toxicology, ASTM Special Technical Publication 707, 1978 October 17–18, New Orleans, LA. Philadelphia, PA: American Society for Testing and Materials, pp. 116–128.

(*12*) Wold JS, Emmerson JL. 1974. The metabolism of ^{14}C-*o*-Chlorotoluene in the rat. Pharmacologist 16:196.

2.2.b. *DIETHYLENETRIAMINE*

Summary of recommended studies. It is recommended that diethylenetriamine (DETA) be tested for the following:

A. Health Effects:

Chronic effects
Reproductive effects
Teratogenicity

PHYSICAL AND CHEMICAL INFORMATION

CAS Number: 111–40–0
Structural Formula:
$H_2NCH_2CH_2NHCH_2CH_2NH_2$
Empirical Formula: $C_4H_{13}N_3$
Molecular Weight: 103.17
Boiling Point: 206.9 [C at 760 mm Hg
Melting Point: −39 [C
Vapor Pressure: 0.37 mm Hg at 20 [C
Vapor Density: 3.5 (air=1.0)
Log Octanol/Water Partition Coefficient: −1.40 at 20 [C (estimated, Leo et al., 1971)
Description of Chemical: DETA is a strongly alkaline, hygroscopic, viscous, yellow liquid with a mild ammoniacal odor. It is highly soluble in water.

Rationale For Recommendations

I. *Exposure information*—A. *Production/use/disposal information.* The TSCA Inventory reports an aggregate production by five producers in 1977 in excess of 10 million pounds (EPA, 1980). DETA is used in the manufacture of a wide variety of products, including chelating agents, wet strength resins for paper goods, epoxy curing agents, polyamide resins for adhesives and coatings, surfactants in shampoos, fabric softeners, corrosion inhibitors in petroleum production, antirust and dispersal additives for high-quality motor oils and fuels, asphalt emulsifiers, and anti-static agents for synthetic fibers (Kirk-Othmer, 1979). It is also a component of high-energy fuels for rockets and military aircraft (Hawley, 1976). This use pattern indicates that significant exposure may occur in the workplace, and the National Occupational Hazard Survey estimates that 62,000 workers are potentially exposed to DETA (NIOSH, 1980). Release of DETA into the environment may occur during industrial use. A threshold limit value (TLVR) of 1 ppm for skin exposure was established by the American Conference of Governmental Industrial Hygienists based on the acute effects of this compound (ACGIH, 1980).

B. *Chemical fate information.* DETA is biodegradable and, due to its high solubility in water, is unlikely to bioaccumulate (Popp, 1977).

II. *Human population studies.* DETA is a skin, eye, and respiratory tract irritant and produces skin and probably pulmonary sensitization (ACGIH, 1980). Dernehl (1951) reported that certain polyamines induce asthmatic symptoms in man.

III. *Biological effects of concern to human health*—A. *Toxicokinetic/metabolism studies.* No information was found on the absorption, distribution, metabolism, and elimination of DETA in man.

B. *Short-term (acute) effects.* The acute intraperitoneal LD_{50} is 0.071 g/kg in mice and 0.074 g/kg in rats (Hine et al., 1958). When administered orally to male rats the LD_{50} after 14 days was 2.33 g/kg, and when administered percutaneously to rabbits the dermal LD_{50} was 1.09 g/kg (Smyth et al., 1949). No toxic signs were reported in a subacute inhalation study where rats were exposed for 15 days, 6 hours a day, to 130 ppm (Gage, 1970). Undiluted DETA tested in rabbits' eyes caused severe local injury with permanent loss of vision, whereas a 1-percent aqueous solution caused slight, transitory corneal damage and very slight conjunctivitis. The eye treated with a 1-percent solution was normal 2 days after exposure (Dow, 1981).

