Introduction to Atlantic RBCA Version 2

Webinar
April 29, 2009

Attending Today's Session

- Hosting
  - Tania Noble Sharpe, Stantec
  - Michel Poirier, NBENV
- Other Members of Atlantic PIRI
- You – People who have taken the on-line course

Outline

- Quick Navigation (Webinar)
- Move through the topics covered in the course
  - Ask Questions at any time
  - Written submissions
- Written responses will be posted

Reminder of the Topics

- M1 – Introduction
- M2 – Overview
- M3 – RA Fundamentals
- M4 – Evaluating Exposure Pathways
- M5 – Fate and Transport
- M6 – ARBCA Model Issues
- M7 – Model Sensitivity
- M8 – Navigating the ARBCA Toolkit
- M9 – Version 2 User Guidance
- M10 – Soil Vapour & IA Monitors
- M11 – Atlantic Regulatory Process
- M12 – Final Test

M2 - Overview

- Define the terms Atlantic **RBCA** and Atlantic **PIRI**.
- List the **members** of the Atlantic PIRI Committee.
- Appreciate and describe the **formation** of Atlantic PIRI.
- Provide a **brief overview of Atlantic RBCA's history** and the need for Atlantic provincial harmonization.
- Outline the Atlantic RBCA **tiered approach**.
- List the **benefits** of Atlantic RBCA.
- Review the **resources available online** for industry members and consultants.

M3 – Risk Assessment Fundamentals

- Define '**risk assessment**' and '**risk management**'.
- Describe the **steps involved** in problem formulation, toxicity assessment, exposure assessment, and risk characterization.
- Determine the **exposure point concentration**.
- Calculate the **exposure rate**.
- Calculate the **chemical intake**.
- Calculate the **health risk**.
- Calculate risk based screening levels (RBSLs).

M4 – Evaluating Exposure Pathways

- Who will be exposed?
- What will they be exposed to?
- How long will they be exposed?
- By what means will they be exposed (e.g., inhalation, ingestion, dermal contact)?
- What effect will the exposure have on them

M5 – Fate and Transport Fundamentals

- Describe the **objectives** for risk-based modeling.
- List the principal **transport mechanisms.**
- Identify and calculate the **cross-media partitioning factors.**
- Define and calculate the **groundwater transport processes.**
- Identify the different types of **air transport processes.**
- Discuss **total petroleum hydrocarbons** (TPH) issues.

M6 – Common Atlantic RBCA Model Issues

- **Common issues** with the RBCA model that are specific to the Atlantic Provinces, including:
  - Volume to area ratio.
  - Crack fraction.
  - Depth to affected soil.
  - Exposure pathway selection.
  - Definition of product type.
  - Non-detectable results.
  - Exclusion of TEX from modified TPH at Tier II.
  - Cumulative risk calculations.
  - Definition of source area.
  - Sensitive off-site receptors.
  - Age adjustment.

M7 – Model Sensitivity

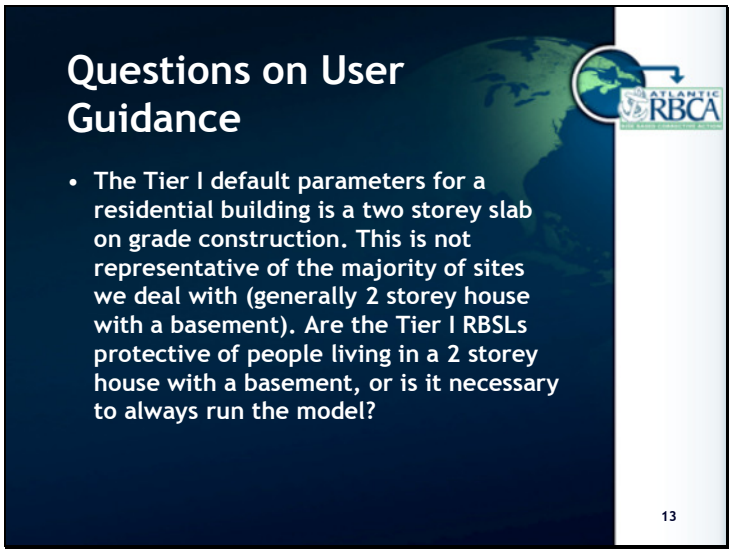
- Review the **sensitivity analysis** of the Atlantic RBCA model.
- Determine **how to change the default settings** to account for these sensitivities.

