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Attachment to LSP Association Cover Letter

Detailed Comments By Section:
Vapor Intrusion Guidance December 2010 Interim Draft

Section 1

Section 1: Introduction

- Guidance vs. Policy. How will this Guidance Document interact with the 2000 BWSC Policy on "Building in Contaminated Areas"? Policy WSC-00-425, seems to cover some of the ideas in the VI document, and it is a Policy not a Guidance. This relationship should be very clearly defined.

Section 1.3 and Section 2

- Figure 1-1. Evaluation of Vapor Intrusion. The comparison of groundwater concentrations to GW-2 is an important part of the flowchart. Exceedances of these Method 1 standards, which are based on modeling and not directly relevant in a Method 3 risk assessment, essentially draw one into a comprehensive, "lines of evidence" evaluation. Soil vapor measurements, sub-slab and/or deep (directly above the water table), are oftentimes a much better indicator of the potential for vapor intrusion into a current or future building, versus groundwater concentrations. Both sub- slab soil gas and indoor air data have been collected to demonstrate the validity of modeling if used appropriately with a representative data set. Additional "outs" should be presented in this flowchart to provide the option that if adequate soil vapor data is available to characterize site conditions, then further evaluation of VI may not be required, despite exceedance of GW-2. Indoor air sampling is given the greatest weight of evidence in determining that there is a completed vapor intrusion pathway. Although multiple lines of evidence are to be used, it is not clear how many additional lines of evidence would be required to counter indoor air results, or whether anything can overcome indoor air sampling results.

- Figure 1-1. This flowchart essentially eliminates the potential for performing Method 2 risk assessments when VOCs are present in groundwater above the default GW-2, since this triggers "lines of evidence" including indoor air data collection (a modest exception is described in 2.5.3, wherein very conservative soil vapor "screening" levels can be used in conjunction with groundwater data to support the lack of a significant pathway). Formerly, such as in the

Implementation of VPH/EPH guidance, soil vapor data could be used as a screening tool to evaluate whether the pathway was complete or not. This should still be an option that is explicitly included in this flowchart and throughout the guidance document.

Section 1.3.2.

- Page 8, first two paragraphs. The guidance focuses too heavily on the assumption that groundwater concentrations > GW-2 will lead to a completed vapor intrusion pathway, versus just a ***potential*** vapor intrusion pathway, and does not consider whether the soils or slabs above the potential groundwater source are being impacted or are providing sufficient attenuation.

- Page 8, wording in last sentence should be edited to match the wording in the regulatory citation to be more precise. Change to "If OHM has actually…, then Method 1 *alone (*including the GW-2 distance criteria*) shall not be used to characterize the risk* (310 CMR….")

Section 1.3.3

- Is it the intent of this section to require that any site with LNAPL or DNAPL within 30 feet horizontally of an occupied building, regardless of the LNAPL or DNAPL type or depth, may not be ruled out based on GW-2 standards? If so, the LSPA disagrees. NAPL at lateral distances less than 30 feet, but at depths greater than 30 feet should not automatically trigger a vapor intrusion assessment. One obvious case of interest would be where DNAPL exists at depth, but with unimpacted soil and groundwater overlying the DNAPL.

Section 2

Section 2.2.1

- Top of page 12. Deep soil vapor (proximate to water table) should be included as a subsurface medium that can be used in a Line of Evidence evaluation for current or future buildings.

Section 2.2.2

- Section 2.2.2 discusses that there may be cases where direct indoor air measurements are not practical or possible. This section states that in these situations, "MassDEP recommends the use of soil gas screening values discussed in Section 2.2.3.2, and if necessary, the estimation of indoor air concentrations using the approach discussed in Section 2.3.4." However, Section 2.2.3.2 does not discuss the evaluation of soil gas or use of the soil gas screening values.

- Paragraph 2. The "long-standing guidance" of MassDEP should be provided with some references to where this guidance is found. The MCP (40.0926(6)) states

that Exposure Point Concentrations may be developed using monitoring data gathered during the site investigation or, when appropriate, through the use of fate and transport models generally accepted by the environmental modeling community. The LSPA believes the use of modeling can be an appropriate Line of Evidence.

