

Association of State and Territorial

ASTSWMO

Solid Waste Management Officials

**VAPOR INTRUSION PATHWAY:
A Guide for State and Territorial Federal
Facilities Managers**

FINAL

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ASTSWMO Policy and Technology Focus Group

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1.0 INTRODUCTION

In the early 1990's, the U.S. Environmental Protection Agency (EPA) and a number of States began recognizing the relevance and importance of the vapor intrusion pathway at various contaminated sites. Since then, significant efforts have been made to better understand the mechanisms and complexities associated with this primary exposure pathway.

According to the Interstate Technology & Regulatory Council (ITRC), vapor intrusion is “the migration of volatile chemicals [VCs] from the subsurface into overlying buildings.” VCs “may include volatile organic compounds, select semi-volatile organic compounds, and some inorganic analytes, such as elemental mercury and hydrogen sulfide.”¹ A vast array of research has been done to understand how VCs present in groundwater and soil migrate through the subsurface and volatilize into the overlying buildings or structures, further impacting indoor air quality and serving as a conduit for the inhalation of these constituents. In addition, updated toxicological and health effects data for key volatile organic compounds (VOCs) of concern points to the need for early identification of these constituents in groundwater and/or soil in order to develop a plan that effectively serves to abate, mitigate or eliminate human exposures and/or risks associated with the inhalation of VCs in indoor air.

The vapor intrusion pathway is a relevant issue at federal facilities with groundwater contamination and dictates the need for assessment and/or cleanup efforts that are protective of human health and the environment. The Environmental Security Technology Certification Program (ESTCP) estimates that more than 7,000 Department of Defense (DoD) “sites” have been identified as sites having groundwater contamination, further resulting in the need for DoD to incorporate this pathway into the overall conceptual site model.² In a separate study of 440 active installations, the Center for Public Environmental Oversight noted concentrations of trichloroethene (TCE) and tetrachloroethene (PCE) exceeding the Preliminary Remediation Goals (PRGs) at 383 and 252 installations, respectively.³

This increased awareness of vapor intrusion and concern that selected remedies may not be necessarily protective of current and/or future exposures and subsequent risks has led some States to require the evaluation of this pathway during the site investigation and/or remedy selection process. The vapor intrusion pathway continues to be a challenging issue for State Managers tasked with overseeing the cleanup of federal facilities. The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) Policy and Technology Focus Group (PTFG) of the Federal Facilities Research Center Subcommittee developed this document to provide State Federal Facilities Managers with a compendium of available U.S. EPA, DoD, and State regulations, policies and guidance materials.

The PTFG recognizes that clear and systematic approaches to the evaluation of the vapor intrusion pathway are essential to ensure that federal facilities cleanups are protective of human health and the environment. While various approaches for evaluating this pathway continue to be debated, as well as the toxicological factors that need to be considered when for remediation at a

¹ http://www.itrcweb.org/teampublic_Vapor.asp

² <http://www.estcp.org/Technology/ER-0707-FS.cfm>

³ www.cpeo.org/pubs/DefenseVOCs.pdf

site, this paper provides a basic understanding of available guidance and policies that aid in the incorporation of this pathway to the overall site remediation conceptual model.

For detailed information on scientific and technological approaches and advances in the vapor intrusion pathway assessment, ASTSWMO recommends visiting the ITRC Vapor Intrusion Team at: http://www.itrcweb.org/teampublic_Vapor.asp.

In addition, EnviroGroup Limited provides a website with links to State and federal policy, guidance and regulatory documents, accessible at: <http://www.envirogroup.com/links.php>.

2.0 U.S. EPA REGULATIONS AND POLICIES

The U.S. EPA Office of Solid Waste and Emergency Response (OSWER) conducts or oversees risk and health assessments at federal facilities.⁴ To address the evaluation of a single exposure pathway, i.e. the vapor intrusion pathway, the U.S. EPA OSWER has drafted a guidance document titled, *Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) [DRAFT]*. This November 2002 guidance document is not a regulation, but provides current technical and policy recommendations on determining whether there is an unacceptable risk to human health at cleanup sites due to the vapor intrusion pathway.⁵

U.S. EPA believes that States will find this guidance document useful and recommends its use in making Current Human Exposures Under Control Environmental Indicator (EI) determinations at Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priority List (NPL) sites, as well as CERCLA remedial investigations and RCRA facility investigations.⁶ The November 2002 guidance document supersedes RCRA's Draft Supplemental Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway (December 2001). It does not, however, supersede State guidance and policy.

In assessing human health risk, OSWER recommends interim use of existing toxicity values developed for TCE. In development of a Preliminary Remediation Goal (PRG), OSWER also recommends using its [Human Health Toxicity Values in Superfund Risk Assessments](#), where a tiered approach for identifying toxicity values is used.⁷

The U.S. EPA Technical Innovation Program provides additional technical guidance and resources for accessing the vapor intrusion pathway on its Cleanup Information (CLU-IN) Website at: [http://www.clu-in.org/issues/default.focus/sec/Vapor Intrusion/cat/Overview/](http://www.clu-in.org/issues/default.focus/sec/Vapor+Intrusion/cat/Overview/).

⁴ The Office of Solid Waste and Emergency Response website includes a number of resources and guidance for conducting risk assessments at: <http://www.epa.gov/oswer/riskassessment/programs.htm>

⁵ <http://www.epa.gov/osw/hazard/correctiveaction/eis/vapor.htm>

⁶ <http://www.epa.gov/osw/hazard/correctiveaction/eis/vapor.htm>

⁷ <http://www.epa.gov/oswer/riskassessment/pdf/hhmemo.pdf>

3.0 DOD REGULATIONS AND POLICIES

CERCLA and the Superfund Amendments and Reauthorization Act (SARA) established the Defense Environmental Restoration Program (DERP), which provides authority to the DoD to conduct environmental restoration activities at properties currently or formerly under the jurisdiction of the Secretary of Defense “consistent with” and “according to the provision of” CERCLA.^{8,9} In September 2001, DoD issued the *Management Guidance for the Defense Environmental Restoration Program*, which provides guidance on the implementation of the DERP.¹⁰ Sections 5, 16, and 18 of the Guidance present general risk management policies and procedures under the DERP. In April 2009, DoD indicated its intent to add vapor intrusion policies into a revised DERP Guidance.¹¹

While the current DERP Guidance does not provide specific policies for addressing the vapor intrusion pathway at federal facilities, the U.S. Army (Army) and U.S. Navy (Navy) have developed service-specific policies for addressing the pathway at cleanup sites. The U.S. Air Force (Air Force) is currently in the process of developing its own vapor intrusion policy.¹² Army and Navy policies indicate that these policies are necessary because U.S. EPA Guidance has not been finalized and due to evolving science related to vapor intrusion. In addition, DoD has also released the *DoD Vapor Intrusion Handbook*, which provides guidance for accessing the vapor intrusion pathway. Summaries of the policies and guidance document are provided below.

3.1 U.S. Army Policy

aec.army.mil/usaec/cleanup/dapolicy-vi.pdf

The U.S. Army issued its *Interim Vapor Intrusion Policy for Environmental Response Actions* in November 2006. This policy indicates that the vapor intrusion pathway assessment is not required under CERCLA and RCRA. However, it states that “given the broad mandate to protect human health from unacceptable risk,” the vapor intrusion pathway may be evaluated and addressed under CERCLA or RCRA.

Under Army policy, if certain site-specific conditions are met, vapor intrusion will be evaluated for existing buildings in the form of vapor intrusion modeling, including geology, which supports vapor migration, and building use resulting in a completed pathway. The Army will continue with a vapor intrusion study (with vapor and groundwater sampling) if the modeling results exceed screening levels. A site-specific risk assessment (SSRA) would also be performed. The policy emphasizes that release-related vapor is clearly differentiated from other sources. Remedial action will be conducted if fate and transport exists and the SSRA indicates unacceptable risk.

Depending upon location, the Army may conduct vapor intrusion modeling prior to future building construction. If modeling indicates a potential risk, vapor intrusion will be addressed

⁸ [10 USC 2701](#)

⁹ [42 USC 9620](#)

¹⁰ www.nao.usace.army.mil/projects/Environmental%20Projects/fuds/DERP_SEPt2001.PDF

¹¹ DoD. April 16, 2009. Federal Facilities Roundtable, ASTSWMO Mid-Year Meeting, Columbus, Ohio.

¹² Air Force and ASTSWMO Correspondence. April 8, 2009.

and these sites would be included in the CERCLA Five Year Review. Historically, vapor intrusion modeling was not typically performed at BRAC or FUDS properties (except for notice of potential risk) due to uncertainties involved with future construction projects. However, recently the Army has conducted vapor intrusion modeling at some BRAC and FUDS properties as necessary.

3.2 U.S. Navy Policy

https://portal.navfac.navy.mil/portal/page/portal/navfac/navfac_ww_pp/navfac_nfes_c_pp/environmental/erb/resourceerb/don%20vi%20policy-final.pdf

The U.S. Navy issued its *Navy/Marine Corps Policy on Vapor Intrusion* in April 2008. The Navy's policy is similar to the Army's, but more general in scope. According to the Navy's policy, vapor intrusion will be evaluated if the site meets all the DERP criteria and the contaminant(s) is sufficiently volatile. An updated conceptual site model (CSM), including information on building structure and local geology, will be used to determine proper sampling methodology. Similar to the Army, the Navy emphasizes that background sources must not be addressed. Site-specific risk assessments would be unique for each site since potential exposure duration would be significantly different for each scenario. Occupational Safety Health Administration (OSHA) standards would be utilized by the Navy in industrial settings. The Navy will become re-engaged at previously transferred property (i.e., BRAC) only if the current landowner and/or regulatory agency demonstrate the existence of a complete vapor intrusion pathway due to a former Navy release.

3.3 DOD Vapor Intrusion Handbook

<https://www.denix.osd.mil/portal/page/portal/denix/environment/cleanup/WN/DoD%20VI%20Handbook%20Final%20Jan%202009.pdf>

In January 2009, the DoD issued the *DoD Vapor Intrusion Handbook*, which provides guidelines for conducting vapor intrusion investigations under the DERP. This guidance is intended to supplement the policies described above and incorporates previous guidance published by individual service components. While the DoD does not consider EPA's 2002 guidance binding, it generally follows its tiered modeling-based approach. The DoD guidance also recognizes that some States have different strategies and may require specific actions if threshold concentrations are present. The guidance does not proscribe any specific methodologies but encourages that the latest vapor intrusion science and technology be employed.

The first step in the DoD approach is to conduct a screening level assessment of site contaminants to determine if a potential risk is present. Conservative-based screening levels and site-specific modeling may be considered sufficient to determine that the site does not pose a vapor risk. The guidance notes that not all regulatory agencies agree that the modeling results are sufficient to screen out a site from further consideration. The guidance recommends that DoD exposure assumptions replace standard default settings where applicable (e.g. more limited on-base exposure due to duty rotation).

A site-specific assessment of the vapor intrusion pathway is performed if a potential risk requires further study. The use of multiple lines of evidence is recommended to support site decision-

making. The guidance is careful to distinguish potential risk from actual risk, which can only be quantified by using indoor air data. The service component is cautioned several times in the guidance to avoid model-derived criteria becoming enforceable by being recorded in a decision document. The guidance also recommends that OSHA standards should be considered where industrial workplace exposures represent a “background” exposure. This has been a contentious issue for regulatory agencies in the past.

The guidance suggests that a risk management strategy, including mitigation and/or remediation, should be developed if the risk assessment indicates that chronic risks are unacceptable. Mitigation and/or remediation can also be performed without calculating risk if collected data significantly exceeds screening criteria. Land-use and building-use controls are also considered. For undeveloped land, DoD prefers to retain the option to either evaluate risk or undertake mitigation measures prior to building construction and avoid enforceable model-derived criteria.

The guidance also includes a section on planning an exit strategy with the end goal of identifying criteria that will be used to determine that a site no longer poses an unacceptable risk and no further mitigation or monitoring is required. Objective measures are to be considered instead of model-derived criteria.

In summary, the guidance provides a flexible, phased approach to evaluating vapor intrusion at DoD sites. As noted above, this guidance anticipates that it may at times conflict with some State guidance and require site-specific regulatory coordination.

4.0 STATE REGULATIONS, POLICIES AND GUIDANCE

Many States have developed specific approaches to addressing vapor intrusion concerns at contaminated properties or facilities. These approaches have been memorialized in laws, regulations, guidance or policies to address vapor intrusion issues. Each state's approach is unique. In 2006, for the DoD, Stateside Associates published a compendium of State laws, regulations, and policies pertaining to vapor intrusion. This compendium detailed each State's current approach and outlined whether the State had developed and adopted specific approaches. The report, "*State Laws, Regulations, and Policies Pertaining to Vapor Intrusion*" ("Stateside Publication"), dated February 3, 2006, can be found in its entirety in Appendix A of this report.

As part of its efforts to determine the current status of each State's programs and approaches for addressing vapor intrusion, the PTFG conducted research to determine if any State had developed additional statutes, regulations, guidance or policies for vapor intrusion since the completion of the Stateside Publication. As a result, the PTFG has determined that in the recent years many States are making strides to ensure that the vapor intrusion exposure pathway is considered in the characterization and remediation decisions for cleanup sites. This is evidenced in the number of new documents, and on-going efforts occurring within States.

The results of the PTFG's research are detailed below. It is important to note that the information provided in this section includes only the additions and changes to the Stateside Publication, which were provided to ASTSWMO by States in 2009. Not all States provided information on its vapor intrusion regulations, policies and guidance, and some States reported no updates. Readers should consult Appendix A for additional State-specific information.

If your State has additions or updates to the information provided in this Section, please contact Charles Reyes, ASTSWMO Federal Facilities, at charlesr@astswmo.org.

4.1 Alabama

Alabama has revised the "Alabama Risk-Based Corrective Action Guidance Manual" (revised April 2008) to aid in investigation and remediation. As part of the risk assessment process and determining the exposure pathways, the vapor intrusion pathway is now considered. The revised Manual can be found at:

<http://www.adem.state.al.us/LandDivision/Guidance/ARBCAApril2008final.pdf>

4.2 Alaska

18 AAC 75.340 (Soil Cleanup Levels) is now located at:

[http://old-www.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=\[jump!3A!2718+aac+75!2E340!27\]/doc/%7B@73936%7D?](http://old-www.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[jump!3A!2718+aac+75!2E340!27]/doc/%7B@73936%7D?)

18 AAC 75.325 (Site Cleanup Rules) is now located at:

[http://old-www.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=\[group+!2718+aac+75!2E325!27!3A\]/doc/%7B@1%7D/hits_only?](http://old-www.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[group+!2718+aac+75!2E325!27!3A]/doc/%7B@1%7D/hits_only?)

Alaska regulations require "...a responsible person to modify a cleanup level ... or to perform a site-specific analysis of additional site risks if the department determines that a site-specific analysis is necessary due to exposure pathways such as accumulation of vapors in buildings or other structures at levels that threaten human health..." (18 AAC 75.340(i)). As stated in the Stateside Publication, the Department of Environmental Conservation has developed a draft technical memo entitled *Evaluation of Vapor Intrusion Pathways at Contaminated Sites*, to aid in the identification of "complete" vapor intrusion pathways and is currently working on a vapor intrusion guidance pathway assessment is a component of a CSM, which is required under the Department's site-cleanup rules and is described in the Department's draft CSM Guidance. A complete vapor intrusion pathway is one that allows for the migration of volatile compounds from the subsurface into overlying buildings. The determination that a pathway is complete triggers the application of a site-specific analysis to determine if the risk to occupants at the site or in the vicinity is at acceptable levels. Other pathways (migration to groundwater, outdoor inhalation, and direct contact or ingestion/dermal contact) reference the Department's Cleanup Levels Guidance, which is used in determining the site-cleanup levels (18 AAC 75.341).

Alaska has revised its *Cleanup Levels Guidance*, effective June 9, 2009, which describes calculation of cleanup levels for contaminated soils and groundwater. The Guidance can be accessed at: <http://www.dec.state.ak.us/spar/csp/guidance/cleanuplevels.pdf>.

Alaska has also revised its *Cumulative Risk Guidance*, effective June 9, 2008, which provides guidance on determining cumulative risk. The Guidance is located at: http://www.dec.state.ak.us/SPAR/csp/guidance/cumul_risk.pdf.

In 2009, the Alaska internal workgroup will complete the State vapor intrusion guidance. Planning for training of staff and local consultants is underway for 2009/2010.

4.3 Arizona

No changes have been made in Arizona since the Stateside Publication document was released.

4.4 Arkansas

No changes have been made in Arkansas since the Stateside Publication document was released.

4.5 California

In late 2007, California approved Assembly Bill No. 422, which amends Section 25356.1.5 of the Health and Safety Code and adds Section 13304.2 to the Water Code, requires that risk assessments be conducted on all brownfield sites subject to cleanup, abatement, or other remedial actions. The Assembly Bill specifically requires that these risk assessments include an evaluation of vapor intrusion.

The California Environmental Protection Agency (CALEPA) has multiple guidance documents to assist stakeholders in evaluating the vapor intrusion exposure pathway. State Guidance addressing the vapor intrusion pathway includes:

- *Advisory – Active Soil Gas Investigation*, jointly released January 28, 2005 by the Los Angeles Regional Water Quality Control Board and the Department of Toxic Substances Control (DTSC), describes how to collect high-quality soil gas samples for use in vapor intrusion evaluations.
- *Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil*, released October 2004 by the Office of Environmental Health Hazard Assessment, describes how the California Human Health Screening Levels (CHHSLs) for vapor intrusion were derived.
- *Interim Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air*, released February 7, 2005 by the DTSC, provides an eleven step program for evaluating vapor intrusion.
- *Response to Public Comments – Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air*, released June 1, 2008 by the DTSC.

