



CHEMICAL UPDATE WORKSHEET

Chemical Name:	1,2-Dichloroethane
CAS #:	107-06-2
Revised By:	RRD Toxicology Unit
Revision Date:	August 17, 2015

(A) Chemical-Physical Properties

	Part 201 Value	Updated Value	Reference Source	Comments
Molecular Weight (g/mol)	98.97	98.96	EPI	EXP
Physical State at ambient temp	Liquid	Liquid	MDEQ	
Melting Point (°C)	238	-35.50	EPI	EXP
Boiling Point (°C)	83.5	83.50	EPI	EXP
Solubility (ug/L)	8.52E+6	8.600E+06	EPI	EXP
Vapor Pressure (mmHg at 25°C)	83.6	7.89E+01	EPI	EXP
HLC (atm-m³/mol at 25°C)	9.79E-4	1.18E-03	EPI	EXP
Log Kow (log P; octanol-water)	1.47	1.48	EPI	EXP
Koc (organic carbon; L/Kg)	17.5	39.6	EPI	EST
Ionizing Koc (L/kg)		NR	NA	NA
Diffusivity in Air (Di; cm²/s)	0.104	8.57E-02	W9	EST
Diffusivity in Water (Dw; cm²/s)	9.9E-6	1.10E-05	W9	EST

	Part 201 Value	Updated Value	Reference Source	Comments
Soil Water Partition Coefficient (Kd; inorganics)	NR	NR	NA	NA
Flash Point (°C)	56 F	13	CRC	EXP
Lower Explosivity Level (LEL; unit less)	0.062	0.062	CRC	EXP
Critical Temperature (K)		5.61E+02	EPA2004	EXP
Enthalpy of Vaporization (cal/mol)		7.64E+03	EPA2004	EXP
Density (g/mL, g/cm³)		1.2454	CRC	EXP
EMSOFT Flux Residential 2 m (mg/day/cm²)	2.59E-05	2.72E-05	EMSOFT	EST
EMSOFT Flux Residential 5 m (mg/day/cm²)	5.89E-05	6.35E-05	EMSOFT	EST
EMSOFT Flux Nonresidential 2 m (mg/day/cm²)	3.65E-05	4.30E-05	EMSOFT	EST
EMSOFT Flux Nonresidential 5 m (mg/day/cm²)	8.16E-05	9.85E-05	EMSOFT	EST

(B) Toxicity Values/Benchmarks

	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
Reference Dose (RfD) (mg/kg/day)	--	2.0E-2	PPRTV, 2010	
RfD details	NA	<p>Tier 2 Source: PPRTV: Basis: No chronic RfD value is currently available. PPRTV is the best available subchronic value. MDEQ is not applying an additional UF for subchronic to chronic extrapolation since a maximum UF (3,000) was used to derive this number. A chronic provisional “screening value” = 6.0E-3 mg/kg-day is available; however, USEPA considers PPRTV screening value a Tier 3 source. Therefore, more weight is given on the PPRTV subchronic RfD, a Tier 2 source. ATSDR (9/2001) derived an intermediate MRL = 2.0E-1 mg/kg-day, which could be used to derive a chronic MRL = 2.0E-1 mg/kg-day after applying an additional UF of 10 to account for use of a subchronic study. This value is the same as the PPRTV subchronic p-RfD. PPRTV (10/1/2010) subchronic p-RfD = 2.0E-2 mg/kg-day Critical Study: NCI (National Cancer Institute). (1978) Bioassay of 1,2-Dichloroethane for Possible Carcinogenicity (CAS No. 107-06-2). Technical Report Series No 55. DHEW (NIH) Publication No. 78-1361. Bethesda, MD: National Institute of Health. 64 pp. Methods: Osborne-Mendel rats (50/sex/group) were treated with 1,2-DCA (>90% pure) in corn oil by gavage at variable doses administered 5 days/week for 78 weeks. Estimated TWA doses (averaged over the 78-week treatment period, but not converted to equivalent continuous, 7-day per week doses) are 47 or 95 mg/kg-day for 78 weeks. B6C3F1 mice (50/sex/group) were also treated for 78 weeks with TWA doses of 97 or 195 mg/kg-day (males) and 149 or 299 mg/kg-day (females), 5 days/week. Critical effect: increase in absolute kidney weights in female F344/N rats End point or Point of Departure (POD): LOAEL = 58 mg/kg-day Uncertainty Factors: UF = 3,000 (10 each for interspecies extrapolation, intraspecies variability, use of LOAEL, and 3 for database inadequacies). The UF of 3 for database deficiencies was deemed appropriate even with relatively</p>	Complete	



