



## CHEMICAL UPDATE WORKSHEET

<b>Chemical Name:</b>	<b>1,2,4-Trichlorobenzene</b>
<b>CAS #:</b>	<b>120-82-1</b>
<b>Revised By:</b>	RRD Toxicology Unit
<b>Revision Date:</b>	August 28, 2015

### (A) Chemical-Physical Properties

	Part 201 Value	Updated Value	Reference Source	Comments
<b>Molecular Weight (g/mol)</b>	181.45	181.45	EPI	EXP
<b>Physical State at ambient temp</b>	Liquid	Liquid	MDEQ	
<b>Melting Point (°C)</b>	---	17.00	EPI	EXP
<b>Boiling Point (°C)</b>	213.5	213.50	EPI	EXP
<b>Solubility (ug/L)</b>	3.00E+5	49000	EPI	EXP
<b>Vapor Pressure (mmHg at 25°C)</b>	0.3344	4.60E-01	EPI	EXP
<b>HLC (atm-m<sup>3</sup>/mol at 25°C)</b>	1.42E-3	1.42E-03	EPI	EXP
<b>Log Kow (log P; octanol-water)</b>	4.01	4.02	EPI	EXP
<b>Koc (organic carbon; L/Kg)</b>	1790	1356	EPI	EST
<b>Ionizing Koc (L/kg)</b>		NR	NA	NA
<b>Diffusivity in Air (Di; cm<sup>2</sup>/s)</b>	0.03	3.96E-02	W9	EST
<b>Diffusivity in Water (Dw; cm<sup>2</sup>/s)</b>	8.23E-6	8.40E-06	W9	EST
<b>Soil Water Partition Coefficient (Kd; inorganics)</b>	NR	NR	NA	NA

	Part 201 Value	Updated Value	Reference Source	Comments
Flash Point (°C)	222 F	105	CRC	EXP
Lower Explosivity Level (LEL; unit less)	NA	0.025	CRC	EXP
Critical Temperature (K)		7.25E+02	EPA2004	EXP
Enthalpy of Vaporization (cal/mol)		1.05E+04	EPA2004	EXP
Density (g/mL, g/cm <sup>3</sup> )		1.459	CRC	EXP
EMSOFT Flux Residential 2 m (mg/day/cm <sup>2</sup> )	1.22E-05	2.08E-05	EMSOFT	EST
EMSOFT Flux Residential 5 m (mg/day/cm <sup>2</sup> )	1.28E-05	3.11E-05	EMSOFT	EST
EMSOFT Flux Nonresidential 2 m (mg/day/cm <sup>2</sup> )	1.50E-05	3.04E-05	EMSOFT	EST
EMSOFT Flux Nonresidential 5 m (mg/day/cm <sup>2</sup> )	1.53E-05	4.06E-05	EMSOFT	EST

