Rules of
Department of Natural Resources
Division 25—Hazardous Waste Management Commission
Chapter 18—Risk-Based Corrective Action

Title 10—DEPARTMENT OF NATURAL RESOURCES
Division 25—Hazardous Waste Management Commission
Chapter 18—Risk-Based Corrective Action

10 CSR 25-18.010 Risk-Based Corrective Action Process

PURPOSE: The Department of Natural Resources (department) oversees response, characterization, risk assessment, and risk management under a variety of authorities at over two thousand (2,000) contaminated sites in Missouri. Many more sites are in an early stage of investigation or as yet unknown to the department. The impetus and philosophy behind Missouri Risk-Based Corrective Action (MRBCA) is to provide a framework for cleanup decisions that facilitates the constructive use of contaminated sites by protecting human health and the environment in the context of current and reasonably anticipated future site use. This framework can streamline the process of site cleanup and closure.

PUBLISHER'S NOTE: The secretary of state has determined that the publication of the entire text of the material which is incorporated by reference as a portion of this rule would be unduly cumbersome or expensive. This material as incorporated by reference in this rule shall be maintained by the agency at its headquarters and shall be made available to the public for inspection and copying at no more than the actual cost of reproduction. This note applies only to the reference material. The entire text of the rule is printed here.

(1) Definitions.

(A) As used in this rule the following terms mean:

1. 7Q10 low-flow of a stream—the average minimum flow for seven (7) consecutive days that has a probable recurrence interval of once-in-ten (10) years;

2. Activity and use limitations (AULs)—mechanisms or controls that ensure that exposure pathways to chemicals of concern (COCs) associated with current or reasonably anticipated future uses are not completed for as long as the COCs would pose an unacceptable risk to human health, public welfare, or the environment if the pathways were complete;

3. Applicable target levels—one (1) of the following for each chemical of concern:

A. The default target level as defined below;

B. The tier 1 risk-based target level as defined below for tier 1 purposes; or

C. A tier 2 or tier 3 site-specific target level as defined below for tier 2 or tier 3 purposes;

4. Chemical of concern (COC)—chemical that may contribute to risk at a site;

5. Commission—the Missouri Hazardous Waste Management Commission;

6. Conceptual site model—information that qualitatively and/or quantitatively describes the relevant site-specific factors that determine the risk COCs pose to human health and the environment and provides a basis for management of a site;

7. Cumulative site-wide risk—sum of risk for all chemicals;

8. Default target level (DTL)—the concentration of a chemical of concern that is the lowest of the tier 1 risk-based target levels for all exposure pathways and below which human receptors are protected from all complete exposure pathways for residential or other unrestricted land use. For each contaminant of concern, the default target level shall be either—

A. The target level shown in Table B-1 of Appendix B of the *Departmental Missouri Risk-Based Corrective Action (MRBCA) Technical Guidance* document published by the Department of Natural Resources, PO Box 176, Jefferson City, MO 65102-0176, dated April 2006 and updated in June 2006 and June 2008, which is hereby incorporated by reference without any later amendments or additions; or

B. A different value if the department determines in writing that a deviation is appropriate based on changes in the scientific data used to calculate such default target level;

9. Department—the Department of Natural Resources (DNR), which includes the director thereof, or the person or division or program within the department delegated the authority to render a decision, order, determination, finding, or other action that is subject to review by the commission;

10. Domestic use of groundwater—groundwater used for indoor water use activities such as drinking, cooking, showering, and other uses by which a receptor could be exposed to COCs via ingestion, dermal contact, or inhalation of vapors;

11. Ecological risk assessment—the process that evaluates the likelihood that adverse ecological effects may occur or are occurring as a result of exposure of ecological receptors to one (1) or more contaminants of concern;

12. Exposure—contact of a chemical of concern with an organism;

13. Exposure domain—the area that can result in a particular receptor being exposed to COCs by a specified exposure pathway;

14. Exposure factors—human behaviors and characteristics that affect the degree or amount of exposure to a chemical of concern, such as duration, frequency, body weight, inhalation rate, or intake rate;

15. Exposure pathway—the course a chemical takes from a source to the receptor. An exposure pathway describes a unique mechanism by which an individual or population is exposed to chemicals originating from a site. Each exposure pathway includes a source or release from a source, an exposure point, and an exposure route. If the exposure point differs from the source, a transport/exposure medium (e.g., air) or media (in cases of intermedia transfer) also is included. The exposure pathway is considered complete if there are no discontinuities in or impediments to movement from the source of the contaminant to the receptor;

16. Fate and transport parameters—factors that characterize physical site properties that affect how a chemical of concern may travel or disperse in any particular medium;

17. Habitat—a place where an ecological receptor, such as an animal or plant, normally lives;

18. Hazard index—the sum of more than one (1) hazard quotient for multiple substances and/or multiple exposure pathways;

19. Hazard quotient—the ratio of an exposure level to a substance to a non-carcinogenic toxicity value selected for the risk assessment for that substance;

20. Hydraulic conductivity—the volume of water at the existing kinematic viscosity that will move in unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow;

21. Long-term stewardship (LTS)—the system of controls, institutions, and information required to ensure protection of human health, public welfare, and the environment at sites where residual contamination has been left in place above unrestricted use levels for the period of time over which the contaminants exceed those levels. Activity and Use Limitations (AULs) may be an integral part of long term stewardship. AULs shall be designed to ensure that pathways of exposure to COCs associated with current or reasonably anticipated future uses are not completed for as long as the COCs would pose an unacceptable risk to human health, public welfare, or the environment if the pathways were complete;

22. Point of demonstration (POD) wells—wells located between the source and the POE to monitor the COC concentrations

in groundwater to prevent exceedances at the POE;

23. Point of exposure (POE)—the nearest down gradient, three-dimensional location that could reasonably be considered for installation of a groundwater supply well;

24. Receptor—an organism that receives, may receive, or has received exposure to a COC as a result of a release. Under the MRBCA program, human receptor refers to a resident child, resident adult, age-adjusted resident (one who resides on the site from birth to age thirty (30)), non-resident adult, or construction worker;

25. Remediating party—the party who is legally responsible for, or who is otherwise taking on the responsibility for, the investigation, risk assessment, and remediation of property known or believed to be contaminated;

26. Representative chemical concentration—the average concentration to which a receptor is exposed over the specified exposure duration, within a specified exposure domain, and for a specific exposure pathway;

27. Risk-based target level (RBTL)—the pathway and chemical-specific concentration of a chemical of concern in an environmental medium that meets an acceptable human health risk level. Risk-based target levels are calculated by the department using standard models and default exposure factors, toxicity factors, physical and chemical properties, and contaminant fate and transport parameters and are applicable at tier 1 of the risk-based corrective action process. For each contaminant of concern, the risk-based target level shall be either—

A. The risk-based target level shown in Tables B-1 through B-11 of Appendix B of the *Departmental Missouri Risk-Based Corrective Action (MRBCA) Technical Guidance* document published by the Department of Natural Resources, PO Box 176, Jefferson City, MO 65102-0176, dated April 2006 and updated in June 2006 and June 2008, which are hereby incorporated by reference without any later amendments or additions; or

B. A different value if the department determines in writing that a deviation is appropriate based on changes in the scientific data used to calculate such risk-based target level;

28. Risk management plan—a written account of all site-specific activities necessary to manage a site's risk to human health, public welfare, and the environment so that acceptable risk levels are not exceeded under current or reasonably anticipated future land use conditions;

29. Route of exposure—the manner or mechanism by which a COC enters a receptor's body, for example, ingestion, inhalation, or dermal contact;

30. Site—areal extent of contamination inclusive of contamination both on the property at which the contamination originated and on all adjacent and nearby properties onto which such contamination has or is likely to migrate;

31. Site-specific target levels (SSTLs)—pathway and chemical specific calculated risk-based target levels that are based on site-specific data and an acceptable risk level considered protective of human health and the environment.

A. Site-specific target levels calculated at tier 2 of the risk-based corrective action process using site-specific fate and transport data and the toxicity factors, parameters for dermal contact pathway, physical and chemical properties, and 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 *Departmental Missouri Risk-Based Corrective Action (MRBCA) Technical Guidance* document published by the Department of Natural Resources, PO Box 176, Jefferson City, MO 65102-0176, dated April 2006 and updated in June 2006 and June 2008, which are hereby incorporated by reference, without any later amendments or additions, and are applicable unless the department determines in writing that a deviation is appropriate based on changes in the scientific data used to calculate the site-specific target levels.

B. Site-specific target levels calculated at tier 3 of the risk-based corrective action process using default, literature-derived, and/or site-specific exposure factors, physical and chemical properties, toxicity factors, and fate and transport data and default, alternative or a combination of default and alternative models are applicable unless the department determines or has determined that a deviation is appropriate based on site-specific conditions or changes in the scientific data used to calculate the site-specific target levels;

32. Source property—the property or properties on which contamination originated;

33. Subsurface soil—soil from three feet (3') below ground surface to the water table;

34. Surficial soil—soil from zero to three feet (0'–3') below ground surface; and

35. Unrestricted use levels—chemical concentrations at which soil and groundwater at a site are safe for residential land use and domestic use of groundwater.

(2) Applicability.

(A) This rule applies to contaminated or potentially contaminated sites. The risk-based corrective action process does not in any way supersede or change applicable federal statutes and regulations. This rule does not supersede the requirement that state programs authorized by the United States Environmental Protection Agency that are operating in lieu of the federal program, including but not limited to the federal Resource Conservation and Recovery Act, be at least as protective as the federal program. This rule does not change the federally mandated, program-specific administrative, technical, and notification requirements on either a remediating party or regulators. Neither the remediating party nor the department can pick or choose portions of the media or sites to which this process will apply. This rule will be applicable only to newly discovered sites, new releases discovered at previously closed sites, on-going cleanups, and site reviews where a different use is being contemplated than planned for at the time of closure. Nothing in this rule addresses any natural resources damages claims that may be applicable at a site.

