

April 15, 2011

U.S. Environmental Protection Agency  
EPA Docket Center, Superfund Docket  
Mail Code 28221T  
1200 Pennsylvania Ave., NW  
Washington, DC 20460

**Re: Docket ID No. EPA-HQ-SFUND-2010-1086**  
**Potential Addition of Vapor Intrusion Component to the Hazard Ranking System**

Dear Madam/Sir:


The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) is forwarding the attached comments to U.S. Environmental Protection Agency's (EPA's) *Potential Addition of Vapor Intrusion Component to the Hazard Ranking System*, published in the Federal Register on January 31, 2011 (76 FR 5370).

ASTSWMO is an association representing the waste management and remediation programs of the 50 States, five Territories and the District of Columbia (States). Our membership includes State Superfund and other program experts in the management and regulation of hazardous waste. The enclosed comments reflect the analyses and input provided by managers from various State programs, including Superfund, Hazardous Waste, Brownfields, and Federal Facilities. These comments have not been reviewed or adopted by the ASTSWMO Board of Directors or Program Subcommittees. In addition, individual State or Territorial programs may also provide comments based on their own State perspectives and experiences.

The enclosed comments provide input from 14 States. With one exception, the States that submitted comments agree with adding some form of the vapor intrusion component to the Hazard Ranking System (HRS). All States agree that the vapor intrusion pathway presents some risk to human health and the environment; however, there are differences in opinion on the extent of risk that vapor intrusion poses. There is also no consensus on how to screen, evaluate, and score sites for the vapor intrusion pathway.

Should you have any questions or require additional information, please contact Jennifer Roberts (AK), Chair, ASTSWMO CERCLA and Brownfields Research Center at (907) 269-7553, or Millie Garcia-Serrano (MA), Chair, ASTSWMO Federal Facilities Research Center at (508) 946-2727.

Sincerely,

  
Mary Zdanowicz, Executive Director  
ASTSWMO

Enclosure

**State Comments to "Potential Addition of Vapor Intrusion (VI) Component  
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State	Comment #	Comments, Input, Suggestions, and Questions
State A	1	The State supports the addition of the VI pathway to the HRS.
State A	2	<b>Question:</b> How will the issue of determining background concentrations be addressed? This has been problematic at VI sites in this State.
State A	3	<b>Recommendation:</b> Consideration should be given to modifying or adjusting the three-times background threshold for establishing an observed release.
State A	4	<b>Question:</b> Will standards be established in the Superfund Chemical Data Matrix to allow for achieving Level 1 contamination for affected targets?
State A	5	<b>Question:</b> Please clarify the intent of <b>Topic 3</b> in the announcement. It is unclear as written. <b>Topic 3</b> states: "Consideration of the importance of evaluating the potential threat to populations not demonstrated to be exposed to contaminant intrusion."
State A	6	<b>Question:</b> Does EPA anticipate re-opening sites that are on the NPL or that have already been scored for potential inclusion on the NPL?
State A	7	<b>Recommendation/question:</b> The notice solicits input on <b>Topic #7</b> : "The importance of the threat posed by exposure to contaminant VI via inhalation, dermal contact with the vapors or condensate on surfaces, and ingestion." The State recommends the HRS VI component focus on the dominant human exposure pathway which is inhalation. The State is not familiar with available methods for estimating dermal absorption from the vapor phase. Will EPA develop methods that will be available as part of the finalization of its VI guidance? Also, the State is not familiar with methods for quantifying condensate on surfaces or with any benchmarks currently available to evaluate the public health significance of these concentrations. Will methods be developed as part of EPA VI guidance and benchmarks be added to the Superfund Chemical Data Matrix? It does not appear necessary to evaluate these pathways as part of a Site Inspection intended to provide a screening-level evaluation of human health risk.
State A	8	<b>Recommendation:</b> Regarding <b>Topic #10</b> which solicits input on "The possible need to consider not only contaminant VI, but also intrusion of contaminants in solid (i.e., particulates) and liquid forms." As stated above, the State recommends that HRS VI component focus the exposure pathway and contaminants that have been demonstrated to be most significant (i.e., inhalation of vapors) and that solids (particulates) not be included as a part of a VI characterization effort.
State A	9	<b>Recommendation:</b> The State suggests that EPA consider other guidance such as the Interstate Technology & Regulatory Council VI guidance documents and previous suggested frameworks for evaluating VI under the HRS (e.g., "Applying the HRS to VI Sites", Kenyon Larson, May 2002, National Site Assessment Symposium).

