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Risk Assessment Evaluation. Occupational Dermal Exposure from Contaminated Surface Water or Groundwater

Purpose

This bulletin provides supplemental technical direction regarding the evaluation of the dermal exposure pathway for human health risk assessment conducted under the Contaminated Sites Regulation (the Regulation).

Bulletin

To evaluate in human health risk assessment, the dermal exposure pathway for occupational receptors (i.e., trench workers, utilities maintenance personnel, etc.) arising from contact with surface or groundwater at a contaminated site:

1. In accordance with procedures provided by the United States Environmental Protection Agency [1], determine the log octanol-water coefficient (log K_{ow}) value for all potential contaminants of concern (PCOCs) and contaminants of concern (COCs) present in the surface or groundwater which exceed the applicable water quality numerical standards in the Regulation.¹
2. a) If the log K_{ow} for a PCOC or COC is less than 4.5, the dermal exposure pathway for occupational receptors arising from contact with surface or groundwater with respect to that substance need not be evaluated in the human health risk assessment.

b) If the log K_{ow} for a PCOC or COC is greater than or equal to 4.5, the dermal exposure pathway for occupational receptors arising from contact with surface or groundwater with respect to that substance must be evaluated in the human health risk assessment.
3. a) If the hazard and risks for the substance(s) quantified for the dermal exposure pathway for occupational receptors arising from contact with surface or groundwater do not exceed the corresponding risk-based standards of the Regulation (i.e., hazard index less than or equal to one or lifetime cancer risk less than or equal to one in 100,000) the parcel is considered to have been satisfactorily

¹ Where mixtures of substances (e.g., a mixture of pesticide and petroleum “carrier”) or different forms of a substance (e.g., pentachlorophenol and pentachlorophenate) may be present, assume that the most conservative (i.e., the largest) log K_{ow} value applies.

remediated in accordance with section 18 (3) of the Regulation with respect to those substance(s) for that pathway.

- b) If the hazard and risks for the substance(s) quantified for the dermal exposure pathway for occupational receptors arising from contact with surface or groundwater exceed the corresponding risk-based standards, the parcel is considered not to have been satisfactorily remediated under section 18 (3) of the Regulation and appropriate remedial actions (e.g., appropriate risk management measures) must be implemented to ensure compliance with the risk-based standards of the Regulation for the substance(s) and/or that pathway.
4. Appropriate risk management measures for the dermal exposure pathway for occupational receptors include: implementation of institutional or engineering controls or the inspection and maintenance of intrinsic controls, to eliminate, prevent or appropriately mitigate hazard and risk.
5. In accordance with [Procedure 12, "Procedures for Preparing and Issuing Contaminated Sites Legal Instruments,"](#) principal risk controls designed to eliminate or mitigate dermal exposure of occupational receptors in contact with contaminated surface or groundwater, (e.g., imposition of an institutional control such as an occupational health and safety plan, or an engineering control such as dewatering of excavations, trenches, pits, etc.) must be described and included:
 - a) as Schedule "B" principal risk controls in any subsequent Contaminated Sites Legal Instrument issued, and
 - b) in any subsequent Performance Verification Plan prepared.

References

1. US Environmental Protection Agency. (2004). [Risk Assessment Guidance for Superfund \(RAGS\), Volume I: Human Health Evaluation Manual \(Part E, Supplemental Guidance for Dermal Risk Assessment\)](#) – Final. Office of Solid Waste and Emergency Response. Washington D.C., U.S.A. August, 2004.

Associated Contaminated Site documents:

Procedure 12, "Procedures for Preparing and Issuing Contaminated Sites Legal Instruments"
Technical Guidance 4, "Vapour Investigation and Remediation"
Technical Guidance 7, "Supplemental Guidance for Risk Assessments"

Keywords: dermal exposure, occupational, risk assessment, trench worker

Definitions: Terms used in this guidance are defined in the ministry's [Procedure 8, "Definitions and Acronyms for Contaminated Sites."](#) Readers are advised to review definitions for the following terms before using this document:

hazard index	potential contaminant of concern
engineering control	receptor
exposure pathway	Regulation
human health risk assessment	risk-based standards
institutional control	risk management measure

For more information, contact the Environmental Management Branch at site@gov.bc.ca.