



MISSOURI DEPARTMENT OF
**HEALTH &
SENIOR SERVICES**

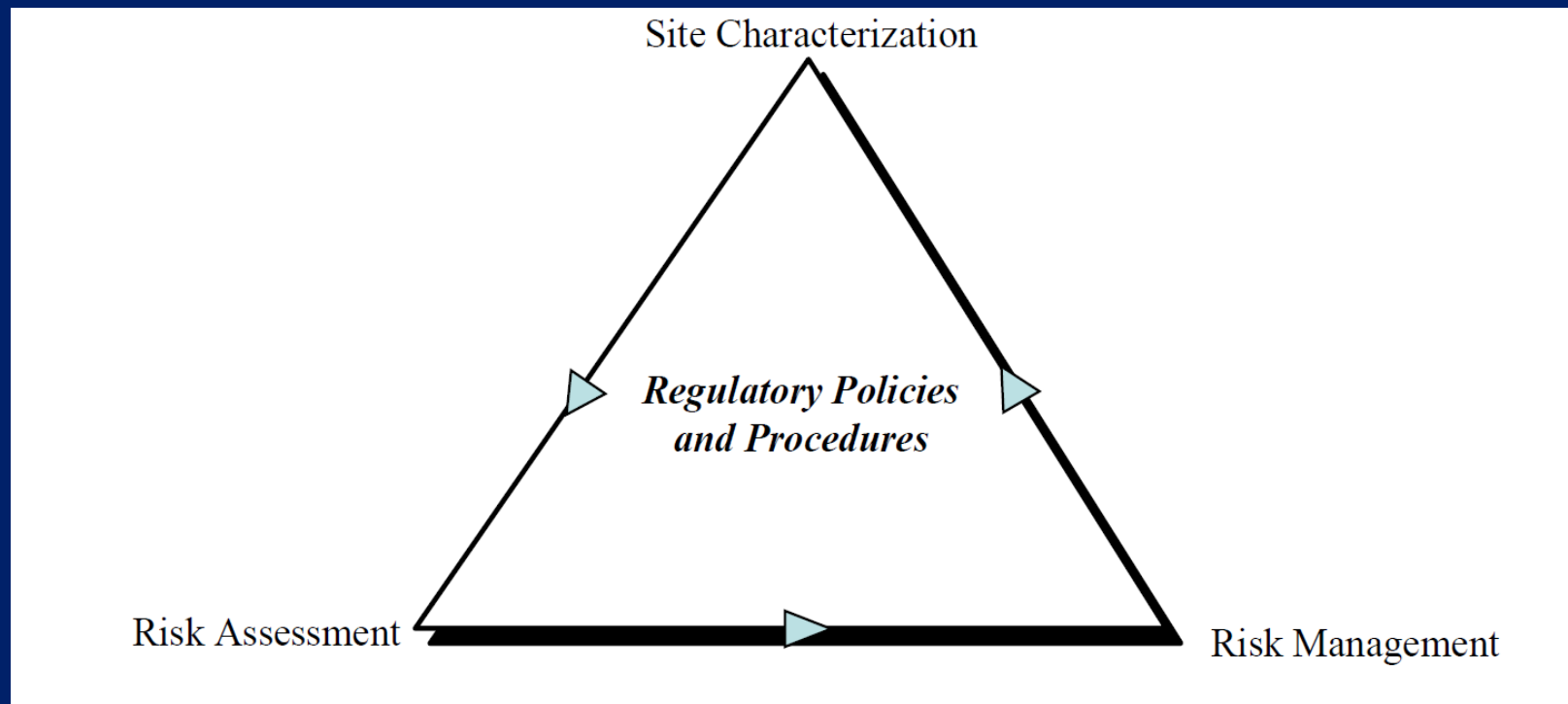
**Missouri Risk-Based Corrective Action (MRBCA)
Proposed Risk-Based Target Levels (RBTLs)**

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Risk-Based Corrective Action

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.



