CHAPTER 1. RELEVANCE TO PUBLIC HEALTH

1.1 OVERVIEW AND U.S. EXPOSURES

ATSDR's *Toxicological Profile for 1,2-Dibromo-3-chloropropane* was released in 1992. In order to update the literature in this profile, ATSDR conducted a literature search focused on health effects information as described in Appendix B. Chapters 2, 3, and 7 were revised to reflect the most current health effects data. In some cases, other sections of the profile were updated as needed or for consistency with the updated health effects and regulations/guidelines. However, the focus of the update to this profile is on health effects information.

The major sources of 1,2-dibromo-3-chloropropane ($C_3H_5Br_2Cl$; CAS Number 96-12-8) in the environment are from its former use as a soil fumigant (fumes that rid vermin or disinfect) and nematocide (worm killer) on a variety of crops and from unintentional release from hazardous waste sites that contain the chemical. There have been no recent reportable releases of 1,2-dibromo-3-chloropropane to the air, water, or soil (TRI16 2017) because all registered uses as a pesticide were canceled by the U.S. Environmental Protection Agency (EPA) in 1985.

The most likely sources of exposure of the general population to 1,2-dibromo-3-chloropropane are from drinking water that may have been contaminated in areas where the chemical was used for agricultural purposes or from food sources grown in soil that may still contain residues. However, it is not likely that the general population would be exposed to 1,2-dibromo-3-chloropropane levels in drinking water or food sources that would be high enough to cause adverse health effects.

1.2 SUMMARY OF HEALTH EFFECTS

As illustrated in Figures 1-1 and 1-2, the most sensitive effects associated with inhalation and oral exposure are testicular, renal, liver, body weight, gastrointestinal, and respiratory effects.

Figure 1-1. Health Effects Found in Animals Following Inhalation Exposure to 1,2-Dibromo-3-Chloropropane

Concentration in Air (ppm)	Effects in Animals
20-25	Intermediate: Intestinal lesions; depressed white blood cell count; bone marrow hypocellularity; thymic atrophy, severe hair loss
3-12	Acute: Lesions in kidney, spleen, and respiratory tract Intermediate: Depressed weight gain; histological alterations in brain; ocular irritation Chronic: Depressed body weight gain; lesions in stomach, brain, spleen
0.1-1.0	Intermediate: Lesions in respiratory tract, liver, kidney, and adrenal gland; testicular effects Chronic: Lesions in respiratory tract, forestomach, urinary bladder, and kidney; nasal and lung tumors
0.0002 ppm 🔶 li	ntermediate MRL

Figure 1-2. Health Effects Found in Animals Following Oral Exposure to 1,2-Dibromo-3-Chloropropane

Dose (mg/kg/day)	Effects in Animals
100-200	Acute: Renal insufficiency, increased liver and pituitary weights
25-75	Acute: Histological alterations in gastrointestinal tract, decreased activity, depressed weight gain, decreased number of litters
15-20	Intermediate: Testicular degeneration, decreased pup weight
	Chronic: Testicular atrophy
5-10	Acute: Post-implantation loss due to dominant lethal mutations Intermediate: Depressed weight gain; histological alterations in kidney
1-3	Intermediate: Abnormal sperm morphology, decreased spermatogenesis Chronic: Decreased bodyweight; histological alterations in kidney and gastrointestinal tract; tumors of liver, kidney, and stomach
0.002 mg/kg/day 🌔 Inter	mediate MRL

1.3 MINIMAL RISK LEVELS (MRLs)

As presented in Figure 1-3, limited inhalation data from animals indicate the respiratory, renal, and gastrointestinal systems as particularly sensitive targets of 1,2-dibromo-3-chloropropane toxicity. The MRL value for intermediate-duration inhalation exposure to 1,2-dibromo-3-chloropropane is summarized in Table 1-1 and discussed in greater detail in Appendix A. As presented in Figure 1-4, available oral data from animals indicate the gastrointestinal, male reproductive, and renal systems as particular sensitive targets of 1,2-dibromo-3-chloropropane toxicity. The MRL value for intermediate-duration oral exposure to 1,2-dibromo-3-chloropropane is summarized in Table 1-1 and discussed in greater detail in Appendix A. The databases were considered inadequate for derivation of acute- or chronic-duration inhalation or oral MRLs; see Appendix A for more details.

