



MCPS RADON TESTING

Executive Summary: Carl Sandberg Learning Center

Date of Test Report:	3/10/2016 (Rev 1)
Round of Testing:	Initial Follow-up Post Remediation
# Rooms Tested:	37
# Rooms \geq 4.0 pCi/L:	0
Low Value:	< 0.3
High Value:	2.4

Project Status:

Initial testing completed; no further action at this time.



March 10, 2016 (Rev 1)

Mr. Richard Cox
Indoor Air Quality Team Leader
Montgomery County Public Schools
850 Hungerford Drive
Rockville, MD 20850

Re: **Radon Testing Services**
KCI Job # 12146341.22

Location: Carl Sandberg Learning Center
451 Meadowhall Drive
Rockville, MD 20851

Dear Mr. Cox:

KCI Technologies, Inc. (KCI) is pleased to submit the following report to the Montgomery County Public Schools (MCPS) pursuant to completing a “short-term” 3 day radon test for the Carl Sandberg learning Center, located at 451 Meadowhall Drive in Rockville, Maryland 20851 (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 Safety Board (NRSB) Radon Measurement Specialist (certification #14SS056) supervised the testing. Additional information on radon management and the health effects of radon exposure is available from www.montgomerycountymd.gov/dep/air/radon or www.epa.gov/radon.

KCI visited the site on December 28, 2015 and deployed forty-six (46) activated charcoal (AC) radon test kits. KCI deployed radon test kits in 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 included duplicate samples, field blanks, lab transit blanks, and office blanks in accordance with AARST recommendations. In addition, KCI submitted six (6) 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 31, 2015 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:

The operating condition that represents the greatest amount of significantly occupied time for this building is; heating active, with outdoor temperature averages $\leq 65^{\circ}$ F.

KCI concludes that the test period reasonably represents normal conditions when the building is significantly occupied. Clear characterization of the radon hazard is most likely to be observed under this normal operating condition. Based on the evaluation of test conditions, this test should reasonably characterize radon hazards.

KCI also conducted observations of field conditions which could affect the results of the test and compiled weather data for the testing period. KCI recorded observations of the following conditions in each room at 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.

Results:

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	

Notes:
D- Duplicate sample

The field blanks, office blank, and lab transit blanks had test results of less than the laboratory detection limit of 0.3 pCi/L. Review of the duplicate sample analysis indicates that adequate laboratory measurement precision was achieved. The Spike sample analysis results indicate the laboratory is operating within statistical control limits.

The sampling locations, field observations, and analytical results are listed on Table 1 (Attachment B). The laboratory analytical results are also attached (Attachment C). Laboratory results and exposure data for the spike samples are also included in Attachment C.

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) 316-7800.

Sincerely,



James M. Mouldale
Radon Measurement Specialist
KCI Technologies, Inc.

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

ATTACHMENT A

Floor Plan With Test Locations

ATTACHMENT B

Radon Test Summary Spreadsheet

Table Notes:

AC- Activated Charcoal

ACI- Air Chek, Inc.

D- Duplicate

FB- Field Blank

KCI- KCI Technologies, Inc.

OB- Office Blank

PM- Project Manager

QC- Quality Control

Radon Testing Results		
Carl Sandberg Center		
Test Period: 12/28/15-12/31/15		
Kit Number	Room / Area	Result
7707134	11A	0.9
7708290	11B	1.3
7708299	BSO	1.4
7708271	CONFERENCE	0.9
7708264	CR1	0.8
7708292	CR10	1.2
7708294	CR12	< 0.3
7708293	CR14	< 0.3
7708296	CR16	0.9
7708298	CR18	0.6
7708266	CR2	1.2
7707138	CR20	0.8
7708272	CR3	2.3
7708273	CR4	1.3
7708259	CR5	1.2
7708270	CR6	0.8
7708268	CR7	1.0
7708262	CR8	0.7
7708265	HR	< 0.3
7708288	IMC	1.7
7708274	MAIN	< 0.3
7708287	MO	1.3
7708289	MP	2.4
7708280	MPR	1.4
7708277	MPR	1.5
7708285	OFF	1.3
7708281	OFFICE A	1.2
7708282	OFFICE B	1.8
7708279	OFFICE C	< 0.3
7708267	OFFICE D	1.2
7708283	OFFICE E	1.5
7708284	OFFICE F	1.5
7707131	PORTABLE	< 0.3
7707145	PORTABLE2	< 0.3
7708291	SR	0.6
7708278	STAFF	1.2
7708275	STO	1.1
7708269	WR	1.5