C. *Long-term (subchronic/chronic) effects.* The lifetime toxicity study in rats conducted by Fujino (1970) was determined to be inconclusive and cannot be used to assess the chronic toxicity of this chemical. However, pathologic changes were noted in the liver and kidney and to a lesser degree in the spleen and adrenal gland in the test animals. The Committee recommends studies to evaluate the chronic toxicity of this compound with particular emphasis on the renal and respiratory systems.

D. *Mutagenicity.* DETA was tested for mutagenicity in the *Salmonella* microbial assay. The TA 1535 and TA 100 tester strains were used, with and without metabolic activation. A direct mutagenic effect, which was not altered by activation, was seen. The authors suspect that activity was due to an alkylating impurity (Hedenstedt, 1978). Other assays using *Salmonella* and *Saccharomyces* organisms were negative with and without metabolic activation (Jagannath and Brusick, 1978).

E. *Teratogenicity and reproductive effects.* Due to the potential for high exposure and the lack of data on teratogenic and reproductive effects, the Committee recommends that appropriate tests be conducted for these effects.

References

(*1*) ACGIH. 1980. American Conference of Governmental Industrial Hygienists. Documentation of Threshold Limit Values, 4th ed. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.

(*2*) Dernehl CU. 1951. Clinical experiences with exposures to ethylene amines. Ind. Med. Surg. 20:541.

(*3*) Dow Chemical Company. 1981 March 27. Unpublished data in letter to S. Diwan, Enviro. Control, Inc., Rockville, MD.

(*4*) EPA. 1980. Environmental Protection Agency. TSCA Chemical Substances Inventory (public portion). Washington, D.C.: Environmental Protection Agency.

(*5*) Fujino M. 1970. Experimental studies on the chronic toxicity of diethylenetriamine in rats. Igaku Kenkyo. 40(2):139–164. (In Japanese, translation)

(*6*) Gage, JC. 1970. The subacute inhalation toxicity of 109 industrial chemicals. Brit. J. Ind. Med. 27:1–18.

(*7*) Hawley GG, ed. 1976. The Condensed Chemical Dictionary, 9th ed. New York: Van Nostrand Reinhold Company.

(*8*) Hedenstedt A. 1978. Mutagenicity screening of industrial chemicals: seven aliphatic amines and one amide tested in the *Salmonella/microsome* assay. Mutat. Res. 53:198–199.

(*9*) Hine CH, Kodama JK, Anderson HH, Simmonson DW, Wellington JS. 1958. The toxicity of epoxy resins. A.M.A. Arch. Ind. Hlth. 17:129–144.

(*10*) Jagannath DR, Brusick D. 1978. Mutagenicity Evaluation of Diethylenetriamine in the Ames *Salmonella/Microsome* Plate Test. Final Report. Kensington, MD: Litton Bionetics, Inc. Unpublished.

(*11*) Kirk-Othmer Encyclopedia of Chemical Technology, 3rd ed, Vol. 7. 1979. New York: John Wiley and Sons, pp. 580–596.

(*12*) Leo A., Hansch C, Elkins D. 1971. Partition coefficients and their uses. Chem. Revs. 71(6):525–616.

(*13*) NIOSH. 1980. National Institute for Occupational Safety and Health. National Occupational Hazard Survey, 1972–1974. Cincinnati, OH: National Institute for Occupational Safety and Health.

(*14*) Popp KH. 1977. Studies of the biodegradability of polyamines. Terside. Doterg. 14(6):310–311.

(*15*) Smyth HF Jr, Carpenter CP, Weil CS. 1949. Range-finding toxicity data, List III. J. Ind. Hyg. Toxicol. 31:60–62.

2.2.c. Hexachloroethane

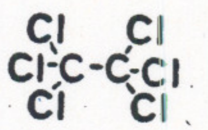
Summary of recommended studies. It is recommended that hexachloroethane (HCE) be tested for the following:

a. Environmental Effects: Chemical fate, Terrestrial plant uptake and toxicity, Bioaccumulation, Microbial toxicity, Avian toxicity, Toxicity to terrestrial invertebrates, Chronic toxicity to fish and aquatic invertebrates.

