



Date: 11/14/22

Performed by: Andrew Tinklenberg

Location: Bryn Mawr School – 252 Upton Avenue South, Minneapolis, MN 55405

RE: Radon Testing

INTRODUCTION

From January 3 – 6, 2022, initial radon testing was performed within Bryn Mawr School located at 252 Upton Avenue South in Minneapolis, MN. The testing was performed to ensure that radon gas concentrations within the building are below the established regulatory limits. Testing was conducted under normal occupied building conditions in frequently-occupied ground contact rooms and other areas in accordance with ANSI/AARST Protocols for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings 2014 with 1/21 Revisions and Minnesota Department of Health (MDH) guidelines.

SUMMARY OF FINDINGS

Forty-five (45) of the forty-seven (47) areas that were tested were found to have radon gas levels below 4.0 picocuries per liter of air (pCi/L), which is the EPA and MDH action level. (Note: Spike sampling is performed in conjunction with this testing, duplicate (side-by-side) sampling was conducted in select areas at a rate of 10% of areas tested, and “Rooms A, B & C” were the blank samples.)

Offices 101 and 102 in the north wing were found to have radon gas levels above 4.0 picocuries per liter of air (pCi/L). When radon is detected at or above this level, the EPA and MDH recommend follow-up testing in the area. From January 12 – 14, 2022, follow-up testing was performed in Office 101 using a continuous radon monitor (CRM). CRMs are recommended for follow-up testing because they give hour by hour results instead of just an overall average of the radon concentration during the test period. This can be helpful in knowing the radon gas concentrations in an area during occupied times. The CRM results for the follow-up testing were still found to be above 4.0 pCi/L, and so the staff members in both offices were relocated and the rooms kept unoccupied. A ventilation upgrade project for these two rooms was then scheduled and completed in the summer of 2022.

From November 1 – 3 and November 9 – 11, 2022, post-mitigation testing was performed in these two offices again using a CRM. The radon gas concentration during the offices occupied hours, which are from approximately 7:30 AM – 3:00 PM, as well as the overall average radon gas concentration was now found to be below 4.0 pCi/L with an average radon gas concentration of 2.5 pCi/L in Office 101 and 2.3 pCi/L in Office 102. The testing verified that the ventilation system is working properly and maintaining radon gas concentrations below the EPA and MDH action level during occupied hours.

REMARKS

The radon test kits were submitted to and analyzed by AirChek, Inc., 1936 Butler Bridge Rd, Mills River, NC 28759 (MN License #RL-00003). Please refer to the attached AirChek radon testing report and sample diagrams for further information concerning the radon testing, areas that were tested, and the radon levels that were found to be present. MPS' CRM is a Sun Nuclear Model 1030 that was last calibrated on 9/26/22 with bi-annual device performing testing (DPT) completed on 6/17/22. Per MDH requirements, this information will be shared with the local regulatory agency (MDH - health.indoorair@state.mn.us, Phone # 651-201-4601) and incorporated in an MPS' board meeting. The information will also be posted on the EH&S webpage available through the main MPS website and maintained on file by EH&S.

Every effort was made to maintain closed building conditions and HVAC systems are monitored and controlled remotely by MPS Direct Digital Control (DDC) personnel. Any deviation in building conditions or sampling protocol which could have an impact on the testing and test results is described in the summary above. If any unoccupied areas that were not tested are planned for future occupancy, contact EH&S so that the areas can be tested. Unless specified, all QA/QC measurements were within the required limits. Radon testing is to be performed in MPS District buildings every 5 years or any time major renovation activities take place which have the potential to impact the building's foundation or HVAC systems. Refer to the attached test condition summary and ANSI/AARST advisories for additional information concerning the radon testing.

