NAIOP
COMMERCIAL REAL ESTATE
DEVELOPMENT ASSOCIATION
MASSACHUSETTS

March 1, 2011

Gerard M. R. Martin
Massachusetts Department of Environmental Protection
One Winter Street
Boston, MA 02108

Re: **Revised Vapor Intrusion Guidance Draft dated 12/14/2010**

Dear Gerard:

NAIOP very much appreciates the opportunity to provide our comments, observations, and suggestions concerning the December 14, 2010 revised draft of the Department's Vapor Intrusion Guidance, and appreciates the significant amount of time and effort that the Department has devoted to vapor intrusion issues over the last several years. NAIOP also notes the considerable amount of time and effort that its members and their consultants and attorneys have devoted to these issues during that same time frame.

This letter provides both our general comments concerning the draft Guidance and more detailed comments concerning specific provisions in the draft Guidance. We would appreciate receiving a detailed response to our comments, particularly in light of the importance of the issues addressed by the Guidance.

All of our comments are provided with the objective of improving the Guidance in a manner that is consistent with the goals referenced in recent public comments made by Commissioner Kimmell. We share the Commissioner's interest in building upon the past success of the Commonwealth's risk-based, Licensed Site Professional implemented, cleanup program to protect public health while encouraging the redevelopment of contaminated sites. Unfortunately, we believe the current draft of the Guidance does not achieve these goals. However, we very much look forward to working with the Commissioner and the Department to develop a final Guidance document that does.

General Issues

While the latest draft of the Guidance represents a significant improvement over the July 2009 draft document, a number of very important issues still remain.

The MCP is a Risk-Based Program.

At its core, the Massachusetts Contingency Plan (the "MCP") is a risk-based program, which is one of the fundamental reasons for the success the program has achieved. A number of elements of the Guidance, however, are significantly at odds with that approach. In some cases, the non-risk-based components of the Guidance are based on specific MCP provisions, in particular, those concerning Critical Exposure Pathways ("CEPs"). (We note that we and other commentators opposed the CEP provisions when they were promulgated for precisely this reason. The adverse consequences of the CEP regulations would only be heightened by implementation of the Guidance as it is currently drafted.)

In other places, the movement away from a risk-based approach in the Guidance appears to be based on the Department's view that the level of uncertainty associated with vapor intrusion risks is uniquely different from that associated with contamination in other media and, therefore, this exposure pathway cannot be regulated using the same risk-based approach adopted under Chapter 21E.

We wholeheartedly disagree with that position. The standard for closing any site is a condition of No Significant Risk, not a condition of No Possible Exposure. Vapor intrusion risks can be measured, evaluated, and successfully addressed. It is incumbent upon the Department to establish and implement technical standards based not on fear of uncertainty but on sound scientific principle. In the past, the Department has done exactly that. In the MCP and existing guidance, the Department has addressed uncertainties inherent in the site assessment and risk characterization process by using conservative but scientifically justifiable assumptions to derive risk-based standards. Indeed, the approach to standards related to vapor intrusion already incorporates a number of conservative assumptions. Some of the conservative assumptions already embedded in the process include the attenuation factors used to derive the GW-2 standards and the cancer risk factors used for the primary contaminants of concern in indoor air.

There is no reasoned basis for departing from that approach here. The Guidance should be based on the MCP's core risk-based approach. The Guidance should not add yet more conservative assumptions onto its approach to the vapor intrusion issues that it addresses.

If the MCP is to continue to work as well as it has, this basic issue needs to be addressed in a consistent manner throughout the Guidance. If not, potential vapor intrusion sites will be subject to open-ended regulatory requirements designed to meet theoretical but unsubstantiated future risks. These sites will be considerably more difficult to redevelop than similar sites that are not subject to the Guidance. In addition, vapor intrusion sites will be seen as being in a fundamentally different and more difficult category than other MCP sites. The result may in fact be increased risks, as developers avoid these Brownfields sites, leaving preexisting contamination and associated exposures in place.

CEPs.

The Guidance would exacerbate the existing CEP provisions by expanding their scope. For example, although the Guidance is, to some extent, contradictory on the point, the intent appears to be to extend the requirement now in the MCP to implement Immediate Response Actions

beyond "completion of a risk assessment pursuant to 310 CMR 40.0900 and a feasibility study pursuant to 310 CMR 40.0860." See 310 CMR 40.0427(1)(c). We discuss this point in more detail in our comments below concerning Section 4.5.1.2 of the Guidance.

A second example is DEP's view of what constitutes a "living or working space" within the definition of a CEP, and how much time one must assume an occupant will spend in a basement space. The Guidance recommends that (i) "[b]asements of any height which show evidence of current activity" and "any basement with at least seven feet of head room" should be subject to CEP requirements, and (ii) an exposure duration of 12 hours per day for these areas should be assumed. The scope of these recommendations is much too broad, and does not make sense from either a public health or a real world perspective.

In addition, the tone of the CEP portion of the Guidance goes much too far. See, for example, the last sentence of the first paragraph of Section 4.3.1.1 of the Guidance, which is supposed to describe the CEP concept. The subject issues are difficult enough without adding what strikes us as alarmist language. We suggest that, instead, the CEP provisions in the Guidance be tailored as carefully as possible so that they only apply in appropriate circumstances, and are written in a clear, concise manner.

Regulatory Closure.

Under the Guidance, and based on our experience to date with a number of specific projects, it can be difficult to achieve MCP closure at vapor intrusion sites. Related to this problem is the significant push in the Guidance in favor of the use of active sub-slab depressurization systems ("SSDSs"). However, once such a system has been installed, the Guidance strongly encourages the continued operation of the system, during which time it is not possible for the subject site to achieve a Class A Response Action Outcome (i.e., closure). As a result, the site remains in the MCP and continues to be subject to semi-annual filing requirements, along with the associated time, work, and expense of making those submissions, which are all in addition to the expense of operating the subject system. Moreover, the additional time to achieve closure resulting from the need to invoke Remedy Operation Status will further discourage Brownfields redevelopment, as potential developers will avoid sites where it is not possible to predict when closure will be possible.

Similarly, in other contexts, the Guidance strongly recommends response actions that involve additional time and expense. An example is the very strong suggestion that AULs be implemented at any site in Massachusetts where contaminant concentrations in groundwater exceed GW-2 standards, on the grounds that no amount of existing data are adequate to predict future conditions. Thus, the Guidance appears to require recording an AUL even if multiple rounds of indoor air sampling demonstrate the absence of an indoor air pathway. This result would also apply even if the relevant groundwater samples exceed GW-2 standards by only one part per billion and even if contemporaneous soil gas data demonstrate the absence of a vapor intrusion risk. The solution to these problems is to allow LSPs to use their professional judgment in evaluating existing and foreseeable future risks, rendering Response Action Outcome opinions and closing sites, as they are currently permitted and required to do under the MCP.

Finally, there is a serious problem with the persistent and strong suggestion of the ongoing sampling of indoor air, especially when there have not been any previous readings indicating the presence of contamination. An example that is discussed in more detail below is the proposal to sample for two years after cleanup has been completed in certain circumstances before a Class A RAO can be prepared. Ongoing testing requirements raise the possibility of a building (residential or commercial) being unfairly labeled as a "sick building." The risk of losing tenants and/or financing on that basis, to the point that a property is unable to function, is enough to prevent a developer from even considering redeveloping such a site.

In our specific comments below, we highlight several places in the draft Guidance where the available MCP off-ramps, including Class A RAOs (i.e., MCP closure), can more easily be achieved without increasing risks to public health.

Potential Future Vapor Intrusion Issues and the Use of AULs.

In at least two places, the Guidance sets forth the Department's position that vapor intrusion related conditions in the future cannot be predicted from current use situations. We strongly take issue with this opinion, which effectively prohibits the use of full data sets and conservative modeling to predict future indoor air conditions. We think this overly conservative approach is incorrect technically, and unnecessarily limits the ability of LSPs to use their technical judgment under appropriate circumstances. Further, this approach would have a number of significant and negative impacts on the potential redevelopment of sites with possible vapor intrusion issues. These include, without limitation, as noted above, the requirement to impose an AUL on any site with groundwater contamination that exceeds generic Method 1 GW-2 standards.

Administrative Procedure Act Issues.

The Guidance contains many very specific recommendations, all of which the Department has described as presumptively appropriate. Consistent with the recent opinion of the United States District Court for the District of Columbia in National Mining Association v. Jackson, No. 10-1220, slip op D.D.C. (decided January 14, 2011), we are very concerned that the Guidance is effectively imposing new substantive requirements that can only be adopted through regulations amending the MCP. See National Mining Association at 11. As noted in our comments, there are instances in which the Guidance is at odds with existing regulations, and therefore cannot be issued without appropriate rule making proceedings.

The core of this issue is that, regardless of how much DEP describes this document as being only guidance, the regulated community and DEP both know that the document will be treated as setting forth rules that must be followed, with exceptions being afforded only in extraordinary circumstances, if at all. To counteract this problem, the Guidance needs to explicitly (and repetitively) remind users that well reasoned and supported approaches other than those set forth in the Guidance can be used to satisfy the requirements of the MCP, and that it is important for LSPs to apply their professional judgment to address the wide variety of circumstances they will encounter at the MCP sites on which they work.

Overall Negative Impact on Brownfields Redevelopment.

Directly related to each of the issues described above is the extent to which these issues limit the redevelopment of contaminated sites. As is well understood at this point, Brownfields can only be successfully redeveloped when the health of site occupants is protected, the regulatory path is clear, required response actions can be performed in a timely and cost effective manner, and regulatory closure means just that. In other words, potential developers must be comfortable that these issues can be addressed with a reasonable degree of predictability. In many places, the draft Guidance does not accomplish these objectives. As a result, there is a very real risk that a significant portion of the sites that will be subject to the Guidance will not be redeveloped.

Specific Issues

Section 1. Introduction

1.3 When the Vapor Intrusion Pathway Should Be Evaluated

1.3, page 6, Figure 1-1. Evaluation of Vapor Intrusion

The comparison of groundwater concentrations to GW-2 standards is a pivotal aspect of the flowchart and, more importantly, the Department's overall approach. Exceedances of these Method 1 standards, which are based on modeling and are not directly relevant in a Method 3 risk assessment, essentially require a comprehensive, "lines of evidence" evaluation. However, soil vapor (sub-slab and/or deep [directly above the water table]) is often a much better indicator of the potential for vapor intrusion into a current or future building. In particular, data have recently been submitted to DEP providing examples of sites where both sub-slab soil gas and indoor air data were collected to demonstrate the validity of modeling if used appropriately with a representative data set. Additional options should be presented in this flowchart so that, if adequate soil vapor data are available to characterize site conditions, further evaluation of vapor intrusion issues may not be required, notwithstanding the exceedance of GW-2 standards.

Furthermore, this flowchart essentially eliminates the potential for performing Method 2 risk assessments when VOCs are present in groundwater above the default GW-2 standards, since this triggers the use of "lines of evidence," including indoor air data collection. (A modest exception is described in Section 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.) Previously, and specifically 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 in the text of the Guidance.

In Figure 1-1, DEP is proposing to require a Vapor Intrusion investigation when GW-2 standards are met if a constituent exceeds ten times the GW-2 standard within 100 feet of an occupied building.

Issue: DEP provides no rationale for deviating from the standards that it formally promulgated explicitly for the purpose of screening out sites where vapor intrusion should not be considered. DEP has provided no modeling or empirical data to support 100 feet as the relevant distance and 10X as the relevant numerical criterion. If available, DEP should provide such data for review

and comment. Also, DEP does not state that this proposed criterion applies only when groundwater is flowing towards the occupied structure of interest.

1.3.1 VOCs in Soil

DEP states: "The presence of such sources or screening results or analytical data showing VOC contamination of vadose zone soils (e.g., direct measurements of soil or of soil gas) near or beneath the structure may be indicative of a potential vapor intrusion pathway."

Issue: Soil samples are only infrequently available from beneath structures. DEP has also stated that soil samples should be taken "near" structures, but no guidance is provided regarding the definition of "near." Given that the MCP at 310 CMR 40.0942(1)(d) states that VOCs in soil within 6 feet of an occupied structure have the potential for significant indoor air concentrations, DEP should specify here that "near" means within 6 feet of an occupied structure.

DEP is requiring a Vapor Intrusion investigation if VOCs are found in any soil samples within 6 horizontal feet and 10 vertical feet from a structure regardless of concentration. In addition, DEP is recommending that GW and soil gas sampling be performed if any VOCs are detected in soil within 30 feet from a structure.

This distance for evaluating soil as a vapor intrusion source is inconsistent with the MCP (310 CMR 40.0942(1)(d)), which states that VOCs in soil within 6 feet of an occupied structure have the potential for significant indoor air concentrations. It is inappropriate for MassDEP to propose a guidance criterion that contradicts the MCP. Thus, this section should replace 30 feet with 6 feet.

In addition, it is inconsistent with the MCP to require a vapor intrusion investigation when VOCs at any level above the detection limit are present in soils, regardless of the relevant distance. We recommend that this section be replaced with a recommendation that calls on LSP to use his or her judgment.

1.3.2 VOCs in Groundwater, page 8, third full paragraph

In cases where a monitoring well has not been or cannot be installed within 30 feet of a building, the groundwater concentrations of VOCs from the nearest monitoring wells should be used for comparison to the GW-2 Standards to evaluate the need for further evaluation of the vapor intrusion pathway.

Issue: This paragraph implies that the nearest well, regardless of its distance (for example, as much as 500 feet) to a structure should be used to make a GW-2 comparison in the absence of closer wells. Constituent concentrations in wells beyond a certain distance from a structure provide no information whatsoever about the conditions beneath or in the structure. It is the responsibility of the LSP to adequately characterize the site and use the available information to assess whether or not known groundwater contamination has the potential to affect the indoor air of occupied buildings. We recommend that this section be deleted or replaced with a recommendation that calls on the LSP to use his or her judgment.

However, data from existing sites has shown that high contaminant concentrations in groundwater beyond the GW-2 distances may act as a source for indoor air contamination. Many other jurisdictions require evaluation of groundwater at distances up to 100 feet from buildings.

If DEP desires to redefine the GW-2 definition then that should be done by regulation and not through guidance. The GW-2 standard was derived to provide protective criteria assuming contamination beneath the building and within a 30-foot radius around the building. In addition, when DEP is considering VOCs in groundwater distant from a building, the direction of groundwater flow must be taken into consideration. If constituent concentrations are not greater than GW-2 standards within 30 feet of a building, or if they exceed GW-2 standards at a location that is not upgradient from the structure, then the proposed criteria should not apply.

1.3.3 Other Factors

DEP proposes to automatically require a Vapor Intrusion investigation when "The structure of concern has an earthen floor, fieldstone or concrete block wall foundation, significant cracks, and/or a groundwater sump…In such cases additional evaluation of the vapor intrusion pathway is recommended."

Issue: Figure 1 shows this criterion automatically requiring a Vapor Intrusion investigation without any evidence of any type that VOCs in fact are present near the structure. This criterion must be used in conjunction with other criteria that define the concentrations of VOCs in groundwater beneath a building. As the draft Guidance reads now, all houses with earthen floors will require Vapor Intrusion investigations even if no VOCs are present in soil or groundwater.

Such evaluations are particularly indicated where groundwater contaminant concentrations just outside GW-2 areas (in distance and depth to groundwater) are greater than ten times the GW-2 standard, or when contamination may have been spread along utility lines or other preferential pathways.

Issue: This section needs to include information about groundwater flow direction. If COPC concentrations are greater than GW-2 standards within 100 feet of a building, but at a location that is not upgradient from the structure, then the presence of the COPC in groundwater is not relevant to conditions in the structure. DEP should provide the basis and documentation for DEP's proposed criterion of ten times the GW-2 standard, which are absent from the Guidance. Alternatively, LSPs should be given the latitude to specify a site-specific criterion that is relevant to the specific environmental conditions at a given site.