- Page 12, paragraphs 1-3. Modeling from subslab and deep soil vapor is a valuable tool for evaluating indoor air migration potential and a useful tool in site closure. In the first paragraph of Section 2.2.2, there is discussion that if concentrations are above GW-2 (by apparently any magnitude) "modeling should not generally be used as the only basis for concluding that no further evaluation is needed." Modeling from subslab soil vapor can be much more representative of site conditions and the potential for vapor intrusion than groundwater data. The GW-2 standards are based on default assumptions regarding soil type, building characteristics, moisture content, etc. which may be not relevant to site conditions, and form the foundation for the modeling from groundwater to indoor air, which adds numerous additional uncertainties relative to modeling from soil vapor. This skeptical stance of modeling, even from soil vapor, appears to be reversed in the third paragraph, where MassDEP acknowledges there may be circumstances which make indoor air data collection difficult or too prone to confounding by indoor sources such as dry cleaning, and that then, use of soil vapor screening or modeling may be relevant. It is recommended that MassDEP re-align its view on modeling from subslab and/or deep soil vapor and acknowledge its value, as well as the value of soil vapor data in general, in the process of VI evaluations and closure.

Section 2.2.3

- Page 15 states that "...DNAPL serves to potentially provide a significant source to indoor air contamination which may not be accounted for in sampling of other subsurface media". The statement might be more accurate if it said that DNAPL may be a source of groundwater contamination which could, in turn, be a source of indoor air contamination.

- In an attempt to be consistent with common conceptual site models and exposure pathway assessments in the EPH/VPH document, which prescribes an iterative approach, proceeding from groundwater to soil gas to indoor air, it is suggested that sections 2.2.3.2 and 2.2.3.3 be swapped.

Section 2.2.3.2 Lines of Evidence - Indoor Air

- Page 13. MassDEP indicates that "several rounds" of indoor air testing may be needed to rule out a VI pathway. In many circumstances, two rounds, especially if both in winter, can be adequate for these assessments; in others, collection of an

additional third round during high water table (spring) conditions may be warranted. In all cases, however, it should be the judgment of the LSP, based on their site-specific CSM, to determine the number of rounds that are adequate for their Site. Suggest replacing "several rounds" with "at least three rounds over at least one year, with at least one round during the heating season."

Section: 2.2.3.3

- For petroleum releases, the LSPA believes that the 'Method 2 Approach to Demonstrating 'No Impact' to Indoor Air, as summarized in the VPH/EPH Guidance, should remain valid. That is, the use of a PID to screen soil vapor points should remain a valid tool. (See Table 4.9 in the VPH/EPH Guidance).

Section 2.2.4 Interpreting Lines of Evidence

- Tables 2-1 and 2-2 present the lines of evidence evaluation criteria for determining whether indoor air is a *current* pathway. The lines of evidence evaluation references 2x GW-2 as a criteria for this evaluation. No justification was provided for the 2x factor. The Method 1 GW-2 standards were developed using an attenuation factor based on the Johnson & Ettinger model, which incorporates many conservative assumptions. Many Method 2 evaluations have shown that although VOCs in groundwater were at levels significantly above the Method 1 GW-2 standards, soil gas and/or indoor air sampling has demonstrated that impacts to indoor air are unlikely or are not occurring. As such, a 2x factor seems overly conservative and one could just as easily, and maybe more appropriately, use a 5 x or 10x factor.

- Since the Soil Gas Contaminant Levels in Table 2-1 are defined as being applicable for "Sub-Slab" samples only, it seems that the MassDEP is concerned that soil gas will accumulate under buildings. In fact, Page 19, Section 2.3.3 states that "soil gas directly beneath a slab or basement is most likely to be representative of what may be entering the building. 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 characterize subsurface conditions." Deep soil gas should be considered a valid Line of Evidence to provide a worst-case indication of the concentrations of VOCs in soil gas under *current* or *future* conditions.

- Page16, Table 2-1, 5th column, 7th row. Change "Likely" to "*Possibly*" and in next row/same column change "Sample Indoor Air" to "*No*". It is too conservative as stated. Also the last row is asking a question of whether there is SRM Notification, not if you should sample. There is often the case that you would do soil gas sampling before proceeding to indoor air sampling as suggested.

