



## CHEMICAL UPDATE WORKSHEET

<b>Chemical Name:</b>	<b>1,3-Dichloropropene</b>
<b>CAS #:</b>	<b>542-75-6</b>
<b>Revised By:</b>	RRD Toxicology Unit
<b>Revision Date:</b>	August 17, 2015

### (A) Chemical-Physical Properties

	Part 201 Value	Updated Value	Reference Source	Comments
<b>Molecular Weight (g/mol)</b>	110.97	110.97	EPI	EXP
<b>Physical State at ambient temp</b>	Liquid	Liquid	MDEQ	
<b>Melting Point (°C)</b>	---	-50.00	EPI	EXP
<b>Boiling Point (°C)</b>	108	112.00	EPI	EXP
<b>Solubility (ug/L)</b>	2.80E+6	2.800E+06	EPI	EXP
<b>Vapor Pressure (mmHg at 25°C)</b>	31.16	3.40E+01	EPI	EXP
<b>HLC (atm-m<sup>3</sup>/mol at 25°C)</b>	1.77E-2	3.55E-03	EPI	EXP
<b>Log Kow (log P; octanol-water)</b>	2.0	2.04	EPI	EXP
<b>Koc (organic carbon; L/Kg)</b>	45.9	72.17	EPI	EST
<b>Ionizing Koc (L/kg)</b>		NR	NA	NA
<b>Diffusivity in Air (Di; cm<sup>2</sup>/s)</b>	0.0626	7.65E-02	W9	EST
<b>Diffusivity in Water (Dw; cm<sup>2</sup>/s)</b>	1.0E-5	1.0158E-05	W9	EST

	Part 201 Value	Updated Value	Reference Source	Comments
Soil Water Partition Coefficient (Kd; inorganics)	NR	NR	NA	NA
Flash Point (°C)	77 F	25	NPG	EXP
Lower Explosivity Level (LEL; unit less)	0.053	0.053	NPG	EXP
Critical Temperature (K)		5.87E+02	EPA2004	EXP
Enthalpy of Vaporization (cal/mol)		7.90E+03	EPA2004	EST
Density (g/mL, g/cm <sup>3</sup> )		1.224	CRC	EXP
EMSOFT Flux Residential 2 m (mg/day/cm <sup>2</sup> )	2.67E-05	2.75E-05	EMSOFT	EST
EMSOFT Flux Residential 5 m (mg/day/cm <sup>2</sup> )	6.40E-05	6.51E-05	EMSOFT	EST
EMSOFT Flux Nonresidential 2 m (mg/day/cm <sup>2</sup> )	3.79E-05	4.36E-05	EMSOFT	EST
EMSOFT Flux Nonresidential 5 m (mg/day/cm <sup>2</sup> )	9.01E-05	1.02E-04	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>	3.4E-2	3.0E-2	ATSDR, 2008	
<b>RfD details</b>	Of the two critical effects, body weight decrease and chronic irritation (as evidenced by the forestomach hyperplasia), data from the most sensitive effect, chronic irritation, were used to develop the RfD. BMDL10 = 3.4 mg/kg/day; UF = 100 (Inter and Intra- species extrapolation; The database for 1,3-dichloropropene is substantial and includes studies of genotoxicity, mode of action, pharmacokinetics, reproductive and developmental toxicity, systemic	<p><b>Tier 2 Source:</b>  <b>ATSDR:</b>  <b>Basis:</b> ATSDR MRL is based on newer published studies of two species and uses BMDS. The EPA-OPP RfD is based on a single unpublished older study. The MRL is the same as the IRIS RfD; however, the IRIS value is based on an unpublished older study. See details below.                      ATSDR (9/2008), chronic oral MRL = 0.03 (3.0E-2) mg/kg-day.</p> <p><b>Critical Study(ies):</b>                      1) Stebbins KE, Johnson KA, Jeffries TK, et al. 2000. Chronic toxicity and oncogenicity studies of ingested 1,3-dichloropropene in rats and mice. Regul Toxicol Pharmacol 32:1-13.                      2) Stebbins KE, Quast JF, Haut KT, et al. 1999. Subchronic and chronic toxicity of ingested 1,3-dichloropropene in dogs. Regul Toxicol Pharmacol 30:233-243.</p> <p><b>Method(s):</b> Stebbins et al. (2000) exposed Fischer 344 rats (50/sex/group) to 1,3-dichloropropene in the diet at doses of 0, 2.5, 12.5, or 25 mg/kg/day for 2 years; satellite groups of 10/sex/group were scheduled for interim sacrifice at 12 months. Stebbins et al. (1999) exposed beagle dogs (4/sex/group) to 0, 0.5, 2.5, or 15 mg/kg/day for 1 year. In both studies, the test material, Telone II®b, was 95.8% pure 1,3-dichloropropene (50.7% cis; 45.1% trans) with 2% ESO as a stabilizer and was microencapsulated in a starch/sucrose (80:20) microsphere matrix before addition to the diets; separate tests showed that the microencapsulated compound was stable in feed for at least three weeks, but test diets were mixed fresh weekly. Control diets received empty microspheres in an amount equivalent to that given to the high-dose treated group.</p> <p><b>Critical effect:</b> Basal cell hyperplasia of the nonglandular stomach mucosa observed in female rats exposed at a LOAEL of 12.5 mg/kg/day</p> <p><b>End point or Point of Departure (POD):</b> BMDL<sub>10</sub> = 3.4 mg/kg/day</p> <p><b>Uncertainty Factors:</b> UF = 100 (10 each for intraspecies variability and</p>		Complete



