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Provisional Peer Reviewed Toxicity Values for

1,2-Dichloroethylene (mixture)

(CASRN 540-59-0)

Derivation of an Inhalation RfC

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Acronyms and Abbreviations

bw	body weight
cc	cubic centimeters
CD	Caesarean Delivered
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CNS	central nervous system
cu.m	cubic meter
DWEL	Drinking Water Equivalent Level
FEL	frank-effect level
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
g	grams
GI	gastrointestinal
HEC	human equivalent concentration
Hgb	hemoglobin
i.m.	intramuscular
i.p.	intraperitoneal
IRIS	Integrated Risk Information System
IUR	inhalation unit risk
i.v.	intravenous
kg	kilogram
L	liter
LEL	lowest-effect level
LOAEL	lowest-observed-adverse-effect level
LOAEL(ADJ)	LOAEL adjusted to continuous exposure duration
LOAEL(HEC)	LOAEL adjusted for dosimetric differences across species to a human
m	meter
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MF	modifying factor
mg	milligram
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MRL	minimal risk level
MTD	maximum tolerated dose
MTL	median threshold limit

NAAQS	National Ambient Air Quality Standards
NOAEL	no-observed-adverse-effect level
NOAEL(ADJ)	NOAEL adjusted to continuous exposure duration
NOAEL(HEC)	NOAEL adjusted for dosimetric differences across species to a human
NOEL	no-observed-effect level
OSF	oral slope factor
p-IUR	provisional inhalation unit risk
p-OSF	provisional oral slope factor
p-RfC	provisional inhalation reference concentration
p-RfD	provisional oral reference dose
PBPK	physiologically based pharmacokinetic
ppb	parts per billion
ppm	parts per million
PPRTV	Provisional Peer Reviewed Toxicity Value
RBC	red blood cell(s)
RCRA	Resource Conservation and Recovery Act
RDDR	Regional deposited dose ratio (for the indicated lung region)
REL	relative exposure level
RfC	inhalation reference concentration
RfD	oral reference dose
RGDR	Regional gas dose ratio (for the indicated lung region)
s.c.	subcutaneous
SCE	sister chromatid exchange
SDWA	Safe Drinking Water Act
sq.cm.	square centimeters
TSCA	Toxic Substances Control Act
UF	uncertainty factor
µg	microgram
µmol	micromoles
VOC	volatile organic compound

PROVISIONAL PEER REVIEWED TOXICITY VALUES FOR 1,2-DICHLOROETHYLENE (mixture) (CASRN 540-59-0) Derivation of an Inhalation RfC

Background

On December 5, 2003, the U.S. Environmental Protection Agency's (EPA's) Office of Superfund Remediation and Technology Innovation (OSRTI) revised its hierarchy of human health toxicity values for Superfund risk assessments, establishing the following three tiers as the new hierarchy:

1. EPA's Integrated Risk Information System (IRIS).

2. Provisional Peer-Reviewed Toxicity Values (PPRTV) used in EPA's Superfund Program.

3. Other (peer-reviewed) toxicity values, including:

   - Minimal Risk Levels produced by the Agency for Toxic Substances and Disease Registry (ATSDR),
   - California Environmental Protection Agency (CalEPA) values, and
   - EPA Health Effects Assessment Summary Table (HEAST) values.

A PPRTV is defined as a toxicity value derived for use in the Superfund Program when such a value is not available in EPA's Integrated Risk Information System (IRIS). PPRTVs are developed according to a Standard Operating Procedure (SOP) and are derived after a review of the relevant scientific literature using the same methods, sources of data, and Agency guidance for value derivation generally used by the EPA IRIS Program. All provisional toxicity values receive internal review by two EPA scientists and external peer review by three independently selected scientific experts. PPRTVs differ from IRIS values in that PPRTVs do not receive the multi-program consensus review provided for IRIS values. This is because IRIS values are generally intended to be used in all EPA programs, while PPRTVs are developed specifically for the Superfund Program.

Because new information becomes available and scientific methods improve over time, PPRTVs are reviewed on a five-year basis and updated into the active database. Once an IRIS value for a specific chemical becomes available for Agency review, the analogous PPRTV for that same chemical is retired. It should also be noted that some PPRTV manuscripts conclude that a PPRTV cannot be derived based on inadequate data.