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State B	10	We support the addition of a VI (VI) component to the HRS. In our experience, the VI risk posed by a VOC plume can be a major component of the risk to human health and that at many sites where groundwater is not used for consumption, it can be the primary risk to human health.
State B	11	For any sites that are listed on the NPL in this State, our State remediation regulations would be an ARAR for the site. The regulations compare groundwater concentrations to listed criteria. These criteria were established using the Johnson-Ettinger model. However we would support use of a similar updated model. Something similar could probably be useful when implementing the addition of the VI component to the HRS.
State B	12	Our State regulations allow for multiple methods for demonstration of compliance. Compliance can be demonstrated by all groundwater concentrations in the plume being below listed criteria. As an alternative demonstration of compliance, soil vapor concentrations can be compared to soil vapor criteria to potentially demonstrate a broken exposure pathway. Potentially, soil vapor concentrations (if available) could be included in the calculation that adds the VI component to the HRS.
State B	13	Additionally, the volatilization criteria in our State regulations do not apply to a structure where a mitigation system has been installed (breaking the exposure pathway). This allows for the site to potentially comply with the regulations (if all other criteria are met) even if there is still a VOC plume beneath the building. Maybe when adding the VI component to the HRS, mitigation systems should be included in the calculation when determining the level of risk presented by the plume (maybe even allowing for the site to avoid being listed if sufficient effort has been expending mitigating the VI issues).
State B	14	With regard to incorporation into the current HRS structure, the potential impacts of a groundwater plume (or soil gas plume) on indoor air targets could be addressed in a fashion similar to the groundwater to surface water discharge pathway. The Observed Release or likelihood of release could be assessed based on the media in which the release is being measured (ie groundwater, soil vapor samples). Waste characteristics could be assessed using a method like the one used in the existing air pathway. Targets could be assessed based on the location of the measured release relative to the indoor air target. Weighting for actual contamination of a target could include indoor air samples where available. We note that accurate indoor air samples are rarely available.
State C	15	<b>Comment to Topic #1-</b> Screening should be at $1 \times 10^{-6}$ and HI=0.1 using groundwater. Soil Gas concentrations for inclusion as an NPL site at $1 \times 10^{-5}$ and HI=1. Risk should be calculated using Johnson and Ettinger Model.
State C	16	<b>Comment to Topic #2-</b> VI should be considered a new pathway like groundwater.

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State C	17	<b>Comment to Topic #3</b> -Wording of this question is not clear. Is this meant to evaluate future risk ie. Change from commercial to residential or plume moves?
State C	18	<b>Comment to Topic #8</b> - Houses with basements are not lifestyle factors but smoking, dry cleaning clothes, and storage of chemicals around the house are lifestyle factors. In addition, location of ambient air sources should be considered (ie. Location of adjacent factories, highways and drycleaners).
State C	19	<b>Comment to Topic #9</b> - Other structures which should be screened to determine if a significant threat exists including daycares, senior citizens homes and hospitals.
State D	20	The State is in general support of the addition of the VI component to the HRS since a multitude of sites with VI issues cannot be adequately assessed or subsequently addressed by using the current HRS.
State D	21	Although the State supports the addition of VI into the HRS, we are concerned that the addition of the VI pathway to the HRS will substantially raise the cost of an investigation of a site by; 1) increasing in the number of samples required; 2) potentially causing the investigative team to mobilize a second (or even third or more) time (s) to complete the VI sampling; 3) VI may also increase costs by adding to the number of sites that each state anticipates investigating during a given year, or may reduce a State's ability to investigate the number of sites anticipated by requiring more time and effort on the sites involving VI; 4) additional agency staff may be required to prepare the investigation and to evaluate the results for this complex pathway. The State would like to be assured that the EPA ensures that the inclusion of VI into the HRS can be implemented without serious financial, technical, and/or logistical disruption to the Site Assessment program.
State D	22	<b>Response to Topic #1.</b> The State suggests that contamination screening levels be developed by toxicologists and incorporated into the HRS Superfund Chemical Data Matrix (SCDM). Level I, Level II, and Potential concentrations should continue to be assigned in keeping with the structure of the HRS. Level I should be based strictly on living quarters only where people are most exposed and only at levels that exceed a breathable/dermal benchmark(s). Level I should not be evaluated in garages, barns, crawlspaces, abandoned buildings, etc. Level II should also be evaluated in living quarters only and should be used where vapors are below a benchmark. Evaluation of VI in the workplace may need to be evaluated and figured into the scoring model.