	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
	<p>toxicity, and cancer. Therefore, no additional UFs are needed.                      CCD date: 5/25/2000</p>	<p>interspecies extrapolation)  <b>Source and date:</b> ATSDR, 9/2008.</p> <p><b>Tier 1 and 2 Sources:</b>  <b>IRIS:</b> Per IRIS (5/25/2000), RfD = 3.0E-2 mg/kg-day.  <b>Critical Study:</b> Stott, WT; Johnson, KA; Jeffries, TK; et al. (1995) Telone II soil fumigant: two-year chronic toxicity/oncogenicity study in Fischer 344 rats. The Dow Chemical Company. Midland, Michigan. Study # M-003993-0311  <b>Method(s):</b> Fischer 344 rats (50/sex/dose) were fed a microencapsulated formulation of Telone II (96% 1,3-dichloropropene) in the diet at doses of 0, 2.5, 12.5, or 25 mg/kg/day for 24 months.  <b>Critical effect:</b> chronic irritation  <b>End point or Point of Departure (POD):</b> BMDL<sub>10</sub> = 3.4 mg/kg/day; BMD<sub>10</sub> = 5.1 mg/kg/day  <b>Uncertainty Factors:</b> UF = 100 (10 each for intraspecies variability and interspecies extrapolation)  <b>Source and date:</b> IRIS, Last revision date - 5/25/2000. USEPA screening-level review in 2003 identified one or more significant new studies.</p> <p><b>EPA-OPP:</b> chronic RfD = 2.5E-2 mg/kg/day  <b>Critical Study:</b> Stott, W.; Johnson, K.; Jeffries, T.; et al. (1995) Telone II Soil Fumigant: Two-Year Chronic Toxicity/Oncogenicity Study in Fischer 344 Rats: Lab Project Number: M-003993-031. Unpublished study prepared by The Dow Chemical Co. 1515 p.  <b>Methods:</b> In a chronic toxicity/carcinogenicity study, Telone II (96% a.i.) was administered as microcapsules by dietary admix to Fischer 344 rats (60/sex/group with 10/sex/group sacrificed at 12 months) at levels of 0, 2.5, 12.5 or 25 mg/kg/day for two years.  <b>Critical effect:</b> Decreased body weight gain and increased incidence of basal cell hyperplasia of nonglandular mucosa of stomach  <b>End point or Point of Departure (POD):</b> the NOEL was 2.5 mg/kg/day and the LOEL was 12.5 mg/kg/day</p>		



