Missouri Risk-Based Corrective Action Default Target Levels and Tier 1 Risk-Based Target Levels Update… the What, the Why, and the When

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Missouri Risk-Based Corrective Action (MRBCA) Update

Risk-based corrective action (RBCA) incorporates the process of site characterization, risk assessment, and risk management, providing a streamlined framework for making remediation decisions at contaminated sites.

The MRBCA update consists of the following:

- Updating the Risk-Based Target Levels (RBTLs) and Default Target Levels (DTLs),
- Updating the MRBCA Guidance, and
- Rulemaking.

MDHSS Role

Missouri Department of Health and Senior Services (MDHSS),
Bureau of Environmental Epidemiology (BEE)

MDHSS has primary responsibility for safeguarding the health of the people of Missouri. BEE has specific responsibility for the investigation and prevention of illnesses and medical conditions related to the environment.

Health and Risk Assessment Program (HRAP)

HRAP is responsible for evaluating human exposure to hazardous substances in the environment and for making health-protective recommendations regarding actions needed.

Risk Assessment vs. Risk Management

RISK ASSESSMENT (MDHSS Role)

- Unbiased scientific approach to assessing potential health risks of exposure to hazardous substances in the environment.

RISK MANAGEMENT (Regulator's Role)

- The process of weighing policy alternatives and selecting the most appropriate regulatory action by integrating the results of risk assessment with other considerations, such as feasibility, cost, etc.

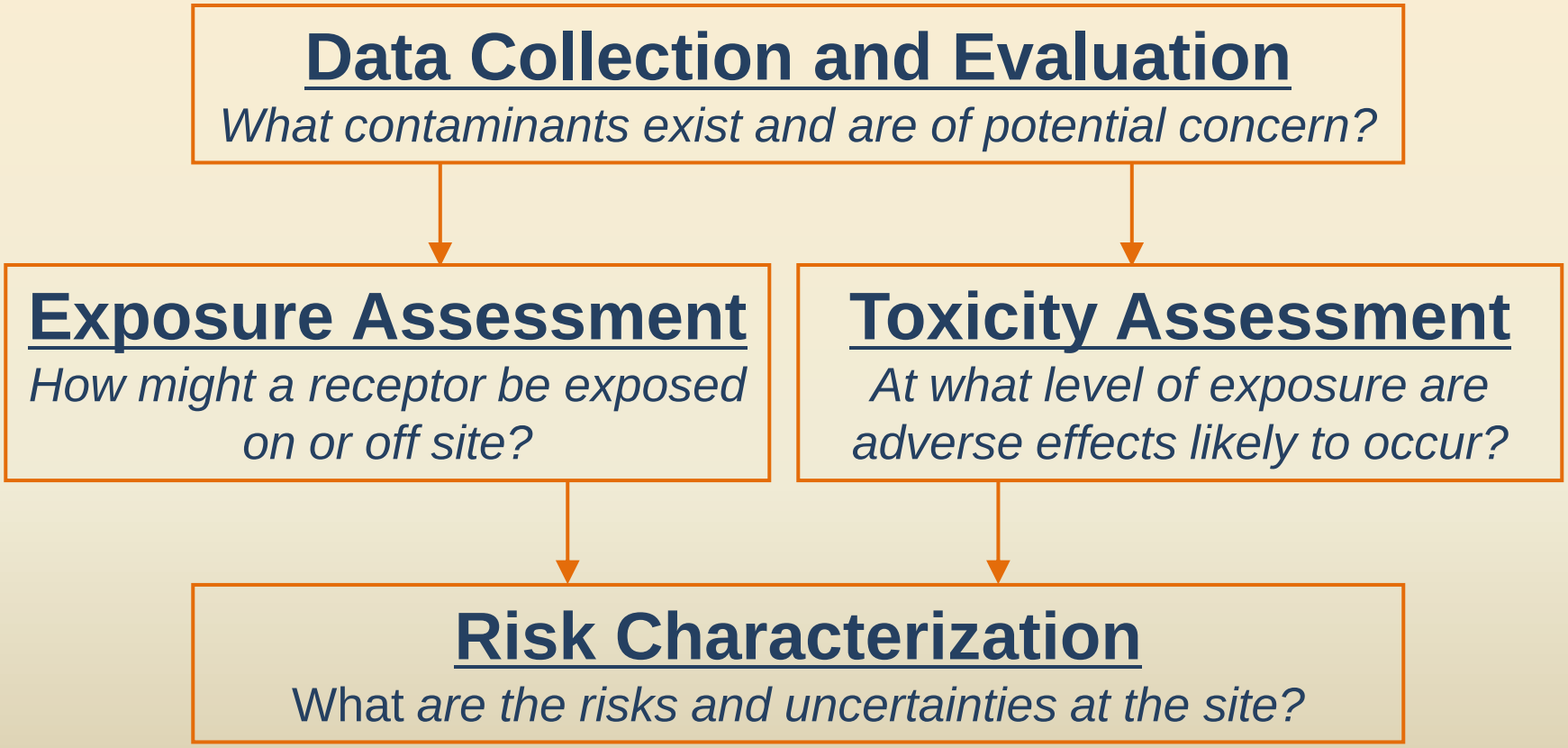
Human Health Risk Assessment (HHRA) Purpose

The HHRA process provides a consistent framework for evaluating and documenting potential public health threats from contaminated sites for the purpose of guiding decision-making on appropriate response actions.

