



Soil Sterilants Program: Risk Assessment and Management

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Soil sterilants are non-selective residual herbicides that render the treated soil unfit for plant growth for relatively long periods of time. Sterilants were commonly used in Alberta from the 1960s to late 1990s for non-selective vegetation control on oil and gas wells, gas processing plants, rights-of-way, railways, sawmills, pulp mills, and electrical utility sites; residues may also be found at agrochemical dealer sites. Sterilant treated areas can remain devoid of vegetation for many years, depending upon the type, rate and frequency of application of soil sterilant and the climatic conditions. Soils treated with sterilants often become a source of contamination to adjacent land and waterbodies through leaching, surface runoff, and wind dispersion. In Alberta, the two most commonly sterilants used were bromacil and tebuthiuron. In 2019 the Soil Sterilants Program (SSP) was established to address the challenges associated with managing sterilant-impacted sites.

The risk models used to develop the Alberta Tier 1 soil and groundwater quality guidelines for bromacil and tebuthiuron, specifically for the protection of the irrigation watering (IW) and freshwater aquatic life (FAL) pathways, were re-visited as part of this study. Currently, the combination of the risk model used and assumptions within the risk model for the derivation of the Tier 1 screening guidelines for bromacil and tebuthiuron have resulted in guidelines which are often considered to be over-conservative in many cases. Additionally, guidelines for the ecological direct contact pathway for both bromacil and tebuthiuron are based on the combined ecotoxicological endpoints of native plants and agronomic species, which may differ in sensitivity.

Through the SSP, risk models and model parameters were reviewed to support improved risk assessment and risk management for bromacil and tebuthiuron. These models apply to the irrigation water and freshwater aquatic life pathways and allow the contaminants' fate and mobility in the subsurface to be better estimated under Alberta field conditions. In addition, new ecotoxicological data were generated for native plant species exposed to bromacil and tebuthiuron to support revised soil remediation guidelines for use in Alberta if appropriate.

Cumulatively, the risk assessment studies completed above have contributed to a set of recommended best practices for site-specific risk assessment screening and ultimately management of bromacil and tebuthiuron impacted sites.

Miles Tinal

Miles Tinal, M.Sc., specializes in using risk assessment techniques to develop cost-effective closure solutions for the most complex contaminated sites. Over the last 25 years he has managed a range of applied research programs funded through PTAC and other organizations to collect data to support regulatory initiatives such as the Green Area Subsoil Hydrocarbon Guidelines and the Native Prairie Protocol for Salts. He has authored a wide range of regulatory guidance documents related to contaminated sites management for the CCME and provincial regulatory agencies including the Alberta Tier 1 and Tier 2 guideline documents. Miles holds master's degrees in Natural Sciences from Cambridge University and Hydrogeology from London University.

Cory Kartz

Cory Kartz, M.Sc., P.Biol., has a background in soil physics and over 10 years of contaminated sites investigation, risk assessment and risk management experience. He has experience with environmental fate and exposure modelling; soil, vegetation and wildlife surveys; and development of site-specific guidelines and risk-based management strategies to minimize remedial cost and liability while ensuring risks to human health and the environment are managed.