



**Title 10 – DEPARTMENT OF NATURAL RESOURCES**  
**Division 26 – Petroleum and Hazardous Substance Storage Tanks**  
**Chapter 2 – Underground Storage Tanks – Technical Regulations**

**PROPOSED RULE**

**10 CSR 26-2.078 Tiered Risk Assessment Process**

*PURPOSE: This rule presents requirements regarding assessing human health and environmental risk posed by chemicals of concern associated with releases from petroleum storage tank systems.*

(1) If the maximum soil or groundwater concentrations for chemicals of concern at a site exceed the default target levels [*established by the department*] in **Table 1 of 10 CSR 26-2.077** and owners and operators choose not to undertake corrective action to achieve the default target levels, then the owners and operators shall evaluate risk for the chemicals of concern at the site in accordance with this rule and, as warranted, take corrective action in accordance with the requirements of 10 CSR 26-2.079 – 10 CSR 26-2.082.

**Comment [n1]:** Based on comments received, the Department intends to revise the definition of "site" to mean the property on which the tank is or was found and on which contamination originated. Revising the definition will necessitate other changes in the rule language for clarity.

(2) Tier one risk assessment. Owners and operators shall assess risks posed by chemicals of concern at the site based on the conceptual model for the site developed in accordance with 10 CSR 26-2.075. **A tier one risk assessment need not necessarily be conducted prior to conducting a tier two risk assessment.**

(A) Owners and operators shall use the conceptual site model to identify any missing or inadequate data and information and conduct necessary site characterization in accordance with 10 CSR 26-2.076.

(B) **Reserved.** [*Owners and operators shall determine the vadose zone soil type or types in accordance with the provisions in section 10 CSR 26-2.076(11). Owners and operators may use soil type one as a default in lieu of the determination or the department may require such use.*]

(C) Owners and operators shall determine maximum and representative concentrations for chemicals of concern in each affected environmental media and exposure domain appropriate for each complete exposure pathway in accordance with the provisions in section 10 CSR 26-2.075(19).

(D) Owners and operators shall compare maximum or representative concentrations for chemicals of concern to **the** tier one risk-based target levels [*established by the department*] in **Tables 2 through 7 of 10 CSR 26-2.077** for each complete exposure pathway at the site. If the maximum concentration for a chemical of concern does not exceed the tier one risk-based target level, calculation of the representative concentrations shall not be necessary.

(E) At sites where tier one risk-based target levels in **Tables 2 and 3 of 10 CSR 26-2.077** applicable to one or more of the indoor air inhalation pathways are exceeded, owners and operators may perform soil gas sampling in accordance with section 10 CSR 26-2.076(20). If owners and operators choose to conduct soil gas sampling, the department recommends that a work plan be submitted to, and approved by, the

department prior to conducting such sampling, regardless of whether the work plan is required to be submitted in accordance with 10 CSR 26-2.076(20).

1. Owners and operators shall determine maximum and representative concentrations for chemicals of concern in soil gas in accordance with 10 CSR 26-2.075(19) based on more than one round of soil gas sampling, with the total number of sampling events as approved by the department.
2. Owners and operators shall compare maximum and representative concentrations for chemicals of concern in soil gas to the tier one risk-based target levels for soil gas in Tables 2 and 3 of 10 CSR 26-2.077. The results of the comparison shall be used to determine whether tier one risk-based target levels for the indoor inhalation pathway are exceeded.

(F) If one or more representative concentrations for chemicals of concern exceed the tier one risk-based target levels, owners and operators shall:

1. Develop a corrective action plan based on default target levels or tier one risk-based target levels; or
2. Conduct a tier two risk assessment.

(G) Owners and operators shall submit a risk assessment report for approval by the department that documents the tier one risk assessment and recommendations. If a tier two risk assessment is to be conducted, the results for both the tier one and tier two risk assessments may be submitted in a single report.