There are significant differences in the potential for preferential pathways when a sump or dirt floor is present in comparison to having fieldstone or concrete block walls in the basement. In some circumstances, these types of walls can actually lead to increased ventilation and dilution of basement air versus serving as a preferential pathway. The mere presence of these wall types should not necessitate different or additional evaluation of the vapor intrusion pathway.

Section 2. Assessment

Overall Comment on Section 2

NAIOP believes that the collection of site-specific data to assess the potential for vapor intrusion combined with the development of an appropriate conceptual site model development is vital to a valid analysis of the vapor intrusion pathway. NAIOP agrees that multiple lines of evidence should be used when evaluating the vapor intrusion pathway, and acknowledges that certain lines of evidence will bear more weight than others, depending on site-specific conditions. In addition, as is the case with all MCP work, LSPs must be able to use their professional judgment when evaluating the potential for vapor intrusion, including consideration of site-specific conditions. This last observation should be given more weight throughout both Section 2 and the Guidance generally.

2.1 Introduction

Assessment of a vapor intrusion pathway should proceed as site conditions warrant. Ideally, an initial assessment of site subsurface conditions, including information relative to contaminant concentrations in groundwater, sub-slab soil gas, and soil, should be conducted before proceeding with indoor air investigations.

Issue: In this introduction, DEP is recommending that sub-slab soil gas be sampled before sampling indoor air. However, in Section 2.3.3, DEP recommends simultaneous sampling of indoor air and sub-slab soil gas. We recommend that DEP make the proposed Guidance consistent from section to section by stating that sampling plans can vary depending on site characterization.

In some cases, however, it may be expedient to sample indoor air while subsurface information is incomplete, for example in cases when the limited data indicates that an Imminent Hazard may exist.

Issue: It is unclear how one can predict an Imminent Hazard without indoor air data and incomplete subsurface information. We recommend that this concept be explained further or deleted.

2.2 Is the Vapor Intrusion Pathway Complete – Use of Lines of Evidence

A vapor intrusion pathway is considered complete if a source and a migration pathway have been identified and indoor air in an occupied building (or planned to be occupied) has been impacted.

Issue: Although the MCP uses the terms "occupied" and "planned to be occupied," the Guidance needs to be clearer with respect to the latter term. A vacant building should not qualify as "planned to be occupied" if it is merely habitable; such a building should qualify as "planned to be occupied" only if there were active plans underway for people to occupy the structure.

A source of vapor intrusion could be the original spill or release of OHM, but may also [be] any media (soil, groundwater, and soil gas) subsequently contaminated.

A "source" is specifically defined in the MCP in 310 CMR 40.1003(5)(c) and would include contaminated fill, soil, sediment and waste deposits. Groundwater and soil gas (and even indoor air) are not sources, but are media that have been affected by a contaminant source. **This statement is inconsistent with the MCP and should be deleted.**

2.2.1. Relevant Lines of Evidence for Vapor Intrusion

MassDEP recommends considering a number of distinct lines of evidence for determining whether or not indoor air contamination is due to a complete vapor intrusion pathway at a site, including:

1. *Concentrations of VOCs in subsurface media (groundwater, soil, and sub-slab soil gas);*
2. *Concentrations of VOCs in indoor air;*
3. *The presence of LNAPL or DNAPL;*
4. *The presence of preferential pathways for vapors;*
5. *Concentrations of VOCs in outdoor air; and*
6. *The presence of indoor sources.*

Issue: This sentence assumes that indoor air contamination is present and the issue is determining whether the contamination is due to vapor intrusion or not. Given that the section's goal is to determine if a vapor intrusion pathway exists, the following language is recommended:

Suggested language: MassDEP recommends considering a number of distinct lines of evidence for determining whether or not a complete vapor intrusion pathway exists at a site, including….

This section lists lines of evidence that should be considered when evaluating the vapor intrusion pathway. The type and construction of the subject building can heavily influence the extent, if any, of the migration of vapors from the subsurface and, as such, these factors should be considered a line of evidence in addition to the others listed. In addition, certain contaminants, such as 1,1-dichloroethylene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), cis-1,2-dichloroethylene (cDCE), and trans-1,2-dichloroethylene (tDCE), are uncommon in background sources and can be used as "vapor intrusion tracers." Deep soil vapor samples can also be useful in evaluating potential vapor intrusion to both current and future buildings. We suggest adding the following lines of evidence to the list on the top of page 12 of those that may be considered: (1) building type, construction, configuration and heating and mechanical systems; (2) measured pressure differential across the floor slab; (3) frequency of contaminant as a background source; and (4) concentrations of deep soil vapor (proximate to water table).

In general, reference to "sub-slab soil gas" may be confusing, particularly when referring to EPA documents, where the term "sub-slab gas" refers to vapor samples collected beneath a building and "soil gas" refers to samples collected exterior to a building.

2.2.2 Modeling

In the first paragraph, there is text that says if groundwater concentrations are above GW-2 standards (by apparently any amount), "modeling should not generally be used as the only basis

for concluding that no further evaluation is needed." However, the GW-2 standards are based on a number of default assumptions regarding soil type, building characteristics, moisture content, etc., which may be not relevant at a specific site. These default assumptions add a number of additional uncertainties to the evaluation, particularly in comparison to the use of modeling from soil vapor. Modeling from subslab soil vapor can be much more representative of site conditions and the potential for vapor intrusion in comparison to groundwater data, and so should be acceptable here.

In addition, the Department's skeptical stance concerning modeling, even from soil vapor, appears to be reversed in the third paragraph of this section, where DEP 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 in such cases, the use of soil vapor screening or modeling may be relevant.

The Guidance should acknowledge the value of modeling from subslab and/or deep soil vapor data in the process of vapor intrusion evaluations and site closure.

2.2.3.2. Indoor Air

…if site-related contaminants (present in soil and/or sub-slab soil gas) are not detected in indoor air over several rounds of testing, other lines of evidence are usually not necessary since there is not likely to be a complete vapor intrusion pathway.

Issue: In addition to non-detects in indoor air, low indoor air concentrations provide a similar line of evidence if the sub-slab concentrations are high. Because of the many sources of VOCs in indoor air, one often finds detectible, but low concentrations of VOCs in indoor air. In addition, DEP should consider adding text noting that basement/first floor comparisons are useful. If one finds non-detects or low levels of VOCs in basement air and higher levels in first floor air, this generally indicates the presence of indoor sources.

The Guidance also is silent on the detection of constituents in indoor air that are not measured in the soil gas or groundwater, and should address this possibility. We suggest adding the following text:

Suggested text: If constituents detected in indoor air testing are not present in soil gas or groundwater samples collected at the Site, one may conclude that the indoor air contaminants are not associated with the disposal site, and there is not a complete vapor intrusion pathway.

At the end of the first paragraph, DEP provides an example of a situation when a vapor intrusion pathway is not complete if "several rounds" of testing of soil vapor are performed. In many circumstances, two rounds, especially if both are 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 the site-specific Conceptual Site Model ("CSM"), that is used to determine the number of rounds that is adequate for each site.

2.2.3.3. Soil/Sub-Slab Soil Gas

The first paragraph of this section states that "In instances where sub-slab soil samples show no contamination but elevated concentrations of a contaminant are found within in (sic) indoor air, this may indicate that a localized source under the building was missed." An interior source could also be causing the higher concentrations in indoor air compared to soil vapor concentrations. As is standard practice, a detailed survey of the structure needs to be done to assess whether the indoor air concentrations are coming from an indoor source.

The source of the generic sub-slab soil gas to indoor air dilution factor of 50 is not clear. Figure 8 of the March 2008 EPA document referenced is for exterior soil gas to indoor air attenuation, while Figure 11 of the same document is for sub-slab soil gas to indoor air attenuation. Also, it should be noted that the EPA document referenced is in draft form.

The relationship between the 2002 VPH/EPH guidance and this Vapor Intrusion Guidance is not clear. This Guidance establishes a sub-slab soil vapor to indoor air dilution factor of 1,000, which is a rounded value derived from the J&E model used in developing the VPH/EPH guidance. DEP is relying on the previously derived dilution factor. However, it is not clear whether other elements of the VPH/EPH guidance can be relied upon, including the use of a photoionization detector to first screen for the potential for vapor intrusion impacts using a Method 2 approach. The relationship between the two documents should be further clarified.

With regard to Sub-Slab Screening Values, Appendix II is reserved for the Soil Gas Screening Values; however, there are currently no values included. The Guidance does state (page 14) that the soil gas screening values are based on the threshold values (TVs) with a soil-gas-to-indoor air dilution factor applied. For most compounds the dilution factor is 50, except for C5-C8 aliphatics, C9-C12 aliphatics, C9-C18 aliphatics, C9-C10 aromatics, toluene, ethylbenzene, and xylenes, for which the dilution factor is 1000.

Issue: DEP has applied a sub-slab to indoor air attenuation factor (AF) from the EPA's 2008 database. The proposed AF of 50 is the inverse of the 90^{th} percentile value. Most of the attenuation factors included in the EPA (2008) database are 100 or more. This can be seen clearly in the cumulative percentile graph included in the EPA document, which shows that 10% to 75% of the attenuation factors are between 100 and 1000. The 75th percentile value is an attenuation factor of 102. It follows that a prudent attenuation factor for use in the Guidance is 100, and not 50, as proposed in the draft Guidance. MassDEP has stated recently in its TIAC guidance that it considers 75th and 90th percentile values appropriate values for comparison to measured indoor air concentrations, as one line of evidence in evaluating whether a building is affected by a vapor intrusion pathway from a disposal site. Statistically speaking, the choice of the 75th percentile in this context, that is, an attenuation factor of 100, would be entirely consistent with the TIAC guidance, from which MassDEP's TVs are derived.

The corresponding soil gas screening values for the petroleum fractions, and toluene, ethylbenzene and xylenes are based on the TVs and the dilution factors presented in the 2002 guidance (rounded to 1000). MassDEP feels it is advisable to continue using the previously derived dilution factor until more petroleum-related empirical information is available.

Issue: Excluding benzene from the 1,000-fold attenuation factor means that the attenuation factor will likely be 50 for all gasoline sites, because the presence of benzene would drive the evaluation. Benzene should be treated similarly to the other gasoline-associated compounds.

2.2.3.4. Other Lines of Evidence

Sources of indoor air contaminants are discussed in this section under the general heading of "Household Products." This section seems to focus on potential contaminant sources in residential settings. This section should be expanded to discuss the influence of commonly used products and building materials in commercial and industrial buildings as well.

This section provides a useful internet source for identifying residential materials and activities that might release contaminants to indoor air. However, the sentence "In addition to minimizing items that might contain contaminants of concern prior to sampling, MassDEP has also developed Residential TVs to help in the identification of concentrations that are likely the result of indoor sources in residential settings" seems misleading in that the Residential TVs mentioned above do not identify concentrations that are solely the result of indoor sources in residential settings. The typical indoor air concentration is only one factor considered when setting the Residential TVs. For each constituent, the Residential TV is derived based on 50th or 90th percentile values (depending on the constituent) for typical indoor air concentrations, laboratory reporting limits, or cancer and non-cancer risk-based concentration. Also, for some constituents, the more conservative (i.e., lower) 50th percentile value is the selected typical indoor air concentration, as opposed to the more frequently used 90th percentile value. As a result, stating that the Residential TVs "help in the identification of concentrations that are likely the result of indoor sources in residential settings" seems misleading. References to the TVs in this regard should be removed.

The section on NAPL states that the presence of NAPL may be a significant source to indoor air contamination that may not be accounted for in sampling of other media. While this may be true for groundwater or soil data, the importance of sub-slab soil gas data is understated in this section. If NAPL is contributing to indoor air contamination, collection of sub-slab soil gas samples throughout the footprint can provide information as to the extent of contamination coming from the NAPL source. This section seems to imply that if NAPL is found, the next step would be indoor air sampling, skipping groundwater and soil gas sampling. However, sub-slab soil gas samples could provide valuable information in evaluating the potential impact of NAPL on indoor air before indoor air sampling is performed.

2.2.4. Recommendations for Interpreting Lines of Evidence

In the paragraph before Table 2-1, DEP proposes that "Data used for a line of evidence evaluation should be representative of site conditions and should not be averaged over locations." There is no rationale provided for not permitting the averaging of indoor air data over locations. As part of a 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 any prohibitions will respect to averaging. In fact, it is appropriate to average sub-slab soil gas data and indoor air data from two or more sampling locations to obtain a value that is "representative of site conditions." For instance, it is not reasonable to implement the matrices

shown in Table 2-1 and 2-2 based on single samples when multiple samples are available. Environmental investigations generally rely on conservative estimates of the central tendency of the environmental data. For instance, one might have two sub-slab soil gas samples. If one result is far less than the sub-slab soil gas screening level and one is slightly higher than the sub-slab soil gas screening level, the mean value will be less than the criterion. There is no scientific rationale for abandoning the averaging that is routine in environmental assessment and, instead, using only the higher value for the purposes of a "lines of evidence evaluation."

Particularly if DEP continues to use risk-based "threshold values" as a substitute for typical indoor air concentrations – the measure DEP long used to determine "background" for indoor air – then it would be scientifically valid and reasonable to calculate and use the weighted average of indoor air samples from basements and higher level floors in residential buildings. In particular, it is reasonable to perform averaging based on site-specific exposure durations for the purposes of developing an indoor air concentration to use in the "lines of evidence evaluation."

With regard to temporal averaging, DEP proposes: "Averaging the results of samples from the same location over time is appropriate only when concentrations are not increasing, and an adequate number of samples is used in averaging. The most representative time period can be selected for comparison to relevant criteria, provided the data selected represents seasonal and other time-related variability.

Issue: It is anticipated that contaminant concentrations from a series of indoor air samples collected in the order: Winter-Spring-Fall might reasonably be expected to *decrease* because the Winter sample is generally considered by DEP to be a worst case sample. On the other hand, the same samples collected in the order Fall-Spring-Winter, might be expected to *increase* for the same reason. The most reasonable estimate of the indoor air concentration of a VOC is the average level over several seasons, not the value from the worst season. The proposed Guidance should be revised to clearly state that temporally averaged data from at least three seasons, including the Winter season, are adequate for a "lines of evidence evaluation."

Also in this context, the Guidance does not define the term "location." Does it mean first floor versus basement, or first floor room 1 versus first floor room 2, or tenant space 1 versus tenant space 2? Or, does it mean each soil vapor point, or all soil vapor points within a defined space? The policy needs clarification regarding the definition of "location" and what types of samples are addressed in this section. Defining a "location" as a specific sampling point seems particularly conservative, especially if averaging over a number of sampling points is not allowed. If few sample points are available over a large area, then assuming each sample point is a separate "location" is likely appropriate. However, for sites where a large number of sample points have been used, especially for soil vapor, averaging may be appropriately conservative. In addition, if there is data variability and sufficient data exist, in lieu of using the maximum concentration, the upper 95th percentile confidence limit on the mean should be an acceptably conservative approach for interpreting lines of evidence.

The proposed approach appears particularly conservative when the current and future use of the property is and will remain commercial/industrial. If each sampling point is considered a separate "location," this requirement may encourage parties performing response actions not to install additional soil vapor or indoor sampling points out of concern that they will encounter one

location that will dictate further investigation or remediation, based on this overly conservative approach.

In Tables 2-1 and 2-2, DEP is giving too much weight to the Threshold Values.

Issue: Whenever the TV is exceeded, SRM notification is required and vapor intrusion is considered "possible" or "likely." As an example, for PCE, the TV is the 50th percentile TIAC, so fully half of all houses would be expected to have PCE in indoor air at this TV of 1.4 ug/m^3. DEP is proposing that all homes with < 1.4 ug/m^3 PCE in indoor air have no vapor intrusion pathway, regardless of the state of groundwater or sub-slab soil gas, and that all homes with > 1.4 ug/m^3 PCE in indoor air have a vapor intrusion pathway and require SRM notification, again regardless of the state of groundwater or sub-slab soil gas. The TV should not be given this much importance. For instance, a house with sub-slab soil gas levels of 1,000 ug/m^3 might require further investigation regardless of a low indoor air measurement that was < 1.4 ug/m^3. At the same time, a house with no PCE detected in groundwater and no PCE detected in sub-slab soil gas should not require further action just because indoor air contained >1.4 ug/m^3 of PCE. After all, there are even odds that houses with no vapor intrusion issues will have indoor air levels that are less than or more than the PCE TV.