Physical and Chemical Information

CAS Number: 67–72–1.

Structural Formula:



Empirical Formula: C_2Cl_6.

Molecular Weight: 236.7.

Melting Point: Sublimes above 186° C.

Vapor Pressure: 0.4 mm Hg at 20° C.

Specific Gravity: 2.09.

Solubility in Water: 50 mg/1 at 22° C.

Log Octanol/Water partition Coefficient: 3.93.

Description of Chemical: White solid.

Rationale for Recommendations

I. *Exposure information*—A. *Production information.* The public portion of the TSCA Inventory lists six U.S. manufacturers and three importers of HCE in 1977 (EPA, 1981). For those companies on this list that disclosed their figures, the aggregate production and importation was between 4.1 and 41.2 million pounds.

One of the two primary uses of HCE is in the manufacture of smoke bombs and other smoke munitions by the U.S. Army. The military is presently seeking a substitute for HCE and plans to discontinue use of the chemical (McCreesh, 1981). However, a substitute has not been designated at this time. The second primary application is in aluminum foundries, where it is used in degassing magnesium.

A wide variety of additional applications for HCE include: an additive for extreme pressure lubricants; a plasticizer for nitrocellulose; an accelerator for rubber vulcanization; a retarding agent for pharmaceutical fermentation processes; and additive to fire extinguishing fluids; an additive to redue ignitability of combustible liquids; fungicidal and insecticidal components; a component of submarine paints; a fixer in photography and xerography; a softening agent in hair setting and styling; and an ingredient in synthetic diamonds. Past uses that apparently are now discontinued include: an anthelmintic for cattle and sheep; and a moth repellent.

B. *Release and exposure.* It is expected that substantial quantities of HCE would be released to the atmosphere as well as to land and water compartments during use and disposal of HCE-containing materials. Although little information is available on the amount of HCE released to the environment as an intermediate or byproduct waste (hex-wastes), this is likely to be the most significant and persistent source of contamination. For example, HCE is one of a group of coproducts in production of trichloroethylene, perchloroethylene, and carbon tetrachloride. Disposal of hex-wastes is usually through landfill operations or incineration; in one major incineration operation, the exhaust gases are scrubbed with sodium hydroxide solution and this solution is then discharged directly to the environment. Some hex-waste samples have contained as much as 15 percent hexachloroethane. Since millions of pounds of hex-wastes are generated each year, this could result in a substantial release of HCE to the environment. It is relevant to any concern over HCE release from hex-wastes that three carbon tetrachloride plants, one trichloroethylene plant, and three perchlroethylene plants have been recommended to the Environmental Protection Agency as monitoring sites (Mumma and Lawless, 1975).

HCE has been detected in rivers, municipal water supplies, and industrial effluent streams at concentrations from 1 to 40 ppb (EPA, 1979).

C. *Chemical fate information.* The chemical fate of HCE is complicated and not clearly defined.

The ratio of the vapor pressure to solubility in water of HCE indicates the molecule is lilkely to evaporate from aqueous solutions if it is not sorbed to the hydrosoil. The rate of evaporation would depend upon the amount of agitation and depth of the body of water. Since HCE is heavier than water, it has the tendency to sink to the bottom of rivers, lakes, wells, and streams. Using the method of Kenaga (1980) for predicting the sorption of chemicals in agricultural soil, it is predicted that HCE is likely to be sorbed to hydrophobic materials present in bottom sediments. Any chemical that has been trapped on the bottom of a body of water by sorption is likely to be available for interactions with microorganisms. In the case of perchlorinated compounds, however, the biochemical reaction rates are so slow that the mocroorganisms tend to accumulate the compound without any substantial degradation.

Since HCE also may sublime readily without melting, the potential for atmospheric release from terrestrial sources may be considerable.