Disclaimers

Users of this document should first check to see if any IRIS values exist for the chemical of concern before proceeding to use a PPRTV. If no IRIS value is available, staff in the regional Superfund and RCRA program offices are advised to carefully review the information provided in this document to ensure that the PPRTVs used are appropriate for the types of exposures and circumstances at the Superfund site or RCRA facility in question. PPRTVs are periodically updated; therefore, users should ensure that the values contained in the PPRTV are current at the time of use.

It is important to remember that a provisional value alone tells very little about the adverse effects of a chemical or the quality of evidence on which the value is based. Therefore, users are strongly encouraged to read the entire PPRTV manuscript and understand the strengths and limitations of the derived provisional values. PPRTVs are developed by the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center for OSRTI. Other EPA programs or external parties who may choose of their own initiative to use these PPRTVs are advised that Superfund resources will not generally be used to respond to challenges of PPRTVs used in a context outside of the Superfund Program.

Questions Regarding PPRTVs

Questions regarding the contents of the PPRTVs and their appropriate use (e.g., on chemicals not covered, or whether chemicals have pending IRIS toxicity values) may be directed to the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center (513-569-7300), or OSRTI.

INTRODUCTION

1,2-Dichloroethylene (CASRN 540-59-0), a mixture of *cis* and *trans* isomers, is not listed on IRIS (U.S. EPA, 2001), and an RfC is not available in the HEAST (U.S. EPA, 1997). The CARA list (U.S. EPA, 1991a, 1994) includes a Health and Environmental Effects Profile (HEEP) on dichloroethenes (U.S. EPA, 1986) and a Health and Environmental Effects Document (HEED) on 1,2-dichloroethylene (mixed isomers) (U.S. EPA, 1991b). Both documents declined to derive an RfC due to insufficient reporting and contradictory results in the limited data available. The ACGIH (1991, 2001) lists a TLV-TWA of 200 ppm (793 mg/m^3) for all forms of 1,2-dichloroethylene based on liver toxicity of the *trans* isomer in a study by Freundt et al. (1977). NIOSH (1981, 2001) established a recommended exposure limit of 200 ppm (790 mg/m^3) and OSHA (1999, 2000) established a permissible exposure limit of 200 ppm (790 mg/m^3) for all forms of 1,2-dichloroethylene to protect against irritation of the eye and respiratory system, and depression of the central nervous system. ATSDR (1996, 2001) has not established inhalation MRLs for mixed isomers of 1,2-dichloroethylene or for the *cis* isomer, but

has established an intermediate inhalation MRL of 0.2 ppm for the *trans* isomer based on hepatic effects. Neither IARC (2001) nor the WHO (2001) have written toxicological review documents on 1,2-dichloroethylene. A toxicity review on unsaturated halogenated hydrocarbons (Lemen, 2001), and the NTP (2001a, 2001b) management status report and health and safety report for 1,2-dichloroethylene were consulted for relevant information. Literature searches were conducted from 1994 to June 2001 for studies relevant to the derivation of an RfC for 1,2-dichloroethylene. The databases searched were: TOXLINE, MEDLINE, CANCERLIT, TOXLIT/BIOSIS, RTECS, HSDB, GENETOX, CCRIS, TSCATS, EMIC/EMICBACK, and DART/ETICBACK.

REVIEW OF THE PERTINENT LITERATURE

Human Studies

No pertinent data regarding the inhalation toxicity of 1,2-dichloroethylene in humans following subchronic or chronic exposures were found in the available review documents (U.S. EPA, 1986, 1991b; ATSDR, 1996; Lemen, 2001).

Animal Studies

The U.S. EPA (1986, 1991b) considered an available subchronic inhalation study on the mixed isomers by Torkelson (1965) to be an inadequate basis for risk assessment because of its lack of detail and because its negative results were discordant with those of Freundt et al. (1977) for the *trans* isomer. Torkelson (1965) reported no effects in rats, rabbits, guinea pigs, and dogs exposed to 500 or 1000 ppm of mixed isomers (60% *cis*, 40% *trans*) for 7 hrs/day, 5 days/week for 6 months, whereas Freundt et al. (1977) reported a LOAEL of 200 ppm for pulmonary and liver histopathology in female Wistar rats exposed to the *trans* isomer for 8 hours/day, 5 days/week for 16 weeks. However, a report of the Torkelson (1965) study submitted to the EPA in 1994 (Dow Chemical, 1962) indicated that statistically significant increases in organ weights relative to body weight were observed in the kidney of male rats and the liver of female rats at 500 and 1000 ppm, and the kidney of female rats at 1000 ppm. In addition, increased relative liver weight was also observed in a small group of male and female rabbits. (Absolute organ weights and histopathological results were not reported.) Rather than contradicting the Freundt et al. (1977) results, the reported organ weight changes in the Dow Chemical (1962) report lend some support to the histopathological observations in Freundt et al. (1977). However, too few details of methods and results are available regarding the Torkelson/Dow study to use this study for risk assessment. No additional subchronic or chronic duration studies of inhalation toxicity of 1,2-dichloroethylene (mixed isomers) in animals were found in the available review documents (ATSDR, 1996; Lemen, 2001) or in the literature search.