	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
		<p><b>Uncertainty Factors:</b> UF = 100 (10 each for intraspecies variability and interspecies extrapolation)</p> <p><b>Source and date:</b> Reregistration Eligibility Decision (RED) 1,3-Dichloropropene December 1998; USEPA-OPP Memo: 1,3-Dichloropropene. Human Health Assessment Scoping Document in Support of Registration Review, Sept 5, 2013.</p> <p><b>PPRTV:</b> No PPRTV record available at this time.</p> <p><b>MRL:</b> Per ATSDR (9/2008), intermediate oral MRL = 0.04 mg/kg-day:</p> <p><b>Critical Study:</b> Haut KT, Stebbins KE, Johnson KA, et al. 1996. Subchronic toxicity of ingested 1,3-dichloropropene in rats and mice. Fundam Appl Toxicol 32:224-232.</p> <p><b>Method(s):</b> Fischer 344 rats (10/sex/group) to 1,3-dichloropropene at doses of 0, 5, 15, 50, or 100 mg/kg/day for 13 weeks.</p> <p><b>Critical effect:</b> basal cell hyperplasia of the nonglandular stomach mucosa in male rats</p> <p><b>End point or Point of Departure (POD):</b> NOAEL = 5 mg/g-day; BMDL<sub>10</sub> = 3.57 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></p> <p><b>MDEQ:</b> Per DEQ-CCD, RRD adopts IRIS value.</p>		
<b>Oral Cancer Slope Factor (CSF) (mg/kg-day)<sup>-1</sup></b>	1.0E-1	1.0E-1	IRIS, 2000	
<b>CSF details</b>	In the absence of a single best study, both the NTP (1985) and Stott et al. (1995) studies have been evaluated	<p><b>Tier 1 Source:</b></p> <p><b>IRIS:</b></p> <p><b>Basis:</b> IRIS is slightly higher than the EPA-OPP value; however, IRIS was based on two chronic studies. EPA-OPP used a single study. IRIS was preferred. IRIS CSF = 1.0E-1 (mg/kg-day)<sup>-1</sup>.</p> <p><b>Critical Study(ies):</b> Both NTP (1985) and Stott et al. (1995) were evaluated. The slope factor based on the urinary bladder tumors in mice (NTP, 1985) was the</p>		Complete



	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
	<p>separately and used for the quantitative oral cancer assessment. Given that both studies have limitations for quantitative risk assessment, the most conservative slope factor, 1E-1 (mg/kg/day)<sup>-1</sup> for urinary bladder tumors in mice (NTP, 1985), is recommended because there is less uncertainty in the delivered dose in that study (IRIS, 2000); Probable human carcinogen based on sufficient animal data (B2); Entry date: 5/25/2000</p>	<p>more conservative and IRIS recommended.</p> <p>1) NTP (National Toxicology Program). (1985) Toxicology and carcinogenesis studies of Telone II (technical grade 1,3-dichloropropene containing 1% epichlorohydrin as a stabilizer) in F344/N rats and B6C3F1 mice (gavage studies). U.S. Dept. of Health and Human Services, Technical Report Series No. 269.</p> <p>2) Stott, WT; Johnson, KA; Jeffries, TK; et al. (1995) Telone II soil fumigant: two-year chronic toxicity/oncogenicity study in Fischer 344 rats. Dow Chemical Company, Midland, MI. Study # M-003993-031I.</p> <p><b>Method(s):</b> In the NTP (1985) study, F344 rats sex were gavaged with Telone II (92% 1,3-dichloropropene) in corn oil at doses of 0, 25, and 50 mg/kg 3 times/week while B6C3F1 mice of each sex were gavaged with 0, 50, and 100 mg/kg 3 times/ week for 104 weeks. A total of 50 rats/sex and 50 mice/sex were used for each dose group in the main oncogenicity study.</p> <p>1) <i>Dose response data: Tumor Type</i> - urinary bladder carcinoma; <i>Test Species</i> - female mouse; <i>Route</i> - oral, gavage</p> <p>2) <i>Extrapolation method:</i> linearized multistage model, extra risk</p> <p><b>Carcinogen Weight-of-Evidence (WOE) Class:</b> B2, probable human carcinogen/likely to be a human carcinogen</p> <p><b>IRIS WOE Basis:</b> tumors observed in chronic animal bioassays for both inhalation and oral routes of exposure</p> <p><b>Source and Date:</b> IRIS, Last revision date - 5/25/2000</p> <p>USEPA-OPP: CSF = 1.22E-1 (mg/kg/day)<sup>-1</sup></p> <p>Critical Study: US of Public Health Service (1985) Toxicology and Carcinogenesis Studies of Telone II (Technical-grade 1,3-Dichloropropene CAS No. 542-75-6 Containing 1.0% Epichlorohydrin as a Stabilizer) in F344/N Rats and B6C3F1 Mice (Gavage Studies): NIH Publication No. 85-2525. US Government Printing Office. 153 p.</p> <p>Methods:</p> <p>1) <i>Dose response data: Tumor Type</i> - Combined forestomach, liver, mammary, thyroid, adrenal, urinary, lung tumors, Multistage Model, 3/4 scaling factor;</p>		