	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
		<p>complete database because human case reports and limited epidemiology (reviewed by Agency for Toxic Substances and Disease Registry [ATSDR], 2001 and World Health Organization [WHO], 1995) suggest that 1,2-DCA may result in neurotoxicity. Data for evaluating potential neurotoxicity are inadequate. In the absence of suitable chronic data, the POD from the subchronic p-RfD could be used to derive the chronic p-RfD; however, the composite UF would include the additional UFs of 10 for applying data from a subchronic study to assess potential effects from chronic exposure. This would result in the large composite UF of greater than 3,000, thereby relegating this derivation of the chronic p-RfD to an appendix screening value (see Appendix B).</p> <p>Source and date: PPRTV, 10/1/2010</p> <p>Tier 1 and 2 Sources: IRIS: Per IRIS (1/01/1991), no value at this time. MRL: Per ATSDR (9/2001), no chronic oral MRL available at this time. An intermediate oral MRL = 0.2 (2.0E-1) mg/kg-day is available: Critical Study: NTP. 1991a. Toxicity studies of 1,2-dichloroethane (ethylene dichloride) (CAS No. 107-06-2) in F344/N rats, Sprague Dawley rats, Osborne-Mendel rats and B6C3F1 mice (drinking water and gavage studies). Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service, National Institute of Health, National Toxicology Program. NIH Publication No. 91-3123. Methods: F344/N rats, Sprague-Dawley rats, Osborne-Mendel rats, and B6C3F1 mice (10 animals/sex/strain) were exposed to drinking water containing 0, 500, 1,000, 2,000, 4,000, or 8,000 ppm of 1,2-dichloroethane for 13 weeks. The high concentration was close to the solubility limit for 1,2-dichloroethane in water. Intake estimates in the mice were 0, 249, 448, 781, 2,710, and 4,207 mg/kg/day in males and 0, 244, 647, 1,182, 2,478, and 4,926 mg/kg/day in females. Additional groups of F344/N rats (10/sex) were administered 1,2-dichloroethane by gavage on 5 days/week for 13 weeks to compare toxicity resulting from bolus administration with that of the continuous exposure in drinking water. Gavage doses were 0, 30, 60, 120, 240, and 480 mg/kg in the male rats and 0, 18, 37, 75,</p>		