Tables 2-1 and 2-2 provide criteria for "groundwater contaminant levels," but the proposed Guidance does not state the location of these groundwater levels relative to the building at issue.

Issue: We assume that these criteria apply to groundwater samples from wells installed within 30 feet of a structure to be consistent with the GW-2 standards. DEP needs to clarify this fact in footnotes to Tables 2-1 and 2-2. Tables 2-1 and 2-2 should not refer to the closest groundwater sample regardless of distance or direction.

The >2X GW-2 criterion has no basis in science.

Issue: DEP provides no rationale for the >2X GW-2 criterion. We recommend that DEP provide any available quantitative documentation for the relevance of this criterion and evidence that similar indoor air impacts are anticipated when sub-slab soil gas is >50X TV or groundwater is >2X GW-2.

DEP has stated that 50 is a reasonable (90th percentile) attenuation factor between sub-slab soil gas and indoor air. However, DEP has presented no evidence that there is a 50-fold attenuation between groundwater concentrations and indoor air. EPA's 2008 database has groundwater to indoor air attenuation factors, so a similar approach to the one used for sub-slab soil gas could be derived if DEP so wishes. In the absence of such an analysis, the arbitrary use of 2X GW-2 is scientifically unjustified.

In fact, the 90th percentile attenuation factor from groundwater to indoor air from EPA's database is ~1,000. Using this attenuation factor and PCE as an example VOC, the groundwater concentration that would predict the TV for PCE would be 1,923 ug/L, which is 38 times the GW-2 standard, not 2 times the GW-2 standard. Because DEP has relied on a high end attenuation factor to derive the sub-slab soil gas screening value, there is no reason why DEP should not also rely on this same attenuation factor database to derive a groundwater criterion as a multiplier of the GW-2 standards. Based on the above simple analysis, it appears that >2X

GW-2 is much lower than is required to relate groundwater concentrations to indoor air concentrations using EPA's large attenuation factor database.

The attenuation factor of 38 that DEP is using to relate PCE groundwater concentrations to indoor air concentrations is essentially the 99.99th percentile value from EPA's database. Graphically presented data indicate that only 4 data points were this low or lower out of the >1,000 data points in EPA's database. We do not see a valid scientific or health based reason to use such a conservative value here.

In addition, Tables 2-1 and 2-2 suggest that if groundwater concentrations are >2X GW-2 but sub-slab soil gas is less than 50X the TV, then indoor air sampling is required and vice versa. Sub-slab soil gas data is a more direct line of evidence for evaluating vapor intrusion potential than groundwater, considering the significant influence of subsurface heterogeneity and physical characteristics on the transport of vapors from groundwater to the slab. This table should be revised so that sub-slab soil gas data is given more weight than groundwater data, especially in cases where there may be a confining layer retarding the transport of vapors from groundwater into soil gas beneath a slab. We recommend that if the subslab soil vapor data is < 50X TV (1000X TV for petroleum related compounds including benzene), then the vapor intrusion pathway should be considered unlikely, instead of requiring that both soil vapor be below screening values AND groundwater be below 2X GW-2 standards.

Tables 2-1 and 2-2 present matrices for use in assessing current buildings. A similar type of approach should be available for the evaluation of future buildings. Although 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 of construction, potentially "locked in" with an AUL, if necessary) to evaluate the significance or existence of a potential vapor intrusion pathway. For example, if there is very limited or no VOC contamination in soil and the depth to groundwater is well below a typical building foundation depth, then collecting soil gas immediately above the water table should represent worst-case soil gas concentrations. If the soil gas results are below the Sub-Slab Soil Gas Contaminant Levels set forth in Table 2-1 and/or Table 2-2 (as applicable), then an LSP should be able to conclude that indoor air is also not a future pathway. Because vapor migration is primarily a diffusive process within soil, vapors will move across a concentration gradient going from high to low concentrations. As such, vapors cannot occur under a building at concentrations greater than deeper soil vapor concentrations (i.e., they cannot build up under a building). Deep soil gas should be considered to provide a worst-case indication of the concentrations of VOCs in soil gas under *current* or *future* conditions. This conclusion provides an opportunity for a line of evidence evaluation of the *current* and the *future* indoor air pathway. In all of 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, based on which modeling could be used and relied upon.

As a follow-on comment pertaining to the approach outlined in Tables 2-1 and 2-2, 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 DEP 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). Further, in these types of uses, potential building occupants will either reside there for a much shorter period of time than the default assumption for "residential" exposure duration (30 years) and/or not be present within the structure 24 hours per day, 7 days per week, year round (e.g., 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 zoning category for these types of facilities is generally designated as "institutional" only to differentiate these projects from residential.

In addition, the interpretation of lines of evidence, as proposed, does not include consideration of whether breakdown products are present in the indoor air. For example, tetrachloroethene (PCE) is a common vapor intrusion issue, yet dry cleaned clothing is also a common source of PCE in indoor air. It can be very difficult to determine whether the source of PCE in indoor air is attributable to vapor intrusion and/or off-gassing of PCE from dry cleaned clothing. This situation is particularly true in buildings with offices or multi-family residential units. In this situation, it is very difficult to eliminate all sources of PCE, because access to all neighboring units or occupants is often not possible. In the subsurface, PCE typically breaks down to trichloroethene (TCE), cDCE and vinyl chloride (VC). The levels of these compounds in the subsurface could be compared to their levels (or their detection limits) in indoor air to derive Site-specific dilution factors. These Site-specific dilution factors could then be used to predict the levels of PCE likely to be present from vapor intrusion alone. The Guidance should note that it is possible to use this approach as one element in a line of evidence evaluation.

2.3 Sampling Considerations

DEP states: "Optimally, the plan should include sampling and analysis of soil, groundwater, sub-slab soil gas, indoor air, and outdoor air."

Issue: This guidance is contrary to the guidance provided in Section 2.1, which states: "Ideally, an initial assessment of site subsurface conditions, including information relative to contaminant concentrations in groundwater, sub-slab soil gas, and soil, should be conducted before proceeding with indoor air investigations." In Section 2.1, DEP recommends sub-slab soil gas sampling in the absence of indoor air sampling, but in Section 2.3, DEP recommends that sub-slab soil gas and indoor air be sampled together in all cases. We recommend that DEP make the proposed Guidance consistent from section to section by stating that sampling plans can vary depending on site characteristics.

2.3.3 Sub-Slab Soil Gas

DEP states: "Sub-slab and indoor air samples should be obtained at the same or similar time (under the same weather conditions) to reduce variability in evaluating the vapor intrusion pathway."

Issue: This guidance is contrary to the guidance provided in Section 2.1, which states: "Ideally, an initial assessment of site subsurface conditions, including information relative to contaminant concentrations in groundwater, sub-slab soil gas, and soil, should be conducted before

proceeding with indoor air investigations." We recommend that DEP make the proposed Guidance consistent from section to section by stating that sampling plans can vary depending on site characteristics.

If soil gas samples are collected using pre-evacuated canisters without flow controllers to temper the filling rate, it can often be difficult to obtain a sample that has not short-circuited with the indoor air. We recommend that an appropriately sized flow controller be used when collecting samples into pre-evacuated canisters to limit the potential for short-circuiting.

This section states that "Sampling adjacent to the building should be performed at a depth below the slab and at an angle such the soil gas under the building footprint is obtained." It would be difficult to sample at depth at an angle, using either a drill rig or manually driven rods. This seems unreasonable.

The recommendation for two to four probes for a typical single family home is high. One to two should be enough for a typical single family home. Ultimately, the number of probes should be determined by the LSP based on the conceptual site model and site-specific considerations. Also, the rationale for requiring one sample in the center of the building should be provided.

2.3.4. Indoor Air

A discussion of the below grade parking level scenario should be added to this section. DEP should acknowledge that the State Building Code's ventilation requirements for underground vehicle garages will be protective of risks associated with the possible presence of sub-slab VOCs. Furthermore, if the basement of the building or garage extends below the seasonal low water table, off-gassing of VOCs from groundwater is not an exposure pathway or a concern. In addition, the Guidance should note that these structures are considered intrinsically safe as set forth in ASTM E2600 (Standard Practice for Assessment of Vapor Intrusion into Structures on Property Involved in Real Estate Transactions).

HVAC settings during an 8-hour indoor air sampling event should be noted for a commercial building. At times, sampling is conducted outside of regular business hours where the HVAC system may not be functioning the same as it does during the day.

MADEP recommends "multiple rounds of indoor air sampling." As stated previously, in most cases, two to three rounds, including up to two Winter rounds, is sufficient. This is because if steady-state conditions have been attained in the subsurface (ongoing sources have been eliminated or controlled) and enough representative data have been compiled to develop a valid CSM, then "considerable" temporal variability associated with vapor intrusion may not be observed.

Table 2-3 is misleading. It suggests that "soil saturated with rain" is a more conservative condition. While Winter sampling in homes is considered more conservative for indoor air sampling because of the heating system draw and closed windows, the soil is dryer in the Summer, resulting in increased vapor diffusion through the subsurface and less contaminant mass trapped in the moisture. 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's interior and the outdoor environment. This table should be corrected.

… MassDEP APH and/or TO-15 CAM methods. If one or both of these methods is selected, all target analytes should be included.

Issue: If groundwater testing has been conducted and the contaminants of concern are limited to chlorinated or aromatic VOCs, then a limited target list based on the results of groundwater sampling is appropriate. If the contaminants of concern are chlorinated VOCs, it is appropriate to limit the TO-15 analysis to only the chlorinated target analytes and to exclude the aromatics which are not associated with the disposal site. The selection of contaminants of concern (COCs) for the site is clearly discussed in Section 2.4.1 ("A variety of compounds are often detected in indoor air. It is therefore important to determine which of these should be considered (COCs) in the risk characterization. Such a process is completed for all site exposure media, as described in MassDEP Risk Characterization Guidance. If subsurface contamination has been adequately characterized, only those chemicals detected in the subsurface should be considered as COCs in indoor air.") The recommendations for indoor air testing should be consistent with this discussion in Section 2.4.1.

Suggested Language: "…unless soil and/or groundwater testing have identified the contaminants associated with the disposal site."

2.3.5. Outdoor Air

This section states that "The investigator may choose to sample outdoor air on all sides of a building." This seems excessive and unnecessary. Choosing a representative area on the exterior of the building, specifically near the air intake for the HVAC system, would be more useful than collecting samples from all sides of a building.

The intent of ambient air samples (collected in the vicinity of the building being evaluated for vapor intrusion) is to capture typical outdoor concentrations of VOCs from auto emissions, point sources (such as stacks) 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.

2.4.2 Site Receptors, Activities, and Uses

DEP does not provide an adequate basis for its position that "vapor intrusion in the future cannot be predicted from a current use situation." DEP's position is inconsistent with the requirement of the MCP to forecast "reasonably foreseeable" site uses and activities and the risks associated with them. The concentrations of the contaminants in indoor air under the current use is a reasonable forecaster of the concentrations expected to be in the indoor air in the future. In addition, there are many sites where adequate subsurface data can be collected (typically, at a minimum, groundwater and either sub-slab or deep soil vapor), a CSM can be developed, and conservative modeling can be used to accurately predict (hypothetical) future indoor air concentrations. This approach assumes that sources, as defined in the MCP, have been eliminated or controlled, groundwater conditions have reached steady state and/or are decreasing, and adequate and representative soil vapor data has been collected and used in

modeling, with conservative assumptions. 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 or is likely to be complete, and second, if so, what are the estimated risks assuming either hypothetical future residential use, and/or incorporating specific future use assumptions/building construction types into the model and implementing an AUL.

The practical implication of DEP's position is that no property at a site where VOCs have been measured in groundwater above GW-2 standards can ever be closed without an AUL, no matter how many times indoor air data demonstrate the absence of a complete indoor air pathway. That is a needless burden based entirely on the fear of uncertainty. DEP should rescind its position that future vapor intrusion cannot be evaluated, particularly at a site with an existing building.

For ongoing permitted commercial operations, the Guidance states that vapor intrusion need not be considered for an Imminent Hazard or Substantial Hazard evaluation provided concentrations are at least one order of magnitude higher than the levels that would be present due to vapor intrusion alone. However, the method for evaluating this is unclear. In addition, here, it appears that DEP is comfortable recommending a modeling approach to attempt to differentiate subsurface vapor intrusion impacts from ongoing commercial activities. This is at odds with the stance DEP has taken for every other situation.

It is not apparent why a Permanent Solution can not be reached for permitted commercial operations. Additional lines of evidence can be used to evaluate the presence or absence of a vapor intrusion pathway in these situations (i.e., soil vapor data, groundwater data, modeling). If the site is adequately characterized, each line of evidence (excluding indoor air data) is applied in accordance with this guidance document, and the results of the lines of evidence evaluation suggest that additional investigation of the vapor intrusion pathway is not required, the site should be eligible for a Permanent Solution. The Guidance suggests that it is not possible to demonstrate the absence of a vapor intrusion pathway when there is permitted indoor use of COCs, and this is not accurate.

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 the 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.

This section also requires that neighboring/common wall businesses should be evaluated for Imminent and Substantial Hazards. This requirement is problematic for a strip mall (or a multi-tenant industrial complex) when common walls or ceiling spaces can introduce fugitive emissions from the dry cleaner (or other operations using VOCs) into the neighboring businesses. This issue is not an MCP issue. The levels of VOCs detected in adjoining tenant spaces are most likely to be attributable to fugitive emissions throughout the building and not to

soil vapor intrusion. This issue may result in the installation of an expensive sub-slab depressurization system in a fruitless and disruptive effort to reduce the levels of volatile chemicals in a neighboring tenant space. While it is important to protect public health in this situation, the MCP is not the correct regulatory program to use to eliminate volatile chemicals from neighboring tenant spaces when the principal source of those contaminants is fugitive emissions and not vapor intrusion.

2.4.3. Exposure Point Concentrations

Any basement with at least seven feet of head room in an occupied residential dwelling should be considered a living space; and basements of any height which show evidence of current activity should be considered living or working space. Crawlspaces would not apply [sic] to this definition of living or working space.

Issue: It is not reasonable to assume that all basements are "living space" simply because they have ceilings high enough for a person to stand. Particularly in urban areas, zoning ordinances and building codes typically prohibit renovation of basements for living space, at least absent a separate route of egress in case of fire. It is unreasonable to assume that every basement will be developed, regardless of whether a building permit could be obtained and whether the basement in fact is in a condition to be developed. For evaluation of CEPs and Imminent Hazards, the actual, current use of the basement in a residence should be considered rather than assuming the basement is living space in all circumstances where ceiling height is 7 feet or higher.

DEP has also proposed that any basement that shows "evidence of current activity" should be considered "living space." This is also unreasonable. First, "evidence of current activity" is subjective. For instance, one person might conclude that running a dehumidifier in a basement is "evidence of current activity," and others may only consider finished bedrooms or children's playrooms as such evidence. Basements that are finished into bedrooms or family rooms should be considered "living space," not basements used for laundry or storage.

Here, the Guidance is silent on the issue of averaging multiple samples within the same general exposure location, such as a basement or a first floor. With respect to averaging multiple sampling points on one floor for the calculation of EPCs, this section of the Guidance should clearly state that the same protocols apply for indoor air as for other media. If the data are highly variable and/or a "hot spot" exists, then distinct sample location data and/or upperbound values (not necessarily maxima) should be used as the EPC. However, when data are generally consistent, the mean of the samples from the basement and the first floor should be used as the EPCs for the basement and the first floor. This medium should not be treated differently than any other media typically evaluated within the risk assessment. There is neither a regulatory nor a technical basis for treating indoor air any differently from other environmental media.