Other Studies

Acute exposures to high concentrations (>1000 ppm) of *trans*-1,2-dichloroethylene have been reported to cause eye irritation, nausea, vertigo, or narcosis (ACGIH, 1991; OSHA, 1999). One human fatality, presumably from depression of the central nervous system, was reported following exposure to an unknown quantity of 1,2-dichloroethylene vapor (isomer composition unreported) in an enclosed area (ATSDR, 1996). 1,2-Dichloroethylene has been used as an anesthetic in humans and animals (ACGIH, 1991; Lemen, 2001).

FEASIBILITY OF DERIVING A PROVISIONAL RfC FOR 1,2-DICHLOROETHYLENE (MIXED ISOMERS)

Quantitative data regarding the inhalation toxicity of 1,2-dichloroethylene are lacking for humans and the available subchronic animal study is inadequate. Thus, it is not possible to derive a provisional RfC for 1,2-dichloroethylene.

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Acronyms and Abbreviations

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CNS	central nervous system
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DWEL	Drinking Water Equivalent Level
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FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
g	grams
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OSF	oral slope factor
p-IUR	provisional inhalation unit risk
p-OSF	provisional oral slope factor
p-RfC	provisional inhalation reference concentration
p-RfD	provisional oral reference dose
PBPK	physiologically based pharmacokinetic
ppb	parts per billion
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PPRTV	Provisional Peer Reviewed Toxicity Value
RBC	red blood cell(s)
RCRA	Resource Conservation and Recovery Act
RDDR	Regional deposited dose ratio (for the indicated lung region)
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SCE	sister chromatid exchange
SDWA	Safe Drinking Water Act
sq.cm.	square centimeters
TSCA	Toxic Substances Control Act
UF	uncertainty factor
µg	microgram
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VOC	volatile organic compound

PROVISIONAL PEER REVIEWED TOXICITY VALUES FOR 1,2-DICHLOROETHYLENE (mixture) (CASRN 540-59-0) Derivation of an Oral Slope Factor

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Disclaimers

Users of this document should first check to see if any IRIS values exist for the chemical of concern before proceeding to use a PPRTV. If no IRIS value is available, staff in the regional Superfund and RCRA program offices are advised to carefully review the information provided in this document to ensure that the PPRTVs used are appropriate for the types of exposures and circumstances at the Superfund site or RCRA facility in question. PPRTVs are periodically updated; therefore, users should ensure that the values contained in the PPRTV are current at the time of use.

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Questions Regarding PPRTVs

Questions regarding the contents of the PPRTVs and their appropriate use (e.g., on chemicals not covered, or whether chemicals have pending IRIS toxicity values) may be directed to the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center (513-569-7300), or OSRTI.

INTRODUCTION

1,2-Dichloroethylene (CASRN 540-59-0), a mixture of *cis* and *trans* isomers, is not listed on IRIS (U.S. EPA, 2001), in the HEAST cancer table (U.S. EPA, 1997), or in the Drinking Water Standards and Health Advisories List (U.S. EPA, 2000). The CARA list (U.S. EPA, 1991a, 1994) includes a Health and Environmental Effects Profile (HEEP) on dichloroethenes (U.S. EPA, 1986) and a Health and Environmental Effects Document (HEED) on 1,2-dichloroethylene (mixed isomers) (U.S. EPA, 1991b). The HEED assigned 1,2-dichloroethylene to Group D because of a lack of data regarding its carcinogenicity in humans or animals. Neither IARC (2001) nor the WHO (2001) have written a toxicological review document on 1,2-dichloroethylene. A Toxicological Profile on 1,2-dichloroethylene (ATSDR, 1996), a toxicity review on unsaturated halogenated hydrocarbons (Lemen, 2001), and the NTP (2001a,b) management status report and health and safety report for 1,2-dichloroethylene were also consulted for relevant information. Literature searches were conducted from 1994 to June 2001 for studies relevant to the derivation of an oral slope factor for 1,2-dichloroethylene. The

databases searched were: TOXLINE, MEDLINE, CANCERLIT, TOXLIT/BIOSIS, RTECS, HSDB, GENETOX, CCRIS, TSCATS, and EMIC/EMICBACK.

