

Indoor Air Quality Assessment Report

Waterloo Membrane Sampler (WMS)

Source

Indoor Air Quality Assessment Report

Summary

Media:	Indoor air
Study Type:	Site investigation with passive sampling, with limited active sampling for comparison
Technology:	WMS (Accumulation)
Peer Reviewed:	No
Publication Date:	March 6, 2015

Study Description

General site description and conditions

The site occupies approximately 15 acres with several buildings used for industrial manufacturing, a maintenance shop, a chemical storage warehouse, and a wastewater treatment plant with small laboratory, office, and maintenance shop. An asphalt parking lot occupies approximately half the site surface area, and a highway is approximately 0.5 mile from the site.

Compounds

Solvent degreasers, plating, and surface preparation activities

Compounds were volatile organic compounds (VOCs), including tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), vinyl chloride (VC), and benzene.

Sampling frequency of Compounds

A total of 20 indoor air samples were collected from 20 different locations on site. The sampling period was 7 days, using the Waterloo Membrane Sampler (WMS), a thermal desorption passive sampler. Colocated air samples were collected over a 24-hour sampling period using 6-liter evacuated certified clean Summa canisters in nine of the locations. At some of the locations where canister samples were collected, a total of three 24-hour samples were collected to coincide with Day 1, Day 4, and Day 7 of the WMS passive sampling period. The Summa canister samples were used as side-by-side comparison.

A total of five ambient air samples were collected using WMS over a 7-day sampling period. Two 24-hour Summa canister ambient air samples were collected at two of the same locations where WMS samples were collected.

Technology used

Samples were shipped under appropriate chain of custody protocols to Eurofins Air Toxics, Ltd., for analysis of VOCs using U.S. EPA Method TO-17. W Sample hold time is 6 months for RAD130 and WMS. Sample preservation requirements are storage in cool, solvent-free refrigerator and optional use of ice during shipping. The indoor air samples (both WMS and Summa canisters) were placed 5–6 feet above the ground level, and sampling was conducted at the facility under



conditions representative of day-to-day operations, with normal operation of the HVAC systems. Where possible, indoor air samples were collected in the center of the room, away from doors, windows, or corners. Sampling locations in front of or near ventilation ducts, where strong air flow currents are present, were avoided as they were not considered representative of typical air flow patterns.

Ambient samples were collected from 5–6 feet above ground surface, at least 10 feet beyond a tree's drip line, and away from apparent fuel and solvent sources. Upwind ambient samples were collected on the upwind side of a building at a distance equal to or less than twice the height of the building, or along the property fence line if the recommended distance could not be met due to property boundary limits.

The WMS samplers were checked periodically throughout the 7-day sampling period to ensure that the samplers were not compromised. Field observations and discrepancies were noted. Weather conditions, such as temperature and humidity at time of sampling commencement and at sampling completion for each sampling device at each location, were recorded. Relative humidity ranged from 50.3 to 61.3%, barometric pressure ranged from 30.14 to 30.5 inches of mercury (inHg), and temperature measurements ranged from 71°F to 77.3°F. Indoor air samples had the greatest temperature variability in the main warehouse locations open to ambient air conditions, compared to HVAC systems-controlled closed offices. Differential air pressures were also measured in the vicinity of the indoor air samples. All locations were measured to a range from 0 to -0.01 inches of water column (in H₂O), except for one indoor air location (0.003 in H₂O).

The samples were transported under standard chain of custody procedures to an accredited laboratory. The WMS samples were analyzed using modified U.S. EPA Method TO-17, which uses thermal desorption (TD) for extraction and GC/MS methodology for analysis of 35 VOCs. The Summa canisters were analyzed for VOCs by GC/MS methodology using U.S. EPA Method TO-15. A total of two duplicate WMS samples and one duplicate Summa canister were used to assess the aggregate precision of sampling techniques and laboratory analysis.

Remedial Phase

The purpose of this sampling was to evaluate potential vapor intrusion of subsurface vapor-forming chemicals into indoor air.

Outcome

For the purposes of this case study, only data for WMS samples with colocated Summa canister samples are presented. See study for specific results.

Comparison of the 7-day WMS to the colocated 24-hr Summa canister samples indicated a correlation and consistency among the detected values of VOCs for the two sampler types.

References

CDM Smith, Indoor Air Quality Assessment Report, X Facility, Santa Ana, California, CDM Smith (Irvine, CA), March 06, 2015.