2.4.3.1 EPCs For Chronic Exposures

DEP allows temporal averaging of data for EPC calculation in certain circumstances. Specifically, "indoor air sample results from a given exposure point may be averaged provided there is sufficient data to support such averaging as yielding a conservative estimate of the average exposure. If sufficient rounds of consistent and representative data exist, such that a

good case can be made that the average value is a representative and reasonably conservative value, then average concentrations can be used for EPCs. When data is variable or limited, a maximum value should be used to develop an EPC. "

Issue: Data from three seasons will vary precisely because of variable conditions that affect the vapor intrusion process. Such data should be averaged to provide a realistic estimate of the average concentration to which the receptors are exposed. Such an estimate is representative, but it may not be consistent. For instance, it is entirely reasonable and representative for three samples taken in Spring, Fall and Winter to be ND, ND and 3 ug/m^3 or 1, 1, and 4 ug/m^3. Such data should be averaged to provide a realistic risk assessment. If the data are not averaged because they are not deemed "consistent," then the risk assessment would be assuming that the worst case Winter conditions are present all year when it is clearly known (the data in fact show) that they are not.

EPCs calculated using the criteria above apply to current scenarios and must use the total concentration of a COC measured in indoor air (cannot deduct levels believed to be from non-release sources). As discussed in Section 2.3.2, EPCs cannot be developed for a future building or use from a current use situation, and an AUL is recommended to control future exposures.

The Guidance indicates that EPCs cannot be developed for a future building or use from a current use situation. This is not true in many circumstances. Indoor air data from a current building can be one technically valid line of evidence in evaluating future exposures. If it is a large commercial building, these data can be used in conjunction with modeling from subslab soil gas obtained from 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 are collected and are shown to pose NSR, why would an AUL ever be required? This section should be revised to reflect these alternatives.

In addition, the reference to Section 2.3.2 is incorrect. It should cite Section 2.4.2. More importantly, specifying that only EPCs for the current scenario can be calculated is inconsistent with the MCP, because current and future EPCs are typically calculated for other media. In that regard, see Section 40.0926(6) of the MCP, 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 the Guidance should allow the use of these models in ways that will be protective of human health. This section of the Guidance should be revised to reflect these alternatives and the quoted language of the MCP.

DEP has no basis for asserting that the indoor air concentrations will change because the use of the building may change. If the concentrations in indoor air pose NSR for current commercial workers and those same concentrations pose Significant Risk for future residents, an AUL should be required. However, if the concentrations pose NSR for a future resident, an AUL is not necessary, because this is a reasonable estimation of future use and its associated exposure.

The uncertainty or the variability of future exposure should be addressed in the uncertainty analysis of the risk assessment. Uncertainty cannot be used to impose a blanket prohibition of a well accepted methodology. Disallowing the calculation of future EPCs based on current data would mandate that an AUL be placed on all commercial properties, regardless of whether or not the current concentrations would pose risk above NSR in a future residential scenario.

With respect to calculation of EPCs, if data is too variable to use the average concentration as the EPC, but sufficient data exists, the 95th percentile upper confidence limit on the mean should be an acceptable alternative to using the maximum concentration.

There are some cases where EPCs cannot be based on indoor air sampling, as buildings contain active indoor air sources. In these cases, indoor air EPCs can be developed based on sub-slab soil gas sampling and the application of the dilution factors identified in Section 2.2.3.3 (50 for most VOCS, and 1000 for APH fractions and toluene, ethylbenzene, and xylenes).

Issue: This statement is contradictory to the approach outlined in Section 2.4.2, which presumes that EPCs cannot be estimated for ongoing and active businesses that contain active indoor air sources and that only a temporary solution can be obtained. By using modeling in this situation, the significance of the vapor intrusion pathway can be evaluated and a permanent solution obtained.

It is not clear if the Guidance is referring only to indoor air EPCs for the active operation using the volatile chemicals. As noted above, at neighboring spaces in a strip mall or multi-tenant industrial building, fugitive emissions from the active operation may be the principal source (rather than vapor intrusion) of indoor air EPCs. The use of soil gas data and dilution factors should be acceptable for the neighboring tenant spaces as well.

2.4.3.2 EPCs for Imminent Hazard Evaluations

In cases where the dataset is limited, the maximum detected concentration should be used for the EPC.

Issue: Certainly, an Imminent Hazard Evaluation can be performed with the first and only dataset available at the onset of an investigation. However, when multiple rounds of data become available, it is logical and reasonable to perform the Imminent Hazard Evaluation using the temporally averaged data for the same reasons as noted above. The Guidance should be revised to provide for the use of multiple rounds of data.

2.4.4. Exposure Assumptions

In order to demonstrate No Significant Risk for commercial or industrial use, MassDEP recommends assuming 8 hours per day, 250 days per year, for 30 years, as shown in Table 2-4. The basis for this proposed 30 year exposure period for commercial/industrial workers should be provided. DEP policy to date has been to assume an exposure duration of 27 years for commercial and industrial workers. This proposed Guidance should not deviate from existing guidance in this regard, particularly with no reason for the change having been provided. We note that EPA's standard assumption for commercial and industrial workers is 25 years based on

census data. Also, EPA guidance typically includes a 2 week vacation even for residential exposures, reducing the EF to 350 (vs. 365) days per year.

For residences, MassDEP recommends assuming an exposure duration of 12 hours in the basement or the bottom-most floor and 12 hours on upper floors, provided there is sufficient data to develop location-specific EPCs as described in Section 2.4.3.

Unless a bedroom or playroom is present in the basement, the recommendation for the assumption of 12 hours per day in a basement every day over an exposure duration of 30 years is excessive. If one were attempting to characterize a "home bound" individual/invalid, how would this person get up the stairs from the basement to access other rooms in the home such as the kitchen, or potentially bathroom? More reasonable and realistic assumptions regarding basement use and exposure frequency should be incorporated. In the vast majority of circumstances, exposure on the order of 1-2 hours per day in the basement is likely conservative relative to actual uses and activities in this portion of the home.

2.5.1. General Risk Characterization Requirements

NAIOP does not concur that future conditions cannot be predicted from current conditions, assuming representative data are available, a valid CSM exists, the source has been controlled or eliminated and appropriately conservative assumptions are used in the modeling from soil vapor data. Furthermore, DEP's position is in direct conflict with its statements regarding the development of GW-2 standards based on "conservative modeling." The modeling used in the development of these standards incorporates more uncertainty that 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 it should not be required that both groundwater concentrations be <2x GW-2 ***and*** soil vapor concentrations be < 50 x TVs. An AUL should ***not*** be required simply because groundwater concentrations exceed GW-2 standards.

The guidance states that "Where GW-2 standards are exceeded at a site, Method 1 may be used to streamline the risk characterization process by quickly concluding that a Condition of No Significant Risk does not exist and the assessment can proceed to evaluation of potential remedies." Although this approach may seem like a cost saving measure up front, it may result in a finding of Significant Risk where one does not exist under current conditions and can be eliminated for future conditions through an appropriate Notice of Activity and Use Limitation. Ideally, sufficient soil gas and indoor air data were collected and preferential pathways examined prior to the Risk Characterization to allow for an understanding of the actual indoor air exposures and conditions that may require a remedy.

2.5.3 Method 2 Risk Characterizations

Here, the Guidance sets forth the DEP's determination that the use of models for calculating building-specific Method 2 Standards is not recommended. We have disagreed with DEP's general position regarding the use of modeling each time it is presented in the Guidance. Here, specifically, the Department's position conflicts with Sections 40.0980 through 40.0989 of the MCP, the use of site-specific soil and depth to groundwater data to develop an attenuation value

other than that developed by the DEP using its "worst-case" sandy soils input variables, which do not apply at every site. The Department's statement concerning the Johnson & Ettinger model also conflicts with the use of that model by the Department to develop the current MCP Method 1 GW-2 groundwater standards. Broad statements effectively prohibiting the use of modeling should be deleted from the Guidance and instead guidance should be provided allowing LSPs to use modeling in appropriate circumstances based on their professional judgment.

Section 3. Mitigation

General Comments on Section 3

NAIOP believes that every building and every MCP site has specific characteristics that should be considered when selecting a remediation or mitigation strategy to protect human health and reach regulatory closure. The current language of the draft Guidance, however, seems to focus on a "one size fits all" approach to mitigation. The suggested revisions that follow in this section acknowledge the variability between situations, and allow LSPs to select the appropriate approach based on site-specific information.

In addition, the DEP reiterates throughout this section its strong preference for active SSDSs to mitigate vapor intrusion, despite the fact that passive SSDSs can be and have been used successfully at many sites. Based on the current regulations, use of a system that can achieve permanent closure of a site is very much preferable to a system that achieves ROS and remains in the MCP. Our comments below reflect these general observations.

3. (Introduction)

Technical and financial feasibility are important considerations under the MCP, especially for existing buildings. We suggest the following wording for paragraph 2, sentence 2:

However, the implementation of measures designed to prevent the migration of vapors into buildings is often necessary to prevent exposure for some period of time ~~while~~ ***when*** *more comprehensive measures are ~~undertaken~~* ***not feasible****.*

The term "building construction" should be expanded in paragraph 3, sentence 2. Suggested wording is as follows:

The selection of the appropriate approaches to elimination or mitigation of vapor intrusion should be based on consideration of site conditions (building ***design and*** *construction* ***materials, heating and ventilation system design,*** *depth to groundwater, etc.), the remedial objectives, and circumstances at the time the indoor air impact is discovered (potential Imminent Hazards, prior to completion of Comprehensive Response Actions, etc.).*

3.1 VOC Source Elimination or Control

Although groundwater contaminated with dissolved VOCs do[sic] not meet the definition of "source" in the context of 310 CMR 40.1003(5), the dissolved VOC sin the groundwater can be a source of contaminants in indoor air. Where VOCs in the groundwater are the source of

impacts to indoor air contamination, reducing contaminant concentrations in groundwater to below the Method 1 GW-2 Standards will likely result in the elimination or mitigation of current and future impacts to indoor air. Soil contaminated with VOCs that may be contributing to vapor intrusion impacts should also be addressed by remedial measures such as excavation and/or in situ treatment to eliminate or mitigate the indoor air impacts.

As stated above in a previous paragraph, the MCP is clear concerning the definition of a "source," and the Guidance cannot reinterpret that definition. A source has been eliminated or controlled if it is not likely to result in an increase in OHM concentrations in an environmental medium. A stable groundwater contaminant plume, even if it contains contaminant concentrations that are greater than GW-2 standards, is an indication that the source has been controlled. The MCP does not require reduction of groundwater contamination to below GW-2 standards or the removal or treatment of soil if the source as defined by Section 40.1003(5) has been controlled. Elimination or mitigation of the vapor intrusion pathway that achieves NSR is an acceptable remedy under the MCP. **The paragraph should be deleted.**

3.2 Indoor Air Pathway Mitigation.

Building construction and configuration can be highly variable and air pressure differentials are a primary driving force concerning the migration of vapors into buildings. These concepts should be factored into this discussion. Suggested changes to paragraph 1 are:

Mitigating the vapor intrusion pathway can be accomplished by a variety of methods. Selection of the best approach will depend on consideration of a variety of building ***design and*** *construction* ***factors, air pressure differentials,*** *and site characteristics as well as the magnitude of the indoor air impact. Several different measures may be sequentially implemented at a specific building. For example, ventilation by opening windows and/or removal of VOCs by indoor air treatment may be the initial approach used to mitigate vapor intrusion from contaminated groundwater while a sub-slab depressurization system is designed and installed. Then, when the sub-slab depressurization system is operational and the pathway to the sensitive receptor is eliminated, the comprehensive site assessment can continue and/or response actions designed to treat groundwater and/or mitigate or control the source can be* ***evaluated and then*** *implemented* ***when appropriate and feasible****.*

Elsewhere within the Guidance the use of passive SSD systems is permitted in certain situations. We note that passive systems have been successfully used at a number of sites. It is not appropriate to exclude that option at this point in the document. Suggested changes to paragraph 2 are:

Under most circumstances, MassDEP considers ~~active~~ sub-slab depressurization (SSD) systems to be the most effective, reliable and feasible means of mitigating the vapor intrusion pathway. This recommendation is based on MassDEP's experience overseeing numerous vapor intrusion projects, including many state-funded projects, and more than 20 years worth of data collected from the mitigation of radon-contaminated soil gas. ***Whether the SSD system needs to include active mechanized equipment or can function in a passive manner needs to be evaluated on a site-specific basis, after consideration of the building design and the soil vapor concentrations that are present.*** *~~However, I~~ In circumstances where concentrations of contaminants in the soil,*

groundwater and/or soil gas are low, or site conditions preclude installation of an SSD system, a variety of other mitigation measures should be considered and may provide adequate mitigation.

The draft Guidance acknowledges the value of air pressure differential monitoring in other sections. It should be included at the end of paragraph 3 for consistency:

…….… vapor intrusion than active systems (refer to Table 3-1). ***Monitoring efforts can include both direct air quality analysis and documentation of air pressure differentials between the sub-slab conditions and the interior of the overlying building.***

We suggest the following edits to paragraph 4:

Prior to selecting the mitigation approach, several factors should be taken into consideration relative to the ~~building structure~~ ***building's design and construction*** *and information relative to the subsurface near the building. These factors are discussed in more detail below.*

3.2.1 Building Survey Considerations

The concern raised in paragraph 3 is an excellent one and we think it can be strengthened by this addition, which acknowledges the variability of structures and the historic evolution of many buildings:

The location of footings or other sub-slab structures should also be identified, as this may impact the effectiveness of a sub-slab depressurization system by inhibiting uniform depressurization. ***Particular consideration should be given to building footprints that have expanded with several additions over time.***

Paragraph 4 appears to focus on conditions in residential households. We suggest these additions to better reflect the situation in many commercial buildings:

Collecting differential pressure measurements within the building is recommended to quantify the forces such as wind, temperature, household appliances, ***design of the heating system, design of the ventilation system (if present),*** *and occupant activities that the mitigation system may have to overcome. This information may be especially important for passive sub-slab venting systems because the sub-slab differential pressures produced by passive systems are low compared to differential pressures produced by active systems. Methods for determining house differential pressures are available in the EPA Handbook, "Sub-Slab Depressurization for Low-Permeability Fill Material, Design and Installation of a Home Radon Reduction System", http://www.epa.gov/radon/pubs/ .* ***Evaluation of differential pressures in commercial buildings may benefit from the assistance of a qualified HVAC design engineer.***

3.2.2 Sub-Slab Materials

The focus should be on creating the necessary pressure differentials to mitigate vapor intrusion in paragraph 1:

Understanding fill/soil conditions beneath the floor of the foundation or slab is necessary to select and design an effective mitigation system. Permeable fill/soil materials beneath the slab

*will allow rapid soil gas movement, and only a slight vacuum will create sufficient flow rates. Less permeable materials beneath the slab may require ~~higher head fan units~~ **greater pressure differentials** to ~~draw~~ **create** the appropriate amount of vacuum necessary to mitigate the vapor intrusion pathway.*

3.2.3 Depth to Groundwater

We think the term "seasonal high" should be included and point out that monitoring wells installed for other purposes can be used to measure depths to water. We suggest these changes to paragraphs 1 and 2:

*The depth to groundwater is a consideration in selecting the most appropriate mitigation method. If the groundwater is very shallow and close to the bottom of the foundation floor or slab, active depressurization systems may not be the most appropriate method. In general, the **seasonal high** groundwater table should be at least 6 inches below the building slab for an active SSD system to be effective. Seasonal changes in groundwater elevation ~~should~~ **need to** be considered when evaluating the feasibility of SSD.*

*Depth to groundwater data can be determined from monitoring wells in the vicinity of the building as well as from test holes drill**ed** through the slab. ~~(executed for the installation of sub slab soil gas probes).~~*

3.3 ~~Active~~ Mitigation Systems

As written, this section focuses entirely on "active" systems, but the Guidance document allows for the use of passive systems in certain circumstances (see Table 3-1). We believe the document would be more logically consistent with these changes and additions:

Brief summaries of various ~~active~~ mitigation techniques are presented below. Appendix V contains a detailed description of standard procedures for the installation of an active SSD system. Appendix VI contains a list of references for the other ~~active~~ systems outlined herein.

