

Attachment 1
Recommended Supplemental Guidance to Vapor Intrusions from Contaminated Soil and
Groundwater into Buildings
Vapor Intrusion Subcommittee- November 2004

Modeling Considerations for Vapor Sources less than 5' vertically from the receptor:

Soil: The EPA's Johnson-Ettinger soil model can be used with site-specific input parameters for contaminated soil that is less than 5' vertically from the receptor. Normally, a person would use the actual depth to the top of contaminated soil and site-specific soil type instead of the default depth of 5' and default soil of sandy clay loam (SCL). The appropriate soil characteristics of the site-specific soil would be based on the values listed in Table 10 of EPA's *User's Guide for Evaluating Subsurface Vapor Intrusion into Building, June 19, 2003*, unless long-term representative measurements of site-specific soil characteristics are available.

The presence of preferential pathway, separate phase liquid (SPL) or earth basement would preclude the use of EPA's Johnson-Ettinger soil model.

Groundwater: Similar to the discussions above for the soil, the EPA's Johnson-Ettinger groundwater model also can be used with site-specific input parameters for contaminated groundwater that is less than 5' vertically from the receptor. Normally, a person would use the actual depth to the groundwater table and site-specific vadose zone soil type instead of the default depth of 5' and default vadose zone soil of sandy clay loam (SCL). The appropriate soil characteristics of the site-specific vadose zone soil would also be based on the values listed in Table 10 of EPA's *User's Guide for Evaluating Subsurface Vapor Intrusion into Building, June 19, 2003*, unless long-term representative measurements of site-specific soil characteristics for vadose zone are available.

The presence of preferential pathway, SPL, wet basement or earth basement would preclude the use of EPA's Johnson-Ettinger groundwater model. If the following error message shows up on the DATENTER worksheet of EPA's Johnson-Ettinger groundwater model, the model results would also be unreliable: "*ERROR: Calculated thickness of capillary fringe (cm) is: nn.nn. Depth to water table minus depth to bottom of floor must be > thickness of capillary fringe.*" Such error message should not be ignored.

When it is not appropriate to use EPA's Johnson-Ettinger groundwater model, one of the alternative approaches is to use Henry's law equation directly. This approach would assume that the contaminated groundwater has entered the basement and the contaminant in the indoor air is essentially in equilibrium with the contaminant in groundwater by Henry's Law (adjusted for differing temperatures). If SPL has entered the basement, Raoult's law equation could be used instead of Henry's law equation.