Building Pressure Control for Rapid, Confident Vapor Intrusion Assessment Outcomes

Indoor air samples should deliver more value. This method reduces investigation time and increases confidence in the outcomes.

Background sources create uncertainty in assessing conventional air sampling results.

Building Pressure Control (BPC)

Building pressure control (BPC) is an investigation technique to measure volatile organic compound (VOC) concentrations in indoor air under worst-case vapor intrusion conditions regardless of the season or local weather conditions, and determine the influence of background sources on those VOC concentrations. Geosyntec was the first to apply BPC for forensic analysis of background source contributions (Berry-Spark et al., 2004) and this method has continued to be applied in vapor intrusion (VI) investigations (Creamer et al., 2014).

BPC offers compelling advantages over conventional approaches to indoor air sampling:

- Obtain cost-effective assessments of VI potential in one day.
- Determine indoor air concentrations under worst-case VI conditions without having to wait for a cold winter day.
- Determine whether and by how much background contamination is contributing to VOC concentrations in indoor air.
- Increase confidence in decisions about the risk posed by the VI pathway.
- Reduce or eliminate the need for ongoing monitoring assess temporal variability.


Two common factors hinder VI investigations. Geosyntec has deep experience solving both of these problems.

1. The presence of volatile chemicals in indoor air arising from background indoor sources can increase the difficulty of interpreting data collected with conventional sampling methods.

2. The large temporal variability in indoor air concentrations that has been observed to occur over weeks, months or seasons means more rounds of sampling are requested by regulators. Attorneys, purchasers and sellers, and stakeholders in investigations of trichloroethylene (TCE) exposure are often unwilling or unable to wait for the long time periods needed to assess the VI pathway.

BPC involves monitoring VOC concentrations in indoor air under various pressure conditions. A fan or HVAC unit is used to under-pressurize the building, which promotes vapor intrusion through building foundation cracks and openings. The fan can also be used to over-pressurize the building, which inhibits vapor intrusion. Indoor air samples are collected under both conditions. The indoor air concentrations when the building is over-pressurized measures the contribution from background sources. The indoor air concentration measured when the building is under-pressurized, less the background indoor air concentration, measures the contribution of vapor intrusion to indoor air under worst-case conditions.

Examples of the different sizes and setting of buildings we have sampled:

- In 2013, we conducted BPC on a 250,000 square foot building in one overnight shift to avoid interruption to manufacturing.
- Geosyntec used BPC in a church to induce worst-case conditions and resolve the VI pathway evaluation in just 4 hours when the building was not in use.
- In 2016, Geosyntec successfully used BPC to identify both the vapor intrusion related and residual background related PCE and TCE contributions to indoor air quality at a former dry cleaning facility.

Geosyntec’s expertise and teamwork were critical in helping achieve closure and No Further Action (NFA) status for over 100 properties associated with one of the most complex and highest profile VI assessment projects in the Southeast.

“…”

– Owen Nuttall
Army BRAC Environmental Coordinator

Geosyntec continues to develop better approaches to assessing and managing vapor intrusion. We have several other innovations that can reduce cost, save time, and deliver a more confident and unambiguous assessment.

About Us

Geosyntec Consultants is a leading consulting and engineering firm that operates over 80 offices throughout North America, Asia, Australia, and Europe. We address new ventures and complex challenges involving our environment, natural resources, and civil infrastructure through high-value services, first-to-field deployment of emerging technologies, and innovative solutions for our clients.

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