

## Target Level Issues

### Updating the RBTLs

The Risk-Based Target Levels (RBTLs) published in 2006 (and currently in use) were developed using:

- Equations from U.S. Environmental Protection Agency's (EPA) Risk Assessment Guidance for Superfund (RAGS) and Soil Screening Guidance and American Society for Testing and Materials (ASTM)
- Toxicity data from EPA, California, and Texas
- Physical and chemical property data from the Missouri Department of Natural Resources' (department) Cleanup Action Levels for Missouri (CALM) document, EPA, Texas, and Idaho
- Exposure and fate and transport factors from undocumented sources, but including factors chosen by the original Missouri Risk-Based Corrective Action (MRBCA) stakeholder group

In 2006, EPA did not have a single source of screening/target levels, with different EPA regions publishing different levels. However, since that time, EPA has moved to a single set of screening levels, known as the Regional Screening Levels (RSLs). Because the methods, equations and input factors used by EPA to develop their RSLs differs from those Missouri used to develop the MRBCA RBTLs, the RBTLs are not consistent with the RSLs (this is true even taking into consideration that the RSLs are calculated to meet a different risk level than are the RBTLs). The degree of inconsistency varies by chemical, and is most significant with respect to target levels for the vapor intrusion exposure pathway.

Twice per year, EPA updates the toxicity data used in developing the RSLs, though each update tends to pertain to only a few of the chemicals in the RSL table, and different chemicals each time. The toxicity data used to develop the currently used RBTLs is from 2006 or before.

On two other occasions, the department has significantly changed the methods and inputs used to develop target levels used by the Brownfields/Voluntary Cleanup Program (BVCP). The first cleanup guidance utilized the Any-Use Soil Levels (ASLs), with the ASLs giving way to the CALM guidance, and the CALM guidance giving way to MRBCA. In each instance, the methods and inputs used to develop the target levels changed significantly. Therefore, the department's proposal to significantly change how the RBTLs are developed is not without precedent.

In order to ensure the methods, equations and inputs used to develop the RBTLs are from known and valid sources and reflect the most current science, the department and Missouri Department of Health and Senior Services (MDHSS) are proposing to develop the RBTLs using EPA's RSL methods and inputs. The resulting RBTLs will be generally consistent with the RSLs, and will be developed to meet our current risk levels.

Michelle Hartman with DHSS will give a presentation explaining proposed RBTL development.

## **Incorporation of RBTLs into rule by reference**

In 2009, the Risk-Based Corrective Action rule at 10 CSR 25-18.010 became effective. The 2006 Default Target Levels (DTLs) and RBTLs are incorporated into the rule by reference, as are the toxicity factors, the parameters for the dermal contact pathway, the physical and chemical properties and the exposure factors found in tables E-1, E-2, E-3 and E-4, respectively, and default models and equations found in Appendix E of the 2006 MRBCA guidance document (all of which are used, along with site-specific fate and transport data, to develop Tier 2 site-specific target levels [SSTLs]).

Because the DTLs, RBTLs and Tier 2 models, equations and inputs are incorporated into rule by reference, the department may not update or otherwise alter the target levels or the models, equations or inputs – at least not to the extent we are proposing – without first conducting a rulemaking. Generally, a rulemaking takes from 12 to 18 months to complete.

As alluded to above, the department does have some authority to adjust target levels. That authority is found in the RBCA rule at 10 CSR 25-18.010, and allows the department to adjust target levels for a limited number of chemicals outside of a formal rulemaking. This is discussed in more detail in the following document regarding the department's proposal to use this authority to adjust the target levels for tetrachloroethylene (PCE), trichloroethylene (TCE), cis-1,2-dichloroethylene (cis-1,2-DCE) and vinyl chloride (VC).

To ensure the RBTLs are kept up to date and consistently reflect the most current science in the future, the department would like to be able to regularly update the RBTLs, likely on an annual basis. This will not be possible if the DTLs, RBTLs and Tier 2 models, equations and inputs remain incorporated into rule by reference. Therefore, the department proposes to conduct a rulemaking to amend the rule to remove the incorporation by reference language. This will allow the department to both update the 2006 RBTLs and facilitate regular updates in the future. The department would like to begin the rulemaking early in 2016, so that the updated RBTLs might be in place by the end of 2017.