DTSC also anticipates that by early 2010, *Advisory – Active Soil Gas Investigation* and *Interim Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* documents will also be revised to incorporate the latest scientific understandings about soil gas sampling and vapor intrusion. These documents and additional information on vapor intrusion can be found online at:

http://www.dtsc.ca.gov/SiteCleanup/Vapor_Intrusion.cfm#VAPOR_INTRUSION_GUIDANCE_DOCUMENTS

Additionally, DTSC generated a *Response to Public Comments* document, which provides technical feedback on all the comments DTSC received on their 2005 VI guidance document. The DTSC VI guidance document will be revised pursuant to these public comments by 2010. In April 2009, DTSC released a *Vapor Intrusion Mitigation Advisory* in April 2009 that addresses the mitigation of vapor intrusion. The document can be accessed at: http://www.dtsc.ca.gov/SiteCleanup/upload/VI_Mitigation_Advisory_Apr09.pdf

The State has also developed several workgroups, which are listed below:

- Soil Gas Advisory Work Group – an interdepartmental workgroup within the California Environmental Protection Agency.
- Indoor Air Work Group - DTSC/CALEPA, working on all matters related to vapor intrusion.
- Vapor Intrusion Mitigation Advisory Work Group – consists of internal DTSC and an external group of reviewers/advisors made up of consultants and government representatives, specific to mitigation efforts.
- Director’s Brownfields Remediation Advisory Group – external consultants, attorneys, and political activists that serve as advisors to DTSC work groups.

4.6 Colorado

The Colorado Department of Public Health and Environment Hazardous Materials and Waste Management Division has developed the following guidance and policies.

- *Policy on an Interim Risk Evaluation and Management Approach for TCE*
<http://www.cdphe.state.co.us/hm/tcepolicy.pdf>
- *Policy on an Interim Risk Evaluation and Management Approach for PCE*
<http://www.cdphe.state.co.us/hm/pcepolicy.pdf>
- *Drycleaner Remediation Guidance Document*
<http://www.cdphe.state.co.us/hm/drycleanerguidance.pdf>
- *Indoor Air Sample Analysis Guidance Document*
<http://www.cdphe.state.co.us/hm/airsmpl.pdf>

4.7 Delaware

In March 2007, Delaware released the “Policy concerning the investigation, risk determination and remediation for the Vapor Intrusion Pathway,” located at: <http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/sirb/policy%20concern07008.pdf> .

The State also released the “Brownfield Design and Action Work Plan Outline, Appendix C,” in January 2008, which is used at Brownfield and other sites. The Outline can be accessed at: <http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/sirb/pdf/RMG08009.pdf>

Delaware also plans to draft guidance for vapor intrusion investigations, including soil gas probe installation.

4.8 Florida

The State does not have guidance concerning vapor intrusion, but has formed a committee of staff members from various cleanup program areas to investigate vapor intrusion and make recommendations as to the most efficient way that vapor intrusion considerations could be incorporated into its existing site rehabilitation procedures.

4.9 Guam and Hawaii

Guam and Hawaii released an updated *Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater: Pacific Basin Edition* guidance in October 2008, which includes guidance and tools for accessing the vapor intrusion pathway. The guidance is located at: <http://hawaii.gov/health/environmental/hazard/pacificbasin.html>

4.10 Illinois

Illinois EPA does not promulgate regulations, but they do draft regulations and submit them to the Illinois Pollution Control Board for promulgation. The Pollution Control Board holds the hearings, collects written testimony and publishes the proposed and final rules. Vapor intrusion regulations will be incorporated into Illinois' Tiered Approach to Cleanup Objectives regulations at 35 IAC Part 742. To date, the Illinois Pollution Control Board has conducted two hearings (1/27/09 and 3/17/09) on these amendments and pre-first-notice comments are due to the Board at the end of May. The rule may go final in October 2009. The Illinois Pollution Control Board link to the rulemaking is:

<http://www.ipcb.state.il.us/cool/external/CaseView2.asp?referer=coolsearch&case=R2009-009>.

4.11 Indiana

Indiana has made statutory changes in order to regulate vapor intrusion. The definition for "Contaminant" provided in IC 13-11-2-41 - Sec. 42, provides Indiana Department of Environmental Management (IDEM) the authority to regulate vapor intrusion. Article 9 under Indiana Administrative Code 329 addresses Underground Storage Tanks (USTs). 329 IAC 9-4; 329 IAC 9-5; 329 IAC 9-6; and 329 IAC 9-7 specifically address vapors related to any UST release.

IDEM has two guidance documents that address vapor intrusion:

- Risk Integrated System of Closure (RISC) Technical Resource Guidance Document, February 2001
<http://www.in.gov/idem/4200.htm>
- Draft Vapor Intrusion Pilot Program Guidance Document, April 2006
<http://www.state.in.us/idem/files/la-073-gg.pdf>

Currently, IDEM is revising and updating the RISC Technical Guide and plans to incorporate the general framework of the 2006 Draft Vapor Intrusion Pilot Program Guidance Document into the RISC guidance as a part of this revision. Specialized components of the VI guidance will be updated and made available on the IDEM website as technical guidance on particular topics, e.g. indoor air and soil gas sampling methodology.

IDEM is also currently writing rules addressing environmental assessment, cleanup and closure of contaminated sites, which may include general requirements for addressing the vapor intrusion exposure pathway. The Indiana Petroleum Equipment Contractors Association (IPECA) has a subcommittee dedicated to vapor intrusion related topics, and is currently working with IDEM by providing technical comments and input on vapor intrusion policy. IDEM is currently soliciting input from the IPECA VI subcommittee and other interested stakeholders. These projects are currently in progress, and are expected to be completed in 2010.

4.12 Iowa

No changes have been made to Iowa policy since the Stateside Publication document was released.

4.13 Kansas

In June 2007, Kansas developed the *Kansas Vapor Intrusion Guidance: Chemical Vapor Intrusion and Residential Indoor Air*. The Guidance can be accessed at: http://www.kdheks.gov/ber/download/Ks_VI_Guidance.pdf. The State also has Standard Operating Procedures for conducting indoor air vapor sampling.

4.14 Louisiana

The State expects that a policy, procedure and/or methodology will be forthcoming in the next year.

4.15 Maine

Maine is currently developing State guidance and policy for vapor intrusion.

4.16 Maryland

Maryland uses the ITRC Guidance, draft EPA RCRA Guidance, and EPA Region 3 Guidance to address vapor intrusion, in addition to the guidance and tools provided in the Stateside Publication.

4.17 Michigan

There are no statutes specifically addressing vapor intrusion; however, Part 201, Environmental Remediation, of Michigan's Natural Resources and Environmental Protection Act (Part 201) does provide for the development of cleanup criteria to address reasonable and relevant exposure pathways under Section 324.20120a(3).

An update to the 1998 Technical Support Document describing the development and application of the soil and groundwater volatilization to indoor air criteria is expected to be finalized in 2009. The document will be Attachment 5 of Operational Memorandum #1 and, when final, can be found at: http://www.michigan.gov/deq/0,1607,7-135-3311_4109_9846-101581--,00.html

The draft Operational Memorandum #4, Attachment #4 contains a table of Acceptable Soil Gas Screening Concentrations and Acceptable Indoor Air Concentrations for comparison to sub-slab soil gas, deep soil gas, and indoor air data. These screening levels are not currently promulgated under the Part 201 Rules. The methodology for the development of these screening levels will be provided in Operational Memorandum #1, Attachment 5, and the appropriate application of these screening levels is explained in the draft Operational Memorandum #4, Attachment #4.

4.18 Minnesota

Minnesota has finalized guidance for assessing the vapor intrusion pathway for both petroleum and non-petroleum sites. As part of this process, Intrusion Screening Values have also been developed. The documents can be accessed at:

<http://www.pca.state.mn.us/publications/c-s4-06.pdf>

<http://www.pca.state.mn.us/publications/c-prp4-01a.pdf>

4.19 Missouri

Missouri has updated its RBCA document since the Stateside document was published, the latest being June 2008. Updates are available at: <http://dnr.mo.gov/env/hwp/mrbca/mrbca.htm>

4.20 Montana

Montana does not have State guidance, and references the following guidance when accessing the vapor intrusion pathway along with site-specific screening: EPA Guidance (November 2002), ITRC Guidance, and guidance documents from New York and California.

4.21 Nebraska

Nebraska is currently making revisions to its vapor intrusion guidance.

4.22 Nevada

Nevada does not currently have a defined policy/guidance for the handling of vapor intrusion. Site cleanup consideration is usually based on drinking water standards, even if the groundwater in question is not a source of drinking water. When vapor intrusion is an issue at a site, it is addressed as a site-specific issue through application of other sources of guidance, most often from EPA Region 9.

4.23 New Jersey

New Jersey assesses the vapor intrusion pathway on a case-by-case basis, using the risk level 1×10^{-6} . The 2005 State guidance document is still used. However, reference tables and frequently asked questions have been updated in 2007 and 2008, respectively, and will continue to be updated as necessary. The State publishes any modification on its website at: <http://www.state.nj.us/dep/srp/guidance/vaporintrusion/>

4.24 New Mexico

New Mexico does not have State guidance, and has been accepting use of the Johnson and Ettinger model.

4.25 New York

The proposed New York State Department of Environmental Conservation (NYSDEC) Program Policy for Evaluating the Potential for Vapor Intrusion at Past, Current, and Future Sites was finalized and released to the public on October 18, 2006, under the name DER-13/Strategy For Evaluating Soil Vapor Intrusion at Remedial Sites in New York. The document can be assessed at: http://www.dec.ny.gov/docs/remediation_hudson_pdf/der13.pdf

Revisions to the NYSDEC's Part 375 Regulations (Environmental Remediation Programs) went into effect on December 14, 2006, which detail the vapor intrusion pathway in Section 10. The regulations can be found at: <http://www.dec.ny.gov/chemical/34189.html>

The proposed New York State Department of Health (NYSDOH) guidance was finalized and released to the public in October 2006 under the name Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York and is located at:
http://www.health.state.ny.us/nysdoh/gas/svi_guidance/index.htm

Information about New York's work with the vapor intrusion pathway is available at:
<http://www.dec.ny.gov/regulations/2588.html>

4.26 North Carolina

North Carolina is currently researching the vapor intrusion pathway, but does not have State guidance or policy.

4.27 North Dakota

North Dakota does not have specific guidance or regulations regarding vapor intrusion.

4.28 Ohio

No changes have been made to Ohio policy since the Stateside Publication document was released.

4.29 Oklahoma

Oklahoma does not have State guidance for vapor intrusion.

4.30 Oregon

Oregon is in the final stages of developing new guidance on vapor intrusion. Much of the focus will be on developing attenuation factors to allow the use of soil gas numbers as a screening tool.

4.31 Pennsylvania

No changes have been made to Pennsylvania's documents since the Stateside Publication document was released.

4.32 Puerto Rico

No changes have been made to Puerto Rico's documents since the Stateside Publication document was released.

4.33 Tennessee

No changes have been made to Tennessee's approach since the Stateside Publication document was released.

4.34 Virginia

Virginia does not have guidance for evaluating vapor intrusion, and relies on EPA Guidance for site-specific evaluations. The Voluntary Remediation Program (VRP) has developed guidance and a fact sheet for screening potential vapor intrusion risk in order to determine if site-specific investigations are needed, which relies heavily on the ITRC Guidance. These documents can be accessed at: <http://www.deq.state.va.us/vrprisk/>

4.35 Washington

Washington does not have statutes specifically addressing vapor intrusion. Regulations (promulgated pursuant to the State's Model Toxics Cleanup Act) briefly address the pathway. The regulatory basis for requiring assessment and protection of the VI exposure pathway is set forth in the MTCA Cleanup Regulations, Chapter 173-340 WAC. The relevant sections include: WAC 173-340-367(3)(f)(i); WAC 173-340-450(2)(c) & (3)(a)(i); WAC 173-340-720(1)(c) & (1)(d)(iv); WAC 173-340-740(3)(b)(iii)(C) & (3)(c)(iv); WAC 173-340-745(2)(c) & (5)(b)(iii)(C); and, WAC 173-340-750.

The State has released two internal draft guidance documents peripherally addressing vapor intrusion:

- *"Focus on developing air cleanup standards under the Model Toxics Control Act,"* revised April 2005, addresses air cleanup standards at sites where a ground water cleanup level is being established for VOCs using a site-specific risk assessment and sites where a site-specific cleanup level is used to establish a soil cleanup level and an air cleanup level is needed to assess exposure to vapors or dust.
<http://www.ecy.wa.gov/pubs/0109072.pdf>
- *"Cleanup Levels and risk calculations under the Model Toxics Control Act Cleanup regulation."* Provides an overview of the development of ground water, surface water, soil and air cleanup standards as well as specific calculation methods. However this on-line database does not contain the soil/ground water cleanup standard to be protective of VI exposure pathway.

http://www.ecy.wa.gov/programs/tcp/tools/CLARC_v_3.1/clarc_v_3_1.htm

The State also anticipates developing another vapor intrusion document by the end of 2009. This document is expected to focus on the steps to be taken to assess the potential for the vapor intrusion pathway, as well as mitigation/remedial actions to be taken when subsurface contamination poses a potential vapor intrusion threat to indoor air.

In the interim, Washington recommends the California, New York, and New Jersey guidance documents, and other materials such as EPA's, ITRC's, and API's guidance documents as resources for addressing vapor intrusion issues in the State.

4.36 Wisconsin

The State has drafted both rule changes to address vapor intrusion and a policy guidance document on vapor intrusion, which should be complete by the end of 2009 or early 2010.

5.0 CHALLENGES FOR STATES

Both States and DoD have recognized that vapor intrusion pathway investigations present unique and additional challenges compared with traditional investigations of other media (e.g. water, soil). Unlike a groundwater plume investigation, the completion of the vapor pathway depends on many site- and location-specific factors such as soil composition and lithology, building construction and use. Recent component and State and federal regulatory guidance point to a tiered approach, which considers many lines of evidence. These include, but are not limited to, modeling, soil gas, and indoor air sampling. However, States and DoD may differ in the weight that should be given to a particular line of evidence. For example, the *DoD Vapor Intrusion Handbook* states that modeling may be sufficient to screen out potential vapor risks. However, many States are concerned with the high degree of uncertainty that rests with modeling inputs that do not contain enough site-specific data. This data, sub-slab and soil gas data sampling for example, is typically not pursued or unavailable due to policy, geology or access challenges. The trend for many States has been to require sub-slab and/or deep soil gas sampling to determine if potential risk is present.

States also believe that one challenge most States will face will be to determine the most appropriate way to measure specific risks and the actions need to be taken to eliminate risks from vapor intrusion. The DoD guidance recognizes that it may be in conflict with other State guidance. As a result of the many variables and policy challenges, more thought for mitigation systems, vapor barriers and institutional controls during the remedy selection phase of cleanup may need to be considered for sites with vapor intrusion concerns.

6.0 CONCLUSION

The PTFG developed this document in order to provide State Federal Facilities Managers with a compendium of information to assist in dealing with the vapor intrusion issues at sites in their State. The documents referenced in the compendium provide current federal and State guidelines and highlight the current scientific thinking as it relates to vapor intrusion concepts and how those concepts are incorporated into selected remedies to ensure that human health and the environment are protected.

As presented in this paper, U.S EPA, the DoD, specific military components, and many States have a variety of laws, regulations, guidance or policies to address vapor intrusion issues. While DoD generally supports the evaluation and investigation of this pathway at federal facilities, as evidenced by their own guidance and policies, State efforts to direct DoD to the evaluate vapor intrusion pathway have been hampered by the fact that U.S. EPA, State, component-specific, and/or DoD policies and guidelines are inconsistent with one another. This could result in an underestimation of concentrations that trigger the need for prompt action in current and foreseeable future land use settings in order to eliminate risk to human health and the environment.

APPENDIX A



**State Laws, Regulations, and Policies
Pertaining to Vapor Intrusion**

**Contract: N47408-03-D-8411
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Prepared for the Department of Defense

By

**Stateside Associates
February 3, 2006**

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Report Overview

The following report details laws, regulations, and guidance specifically addressing Vapor Intrusion (VI). While VI could be a factor covered by most, if not all, state risk assessment and remediation programs, this report details when state agencies or legislatures have addressed VI directly, or have directed regulated parties to another set of regulatory guidelines. In addition, Stateside Associates has contacted the appropriate state contacts to determine which states are pursuing new policies towards VI.

The Current State of Vapor Intrusion (VI) Practice:

We have looked at all 50 states to determine which states have vapor intrusion specific laws, regulations and statutes. No state has a statute that directly identifies VI, or provides VI specific requirements for risk assessment. Statutes like the brownfields remediation laws in New York (see page 41 below) come the closest, requiring that remedial programs include an exposure assessment including all “current and reasonably foreseeable exposure pathways.” Similarly, only 9 states have current regulations that address VI specifically, with 3 more states having regulations under development.

The most specific treatment of VI occurs in guidance. In a few cases, as in Alaska and Virginia, guidance documents are referenced in the state regulations. More often, state agencies have promulgated guidance based on broader authority under existing remediation regulation or statute, directed the regulated community to other non-pathway specific guidance, or utilized the Vapor Intrusion Guidance available at USEPA. In these ways, all of the states have either regulations or guidance documents that address vapor intrusion in some fashion.

Present VI Activity

Nine states (Alabama, Alaska, Colorado, Florida, Illinois, Michigan, Minnesota, Mississippi, and Wisconsin) have active stakeholder groups addressing VI issues. As mentioned above, 3 states (Illinois, Missouri, and New York) have VI rulemakings under development. In addition, two more states (Connecticut and Massachusetts) are revising their VI regulations. Nevertheless, most current activity is occurring at the guidance level.

