

2005 Review of Canada-Wide Standards for Petroleum Hydrocarbons in Soil

Report of the Toxicity Reference Value (TRV) Advisory Sub Group

February 2006

Executive Summary

The Toxicity Reference Value (TRV) Advisory Sub Group was formed to review information and develop recommendations and advice for the CCME Soil Quality Guidelines Task Group with respect to human health toxicity reference values for Petroleum Hydrocarbon contaminants in soil.

The TRV Sub Group conducted nine teleconference meetings and held a one day-long meeting in Calgary, AB between August 2005 and February 2006. These meetings resulted in a number of recommendations being put forward to the CCME Soil Quality Guidelines Task Group. These recommendations are presented below with further rationale provided in the body of this report:

For cumulative effects approach for hydrocarbon fractions used by Atlantic RBCA:

- 1 The CWS four hydrocarbon fraction-approach (F1 to F4) is similar in intent to the current Atlantic Partnership In RBCA Implementation (PIRI) approach at the Tier I level. The issue of whether equivalency exists between the CWS process and the current Atlantic PIRI process is best served through further interaction between CCME and Atlantic RBCA outside of this Sub Group.

For modification of F3 and F4 aliphatic oral exposure limits:

- 2 Modifying the F3 and F4 aliphatic TRVs in light of new toxicological information available from scientific literature theoretically would be technically correct, however, the impact on the TRVs is so small that change is a low priority at this time.

For direct soil exposure pathway and treatment of ingestion and skin contact:

- 3 The TRV Sub Group recommends that the CCME SQGTG combine the ingestion and skin contact pathways (consistent with CCME protocol) for the purpose of determining soil quality guidelines.

For vapour measurements of n-hexane and other C₆ to C₈ aliphatics at contaminated sites:

- 4 The TRV Sub Group initially identified a recommendation for the CCME SQGTG to undertake efforts to pull together field data on vapour measurements of n-hexane and other C₆ to C₈ aliphatics at contaminated sites. The purpose of this recommendation was to obtain a better understanding of the extent to which this hydrocarbon may be present in vapours relative to other C₆ to C₈ aliphatics at contaminated sites. However this recommendation was judged unnecessary after further discussion.

For Toxicity Reference Value (TRV) for n-hexane:

- 5 The TRV Sub Group recommends that the CCME SQGTG develop a separate Toxicity Reference Value and soil quality guideline for n-hexane. In accomplishing this, the CCME SQGTG needs to consider relevant toxicology studies to determine a TRV to represent this hydrocarbon compound.

For Toxicity Reference Value (TRV) to represent the toxic potency of F1 C₆ to C₈ aliphatic hydrocarbons:

- 6 A recommendation was initially considered for the CCME SQGTG to continue using the current Toxicity Reference Value of 18.4 mg/m³ for the F1 C₆ to C₈ aliphatic mixture with n-hexane. However this recommendation was not carried after further discussion because consensus could not be achieved among the Sub Group.
- 7 The TRV Sub Group recommends that the CCME SQGTG initiate a more complete analysis of irritancy data with respect to exposure to F1 C₆ to C₈ aliphatic hydrocarbons as proposed by Equilibrium Environmental Inc. (Equilibrium, 2006)
- 8 The TRV Sub Group recommends that the CCME SQGTG undertake efforts to pull together field data on vapour measurements of the following hydrocarbons that may possibly be associated with neurotoxicity: n-heptane, 3-methyl hexane, 3,4-dimethyl hexane, and n-nonane.
- 9 The TRV Sub Group recommends that the CCME SQGTG further investigate scientific evidence of neurotoxicity that may be associated with exposure to the following hydrocarbons: n-heptane, 3-methyl hexane, 3,4-dimethyl hexane, and n-nonane.

For Toxicity Reference Values (TRV's) for F2 to F4 aromatic and aliphatic fractions:

- 10 Modification of the F2 aromatic Toxicity Reference Value for inhalation is not warranted.
- 11 The TRV Sub Group recommends that CCME SQGTG should develop a Toxicity Reference Value for 1,2-diethylbenzene for the oral exposure route. Once an oral TRV is developed, the F2 soil quality guideline should be reassessed.