1. If [Based on] the results of site characterization or the tier one risk assessment show that the tier 1 risk-based target levels do not provide an acceptable level of human health and environmental protection because the default fate and transport parameters used by the department to develop the tier 1 risk-based target levels are not adequately representative of site conditions, the department may require that owners and operators conduct a tier two risk assessment.

Comment [n2]: Public comments received in opposition to this provision.

(H) Owners and operators may request that the department make a no further [remedial] corrective action determination for the site if the maximum or representative concentrations for all chemicals of concern and all complete exposure pathways are below the tier one risk-based target levels subject to the conditions in section 10 CSR 26-2.082(4). If a no further [remedial] corrective action determination is requested based on the results of the tier one risk assessment, the risk assessment report shall include documentation necessary to support the determination.

Comment [n3]: Long-term stewardship

(3) Tier two risk assessment. Owners and operators shall assess risks posed by chemicals of concern at the site based on the conceptual model for the site developed in accordance with 10 CSR 26-2.075. The department may require that owners and operators conduct a tier two risk assessment if the site-specific fate and transport parameters or other site conditions are different from the default assumptions used to develop tier one risk-based target levels such that application of the tier 1 risk-based target levels to a specific site would not provide adequate protection of human health or the environment. A

Comment [n4]: Same as (2)G.1 above

tier one risk assessment need not necessarily be conducted prior to conducting a tier two risk assessment.

(A) Prior to conducting a tier two risk assessment, owners and operators shall use the conceptual site model to identify any missing or inadequate data and information and conduct necessary site characterization in accordance with 10 CSR 26-2.076.

Information specific to site characterization may be provided to the department in a report separate from the risk assessment report.

(B) Owners and operators shall determine and evaluate site-specific values for fate and transport parameters and select representative values, subject to approval by the department, to be used in developing tier two site-specific target levels.

1. Site-specific values for fate and transport parameters shall be:
  - A. Measured on site at appropriate locations using approved methods;
  - B. Literature values justified as being representative of site conditions; or
  - C. Default values justified as representative of current conditions at the site or shown to be conservative based on site conditions.
2. Owners and operators shall provide a justification for selecting the representative value for each fate and transport parameter explaining why the value is appropriate for the site.
  - A. At sites where site-specific fate and transport parameter values show considerable spatial or temporal variability, the department may require that a sensitivity analysis be performed.

(C) Owners and operators shall determine revised representative concentrations if additional data is available.

(D) Owners and operators shall use the representative site-specific fate and transport parameter values to develop tier two site-specific target levels for chemicals of concern and all complete exposure pathways, including exposure pathways for which representative concentrations did not exceed tier one risk-based target levels, at the site in accordance with Section 10 CSR 26-2.077(10).

(E) Owners and operators shall compare maximum or representative concentrations for chemicals of concern to the tier two site-specific target levels for each complete exposure pathway at the site.

(F) At sites where tier two site-specific target levels applicable to one or more of the indoor inhalation pathways are exceeded, owners and operators may perform soil gas sampling in accordance with section 10 CSR 26-2.076(20). If owners and operators choose to conduct soil gas sampling, the department recommends that a work plan be submitted to, and approved by, the department prior to conducting such sampling, regardless of whether the work plan is required to be submitted in accordance with 10 CSR 26-2.076(20).

1. Owners and operators shall determine maximum or representative concentrations for chemicals of concern in soil gas in accordance with section 10

CSR 26-2.075(19)(B) based on more than one round of soil gas sampling, with the total number of sampling events as approved by the department..

2. Owners and operators shall develop tier two site-specific target levels for soil gas for the indoor inhalation exposure pathway using representative site-specific fate and transport parameter values, subject to approval by the department, in accordance with section 10 CSR 26-2.077(10).

3. Owners and operators shall compare maximum or representative concentrations for chemicals of concern in soil gas to the tier two site-specific target levels for soil gas. The results of the comparison shall be used to determine whether tier two site-specific target levels for the indoor inhalation exposure pathway are exceeded.

