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June 26, 2019

Department of General Services
Office of Safety and Health, Facilities Division 2000 14th Street NW, 5th Floor
Washington, DC 20009

Subject: Volatile Organic Compounds Testing-East and West Wings
801 East Men's Shelter
2700 Martin Luther King Jr. Ave. SE
Washington, DC 20032
Work Order 603978

On June 6th/7th, 2019, a Soil and Land Use Technology, Inc. (SaLUT) Industrial Hygienist (IH) conducted a Volatile Organic Compounds (VOCs) survey at 801 East Men's Shelter, a property maintained by the Department of General Services (DGS), located at 2700 Martin Luther King Jr. Ave. SE, Washington, DC 20032. The survey was conducted in response to a request from Washington Legal Clinic for the Homeless due to a concern of potential vapor intrusion into the shelter from the ground associated with fly ash.

Background

A concern was presented during due diligence activity (Phase I Environmental Site Assessment) for the proposed new 801 East Men's Shelter facility adjacent to the existing. The concern was the potential for fly ash beneath the ground surface from a historic landfill in the vicinity of the proposed location. Being adjacent to the proposed location of which the assessment was performed on, there was a concern the same potential is present at the existing facility and the request was made to test for VOCs.

Methodology

The survey conducted by SaLUT included a visual assessment, IAQ instrumentation screening, and a collection of air samples for Volatile Organic Compounds (VOCs) on the First Floor East and West Wings of the Building. Please note the survey was limited to the first floor based on the highest risk for vapor intrusion.

Summa® canisters were delivered to SGS Galson, Inc. of East Syracuse, New York for analysis. Volatile Organic Compound in air samples were analyzed by mod. OSHA PV2120/mod. EPA TO15; GC/MS for VOCs. This method is designed for samples collected in Summa canisters and analyzed by gas chromatography/mass spectrometry (GCMS). The analytical strategy for Compendium Method TO-15 involves using a high-resolution gas chromatograph (GC) coupled to a mass spectrometer.

In tandem with collecting VOCs samples, real-time readings for carbon dioxide, carbon monoxide, temperature and relative humidity were collected using a Fluke 975 Air Meter in concerned areas and representative locations within the facility. Respirable particulate in air (size classes PM_{2.5} and PM₁₀) was measured using the Particles Plus 8306 Handheld Particle Counter which was calibrated prior to sampling.

Sampling Protocol for TO-15

1. The atmosphere was sampled by introduction of air into a specially-prepared stainless steel canister. A preset flow rate regulator is connected to the canister and the pressure is documented. With the valve open the canister remains in-place for 24 hours.
2. After the air sample was collected, the canister valve was closed, pressure documented, and an identification tag was attached to the canister.
3. The sample was labeled and recorded on a sample collection form and laboratory chain of custody form.
4. Samples were delivered to a laboratory for analysis.

The sample chain-of-custody and laboratory reports are attached. Results above laboratory detection limits are tabulated below in Table 1 and compared to applicable OSHA and NIOSH standards.

Measurements of Indoor Environmental Quality Parameters

Table 2 depicts a summary of average measurements of comfort parameters and respirable particulates.

Temperature

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) have published recommendations for year-round acceptable temperatures in Standard 55-2010 *Thermal Environmental Conditions for Human Occupancy*. The winter comfort range is 20 to 24°C (68 to 75°F) and 23 to 26°C (73 to 79°F) is the summer comfort range. The temperature readings were within the ASHRAE recommended ranges in the concerned space.

Relative Humidity (RH)

RH is a key factor for mold growth and comfort. Mold has the potential of growing on suitable surfaces with humidity levels above 60%. ASHRAE Standard 62.1-2010 *Ventilation for Acceptable Indoor Air Quality* recommends a maximum indoor RH of 65% to

preclude the likelihood of condensation on cool surfaces encouraging mold growth. The RH readings were within the ASHRAE recommended ranges in the concerned space.

Carbon Dioxide (CO₂)

Under conditions of maximum occupancy, ASHRAE Standard 62.1-2010, Appendix C, infers that the acceptable CO₂ upper limit is the prevailing outdoor CO₂ concentration plus 700 parts per million (ppm). On the day of the space evaluation, the outdoor (building exterior) CO₂ concentration was approximately 458 ppm therefore indoor concentrations should not exceed approximately 1,158 ppm (700 + 458). The maximum average interior CO₂ concentration detected was 692 ppm in the First Floor West Wing, a range within the ASHRAE recommendations, per Table 2 below.

