

changed, that result in conditional closure as indicated in Appendix 1, Table 1 and Table 2, respectively.

b) Tier 2 Conditional

The use of Tier 2 remediation levels (PSS tables or SSTLs) results in conditional closure when exposure pathways are removed, or when default parameters are changed, that result in conditional closure as indicated in Appendix 1, Table 1 and Table 2, respectively. Conditional closure is only allowable within the context of the Limited Remediation pathway.

c) Use of Atlantic RBCA Guidance for Soil Vapour and Indoor Air Monitoring Assessments

The Guidance for Soil Vapour and Indoor Air Monitoring Assessments from Atlantic RBCA (latest version) can be used to support the development of Tier 2 remediation levels. Since the method is one of direct confirmatory measurement, exposure pathways that show acceptable risk under this method are eligible (if all other conditions and exposure pathway criteria are met) for unconditional closure under either Limited Remediation, or Full Property Remediation. Table 1 in Appendix 1 indicates this concept for the relevant indoor air pathways.

5.3 Requirements Regarding Third-Party Properties

In general, the Minister accepts any remediation levels or measures for third-party properties that were determined following this protocol and are consistent with the requirements of the *Contaminated Sites Regulations* and all other protocols.

6 LONG-TERM EXPOSURE MANAGEMENT MEASURES

Contaminated sites that are not cleaned-up to acceptable Tier 1 EQS or Tier 2 remediation levels in some cases may be managed through the use of long-term exposure controls documented in a risk management plan. Such controls protect all applicable human and ecological receptors from exposure to contaminants. The use of exposure controls for managing contamination results in conditional closure that may only be used in Limited Remediation.

Long-term exposure management measures may include monitoring pathway exposures as well as acceptable controls for reducing or eliminating contaminated site exposures. Monitoring is intended to confirm that receptor exposure does not occur over time despite the existence of contamination on a site. Exposure controls may involve engineering or physical controls as well as administrative receptor access controls.

To ensure information is administratively linked with properties, conditions associated with site monitoring, inspection and maintenance of exposure management controls must be documented in a Risk Management Plan. This must be included as specified in protocol PRO-600, *Remedial Action Plan Protocol*.

6.1 Exposure Management using Monitoring to Confirm No Exposure to Receptors

When monitoring is used as a means to manage exposure from a contaminated site, a detailed long-term monitoring plan is required, in the Risk Management Plan, that includes the following:

- a) sufficient initial monitoring to verify that site contaminants in any affected media are not mobile
- b) identification of exposure pathways of concern that need to be monitored
- c) long-term monitoring plan preparation showing the contaminants to be monitored, the media that are to be sampled, and the frequency of monitoring
- d) establishment of monitoring action target levels
- e) description of actions to be taken if monitoring results exceed action levels

6.2 Exposure Management with Engineering or Physical Controls

Soil or groundwater contamination exceeding remedial objectives for a site (Tier 1 EQS or Tier 2 levels) may be left in place if appropriate engineering or physical controls ensure that receptors are not exposed to the contaminant hazards. This includes such controls as fencing, caps, covers, barriers, vapour removal systems, indoor ventilation, liners, and groundwater

hydraulic barriers, among others. Requirements by the Minister regarding engineering or physical controls that must be included in the Risk Management Plan are:

- a) physical controls that are appropriately designed or otherwise determined by site professionals
- b) demonstrated effectiveness of physical controls prior to closure
- c) ongoing monitoring and inspection of proper physical control function
- d) proper consideration of the physical controls used, since they will affect the type of site closure as well as requiring long-term exposure management requirements.

6.3 Exposure Management Using Administrative Restricted Access Controls

As an alternate to physical controls, exposure to site contaminants may be managed by administrative controls that effectively restrict access to contamination. This includes such controls as building restrictions and covenants, security programs, activity prevention programs, changes to land use through zoning or by-laws, and contingency plans. Requirements by the Minister regarding administrative controls that must be documented in the Risk Management Plan are as follows:

- a) administrative controls must be properly determined by a site professional and implemented
- b) the effective use of administrative controls must be demonstrated prior to site closure
- c) monitoring and inspection measures must be in place to ensure administrative controls remain effective over time.

APPENDICES

Appendix 1

Table 1 Tier 2 Pathway Specific Standards – Exposure Pathway Removal Effects

Table 2 Tier 2 Site Specific Risk Assessment Modeling: Changes to Typical Default Data Parameters ¹

Appendix 2 Pathway Specific Standards (PSS) Tables

Table 3A Pathway Specific Standards for Agricultural Soil

Table 3B Pathway Specific Standards for Residential Soil

Table 3C Pathway Specific Standards for Commercial Soil

Table 3D Pathway Specific Standards for Industrial Soil

Table 4 Pathway Specific Standards for Sediment

Table 5 Pathway Specific Standards for Surface Water and Groundwater Discharging to Surface Water

Table 6A Pathway Specific Standards for Agricultural Groundwater

Table 6B Pathway Specific Standards for Residential Groundwater

Table 6C Pathway Specific Standards for Commercial Groundwater

Table 6D Pathway Specific Standards for Industrial Groundwater