May 9, 2017

Mr. Dan Janniello, LEED AP
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ECS Project No. 47:2199-A

Reference: Indoor Air Quality Monthly Testing Services, Corcoran Gallery of Art, 500 17th Street NW, Washington, DC – March 2017

Dear Mr. Janniello:

ECS Mid-Atlantic, LLC (ECS) is pleased to provide George Washington University (GWU) with the results of monthly Indoor Air Quality conducted in March 2017 at the above-referenced property.

Methodology

The testing parameters and acceptable limits were determined in collaboration with GWU. From the suitable methods available, ECS selected the following sample methods based on sampling feasibility, schedule, cost objectives, and prior history of performance in similar projects.

PROPOSED SAMPLE METHODS

Testing Parameter	Method	Analysis	Reporting Time	Sample Locations	Acceptable Limit
Carbon Monoxide	Direct Read Instrument	Electrochemical sensor	Immediate	Target Indoors, Outdoors	9 parts per million (ppm)
Carbon Dioxide	Direct Read Instrument	Non-Dispersive Infrared Detector	Immediate	Target Indoors, Outdoors	1,000 ppm
Formaldehyde	Assay 571 passive badge	NIOSH 2016, high performance liquid chromatography	6 Days	Target Indoors, Blank	0.027 ppm
Volatile Organic Compound Scan	Assay 521 passive badge	OSHA 7, Gas Chromatography	6 Days	Target Indoors, Blank	CARB RELs*

Testing Parameter	Method	Analysis	Reporting Time	Sample Locations	Acceptable Limit
Mold	Non-viable Spore Trap Sampler	Optical Microscopy	5 days	Target Indoors, Outdoors	Compare to Outdoors
Respirable Dust	Indoor Air Sampler	NIOSH 0600	5 Days	Target Indoors, Blank	0.150 mg/m3 (EPA NAAQS)
Silica Dust	Indoor Air Sampler	NIOSH 7500	5 Days	Target Indoors, Blank	0.025 mg/m3 (OSHA Action Level)

*CARB RELs = California Air Resources Board Recommended Exposure Limit, acute or 8-hour

ECS collected air samples for fungal spore count analysis. For air sample collection, a high volume sampling pump and air cassettes were utilized in sampling for airborne fungal spores, hyphal fragments, insect fragments, and pollen. Analytical background levels on the slide of skin fragments, fibers, and other debris are also reported. Samples were collected with an air flow of 15 liters/minute verified by a pre-calibrated rotameter for 5 minutes.

Samples collected were shipped to Scientific Analytical institute, Inc. (SAI) located in Greensboro, North Carolina for analysis. SAI is an AIHA (American Industrial Hygiene Association) EMLAP (Environmental Microbiology Laboratory Accreditation Program) accredited laboratory. The samples were analyzed for total spore concentrations in accordance to the laboratory's quantification methods. The analytical results and chain of custody are attached in the Appendix of the report.

Formaldehyde and Volatile Organic Compound (VOC) sampling was conducted using passive indoor air quality samplers. Formaldehyde samples were analyzed by High Performance Liquid Chromatography using NIOSH Method 2016 by Assay Technology in Boardman, Ohio, an independent AIHA Accredited Laboratory. The VOC samples were analyzed by Gas Chromatograph in general accordance with OSHA Method 7 by Assay Technology. The VOC scan includes a panel of 25 common solvents, including: Acetone, Benzene, 1-Butanol, Butyl Acetate, Chloroform, Cyclohexanone, Ethyl Acetate, Ethyl Alcohol, Ethylbenzene, Heptane, Hexane, Isopropyl Alcohol, Methyl Ethyl Ketone, Methyl Isobutyl Ketone, Methyl Methacrylate, Methylene Chloride, Naphthalene, Perchloroethylene, 4-Phenyl Cyclohexene, Styrene, Tetrahydrofuran, Toluene, 1,1,1-Trichloroethane, Trichloroethylene, and m-, o-, and p-Xylenes.