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State D	23	<p><b>Response to Topic #2.</b> The State suggests that a new VI Pathway be incorporated into the Air Pathway so as to cause as little disruption as possible to the other more frequently used pathways. Perhaps breaking the Air Pathway into two parts, Outdoor Air and Indoor Air. This would be similar to the way the Surface Water Pathway was previously revised to give more emphasis to endangered species and contaminated fisheries. A value for Likelihood of Release (LR) should be calculated similar to how the LR value is now being assigned. A value of 550 should be assigned if a release actually is present. Waste Characteristics (WC) should be calculated as in the same current method.</p>
State D	24	<p><b>Response to Topic #3.</b> A) If it is not known if a VI release had occurred, then the LR should be calculated by assigning a specific value for various parameters. Various parameters that could be used when calculating the LR include a value for high/low/medium porosity of soils/subsurface; moisture in soils; nearby preferential pathways such as storm drains, buried electrical cables, abandoned underground structures, etc.; houses on slab vs. basements; structures over a ground water plume or not; rainfall; average temperature; wind and barometric pressure; air exchange rates such as ventilation issues between a home or a building; land use; biodegradation; are buildings located in close proximity to volatile chemicals in soil, soil gas, or groundwater; VOCs vs. SVOCs; degradable vs. non-degradable; vadose zone or ground water; etc. Contaminant-specific parameters of the chemicals of concern such as vapor pressure, toxicity, etc., should be considered.</p> <p>B) Potential contamination should be distance weighted in the same manner as nearby soil exposure is (0 - 1/4 mile, 1/4 - 1/2 mile, and 1/2 - 1 mile). Industrial criteria should also be characterized. Any confirmed VI results obtained from places other than living quarters should be evaluated as potential.</p> <p>C) the potential for VI should be evaluated similar to how the potential for ground water contamination is evaluated. If the VI is confirmed then the LR should be 550. If not then a set of parameters should be evaluated to obtain an LR value of 500 or less.</p>
State D	25	<p><b>Response to Topic #4.</b> Any sampling procedure should occur only if ground water, soil or soil gas are confirmed to be contaminated with volatile type compounds. Sampling procedures for VI should include standard protocols including but not limited to the following: Ambient air sampling, survey of living quarters, sub-slab sampling, soil gas sampling, etc.</p>
State D	26	<p><b>Response to Topic #5.</b> The State defers to current EPA/Interstate Technology and Regulatory Council guidance.</p>
State D	27	<p><b>Response to Topic #6.</b> The State defers to EPA/Interstate Technology and Regulatory Council guidance.</p>

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State D	28	<b>Response to Topic #7.</b> Level I should be based strictly on living quarter and workplace only where people are most exposed and only at levels that exceed a breathable/ dermal benchmark (ie.Risk based concentration from ASTM, Permissible Exposure Limits (PEL) from OSHA, chemical toxicity values, 10E-4 TO 10E-8 cancer risk levels; acute vs. chronic exposure (ATSDR MRLs).
State D	29	<b>Response to Topic #8.</b> The State suggests that the VI pathway utilize groundwater contamination and the presence of contaminants in soil gas as primary factors in determining whether a site warrants sampling for VI. A predetermined value should be assigned specific set of parameters; a value for high/low/medium porosity of soils/subsurface; moisture in soils; a value for nearby preferential pathways such as storm drains, buried electrical cables, abandoned underground structures, etc.; houses on slab vs. basements; structures over a ground water plume or not; rainfall; average temperature; wind and barometric pressure; air exchange rates such as ventilation issues between a home or a building; land use; biodegradation; are buildings located in close proximity to volatile chemicals in soil, soil gas, or groundwater; VOCs vs. SVOCs; degradable vs. non-degradable; vadose zone or ground water; etc. Contaminant-specific parameters of the chemicals of concern such as vapor pressure, toxicity, etc., should be considered.
State D	30	<b>Response to Topic #9.</b> In addition to residences (homes, apartments/condos), the State suggests that any occupied structure should be included, though weighted to favor those with sensitive subpopulations (schools, day-cares, hospitals).
State D	31	<b>Response to Topic #10.</b> The State defers to the current U.S.EPA studies to determine if inclusion of contaminants in solid or liquid form is warranted.
State E	32	The State strongly supports EPA’s proposal to add a VI Pathway component in to the Superfund HRS. The VI pathway is an important pathway when considering risk to public health posed by contaminated sites. While not currently considered in the evaluation of sites for the listing on the NPL, VI is an important component in the evaluation of risk posed by sites that are on the NPL, as well as at RCRA sites, and it should be taken in to account when considering sites for potential listing on the NPL. The State has considered this pathway in our Numerical Ranking System for State sites since 1993.