3.3.1.1 Active Sub-Slab Depressurization (SSD) Systems

Consistent with the general comment provided for Section 3.3, we suggest the following changes to paragraph 1:

*Active ~~sub-slab depressurization (SSD)~~ systems mitigate the vapor intrusion pathway by ~~creating~~ **using a fan or blower to create** a negative pressure field beneath a structure of concern, inducing the flow of VOC vapors to one or more collection points, with the subsequent discharge of vapors up a stack and into the ambient air.*

We also suggest the following changes to paragraph 2, sentence 4:

*Effective mitigation requires depressurization beneath the slab that is strong enough to overcome depressurizations within the ~~house~~ **building** caused by appliances, bathroom fans, stove vents, **HVAC systems**, occupant activities (i.e., opening windows and doors) or weather effects (i.e., changes in wind and barometric pressure.)*

We also suggest the following changes to paragraph 5, sentence 2:

As the work will likely be conducted in close proximity to building ~~inhabitants~~ occupants, safety concerns are a priority….

New Section 3.3.1.5 Passive Sub-Slab Depressurization (SSD) Systems

We believe it would be appropriate to add a new subsection 3.3.1.5 to discuss the use of passive SSD systems and make the document more consistent. Our suggested text for this section is as follows:

Passive SSD systems mitigate the vapor intrusion pathway by using the pressure differential of the chimney effect to create a negative pressure field beneath a structure of concern. (See Section 3.4.2) This pressure differential induces the flow of vapors to one or more collection points, with the subsequent discharge of vapors up a vent and into the ambient air.

Passive SSD systems are based on the sub-slab piping used for radon-mitigation technology, connected to the atmosphere through a series of collection and discharge pipes. In situations where a building is positively pressurized as an outcome of the building's HVAC system design (see Section 3.4.1.1), a passive system can provide an acceptable pathway of least resistance for vapors to reach the atmosphere.

All SSD systems should be designed in conformance with standard engineering principles and practices. The installation of an SSD system should be conducted under the direct supervision of a competent professional with specific experience in building soil vapor mitigation, site remediation, and/or environmental engineering practices.

3.3.2 Indoor Air Treatment

We suggest a wording correction in sentence 4:

*Mitigation systems that ~~incorporating~~ **incorporate** high surface area sorbtion filters generally have better removal efficiencies due to the resulting better air-to-sorbent contact.*

3.4 Alternative Mitigation Approaches

We suggest changes to the first two sentences to support the use of passive SSD systems in certain situations:

*Mitigation approaches that are alternatives to depressurization systems, including active pressurization systems and passive techniques, are presented here with the understanding that these approaches may ~~have some benefit~~ **be appropriate** in situations where active depressurization is not possible**, or other factors support their use**. MassDEP **encourages** ~~recommends~~ active depressurization approaches ~~as a first choice~~ for mitigating vapor intrusion impacts because of their demonstrated success in mitigating exposures from radon and contaminants from sites over the past two decades**, recognizing that each method must be judged on its merits on a site-specific basis.***

3.4.1.1 Building Pressurization/ HVAC Modification

This section assumes that it is necessary to modify an HVAC system to pressurize a building. In general, new commercial and institutional buildings are often designed to function that way normally, but maintenance and monitoring is required to confirm they are operating as designed. As such, we suggest these changes:

*In ~~certain~~ situations **where the building's system design permits**, it is possible to modify or supplement the existing heating, ventilation and cooling (HVAC) system to create positive pressure within at least the lower level of the structure to mitigate vapor intrusion. **Newly constructed commercial buildings are often designed to be positively pressurized due to energy conservation design considerations.** Positive pressure within the building must be consistently maintained so that advective flow of subsurface soil gas into the structure is not occurring. This approach may not be suitable to older buildings since they may not be as air tight as newer buildings, making this approach more costly. Heating and air conditioning systems may need to be modified from running on an as-needed basis to running continuously. Although this approach may be capable of reducing advective forces, diffusive flow may continue, and **thus this approach** may not be appropriate when the concentrations of contaminants in the soil gas are high.*

*While HVAC modifications may be effective as an interim measure to control vapor intrusion **in an existing building**, such modifications **alone** are not an adequate long term solution for achieving a condition of No Significant Risk. It is unreasonable to expect that running an HVAC system outside the usual range of operations will be maintained over time. Occupant activities and minor unscheduled adjustments to the HVAC system ~~are likely to~~ **could** confound efforts to create positive pressure. In some **existing** buildings, manipulation of the HVAC system may be too complicated to effectively mitigate the vapor intrusion pathway.*

*At **existing** buildings where establishment of a negative pressure field is difficult, steps can be taken to improve the effectiveness of the SSD system by reducing the degree of under-pressurization occurring within the basement. These include: ducting make-up air from outside the building for combustion and drafting; and/or over-pressurizing the basement by using fans to direct air from the rest of the building into the basement, or an air/air heat exchanger to direct outside air into the basement.*

A building's HVAC system can serve as part of a mitigation system in a building where: (a) the HVAC make up air intakes are on the roof, (b) the building is designed to be operated in a positively pressurized condition during all seasons, (c) a passive sub-slab venting system has been installed below the floor slab, (d) air pressure differential monitoring is conducted as part of routine building maintenance, and (e) the concentrations of contaminants in soil gas are relatively low.

3.4.2 Passive Techniques

Our suggested changes to paragraph 2 are again intended to acknowledge that for certain building designs and circumstances passive systems are acceptable, as follows:

~~Since~~ ***Although*** *passive systems* ***can be effective in appropriate circumstances, DEP does not generally encourage their use*** *~~are not generally as effective as active SSD systems, they are not recommended~~ to mitigate Imminent Hazards. ~~However, if~~* ***If*** *it can be demonstrated through indoor-air sampling that installing a passive SSD, or an impermeable barrier, and/or sealing the cracks and other openings has mitigated the vapor intrusion pathway, and a sufficient amount* ***of air pressure differentia****l monitoring is conducted to ensure that these measures remain intact, these activities may be sufficient to mitigate the vapor intrusion pathway, especially in the short term,* ***or when utilized in conjunction with positively pressurized buildings.***

It appears as if the DEP did not consider both components of passive SSD systems when formulating its recommendations in the Guidance on this issue. 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 cracks in a floor) when installing a system. Also, since the DEP is indicating that to reach permanent closure of sites with active SSD systems, sampling needs to be performed when the system is turned off (essentially equivalent to a passive SSD system), and that following three rounds of sampling, the system can be shut down, it is unclear why this approach cannot be used to support NSR and closure at sites with passive SSD systems. That option should be included in the Guidance.

3.4.2.3 Membrane Systems

We do not think the guidance document should be this specific regarding the installation of membrane systems. The specifics of QA/QC vary from system type to system type. In our opinion, requiring a 70 mil membrane is excessive for most situations. A 70 mil membrane is impractical. It is too thick to handle. The membrane should be between 20 and 40 mil depending on the type of system and building configuration. The building owner's consultant and contractor are motivated to install a system that will work, as demonstrated by post installation testing. The Guidance needs to be more general. We suggest the following changes in paragraph 2:

Membrane systems installed above a gas-permeable layer prevent soil gas migration upwards and direct soil gas to the perimeter of the building or up and out passive or active vent piping. ***All*** *membrane systems ~~installed alone or as a component of a passive venting system should have a thickness of at least 70 mil, include~~* ***need to be durable and consist of*** *material ~~component~~ that has* ***been*** *demonstrated* ***to*** *not ~~to~~ significantly absorb VOCs.* ***Installation of membrane systems should*** *~~and~~ include a ~~comprehensive QA/QC~~ monitoring process to ensure soil gas entry routes have been eliminated.*

We suggest the following changes in paragraph 4:

Proper installation ~~including QA/QC of seams, joints, and welds~~ is critical to the performance of a membrane system. Manufacturers of membrane systems typically have stringent QA/QC standards and testing requirements that may include smoke or pressure testing of seams, joints and/or welds and around utility penetrations. ~~Installation should be performed by a trained, experienced and certified installer. Some manufacturers offer third party inspection services and warranties.~~ Since the membrane is typically installed below (and before installation of) the

concrete foundation, it is important to ensure the membrane is installed correctly and inspected and tested before the foundation is poured. Construction occurring after the membrane is in place, (e.g., cutting or grinding of rebar just above the barrier, installation of stakes for concrete forms) can damage the membrane. Multiple rounds of testing are recommended, with at least one round conducted immediately after membrane installation and at least one round after the floor system has been constructed. Repair of the membrane before the foundation is constructed is likely to be more straightforward and less expensive than afterward.

3.4.2.4 Passive Venting

We think the focus should be on the performance of the passive venting system. We suggest the following changes to paragraph 2:

*Although it is possible to install a passive venting system and membrane barrier as a retrofit to an existing building, these systems are generally better suited to new construction, where the appropriate amount and type of sub-slab bedding material can be specified and verified, and the proper installation of membrane barriers can be assured. Because the passive venting system does not use a fan to remove sub-slab soil gas, and relies instead on ~~atmospheric~~ **air** pressure ~~changes~~ **differentials** to induce soil gas removal, it is critical that the system include sufficient interception piping and highly permeable bedding, and that the barrier system ~~be~~ **is** properly installed. ~~QA/QC of seams, joints, and welds is critical to the performance of a passive barrier.~~*

3.5 Mitigation Maintenance and Monitoring

In Table 3-1, DEP proposes monitoring frequencies based on pre-remediation concentrations of VOCs in groundwater, sub-slab soil gas and indoor air.

Issue: As noted elsewhere in these comments, the proposed groundwater concentration criterion, two times the applicable GW-2 standard, has been proposed with no quantitative rationale or documentation. DEP needs to provide documentation concerning the basis and rationale for proposing >2X GW-2 as a decision criterion.

In Note #1 of Table 3-1, DEP states: "If sub-slab soil gas samples cannot be collected due to site conditions (shallow groundwater), the decisions should be based on groundwater concentrations (inferred or directly measured) and indoor air concentrations. "

Issue: DEP has stated that one can base decisions on "inferred" groundwater concentrations, but it is unclear how one can "infer" a groundwater concentration when measurements are not available. DEP should clarify this. We assume that DEP is referring here to concentrations predicted from groundwater flow models and interpolated values from nearby groundwater wells.

Table 3-1 provides for either annual or bi-annual indoor air samplings for passive systems until site closure.

The table should clarify that the testing must be conducted until site closure or a partial RAO at an affected property. For example, if a passive system has been installed, the site adequately

characterized and the source has been eliminated or controlled, a partial Class A-3 RAO could be prepared for the building.

3.5.2.1 Confirmation of Pressure Field of Active Mitigation Systems

We suggest adding a new paragraph 4 at the end of this section:

Note that short term fluctuations in manometer readings are generally not a concern, provided the data collected over time demonstrate negative pressure on average when compared to the air pressure within the occupied space.

3.5.2.2 Indoor Air Quality Monitoring of Active Mitigation Systems

The creation of an effective sub-slab negative pressure field should result in the reduction of VOC concentrations in the indoor air within the building. After SSD system startup, indoor air quality samples should be collected to confirm that concentrations of VOCs in indoor air are reduced (e.g. to levels below typical indoor background levels.)….. If sampling indicates that the system as installed is not effective, the system should be augmented, modified or another approach selected that will achieve the goals of the response actions.

Issue: Reduction to below TIACs should not be identified as the remedial goal for SSD systems (or other vapor intrusion-related response actions). For many compounds, a condition of NSR can be demonstrated at concentrations above TIACs. The Guidance should also not suggest that system modification is required if TIACs are not achieved. The performance standard under the statute and the MCP is a condition of No Significant Risk (NSR), not some lower level of risk arbitrarily calculated without regard either to the risk assessment standards DEP has previously promulgated or the cost of reducing calculated risk below NSR. This language also appears in Section 3.5.3.1 for monitoring of passive mitigation measures, and should be modified similarly.

Suggested Language: After SSD system startup, indoor air quality samples should be collected to confirm that concentrations of VOCs in indoor air are reduced (e.g. to levels that achieve No Significant Risk) ….. If sampling indicates that the system as installed is not effective, the system should be augmented, modified or another approach selected that will achieve the goals of the response actions.

3.5.3 Monitoring Passive Mitigation Measures

We believe that passive systems can in certain situations be used to achieve NSR. Our proposed wording for this section is:

Passive measures (such as passive venting systems, sealing cracks and concrete walls and floors, sealing the annular spaces around utilities, and sealing sumps) may be an alternative to active SSD systems when ~~the~~ low subsurface contaminant concentrations exist, ***or the systems are utilized in conjunction with other mitigation measures.***

3.5.3 Monitoring Passive Mitigation Measures, continued

Passive measures are not recommended for mitigating Imminent Hazards or eliminating Significant Risk.

Issue: Either a system is effective at eliminating or mitigating a complete vapor intrusion pathway or it is not, regardless of the initial concentration. There is no reason to state categorically that passive mitigation measures should not be used for mitigating Imminent Hazards or Significant Risks. The appropriateness of a remedy is not determined by the magnitude of the indoor air concentrations and thus risk. Instead, the appropriateness of a remedy is determined by physical and practical constraints – depth to water table, geological substrate, construction details, etc.

Moreover, where there is an Imminent Hazard, and Immediate Response Actions are required, passive measures are precisely the kind that can be undertaken quickly. These include sealing large cracks, sealing foundation joints, and enclosing open sumps.

Suggested Language: The sentence should be deleted.

3.5.3.1 Indoor Air Quality Monitoring of Passive Mitigation Measures

In paragraph 1, what is meant by the term "below typical background levels"? Is the Guidance referring to the Threshold Values? (Same question regarding Section 3.5.2.2 above.)

The sampling to demonstrate effectiveness should be as follows…and the indoor air concentration is less than two times the appropriate threshold values), then indoor air should be sampled at least twice in the first year with one round conducted during the heating season... and the indoor air concentrations is greater than two-times the appropriate threshold values), then indoor air should be sampled quarterly within the first year.

Issue: As discussed above regarding Section 3.5.2.2, the remedial goal for passive systems, just like active systems, is NSR, not TIACs or TVs.

Suggested Language: The sampling to demonstrate effectiveness should be as follows…and the indoor air concentrations pose No Significant Risk, then indoor air should be sampled at least twice in the first year with one round conducted during the heating season… and when the indoor air concentrations pose No Significant Risk, then indoor air should be sampled quarterly within the first year.

If the passive measures appear to be effective based on the initial sampling, additional indoor air sampling should be conducted as follows and as outlined in Table 3-1:…until site closure can be achieved.

Issue: As discussed above, a Partial Class A-3 RAO may be appropriate for an individual building at a site, even though the entire site has not reached closure, and monitoring at the building could then be discontinued.

Suggested Language: If the passive measures appear to be effective based on the initial sampling, additional indoor air sampling should be conducted as follows and as outlined in Table 3-1:…until site closure can be achieved or a Partial RAO can be prepared for a property.

Issue: The Guidance should state clearly that once it is demonstrated that an active system is no longer needed to maintain NSR, then the lines of evidence demonstrate that there is not a complete vapor intrusion pathway. In that case, an AUL to maintain the default passive system is not necessary and a Class A-2 RAO may be prepared for the site or the property.

Suggested Language: If it can be demonstrated that a condition of No Significant Risk has been achieved without the system operating, the system can be shut down. If the requirements for achieving an RAO have been met for the site (i.e. adequately characterized, source controlled or eliminated), a Class A-2 RAO may be prepared for the site or the property. This approach is based on the conclusion that the passive system which was embedded in the active system is not necessary to maintain a condition of NSR.

3.6 Closure Sampling

To demonstrate that an active system is no longer required to mitigate the vapor intrusion pathway MassDEP recommends a minimum of three rounds of indoor air sampling collected over two years, with two rounds collected during the heating season, with the system off.