MDHSS Role

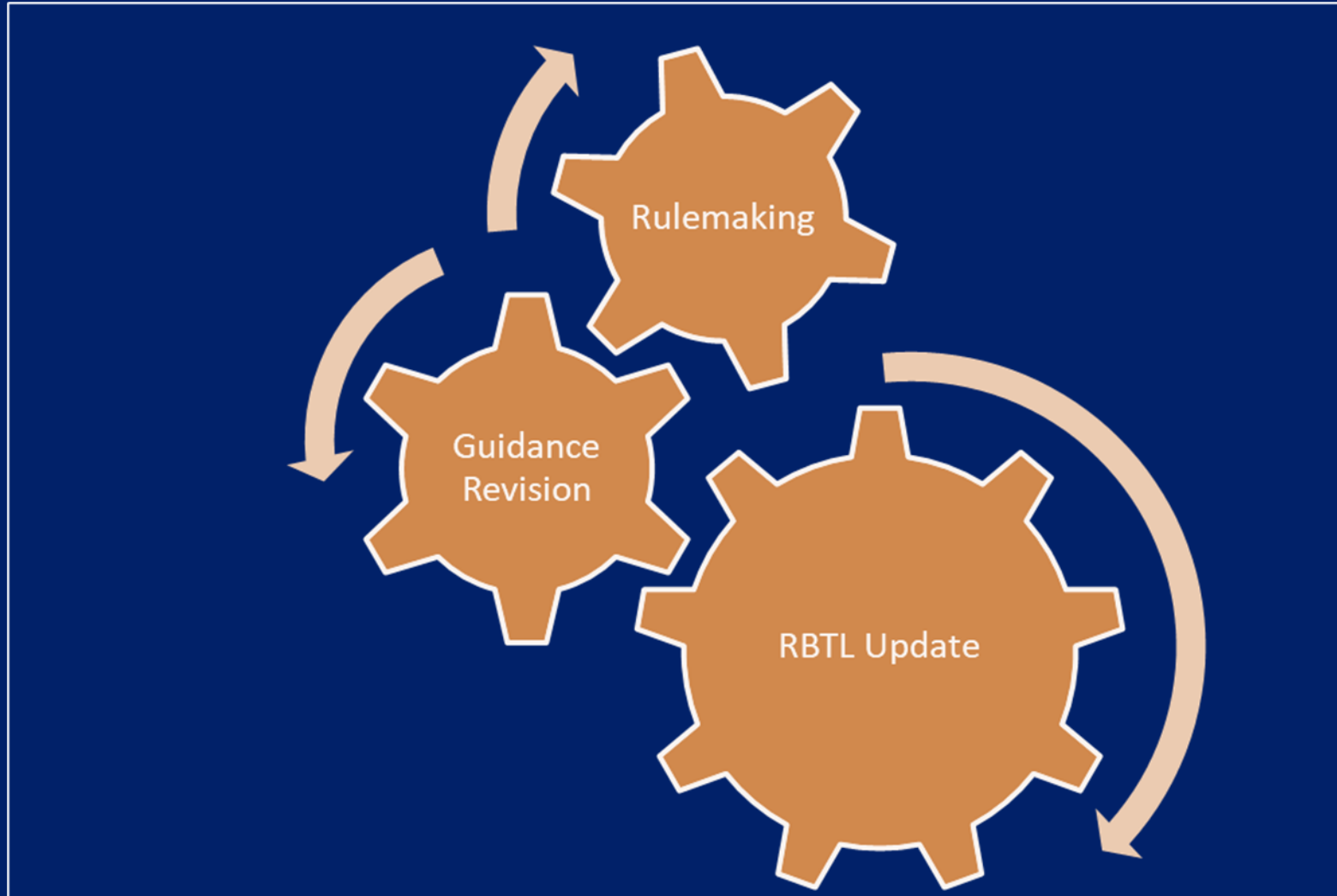
Missouri Department of Health and Senior Services (DHSS),
Bureau of Environmental Epidemiology (BEE)

DHSS 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.