Figure 1-3. Summary of Sensitive Targets of 1,2-Dibromo-3-Chloropropane --Inhalation

The renal system, respiratory tract, gastrointestinal tract, and liver are the most sensitive targets of 1,2-dibromo-3-chloropropane.

Numbers in circles are the lowest LOAELs (ppm) among health effects in animals; no human data were identified.

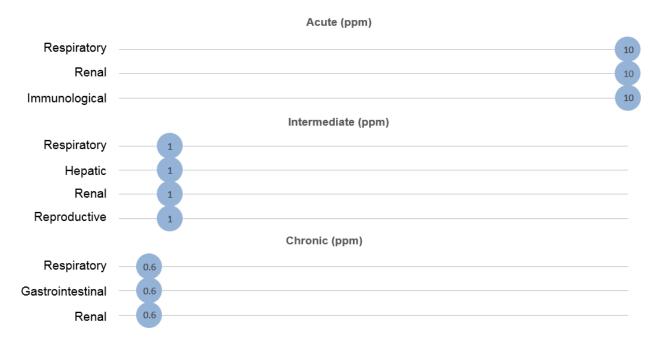


Figure 1-4. Summary of Sensitive Targets of 1,2-Dibromo-3-Chloropropane -- Oral

The gastrointestinal tract and male reproductive system are the most sensitive targets of 1,2-dibromo-3-chloropropane.

Numbers in circles are the lowest LOAELs (mg/kg/day) among health effects in animals; no reliable dose response data were available for humans.

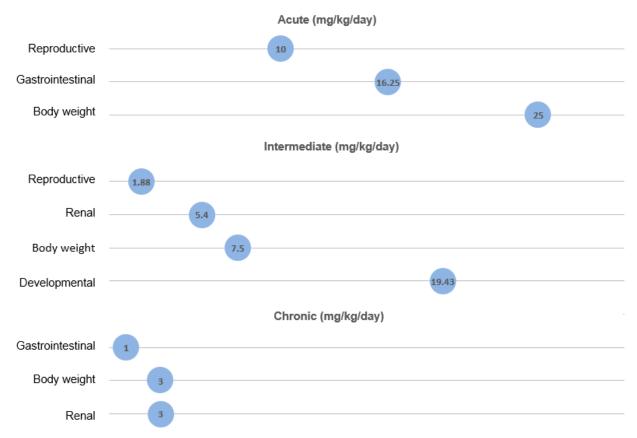


Table 1-1.	Minimal Risk	Levels (MRLs) for	r 1,2-Dibromo-3	B-Chloropropane ^a
------------	--------------	-------------------	-----------------	------------------------------

Exposure			Point of	Uncertainty				
duration	MRL	Critical effect	departure	factor	Reference			
Inhalation exposure (ppm)								
Acute	Insufficient data for MRL derivation							
Intermediate	0.0002	Impaired spermatogenesis; testicular atrophy	0.1 (NOAEL)	100	Rao et al. 1982			
Chronic	Insufficient data for MRL derivation							
Oral exposure (mg/kg/day)								
Acute	Insufficient data for MRL derivation							
Intermediate	0.002	Impaired spermatogenesis and sperm morphology	1.88 (LOAEL)	1,000	Foote et al. 1986a, 1986b			
Chronic	Insufficient data for MRL derivation							

^aSee Appendix A for additional information.

LOAEL = lowest-observed-adverse-effect level; NOAEL = no-observed-adverse-effect level