

# Indoor Air Vapor Intrusion Investigation and Risk Assessment

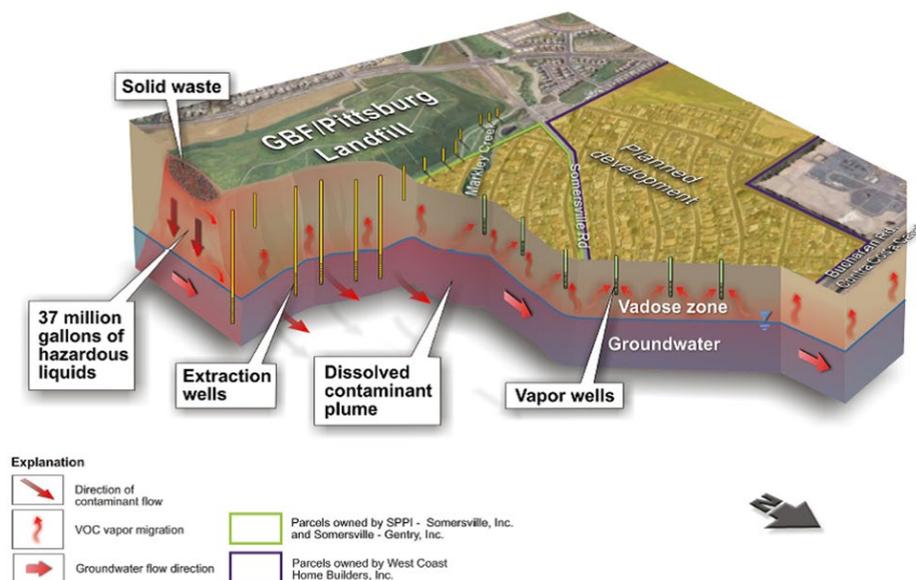
Residential and commercial buildings that overlay volatile organic compound (VOC) contamination in soil and/or groundwater may be subject to vapor intrusion, which refers to chemical transport from the subsurface into indoor air. Vapor intrusion is at the core of DBS&A's environmental practice, and DBS&A scientists have investigated subsurface vapor migration for more than 20 years.

DBS&A's staff includes experts in contaminant fate and transport in groundwater and the vadose zone, vapor migration, and vapor intrusion into building indoor air. We manage complex vapor intrusion field investigations, and serve in an expert-witness capacity on vapor intrusion-related matters. Our experience encompasses the gamut of VOCs, including chlorinated solvents and petroleum

hydrocarbons. We assist our clients in evaluating the potential risks of vapor intrusion and, if necessary, identify short-term mitigation strategies and design remedial plans to achieve site closure. We work with state and federal regulators, reduce current and future financial/environmental liabilities, and negotiate a mutually agreeable settlement.

DBS&A's professional staff has provided expertise and testimony on VOC migration in groundwater from releases at landfills, industrial facilities, refineries, gasoline stations, and dry cleaning facilities to underneath residential neighborhoods. We have also provided technical support and testimony on projects relating to vapor migration and contaminant transport in the vadose zone, risk assessment of vapor intrusion, and multi-party allocation for vapor intrusion mitigation. In support of our analyses, we have performed extensive data compilation, hydrogeologic analysis, database development, geographic information system (GIS) analysis, and vapor intrusion modeling ranging from simple analytic (e.g., Johnson/Ettinger) to complex numerical methods.

We stay current with recent developments at the U.S. Environmental Protection Agency (USEPA), the California Environmental Protection Agency (CalEPA), and other state agencies regarding vapor intrusion. This



For a landfill in Antioch, California, DBS&A evaluated the occurrence, nature, and extent of soil vapor chemical impacts, and the technical feasibility and cost of remedies, which contributed to mutually agreeable settlement.



includes recently published guidance and technical reports, recent updates to projected chemical toxicity of chlorinated VOCs, and recent model developments to account for degradation of petroleum hydrocarbons during vapor intrusion. In addition, we have a particularly high level of expertise in the field methodologies required to produce credible, technically defensible data. DBS&A's Soil Testing and Research Laboratory offers a specific vapor intrusion analysis package for key soil properties that control subsurface vapor migration and risk. DBS&A is equipped to handle all aspects of vapor intrusion issues that our clients may face.

Recently we performed a complete vapor intrusion risk assessment for a large VOC-contaminated site in accordance with CalEPA guidance, including installation of an extensive soil vapor monitoring network and collection of field data, characterization of site characteristics that control vapor migration and vapor intrusion, vapor intrusion modeling, and calculation

of lifetime cumulative incremental cancer risks. Our investigation demonstrated that while groundwater VOC impacts at the site are relatively significant and extensive, hydrogeologic conditions beneath the site limit the amount of vapor intrusion hazard. This demonstration was critical to the client's potentially significant legal—and therefore financial—liability. Site regulators with the California Regional Water Quality Control Board (RWQCB), the California Department of Toxic Substances Control (DTSC), and the California Office of Environmental Health Hazard Assessment (OEHHA) have concurred with our assessment methodologies and findings.

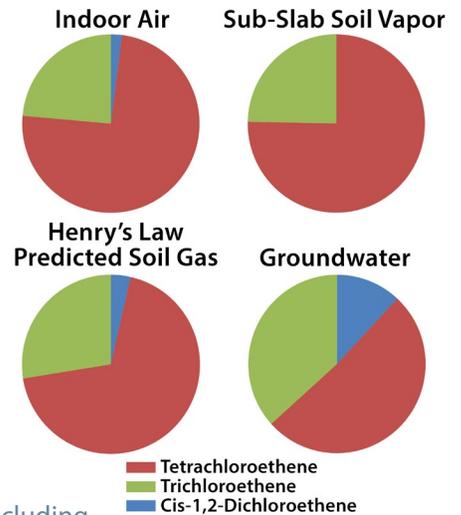
DBS&A also has experience with conducting public-participation activities on behalf of its clients. This includes permit acquisition, site access acquisition and negotiation, regulatory agency interface and negotiation, stakeholder interface, site-related websites, and public information meetings.

DBS&A brings technical knowledge and focus to our vapor intrusion investigations, combined with professionalism, responsiveness, and the ability to explain technically complex matters to a wide audience of interested parties.

DBS&A performed a vapor intrusion evaluation for residential and commercial neighborhoods downgradient of large industrial complex and superfund site in Dayton, Ohio.

The contaminants of concern were chlorinated VOCs, including

TCE and PCE. DBS&A critically evaluated indoor air and sub-slab soil vapor data from hundreds of residences and groundwater data from dozens of monitoring wells, which demonstrated a direct connection between groundwater impacts and indoor air impacts.



“ I have worked with many contamination ‘experts’ over the years, specifically since 1985 when I made it a predominant niche in my law practice. DBS&A is the best of them: prompt, diligent, accurate, and above all, absolutely up to date in every detail with respect to methodology, cost-benefit analysis, and the meaning and effect of the ever-changing regulatory guidelines set by the State of California and the federal government—and that says a lot.”

~John DeLoreto, Esq., Trustee of the San Roque Cleanup Fund