(B) In the absence of a hazardous substance emergency or any other situation requiring immediate corrective action, and in lieu of complete remediation, any party seeking to remediate a contaminated site within the purview of the Missouri Department of Natural Resources may choose to follow the risk-based process described in this rule, which may be applied at any of the following types of sites:

1. Sites on the registry of abandoned or uncontrolled sites pursuant to section 260.435, RSMo, *et seq*;

2. Sites enrolled in the Voluntary Cleanup Program pursuant to section 260.265, RSMo, *et seq*;

3. Sites with dry-cleaning facilities governed by section 260.900, RSMo, *et seq*; or

4. Any other site where the department and the remediating party agree to apply this rule.

(C) This rule does not apply to petroleum storage tank sites where risk-based corrective action is implemented in accordance with section 319.109, RSMo, and any implementing rules.

(D) Where necessary to promote the public benefit of remediating a "brownfield" or other voluntary cleanup site, a remediating party who is substantially in compliance with the EPA All Appropriate Inquiries rule (40 CFR Part 312) and who, along with the property owner or operator if different from the remediating party, did not cause nor contribute to the release or potential release of a hazardous material at the site, may apply the

requirements of sections (8), (11), (14), (15), and (16) and subsections (4)(B), (9)(J), (18)(A), and (19)(A) of this rule, to the property subject to voluntary remediation rather than the entire site.

(3) Rationale and Characteristics of Tiered Approach. Each tier will result in cleanup target levels that provide an acceptable level of protection to human health, public welfare, and the environment. This rule is based on *Missouri Risk-Based Corrective Action (MRBCA) Technical Guidance* published by the department. Table 1, included herein, shows a comparison of risk-based assessment options.

(4) Risk-Based Corrective Action Process. This section identifies the steps in the process. Requirements for steps (B) through (G) are contained in succeeding sections. The department shall establish a Memorandum of Understanding with the Missouri Department of Health and Senior Services (DHSS) to effectively involve DHSS in the risk assessment activities in the risk-based corrective action process.

(A) Determination and Abatement of Imminent Threat(s). When imminent threats are discovered, the remediating party shall inform the department immediately. Upon completion of imminent threat abatement actions, the remediating party shall submit a report to the department that documents the activities and confirms that all imminent threats have been abated.

(B) Initial Site Characterization and Comparison with Default Target Levels. The remediating party shall perform an initial site characterization. The initial site characterization shall be conducted to identify with certainty the maximum concentrations of the contaminants or chemicals of concern in each impacted environmental media and compare the sample concentrations with default target levels (DTLs) and, to the extent needed, water quality criteria (10 CSR 20-7.031). Impacts are to be delineated to the higher of DTLs or other residential levels necessary to protect the receptors from complete exposure pathways. This initial comparison is not required if the remediating party has chosen to conduct a tier 1 or tier 2 analysis. The extent of contamination and complete exposure pathways, not the property boundaries, determine the extent of site-specific data collection and analysis.

(C) Development and Validation of Conceptual Site Model. If the maximum concentrations of COCs exceed the DTLs, or the DTLs are not selected as the cleanup levels, the remediating party shall develop and validate a conceptual site model. A conceptual site model shall qualitatively and/or quantitatively describe the relevant site-specific factors that determine the risk COCs pose to human health and the environment. If the contaminants are below the default target levels, the remediating party may request a letter of completion.

(D) Acceptable Risk. For the MRBCA process, the acceptable risk levels are—

1. Carcinogenic risk. The total risk for each chemical, which is the sum of risk for all complete exposure pathways for each chemical, shall not exceed 1×10^{-5}. The cumulative site-wide risk (sum of risk for all chemicals and all complete exposure pathways) shall not exceed 1×10^{-4}; and

2. Non-carcinogenic risk. The hazard index for each chemical, which is the sum of hazard quotients for all complete exposure pathways for each chemical (the total risk), shall not exceed 1.0. The sitewide hazard index, which is the sum of hazard quotients for all chemicals and all complete exposure pathways, shall not exceed 1.0.

3. If the hazard index exceeds 1.0, a qualified toxicologist may calculate the hazard index corresponding to a specific toxicological end point.

(E) Tier 1 Risk Assessment. Based on the comparison of representative concentrations and tier 1 risk-based target levels or calculated site risk with target risk, the remediating party may—

1. Request a determination from the department that the residual concentrations are protective of human health, public welfare, and the environment. If the concentrations are below the tier 1 risk-based target levels, the remediating party may request a letter of completion;

2. Adopt tier 1 risk-based target levels and submit a Risk Management Plan to manage the risk associated with these levels; or

3. Perform a tier 2 risk assessment. Unless performing a tier 2 risk assessment, upon completion of the tier 1 risk assessment, the remediating party shall submit a tier 1 risk assessment report to the department.

(F) Tier 2 Risk Assessment. Tier 2 risk assessments allow for the use of site-specific fate and transport parameters to calculate site-specific target levels. Tier 2 site-specific target levels are calculated values based on site-specific data, including but not limited to the nature and extent of contamination and physical characteristics of the site. After the tier 2 site-specific target levels have been calculated, the results shall be compared with representative COC concentrations at the site. Based on the comparison results, the remediating party may—

1. Request a determination from the department that the residual concentrations are protective of human health, public welfare, and the environment;

2. Adopt calculated tier 2 site-specific target levels as cleanup levels and develop a risk management plan to manage the risk associated with these levels; or

3. Develop a work plan for a tier 3 risk assessment. Upon completion of the tier 2 risk assessment, the remediating party shall provide a tier 2 risk assessment report to the department.

(G) Tier 3 Risk Assessment. The remediating party shall submit a work plan to the department and receive approval prior to the performance of a tier 3 risk assessment. Upon completion of the tier 3 risk assessment, the remediating party shall provide a tier 3 risk assessment report to the department.

(H) Development, Approval, and Implementation of Risk Management Plan (RMP). The risk management plan shall protect human health, public welfare, and the environment under current and reasonably anticipated future use conditions. An RMP shall be developed after the department approves media-specific cleanup levels under any of the tiers. Where residual contamination will be left in place above unrestricted use levels, the RMP shall include an AUL as an integral part of the plan. The RMP shall be implemented as written and approved. Data shall be collected and analyzed to evaluate the performance of the plan and, if needed, to implement modifications. If additional information becomes available while or after the RMP has been implemented that shows the site poses an unacceptable risk to human health, public welfare, or the environment, or that the land use has changed and is no longer compatible with the risk management plan, the department may rescind its decision and require further action at the site.

Table 1
Comparison of Risk Assessment Options

Factors	DTL	Tier 1	Tier 2	Tier 3
Exposure Factors	Default	Default	Default	Site-specific
Toxicity Factors	Default	Default	Default	Most current
Physical and Chemical Properties	Default	Default	Default	Most current
Fate and Transport Parameters	Default	Default	Site-specific	Site-specific
Unsaturated Zone Attenuation	Depth to water table dependent	Depth to water table dependent	Depth to water table dependent	Site-specific model
Fate and Transport Models	Default	Default	Default	Alternative
Comparative Concentrations	Maximum	Representative Concentrations	Representative Concentrations	Representative Concentrations
IELCR for Each Chemical & Exposure Pathway	1×10^{-5}	1×10^{-5}	1×10^{-5}	1×10^{-5}
Hazard Quotient for Each Chemical & Exposure Pathway	1	1	1	1
Site-wide IELCR	1×10^{-4}	1×10^{-4}	1×10^{-4}	1×10^{-4}
Site-wide Hazard Index	1	1	1	1
Domestic Use of Groundwater Pathway if Complete	MCL or equivalent	MCL or equivalent	MCL or equivalent	MCL or equivalent
Ecological Risk	Compare with WQC	Evaluate	Evaluate	Evaluate
Outcome of Evaluation	LOC, Tier 1, RMP	LOC, Tier 2, RMP	LOC, Tier 3, RMP	LOC, RMP
Land Use	No	Yes	Yes	Yes
Activity and Use Limitations	None	Depend on land use, groundwater use, and other assumptions in risk assessment		

DTL: Default Target Level
IELCR: Individual Excess Lifetime Cancer Risk
LOC: Letter of Completion
MCL: Maximum Contaminant Level
RMP: Risk Management Plan
WQC: Water Quality Criteria, 10 CSR 20-7.031

(5) Applicable Target Levels within the MRBCA Process. If an analysis proceeds from DTLs through the tiers and the applicable target levels become lower, the remediating party does not have the option of using higher levels from the previous tier since the higher tiered analysis provides a more precise estimate of the actual risk. Large sites may be divided into smaller areas, and these areas may be managed using different applicable target levels and different AULs.

(6) Documentation of the MRBCA Process. To record the data, analysis, and decision making of the MRBCA process, the remediating party shall develop applicable documents including the initial site characterization, the conceptual site model, the risk assessment, and the risk management plan. Each applicable document shall be provided to the department.

(7) Initial Site Characterization.

(A) The remediating party shall develop an initial site characterization, consisting of a site description, data collection work plan, and comparison of the maximum concentrations of chemicals of concern with default target levels and relevant water quality criteria.

(B) Site Description. The remediating party shall conduct a thorough site reconnaissance and a historic review of site use and site operations to identify existing and potential sources of contamination. The remediating party shall prepare a list of potential chemicals of concern (COCs) and the probable onsite location(s) of COCs. The remediating party shall prepare a site description based on available information, including but not limited to—

1. Knowledge of known or documented releases;

2. Current and past location of certain structures that represent potential sources (for example, pipelines, process areas, pumps, or transformers);

3. Historic documentation of site layout such as aerial photographs, fire insurance maps, etc.;

4. Interviews with current and past owners and operators to understand site activities;

5. Permits issued for various activities; and

6. One (1) or more site visits.

(C) Collection of Data. Prior to the collection of environmental data for the initial site characterization, the remediating party shall submit the initial characterization and data collection work plan to the department for review and approval. The work plan shall meet the minimum data quality assurance/quality control requirements of the department's Quality Management Plan. After approval, the remediating party shall implement the work plan.

(D) Comparison with Default Target Levels and Relevant Water Quality Criteria.

1. The remediating party shall compare the maximum groundwater concentrations with the lower of the DTLs or the applicable water quality criteria. To determine if an ecological risk exists at the site, for any COCs listed in the guidance document for aquatic life protection, determine whether levels found exceed water quality criteria. Other potentially toxic substances for which sufficient toxicity data are not available may not be released to waters of the state until safe levels are demonstrated through adequate bioassay studies.

2. For any COCs found to exceed water quality criteria, determine whether and where there are any complete pathways for eco-receptors by completing a level 1 ecological risk assessment.