Table Note:

* Missing or Compromised Sample

Radon Testing Results		
Carl Sandberg Center		
Test Period: 12/28/15-12/31/15		
Kit Number	QC Type	Result
7708300	D (BSO)	1.2
7707100	D (CR18)	< 0.3
7708261	D (CR5)	1.2
7708258	D (CR8)	0.8
7708286	D (IMC)	1.6
7708276	FB (BSO)	< 0.3
7708260	FB (PORTABLE)	< 0.3
7708295	OB (0)	< 0.3

Table Note:

* Missing or Compromised Sample

ATTACHMENT C

Laboratory Analytical Results

January 16, 2016
**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:
**CARL SANDBERG CENTER
 MAIN**

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
7708295	0	2015-12-28 @ 12:00 pm	2015-12-31 @ 10:00 am	< 0.3	2016-01-04
7707134	11A	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	0.9 ± 0.4	2016-01-05
7708290	11B	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.3 ± 0.3	2016-01-04
7708300	BSO	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.2 ± 0.3	2016-01-04
7708276	BSO	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	< 0.3	2016-01-04
7708299	BSO	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.4 ± 0.4	2016-01-05
7708271	CONFERENCE	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	0.9 ± 0.4	2016-01-05
7708264	CR1	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	0.8 ± 0.3	2016-01-04
7708292	CR10	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.2 ± 0.3	2016-01-04
7708294	CR12	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	< 0.3	2016-01-05
7708293	CR14	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	< 0.3	2016-01-04
7708296	CR16	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	0.9 ± 0.4	2016-01-05
7707100	CR18	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	< 0.3	2016-01-04
7708298	CR18	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	0.6 ± 0.3	2016-01-05
7708266	CR2	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.2 ± 0.3	2016-01-04
7707138	CR20	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	0.8 ± 0.3	2016-01-04
7708272	CR3	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	2.3 ± 0.4	2016-01-05
7708273	CR4	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.3 ± 0.3	2016-01-04
7708259	CR5	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.2 ± 0.3	2016-01-04
7708261	CR5	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.2 ± 0.3	2016-01-04
7708270	CR6	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	0.8 ± 0.3	2016-01-04
7708268	CR7	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.0 ± 0.3	2016-01-04
7708258	CR8	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	0.8 ± 0.4	2016-01-05
7708262	CR8	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	0.7 ± 0.3	2016-01-05
7708265	HR	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	< 0.3	2016-01-04
7708286	IMC	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.6 ± 0.3	2016-01-04
7708288	IMC	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.7 ± 0.4	2016-01-04
7708274	MAIN	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	< 0.3	2016-01-04
7708287	MO	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.3 ± 0.4	2016-01-05
7708289	MP	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	2.4 ± 0.4	2016-01-04
7708277	MPR	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.5 ± 0.4	2016-01-05
7708280	MPR	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.4 ± 0.4	2016-01-05
7708285	OFF	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.3 ± 0.4	2016-01-04
7708281	OFFICE A	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.2 ± 0.3	2016-01-04
7708282	OFFICE B	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.8 ± 0.4	2016-01-04
7708279	OFFICE C	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	< 0.3	2016-01-04
7708267	OFFICE D	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.2 ± 0.3	2016-01-04

January 16, 2016
**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:
**CARL SANDBERG CENTER
MAIN**

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
7708283	OFFICE E	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.5 ± 0.3	2016-01-04
7708284	OFFICE F	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.5 ± 0.4	2016-01-05
7708260	PORTABLE	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	< 0.3	2016-01-04
7707131	PORTABLE	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	< 0.3	2016-01-05
7707145	PORTABLE2	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	< 0.3	2016-01-04
7708291	SR	2015-12-28 @ 9:00 am	2015-12-31 @ 11:00 am	0.6 ± 0.4	2016-01-05
7708278	STAFF	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.2 ± 0.4	2016-01-05
7708275	STO	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.1 ± 0.3	2016-01-04
7708269	WR	2015-12-28 @ 9:00 am	2015-12-31 @ 9:00 am	1.5 ± 0.4	2016-01-04

