

Comparison of Estimated Versus Actual Vapor Intrusion Management System Performance

Sigrida Reinis, PhD, PE (sreinis@treadwellrollo.com) and
Jeffrey F. Ludlow, PG (Treadwell & Rollo, Inc., San Francisco, California, USA)

Treadwell & Rollo, Inc. designed passive sub-slab vapor management systems (VMS) to mitigate volatile organic compound (VOC) vapor intrusion into indoor air for 28 buildings at a new shopping mall on a 55-acre property in the San Francisco Bay Area formerly occupied by a manufacturing facility. After construction, a VMS monitoring program (as required by the Regional Water Quality Control Board [RWQCB]) was implemented, measuring influent and effluent airflow at selected buildings and collecting 24-hour whole air samples at all buildings. VMS discharge of VOCs is subject to Bay Area Air Quality Management District (BAAQMD) regulations and permitting requirements, which can include significant fees and monitoring requirements. To minimize these potential impacts a permit exemption with the BAAQMD was applied for. To evaluate the request for exemption, the BAAQMD required an estimate of the total annual VOC emissions from the VMS effluent (discharge) risers from the 28 new buildings. An earlier paper (2008) presented the methodology used to calculate estimated VOC emissions for the site, which utilized monitoring data collected from operational VMS at other, existing facilities and pre-development soil gas data from the subject site. This paper uses actual VMS monitoring results collected over a one-year time period from the 28 buildings at this site to calculate actual annual VOC emissions and compares them to those predicted prior to construction using the methodology used in applying for the BAAQMD permit exemption. Based on the comparison of predicted versus actual VMS performance for this site, recommendations are made regarding refinements to the calculation methodology of predicted VMS emissions.