II. *Environmental considerations*—A. *Short-term (acute) effects.* Test conducted for the development of the Ambient Water Quality Criteria for Chlorinated Ethanes (EPA, 1980) provide ample evidence that HCE at concentrations below 1 ppm can affect aquatic organisms. The following acute data were reported:

Daphnia, 48-hour LC_{50}=8,070 μg/l.

Midge *(Tanytarsus dissimilis)*, 48-hour LC_{50}=1,700 μg/l.

Mysid shrimp, 96-hour static LC_{50}=940 μg/l.

Fathead minnow, 96-hour flow-through LC_{50}=1,530 μg/l.

Bluegill, 96-hour static LC_{50}=980 μg/l.

Sheepshead minnow, 96-hour static LC_{50}=2,400 μg/l.

Rainbow trout, flow-through LC_{50}=980 μg/l.

Acute toxicity of HCE to mammals was reported by Weeks et al. (1979). The oral LD_{50} for the rat and guinea pig ranged from 4,460 to 7,690 mg/kg and and the dermal LD_{50} for the male rabbit was >32,000 mg/kg.

B. *Long-term (subchronic/chronic) effects.* The no-effect level, based on an embryo-larval test with fathead minnows, was 380 μg/l (EPA, 1980). The lowest measured toxic effect level in this study was 700 μg/l.

Subchronic vapor inhalation toxicity of HCE at 260 ppm was moderate to severe in guinea pigs, rats, and dogs, but minimal in Japanese quail after 6 weeks' exposure. Similar exposure of these species to HCE at 15 ppm showed no detectable toxicity (Weeks et al., 1979).

C. *Other effects (physiological/behavioral/ecosystem processes).* The following 96-hour EC_{50} values for algae exposed to HCE were reported in Ambient Water Quality Criteria for Chlorinated Ethanes (EPA, 1980):

Selenastrum (chlorophyll a)=87,000 μg/l.

Selenastrum (cell no.)=93,200 μg/l.

Skeletonema (chlorophyll a)=8,570 μg/l.

Skeletonema (cell no.)=7,750 μg/l.

Behavioral studies by Weeks et al. (1979) produced no measurable effects on either avoidance performance or spontaneous motor activity in rats at exposures to HCE of up to 6 weeks and 260 ppm.

D. *Bioaccumulation and food-chain transport.* Measured bioconcentration factors are 139 for bluegills (EPA, 1980) and 703 for fatheat minnows (Veith, 1981). This corresponds to total lipid contents in these fishes of 2 percent to 3 percent for the bluegill and about 8 percent for the fathead minnow. However, the fathead minnow is still a rather lean fish as compared with salmonids such as trout, which have lipid contents ranging from about 14 percent to as high as 50 percent. The very high bioconcentration factor expected for trout raises concern for high food-chain residues and consequently a possibility of significant human exposure, as well as latent physiological and reproductive effects in the trout itself that are typical for organochlorines.

E. *Reasons for specific environmental effects recommendations.* Although EPA has designated hexachloroethane as a priority pollutant under the Clean Water Act of 1977, no further studies beyond those reported in the Ambient Water Quality Criteria for Chlorinated Ethanes (EPA, 1980) (primarily acute toxicity studies) are underway or planned at this time. HCE was not among the list of priority pollutants, including 12 of highest concern and 16 of secondary concern, that have been selected for additional aquatic toxicity testing by the Office of Water Regulations and Standards.

Organochlorines in general are notorious for latent forms of toxicity, including reproductive toxicity, neural toxicity, and behavior modifications. Compounds suspected of latent forms of toxicity should not be judged for environmental hazard solely on the basis of acute toxicity tests. For an organochlorine, annual production of 40 million pounds must be considered very high (e.g., most organochlorine pesticides do not approach this level of production).

Chemical fate studies are recommended because of the almost complete absence of these data. The broad spectrum of opportunities for environmental release justify fate studies applicable to all environmental compartments.

