

## EXECUTIVE SUMMARY

This Executive Summary highlights key issues and concerns raised by the commenters. More detailed discussions of these issues are included in the remainder of the document, which contains all of the comments received (paraphrased or original) and the responses prepared.

### **RULE-MAKING** [Part A.2]

The NYSDOH received approximately five comments claiming the guidance is a rule or regulation, and not guidance, because various provisions of the document are non-discretionary, mandatory compliance requirements.

The guidance is not a regulation, rule or requirement. The guidance describes the methodology by which the State (i.e., the New York State Departments of Environmental Conservation and Health) addresses soil vapor intrusion at a site. It reflects our experience in conducting soil vapor intrusion investigations and presents a reasonable and practical approach to identifying and addressing current and potential human exposures to contaminated subsurface vapors associated with known or suspected volatile chemical contamination (in terms of environmental contamination only). The approach presented is analogous to the approach taken when investigating contamination in other environmental media (e.g., groundwater, soil, etc.) and addressing corresponding exposure concerns.

One of the reasons why the guidance was prepared was to promote consistency in addressing the issue of soil vapor intrusion. While approaches for meeting the objectives discussed in the guidance may vary, the objectives themselves remain consistent from site to site. The document has been revised throughout to reflect that the guidance is providing recommendations, not requirements. Text has been eliminated that might create a contrary impression.

### **NYSDOH's AUTHORITY** [Parts A.1, A.5 and A.8]

More than 20 comments were received claiming that the guidance appears to overstep the NYSDOH's jurisdictional bounds and conflicts with the NYSDEC's proposed policy on soil vapor intrusion. Commenters believe the development of guidance on the method of sampling environmental media, the number of samples taken, the frequency of monitoring, and decisions on remedial measures for vapor intrusion pathways is within NYSDEC's purview, not the NYSDOH's.

The NYSDOH, in cooperation with NYSDEC, is responsible for assessing potential human exposure pathways at contaminated sites. The guidance provides recommendations on how to investigate and address a specific exposure pathway (soil vapor intrusion) that may exist at a site. As discussed in the NYSDEC's Program Policy *DER-13: Strategy for Prioritizing Vapor Intrusion Evaluations at Remedial Sites in New York* [NYSDEC 2006], this pathway will be evaluated at all completed, current and future sites in New York State. The NYSDOH's guidance complements the NYSDEC's policy by providing recommendations on how to evaluate soil vapor intrusion. The guidance was drafted in consultation with the NYSDEC and should not be interpreted as the NYSDOH operating separately from the NYSDEC. The combined goal of the policy and guidance documents is to conduct soil vapor intrusion evaluations as efficiently and effectively as possible at all remedial sites in New York.

**NYSDOH's OVERALL APPROACH** [Parts A.8 and A.9]

Over 40 comments were received from approximately half of the commenters noting that the approach to evaluating soil vapor intrusion in the guidance differs from those developed by other state and federal agencies. Numerous comments encouraged the NYSDOH to adopt an approach more analogous to those of others -- one that includes screening levels in environmental media, distance criteria, modeling results alone, default attenuation factors, a tiered approach, a weight-of-evidence approach, etc.

The State believes that the guidance provides a reasonable and practical approach to evaluating soil vapor intrusion that is

- analogous to the approach taken when investigating contamination in other environmental media (e.g., groundwater, soil, etc.) and addressing corresponding exposure concerns, and
- supported by data collected during soil vapor intrusion investigations throughout New York State to date.

The guidance is intended to provide recommendations on how to investigate and address exposures related to soil vapor intrusion. As discussed in Section 1.8 of the guidance, the investigation, evaluation, mitigation and remediation of soil vapor and soil vapor intrusion are evolving disciplines. The guidance provides as detailed recommendations as possible given the current state of knowledge and our experience to date. To make the guidance more prescriptive would not allow for the flexibility needed in investigating and addressing this complex exposure pathway and may not be appropriate for all sites.