3. For both ecological and human health risk assessments, the maximum soil and groundwater concentrations shall be compared with the default target levels (DTLs) presented in Appendix B of the guidance. If the maximum soil and groundwater concentrations do not exceed the DTLs and no ecological risk is identified, the remediating party may petition the department for a letter of completion. If either the soil or groundwater maximum concentrations exceed their comparative values, the remediating party shall either—

A. Conduct a tier 1, tier 2, or tier 3 evaluation; or

B. Select the DTLs (or lower of DTLs and water quality criteria if ecological issues are of concern) as the cleanup levels.

(E) Initial Characterization Report. The remediating party shall document the results of the initial characterization and comparison with target levels in a report to the department.

(8) Conceptual Site Model.

(A) Components of Conceptual Site Model. The remediating party shall develop a conceptual site model, including the following key elements:

1. The chemical release scenario, known and suspected source(s), and chemicals of concern (COCs);

2. Spatial and temporal distribution of COCs in the various affected media;

3. Description of any known durable and enforceable land or water use restrictions;

4. Current and reasonably anticipated future land and groundwater use;

5. Description of site stratigraphy, hydrogeology, meteorology, determination of the predominant vadose zone soil type, and identification of surface water bodies that may potentially be affected by site COCs;

6. Remedial activities conducted to date; and

7. An exposure model that identifies the receptors, exposure pathways, and routes of exposure under current and reasonably anticipated future land use conditions.

(B) Determinations of Reasonably Anticipated Future Land Use. The department will make final decisions with respect to the reasonably anticipated future land use of each property that is or is a part of a site evaluated under the risk-based corrective action process. The department will make such decisions in accordance with the following:

1. Decisions will be made in consideration of information available to the department relevant to the future use of a property, including conclusions and recommendations in a risk assessment report, provided to the department by the remediating party, the owner of an adjacent or nearby property affected by a release from the source property being evaluated by the remediating party, or either party's environmental consultant or other authorized designee;

2. The department may also consider information obtained from other information sources, including but not limited to, local, county, state, and federal governmental entities and actual and prospective future purchasers, developers, tenants, and users of the property to which the decision pertains; and

3. The department may request future land use information from the owner, or the owner's authorized designee, of an adjacent or nearby property affected by a release from a source property being evaluated under the risk-based corrective action process. Such owner or designee is not obligated to respond to the department's request.

(C) Exposure Model.

1. In developing an exposure model, the following receptors shall be considered at all sites:

A. Resident;

B. Non-resident worker; and

C. Construction worker.

2. The exposure model shall consider any additional receptors that may be exposed to contamination, both currently and in the future.

3. The exposure model shall include a determination as to whether or not each of the following pathways is complete under current or future conditions:

A. Pathways for surficial soils, defined as zero to three feet (0'–3') below

ground surface (bgs):

(I) Leaching to groundwater and potential use of groundwater;

(II) Leaching to groundwater and subsequent migration to a surface water body; and

(III) Ingestion of soil, dermal contact with soil, and outdoor inhalation of vapors and particulates emitted by surficial soils.

B. Pathways for subsurface soils, defined as greater than three feet (3') bgs to the water table:

(I) Volatilization and upward migration of vapors from subsurface soil and potential indoor inhalation of these vapor emissions;

(II) Leaching to groundwater and potential use of groundwater; and

(III) Leaching to groundwater and subsequent migration to a surface water body.

C. Soil pathways applicable to construction worker for soil up to depth of construction.

(I) Ingestion, dermal contact with, and inhalation of vapor emissions and particulates from soil.

D. Groundwater pathway applicable to construction worker.

(I) Outdoor inhalation of vapor emissions.

(II) Dermal contact.

E. Pathways for groundwater—

(I) Volatilization and upward migration of vapors from groundwater and potential indoor inhalation of these vapor emissions;

(II) Volatilization and upward migration of vapors from groundwater and potential outdoor inhalation of these vapor emissions;

(III) Ingestion of water, dermal contact with water, and inhalation of vapors if the domestic use of groundwater pathway is complete;

(IV) Dermal contact with groundwater; and

(V) Migration to a surface water body and potential impacts to surface waters.

F. Other pathways that may need to be considered on a site-specific basis include, but are not necessarily limited to, the following:

(I) Ingestion of surface water;

(II) Contact with surface water during recreational activities (ingestion, inhalation of vapors, and dermal contact);

(III) Contact with (accidental ingestion and dermal contact with) sediments;

(IV) Ingestion of produce grown in impacted soils;

(V) Use of groundwater for irrigation purposes;

(VI) Use of groundwater for industrial purposes; or

(VII) Ingestion of fish or other aquatic organisms that have bioaccumulated COCs through the food chain as a result of surface water or sediment contamination.

(D) Evaluation of the Groundwater Use Pathway.

1. The analysis of current and future groundwater use shall include all groundwater zones beneath or in the vicinity of the site that could potentially be—

A. Impacted by site-specific COCs; or

B. Targeted in the future for the installation of water use wells.

2. The current groundwater domestic use pathway is considered complete if water use wells are located on or near the site, and there is a reasonable probability of impact to the wells or the groundwater zones they intersect by site-specific chemical releases.

A. All public water supply wells within a one (1)-mile radius of the site and all private water wells within a quarter (¼)-mile radius of the site shall be identified. Other distances may be used if prescribed by law, or necessary and appropriate based on COC mobility and hydrogeology.

B. Whether a well might be impacted depends on the hydrogeological conditions, well construction, and use of the well, including the following factors:

(I) Characteristics of soil and rock formations;

(II) Groundwater flow direction;

(III) Hydraulic conductivity;

(IV) Distance to the well;

(V) The zone where the well is screened;

(VI) Casing of the well;

(VII) Well seals and other well construction attributes;

(VIII) Zone(s) of influence and capture generated by well pumpage; and

(IX) Biodegradability and other physical and chemical properties of the COCs.

3. For each zone, the future groundwater use pathway will be judged complete if—

A. There is no ordinance that prohibits well drilling in that zone supported by a memorandum of agreement between the department and a governing body; and

B. The zone is suitable for use and there is a reasonable probability of future use, or the zone is the only viable source of future water supply; and

C. There is a reasonable probability of site impacts to the zone.

4. Evaluation of activity and use limitations (AULs). If an AUL is in place that eliminates the potential that a specified groundwater zone will serve as a future source of domestic water, the presence of the AUL will be considered along with other relevant site-specific domestic use factors. For early relief from consideration of this pathway, an ordinance that prohibits well drilling along with a memorandum of agreement between the department and a governing body can be used to justify an incomplete pathway.

5. Suitability for use determination: For groundwater to be considered a viable domestic water supply source, it shall meet appropriate total dissolved solids (TDS) and yield criteria—

A. Total dissolved solids criteria—Groundwater containing less than ten thousand milligrams per liter (10,000 mg/L) total dissolved solids is considered a potential source of domestic use;

B. Yield criteria—Groundwater zones capable of producing a minimum of one-quarter (¼) gallon per minute or three hundred sixty (360) gallons per day on a sustained basis have sufficient yield to serve as a potential source of domestic use.

6. Determination of sole source/availability of alternative water supplies. If the groundwater zone being considered is the only viable source of water at or in the vicinity of the site, then the remediating party shall assume that future domestic use is reasonable. This conclusion is irrespective of TDS or yield considerations, and this zone shall be evaluated to determine if it is likely to be impacted by COCs from the site. Determining the availability of alternative water supplies should include consideration of other groundwater zones, municipal water supply systems, and surface water sources;

7. Reasonable probability of future use determination. The probability that a groundwater zone could be used as a future source of water for domestic use shall be a weight of evidence determination based on consideration of the following factors:

A. Current groundwater use patterns in the vicinity of the site under evaluation;

B. Suitability of use (TDS and yield criteria);

C. Availability of alternative water supplies;

D. AULs;

E. Urban development considerations for sites in areas of intensive historic industrial or commercial activity, having groundwater zones in hydraulic communication with industrial or commercial surface activity, and located within metropolitan areas with a population of at least seventy thousand (70,000) as established by the 1970 census; and

F. Aquifer capacity limitations (ability to support a given density of production wells).

8. Probability of impact determination. If a groundwater zone has a reasonable probability of future use as a domestic water supply, the zone shall be evaluated for the probability that the zone could be impacted by site COCs. The evaluation shall consider the nature and extent of contamination at the site, site hydrogeology including the potential presence of karst features, contaminant fate and transport factors and mechanisms, and other pertinent variables. To evaluate potential site impacts to groundwater zones that could serve as future water supply sources, the potential impact shall be evaluated at the nearest down-gradient location that could reasonably be considered for installation of a groundwater supply well. In the absence of durable AULs, the nearest location might be on the site itself.

(9) Site Characterization for an MRBCA Risk Assessment.

(A) To adequately characterize a site to determine risks, the following categories of data are required. If any categories of data are not included, the site characterization report shall document the reason(s) for the omission.

1. Description and magnitude of the spill or release;

2. Land use, activity and use limitations, and receptor information;

3. Analysis of current and reasonably anticipated future groundwater use;

4. Vadose zone soil characteristics, including determination of soil type;

5. Characteristics of saturated zones;

6. Surface water body characteristics;

7. Ecological receptor information;

8. Meteorology (such as rainfall, infiltration rate, evapotranspiration, wind speed, and direction);

9. Distribution of chemicals of concern in soil;

10. Distribution of chemicals of concern in groundwater;

11. Distribution of chemicals of concern in soil vapor; and

12. Distribution of chemicals of concern in sediments and surface waters.

(B) The remediating party shall develop a work plan, for approval by the department, to address any data inadequacies, as appropriate, including a sampling and analysis plan and a quality assurance project plan (QAPP). Environmental data shall be collected consistent with the department's quality management plan.

(C) Lateral and vertical impacts in soil and groundwater shall be delineated to the extent required to determine—

1. Potential exposure pathways to human and ecological receptors under current and reasonably anticipated future conditions;

2. The extent of impacts above the tiered risk-based levels for the identified exposure pathways; and

3. Exposure domains for each combination of receptor-pathway-route of exposure.

(D) To delineate impacts in other media (for example, surface water, sediments, and air), the number of samples, sample locations, delineation levels, and sampling methodologies will be based on site-specific considerations; hence the remediating party shall receive the department's approval for the work plan prior to conducting fieldwork. For surface water and sediment sampling, the work plan shall contain a strategy to determine background levels; delineation criteria; location of, and concentrations of COCs in, site-related discharges to the surface water; and the current and future extent of related impacts.