**(B) Toxicity Values/Benchmarks**

	Part 201 Value	Updated Value	Source/Reference/ Date	Comments/Notes /Issues
<b>Reference Dose (RfD) (mg/kg/day)</b>	1.5E-2	1.0E-1	ATSDR, 2014	
<b>RfD details</b>	<p>Rat reproductive study. NOAEL = 14.8 mg/kg (100 ppm); LOAEL = 53.6 mg/kg (400 ppm); Critical effect = increased adrenal weights, vacuolization of zona fasciculata in the cortex. UF = 1000;</p> <p>Multigeneration reproductive drinking water study (Robinson et al., 1981] SUBCHRONIC RfD: Based on a multigeneration reproduction study. CCD/RRD date: 12/12/1991</p>	<p><b>Tier 2 Source:</b> <b>ATSDR:</b> <b>Basis:</b> ASTDR is the most recent assessment of chronic data using BMDS analysis. <b>ATSDR (2014) chronic MRL = 0.1 mg/kg-day</b> <b>Critical Study:</b> Moore MR. 1994a. Final report, 104-week dietary carcinogenicity study with 1,2,4-trichlorobenzene in rats, with cover letter dated 6/15/94. Chemical Manufacturers Association. Submitted to the U.S. Environmental Protection Agency under TSCA Section 4. EPA Document No. OPPTS-44612. OTS0558832. <b>Methods:</b> Fisher-344 rats (50/sex/group) were fed a diet containing 0, 100, 350, or 1,200 ppm 1,2,4-trichlorobenzene for 104 weeks. The diet provided doses of 0, 5.6, 19.4, or 66.5 mg/kg/day 1,2,4-trichlorobenzene to males and 0, 6.9, 23.5, or 81.4 mg/kg/day 1,2,4-trichlorobenzene to females. <b>Critical effect:</b> hepatocellular hypertrophy in male rats. <b>End point or Point of Departure (POD):</b> BMDL<sub>10</sub> = 13.33 mg/kg/day <b>Uncertainty Factors:</b> UF = 100 (10 each for intraspecies variability and interspecies extrapolation) <b>Source and date:</b> ATSDR, 10/2014</p> <p><b>Tier 1 and 2 Sources:</b> <b>IRIS:</b> RfD = 1.0E-2 mg/kg-day. PPRTV (2009) refers to the IRIS chronic RfD. PPRTV (2009) derived a subchronic RfD of 1.0E-1 mg/kg-day, which is the same value as the ATSDR (2010) chronic MRL. Both PPRTV and MRL values are based on liver toxicity. <b>Critical Study:</b> Robinson, K.S., R.J. Kavlock, N. Chernoff and E. Gray. 1981. Multi-generation study of 1,2,4-trichlorobenzene in rats. J. Toxicol. Environ. Health. 8: 489-500. <b>Methods:</b> Multi-generation reproductive study in rats: At birth of the F0 generation of rats, litters (17-23 litters/dose group) were randomly reduced to 4</p>		Complete

	Part 201 Value	Updated Value	Source/Reference/ Date	Comments/Notes /Issues
		<p>males and 4 females. The F0 progenies were exposed to 0, 25, 100 or 400 ppm of 1,2,4-trichlorobenzene (TCB) in the drinking water. Similar procedures were performed with the F1 generation. The study ended when the F2 generation was 32 days old.</p> <p><b>Critical effects:</b> increased adrenal weights in the F0 and F1 generations; vacuolization of zona fasciculata in the cortex</p> <p><b>End point or Point of Departure (POD):</b> NOAEL = 14.8 mg/kg-day (100 ppm was adjusted for water consumption and body weights provided by the authors)</p> <p><b>Uncertainty Factors:</b> UF = 1,000 (10 each for intraspecies variability, interspecies extrapolation and database deficiencies)</p> <p><b>Source and date:</b> IRIS, Last revision date - 11/1/1996. An IRIS screening level review in 2001 did not identify any critical new studies.</p> <p><b>PPRTV:</b> subchronic RfD = 9.0E-2 mg/kg/day. PPRTV refers to refers to the IRIS for a chronic RfD.</p> <p><b>Critical Study:</b> CMA (Chemical Manufacturers Association). 1989a. A three-month dietary range-finding study of 1,2,4-trichlorobenzene in rats: Final report with cover letter dated 02/02/89 from Chemical Manufacturers Association. Produced 02/02/89 by Bio/Dynamics, Inc. Submitted 02/07/89. TSCATS 407023. EPA Doc. #40-98201006.</p> <p><b>Methods:</b> Fisher-344 rats (10/sex/dose) were exposed to 0, 14.6, 45.6, or 133.7 (M) or 0, 17.0, 52.5, or 150.6 (F) 1,2,4-trichlorobenzene in diet for 13 weeks.</p> <p><b>Critical effect:</b> increased relative liver weight and increased incidence of hepatocyte hypertrophy in males</p> <p><b>End point or Point of Departure (POD):</b> BMDL = 9.41 mg/kg-day</p> <p><b>Uncertainty Factors:</b> UF = 100 (10 each for intraspecies variability and interspecies extrapolation)</p> <p><b>Source and date:</b> PPRTV, 6/16/2009</p> <p><b>MRL:</b> ATSDR (9/2010) intermediate MRL = 0.1 mg/kg-day</p> <p><b>Critical Study:</b> CMA. 1989. A three month dietary range-finding study of 1,2,4-trichlorobenzene in rats final report with letter dated 2/2/89 from Chemical</p>		