- First paragraph, page 16. Data averaging. There is no rationale provided for not permitting the averaging indoor air data over locations. As part of the risk assessment, so long as the EPCs that are developed are conservative but representative of the exposure under evaluation (typically long-term), there should not be prohibitions on averaging.

- Tables 2-1 and 2-2 on page 16 present matrices for use in assessing current buildings. A similar type of approach should be available for evaluation of future buildings. Although use of sub-slab soil vapor data may not be available, deep soil vapor data, collected immediately above the water table, can be used in conjunction with screening levels and/or modeling using conservative future assumptions, such as assuming a single family residence (or other type construction, potentially "locked in" with AUL as necessary) to evaluate the significance or existence of a VI pathway. In these cases, the LSP would not be relying only on modeling, but would also have groundwater and soil vapor (and potentially soil data) upon which to build a valid CSM, with which modeling can be used and relied upon.

- Tables 2-1 and 2-2 on page 16. Sub-slab soil vapor (or deep soil vapor) data provides a much clearer sense of contaminant flux from the subsurface (and hence VI potential) relative to groundwater data. Accordingly, it is recommended that if the sub-slab soil vapor data is < 50x TV (1000xTv for petroleum), then the VI pathway should be considered unlikely, versus requiring that both soil vapor be below screening values AND groundwater be below 2 x GW-2. Tables 2-1 and 2-2 on page 16. CEP assessments should not extend to institutional uses, such as assisted living facilities or dormitories on college campuses. These types of uses are not included in the current MASSDEP definition of "schools," which are limited to primary or secondary education buildings, presumably because of the age and potential additional sensitivities of the receptor group (young children). In both the dormitory and assisted living setting, potential receptors are of adult age (>18 years). Secondly, in these types of uses, potential building occupants will either reside there for a much shorter period of time versus default assumption for "residential" exposure duration (30 years) and/or will not be present within the structure 24 hours per day, 7 days per week, year round (for example, college students typically spend at most half the day in their dormitories, and generally are not in same building during the summer months). Lastly, the type of zoning for these types of facilities is generally "institutional" to differentiate these projects from residential.

Section 2.3.2

- Paragraph 1 says that soil samples and sub-slab data need to be collected to evaluate vapor intrusion from a soil source. It is not clear why the guidance requires sub-slab soil gas and is silent on having soil gas from other locations adjacent to the building. Paragraph one in Section 2.2.3.3 says that soil data cannot be used to rule out the vapor intrusion pathway. The LSPA believes that this contradiction be addressed and soil gas from other locations, should be included at the determination of the LSP.

Section 2.3.3

- Section 2.3.3 prescribes a specific sampling device for collecting soil gas samples. Some consideration should be given to allow the use of alternative and emerging sampling techniques and devices. The LSPA recommends less prescriptive and more discretionary approaches be allowed regarding depth of soil gas sample collection, method of collection, and adjustments for temporal variation.

- The recommendation for 2 to 4 probes in a single family residence seems high based on typical footprints in residential basements. The LSPA recommends a sample set designed to be representative of the type and size of the space being evaluated with a minimum sample set of 2.

Section 2.3.4

- Table 2-3 "Conditions for Sampling Indoor Air" What is the technical basis for including "soil saturated with rain" as a conservative condition? In fact, the opposite is typically true, and soil moisture content is inversely related to the potential for flux/vi because more of the void spaces are filled with water versus air when compared to dry conditions. This was supported by John Fitzgerald's review of Site data which concluded that soil moisture content can be a key variable in vapor flux, and that an inverse relationship was found. Additional/alternate parameters which may be considered for this table could include water table depth (higher water table = more conservative) and pressure differentials between the building and the outdoor environment.

Section 2.3.5

- Page 21-22. The intent of ambient air samples (collected in the vicinity of the building being evaluated for VI) is to capture typical outdoor concentrations of VOCs from auto emissions, point sources (such as stacks) or drycleaners operating in the vicinity of the Site, etc. One should not try to pick locations to "minimize bias" from the very type of regional contamination one is trying to understand.

