Vapor Intrusion & HRS

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What is Vapor Intrusion?
HRS and Vapor

- HRS does not have a vapor intrusion pathway
- HRS pathways are groundwater, surface water, air, soil
Region 6 Approach

- Mechanisms of vapor intrusion include the migration of contaminants in groundwater to overlying soil matrix (encompassing soil, water, and vapor)
- Vaporization presents risk to overlying populations
- Use appropriate soil vapor samples to evaluate direct contact in the HRS soil exposure pathway
Simply Put

- Contaminated soil includes contaminated soil gas at the sample site.
- Use the Soil Exposure Pathway to evaluate the threat posed by the vapor portion of the soil matrix.
Disclaimer

- Region 6 is only starting conversations with OGC on this approach.

- It has not been fully vetted or discussed.
Policy Overview

Scope of the Soil Exposure Pathway

- Intent of SARA
- Scope of the pathway
- Relationship between the soil exposure pathway and the air pathway within the current HRS.
Policy Overview

Eligibility of Multiple Exposure Routes for the Soil Exposure Pathway

- Ingestion
- Dermal
- Inhalation

HRS focuses on exposure routes for Soil Exposure Pathway and benchmarks based solely on ingestion for this pathway, but does this exclude dermal and inhalation exposure routes?

Key Point: HRS model does not discriminate between human exposure for assigning the toxicity of a substance.
Policy Overview

- HRS provides the rationales and discussion at proposal and promulgation to illustrate that **the intent of the benchmarks was not inclusive of all risk**

- but generally associated with the major risks associated with each pathway.
Policy Overview

Scoring the Soil Exposure Pathway Using Soil Gas without Considering Ingestion Exposure

- Applicability of benchmarks to a site evaluated using soil gas samples
- HRS evaluates ingestion only in regards to establishment of benchmarks and the identification of Level 1 targets
- However, it is not necessary to identify Level 1 targets or to have an applicable benchmark to determine a pathway score
Policy Overview

- No requirement for Level I contamination to be present for a site to be evaluated.

- The remaining rules for application of the model for the soil exposure pathway still pertain and apply regardless of matrix of the sample.
Conclusion of Policy Overview

- Scope of the pathway includes all routes of direct contact with contaminated surfaces including soils.
- Soil Exposure Pathway considers ingestion, dermal, and inhalation exposures as applicable exposure routes.
- HRS evaluation is only specific to ingestion in regards to the establishment of benchmarks and the identification of Level I targets, but it is not necessary to identify Level I targets or to have an applicable benchmark to determine a pathway score.
Assuming the presence of contaminated soil gas is indicative of contaminated soil at the location of the sample, then a site can be evaluated using the soil exposure pathway based on soil gas samples.
Case Study

- 200-300 homes are possibly exposed to TCE vapor
- Extent of groundwater contamination unknown
- Vapor exposure is only mechanism available to score the site
Neighborhood View
Ground Water Plume
Phased Sampling Plan

- Delineate the plume with groundwater and passive soil gas sampling
- Collect additional soil vapor in sub-slab or within crawl spaces in homes over the contaminated plume
- Data delineates Areas of Observed Contamination (AOC) for HRS source identification
Region 6 Pilot for Applying the Hazard Ranking System

Areas of observed contamination will be determined based on all criteria set forth in Section 5 of the HRS, with the exception that samples collected will be soil vapor samples.
To delineate the area of observed contamination, samples shall:

- use chemical analysis per Table 2-3 of the HRS
- overlie the existing groundwater plume
- be collected within the top two feet of surface samples
- represent non-ambient vapor
- be collected from beneath the slab, within crawl space or soil vapor below ground surface
- and contamination may be inferred between samples meeting Observed Contamination Criteria
Application of the Hazard Ranking System

- Targets (5.1.3 of the Hazard Ranking System)
  - resident, student or worker within 200 feet
  - all individuals subject to level II contamination
  - physical mitigation of vapors
  - contamination may be inferred
Summary & Next Steps

Preliminary Conclusions:

1. SARA intended that all routes of direct contact with contaminated surfaces would be considered.
2. Soil exposure pathway considers that the most significant human exposure pathway is ingestion, but dermal and inhalation exposures are also considered applicable exposure routes.

Work with OGC on Case Study to incorporate soil vapor samples in evaluating the Soil Exposure Pathway of the HRS.
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