



# Environmental Control Systems, Inc.

Environmental Engineers and Management Consultants

August 18, 2022

Mr. Dan Pellegrin  
Coatesville Area School District  
1445 East Lincoln Highway  
Coatesville, PA 19320

RE: North Brandywine Middle School  
Indoor Air Quality Evaluation

Dear Mr. Pellegrin:

In the capacity as the Coatesville Area School District's environmental risk engineer, we offer you the following narrative.

On August 11, 2022, Environmental Control Systems, Inc. (ECS) performed diagnostic air sampling at the North Brandywine Middle School to evaluate indoor airborne fungal concentrations. This sampling was performed as part of routine evaluations of facilities prior to the commencement of the academic year.

The assessment included:

- Visual inspection representative locations in the building.
- Fungal Air Sampling.

## VISUAL INSPECTION

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ECS observed that the interior of the building was free of accumulated dirt and debris. No visible suspect fungal growth was observed, and no musty odors present.

## FUNGAL AIR SAMPLING

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ECS elected to use Air-O-Cell™ sampling cassettes as the screening device for this cursory event. The Air-O-Cell™ Air Sampling cassette is a device designed for the rapid collection and analysis of a wide range of aerosols. These include fungal spores, pollen, insect parts, skin cell fragments, fibers, and inorganic particulates. Please note that the analytical results of a few diagnostic samples should be used only as an indicator or 'snapshot' of the levels and types of microorganisms at the time of the sample collection.

Airborne levels and types of fungi constantly vary depending on factors including the wind direction, weather, seasons, time of day, day of week, etc. The interpretation of fungal air samples is usually based on exterior sample/s collected during the sampling event and should have a diversity and concentration of fungal structures greater than inside the building, depending on building conditions and the HVAC system. Sampling for airborne fungal concentrations on this date was performed with two (2) exterior control samples collected for comparison.

The analysis of the samples was performed using direct microscopic examination by EMSL Analytical, Inc. EMSL is an AIHA accredited laboratory for environmental microbiology (AHA-LAP LLC-EMLAP accreditation #178659.)

Two (2) exterior control samples and four (4) inside samples were collected during this assessment. The exterior samples are used for comparison to the inside samples. The AIHA suggests that a useful method for interpreting microbiological results is to compare the kinds and levels of organisms detected in different environments. Usual comparisons include indoors versus outdoors, or complaint areas versus non-complaint areas. Specifically, in buildings without mold problems, the qualitative diversity (types) of airborne fungi indoors and outdoors should be similar.

The results of the fungal sampling are summarized as follows:

The outside control samples were reported to have total fungi concentrations of 45,860 spores/m<sup>3</sup> and 52,620 S/m<sup>3</sup> with an average of 49,240 S/m<sup>3</sup>. The total spore counts on the interior samples ranged from 1,920 S/m<sup>3</sup> to 3,120 S/m<sup>3</sup> which are well below the average of the exterior samples. No water damage indicator groups were reported on the inside samples.

Currently, there are no EPA, CDC or OSHA regulations or standards for airborne mold contaminants. Therefore, there are no quantitative health-based guidelines, values, or thresholds for acceptable, tolerable, or normal concentrations for airborne fungi spores.

The most commonly cited indoor air quality standards and generally accepted practices supporting acceptable indoor air quality are those established by the American Society of Heating and Air Conditioning Engineers (ASHRAE), and the American Industrial Hygiene Association (AIHA).

- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standards 55 & 62 provide guidelines addressing optimum achievable "thermal comfort" for occupants of buildings and system requirements which are expected to result in indoor air quality "acceptable" to human occupants.

*(ANSI/ASHRAE Standard 55: Thermal Environmental Conditions for Human Occupancy establishes the ranges of indoor environmental conditions to achieve acceptable thermal comfort for occupants of buildings and ANSI/ASHRAE Standards 62.1 and 62.2 are the recognized standards for ventilation system design and acceptable IAQ).*

Since there are individual differences in preferences for thermal comfort, it may not be possible to achieve an acceptable comfort level for all occupants. That being said, ASHRAE guidelines recommend 68°F to 74°F in the winter and 75°F to 80°F in the summer. as well as a relative humidity (RH) range of 30% to 60%.

In addition, the required minimum ventilation rate in cubic feet per minute (CFM) per person in an educational classroom is suggested to have 15 CFM per person (students ages 5-8); and 13 CFM per person (students age 9+) \*\*ASHRAE 62.1-2016 recommends that relative humidity in occupied spaces be controlled to less than 65% to reduce the likelihood of conditions leading to microbial growth.

- ASHRAE Standards 62.1 and 62.2 (Ventilation for Acceptable IAQ) defines “Acceptable Indoor Air Quality” as “air in which there are no known contaminants at harmful concentrations as determined by cognizant authorities and with which a substantial majority (80% or more) of the people exposed do not express dissatisfaction”.
- The AIHA Position Statement (Recognition, Evaluation, & Control of Indoor Mold) states that sampling for airborne mold spores can indicate whether the mix of indoor constituents is “typical” of the outdoor mix or, conversely, “atypical” or unusual at the time of airborne sampling. The AIHA suggests a useful method for interpreting microbiological results is to compare the kinds and levels of organisms detected in different environments. Usual comparisons include indoors versus outdoors, or complaint areas versus non-complaint areas. Specifically, in buildings without mold problems, the qualitative diversity (types) of airborne fungi indoors and outdoors should be similar. Conversely, the dominating presence of one or two kinds of fungi indoors, coupled with the absence of the same kind of fungi outdoors, may indicate a moisture problem and degraded air quality. Generally speaking, indoor mold types should be similar to, and airborne concentrations should be no greater than, those found outdoors and in non-complaint areas

## CONCLUSIONS & RECOMMENDATIONS

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1. In accordance with your building preventative maintenance program, remove and replace any water-stained ceiling tiles throughout the building.
2. Thermostats should be set according to the ASHRAE recommendations listed above.

Based on the numerical data and information gathered during our August 11, 2022 environmental assessment and considering the specific definitions, standards and guidelines as documented by the National Allergy Bureau (NAB), American Industrial Hygiene Association (AIHA), American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE), World Health Organization (WHO), & Environmental Protection Agency (EPA), it is the opinion of Environmental Control Systems, Inc. that the areas evaluated, by ASHRAE definition, should be considered “acceptable” for occupancy.

Mr. Pellegrin, thank you for allowing ECS to provide you with our industrial hygiene services. Should you have any further questions, please feel free to contact us.

Respectfully Submitted,



Wayne R. Pistoia, MSE, NSPE  
Operations Director