While a majority of states (34) have their own VI guidance (or draft guidance under development), a number of states have relied on the United States Environmental Protection Agency’s (USEPA) published guidance. Twenty-two states, including many who have their own state guidance, currently refer their regulated communities to USEPA’s 2002 draft guidance entitled “OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance).” This guidance is available online at <http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm>. In addition to

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utilizing federal agency guidance, Hawaii and Maryland have used guidance documents from California and Pennsylvania respectively, to address VI issues. Also, regulators in Maine and the District of Columbia have been working with and are now using Interstate Technology & Regulatory Council (ITRC) developed guidance in their states.

Where is V.I. Practice Headed?

The States are generally moving towards specific regulation of VI risk assessment and remediation by creating guidance materials in accordance with existing rules, not through new rulemakings. At the moment, there are only 3 states with VI rules under development.

The majority of states are engaging in guidance development or revision. As detailed above and in the following report, many states formally recommend the USEPA's Draft Subsurface Vapor Intrusion Guidance. This draft guidance is currently being finalized, and is expected in the first quarter of 2006. The finalization of the draft will clearly be a triggering event within the state agencies, and is likely to result in a number of state guidance revisions. Regulators in California and Arizona have stated directly that their agencies are waiting on the final guidance from USEPA before releasing final revisions of their own guidance. This is supported by the timing of 12 other states (including Alabama, Colorado, Delaware, Florida, Illinois, Indiana, Kansas, Michigan, Minnesota, New York, Washington, and Wyoming) planning to release guidance revisions later in 2006.

Alabama

Overview:

Alabama does not have statutes or regulations specifically addressing Vapor Intrusion (VI). However, the Department of Environmental Management has developed the document entitled *Alabama Environmental Investigation and Remediation Guidance* (AEIRG) to aid in the development of environmental investigations and remediation projects. Pursuant to the AEIRG, owners/operators conduct a Preliminary Investigation (PR) to confirm or deny that releases of constituents of potential concern (COPCs) have occurred and determine what potential receptors exist in the area. If contamination is confirmed in any environmental media, the owner/operator must conduct a Comprehensive Investigation (CI) to determine the full horizontal and vertical extent of contamination (soil and groundwater) and/or free product plume in all media. Upon completion of the CI, a risk assessment is conducted to identify baseline risks to human and ecological receptors. The risk assessment includes the following: (a) determines risk-based target levels (RBTLs) (i.e. remediation levels) of contaminants of concern; (b) evaluate remedial alternatives for potential impacts to human health and the environment; and (c) document and communicate to the public risks associated with contaminated properties. The analysis described in the AEIRG includes all pathways which may include the vapor intrusion pathway.

The Department is currently revising the document entitled *Alabama Risk-Based Corrective Action Guidance* (ARBCA). The ARBCA guidance will provide a risk-based approach to develop and select appropriate Risk-Based Target Levels (RBTLs) for contaminated sites. The ARBCA guidance will establish a consistent framework for risk-based decision making across all of the Department's cleanup programs, including those regulated under Alabama's Hazardous Waste Program, the Brownfield Redevelopment and Voluntary Cleanup Program, and the Underground Storage Tank Program. Staff note that vapor intrusion is addressed in the ARBCA guidance. Staff report it is likely the ARBCA will become effective in April 2006. In addition, the staff refer owners/operators to the *USEPA's Subsurface Vapor Intrusion Guidance* for further information.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Alabama Environmental Investigation and Remediation Guidance (AEIRG) (revised September 2005); aid in development of environmental investigations and remediation projects
Online at: <http://www.adem.state.al.us/LandDivision/Guidance/AEIRGInvestigation.pdf>

USEPA's Draft Subsurface Vapor Intrusion Guidance (November 2002)

Online at: <http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm>

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Stakeholder Groups

Staff report the Department is internally revising the ARBCA guidance. Development of the ARBCA guidance is being monitored at Statelink Reg ID# AL4950. Development of AEIRG was monitored at Statelink Reg ID# AL0014863.

State Contacts

Brian Espy, Alabama Department of Environmental Management, Phone: (334) 271-7749, E-mail: bespy@adem.state.al.us

Plans to address VI in 2006

Alabama Risk-Based Corrective Action Guidance (ARBCA) (anticipated April 2006), intended to be used by individuals with appropriate technical expertise and skills in environmental evaluations, risk assessment, and risk management issues.

Oversight Board for VI

There is no specific oversight board or commission.

Alaska

Overview: Alaska does not have statutes or regulations specifically addressing Vapor Intrusion (VI). However, the Department of Environmental Conservation has developed a draft technical memo entitled *Evaluation of Vapor Intrusion Pathways at Contaminated Sites*, to aid in the identification of “complete” vapor intrusion pathways. A complete pathway is one that allows for the migration of volatile compounds from the subsurface into overlying buildings. Pathway assessment is a component of a conceptual site model (CSM) which may be required under the Department’s site-cleanup rules. The determination that a pathway is complete triggers the application of a site-specific analysis to determine if the risk to occupants at the site or in the vicinity is at acceptable levels. This analysis incorporates by reference the Department’s Cleanup Levels Guidance, which is used in determining migration to groundwater and maximum inhalation levels as set forth in the site-cleanup levels (18 AAC 75.341). Staff adds that a VI work group has been formed but has not yet released any public documents.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

18 Alaska Administrative Code 75.340, last amended 01/30/03 (soil cleanup levels, general requirements) incorporates by reference the Department of Environmental Conservation (DEC) *Cleanup Levels Guidance*

Online at: [http://old-www.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=\[jump!3A!2718+aac+75!2E325!27\]/doc/{@68299}](http://old-www.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[jump!3A!2718+aac+75!2E325!27]/doc/{@68299})?

18 AAC 75.325, (site cleanup rules) adopt by reference the Department's *Cumulative Risk Guidance* to be used in determining an appropriate soil cleanup level that, after completing site cleanup, the risk from hazardous substances does not exceed a cumulative carcinogenic risk standard of 1 in 100,000 across all exposure pathways and a cumulative non-carcinogenic risk standard at a hazard index of 1.0 across all exposure pathways.

Online at: [http://old-www.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=\[group+!2718+aac+75!2E325!27!3A\]/doc/{@1}/hits_only?](http://old-www.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[group+!2718+aac+75!2E325!27!3A]/doc/{@1}/hits_only?)

Guidance addressing VI

Cleanup Levels Guidance, effective 11/07/02, addresses cleanup of petroleum contaminated soils and standard sampling procedures.

Online at: http://www.dec.state.ak.us/spar/ipp/docs/ust_man02_10_07.pdf

Evaluation of Vapor Intrusion Pathways at Contaminated Sites, effective 06/28/04, assists in the determination of whether or not a pathway is complete. This guidance also sets forth the criteria for determining a pathway's completeness, what to do when a pathway is complete, and conditions allowing for a limited evaluation.

Online at: http://www.dec.state.ak.us/spar/csp/guidance/draft_vap_intr_tm_6_28.doc

Cumulative Risk Guidance, effective 11/07/02, Provides guidance on determining cumulative risk. Cumulative risk assessment is required for certain cleanup methods found in 18 AAC 75.325. Cumulative risk is the sum of risks resulting from multiple sources and pathways to which humans are exposed. The Risk Based Concentration (RBC) for soil inhalation and ingestion pathways can be found in Appendix B. RBCs correspond to the concentration in soil that would cause an adverse effect through the inhalation or ingestion routes of exposure and are calculated using the equations presented in DEC's *Cleanup Levels Guidance* (2002). Includes a list of contaminants for which an assessment should be prepared as well as five example assessments.

Online at: http://www.dec.state.ak.us/spar/csp/guidance/cumrisk02_10_07.pdf

Stakeholder Groups

Staff report that an internal petroleum vapor intrusion work group has been formed. The group is in early stages of developing an action plan. No public documents are currently available.

State Contacts

Jill Taylor, Alaska Department of Environmental Conservation, (907) 465-5209,
jill_taylor@dec.state.ak.us

Plans to address VI in 2006

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Apart from the internal workgroup described above, there are no additional plans to address V.I.

Oversight Board for VI

Alaska DEC promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Arizona

Overview: Arizona does not have any statutes or regulations specifically addressing Vapor Intrusion (VI). However, various sections and units within Arizona's Waste Programs Division are involved in coordinating and overseeing contaminated soil and groundwater investigations and cleanups. Staff indicated that through these programs, they indirectly deal with VI pathways on a case by case basis. Staff also indicated that Arizona's soil cleanup standards for some contaminants are based in part upon inhalation of vapors emitting from a release. However, this assessment is made assuming a receptor is outdoors. Staff reported that they reference USEPA's *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* when assessing a VI issue.

Statutes specifically addressing VI

There are no statutes that specifically address "vapor intrusion". However, Arizona Revised Statute (A.R.S.) 49-152 requires rules that establish cleanup levels to be based on a risk-based methodology. In addition, the Department must provide guidance for the use of these risk-based methodologies (accepted by the scientific community), including newly developed methodologies.

Online at:

<http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/49/00152.htm&Title=49&DocType=ARS>

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Release Reporting and Corrective Action Guidance, 08/20/02, Section 6.3.5.1, references indoor air intrusion in a limited way. Staff report that as it stands now, a site-specific remediation level must protect human health for a target hazard index of 1 and cumulative risk range between 10^{-6} and 10^{-5} , the latter determined by various risk management criteria. Staff report that since indoor air intrusion of vapors from regulated releases is one aspect of possible exposure pathways, it must be evaluated like all other potential exposure pathways when a site-specific remediation level is determined for a site.

Online at: <http://www.azdeq.gov/environ/ust/lust/rbca.html>

Arizona Department of Health Services Deterministic Risk Assessment Guidance, prepared 03/15/99. This document does not specifically mention “vapor intrusion” and does not offer much guidance on evaluating the indoor vapor intrusion risk. There is a brief mention of vapor intrusion evaluation in the Appendix, which is not available online. Staff conclude that by the date of the document, and the reference in the Appendix to the USEPA’s *Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings* guidance document, that the Appendix probably discusses the Johnson/Ettinger model as a vapor intrusion evaluation tool. However, this guidance document does assist in the preparation of a risk assessment. This guidance document provides guidance for parties using risk assessment to develop site-specific health-based cleanup levels.

Online at: <http://www.azdhs.gov/phs/oeh/pdf/guidance.pdf>

OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance), 2002.

Online at: <http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm>

Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings

Online at: http://www.epa.gov/oswer/riskassessment/airmodel/johnson_ettinger.htm

Stakeholder Groups

There is a stakeholder group that meets to discuss vapor intrusion guidance. Staff indicated that there are no immediate plans to resurrect these meetings.

State Contacts

Richard Olm, Arizona Department of Environmental Quality, (602) 771-4223, rco@azdeq.gov

Jeanene P. Hanley, Senior Risk Assessor, Arizona Department of Environmental Quality, Tank Program Division Corrective Actions Section, (602) 771-4314, hanley.jeanene@azdeq.gov

Plans to address VI in 2006

Staff have been working on a guidance document for the past several years. Staff do not know when this document will be completed. Staff reported that this document relies on the USEPA guidance document entitled *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils*. The development of this document will be tracked in Regulatory ID# AZ4954. In addition, the Waste Program Division and the Tank Program Division is planning on proposing an update to the 12/97 amendment version of the Soil Rule (Title 18, Chapter 7, Article 2). Staff report that this rule will not specifically reference VI. However, VI will be an aspect of the guidance document the Division is planning to publish. This guidance document will evaluate all complete expose pathways for determining a site-specific remediation level. This proposed rule is being tracked in Regulatory ID# AZ0009087.

Oversight Board for VI

None

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Arkansas

Overview: The Arkansas Department of Environmental Quality utilizes the USEPA's guidance document entitled *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, EPA530-D-02-0004, November 2002. They do not have their own guidance document or regulations on this issue. There are no immediate plans to promulgate regulations or prepare guidance.

Statutes specifically addressing VI

Arkansas does not have any statutes specifically addressing VI.

Regulations addressing VI

Arkansas does not have any regulations specifically addressing VI.

Guidance addressing VI

Arkansas follows USEPA's guidance document entitled *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, EPA530-D-02-0004, released in November 2002. The draft EPA Guidance document is available at: <http://www.epa.gov/correctiveaction/eis/vapor/complete.pdf>

Stakeholder Groups

Arkansas does not have a stakeholder group that is working on this issue.

State Contacts

Terry Perry, Arkansas Department of Environmental Quality, (501) 682-0987.

Plans to address VI in 2006

Department Staff reports that there are no plans to address this issue in the future.

Oversight Board for VI

Arkansas Department of Environmental Quality promulgates regulations pertaining to VI. There is no specific oversight board or commission.

California

Overview: The Department of Toxic Substances Control (DTSC) has made available an interim final guidance document for the evaluation and mitigation of subsurface vapor intrusion to indoor air, dated February 7, 2005. Staff reports that no regulations are expected to be developed in conjunction with the guidance and anticipates that because USEPA is planning to release a revised guidance document in the first quarter of 2006, DTSC will not release their final

guidance document until mid-2006 at the earliest. Staffs expect that the final version will include greater detail on the degradation of petroleum hydrocarbons as well as engineering controls. The development of this guidance document has been, and will continue to be followed in Statelink Reg ID# [CA0015636](#). In addition, the San Francisco Bay Regional Quality Control board has released a technical manual on screening levels for water and soil contamination. This technical manual does not constitute a departmental policy or regulation, but the manual has influenced Hawaii's treatment of the subject.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Interim Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air, released 02/07/05, provides an 11 step program for identifying sources of vapor intrusion; testing and conducting a risk assessment; mitigation and remediation.

Online at:

<http://www.dtsc.ca.gov/loader.cfm?url=/commonspot/security/getfile.cfm&pageid=11492>

Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater provides an overview of the vapor intrusion issue and presents action levels (screening levels) for groundwater, soil, soil gas, and indoor air. This document follows guidance that was published by the San Francisco Bay Regional Water Quality Control Board, which is part of California EPA.

Online at: <http://www.waterboards.ca.gov/sanfranciscobay/esl.htm>

Stakeholder Groups

No stakeholder groups currently exist.

State Contacts

Dan Gallagher, Department of Toxic Substances Control, (916) 255-6536, dgallagh@dtsc.ca.gov

Plans to address VI in 2006

Apart from the guidance being developed above, there are no additional plans to address V.I.

Oversight Board for VI

DTSC has responsibility for developing VI guidance.

Colorado

Overview

The Department of Public Health and Environment published a draft guidance document on Indoor Air Quality that specifically addresses Vapor Intrusion in September 2004. The document summarizes the Department's expectations of how vapor intrusion problems should be identified, characterized and remediated. The purpose of the guidance is to describe the indoor air assessment process. Department staff expects the Guidance to be implemented at sites where volatile chemicals are present in ground water at levels that could pose a threat to inhabitants in overlying structures. Staff also expects that the Department will resume work on the guidance document by late-January 2006. Upon completion of the comment review, the Department will offer the final version of the guidance to the Division Director for approval. The development of this guidance document has been, and will continue to be followed in Statelink Reg ID# CO0013999.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Draft Indoor Air Quality guidance, released 09/14/04, addresses the following: Evaluating the Indoor Exposure Pathway, Exposure Concentrations, Indoor Air Background, Remedial Actions and Monitoring requirements.

Online at:

<http://www.cdphe.state.co.us/hm/indoorair.pdf>

Stakeholder Groups

No stakeholder groups currently exist.

State Contacts

Walter Avramenko, CDPHE Hazardous Materials and Waste Management Division, (303) 692-3362, Walter.Avramenko@state.co.us

Plans to address VI in 2006

Apart from the guidance being developed above, there are no additional plans to address V.I.

Oversight Board for VI

CDPHE Hazardous Materials and Waste Management Division is developing the draft IAQ guidance.

Connecticut

Overview: Connecticut has Remediation Standard Regulations (**CONN. AGENCIES REGS. § 22a-133k**) that address volatilization of soil vapor. In March of 2003, the Connecticut Department of Environmental Protection proposed amendments to the regulations. There are no immediate plans to prepare additional guidance documents.

Statutes specifically addressing VI

Connecticut does not have any statutes specifically addressing VI.

Regulations addressing VI

Connecticut has Site Remediation Regulations that address volatilization of soil vapor. **CONN. AGENCIES REGS. § 22a-133k**, Appendices E and F, effective January 30, 1996, apply to any action taken to remediate polluted soil, surface water or ground-water plume at or emanating from a release area. The Volatilization Criteria for groundwater vary depending on whether the overlying building is used for residential or industrial/commercial purposes. Website with regulations: <http://dep.state.ct.us/wtr/regs/remediationregs.htm> Further, Significant Environmental Hazard Condition Notification Threshold Concentrations Reference Table A specifically addresses Volatile Organic Substances. It is available at: <http://www.dep.state.ct.us/wtr/remediation/98-134/134thresholdA.htm>

The Department has also drafted revisions to these regulations which are being used as Guidance. Department staff reports that it plans to propose the draft revisions sometime this spring. The draft revisions are available online at: <http://dep.state.ct.us/wtr/regs/RvVolCri.pdf> Additional information regarding the revisions is available under Statelink Reg ID# CT0010084.

Guidance addressing VI

Connecticut does not have any specific guidance on VI, though it uses the proposed revisions as guidance. (Proposed regulations are online at: <http://dep.state.ct.us/wtr/regs/RvVolCri.pdf>)

Stakeholder Groups

Connecticut does not have a stakeholder group that is working on this issue.

State Contacts

Graham Stevens, Connecticut Department of Environmental Protection, 860-424-4166.

Plans to address VI in 2006

Department Staff reports that the drafted revisions will be officially proposed sometime in the spring of 2006.

Oversight Board for VI

Connecticut Department of Environmental Protection promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Delaware

Overview: Delaware does not have any statutes or regulations specifically addressing Vapor Intrusion (VI). However, the Site Investigation and Restoration Branch of the Delaware Department of Natural Resources and Environmental Control addresses VI like any other pathway. It is evaluated during a risk assessment process on a site by site basis. Remediation is required for any pathway which exceeds 1×10^{-5} . If VI has to be addressed, the Department references the USEPA's *Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings*.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

Delaware Regulations Governing Hazardous Substance Cleanup, effective 09/96 and amended 02/02, establish the administrative processes and standards to identify, investigate, and cleanup facilities with a release or imminent threat of release of hazardous substances. These regulations implement the Delaware Hazardous Substance Cleanup Act. "Vapor intrusion" is not specifically referenced in these regulations. However, the regulations do address pathways.

