



**MCPS RADON TESTING – EXECUTIVE SUMMARY**

Site Name	S. Christa McAuliffe Elementary School
Date of Test Report	1/25/2023
Round of Testing	Initial Follow-up Post Remediation 2 Year Testing 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility
# Rooms Tested	1
# Rooms $\geq$ 4.0 pCi/L	0
Lowest Value	<0.3 pCi/L
Highest Value	0.7 pCi/L

Project Status:

1. Post mitigation testing completed.



January 25, 2023

Mr. Brian Croyle  
Environmental Specialist  
Montgomery County Public Schools  
Gaithersburg, MD 20879

Re: **Radon Testing Services**  
KCI Job # 122210551

Location: S. Christa McAuliffe Elementary School  
12500 Wisteria Drive  
Germantown, MD 20874

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 S. Christa McAuliffe Elementary School located at 12500 Wisteria Dr. Germantown, MD 20874 (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](http://www.epa.gov/radon).

KCI visited the site on December 19, 2022 and deployed three (3) 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 December 22, 2022 to retrieve the radon sampling test kits. KCI shipped all radon tests via overnight delivery to Accustar Labs - MA for analysis by gamma-ray spectroscopy.

Accustar Labs - MA is a NRSB certified analytical laboratory for radon analysis (certification #ARL0017) located at 2 Saber Way, Ward Hill, MA 01835.

**Evaluation of Testing Conditions:**

These tests represent:

- Follow up to post mitigation biennial testing.

These tests were conducted to:

- Confirm the success of the mitigation system(s).

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 temperatures ranged from 23°F to 55°F. Maximum sustained winds ranged from 0-18 miles per hour. Average humidity was around 75% with 0.0 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:

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

<b>Quality Control Samples</b>	
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		
S. Christa McAuliffe ES		
Test Period: 12/19/2022 - 12/22/2022		
Kit Number	Room / Area	Result
11287878	108	< 0.3
11288511	108	0.7
11288535	108	< 0.3



Table 2- Radon Testing Results			
S. Christa McAuliffe ES			
Test Period: 12/19/22 - 12/22/22			
Kit Number	QC Type	Room / Area	Result
11288511	D	108	0.7
11288535	FB	108	< 0.3
11288518	OB	OFFICE BLANK	< 0.3
11287685	TB	TRAVEL BLANK	< 0.3



# ATTACHMENT C

## Laboratory Analytical Results

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December 28, 2022

**\*\* LABORATORY ANALYSIS REPORT \*\***

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Radon test result report for:  
**S CHRISTA MCAULIFFE**  
**MAIN**

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<b>Kit #</b>	<b>Room Id</b>	<b>Started</b>	<b>Ended</b>	<b>pCi/L</b>	<b>Analyzed</b>
11287878	108	2022-12-19 @ 2:00 pm	2022-12-22 @ 12:00 pm	< 0.3	2022-12-28
11288511	108	2022-12-19 @ 2:00 pm	2022-12-22 @ 12:00 pm	0.7 ± 0.5	2022-12-28
11288535	108	2022-12-19 @ 2:00 pm	2022-12-22 @ 12:00 pm	< 0.3	2022-12-28

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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 KC1 TECHNOLOGIES, INC Job Number 208343

NOMINAL Conditions: Radon Conc 34.7 pCi/L Rel. Hum 49.4 % Temp. 69.6 F

Date Start: 12/24/22 Date Stop: 12/27/22 Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_

Time Start: 0810 Time Stop: 0810 Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_

Device No.'s: (5) CHAR BAGS - Device No.'s: \_\_\_\_\_

11285109, 11285110, 11285101

THRU 11285103

BY LEFT

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  $\mu$ R/h Elevation = 820 ft**

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December 29, 2022

**\*\* LABORATORY ANALYSIS REPORT \*\***

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Radon test result report for:

**OFFICE**

**MAIN**

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<b>Kit #</b>	<b>Room Id</b>	<b>Started</b>	<b>Ended</b>	<b>pCi/L</b>	<b>Analyzed</b>
11285110	SK1	2022-12-24 @ 8:00 am	2022-12-27 @ 8:00 am	31.7 ± 2.5	2022-12-29
11285101	SK2	2022-12-24 @ 8:00 am	2022-12-27 @ 8:00 am	30.1 ± 2.4	2022-12-29
11285103	SK3	2022-12-24 @ 8:00 am	2022-12-27 @ 8:00 am	34.0 ± 2.7	2022-12-29
11285102	SK4	2022-12-24 @ 8:00 am	2022-12-27 @ 8:00 am	30.9 ± 2.5	2022-12-29
11285109	SK5	2022-12-24 @ 8:00 am	2022-12-27 @ 8:00 am	32.0 ± 2.6	2022-12-29

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### Radon Test Kit Chain of Custody

Project Name: MCPS Radon – Week 3 December Schools

Name of Schools:

1. Clopper Mill ES
2. Cold Spring ES
3. Fox Chapel ES
4. Gaithersburg HS
5. Longview School
6. North Lake Center
7. Ronald McNair ES
8. Rosemont ES
9. S. Christa McAuliffe ES
10. Spark M. Matsunaga ES
11. William B. Gibbs, JR. ES

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	Date	Initials
Radon Test Kits Deployed	12/19/2022	BMM
Radon Test Kits Collected	12/22/2022	BMM
Radon Test Kits Shipped to Lab*	12/22/2022	BMM
Radon Test Kits Received by Lab*	12/28/2022	BMM

\*All samples sent to Air Check, Inc., 2 Saber Way, Ward Hill, MA 01835



**MCPS RADON TESTING – EXECUTIVE SUMMARY**

Site Name	S. Christa McAuliffe Elementary School
Date of Test Report	05/27/2022
Round of Testing	Initial Follow-up Post Remediation 2 Year Testing 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility
# Rooms Tested	3
# Rooms $\geq$ 4.0 pCi/L	0
Lowest Value	<0.3 pCi/L
Highest Value	3.3 pCi/L

**Project Status**

Current Project Status at this time: Testing completed; no further action needed;

Mitigation needed - Room 108





May 27, 2022

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

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

Location: S. Christa McAuliffe Elementary School  
12500 Wisteria Dr.  
Germantown, MD 20874

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 S. Christa McAuliffe Elementary School, located at 12500 Wisteria Dr. Germantown, MD 20874 (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](http://www.epa.gov/radon).

KCI visited the site on March 28, 2022 and deployed five (5) 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.

KCI sampled the following locations during this follow-up test:

1. Rooms with missing test kits from the Radon 2022 testing period (i.e. test kit was deployed but not recovered),
2. Rooms with invalidated test kits from the Radon 2022 testing period (e.g. an open window in the room or disturbed test kit),
3. Rooms which were locked/inaccessible during the Radon 2022 testing period,
4. Rooms with elevated radon results (i.e.  $\geq 3.5$  pCi/L),
5. Rooms previously tested for radon but not tested in Radon 2022, and
6. Additional rooms that require testing (if applicable.)

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 31, 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 concentrations 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 20°Fs and high temperatures ranged from the low 50°Fs to the mid 70°Fs. Maximum sustained winds ranged from 0-33 miles per hour. Average humidity was around 47% with 0.23 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		
S. Christa McAuliffe ES RT		
Test Period: 03/28/2022 - 03/31/2022		
Kit Number	Room / Area	Result
11139808	32	< 0.3
11139809	32	0.6
11139811	32	0.7
11139803	108	3.3
11139807	109	< 0.3

Table 2- Radon Testing Results			
S. Christa McAuliffe ES RT			
Test Period: 03/28/2022 - 03/31/2022			
Kit Number	QC Type	Room / Area	Result
11139811	D	32	0.7
11139808	FB	32	< 0.3
11139883	OB	OFFICE BLANK	< 0.3
11139841	TB	TRAVEL BLANK	< 0.3





# ATTACHMENT C

## Laboratory Analytical Results

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April 4, 2022

**\*\* LABORATORY ANALYSIS REPORT \*\***

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Radon test result report for:

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<b>Kit #</b>	<b>Room Id</b>	<b>Started</b>	<b>Ended</b>	<b>pCi/L</b>	<b>Analyzed</b>
11139808	32	2022-03-28 @ 9:00 am	2022-03-31 @ 9:00 am	< 0.3	2022-04-04
11139809	32	2022-03-28 @ 9:00 am	2022-03-31 @ 9:00 am	0.6 ± 0.3	2022-04-04
11139811	32	2022-03-28 @ 9:00 am	2022-03-31 @ 9:00 am	0.7 ± 0.3	2022-04-04

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

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April 4, 2022

**\*\* LABORATORY ANALYSIS REPORT \*\***

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Radon test result report for:

**S. CHRISTA MCAULIFFE  
MAIN**

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<b>Kit #</b>	<b>Room Id</b>	<b>Started</b>	<b>Ended</b>	<b>pCi/L</b>	<b>Analyzed</b>
11139803	108	2022-03-28 @ 9:00 am	2022-03-31 @ 9:00 am	3.3 ± 0.4	2022-04-04
11139807	109	2022-03-28 @ 9:00 am	2022-03-31 @ 9:00 am	< 0.3	2022-04-04

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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 light

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  $\mu$ R/h Elevation = 820 ft

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March 30, 2022

**\*\* LABORATORY ANALYSIS REPORT \*\***

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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).

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<b>Kit #</b>	<b>Room Id</b>	<b>Started</b>	<b>Ended</b>	<b>pCi/L</b>	<b>Analyzed</b>
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

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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 – Retesting

Name of Schools:

1. Rock Terrace School
2. S. Christa McAuliffe ES
3. Cedar Grove ES
4. DuFief ES
5. Emory Grove Center
6. Gaithersburg ES
7. Gaithersburg MS
8. Jones Lane ES
9. Rachel Carson ES
10. Rosemont ES
11. Shady Grove MS
12. Summit Hall ES
13. Albert Einstein HS
14. Eastern MS
15. Montgomery Blair HS
16. Newport Mill MS
17. Strawberry Knoll ES

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	Date	Initials
Radon Test Kits Deployed	03/28/2022	BMM
Radon Test Kits Collected	03/31/2022	BMM
Radon Test Kits Shipped to Lab*	04/01/2022	BMM
Radon Test Kits Received by Lab*	04/04/2022	BMM

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



**MCPS RADON TESTING – EXECUTIVE SUMMARY**

Site Name	S. Christa McAuliffe Elementary School
Date of Test Report	4/6/2022
Round of Testing	Initial Follow-up Post Remediation 2 Year Testing 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility
# Rooms Tested	73
# Rooms $\geq$ 4.0 pCi/L	1
Lowest Value	<0.3 pCi/L
Highest Value	5.8 pCi/L

Project Status:

Initial testing completed; Missing, Elevated, or compromised kits need re-sampling.





April 6, 2022

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

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

Location: S. Christa McAuliffe ES  
12500 Wisteria Dr.  
Germantown, MD 20874

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 S. Christa McAuliffe ES, located at 12500 Wisteria Dr. Germantown, MD 20874 (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](http://www.epa.gov/radon).

KCI visited the site on February 15, 2022 and deployed eighty five (85) 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 February 18, 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 post-mitigation biennial testing.

These tests were conducted to:

- Confirm the success of the mitigation system(s).

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 20s and high temperatures ranged from the high 30s to the high 40s Fahrenheit. Maximum sustained winds ranged from 5-18 miles per hour. Average humidity was around 15% with 1.5 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:

