**LSPA Comments: MassDEP 2014 Public Review Draft, Vapor Intrusion Guidance**

The following are the comments from the LSP Association. Page numbers refer to the Public Comment Draft made available electronically in pdf on the MassDEP website. Every effort has been made to state the issue of concern, provide a specific example wherever possible, and propose suggested language changes where appropriate.

| Vapor Intrusion Guidance | | |
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| **Page No.** | **Section** | **Comment** |
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| **9** | **1.3** | Figure 1-1 Unclear why there would be a concern about fieldstone foundations or sumps if no groundwater >GW-2 or >10xGW-2 within 100 feet and no evidence of soil contamination near building. As indicated in Section 1.3.4, the movement along preferential pathways only exists if there is VOC contamination (a source). |
| **11** | **1.3.3** | To be consistent with 310 CMR 40.0313(4)(f)2 this additional language is needed: "…at concentrations exceeding the applicable Groundwater Category GW-2 Standard." |
| **13** | **1.3.4** | We recommend replacing "next" with "within 30 feet of" in the third sentence to remain consistency with the MCP, so the sentence reads: "…..excavation or subsurface depression within 30 feet of a building that is a School, Daycare or Child Care Center or occupied Residential Dwelling (310 CMR 40.0313(4)(f)3.). |
| **15** | **2.0** | Last sentence of first paragraph. Recommend replacing the phrase "typically includes" with "may include". It is not our experience that VI investigations currently being performed are typically including exterior soil gas. This version of the VI guidance appears to be more receptive to using exterior soil gas as a line of evidence. The current phrasing suggests it is a common component of VI investigations. |
| **15** | **2.1** | Footnote. This is slightly inconsistent with P. 23, 2nd to last paragraph, which states exterior soil gas can be used as substitute for sub slab if access issues. The LSPA suggests revising the last sentence of this footnote to read:** "In most cases, exterior soil gas should not be used as a substitute for sub-slab soil gas when assessing the groundwater to indoor air pathway. See Section 2.2.2.1" |
| **19** | **2.2** | We recommend changing the first bullet provided under the "Lines of Evidence…." list, to: "Concentrations of VOCS in groundwater, soil, near slab exterior soil gas and/or sub-slab soil gas" |
| **20** | **2.2.1.1** | The last sentence in the second to last paragraph on this page could be interpreted as mandating soil gas sampling whenever elevated concentrations are present in deep groundwater, regardless of concentrations measured in shallow groundwater. We recommend that some caveat be added, such as "In such cases, the CSM should address the sufficiency of the shallow groundwater data to evaluate the vapor intrusion pathway and the relationship between the shallow and deep groundwater." Based on initial experiences with MassDEP staff interpretations of the guidance, we can envision soil gas sampling being required where deeper groundwater has elevated levels of contaminants even in cases where the shallow groundwater data is adequate to demonstrate no VI pathway exists. For example, a "clean lens" may be present that effectively mitigates the potential for migration of deeper groundwater contamination. |
| **20** | **2.2.1.1** | Last sentence, 2nd paragraph from bottom. Remove the word "applicable" from this sentence: "Therefore, contaminant levels that greatly exceed the applicable GW-2 Standard in deeper groundwater might indicate the need for sub-slab soil gas sampling even in |

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| | | cases where more surficial groundwater is not very contaminated." Assuming the deep groundwater in this paragraph is greater than 15 feet, GW-2 is NOT an applicable Method 1 standard for comparison to deep groundwater concentrations. Using the word "applicable" here is not consistent with the MCP. |
| **21** | **2.2.1.1** | Recommend starting 2nd paragraph with "In some cases, multi-year sampling programs…" There will be a universe of smaller scale sites and/or sites where releases occurred in the distant past where plume stability and migration control can be assessed with 1or 2 years of GW sampling. We want it to be clear that you don't always need "multiple years" of GW data to satisfy VI and closure requirements. |