Online at:

<http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/sirb/DOCS/PDFS/Misc/fdb99085.pdf>

Guidance addressing VI

Remediation Standards Guidance under the Delaware Hazardous Substance Cleanup Act, effective 03/01/98 and revised 12/99, addresses the Hazardous Substance Cleanup Act (HSCA) and the Voluntary Cleanup Program (VCP) cleanup processes for applicable sites in Delaware. "Vapor intrusion" is not specifically referenced in this guidance document.

Online at:

<http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/sirb/DOCS/PDFS/Misc/RemStnd.pdf>

Hazardous Substance Cleanup Act Guidance Manual, published 10/94, provides informational guidance to potentially responsible parties implementing site cleanup under HSCA. "Vapor intrusion" is not specifically referenced in this guidance document.

Online at:

<http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/sirb/DOCS/PDFS/Misc/hscaguid.pdf>

Delaware Voluntary Cleanup Program Guidance, published 02/95, provides information about the VCP Program and describes the phased approach for conducting an investigation and any necessary response actions. "Vapor intrusion" is not specifically referenced in this document.

Online at:

<http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/sirb/DOCS/PDFS/Misc/fdb99092.pdf>

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Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings

Online at: http://www.epa.gov/oswer/riskassessment/airmodel/johnson_ettinger.htm

Stakeholder Groups

Delaware is in the process of drafting a guidance document internally. Staff are not sure when this document will be released for public comment, but hope it will be within the next couple of months.

State Contacts

Rick Galloway, Delaware Department of Natural Resources and Environmental Control,
(302)395-2614, rick.galloway@state.de.us

Plans to address VI in 2006

See above. The development of the guidance document will be tracked in Regulatory ID # DE4946.

Oversight Board for VI

There is no specific oversight board or commission.

District of Columbia

Overview – The District of Columbia does not have any specific regulations or statutes regulating vapor intrusion (VI). However, staff indicated that if VI requirements were adopted, it would likely be through the newly created Department of Environment. Staff also reported that they use the *Vapor Intrusion Issues at Brownfield Sites* document, produced by the Interstate Regulatory Technical Council, as a reference document.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Vapor intrusion Issues at Brownfield Sites, prepared by the Interstate Technology & Regulatory Council Brownfields Team in 12/03. Staff indicated that they use this as a reference guide if they have to assess a vapor intrusion pathway.

Online at: <http://www.itrcweb.org/Documents/BRNFLD-1.pdf>

Stakeholder Groups

None

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State Contacts

Ron Johnson, Environmental Health Administration, (202)535-2257

Plans to address VI in 2006

Staff are unaware of any plans to address VI in the near future.

Oversight Board for VI

None

Florida

Overview:

Florida does not have statutes or regulations specifically addressing Vapor Intrusion (VI). Staff report that cleanup rules, supplemental program guidance, and the technical basis for the development of cleanup target levels do not specifically address the vapor intrusion pathway. Thus, the vapor intrusion pathway is not currently being considered in the assessment and cleanup of sites as a routine program requirement. During the course of assessment or remediation of a site, if vapor intrusion is a concern, staff note the decisions of how a site assessment is conducted, strategies of remediation or other measures to mitigate exposure to vapors from sources of contamination are considered. If vapor intrusion is a concern, staff direct owners/operators to the USEPA's Draft Subsurface Vapor Intrusion Guidance.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Florida does not have guidance documents concerning VI. Staff direct owners/operators to the USEPA's Draft Subsurface Vapor Intrusion Guidance (November 2002).

Online at: <http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm>

Stakeholder Groups

Staff report the Department is internally discussing development of a vapor intrusion guidance document. It is anticipated a draft vapor intrusion document may be available in late 2006. Development of the guidance document is being monitored at Statelink Reg ID# FL 4956.

State Contacts

Bheem Kothur, Florida Department of Environmental Protection, Phone: (850) 245-8781, E-mail: bheem.kothur@dep.state.fl.us

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Thomas Conrardy, Florida Department of Environmental Protection, Bureau of Petroleum Storage System, Phone: (850) 245-8899, E-mail: tom.conrardy@dep.state.fl.us

Plans to address VI in 2006

Apart from the internal workgroup described above, there are no additional plans to address VI.

Oversight Board for VI

There is no specific oversight board or commission.

Georgia

Overview:

Georgia does not have statutes or regulations specifically addressing Vapor Intrusion (VI). However, staff report that pursuant to the State Superfund Rules associated with corrective actions there should be no risk to indoor air quality (Georgia Rules Chapter 391-3-19). The regulation states “[t]he corrective action shall not allow exposure to concentrations which would cause...the accumulation of vapors in buildings or other structures which pose a threat to human health or the environment” (Georgia Rules Chapter 391-3-19-.07(4)(c)). If vapor intrusion is an issue of concern, staff refer the owner/operator to the USEPA’s Draft Subsurface Vapor Intrusion Guidance document.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

Georgia Rules Chapter 391-3-19, Hazardous Site Response (amended 06/23/03), establishes policies, procedures, requirements, and standards to implement the Georgia Hazardous Site Response Act. Vapor accumulation is listed as a hazard that must be addressed by corrective action.

Online at: http://www.gaepd.org/Files_PDF/rules/rules_exist/391-3-19.pdf

Guidance addressing VI

Georgia does not have guidance documents concerning VI. Staff direct owners/operators to the USEPA’s Draft Subsurface Vapor Intrusion Guidance (November 2002).

Online at: <http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm>

Stakeholder Groups

The Department does not anticipate drafting guidance documents or regulations addressing VI.

State Contacts

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Tonia Burk, Department of Natural Resources, Environmental Protection Division, Phone: (404) 657-8642, E-mail: tonia_burk@dnr.state.ga.us

Jim Brown, Department of Natural Resources, Environmental Protection Division, Phone: (404) 657-8642

Plans to address VI in 2006

There are no additional plans to address VI.

Oversight Board for VI

There is no specific oversight board or commission.

Guam

Overview: Guam does not have any specific regulations or guidance documents that specifically address Vapor Intrusion (VI). Guam Environmental Protection Agency (EPA) is currently working on developing radon resistant building codes. Staff indicated that if there is a need in the future, Guam EPA may be able to modify the radon codes to include vapor intrusion.

Statutes specifically addressing VI

Guam does not have statutes that specifically address VI.

Regulations addressing VI

Guam does not have regulations that specifically address VI.

Guidance addressing VI

Guam does not have guidance documents that address VI.

Stakeholder Groups

None

State Contacts

Peter Q. Cruz, Air Pollution Control Program, Guam Environmental Protection Agency, +1-671-475-1611, Peter.Cruz@guamepa.net

Plans to address VI in 2006

Staff report that there are no plans to address VI.

Oversight Board for VI

None

Hawaii

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Overview: Hawaii does not have specific vapor intrusion regulations or statutes specifically addressing Vapor Intrusion (VI). However, it does have a guidance document that addresses VI based on California screening level guidance.

Statutes specifically addressing VI

None

Regulations addressing VI

There are no specific VI regulations. Hawaii's regulations simply state that contaminated sites must be remediated to prevent adverse impacts to human health or the environment. Vapor hazards are addressed directly as applied to Underground Storage Tanks. (Title 11, Chapter 281). This applies to non-underground storage tank groups as well, under Chapter 128D of the Environmental Emergency Response Act.

Online at: <http://hawaii.gov/health/about/rules/11-281.pdf>

Guidance addressing VI

Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, interim final 05/05, includes vapor intrusion as one of several potential environmental concerns that must be addressed at contaminated sites. This document provides an overview of the issue and presents action levels (screening levels) for groundwater, soil, soil gas, and indoor air. This document follows guidance that was published by the San Francisco Bay Regional Water Quality Control Board, a subdivision of California EPA.

Online at: <http://www.hawaii.gov/health/environmental/hazard/eal2005.html>
<http://www.waterboards.ca.gov/sanfranciscobay/esl.htm>

Stakeholder Groups

None

State Contacts

Roger Brewer, Hawai'i Department of Health, Environmental Management Division, Hazard Evaluation and Emergency Response, (808)586-4328, roger.brewer@doh.hawaii.gov

Plans to address VI in 2006

Staff report that there are continually addressing VI at sites impacted with volatile organic chemicals (VOCs). Also, the Department includes vapor intrusion concerns in workshops that they offer periodically for staff and the general public (about 10 in the last year). Any developments concerning VI will be tracked in Regulatory ID# HI4987.

Oversight Board for VI

None

Idaho

Overview

Idaho has a final risk evaluation manual for determining risks due to contamination of groundwater, surface water and soil. The manual contains guidance on determining exposure pathways, as well as soil sampling with an orientation towards prevention of vapor intrusion. Staff reports that this is the resource to be used for purposes of assessing vapor intrusion issues in Idaho. No plans are underway for the development of alternate or updated vapor intrusion guidance.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Idaho Risk Evaluation Manual, released July 2004, addresses the vapor intrusion directly in section 3.4.1- pathways for inhalation.

Online at: <http://www.deq.idaho.gov/Applications/Brownfields/download/MainDocument.pdf>

Stakeholder Groups

No stakeholder groups currently exist.

State Contacts

Bruce Wicherski, Voluntary Cleanup Program Manager, Idaho Department of Environmental Quality, (208) 373-0246, bruce.wichers@deq.idaho.gov

Plans to address VI in 2006

No plans to develop VI guidance or regulations beyond the current risk evaluation manual.

Oversight Board for VI

Department of Environmental Quality is responsible for addressing VI.

Illinois

Overview: Illinois does not have regulations, statutes, or guidance that specifically address VI. They do utilize the USEPA's guidance document entitled *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, EPA530-D-02-0004, November 2002. There are plans to amend their current site remediation regulations to specifically address VI. A working group was formed for this purpose.

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Statutes specifically addressing VI

Illinois does not have any statutes specifically addressing VI.

Regulations addressing VI

Illinois does not have any regulations that specifically address vapor inhalation. The Agency does plan to amend their Tiered Approach to Corrective Action Objectives (TACO), **35 Ill. Adm. Code Parts 740,742**, to specifically address VI.

Guidance addressing VI

The Agency utilizes the USEPA's guidance document entitled "*OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*", EPA530-D-02-0004, November 2002. The draft EPA Guidance document is available at: <http://www.epa.gov/correctiveaction/eis/vapor/complete.pdf>

Stakeholder Groups

Illinois does not have a stakeholder group that is working on this issue at this time. The Agency did create a Workgroup for the purpose of preparing amendments to their cleanup regulations. The amendments will specifically address VI.

State Contacts

Tanya Maniti, Illinois Environmental Protection Agency, 217-558-2564

Plans to address VI in 2006

The Agency has created a Workgroup for the purpose of preparing amendments to the Tiered Approach to Corrective Action Objectives (TACO), 35 Ill. Adm. Code 740,742. Staff reports that VI will be specifically addressed in the amended rules. The Agency anticipates that a proposed draft of the amended rules will be available to the public in the spring of 2006. See Statelink entry IL5261 for additional information.

Oversight Board for VI

The Illinois Environmental Protection Agency promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Indiana

Overview: Indiana does not have statutes or regulations specifically addressing Vapor Intrusion (VI). The Indiana Department of Environmental Management (IDEM) is in the process of drafting guidance on VI for use by IDEM staff.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

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Regulations specifically addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Under development – see below

Stakeholder Groups

There are no stakeholder groups currently addressing VI.

State Contacts

Rod Thompson, Indiana Department of Environmental Management, (317) 233-1514,
rthomps@idem.in.gov

Plans to address VI in 2006

IDEM is currently drafting VI guidance for IDEM use, based on the investigation of sites with potential for vapor intrusion. The guidance will provide recommendations for an investigation process and will provide refined screening levels. Staff estimate the VI guidance will be complete by the end of January, 2006. The guidance document will be made available online upon completion.

A brief description of the proposed guidance content is online at:

<http://www.in.gov/idem/land/risc/announcements.html#vapor>

Oversight Board for VI

IDEM promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Iowa

Overview: Iowa does not have statutes specifically addressing Vapor Intrusion (VI). Iowa does have regulations governing risk-based corrective action (RBCA) that specifically refer to soil vapor and groundwater vapor pathway assessment. In addition, the Iowa Department of Natural Resources (DNR) offers two guidance documents on Tier 1 and Tier 2 site assessment of leaking underground storage tanks using RBCA, which includes pathway evaluation methodology for “groundwater vapor to enclosed space” and “soil vapor to enclosed space.”

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

567 Iowa Administrative Code 135.8, last amended 01/15/97 (risk-based corrective action) discusses the general purpose of RBCA and identifies the purpose of Tier 1, Tier 2, and Tier 3 site assessments. The regulation goes on to state that Tier 1 site assessments are supposed to identify sites that do not pose an unreasonable risk to public health and safety based on available data, and that the Tier 1 assessment “assumes worst-case scenarios in which actual or potential receptors could be exposed to these chemicals at maximum concentrations through certain soil and groundwater pathways.”

Online at: <http://www.legis.state.ia.us/Rules/Current/iac/567iac/e135/e135pp17.pdf> at page 12 of 51.

567 Iowa Administrative Code 135.9, last amended 01/15/97 (Tier 1 site assessment policy and procedure) identifies pathways to be evaluated at Tier 1 sites, including “soil vapor to enclosed space pathway” and “groundwater vapor to enclosed space pathway.” The regulation also briefly discusses pathway assessment methodology for the abovementioned pathways.

Online at: <http://www.legis.state.ia.us/Rules/Current/iac/567iac/e135/e135pp17.pdf> at page 13 of 51.

567 Iowa Administrative Code 135.10, last amended 01/15/97 (Tier 2 site assessment policy and procedure) discusses the “soil vapor to enclosed space pathway” assessment and “groundwater vapor to enclosed pathway” assessment for Tier 2 sites.

Online at: <http://www.legis.state.ia.us/Rules/Current/iac/567iac/e135/e135pp17.pdf> at page 21 of 51.

567 Iowa Administrative Code 135.12, last amended 01/15/97 (Tier 2 and 3 site classification and corrective action response) discusses risk classification for Tier 2 and Tier 3 sites based on target levels at certain pathways, including “soil vapor to enclosed space” and “groundwater vapor to enclosed space.”

Online at: <http://www.legis.state.ia.us/Rules/Current/iac/567iac/e135/e135pp17.pdf> at page 37 of 51.

Guidance addressing VI

Tier 1 Guidance—Site Assessment of Leaking Underground Storage Tanks (LUST) Using Risk-Based Corrective Action (RBCA), effective 11/96, addresses (1) RBCA generally; (2) Soil Gas Target Levels; (3) Tier 1 Pathway Evaluation (including “groundwater vapor to enclosed space” and “soil vapor to enclosed space”); (4) Completing the Tier 1 Report Form Summary Pages; (5) Site History; (6) Sampling Requirements; (7) Soil Gas Sampling; (8) Receptor Surveys; (9) Tier 1 Corrective Action Response; (10) Expedited Corrective Action; and (11) Guidance for Maps and Appendices.

Online at:

<http://www.iowadnr.com/land/ust/technicalresources/lustsiteassessment/documents/tier1guide.pdf>

Tier 2 Site Cleanup Report Guidance for Assessing Leaking Underground Storage Tanks (LUST) Using Risk-Based Corrective Action (RBCA), effective 11/96, addresses (1) Tier 2 Site

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Assessment Overview and General Considerations; (2) Modeling; (3) Routine Assessment Procedures by Pathway (including “Groundwater vapor to enclosed space pathway assessment” and “Soil vapor to enclosed space pathway assessment”); (4) Bedrock Assessment; (5) Tier 2 and 3 Site Classification and Corrective Action Response; and (6) Directions for Completing the Tier 2 Report Form.

Online at:

<http://www.iowadnr.com/land/ust/technicalresources/lustsiteassessment/documents/tier2guide.pdf>

Stakeholder Groups

There are no stakeholder groups addressing VI.

State Contacts

Vern Strunk, Iowa Department of Natural Resources, (515) 281-6704,
vern.schrunk@dnr.state.ia.us

Plans to address VI in 2006

There are no plans to address VI in 2006.

Oversight Board for VI

Iowa DNR promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Kansas

Overview: Kansas does not have statutes or regulations specifically addressing Vapor Intrusion (VI). The Kansas Department of Health and Environment (KDHE) is drafting guidance on VI and anticipates that the guidance will be completed by mid-2006.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Under development – see below

Stakeholder Groups

There are no stakeholder groups addressing VI.

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State Contact

Bill Morris, Kansas Department of Health and Environment, (785) 296-8425,
bmorris@kdhe.state.ks.us

Plans to address VI in 2006

KDHE is in the process of drafting comprehensive guidance on VI that will include a discussion of soil gas sampling as a screening methodology. The guidance is intended to inform the consulting community on how to address a vapor intrusion site according to KDHE policy. KDHE staff indicates that the guidance is expected to be completed by mid-2006, and will be available online upon its completion.

Oversight Board for VI

KDHE promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Kentucky

Overview:

Kentucky does not have statutes or regulations specifically addressing Vapor Intrusion (VI). However, staff report that VI may be covered by the Department's solid waste and hazardous waste regulations that require assessment of the vertical and horizontal release of contamination and if necessary remediation. If vapor intrusion is an issue of concern, then staff would refer the owner/operator to the *USEPA's Draft Subsurface Vapor Intrusion Guidance* document. Staff note that very few locations have considered VI a problem and to the staff's knowledge no facility to date has addressed a release using the *USEPA's Guidance* document.

Statutes specially addressing VI

There are no statutes specially addressing VI.

