



**MISSOURI**  
DEPARTMENT OF  
NATURAL RESOURCES

---

# Vapor Intrusion at Tanks Sites in Missouri

---

Laura Luther, RBCA Unit Chief

# Regulatory Basis

- 319 RSMo
- 10 CSR 26
- MRBCA for Petroleum Storage Tanks  
2004
- MRBCA for Petroleum Storage Tanks  
2013



**MISSOURI**  
DEPARTMENT OF  
NATURAL RESOURCES

---

Vapor Intrusion = Indoor Inhalation

# Target Levels

- Tier 1 – Risk-Based Target Levels
- Tier 2 and Tier 3 – Site-Specific Target Levels

# Target Levels (cont.)

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

# Target Levels (cont.)

- Mathematical Models
  - Emission Model
  - Indoor Air Mixing Model
  - Johnson and Ettinger Model (US EPA, 2001)  
(Does Not Include Advection or Biodegradation)

# Exposure Pathways

- Current and Future Buildings
- Residential and Non-Residential

# Media Sampled

- Subsurface Soil
- Groundwater
- Soil Vapor



# Soil Data

- Collected Within 10 Feet Horizontally of Receptor
- Collected from Vadose Zone (Greater Than 3 Feet BGS)
- 50 x 50 Foot Exposure Domain for Future Building
- Analyzed for Petroleum COCs
- Representative Concentration Can Be Calculated From Samples Collected Within the Exposure Domain

# Groundwater Data

- Collected From Registered Monitoring Wells
- Representative Concentration Can Be Calculated From Samples Collected Within the Exposure Domain

# Soil Vapor Data

- Collected From Shallow and Deep Sampling Points
- Collected From Exposure Domain
- At Least Two Samples From Each Sampling Point Collected At Least Three Months Apart
- Representative Concentrations Can Be Calculated Over Exposure Domain For Each Sampling Event

# Risk Assessment

- Exceedance(s)
  - Proceed to Next Tier
  - Corrective Action
- No Exceedance(s)
  - NFA



**MISSOURI**  
DEPARTMENT OF  
NATURAL RESOURCES

---

# Thank You

## Contact Information

[Laura.Luther@dnr.mo.gov](mailto:Laura.Luther@dnr.mo.gov)

(573) 751-6822