Section 2.4.2

- Page 22-23. MassDEP does not provide an adequate basis for its position that "vapor intrusion in the future cannot be predicted from a current use situation,…." There are many Sites where sufficient subsurface data can be collected, a CSM can be developed, and conservative modeling can be used to accurately predict (hypothetical) future indoor air concentrations. Furthermore, in cases where an existing building is present and can be sampled, these data, too, can be used as part of a Lines of Evidence approach in determining first, if a vapor intrusion pathway is complete and what the estimated risks would be assuming either hypothetical future residential use, and/or incorporating specific future use assumptions/building construction types into the model and implementing an AUL.

- Page 22 -23. In MassDEP's discussion of "ongoing Permitted Commercial Operations," it appears that MassDEP is comfortable recommending a modeling approach to attempt to discern subsurface VI impacts from ongoing commercial activities, which appears to be at odds with the stance taken for virtually every other situation in this guidance document. The LSPA believes that modeling can be an appropriate LOE at many sites. Furthermore, it is not apparent why a Permanent Solution can not be reached for these types of situations. If modeling and/or indoor air sampling can be performed in relevant spaces, (for example, if they can be collected after equipment shut off for a day), and NSR can be demonstrated, there is no rationale for precluding achievement of an RAO for these Sites, with, or without an AUL. Furthermore, extensive experience with strip malls containing active dry cleaners has indicated that emissions from operations frequently enter adjacent spaces from both air intakes on roof (proximate to equipment vent pipes) and, more significantly, through flow in suspended ceilings, as demising walls rarely extend up to the roof. If indoor air data is collected in these spaces, it should only be collected either after dry cleaning operations have ceased (i.e., converted to drop off dry cleaners) or if operations have been stopped for a minimum period of 24 hours. Similar approaches can be taken within the actual dry cleaning space to permit a more flexible AUL and permanent closure of these types of Sites. The section on "Permitted Commercial Operations" needs to be clarified, particularly for sites that have downgradient property status or facilities that are being operated by tenants or owners who are not associated with the MCP regulated release. Remediation of indoor air under the MCP should not be driven by the uncontrolled activities of a third party. The LSPA recommends use of an AUL to allow permanent closure at these commercial sites using COCs where indoor air quality is >TVs but <OSHA standards. The AUL could require re-evaluation if the business changes and no longer uses the COC.

- Stated differently, this section addresses commercial and industrial operations and provides an exemption from IH and SH evaluations when concentrations of a COC are high due to a permitted use of the COC. An analogous situation is a release which has impacted the structure (such as walls, floors) of a building. MassDEP guidance elsewhere exempts the impact of vapor emanating from such impacted walls and floors from the risk assessment but provides no guidance on how to exclude that component of vapor from other sources. The Vapor Intrusion Guidance document may be an appropriate place in which to address this difficult concept.

- Grandfathering Issues. Paragraph two can be read to require the evaluation of a sensitive receptor exposure to vapor intrusion at any site where there is a potential vapor source. What are the implications of this position on the thousands of sites that have RAOs where the risk characterization did not evaluate or implement an AUL for a change in use exposures to vapor intrusion, if that use was not known to the PRP at the time of the RAO? This approach was consistent with the MCP requirements for the historic applicability of the GW-2 standard (40.0932(6)) that says the GW-2 is applicable only to an existing or planned buildings or use. This approach also appears to contradict section 4.7.2 that indicates this interpretation of the applicability of the GW-2 assumptions currently is, and will continue to be, allowed.

Section 2.4.3 Exposure Point Concentrations

- Page 24. For evaluation of CEP and Imminent Hazards, the actual, current use of the basement in a residence should be considered rather than assuming it is living space in all circumstances where ceiling height is 7 feet or higher. With respect to averaging multiple locations (such as multiple sampling points on one floor) for EPCs, the same protocols should apply for indoor air as for other media. If the data are highly variable and/or a "hot spot" exists, then distinct exposure points and/or upperbound values (not necessarily maximum) should be used. This medium should not be treated differently than other media typically evaluated within the risk assessment. There is no regulatory or technical basis for these distinct rules.