(G) If one or more representative concentrations for chemicals of concern exceed the tier two site-specific target levels, owners and operators shall:

1. Develop a corrective action plan based on the DTLs, tier one risk-based target levels, or tier two site-specific target levels; or
2. Conduct a tier three risk assessment.

(H) Owners and operators shall submit a risk assessment report for approval by the department that documents the tier two risk assessment and recommendations. If a tier one risk assessment report was not previously submitted, the results for both the tier one and tier two risk assessments may be submitted in a single report.

(I) Owners and operators may request that the department make a no further [remedial] **corrective** action determination for the site if the maximum or representative concentration for all chemicals of concern and all complete exposure pathways are below the tier two site-specific target levels **subject to the conditions** in **section 10 CSR 26-2.082(4)**. If a no further [remedial] **corrective** action determination is requested based on the results of the tier two risk assessment, the risk assessment report shall include documentation necessary to support the determination.

Comment [n5]: Long-term stewardship

(4) Tier three risk assessment. A tier three risk assessment is a detailed, site-specific evaluation that owners and operators may conduct only after receiving approval of a tier three risk assessment work plan from the department. Owners and operators shall assess risks posed by chemicals of concern at the site based on the conceptual model for the site developed in accordance with 10 CSR 26-2.075. The tier three risk assessment may use the most recent toxicity factors and physical and chemical properties data, alternative fate and transport and risk assessment models, and site-specific fate and transport and exposure factors. The tier three risk assessment shall consider only the complete exposure pathways for which representative concentrations of chemicals of concern at the site exceed the tier two site-specific target levels, and any additional receptors and exposure pathways identified, unless the resulting tier three site-specific target levels are or are likely to be more conservative than the tier two site-specific target levels in which case the tier two risk assessment findings shall be re-evaluated and the department may require that tier three site-specific target levels be developed for those pathways.

(A) Tier three risk assessment work plan. Owners and operators shall develop a detailed technical work plan that shall be submitted to and approved by the department prior to being implemented. The work plan shall include, at a minimum, the following:

1. An explanation of the chemicals of concern and complete exposure pathways at the site to be evaluated in the tier three risk assessment.
2. A detailed explanation of the fate and transport models to be used. Owners and operators may propose the use of a model or models different than those used to develop tier one risk-based target levels and tier two site-specific target levels. At a minimum, the proposed model shall be peer reviewed, publicly available, have a history of use on similar projects, and be technically defensible. In certain cases where specific computer software is used to conduct the tier three risk assessment, the department may require that owners and operators provide a copy of the software to the department to facilitate review of the assessment.
3. An explanation of the input parameters required to determine tier three site-specific target levels and how the necessary data for each parameter will be obtained. For each input parameter, owners and operators shall provide justification for the selected value to be used.
4. An explanation of missing or inadequate data that require additional fieldwork and a detailed scope of work for the collection of this data.

(B) Upon approval of the tier three risk assessment work plan by the department, owners and operators shall implement the approved work plan. Any changes to the work plan made subsequent to the department's approval shall be documented in writing and submitted to and approved by the department.

(C) Owners and operators shall determine revised representative concentrations for relevant chemicals of concern and exposure pathways if additional data is available.

(D) Owners and operators shall determine human health risk or develop tier three site-specific target levels, or both, for the complete exposure pathways using the models and data in accordance with the approved work plan.

1. Human health risk. Owners and operators shall determine human health risk in accordance with section 10 CSR 26-2.077(11) and compare estimated human health risk to target risk levels in 10 CSR 26-2.077(4).
2. Tier three site-specific target levels. Owners and operators shall develop tier three site-specific target levels in accordance with section 10 CSR 26-2.077(11) and compare representative concentrations for chemicals of concern to the tier three site-specific target levels for each complete exposure pathway at the site.
3. If lead is a chemical of concern at the site, owners and operators may evaluate human health risk or develop tier three site-specific target levels for lead using the United States Environmental Protection Agency's Integrated Exposure Uptake Biokinetic Model for Lead in Children or another model approved by the department.