**Interim fix for PCE, TCE, cis-1,2-DCE and VC target levels**

TCE and its daughter products cis-1,2-DCE and VC are some of the most commonly encountered contaminants at sites overseen by the HWP. The 2006 MRBCA RBTLs for these chemicals are badly out of date, as illustrated by the following target level comparison for TCE:

	<u>Res. Air</u>	<u>Res. Surface Soil</u>	<u>Res. Soil Vapor</u>	<u>Res. GW VI</u>	<u>GW Domestic Use</u>
2006 RBTLs*	0.0128 mg/m <sup>3</sup>	477 mg/kg	546 mg/m <sup>3</sup>	1.6 mg/L	0.005 mg/L (MCL)
EPA RSLs**	0.0021 mg/m <sup>3</sup>	4.1 mg/kg	0.070 mg/m <sup>3</sup>	0.0052 mg/L	0.0028 mg/L (risk-based)
<u>NR Air</u>	<u>NR Surface Soil</u>	<u>NR Soil Vapor</u>	<u>NR GW VI</u>		
2006 RBTLs***	0.0273 mg/m <sup>3</sup>	2,050 mg/kg	2,860 mg/m <sup>3</sup>	8.41 mg/L	
EPA RSLs**	0.0088 mg/m <sup>3</sup>	19 mg/kg	0.29 mg/m <sup>3</sup>	0.022 mg/L	

\*RBTLs for residential (Res.) land use, Soil Type 1 (sandy)

\*\*The EPA RSLs shown have been adjusted to meet Missouri risk levels of 1x10E-05 cancer risk and hazard quotient of 1.0 non-cancer risk, and the lower of the two values for each exposure pathway is shown. The RSLs are not soil type-specific, but the fate and transport parameters used most closely resemble sandy soil.

\*\*\*RBTLs for non-residential (NR) land use, Soil Type 1

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The DTLs, RBTLs and the models, equations and input factors used to Tier 2 SSTLs are incorporated into 10 CSR 25-18.010 by reference. Therefore, the department may update all of the 2006 target levels only through a rulemaking, a process that generally takes about 18 months to complete. However, sections 10 CSR 25-18.010(1)(A)8.B,(1)(A)27.B and (1)(A)31.A allow the department to modify the DTLs and RBTLs and deviate from the default models, equations and input factors used to develop Tier 2 SSTLs “if the department determines in writing that a deviation is appropriate based on changes in the scientific data used to calculate [the DTLs, RBTLs, or SSTLs].” As determined by an analysis of the rule by department legal staff, this authority is limited and permits the department to change some of the target levels without conducting a rulemaking, but it does not permit the department to change all of the target levels or to add target levels for new chemicals outside of a rulemaking.

Because TCE and its daughter products cis-1,2-DCE and VC are very common contaminants and the 2006 RBTLs for these chemicals vary significantly from the current (adjusted) EPA RSLs, the department would like to update the RBTLs for these chemicals soon (ideally no later than March 1, 2016) under the authority of sections (1)(A)8.B, (1)(A)27.B and (1)(A)31.A. And, because TCE is commonly found in association with PCE, we propose to update the RBTLs for it, as well. This approach would avoid an approximately two-year delay in updating the RBTLs for these chemicals.

For PCE/TCE sites enrolled in the BVCP at the time the updated target levels become effective, the department will allow those sites for which a remedial action plan (RAP) has been approved by the department prior to the effective date of the updated target levels to proceed under either the

approved RAP and the target levels therein or a revised RAP that incorporates the updated target levels. Under the latter option, further site characterization may be necessary to delineate PCE, TCE, cis-1,2-DCE and VC in affected media to the updated target levels, and that could result in an expansion of the area of the site requiring remediation. For sites for which a RAP has not yet been developed, the updated target levels will apply.

### **Groundwater Target Levels: MCL, WQS or Risk-Based?**

The following is an example of a condition where various groundwater target levels exist for a chemical, and is applicable to a number of chemicals in the MRBCA RBTL list: For PCE, the maximum contaminant level (MCL) is 5 ug/L and the MRBCA groundwater domestic use target level is the same, but the Missouri Water Quality Standard (WQS) for a drinking water supply (DWS) is 0.8 ug/L.

For each chemical for which a MCL exists, the 2006 RBTL for groundwater domestic use is the MCL. If a chemical does not have a MCL, the target level is risk-based.

In these cases, which target level should be used under the MRBCA process – the MCL, WQS, or risk-based target? Should the lowest of the three be used? If the risk-based target is applicable, what about a situation where the risk-based target is greater than the MCL and WQS? For that condition, bear in mind that the department is generally obligated to ensure compliance with federal and state standards (and to ensure some uniformity in legally enforceable target levels), even when a non-regulatory approach such as MRBCA is being applied.

