

Technical Update

Rationale for Site Condition Standards in O. Reg. 153/04

1. General Information

The purpose of this update is to clarify the origins of the Soil, Ground Water and Sediment Standards for use under Part XV.1 of the *Environmental Protection Act* (“Soil, Ground Water and Sediment Standards”) and to provide the rationale behind the numeric criteria. These standards are published by the Ministry of the Environment and referred to in the Record of Site Condition (RSC) Regulation.

The 1996 MOE “Guideline for Use at Contaminated Sites in Ontario” (as revised February 1997), and associated technical support documents (*Guideline*), were created to provide property owners and their consultants with guidance for site restoration. The guidance documents provide a process for voluntary filing of a RSC and acknowledgement by the Ministry as demonstration that they have met Ministry standards. As of October 1, 2004, the site assessment and remediation of properties for which RSCs are filed will need to be carried out in accordance with the requirements set out by O. Reg. 153/04, the new RSC Regulation. The Environmental Protection Act, as amended by the Brownfields Statute Law Amendment Act 2001, provides for indemnity from MOE orders for properties for which a RSC is filed.

2. Rationale for Site Condition Standards (SCS) in Tables 1 to 5

With a few exceptions, Tables 1, 2, 3, 4, and 5 of the Site Condition Standards referred to in the RSC Regulation contain values that are identical to the old Tables F, A, B, C, and D respectively, of the 1997 “*Guidelines for Use at Contaminated Sites in Ontario*”. The rationale for these numbers can be found in the document “*Rationale for the Development and Application of Generic Soil, Groundwater and Sediment Criteria for Use at*

Contaminated Sites in Ontario” (Dec. 1996) (Rationale Document). This document is available from the Ministry of the Environment Public Information Centre, located at 135 St. Clair Avenue West.

2.1 Petroleum Hydrocarbon Rationale

The first exception is that there are now new criteria for Petroleum Hydrocarbons (PHCs) in soil. The rationale for the development of the PHC values for soils is contained in the document “*Canada-Wide Standards for Petroleum Hydrocarbons (PHCs) in Soil: Scientific Rationale: Supporting Technical Document*” (Dec, 2000) developed by the Canadian Council of Ministers of the Environment (CCME). This document is available on the internet at: http://www.ccme.ca/initiatives/standards.html?category_id=9 The Canada-wide Standard (CWS) for PHCs, as described in the CCME document, contains values for four fractions that are defined by the number of carbons (C) in the organic compound. Fraction 1 is C6 to C10, fraction 2 is C>10 to C16, fraction 3 is C>16 to C34 and fraction 4 is C>34. The potable groundwater numbers for PHCs were obtained by applying the gas/diesel criteria from the 1996 *Guideline* to the sum of the CWS fractions 1 and 2, and applying the value for heavy oils to the sum of the CWS fractions 3 and 4. As there were no criteria values for non-potable ground water in the 1996 *Guideline*, and as there were no Canada-wide Standard values, there are no “non-potable ground water” values available for use in Tables 3 or 5, and accordingly, the data fields for fractions 1 to 4 are shown as N/V (no value).

When using the new PHC values you should familiarize yourself with the new non-numerical components for meeting PHC standards as specified in Section 49(1) and



(2) of the RSC Regulation. Under these sub-sections, meeting the new PHC Site Condition Standards requires a determination by the Qualified Person that there is no evidence of free product, including but not limited to any visible petroleum hydrocarbon film or sheen present in the ground water or surface water or in any ground water or surface water samples.

In the case of a potable ground water site condition, a property does not meet an applicable potable ground water Site Condition Standards unless the ground water is also free from objectionable petroleum hydrocarbon odour and taste. This is consistent with similar requirements in other jurisdictions such as the Atlantic Partners In Risk Based Corrective Action (RBCA) Implementation. There are no prescribed methods for assessing this; therefore it is at the Qualified Person's discretion. This is consistent with the certification to be made by the Qualified Person, when filing a RSC, that there is no evidence of contamination which will interfere with the proposed use.

2.2 Full Depth Background Ground Water Site Condition Standards

The second exception is for the "Full Depth Background Ground Water Site Condition Standards" (Table 1). The original table (Table F) in the *Guideline* had background values for soils but not for ground water. As a result of incorporation of the standards into the RSC Regulation, a need was identified to have a set of background ground water criteria to be used in the table for "Full Depth Background Site Condition Standards for All Types of Property Use". There were no suitable background concentrations available from ground water surveys to cover the chemicals in Table 1. A set of standards consistent with background conditions was therefore derived from previously published criteria using the following procedure:

1. The lower value of either Table 6 (see below) or the Provincial Water Quality Objective (PWQO) was determined.
2. Where there was no PWQO for an organic compound, the Method Detection Limit (MDL) was substituted, where no PWQO for an inorganic substance was available, no value (NV) was put in the table.
3. Where there was neither a PWQO nor an MDL, no value (NV) was put in the table.

The resulting number was not permitted to be below the MDL, unless the Ontario Drinking Water Quality Standard (ODWQS) was below the MDL, in which case the ODWQS was used.

3. Rationale for Site Condition Standards in - Table 6 (Soil Extract and Ground Water Standards to Determine Whether a Property is a "Shallow Soil Property")

A table was developed for the purpose of assessing vulnerability of shallow or thin soils over bedrock to leaching of contaminants into ground water and surface water.

Table 6 was derived to provide the lowest of the following values from the 1996 component tables in the Rationale Document:

- the actual aquatic effects number,
- the groundwater to indoor air component value, and
- the potable groundwater component value.

To ensure consistency with the basis of the values in Tables 1 to 5, this value was adjusted so as not to exceed:

- the 1996 groundwater ceiling limit (50,000 ug/litre)
- the 1/2 solubility limit values as in the 1996 Rationale document.

The resulting number was not permitted to be below the MDL, unless the Ontario Drinking Water Quality Standard (ODWQS) was below the MDL, in which case the ODWQS was used.

The Proponent is to compare measured soil extract or ground water concentrations with these standards to determine whether or not the generic standards (Tables 2 to 5) can be applied in these shallow or thin soil situations.

4. Use of the Tables of Site Condition Standards

The tables of Site Condition Standards referred to in the RSC Regulation were derived for use in the assessment and remediation of the majority of contaminated sites in Ontario and filing a RSC for those properties. The numeric criteria contain many assumptions that are appropriate for use at contaminated sites being redeveloped under Ontario RSC legislation, regulations and guidelines. However, some of these assumptions may not be appropriate for other uses of these numeric criteria. It is recommended that use of these numbers for other purposes occur only with a thorough understanding of the development process, assumptions used, and the potential consequences, and after discussion with the Standards Development Branch of the Ministry of the Environment.