Terrestrial plant uptake and toxicity studies are recommended because no information has been found. The likely exposure routes would be through atmospheric release and from irrigation by ground or surface water contaminated by runoff or leachates from landfill sites containing hex-wastes. Additional bioaccumulation studies are recommended. Bioconcentration factors for species in taxonomic groups other than fish should be determined. Benthic species would be preferred because high chronic exposures are more likely in this portion of the aquatic environment.

Microbial toxicity studies are recommended specifically for benthic decomposers since HCE sinks in aquatic systems, is likely to sorb to sediments, and may accumulate there at high concentrations.

The acute toxicity data for the rat, guinea pig, and rabbit suggest a low hazard to mammals from oral and dermal exposure to HCE. Similarly, subchronic vapor inhalation toxicity of HCE to guinea pigs, rats, and dogs is also low. For these reasons, testing is not recommended for mammalian species at this time. However, if latent forms of toxicity are demonstrated in other tests, the need for chronic mammalian testing should be evaluated.

Very few data are available for avian species. A single subchronic vapor inhalation test with Japanese quail showed almost no toxicity from HCE. However other tests, such as dietary and reproductive tests with other species, are needed. Avian toxicity tests are recommended due to the expected diversity of exposure routes and would be particularly appropriate if residues of HCE in the parts-per-billion range are found in food sources such as terrestrial annelids, insects, fish, and plant tissues.

Toxicity tests and residue measurements with terrestrial invertebrates, particularly annelids, are recommended because of their importance in the terrestrial food web.

Chronic toxicity studies with fish and aquatic invertebrates are recommended. In spite of evidence of acute toxicological concern, no full chronic studies with aquatic species have been conducted. The one partial chronic test with the embryo-larval stages of the fathead minnow does not indicate toxicity much greater than the acute toxicity value for this species. The fathead minnow is not a particularly sensitive species, however, and a partial chronic test with this fish is not adequate to assess the possibility of latent toxic effects, especially in species of higher lipid content.

Chronic studies with aquatic invertebrates such as benthic arthropods or polychaetes are particularly appropriate due to the possibility of greater exposure in the benthic environment and their critical role in the aquatic food web.

References

(*1*) EPA. 1979. Environmental Protection Agency. Computer printout: STORET (EPA Water Quality Data Base). Retrieved October 1979. Washington, D.C.. Environmental Protection Agency, Office of Water Regulations and Standards, Criteria and Standards Division.

(*2*) EPA. 1980. Environmental Protection Agency. Ambient Water Quality Criteria for Chlorinated Ethanes. Washington, D.C.. Environmental Protection Agency, Office of Water Regulations and Standards, Criteria and Standards Division, EPA Report No. 440/5-80-029.

(*3*) EPA. 1981. Environmental Protection Agency. TSCA Chemical Substances Inventory (public portion). Washington, D.C.. Environmental Protection Agency.

(*4*) Kenaga EE. 1980. Predicted bioconcentration factors and soil sorption coefficients of pesticides and other chemicals. Ecotoxicol. Environ. Safety 4:26-38; 1980.

(*5*) McCreesh, A.H. 1981 February 2. Memorandum to the Interagency Testing Committee.

(*6*) Mumma C, Lawless E. 1975. Survey of industrial processing data. Task 1-hexachlorobenzene and hexachlorobutadiene pollution from chlorocarbon processes. EPA Report No. 560/3-75-003.

(*7*) NIOSH. 1980. National Institute for Occupational Safety and Health. National Occupational Hazard Survey, 1972-1974. Cincinnati, OH: National Institute for Occupational Safety and Health.

(*8*) Veith GD. 1981 April 10. Memorandum to E.J. Zillioux.

(*9*) Weeks MH, Angrhofer RA, Bischop R, Thomasino J, Pope CR. 1979. The toxicity of hexachloroethane in laboratory animals. Am. Ind. Hyg. Assoc. J. 40(3):187-198.

[FR Doc. 81-15374 Filed 5-21-81; 8:45 am]

BILLING CODE 6560-31-M