Stakeholders should note that, for chemicals for which a MCL exists, the RSL tables include both the MCL and the calculated risk-based RSL. The department will be responsible for identifying chemicals for which the Missouri WQS differs from the MCL (the department's experience indicates this condition is applicable to only a few chemicals).

## **Soil contamination below the water table (general vs. prescriptive guidance)**

In overseeing application of the MRBCA process, the department has come across situations – notably at former manufactured gas plant (FMGP) sites, but at other types of sites as well – where high concentrations of COCs exist below the top of groundwater, but the contamination is not creating significant groundwater contamination and there is no direct exposure pathway.

The MRBCA guidance is not explicit or prescriptive with respect to the vertical extent of investigation necessary as part of MRBCA site investigations. The department is of the opinion that no guidance document can address all possible site conditions, and that overly prescriptive guidance can create more problems than it resolves, as guidance becomes less flexible the more prescriptive it becomes. The department believes it is reasonable to expect those applying the MRBCA process to exercise some degree of professional judgment in addressing conditions that are not explicitly addressed by the guidance. Yet, the department also thinks the guidance should include general provisions that give MRBCA users a clear understanding of what is needed to adequately investigate contamination and assess risk.

Section 6 of the 2006 guidance includes general expectations for site characterization, while Section 8 includes general expectations for risk assessment. Both sections also include specific requirements for site characterization and risk assessment, and while these requirements are generally applicable to all sites, they do not address all possible site conditions that might be encountered at sites addressed under MRBCA. The intent, however, was that the general provisions and specific requirements together should provide a framework under which all possible site conditions related to site characterization and risk assessment could be addressed.

The experience of the HWP in overseeing MRBCA suggests that revising the guidance to include additional specific requirements may be warranted. Ultimately, we need to find a balance between the degree of prescriptiveness and flexibility afforded by the guidance, and it is this balance that the department would like to discuss with the MRBCA Stakeholder Group.

In situations like that described in the first paragraph above, the department believes that the following issues would benefit from more detailed guidance:

- Potential for migration or media transfer
- Indirect connection to an exposure pathway
- Construction worker exposure
- Contaminant delineation

## Target levels for ecological receptors

MRBCA does not include screening/target levels for ecological receptors, though a few sources of such levels are provided in subsection 6.11.2. At least a qualitative ecological risk assessment is required at every site evaluated under MRBCA, and many sites require a quantitative assessment as well. It is for these quantitative assessments that ecological screening/target levels are needed.

Note that “Question 1” in subsection 5.4 of the 2006 MRBCA guidance indicates that, for the chemical of concerns (COCs) listed in Table 5-1, the Missouri water quality standards (WQS) are protective of ecological receptors and, for all other COCs, the DTLs are protective of ecological receptors. This is not entirely true; only the WQS specifically developed to be protective of aquatic life (designated as AQL in Table A of 10 CSR 20-7.031) are protective of aquatic ecological receptors (and even then only specific aquatic receptors), and these WQS only pertain to water, not sediment. The WQS developed based on Human Health Protection – Fish Consumption (designated as HHF in Table A) are not protective of ecological receptors.

In addition, the groundwater target levels (DTLs and RBTLs) for COCs that are not listed in Table 5-1 of MRBCA were developed based solely on human health protection and, therefore, it is incorrect to assume the DTLs are protective of ecological receptors, whether based on a comparison to the WQS or otherwise.

For these reasons, the department is proposing to remove Table 5-1 and associated guidance.

Further, the MRBCA soil DTLs were also developed based solely on human health protection, and without regard to ecological receptors. Therefore, the soil DTLs are not applicable in assessing the risk COCs in soil (or sediment) pose to ecological receptors.

To ensure uniformity and predictability for quantitative ecological risk assessments, should the MRBCA guidance include specific sources of ecological screening/target levels? If so, three sources we might consider for inclusion in the guidance are:

- Missouri water quality standards protective of aquatic life (designated as AQL) in 10 CSR 20-7.031
- The USGS Consensus-Based Sediment Quality Guidelines (which include both Threshold Effects Concentrations and Probable Effects Concentrations) at <http://www.cerc.usgs.gov/pubs/center/pdffdocs/91126.pdf>
- The Wisconsin sediment standards guidance at [http://dnr.wi.gov/org/aw/rr/technical/cbsqg\\_interim\\_final.pdf](http://dnr.wi.gov/org/aw/rr/technical/cbsqg_interim_final.pdf)

Note, however, that the first pertains to only a relatively few chemicals and only in water, and the second two pertain only to sediment; additional sources would be needed for soil and water.