



Former Dry Cleaners

Waterloo Membrane Sample (WMS)

Summary

Media:	Indoor air
Study Type:	Site characterization
Technology:	Accumulation
Peer Reviewed:	No
Publication Date:	January 6, 2022

Study Description

General site description and conditions

The site is a former dry cleaner in California, in operation from 1989 to 2006, with adjacent commercial/retail land use, a fitness gym, residential properties, gasoline stations, and interstate highways in the vicinity of the site.

Contaminants of concern (COCs)

COCs include volatile organic compounds (VOCs) including tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and benzene.

Sampling frequency of COCs

Four indoor air and ambient air samplers were deployed from October 7 to October 22, 2019 (sampling duration of 15 days) and one sampler was deployed from November 7 to November 18, 2019 (11 days). Samplers were placed approximately 3–5 ft above ground surface to simulate receptor breathing space. Weather measurements were collected throughout the sampling period. These sampling results were reported along with indoor and ambient air sampling conducted in March 2018. The Waterloo Sampler was not explicitly noted for that sampling event and therefore not included in this case study. However, the reporting limits and detected concentrations were comparable to those reported for the Waterloo Sampler.

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. Waterloo samplers with charcoal sorbent bed were analyzed by modified TO-17 (collection of VOCs in ambient air using sorbents and analysis by GC/MS, instead of active sample collection using a pump and thermal desorption as the prep step). Sample hold time is 56 months for RAD130 and WMS. Sample preservation requirements are storage in cool, solvent-free refrigerator and optional use of ice during shipping.

VOCs were chemically extracted using carbon disulfide and aliquot was analyzed by GC/MS. Technical note: 1,1,2,2-tetrachloroethane (1,1,2,2-PCA) can degrade into trichloroethene (TCE) during storage on the charcoal-based sorbent used in the WMS device. Therefore, samples containing 1,1,2,2-PCA may yield reduced concentrations of 1,1,2,2-PCA and elevated concentrations of TCE.



Remedial Phase

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

Outcome

PCE was detected at concentrations of less than the reporting limit (<RL) of 0.55 $\mu\text{g}/\text{m}^3$ to 0.66 $\mu\text{g}/\text{m}^3$. Other concentration ranges for VOCs detected in indoor and outdoor air included:

- TCE (<0.55 $\mu\text{g}/\text{m}^3$ to <1.2 $\mu\text{g}/\text{m}^3$)
- toluene (1.3 $\mu\text{g}/\text{m}^3$ to 5.7 $\mu\text{g}/\text{m}^3$)
- 2-butanone (<2.8 $\mu\text{g}/\text{m}^3$ to 8.4 $\mu\text{g}/\text{m}^3$)
- chloroform (<1.1 $\mu\text{g}/\text{m}^3$ to <1.6 $\mu\text{g}/\text{m}^3$)
- ethylbenzene (<0.51 $\mu\text{g}/\text{m}^3$ to < 0.74 $\mu\text{g}/\text{m}^3$)
- m,p-xylene (1.0 $\mu\text{g}/\text{m}^3$ to 1.4 $\mu\text{g}/\text{m}^3$)
- o-xylene (<0.48 $\mu\text{g}/\text{m}^3$ to <0.70 $\mu\text{g}/\text{m}^3$)
- 1,2,4-trimethylbenzene (<0.25 $\mu\text{g}/\text{m}^3$ to 0.28 $\mu\text{g}/\text{m}^3$)
- naphthalene (<0.4 $\mu\text{g}/\text{m}^3$ to <0.71 $\mu\text{g}/\text{m}^3$)
- benzene (0.39 $\mu\text{g}/\text{m}^3$ to <5.7 $\mu\text{g}/\text{m}^3$)

The Waterloo membrane sampler was able to detect indoor and ambient air concentrations of VOCs. Overall, the reporting limits were below the applicable regulatory comparison criteria.

Case Study Reference

Final Supplemental Site Investigation Report, Former Dry Cleaners, Arcadis U.S., Inc., January 6, 2022.