	Part 201 Value	Updated Value	Source/Reference/Date	Comments/Notes/Issues
		<p>Manufacturers Association. Chemical Manufacturers Association. Submitted to the U.S. Environmental Protection Agency under TSCA Section 4. EPA Document No. 40-98201006. OTS0523023.</p> <p><b>Methods:</b> Fisher-344 rats (10/sex/group) were fed a diet containing 0, 200, 600, or 1,800 ppm 1,2,4-trichlorobenzene for 14 weeks; this diet provided doses of 0, 14.6, 45.6, or 133.7 mg/kg/day for males and 0, 17, 52.5, or 150.6 mg/kg/day for females. These doses were calculated by dividing the sum of the weekly doses provided by the investigators by 14 weeks.</p> <p><b>Critical effect:</b> centrilobular hepatocyte hypertrophy in male rats</p> <p><b>End point or Point of Departure (POD):</b> BMDL<sub>10</sub> = 14.35 mg/kg-day</p> <p><b>Uncertainty Factors:</b> UF = 100 (10 each for intraspecies variability and interspecies extrapolation)</p> <p><b>Tier 3 Source:</b>  <b>MDEQ:</b> Per DEQ-CCD/RRD (12/12/1991), RfD = 1.5E-2 mg/kg-day. See Part 201 Value RfD details.</p>		
<b>Oral Cancer Slope Factor (CSF) (mg/kg-day)<sup>-1</sup></b>	NA	2.9E-02	PPRTV, 2009	
<b>CSF details</b>	NA	<p><b>Tier 2 Source:</b>  <b>PPRTV:</b>  <b>Basis:</b> PPRTV (2009) CSF = 2.9E-02 mg/kg-day<sup>-1</sup>.  <b>Critical Study:</b> CMA (Chemical Manufacturers Association). 1994b. Final report: 104-week dietary carcinogenicity study with 1,2,4-trichlorobenzene in mice, with cover letter dated 6/15/94. Produced 6/06/94 by Hazelton Washington Inc. Submitted 6/16/94. TSCATS 444833. EPA Doc. #OPPTS-44612. OTS #0558831. Section 4.  <b>Methods:</b> Mice (50 mice/sex/dose) were exposed to 1,2,4-trichlorobenzene (98.9% pure) in the diet at target concentrations of 0, 150, 700, or 3200 ppm for 104 weeks. Due to the volatility of the test compound, the investigators mixed diets containing 110% of the target concentrations and analyzed the diet for actual concentrations. Diets were prepared weekly and frozen until use; in addition, the diet was analyzed for actual concentrations weekly for the first</p>		Complete



	Part 201 Value	Updated Value	Source/Reference/ Date	Comments/Notes /Issues
		<p>month and then monthly thereafter. Measured concentrations averaged over the 7 days between diet changes were within 2% of the target concentrations. Based on measured food consumption and body weight, and actual diet concentrations, the estimated mean doses are 0, 21.0, 100.6, or 519.9 mg/kg-day in males and 0, 26.3, 127.0, or 572.6 mg/kg-day in females.</p> <p>1) <i>Dose response data: Tumor Type</i> – liver tumor; <i>Test Species</i> – mice, male; <i>Route</i> – oral (diet)</p> <p>2) <i>Extrapolation method</i>: multi-stage model</p> <p><b>Carcinogen Weight-of-Evidence (WOE) Class:</b> “Likely to Be Carcinogenic to Humans” by the oral route of exposure</p> <p><b>WOE Basis:</b> based on a finding of increased tumor incidence in male and female mice. Holsapple et al. (2006) concluded that rodent liver tumors induced by porphyrogenic compounds may be relevant as a predictor of human toxicity.</p> <p><b>Source and Date:</b> PPRTV, 6/16/2009</p> <p><b>Tier 1 and 2 Sources:</b>  <b>IRIS:</b> Per IRIS (3/01/1991), no value at this time.  <b>IRIS Weight of Evidence Characterization:</b> D (Not classifiable as to human carcinogenicity)  <b>Weight of Evidence Basis:</b> A dermal exposure study in mice was found inadequate for drawing conclusions as to carcinogenicity in humans.</p> <p><b>MRL:</b> NA; MRLs are for non-cancer effects only.</p> <p><b>Tier 3 Source:</b>  <b>MDEQ:</b> Per DEQ-CCD, no value at this time.</p>		
<p><b>Reference Concentration (RfC) or Initial Threshold Screening Level (ITSL) (<math>\mu\text{g}/\text{m}^3</math>)</b></p>	<p>3.7E+2</p>	<p>2.0E+0</p>	<p>PPRTV, 2009</p>	