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State F	33	<p>The State is fully in support of adding a VI migration pathway score component to the HRS. While the majority of known State sites with VI concerns score high enough in the HRS for NPL nomination, the State does recognize that there are certain situations where a site with mainly or only VI concerns may not score high enough in the HRS. Adding the VI migration component score to the HRS would remedy this situation and allow for VI sites that are negatively impacting human health to be dealt with through the NPL.</p> <p>The State would like to request that the VI component should be a separate migration pathway component similar to the groundwater, surface water, soil, and air components. The purpose of this is so that, just as maximizing any one single pathway score creates an overall HRS score of 50 (which is above the cutoff of 28.5), maximizing the VI component score would cause a site to be eligible for nomination to the NPL.</p> <p>The State would also like to request that fire and explosion hazards from compounds such as methane be included in the VI component. The State has several sites where explosions have occurred or are a threat due to VI.</p>
State G	34	<p>The State Superfund Section agrees with the premise of adding VI to the HRS. However, we do not have further comments at this time as the technical details have yet to be worked out or at least presented by EPA to the States. The State might have additional comments at that time.</p>
State H	35	<p><b>General Comment:</b> The State supports the addition of a VI component to the HRS. We have some sites that would not score above 28.5 for the existing pathways that pose an unacceptable risk to human health due to VI. In some instances, there are not viable liable parties to conduct the necessary cleanup. While EPA emergency removal has been able to somewhat address significant VI risks, they have not been able to fully characterize sites, conduct complete cleanup, or ensure long-term effectiveness of the removal action. In addition, the funding cap on removals has been problematic for larger sites. Adding this component to the HRS is necessary to adequately protect human health.</p>
State H	36	<p><b>Level and extent of VI that would warrant evaluation of placement on the NPL:</b> CERCLA site inspections do not define the extent of contamination at sites and the State does not believe that should be a component of determining if a site should be proposed to the NPL. Once a site is placed on the NPL, a remedial investigation is performed to determine the extent of contamination. We suggest that EPA consider screening levels provided in its Regional Screening Levels (RSL) table as a starting point for levels that it might include for evaluating potential VI risks.</p>

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State H	37	<p><b>Methods for incorporating VI into the HRS:</b> The State has not scored a site using the existing air pathway in the HRS, but this seems like a logical pathway for VI. We are concerned that if VI is added to just the groundwater or soil exposure pathway, then the other pathway will be ignored. VI can come from either contaminated soil, groundwater or free product. However EPA chooses to incorporate the VI component, we want to make sure that it's not limited solely to a contaminated groundwater site or solely to a contaminated soil site. Different concentrations could reflect Level I or Level II contamination (similar to the other pathways). The volatility and mobility of the contaminant could be considered in the waste characteristics. The number of potential receptors could be considered and it might be appropriate to identify potential receptors within a specific distance from the source of the VI, if the source is known.</p>
State H	38	<p><b>Importance of evaluating the potential threat to populations not demonstrated to be exposed to contaminant intrusion:</b> The State's experience suggests that it is important to consider the potential migration of contaminants via groundwater transport, preferential movement through utility corridors, and potential future use of sites. We recognize that it is difficult to predict VI for future structures, but it is important to consider that future development may result in unacceptable risks to human health.</p>
State H	39	<p><b>Identification of sampling procedures to detect VI:</b> The State is developing VI guidance and we have researched various sampling and analytical methods available for VI. We believe sufficient methods exist.</p>
State H	40	<p><b>Availability of screening sampling strategies to compensate for seasonal conditions:</b> The State is not aware of different strategies to compensate for this condition. At most sites, we find that winter (frozen ground) conditions are the worst case scenario for VI. However, at other sites, fluctuating contaminated groundwater (when contaminated groundwater is most shallow and almost in contact with basement floors/subslabs) may be the worst case. We recommend that EPA consider both potential worst case scenarios when developing a scoring mechanism for the VI component.</p>
State H	41	<p><b>Identification of analytical methods that are sufficiently precise and accurate:</b> The State is developing VI guidance and we have researched various analytical methods available for VI. We believe sufficient methods exist (i.e. TO-15 and TO-15 SIM).</p>
State H	42	<p><b>Importance of the threat posed by exposure to contaminant VI via inhalation, dermal contact with vapors or condensate on surfaces, and ingestion:</b> The State is focusing on inhalation of vapors when we evaluate risks.</p>