Section 2.4.3.1 EPCs for Chronic Exposures

- Page 24-25. MassDEP indicates that EPCs cannot be developed for a future building or use from a current use situation. This is not a valid statement in many circumstances. Indoor air data from a current building can be one technically valid LOE in evaluating future exposures. If it is a large commercial building, these data can be used in conjunction with modeling from subslab beneath the building and/or deep soil vapor, coupled with groundwater (and, as necessary soil) data, to provide a good picture of potential future risks assuming site

redevelopment. Also, if the current building is a residence, which is the most conservative (and default) future use scenario, if indoor air data is collected and is shown to pose NSR, why would an AUL even be required? Furthermore, this position seems to contradict 310 CMR 40.0926(6), which states that "Exposure Point Concentrations may be developed using monitoring data gathered during the site investigation or, when appropriate, **through the use of fate and transport models** generally accepted by the environmental modeling community." Fate and Transport models exist to evaluate these future use scenarios, and this Guidance should allow for use of such models in ways that will be protective of human health. This section should be revised to reflect these alternatives.

Section 2.4.4 Exposure Assumptions

- MassDEP's recommendation that residential receptors should be assumed to spend 12 hours/day in their basements seems unreasonable for many residential buildings. LSPs and risk assessors should be allowed to use their professional judgment in developing appropriate exposure assumptions for individual buildings within MassDEP's recommendation that residents be assumed to spend 24 hours/day in their homes.

Section 2.5

- Page 26-28. The LSPA does not concur that future conditions cannot be predicted from current conditions, assuming representative data is available, a valid CSM exists, the source has been controlled/mitigated and appropriately conservative assumptions are used in the modeling from soil vapor data. Furthermore, MassDEP's position is in direct conflict with their statements regarding development of GW-2 standards based on "conservative modeling." The modeling used in the development of GW-2 standards incorporates more uncertainty than modeling from soil vapor, as this medium is more indicative of potential vapor flux versus groundwater concentrations. Therefore, soil vapor data should be considered preferentially over groundwater data, and MassDEP should not require that both groundwater concentrations be <2x GW-2 *and* soil vapor concentrations be < 50 x TVs.

- This policy essentially requires that a Method 3 risk assessor compare to Method 1 GW2 criteria (which have been ruled not applicable) to establish the potential for future risk. This requirement, to use Method 1 Standards in a Method 3 Risk Assessment for presumptive certainty, is in direct violation of regulations contain*ed a*t 40.0993(3) which explicitly excludes Method 1 groundwater and soil standards as "applicable or suitably analogous health standards" that are required to be used under Method 3. An AUL should *not* be required simply because groundwater concentrations exceed GW-2 standards.

Section 2.5.1

- Section 2.5.1 explains that MassDEP recommends the use of AULs to control potential future use in the event that Method 1 GW2 standards are exceeded even if Method 3 shows no significant current risk. It is unclear if this applies to non-GW2 properties where groundwater is located greater than 15 feet below ground surface? It should be the judgment of the LSP, based on their site-specific CSM and site information, to determine whether an AUL is appropriate.

2.5.3 Method 2 Standards.

- Method 2 Standards. (P. page 32, second paragraph, last sentence): MassDEP has determined use of models (e.g., J&E) for calculating building–specific Method 2 Standards is not supported by empirical evidence and is not recommended. This statement directly contradicts the MCP's use of a Method 2, which allows the incorporation of site-specific information to develop alternative MCP Method 1 Groundwater Standards (see 310 CMR 40.0980 through 40.0989), in the case of GW-2 Standards, use of site specific soil data and depth to groundwater to develop an attenuation value other than that developed by MassDEP, using their "worst-case" sandy soils input variables. MassDEP's statement on use of the J&E Model negates its use by MassDEP to develop the current MCP Method 1 GW-2 Groundwater Standards. Therefore, the LSPA recommends the use of modeling, as deemed appropriate for site closure by the LSP of Record. Broad statements prohibiting the use of modeling and the J&E model should be removed and modified in this document.

Section 3

Section 3.0

- The MassDEP reiterates throughout this section its strong preference for active SSDS to mitigate VI despite the fact that passive SSDS can be and have been used successfully at many Sites. Based on the current regulations, use of a system that can support permanent closure of a Site, is obviously preferable. It should be the judgment of the LSP, based on site-specific information and CSM, to determine the appropriate closure method. The LSPA supports passive SSDS as a valuable permanent closure option.