	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
		<p>150, and 300 mg/kg in the female rats. Critical effect: increased kidney weights (an early-stage adverse effect because dose-related renal histopathology (tubular regeneration, indicative of previous tubular injury with subsequent repair) developed at higher doses in the same strain of rats.) End point or Point of Departure (POD): LOAEL = 58 mg/kg-day Uncertainty Factors: UF = 300 (10 each for interspecies extrapolation and intraspecies variability, and 3 for use of a minimal LOAEL). Source and date: ATSDR, 09/2001</p> <p>Tier 3 Sources: MDEQ: Per DEQ-CCD/WRD, RfD = 0.25 mg/kg/day. Critical Study: Alumot et al. (1976) Tolerance and acceptable daily intake of chlorinated fumigants in the rat diet. Food and Cosmetics Toxicology 14: 105-110 Methods: 2-year study with rats fed mash fumigated with 1,2-dichloroethane at 300 – 1600 ppm Critical effect: slight increase in liver fat at high doses End point or Point of Departure (POD): NOAEL = 250 ppm = 25 mg/kg/day Uncertainty Factors: UF = 100 (10 each intra- and intraspecies variability) Source and date:</p> <p>PPRTV: PPRTV chronic “screening value” = 6.0E-3 mg/kg-day. USEPA considers PPRTV screening value a Tier 3 source. Basis: For reasons noted in the main PPRTV document, it is inappropriate to derive provisional toxicity values for 1,2-dichloroethane (1,2-DCA). However, information is available for this chemical which is used to develop a “screening value” presented in the Appendix of the PPRTV document. USEPA considers a Screening Value a Tier 3 source as more uncertainty is associated with its derivation. Critical Studies: 1) Alumot, E., E. Nachtomi, E. Mandel et al. (1976) Tolerance and acceptance daily intake of chlorinated fumigants in the rat diet. Food Cosmet. Toxicol. 14:105–110.</p>		

	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
		<p>2) National Cancer Institute [NCI] (1978). Poor reporting, limitations in the toxicological evaluations and uncertainty in the dose estimates precluded determination of reliable effect levels for Alumot et al. (1976). In the gavage study conducted by NCI (1978), LOAELs of 34 and 139 mg/kg-day were identified in rats and mice for clinical signs and an increased incidence of chronic murine pneumonia (respectively). The quality of the rat study was limited by poor survival at the high dose and the use of a variable dosing regimen. Further, the clinical signs observed in rats were not seen in any of the subchronic studies of various rat strains exposed via gavage or drinking water to much higher doses.</p> <p>Methods:</p> <p>1) A preliminary study was conducted in which rats were fed dietary levels of 0, 300, or 600 ppm (about 30 or 60 mg/kg-day) 1,2 DCA for 5 weeks or 1,600 ppm (about 160 mg/kg-day) 1,2-DCA for 7 weeks and liver weight, total liver fat content, and liver triglycerides were measured. In the 2-year study, rats (18/sex/dose) of unspecified strain were fed a feed mash fumigated with 1,2-DCA that resulted in measured feed concentrations of 0, 250, or 500 ppm (60–70% of the residue initially present in the feed was consumed).</p> <p>2) Osborne-Mendel rats (50/sex/group) were treated with 1,2-DCA (>90% pure) in corn oil by gavage at variable doses administered 5 days/week for 78 weeks. Estimated TWA doses (averaged over the 78-week treatment period, but not converted to equivalent continuous, 7-day per week doses) are 47 or 95 mg/kg-day for 78 weeks. B6C3F1 mice (50/sex/group) were also treated for 78 weeks with TWA doses of 97 or 195 mg/kg-day (males) and 149 or 299 mg/kg-day (females), 5 days/week.</p> <p>Critical effect: increase in absolute kidney weights in female F344/N rats</p> <p>End point or Point of Departure (POD): LOAEL = 58 mg/kg-day</p> <p>Uncertainty Factors: UF = 10,000 (10 each for interspecies extrapolation, intraspecies variability, use of LOAEL, and use of subchronic study). The UF of 3 for database deficiencies was deemed appropriate even with relatively complete database because human case reports and limited epidemiology (reviewed by Agency for Toxic Substances and Disease Registry [ATSDR], 2001 and World</p>		