(E) If one or more representative concentrations for chemicals of concern exceed the tier three site-specific target levels or the estimated human health risks exceed the target risk levels, owners and operators shall develop a corrective action plan based on the default target levels, tier one risk-based target levels, tier two site-specific target levels, or tier three site-specific target levels or target risk levels.

(F) Owners and operators shall submit a risk assessment report for approval by the department that documents the tier three risk assessment and clearly describes the data and methodology used, key assumptions and results. Any deviation from the approved work plan, the rationale for the deviation, and approval by the department shall be clearly documented in the risk assessment report.

(G) Subject to the conditions in section 10 CSR 26-2.082(4), owners and operators may request that the department make a no further [remedial] corrective action determination for the site if the representative concentration for all chemicals of concern and all complete exposure pathways are less than the tier three site-specific target levels or the estimated human health risks are less than target risk levels. If a no further [remedial] corrective action determination is requested based on the results of the tier three risk assessment, the risk assessment report shall include documentation necessary to support the determination.

(5) Ecological risk assessment. Owners and operators shall assess risks posed by chemicals of concern at the site to ecological receptors in accordance with 10 CSR 26-2.075(17).

(A) Level two ecological risk assessment. Owners and operators shall compare maximum or representative concentrations for chemicals of concern in soil, groundwater, surface water or sediment with applicable standards or criteria protective of ecological receptors available in literature and approved by the department or to site-specific target levels developed using an appropriate methodology approved by the department.

1. If one or more maximum or representative concentrations for chemicals of concern in soil, groundwater, surface water or sediment exceed the applicable standards or criteria, or the level two site-specific target levels if applicable, owners and operators shall:

A. Develop a corrective action plan based on the applicable standards or criteria, or the level two site-specific target levels if applicable; or

B. Conduct a level three ecological risk assessment.

(B) Level three ecological risk assessment. Owners and operators shall conduct a detailed site-specific evaluation as per current United States Environmental Protection Agency guidance for ecological risk assessment. Owners and operators shall develop a detailed technical work plan that shall be submitted to and approved by the department prior to initiating the level three ecological risk assessment.

1. If the level three ecological risk assessment determines that the risk to ecological receptors at the site exceeds levels deemed acceptable by the department, owners and operators shall develop a corrective action plan to protect ecological receptors.

*AUTHORITY: 319.109 and 319.137 RSMo Supp. 2007. Original rule filed February 13, 2009.*

*PUBLIC ENTITY COST: The proposed rule will cost public entities \$6,167,486 in the aggregate.*

*PRIVATE ENTITY COST: The proposed rule will cost private entities \$343,524 in the aggregate.*

*NOTICE OF PUBLIC HEARING AND NOTICE TO SUBMIT COMMENTS: The Missouri Hazardous Waste Management Commission will hold a public hearing on this rule action and others beginning at 10:30 a.m. on August 20, 2009, at the Elm Street Conference Center, 1738 East Elm Street, Jefferson City, Missouri. Any interested person will have the opportunity to testify. Advance notice is not required. However, anyone who wants to make arrangements to testify may do so prior to the hearing by contacting the secretary of the Hazardous Waste Management Commission at (573) 751-2747.*

*Any person may submit written comments on this rule action. Written comments shall be sent to the director of the Hazardous Waste Program at PO Box 176, Jefferson City, MO 65102-0176. To be accepted, written comments must be postmarked by midnight on August 27, 2009. Faxed or emailed correspondence will not be accepted. Please direct all inquiries to the Rules Coordinator of the Hazardous Waste Program, at 1738 E. Elm, Jefferson City, MO 65102, telephone (573) 751-3176.*