Issue: Here and in several other places within the Guidance, MassDEP specifies that two years of post-closure sampling is required. NAIOP understands the rationale for having data which represents different seasonal conditions, and for having data which represents the theoretical "worst case" of a heating season. However, the requirement for this data collection to take place over a two-year period is excessive, particularly given that the period in question doesn't even begin until it appears that no further mitigation is necessary. We note that the other places in the Guidance that the Department specifies that two years of post-closure sampling is required include Sections 4.5.1.1, 4.5.3, 4.5.3.1, and 4.7, and Appendix VIII on pages VIII-7 and VIII-10. For efficiency, we do not repeat these same comments in each of those places, and instead only note them here and note that they apply with respect to each of the referenced portions of the Guidance.

Suggested wording: … MassDEP recommends a minimum of three rounds of indoor air sampling over a period of at least a year, with at least one of these rounds collected during the heating season*, with the system off*.

We also recommend adding a second paragraph to this section to acknowledge that some sites may achieve closure with passive systems**:**

To demonstrate that ongoing monitoring of a passive system is no longer required, DEP recommends a minimum of three rounds of indoor air sampling collected over one year, with at least one round collected during the heating season, with the SSD system off. The system should be turned off for at least seven days prior to sampling to allow for equilibration. For a passive system that is equipped with wind driven turbines, this requires securing the turbines

during the testing. If it can be demonstrated that No Significant Risk has been achieved, the ongoing monitoring of the passive system will no longer be required.

Section 4. Regulatory Framework

4.1.1 Two-Hour Notifications for Imminent Hazards

In the case of vapor intrusion, this means consideration of the current occupants and their likely exposures given how the structure is used.

Issue: DEP proposes that the evaluation be performed considering "how the structure is used." If the basement is currently not living space, is used intermittently (e.g., laundry) or for long-term storage, the evaluation should not assume 12 hours of exposure in the basement for the purposes of an Imminent Hazard evaluation; 4 hours should be sufficient as is currently recommended in the MassDEP Risk Guidance Document to evaluate current use.

4.3.1.1 The CEP Concept

DEP states that exposure potential and periods are greatest in schools, daycares and homes.

Issue: Neither the exposure potential nor the exposure period are as high at a day care center as in a home. For schools, the frequency may be high, but the duration is typically much lower, making the exposure potential and period low overall. The proposed language in the Guidance should be corrected, and the tone of this section should demonstrate less embellishment.

4.3.1.2 Defining CEP

A CEP exists from vapor intrusion only if OHM from a disposal site is present from vapor intrusion into the living or working space of a pre-school, daycare, school or occupied residential dwelling.

Issue: DEP has arbitrarily defined living or working space in Section 2.4.3. As noted above, it is not reasonable to assume that all basements are "living or working space" simply because they have ceilings high enough for a person to walk. Many people have basements with family rooms and such basements should be considered "living space." On the other hand, many people have basements that are used only for long term storage. Such basements should not be considered "living space" regardless of the height of the ceiling.

DEP has also proposed that any basement that shows "evidence of current activity" should be considered "living space." Again, this is both unreasonable and illogical. In addition, "evidence of current activity" is subjective. For instance, one person might conclude that running a dehumidifier in a basement is "evidence of current activity" and others may only consider finished bedrooms or children's playrooms as such evidence. Basements that are finished into bedrooms or family rooms should be considered "living space," but not basements just used for laundry or storage.

DEP has acknowledged that many basements are used infrequently and that, when true, such information can be incorporated into an assessment of the feasibility of mitigation, but not the

definition of a CEP: "Where vapor intrusion impacts are limited to a basement that is infrequently used or visited, the limited use may be factored into the evaluation of the feasibility of response actions to address the CEP (see Section 4.3.2.3), rather than into the decision of whether or not the CEP exists." This is not logical. When as a matter of fact a basement is not used for living or working space, then by definition a CEP does not and should not be considered to exist.

DEP states that these bright line criteria are needed to reduce subjectivity. However, DEP's use of the term "evidence of current activity" is itself highly subjective. In any event, the criteria, bright line or not, must be logical, consistent with existing guidance and not designed to expand the number of sites subject to CEP criteria without a reasonable basis.

4.3.2.2 Categorically Infeasible Response Actions

At properties with a CEP that does not pose Significant Risk-based on information collected to-date, MassDEP considers response actions to eliminate or mitigate CEP conditions to be infeasible if the owner of an owner-occupied residence does not wish to address CEP conditions.

Issue: Whether or not the CEP poses Significant Risk, if the owner of property (owner-occupied or rental) does not wish to have the CEP condition addressed, then it is infeasible to do so. The level of risk presented by the CEP has no relevance with respect to feasibility.

Suggested language: At properties with a CEP, MassDEP considers response actions to eliminate or mitigate CEP conditions to be infeasible if the owner of the residence does not wish to address CEP conditions.

4.3.2.3 Rebutting the MCP Presumption for CEP Elimination/Mitigation

For example, if building or site conditions pose special challenges to the installation of a typical active SSD system, a feasibility evaluation may be performed to weigh the costs and benefits of eliminating the CEP conditions. The CEP feasibility evaluation for such a system should anticipate operation and maintenance costs for a period of 2 to 5 years, or the time period that is likely to be required to reach a Response Action Outcome at the site, as well as the benefits from risk reduction accrued over the same period of time.

Issue: The Guidance should distinguish between rebutting the presumption for CEP elimination/mitigation vs. rebutting the presumption that a SSD system is infeasible (Section 4.3.2.1). It may be infeasible to install an SSD system due to physical site conditions; in that event, the benefits of risk reduction and the associated cost are irrelevant.

Where the available data suggest that concentrations do not pose a significant risk, the feasibility evaluation should compare the incremental benefit of further risk reduction with the cost considerations below…in addition to a theoretical uncertainty about the health effects associated with low-level exposure to indoor air contaminants. "

Issue: The proposition that there is some additional level of protectiveness to be achieved beyond the highly conservative standard of No Significant Risk because of some theoretically higher level of uncertainty inherent in vapor intrusion risk is scientifically and legally untenable.

There is no incremental benefit to reducing indoor air concentrations of VOCs from levels that do not pose a Significant Risk to levels that are even lower. For many VOCs, such as PCE, any detectable level that is less than the Significant Risk level is in the realm of levels that are typical throughout the country in residential buildings, even levels in excess of DEP's designated TIAC of 1.4 ug/m^3 which is a level found in 50% of the homes in a limited set of studies that DEP employed for that exercise. Clearly, there is no incremental benefit to reducing VOC levels in one house to levels that are much lower than the typical levels in millions of houses across the country. In addition, such a theoretical reduction of risk would be immeasurable. The benefits of reducing risk below NSR cannot be quantified in any way that would allow one to estimate the costs and benefits of doing so. And, in any event, there is no significant benefit in that instance.

DEP also states that feasibility evaluations take into account the uncertainties in the risk estimates due to uncertainties in the site data and uncertainties in the toxicological criteria.

Issue: Uncertainty is not unique to indoor air and cannot be a basis for heightening the MCP's risk-based standards. Technical uncertainties that may be inherent in vapor intrusion assessments are already addressed by the draft Guidance's provisions favoring the Lines of Evidence approach and prescribing sampling methods, duration, and frequency where sampling is appropriate. NSR is defined as "a level of control of each identified substance of concern at a site or in the surrounding environment such that no such substance of concern shall present a *significant risk* of harm to health, safety, public welfare or the environment during any foreseeable period of time." (M.G.L. c. 21E, § 3A(g).) Mitigating CEPs that do not pose a Significant Risk is addressing a "risk" that is, by definition, *de minimis*.

Public health and environmental agencies in other states and around the world recognize that when risk levels are sufficiently low, they are virtually equal to zero. For instance, in a community of 1,000 people, an Excess Lifetime Cancer Risk Level of one in one hundred thousand is essentially "zero risk," because the number of cases of cancer predicted over a lifetime is 0.01 case. "Reducing" this risk level by a factor of 10, to $1x10^{-6}$, decreases the number of cases over a lifetime to 0.001, which has no effect on the absolute number of cases, which is still less than one. Risk-benefit analysis would definitively demonstrate that taking action to decrease this "incremental risk" has no actual benefit for human health. If the risk level associated with a CEP is not capable of measurement, then there is no benefit to reducing it any further.

Moreover, the "uncertainty" inherent in existing risk assessment methodologies is all in the direction of *overestimating* risk. Every toxicological reference value used in performing risk assessment overestimates the true risk to humans by at least one hundred-fold and in some cases thousands-fold. For example, ARCADIS recently conducted a population risk assessment to evaluate EPA's recently proposed Unit Risk Factor for naphthalene. If the proposed value were a true reflection of the risk to humans posed by the inhalation of naphthalene, the number of cases of a rare nasal tumor in the US population should be over 26,000 per year. The actual number seen per year from all causes is 61 per year. In other cases, cancer risk values are based on liver tumors in the B6C3F1 mouse, which is a strain of mouse that is highly susceptible to liver carcinogenesis regardless of external chemical exposures. Use of tumor response data from species and strains of animals that yield high reference values, but are not themselves good

models of human responses, ensures that risk assessments in fact overestimate human risk. In this way, all risk assessments, including the MCP-required risk assessments of levels of OHM in indoor air, are specifically designed to vastly overestimate risk to humans.

Exposure assessments also overestimate risk by design. With regard to indoor air, DEP's "homebound adult" receptor is a person who is assumed to breathe indoor air in one building for 24 hours a day, 365 days a year for 30 years. MassDEP also assumes that an infant breathes air at its residence for 24 hours a day and never visits the doctor, relatives or otherwise leaves the home, and that a child breathes air at its residence for 20 hours a day even though MassDEP assumes that they also breathe air at a school for 8 hours a day during the school week. The former assumptions with regard to the homebound adult should be deleted from the Guidance, because the probability that there is even one person who could stay within one building and not leave the house or even venture onto their front porch for 30 years is not "reasonably anticipated" and is probably zero. However, the infant and child assumptions, while clearly impossible for average infants and children, are understood to be conservative estimates that err on the side of health protection. When MassDEP overestimates exposures for infants and children by assuming they do not visit the doctor or attend school as required by law, DEP is establishing a risk assessment paradigm that intentionally overestimates risk, again, as a matter of policy.

In Section 4.3.2.3, the draft Guidance instructs the feasibility evaluation to explicitly consider how response actions can reduce uncertainties. The clear implication is that any reduction of "uncertainty" is a "benefit" that must be weighed in feasibility evaluations. Such reductions of uncertainty are impossible to quantify and are not benefits recognized in the statute.

"Uncertainty" by itself is not a risk to human health or the environment, nor does the term appear in the feasibility provisions of the statute. As explained above, the risk factors, exposure assumptions, and other parameters that the MCP requires already result in risk assessments that vastly overestimate risk to humans and, therefore, provide ample protection regardless of which exposure pathway is being evaluated.

Site-specific issues may affect the costs of implementing measures to eliminate CEP. Consider whether the building and its setting include factors that significantly affect the available remedial options and cost of CEP elimination.

Issue: "Significantly affect" is a very subjective criterion. In prior iterations of this draft Guidance and in public meetings to discuss its basis, DEP has indicated that the Department has used a cost of $3000 to $5000 as a benchmark, for example, in concluding that installation of a sub-slab depressurization system is presumptively feasible. DEP should clearly state, quantitatively, what benchmarks it is using for the conclusions stated in this draft Guidance.

4.4 Numerical Ranking System and the Indoor Air Pathway

If current indoor air concentrations are above the 95th Upper Percentile Value of Typical Indoor Air Concentrations (TIACs), the air pathway should be scored as a Likely or Confirmed Exposure Pathway, unless the levels are associated with on-going commercial or industrial processes.

Issue: The Guidance should be clear that if risk reduction methods have been "*taken in accordance with the provisions of the MCP, prior to completion of the NRS, only the contaminants, concentrations and exposure pathways present after the action(s) should be scored, provided such actions have been documented in the classification submittal.* " (NRS Guidance Document, February 1996). Therefore, if CEPs have been eliminated, it is likely that there is no longer a complete vapor intrusion pathway and the site need not be scored as a Likely or Confirmed Exposure Pathway.

Issue: The DEP TIAC document lists 50th and 90th percentile values, not 95th percentile values, so this section of the draft Guidance must be updated. We anticipate that DEP means the 90th percentile TIAC value. In that case, PCE would not be considered to have a "Likely or Confirmed Exposure Pathway" unless indoor air concentrations exceeded 4.1 ug/m^3. This guidance does not match that presented in Section 2.2.4, which states that PCE would be considered a "Likely or Confirmed Exposure Pathway" if groundwater exceeded 100 ug/L OR sub-slab soil gas exceeded 70 ug/m^3 and either indoor air was not tested or was tested and exceeded 1.4 ug/m^3. DEP needs to ensure consistency between these two sections of the Guidance or explain why they need not be consistent.

Issue: In addition, it is not clear why indoor air in a commercial or industrial setting would be compared to residential TIACs. Further, why is this line of evidence given precedence for scoring purposes when an LSP may appropriately rule in or rule out the vapor intrusion pathway based on other information, as described in Section 2.0 of the Guidance?

Likely or Confirmed Exposure Pathway are not met, but any of the following conditions exist: (1) sub-slab soil vapor OHM concentrations exceed fifty (50) times the TIACs; (2) LNAPL or DNAPL are present within 30 feet of an occupied building; or (3) groundwater OHM concentrations exceed GW-2 Standards and the building of concern may be impacted due to its construction (earthen floor, fieldstone foundations, cracks or sumps).

Issue: The lines of evidence sections of the Guidance distinguish between the attenuation of chlorinated VOCs and aromatic VOCs. Criterion (1) should make the similar distinction using 1,000 times the TIAC for C5-C8 aliphatics, C9-C12 aliphatics, C9-C18 aliphatics, C9-C10 aromatics, toluene, ethylbenzene, and xylenes and 50 times the TIAC for the remaining VOCs. Additionally, benzene should be included in the 1,000 times list, since it physically behaves similar to TEX. Information presented in "An Evaluation of Vapor Intrusion Into Buildings Through a Study of Field Data" (Fitzpatrick and Fitzgerald, 1996) suggests that typical attenuation factors for benzene are also several orders of magnitude higher than attenuation factors for chlorinated VOCs. Excluding benzene from the 1,000 times list undermines the basis for the 1,000 times vs. 50 times attenuation factors. In addition, if benzene remains at 50 times TIAC, it will likely drive the lines of evidence evaluations at any site at which benzene is present.

Issue: DEP does not specify which TIAC is being referred to here, but given the reference in the previous paragraph to the 95th percentile, which is not presented in the TIAC document, it appears that DEP is probably referring to the 90th percentile TIAC in this section. This should be clarified in the Guidance.

4.5.1.2 CEP Mitigation is Incorporated into Comprehensive Response Actions

The response action used to address the CEP may be part of the recommended Comprehensive Response Action following a Phase II Assessment and a Phase III evaluation of remedial action alternatives. At that point, with the submittal of a Phase IV Remedy Implementation Plan, the IRA addressing CEP would be closed with an IRAC.

Issue: DEP has paraphrased only a portion of 310 CMR 40.0427(1)(c) and, as a result, has suggested an approach that is inconsistent with that MCP provision. The provision states that an IRA shall be considered complete when the IRA condition has been assessed and remediated in a manner and to a degree that will ensure "the elimination, prevention or mitigation of Critical Exposure Pathway(s) without the continued operation and maintenance of active remedial systems, pending the completion of a risk assessment pursuant to 310 CMR 40.0900 and a feasibility study pursuant to 310 CMR 40.0860." The underlined clause cannot simply be ignored. The only way that clause makes sense is that the CEP standard applies "pending" completion of the site investigation and risk characterization.

By the time the Phase IV has been completed, the uncertainties about the site including the nature and extent of contamination and the risk posed by the site have been addressed. If the Phase IV has been completed and the CEP has not been previously eliminated or mitigated as part of an IRA because it was infeasible (e.g., access was denied or the cost was not commensurate with the benefit), but the indoor air concentrations achieve NSR, then the elimination or mitigation of the CEP is no longer necessary. The IRA can be closed and the requirement to eliminate or mitigate the CEP no longer applies.