| **22** | **2.2.2.1** | We recommend that the sentence regarding grid sampling be revised to clarify that it can be useful at sites where there is a history of volatile OHM ***AND*** analytical evidence of regulated subsurface impacts ***BUT*** no clearly identified point of release/source. With respect to the vapor intrusion pathway, soil vapor and indoor air data (as necessary) are much stronger lines of evidence to understand whether the pathway is complete or significant, relative to total soil data. |
| **22-23** | **2.2.2.1** | Last line on p.22, continuing to p.23. We recommend adding "unless sub-slab soil gas cannot be obtained" to "It is important to note that exterior soil gas levels should not be used to assess soil gas concentrations for the purpose of evaluating potential vapor intrusion; sub-slab soil gas should be used for that evaluation." This is to ensure consistency with language at bottom of p.23 that reads: "If samples cannot be obtained directly beneath the slab due to access issues, soil gas samples obtained adjacent to the building and under pavement can be used to estimate conditions beneath the building."<br><br>We also recommend changing that sentence to read: ""If samples cannot be obtained directly beneath the slab due to access issues, soil gas samples obtained adjacent to the building and under pavement can be used to estimate conditions beneath the building *based on the evaluation of the source location."* |
| **23** | **2.2.2.1** | We disagree with the suggestion in the 2nd paragraph that "Sub-slab soil gas analyte lists should not be limited because soil gas can sometimes detect VOCs missed by soil and groundwater sampling programs." We believe that there should always be flexibility to focus soil gas analytical testing based on a thorough CSM. This is consistent with the recommendations on page III-10. |
| **24** | **2.2.2.1** | 2nd paragraph. Sub-slab soil gas samples do not determine that the VI pathway is complete; they are only an indicator of the potential for a complete pathway. Revise to "One sample may be sufficient *to indicate the potential for a complete pathway*, but two or more samples…." |
| **24** | **2.2.2.2** | In the 2nd paragraph of this section, is MassDEP suggesting that even if >GW-2, if sub-slab soil screening data are below SGSL, then the VI pathway would not be of concern assuming appropriate CSM? If so, this should be stated more clearly and seems to indicate that indoor air data would not be required as per Table 2-3 |
| **25** | **2.2.3** | We support the addition of the Inclusion Distance Approach for screening out VI concerns at petroleum sites and concur that these constituents are normally readily degraded in the vadose zone. |
| **29** | **2.2.4.1** | We recommend removing the following sentence because we think that these recommendations should apply to all indoor air sampling. "The above recommendations are specific to a vapor intrusion evaluation using Lines of Evidence. Indoor air sampling to establish exposure point concentrations should be focused on characterizing representative, current exposure conditions (see Section 2.3.3." |
| **29** | **2.2.4.1** | It is often difficult, if not impossible, to identify confounding potential sources of indoor air contaminants. There is limited research available on many products (or none at all), and even building materials such as PVC piping or associated adhesives and/or spray-on fireproofing propellants can contain many CVOCs that are also COPCs for a Site. Hence, multiple LOE, including concentration gradients, changes in concentrations over time and the correlation (or lack thereof) with subslab soil vapor data and/or groundwater data should be considered as valid and valuable lines of evidence, especially in light of how low many of the TVs are, relative to |

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| | | "typical" concentrations (e.g., TCE, 1,2-DCA). Suggest adding a bullet point to this list that a "time representative" data set across the entire pathway including background sampling should be considered in cases where confounding sources are suspected. |
| **30** | **2.2.4.1** | We recommend striking this portion of the sentence in the 3rd paragraph: "The collection of indoor air samples should occur while people are using the building for its intended purpose…" Since one is trying to understand the potential indoor air impacts related to subsurface contamination, so long as typical building operating conditions exist (e.g., HVAC running normally, etc.), the occupancy of the building should not be directly relevant. |