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State H	43	<p><b>Identification of what environmental factors and structural and lifestyle factors should appropriately be considered in determining whether a site warrants sampling for VI:</b> The State has not identified specific structures that are not at risk from VI. There are several factors that may influence why sampling from some structures show VI and sampling from a nearby structure does not. We also have not identified specific environmental factors that rule out the potential for VI to occur. Each of these is likely to be site-specific.</p>
State H	44	<p><b>Identification of structures in which contaminant VI could result in a significant threat to human health (i.e. community recreation centers, cultural centers, museums, athletic facilities):</b> It seems as though there would be employees at any of these structures that could be at potential risk and they could be considered a commercial operation. We are not certain that a separate recreational pathway would need to be considered in the HRS. It may be appropriate during a risk evaluation after a remedial investigation was completed.</p>
State H	45	<p><b>The need to consider intrusion of contaminants in solid or liquid forms:</b> In this State, we have some VI sites that are the result of contaminated groundwater or product entering structures. It seems appropriate to consider this potential.</p>
State I	46	<p>The state of the science in understanding VI has been continuing to advance over the last two decades. Many States, including ours, have been evaluating VI (VI) as a risk-pathway and to address this pathway in their own voluntary cleanup programs. We believe that collection of information from as many sites as possible will assist EPA in identifying commonalities upon which to base approaches to the topics listed above. The State will support any information gathering efforts EPA undertakes.</p>

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State I	47	<p><b>Topic 1.</b> The ITRC Vapor Intrusion Pathway: A Practical Guideline (2007) presents the framework for a preliminary screening and investigative approach for evaluating the VI pathway. This approach along with appropriate screening based lookup concentrations from EPA’s version of the Johnson and Ettinger Model may provide a good building block for establishing a screening process with sufficient information to evaluate the VI pathway. In addition, many states have developed screening approaches which attempt to determine if the level of contamination in groundwater and its proximity to a building warrants further sampling inside a building to determine if VI from groundwater is a completed pathway.</p> <p>These approaches all use concentrations in groundwater as the screening criteria to determine if further investigation to quantify VI is necessary. This approach varies from the Site Inspection approach used to collect information for HRS scoring. According to the Guidance for Performing Site Inspections Under CERCLA (EPA540-R-92-021) monitoring wells should not be installed unless they are necessary for the site score to be 28.5 or greater based on an observed release. The program’s approach may need to be changed to adjust to collecting data to screen for a vapor intrusion risk. Either additional groundwater samples should be considered or soil gas screening points might need to be installed. Without understanding the location of groundwater contamination, it may be difficult to properly target soil gas screening points. In addition, soil gas data has been shown to have high lateral variability and limited points may not be sufficient to identify impacts to indoor air.</p>
State I	48	<p><b>Topic 2.</b> In our State there are many contaminated sites where VI is the primary human health related exposure pathway, therefore, the State supports evaluating VI as a separate pathway during HRS scoring. The scoring system for the VI pathway could be based on similar factors that other pathways are now scored using; likelihood of release/exposure, waste characteristics (i.e., toxicity, volatility, mobility) and targets (i.e., people or sensitive environments actually or potentially exposed to the release).</p>
State I	49	<p><b>Topic 3.</b> We are unsure if this means evaluating areas that do not currently have buildings for potential threats from VI should a building be constructed or the need for additional air monitoring within buildings that have not been shown to have VI through one or two rounds of sampling. In either case, building configurations, HVAC systems and even the buildings themselves can change drastically over time. Sites that may be judged to have no threat of VI based on current conditions can easily undergo changes that ultimately result in later VI if the contaminants are present.</p>
State I	50	<p><b>Topic 4.</b> The ITRC Vapor Intrusion Pathway: A Practical Guideline (2007) presents the framework for a preliminary screening and investigative approach for evaluating the VI pathway. This approach along with appropriate screening based lookup concentrations from EPA’s version of the Johnson and Ettinger Model may provide a good building block for establishing a screening process with sufficient information to evaluate the pathway.</p>