At the sites where (i) remedial actions may not have been implemented as part of the IRA but are still necessary to achieve NSR or (ii) previously implemented response actions are to continue as Phase IV activity, the IRA addressing the CEP would be closed.

Suggested Language: The response action used to address the CEP may be part of the recommended Comprehensive Response Action following a Phase II Assessment and a Phase III evaluation of remedial action alternatives. At that point, with the submittal of a Phase IV Remedy Implementation Plan, the IRA addressing the CEP would be closed with an IRAC. In addition, if the CEP was not eliminated or mitigated because it was shown to be infeasible and indoor air concentrations pose NSR, the IRA addressing CEP would be closed with an IRAC that is included with the submittal of the Phase IV.

4.5.1.3 CEP Mitigation is Concluded with a Partial RAO

However, in cases where the contaminant source has been eliminated or controlled, a partial RAO for an individual building may be supported when indoor air concentrations of contaminants of concern, in the absence of any active remediation, are shown to:

(a) pose No Significant Risk, based on adequate data collected to reflect any temporal variability of contaminant levels in groundwater and soil vapor, and

(b) have limited enough variability to permit predictions of long-term conditions, based on at least three indoor air samples collected over a time period of at least two (2) years, including samples collected in the winter months.

Issue: The Department is correctly using the NSR standard as the MCP endpoint for preparing a Partial RAO. If elimination or mitigation of the CEP was infeasible during the IRA, the Phase II is completed and the contaminant source has been eliminated or controlled, and adequate data demonstrates NSR, a partial RAO is appropriate for the building.

It also follows that if there is sufficient information at the time indoor air testing is conducted to establish NSR, additional indoor air test results are at NSR, and additional sampling is conducted to confirm that NSR continues to be achieved, elimination or mitigation of the CEP should not be necessary.

4.5.2.2 RAO Following Tier Classification at Sites with Vapor Intrusion Mitigation

Transitioning Preliminary Response Actions to Comprehensive Response Actions

Issue: The guidance document does not address CEPs that could not feasibly be eliminated or mitigated as part of an IRA (see discussion above regarding closing the IRA).

Recommended additional text: (To be added at the conclusion of this section) If a CEP was not previously eliminated or mitigated because it was infeasible to do so, then response actions would continue as Phase IV activities for those buildings where NSR has not been achieved. If adequate indoor air testing (three samples over at least one year including at least one Winter sample [elsewhere we seriously question the two year timeframe that was proposed]) has been conducted and demonstrates NSR, then further mitigation and testing are not necessary.

4.5.3.1 Performance Standards for Permanent Solutions at Sites with Vapor Intrusion Pathways

Parties electing to use these criteria will be assured of their acceptance by MassDEP staff.

3. No groundwater concentrations of COCs are greater than the GW-2 standards, based on seasonally representative data.

Issue: Vapor intrusion sites are complex and a Method 3 Risk Characterization will often be necessary to demonstrate NSR and achieve a Permanent Solution. Stipulating that groundwater must meet GW-2 standards in order to reach a Permanent Solution and presumptive certainty disregards that site-specific conditions are likely not those assumed in the GW-2 modeling and contradicts the entire approach to lines of evidence in that is central to the Guidance. Groundwater concentrations in excess of GW-2 indicate the potential for a vapor intrusion pathway. Lines of evidence can be used to demonstrate that even though the GW-2 standard has been exceeded there is not a complete vapor intrusion pathway. DEP's approach here also effectively dismisses the results of indoor air testing demonstrating that the vapor intrusion pathway has been mitigated and/or that NSR has been achieved. This criterion should be deleted from this presumptive certainty section of the Guidance.

4. Groundwater monitoring has not detected LNAPL or DNAPL (as defined by MassDEP's policy) at the site during the past two years.

Issue: The presence of LNAPL or DNAPL alone should not be a prohibitive criterion preventing the achievement of a Class A RAO. According to DEP Q&A Volume 4, Number 1 (May 1997), a Permanent Solution can be achieved with NAPL present if it is demonstrated that the NAPL UCL specified in 310 CMR 40.0996(4) has not been exceeded and the NAPL does not represent a continuing source (310 CMR 40.1003(5)(a)(3)). As in the comment above, lines of evidence can demonstrate that even though LNAPL or DNAPL is present, NSR has been achieved, the UCL has not been exceeded and the vapor intrusion pathway has been eliminated or mitigated (e.g., a passive ventilation system has been successfully implemented).

Suggested language: Delete language and substitute: Although groundwater monitoring has detected LNAPL or DNAPL, it can be demonstrated that the NAPL UCL specified in 310 CMR 40.0996(4) has not been exceeded and the NAPL does not represent a continuing source (310 CMR 40.1003(5)(a)(3)).

5. Contaminated soil that is serving as a source of vapor intrusion has been eliminated or controlled through removal or treatment.

Issue: The presence of contaminated soil should be eliminated or controlled to the same extent required in the MCP for any Class A RAO. But the requirement in the MCP is that the source of OHM which is resulting or is likely to result in an increase in concentrations of OHM in an environmental medium either by direct discharge or by intermedia transfer (310 CMR 40.1003[5]) must be eliminated or controlled. The MCP does not require treatment or excavation if this criterion has been met in another manner.

The recommendation to meet GW-2 Standards at vapor intrusion sites relates to concerns about vapor intrusion conditions in future buildings, and/or existing buildings that are modified, as discussed in Section 4.7. Where groundwater concentrations do not meet GW-2 and the potential for future building construction or modification is not addressed with the implementation of an AUL, the property owner runs the risk of requirements for notification and additional response actions in the future if such construction or modification results in vapor intrusion.

Issue: The Department's position that the potential for future building construction or building modifications requires that the GW-2 standard always be met to achieve a Permanent Solution contradicts both the lines of evidence approach, and the site-specific investigation and evaluation of disposal sites that is a hallmark under the MCP. Here also, the Department's suggested language in the Guidance makes irrelevant the use of a Method 3 Risk Characterization at a vapor intrusion site.

Issue: Placing an AUL on sites with existing buildings to address the potential for future modifications when it has been adequately demonstrated that the site poses NSR will negatively affect Brownfields redevelopment. First, such an AUL will subject the relevant buildings and property to additional concerns associated with vapor intrusion issues. In addition, the

redevelopment of such sites will become considerably more expensive since the Brownfields tax credits are reduced from 50% to 25% if an AUL is placed on the property.

4.5.4 Class B RAOs – No Remedial Action Required

Sites with confirmed vapor intrusion pathways in existing buildings cannot qualify for a Class B RAO if any response actions have been conducted to address the vapor intrusion… A Class B RAO may be appropriate for a disposal site where maintaining a condition of No Significant Risk is dependent only on the implementation of an Activity and Use Limitation to restrict future building construction or certain property uses.

Issue: Partial Class B RAOs can also be written for portions of a site where lines of evidence have demonstrated that there is not a complete vapor intrusion pathway and response actions have not been performed. An AUL is not necessary in this situation.

Suggested language: A Class B RAO (a Partial RAO) may be appropriate for a portion of a disposal site where the GW-2 criteria do not apply (e.g., when only the deep bedrock groundwater aquifer is contaminated on a portion of the site). In such a case, an AUL would not be required to maintain a condition of NSR under future conditions.

4.6 Continuation of Vapor Intrusion Mitigation outside the MCP Process

As long as there are detectable levels of contaminants in indoor air from vapor intrusion, the operation of mitigation system serves to reduce exposure to those contaminants. MassDEP encourages the continuation of effective actions to reduce exposure to contamination.

Issue: By "encouraging" the continued operation of mitigation systems after NSR has been achieved, DEP inappropriately goes beyond interpreting the requirements of the MCP in the Guidance. In addition, the Department may unintentionally encourage frivolous toxic tort litigation by suggesting that there is some measurable value to reducing exposure below NSR standards. Nonetheless, we support the Department's clarification that such systems can remain in place without upsetting site closure, and agree that in many instances property owners may choose to continue to operate these systems. However, the language quoted above needs to be modified to reflect these considerations.

In cases where testing has determined that the site-related contaminants pose No Significant Risk and a feasibility evaluation has concluded that further operation of a SSD system is infeasible,…

Issue: This section discusses vapor intrusion mitigation outside the MCP process. Once testing has determined that site-related contaminants pose NSR, a feasibility evaluation is not required to conclude that further operation of the SSD is infeasible. **This portion of the document should be deleted from the Guidance.**

…the presence or absence of radon in indoor air may affect the next steps. When radon is present in indoor air without the operation of a SSD system, the property owner and the occupants (if applicable) should be offered the opportunity to take over the operation and financial responsibility for the SSD system. Given the health risks associated with radon

exposure, an SSD system in place and operating where there is natural radon intrusion could provide great health benefits.

Issue: Radon is outside of the scope of the MCP. **This portion of the guidance document should also be deleted.** Its inclusion implies that a PRP must also test residences for radon.

4.7 Future Use Considerations for Vapor Intrusion Sites Evaluated Under the MCP

Therefore, the remedial approach at undeveloped sites with VOC contamination should include effective source elimination and groundwater remediation should be undertaken prior to closure to reduce potential impacts to future buildings.

Issue: The requirement in the MCP is that the source of OHM which *is resulting or is likely to result* in an increase in concentrations of OHM in an environmental medium either by direct discharge or by intermedia transfer (310 CMR 40.1003[5]) must be eliminated or controlled. Remedial action solely to eliminate or control a source is not required. This scenario may be the case at a site with a groundwater plume at steady state, even if concentrations within the plume are greater than GW-2 standards. In addition, the language of the Guidance noted above ignores the language in the MCP referring to sources that must be eliminated **or controlled.** This second concept, which is included in the relevant regulations, cannot be ignored. In addition, the quoted language calls for groundwater remediation regardless of contaminant concentrations in the subject groundwater, which does not make sense.

Establishing this approach as guidance could add decades of treatment time and expense at sites that pose NSR. Between the requirement in Section 4.5.3.1 effectively prohibiting groundwater concentrations of COCs greater than GW-2 standards and this approach, the MCP's risk-based program and the use of site-specific Method 3 risk assessments are both being gutted. **Therefore, this approach should be deleted from the Guidance.**

Issue: The Guidance references only two mechanisms under the MCP to ensure that the potential for vapor intrusion is addressed at a site that achieves NSR prior to the construction of a future building: (i) the use of an AUL and (ii) the new notification of a reportable condition. In fact, there is a third mechanism, which is to evaluate the possibility of vapor intrusion conditions associated with a future building as part of the RAO that closed out the site. As detailed extensively in other comments we have provided, that approach can be effectively implemented through the use of soil, soil vapor and groundwater data; the development of a well-thought-out CSM; and the application of a numerical model with conservative inputs to evaluate possible future conditions. Depending on the results of that valuative process, it is possible that neither an AUL nor future notification will be required at a site where vapor intrusion issues were adequately identified and addressed in the response actions leading up to the RAO.

Issue: Here, the Guidance references an AUL that requires the installation of SSDS as part of future construction. The Guidance, however, does not confirm that if an active SSDS is installed pursuant to the provisions of such an AUL, then the subject site will continue to have achieved an RAO, and will not be pushed into ROS. The Guidance should confirm this point.

4.7.1 Use of an AUL to Protect Future Buildings

Issue: In many places the Guidance very strongly recommends the use of an AUL if groundwater sample results exceed GW-2 standards. In light of the heading to Section 4.7.1 of the Guidance, we provide here our general comments on this approach, which apply concerning each instance in the Guidance in which DEP makes this recommendation. This proposal in the Guidance, essentially a requirement in many instances, will result in the implementation of many AULs that are not necessary, with the attendant significant negative consequences to economic development in the Commonwealth.

Historically, the MCP has generally adhered to the principle that some eventualities are remote enough that they are not "foreseeable." For example, GW-2 does not apply to vacant land where building is not contemplated, even if future building is not prohibited. The Guidance, however, rejects this key principle in the case of virtually any property at which VOC concentrations in groundwater exceed GW-2 standards. For example, at property with an existing structure that meets NSR based on indoor air data (but at which a limited area of groundwater still exceeds GW-2), an AUL will be required to prohibit the construction of a new building without a realistic consideration of potential indoor air issues. This is true even for existing office buildings in urban areas that meet NSR for every scenario other than small single family homes. (We note that such homes are <u>not</u> reasonably foreseeable in downtown Boston, Cambridge, Worcester, Chelsea, and other similar locations in Massachusetts.) Similarly, while not mandatory, AULs are strongly encouraged for vacant land with GW-2 exceedances, even though GW-2 does not apply. The Department's position seems to be that the need for a notice of the presence of VOCs is so compelling that AULs are necessary as a notice mechanism, even at sites that the MCP does not otherwise view as presenting a foreseeable vapor intrusion risk. We strongly disagree with this position, and do not think it is reasonable to use or require (either expressly or by implication) AULs as a mechanism to provide notice "just in case" rather than as an institutional control to limit truly foreseeable activity.

There are many negative consequences of requiring these "just in case" AULs. First, AULs entail tens of thousands of dollars of expense, in terms of both preparation and recording and "continuing maintenance" (e.g., the incorporation of provisions into leases, negotiations with lenders, etc.). Second, the preparation of AULs and their amendments result in the expenditure of a considerable amount of time, in addition to the costs just noted. In addition to the time involved with preparing the relevant documentation itself, there are requirements to prepare title reports and then give either thirty or forty-five days advance notice before the AUL or an AUL amendment may be implemented. Third, Eligible Persons will be much more hesitant to acquire, remediate, and redevelop property where VOCs have migrated off-site (even to vacant land) because the path to closure will be much more uncertain. How comfortable can a potential developer be that a downgradient third party land owner will agree to an AUL? If an AUL is required, is there de facto property damage to be recovered from the Eligible Person? How much will need to be paid to such a third party property owner to obtain permission to record such an AUL?

Third, there is no audit time limit on property subject to AULs. This makes regulatory closure and certainty much more difficult (essentially, impossible) to achieve in transactions involving contaminated property and, as a result, fewer transactions will be financed and proceed. Finally,

a party that seeks a brownfields tax credit (which party must by statute be an Eligible Person) will see its credit cut from 50% to 25% when an AUL is required. This can represent a swing of hundreds of thousands of dollars on a project's pro forma, an amount large enough to make or break a project.

In summary, AULs should be limited to situations where actual foreseeable uses are at issue. The Guidance should not require AULs as a notice mechanism for future eventualities that are not reasonably foreseeable.

4.7.2 Notification Required for New Buildings

Reliance upon subsequent DEP notification to insure appropriate evaluation of potential vapor intrusion concerns is, at best, an uncertain approach. Future developers/owners/occupants may face unanticipated exposures and associated costs if construction proceeds without a full knowledge of site conditions.

Issue: This provision is another attempt by the Department, through the issuance of the Guidance, to require AULs at all sites where GW-2 standards are exceeded by any amount. Specifically, the implication here is that DEP may require that GW-2 standards be applied to require AULs even though, under the MCP, no such standards would apply because there is no building and no planned building. DEP should make clear that it is not purporting here to amend existing regulations through guidance. Regardless, it is inappropriate (and incorrect) for DEP to assume that a developer would be so woefully uninformed as to construct (or obtain financing for) a new building without considering environmental conditions.

4.7.3 Use of Modeling for Future Buildings

Many of the comments we have provided elsewhere in this letter have disputed DEP's position that modeling is not useful and should not be used to determine potential Exposure Point Concentrations for future buildings. We refer you to those comments, and do not repeat them here.

4.7.4 Engineering Approach to Address Future Buildings

DEP is proposing a bright line criterion of 10X GW-2 as the determinant for post-construction indoor air sampling for future buildings that have been built with vapor barriers and active SSD systems.