Specifically, results of an HHRA are used to:

- provide an analysis of baseline risks to help determine whether response action is necessary at the site;
- provide a basis for determining levels of chemicals that can remain onsite and still be adequately protective of public health; and
- provide a basis for comparing potential health impacts of various response actions.

HHRA Process



MRBCA RBTLs – Need for Update

MRBCA should provide a scientifically defensible and consistent framework to make decisions related to site characterization, risk assessment and risk management and a predictable regulatory process for property owners and developers.

Proposed changes focus on these two aspects – scientific defensibility and consistency.

- The current MRBCA RBTLs are outdated.
- There is a lack of consistency in the cleanup of contaminated sites in our state.

MRBCA RBTLs - Update Approach

The Tier 1 RBTLs will be modified to incorporate current U.S. Environmental Protection Agency (EPA) risk assessment guidance and to be generally consistent with EPA's Regional Screening Levels (RSLs). The update will follow the same general approach outlined in MRBCA guidance as follows:

Target Risk Levels:

- Carcinogenic Risk – Individual Excess Lifetime Cancer Risk (IELCR) of 1E-5
- Non-Carcinogenic Risk – Hazard Quotient (HQ) of 1

Tier 1 RBTL Calculations:

- Exposure Pathways for Soil, Groundwater, and Air for the following receptor populations:
  - Residential Land Use – Tier 1 RBTLs will be selected based on the lowest of child resident, adult resident, and age-adjusted resident
  - Non-Residential Land Use
  - Construction Worker
- Soil concentrations protective of domestic use of groundwater pathway

Target Level Development Process

Standard Models/Equations

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Inputs:

- **Exposure Factors**
- **Chemical Toxicity Values**
- **Physical and Chemical Properties**
- **Fate and Transport Parameters**

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Target Risk Levels (Cancer and Non-Cancer Effects)

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Tier 1 RBTLs

(Residential, Non-Residential, Construction Workers)

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DTLs (Lowest of all Tier 1 RBTLs)

MRBCA RBTLs - Update Details

	2006	Proposed
Total Chemicals	280	>700
Models/Equations	Various Sources	EPA
Exposure Factors	Various Sources	EPA defaults
Toxicity Values	Various Sources	EPA hierarchy
Physical and Chemical Properties	Various Sources	EPA hierarchy
Fate and Transport Parameters	Various Sources	EPA defaults
Target Cancer Risk (IELCR)	1E-5 each chemical 1E-4 cumulative	1E-5 each chemical 1E-4 cumulative
Target Non-Cancer Risk (HQ, HI)	1 (HQ-each chemical) 1 (HI-cumulative)	1 (HQ-each chemical) 1 (HI-cumulative)

MRBCA RBTLs - Models/Equations Update

Equations used to develop Tier 1 RBTLs will be updated to be based on current science and will be derived from EPA. This is for consistency and to ensure the equations used for our state produce conservative levels protective of public health.

Changes are warranted for:

- Equations derived from ASTM
- Mutagenic Equations
- Inhalation Equations for all scenarios
- Construction Worker Inhalation Equations
- Vapor Intrusion Equations

MRBCA RBTLs – Exposure Factors Update

Exposure Factors used to develop Tier 1 RBTLs will be updated to be based on default EPA assumptions in order to represent a conservative reasonable maximum exposure (RME) scenario to protect public health.

Changes are warranted for:

- Non-standard exposure factors currently in MRBCA and updating of previous default factors to be based on current defaults.

MRBCA RBTLs – Toxicity Values Update

Toxicity values used to develop Tier 1 RBTLs will be updated to reflect current science. There have been numerous updates to toxicity values over the past years - the current MRBCA toxicity values are outdated and some differ substantially with current values.

Changes are warranted for:

- Toxicity Value Hierarchy
- Dermal Toxicity Values
- Toxicity Values based on Route-to-Route Extrapolation

MRBCA RBTLs – Physical & Chemical Properties Update

Chemical-specific parameters used to develop Tier 1 RBTLs will be updated to be consistent with the hierarchy of sources used for the EPA RSLs.

Changes are warranted for:

- Physical and Chemical Properties Hierarchy
- Chemical-Specific Parameters Hierarchy for Dermal Exposure Pathways
- Definition of Volatiles

MRBCA RBTLs – Fate and Transport Parameters Update

Fate and transport parameters used to calculate Tier 1 RBTLs will be updated to be consistent with EPA default values.

Changes are warranted for:

- MRBCA parameters inconsistent with EPA defaults.
- MRBCA parameters used in ASTM equations that are no longer recommended.
- Incorporation of additional fate and transport parameters for new equations to be incorporated into MRBCA as needed.

Major RBTL Changes

- Chemical Toxicity Values

Comparison of 2006 vs. Proposed Updated RBTLs				
	TCE		PCE	
	2006	Proposed	2006	Proposed
Residential Air (µg/m^3)	12.80	2.10	4.00	42.00
Residential Vapor Intrusion - Soil Gas (µg/m3)	546000.00	70.00	200000.00	1400.00
Residential Vapor Intrusion - Groundwater (µg/L)	1600.00	5.20	338.00	58.00
Residential Soil Direct Contact (mg/kg)	477.00	4.10	11.80	81.00
Groundwater Domestic Water Use (µg/L)	5.00	2.80	5.00	41.00

- Calculation of Cumulative Risk

  Currently, calculated infrequently. MRBCA guidance will be modified to clarify when cumulative risk is required.

QUESTIONS

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