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# Updates to Alberta Tier 1 and Tier 2 Soil and Groundwater Guidelines

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Alberta

# Outline

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- Effective dates
- Revisions:
  - Domestic Use Aquifer (DUA) Exclusion Updates
  - Freshwater Aquatic Life (FAL) receptor Updates
  - Drinking Water Guideline Updates
  - Perfluorooctane Sulfonate Guideline Updates
  - Toxicity Reference Value Updates

# Effective Dates

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- 2022 editions may be used immediately, formally come into effect on January 1, 2023.
- Remediation and reclamation certificate applications compliant with the 2019 edition will be accepted up to January 1, 2023

# Domestic Use Aquifer Exclusion Updates

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- Changed Appendix E, DUA pathway exclusion
  - Responsible parties may exclude the DUA as a pathway in municipalities that have municipal water supply systems and do not permit access to drinking water within certain parameters.

# Freshwater Aquatic Life receptor Updates

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- Defined the freshwater aquatic life receptor for rivers as the “floodway” rather than the 1/100 floodplain
  - Change to FAL receptor - the floodway is considered sufficiently protective.

# Drinking Water Guideline Updates


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- Changes were made per the updated Canadian Drinking Water Guidelines (Pb, Mn, Ba, Al, Cd, PFOA), published September 2020



# Perfluorooctane Sulfonate Guideline Updates

- Changes were made to Tier 1 tables to align with Canadian Council of Ministers of the Environment (CCME) guidelines for PFOS in soil and groundwater, published September 2021



**Canadian Soil and Groundwater  
Quality Guidelines for the  
Protection of Environmental and  
Human Health**

**PERFLUOROCTANE  
SULFONATE (PFOS)  
2021**

**P**erfluorooctane sulfonate (PFOS) ( $C_8HF_{17}SO_3$ ) is an extremely stable anthropogenic compound present in significant quantities in many environmental media. PFOS is present in numerous products such as firefighting foams, insecticides, coatings used for textiles and paper, and cleaning products. PFOS can be released directly into the environment as a result of its production, use (in consumer, commercial and industrial products) and disposal, or it may result indirectly from the biodegradation, photo oxidation, photolysis and hydrolysis of precursor per- and polyfluoroalkyl substances (PFAS).

# Toxicological Reference Value Update

- Changes were made to Tier 1 using Health Canada's revised Toxicological Reference Values (TRV) and relative dermal absorption factors.
- Health Canada added and removed TRVs in August 2021.
- Tier 1 will default to US EPA IRIS values where Health Canada has removed TRVs.





# TRV change example

- Benzene – previous Inhalation Unit Risk was 0.0033 mg/m<sup>3</sup>, new is 0.016 mg/m<sup>3</sup>

$$SRG_I = \frac{RsC \times [\theta_w + (K_{oc} \times f_{oc} \times \rho_b) + (H' \times \theta_a)] \times DF_i \times 10^3 \times AF}{H' \times \rho_b \times ET \times 10^6} + BSC$$

Where:	SRG <sub>I</sub>	=	soil remediation guideline for indoor infiltration (mg/kg);
	RsC	=	risk-specific concentration (mg/m <sup>3</sup> );
	θ <sub>w</sub>	=	moisture-filled porosity (dimensionless);
	K <sub>oc</sub>	=	organic carbon partition coefficient (L/kg);
	f <sub>oc</sub>	=	fraction of organic carbon (g/g);
	ρ <sub>b</sub>	=	dry soil bulk density (g/cm <sup>3</sup> );
	H'	=	Henry's Law Constant (dimensionless);
	θ <sub>a</sub>	=	vapour-filled porosity (dimensionless);
	DF <sub>i</sub>	=	dilution factor from soil gas to indoor air (calculated below);
	10 <sup>3</sup>	=	conversion factor from kg to g;
	AF	=	adjustment factor (10, hydrocarbons; 1, non-petroleum hydrocarbons);
	ET	=	exposure term (dimensionless);
	10 <sup>6</sup>	=	conversion factor from m <sup>3</sup> to cm <sup>3</sup> ; and,
	BSC	=	background soil concentration (mg/kg).

# TRV change example

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- Calculation for soil guideline: Agricultural/ Residential/ Parkland, Vapour Inhalation, Coarse, Slab (benzene)

	Inhalation Unit Risk	Guideline
Previous	0.0033 mg/m <sup>3</sup>	0.073 mg/kg
Current	0.016 mg/m <sup>3</sup>	0.015 mg/kg

# Questions?

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Further Questions?

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