<b>Radon Concentration</b>	<b>Room</b>	<b>Result</b>
≥4.0 pCi/L	108	5.8
<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		
S. Christa McAuliffe ES		
Test Period: 02/15/2022 - 02/18/2022		
Kit Number	Room / Area	Result
11123211	1	0.7
11123210	2	1.0
11123218	3	< 0.3
11123201	4	0.7
11123217	5	1.0
11123226	6	0.7
11123228	7	< 0.3
11123214	8	0.7
11123235	8	< 0.3
11123273	9	1.8
11123274	9	2.2
11123264	10	< 0.3
11123249	12	< 0.3
11123237	14	< 0.3
11123220	15	0.9
11123257	16	0.6
11123233	25	0.8
11123204	26	< 0.3
11123240	27	1.3
11123205	28	2.6
11123259	29	< 0.3
11123260	30	2.4
11123262	31	0.6
11123222	32	2.8
11123231	33	1.0
11123224	34	1.3
11123239	34	< 0.3
11123254	34	1.2
11123206	35	0.5
11123232	36	1.3
11123243	37	0.6
11123216	38	0.9
11123223	40	0.9
11123253	42	0.6
11123246	43	< 0.3
11123248	102	1.1
11123255	102	0.5
11123256	102	1.2
11123247	103	0.9
11123261	104	1.4
11123270	105	1.2
11123258	106	1.2

Table 1- Radon Testing Results		
S. Christa McAuliffe ES		
Test Period: 02/15/2022 - 02/18/2022		
Kit Number	Room / Area	Result
11123269	106	1.2
11123268	107	1.1
11123267	108	5.8
11123250	109	3.7
11123276	113	1.4
11123275	205	0.8
11123266	102A	1.1
11123277	1B	< 0.3
11123227	2A	0.8
11123278	ALVING	< 0.3
11123213	APR	< 0.3
11123238	APR	1.0
11123244	APR	1.6
11123252	APR	1.4
11123207	ART	0.6
11123208	ART	< 0.3
11123219	ART	< 0.3
11123251	BSO	0.8
11123279	CONFERENCE	0.8
11123230	COU	< 0.3
11123236	ESOL	< 0.3
11123234	GYM	1.3
11123245	GYM	1.4
11123225	GYM OFFICE	2.0
11123242	HR	1.4
11123286	HR EXAM	1.4
11123272	IMC	< 0.3
11123283	IMC	< 0.3
11123271	IMC OFFICE	< 0.3
11123265	ISM	< 0.3
11123209	KITCHEN OFFICE	< 0.3
11123203	MAIN OFFICE	0.8
11123281	MAIN OFFICE	0.7
11123282	MAIN OFFICE	< 0.3
11123215	MU	1.0
11123202	OBSERVATION OFFICE	0.6
11123280	OFFICE 1	1.2
11123291	OFFICE 2	0.7
11123229	PSYCH	< 0.3
11123221	TRIAGE	0.7
11123284	TV	< 0.3
11123263	WR	< 0.3



Table 1- Radon Testing Results		
S. Christa McAuliffe ES		
Test Period: 02/15/2022 - 02/18/2022		
Kit Number	Room / Area	Result
11123285	WR	1.3

Table 2- Radon Testing Results			
S. Christa McAuliffe ES			
Test Period: 02/15/2022 - 02/18/2022			
Kit Number	QC Type	Room / Area	Result
11123235	D	8	< 0.3
11123244	D	APR	1.6
11123213	FB	APR	< 0.3
11123207	D	Art	0.6
11123224	D	34	1.3
11123239	FB	34	< 0.3
11123269	D	106	1.2
11123248	D	102	1.1
11123255	FB	102	0.5
11123273	D	9	1.8
11123203	D	Main Office	0.8
11123282	FB	Main Office	< 0.3
11131660	OB	OFFICE BLANK	< 0.3
11131661	TB	TRAVEL BLANK	< 0.3



# ATTACHMENT C

## Laboratory Analytical Results

Radon test result report for:

**S. CHRISTA MCAULIFFE ES**

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11123264	10	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123256	102	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	1.2 ± 0.3	2022-02-22
11123255	102	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	0.5 ± 0.3	2022-02-22
11123248	102	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	1.1 ± 0.3	2022-02-22
11123266	102A	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	1.1 ± 0.3	2022-02-22
11123247	103	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	0.9 ± 0.3	2022-02-22
11123261	104	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	1.4 ± 0.3	2022-02-22
11123270	105	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	1.2 ± 0.3	2022-02-22
11123269	106	2022-02-15 @ 11:00 am	2022-02-18 @ 10:00 am	1.2 ± 0.3	2022-02-22
11123258	106	2022-02-15 @ 11:00 am	2022-02-18 @ 10:00 am	1.2 ± 0.3	2022-02-22
11123268	107	2022-02-15 @ 11:00 am	2022-02-18 @ 10:00 am	1.1 ± 0.3	2022-02-22
11123267	108	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	5.8 ± 0.5	2022-02-22
11123250	109	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	3.7 ± 0.4	2022-02-22
11123276	113	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	1.4 ± 0.4	2022-02-22
11123249	12	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123257	16	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	0.6 ± 0.3	2022-02-22
11123277	1B	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123275	205	2022-02-15 @ 12:00 pm	2022-02-18 @ 9:00 am	0.8 ± 0.3	2022-02-22
11123259	29	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	< 0.3	2022-02-22
11123260	30	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	2.4 ± 0.4	2022-02-22
11123262	31	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	0.6 ± 0.3	2022-02-22
11123273	9	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	1.8 ± 0.4	2022-02-22
11123274	9	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	2.2 ± 0.4	2022-02-22
11123278	ALVING	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123279	CONFERENCE	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	0.8 ± 0.3	2022-02-22
11123242	HR	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	1.4 ± 0.4	2022-02-22
11123286	HR EXAM	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	1.4 ± 0.3	2022-02-22
11123272	IMC	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123283	IMC	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123271	IMC OFFICE	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123265	ISM	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123203	MAIN OFFICE	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	0.8 ± 0.3	2022-02-22
11123281	MAIN OFFICE	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	0.7 ± 0.3	2022-02-22
11123282	MAIN OFFICE	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123280	OFFICE 1	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	1.2 ± 0.3	2022-02-22
11123291	OFFICE 2	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	0.7 ± 0.3	2022-02-22
11123284	TV	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	< 0.3	2022-02-22

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February 23, 2022

**\*\* LABORATORY ANALYSIS REPORT \*\***

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Radon test result report for:

**S. CHRISTA MCAULIFFE ES**

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<b>Kit #</b>	<b>Room Id</b>	<b>Started</b>	<b>Ended</b>	<b>pCi/L</b>	<b>Analyzed</b>
11123263	WR	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123285	WR	2022-02-15 @ 12:00 pm	2022-02-18 @ 10:00 am	1.3 ± 0.4	2022-02-22

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

Radon test result report for:

**S. CHRISTA MCAULIFFE ES****1**

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11123211	1	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	0.7 ± 0.3	2022-02-22
11123237	14	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123220	15	2022-02-15 @ 10:00 am	2022-02-18 @ 9:00 am	0.9 ± 0.3	2022-02-22
11123210	2	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	1.0 ± 0.3	2022-02-22
11123233	25	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	0.8 ± 0.3	2022-02-22
11123204	26	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	< 0.3	2022-02-22
11123240	27	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	1.3 ± 0.4	2022-02-22
11123205	28	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	2.6 ± 0.4	2022-02-22
11123227	2A	2022-02-15 @ 10:00 am	2022-02-18 @ 9:00 am	0.8 ± 0.3	2022-02-22
11123218	3	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123222	32	2022-02-15 @ 10:00 am	2022-02-18 @ 9:00 am	2.8 ± 0.4	2022-02-22
11123231	33	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	1.0 ± 0.3	2022-02-22
11123239	34	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	< 0.3	2022-02-22
11123224	34	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	1.3 ± 0.3	2022-02-22
11123254	34	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	1.2 ± 0.3	2022-02-22
11123206	35	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	0.5 ± 0.3	2022-02-22
11123232	36	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	1.3 ± 0.3	2022-02-22
11123243	37	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	0.6 ± 0.3	2022-02-22
11123216	38	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	0.9 ± 0.3	2022-02-22
11123201	4	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	0.7 ± 0.3	2022-02-22
11123223	40	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	0.9 ± 0.3	2022-02-22
11123253	42	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	0.6 ± 0.3	2022-02-22
11123246	43	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	< 0.3	2022-02-22
11123217	5	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	1.0 ± 0.3	2022-02-22
11123226	6	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	0.7 ± 0.3	2022-02-22
11123228	7	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123235	8	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123214	8	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	0.7 ± 0.3	2022-02-22
11123213	APR	2022-02-15 @ 11:00 am	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123238	APR	2022-02-15 @ 11:00 am	2022-02-18 @ 10:00 am	1.0 ± 0.3	2022-02-22
11123252	APR	2022-02-15 @ 11:00 am	2022-02-18 @ 10:00 am	1.4 ± 0.3	2022-02-22
11123244	APR	2022-02-15 @ 11:00 am	2022-02-18 @ 10:00 am	1.6 ± 0.4	2022-02-22
11123208	ART	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	< 0.3	2022-02-22
11123207	ART	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	0.6 ± 0.3	2022-02-22
11123219	ART	2022-02-15 @ 10:00 am	2022-02-18 @ 9:00 am	< 0.3	2022-02-22
11123251	BSO	2022-02-15 @ 11:00 am	2022-02-18 @ 10:00 am	0.8 ± 0.3	2022-02-22
11123230	COU	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	< 0.3	2022-02-22

