

CALCULATION OF HUMAN HEALTH CRITERIA FOR PESTICIDES IN SURFACE WATER AND GROUND WATER PROPOSED FOR CIRCULAR DEQ-7 2026 AMENDMENT RULEMAKING

This document provides the calculations for the human health criteria for chlorsulfuron, imazapic, 1,2-dibromoethane, and nicosulfuron in surface water and ground water proposed in the Circular DEQ-7 rulemaking occurring in 2026.

Montana Administrative Register (MAR) Notice of Proposed Rulemaking, Notice No. 2026-496.1, Issue 8

Montana Department of Environmental Quality

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PROPOSED CRITERIA CALCULATIONS

Calculation methods are consistent with EPA methodology (EPA 2000, 2015, 2018).

Human health (non-cancer) criteria ($\mu\text{g/L}$) = $\text{RfD} * \text{RSC} * (\text{BW}/\text{DWI}) * \text{Unit Conversion Factor}$

Human health (cancer) criteria ($\mu\text{g/L}$) = $\text{Target Cancer Risk} * (1/\text{CSF}) * (\text{BW}/\text{DWI}) * \text{Unit Conversion Factor}$

RfD: Reference dose

RSC: Relative source contribution

BW: Body weight; EPA (2015) default body weight for human criteria is 80 kg

DWI: Drinking water intake; EPA (2015) default drinking water consumption rate is 2.4 L/day

Target cancer risk: Montana uses a target cancer risk level of 10^{-5} (1 in 100,000)

CSF: Cancer slope factor

Table 1. Calculations for pesticide human health criteria proposed in MAR Notice No. 2026-496.1, Issue 8

Compound	CASRN	Category	RfD (mg/kg/day)	RSC	CSF (mg/kg/day)	RfD/CSF Source	Calculated Human Health Criteria (Non-Cancer) (µg/L)	Calculated Human Health Criteria (Cancer; 10 ⁻⁵ Cancer Risk) (µg/L)	Final Proposed Human Health Criteria (µg/L)	Notes
Chlorsulfuron	64902-72-3	Toxic	0.05	0.20	NA	EPA 2021	333.3333	NA	300	-
Imazapic	104098-48-8	Toxic	0.137	0.20	NA	EPA 2021	913.3333	NA	913	-
Dibromoethane, 1,2-	106-93-4	Carcinogen	0.009	0.20	2	EPA 2004a,b	60.0000	0.1667	0.2	“The carcinogenicity of 1,2-dibromoethane is evaluated according to the linear approach...” (EPA 2004b)
Nicosulfuron	111991-09-4	Toxic	1.25	0.20	NA	EPA 2021	8333.3333	NA	8330	-

REFERENCES

- EPA. 2000. Methodology for deriving ambient water quality criteria for the protection of human health. EPA-822-B-00-004. U.S. Environmental Protection Agency, Office of Water and Office of Science and Technology.
- EPA. 2004a. 1,2-dibromoethane; CASRN 106-93-4. Integrated Risk Information System (IRIS) chemical assessment summary. U.S. Environmental Protection Agency, National Center for Environmental Assessment.
- EPA. 2004b. Toxicological review of 1,2-dibromoethane in support of summary information on the Integrated Risk Information Systems (IRIS). EPA 635/R-04/067. U.S. Environmental Protection Agency.
- EPA. 2015. Human health ambient water quality criteria: 2015 update. EPA 820-F-15-001. U.S. Environmental Protection Agency, Office of Water.
- EPA. 2018. 2018 edition of the drinking water standards and health advisories tables. EPA 822-F-18-001. U.S. Environmental Protection Agency, Office of Water.
- EPA. 2021. 2021 human health benchmarks for pesticides. Last updated on January 15, 2025. Available at <https://www.epa.gov/sdwa/2021-human-health-benchmarks-pesticides>