The Respirable Dust and Crystalline Silica samples were collected using indoor air sampling pumps fitted with pre-weighed poly-vinyl chloride filters. Respirable dust was determined by gravimetric analysis by NIOSH Method 600 by Analytics Corporation in Ashland, Virginia, an independent AIHA Accredited Laboratory. Crystalline silica concentrations was measured by X-Ray diffraction analysis using NIOSH Method 7500.

Environmental conditions, including temperature and relative humidity (RH), were recorded using a Fluke brand meter. The purpose of these measurements was to evaluate if interior temperature and RH were sufficient to support mold growth and also to measure general indoor comfort parameters related to temperature/relative humidity. The relative humidity is the ratio of the amount of moisture contained in the air to the maximum amount of moisture the air can contain at a specific temperature. Additionally, a calibrated Air Quality Meter was used to collect measurements of carbon dioxide and carbon monoxide as general indicators of overall IAQ. Sample locations were identified by GWU representatives as areas of interest. Chemical and biological sampling was performed in occupied areas of the facility. Biological samples were also collected outdoors for comparison purposes. As required by the sample method, blank samples were submitted with each set of chemical samples.

Results

Mold

Fungal spore-trap air samples were collected from the eight locations within the subject building identified by GWU representatives as areas of interest. Two representative exterior samples were collected for comparison. The appended table summarizes the results of sample analysis reported in spore counts per cubic meter of air.

The analytical results of the sample collected from Sample Location 3 - Room B109, a basement level etching studio space, indicate that the total concentrations of airborne fungal spores were more than spore concentrations reported on the exterior samples. Specifically, *Aspergillus / Penicillium*-like genera were detected in the Room B109 sample at a higher concentration than the outdoor fungal genera detected. Please not that subsequent testing in this location conducted in April 2017 did not see a similar elevation in the spore data. However, ECS recommends a review of the space for evidence of moisture intrusion or humidity concerns. The analytical results of the remaining seven samples indicate that the total concentrations of airborne fungal spores detected were less than spore concentrations reported on the exterior samples.

There are currently no accepted regulatory standards or guidelines with respect to acceptable fungal levels inside buildings. It is important to note however that spore trap measurements can fluctuate rapidly and the readings reported should not be used as a definitive indication that mold and or health hazards related to mold are present or absent.

Carbon Monoxide and Carbon Dioxide

Carbon monoxide and carbon dioxide were measured onsite utilizing a calibrated Air Quality meter. No readings exceeded the US EPA NAAQS or limits recommended in the Occupational Safety and Health Administration (OSHA) Technical manual for carbon monoxide or carbon dioxide respectively. The appended table summarizes the results

Formaldehyde

No formaldehyde levels above the laboratory detection limit or the 27 parts per billion (ppb) reference criteria (reference US Green Building Council – LEED Standard) were found.

Volatile Organic Compounds

Twenty-four (24) of the 25 volatile organic compounds (VOCs) analyzed for were not detected in any of the VOC samples collected. Isopropyl alcohol was detected in five locations (Sample Location 3 – Room B109, Sample Location 4 – Room B130, Sample Location 6 – First floor Main Atrium, Sample Location 7 – Second Floor Main Atrium, and Sample Location 8, Auditorium) at levels ranging from 127.72 micrograms per meter cubed (μ/m^3) (21 ppb) to 196.79 127.72 μ/m^3 (80 ppb). None of the levels exceeded the California Office of Environmental Health Hazard Assessment (OEHHA) Reference Exposure Level (REL) for Isopropyl alcohol of 3,200 μ/m^3). Please note that this compound is a common chemical in use in buildings and is found in a variety of everyday products such as inks, cleaners, etc.

Conclusions

Based on the results of the indoor air quality sampling conducted in March 2017, no indoor air quality concerns were identified.

Respectfully,

ECS MID-ATLANTIC, LLC

Brian Wasserstein
Environmental Project Manager

Christopher Chapman
Director of Industrial Hygiene

Attachments: Results Tables
Laboratory Results
Limitations

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