| **31** | **2.2.4.1** | It is recommended that MassDEP modify the last sentence in the third to last paragraph in this section to read "For daycares, schools, residences, or other locations where sensitive receptors may be present, MassDEP recommends that *at least two indoor air sampling rounds be conducted,* depending on the degree of subsurface contamination,..."<br><br>The LSP always has the obligation to create and support a CSM for a Site and there is concern that MassDEP will prefer and require the upper end of the range at many sites rather than deferring to the LSP's professional judgment. |
| **32** | **2.2.4.2** | We recommend that MassDEP clarify here (where TVs are first mentioned) or elsewhere in the document that TVs can be used to assess whether a CEP exists. There is still confusion with the MCP definition ("measurable concentrations") and the TVs which reflect "background" or insignificant levels. |
| **32** | **2.2.4.2 and Appendix I** | The TVs (and associated SVSL) have not been updated to reflect additional USEPA data regarding background concentrations, such as for TCE, or other recent studies for certain contaminants that do not currently have a MassDEP background level established (e.g., 1,2-DCA). |
| **38** | **Tables** | Tables 2-2 and 2-3 indicate subtle changes from the prior Interim Final version of the guidance, all of which reflect a more conservative approach to VI evaluation. Changing the groundwater criteria from "2 x GW-2" to "GW-2" will capture a substantial number of additional sites and it is unclear whether that is warranted. This will be a particular problem for TCE sites, with the 5 ppb GW-2 standard. The elimination of the "IA Not Tested" column for the ">GW-2" scenario, while simply incorporating the footnote from the old version, complicates this issue.<br><br>Following the guidance in the tables, indoor air (IA) sampling would always be required at sites where a GW-2 standard is exceeded even in cases where a robust soil gas data set indicates that VI would not be a concern. The GW-2 exceedance effectively "trumps" the soil gas data set. We disagree with this concept and recommend that the tables be modified to allow for adequate soil gas data to preclude the need for IA testing, particularly for the Commercial/Industrial (C/I) scenario. This could be accomplished by adding a column for groundwater ">GW-2" and soil gas < Screening levels with the 3 scenarios for IA testing (Not tested, <TVs, >TVs). Even if there were an upper bound on the groundwater levels (">GW-2 and <5 x GW-2"), this would provide appropriate flexibility for these situations.<br><br>In addition, because of the potential for a new "Condition," MassDEP may want to consider adding something to Table 2-3 that reflects potential outcomes if less the residential Screening levels or Threshold Values for indoor air. |
| **40** | **2.3.3** | Recommend adding the word "occupiable" prior to the word "basement." |
| **41** | **Table 2-4** | This table will need to be revised to reflect inclusion of a new Condition, as described under the options in 2.3.3.2. |
| **41** | **2.3.3.1** | Exclude the language "For IH evaluations, a shorter-term exposure (e.g., 5 years) should be the basis for EPC development. When determining whether or not NSR or No Substantial Hazard (NSH) exists, EPCs should be developed to represent a longer-term exposure (e.g., greater than 5 years)." |

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| | | EPC development is essentially independent of exposure time, and is more dependent on quality of data set. The goal of EPC development is a representative concentration in air, and typically the more data the better to reflect variability. |
| **42** | **2.3.3.1** | 2nd paragraph. We recommend adding language to this so that it reads: "EPCs calculations should be based on the total concentration of a COC measured in indoor air, *unless it is the LSP's opinion that confounding chemicals are present and the concentrations associated with the site release can be quantified.""* |
| **42** | **2.3.3.1** | In the title of this section, we recommend removing "permitted" from the fourth paragraph as operational uses may not always be permitted. PCs for Ongoing Permitted Commercial or Industrial Operations |
| **42-43** | **2.3.3.1** | We request clarification on the last sentence of the last paragraph that spans two pages: "EPCs must still be developed for any vapor intrusion into neighboring buildings or spaces that are NOT licensed and permitted to operate such processes and do not use such chemicals (e.g., neighboring/common-wall businesses in a strip mall containing a dry cleaner)."<br><br>This seems to be in direct conflict with the previous paragraph; however, if this sentence is as intended, we recommend adding "unless in the LSP's opinion, the indoor air concentrations of the neighboring buildings or spaces are affected by confounding chemicals associated with the operations of the neighboring spaces and result in the same chemicals being present in indoor air at concentrations higher than the estimated contribution from the vapor intrusion pathway." |