	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
		Health Organization [WHO], 1995) suggest that 1,2-DCA may result in neurotoxicity. Data for evaluating potential neurotoxicity are inadequate. The UF of 30,000 was downgraded to 10,000 as there is evidence that responses to chronic exposure are of similar magnitude to subchronic responses. Source and date: PPRTV, 10/1/2010		
Oral Cancer Slope Factor (CSF) (mg/kg-day)⁻¹	5.8E-2	9.1E-2	IRIS, 1991/PPRTV 2010	
CSF details	Hemangiosarcom as in male Osborne-Mendel rats dosed by gavage for 78 weeks followed by a 32 week observation period (NCI, 1978). Linearized multistage procedure with time to death analysis used to develop SF (IRIS, 1991). Revised species scaling factor of (BWh/BWa) to the 0.25 power used for q* calculation. MDEQ-CCD/SWQD: Date: 1/13/2000.	<p>Tier 1 Source: IRIS: Basis: PPRTV is a more current assessment; PPRTV (2010) refers to the IRIS value. IRIS (1991) CSF = 9.1E-2 (mg/kg-day)⁻¹. Critical Study: NCI. 1978. Bioassay of 1,2-Dichloroethane for Possible Carcinogenicity. NCI Carcinogenesis Technical Report Series No. 55. DHEW Publ. No. (NIH) 78-1361, Washington DC Methods: Osborne-Mendel rats and B6C3F1 mice (50/sex/dose) were exposed to 1,2-DCA in corn oil by gavage for 78 weeks followed by an additional observation period of 12-13 weeks for mice or 32 weeks for low-dose rats</p> <ol style="list-style-type: none"> 1) <i>Dose response data:</i> Tumor Type - hemangiosarcomas; <i>Test Species</i> male Osborne-Mendel rats; <i>Route</i> – oral (gavage) 2) <i>Extrapolation method:</i> linearized multistage procedure with time-to-death analysis, extra risk <p>Carcinogen Weight-of-Evidence (WOE) Class: B2 or probable human carcinogen (IRIS, 1991); Reasonably Anticipated to Be a Human Carcinogen based on sufficient evidence of carcinogenicity in experimental animals (NTP, 2005); Group 2B (Possible Human Carcinogen) based on sufficient evidence of carcinogenicity in animals and inadequate evidence of carcinogenicity in humans. (IARC, 2008). IRIS WOE Basis: Based on the induction of several tumor types in rats and mice treated by gavage and lung papilloma in mice after topical application Source and Date: IRIS, Last revision date – 1/01/1991; PPRTV, 10/01/2010</p> <p>Tier 2 Sources:</p>	Complete	

	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
		<p>PPRTV: PPRTV (10/01/2010) refers to IRIS CSF. MRL: NA; MRLs are for non-cancer effects only.</p> <p>Tier 3 source: MDEQ: Per DEQ-CCD, RRD CSF = 5.8E-2 is a modified IRIS value; a revised species scaling factor of (BWh/BWa)^{0.25} was applied. Refer to Part 201 Value CSF details.</p>		
Reference Concentration (RfC) or Initial Threshold Screening Level (ITSL) (µg/m³)	--	7.0E+0	PPRTV, 2010	
RfC/ITSL details	NA	<p>Tier 2 Source: PPRTV: Basis: No Tier 1 value. PPRTV is a more current assessment than ATSDR. PPRTV (10/1/2000) p-RfC = 7.0E-3 mg/m³. Critical Studies: Kozik, 1957; NIOSH, 1976 1) Kozik, I.V. (1957) Problems of industrial hygiene in using dichloroethane in the aircraft industry. Gig. Tr. Prof. Zabol. 1:31–38. (Translated from Russian). 2) NIOSH (National Institute for Occupational Safety and Health). (1976) Criteria For A Recommended Standard. Occupational Exposure to Ethylene Dichloride (1,2-Dichloroethane). National Institute of Occupational Safety and Health, Cincinnati OH; Public Health Service, U.S. Department of Health, Education, and Welfare. 3) Supporting study: Spreafico, F., E. Zuccato, F. Marcucci et al. (1980) Pharmacokinetics of ethylene dichloride in rats treated by different routes and its long term inhalation toxicity. In: Banbury Report 5. Ethylene Dichloride: A Potential Health Risk? B. Ames, P. Infante and R. Reitz., Ed. Cold Spring Harbor, NY: Cold Spring Harbor Laboratory. pp. 107–129. Method(s): occupational study (TWA concentration of ~61 mg/m³) Critical effect: neurobehavioral effects End point or Point of Departure (POD): LOAEL_{HEC} = 22 mg/m³. This POD is based</p>		Complete



