

Douglas Bacon  
ITRC State Engagement Coordinator  
State of Utah - Dept. of Environmental Quality/Div. of Environmental Response & Remediation  
195 North 1950 West  
Salt Lake City, UT 84114-4840

Dear Mr. Bacon,

As a member state of the Interstate Technology and Regulatory Council (ITRC; <http://www.itrcweb.org>) the Connecticut Department of Energy and Environmental Protection (“the Department”) supports the efforts of ITRC to promote efficient remediation through the use of training and documentation in the technical and regulatory aspects of innovative technologies.

The Department has reviewed the Technical and Regulatory Guidance developed by ITRC titled *Vapor Intrusion Pathway: A Practical Guideline*, January 2007 (the “Document”). (The Document may be found on the ITRC web site at <http://www.itrcweb.org/documents/vi-1.pdf>.) The Department concurs that this Document provides useful guidance for making site-specific decisions on the associated environmental technology and/or methodology.

The Document is viewed by the Department as describing an appropriate approach and standard of care for designing, conducting, and documenting remedial activity. It can serve as a useful guidance when conducting remediation of polluted sites where there are risks of vapor intrusion (VI).

The Department also considers the Document to provide useful reference guidelines for technical staff to use when conducting site specific review(s) of projects where the subject remedial technology and/or methodology has been implemented.

The Department advises that the following factors should be considered when using this Document for projects in Connecticut and when applying it to the [Remediation Standard Regulations](#) (RSRs; Regulations of Connecticut State Agencies sections 22a-133k 1 through 3) volatilization criteria (VolC):

Programmatic Considerations:

- The Document has been written to be most in parallel with the federal remediation process defined by CERCLA (Superfund). Remediation in Connecticut is different in many aspects from this process and therefore the document must be judiciously applied. Specific differences include:
  - The Licensed Environmental Professional (LEP) is typically the project manager and decides, in consultation with their client, the specific remedial technology to apply to achieve RSR compliance.
  - The RSRs apply to a fully characterized release and define end points for compliance that incorporate flexible options for risk management, which renders moot much of the Document’s discussion of using risk screening levels to limit investigation; a release must always be fully characterized to apply the RSRs.
  - The RSRs apply to the entire release as a source of pollution, and include future potential risk, whereas the ITRC guidance is focused on evaluation and mitigation of current receptor impacts; a more comprehensive conceptual site model is therefore necessary.

- The Department notes that a mitigation or monitoring approach may be approvable for remedial risk management to achieve compliance under the RSRs, and considers the Document an acceptable reference to use when developing a site-specific plan for review and approval by the Commissioner.
- The Document's references to reopening of older sites are not as relevant in Connecticut since fortunately the RSRs have incorporated the VI pathway since 1996.
- In Connecticut, screening under step one of the Document should incorporate evaluation of the presence of a Significant Environmental Hazard under Connecticut's General Statutes (CGS 22a-6u) and evaluation of Trichloroethylene (TCE) as recommended by the Department's guidance issued jointly with the Department of Health (see [Trichloroethylene \(TCE\) Developmental Risks](#)).
- The Document is appropriate as a reference in developing any mitigation plan required for Significant Environmental Hazard response.

#### Investigation:

- Soil vapor samples collected outside the footprint of a building are not appropriate for demonstrating compliance with the VolC due to potential false negative conclusions. However, such data, especially when depth discrete profiling is used, may have applicability for characterization as a line of evidence.
- Passive soil gas sampling is not considered representative for demonstrating compliance with the RSRs because the VolC were generated for comparison with the direct analysis of soil gas concentrations. However, such data may have usefulness for characterization.
- Slab on grade substrate commonly found in some Connecticut construction practice may provide a preferential volatile migration pathway that should be evaluated. While this construction practice could positively impact mitigation implementation, it also has the potential to contribute to a wider spread of volatiles to receptors further from the source.
- Characterization should include evaluation of all possible daughter/breakdown and associated substances.

#### Compliance:

- Since back-modeling from risk derived indoor air target concentrations was used to develop the VolC provided in the RSRs, use of modeling is not acceptable/appropriate for screening to limit investigation: a full characterization of a release is required for a compliance evaluation.
- The RSRs require all groundwater encountered within a depth of 15 feet beneath a structure (including its basement) comply with the applicable VolC, however compliance may alternatively be demonstrated through testing of sub-slab vapors. The presence of a thin layer of clean water or constituents with biodegradation potential may be factors to incorporate in the CSM, and may thus affect the data necessary for a compliance demonstration, but cannot negate completely the need to demonstrate compliance using representative samples of groundwater or soil vapor as required in the RSRs.
- The alternative VolC provision in the RSRs would allow a proposing a site specific modeling approach for compliance demonstration, for the commissioner's approval consistent with the RSR requirements. The Document's discussion of modeling is appropriate to consider in preparing a request for approval. The RSRs also provide for developing site-specific residential criteria using a self-implementing prescribed modeling approach.