| **43** | **2.3.3.2** | In this section, or elsewhere in the document, MassDEP should address the situation associated with the construction of a new residence, school, Daycare or child care center in an area where VOCs exceed GW-2 standards within 30 feet of the structure (the new SRM Condition 40.0313(4)(2)). Based on the Department's recent Q&A responses, this scenario would always require a new 72-hour notification regardless of the site-specific conditions, the status of remedial activities and mitigation measures incorporated into the building design.<br><br>Consider the scenario of a new residential structure incorporating multiple levels of open-air parking, a vapor barrier and passive ventilation system and an AUL requiring maintenance of such systems. Despite these precautions, notification would be required upon building occupancy due to the recent Q&A effectively revoking the notification exemption for conditions consistent with a prior closure or ongoing response actions in the case of the VI SRM condition.<br><br>This becomes more problematic in the situation where the GW-2 exceedances are actually confined to **deep** groundwater and the shallow groundwater is "clean". (The SRM Condition is not limited to shallow groundwater; rather it encompasses all groundwater within 30 feet of the structure as long as depth to groundwater is less than 15 feet.) There are clearly some unforeseen consequences to the revocation of the notification exemption for the VI SRM conditions that the Department should carefully consider. |
| **43** | **2.3.3.2** | Under the intro for options for EPCs for Existing Buildings, MassDEP should consider taking current building use into account. In reality, there is likely a different potential for "significant building modifications" for a currently residential building that is modified for residential vs a currently commercial building modified for residential. That is, the concerns about future building modifications and potential for increased VI are influenced by the current building use, but the 2nd paragraph of the "feedback" box disregards current use. In developing the new option, MassDEP should be more receptive to the likelihood for significant building modification if the building is already residential. |
| **44** | **2.3.3.2** | We applaud the Department's proposal of additional options for evaluating future exposures. Option 2 appears to be the most health protective yet flexible to not impede regulatory closure. |
| **46** | **2.3.4** | The previous guidance had language relating basement ceiling height to potential for use as living and working space, but this has |

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| | | been removed. Assuming 12 hours of exposure in all basements, regardless of evidence of current use, is overly conservative. Particularly for current use exposure assumptions, existing conditions should be paramount. |
| **46** | **2.3.4** | Recent USEPA guidance and several states (e.g., New Jersey) have reduced the upper bound exposure duration for residential tenure from 30 to 26 years. MassDEP should be consistent with this modification, which is based on more recent data.<br><br>Similarly, USEPA and many states are now using 75 year averaging periods for cancer that reflect longer life expectancies in the U.S.<br><br>For current use, the actual height and use of the basement should be considered. This is important for both IH evaluation and Substantial Hazard Evaluations, which do not necessarily need to incorporate hypothetical future use scenarios. |
| **53** | **3.2.1** | 5th paragraph. We don't agree that sub-slab pressure differentials are an important component of passive venting. Passive venting simply provides a preferential pathway for vapors, and relies minimally on pressure gradients. |
| **54** | **Table 3-1** | Under "Maintenance and Monitoring", the table indicates that indoor air sampling would be recommended when differential pressures are less than those observed during the initial evaluation. Extensive monitoring experience indicates that the differential pressures vary over time. We recommend that this wording be modified to indicate that the need for additional sampling would be associated with differential pressures that are **significantly** less than those initially measured.<br><br>Additionally, the magnitude of the actual pressure differential should be considered in this evaluation. If differential pressures decrease, but are still well above design targets (such as the 4 Pascal criterion in the guidance), additional indoor air sampling may not be warranted. This would also affect "equal to or greater than" language in other related portions of the text. |
