

Technical Memorandum

TO: Bucklin Place LLC
FROM: Dylan Frazer, LG; Tim Syverson, LHG
DATE: December 16, 2016
RE: **HVAC Adjustments and Indoor Air Sampling Summary**
Happy Nails Tenant Space – Bucklin Place
Silverdale, Washington
Project No. 1595001.020.025

Introduction

As a follow-up to the ongoing environmental investigations conducted by Landau Associates, Inc. (LAI) at the Ultra Custom Cleaners (UCC) tenant space at Bucklin Place (site) located at 2222 NW Bucklin Hill Road, Suite 105, Silverdale, Washington, adjustments were made to the heating, ventilation and air conditioning (HVAC) system at the Happy Nails tenant space, and additional indoor air samples were collected following the system adjustments. This technical memorandum documents the HVAC system adjustments that were made on September 23, 2016, the additional indoor air sampling and analysis conducted on November 2, 2016, and the implications of the analytical results for future use of the tenant space. The results of the previous indoor air and sub-slab soil sampling and analysis were presented in a technical memorandum dated September 23, 2016 (LAI 2016).

HVAC System Adjustments

In response to the detections of trichloroethene (TCE) at concentrations greater than the Washington State Model Toxics Control Act (MTCA) modified Method B screening level and the published US Environmental Protection Agency (EPA) Indoor Air Action Level (IAAL)-Accelerated Response Action Level (EPA 2014) in previously collected indoor air samples, HVAC system adjustments were made to increase the air pressure (i.e., create positive pressure) inside the Happy Nails tenant space and decrease the pressure gradient for potential indoor vapor intrusion from sub-slab soil vapor. These HVAC system adjustments were made on September 23, 2016, and consisted of adjusting the HVAC fresh air dampers on the roof-mounted units. Documentation provided by the HVAC technician indicates that the indoor air pressure was increased to 3 pascals.

Indoor Air Sampling and Analytical Results

To evaluate the effectiveness of the HVAC system adjustments as a mitigation measure for potential vapor intrusion, a follow-up indoor air sample was collected from inside the Happy Nails tenant space on November 2, 2016. The analytical results for this indoor air sample are provided in Table 1, which also includes the results for prior indoor air samples. For comparison with the detected concentrations, the attached table also includes screening levels developed using the Washington State Department of Ecology (Ecology) MTCA modified Method B scenario for a commercial worker, and published EPA IAALs for a 10-hour/day exposure. The modified Method B screening levels were

developed for the Happy Nails tenant space using the modified Method B procedures, as allowable under MTCA and suggested by Ecology vapor intrusion guidance, assuming that an adult worker will occupy the Happy Nails tenant space for 60 hours per week (12 hours/day, 5 days/week) for 52 weeks per year.

The analytical results for the indoor air sample collected on November 2, 2016 (IA-2) indicate that tetrachloroethene, trichloroethene (TCE), cis-1,2-dichloroethene, and vinyl chloride were not detected at concentrations greater than the laboratory reporting limits. These reporting limits were well below both the MTCA modified Method B screening levels and the published EPA IAAL-Accelerated Response Action Level for TCE. These data indicate that the HVAC system adjustments were effective in reducing the TCE concentrations present in the indoor air within the Happy Nails tenant space.

Recommendations

The analytical results indicate that maintaining positive pressure within the Happy Nails tenant space is effective mitigation for reducing the contaminant concentrations in indoor air and decreasing the potential for vapor intrusion from sub-slab soil vapor beneath the Happy Nails tenant space. Therefore, the HVAC system should continue to be operated at the settings set by the HVAC technician on September 22, 2016, during use of the Happy Nails tenant space.

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If you have any questions or comments regarding the indoor air sampling results for the Happy Nails tenant space or the HVAC system adjustments, please contact the undersigned.

LANDAU ASSOCIATES, INC.



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DHF/TLS/ccy

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References

- EPA. 2014. Memorandum: EPA Region 9 Interim Action Levels and Response Recommendations to Address Potential Developmental Hazards Arising from Inhalation Exposures to TCE in Indoor Air from Subsurface Vapor Intrusion. From Gerald Hiatt and Daniel Stralka, Regional Toxicologists, US Environmental Protection Agency, to Enrique Manzanilla, Superfund Division, US Environmental Protection Agency. June 30.
- LAI. 2016. Technical Memorandum: Sub-Slab Soil Vapor and Indoor Air Sampling Results, Happy Nails Tenant Space - Bucklin Place, Silverdale, Washington. Landau Associates, Inc. September 23.

Attachments

Table 1: Indoor Air Analytical Results

Table 1
Indoor Air Analytical Results
Happy Nails Tenant Space - Bucklin Place
Silverdale, Washington

Analyte	Modified MTCA Method B Indoor Air Screening Level- Commercial Exposure Scenario ^a	EPA Indoor Air Action Level- Accelerated Response Action Level Commercial/ Industrial 10-hour work day	EPA Indoor Air Action Level- Urgent Response Action Level Commercial/ Industrial 10-hour work day	Sample Location, Lab ID, Sample Date			
				Happy Nails ^b		Ambient Air	
				IA-1 P1604179-001 8/24/2016	IA-2 P1605188-002 11/2/2016	AA-1 P1604179-002 8/24/2016	AA-1 P1605188-003 11/2/2016
Volatiles (µg/m³) Method EPA TO-15							
Vinyl Chloride	NC	N/A	N/A	6.5 U	0.093 U	0.18 U	0.18 U
cis-1,2-Dichloroethene	NC	N/A	N/A	6.5 U	0.093 U	0.18 U	0.18 U
Trichloroethene	1.7	7	21	9.8	0.093 U	0.22	0.99
Tetrachloroethene	27	N/A	N/A	6.0 J	0.093 U	0.15 J	0.18 U

U = The compound was not detected at the reported concentration.

J = Analyte was positively identified. Reported result is an estimate below the associated reporting limit but above the method detection limit.

NC = Not calculated as analyte was not detected.

N/A = Not applicable.

Bold = Detected compound.

 = Exceedance of screening criteria.

EPA = US Environmental Protection Agency

MTCA = Model Toxics Control Act

µg/m³ = Micrograms per cubic meter

^a MTCA Method B Indoor Air Screening Level adjusted for a commercial exposure scenario (adult only, 60 hours/week, 52 weeks/year).

^b 8/24/16 sample was collected with exterior doors closed. 11/2/16 sample was collected after HVAC system modifications and with exterior doors closed.