



Environment
Canada

Environnement
Canada

Canada



FCSAP

Ecological Risk Assessment Guidance

**Geoenvirologic – 5th Annual Symposium
Contaminated Site Risk Assessment**

**Vancouver, June 4, 2010
Ute Pott
Environment Canada**

Overview of FCSAP Guidance for Ecological Risk Assessment

- **Comprehensive Ecological Risk Assessment Guidance – General Methods**
- **2 Technical Modules in Appendices**
 - Guidance on how to develop Site Specific Toxicity Reference Values
 - Guidance on how to select appropriate Toxicity Tests
 - Additional Technical Modules will be added in future
- **Interim Groundwater Guidelines for Federal Sites**

Comprehensive ERA Guidance

- Technical guidance for all phases of the ERA (problem formulation, exposure assessment, effects assessment risk characterization)
- Supplemental to CCME 1996, 1997 guidance
- Based on Weight of Evidence Approach to Ecological Risk Assessment
- Promotes identifying lines of evidence early and carrying them through in the risk assessment
- Promotes documenting that risk was addressed comprehensively (e.g. all receptors, all contaminants)



Comprehensive ERA Guidance

- **Contracted to Azimuth/Golder in 2009**
- **Finalizing Draft Spring 2010**
- **Translation Summer 2010**
- **Peer/Public Review Fall 2010**
- **Interested to review?
Sign-up with presenter**



Technical ERA Guidance Modules

- **Module 1:**
Guidance on how to develop Site Specific Toxicity Reference Values (TRVs).
- **Module 2:**
Guidance on how to select appropriate Toxicity Tests for Ecological Risk Assessment.



Technical ERA Guidance Modules



Drafted in 2008/09

- Azimuth Consulting Group
- Golder

Public/Peer Review in 2009/2010

- FCSAP Expert Support (DFO, EC, HC)
- Environment Canada Science and Technology
- Provincial Governments
- Consultants

Current Status

- Will be published after translation – Fall 2010
- Available upon request – Summer 2010



Technical Module 1: TRV Selection & Development

- A Toxicity Reference Value (TRV) is:
 - An exposure concentration or dose for a contaminant of potential concern (COPC) that is not expected to cause an unacceptable level of effect in a receptor of concern (ROC).
 - contaminant-specific, receptor-specific and possibly site-specific.
- Toxicity Reference Values (TRVs) are selected or developed during the effects assessment stage of the ERA.
- TRVs are utilized in the Risk Characterization Stage

$$\textit{Hazard} _ \textit{Quotient} = \frac{\textit{Exposure}}{\textit{TRV}}$$

Technical Module 1:

Development of specific TRVs

- TRVs can be divided into three categories according to their development and their application :
 - **Dose-based TRVs:**
 - mg/kg/per day
 - species of higher trophic level
 - **Concentration-based TRVs in media:**
 - mg/kg or mg/L
 - species of lower trophic level
 - **Concentration-based TRV in tissues :**
 - mg/kg
 - Mainly used for the bioaccumulative contaminants
 - Critical body residue (CBR) is another term that is often used to refer to a tissue-based TRV.



Technical Module 1: TRV Selection & Development

TRVs can be obtained from several sources:

- **Published TRVs**

- TRV module provides table with sources of published TRVs plus info on derivation methods, ecological endpoints, protection levels, advantages and limitations.
- TRV Module provides guidance on how to select from published TRVs.

- **Derivation of Site Specific TRVs from:**

- Published toxicological data (TRV Module lists applicable databases plus guidance on how to use literature data).
- Modifying Existing Guidelines (TRV Module lists appropriate guideline derivation protocols)
- Site specific toxicity tests (use in conjunction with Technical Module 2 – Toxicity Testing)

Technical Module 2: Selecting Toxicity Tests for ERAs

- Overview of Different Roles of Toxicity Testing in Ecological Risk Assessment (Line of Evidence, TRV development, etc.)
- Guidance on Interpretation of Toxicity Test Results in a Risk Assessment Weight-of-Evidence Framework
- **Guidance on Selecting Appropriate Toxicity Tests for Ecological Risk Assessment**
- *Format: Guidance Text and Interactive Excel Tables*



Technical Module 2: Selecting Toxicity Tests for ERAs

Key Information in 3 Excel Tables:

- **Table 1:** Demonstrates linkage between receptor types, applicable ecosystem types, test media and what pathways are being simulated
- **Table 2:** Generates a list of all applicable toxicity testing protocols by ecosystems and receptor types
- **Table 3:** Evaluates the suitability of the tests selected in Table 2 :
 - Utility for Risk Assessment
 - Organism/Substrate Characteristics
 - Logistics and Planning

Technical Module 2: Selecting Toxicity Tests for ERAs

- Demonstration of EXCEL Tables

[Toxicity Module Tables March 2010.xls](#)

Interim Federal Groundwater Guidelines

- FCSAP Lead – Environment Canada
Marie-Louise Geadah and Xing Wu
- Contractor: Meridian Environmental Inc.
- Developed and reviewed
in 2009/10
- Available on IDEA
or by request to
xing.wu2@ec.gc.ca
- “Interim” guidelines
should be used on
FCSAP sites until CCME
develops groundwater
guidelines
- To be used in conjunction
with Health Canada
Drinking Water Guidelines



Interim Federal Groundwater Guidance

3 Tiered Framework

(consistent with the CCME Canadian Soil Quality Guidelines)

Tier 1: direct application of the generic numerical guidelines;
application of the lowest guideline for any pathway

Tier 2: modifying the numerical Tier 1 guidelines based on site-specific conditions and focusing on exposure pathways and receptors that are applicable to the site

Tier 3: use of site-specific risk assessment to develop site-specific remediation objectives

Interim Federal Groundwater Guidance

- Interim Tier 1 and pathway specific Groundwater Guidelines
 - metals,
 - hydrocarbons,
 - halogenated aliphatics,
 - chlorinated aromatics,
 - phenols,
 - pesticides,
 - other organics
- 3 different landuses: agricultural, residential/parkland and commercial/industrial
- Separate values for fine/coarse soil
- Applies to groundwater at > 10m distance to surface water
- Guidelines not include drinking water protection!



Interim Federal Groundwater Guidance

Interim Groundwater Guidelines based on specific pathways:

For all land uses

- Groundwater flow to surface water and exposure to aquatic life
- Direct contact of soil organisms to groundwater
- Vapour generation and inhalation by humans

For agricultural land use only:

- Groundwater use for irrigation
- Groundwater use for livestock watering
- Groundwater discharging to surface water and subsequent ingestion by wildlife

Interim Federal Groundwater Guidance

- Federal interim groundwater guidelines should be used at all federal sites receiving FCSAP funding.
- Separate comparison the Drinking Water Guidelines (Health Canada) is required where applicable
- Tier 1 and Tier 2 Federal interim groundwater guidelines apply only to groundwater samples > 10m from surface water
- Groundwater <10m from surface water must be compared to CCME Water Quality Guidelines for the Protection of Aquatic Life

Guidance for ERA - Summary

Comprehensive ERA Guidance

- Peer/Public Review – Fall 2010
- Interesting in reviewing – contact Ute.Pott@ec.gc.ca

Technical ERA Guidance Modules – TOX and TRV

- Peer/Public Review completed
- Will be published after translation – Fall 2010
- Available upon request – Summer 2010 Ute.Pott@ec.gc.ca

Interim Federal Groundwater Guidelines

- Posted on IDEA (federal custodian access only)
- Available upon request from xing.wu2@ec.gc.ca



Guidance for ERA



Environment
Canada

Environnement
Canada

Canada 