The overall approach presented in the guidance remains the same as that in the public comment draft. However, if the results of future investigations indicate that recommendations currently presented in the guidance (or the bases for those recommendations) are inappropriate or are unnecessarily vague, then the guidance will be revised or amended accordingly.

**EXPOSURES IN NON-RESIDENTIAL SETTINGS** [Part A.3]

Approximately 20 complex legal and policy comments were received regarding the approach taken to address soil vapor intrusion in non-residential buildings, particularly those in occupational settings. The commenters believe the Occupational Safety and Health Administration (OSHA) standards are the applicable standards for addressing workplace exposures regardless of the source of the volatile chemicals found in workplace air. The commenters recommended that, consistent with EPA's guidance and the approach taken by several other states, the NYSDOH guidance should only apply to potential exposures not regulated under OSHA.

The NYSDOH's document provides guidance on identifying and addressing current and potential involuntary human exposures to contaminated subsurface vapors associated with known or suspected volatile chemical contamination. It does not constitute a rule or regulation.

One of the areas of the EPA's draft guidance that generated much comment from states, industry, and other federal authorities, was the guidance's applicability to workplace settings. The EPA will be addressing this issue in their revised guidance. Contrary to the comment regarding the use of OSHA standards by other states, we have found that the soil vapor intrusion guidance of other states such as Alaska, 2005; California, 2004; Colorado, 2004; New Hampshire, 2005; New Jersey, 2005; and

Ohio, 2005, generally defer to OSHA standards only when the chemical(s) in soil vapor are routinely used as part of regular operations in the building.

### **NYSDOH's GUIDELINE FOR TRICHLOROETHENE (TCE) IN AIR** [Part A.4]

The NYSDOH received approximately 5 comments regarding the guideline established by the NYSDOH for TCE in air (5 micrograms per cubic meter).

Comments pertaining to the derivation of the guideline for TCE in air are outside the scope of the guidance document. In August 2005, the NYSDOH issued a 300-page draft report entitled *Trichloroethene (TCE) Air Criteria Document*. We convened a Peer Review Panel of national experts selected from nominations solicited from interested parties. The Panel reviewed the report and requested that we consider

- a number of technical comments related to some health endpoints,
- childhood vulnerabilities to a greater extent, and
- adding more detail about the selection of the guideline.

The Peer Review Panel comments along with others that we received and our responses are in the final TCE guideline document [NYSDOH 2006b].

### **SOIL VAPOR/INDOOR AIR MATRICES**

The following revisions were made to the Soil Vapor/Indoor Air Matrices in Section 3.4 of the guidance based on comments received on the NYSDOH's draft report entitled *Trichloroethene (TCE) Air Criteria Document* (NYSDOH 2005):

- Matrix 1: changed the boundary between the indoor air concentration ranges in Columns 2 and 3 from 2.5 to 1 mcg/m<sup>3</sup> and added "Monitor/Mitigate" as a recommended action in Box 10; and
- Matrix 2: added Monitor/Mitigate action to Box 6.

For additional information, please see the memorandum from N. Kim to R. Tramontano dated October 12, 2006, provided in Appendix 2.

### **ACTION LEVELS FOR MITIGATION** [Parts D.11 and D.12]

Approximately 10 comments were received expressing concern that variable air quality action levels have been permitted on a site-by-site basis. Commenters requested that the decision matrices be created as conservatively as possible with the best interest of the residents in mind. They also requested that the NYSDOH protect all of the State's residents equally by demanding remediation at consistent and conservative air quality action levels. Specifically, several commenters recommended that homes with TCE detected in the indoor air or sub-slab vapor be mitigated.