Regulations specifically addressing VI

There are no regulations specifically addressing VI.

Kentucky Administrative Regulation 401 KAR 34:060, Section 12, though vapor intrusion is not specifically mentioned, the regulation require corrective action to protect human health and the environment for all releases of hazardous waste or constituents from any solid waste management unit

Online at: <http://www.lrc.state.ky.us/kar/401/034/060.htm>

Kentucky Administrative Regulation 401 KAR 42:060, though vapor intrusion is not specifically mentioned, the regulations describe release response and corrective action for Underground Storage Tank systems containing petroleum or hazardous substances

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Online at: <http://www.lrc.state.ky.us/kar/401/042/060.htm>

Guidance specifically addressing VI

Staff report there are no guidance documents specifically addressing VI.

Underground Storage Tank System Corrective Action Plan Outline (October 1995), though vapor intrusion is not specifically mentioned, the outline is used by owners and operators to develop and implement a corrective action plan (CAP) under Kentucky Administrative Regulation 401 KAR 42:060. The CAP outlines the proposed remediation of contaminated soils, air, surface water, sediment, groundwater, or bedrock impacted by the release of a regulated substance from a regulation underground storage tank system. The outline assists owners/operators in choosing remediation options that are appropriate to the geological and hydrogeological conditions at the site, within the context of the type and extent of contamination present at the site, and in determining whether the remediation options proposed are appropriate for meeting the allowable levels for target chemical constituents established for the site.

Online at: <http://www.waste.ky.gov/NR/rdonlyres/29AAC2E4-0AD3-4039-A9CB-6753D1799F26/0/cap.pdf>

USEPA's Draft Subsurface Vapor Intrusion Guidance (November 2002)

Online at: <http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm>

Stakeholder Groups

Staff report the Department is not discussing or drafting guidance documents or regulations regarding VI.

State Contacts

Eddie Allameh, Department for Environmental Protection, Phone: (502) 564-6120

Albert Westerman, Department for Environmental Protection, Phone: (502) 564-6120, E-mail: albert.westerman@ky.gov

Plans to address VI in 2006

Staff report there are no plans to address VI in 2006.

Oversight Board for VI

There is no specific oversight board or commission.

Louisiana

Overview: Louisiana has regulations that address vapor intrusion issues, but does not have any specifically related statutes. The **Risk Evaluation/Corrective Action Program (RECAP)**, last

amended October 20, 2003, consists of a tiered framework comprised of a screening option and three management options. **LAC 33:I. Chapter 13.**

Statutes specifically addressing VI

Louisiana does not have any statutes specifically addressing VI.

Regulations addressing VI

The **Risk Evaluation/Corrective Action Program (RECAP)**, last revised October 20, 2003, consists of a tiered framework comprised of a screening option and three management options. **LAC 33:I. Chapter 13.** This is the Department's primary statutory mandate for remediation activities that uses risk evaluation to identify constituent levels in impacted media that do not pose unacceptable risks to human health or the environment. The regulations address finding acceptable constituent concentrations in air for the evaluation of the vapor emissions from soil to an enclosed structure pathway, the vapor emissions from groundwater to an enclosed structure pathway, and the vapor emissions from groundwater to ambient air pathway. These regulations are available online at:

<http://www.deq.louisiana.gov/portal/Portals/0/technology/recap/2003/RECAP%202003%20Text%20-%20final.pdf> Additional RECAP-related documentation is available at:
<http://www.deq.louisiana.gov/portal/tabid/1569/Default.aspx>

Guidance addressing VI

There are no specific Guidance documents regarding VI other than RECAP-related documents referenced above. Department staff explained that the "**RECAP Frequently Asked Questions**" page (last updated February 11, 2002) on their website is utilized as a Guidance document for vapor intrusion evaluations. This is available online at:

<http://www.deq.louisiana.gov/portal/tabid/1566/Default.aspx>

Stakeholder Groups

Louisiana does not have a stakeholder group that is working on this issue.

State Contacts

Steven Chustz, Louisiana Department of Environmental Quality, (225)219-3388,
stephen.chustz@la.gov.

Plans to address VI in 2006

Department staff indicated there are no specific plans to address VI in 2006.

Oversight Board for VI

The Department of Environmental Quality promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Maine

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Overview: Maine does not have any statutes or regulations specifically addressing Vapor Intrusion (VI). However, the Maine Department of Environmental Protection is in the process of drafting Guidance regarding vapor intrusion evaluation. See Statelink Reg. ID # ME4949 for additional information. The Department also uses the “Field Guideline for Protecting Residents from Inhalation Exposure to Petroleum Vapors” that addresses air assessments and exposure investigations.

Statutes specifically addressing VI

Maine does not have any statutes specifically addressing VI.

Regulations addressing VI

Maine does not have any regulations specifically addressing VI.

Guidance addressing VI

The Department of Environmental Protection is in the process of drafting Guidance addressing vapor intrusion. They are working with the Interstate Technology & Regulatory Council (ITRC) in this endeavor. They are still in the drafting phase and do not anticipate completion until spring of 2006. (See Statelink Entry ME4949 for additional information.) Additional information regarding the cooperation with ITRC can be found at:

http://www.itrcweb.org/teampublic_Vapor.asp. The Department also uses the “**Field Guideline for Protecting Residents from Inhalation Exposure to Petroleum Vapors**” (revised June, 2000) that addresses air assessments and exposure investigations. This is available online at: http://mainegov_images.informe.org/dep/rwm/publications/pdf/InhalExpfg.pdf

Stakeholder Groups

Maine does not have a stakeholder group that is working on this issue.

State Contacts

Peter Emerita, Maine Department of Environmental Protection, 207-822-6364.

Plans to address VI in 2006

Department staff is working with ITRC to develop Guidance for vapor intrusion. Staff reports that there are no plans at this time to promulgate regulations on vapor intrusion.

Oversight Board for VI

The Department of Environmental Protection promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Maryland

Overview: Maryland does not have any specific regulations or guidance documents that specifically address Vapor Intrusion (VI). However, if VI is an issue, it is evaluated on a case by case basis and certain requirements have to be met. Some staff have tackled VI issues by using the USEPA's *Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings*; using Pennsylvania's vapor guidance document, *Land Recycling Program Technical Guidance Manual-Section IV.A.4. Vapor Intrusion into Buildings from Groundwater and Soil under the Act 2 Statewide Health Standard*; or have conducted subsurface soil gas sampling. Staff pointed to their Voluntary Cleanup Program as a source to find out information on how VI concerns are handled and what requirements there are.

Statutes specifically addressing VI

There are no statutes that specifically address VI. However, as noted above, staff pointed to their voluntary cleanup program as a source to find out information on how VI concerns are handled. Listed below are statutes that address the Maryland Voluntary Cleanup Program.

Maryland Voluntary Cleanup and Revitalization Program Act, which was signed into law in 02/97, created the Voluntary Cleanup Program and a Brownfields Revitalization Incentive Program. "Vapor intrusion" is not specifically referenced in this Act.

Online at: <http://www.mde.state.md.us/assets/document/hb409.pdf>

Brownfields Redevelopment Reform Act, which was signed into law in 04/04, amends the Maryland Voluntary Cleanup and Revitalization Program Act

Online at: http://www.mde.state.md.us/assets/document/House_Bill0294.pdf

Regulations addressing VI

There are no specific regulations addressing VI.

Guidance addressing VI

Voluntary Cleanup Program Guidance Document published 09/20/05, references VI. Specifically, the document references VI when sampling groundwater to evaluate impacts to groundwater. The guidance document also suggests the evaluation of the potential for VI through a comprehensive characterization of foundation air, which may include sampling of the groundwater, soil, soil gas, and indoor air. This characterization is typically performed by utilizing the *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*. In addition, the guidance document also recommends using the USEPA's *Johnson & Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings* model to evaluate the potential of VI.

Online at: [http://www.mde.state.md.us/assets/document/9-30-05%20Version%20\(Guidance%20Doc\).pdf](http://www.mde.state.md.us/assets/document/9-30-05%20Version%20(Guidance%20Doc).pdf)

Johnson & Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings

Online at: http://www.epa.gov/oswer/riskassessment/airmodel/johnson_ettinger.htm

OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)

Online at: <http://www.epa.gov/correctiveaction/eis/vapor.htm>

Land Recycling Program Technical Guidance Manual-Section IV.A.4. Vapor Intrusion into Buildings from Groundwater and Soil under the Act 2 Statewide Health Standard

(Pennsylvania's guidance document), effective 01/24/04:

Online at:

<http://164.156.71.80/VWRQ.asp?docid=2087d8407c0e0000000051100000511&context=2&backlink=WXOD.aspx%3ffs%3d2087d8407c0e0000800005100000510%26ft%3d1>

Maryland's Voluntary Cleanup Program website online at:

http://www.mde.state.md.us/Programs/LandPrograms/ERRP_Brownfields/vcp_info/index.asp

Stakeholder Groups

None

State Contacts

Mark Mank, Maryland Department of the Environment, (410) 537-3493,
mmank@mde.state.md.us

Plans to address VI in 2006

Staff indicated that it is a possibility that in the future Maryland will pass regulations concerning VI. However, there is no timetable for when this would happen.

Oversight Board for VI

There is no specific oversight board or commission.

Massachusetts

Overview: Massachusetts has regulations (**30 CMR 40.0900**, effective February 1, 1995) that address vapor intrusion issues. The Massachusetts Department of Environmental Protection is in the process of amending these regulations but does not have any specifically related guidance.

Statutes specifically addressing VI

Massachusetts does not have any statutes specifically addressing VI.

Regulations addressing VI

Massachusetts has regulations (**30 CMR 40.0900**, effective February 1, 1995) that address vapor intrusion issues. These are a subsection of the Massachusetts Contingency Plan. These regulations are available online at: <http://www.mass.gov/dep/cleanup/laws/310cmr40.pdf>

The Department has drafted amendments to the regulations that include amending the current Category Ground Water-2 Standards (310 CMR 40.0974(2)) which are numerical standards applicable to vapor intrusion. The Department staff stated that they plan to propose the amendments in the next few months, but that the drafts are being utilized as Guidance in the meantime. The amended standards apply to groundwater that is considered a potential source of indoor air contamination. These standards apply to groundwater that is both shallow and below an occupied building. See Statelink Reg. ID # MA0010314. The drafts of the amended sections are available at:

<http://www.mass.gov/dep/bwsc/files/mcp/mcp-2-04.pdf>

<http://www.mass.gov/dep/bwsc/files/mcp/mcp-3-04.pdf>

<http://www.mass.gov/dep/bwsc/files/mcp/mcp-4-04.pdf>

<http://www.mass.gov/dep/bwsc/files/mcp/mcp-5-04.pdf>

Guidance addressing VI

There are no specific Guidance documents regarding VI other than the draft amendments, referenced above which are being treated as guidance.

Stakeholder Groups

Massachusetts does not have a stakeholder group that is working on this issue.

State Contacts

Elizabeth Callahan, Massachusetts Department of Environmental Protection, 617-348-4056.

Plans to address VI in 2006

Department staff indicated they plan to propose in early 2006 the draft amendments referenced above.

Oversight Board for VI

The Department of Environmental Protection promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Michigan

Overview: Michigan has regulations that address the identification of soil and groundwater as relevant exposure pathways, and establish algorithms for “soil volatilization to indoor air” cleanup criteria, as well as “groundwater volatilization to indoor air” cleanup criteria. A

workgroup is in place to create a guidance document for Department staff on how to sample soil gas and indoor air.

Statutes specifically addressing vapor intrusion (VI)

There are no statutes specifically addressing VI.

Regulations addressing VI

The Part 201 Rules were promulgated pursuant to Part 201 of Michigan's Natural Resources and Environmental Protection Act. The Part 201 Rules govern all response actions for environmental cleanup conducted in Michigan, and include: (1) identification of groundwater and soil as relevant pathways, and (2) algorithms for the development of "soil volatilization to indoor air" criteria and "groundwater volatilization to indoor air" criteria. Mich. Admin. Code r. 299.5101 et. seq.; r. 299.5520 et. seq.; r. 299.5701 et. seq.; r. 299.5801 et. seq.; r. 299.5901 et. seq.; r. 51001 et. seq. (Effective 12/02).

Online at: http://www.michigan.gov/deq/0,1607,7-135-3311_4109_9846-58095--,00.html

Guidance addressing VI

Under development – see below

Stakeholder Groups

The Department of Environmental Quality, with the assistance of a workgroup that consists of stakeholders in the regulated community, is developing Attachment #4 to Operational Memorandum #4, which is guidance to Department staff on how to sample soil gas and indoor air. Department staff has estimated that the draft guidance will be completed by the end of January, 2006, and will be finalized during the Spring of 2006.

State Contact

Amy Merricle, Michigan Department of Environmental Quality, (517) 373-3584,
merricla@michigan.gov

Plans to address VI in 2006

Apart from the workgroup described above, there are no additional plans to address VI.

Oversight Board for VI

The Michigan Department of Environmental Quality promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Minnesota

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Minnesota does not have statutes or regulations specifically addressing Vapor Intrusion (VI). However, the *Risk-Based Site Evaluation Guidance Documents* (for non-petroleum sites) describe site screening and evaluation. Staff report that the guidance documents nor the Minnesota Environmental Response and Liability Act (MERLA) do not explicitly address the vapor intrusion issue or require that specific steps be taken to address it. Though VI is not described in guidance or regulations, technical staff with the Minnesota Pollution Control Agency (MPCA) understand that the vapor intrusion pathway should be considered. If vapor intrusion is an issue of concern, then sampling and evaluation steps are taken.

To conduct a vapor intrusion risk screening, the MPCA uses health risk values (HRVs) established by either the Minnesota Department of Health (MDH) or by USEPA. The MDH established HRVs for some contaminants in air for several exposure scenarios. The HRVs are standards designed to be protective of human health. The Minnesota HRVs were adopted in March 2002 as publicly reviewed science-based rules. The application of HRVs is not specified in rule, although they are used by the MPCA and MDH to assist in determining the potential health risks associated with chemicals in ambient air. A total of 104 HRVs have been derived for both carcinogenic and non-carcinogenic endpoints. The MDH notes that the absence of a chemical from the HRV list does not imply that there is no health risks associated with the emission of that chemical to air.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Health Risk Values Website, Department of Health, provides background information about Health Risk Values (HRVs)

Online at: <http://www.health.state.mn.us/divs/eh/air/hrvbackground.htm>

Air Quality Rules / Guidance Website, Department of Health, provides the Health Risk Values Rules and guidance to assist in evaluating health risks

Online at: <http://www.health.state.mn.us/divs/eh/air/rules.htm>

Vapor Intrusion Website, Department of Health, general information about vapor intrusion

Online at: <http://www.health.state.mn.us/divs/eh/hazardous/topics/vaporintrusion.html>

Indoor Air Sampling at VOC Contaminated Sites Website, Department of Health, collection and analysis of indoor air quality samples at or near sites contaminated with volatile organic compounds (VOCs)

Online at: <http://www.health.state.mn.us/divs/eh/hazardous/topics/iasampling.htm>

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Indoor Air Sampling at VOC Contaminated Sites Guidance (revised 01/05/06) Department of Health, describes assessment of indoor air once a decision has been made that vapor intrusion is a pathway of potential concern

Online at: <http://www.health.state.mn.us/divs/eh/hazardous/topics/iasampling.pdf>

Environmental Health Information Fact Sheet - Vapor Intrusion (July 2004), Department of Health

Online at: <http://www.health.state.mn.us/divs/eh/hazardous/topics/vaporintrusion.pdf>

Vapor Intrusion Assessments Performed During Site Investigations Guidance Document 4-01a (effective 05/15/05), Pollution Control Agency, describes process used to assess risk posed by vapor intrusion at petroleum release sites, assessment is mandatory addition to site investigation procedures

Online at: <http://www.pca.state.mn.us/publications/c-prp4-01a.pdf>

Soil and Ground Water Assessments Performed During Site Investigations – Guidance Document 4-01 (April 2005), Pollution Control Agency, discusses procedures and techniques to be used when performing soil and ground water assessments

Online at: <http://www.pca.state.mn.us/publications/c-prp4-01.pdf>

Potential Receptor Surveys and Risk Evaluation Procedures at Petroleum Release Site – Guidance Document 4-02 (April 2005), Pollution Control Agency, describes the procedures for identifying receptors and evaluating the risks associated with: (1) contaminated drinking water; (2) high concentrations of petroleum vapors; (3) discharge to surface waters; and (4) impacts from surface contamination (surface runoff and dermal contact)

Online at: <http://www.pca.state.mn.us/publications/c-prp4-02.pdf>

Stakeholder Groups

MPCA staff report an internal vapor intrusion work group has been formed. The MPCA Voluntary Investigation and Cleanup (VIC) program is developing two items: (1) a fact sheet entitled *Intrusion Screening Values (ISVs)* to publish on the VIC program website; and (2) a VIC technical document which will explain in greater detail how to approach VI systematically. It is anticipated the fact sheet will be available in spring 2006. Staff do not yet have a schedule for completing the technical document. Development of these documents is being monitored at Statelink Reg ID# MN5256.

State Contacts:

Jim Kelly, Minnesota Department of Health, Phone: (651) 201-4910

Allen Dotson, Minnesota Pollution Control Agency, Phone: (651) 296-7735, E-mail: allen.dotson@state.mn.us

Tom Higgins, Minnesota Pollution Control Agency, Phone: (651) 282-9880

Lynne Grigor, Minnesota Pollution Control Agency, Phone: (651) 296-8572, E-mail:
lynne.grigor@pca.state.mn.us

Plans to address VI in 2006

Apart from the internal work group described above, there are no additional plans to address VI.

Oversight Board for VI

There is no specific oversight board or commission.