	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
		<p>on human data and lower than the BMCL_{1SDHEC} of 27 mg/m³ derived from Spreafico et al. (1980). Uncertainty Factors: UF = 3,000 (10 each for intraspecies variability, use of LOAEL, and use of subchronic study and 3 for database deficiencies). Source and date: PPRTV, 10/01/2010</p> <p>Tier 1 and 2 Sources: IRIS: Per IRIS (3/31/1987), no value at this time. MRL: Per ATSDR (9/2001), chronic inhalation MRL = 0.6 ppm (2.43 mg/m³). Critical Study: Cheever KL, Cholakis JM, el-Hawari AM, et al. 1990. Ethylene dichloride: The influence of disulfiram or ethanol on oncogenicity, metabolism, and DNA covalent binding in rats. Fundam Appl Toxicol 14: 243-261. Methods: Sprague-Dawley rats (50/sex/group) were exposed to 50 ppm 1,2-dichloroethane for 7 hours/day, 5 days/week for 2 years. Additional rats were similarly exposed to 50 ppm with either 0.05% disulfiram in the diet or 5% ethanol in the drinking water. Critical effect: histopathology in the liver and other tissues End point or Point of Departure (POD): NOAEL = 50 ppm; NOAEL_{HEC} = 50 ppm. (No conversion from intermittent to continuous exposure was used since blood levels of 1,2-dichloroethane reach equilibrium within 2 to 3 hours of the onset of inhalation exposure) Uncertainty Factors: UF = 90 (3 each for interspecies extrapolation and database deficiencies, and 10 for intraspecies variability, Source and date: ATSDR, 9/2001</p> <p>Tier 3 Source: MDEQ: Per DEQ-CCD, no value at this time.</p>		
Inhalation Unit Risk Factor (IURF) ((µg/m ³) ⁻¹)	2.6E-5	2.6E-5	IRIS, 1991	
IURF details	Potency based on NCI 1978 as	Tier 1 Source: IRIS:		Complete



	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
	presented in IRIS; male rats that were gavaged had increased incidence of hemangiosarcomas. CCD/AQD date: 12/4/1986	<p>Basis: IRIS is a Tier 1 source. A newer assessment by PPRTV refers to the IRIS value.</p> <p>IRIS (1991) IURF = 2.6E-5 (mg/m³)⁻¹. The inhalation unit risk was based on extrapolation from the oral data for hemangiosarcoma in male rats (NCI, 1978).</p> <p>Critical Study and Methods: Refer to Updated Value CSF Details.</p> <p>Carcinogen Weight-of-Evidence (WOE) Class: B2 or probable human carcinogen (IRIS, 1991); Reasonably Anticipated to Be a Human Carcinogen based on sufficient evidence of carcinogenicity in experimental animals (NTP, 2005); Group 2B (Possible Human Carcinogen) based on sufficient evidence of carcinogenicity in animals and inadequate evidence of carcinogenicity in humans. (IARC, 2008).</p> <p>IRIS WOE Basis: Based on the induction of several tumor types in rats and mice treated by gavage and lung papilloma in mice after topical application</p> <p>Source and date: IRIS, Last revision date – 1/01/1991; PPRTV – 10/01/2010</p> <p>Tier 2 Sources: PPRTV: PPRTV (10/01/2010) refers to the IRIS value. MRL: NA; MRLs are for non-cancer effects only.</p> <p>Tier 3 Source: MDEQ: Per DEQ-CCD, AQD adopted IRIS value for IURF.</p>		
Mutagenic Mode of Action (MMOA)? (Y/N)	--	NO	USEPA, 2015	
MMOA Details	--	NA Not listed as a carcinogen with mutagenic MOA in the USEPA OSWER List.		
Developmental or Reproductive Effector? (Y/N)	No	No, the RfD or RfC/ITSL is not based on a reproductive-developmental effect.	MDEQ, 2015	
Developmental or Reproductive Toxicity Details	NA	NA		
State Drinking	5.0	5.0	SDWA, 1976 Lists	