MRBCA Update



MRBCA

Tiered Risk Assessment Process

DTL Default Target Level	Tier 1	Tier 2	Tier 3
Lowest of all RBTLs	Default models and inputs	Semi site-specific evaluation using default or alternate fate and transport models and site-specific data	Detailed, site-specific evaluation allowing possible use of alternate models, current chemical inputs, and site-specific data and exposure factors
Allows unrestricted use of property	Land-Use Dependent		
Max Concentration	Representative Concentration		

Risk Assessment & RBTLs

Calculating Cancer Risk/Non-Cancer Hazard



Calculating Risk-Based Target Levels



Target Level Development Process

Target Risk Levels (Cancer and Non-Cancer Effects)

Standard Models/Equations

Inputs:

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

Tier 1 RBTLs
(Residential, Non-Residential, Construction Workers)

DTLs (Lowest of all Tier 1 RBTLs)

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.

Changes focus on:

- **scientific defensibility**
- **consistency**

MRBCA RBTLs – Update Approach

The Tier 1 RBTLs were modified to:

- Transition from the 2006 MRBCA equations to ensure consistency with current risk assessment methodologies and incorporate current U.S. Environmental Protection Agency (EPA) risk assessment guidance.
- Be generally consistent with EPA's Regional Screening Levels (RSLs).

MRBCA RBTLs – Update Approach continued

The update follows 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 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

MRBCA RBTLs – Update Details

	2006	Proposed
Total Chemicals	~300	>800
Models/Equations	Various Sources	EPA
Exposure Factors	Various Sources	EPA defaults
Toxicity Values	Various Sources	EPA hierarchy
Physical & Chemical Properties	Various Sources	EPA hierarchy
Fate & Transport Parameters	Various Sources	EPA defaults

MRBCA RBTLs – Models/Equations Update

Equations used to develop Tier 1 RBTLs were updated to be based on current scientific methodology.

Changes recommended for:

- Equations derived from ASTM (American Society for Testing and Materials)
- Vapor Intrusion Equations
- Inhalation Equations for all scenarios
- Construction Worker Inhalation Equations
- Mutagenic Equations

MRBCA RBTLs – Exposure Factors Update

Exposure factors used to develop Tier 1 RBTLs were updated to be based on the most recent EPA recommended default exposure factors.

Changes recommended 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 were updated to reflect current science.

Changes recommended 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 were updated to be consistent with the hierarchy of sources used for the EPA RSLs.

Changes recommended for:

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

MRBCA RBTLs- Fate & Transport Parameters Update

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

Changes recommended for:

- Modifying defaults used for certain parameters.
- MRBCA parameters used in equations that are no longer recommended.
- Incorporation of additional fate and transport parameters for new equations incorporated into MRBCA.

MRBCA RBTLs- Special Case Chemicals

Lead

- The RBTL was updated for residential soil lead sites following EPA's 2024 Updated Residential Soil Lead Guidance. RBTLs for non-residential scenarios were calculated using the Adult Lead Model (ALM).

Hexavalent Chromium

- RBTLs were calculated through the use of a non-linear RfD approach for assessing the oral carcinogenicity of Cr(VI).

Total Petroleum Hydrocarbons (TPH)

- RBTLs were calculated using a weighting approach applied to toxicity values based on an assumed percent composition of the various fractions.
 - TPH-GRO (Gasoline-Range Organics): Aliphatics C5-C8, C9-C18, and Aromatics C9-16
 - TPH-DRO (Diesel-Range Organics): Aliphatics C5-C8, C9-18, C19+, and Aromatics C9-16
 - TPH-ORO (Oil-Range Organics): Aliphatics C19+ and Aromatics C9-16

Questions:

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MDHSS Vision: Optimal health and safety for all Missourians,
in all communities, for life.

MDHSS Mission: To promote health and safety through prevention,
collaboration, education, innovation, and response.