Mississippi

Overview:

Mississippi does not have statutes or regulations specifically addressing Vapor Intrusion (VI). However, staff report that vapor intrusion is considered in the Brownfield Program which utilizes risk-based criteria for site evaluation and remediation. The following must be addressed when considering the risk-based evaluation of conditions on or under a site: (a) complete the Site Conceptual Exposure Model (SCEM) to evaluate site-specific risk and exposure conditions before and after remediation; (b) conduct a Site Characterization to delineate the nature and extent (vertically and horizontally) of contamination found on or under the site; (c) complete the Site Ecological Checklist to determine whether an ecological risk assessment is necessary; and (d) conduct a Risk-Based Evaluation of the Site utilizing the Brownfields Program three-tiered approach. Staff note vapor intrusion is considered when conducting the Site Characterization. If vapor intrusion is identified as an issue, the Department utilizes the USEPA's Region IV Environmental Investigations Standard Operating Procedures and Quality Assurance Manual and the USEPA's Draft Subsurface Vapor Intrusion Guidance.

Staff report vapor intrusion is not a major issue in Mississippi for several reasons including: (a) the geology is mainly alluvium deposits which control migration of contaminants; and (b) most expansion is growing out, rather than redeveloping property with environmental issues.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Miss. Code Ann. 49-35-1, et seq., (1972, as amended), Mississippi Brownfields Voluntary Cleanup and Redevelopment Act, though not specifically mentioned, vapor intrusion is considered during site evaluation and remediation of Brownfield Sites

Online at: <http://www.mscode.com/free/statutes/49/035/index.htm>

Regulations addressing VI

There are no regulations specifically addressing VI.

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Final Regulations Governing Brownfield Voluntary Cleanup and Redevelopment, (last amended 02/28/02), Subpart II Risk Evaluation Procedures for Voluntary Cleanup and Redevelopment of Brownfield Sites, though not specifically mentioned, vapor intrusion is considered during site evaluation and remediation of Brownfield Sites

Online at:

[http://deq.state.ms.us/MDEQ.nsf/pdf/GARD_brownfieldrisk/\\$File/Proced.pdf?OpenElement](http://deq.state.ms.us/MDEQ.nsf/pdf/GARD_brownfieldrisk/$File/Proced.pdf?OpenElement)

Guidance addressing VI

Mississippi does not have guidance documents addressing VI. Staff direct owners/operators to the USEPA's Draft Subsurface Vapor Intrusion Guidance (November 2002).

Online at: <http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm>

Staff also direct owners/operators to USEPA's Region IV Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (November 2001).

Online at: <http://www.epa.gov/region4/sesd/eisopqam/eisopqam.pdf>

Stakeholder Groups

The Department does not anticipate drafting guidance documents or regulations addressing VI.

State Contacts

Willie McKercher, Department of Environmental Quality, Phone: (601) 961-5731, E-mail: Willie_McKercher@deq.state.ms.us

Plans to address VI in 2006

There are no additional plans to address VI.

Oversight Board for VI

There is no specific oversight board or commission.

Missouri

Overview: Missouri does not have any statutes or regulations specifically addressing Vapor Intrusion (VI). Missouri utilizes the *Missouri Risk-Based Corrective Action Technical Guidance* document for vapor intrusion issues. The Missouri Department of Natural Resources has also drafted amendments to this Guidance document that are going through internal review and the Department indicated that they are contemplating a rulemaking in the next year. The draft amends the existing guidance through the addition of methodology for ecological risk assessment at the Default Target Level. The draft also adds a section to provide guidance on long term stewardship of cleanup sites. See Statelink Entry ID MO0014711 for additional information.

Statutes specifically addressing VI

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Missouri does not have any statutes specifically addressing VI.

Regulations addressing VI

Missouri does not have any regulations specifically addressing VI. There has been some departmental discussion about promulgating rules regarding VI, and it is anticipated that the Risk-Based Remediation Rule Workgroup (see below) will begin working on rules after completing the technical guidance.

Guidance addressing VI

The Department of Natural Resources uses the *Missouri Risk-Based Corrective Action (MRBCA) Technical Guidance* (last revised February, 2004) document for vapor intrusion issues. The Missouri Department of Natural Resources has also drafted amendments to the Guidance that are going through internal review. The draft amends the existing guidance through the addition of methodology for ecological risk assessment at the Default Target Level. The draft also adds a section to provide guidance on long term stewardship of cleanup sites. Department staff reports that they are utilizing the revised Guidance. See Statelink Entry ID MO0014711 for additional information. The draft amendments can be found at:

<http://www.dnr.mo.gov/alpd/hwp/mrbca/ref/mrbca-technical-guidance-2005-08-24.pdf> Further, soil concentration information related to inhalation pathways is available in the *Missouri Risk-Based Corrective Action (MRBCA) Guidance for Petroleum Storage Tanks* (last revised April 2005). Available online at: <http://www.dnr.mo.gov/env/hwp/tanks/mrbca-pet/mrbca-pet-tanks.htm> The Department also uses the *MO Risk-Based Corrective Action for Petroleum Storage Tank Sites – Applicability of Vapor Pathway to Superficial Soil* (revised April, 2005) <http://www.dnr.mo.gov/pubs/pub2162.pdf>

Stakeholder Groups

The Department has created the Risk-Based Remediation Rule Workgroup (Vapor Pathway Subgroup) that works on vapor intrusion issues. Additional information regarding this Subgroup can be found at: <http://www.dnr.mo.gov/env/hwp/mrbca/VaporPathwaySubgroup.htm>

State Contacts

Linda Vogt, Missouri Department of Natural Resources, (573) 751-2747

Plans to address VI in 2006

The Risk-Based Remediation Rule Workgroup (Vapor Pathway Subgroup) is discussing the revisions to the Guidance as well as promulgation of rules.

Oversight Board for VI

The Department of Natural Resources promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Montana

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Overview

Montana does not have statutes or regulations specifically addressing VI. The Department of Environmental Quality has final guidance addressing Risk Based Corrective Action (RBCA) at Petroleum Release Sites that provides guidance on risk assessment, exposure pathways and remedial actions at petroleum releases. This document does not specifically address VI, however, the concepts contained therein may be germane to VI assessment. Staff recommends the EPA guidance for parties contemplating VI assessment. Staff adds that VI is currently addressed on a case-by-case basis; however, it is expected that VI screening levels will be incorporated into the next set of revisions to the RBCA document for petroleum releases. Staff adds that these levels will likely be taken directly from the existing EPA guidance. EPA guidance will continue to be the primary reference document for non-petroleum compounds.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Montana Tier 1 Risk-Based Corrective Action Guidance for Petroleum Releases, released October 2003, addresses risk assessment (soil and groundwater sampling, exposure tables) exposure pathways and remedial actions relating to petroleum releases.

Online at:

<http://deq.mt.gov/rem/hwc/rbca/NewRBCA11-2003/Tier1Guidance10-03.pdf>

EPA Guidance, released November 2002,

Online at:

<http://www.epa.gov/correctiveaction/eis/vapor/complete.pdf>

Stakeholder Groups

No stakeholder groups currently exist.

State Contacts

Aimee Reynolds, MT Department of Environmental Quality, (406) 841-5065,

Areynolds@mt.gov

Plans to address VI in 2006

Staff indicates that VI screening levels for petroleum compounds are expected to be developed and incorporated into the RBCA Guidance document in 2006.

Oversight Board for VI

Department of Environmental Quality has oversight for VI issues.

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Nebraska

Overview: Nebraska does not have any statutes or regulations specifically addressing Vapor Intrusion (VI). Nebraska utilizes final guidance entitled *Risk-Based Corrective Action (RBCA) at Petroleum Release Sites: Tier 1/Tier 2 Assessment & Reports* that was issued in February of 2004. There are no plans to promulgate specific vapor intrusion regulations at this time.

Statutes specifically addressing VI

Nebraska does not have any statutes specifically addressing VI.

Regulations addressing VI

Nebraska does not have any regulations specifically addressing VI.

Guidance addressing VI

Nebraska utilizes final guidance entitled "*Risk-Based Corrective Action (RBCA) at Petroleum Release Sites: Tier 1/Tier 2 Assessment & Reports*" that was issued in February of 2004. The Department compiled this document for the purposes of conducting risk-based corrective action (RBCA) Tier 1 and Tier 2 site assessments and evaluations at petroleum release sites. The RBCA Guidance document can be found at:

[http://www.deq.state.ne.us/Publications/0/66fdec793aefc4b286256a93005b8db8/\\$FILE/RBCA-GD-2-04.pdf](http://www.deq.state.ne.us/Publications/0/66fdec793aefc4b286256a93005b8db8/$FILE/RBCA-GD-2-04.pdf)

Stakeholder Groups

Nebraska does not have a stakeholder group that is working on this issue.

State Contacts

Ted Huscher, Nebraska Department of Environmental Quality, (402) 471-3388

Plans to address VI in 2006

There are no specific plans to address VI in 2006.

Oversight Board for VI

The Department of Environmental Quality promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Nevada

Overview: Nevada does not have any statutes or regulation specifically addressing "Vapor Intrusion," nevertheless, the state regulations do reference vapor from soil contaminants as a hazard to be considered for corrective action. While Nevada has not developed a guidance

document that specifically addresses VI, the Nevada Bureau of Corrective Actions and Remediation Case officers make case by case decisions on VI. The individual case officer would require a VI study if an owner/operator asks to close a site using a risk based approach. If the impacted groundwater and/or soil contain levels that may pose a VI risk, and is within a commercial or residential area, then the Bureau would ask for a VI study. The case officer would also assess what risk the VI will pose. When assessing a VI issue, the Nevada Division of Environmental Protection uses the USEPA *Johnson and Ettinger Model for Subsurface Vapor Intrusion into Buildings* as a guidance document.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

Nevada Administrative Code 445A.227 (2) (j), makes reference to vapors with regards to contaminants in soil. This section states that the Director may require an owner/operator to take corrective action if the release of a hazardous substance, hazardous waste or regulated substance contaminates soil and the level of contamination exceeds the action level established for the soil. Online at: <http://www.leg.state.nv.us/NAC/NAC-445A.html#NAC445ASec227>

Guidance addressing VI

Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings

Online at: http://www.epa.gov/oswer/riskassessment/airmodel/johnson_ettinger.htm

Stakeholder Groups

None

State Contacts

Sara Piper, Nevada Division of Environmental Protection, Bureau of Corrective Actions Remediation and LUST Branch, (702) 486-2850, spiper@ndep.nv.gov

Plans to address VI in 2006

Staff reported that they do not anticipate rules being proposed in the near future.

Oversight Board for VI

None

New Hampshire

Overview: New Hampshire does not have any statutes or regulations specifically addressing Vapor Intrusion (VI). New Hampshire utilizes the *Draft Vapor Intrusion Guidance* for vapor intrusion issues. There are no plans to promulgate specific vapor intrusion regulations at this time.

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Statutes specifically addressing VI

New Hampshire does not have any statutes specifically addressing VI.

Regulations addressing VI

New Hampshire does not have any regulations specifically addressing VI.

Guidance addressing VI

The Department has issued draft guidance for vapor intrusion requirements that contains recommendations for evaluating and minimizing vapor intrusion for volatile organic compounds into buildings. The *Draft Vapor Intrusion Guidance* was developed exclusively for the Waste Management Division's Site Remediation Programs to assist DES staff and consultants when conducting vapor intrusion assessments including soil gas surveys, indoor air sampling, and vapor abatement measures. The Department is currently using the guidance as a draft document in their site remediation procedures. Additional information is available under the Statelink Reg. ID # NH4959. Draft Vapor Intrusion Guidance is available at:

http://www.des.state.nh.us/orcb/doclist/pdf/vapor_intrusion.pdf

The Department also has draft Guidance that addresses only air quality assessment. See *Draft Residential Indoor Air Assessment Guidance Document* (last revised March, 2000), online at:

<http://www.des.state.nh.us/ORCB/DOCLIST/draft.pdf>

Stakeholder Groups

New Hampshire does not have a stakeholder group that is working on this issue.

State Contacts

Robin Mongeon, New Hampshire Department of Environmental Services, (603) 271-7378

Plans to address VI in 2006

There are no specific plans to address VI in 2006 other than to finalize the Guidance referenced above early in the year.

Oversight Board for VI

The Department of Environmental Services promulgates regulations pertaining to VI. There is no specific oversight board or commission.

New Jersey

Overview: The New Jersey Department of Environmental Protection (NJDEP) finalized its Vapor Intrusion Guidance in October 2005. The document explains that the regulatory basis for vapor intrusion (VI) evaluation is derived from various sections of the Technical Requirements for Site Remediation regulations.

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Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

New Jersey Administrative Code (N.J.A.C.) 7:26E-4.4(h)3viii, last amended 07/05/05 (Technical Requirements for Site Remediation (TRSR)) contains a section on the remedial investigation of groundwater which specifies that remediation requires an evaluation of utilities and structures to determine “whether vapor hazards as a result of the ground water contamination may exist for receptors associated with the utility or structure.”

N.J.A.C. 7:26E-6.3(d)(7), last amended 07/05/05 (TRSR) also states that a proposal for natural ground water remediation must show that “contaminant levels in ground water do not present a vapor risk to any receptors.”

Online at: <http://www.state.nj.us/dep/srp/regs/techrule/>

Guidance addressing VI

NJ Department of Environmental Protection Vapor Intrusion Guidance, effective 10/05, provides guidance in determining whether VI of site-related contaminants is taking place, and if so, what actions are appropriate. The guidance is divided into several sections: (1) Introduction covering the regulatory basis for the guidance, as well as an overview of the guidance; (2) Conceptual Site Model; (3) Decision framework in remediation; (4) Generic vapor intrusion screening levels; (5) Site-specific screening procedures; (6) Sampling procedures and investigation requirements; (7) Evaluation of analytical results; (8) Background contamination; (9) Petroleum hydrocarbons; (10) Remedial action techniques, covering operation, monitoring, and maintenance; and (11) Community outreach for VI sites.

Online at: <http://www.state.nj.us/dep/srp/guidance/vaporintrusion/vig.htm>

Stakeholder Groups

There are currently no stakeholder groups further addressing VI.

State Contacts

Diane Groth, New Jersey Department of Environmental Protection, (609) 984-9782,
diane.groth@dep.state.nj.us

John Boyer, New Jersey Department of Environmental Protection, (609) 984-9751,
john.boyer@dep.state.nj.us

Plans to address VI in 2006

There are no additional plans to address VI in 2006.

Oversight Board for VI

The New Jersey Department of Environmental Protection promulgates regulations pertaining to VI. There is no specific oversight board or commission.

New Mexico

Overview: The New Mexico Environment Department utilizes the USEPA's guidance document entitled *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, EPA530-D-02-0004, November 2002. They do not have their own guidance document or regulations on this issue. There are no immediate plans to promulgate regulations or prepare guidance.

Statutes specifically addressing VI

New Mexico does not have any statutes specifically addressing VI.

Regulations addressing VI

New Mexico does not have any regulations specifically addressing VI.

Guidance addressing VI

New Mexico follows USEPA's guidance document entitled *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, EPA530-D-02-0004, released in November 2002. The draft EPA Guidance document is available at: <http://www.epa.gov/correctiveaction/eis/vapor/complete.pdf>

Stakeholder Groups

New Mexico does not have a stakeholder group that is working on this issue.

State Contacts

Christine Vainan, New Mexico Environment Department, (505) 827-2754.

Plans to address VI in 2006

Department Staff reports that there are no plans to address this issue in the future.

Oversight Board for VI

New Mexico Environment Department promulgates regulations pertaining to VI. There is no specific oversight board or commission.

New York

Overview: New York has no statutes or regulations that specifically address Vapor Intrusion (VI). New York anticipates having finalized, specific guidance documents on VI by the end of

January, 2006. Current regulatory proposals do not go in depth into VI specifically, but do identify “soil vapor” as a contaminated media requiring treatment in a remediation program.

Statutes specifically addressing VI

New York does not have statutes specifically addressing VI, although there is brownfields cleanup legislation requiring the New York State Department of Environmental Conservation (NYSDEC) to create remedial programs. The legislation also states that any remedial programs include a qualitative exposure assessment that identifies “current and reasonably foreseeable exposure pathways.” N.Y. Env'tl. Conserv. Law § 27-1415(2)(b) (10/07/03).

Online at:

[http://public.leginfo.state.ny.us/LAWSSEAF.cgi?QUERYTYPE=LAWS+&QUERYDATA=\\$ENV27-](http://public.leginfo.state.ny.us/LAWSSEAF.cgi?QUERYTYPE=LAWS+&QUERYDATA=$ENV27-) (ENV, Art. 27)

Regulations addressing VI

Under development – see below

Guidance addressing VI

Under development – see below

Stakeholder Groups:

None

State Contacts

James Harrington, New York State Department of Environmental Conservation, (518) 402-9755, jbharrin@gw.dec.state.ny.us

Bill Wertz, New York State Department of Environmental Conservation, (518) 402-8594, wewertz@gw.dec.state.ny.us

Krista Anders, New York State Department of Health, (518) 402-7880, kma06@health.state.ny.us

Plans to address VI in 2006

The NYSDEC is promulgating regulations creating the Environmental Remediation Program. Although the proposed regulations do not address VI per se, they define “contamination” as “the presence of a contaminant in any environmental media, including...soil vapor...” The proposed regulations go on to generally set forth source removal and control measures, as well as remediation investigation scope, all of which make reference to “contamination.”

On-line at: <http://www.dec.state.ny.us/website/der/superfund/index.html> (Part 375)

Both the NYSDEC and the New York Department of Health (NYDOH) are drafting guidance documents on vapor intrusion that are anticipated to be completed by the end of January, 2006.

