



MCPS RADON TESTING – EXECUTIVE SUMMARY

Site Name	Cresthaven Elementary School
Date of Test Report	4/29/2022
Round of Testing	Initial Follow-up Post Remediation 2 Year Testing 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility
# Rooms Tested	30
# Rooms \geq 4.0 pCi/L	0
Lowest Value	<0.3 pCi/L
Highest Value	0.6 pCi/L

Project Status: no further action needed.



April 29, 2022

Brian T. Croyle, PG, CHMM
Environmental Specialist
Montgomery County Public Schools
Gaithersburg, MD 20879

Re: **Radon Testing Services**
KCI Job # 122108316

Location: Cresthaven Elementary School
1234 Cresthaven Dr.
Silver Spring, MD, 20903

Dear Mr. Croyle:

KCI Technologies, Inc. (KCI) is pleased to submit the following report to Montgomery County Public Schools (MCPS) pursuant to completing a “short-term” 3 day radon test for the Cresthaven Elementary School, located at 1234 Cresthaven Dr. Silver Spring, MD 20903 (subject site).

Scope of Services:

KCI conducted radon testing at the subject site to evaluate indoor radon levels relative to the USEPA's recommended action level of 4.0 picocuries per Liter (pCi/L) - the level at which EPA recommends that schools take action to reduce the level. KCI conducted the radon testing in accordance with American Association of Radon Scientists and Technologists (AARST) *Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings*. A National Radon Proficiency Program (NRPP) Radon Measurement Specialist (certification #111004 RT) supervised the testing. Additional information on radon management and the health effects of radon exposure is available from <https://www.montgomeryschoolsmd.org> or www.epa.gov/radon.

KCI visited the site on March 7, 2022 and deployed thirty-four (34) activated charcoal (AC) radon test kits. KCI deployed radon test kits in all frequently-occupied ground contact rooms, and other areas, (if applicable) in accordance with AARST guidance.

A floor plan map of the building with the test locations is included as Attachment A of this report.

As a quality control measure, KCI also included duplicate samples, field blanks, lab transit blanks, and office blanks in accordance with AARST recommendations. In addition, KCI submitted test kits to Bowser-Morner, Inc. as spike samples. The spiked tests were exposed to a known radon concentration by Bowser-Morner prior to being returned to the laboratory for analysis.

KCI returned to the site on March 10, 2022 to retrieve the radon sampling test kits. KCI shipped all radon tests via overnight delivery to Airchek, Inc. for analysis by gamma-ray spectroscopy. Airchek, Inc. is a

NRSB certified analytical laboratory for radon analysis (certification # ARL1402) located at 1936 Butler Bridge Road, Mills River, North Carolina.

Evaluation of Testing Conditions:

These tests represent:

- Follow-up to initial testing.

These tests were conducted to:

- Evaluate radon concentration levels at the facility.

According to AARST, *Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings*, ideal testing conditions would be when the building is fully occupied and the heating system is active. For this test, the facility's HVAC system was operating in heating mode; therefore, KCI concludes that this test was conducted during ideal testing conditions.

KCI recorded observations of the following conditions in each room during the time of deployment and collection of the radon test kits:

- Indoor temperature,
- HVAC Operation,
- Dehumidifier operation,
- Humidifier operation,
- Ceiling fan operation, and
- Open windows or doors.

KCI also compiled weather data for the testing period and conducted observations of relevant field conditions. During the test period, weather records indicate low temperatures were in the mid 20s and high temperatures ranged from the high 70s to the low 50s Fahrenheit. Maximum sustained winds ranged from 0-32 miles per hour. Average humidity was around 65% with 1.09 inches of precipitation (rain) was recorded during testing period.

Results:

The sampling locations and analytical results are listed on Table 1 (Attachment B). The quality control sample locations and analytical results are listed on Table 2 (Attachment B). Sampling locations and associated test kit identification numbers and relevant field observations are listed on Table 3 (Attachment B). The laboratory analytical results are included in Attachment C. Laboratory results and exposure data for the spike samples are also included in Attachment C.