M8 – Navigating the Atlantic RBCA Toolkit

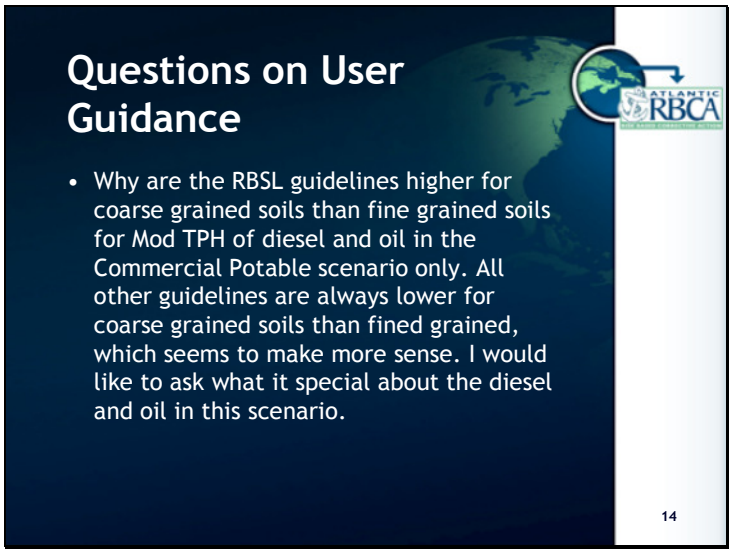
- Perform **basic tasks** within the Atlantic RBCA toolkit.
- Use the toolkit to **assess** case studies modeled on actual sites.

M9 – Version 2 User Guidance

- Find the Atlantic RBCA User Guidance document online.
- List the main components of the User Guidance document.
- Use the Tier I and Tier II look-up tables.
- Identify the default conditions defined by Atlantic PIRI.
- Discuss elements that require special consideration.



Yes, the Tier I RBSLs are protective for this scenario. With respect to the number of stories, the RBSLs are based on an assumption that there is a certain minimum amount of dilution within the building based on the presence of at least two stories (refer to the volume: area ratio of 4.88 m). With a two storey plus basement, there would be a greater potential for mixing and therefore the RBSLs are considered conservative. If there is only a one storey house with a slab-on-grade construction, there would be less space within which vapours could mix (relative to the default), and hence a Tier II assessment (model run) would be required.

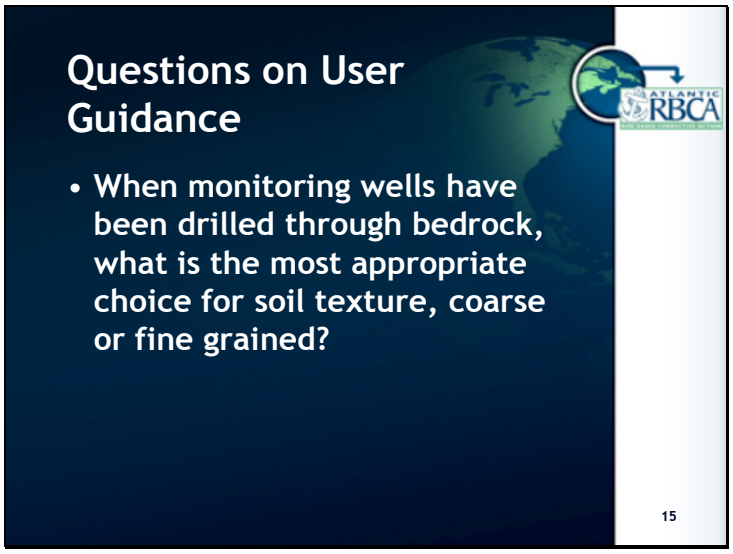


The answer is related to the controlling exposure pathway not the fuel type.

For soil leaching to groundwater, the RBSLs are lower for a fine grained soil. Conceptually, the groundwater flows more slowly through a fine grained soil and picks up more hydrocarbons at the source. Higher source groundwater concentration means lower soil RBSL.

For indoor air, vapour permeability is higher in a coarse grained soil and more vapours get into the building, hence the soil RBSL is lower in a coarse grained soil.