- Delineation of the full extent of the migrating pollution, regardless of depth, is necessary to ensure that there are no discharge zones that are remote from the site that exceed remedial criteria and pose a risk.

#### Site-specific Conditions:

- Many institutional controls and limitations on use of the site (such as Industrial/Commercial criteria or that no building will be built) may require an Environmental Land Use Restriction (ELUR). Consult the RSRs to determine what is necessary for compliance.
- OSHA standards are not appropriate for use as a remedial goal for RSR compliance. For RSR compliance the specific contribution of volatile organics to indoor air from environmental media is compared to the applicable RSR VolC.

#### Mitigation:

- A passive barrier alone is not sufficient to be considered a mitigation measure – passive venting should also be included. Passive venting should be designed so that it can be made active, if necessary.
- An alternative to a crawlspace membrane barrier that has been accepted in Connecticut is the use of controlled low strength material (flowable concrete), provided it is installed appropriately and the specific design adequately limits airflow.
- Mitigation system performance should be demonstrated using sub-slab pressures (as a performance standard). Indoor air sampling is often not the best way to demonstrate that a mitigation system is working due to concerns about false positives from indoor sources.
- Using sub-slab vapor to demonstrate that a mitigation system is no longer necessary will require multiple sampling rounds collected over time after the mitigation system has been turned off to demonstrate that the conditions have returned to equilibrium. Only once the conditions have stabilized is it appropriate to compare the soil vapor samples to the VolC to demonstrate RSR compliance.

#### Indoor Air Testing

- The Department does not recommend widespread indoor air testing as an early stage in evaluation of a vapor migration site; evaluation of groundwater should first identify target structures. Sub-slab gas sampling is preferred for evaluation of those structures where groundwater exceeds RSR criteria because indoor air sampling can often be inconclusive.
- Indoor air sampling is an option for compliance demonstration in the RSRs, but it should only be used as a last resort since there are concerns about false positives from indoor sources. If indoor air is collected, it is recommended that during the initial round(s) sub-slab samples be collected as well, so the contaminant ratios can be compared.
- In the event there is sampling of indoor air, it is appropriate to also acquire the recommended comparison ambient air samples. These ambient air samples should be acquired in areas unaffected by any release, including nearby permitted air discharges and potential outgassing from an affected building.

#### Other Technical Qualifications:

- Connecticut's [Site Characterization Guidance Document](#) (SCGD) concepts should be included when developing the Conceptual Site Model (CSM); in addition, the CSM focus must include potential future conditions.

- Groundwater and soil vapor analysis methodologies used shall provide analytical data of known and documented quality. The [Connecticut Reasonable Confidence Protocols](#) provide an approach to obtain analytical data meeting this standard, for the analytical methods published on the Department's website. Methodologies described in the guidance that are not equivalent to this standard may be useful as an additional line of evidence for site characterization, but would need careful evaluation before they are used as a sole line of evidence.
- References to other documents or commercial products should not be construed to imply that the Department has reviewed or endorsed them.
- The Document describes the importance of community outreach in evaluation of vapor intrusion. Especially if a volatilization risk involving residential properties is identified, the Department recommends early contact with it and health officials to ensure an outreach program as appropriate is developed with the support of all parties that may be involved.

The Department looks forward to our continued participation in ITRC. If you have any questions about the Department's concurrence, please contact Kenneth Feathers, Connecticut's Point of Contact for ITRC activities, by phone at (860) 424-3770 or by e-mail at [kenneth.feathers@ct.gov](mailto:kenneth.feathers@ct.gov).

Sincerely,

/S/PATRICK F. BOWE

Patrick Bowe  
Director  
Remediation Division

cc: Bureau of Water Protection and Land Reuse  
Remediation Division  
Water Planning and Management Division  
Land and Water Resources Division  
Bureau of Materials Management and Compliance Assurance  
Waste Engineering and Enforcement Division  
Water Permitting and Enforcement Division  
Emergency Response and Spill Prevention  
Bureau of Air Management