



MCPS RADON TESTING – EXECUTIVE SUMMARY

Site Name	Midcounty Maintenance and Operations Service Center (Formerly Bethesda Maintenance & Transportation Depot)
Date of Test Report	02/23/2022
Round of Testing	Initial Follow-up Post Remediation 2 Year Testing 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility
# Rooms Tested	1
# Rooms ≥ 4.0 pCi/L	0
Lowest Value	<0.3 pCi/L
Highest Value	<0.3 pCi/L

Project Status

Current Project Status at this time: Retesting complete; no further action needed.



February 23, 2022

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

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

Location: Midcounty Maintenance and Operations Service Center
(Formerly Bethesda Maintenance and Transportation Depot)
10901 Westlake Dr.
Rockville, MD 20852

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 Midcounty Maintenance and Operations Service Center, located at 10901 Westlake Dr. Rockville, MD 20852 (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 January 18, 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.

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

1. Rooms with missing test kits from the December 2021 testing period (i.e. test kit was deployed but not recovered),
2. Rooms with invalidated test kits from the December 2021 testing period (e.g. an open window in the room or disturbed test kit),
3. Rooms which were locked/inaccessible during the December 2021 testing period,
4. Rooms with elevated December 2021 results (i.e. ≥ 3.5 pCi/L),
5. Rooms previously tested for radon but not tested in December 2021, 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 January 21, 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:

- 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 low 20°Fs and high temperatures ranged from the mid 20°Fs to the high 50°Fs. Maximum sustained winds ranged from 9-11 miles per hour. Average humidity was around 61% 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:

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		
Bethesda M&T RT		
Test Period: 01/18/2022-01/21/2022		
Kit Number	Room / Area	Result
11106393	COPY ROOM	< 0.3
11106395	COPY ROOM	< 0.3
11106399	COPY ROOM	< 0.3

Table 2- Radon Testing Results			
Bethesda M&T RT			
Test Period: 01/18/22-01/21/22			
Kit Number	QC Type	Room / Area	Result
11106395	D	Copy Room	< 0.3
11106393	FB	Copy Room	< 0.3

ATTACHMENT C

Laboratory Analytical Results

January 27, 2022

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11106393	COPY ROOM	2022-01-18 @ 1:00 pm	2022-01-21 @ 10:00 am	< 0.3	2022-01-26
11106395	COPY ROOM	2022-01-18 @ 1:00 pm	2022-01-21 @ 10:00 am	< 0.3	2022-01-26
11106399	COPY ROOM	2022-01-18 @ 1:00 pm	2022-01-21 @ 10:00 am	< 0.3	2022-01-26

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 203404

NOMINAL Conditions: Radon Conc 16.2 pCi/L Rel. Hum 28.8 % Temp. 59.9 F

Date Start: 12/24/21 Date Stop: 12/27/21 Date Start: _____ Date Stop: _____

Time Start: 0809 Time Stop: 0809 Time Start: _____ Time Stop: _____

Device No.'s: (2) Char Bags- Device No.'s: _____

9341721, 9341722

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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**

December 31, 2021

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

SK
MA MCPS - Spike Sample Lab Results. Measured values are satisfactory, i.e., within $\pm 25\%$ of the chamber's reference value (16.2 pCi/L).

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
9341721	1	2021-12-24 @ 8:00 am	2021-12-27 @ 8:00 am	11.6 \pm 0.9	2021-12-31
9341722	1	2021-12-24 @ 8:00 am	2021-12-27 @ 8:00 am	15.4 \pm 1.2	2021-12-31

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 – December 2021 Schools Retesting

Name of Schools:

1. 45 Gude
2. Bethesda M&T
3. Darnestown ES
4. McDonald Knolls ECC
5. Shady Grove M&T

	Date	Initials
Radon Test Kits Deployed	01/18/2022	DM
Radon Test Kits Collected	01/21/2022	DM
Radon Test Kits Shipped to Lab*	01/21/2022	DM
Radon Test Kits Received by Lab*	01/23/2022	DM

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



MCPS RADON TESTING – EXECUTIVE SUMMARY

Site Name	Midcounty Maintenance and Operations Service Center (Formerly Bethesda Maintenance & Transportation Depot)
Date of Test Report	01/20/2022
Round of Testing	Initial Follow-up Post Remediation <u>2 Year Testing</u> 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility
# Rooms Tested	16
# Rooms \geq 4.0 pCi/L	0
Lowest Value	<0.3 pCi/L
Highest Value	2.5 pCi/L

Project Status

Current Project Status at this time: Testing Complete; no further action.



January 20, 2022

Mr. Richard Cox
Indoor Air Quality Team Leader
Montgomery County Public Schools
Gaithersburg, MD 20879

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

Location: Midcounty Maintenance and Operations Service Center
(Formerly Bethesda Maintenance and Transportation Depot)
10901 Westlake Dr.
Rockville, MD 20852

Dear Mr. Cox:

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 Midcounty Maintenance and Operations Service Center, located at 10901 Westlake Dr. Rockville, MD 20852 (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 December 14, 2021 and deployed eighteen (18) 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 17, 2021 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 low 30°Fs and high temperatures ranged from the mid 50°Fs to the high 60°Fs. Maximum sustained winds ranged from 3-12 miles per hour. Average humidity was around 50% 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:

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.
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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
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ATTACHMENT A

Floor Plan With Test Locations

ATTACHMENT B

Radon Test Summary Spreadsheet

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D- Duplicate

FB- Field Blank

KCI- KCI Technologies, Inc.