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State I	51	<b>Topic 5.</b> Our State tried to ensure that indoor air samples are collected at climatic and seasonal conditions considered to be a conservative scenario for VI and assumed that indoor air at other times of the year are of a lower magnitude.
State I	52	<b>Topic 6.</b> We recommend that all soil gas samples be collected using gas chromatography.
State I	53	<b>Topic 7.</b> Our experience has thus far concentrated on inhalation risk and we have not so far explored the health effects due to dermal contact or ingestion of vapors or condensate.
State I	54	<b>Topic 8.</b> We have learned much from the radon industry with regard to soil and building conditions and the risk of radon gas intrusion. A review of work in this field may help identify risk factors for vapor intrusion specific to the physical setting of a potential VI site.
State I	55	<b>Topic 9.</b> The list of structures and populations at risk in this Topic appears to avoid mention of workplaces which are the prime locations of past releases of contaminants. There has been considerable policy debate in our State about whether workplace indoor air issues fall under the jurisdiction of the State or OSHA. This is significant because our health-risk based indoor air vapor thresholds can be much lower than OSHA standards considered acceptable in a workplace setting. We have determined that in the case where a chemical is in active use at a facility, OSHA standards for indoor air quality apply. In workplaces where indoor air concentrations result from vapor intrusion from groundwater contamination and the chemical is no longer used at the property, the State indoor air guidelines apply.
State I	56	<b>Topic 10.</b> We understand that some sites elsewhere in the country have had contaminants that don't necessarily pose a vapor intrusion risk but that pose a direct contact risk when transported into a building with open groundwater. We are also aware of sites where VI is exacerbated by the intrusion of open groundwater into a building. We leave it to EPA to decide if the latter scenario should be covered under the proposed changes to the HRS scoring process.
State J	57	The State recommends that VI not be included as a ranking criteria in the HRS until such time as improved predictive models can be developed that can both screen-in and screen out sites, with an adequate yet not extreme factor of safety.

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State J	58	At the present time, predictions on VI are more art than science. EPA’s national policy is unsettled, but the recent (September, 2010) publication of the Region 6 Corrective Action VI Policy indicates a trend to “screen in” all sites where VI may possibly be an issue, with no reasonable way to “screen out” sites with negligible risks. This is considered as a very conservative approach, and considering the state-of-the-art may be felt to be justified by some. However, once a site is “screened in” the only way to conclude that VI is not an issue (and thus VI need not be addressed) is to take multiple sub-slab and indoor air samples, which can be very intrusive and disruptive in residences. And, repeated sampling may be needed to address seasonal variability and contaminant plume instability.
State J	59	If the Region 6 Corrective Action Policy is any indication, the inclusion of VI into the HRS will greatly increase the costs, time, and difficulty of ranking sites. It will also be a continuing effort, as the expansion of a contamination plume from an uncontrolled site may continually increase the number of residences or other buildings which must be considered.
State J	60	A draft Superfund Frequently Asked Questions on VI indicates occupied buildings within 100 feet of a groundwater plume exceeding MCL for VOCs need both sub slab and indoor air sampling. A Region VI, RCRA policy is essentially the same. This suggests any occupied building within 100 feet of a groundwater plume might need to be considered a possible receptor for scoring purposes. Has EPA published a final guidance on this subject? How would EPA appropriately score potential receptor? There is a lot of confusion on this issue and much potential for false positives.
State J	61	We suggest that VI be considered a threat within the air direct exposure pathway not its own migration pathway.
State J	62	It will be difficult to incorporate sampling for the VI pathway into the site assessment program due to limited budgets and limited amount of time to perform site assessments. A method should be developed to give weight to both potential threat and demonstrated exposure depending on the site information available at the time of site assessment. This should be weighed against the possibility of scoring a site high enough to rank without there being a demonstrated problem. Other pathways evaluated and scored are usually demonstrated with sampling information.
State J	63	We feel that we need definitive/final guidance from EPA to be able to incorporate VI assessments into our Site Assessment program.

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State J	64	EPA’s current approach in the draft superfund FAQ and Region 6 RCRA policy document seem to specify that no screening approach is adequate and only multiple rounds of indoor air and sub-slab sampling provide appropriate information. EPA should have a definitive policy on this issue to avoid confusion. Multiple rounds of sampling may not be realistic considering the current scope and budget of site assessments.
State J	65	Structures that are occupied by sensitive populations should be given higher weight than other populations.
State J	66	Intrusions of contaminants in solid and liquid forms we think are already covered by the HRS system.
State J	67	Does EPA have a plan if a site is found to have really high levels? SF moves slowly...so, it would seem to make sense to have some emergency response protocol established to address issues if found, not to just find issues and wait ten years for funding for cleanup.
State J	68	We are concerned that without final guidance and a good plan in place to deal with VI issues adding VI to the HRS at this point may be complicating risk perception and risk communication without really adding environmental protection.
State K	69	General comment: Overall, it is helpful to consider VI in HRS scoring because it is often the dominant risk pathway between subsurface contamination and human health. While most NPL-caliber sites may rank on more than one pathway, it is possible that the NPL misses site with significant human health risks by omitting consideration of the VI pathway.
State K	70	<b>Regarding p. 5373 Topic 2</b> – VI could be added to HRS as an indirect exposure component of the groundwater and soil pathways. Perhaps a simple screening tool could be developed adding points for concentrations of volatile and toxic substances and distance to receptors.
State K	71	<b>Regarding p. 5373 Topic 3</b> – The potential for contaminant intrusion should be assumed when significant contamination is present in the subsurface near occupied structures. Confirmed intrusion would presumably be worth more HRS points than potential intrusion.
State K	72	<b>Regarding p. 5373 Topic 4</b> – Depending on the level of investigation required to score, standard methods and EPA guidance for soil, water, or vapor sampling can be used.
State K	73	<b>Regarding p. 5373 Topic 5</b> – It may be difficult or impractical to account for seasonal variations in a PA/SI situation.
State K	74	<b>Regarding p. 5373 Topic 6</b> – Samples analyzed would usually be collected closer to the source than the receptor in PA/SI work; therefore, standard methods will likely have sufficient precision and accuracy.