January 15, 2016
** LABORATORY ANALYSIS REPORT **

Radon test result report for:
**MCPS PHASE 3 & 4
TRANSIT BLANKS**

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
7708218	TRANSIT 4	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708200	TRANSIT 1	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708190	TRANSIT 10	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708189	TRANSIT 11	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708191	TRANSIT 12	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708188	TRANSIT 13	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708197	TRANSIT 14	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708186	TRANSIT 15	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708185	TRANSIT 16	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708184	TRANSIT 17	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708182	TRANSIT 18	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708187	TRANSIT 18	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708199	TRANSIT 2	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708181	TRANSIT 20	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708180	TRANSIT 21	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708183	TRANSIT 22	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708178	TRANSIT 23	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708179	TRANSIT 24	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708177	TRANSIT 25	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708176	TRANSIT 26	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708174	TRANSIT 27	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708173	TRANSIT 28	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708175	TRANSIT 29	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708198	TRANSIT 3	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708172	TRANSIT 30	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708194	TRANSIT 5	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708196	TRANSIT 6	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708193	TRANSIT 7	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708192	TRANSIT 8	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23
7708195	TRANSIT 9	2015-12-18 @ 12:00 pm	2015-12-21 @ 12:00 pm	< 0.3	2015-12-23

December
23,
2015

**LABORATORY ANALYSIS
REPORT ****

Spike Sample Laboratory Results

Radon test result report for:
MCPS

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
7706380	101	2015-12-18 @ 9:00 am	2015-12-21 @ 9:00 am	25.2	2015-12-23
7706381	102	2015-12-18 @ 9:00 am	2015-12-21 @ 9:00 am	26.5	2015-12-23
7706208	103	2015-12-18 @ 9:00 am	2015-12-21 @ 9:00 am	27.7	2015-12-23
7705132	104	2015-12-18 @ 9:00 am	2015-12-21 @ 9:00 am	28.6	2015-12-23
7706366	105	2015-12-18 @ 9:00 am	2015-12-21 @ 9:00 am	26.5	2015-12-23
7706211	106	2015-12-18 @ 9:00 am	2015-12-21 @ 9:00 am	26.1	2015-12-23

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

Note: Spike samples are test canisters that are deliberately exposed to a controlled high level of radon in a laboratory. They provide a quality control measure in the testing process and do NOT reflect radon levels in the building being tested.

EXPOSURE IN BOWSER-MORNER RADON CHAMBER

CLIENT KCI Technologies Inc. Job Number 173224

NOMINAL Conditions: Radon Conc 26.9 pCi/L Rel. Hum 49.6 % Temp. 69.9 F

Date Start: 12/18/15 Date Stop: 12/21/15 Date Start: _____ Date Stop: _____

Time Start: 0929 Time Stop: 0929 Time Start: _____ Time Stop: _____

Device No.'s: 7705132, 7706208, Device No.'s: _____

7706211, 7706366, _____

7706380, 7706381 _____

F3 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 μ R/h Elevation = 820 ft**



Chain of Custody

Project Name: MCPS Radon Phase III

Name of Schools:

- | | | |
|-----------------------|-----------------------|-----------------------|
| 1. Burnt Mills ES | 13. Georgian Frost ES | 25. Northlake Center |
| 2. Burtonsville ES | 14. Germantown ES | 26. Olney ES |
| 3. Cedar Grove ES | 15. Goshen ES | 27. Rosa Parks MS |
| 4. Cloverly ES | 16. Greencastle ES | 28. Poolesville ES |
| 5. Cold Spring ES | 17. Greenwood ES | 29. Poolesville HS |
| 6. Damascus HS | 18. Lake Seneca ES | 30. Potomac ES |
| 7. Darnestown ES | 19. Laytonsville ES | 31. Rock Terrace HS |
| 8. Diamond ES | 20. Col. E. Brooke MS | 32. Rosemary Hills ES |
| 9. Charles R. Drew ES | 21. Luxmanor ES | 33. Carl Sandburg |
| 10. DuFief ES | 22. Magruder HS | 34. Sequoyah ES |
| 11. Thomas Edison HS | 23. Thur. Marshall ES | 35. Stedwick ES |
| 12. Robert Frost MS | 24. Monocacy ES | 36. Whetstone ES |

	Date	Initials
Radon Test Kits Deployed	12/28/15	JM
Radon Test Kits Sampled	12/31/15	JM
Radon Test Kits Shipped to Lab*	12/31/15	JM
Radon Test Kits Received by Lab*	1/4/16	JM

*All samples sent to Air Check, Inc., 1936 Butler Bridge Road, Mills River, NC 28758