**Development of More Cost-Effective Methods for Long-Term Monitoring of Soil Vapor Intrusion to Indoor Air Using Quantitative Passive Diffusive-Adsorptive Sampling Techniques**

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This research program is designed to demonstrate the applicability of lower-cost alternatives for sampling and analysis of volatile organic compounds (VOCs) in indoor air and soil gas during investigation of subsurface vapor intrusion to indoor air. Laboratory analysis of indoor air, outdoor air or soil gas samples by EPA Method TO-15 is currently the most common method used for vapor intrusion assessments, but typically costs $250 to $400 per sample, depending on the reporting limit required. Passive diffusive sampling and analysis can be 30 to 50% less expensive. The passive samplers also have at least three technical benefits: 1) they can be used consistently by different operators with minimal training, 2) they can be deployed over relatively long periods of time, which would provide a long-term average concentration more suitable for assessing risks over long exposure periods and minimizing temporal variability inherent in shorter-term samples, and 3) they are significantly smaller and less obtrusive than Summa canisters, which is less disruptive to buildings occupants.

Four distinct types of passive diffusive samplers will be tested against two conventional active gas sampling methods. Each of the passive diffusive samplers contains an adsorbent media that traps VOCs over time during exposure of the sampler to indoor air or soil gas. They each have different materials of construction and geometries that make them sufficiently different to justify comparative testing. None were specifically designed for soil gas monitoring, although the benefit of having data from both soil gas and indoor air is very attractive for vapor intrusion assessments, so the proposed research is designed to test their applicability to soil gas as well. The testing will include controlled laboratory experiments at 1, 50, 100, 1,000, 10,000, 100,000 and 1,000,000 parts per billion by volume at various temperature, relative humidity and wind speeds. Field testing will also be conducted at one or more DoD sites to be selected in 2010.