(E) For zones of impacted groundwater, plume status (increasing, stable, or decreasing) shall be determined. To assess plume stability, groundwater monitoring shall be conducted for a period of time sufficient to show a reliably consistent trend in contaminant concentrations.

(F) For delineating groundwater impacts where the domestic use of groundwater pathway is complete, delineation criteria will be the lower of the following four (4) criteria:

1. MCLs (in the absence of MCLs, risk-based concentrations that assume ingestion of, dermal contact with, and inhalation of vapors from indoor groundwater use);

2. Land use-dependent concentrations protective of indoor inhalation;

3. Concentrations for the protection of ecological receptors (when such receptors are present); or

4. Non-domestic uses of groundwater (when such uses are present).

(G) Where the domestic use of groundwater pathway is incomplete, the groundwater delineation criteria will be based on other actually or potentially complete groundwater pathways, or concentrations protective of ecological receptors (when present).

(H) When a discharge of contaminated groundwater to a surface water body (perennial or intermittent stream, river, or lake) is suspected or known, water and sediment samples shall be collected both upstream and downstream of each point of discharge. The remediating party shall compare the sediment sample data with sediment criteria that are protective of human health and ecological receptors that can be obtained from literature or develop site-specific levels and delineate any sediment contamination based on the criteria determined to be applicable as per subsection (9)(D) above.

(I) The following information shall be collected for any surface water impacted by site-related COCs:

1. Distance to the surface water body. If the body is impacted, the distance is zero; if the body might be impacted, the distance should be measured from the leading edge of the groundwater plume or the down-gradient edge of the area of release to the water body;

2. Likely location where COCs from the site would discharge into a surface water body;

3. Flow direction and depth of any groundwater contamination plume(s) in relation to the water body;

4. Lake or stream classification as found in 10 CSR 20-7.031, Table G and Table H respectively;

5. Lake or pond acreage or stream 7Q10 flow rate;

6. Determination of the beneficial uses of the lake or stream as found in 10 CSR 20-7.031, Table G and Table H respectively; and

7. Water quality criteria based upon the beneficial uses of the lake or stream as found in 10 CSR 20-7.031, Table A. If a water quality criterion for a COC is not available, contact the department project manager. If necessary, the project manager can then coordinate with the Water Protection Program (WPP) for further guidance.

(J) Access to Adjacent and Nearby Property Beyond the Source Property. When contamination at concentrations exceeding target levels applicable to residential land use has or is likely to migrate beyond one (1) or more boundaries of the property on which the contamination originated (i.e., the source property) and onto one (1) or more adjacent or nearby properties, the remediating party must gain access to all such properties in order to fully characterize the contamination and assess associated risks, unless the department determines that such access is not required.

1. If the remediating party is unable to gain access to an adjacent or nearby property from the owner of the property or the owner's authorized representative, the remediating party shall—

A. Document all unsuccessful attempts to gain access to the department and obtain concurrence from the department that the attempts to gain access were legitimate and reasonable and that further attempts by the remediating party need not be made;

B. Provide written notice of the contamination to the owner, or the owner's authorized representative, of the adjacent or nearby property to which access has been denied and document such notice to the department; and

C. Document to the department that all applicable target or risk levels have been met at the boundary of the source property and that actions have been taken to ensure that further migration off the source property of COCs at concentrations exceeding the criteria specified in subsections (9)(C) through (G) will not occur in the future.

2. Any letter of completion subsequently issued by the department shall include a statement regarding the denial of access and the property to which access was denied.

(10) Ecological Risk Assessment.

(A) The ecological risk assessment has three (3) levels—

1. Level 1 is a qualitative screening evaluation comprised of checklists A and B of the MRBCA guidance document;

2. Level 2 requires comparison of site-specific COC levels with applicable standards or criteria protective of ecological receptors available in literature; and

3. Level 3 allows for a site-specific evaluation.

(B) Level 1 ecological assessment shall be performed at every tier 1, 2, and 3 site to identify whether any ecological receptors or habitat exist at, adjacent to, or near the site. The following decision criteria shall be used:

1. If the answers to all of the checklist A questions are negative, no further ecological evaluation is necessary;

2. A positive answer to any one (1) of the questions in checklist A implies that a receptor or a habitat exists on or near the site and further evaluation is required, and this evaluation is ecological risk assessment checklist B;

3. If the answer to all of the checklist B questions are negative, the conclusion is that, even though a receptor exists on or near the site, a complete pathway to the receptor(s) does not exist and, therefore, there are no ecological concerns at the site; and

4. If the answer to one (1) or more of the seven (7) questions is positive, a level 2 or level 3 ecological risk assessment is necessary to determine whether contamination at the site poses an unacceptable risk to ecological receptors.

(C) A level 2 and/or level 3 evaluation is necessary only if ecological concerns continue to persist beyond the level 1 evaluation.

1. In a level 2 ecological risk assessment, site-specific COC concentrations that may reach an ecological receptor are compared to Missouri's Water Quality Standards or literature values when standards are not available. If the comparison of representative, site-specific soil, groundwater, surface water, or sediment values indicates that applicable values are exceeded, the remediating party may perform a level 3 ecological risk assessment or use the applicable water quality criteria or literature values as cleanup goals. If water quality criteria or literature values are used, then at least one (1) element of the risk management plan shall address remediation goals to protect ecological receptors.

2. A level 3 ecological risk assessment will include a detailed site-specific evaluation as per current EPA guidance on performing risk assessment. A level 3 ecological risk assessment will require the development of a site-specific, detailed work plan and approval by the department prior to its implementation. If a site-specific analysis determines that the risk to ecological receptors remains unacceptable, then at least one (1) element of the Risk Management Plan shall specify remediation goals to protect ecological receptors.

(11) Representative Concentrations.

(A) Estimating Representative Soil and Groundwater Concentrations. For each receptor—

1. Identify all media of concern;

2. Identify all complete exposure pathways under current and reasonably anticipated future conditions;

3. Identify the exposure domain for each media identified in step 1, and each complete exposure pathway identified in step 2;

4. Identify the chemical concentration data available within the exposure domain for each media; and

5. Calculate the representative concentration.

(B) To ensure the calculated average value is representative, take the following actions:

1. Do not use data beyond the exposure domain. If there is not enough data within the domain, additional data should be collected;

2. Replace the non-detect values with half the detection limit. Concentrations with a "J" laboratory qualifier should use the laboratory-estimated value;

3. If the maximum concentration of a chemical exceeds ten times the representative concentration for any exposure pathway, document the situation and explain its cause in the risk assessment report;

4. If the representative concentration is based in whole or in part on extrapolation using a model, the model must be supported by site-specific data;

5. For groundwater, estimate the average concentration in each well based on recent data, if data from multiple events is available, and then use the average of each well to estimate the representative concentration;

6. If multiple years of data are available for a well, use data from the two (2) most recent years to estimate the representative concentration. Justify the use of any data more than two (2) years old in the report;

7. If free product is present, use the effective solubility or effective vapor pressure to estimate COC concentrations associated with the free product at that point; depending on the extent, multiple data points might be needed to represent the full extent of free product;

8. If the area of impact is smaller than the exposure domain, the exposure factors may be modified in a tier 3 evaluation and representative concentrations calculated over the area of impact; and

9. Do not use soil data collected below the water table for the subsurface-soil-to-indoor-inhalation pathway. Groundwater data from the first encountered saturated zone is used for the groundwater-to-indoor-inhalation pathway.

10. In certain cases, the department may require that area-weighted averaging be used in the development of representative concentrations, in particular when data has been collected using a biased sampling protocol.

(C) Additional Information About Representative Concentrations.

1. For surficial soil concentration for leaching to groundwater, the exposure domain is the area of release. The representative surficial soil concentration is calculated using surficial soil data collected within this exposure domain.

2. For the surficial soil direct contact pathway, the representative concentration is based on the receptor's exposure domain, which is the area of the site over which the receptor might be exposed to the surficial soil. In the absence of specific information about the receptor's activities, the unpaved portion of a site is the receptor's exposure domain. For potential future exposures in the absence of any engineered controls, assume the pavement will be removed and the receptor will be exposed to surficial soil. For a non-resident worker, the average concentration over the domain may be used. For a child receptor (actual or potential and for residential land use), the maximum concentration is used and the representative concentration need not be calculated.

3. For subsurface soil, consider two (2) exposure pathways: leaching of residual chemical concentrations from subsurface soil

to groundwater, and indoor inhalation of vapor emissions. Calculate a representative concentration for each complete pathway. Calculate additional representative concentrations if the receptor's domain differs under current and reasonably anticipated future conditions.

4. For the construction worker receptor, consider incidental ingestion, dermal contact and outdoor inhalation of vapors and particulates from soil, outdoor inhalation of vapors from groundwater, and dermal contact with groundwater. For representative soil concentration for the construction worker, no distinction is made between surficial and subsurface soil. Estimate the representative concentration based on the depth of construction and the areal extent of construction. If the areal extent of the construction area is not known, assume construction will be within the area of release unless there are site limitations that would prevent construction in that area. For representative groundwater concentrations for construction worker, estimate the areal extent of the construction zone. The representative concentration is calculated using data from within this zone.

5. Groundwater.

A. For groundwater, consider three (3) exposure pathways: ingestion, dermal contact, and indoor inhalation of vapor emissions from groundwater. The analysis considers specific aquifers that are or might be used for domestic use or in any other manner in which dermal contact could occur. Representative concentrations shall be calculated for each aquifer that is or is reasonably likely to be used for domestic purposes. The shallowest aquifer is considered for the indoor inhalation of vapor emissions from groundwater pathway.

B. For the groundwater domestic use pathway, maximum contaminant levels (MCLs) or, where MCLs are not established, calculated risk-based concentrations shall be met at the point of exposure. The point of exposure well may be hypothetical. One (1) or more point-of-demonstration wells shall be established, if possible. Target concentrations shall be calculated for both point of exposure and point-of-demonstration wells. The representative concentration at the point of exposure or demonstration are calculated as follows. If chemical concentrations in groundwater are stable, the representative concentration is the arithmetic average of the most recent data collected over a period of at least two (2) years on at least a quarterly basis. If chemical concentrations are decreasing, the representative concentration is the arithmetic average of the most recent data collected over a period of at least one and one-half (1½) years on at least a quarterly basis.

