



# 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

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## Outline

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

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## 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

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## 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.

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## 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).

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## 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

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## 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.

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## 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.

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## M7 - Model Sensitivity

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

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## 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.

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## 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.

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## Questions on User Guidance

- The Tier I default parameters for a residential building is a two storey slab on grade construction. This is not representative of the majority of sites we deal with (generally 2 storey house with a basement). Are the Tier I RBSLs protective of people living in a 2 storey house with a basement, or is it necessary to always run the model?

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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.

## Questions on User Guidance

- Why are the RBSL guidelines higher for coarse grained soils than fine grained soils for Mod TPH of diesel and oil in the Commercial Potable scenario only. All other guidelines are always lower for coarse grained soils than fine grained, which seems to make more sense. I would like to ask what is special about the diesel and oil in this scenario.

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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.

## Questions on User Guidance

- When monitoring wells have been drilled through bedrock, what is the most appropriate choice for soil texture, coarse or fine grained?

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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.

## M10 - Soil Vapour and Indoor Air Monitoring

- Define soil vapour and indoor air sampling in the regulatory context of Atlantic Canada.
- Describe how soil vapour and indoor air are monitored.
- Identify the regulatory expectations.

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## M11 - Atlantic Regulatory Process

- Define Limited Remedial Action.
- List and describe the key harmonized regulator discretion items in the User Guidance Reference Documentation.
- Identify key provincial technical, regulatory and policy supporting documentation.

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## Question on Regulatory Process

- Has there been any consideration of broadening the scope of the RBCA model to include regulatory acceptance of the groundwater discharge to surface water scenario, or for the assessment of chemicals other than petroleum hydrocarbons?
- What improvements to the Atlantic RBCA process and/or toolkit can we expect to see in the near future?

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The Atlantic RBCA model is used to 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 chlorinated solvents to version 3 of the Atlantic RBCA toolkit. The release of the next version of the toolkit is expected within the next twelve months.