	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
		2) <i>Test Species</i> – F344 rats; 3) <i>Route</i> - oral, drinking water <b>Source and Date:</b> Reregistration Eligibility Decision (RED) 1,3-Dichloropropene December 1998; USEPA-OPP Memo: 1,3-Dichloropropene. Human Health Assessment Scoping Document in Support of Registration Review, Sept 5, 2013.  <b>Tier 2 Sources:</b> <b>PPRTV:</b> No PPRTV record available at this time. <b>MRL:</b> NA; MRLs are for non-cancer effects only.  <b>Tier 3 Source:</b> <b>MDEQ:</b> Per DEQ-CCD, RRD adopts the IRIS value		
Reference Concentration (RfC) or Initial Threshold Screening Level (ITSL) ( $\mu\text{g}/\text{m}^3$ )	20	3.0E+1	ATSDR, 2008	
RfC/ITSL details	IRIS based RfC on Lomax et al 1989. Hypertrophy and hyperplasia of nasal epithelium. CCD/AQD date: 5/25/2000	<b>Tier 2 Source:</b> <b>ATSDR:</b> <b>Basis:</b> This assessment is more current than IRIS; both used the same critical study and UF value but the POD differed slightly. <b>ATSDR (9/2008) chronic inhalation MRL</b> = 0.007 ppm ( $3.0\text{E}-2 \text{ mg}/\text{m}^3$ ; molecular weight = 110.97 g/mol). <b>Critical Study:</b> Lomax, LG; Stott, WT; Johnson, KA; et al. (1989) The chronic toxicity and oncogenicity of inhaled technical-grade 1,3-dichloropropene in rats and mice. <i>Fundam Appl Toxicol</i> 12:418-431. An intermediate MRL = 0.008 ppm is available based on Hypertrophy/hyperplasia of nasal respiratory epithelium in B6C3F1 mice exposed to 60 ppm ( $272 \text{ mg}/\text{m}^3$ ) (Lomax et al., 1989). <b>Method(s):</b> B6C3F1 mice and F344 rats were exposed to vapors of 1,3-dichloropropene 6 hours/day, 5 days/week for 2 years at concentrations of 0, 5, 20, or 60 ppm (0, 22.7, 90.8, or $272 \text{ mg}/\text{m}^3$ ). Additional satellite groups (10/sex/concentration) were established interim sacrifices at 6 and 12 months		Complete