The decision to install sub-slab depressurization systems at structures where TCE is detected is made on a site-specific basis with many factors considered. The NYSDOH has developed two decision matrices that are general risk management tools used to guide decisions on appropriate actions to address exposures related to soil vapor intrusion in the context of a particular site. In other words, they are not intended to be prescriptive or to mandate universal decisions without accounting for the multitude of site-specific and building-specific considerations. The matrices provide indoor air and sub-slab vapor concentration ranges for four volatile chemicals (TCE, tetrachloroethene, 1,1,1-trichloroethane and carbon tetrachloride) and corresponding

recommendations for action, from a human health perspective. The actions are both protective of human health and appropriate to addressing current and potential exposures related to soil vapor intrusion. As discussed in Note 1 of the matrices, actions more protective of public health than those specified within the matrix may be proposed at any time. Such approaches are usually undertaken for reasons other than public health (e.g., seeking community acceptance, reducing excessive costs, etc.). As a result, actions may vary from site to site in their degree of protectiveness. Nevertheless, the protection of human health serves as the foundation of all actions taken at sites, and this foundation is reflected in both the guidance and the decision matrices.

#### **NEW YORK STATE BROWNFIELD CLEANUP PROGRAM (BCP) [Part A.6]**

Two comments were received claiming the guidance undercuts the purpose and intent of the Brownfield Cleanup Act. The NYSDOH also received approximately 10 comments expressing concerns that the requirements of the soil vapor intrusion guidance will discourage parties to voluntarily clean-up brownfield sites. Reluctance may be due to uncertainty in the level and the length of remedial activities that may be required or an inability to get financing to remediate and develop the site. In addition, there may be lingering concerns about liability issues, such as in locations of area-wide groundwater contamination.

The purpose and intent of the "Brownfield Cleanup Program" is to encourage cleanup and redevelopment of brownfield sites using remedies that are fully protective of public health and the environment. The guidance provides an approach that will accomplish these goals at brownfields. Specifically, the guidance will help ensure that responsible parties seeking to investigate and remediate brownfield soil contamination will consider important site-specific factors such as the toxic potential of the contaminant(s) present, the extent of contamination, preferential pathways, subsurface hydrology, soil properties, existing structures, and anticipated future use.

The guidance allows for flexibility in site redevelopment and should not preclude satisfactory redevelopment of sites. In many cases, mitigation systems have been installed on new or existing buildings as preventative measures to address concerns about soil vapor intrusion and radon. This may be prudent in areas of wide-spread groundwater contamination. While areas of site-wide groundwater contamination of an unknown source may present redevelopment difficulties, the State will be responsible for addressing or identifying the responsible party to address sources of contaminants not attributable to the site itself. To the extent that site data and site conditions demonstrate that soil vapor intrusion is not occurring and that the potential for soil vapor intrusion to occur is not likely, the soil vapor intrusion investigation would be considered complete. If a soil vapor intrusion investigation is needed but it is not the responsibility of the participant in a specific environmental remediation program then the NYSDEC and NYSDOH will make sure appropriate actions are taken to complete the investigation and remediation, as well as to address exposures. This would include identifying any additional responsible parties and enrolling them into an appropriate remedial program.

#### **RESPONSIBILITY FOR MITIGATION [Part A.11]**

The NYSDOH received approximately 15 comments expressing concerns that the guidance may impose mitigation and remedial obligations on a party where the indoor air impacts do not result from soil or groundwater contamination or from subsurface sources alone.

To the extent that site data and site conditions demonstrate that soil vapor intrusion is not occurring and that the potential for soil vapor intrusion to occur is not likely, the vapor intrusion investigation would be considered complete. In general, if indoor exposures represent a concern due to indoor sources, then the State will provide guidance to the property owner and/or tenant on ways to reduce their exposure. If indoor exposures represent a concern due to outdoor sources, then the NYSDEC will decide who is responsible for further investigation and any necessary remediation. Depending upon the outdoor source, this responsibility may or may not fall upon the party conducting the soil vapor intrusion investigation.

### **PETROLEUM HYDROCARBON SITES [Part A.10]**

Approximately 8 comments were received where commenters recommended that special considerations (e.g., biodegradation, screening levels, default attenuation factors, etc.) for petroleum hydrocarbon sites be incorporated into the guidance or that a separate guidance document be prepared.

