IAQ Decision Matrix for SHS Definitions
(see Figures 2 and 3)

Receptor	A receptor (humans in this case) is located in an occupied or potentially occupiable home or building built on a slab or below grade basement or area.
COPIAC	Contaminant (substance) of potential indoor air concern for soil. Determined using contaminant lists from nearby states and PA-specific Johnson and Ettinger IAQ modeling
COPIAC for soil -- DRAFT	acetone benzene carbon tetrachloride chloroform dibromochloromethane 1,1 – dichloroethene (EDC) cis – 1,2 – dichloroethene trans – 1,2 – dichloroethene tetrachloroethene (PCE) toluene vinyl chloride xylenes (m-xylene)
Potentially complete exposure pathway	An exposure pathway is the course a regulated substance(s) takes from the source area(s) to a species of concern including absorption or intake into the organism; a pathway must include a source or release from a source, a point of exposure, and an exposure route into the organism to be potentially complete. Completed exposure pathways need to be present for exposure of the receptor to occur. An exposure pathway must exist between substance and receptor.
Preferential exposure pathway -- DRAFT	Pathway from contamination to receptor that is somewhat direct and has little impediment to transport (e.g., fissures in soil; sewer or other drainage pipes; paved areas which can trap and transport substances horizontally; etc.)
Soil gas	Because sampling VOCs in indoor air can be complicated by sources of VOCs within a home or building, soil gas measurements can be taken at a distance not to exceed 5 feet from the slab or

basement edge and compared to MSCs for soil gas, where MSCs for soil gas would be calculated as follows:

$$MSC_{SG} = \frac{MSC_{IAQ}}{TF}$$

Where:

MSC_{SG} = Medium-specific concentration for soil gas (mg/m^3);
MSC_{IA} = Medium-specific concentration for indoor air as described in Step 2A (mg/m^3); and
TG = TF Transfer factor from soil gas to indoor air,
= 0.01 (a conservative value relating concentrations in indoor air to concentrations in soil gas adjacent to a building based on data report in Management of Manufactured Gas Plant Sites, Volume III: Risk Assessment, Gas Research Institute, 1987, pages 6-30 and 6-31).

To use such a procedure, a method or methods for taking soil gas samples and performing soil gas analysis must be specified or suggested.

Johnson-Ettinger Vapor Intrusion Model

Johnson and Ettinger (1991) developed a model, which coupled steady-state diffusion from a planar source to vapor intrusion into basements of buildings via advection and diffusion processes. The model is based on permeation through cracks in the foundation/floor with the planar source at a finite depth, with a boundary around the building referred to as the "building zone of influence". The USEPA although initially attempting to develop generic soil screening levels (SSLs) for volatiles, has adopted the Johnson-Ettinger model to examine subsurface vapor intrusion into buildings via a site-specific approach. Degradation of the contaminant is not considered nor is convective water movement in the soil column (http://www.epa.gov/superfund/programs/risk/airmodel/johnson_ettinger.htm) (see Appendix for details). The model is one-dimensional, providing an estimated attenuation coefficient that associates indoor vapor concentration to the vapor concentration at the source and is based on soil

building pressure differentials (USEPA 1997b).

IAQ sampling

Indoor air samples are to be taken from the home or building beneath or adjacent to an occupied or potentially occupiable home or building (where adjacent to is defined as within 15 feet of the home or building perimeter).

Passive badge samplers, direct measurement using a FID or PID, adsorption onto activated charcoal, or direct sample collection using evacuated SUMMA-passivated canisters (USEPA Method TO-14) and analytical testing at a laboratory certified by USEPA for such analyses. Direct air sampling using SUMMA canisters is often preferred by the USEPA and other agencies. Factors such as cost, sensitivity, data reliability and the data quality objectives should be considered prior to selecting a method. Other considerations include but are not limited the following: duration of sample collection, sample locations, number of samples, atmospheric conditions, ambient (background) air quality, structural considerations. Rigorous indoor air quality monitoring programs can become quite expensive to implement.

These results are to be compared to the following criteria For residential exposures, the criteria are medium specific concentrations (MSCs) for indoor air calculated using the equations presented in Table __. For non residential exposures, if, for any selected VOC at the site, OSHA regulates the chemical at the site and OSHA has jurisdiction over the site, then OSHA applies for that chemical and continued monitoring and reporting should occur to ensure continued compliance under OSHA. For all other chemicals, the criteria are medium-specific concentrations (MSCs) for indoor air calculated using the equations for nonresidential exposures presented in Table __. Indoor air samples are to be taken from basements in those locations where the highest routine exposures are expected and the concentrations must be below the MSCs for indoor air. This procedure is only to be applied to homes and buildings with basements.

Separate phase liquid (SPL)	To de defined consistent with Chapter 250