| **54-55** | **Tables 3-1 & 3-2** | We recommend changing "Monitoring to Support Closure with a Permanent Solution" to "Closure Sampling to Demonstrate that Mitigation System is No Longer Required" as the current wording has led to confusion associated with site closure versus operational system closure aka shutdown.<br><br>We suggest simple language for this row of both tables such as: "Monitoring should consist of 3 events over 2 years with one during the heating season." |
| **54** | **Table 3-1** | Under "Maintenance and Monitoring", replace the language "…the concentration of contaminants in the indoor air were at or below the appropriate TVs" with "the system was achieving the remedial objectives". There is no regulatory requirement to achieve TVs with an active system, and concentrations that pose NSR and may be slightly above TVs are indicative of an effective active system. Removing the reference to TVs is also more in line with Section 3.5.2.2 "Indoor air Quality Monitoring of Active Mitigation Systems".<br><br>Also, there are two sections numbered as 3.5.2.2. The one reference above should be 3.5.2.3. |
| **57** | **3.3.1.1** | At the end of the second paragraph, we recommend the guidance acknowledge that it may not be practical or appropriate to locate blowers outside of a building in some scenarios, particular for large industrial buildings. |
| **65-66** | **3.4.2.4** | Last sentence on page 65 and 1st paragraph on page 66 is duplicate language from 2 paragraphs earlier. Suggest combining into one paragraph. |
| **69** | **3.5.2.2** | See comments regarding changes in differential pressures under Table 3-1. |
| **73** | **3.6** | The wording in the first paragraph should be consistent with Tables 3-1 and 3-2. See comment above for Tables 3-1 and 3-2. |
| **74-75** | **4.1.1** | We recommend that the guidance reference (or even attach as an appendix) the relevant MassDEP TCE fact sheet that provides the appropriate action levels. |
| **81** | **4.3** | In the box defining Critical Exposure Pathways, we recommend adding "above applicable residential TVs" so that this reads: "(a) |

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| | | vapor-phase emissions of measurable concentrations of oil and/or hazardous materials, *above applicable residential TVs,* into the living or working space of a pre-school, daycare, school or occupied residential dwelling;" to clarify the meaning of "measureable" as indicated in the 12/11/14 meeting. |
| **85** | **4.3.6** | 2nd paragraph. For larger vapor intrusion sites with multiple buildings and various building owners, more than one of the four conditions may be met for various properties at the disposal site to satisfy the CEP and IRA-Completion criteria. Prior to "These conditions are", we suggest adding the sentence "At larger vapor intrusion sites where multiple buildings and properties are impacted, each property must meet one of the four conditions." |
| **96** | **4.7** | MCP citation is incorrect at end of 2nd paragraph (should be 40.1003(7)(b)) |
| **97-98** | **4.7.1** | Last paragraph describes example where indoor air is at NSR, no remediation was required, and site is eligible for Permanent Solution with No Conditions. This is entirely appropriate for a currently residential building, but appears to be not quite aligned with the proposed "Options" in Section 2.3.3.2 in regard to EPCs for future use. We request that MassDEP make this consistent with Option 2. |
| **102** | **4.7.2.3** | Middle paragraph, 2nd sentence. Replace "…are found to pose a future significant risk…" so that the phrase reads: As discussed in Section 2.3, where the concentration of VOCs in subslab soil gas indicate the potential for significant risk under future conditions as the result of building alteration (in the course of building repair or renovation) or through the development of cracks or other preferential pathways as the structure settles and ages,…" Sub-slab soil gas never poses risk, it is only an indicator of potential for VI and possibly magnitude of future VI. |
| **102** | **4.7.2.3** | "Example Vapor Intrusion Scenario 7 – Permanent Solution with Conditions, AUL Implemented to Condition Maintenance of Building Slab or Renovations to Building" seems to assume Option 2 from Section 2.3.3.2 for future use. |