C. For representative groundwater concentration for the protection of indoor inhalation, use a model approved by the department.

D. For the indoor inhalation of vapors from groundwater pathway, the calculation of multiple representative concentrations may be required if the plume has migrated below several current or potential future buildings.

E. For representative groundwater concentration for dermal contact, use the average concentration of chemicals in the groundwater that a receptor might contact. More than one (1) representative concentration may be needed if a receptor might contact groundwater from more than one (1) aquifer or saturated zone.

(12) Selection of COCs for MRBCA Evaluation.

(A) The remediating party may focus the risk assessment on the data for chemicals of concern (COCs) that contribute to the total risk at a site and eliminate—

1. Data analyzed using an outdated analytical method or a wrong and unproven method;

2. Data that is not adequately supported by corresponding quality assurance/quality control (QA/QC) data/measures;

3. Data that is not considered representative of current conditions; or

4. Data collected prior to earlier remediation at the site, if that remediation affected or likely affected that data.

(B) If data is eliminated, it should be replaced with better data unless the eliminated data is not necessary for site characterization or risk assessment purposes. Eliminating COCs from further consideration due to laboratory artifacts or common laboratory contaminants shall be supported by site-specific QA/QC information.

(C) If more than thirty (30) chemicals are selected as COCs, additional chemicals may be eliminated by the use of the toxicity screen (EPA, 1989). The screening procedure shall identify and possibly eliminate chemicals that are likely to contribute relatively little (less than one percent (1%)) to the total risk. Use the following steps to complete this procedure:

1. Identify the maximum concentration of the chemical in each media;

2. Select the toxicity value(s). For chemicals that have different toxicity values for various routes of exposure, use the most health-protective toxicity value;

3. Estimate the carcinogenic and non-carcinogenic toxicity score by multiplying the concentration with the slope factor, and by dividing the concentration with the reference dose, respectively;

4. Estimate the site score by adding the toxicity score for each chemical and each media. A separate site score is calculated for carcinogenic and non-carcinogenic effects; and

5. Estimate the percent contribution of each chemical to the site score and eliminate chemicals that have a very low score relative to the other chemicals.

(D) Document the rationale for the elimination of any chemicals. During the tier 1, tier 2, or tier 3 evaluation, chemicals that were eliminated shall be reviewed and a determination made of whether their inclusion would have resulted in an unacceptable risk.

(13) Applicable Target Levels. Use the published values as default target levels (DTLs) and tier 1 risk-based target levels. These may also be used in tier 2 evaluation. Use the following parameters to calculate the tiers 2 and 3 site-specific target levels: 1) acceptable risk level; 2) chemical-specific toxicological factors; 3) chemical-specific physical and chemical properties; 4) receptor-specific exposure factors; 5) fate and transport parameters; and 6) mathematical models.

(A) Tier 1 Target Levels. Tier 1 risk-based target levels are calculated for each COC, each receptor (child, adult resident, age-adjusted resident, non-residential worker, and construction worker), and each of the following exposure pathways using conservative assumptions applicable to most Missouri sites. Tier 1 risk-based target levels are not adjusted for the presence of other exposure pathways and COCs, and any additional exposure pathways shall be considered in using these levels. The pathways included in paragraph (8)(B)3. are considered in tier 1.

(B) Tier 2 Target Levels. The remediating party shall calculate the site-specific target levels for all COCs and all complete exposure pathways using technically justifiable, site-specific fate and transport data and taking into consideration target risk and the additive effect of multiple COCs and multiple complete exposure pathways. The default fate and transport models used for developing the tier 1 risk-based target levels shall be used.

(C) Tier 3 Target Levels. Tier 3 target levels are calculated for the pathways listed in paragraph (8)(B)3. In addition, target levels must be calculated for all other complete exposure pathways that may include exposure through, for instance, ingestion of produce grown in impacted soils; use of groundwater for irrigation purposes; use of groundwater

for industrial purposes; or ingestion of fish or other aquatic organisms that have bioaccumulated COCs through the food chain as a result of surface water or sediment contamination. Alternative fate and transport models, different exposure factors and scenarios, the most current toxicity factors and chemical and physical properties, and site-specific data may be used to develop tier 3 site specific target levels if approved by the department.

(D) Risk Levels. For carcinogenic effects, risk is quantified using individual excess lifetime cancer risk (IELCR), and, for non-carcinogenic effects, the risk is quantified using a hazard quotient (HQ) or hazard index (HI). A hazard index is the sum of hazard quotients when multiple chemicals and multiple exposure pathways are evaluated. For evaluating the groundwater domestic use pathway, maximum contaminant levels (MCLs) are used as the target concentrations at the point of exposure. For COCs that do not have MCLs, the target concentration at the point of exposure (POE) is estimated assuming ingestion of, dermal contact with, and indoor inhalation of vapors from groundwater use under residential conditions. Potential impacts to surface waters from a release shall be evaluated against water quality standards (10 CSR 20-7.031). Other potentially toxic substances for which sufficient toxicity data are not available may not be released to waters of the state until safe levels are demonstrated through adequate bioassay studies. Tier 1 risk-based target levels are based on risk levels of 1×10^{-5} for the carcinogenic chemicals and a hazard quotient of 1.0 for non-carcinogenic chemicals and do not account for cumulative site-wide risk. These target levels shall be adjusted to address cumulative site-wide risk at each risk assessment level. The acceptable risk levels are presented in subsection (4)(D).

(14) Conducting a Tier 1 Risk Assessment. If the maximum soil or groundwater concentrations exceed the default target levels (DTLs) and the remediating party wishes to continue the risk-based remedation, the remediating party shall either conduct the cleanup using DTLs as cleanup levels or complete a tier 1 risk assessment as follows. A tier 1 risk assessment consists of the following steps:

(A) Compile relevant site characterization data including that necessary to determine the predominant vadose zone soil type;

(B) Develop an exposure model, including—

1. All complete exposure pathways for current and reasonably anticipated future land use;

2. The exposure domain for each complete exposure pathway identified above; and

3. The point of exposure for each exposure pathway;

(C) Collect data to fill any site characterization or risk assessment data gaps;

(D) Calculate media and pathway-specific representative concentrations for chemicals of concern (COCs). If the risk calculated with the use of the maximum concentrations meets the tier 1 risk-based target levels, calculation of representative concentrations is not necessary;

(E) Compare representative site concentrations with selected tier 1 risk-based target levels from lookup tables of the guidance document referenced in section (22). For residential land use, tier 1 values are the lower of the values for the three (3) receptors: child, adult, and age-adjusted individual;

(F) Calculate cumulative site-wide risk and compare with acceptable risk at each risk assessment level. The cumulative site-wide risks calculated in this step are compared with acceptable cumulative site-wide risk levels. The cumulative site-wide risk is calculated for each receptor using the following two (2)-step process:

1. The risk of each chemical for each complete (current or future) exposure pathway; and

2. The total risk for each chemical (sum of risk for all exposure pathways) and the site-wide risk (sum of risk of all chemicals for all pathways) for each receptor;

(G) Evaluate the next course of action. The remediating party may request that the department issue a letter of completion for the site if—

1. The analysis indicates that both the cumulative site-wide risk (all chemicals and all complete pathways) and the risk for each chemical (all complete pathways) for all receptors is acceptable; or

2. The representative concentration for all COCs and all complete exposure pathways are below the tier 1 risk-based target levels;

(H) Document the tier 1 risk assessment and recommendations. If a tier 2 assessment is also conducted, both tier 1 and tier 2 assessments may be submitted as one (1) report. The tier 1 risk assessment report shall include, but not necessarily be limited to, the following:

1. Site background and chronology of events;

2. Data used to perform the evaluation;

3. Documentation of the exposure model and its underlying assumptions;

4. If cumulative risk calculation is required, the estimated risk for each chemical, each exposure pathway, each receptor, each media, and the cumulative site-wide risk for each receptor;

5. Recommendations based on the tier 1 risk assessment (either tier 2 assessment or preparation of a risk management plan); and

6. If a letter of completion is requested, documentation that both the cumulative site-wide risk (all carcinogenic and non-carcinogenic COCs and all complete pathways) and the risk for each COC (carcinogenic and non-carcinogenic and all complete pathways) for all receptors have been met or that representative concentrations for all COCs and all exposure pathways are below the tier 1 risk-based target levels;

(I) To conclude a remediation at tier 1, the following four (4) conditions must be met:

1. If relevant, a groundwater plume is stable or decreasing. If this condition is not satisfied, the remediating party shall continue groundwater monitoring until the plume is demonstrably stable or successfully run an approved predictive model to demonstrate the extent to which COC concentrations will increase or the areal extent of the plume will expand and how such increases or expansion will effect the conclusions of the tier 1 risk assessment;

2. The maximum concentration of any COC in any sample used in developing a representative concentration is less than ten (10) times the representative concentration of that COC for any exposure pathway. This condition can be met if an exceedance can be explained by any of the following, appropriate action is taken to address the condition, and the department approves the risk assessment with this explanation:

A. The maximum concentration is an outlier; or

B. Other explanation satisfactory to the department;

3. Pursuant to section (18), long-term stewardship is established if any contaminant of concern exceeds unrestricted levels after cleanup; and

4. There are no ecological concerns at the site, as determined by confirmation that the maximum representative concentrations are below levels protective of ecological receptors or completion of the ecological risk assessment. This condition can be met if an unacceptable ecological risk can be managed through actions recommended in the risk management plan and approved by the department; and

(J) If the remediating party chooses to remediate the site to meet the tier 1 risk-based target levels, the cleanup criteria are the lowest of the concentrations protective of human health, both carcinogenic and non-carcinogenic, and ecological receptors.