REVIEW OF THE PERTINENT LITERATURE

Human Studies

No data regarding carcinogenicity of 1,2-dichloroethylene in humans following oral exposure were found in the available review documents (U.S. EPA, 1986, 1991b; ATSDR, 1996; Lemen, 2001). The literature search located one relevant human epidemiological study. A case-control study of 63,097 persons who died from pancreatic cancer between 1984 and 1993 found no association between occupational exposure to 1,2-dichloroethylene and death from pancreatic cancer (Kernan et al., 1999). No human studies were located that reported levels of exposure to 1,2-dichloroethylene.

Animal Studies

No data regarding carcinogenicity in animals following oral exposure to 1,2-dichloroethylene were located in the available reviews (U.S. EPA, 1986, 1991b; ATSDR, 1996; Lemen, 2001) or the literature search.

Other Studies

1,2-Dichloroethylene did not produce reverse mutations in *Salmonella typhimurium* (strains TA98, TA100, TA1535, TA1537) or *Saccharomyces cerevisiae* D7 with or without metabolic activation, and did not produce reverse or forward mutations in *Escherichia coli* K12 with activation (U.S. EPA, 1991b). At a high concentration, it was weakly positive for mitotic recombination in *Saccharomyces cerevisiae* D7 (U.S. EPA, 1991b). 1,2-Dichloroethylene altered chromosomal segregation, resulting in aneuploidy, in *Aspergillus nidulans* diploid strain P1 (Crebelli et al., 1992, 1995; Rosenkranz and Klopman, 1996). This effect of 1,2-dichloroethylene and other haloalkanes was attributed to a direct or indirect interaction with spindle microtubules (Crebelli et al., 1992). In freshly isolated human lymphocytes with or without metabolic activation, 1,2-dichloroethylene induced micronucleus formation and also caused DNA breakage in the alkaline single cell gel electrophoresis (comet) assay (Tafazoli and Kirsch-Volders, 1996). 1,2-Dichloroethylene also induced micronucleus formation in 2 out of 3 human cell lines that stably express cytochromal enzymes: positive in parental human B lymphoblastoid line AHH-1 Tk+/- and line h2E1, but negative in line MCL-5 (Doherty et al., 1996; Parry et al., 1996). At injected doses high enough to elicit clinical signs in CD-1 mice, 1,2-dichloroethylene (purity 98%) did not induce micronucleus formation in bone marrow cells (Crebelli et al., 1999).

FEASIBILITY OF DERIVING A PROVISIONAL ORAL SLOPE FACTOR FOR 1,2-DICHLOROETHYLENE

Since the available literature contains no information regarding carcinogenicity in humans or animals following oral exposure to 1,2-dichloroethylene, there is no basis for the derivation of an oral slope factor.

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Provisional Peer Reviewed Toxicity Values for

1,2-Dichloroethylene (mixture)

(CASRN 540-59-0)

Derivation of an Inhalation Unit Risk

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Acronyms and Abbreviations

bw	body weight
cc	cubic centimeters
CD	Caesarean Delivered
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CNS	central nervous system
cu.m	cubic meter
DWEL	Drinking Water Equivalent Level
FEL	frank-effect level
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
g	grams
GI	gastrointestinal
HEC	human equivalent concentration
Hgb	hemoglobin
i.m.	intramuscular
i.p.	intraperitoneal
IRIS	Integrated Risk Information System
IUR	inhalation unit risk
i.v.	intravenous
kg	kilogram
L	liter
LEL	lowest-effect level
LOAEL	lowest-observed-adverse-effect level
LOAEL(ADJ)	LOAEL adjusted to continuous exposure duration
LOAEL(HEC)	LOAEL adjusted for dosimetric differences across species to a human
m	meter
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MF	modifying factor
mg	milligram
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MRL	minimal risk level
MTD	maximum tolerated dose
MTL	median threshold limit