Carbon Monoxide (CO)

CO is a colorless and odorless gas that is produced by the incomplete combustion of carbon containing fuels. Oil, gasoline, diesel fuels, wood, coke, and coal are major sources of CO. All registered CO concentrations were below the EPA National Ambient Air Quality Standard (NAAQS) of 9 ppm, per Table 2 below.

Respirable Particulates

Direct reading particulate monitoring did not identify a condition of concern. Particulate concentrations for two mass ranges with EPA ambient air quality guidelines (PM_{2.5} and PM₁₀) were below their respective NAAQS levels. On June 6, 2019, the highest average PM_{2.5} concentration during the monitoring period was 0.002 mg/m³ (2 µg/m³) in the First floor West Wing. This is compared to the NAAQS primary standard for PM_{2.5} of 12 µg/m³ annual mean. The highest average PM₁₀ concentration during the same period was 0.031 mg/m³ (31 µg/m³) in the First Floor West Wing. This is compared to NAAQS standard for PM₁₀ of 150 µg/m³ 24-hour average.

Table 1: Results of the Volatile Organic Compounds by using TO-15 Method
June 6, 2019 – June 7, 2019

Volatile Organic Compound	East Wing (ppm)	West Wing (ppm)	OSHA 8-hour TWA/NIOSH REL Limit (ppm)	OSHA/NIOSH Limit Exceeded?
Propylene	0.0033	0.0025	N/A	No
Freon-12 (Dichlorodifluoromethane)	0.00043	0.00044	1000	No
Chloromethane (Methyl chloride)	0.00064	0.00082	100	No
1,3-Butadiene	0.00021	BDL	1	No
n-Butane	0.022	0.015	800*	No
Ethanol	0.32	0.26	1000	No
Acetonitrile	0.0016	0.0028	40	No
Acrolein	0.00041	0.00043	0.1	No
Acetone	0.011	0.015	500	No
Freon-11 (Trichlorofluoromethane)	0.00022	0.00021	1000	No
Isopropyl Alcohol	0.0099	0.059	400	No
Pentane	0.00041	0.0005	1000	No
Vinyl Acetate	0.00044	0.00058	4*	No
Methyl Ethyl Ketone	0.00062	0.00074	200	No
Hexane (n-Hexane)	0.00016	BDL	50	No
Ethyl Acetate	0.00092	0.0012	400	No
Benzene	0.00019	0.00024	1	No
Toluene	0.00055	0.0006	200	No
Styrene	0.00021	BDL	100	No

*NIOSH REL (Recommended Exposure Limit)

BDL- Below detectable limits

Table 2: East Men's Shelter Instrumental Screening Levels
June 6, 2019

Sample Location	Temp °F	RH%	CO ppm	CO ₂ ppm	PM 2.5 mg/m ³	PM 10 mg/m ³
Standards	ASHRAE 73 to 79°F*	ASHRAE <65%	NAAQS 9	ASHRAE 1,158	NAAQS 0.012	NAAQS 0.150
East Wing-1 st Floor	73.3	48.1	0	685	0.001	0.021
West Wing-1 st Floor	74.1	49.2	0	692	0.002	0.031
Exterior of the Building Next to the Entrance	78.7	64.2	0	458	0.003	0.051

PM- Particulate matter size

°F- Degrees Fahrenheit

CO- Carbon Monoxide

PPM-Parts Per Million

µg/m³ - Micrograms per cubic meter

RH% - % Relative Humidity

CO₂- Carbon Dioxide

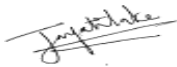
* - Summer Comfort Range

Findings and Conclusions

On June 6/7, 2019, the comfort parameters (i.e., temperature, RH, CO₂, and CO levels) and respirable particulates in affected areas conform to ASHRAE and/or NAAQS guidelines. All individual VOC levels detected were below applicable OSHA and NIOSH standards.

Based on the observations, and the results of the indoor environmental quality parameters and the results of the TO-15 analysis for VOCs, we have no recommendations at this time.

Sincerely,



Chaminda Jayatilake, PE, CIH, CSP, CHMM
 Certified Industrial Hygienist
 Soil and Land Use Technology Inc. (SaLUT)

References and Resources

EPA. 1999. "Air Method, Toxic Organics-15 (TO-15): Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition: Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)." EPA 625/R-96/010b.

https://www.epa.gov/sites/production/files/2015-07/documents/epa-to-15_0.pdf