	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
		<p>(results for the 6-month sacrifice are given under the description for the intermediate-duration inhalation MRL).</p> <p><b>Critical effect:</b> Hypertrophy/hyperplasia of the nasal respiratory epithelium</p> <p><b>End point or Point of Departure (POD):</b> BMCL<sub>10</sub>(ADJ) = 4.567 mg/m<sup>3</sup>; BMCL<sub>10</sub>(HEC) = 0.913 mg/m<sup>3</sup> (0.2009 ppm)</p> <p><b>Uncertainty Factors:</b> UF = 30 (10 for intraspecies variability and 3 for interspecies extrapolation)</p> <p><b>Source and date:</b> ATSDR, 9/2008</p> <p><b>Tier 1 and 2 Sources:</b></p> <p><b>IRIS:</b> RfC = 2.0E-2 mg/m<sup>3</sup></p> <p><b>Critical Study:</b> Lomax, LG; Stott, WT; Johnson, KA; et al. (1989) The chronic toxicity and oncogenicity of inhaled technical-grade 1,3-dichloropropene in rats and mice. Fundam Appl Toxicol 12:418-431.</p> <p><b>Method(s):</b> F344 rats and B6C3F1 mice (50/sex/dose) via whole-body chamber inhalation to 0, 5, 20, or 60 ppm (0, 22.7, 90.8, or 272 mg/m<sup>3</sup>) technical-grade 1,3-dichloro-propene for 6 hours/day, 5 days/week for 2 years. Two satellite groups of rats and mice (10/sex/dose group) were exposed to 1,3-dichloropropene for 6 and 12 months, respectively.</p> <p><b>Critical effect:</b> Hypertrophy/hyperplasia of the nasal respiratory epithelium</p> <p><b>End point or Point of Departure (POD):</b> BMCL<sub>10</sub>(ADJ) = 3.7 mg/m<sup>3</sup>; BMCL<sub>10</sub>(HEC) = 0.72 mg/m<sup>3</sup></p> <p><b>Uncertainty Factors:</b> UF = 30 (10 for intraspecies variability and 3 for pharmacodynamic component of interspecies uncertainty)</p> <p><b>Source and date:</b> IRIS, Last revision date - 5/25/2000</p> <p><b>USEPA-OPP:</b> RfC = 27.6 µg/m<sup>3</sup> = 3.0+1 µg/m<sup>3</sup>.</p> <p><b>Critical Study:</b> MRID 40312301 (1987)</p> <p><b>Methods:</b> B6C3F1 mice (50/sex/group) exposed to 0, 5, 20 or 60 ppm (0, 0.023, 0.091 or 0.272 mg/L) by inhalation 6 hours/day, 5 days /week for 510 days</p> <p><b>Critical effect:</b> nasal histopathology</p> <p><b>End point or Point of Departure (POD):</b> NOAEL = 5 ppm Human Equivalent</p>		

	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
		Concentration = 0.182 ppm = 0.83 $\mu\text{g}/\text{m}^3$ <b>Uncertainty Factors:</b> UF = 30 (10 for intraspecies variability and 3 for interspecies extrapolation) <b>Source and Date:</b> USEPA-OPP Memo: 1,3-Dichloropropene. Human Health Assessment Scoping Document in Support of Registration Review, Sept 5, 2013.  <b>PPRTV:</b> No PPRTV record available at this time.  <b>Tier 3 Source:</b> <b>MDEQ:</b> Per DEQ-CCD, AQD adopted IRIS value		
<b>Inhalation Unit Risk Factor (IURF) (<math>(\mu\text{g}/\text{m}^3)^{-1}</math>)</b>	4.0E-6	4.0E-6	IRIS, 2000/OPP, 2013	
<b>IURF details</b>	EPA calculated a new potency based on the same study used by AQD in 1995. Lomax et al 1989. New slope factor of 4e-6 ( $\mu\text{g}/\text{m}^3$ )-1 based on Bronchioalveolar adenoma in male mice (same endpoint as AQD 1995). See IRIS document for further details. - OLD AQD values: IRSL based on recommendations of the Scientific	<b>Tier 1 Source:</b> <b>IRIS and EPA-OPP:</b> <b>Basis:</b> IRIS and EPA-OPP have the same value although the critical studies are different. <b>IRIS:</b> IURF = 4.0E-6 ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup> <b>Critical Study(ies):</b> Lomax, LG; Stott, WT; Johnson, KA; et al. (1989) The chronic toxicity and oncogenicity of inhaled technical-grade 1,3-dichloropropene in rats and mice. Fundam Appl Toxicol 12:418-431. <b>Method(s):</b> Rats and mice were exposed to up to 272 mg/m <sup>3</sup> 1,3-dichloropropene vapors for 6 hours/day, 5 days/week for 2 years. 1) <i>Dose response data:</i> Tumor Type - bronchioalveolar adenoma; Test Species - male mouse; Route - inhalation 2) <i>Extrapolation method:</i> linearized multistage model, extra risk <b>Carcinogen Weight-of-Evidence (WOE) Class:</b> B2, probable human carcinogen/likely" to be a human carcinogen <b>IRIS WOE Basis:</b> tumors observed in chronic animal bioassays for both inhalation and oral routes of exposure <b>Source and Date:</b> IRIS, Last revision date - 5/25/2000  <b>USEPA-OPP:</b> IURF = 4.0E-6 ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup> . Critical Study: MRID 40312301 (1987)		Complete