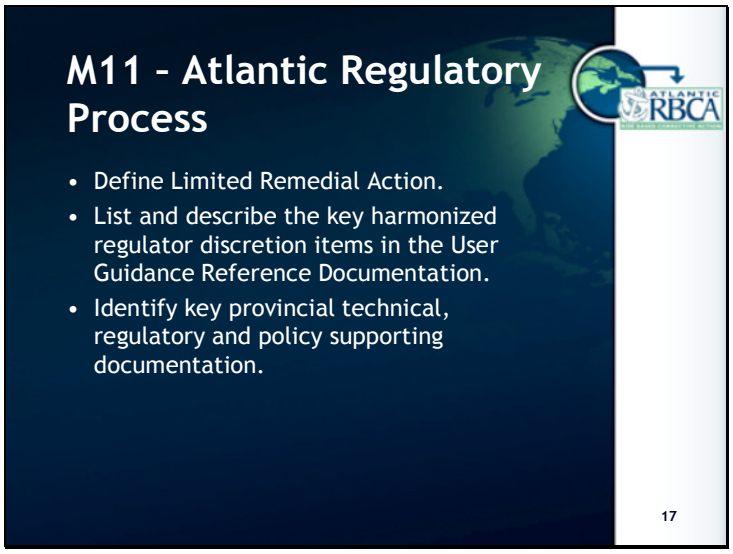
At sites which are controlled by the soil leaching numbers, the fine grained RBSLs will be lower. For sites controlled by the indoor air numbers, the coarse grained RBSLs will be lower.

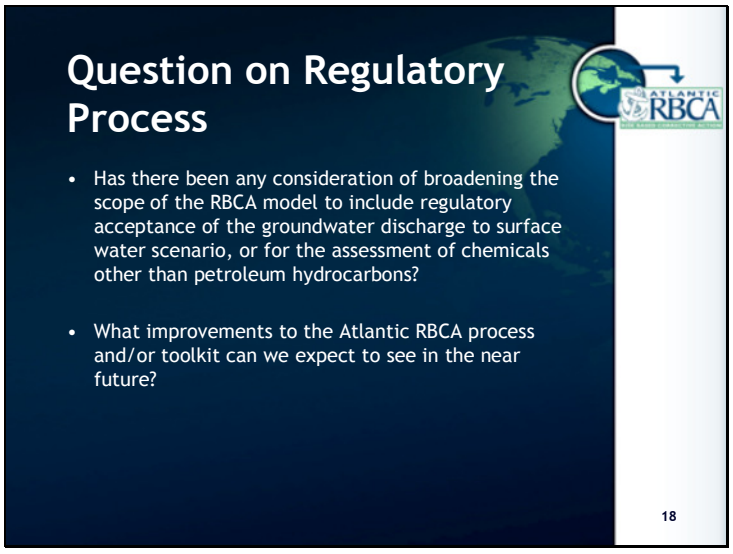


With respect to the use of the groundwater RBSLs for a potable site, the RBSLs are based on the direct ingestion of the groundwater. As a result, whether the well is constructed in soil, groundwater, or any type of bedrock does not affect the RBSLs (i.e., for potable sites, the RBSLs are the same for coarse-grained and fine-grained soil, and would be the same for bedrock too).

With respect to the use of groundwater RBSLs on non-potable sites, the RBSLs for a coarse-grained soil may be used if the bedrock is very fractured and has secondary porosity – in short, the site professional must be confident that transport within the bedrock is similar to that within an equivalent porous media. If these conditions do not apply, the Tier I RBSLs should not be used and a Tier III approach considered.

For example, non-potable coarse-grained RBSLs may be appropriate for wells completed in highly fractured sandstone; non-potable RBSLs would not be recommended for wells completed in competent granite.





The Atlantic RBCA model is used assess potential human health exposure to petroleum hydrocarbons. The primary concern with the groundwater discharge to surface water exposure scenario is the ecological receptor, and that is beyond the capability of the current version of the toolkit. Later this year, Atlantic PIRI plans to release a more comprehensive ecological receptor screening tool. Atlantic PIRI is also in the process of adding chloronated solvents to version 3 of Altlantic RBCA toolkit. The release of the next version of the toolkit is expected within the next twelve months.