- It appears as if the MassDEP did not consider both components of passive SSDS when formulating their recommendations. A "true" *passive SSDS includes both a passive venting system and an overlying barrier or membrane (such as "liquid boot")*. The vast majority of practitioners do not consider the use of just one of these components (or simply sealing crack in a floor) when installing a "system." Also, since the MassDEP is essentially indicating that to reach permanent closure of Sites with active SSDS, sampling needs to be performed when system turned

off (essentially equivalent to passive SSDS), and that following three rounds of sampling, the system can be shut down, it is unclear why this passive approach cannot be used to support NSR and closure at sites with passive SSDS.

Section 3.1

- Page 31, 2nd paragraph: Typographical error. "VOC sin" should be "VOCs in".

Section No. 3.3.1.4.

- Paragraph 3: The requirement for a 60 mil barrier should be revised. The selection of the barrier thickness and material should be dependent on site-specific characteristics. The use of a 40 mil barrier is often adequate. In sample paragraph, delete the "minimum 12-inch overlap of membrane sections" and say *liner manufacturer recommended overlap and sealing*.

Section No. 3.4.2.3:

- 70-mil Barrier. Paragraph 2:A technical basis should be provided for selecting the minimum thickness of 70 mil. In Sec 3.3.1.4, 60 mil barrier was recommended. The specification of a 70 mil barrier includes no reference to the type of material. This thickness of liner would be impractical to install in many locations, including retrofits. It would be helpful to provide additional information on membrane material types, thicknesses and seam sealing in an appendix.

Section 3.5

- Table 3-1 in Section 3.5 should be modified to list the steps of mitigation in the opposite order: passive actions (such as sealing cracks) should be implemented first to minimize or stop the migration pathway.

Section 3.5.2.1

- There is an inconsistent use of minimum negative pressure values in paragraphs 1 and 3. Please make the references consistent.

Section 3.5.2.3

- Paragraph 2. The reference to checking carbon monoxide alarms should be removed from this document.
- Section 3.4.3The MassDEP recommends use of passive measures as an alternative to the use of active SSD systems. The LSPA recommends the use of passive measures, such as sealing cracks and other migration pathways, wherever possible, as the first step in preventing vapor intrusion into buildings.

Section 4

Section 4.1.3

- Paragraph 2. The LSPA suggests clarification of the paragraph as follows: "Note that a '120 day' reporting obligation per 310 CMR 40.0315 may still exist if environmental releases of oil or waste oil at levels less than the Reportable Quantity contaminate more than 2 contiguous cubic yards of soil at levels exceeding a Reportable Concentration applicable at the site, or if environmental releases of other hazardous materials at levels less than the Reportable Quantity contaminate soil or groundwater at levels exceeding a Reportable Concentration applicable at the site.

Section 4.3.2.3

- The two step process discussed in second paragraph should be indicated in Figure 4-2.

- The LSPA recommends consideration of some sort of "threshold" on the CEP elimination cost criteria, based on current property values.

Section 4.3.2.1.

- Footnote 7. This footnote states: "See Section 2.0 for a discussion of assessing whether indoor air concentrations are attributable to a disposal site, and the application of Threshold Values for ruling out the need for additional assessment or mitigation of the vapor intrusion pathway." Section 2.0 does address use of Threshold Values for determining whether indoor air concentrations are attributable to a disposal site, but does not discuss using Threshold Values for ruling out the need for additional assessment or mitigation where indoor air values are or potentially are attributable to a disposal site. This path forward should be clearly described, likely in Section 4.

Section 4.4

- Paragraph 2. This paragraph essentially states that for purposes of the numerical ranking system, a property with indoor air above the 95th upper percentile values in the residential TIACs, should score 200 points for a "likely or confirmed exposure pathway." It is not clear why indoor air in a commercial or industrial setting would be compared to *residential* TIACs. Second, why is this line of evidence given precedence for scoring purposes when an LSP may rule in or out the vapor intrusion pathway based on other information as described in Section 2.0.? Is MassDEP suggesting this approach when the LSP does not have sufficient information to reach a conclusion on whether a vapor intrusion pathway exists at the time of the tier classification? If so, please clarify.