If you have any questions regarding this information, please feel free to contact me. Thank you,



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Attachments

Radon Testing Results
Floor Plans with Sample Locations
Notification Documents
Test Condition Summary
ANSI/AARST Advisory Statements



Bryn Mawr Test Condition Summary

January 3-14, 2022 – Minneapolis, MN (Climate Zone 6)

	Annually	During Testing
Outdoor Temperatures	Average = 46° F	Max. = 30° F Min. = -8° F Average = 11° F
Operating Conditions (Heating/Cooling)	Heating – 50% Cooling – 25% Mixed – 25%	Heating – 100% Cooling – 0% Mixed – 0%
Air Distribution Systems	Intermittent during summer	Active

* - Note: Moderate snowfall and winds with low/negative temperatures were recorded during the latter portion of the testing period.

November 1-11, 2022 – Minneapolis, MN (Climate Zone 6)

	Annually	During Testing
Outdoor Temperatures	Average = 46° F	Max. = 73° F Min. = 38° F Average = 57° F
Operating Conditions (Heating/Cooling)	Heating – 50% Cooling – 25% Mixed – 25%	Heating – 100% Cooling – 0% Mixed – 0%
Air Distribution Systems	Intermittent during summer	Active

* - Note: Some rainfall was recorded during the testing period.

Informative Advisories

- Fluctuations in radon concentrations are usually caused by either:
 - changes in the strength of indoor air pressures that draw soil gas into a building; or
 - changes in the volume of outside air entering a building.
- Clear characterization of a radon hazard is more likely to occur when:
 - Outdoor temperatures extend below 65°F (18°C), at least intermittently, which causes natural indoor air pressures that draw radon laden soil gas into a building; and
 - Heating or cooling distribution fans are at least intermittently active during a test.
- Measurements more likely to reflect an occupant’s exposure to radon are measurements conducted under conditions that most closely align to the building operating conditions that prevail during the greatest amount of time each year.

* - Above advisory information is taken from page 31 of the ANSI/AARST Standard, “Protocols for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings, 2014 with 1/21.” Additional advisory notes/information will be added when necessary.

ANSI/AARST ADVISORY STATEMENTS

8-A Reporting Low Radon Concentrations

Consider fixing the building if test results indicate radon concentrations greater than half the action level, (e.g., between 2 and 4 pCi/L). Responsible care requires repeating initial testing procedures for all building(s) at least every 5 years and in conjunction with any sale of a building. Radon testing should also be conducted when any of the following circumstances occur:

- a new addition is constructed or alterations for building reconfiguration or rehabilitation occur;
- a ground contact area not previously tested is occupied, or a building is newly occupied;
- heating or cooling systems are significantly altered, resulting in changes to air pressures or pressure relationships;
- ventilation is significantly altered by extensive weatherization, changes to mechanical systems or comparable procedures;
- significant openings to soil occur due to:
 - groundwater or slab surface water control systems that are altered or added (e.g., sumps, perimeter drain tile, shower/tub retrofits, etc.) or,
 - natural settlement causing major cracks to develop;
- earthquakes or construction blasting, fracking or formation of sink holes nearby; or
- a mitigation system is altered, modified or repaired.

Should testing indicate concentrations that meet or exceed the action level, conduct evaluations, corrections and further testing until radon concentrations have been mitigated to below the action level.

Table 8-B Reporting Elevated Radon Concentrations

Fix the building. Test results indicate occupants may be exposed to radon concentrations that meet or exceed the action level. Efforts to reduce radon concentrations are not complete until retests provide evidence of effectiveness. The initial retest should be conducted within 30 days after mitigation efforts and system installations.

Post-mitigation clearance testing to confirm each building is fixed requires testing all buildings that demonstrated elevated radon concentrations:

- 1) in all ground-contact rooms and dwellings,
- 2) in not less than 10% of non-residential rooms and dwellings on each upper floor.

Should testing indicate concentrations that meet or exceed the action level, conduct evaluations, corrections and further testing until radon concentrations have been mitigated to below the action level.

* - Above advisory information is taken from page 28-29 of the ANSI/AARST Standard, "Protocols for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings, 2014 with 1/21 Revisions." Additional advisory notes/information will be added when necessary.