(15) Conducting a Tier 2 Risk Assessment. If any of the representative concentrations at the site are above the tier 1 risk-based target levels or if the cumulative site-wide risk exceeds acceptable target risk levels, and the remediating party wishes to continue the risk-based remediation, the remediating party shall either conduct the cleanup using tier 1 risk-based target levels or complete a tier 2 risk assessment as follows. A tier 2 risk assessment may also be required by the department if the site-specific fate and transport parameters or other site conditions are different from the default assumptions used to develop tier 1 risk-based target levels. Concluding a tier 2 risk assessment is subject to the conditions in subsection (14)(I). A tier 2 risk assessment shall include the following steps:

(A) Compile site-specific fate and transport parameters. Fate and transport parameters are considered site-specific if they are—

1. Measured on site at the appropriate location using approved methods;

2. Literature values justified as being representative of site conditions;

3. Default values justified as representative of current conditions at the site or shown to be conservative based on site conditions; or

4. Documented values from a nearby site in a similar hydrogeologic setting. In cases that show considerable variability in fate and transport parameter values, the department may require a sensitivity analysis. The guidance document provides considerations related to each parameter that may be considered in a tier 2 analysis; deviations from the guidance document in the development of any parameter must be explained in the risk assessment document;

(B) Calculate Tier 2 Risk Levels. At tier 2, risk values shall be individually calculated for each COC and each complete exposure pathway. Then the total risk for each COC and the cumulative site-wide risk shall be calculated. In calculating the tier 2 risk, the models, physical-chemical properties, toxicological properties, and exposure factors will be the same as used in the tier 1 risk calculations;

(C) Tier 2 risks for each COC and the total site-wide risk will be compared with the acceptable risk levels. The total acceptable individual excess lifetime cancer risk for each COC is 1×10^{-5}. The acceptable risk level for site-wide cumulative individual excess lifetime cancer risk is 1×10^{-4}. The acceptable hazard quotient (HQ) for each COC and each exposure pathway as well as the hazard index is 1.0. Based on this comparison, one (1) of the following four (4) outcomes is possible:

1. The calculated individual excess lifetime cancer risk for each COC and the cumulative site-wide individual excess lifetime cancer risk are below the acceptable risk levels. In such case, it is not necessary to develop tier 2 site-specific target levels for carcinogenic effects;

2. Either the individual COC or the cumulative site-wide individual excess lifetime cancer risk exceeds the acceptable risk level. In such case, tier 2 site-specific target levels shall be developed;

3. The calculated cumulative site-wide hazard index (sum of the hazard quotients for all chemicals for all exposure pathways) is acceptable (less than 1.0). In such case, it is not necessary to develop tier 2 site-specific target levels for non-carcinogenic adverse health effects; and

4. The hazard quotient for each COC is acceptable (less than 1.0), but the site-wide hazard index is unacceptable (greater than 1.0). In such case, the remediating party may segregate the COCs by target organ, system, or mode of action and derive hazard indices for each. If each of these cumulative hazard indices is acceptable (less than 1.0), it is not necessary to develop tier 2 site-specific target levels for these COCs for non-carcinogenic health effects. If not acceptable (greater than 1.0), site-specific target levels for the COCs in the group that exceed the hazard index of 1.0 shall be developed. A toxicologist shall perform this analysis. In calculating the hazard index, COCs with multiple effects shall be included in each category of organ affected by that COC;

(D) Calculate Tier 2 Site-Specific Target Levels. If risk levels (carcinogenic and non-carcinogenic, individual and site-wide) are exceeded and remediation is not proposed to lower risk to acceptable levels, tier 2 site-specific target levels shall be developed as per subsection (13)(B);

(E) Evaluate the Next Course of Action.

1. The remediating party may request that the department issue a letter of completion for the site if—

A. The representative concentration for all COCs and all the exposure pathways are below the tier 2 site-specific target levels; or

B. The analysis at subsections (15)(B) and (C) indicates that both the cumulative site-wide risk (all chemicals and all complete pathways, cancer and hazard indices) and the risk for each chemical (all pathways, cancer and hazard indices) for all receptors is acceptable; and

C. All other conditions in subsection (14)(I) are satisfied.

2. The remediating party shall decide either to use the calculated tier 2 site specific target levels as the cleanup levels and conduct corrective action to meet these levels or perform a tier 3 risk assessment if the analysis determines—

A. The risk any chemical poses (all pathways, cancer and hazard indices) to any human or ecological receptor exceeds acceptable levels; or

B. The cumulative site-wide risk (all chemicals and all complete pathways, cancer and hazard indices) exceeds acceptable levels; or

C. The representative concentrations exceed the calculated tier 2 site specific target levels.

3. Based on the decision above, the remediating party shall recommend one (1) of the following:

A. Remediation to tier 2 site-specific target levels. If the remediating party decides to remediate the site to tier 2 site-specific target levels, the cleanup levels will be the lower of concentrations protective of human health, both carcinogenic and non-carcinogenic, and ecological receptors; or

B. Performance of a tier 3 risk assessment; and

(F) The risk assessment shall be documented. If a tier 1 risk assessment is also conducted, both tier 1 and tier 2 risk assessments may be submitted as one (1) report. The tier 2 risk assessment report shall include but is not necessarily limited to the following:

1. Site background and chronology of events;

2. Data used to perform the evaluation including, as applicable, calculated tier 2 site-specific target levels;

3. Documentation of the exposure model and its assumptions;

4. Documentation and justification of all fate and transport parameters used in the development of tier 2 site-specific target levels;

5. Estimated risk for each COC, each exposure pathway, and each receptor, and the cumulative site-wide risk for each receptor and media;

6. Recommendations based on the tier 2 risk assessment; and

7. If a letter of completion is requested, documentation that all four (4) of the risk conditions (carcinogenic and non-carcinogenic chemicals, individual and site-wide risk) and the conditions listed in subsection (14)(I) have been met.

(16) Conducting a Tier 3 Risk Assessment. If any of the representative concentrations at the

site are above the tier 2 site-specific target levels or if the individual or cumulative site-wide risks exceed acceptable target risk levels, and the remediating party wishes to continue the risk-based remediation, the remediating party shall either conduct the cleanup using tier 2 site-specific target levels or complete a tier 3 risk assessment as follows. A tier 3 risk assessment may use the most recent toxicity factors, physical and chemical properties, site-specific exposure factors, and alternative models. Concluding a tier 3 risk assessment is subject to the conditions in subsection (14)(I). A tier 3 risk assessment consists of the following steps:

(A) Develop a tier 3 work plan. The tier 3 risk assessment must consider the receptors for which risks exceed acceptable levels as determined in tier 2 and any additional receptors identified in tier 3. Receptors for which risks do not exceed acceptable risk levels as determined at tier 2 need not be evaluated. All chemicals of concern (COCs) considered in the tier 2 risk assessment must be considered in the tier 3 analysis unless new data collected after the tier 2 assessment indicates they no longer pose unacceptable risk and the condition can be documented to the department, in which case the COCs may be eliminated from consideration. The department must approve a tier 3 work plan. The technical portion of the work plan shall include but not necessarily be limited to the following:

1. Identification of the receptors that will be evaluated in tier 3;

2. Identification of the COCs and the exposure pathways for which tier 3 risk will be calculated;

3. An explanation of the fate and transport models to be used for the calculation of risk for the identified exposure pathways;

4. A tabulation of the input parameters required to calculate the tier 3 risk and a justification for the use of each selected value;

5. A discussion of the data and the methodology that will be used to calculate the representative concentrations;

6. An explanation of data gaps, if any, that require additional fieldwork and a scope of work for the collection of this data;

7. A discussion of the variability and uncertainty in the input parameters and the manner in which the impact of this variability on the final risk will be evaluated; and

8. An evaluation of ecological risk, if any, in addition to ecological risk assessments previously completed;

(B) Collect additional data, if necessary. Upon approval of the Tier 3 work plan, the remediating party shall perform the necessary fieldwork to collect the data. Any changes in the data collection due to field conditions or logistics of fieldwork shall be discussed with the department prior to completion of the field effort;

(C) Calculate tier 3 risk. Estimate the carcinogenic and non-carcinogenic risk for all COCs, receptors, and exposure pathways, using the models and data in accordance with the approved work plan. At tier 3, the risk values shall be calculated for each COC and each exposure pathway. The total risk for each COC (sum of risk for all the complete exposure pathways for a COC) and the cumulative site-wide risk (sum of risk for all COCs and all complete exposure pathways) shall then be calculated. Ecological risk must also be considered according to the work plan;

(D) Compare tier 3 risks with acceptable risk levels. Total risks for each COC as well as cumulative site-wide risk for each receptor are compared with respective acceptable risk levels. If the calculated risks for each COC and the cumulative site-wide risk do not exceed the target risk levels, tier 3 site-specific target levels need not be developed, and, if the other conditions set forth in subsection (14)(I) are satisfied, the remediating party may request a letter of completion from the department;

(E) The remediating party shall develop site-specific target levels and propose remedial actions to achieve these levels if the analysis finds that either—

1. The total risk any COC poses (considering all pathways and both carcinogenic and non-carcinogenic risk) to any of the human or ecological receptors is unacceptable; or

2. The cumulative site-wide risk (considering all COCs, all complete pathways, and both carcinogenic and non-carcinogenic risk) posed to any of the human or ecological receptors is unacceptable. The site-specific target levels and the methodologies used to achieve these levels shall be included in the risk management plan; and

(F) The remediating party shall submit a tier 3 risk assessment report that clearly describes the data and methodology used, key assumptions, results, and recommendations. Any deviation from the approved scope of work, the rationale for the deviation, and approval by the department shall be clearly documented in the report. The report shall include but not necessarily be limited to—

1. Site background and chronology of events;

2. Data used to perform the evaluation, including any calculated tier 3 site-specific target levels;

3. Documentation of the exposure model and its assumptions;

4. Documentation and justification of all input parameters used;

5. Estimated risk for each COC, each exposure pathway, each receptor, and the site-wide risk for each receptor and media;

6. Recommendations based on the tier 3 risk assessment; and

7. If a letter of completion is requested, documentation that all the risk conditions (carcinogenic and non-carcinogenic chemicals, individual and site-wide risk) and the conditions at subsection (14)(I) have been met.

(17) Data Quality. Following are the areas that shall be addressed to meet quality assurance/quality control requirements for environmental measurement data collected as part of the MRBCA process. These minimum requirements include the necessary components for work plans submitted for department approval to conduct environmental data collection and the necessary QA/QC documentation to be submitted after data collection.