Section 4.5.1.1

- The requirement for post-remediation indoor air monitoring of at least three samples collected over a two year period seems excessive. We understand the need to access seasonal variations and to confirm that levels are consistent from one year to another, but we would hope that the use of additional lines of evidence could be used in the absence of completing monitoring over two years (e.g., additional samples over one year, historical groundwater elevations and concentrations, etc.).

Section 4.5.2.2

- *Example Vapor Intrusion Scenario* – These are very worthwhile, and there should be consideration to include more of them throughout Section 4 in the final version.

Section 4.5.3.1

- The use of the word "most" ("For most vapor intrusion sites, meeting these criteria, as well as the general requirements identified above....") points out the importance of MassDEP qualifying this Guidance to indicate that there are approaches other than what is described in the Guidance that can achieve or demonstrate No Significant Risk and a Permanent Solution at a particular Site.

- Criteria 4 requires that LNAPL or DNAPL are not detected during the past two years. This is a very conservative requirement for those sites where the source areas are not contributing to vapor intrusion. The LSPA recommends revising Criteria 4 to include the same qualifier as used in Criteria 5, (such as "groundwater and soil gas monitoring has shown that LNAPL and DNAPL, if present at the site, is not a source of vapor intrusion" .

Section 4.7.2.

- Paragraph 1. MassDEP appears to be discouraging use of future notification to address vapor intrusion issues (as opposed to an AUL) by identifying it as an "uncertain approach." We suggest clarifying that this approach is allowed under the MCP regulations and requires no technical justification, despite MassDEP's apparent preferences.

- The use of the GW-2 as a criterion is understood but the introduction of the GW-3 as a screening criterion in Figure 4-5 is not appropriate. The obligation to undertake response actions for not meeting the GW-3 criteria is only correct if a PRP elects to use Method 1 risk characterization methods. A site specific Method 3 risk characterization will often demonstrate NSR for groundwater quality above GW-3 criteria. The arbitrary introduction of GW-3 into the VI question isn't appropriate and this figure needs to be revised.

Section 4.7.4.1

- This section on AULs and future building construction is far too prescriptive. The LSPA recommends providing as-built SSDS information in the RAM or RAO documents, rather than included detailed design information in documents being recorded/registered at the Registry of Deeds. The details on SSDS construction belongs in the MassDEP files, not in the Registry of Deeds files.

Section 4.7.4.3

- Information in Appendix VIII should be included in the new AUL guidance document. The LSPA recommends less prescriptive examples of AULs.

Comments on Appendices

Appendix I-

- Table I.1 -Carbon tetrachloride threshold value (0.086 ppbV) is below current ambient air background concentrations (0.1 ppbV) provided at the NOAA website: http://www.esrl.noaa.gov/gmd/hats
- Table I.2 - Carbon tetrachloride threshold value (0.14 ppbV) is just above ambient air background concentrations (0.1 ppbV) provided at the NOAA website: http://www.esrl.noaa.gov/gmd/hats The LSPA recommends clarification of this issue, such as: "According to government data, the current (i.e. 2011) ambient air background concentration for carbon tetrachloride is approximately 0.1 ppbV (0.63 ug/m3), which may impact analytical results that are near the threshold value."

Appendix II-

- Page 6 - Currently, the soil gas screening values are reserved, and may not be published, since it is simply going to be an adjustment of the threshold values for the attenuation factor of 50. These tables should be added to the guidance document to make it clear as to what the action levels are for soil vapor. Please clarify if the screening values can be used for both soil gas and subslab soil gas.

Appendix III-

- Section: III.2.2.2 mentions that "For sub-slab soil gas, grab samples are often sufficient." This is inconsistent with the statement in Section 2.3.3 on page 19 of the Vapor Intrusion Guidance document which states "care should be exercised to avoid sampling at too high a rate". A grab sample will be taken at the highest flow rate possible. The current industry standard adopted by other states is a maximum flow rate of 200 ml/min; I suggest that this appendix section also adopt that maximum.

- Figure 1- standard tubing size for connecting to canisters is ¼" outer diameter (OD) tubing. This figure should specify whether the dimensions for tubing are OD or inner diameter (ID).

- Section: 2.1 Glass vials are not typically used to collect air samples. It is very difficult to determine if samples have been collected in the vial, since the vial is not equipped with a pressure gauge. The maximum recommended sampling rate listed should apply to all media used to collect soil vapor samples, not just glass vials.