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State K	75	<b>Regarding p. 5373 Topic 8</b> – For HRS considerations this should be kept as simple as possible. If VI is likely the only pathway, then vapor data could be collected adjacent to structures and simple screening values could be established for the most common CERCLA-eligible chemicals. Simple screening values for volatiles in soil and groundwater could also be established for HRS scoring purposes (more detailed analysis should be done during an RI or similar phase).
State K	76	<b>Regarding p. 5373 Topic 9</b> – Because exposure duration is relatively low in most of these types of structures, an occupational scenario may be appropriate and sufficiently conservative for non-residential structures.
State K	77	<b>Regarding p. 5373 Topic 10</b> – There may be cases where direct exposure to solids or liquids through unanticipated pathways poses risks, and a scoring mechanism to capture these risks would be good, although these cases seem to be less numerous than VI. Some direct exposure cases may be more appropriately addressed as emergency-response scenarios. This may be an opportune time for EPA to consider the inhalation risk from particulates such as asbestos. However, consideration of other contaminant intrusion forms and pathways (solid particulates and liquids) may slow the process for HRS changes and thus delay scoring of the more common and better understood risk of VI.
State L	78	Any additional expectations within the current CERCLA site assessment process to include analysis of the VI pathway at CERCLA sites should be adequately funded so that the staff time, field work, lab analysis, documentation and other related work can be paid for with federal monies.
State L	79	Screening criteria should be developed which would be evaluated on a site-specific basis in order to determine if a VI pathway (including sampling) is even triggered or needed at the site. If the criteria are not met, then the pathway could be considered incomplete and no further analysis or sampling (e.g., soil gas, sub-slab, crawl space, indoor air, outdoor ambient for background, etc) would be needed for that site. This screening criteria should consider the correlation between contaminant concentrations in impacted media (soils and groundwater), soil types, thickness of vadose zone, depth to impacted groundwater, sub-slab attenuation factors, moisture content, bioattenuation potential, and other applicable factors.
State L	80	There should be QA/QC controls in-place so that if sampling was done for making a determination regarding the VI pathway, that the data collected could be validated to ensure that it is representative of actual contaminant levels in building structures, and would meet the data quality objectives in general.
State L	81	Consideration should be given for the development of detailed screening criteria, sampling procedures and general guidance and protocols to ensure consistency between different CERCLA sites and different states within the region when evaluating and scoring the VI pathway.

**State Comments to "Potential Addition of Vapor Intrusion (VI) Component  
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State M	82	Even though the current HRS rules in the Federal Register include the ambient air Air Pathway it is obvious that air targets are exposed to hazardous air contaminants inside structures as well as outside of structures. Therefore VI should be included in the HRS process and should be a component in determining the total air pathway score or its own pathway. In our State's experience there does not appear to have ever been a site that has scored high enough on the current air pathway to score above 28.5.
State M	83	It would seem that by not including a VI component in the HRS, EPA is overlooking sites that have a high likelihood of having individuals exposed to hazardous substances and therefore is missing high priority sites for evaluation for the NPL.
State M	84	VI would best be handled in the Air Pathway and should make up the major weighting of the revised air pathway. There would be much more potential for impact from VI than ambient air from most/all air contaminants.
State M	85	The evaluation process for a VI pathway should be conservative but should incorporate actual vapor data as opposed to relying solely on predicted vapor concentrations from groundwater and soil.
State M	86	Any screening levels used in the process should have as their basis the indoor residential and/or commercial screening levels presented in the USEPA's Regional Screening Levels table. OSHA-based standards (PELs) are not appropriate.
State M	87	Incorporating passive screening methods (Goresorber, Beacon) into pre-screens should be explored. Current passive soil gas (PSG) methods that measure mass (ug) can be used and newer methods that can measure concentrations (ug/m3) should be considered as well. The proposed rule changes ought to allow PSG to be considered as an acceptable methodology in the pre-scoring process. More quantitative, replicable methods and associated lab based analysis may be necessary to document HRS scores. Summa canisters would be the logical choice for measurement when the need for good quality data is high.
State M	88	The focus of VI sampling should be the subsurface soil, crawlspace, sub-slab space as opposed to going indoors in the pre-screen phase because of cross contamination possibilities in residences or offices due to compounds found in commonly used household/office products.
State M	89	There should also be consideration for a "Potential Pathway Score" to address the possibility of a pathway existing if a building is constructed over a source area. Buildings constructed above source areas (groundwater, soil) can put new workers/inhabitants at risk through the VI pathway.
State M	90	It would seem that the inhalation pathway would be the most significant exposure route over dermal and ingestion exposure caused by VI ( <b>Item 7</b> ).