	Part 201 Value	Updated Value	Source/Reference/ Date	Comments/Notes /Issues
<p><b>RfC/ITSL details</b></p>	<p>Note: This value and its basis have been replaced with new AQD information in the CCD.</p>	<p><b>Tier 2 Source:</b>  <b>PPRTV:</b> PPRTV is the more recent assessment. No Tier 1 is available.  <b>Basis:</b>                      PPRTV chronic p-RfC = 0.002 mg/m<sup>3</sup> or 2.0 µg/m<sup>3</sup>.  <b>Critical Studies:</b> 1) Watanabe, P.G., H.O. Yankel and R.J. Kociba. 1977. Subchronic toxicity study of inhaled 1,2,4-trichlorobenzene in rats. Toxicology Research Center, Health and Environmental Research, Dow Chemical Company, Midland, MI. Produced 11/18/77. Submitted 12/20/82. TSCATS 20327. EPA Doc. #878221105.                      2) Watanabe, P.G., R.J. Kociba, R.E. Hefner Jr. et al. 1978. Subchronic toxicity studies of 1,2,4-trichlorobenzene in experimental animals. Toxicol. Appl. Pharmacol. 45:332-333.  <b>Methods:</b> Groups of 10 male and 26 female Sprague-Dawley rats were exposed by inhalation to 0, 2.8, or 10.2 ppm 1,2,4-trichlorobenzene (0, 21 or 76 mg/m<sup>3</sup>) 6 hours/day, 5 days/week, for 3 months. Between four and five females/group were sacrificed after 2 weeks, 1 month, or 2 months of exposure and 2 or 4 months post-exposure for assessment of total liver porphyrins. Urine was collected at these same intervals from the rats maintained for the entire experiment. The NOAELs and LOAELs from Watanabe et al. (1977, 1978) were first adjusted to an equivalent continuous exposure concentration, then converted to human equivalent concentrations.  <b>Critical effect:</b> increased urinary excretion of porphyrins  <b>End point or Point of Departure (POD):</b> BMCL<sub>HEC</sub> = 4.6 mg/m<sup>3</sup>  <b>Uncertainty Factors:</b> UF = 3,000 (10 each for intraspecies variability, use of a subchronic study and database deficiencies, and 3 for interspecies extrapolation)  <b>Source and date:</b> PPRTV, 6/16/2009</p> <p><b>Tier 1 and 2 Sources:</b>  <b>IRIS:</b> Per IRIS (3/01/1991), no value at this time.  <b>MRL:</b> Per MRL record (10/2014), no inhalation value available at this time.</p> <p><b>Tier 3 Source:</b></p>		<p>Complete</p>



	Part 201 Value	Updated Value	Source/Reference/Date	Comments/Notes/Issues
		<b>MDEQ:</b> Per DEQ-CCD/AQD (1/9/2006), ITSL = 4.0 µg/m <sup>3</sup> based on rat NOAEL of 21 mg/m <sup>3</sup> reported by Watanabe et al. (1977) for increased urinary porphyrins at 76 mg/m <sup>3</sup> . Use of RfC methodology with total UF of 1000 resulted in the ITSL.		
<b>Inhalation Unit Risk Factor (IURF) ((µg/m<sup>3</sup>)<sup>-1</sup>)</b>	--	NA	MDEQ, 2015	
<b>IURF details</b>	NA	<p><b>Carcinogen Weight-of-Evidence (WOE) Class:</b> "Likely to Be Carcinogenic to Humans" by the oral route of exposure based on a finding of increased tumor incidence in mice. Only one chronic inhalation study is identified (Coate et al., 1977) and, in the study, the neoplastic changes are not reported.</p> <p><b>Source and Date:</b> PPRTV, 6/16/2009</p> <p><b>Tier 1 and 2 Sources:</b>  <b>IRIS:</b> Per IRIS (3/01/1991), no value at this time.  <b>IRIS Weight of Evidence Characterization:</b> D (Not classifiable as to human carcinogenicity)  <b>Weight of Evidence Basis:</b> A dermal exposure study in mice was found inadequate for drawing conclusions as to carcinogenicity in humans.  <b>PPRTV:</b> Per PPRTV (6/16/2009), no value at this time.  <b>MRL:</b> NA; MRLs are for non-cancer effects only.</p> <p><b>Tier 3 Source:</b>  <b>MDEQ:</b> Per DEQ-CCD, no value at this time.</p>		Complete
<b>Mutagenic Mode of Action (MMOA)? (Y/N)</b>	--	NO	USEPA, 2015	
<b>MMOA Details</b>	--	NA Not listed as a carcinogen with mutagenic MOA in the USEPA OSWER List.		
<b>Developmental or Reproductive Effector? (Y/N)</b>	No	<b>No.</b> The RfD or RfC/ITSL is not based on developmental and reproductive effects.	MDEQ, 2015	