- Section: 2.2.1 The word "Grab" should be removed from the header of this section. Also, sample canisters-15 L is not a typical size that labs will send out. Current sizes are 1.0 L, 3 L, and 6.0 L. The LSPA thinks it is more appropriate and that the canister size should be selected based on the sampling protocol and data quality objectives, and that size specifications should be removed.

- Section 2.4 It is suggested that the section acknowledge the applicability of longer term (3 days or greater) sampling efforts to evaluate chronic risks, as deemed appropriate by the LSP. Longer-term sampling helps to minimize the skewing effect of confounding conditions and would provide data more representative of "actual" exposure scenarios during worst-case conditions. Long-term integrated average sampling up to several days is technically feasible and is the US EPA recommended approach for radon monitoring.

- Attachment 3. This attachment addresses the collection of subslab soil gas grab samples. It is suggested that there should be some discussion with respect to pressure differentials across the slab during collection. In particular, if the grab samples are collected at a time when the interior air pressure is greater than subslab pressure, indicating a flow from inside out, the subslab sample integrity may be compromised. It is noted that outside of installing deeper sample probes (which are less subject to atmospheric effects) this is the only method available to confirm the validity of the subslab soil gas sample.

- Page 14. The method of constructing a vapor point differs from that illustrated in the VPH/EPH Guidance. Is the construction methodology in the VPH/EPH Guidance still valid, or has it been replaced by the new VI Guidance? Page 17. Section Number: 2.0 Sample canisters - 15 L is not a typical size that labs will send out. Current sizes are 1.0 L, 3 L, and 6.0 L. Also, the statement "flowrates between 5 and 100 cubic centimeters per minute" should be changed to "3 and 100" to accommodate 24 hr. samples for 6.0 L canisters.

- Page 18, Section 3.0: In reference to the last sentence, "This observation compromises the time-integrated nature of the sample", there needs to be further clarification as to what "compromises" means to the acceptability of the sample. It is not clear if it should it be rejected, or if it should be noted that the composite time may not have been to the desired length.

Appendix V-

- Section 5 requires a performance guarantee from system installers. This is excessive and might not be possible.

Appendix VII-

- Paragraph 1. Sentence 2 states: "In addition, upon construction of the building that includes a vapor barrier and subslab depressurization or venting system (consistent with the approach presented in Section 4.7), an AUL amendment is necessary to document the presence, specifications and footprint of the vapor barrier and subslab depressurization/venting system." It is not clear why this would be required. If the AUL explicitly allows both the building construction and the planned use, and construction occurs consistent with the AUL, then there is no change in Site Activity and/or Use as that phrase is used in 310 CMR 40.1080. We see no trigger for amending the AUL.

- The LSPA believes that the Registry of Deeds AUL is not the appropriate location for documenting environmental construction details, changes to the SSDS, or changes to the venting system. Construction details should be included in a RAM or post-RAO status report, rather than amending the AUL.

Appendix VIII-

- VIII.1, Paragraph 1, sentence 2. MassDEP should add reference to AULs that are less prescriptive than the examples in this Appendix. An AUL can be written to prohibit construction of occupied structures in specified areas until an LSP evaluation/opinion is completed of the Vapor Intrusion Pathway.

- VIII.5.3.1. The requirement that "all buildings shall be constructed with a vapor barrier system and active subslab depressurization system consistent with the specifications included in Attachment X of this Notice of Activity and Use Limitation" should be modified. The design details of the vapor barrier and SSDS should not be provided in an attachment to the AUL. These details should be included in the RAO or other MCP documents, which will minimize costs, and minimize the size of documents recorded at the Registry of Deeds.

- VIII.5.3.2. Similar to the comment above, the LSPA recommends modifying this section by removing the requirement that design specifications be added in Attachment X of the AUL. Detailed design specifications, if included in the AUL, will add unnecessary costs and require future changes to AUL documents. The design specifications should be included in MCP reports, not in documents at the Registry of Deeds.

- VIII.5.3.1 & 5.3.2. Information related to recommended AUL language in the final Vapor Intrusion Guidance should be included in the revised AUL guidance document.