Issue: DEP has proposed the value of ten times the GW-2 standard without providing any scientific rationale or documentation to support this proposed criterion. DEP should base such a regulatory criterion on a firm scientific basis. Under DEP's proposal, builders whose buildings are built over groundwater containing a VOC at 11 times the GW-2 standard will have to perform extensive indoor air testing while builders having buildings over groundwater at 9 times the GW-2 standard will not have such testing imposed. The imposition of such a major regulatory requirement requires criteria that are well-founded in science (e.g., reasonable screening standards based on default attenuation parameters).

For Category B sites, parties have the option of forgoing operation of SSD systems based on actual post-construction indoor air testing following the sampling regimen outlined in Section 3.5.2 that demonstrates the absence of vapor intrusion.

Issue: If an active SSD system and vapor barrier were installed, once the SSD system is turned off the system is effectively a passive system. The Guidance should clarify that if the recommended sampling regime is followed and successful results are achieved, then the conclusion is that the SSD system is not necessary to maintain a level of NSR and an AUL is not necessary, or if an AUL was placed on the site it may be removed.

Issue: The Guidance states that post-construction indoor air testing can be used to demonstrate "the absence of vapor intrusion," which implies concentrations that are less than the TVs. This should be corrected to be consistent with the standard proposed for Category C post-construction testing, which is NSR.

Suggested language: For Category B sites, parties have the option of forgoing operation of SSD systems based on actual post-construction indoor air testing following the sampling regimen outlined in Section 3.5.2 that demonstrates operation of the SSD system is not necessary to ensure a level of NSR, in which event no additional response actions are necessary and an AUL is not necessary.

In addition, for "Off-Ramps" B and C, if an AUL has been imposed and the AUL Opinion, the AUL, and the RAO all provide that the use of an SSDS will achieve or maintain NSR, the Guidance should specify that a Permanent Solution continues to be in effect so long as the requirements of the subject AUL are implemented. In this way the liability protection afforded Eligible Persons under Chapter 21E, Sec. 5C will be maintained.

For "Off-Ramp" C, where indoor air sampling indicates the presence of site-related VOCs in indoor air that are determined to be the result of vapor intrusion, this result should not be deemed to negate or change the determinations or statements of the RAO, since these conditions were already considered. Accordingly, in this case, the notification exemption at 310 CMR 40.0317(17)(a) applies. In other words, this data would not negate or change the determination or statements made in the RAO so as to require notice, "reopening" of the RTN or any further response actions, other than the ongoing operation of the SSDS pursuant to documentation that had already been filed with the Department.

4.7.4.1 Process for Documenting Building Construction after an RAO

Response actions should be conducted, as applicable, after a new notification, or as part of implementing terms specified in an AUL recorded at the time that the RAO was submitted (i.e., prior to the building construction).

Issue: DEP should clarify when in this scenario it expects notification. When the building is planned? When ground is broken? Once the building is constructed and post-construction sampling demonstrates a complete vapor intrusion pathway? Also, if testing indicates the vapor intrusion pathway is incomplete, or there is NSR, is notification necessary? In the last example, the notification exemption provisions in Section 40.0317(17)(a) of the MCP would apply.

Issue: According to the second paragraph of this section of the Guidance, if an AUL is used to condition future building construction, when the building is constructed, the AUL must be amended to include as-built information. If there is any subsequent change to the system, must the AUL be amended again? How many times could a normal building require AUL amendments? Each of these amendments requires a 45 day notice, the time and money to prepare the amendment including an LSP, surveyors, attorneys and registry work.

The Guidance notes that supporting documentation should be submitted to the Department, consistent with other post-RAO response actions. A post-RAO RAM filing could accomplish all of these objectives much more efficiently. This approach would also avoid the problem from a real estate perspective of unnecessarily cluttering title to the subject property.

Issue: DEP has not yet developed the Performance Standards for vapor barriers and SSDS referenced in Figure 4-4. If those Performance Standards are prepared, they should be provided for review and comment, like the rest of the Guidance.

Issue: The last sentence of Paragraph 2 of this section of the Guidance should be revised to specify that it pertains to post-RAO Response Actions "within an AUL area…."

4.7.4.2 Other Scenarios for Future Building Construction

Issue: The Guidance does not but should acknowledge that a building constructed with an underground parking garage is intrinsically safe, as set forth in ASTM E2600 (Standard Practice for Assessment of Vapor Intrusion into Structures on Property Involved in Real Estate Transactions) and as previously discussed at several workgroup meetings.

Section 5. Communication and Public Involvement

Overall Comment on Section 5

NAIOP believes that, in light of work most recently completed by DEP staff and stakeholders with respect to the MCP's public involvement provisions, limited if any further information on this subject is needed in the current Vapor Intrusion Guidance. DEP's current draft has made helpful progress in streamlining this section of the proposed Guidance, compared to the approach that had been proposed in the outline of this section provided in the July, 2009 draft Guidance document. To the extent that guidance on this topic continues to be offered here, it needs to remain consistent with existing regulations and policies and with the balanced resolutions reached by prior stakeholder consultation on public involvement, and to provide optional resources and tools rather than promoting additional procedures that are likely to become *de facto* extra-regulatory mandates.

5.1 Introduction

This introductory subsection appears to stress various problems and negative aspects of public communication regarding vapor intrusion issues, using language (particularly in the first and fourth paragraphs) that seems unnecessary and that could be perceived as inflammatory. In addition, the fourth paragraph "encourages" communication with "potentially affected individuals", (emphasis added), suggesting an undefined class of notice recipients beyond the

regulatory requirements. We recommend that this introductory section be limited to a brief and simple statement of purpose, such as:

> Public involvement provisions of the MCP (310 CMR 40.1400) provide opportunities and procedures to inform the public about activities being undertaken at MCP sites, the status of response actions, and ways to obtain additional information. The goals of this section are to:
>
> - outline and summarize the MCP public notification requirements applicable to sites with vapor intrusion issues; and
>
> - provide references and links to relevant MCP forms and to other optional tools that may be used in the communication process.

Additional information and guidance on public involvement under the MCP generally can be found at http://www.mass.gov/dep/cleanup/laws/policies.htm.

5.2 Notification of Property Owners

The overview sentence for this section states that the MCP requires notices to property owners and to "other interested parties who are likely to be interested in sampling and other response actions at a site." The quoted paraphrase does not accurately summarize the regulatory requirements; rather, it appears to suggest that notice must be provided to an open-ended and subjectively defined group of "interested parties." This introduction to the notification requirements should more accurately be phrased as:

> … and for notifying, in certain circumstances, other specified persons ("Affected Individuals", as defined in 310 CMR 40.0006) who may experience significant health, safety, welfare or environmental impacts from a disposal site.

5.2.1 Notice of Environmental Sampling (BWSC Form 123)

Since the referenced notice is required both prior to and upon completion of sampling, the first sentence should so state. It would also be helpful to note that public entity property owners (municipalities, state agencies, public authorities) are included among the property owners required to receive notice.

The final sentence of this paragraph calls for providing "some context and/or interpretation" for the analytical sample results that are the subject of notification. The quoted phrase is vague and subjective, and purports to call for information that is in no way required by the regulation or mentioned on the form. We suggest instead the following statement that currently appears in Section 5.5 of the draft Guidance:

> When communicating environmental sampling results, it is helpful to include summary tables for results from the site. Groundwater monitoring results could be compared to the applicable Standards (such as Method 1 GW-2 Standards) and indoor air results could be compared to the Mass DEP Threshold Values (Appendix I).

5.2.2 Notice Related to Immediate Response Actions (BWSC Form 124)

The language should be clarified to reflect that such notices under 310 CMR 40.1403(11) are required only where an Immediate Response Action (IRA) to address an Imminent Hazard or a CEP has reached the point of undertaking physical activities that would meet the 310 CMR 40.0006 definition of Remedial Action (defined as "any containment or removal"). Site investigation activities (sampling and/or other assessment) which may be undertaken under an IRA do not require filing a BWSC Form 124.

The discussion should specify that Affected Individual, as defined in 310 CMR40.0006 ("any individual who experiences or may experience significant health, safety, welfare or environmental impacts from a disposal site") is the relevant category of notice recipients, in addition to property owners, under the circumstances described in 310 CMR 40.1403(11). The paraphrasing used in the first sentence of the subsection in place of the regulatory term makes this unclear. The second sentence should state DEP's view that such Affected Individuals (not "other persons") can include tenants of residential, commercial or industrial space.

As stated in the third sentence of this subsection, under 310 CMR 40.1403(11)(d) for multi-unit or industrial or commercial buildings, the person conducting the IRA remedial activities is also required to request that the owners and/or operators of the buildings "post the notice where it will be visible to individuals who are routinely present in such building(s)." The Guidance should make clear that a good faith and appropriately-documented request is sufficient to satisfy this regulatory obligation, insofar as non-owner PRPs do not control or have legal rights to access the property or space of such owners and operators.

5.2.3 Notification to Property Owners within the Boundaries of a Disposal Site (BWSC Form 122)

This section should clarify that the MCP provision (310 CMR 40.1406) requires the described notice to such property owners only at two defined points in the MCP process: at the completion of a Phase II Comprehensive Site Assessment or upon filing of a Response Action Outcome Statement (whichever comes first).

5.3.1 Notifications to Local Officials

The fifth bullet should describe the relevant regulatory requirement (310 CMR 40.1403(3)(a)) more specifically, as follows:

- Sampling of indoor air, surficial soil, or private drinking water wells, at any residential property at, adjacent to, or downgradient from suspected contamination;

5.4 Public Involvement Plan (PIP) Designation

The fourth sentence is ambiguous, and should be revised to read:

> Designating a site as a PIP site typically includes submitting a petition signed by ten or more residents of a community potentially affected by a disposal site to the party responsible for conducting the response action, with a copy to MassDEP.

The fifth sentence should be revised to reflect that 310 CMR 40.1405 provides that upon designation as a PIP site, a Public Involvement Plan and other steps are required, not optional.

5.5 Optional Public Involvement Activities

As stated above, NAIOP is concerned that suggestions for communication and public involvement activities will create new *de facto* requirements beyond the considerable measures already required by MCP regulations. Most vapor intrusion sites require site-specific communication strategies and information. Standardized fact sheets and exhortations to communicate earlier, more often, and to larger classes of abutters, neighbors, and other persons who are not "affected individuals" are not likely to be generally helpful to parties conducting response actions. We recommend that this subsection be limited to referencing sources of sample fact sheets and not seek to promote a range of "optional" activities.

APPENDIX VIII. Use of AULs to Address Future Buildings in Areas of Potential Vapor Intrusion

General Comment on Appendix VIII

First, all of our comments concerning Section 4.7 of the Guidance apply to the analogous provisions of Appendix VIII. We do not repeat here our comments concerning Section 4.7, and instead refer you to those comments.

Second, the proposed provisions in this Appendix are far too prescriptive. In addition, AULs, when used to address vapor intrusion issues, should not include as-built design information for an SSDS or a vapor barrier. It is very cumbersome for documents of this type to be recorded at the Registry of Deeds or registered with the Land Court. Further, if technology changes in the future, it should not be necessary to file an (expensive and time consuming) amendment to the AUL to document any improvements that may be made to the subject SSDS. As noted above, details of this sort belong in DEP files, not the Registry.

Third, the use of AULs as described in this portion of the Guidance unnecessarily burdens the current owner, or person performing the response actions, instead of future owners or occupants who would be incurring the costs for and undertaking future building construction activities in areas of potential vapor intrusion. MassDEP's expressed concern is that future developers/owners/occupants may not have clear notice of the risks of unanticipated exposures and associated costs if construction proceeds without full knowledge of site conditions. (VI Guidance, 4.7.1 and 4.7.2.) The use of an AUL to inform future developers/owners/occupants of such risks is unnecessarily conservative, and imposes excessive costs and procedural requirements toward assuring notice of that risk. This is because the AUL would need to be prepared and recorded, which is expensive and time consuming. In addition, then, possibly (depending on the scope of the currently draft revisions to the Department's AUL Guidance), the AUL may need to be amended when work performed pursuant to the AUL is carried out.

These undeveloped areas that might be developed in the future are each already part of an MCP disposal site. As a result, future developers/owners/occupants will be on notice of site conditions by way of an RAO and all of the prior MCP filings concerning the subject disposal site. All of these documents will be reviewed by potential developers, owners, occupants and their lenders before any future construction. Why is the notice provided by all of these public documents not sufficient? In addition, the public involvement provisions of the MCP already require that a number of notices be provided to municipal officials concerning site conditions. These same public officials are often involved in local permitting associated with development projects. If all of those forms of notice are not sufficient, which we think they are, why not guidance that says the RAO should clearly state "the presence of VOCs in groundwater in certain portions of the property pose a potential for vapor intrusion into buildings constructed in that area. To guard against this potential, buildings in those portions of the property shall be constructed with a vapor barrier system and an SSDS unless an LSP determines otherwise."

Future development at the subject sites that have potential vapor intrusion issues of any significance will also require a post-RAO RAM Plan. To the extent that potential vapor intrusion issues are relevant to future development at a site, clearly these issues will be addressed

in the required post-RAO RAM Plan using the approaches that are laid out in considerable detail in the Guidance. We think that approach is also quite sufficient. If the Department does not, would not a better approach be for the MassDEP to amend the RAM provisions in 310 CMR 40.0440 to provide requirements for construction where there is potential for vapor intrusion, rather than creating a blanket requirement for AULs?

VIII.1 Introduction

The Appendix states that it "applies to those cases where parties are following MassDEP guidance on future building construction at sites where there is the potential for vapor intrusion outlined in Section 4.7." This language correctly implies that there are alternatives to following the Guidance. As we have noted elsewhere in our comments, here also the Guidance should be explicit that appropriately supported and documented alternative approaches may comply with the Guidance and, more importantly, the MCP.

Appendix VIII appears to be designed to address sites where buildings do not exist at the time of the RAO. The Guidance should also consider how AULs should be written for future development sites that have existing buildings, which will be retained as part of the subject development. It is not unusual, particularly in urban locations, to have a mix of both new and existing buildings at a development site. The Guidance should recognize that it is possible to address both of these situations in one AUL if an AUL is a necessary for the site. One example we have seen in practice involves the use of more than one AUL Area being subject to the requirements of the AUL, with specific provisions (some of which differ depending on specific conditions at the site) being applicable to different AUL Areas. The different AUL Areas are then illustrated in the plans that are Exhibits to the AUL.

VIII. 3 Consistent and Inconsistent Uses

Note that, quite properly, Section VIII.3 of Appendix VIII states that the goal of the AUL is to specify "those uses and activities that can take place at the property without undermining the maintenance of a condition of no significant risk." Thus, the performance standard is NSR, not CEP, TV, or another newly created acronym for a level of risk that is below NSR. To be internally consistent, and to be consistent with the statute and the MCP, the Guidance should apply this same performance standard for RAOs at sites with existing buildings. The RAO standard for existing buildings is NSR.

VIII. 5.3.1 and 5.3.2 Future Building Construction without Open Air Ground Level/Construction Limitation at Properties with "Elevated"/"High" VOCs

Issue: The proposed obligations and conditions text in both of these sections refers to keeping the active SSDS intact and operating "continuously." As noted above, we think generally this language is too prescriptive. If, however, some version of this language is retained in the final version of the Guidance, we note that with respect to an SSDS it is necessary to perform maintenance and repairs over time, which may not allow the subject system to be operated "continuously." The relevant language in the Guidance should recognize these conditions.

Closing

Again, NAIOP very much appreciates the opportunity to provide our comments, observations and suggestions in this letter concerning the Department's most recent draft of its Vapor Intrusion Guidance. We look forward to continuing to work with the Department so that the Guidance in its final form both protects public health and encourages the redevelopment of contaminated sites in a reasonable, balanced manner.

We hope that you will feel free to contact us should you have any questions or if you would like any additional information concerning the materials that we have provided in this letter.

Very truly yours,

David Begelfer
Chief Executive Officer

cc: Kenneth L. Kimmell, Commissioner
Janine Commerford, Assistant Commissioner
Elizabeth J. Callahan, Acting Director, Division of Policy and Program Development
Paul W. Locke, Director, Division of Response and Remediation