	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
Water Standard (SDWS) (ug/L)				
SDWS details	SDWA, 1976	MI Safe Drinking Water Act (SDWA) 1976 PA 399		
Secondary Maximum Contaminant Level (SMCL) (ug/L)	--	NA	SDWA, 1976 and USEPA SMCL List	
SMCL details	NA	MI Safe Drinking Water Act (SDWA) 1976 PA 399 and USEPA SMCL List		
Is there an aesthetic value for drinking water? (Y/N)	NO	Not evaluated	NA	
Aesthetic value (ug/L)	NA	NA	NA	
Aesthetic Value details	NA	NA		
Phytotoxicity Value? (Y/N)	NO	Not evaluated	NA	
Phytotoxicity details	NA	NA	NA	
Others				

(C) Chemical-specific Absorption Factors

	Part 201 Value	Update	Source/Reference/ Dates	Comments/Notes /Issues
Gastrointestinal absorption efficiency value (ABS _{gi})	---	1.0	MDEQ, 2015/ USEPA RAGS-E	
ABS _{gi} details		RAGS E (EPA, 2004) Default Value		
Skin absorption efficiency value (AE _d)	---	0.1	MDEQ, 2015	
AE _d details				
Ingestion Absorption Efficiency (AE _i)		1.0	MDEQ, 2015	
AE _i Details				
Relative Source Contribution for Water (RSC _w)		0.2	MDEQ, 2015	
Relative Source Contribution for Soil (RSC _s)		1.0	MDEQ, 2015	
Relative Source Contribution for Air (RSC _a)		1.0	MDEQ, 2015	
Others				

(D) Rule 57 Water Quality Values and GSI Criteria

Current GSI value (µg/L)	360 (X)
Updated GSI value (µg/L)	360 (X)
Rule 57 Drinking Water Value (µg/L)	6

	Rule 57 Value (µg/L)	Verification Date
Human Non-cancer Values- Drinking water source (HNV-drink)	6,900	7/2012
Human Non-Cancer Values- Non-drinking water sources (HNV-Non-drink)	420,000	7/2012
Wildlife Value (WV)	NA	NA
Human Cancer Values for Drinking Water Source (HCV-drink)	6	7/2012
Human Cancer values for non-drinking water source (HCV-Non-drink)	360	7/2012
Final Chronic Value (FCV)	2,000	7/2012
Aquatic maximum value (AMV)	8,200	7/2012
Final Acute Value (FAV)	16,000	7/2012

Sources:

1. MDEQ Surface Water Assessment Section Rule 57 [website](#)
2. MDEQ Rule 57 [table](#)

(E) Target Detection Limits (TDL)

	Value	Source
Target Detection Limit – Soil ($\mu\text{g}/\text{kg}$)	50	MDEQ, 2015
Target Detection Limit – Water ($\mu\text{g}/\text{L}$)	1	MDEQ, 2015
Target Detection Limit – Air (ppbv)	2.40E-01	MDEQ, 2015
Target Detection Limit – Soil Gas (ppbv)	8.20E+00	MDEQ, 2015

CHEMICAL UPDATE WORKSHEET ABBREVIATIONS:

CAS # - Chemical Abstract Service Number.