NAAQS	National Ambient Air Quality Standards
NOAEL	no-observed-adverse-effect level
NOAEL(ADJ)	NOAEL adjusted to continuous exposure duration
NOAEL(HEC)	NOAEL adjusted for dosimetric differences across species to a human
NOEL	no-observed-effect level
OSF	oral slope factor
p-IUR	provisional inhalation unit risk
p-OSF	provisional oral slope factor
p-RfC	provisional inhalation reference concentration
p-RfD	provisional oral reference dose
PBPK	physiologically based pharmacokinetic
ppb	parts per billion
ppm	parts per million
PPRTV	Provisional Peer Reviewed Toxicity Value
RBC	red blood cell(s)
RCRA	Resource Conservation and Recovery Act
RDDR	Regional deposited dose ratio (for the indicated lung region)
REL	relative exposure level
RfC	inhalation reference concentration
RfD	oral reference dose
RGDR	Regional gas dose ratio (for the indicated lung region)
s.c.	subcutaneous
SCE	sister chromatid exchange
SDWA	Safe Drinking Water Act
sq.cm.	square centimeters
TSCA	Toxic Substances Control Act
UF	uncertainty factor
µg	microgram
µmol	micromoles
VOC	volatile organic compound

PROVISIONAL PEER REVIEWED TOXICITY VALUES FOR 1,2-DICHLOROETHYLENE (mixture) (CASRN 540-59-0) Derivation of an Inhalation Unit Risk

Background

On December 5, 2003, the U.S. Environmental Protection Agency's (EPA's) Office of Superfund Remediation and Technology Innovation (OSRTI) revised its hierarchy of human health toxicity values for Superfund risk assessments, establishing the following three tiers as the new hierarchy:

1. EPA's Integrated Risk Information System (IRIS).

2. Provisional Peer-Reviewed Toxicity Values (PPRTV) used in EPA's Superfund Program.

3. Other (peer-reviewed) toxicity values, including:

   - Minimal Risk Levels produced by the Agency for Toxic Substances and Disease Registry (ATSDR),
   - California Environmental Protection Agency (CalEPA) values, and
   - EPA Health Effects Assessment Summary Table (HEAST) values.

A PPRTV is defined as a toxicity value derived for use in the Superfund Program when such a value is not available in EPA's Integrated Risk Information System (IRIS). PPRTVs are developed according to a Standard Operating Procedure (SOP) and are derived after a review of the relevant scientific literature using the same methods, sources of data, and Agency guidance for value derivation generally used by the EPA IRIS Program. All provisional toxicity values receive internal review by two EPA scientists and external peer review by three independently selected scientific experts. PPRTVs differ from IRIS values in that PPRTVs do not receive the multi-program consensus review provided for IRIS values. This is because IRIS values are generally intended to be used in all EPA programs, while PPRTVs are developed specifically for the Superfund Program.

Because new information becomes available and scientific methods improve over time, PPRTVs are reviewed on a five-year basis and updated into the active database. Once an IRIS value for a specific chemical becomes available for Agency review, the analogous PPRTV for that same chemical is retired. It should also be noted that some PPRTV manuscripts conclude that a PPRTV cannot be derived based on inadequate data.

Disclaimers

Users of this document should first check to see if any IRIS values exist for the chemical of concern before proceeding to use a PPRTV. If no IRIS value is available, staff in the regional Superfund and RCRA program offices are advised to carefully review the information provided in this document to ensure that the PPRTVs used are appropriate for the types of exposures and circumstances at the Superfund site or RCRA facility in question. PPRTVs are periodically updated; therefore, users should ensure that the values contained in the PPRTV are current at the time of use.

It is important to remember that a provisional value alone tells very little about the adverse effects of a chemical or the quality of evidence on which the value is based. Therefore, users are strongly encouraged to read the entire PPRTV manuscript and understand the strengths and limitations of the derived provisional values. PPRTVs are developed by the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center for OSRTI. Other EPA programs or external parties who may choose of their own initiative to use these PPRTVs are advised that Superfund resources will not generally be used to respond to challenges of PPRTVs used in a context outside of the Superfund Program.

Questions Regarding PPRTVs

Questions regarding the contents of the PPRTVs and their appropriate use (e.g., on chemicals not covered, or whether chemicals have pending IRIS toxicity values) may be directed to the EPA Office of Research and Development's National Center for Environmental Assessment, Superfund Health Risk Technical Support Center (513-569-7300), or OSRTI.