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State M	91	The need to identify additional types of structures ( <b>Item 9</b> ) that could be affected by VI is not apparent. All structures where people spend time and can be exposed and that are not open-air structures can have VI issues.
State M	92	For intrusion of solid or liquids ( <b>Item 10</b> ), these should probably be handled under a different pathway if their volatility is low. If volatility is high, then the air pathway seems the most appropriate.
State N	93	The State supports the proposal to add the VI (VI) pathway to the HRS in principle. However, there are a number of technical and policy issues that would have to be addressed prior to including the pathway in the HRS. Failure to address these issues could have significant consequences.
State N	94	<b><u>Lack of universally accepted approaches to evaluating VI:</u></b> There are a wide range of approaches that States and Federal agencies use to evaluate the VI pathway. The only comprehensive guidance from the EPA (2002) is in need of updating (Office of Inspector General Report, 2009) and deviations from that guidance (Frequently Asked Questions fact sheet, 2010) have not been finalized. Although the EPA has committed to releasing revised guidance by 2012 the final form of that guidance is yet to be determined. Unless an investigation approach is agreed upon, inclusion of the VI pathway will likely result in confusion concerning how to determine the hazard ranking score. This could result in significant litigation and a standardized approach could be finalized through a judicial decision instead of using the technical expertise of regulators and the scientific community if EPA moves forward without standardizing its approach.
State N	95	<b><u>Current requirements of the HRS to evaluate if a pathway is complete or not:</u></b> In its current form, the HRS evaluates if there is an observed release" and if there is a "potential to release" and therefore must answer the question "is there a completed exposure pathway between contaminant and receptor?" In order to answer that question, indoor air samples would have to be taken which could be problematic.
State N	96	<b><u>Concerns about the ability to collect and reliability of indoor air quality data:</u></b> Concentrations of concern for contaminants of concern for the VI pathway are generally in the low parts per billion and require particularly sensitive analysis. Recent literature and field experiences have noted that basic household products such as cleaners, new carpets, and even Christmas ornaments within a home can contribute enough to indoor air concentrations that screening levels may be exceeded. Therefore the nature of the sampling generally requires that these products be removed from the home before sampling. Sampling also requires the equipment to be left unattended for 24 hrs. In addition to and in part because of these issues, obtaining access to properties for sampling could also be difficult.

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State N	97	<p><b>Time and budget:</b> Sampling to evaluate all vapor based lines of evidence for the VI pathway is expensive due to the required sensitivity of the analysis. The requirement for these analyses could sap resources for the investigation of other media and would slow the pace of site evaluations unless funding levels are increased</p>
State N	98	<p>The EPA’s approach to evaluating VI, the HRS methodology, or both would have to have to be modified to accommodate the inclusion of the VI pathway in the HRS. Some possible solutions include: (1) Using subslab gas data as the relevant sampling parameter for determining if the exposure pathway is complete instead of indoor air sampling. While access issues to properties would still remain, it would reduce much of the uncertainty associated with indoor air samples. (2) Weighing compounds capable of contributing to VI more heavily in groundwater evaluations. It was noted by several program managers that including the VI pathway in the HRS would primarily affect sites on the cusp of placement on the NPL. Since groundwater concentrations of the relevant contaminants would likely be significant to begin with weighing these contaminants in the groundwater media more heavily could address the pathway without the burdens of additional sampling. (3) Placing more weight on the “potential to release” categories as a conservative measure and allow for the modeling of concentrations within the HRS more readily, though it could have significant implications when evaluating other pathways (e.g. the soil to groundwater pathway).</p>
State N	99	<p>EPA should carefully consider the consequences of revisiting previously investigated sites to include the VI pathway.</p>