1. *Proposed NYSDEC Program Policy for Evaluating the Potential for Vapor Intrusion at Past, Current, and Future Sites*: The document discusses both the evaluation of ongoing sites and the evaluation of pre-2003 sites. With respect to pre-2003 sites, the document discusses (1) screening criteria, (2) site ranking and prioritization, (3) vapor intrusion investigation, and (4) vapor intrusion investigations schedules. On-line at: <http://www.dec.state.ny.us/website/der/vaporstrat.pdf>
2. *Proposed NYDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York*. The document is divided into five sections: (1) A general approach to evaluating vapor intrusion; (2) Guidance on collecting relevant data to identify human exposures; (3) Method for evaluation of investigation data and recommended actions based on evaluation; (4) Overview of soil vapor intrusion mitigation methods; and (5) Outreach techniques commonly used to inform the community about soil vapor intrusion sites. On-line at: http://www.health.state.ny.us/nysdoh/gas/svi_guidance/docs/svi_main.pdf

The NYDOH contact describes the handling of VI in New York as a “joint effort” between NYDOH and NYSDEC, and has stated that neither agency is considered a “lead agency” in the VI development process. NYSDEC is primarily addressing the issue of which cleanup sites will involve VI, and NYDOH is addressing the technical aspects of VI.

Oversight Board for VI

NYSDEC and NYDOH promulgate regulations pertaining to VI. There is no specific oversight board or commission.

North Carolina

Overview:

North Carolina does not have statutes or regulations specifically addressing Vapor Intrusion (VI). More specifically, North Carolina statutes and regulations associated with Superfund, Underground Storage Tanks (USTs), or RCRA sites do not require owners/operators to assess the vapor intrusion pathway. If vapor intrusion is considered an issue of concern, the staff direct the owner/operator to the *USEPA's Draft Subsurface Vapor Intrusion Guidance*. Staff report vapor intrusion is addressed on a site-by-site basis.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

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There are no regulations specifically addressing VI.

Guidance addressing VI

North Carolina does not have guidance documents addressing VI.

USEPA's Draft Subsurface Vapor Intrusion Guidance (November 2002)

Online at: <http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm>

Stakeholder Groups

None

State Contacts

Susan Goldhaber, Department of Environment and Natural Resources, Phone: (919) 508-8553,
E-mail: susan.goldhaber@ncmail.net

Plans to address VI in 2006

Staff report the Division of Waste Management is drafting guidance addressing vapor intrusion. Staff do not anticipate holding stakeholder meetings regarding the draft guidance document. Development of the draft guidance document is being monitored at Statelink Reg ID# NC4951.

Oversight Board for VI

There is no specific oversight board or commission.

North Dakota

Overview

North Dakota does not have statutes or regulations specifically addressing VI. Vapor intrusion issues are jointly addressed on a case-by-case basis by the Department of Health's Division of Air Quality and Waste Management. The Waste Management Division has several guidance documents available on the investigation of petroleum and other contaminant releases that make reference to vapor intrusion, but do not specifically address it. Indoor Air Quality staff adds that no formal guidance on vapor intrusion has been published, but that they assess the issue on a case-by-case basis.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

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Guidelines for Investigations of Contaminant Release Sites, revised 02/03, provides guidance on the identification and evaluation of potential receptors (including structures) resulting from petroleum releases.

Online at:

http://www.health.state.nd.us/WM/pdf/Guide_contamsite2.pdf

Stakeholder Groups

No stakeholder groups currently exist.

State Contacts

Gary Berreth, North Dakota Department of Health, Division of Waste Management, Underground Storage Tank Program Coordinator, Phone: (701) 328-5166, gaberret@state.nd.us

Chris Schmaltz, North Dakota Department of Health, Indoor Air Quality Program, (701) 328-5188, cschmalt@state.nd.us

Plans to address VI in 2006

No plans to address VI in 2006.

Oversight Board for VI

Department of Health has oversight of VI issues.

Ohio

Overview: Ohio uses the *Methodology for Vapor Intrusion Assessment* guidance document for vapor intrusion issues. This final guidance document issued 4/12/05 directs the Agency to use the USEPA Draft Guidance as modified by the Agency's guidance document. There are no immediate plans to promulgate regulations or prepare guidance.

Statutes specifically addressing VI

Ohio does not have any statutes specifically addressing VI.

Regulations addressing VI

Ohio does not have any regulations specifically addressing VI.

Guidance addressing VI

Ohio uses the *Methodology for Vapor Intrusion Assessment* guidance document for vapor intrusion issues. This final guidance document issued April 12, 2005 directs the Agency to use the USEPA Draft Guidance (*OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*”, EPA530-D-02-0004, released in November 2002) as modified by the Agency's guidance

document. The "Methodology for Vapor Intrusion Assessment" is available online at:

<http://www.epa.state.oh.us/derr/rules/vapor.pdf>

The USEPA Draft Guidance document (12/29/02) is available online at:

<http://www.epa.state.oh.us/derr/rules/vapor.pdf>

Stakeholder Groups

Ohio does not have a stakeholder group that is working on this issue.

State Contacts

Mark Rickers, Ohio Environmental Protection Agency, (614) 644-2305

Plans to address VI in 2006

Department Staff reports that there are no immediate plans to address this issue in 2006.

Oversight Board for VI

Ohio Environmental Protection Agency promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Oklahoma

Overview: The Oklahoma Department of Environmental Quality utilizes USEPA's guidance document entitled *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, EPA530-D-02-0004, November 2002. The Oklahoma Corporation Commission's Division of Underground Storage Tanks follows the procedures set forth in the Oklahoma *RBCA Report*. They do not have their own guidance document, regulations, or statute on this issue. There are no immediate plans to promulgate regulations or prepare additional guidance.

Statutes specifically addressing VI

Oklahoma does not have any statutes specifically addressing VI.

Regulations addressing VI

Oklahoma does not have any regulations specifically addressing VI.

Guidance addressing VI

Oklahoma follows USEPA's guidance document entitled *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, EPA530-D-02-0004, released in November 2002. The draft EPA Guidance document is available at: <http://www.epa.gov/correctiveaction/eis/vapor/complete.pdf>

The Oklahoma Corporation Commission's Division of Underground Storage Tanks follows the procedures set forth in the Oklahoma *RBCA* Report. This is available online at:
<http://www.occ.state.ok.us/Divisions/PST/Technical/OrbcaReport.doc>

Stakeholder Groups

Oklahoma does not have a stakeholder group that is working on this issue.

State Contacts

David Polson, Oklahoma Corporation Commission, Division of Underground Storage Tanks,
(405) 702-8100.

Plans to address VI in 2006

Department Staff reports that there are no plans to address this issue in the future.

Oversight Board for VI

Oklahoma Department of Environmental Quality promulgates regulations pertaining to VI.
There is no specific oversight board or commission.

Oregon

Overview

Oregon does not have statutes or regulations specifically addressing vapor intrusion. The Department of Environmental Quality has developed a guidance document addressing risk-based decision making for the remediation of petroleum contaminated sites that references inhalation of contaminated soil vapors in indoor air as part of the development of a conceptual site model (CSM). Staff indicates that this document, as well as EPA and API guidance on VI should be referred to when addressing VI concerns in Oregon. Staff adds that no VI specific state guidance is anticipated in the near future.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Risk-based decision making for the remediation of petroleum contaminated sites, released 09/22/03, provides guidance on the identification, risk assessment, and remediation of petroleum contaminated sites including information on pathways between volatilized petroleum in soils and groundwater and indoor air.

Online at:

<http://www.deq.state.or.us/wmc/tank/documents/RBDM03Final.pdf>

EPA Guidance, released November 2002,

Online at:

<http://www.epa.gov/correctiveaction/eis/vapor/complete.pdf>

American Petroleum Institute Soil and Groundwater research bulletins:

http://api-ep.api.org/environment/index.cfm?objectid=3874DD32-D87D-4AF3-875DB513BFC5446A&method=display_body&er=1&bitmask=002008008000000000

Stakeholder Groups

No stakeholder groups currently exist.

State Contacts

Mike Anderson, Department of Environmental Quality- Land Quality Division, (503) 229-6764,

Plans to address VI in 2006

No plans to address VI in 2006.

Oversight Board for VI

Department of Environmental Quality has oversight of VI issues.

Pennsylvania

Overview: Pennsylvania does not have statutes or regulations specifically addressing Vapor Intrusion (VI). However, Pennsylvania does have a guidance document. This document provides guidance for assessing VI under the Statewide health standard. The guidance document assists remediators in satisfying the requirements of Act 2 and the regulations published in Chapter 250 of the PA Code, which includes providing additional screening requirements in some cases to prevent unacceptable risks being present as a result of VI of contaminants from soil and/or groundwater into indoor structures. This guidance document is applicable to any person conducting a site remediation under Act 2 under the Statewide Health Standard.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

Administration of Land Recycling Program, 25 PA Code Chapter 250. These regulations were issued pursuant to the Land Recycling and Environmental Remediation Standards Act (Act 2 of 1995) (35 P.S. §§6026.101 et seq.). These regulations do not specifically reference “vapor intrusion”. However, Act 2 and the regulations issued pursuant to that legislation (25 PA Code

Chapter 250) gave the Department the authority to issue the *Land Recycling Program Technical Guidance Manual* (see below).

Online at: <http://www.pacode.com/secure/data/025/chapter250/chap250toc.html>

Guidance addressing VI

Land Recycling Program Technical Guidance Manual-Section IV.A.4. Vapor Intrusion into Buildings from Groundwater and Soil under the Act 2 Statewide Health Standard, effective date 01/24/04, addresses the steps remediators need to satisfy in order to meet the requirements of Act 2 and the regulations published in Chapter 250 of the PA Code. This guidance document provides additional screening requirements in some cases. Indoor air quality from the VI of contaminants into buildings from groundwater and soil is not assessed under the Statewide health standard in the Act 2, Chapter 250 regulations. However, the guidance document provides direction on how to assess potential subsurface VI of volatile organic and semivolatile contaminants into buildings from contaminated groundwater and soils under the Statewide health standard. The guidance document is applicable to any person conducting a site remediation under Act 2 under the Statewide Health Standard.

Online at :

<http://164.156.71.80/VWRQ.asp?docid=2087d8407c0e00000000051100000511&context=2&backlink=WXOD.aspx%3ffs%3d2087d8407c0e00008000051000000510%26ft%3d1>

Stakeholder Groups

None. However, the Department does meet with the Cleanup Standards Scientific Advisory Board Meeting (CSSAB) vapor subcommittee from time to time and those subcommittee meetings are open to the public. Staff report that the vapor subcommittee has not scheduled a meeting at this time. However, the CSSAB will be meeting on 01/31/06. The CSSAB meetings will be tracked in Statelink as Regulatory ID# PA4948.

State Contacts

Randy Roush, Pennsylvania Department of Environmental Protection, Land Recycling Program, (717) 783-7816, raroush@state.pa.us

Plans to address VI in 2006

Staff reported that they are unaware of vapor intrusion regulations being proposed.

Oversight Board for VI

There is no specific oversight board for VI.

Puerto Rico

Overview: Puerto Rico follows federal guidelines on vapor intrusion (VI). There are no plans internal to the Commonwealth to address VI independently of the USEPA guidelines.

Statutes specifically addressing VI

None

Regulations addressing VI

None

Guidance addressing VI

None

Stakeholder Groups

No

Territory Contacts

Luis Negron, USEPA Caribbean Environmental Protection Division, (787) 977-5870,
negron.luis@epa.gov

Plans to address VI in 2006

None

Oversight Board for VI

There is no specific oversight board or commission for VI.

Rhode Island

Overview: The Rhode Island Department of Environmental Management utilizes the USEPA's guidance document entitled *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, EPA530-D-02-0004, November 2002. They do not have their own guidance document, regulations, or statute on this issue. There are no immediate plans to promulgate regulations or prepare guidance.

Statutes specifically addressing VI

Rhode Island does not have any statutes specifically addressing VI.

Regulations addressing VI

Rhode Island does not have any regulations specifically addressing VI.

Guidance addressing VI

Rhode Island loosely follows USEPA's guidance document entitled *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, EPA530-D-02-0004, released in November 2002. The Staff reports

that they assess things primarily on a case-by-case basis. The draft EPA Guidance document is available at: <http://www.epa.gov/correctiveaction/eis/vapor/complete.pdf>

Stakeholder Groups

Rhode Island does not have a stakeholder group that is working on this issue.

State Contacts

Paula Therien, Rhode Island Department of Environmental Management, (401) 222-6800.

Plans to address VI in 2006

Department Staff reports that there are no plans to address this issue in the future.

Oversight Board for VI

Rhode Island Department of Environmental Management promulgates regulations pertaining to VI. There is no specific oversight board or commission.

South Carolina

Overview:

South Carolina does not have statutes or regulations specifically addressing Vapor Intrusion (VI). However, the South Carolina Code of Regulations 61-98, *State Underground Petroleum Environmental Response Bank (SUPERB) Site Rehabilitation and Fund Access Regulation*, does require an owner/operator to identify all potential exposure pathways. Specifically, the regulation requires an Underground Storage Tank (UST) owner/operator to develop a site conceptual model to identify all exposure pathways and to use the site conceptual model to identify the data required to quantify the exposure by estimating the dose for all complete pathways. The site conceptual exposure model must identify all exposure pathways including air inhalation and site-specific target levels for the dermal contact, soil ingestion, and vapor inhalation pathway based on a Carcinogenic Risk Limit of 106 and a Hazard Index of 1 for non-carcinogens to be applied at the exposure point unless a different risk level for a specific chemical of concern has been established by the Department. The Department may approve less conservative exposure factors used in the calculations for commercial and industrial scenarios. It is likely the Department would use site-specific exposure factors based on average exposure factors, as appropriate.

The UST Program's guidance document, *South Carolina Risk-Based Corrective Action for Petroleum Releases*, describes the process for assessing a petroleum and/or petroleum products release. If the VI pathway is determined to be a potential risk, the UST program refers the owner/operator to the USEPA's *Draft Subsurface Vapor Intrusion Guidance*.

Statutes specifically addressing VIU

There are no statutes specifically addressing VI.

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Regulations addressing VI

There are no regulations specifically addressing VI.

SC Code of Regulations 61-98, State Underground Petroleum Environmental Response Bank (SUPERB) Site Rehabilitation & Fund Access; though VI is not mentioned specifically, requires UST sites to identify all potential exposure pathways
Online at: <http://www.scdhec.gov/lwm/html/regs.html>

Guidance addressing VI

South Carolina Risk-Based Corrective Action for Petroleum Releases (05/21/01), technical criteria for making risk-based decisions concerning corrective action for releases of petroleum and petroleum products including vapor model
Online at: http://www.scdhec.gov/eqc/admin/html/..%5C..%5Cust%5Cpubs%5CRBCA_01.pdf

USEPA's Draft Subsurface Vapor Intrusion Guidance (November 2002)

Online at: <http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm>

Stakeholder Groups

Department's UST program is in the early stages of evaluating internal procedures for assessing the vapor intrusion pathway and methods to obtain reliable indoor air and soil gas measurements. Development of these procedures are being monitored at Statelink Reg ID# SC5229.

State Contacts:

Debra L. Thoma, Department of Environment and Conservation, Northeastern South Carolina Corrective Action Section, Underground Storage Tank Program, Phone: (803) 896-6397, E-mail: thomadl@dhec.sc.gov

Plans to address VI in 2006

Apart from the internal work group described above, there are no additional plans to address VI.

Oversight Board for VI

There is no specific oversight board or commission.

South Dakota

Overview

South Dakota does not have statutes or regulations specifically addressing VI. The South Dakota Department of Environment and Natural Resources has released a petroleum assessment and

cleanup handbook that addresses VI from these sources. Staff reports that this is currently the only document available for VI issues in South Dakota. Staff does not anticipate updates or additions to this document in the near future.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Petroleum Assessment and Cleanup Handbook, released March 2003, section 3.1, sets forth steps to be taken upon the identification of vapors in a structure. Volatilization and indoor space accumulation is identified as a Tier 2 transport mechanism in chapter 4. Section 4.2.1.3 provides guidance for using the indoor air lookup tables including what building structural criteria should be assessed.

Online at:

<http://www.state.sd.us/denr/DES/Ground/Spills/Handbook.htm>

Stakeholder Groups

No stakeholder groups currently exist.

State Contacts

Gary Haag, Department of Environment and Natural Resources, Groundwater Quality Program, (605) 773-3296,

Plans to address VI in 2006

No plans to address VI in 2006.

Oversight Board for VI

Department of Environment and Natural Resources has oversight for VI.

Tennessee

Overview:

Tennessee does not have statutes or regulations specifically addressing Vapor Intrusion (VI). However, the Tennessee Department of Environment and Conservation's Division of Underground Storage Tanks has developed a technical guidance document, *Risk-Based Procedures to Determine Clean-Up Levels – Exposure Assessment Report Preparation*, to describe the minimum requirements to assess clean-up levels at petroleum underground storage tank sites. The guidance addresses VI for both soil and groundwater. If VI is an issue of

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concern, staff report that other Divisions within the Department refer to the *USEPA's Draft Subsurface Vapor Intrusion Guidance*.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Technical Guidance Document TGD-017 Exposure Assessment, Risk-Based Procedure to Determine Clean-up Levels – Exposure Assessment Report Preparation (revised 12/01/05), addresses VI for both soil and groundwater at petroleum underground storage tank sites

Online at: <http://www.state.tn.us/environment/ust/guidance/tgd017.pdf>

USEPA's Draft Subsurface Vapor Intrusion Guidance (November 2002)

Online at: <http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm>

Stakeholder Groups

The *TGD-017 guidance* document became effective in December 2005. Development of the guidance document was monitored at Statelink Reg ID# TN4980. Staff report they are not working on any other vapor intrusion regulations or guidance documents.

State Contacts

Mohammad Naqvi, Environmental Engineer, Division of Underground Storage Tanks, Department of Environment and Conservation, Phone: (615) 532-0945, E-mail:

Mohammad.Naqvi@state.tn.us

Plans to address VI in 2006

There are no plans to address VI in 2006.

Oversight Board for VIU

There is no specific oversight board or commission.