Section (A) Chemical-Physical Properties**Reference Source(s):**

CRC	Chemical Rubber Company Handbook of Chemistry and Physics, 95th edition, 2014-2015
EMSOFT	USEPA Exposure Model for Soil-Organic Fate and Transport (EMSOFT) (EPA, 2002)
EPA2001	USEPA (2001) Fact Sheet, Correcting the Henry's Law Constant for Soil Temperature. Office of Solid Waste and Emergency Response, Washington, D.C.
EPA4	USEPA (2004) User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings. February 22, 2004.
EPI	USEPA's Estimation Programs Interface SUITE 4.1, Copyright 2000-2012
HSDB	Hazardous Substances Data Bank
MDEQ	Michigan Department of Environmental Quality
NPG	National Institute for Occupational Safety and Health Pocket Guide to Chemical Hazards
PC	National Center for Biotechnology Information's PubChem database
PP	Syracuse Research Corporation's PhysProp database
SCDM	USEPA's Superfund Chemical Data Matrix
SSG	USEPA's Soil Screening Guidance: Technical Background Document, Second Edition, 1996
USEPA/EPA	United States environmental protection agency's Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). July, 2004.

W9 USEPA's User Guide for Water9 Software, Version 2.0.0, 2001

Basis/Comments:

EST	estimated
EXP	experimental
EXT	extrapolated
NA	not available or not applicable
NR	not relevant

Section (B) Toxicity Values/Benchmarks**Sources/References:**

ATSDR	Agency for Toxic Substances and Disease Registry
CALEPA	California Environmental Protection Agency
CAL DTSC	California Department of Toxic Substances Control
CAL OEHHA	CAEPA Office of Environmental Health Hazard Assessment
CCD	MDEQ Chemical Criteria Database
ECHA	European Chemicals Agency (REACH)
OECD HPV	Organization for Economic Cooperation and Development HPV Database
HEAST	USEPA's Health Effects Assessment Summary Tables
IRIS	USEPA's Integrated Risk Information System
MADEP	Massachusetts Department of Environmental Protection
MDEQ/DEQ	Michigan Department of Environmental Quality
DEQ-CCD/AQD	MDEQ Air Quality Division
DEQ-CCD/RRD	MDEQ Remediation and Redevelopment Division
DEQ-CCD/WRD	MDEQ Water Resources Division
MNDOH	Minnesota Department of Health

NJDEP	New Jersey Department of Environmental Protection
NYDEC	New York State Department of Environmental Conservation
OPP/OPPT	USEPA's Office of Pesticide Programs
PPRTV	USEPA's Provisional Peer Reviewed Toxicity Values
RIVM	The Netherlands National Institute of Public Health and the Environment
TCEQ	Texas Commission on Environmental Quality
USEPA	United States Environmental Protection Agency
USEPA OSWER	USEPA Office of Solid Waste and Emergency Response
USEPA MCL	USEPA Maximum Contaminant Level
WHO	World Health Organization
WHO IPCS	International Programme on Chemical Safety (IPCS/INCHEM)
WHO IARC	International Agency for Research on Cancers
NA	Not Available.
NR	Not Relevant.

Toxicity terms:

BMC	Benchmark concentration
BMCL	Lower bound confidence limit on the BMC
BMD	benchmark dose
BMDL	Lower bound confidence limit on the BMD
CSF	Cancer slope Factor
CNS	Central nervous system
IURF or IUR	Inhalation unit risk factor
LOAEL	Lowest observed adverse effect level
LOEL	Lowest observed effect level
MRL	Minimal risk level (ATSDR)
NOAEL	No observed adverse effect level
NOEL	No observed effect level

RfC	Reference concentration
RfD	Reference dose
p-RfD	Provisional RfD
aRfD	Acute RfD
UF	Uncertainty factor
WOE	Weight of evidence

Section (C) Chemical-specific Absorption Factors

MDEQ	Michigan Department of Environmental Quality
USEPA RAGS-E	United States Environmental Protection Agency's Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). July, 2004.

Section (D) Rule 57 Water Quality Values and GSI Criteria

GSI	Groundwater-surface water interface
NA	A value is not available or not applicable.
ID	Insufficient data to derive value
NLS	No literature search has been conducted