	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
	Advisory Panel (SAP). A slope factor of 0.0078 mg/m <sup>3</sup> -1 was derived from a study (Lomax) using the significant increase in lung bronchioloalveolar adenomas in male mice. CCD/AQD date: 5/25/2000	<p>Methods: B6C3F1 mice (50/sex/group plus 10/sex/group for the 6- and 12-month interim sacrifices) were exposed by whole-body inhalation to Telone II (92.1%) at concentrations of 0, 5, 20 or 60 ppm (equivalent to approximately 0, 0.023, 0.091 or 0.272 mg/L) 6 hours/day, 5 days/week for a total of 510 days over a two-year period</p> <p>1) <i>Dose response data: Tumor Type</i> - bronchioloalveolar adenomas; <i>Test Species</i> - mouse; <i>Route</i> - inhalation</p> <p>Source and Date: USEPA-OPP Memo: 1,3-Dichloropropene. Human Health Assessment Scoping Document in Support of Registration Review, Sept 5, 2013. (table 3.3)</p> <p><b>Tier 2 Sources:</b>  <b>PPRTV:</b> No PPRTV record available 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, AQD adopted IRIS value for IURF</p>		
<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	No, the RfD or RfC/ITSL is not based on a reproductive-developmental effect.	MDEQ, 2015	
<b>Developmental or Reproductive Toxicity Details</b>	NA	NA		
<b>State Drinking Water Standard (SDWS) (ug/L)</b>	--	NO	SDWA, 1976	
<b>SDWS details</b>	NA	MI Safe Drinking Water Act (SDWA) 1976 PA 399		



	Part 201 Value	Updated Value	Source*/Reference /Date	Comments/Notes /Issues
Secondary Maximum Contaminant Level (SMCL) (ug/L)	--	NO	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		
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 <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>	9.0 (X)
<b>Updated GSI value (µg/L)</b>	9.0 (X)
<b>Rule 57 Drinking Water Value (µg/L)</b>	3.3

	<b>Rule 57 Value (µg/L)</b>	<b>Verification Date</b>
<b>Human Non-cancer Values- Drinking water source (HNV-drink)</b>	930	9/2007
<b>Human Non-Cancer Values- Non-drinking water sources (HNV-Non-drink)</b>	39,000	9/2007
<b>Wildlife Value (WV)</b>	NA	
<b>Human Cancer Values for Drinking Water Source (HCV-drink)</b>	3.3	9/2007
<b>Human Cancer values for non-drinking water source (HCV-Non-drink)</b>	140	9/2007
<b>Final Chronic Value (FCV)</b>	9.0	8/2007
<b>Aquatic maximum value (AMV)</b>	81	8/2007
<b>Final Acute Value (FAV)</b>	160	8/2007

Sources:

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

**(E) Target Detection Limits (TDL)**

	<b>Value</b>	<b>Source</b>
<b>Target Detection Limit – Soil (<math>\mu\text{g}/\text{kg}</math>)</b>	100	MDEQ, 2015
<b>Target Detection Limit – Water (<math>\mu\text{g}/\text{L}</math>)</b>	1	MDEQ, 2015
<b>Target Detection Limit – Air (ppbv)</b>	1.40E+00	MDEQ, 2015
<b>Target Detection Limit – Soil Gas (ppbv)</b>	4.70E+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 OEHHHA	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