(A) Work plans for site characterization must include the following, each of which is subject to QA/QC requirements:

1. Sampling and analysis plan;

2. Field sampling plan; and

3. Quality assurance project plan.

(B) Characterization reports, including tier 1, tier 2, and tier 3 risk assessment reports, are subject to QA/QC requirements, in particular—

1. Field QA/QC documentation requirements; and

2. Laboratory QA/QC documentation requirements.

(C) For field QA/QC planning and documentation, the following practices shall be observed, if applicable:

1. Calibration and maintenance records for field instrumentation;

2. Documentation of sample collection procedures;

3. Reporting of any variances made in the field to sampling plans, standard operating procedures (SOPs), or other applicable guidance documents;

4. Reporting of all field analysis results;

5. Documentation of sample custody (provide copies of chain-of-custody documents);

6. Documentation of sample preservation, handling, and transportation procedures;

7. Documentation of field decontamination procedures (and, if applicable, collection and analysis of equipment rinsate blanks);

8. Collection and analysis of all required duplicate, replicate, background, and trip

blank samples; and

9. Documentation of disposal of investigation-derived wastes.

(D) All analytical data shall be accompanied by QA/QC sample results. The following shall be considered in laboratory QA/QC planning and documentation, if applicable:

1. If the published analytical method used specifies QA/QC requirements within the method, those requirements shall be met and the QA/QC data reported with the sample results;

2. At a minimum, QA/QC samples shall consist of the following items (where applicable):

A. Method/instrument blank;

B. Extraction/digestion blank;

C. Initial calibration information;

D. Initial calibration verification;

E. Continuing calibration verification;

F. Laboratory fortified blanks/laboratory control samples;

G. Duplicates;

H. Matrix spikes/matrix spike duplicates;

I. Rinsate when equipment will be reused; and

J. Documentation of appropriate instrument performance data such as internal standard and surrogate recovery.

(E) Risk Management Plan. If the risk management plan involves environmental data collection, such as further site characterization, confirmatory samples shall follow the requirements of subsection (17)(A). If the risk management plan does not involve sampling but only LTS (including but not limited to AULs), then data QA/QC would not be a component.

(F) Completion of Risk Management Plan. If implementation of the risk management plan involves sampling, then the following components, as explained in subsections (17)(C) and (D) above, pertain—

1. Field QA/QC documentation requirements; and

2. Laboratory QA/QC documentation requirements.

(18) Long-Term Stewardship (LTS) for Risk-Based Corrective Action Sites.

(A) Activity and use limitations (AULs) shall be used at any site where a chemical of concern concentration exceeds unrestricted use levels after cleanup. Where required, AULs shall be fully developed and proposed as part of the risk management plan. To be approved, a risk management plan with proposed controls must be consistent with this rule and any other controls or limitations that are required by the specific legal authority governing the cleanup. AULs shall be established as environmental covenants pursuant to sections 260.1000 to 260.1039, RSMo, or, alternatively, AULs for groundwater contamination at a site may be addressed through an ordinance and memorandum of agreement described in subsection (18)(G) below or well location and construction restrictions described in subsection (18)(J) below. Department of Defense sites may be addressed through subsection (18)(H) below. Environmental covenants may be supplemented with other AULs as provided in subsections (18)(I) and (18)(J) below.

(B) AULs shall guarantee that pathways of exposure to chemicals of concern (COCs) remain incomplete for as long as there are chemicals remaining that could pose an unacceptable risk to human health, public welfare, or the environment.

(C) AULs shall be readily accessible, durable, reliable, enforceable, and consistent with the risk posed by the COCs. Environmental covenants, letters of completion, and any additional requirements of the authority under which remediation is being performed apply to the property.

(D) Environmental covenants shall be enforceable by the department and shall contain the following elements:

1. State that the instrument is an environmental covenant executed under sections 260.1000 to 260.1039, RSMo;

2. Contain a legally sufficient description of the real property subject to the covenant;

3. Describe the activity and use limitations on the real property;

4. Identify every holder. In addition, identify any lienholder or person who otherwise owns a prior interest in the property as described in section 260.1006.1, RSMo, and whether such interests are subordinated to the environmental covenant, or alternatively, provide a title insurance commitment or other documentation demonstrating the property is free and clear of liens;

5. Be signed by the department, every holder, and, unless waived by the department, every owner of the fee simple of the real property subject to the covenant; and

6. Identify the name and location of any administrative record for the environmental response project reflected in the environmental covenant.

(E) The following elements may be included in an environmental covenant for clarity or based on site-specific conditions:

1. Requirements for notice following transfer of a specified interest in, concerning proposed changes in use of, applications for building permits for, or proposals for any site work affecting the contamination on the property subject to the covenant;

2. Requirements for periodic reporting describing compliance with the covenant;

3. Rights of access to the property granted in connection with implementation or enforcement of the covenant;

4. A brief description of the contamination and remedy, including the contaminants of concern, the pathways of exposure, limits on exposure, and the location and extent of the contamination;

5. Limitation on amendment or termination of the covenant in addition to those contained in sections 260.1024 and 260.1027, RSMo; and

6. Rights of the holder in addition to its right to enforce the covenant under section 260.1030, RSMo.

7. The department may require those persons specified by the department who have interests in the real property to sign the covenant.

(F) A copy of the recorded covenant that references the book and page of recording shall be submitted to the department as part of the completion of the risk management plan report before the department will issue a letter of completion. The covenant does not become effective until it is officially recorded in the chain of title for the property. A covenant remains in effect unless amended or terminated in accordance with section 260.1024 or 260.1027, RSMo. The use of a site shall be consistent with the terms of the environmental covenant established on the property.

(G) Ordinances and Supporting Memoranda of Agreement. An ordinance and supporting memorandum of agreement may be used as an AUL if it prohibits the installation of water supply wells and requires the closure of any existing private wells, but does not expressly prohibit the installation of public potable water supply wells and require the closure of such wells owned and operated by units of local government that are part of the agreement. Monitoring wells shall not be used for providing a potable water supply, and shall be managed in accordance with 10 CSR 23-4. In a request for approval of a local ordinance and supporting memorandum of agreement as an AUL, the remediating party shall submit the following to the department:

1. A copy of the ordinance restricting groundwater use, including prohibitions on new wells, certified by an official of the unit of local government representative of the area in which the site is located that it is a true and accurate copy of the ordinance, and supporting information including—

A. A scaled map(s) delineating the area and extent of groundwater contamination above the applicable remediation objectives including a summary of any measured data showing concentrations of chemicals of concern for which the applicable remediation objectives are exceeded;

B. Scaled map delineating the boundaries of all properties under which groundwater is located that exceeds the applicable groundwater remediation objectives and information identifying the current owner(s) of each property identified in the boundary map;

C. Documentation that the current owners identified in subparagraph (18)(G)1.B. above have been notified that groundwater that extends beneath their property is the subject of a risk-based cleanup and that each has been sent a copy of this request as submitted to the department; and

D. Documentation that the current property owners identified in subparagraph (18)(G)1.B. above have been notified of the intent to use the local ordinance as an AUL; and

2. A supporting memorandum of agreement (MOA) between the department and the local government which includes the following provisions:

A. Identification of the authority of the unit of local government to enter into the MOA;

B. Identification of the legal boundaries, or equivalent, to which the ordinance is applicable;

C. A certified copy of the ordinance expressly prohibiting the installation of public and private potable water supply wells, the use of such wells, and the closure of existing wells;

D. A commitment by the unit of local government to notify the department of any variance requests or proposed ordinance changes at least thirty (30) days prior to the date the local government is scheduled to take action on the request or proposed change;

E. A commitment by the unit of local government to maintain a list of all sites within the geographical unit of local government that have received letters of completion under the MRBCA process;

F. A provision that allows departmental access to information necessary to monitor adherence to requirements in subparagraphs (18)(G)2.D. and (18)(G)2.E. above;

G. If applicable, the terms of any commitment by the local government to reimburse the department for periodic review of the local ordinance and actions relating to it, and for any actions taken by the department to address increased risks that arise from actions taken by the local government on the ordinance or related to it; and

H. The commitment of the local government to enforce the ordinance.

(H) For any Department of Defense (DOD) properties that contain contaminants of concern exceeding unrestricted use levels after cleanup, an environmental covenant will be required at the time that such property is transferred to a non-federal entity or person. For property owned by the DOD, other land use or institutional control mechanisms may be used as part of the risk management plan if approved by the department.

(I) Engineered controls or barriers may be used as AULs as part of the risk management plan to prevent direct human or environmental exposure to contaminants, and environmental covenants shall accompany their use. Any letter of completion determination that is based, in whole or in part, upon the use of engineered controls requires effective inspection and maintenance of the engineered control. The inspection, maintenance, and integrity certification requirements will be included in the risk management plan and environmental covenant.

(J) Well location and construction restrictions pursuant to 10 CSR 23-3 may be used as AULs to the extent that they restrict access to certain groundwaters and thus limit the pathway for contaminants.

(19) Risk Management Plan.

(A) A risk management plan shall encompass all activities necessary to manage a site's risk to human health, public welfare, and the environment so that acceptable risk levels are not exceeded under current or reasonably anticipated future land use conditions. The risk management plan shall ensure that assumptions made in the estimation of risk and development of applicable target levels are not violated in the future, and the groundwater extent of contamination is stable or decreasing. A site-specific risk management plan, approved by the department, is required at a site under any one (1) of the following conditions:

1. The total (sum of all pathways) carcinogenic risk for any COC exceeds 1×10^{-5};

2. The hazard index (sum of all pathways) for any COC exceeds 1.0 (or, if appropriate, the hazard index for individual organ, system, or mode of action);

3. The cumulative site-wide carcinogenic risk (sum of COCs and all exposure pathways) exceeds 1×10^{-4};

4. The site-wide hazard index (sum of COCs and all exposure pathways) for individual adverse health effects exceeds 1.0 (or, if appropriate, the hazard index for individual organ, system, or mode of action);

5. Although neither the carcinogenic or non-carcinogenic risk for any COC nor the site-wide risk exceeds acceptable levels, the risk assessment was based on site-specific assumptions that require a risk management plan;

6. Although neither the carcinogenic nor non-carcinogenic risk for any COC nor the site-wide risk exceeds acceptable levels, the groundwater plume is expanding and such expansion, either as an increase in COC concentrations or a physical expansion of the plume, would result in unacceptable risks;

7. There are hot spots where sample results exceed ten (10) times average concentrations, and these pose unacceptable risks; or

8. Ecological risk does not meet the acceptable criteria.

(B) Successful implementation of the risk management plan will result in a letter of completion from the department. The department will approve the risk management plan as submitted or provide comments. Upon receipt of approval, the remediating party shall implement the plan. The plan shall include—

1. Rationale explaining why the risk management plan was prepared and the specific objectives of the plan;

2. Reference to the approved risk assessment report;

3. An explanation of technologies to be used to reduce mass, concentration, or mobility of COCs to meet the applicable target levels determined for the site or specific engineering activities to be used to mitigate excessive risks;

4. Data to be collected and quality control/quality assurance procedures for collection, documentation, analysis, and reporting during the implementation of the risk management plan;

5. Application of long-term stewardship provisions to eliminate certain pathways of exposure or to ensure pathways remain incomplete under current and reasonably anticipated future uses and that site information remains publicly available;

6. If needed, monitoring demonstrating plume stability or the effectiveness of monitored natural attenuation;

7. A schedule for implementation of the plan, including all major milestones and all deliverables to the department, and a requirement to conduct a review five (5) years following completion where appropriate. Such a requirement would be included in an AUL;

8. Criteria to determine whether the risk management plan has been successfully implemented; and

9. As needed, contingency plans if the risk management plan fails to provide adequate protection in a timely manner.

(20) Completion of Risk Management Activities. Upon successful implementation of the approved risk management plan, the remediating party shall submit a completion of the risk management plan report to the department for approval that includes but is not necessarily limited to—

(A) Documentation of completion of all risk management activities; and

(B) If applicable, a request to plug and abandon all nonessential monitoring wells related to the environmental activities at the site.