To date, the assessment of petroleum hydrocarbon sites has been based on soil vapor sampling results, indoor air results, model predictions, or some combination thereof. The information currently available does not support the use of soil vapor or groundwater screening values or of default factors for attenuation, dilution or degradation to presumptively rule out sub-slab vapor or indoor air sampling. Specifically, field data demonstrating the following are scarce:

- the relationship between the results of sampling outside of buildings (soil vapor) and within buildings (sub-slab vapor and indoor air),
- the relationship between sub-slab vapor and indoor air concentrations, and
- the effect of biodegradation on sub-slab vapor concentrations.

The guidance is intended to provide an approach for investigating and addressing the potential for soil vapor intrusion at sites with volatile chemical contamination, regardless of the nature of the contamination. If field data across the state demonstrate the validity of the considerations presented by the commenters, the State will update or amend the guidance accordingly.

### **SAMPLING BUILDINGS DURING THE HEATING SEASON [Part C.5]**

Approximately half of the commenters submitted over 40 comments disagreeing with the emphasis placed on sampling buildings in the heating season. Commenters offered many reasons for allowing sampling at different times of the year or throughout the year, including the following: the heating season may not represent a worst case scenario for all buildings (e.g., buildings with complex heating, ventilation and air-conditioning systems) and indoor air concentrations are not expected to vary during the year.

The State agrees that all available information about a site and potentially affected buildings (including operation of heating, ventilation and air-conditioning systems) should be considered in planning and timing an investigation. The guidance has been revised to clarify that a soil vapor intrusion investigation should be performed when the likelihood of vapor intrusion to occur is considered to be the greatest (i.e., worst-case conditions).

The NYSDEC and NYSDOH intend to collect samples at several sites across the state over the course of a year to improve our understanding of how subsurface vapor concentrations and corresponding indoor air concentrations may or may not fluctuate with seasonal changes. If the results indicate that recommendations currently

presented in the guidance (or the bases for those recommendations) are inappropriate, then the guidance will be revised or amended accordingly.

#### **PURPOSE OF SOIL VAPOR SAMPLING** [Part C.3]

Approximately 8 comments were received where commenters requested clarification on the utility of soil vapor data and recommended that the guidance be revised to include the use of soil vapor data to rule out the need for structure sampling.

Soil vapor samples are collected to characterize the nature and extent of contamination in this environmental medium. The results can be useful tools for guiding the selection of structures to perform sampling (sub-slab vapor, indoor air, outdoor air). Soil vapor data are typically not sufficient as a single determinant for considering an investigation complete because, in our experience to date, soil vapor (alone and in conjunction with modeling) has not been shown to be a reliable tool for predicting concentrations immediately beneath a building's slab or in the indoor air. However, to the extent that existing site data are sufficient to meet the investigation objectives outlined in Section 1.5 of the guidance, no further sampling may be appropriate. These determinations are made on a site-specific basis.

#### **METHODS OF MITIGATION** [Part E.2]

The NYSDOH received over 10 comments stating that the mitigation methods required in the guidance (e.g., sub-slab depressurization systems) are not always technically or financially feasible and may not be the most appropriate means of control. Commenters requested that other methods, such as passive ventilation systems and vapor barriers, also be allowed.

Due to their effectiveness, energy-efficiency and ease in monitoring, the State strongly recommends the installation of sub-slab depressurization systems to prevent vapor intrusion and subsequent human exposures. However, the State acknowledges throughout Section 4.0 of the guidance, that the installation of a sub-slab depressurization system may not be feasible or practical in all circumstances. Alternative mitigation methods, including modification of heating, ventilation and air-conditioning systems, sealing, room pressurization, or vapor barriers, may be considered if the effectiveness of the mitigation method can be documented and maintained for as long as the potential for soil vapor intrusion exists at the structure and if they are installed and maintained in accordance with the United States Environmental Protection Agency's radon guidance (where applicable). All proposed mitigation technologies will be reviewed on a case-by-case, site-by-site basis.