OB- Office Blank

PM- Project Manager

OC- Quality Control

Table 1- Radon Testing Results		
Bethesda Maintenance and Transportation Depot		
Test Period: 12/14/2021-12/17/2021		
Kit Number	Room / Area	Result
9347961	ASST. MANAGERS OFFICE	< 0.3
9347962	DEPOT OFFICE	< 0.3
9347963	MANAGERS OFFICE	< 0.3
9347964	SUPERVISORS OFFICE	< 0.3
9347967	ROOM 5 ASST OPS MANAGER	< 0.3
9347968	ROOM 4 OPS MANAGER	< 0.3
9347970	TRANSPORTATION MAIN OFFICE	< 0.3
9347971	SMALL SUPERVISORS OFFICE	< 0.3
9347972	TRANSPORTATION BREAK ROOM	< 0.3
9347973	TRANSPORTATION BREAK ROOM	< 0.3
9347974	BCARP OFFICE	< 0.3
9347975	MST OFFICE	< 0.3
9347976	CARPENTRY SHOP	0.6
9347978	PARTS ROOM OFFICE	< 0.3
9347979	MAINTENANCE BREAK ROOM	< 0.3
9347980	COVID TESTING AREA	0.9
9347981	GAS SHACK	2.3
9347984	GAS SHACK	2.5

Table 2- Radon Testing Results			
Bethesda Maintenance and Transportation Depot			
Test Period: 12/14/2021-12/17/2021			
Kit Number	QC Type	Room / Area	Result
9347973	D	Transportation Break Room	< 0.3
9347981	FB	Gas Shack	2.3
9347000	OB	OFFICE BLANK	< 0.3
9346980	TB	TRAVEL BLANK	< 0.3

ATTACHMENT C

Laboratory Analytical Results

Radon test result report for:

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
9347961	ASST. MANAGERS OFFICE	2021-12-14 @ 8:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20
9347974	BCARP OFFICE	2021-12-14 @ 9:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20
9347976	CARPENTRY SHOP	2021-12-14 @ 9:00 am	2021-12-17 @ 8:00 am	0.6 ± 0.3	2021-12-20
9347980	COVID TESTING AREA	2021-12-14 @ 9:00 am	2021-12-17 @ 8:00 am	0.9 ± 0.3	2021-12-20
9347962	DEPOT OFFICE	2021-12-14 @ 8:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20
9347984	GAS SHACK	2021-12-14 @ 9:00 am	2021-12-17 @ 8:00 am	2.5 ± 0.3	2021-12-20
9347981	GAS SHACK	2021-12-14 @ 9:00 am	2021-12-17 @ 8:00 am	2.3 ± 0.3	2021-12-20
9347979	MAINTENANCE BREAK ROOM	2021-12-14 @ 8:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20
9347963	MANAGERS OFFICE	2021-12-14 @ 8:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20
9347975	MST OFFICE	2021-12-14 @ 9:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20
9347978	PARTS ROOM OFFICE	2021-12-14 @ 8:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20
9347968	ROOM 4 OPS MANAGER	2021-12-14 @ 8:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20
9347967	ROOM 5 ASST OPS MANAGER	2021-12-14 @ 8:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20
9347971	SMALL SUPERVISORS OFFICE	2021-12-14 @ 8:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20
9347964	SUPERVISORS OFFICE	2021-12-14 @ 8:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20
9347972	TRANSPORTATION BREAK ROOM	2021-12-14 @ 8:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20
9347973	TRANSPORTATION BREAK ROOM	2021-12-14 @ 8:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20
9347970	TRANSPORTATION MAIN OFFICE	2021-12-14 @ 8:00 am	2021-12-17 @ 8:00 am	< 0.3	2021-12-20

EXPOSURE IN BOWSER-MORNER RADON CHAMBER

CLIENT KCI Technologies, Inc. Job Number 203404

NOMINAL Conditions: Radon Conc 16.2 pCi/L Rel. Hum 28.8 % Temp. 59.9 F

Date Start: 12/24/21 Date Stop: 12/27/21 Date Start: _____ Date Stop: _____

Time Start: 0809 Time Stop: 0809 Time Start: _____ Time Stop: _____

Device No.'s: (2) Char Bags- Device No.'s: _____

9341721, 9341722

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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 µR/h Elevation = 820 ft**

December 31, 2021

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

SK
MA MCPS - Spike Sample Lab Results. Measured values are satisfactory, i.e., within $\pm 25\%$ of the chamber's reference value (16.2 pCi/L).

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
9341721	1	2021-12-24 @ 8:00 am	2021-12-27 @ 8:00 am	11.6 \pm 0.9	2021-12-31
9341722	1	2021-12-24 @ 8:00 am	2021-12-27 @ 8:00 am	15.4 \pm 1.2	2021-12-31

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 - December 2021 Schools

Name of Schools:

1. Ewing at Cloverleaf Center
2. Bethesda Main. & Tran.
3. Clarksburg ES Annex
4. Clarksburg Main. & Tran.
5. Taylor Learning Center
6. Darnestown ES
7. Shady Grove Main. & Tran.

	Date	Initials
Radon Test Kits Deployed	12/14/2021	JM
Radon Test Kits Collected	12/17/2021	JM
Radon Test Kits Shipped to Lab*	12/17/2021	JM
Radon Test Kits Received by Lab*	12/18/2021	JM

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