(21) Public Participation and Notice.

(A) When contamination in any media at concentrations exceeding target levels applicable to residential land use has or is likely to migrate beyond one (1) or more boundaries of the property on which the contamination originated (i.e., the source property) and onto one (1) or more adjacent or nearby properties, the department will provide notice to those members of the public directly affected by the contamination and the planned risk management activities. Where it determines appropriate, the department will also provide notice to the local (city or county) government.

(B) If the department determines that implementation of an approved risk management plan has failed to achieve applicable target or risk levels or otherwise successfully mitigate excessive risks associated with contamination, and the department is considering terminating the RMP, the department will provide public notice regarding the failure of the RMP to those members of the public directly affected by the contamination and the RMP and, as appropriate, the local government.

1. Notice may be made via one (1) or more of the following means or other means determined appropriate by the department:

A. Notice in newspapers having circulation in the area in which the site is located;

B. Block advertisements;

C. Public service announcements;

D. Publication in a state register;

E. Letters to individual households;

F. Letters to property owners;

G. Letters to government agencies; or

H. Personal contacts by department field staff.

2. The notice will provide for a minimum of thirty (30) days in which to submit comments to the department regarding the subject of the notice. The notice must specify a date by which comments must be submitted to the department, a contact for the department and a telephone number at which that person may be contacted, and the department's mailing address and electronic mail address to which comments shall be directed.

(C) In each instance in which the department determines that public notice as per subsection (21)(A) or (21)(B) above is required, before providing the public notice, the department will give the remediating party an opportunity to provide the required public notice in lieu of the department. If the remediating party declines, fails to meet notification deadlines as prescribed by the department, or provides notice the department believes to be inadequate, the department will provide the public notice.

(D) When contamination associated with a site is, without cleanup or other actions, contained to the property on which the contamination originated such that chemicals of concern at concentrations above residential target levels do not extend off the property of origin, and, after cleanup, one (1) or more chemicals of concern exist on the property at concentrations exceeding unrestricted use levels such that an AUL per subsection (18)(A) is required, the department, or the remediating party in lieu of the department, will notify the local government in writing.

1. The notification shall include a description and address of the property, the name and address of the remediating party, the name and address of the department contact, and an explanation of the type and extent of contamination, that the cleanup levels applied pertained to non-residential land use, and that an AUL has been recorded in the property chain of title to restrict certain uses of and activities on the property. A copy of the AUL, as recorded with the Office of the Recorder, must be included with the notification.

2. If local government notification is made by the remediating party in lieu of the department, the remediating party must submit a copy of the written notification provided to the local government to the department with documentation appropriate to demonstrate that the local government received the notification.

(E) The department will review each comment received as a result of the public notice provided for above and determine an appropriate response to each and collectively.

(22) Procedure for Letter of Completion.

(A) After the risk management plan has been successfully implemented, the remediating party may request a letter of completion from the department. The department will issue a letter if it determines that all requirements of the approved risk management plan have been satisfied. The letter would state that, based on the information submitted, the concentrations of COCs on the site do not pose an unacceptable level of risk to human health, public welfare, and the environment for the current and reasonably anticipated future land use and provided that all applicable long-term stewardship requirements remain in place.

(B) The department will include all of the following in a letter of completion:

1. An acknowledgement that the requirements of the risk management plan were satisfied, including reference to the administrative record supporting completion of the site work and acknowledging continuing requirements of the risk management plan, if any;

2. The use level of remediation objectives specifying any long-term stewardship requirements imposed as part of the remediation efforts;

3. A statement that the department's issuance of the letter of completion signifies achievement of risk reduction under applicable laws and regulations in implementing the approved risk management plan, other than any continuing requirements of the risk management plan, and that the site does not present unacceptable risks to human health, public welfare, and the environment based upon currently known information. If the site is part of a larger parcel of property or if the remediating party limited the cleanup to specific environmental conditions and related contaminants of concern, or both, the letter of completion may include this information;

4. The prohibition against the use of the site in a manner inconsistent with any use limitation imposed as a result of the remediation efforts without additional appropriate remedial activities;

5. A description of any preventive, engineered, or institutional controls or monitoring, including long-term monitoring of wells, required in the approved risk management plan or a reference identifying where risk management plan information can be found;

6. The obligation to record the letter of completion in the chain of title for the site;

7. Notification that further information regarding the site can be obtained from the department through a request under the Missouri Sunshine Law (Chapter 610, RSMo);

8. A standard agency reservation of rights clause for previously unknown or changing site conditions. This wording may vary depending upon the authority overseeing the remediation;

9. Notification that the letter of completion may be voided for reasons listed in subsection (21)(E); and

10. A description of the site by legal description, by reference to a plat showing the boundaries, or by other means sufficient to identify site location, any of which may be an attachment to the letter.

(C) If only a portion of the site or only selected contaminants at a site were remediated, the letter of completion may contain any other provisions agreed to by the department and the remediating party, such as the limitation of the letter to the specific area or contaminants. The remediating party receiving a letter of completion from the department shall submit the letter, and, where the remediating party is not the sole owner of the remediation site, an owner certification described below, to the Office of the Recorder of the county or city not within a county in which the site is located within forty-five (45) days after receipt of the letter. The Office of the Recorder will record the letter and, where applicable, the owner certification so that it forms a permanent part of the chain of title for the property. The remediating party is responsible for any cost of recording. Where the remediating party is not the sole owner of the site, the remediating party shall obtain a certification by original signature of each owner, or the authorized agent of the owner(s), of the site or any portion of the site. The certification shall be recorded along with the letter of completion. The certification shall read as follows: "I hereby certify that I have reviewed the attached letter of completion, and that I accept the terms and conditions and will abide by any AULs set forth in the letter." The issuance of the letter is contingent on obtaining this certification from all owners. A letter of completion is effective upon the date of the official recording of the letter and any associated owner certification(s). Until it is in the chain of title, the letter of completion is effective only between the department and the remediating party. The remediating party shall obtain and submit to the department an acknowledgement from the Office of the Recorder that a copy of the letter and any owner certifications have been recorded. This acknowledgement shall be provided to the department within thirty (30) days after recording to demonstrate that the recording requirements have been satisfied.

(D) No site with activity or use limitations or other long-term stewardship requirements may be used in an inconsistent manner unless further evaluation or remediation documents the attainment of objectives appropriate for the new land use or activity. If the department approves modified long-term stewardship requirements, an updated letter of completion reflecting the new site conditions and requirements may be obtained and recorded as described above.

(E) The department may void a letter of completion, with prior notice to the current title holder or holders of the site and to the remediating party at the last known address, if site use and activities are not managed in full compliance with the approved risk management plan. Specific acts or omissions that may result in voiding of the letter of completion include and are not limited to—

1. Failure to adhere to the terms of an environmental covenant;

2. Failure to adhere to any other applicable institutional controls, land use restrictions, or other environmental limitation;

3. Failure of the owner, operator, remediating party, or any subsequent transferee to operate and maintain preventive or engineered controls, to comply with any monitoring plan, or to disturb the site contrary to the established limitations;

4. Disturbance or removal of contamination that has been left in place if such disturbance or removal is not in accordance with the risk management plan;

5. Failure to comply with the recording requirements or to complete them in a timely manner;

6. Obtaining the letter of completion by fraud or misrepresentation; and

7. Subsequent discovery of contaminants, releases, or other site-specific conditions not identified as part of the investigative or remedial activities and which pose a threat to human health, public welfare, or the environment.

(23) MRBCA Technical Guidance.

(A) DNR shall develop and maintain a technical guidance document for implementation of the MRBCA process that shall include, at a minimum, the following:

1. Equations and default factors to be used in the derivation of RBTLs and SSTLs;

2. Tables of DTLs and tier 1 RBTLs; and

3. Additional elaboration or description that may be useful for implementing the MRBCA process not covered in this rule.

(B) Significant changes to the DNR MRBCA technical guidance will occur only after a stakeholder process that includes, at a minimum, the following:

1. Stakeholder notification of proposed changes a minimum of sixty (60) days prior to issuance of new guidance;

2. Opportunity for stakeholder input, including submission of written comments, prior to the issuance of the new guidance; and

3. DNR shall prepare and distribute responses to stakeholder comments prior to issuance of the new guidance.

AUTHORITY: sections 260.370, 260.470, and 260.905, RSMo Supp. 2008 and sections 260.437, 260.465, 260.500, 260.510, 260.520, 260.567, 260.573, 644.026, and 644.143, RSMo 2000. Original rule filed Jan. 30, 2009, effective Oct. 30, 2009.*

**Original authority: 260.370, RSMo 1977, amended 1980, 1988, 1993, 1995, 2004; 260.437, RSMo 1983, amended 1995; 260.465, RSMo 1983, amended 1988; 260.470, RSMo 1983, amended 2007; 260.500, RSMo 1983, amended 1995, 2000; 260.510, RSMo 1983; 260.520, RSMo 1983, amended 1993, 1995; 260.567, RSMo 1993; 260.573, RSMo 1993; 260.905, RSMo 2000, amended 2005; 644.026, RSMo 1972, amended 1973, 1987, 1993, 1995, 2000; and 644.143, RSMo 1999.*