The results of the radon test analysis indicated the following:

Radon Concentration	Room	Result
≥4.0 pCi/L	None	N/A
<4.0 pCi/L	See Attachment B	

Quality Control Samples	
Results of Blank Canisters:	The office blanks, and lab transit blanks had test results of less than the laboratory detection limit of 0.3 pCi/L.
Adequate Laboratory Precision?	Review of the duplicate sample analysis indicates that adequate laboratory measurement precision was achieved.
Spike Sample Analysis:	The Spike Sample analysis results indicate the laboratory is operating within statistical control limits.

Our professional services have been performed in accordance with customary principles and practices in the field of industrial hygiene and engineering. If you have any questions or comments regarding this report, please feel free to contact me at (410) 891-1769.

Sincerely,



Tyler P. McCleaf
Radon Measurement Provider
#111004 RT
KCI Technologies, Inc.

Attachments: A- Floor Plan with Test Locations
 B- Table 1-3, Radon Test Summary Spreadsheets
 C- Laboratory Analytical Results

ATTACHMENT A

Floor Plan With Test Locations

ATTACHMENT B

Radon Test Summary Spreadsheet

Table Notes:

AC- Activated Charcoal

ACI- Air Check, Inc.

D- Duplicate

FB- Field Blank

KCI- KCI Technologies, Inc.

OB- Office Blank

PM- Project Manager

OC- Quality Control

Table 1- Radon Testing Results		
Cresthaven ES		
Test Period: 03/07/2022 - 03/10/2022		
Kit Number	Room / Area	Result
11130472	1	< 0.3
11130471	5	< 0.3
11130458	7	< 0.3
11130456	11	< 0.3
11130455	13	< 0.3
11130454	17	< 0.3
11130445	19	< 0.3
11130451	23	0.6
11130437	31	< 0.3
11130461	31	< 0.3
11130446	47	< 0.3
11130438	108	< 0.3
11130464	108	< 0.3
11130482	114	< 0.3
11130484	120	< 0.3
11130485	125	< 0.3
11130453	130	< 0.3
11133847	130	< 0.3
11133842	248	< 0.3
11133843	248	< 0.3
11130452	249	< 0.3
11130475	100A	< 0.3
11130469	100B	< 0.3
11130468	100C	< 0.3
11130463	100D	< 0.3
11130465	100E	< 0.3
11130466	103A	< 0.3
11130467	108A	< 0.3
11130470	132A	< 0.3
11130477	HEALTH	< 0.3
11130474	MAIN OFFICE	< 0.3
11130476	MAIN OFFICE	< 0.3
11130478	MAIN OFFICE	< 0.3
11130473	NURSE	< 0.3

Table 2- Radon Testing Results			
Cresthaven ES			
Test Period: 03/07/2022 - 03/10/2022			
Kit Number	QC Type	Room / Area	Result
11130478	D	Main office	< 0.3
11130474	FB	Main office	< 0.3
11130461	D	31	< 0.3
11133843	D	248	< 0.3
11131662	OB	OFFICE BLANK	< 0.3
11131691	TB	TRAVEL BLANK	< 0.3

Summary of Missed Locations		
Cresthaven ES		
Test Period: 03/07/22 - 03/10/22		
Kit Number	Room/Area	Result
NA	Finance Office	NA

Summary of Missing, Compromised and >= 4 piC/L Tests		
Cresthaven ES		
Test Period: 03/07/22 - 03/10/22		
Kit Number	Room/Area	Result
	NA	