	Part 201 Value	Updated Value	Source/Reference/ Date	Comments/Notes /Issues
<b>Developmental or Reproductive Toxicity Details</b>	NA			
<b>State Drinking Water Standard (SDWS) (ug/L)</b>	70	70	SDWA, 1976	
<b>SDWS details</b>	SDWA, 1976	MI Safe Drinking Water Act (SDWA) 1976 PA 399		
<b>Secondary Maximum Contaminant Level (SMCL) (ug/L)</b>	--	NO	SDWA, 1976 and USEPA SMCL List	
<b>SMCL details</b>	NA	MI Safe Drinking Water Act (SDWA) 1976 PA 399 and USEPA SMCL List		
<b>Is there an aesthetic value for drinking water? (Y/N)</b>	NO	Not evaluated	NA	
<b>Aesthetic value (ug/L)</b>	NA	NA	NA	
<b>Aesthetic Value details</b>	NA	NA		
<b>Phytotoxicity Value? (Y/N)</b>	NO	Not evaluated	NA	
<b>Phytotoxicity details</b>	NA	NA	NA	
<b>Others</b>				

**(C) Chemical-specific Exposure Factors**

	Part 201 Value	Update	Source/Reference/ Dates	Comments/Notes /Issues
Gastrointestinal absorption efficiency value (ABS <sub>gi</sub> )	---	1.0	MDEQ, 2015/USEPA RAGS-E	
ABS <sub>gi</sub> details		RAGS E (EPA, 2004) Default Value		
Skin absorption efficiency value (AE <sub>d</sub> )	---	0.1	MDEQ, 2015	
AE <sub>d</sub> details				
Ingestion Absorption Efficiency (AE <sub>i</sub> )		1.0	MDEQ, 2015	
AE <sub>i</sub> Details				
Relative Source Contribution for Water (RSC <sub>w</sub> )		0.2	MDEQ, 2015	
Relative Source Contribution for Soil (RSC <sub>s</sub> )		1.0	MDEQ, 2015	
Relative Source Contribution for Air (RSC <sub>a</sub> )		1.0	MDEQ, 2015	
Others				

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

<b>Current GSI value (µg/L)</b>	99 (X)
<b>Updated GSI value (µg/L)</b>	99 (X)
<b>Rule 57 Drinking Water Value (µg/L)</b>	80

	<b>Rule 57 Value (µg/L)</b>	<b>Verification Date</b>
<b>Human Non-cancer Values- Drinking water source (HNV-drink)</b>	80	2/2010
<b>Human Non-Cancer Values- Non-drinking water sources (HNV-Non-drink)</b>	99	2/2010
<b>Wildlife Value (WV)</b>	NA	NA
<b>Human Cancer Values for Drinking Water Source (HCV-drink)</b>	NA	NA
<b>Human Cancer values for non-drinking water source (HCV-Non-drink)</b>	NA	NA
<b>Final Chronic Value (FCV)</b>	130	6/2010
<b>Aquatic maximum value (AMV)</b>	420	6/2010
<b>Final Acute Value (FAV)</b>	850	6/2010

Sources:

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



**(E) Analytical Information**

	<b>Value</b>	<b>Source</b>
<b>Target Detection Limit – Soil (<math>\mu\text{g}/\text{kg}</math>)</b>	250	MDEQ, 2015
<b>Target Detection Limit – Water (<math>\mu\text{g}/\text{L}</math>)</b>	5	MDEQ, 2015
<b>Target Detection Limit – Air (ppbv)</b>	5.30E-01	MDEQ, 2015
<b>Target Detection Limit – Soil Gas (ppbv)</b>	1.80E+01	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