Radon test result report for:**S. CHRISTA MCAULIFFE ES****1**

<b>Kit #</b>	<b>Room Id</b>	<b>Started</b>	<b>Ended</b>	<b>pCi/L</b>	<b>Analyzed</b>
11123236	ESOL	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123245	GYM	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	1.4 ± 0.3	2022-02-22
11123234	GYM	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	1.3 ± 0.3	2022-02-22
11123225	GYM OFFICE	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	2.0 ± 0.3	2022-02-22
11123209	KITCHEN OFFICE	2022-02-15 @ 11:00 am	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123215	MU	2022-02-15 @ 11:00 am	2022-02-18 @ 9:00 am	1.0 ± 0.3	2022-02-22
11123202	OBSERVATION OFFICE	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	0.6 ± 0.3	2022-02-22
11123229	PSYCH	2022-02-15 @ 10:00 am	2022-02-18 @ 10:00 am	< 0.3	2022-02-22
11123221	TRIAGE	2022-02-15 @ 11:00 am	2022-02-18 @ 10:00 am	0.7 ± 0.3	2022-02-22



**EXPOSURE IN BOWSER-MORNER RADON CHAMBER**

CLIENT KCI Technologies, Inc. Job Number 204186

NOMINAL Conditions: Radon Conc 25.8 pCi/L Rel. Hum 50.1 % Temp. 70.9 F

Date Start: 2/18/22 Date Stop: 2/21/22 Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_

Time Start: 0911 Time Stop: 0911 Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_

Device No.'s: (3) Char Bags -  
11113484, 1112998, 20107126 Device No.'s: \_\_\_\_\_

23 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  $\mu$ R/h Elevation = 820 ft**

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 Number	Start Date	Start Time	End Date	End Time	Temp.	Facility	Building	Room	Project ID	Floor	Result
11113484	2022-02-18	9:00 am	2022-02-21	9:00 am	71	OFFICE	MAIN	SK1		1	27.9
11122998	2022-02-18	9:00 am	2022-02-21	9:00 am	71	OFFICE	MAIN	SK2		1	26.0
20107126	2022-02-18	9:00 am	2022-02-21	9:00 am	71	OFFICE	MAIN	SK3		1	27.6

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### Radon Test Kit Chain of Custody

**Project Name:** MCPS Radon – February 2022 Schools

**Name of Schools:**

1. Damascus HS
2. Germantown ES
3. Great Seneca Creek ES
4. Lake Seneca ES
5. S. Christa McAuliffe ES
6. Northwest HS
7. Waters Landing ES
8. Seneca Valley HS
9. Cedar Grove ES
10. Capt. James E. Daly ES
11. Neelsville MS
12. Dr. Sally K. Ride ES

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	Date	Initials
Radon Test Kits Deployed	02/15/2022	DM
Radon Test Kits Collected	02/18/2022	DM
Radon Test Kits Shipped to Lab*	02/18/2022	DM
Radon Test Kits Received by Lab*	02/21/2022	DM

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