INTRODUCTION

1,2-Dichloroethylene (CASRN 540-59-0), a mixture of *cis* and *trans* isomers, is not listed on IRIS (U.S. EPA, 2001), in the HEAST cancer table (U.S. EPA, 1997), or in the Drinking Water Standards and Health Advisories List (U.S. EPA, 2000). The CARA list (U.S. EPA, 1991a, 1994) includes a Health and Environmental Effects Profile (HEEP) on dichloroethenes (U.S. EPA, 1986) and a Health and Environmental Effects Document (HEED) on 1,2-dichloroethylene (mixed isomers) (U.S. EPA, 1991b). The HEED assigned 1,2-dichloroethylene to Group D because of a lack of data regarding its carcinogenicity in humans or animals. Neither IARC (2001) nor the WHO (2001) have written a toxicological review document on 1,2-dichloroethylene. A Toxicological Profile on 1,2-dichloroethylene (ATSDR, 1996), a toxicity review on unsaturated halogenated hydrocarbons (Lemen, 2001), and the NTP (2001a,b) management status report and health and safety report for 1,2-dichloroethylene were also consulted for relevant information. Literature searches were conducted from 1994 to June 2001 for studies relevant to the derivation of an inhalation unit risk for 1,2-dichloroethylene. The

databases searched were: TOXLINE, MEDLINE, CANCERLIT, TOXLIT/BIOSIS, RTECS, HSDB, GENETOX, CCRIS, TSCATS, and EMIC/EMICBACK.

REVIEW OF THE PERTINENT LITERATURE

Human Studies

No data regarding carcinogenicity of 1,2-dichloroethylene in humans following inhalation exposure were found in the available review documents (U.S. EPA, 1986, 1991b; ATSDR, 1996; Lemen, 2001). The literature search located one relevant human epidemiological study. A case-control study of 63,097 persons who died from pancreatic cancer between 1984 and 1993 found no association between occupational exposure to 1,2-dichloroethylene and death from pancreatic cancer (Kernan et al., 1999). No human carcinogenicity study was located that reported levels of exposure to 1,2-dichloroethylene.

Animal Studies

No data regarding carcinogenicity in animals following inhalation exposure to 1,2-dichloroethylene were located in the available reviews (U.S. EPA, 1986, 1991b; ATSDR, 1996; Lemen, 2001) or the literature search.

Other Studies

1,2-Dichloroethylene did not produce reverse mutations in *Salmonella typhimurium* (strains TA98, TA100, TA1535, TA1537) or *Saccharomyces cerevisiae* D7 with or without metabolic activation, and did not produce reverse or forward mutations in *Escherichia coli* K12 with activation (U.S. EPA, 1991b). At a high concentration, it was weakly positive for mitotic recombination in *Saccharomyces cerevisiae* D7 (U.S. EPA, 1991b). 1,2-Dichloroethylene altered chromosomal segregation, resulting in aneuploidy, in *Aspergillus nidulans* diploid strain P1 (Crebelli et al., 1992, 1995; Rosenkranz and Klopman, 1996). This effect of 1,2-dichloroethylene and other haloalkanes was attributed to a direct or indirect interaction with spindle microtubules (Crebelli et al., 1992). In freshly isolated human lymphocytes with or without metabolic activation, 1,2-dichloroethylene induced micronucleus formation and also caused DNA breakage in the alkaline single cell gel electrophoresis (comet) assay (Tafazoli and Kirsch-Volders, 1996). 1,2-Dichloroethylene also induced micronucleus formation in 2 out of 3 human cell lines that stably express cytochromal enzymes: positive in parental human B lymphoblastoid line AHH-1 Tk+/- and line h2E1, but negative in line MCL-5 (Doherty et al., 1996; Parry et al., 1996). At injected doses high enough to elicit clinical signs in CD-1 mice, 1,2-dichloroethylene (purity 98%) did not induce micronucleus formation in bone marrow cells (Crebelli et al., 1999).

FEASIBILITY OF DERIVING A PROVISIONAL INHALATION UNIT RISK FOR 1,2-DICHLOROETHYLENE

Since the available literature contains no information regarding carcinogenicity in humans or animals following inhalation exposure to 1,2-dichloroethylene, there is no basis for the derivation of an inhalation unit risk.

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