Table Note:
* Missing or Compromised Sample

ATTACHMENT C

Laboratory Analytical Results

Radon test result report for:
CRESTHAVEN ES

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11130472	1	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130475	100A	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130469	100B	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130468	100C	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130463	100D	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130465	100E	2022-03-07 @ 12:00 pm	2022-03-10 @ 11:00 am	< 0.3	2022-03-14
11130466	103A	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130438	108	2022-03-07 @ 1:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130464	108	2022-03-07 @ 1:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130467	108A	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130456	11	2022-03-07 @ 1:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130482	114	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130484	120	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130485	125	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130455	13	2022-03-07 @ 1:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130453	130	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130470	132A	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130454	17	2022-03-07 @ 1:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130445	19	2022-03-07 @ 1:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130451	23	2022-03-07 @ 1:00 pm	2022-03-10 @ 10:00 am	0.6 ± 0.3	2022-03-14
11130452	249	2022-03-07 @ 1:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130461	31	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130437	31	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130446	47	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130471	5	2022-03-07 @ 1:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130458	7	2022-03-07 @ 1:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130477	HEALTH	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130476	MAIN OFFICE	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130478	MAIN OFFICE	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130474	MAIN OFFICE	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11130473	NURSE	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14

March 15, 2022

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:
CRESTHAVEN ES

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11133847	130	2022-03-07 @ 12:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11133842	248	2022-03-07 @ 1:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14
11133843	248	2022-03-07 @ 1:00 pm	2022-03-10 @ 10:00 am	< 0.3	2022-03-14

Air Chek 1936 Butler Bridge Rd, Mills River, NC 28759-3892 Phone: (828) 684-0893 Fax: (828) 684-8498

EXPOSURE IN BOWSER-MORNER RADON CHAMBER

CLIENT KCI Technologies, Inc. Job Number 204620

NOMINAL Conditions: Radon Conc 27.0 pCi/L Rel. Hum 50.1 % Temp. 70.0 F

Date Start: 3/18/22 Date Stop: 3/21/22 Date Start: _____ Date Stop: _____

Time Start: 0705 Time Stop: 0705 Time Start: _____ Time Stop: _____

Device No.'s: (5) Char Bags - Device No.'s: _____

11139367, 11139368, 11139371, _____

11139710, 11139717 _____

E3 Right

Date Start: _____ Date Stop: _____ Date Start: _____ Date Stop: _____

Time Start: _____ Time Stop: _____ Time Start: _____ Time Stop: _____

Device No.'s: _____ Device No.'s: _____

Date Start: _____ Date Stop: _____ Date Start: _____ Date Stop: _____

Time Start: _____ Time Stop: _____ Time Start: _____ Time Stop: _____

Device No.'s: _____ Device No.'s: _____

Note: All times are in 24-hour (military) notation, Eastern Standard Time (EST)
Background = 7 μ R/h Elevation = 820 ft

March 30, 2022

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

MCPS - Spike Sample Lab Results. Measured values are satisfactory, i.e., within $\pm 25\%$ of the chamber's reference value (25.7 pCi/L).

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11139367	SK1	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	25.9 \pm 2.1	2022-03-30
11139368	SK2	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	23.9 \pm 2.0	2022-03-30
11139371	SK3	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	25.7 \pm 2.1	2022-03-30
11139710	SK4	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	26.4 \pm 2.1	2022-03-30
11139717	SK5	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	24.6 \pm 2.0	2022-03-30

Air Chek 1936 Butler Bridge Rd, Mills River, NC 28759-3892 Phone: (828) 684-0893 Fax: (828) 684-8498



Radon Test Kit Chain of Custody

Project Name: MCPS Radon – March 2022 Schools

Name of Schools:

1. Cresthaven ES
2. Key, Francis Scott MS
3. Nix, Roscoe ES
4. Greencastle ES
5. Jackson Road
6. Page, William Tyler ES
7. West Farm Transportation Depot
8. Westover ES
9. White Oak MS

	Date	Initials
Radon Test Kits Deployed	03/07/2022	BMM
Radon Test Kits Collected	03/10/2022	BMM
Radon Test Kits Shipped to Lab*	03/10/2022	BMM
Radon Test Kits Received by Lab*	03/13/2022	BMM

*All samples sent to Air Check, Inc., 1936 Butler Bridge Rd, Mills River, NC 28759