| **104** | **4.7.2.4** | In the last complete sentence, we recommend changing "post-construction indoor air sampling to ensure the effectiveness of such measures" to "post-construction indoor air sampling or other technique or method to ensure the effectiveness of such measures." We recommend allowing multiple lines of evidence evaluations for new buildings as is allowed for existing buildings; for instance, sampling of a building with a parking garage or on stilts would not be necessary. |
| **108** | **4.7.3** | Clarification is needed regarding language in the 2nd paragraph about how to determine "representative indoor air EPCs in the building when the SSD system is not in operation" for "An evaluation as to whether the restriction at 310 CMR 40.1025(4) applies should be based on representative indoor air EPCs in the building when the SSD system is not in operation assuming current use conditions."<br><br>During 12/11/14 meeting, MassDEP indicated they did not expect the system to be shut down to determine representative indoor air EPCs; however, sampling during system shutdown is sometimes necessary.<br><br>We recommend the following options for determining "representative indoor air EPCs":<br>• Use pre-remediation, pre-SSDS activation indoor air concentrations as conservative "worse-case" EPCs.<br>• In cases where an IH is not expected to be created or the exposure pathway is incomplete, collect indoor air samples after active SSDS has not been in operation for 60 days. This conforms to several of the "Example Vapor Intrusion Scenarios".<br>• If neither of the previous options is available, a sampling protocol to evaluate the time to reach equilibrium concentrations in indoor air after the active SSDS has not been in operation can be developed by an LSP, so as to collect representative indoor air data and resume operation of the SSDS prior to the 60 days.<br>• Other approaches deemed appropriate by an LSP. |
| **109** | **4.7.3** | Bullet #5, maybe more of an MCP issue. Since IH is based on 5 year evaluation, and NSR is (typically) based on 25-30 year evaluation for commercial/residential exposure, the MCP requirement for identifying both exposure times is odd, in that the NSR time will always be longer than the IH time. Since IH evaluation is up to 5 years, isn't that more relevant in terms of shutdown exposure |

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| | | evaluation. That is, if you don't exceed IH risk within 5 years, are you really concerned with longer NSR shutdown time? |
| **111** | **4.7.4.1** | An outstanding question: Will closed sites with AEPMMs related to Temporary Solutions submitted prior to the promulgation of the new MCP (June 2014) be affected by this guidance, and how? |
| **114** | **4.8.4** | We recommend clarification of "It is recommended that sampling of indoor air once construction of a new building has been completed be conducted before the building is occupied. This will avoid, in the event that vapor intrusion is found, of having to notify for IH and Conditions of SRM (that are triggered by current exposures to current occupants) and will allow the work to mitigate the pathway to be performed as a RAM (pursuant to 310 CMR 40.1067(4) or (5)). Where the new building is determined to rely on a Passive or Active Exposure Pathway Mitigation Measure to ensure maintenance of a level of NSR, an AUL must be implemented to document that maintenance of those measures is a requirement of maintaining the Permanent Solution and the Permanent Solution Statement must be revised to reflect the applicable conditions."<br><br>We recommend allowing multiple lines of evidence evaluations for new buildings as is allowed for existing buildings. |
| **II-2** | **II.B** | We recommend adding clarification that derivation of SSGSVs and derivation of GW-2 standards do not have consistent approaches (attenuation factor derivation) and use of the two values could lead to differing conclusions. |
| **III-3** | **III.B.2** | "MassDEP recommends sampling durations of 24-hours for indoor and outdoor air data collection because a longer sampling duration is likely more representative of the actual exposures over time. Shorter sampling durations may be necessary for logistical reasons; in such cases four hours should be considered a minimum sampling duration. For sub-slab soil gas, grab (short duration) samples are often sufficient."<br><br>We recommend specifying that 8-hour is the recommended duration for commercial/industrial buildings. |
| **III-6** | **III.B.4** | We recommend allowing consideration of conditions representative of normal exposure as it relates to the "Windows and Doors" paragraph. |