Texas

Overview: Texas does not have specific regulations or statutes addressing Vapor Intrusion (VI). Texas uses *Toxicity Factors and Chemical/Physical Parameters Guidance* (issued June 2001) that addresses how changes in toxicity factors will be handled, establishes a schedule for updating the human toxicity factors table, and describes the procedure for requesting toxicity factors and chemical/physical parameters for chemicals of concern. There are no immediate plans to promulgate regulations or prepare guidance.

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Statutes specifically addressing VI

Texas does not have any statutes specifically addressing VI.

Regulations addressing VI

Texas has pathway-related regulations that are part of the Texas Risk Reduction Program. **30 TAC 350; 31 TAC § 335,559(e)** (effective September 23, 1999). The regulations outline a comprehensive program that addresses the investigation of contaminated sites, establishes reasonable standards for notice, provides flexibility in calculating site-specific cleanup levels, and sets forth appropriate response actions to address environmental contamination. The rule uses a tiered approach incorporating risk assessment techniques to help focus investigations and to determine appropriate protective concentration levels. The regulations and related information can be found at: <http://www.tceq.state.tx.us/remediation/trrp/trrprule.html> See also: <http://www.tceq.state.tx.us/assets/public/legal/rules/rules/pdflib/335s.pdf>

Guidance addressing VI

Texas uses *Toxicity Factors and Chemical/Physical Parameters Guidance* (issued June 2001) that addresses how changes in toxicity factors will be handled, establishes a schedule for updating the human toxicity factors table, and describes the procedure for requesting toxicity factors and chemical/physical parameters for chemicals of concern. Available online at: http://www.tceq.state.tx.us/comm_exec/forms_pubs/pubs/rg/rg-366_trrp_19_200124.pdf

The Department also uses the USEPA Draft Guidance (*OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, EPA530-D-02-0004, released in November 2002). The USEPA Draft Guidance document (12/29/02) is available online at: <http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm>

Stakeholder Groups

Texas does not have a stakeholder group that is working on this issue.

State Contacts

Phyllis Primrose, Texas Department of Environmental Quality, (512) 239-0730

Plans to address VI in 2006

Staff reports that there are currently no plans to amend the vapor intrusion regulations.

Oversight Board for VI

Texas Department of Environmental Quality promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Utah

Overview

Utah does not have statutes or regulations specifically addressing VI. The Utah Department of Environmental Quality has released Tier 2 (risk-based analysis applying the risk-based screening level at the exposure point- including screening of all exposure pathways, such as the vapor-intrusion-to-indoor air inhalation pathway) risk-based corrective action (RBCA) guidelines for leaking underground storage tanks. This document addresses vapor intrusion to indoor air. Staff reports that no other vapor intrusion specific guidance has been developed. The RBCA guidance is currently being revised to include greater detail on VI. This development is being followed in Statelink Reg ID# UT4985.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Guidelines for Utah's Corrective Action Process for Leaking Underground Storage Tank Sites, released 07/30/99, addresses vapor intrusion including, in section 3, procedures for performing a Tier 2 risk assessment for the vapor intrusion to indoor air pathway.

Online at:

http://www.undergroundtanks.utah.gov/leakingtanks/tier2/Tier2_manual.pdf

Stakeholder Groups

No stakeholder groups currently exist.

State Contacts

Mike Peccorelli, Department of Environmental Quality, Underground Tank Program, (801) 536-4291

Plans to address VI in 2006

Department anticipates revising Tier 2 RBCA guidance to incorporate Tier 1 procedures and provided enhanced detail on VI.

Oversight Board for VI

Department of Environmental Quality has oversight for VI.

Vermont

Overview: Vermont does not have specific regulations or statutes addressing Vapor Intrusion (VI). Vermont uses the *Site Investigation Procedures* Guidance (effective June 2005) for risk assessment of vapor intrusion issues. There are no immediate plans to promulgate regulations or prepare guidance.

Statutes specifically addressing VI

Vermont does not have any statutes specifically addressing VI.

Regulations addressing VI

Vermont does not have any regulations specifically addressing VI.

Guidance addressing VI

Vermont uses the *Site Investigation Procedures* Guidance (effective June 2005) for risk assessment of vapor intrusion issues. This document outlines when risk assessment procedures and certain numerical standards. This has been updated and revised from the 1996 Site Investigation Guidance. Available online at:

<http://www.anr.state.vt.us/dec/wastediv/sms/pubs/SI%20Guidance%2096.pdf>

The Department also uses the USEPA Draft Guidance (*OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*), EPA530-D-02-0004, released in November 2002). The USEPA Draft Guidance document (12/29/02) is available online at:

<http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm>

Stakeholder Groups

Vermont does not have a stakeholder group that is working on this issue.

State Contacts

George Desch, Vermont Department of Environmental Conservation, (802) 241-3491

Plans to address VI in 2006

Department Staff reports that there are no immediate plans to address VI in 2006.

Oversight Board for VI

Vermont Department of Environmental Conservation promulgates regulations pertaining to VI. There is no specific oversight board or commission.

Virgin Islands

Overview: The US Virgin Islands (USVI) has no statutes or regulations that specifically address Vapor Intrusion (VI). USVI follows USEPA guidance, and in some instances may follow the more stringent standards of other states, on a case-by-case basis.

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Statutes specifically addressing VI

None

Regulations addressing VI

None

Guidance addressing VI

None

Stakeholder Groups

No

Territory Contacts:

Jim Casey, USEPA Virgin Islands Coordinator's Office, (340) 714-2333, casey.jim@epa.gov

Clanicia Pelle, USVI Department of Planning and Natural Resources, Division of Environmental Protection, (340) 773-1082, pelle.clanicia@vidpnr-dep.org

Plans to address VI in 2006

According to the USEPA Virgin Islands Coordinator's Office, the USVI Department of Planning and Natural Resources (DPNR) is engaged in departmental discussion to establish, through regulatory action, its own voluntary cleanup program addressing brownfield sites. VI criteria could conceivably be included as part of such a program. While this could not be independently verified by the DPNR, we will continue to track this issue.

Oversight Board for VI

There is no specific oversight board or commission for VI.

Virginia

Overview: Virginia does not have any specific regulations or statutes that specifically address Vapor Intrusion (VI). However, there are areas in which VI requirements are present, such as in the voluntary remediation program. In this program, groundwater concentrations are tested and if found to be at risk, then risk assessment procedures are required. When evaluating VI, the Department of Environmental Quality references the USEPA's *Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings* guidance document. Staff also report that the RCRA Corrective Action Program and the hazardous waste permitting program both consider the indoor air pathway when appropriate. The hazardous waste management regulations require both site-wide clean up and closure of units that handled hazardous wastes at

regulated facilities. During both those activities, all impacted environmental media are addressed, including the indoor air pathway.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

Voluntary Remediation Regulations (9 VAC 20-160), effective 07/01/02, provides the regulatory basis for performing risk assessments under the Virginia Voluntary Remediation Program. "Vapor intrusion" is not specifically referenced in this regulation. However, the regulations do require that the site characterization include a description of the nature and extent of releases to all media, including the vertical and horizontal extent of the contaminants, and that the risk assessment contain an evaluation of the risks, a proposed set of remediation levels that meet certain standards, and a recommended remediation. (see 9 VAC 20-160-70).

Online at: <http://www.deq.virginia.gov/waste/pdf/wstregs/vr.pdf>

Guidance addressing VI

Voluntary Remediation Program Risk Assessment Guidance provides assistance on how to perform risk assessments. This document also provides links to Microsoft Excel spreadsheets that the participant may use to present the risk assessments. This guidance document recommends participants to use the USEPA's *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*. This document, in section 2.4.3.2., also addresses the scenario of a worker inhaling vapors that migrated from the groundwater through the soil and collected in the trench.

Online at: <http://www.deq.virginia.gov/vrprisk/raguide.html>

Stakeholder Groups

None

State Contacts

Patricia McMurray, Virginia Department of Environmental Quality, Office of Remediation Programs, (804)698-4186, pamcmurray@deq.virginia.gov

Maria Slaboda Williams, Virginia Department of Environmental Quality, Corrective Action Program Manager, (804)698-4211, mwilliams@deq.virginia.gov

Plans to address VI in 2006

Staff do not anticipate Virginia proposing any rules in the near future regarding VI.

Oversight Board for VI

None

Washington

Overview

Washington does not have statutes or regulations specifically addressing VI. The Department of Ecology has released two guidance documents addressing, in part, VI. Staff reports that the Department anticipates developing a VI document in 2006. This document is expected to focus on steps to be taken after a VI pathway is identified. In the interim, Staff recommends the California Interim Guidance and API guidance materials as a resource for addressing VI issues in Washington. The development of the vapor intrusion guidance document will be followed in Statelink Reg ID# WA4988.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Focus on developing air cleanup standards under the Model Toxics Control Act, revised April 2005, addresses air cleanup standards at sites where a ground water cleanup level is being established for VOCs using a site-specific risk assessment and sites where a site-specific cleanup level is used to establish a soil cleanup level and an air cleanup level is needed to assess exposure to vapors or dust.

Online at:

<http://www.ecy.wa.gov/pubs/0109072.pdf>

Cleanup Levels and risk calculations under the Model Toxics Control Act Cleanup regulation: provides an overview of the development of ground water, surface water, soil and air cleanup standards as well as specific calculation methods.

Online at:

http://www.ecy.wa.gov/programs/tcp/tools/CLARC_v_3.1/clarc_v_3_1.htm

Stakeholder Groups

No stakeholder groups currently exist.

State Contacts

Hun Seak Park, Department of Ecology, Toxics Cleanup Program, (360) 407-7189
Toxics Cleanup Program, (360) 407-7170

Plans to address VI in 2006

Department anticipates developing a VI specific guidance document in 2006.

Oversight Board for VI

ASTSWMO
VAPOR INTRUSION PATHWAY:
A Guide for State and Territorial Federal Facilities Managers
July 2009
Appendix A

Department of Ecology has oversight for VI.

West Virginia

Overview: West Virginia does not have any regulations or statutes specifically addressing Vapor Intrusion (VI). However, programs under the Division of Land Restoration having risk-based cleanup standards do require that all relevant pathways to existing and future receptors be evaluated. Specifically, administrative rules governing the Voluntary Remediation and Redevelopment Program (VRRP) (60CSR3) require that all applicable pathways be addressed and evaluated against specific target risk goals. This language would require that VI be evaluated if it is (or may reasonably be expected to become) a complete exposure pathway. Staff report that West Virginia's current approach to VI requirements is somewhat informal. The West Virginia Department of Environmental Protection generally adheres to USEPA guidance, and estimates risks using their spreadsheets for groundwater and/or soil gas as appropriate. Modeling results using bulk soil data are also used as screening tools, although confirmation of model results with soil gas data are encouraged.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

Voluntary Remediation and Redevelopment Rule, enacted 07/01/97, established the eligibility, procedures, standards and legal documents required for voluntary and brownfield cleanups. "Vapor intrusion" is not specifically referenced in this regulation. However, these rules do require that all applicable pathways be addressed.

Online at: http://www.dep.state.wv.us/Docs/1444_60-CSR3.doc

Guidance addressing VI

West Virginia Voluntary Remediation and Redevelopment Act Guidance Manual, provides technical and scientific methods, and provides guidelines to help lead applicants through the Voluntary Remediation Program. "Vapor intrusion" is not specifically referenced in this document. The Voluntary Remediation and Redevelopment Rules provide for a range of risk-based soil, sediment and groundwater remedial objectives for site remediation. The document provides guidance on site assessment, the VRRP application (which includes proposed Clean-up standards), the Voluntary Remediation Agreement, and the implementation of the remedy

Online at: http://www.dep.state.wv.us/Docs/3200_RemediationGuidanceVersion2-1.pdf

Stakeholder Groups

Staff report that there are no stakeholder groups addressing VI at this time.

State Contacts

Lawrence P. Sirinek, West Virginia Department of Environmental Protection, (304)238-1220,
lsirinek@wvdep.org

David Hight, Project Manager, West Virginia Department of Environmental Protection,
Office of Environmental Remediation (this is the Voluntary Remediation Program), (304) 926-
0499 X 1268, dhight@wvdep.org

Plans to address VI in 2006

Staff are unaware of any plans to develop a more formal regulatory process at this time.

Oversight Board

None

Wisconsin

Overview:

Wisconsin does not have statutes or regulations specifically addressing Vapor Intrusion (VI). However, vapor migration is a contaminant pathway that must be evaluated like other pathways. The Department of Natural Resource's (DNR) NR 700 rules address site contamination including investigation and clean-up. Using the NR 700 rules, the DNR with consultation from the Department of Health and Family Services (DHFS) consider vapor intrusion as a component of evaluation and remediation of a contaminated site. Section NR 716.11(3)(a) of the site investigation regulations specifies that the purpose of the field investigation is to "determine the nature, degree and extent, both areal and vertical, of the hazardous substances or environmental pollution in all affected media." In addition, the "field investigation shall include an evaluation of all the following items: (a) Potential pathways for migration of the contamination, including drainage improvements, utility corridors, bedrock and permeable material or soil along which vapors, free product or contaminated groundwater may flow. (b) The impacts of the contamination upon receptors" (Sections NR 716.11(5)(a) and (b)). DNR staff note that responsible parties are expected to evaluate the vapor migration pathway in site investigations where the contaminants include volatile compounds. If vapor migration is an issue of concern, DNR staff encourage the responsible parties to utilize the *USEPA's Draft Subsurface Vapor Intrusion Guidance*.

The DHFS created guidance documents to inform the public along with environmental consultants and contractors about vapor intrusion. The guidance documents are similar to *USEPA's Draft Subsurface Vapor Intrusion Guidance*, although the DHFS documents include petroleum contamination.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

Wisconsin does not have specific regulations addressing VI.

Chapter NR 716 Site Investigations, requires responsible parties to evaluate all contaminant pathways (note NR 716.11(5)(a) and (b) (amended 02/01/01))

Online at: <http://www.legis.state.wi.us/rsb/code/nr/nr716.pdf>

Guidance addressing VI

Wisconsin does have specific guidance addressing VI.

Chemical Vapor Intrusion and Residential Indoor Air Guidance for Environmental Consultants and Contractors (02/13/03), Department of Health & Family Services, assists consultants and contractors in understanding the basic concepts of chemical vapor intrusion

Online at: http://dhfs.wisconsin.gov/eh/Air/fs/VI_prof.htm

General Information Vapor Intrusion Website, Department of Health & Family Services

Online at: <http://www.dhfs.state.wi.us/eh/Air/fs/VI.htm>

USEPA's Draft Subsurface Vapor Intrusion Guidance (November 2002)

Online at: <http://www.epa.gov/epaoswer/hazwaste/ca/eis/vapor.htm>

Department of Natural Resources Website - Resources for Environmental Professions, directs responsible parties to the USEPA's Draft Subsurface Vapor Intrusion Guidance

Online at: <http://dnr.wi.gov/org/aw/rr/technical/index.htm#vapor-pathway>

Stakeholder Groups

DNR staff report two stakeholder groups are working on development of policy guidance documents. The "Brownfield Study Group" is comprised of representatives from state government agencies, local governments, environmental attorneys, consultants, environmental groups, and others interested in Brownfield redevelopment. The Study Group maintains a website.

Online at: http://dnr.wi.gov/org/aw/rr/rbrownfields/bsg/index.htm#bsg_reports

The Technical Focus Group is comprised of environmental consultants and environmental specialists from several state agencies. This group primarily discusses and comments on technical aspects of rule and guidance development.

Development of the policy guidance documents from both stakeholder groups are monitored at Statelink Reg ID# WI4947.

State Contacts

Theresa (Terri) Evanson, Department of Natural Resources, Phone: (608) 266-0941, E-mail: Theresa.Evanson@dnr.state.wi.us

Rob Thiboldeaux, Department of Health & Family Services, Phone: (608) 267-6844, E-mail:
ThiboRL@dhfs.state.wi.us

Plans to address VI in 2006

Apart from the workgroups described above, there are no additional plans to address VI.

Oversight Board for VI

There is no specific oversight board or commission.

Wyoming

Overview

Wyoming does not currently have statutes or regulations specifically addressing VI. Staff reports that several of the voluntary remediation program (VRP) fact sheets currently provide guidance on addressing VI in Wyoming. Staff expects that Fact Sheet #25 will be revised in 2006 to include specific guidance on VI. Currently, this document only addresses modeling and calculations to determine site-specific cleanup levels protective of groundwater. The revisions to Fact Sheet #25 are being followed in Statelink Reg ID# WY0004773.

Statutes specifically addressing VI

There are no statutes specifically addressing VI.

Regulations addressing VI

There are no regulations specifically addressing VI.

Guidance addressing VI

Fact Sheet #20- Human Health Risk Assessment under the Voluntary Remediation Program, released 03/03/05, provides general information on risk assessment including information on developing a site conceptual model, which must identify potential migration pathways (such as volatilization to a confined space).

Online at:

<http://deq.state.wy.us/volremedi/downloads/Fact%20Sheet%2020%20Mar05/f.s.%2020%2003-03-05%20v3clean.pdf>

Fact Sheet #12 Soil Cleanup Level Look-Up Table Under the Voluntary Remediation Program, released 01/06/05, provides guidance on: (1) direct contact with soil (which includes ingestion, skin contact, and inhalation) and, (2) the potential for soil contamination to migrate to groundwater. This document helps to determine whether contamination is present and whether further evaluation or remediation may be necessary.

Online at:

<http://deq.state.wy.us/volremedi/downloads/Fact%20Sheet%2012%20Jan05/F%20S%2012%201-06-05%20clean.pdf>

Stakeholder Groups

No stakeholder groups currently exist.

State Contacts

Ali Tavelli, Department of Environmental Quality, Voluntary Remediation Program, (307) 777-5447

Department of Environmental Quality, Solid and Hazardous Waste Division, (307) 777-7752

Plans to address VI in 2006

Revisions to fact sheet #25 to include VI information expected in 2006.

Oversight Board for VI

Department of Environmental Quality has oversight for VI issues.