

School Year: **24-25**

| | | | |
|-----------------------|---|--|--|
| Facility: | Greencastle Elementary School | | |
| Address: | 13611 Robey Road | | |
| | Silver Spring, MD 20904 | | |
| Reason for Testing: | Scheduled Re-Testing - <input checked="" type="checkbox"/> 2-year or <input type="checkbox"/> 5-year schedule <input type="checkbox"/> Clearance Testing (Post-Mitigation) <input checked="" type="checkbox"/> Building Envelope or HVAC Upgrades <input type="checkbox"/> New Construction – Addition or Facility | | |
| Current Radon Status: | <input checked="" type="checkbox"/> Active Mitigation (2-year regular schedule) <input type="checkbox"/> No Active Mitigation (5-year regular schedule) <input type="checkbox"/> Not Previously Tested (New Facility) | | |
| Round of Testing: | <input checked="" type="checkbox"/> Initial Testing -or- <input type="checkbox"/> Follow-up Testing | | |
| Testing Status: | <input checked="" type="checkbox"/> No Further Testing Needed -or- <input type="checkbox"/> Follow-Up Testing Required | | |

Conclusion (When Testing Status is - No Further Testing Needed)

| Mitigation - | Facility Radon Status: | | |
|--|--|-----------------------|-------|
| <input checked="" type="checkbox"/> Not Required <input type="checkbox"/> Required (≥ 4.0 -pCi/L) Rooms: | <input checked="" type="checkbox"/> No Change in Status <input type="checkbox"/> Active Mitigation (2-year regular schedule) <input type="checkbox"/> No Active Mitigation (5-year regular schedule) | | |
| Number of Rooms Tested | 45 | Lowest Value (pCi/L) | < 0.3 |
| Number of Rooms (≥ 4.0 -pCi/L) | 0 | Highest Value (pCi/L) | 2.0 |

Instructions: Submit one testing report form per-facility. Include the following as attachments:

Attachment 1- Summary Data Tables – containing the following: (see attached samples tables)

- Testing Results – lab/detector Identification, by room number/name (alpha-numeric order) as depicted on facility map/floor plan provided by the facility/school at the time of test device deployment;
- Summary Results – list of rooms by test result ≥ 2.0 -pCi/L; ≥ 2.7 -pCi/L; ≥ 4.0 -pCi/L; and ≥ 8.0 -pCi/L;
- QA/QC Results - (field blanks and duplicates) indicating location collected; trip and office blanks; and spike sample results;
- Invalid Measurement Locations – missed locations, missing and or damaged/compromised testing devices.

Attachment 2 – Laboratory Report(s)

Attachment 3 – Sampling Location Map(s) – indicating approximate location of samples, duplicates and blanks.

Detector and Deployment

| | | |
|--|---|---|
| Detector/Device Type: | <input checked="" type="checkbox"/> Passive | <input checked="" type="checkbox"/> Charcoal Absorption (CAD) <input type="checkbox"/> Alpha Track (ATD) <input type="checkbox"/> Other |
| | <input type="checkbox"/> Continuous | <input type="checkbox"/> Electret ion Chamber (EIC) <input type="checkbox"/> Electronic Integration (EID) |
| <i>Other—Specify here:</i> | | |
| Detector/Device Name: | Air Chek – Radon Test Kits | |
| Manufacturer: | Radon Lab | |
| Person(s) Deploying or Retrieving Test Devices and certification number | | Organization/Company |
| Shakia Dawkins | | KCI Technologies, Inc. |
| | | |
| | | |
| <i>If noncertified individuals, the qualified measurement professional providing oversight -</i> | | |
| Tyler McCleaf, CSP – Cert. #111004-RMP | | KCI Technologies, Inc. |

Testing

| | | | | |
|---|------------------------|---|--|---|
| <input checked="" type="checkbox"/> Short-Term | Length of Test (days): | 3 | Date of Deployment and Retrieval (mm/dd/yy): | 12/09/2024 |
| <input type="checkbox"/> Long-Term | | | | 12/12/2024 |
| Does the test period include weekends, school breaks or holidays? | | | | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| <i>If “Yes” please explain/detail in the space below:</i> | | | | |
| Was HVAC operating under occupied conditions? | | | | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| <i>If “No” please explain/detail in the space below:</i> | | | | |

Testing (continued)

| Round of Testing | Detectors Deployed | | | | Total |
|-----------------------------|--------------------|-----------|----------------|-----------|-------|
| | Ground-Contact | | Upper-Level(s) | | |
| | Initial | Follow-Up | Initial | Follow-Up | |
| Test Locations ¹ | 41 | 0 | 4 | 0 | 45 |
| Duplicates ² | 4 | 0 | 1 | 0 | 5 |
| Field Blanks ³ | 2 | 0 | 0 | 0 | 2 |
| Grand Total | | | | | 52 |

1 – include all detectors deployed (duplicates, field blanks); 1 detector per occupied (or intended to be occupied) ground-contact space ≤ 2,000-square feet; large spaces ≥ 2,000-square feet - 1 detector per 2,000-square feet or part thereof); and upper floors - 10% of all occupied or intended to be occupied rooms per floor (these are in addition to ground contact locations)

2 - 10% of all locations tested, per floor

3 – 5% of all locations tested, per floor

Quality Assurance / Quality Control (QA/QC)

A Quality Assurance plan that is consistent with ANSI/AARST MS-QA (Radon Measurement Systems Quality Assurance) was submitted under separate cover, and is available to review at the MCPS Radon Testing and Mitigation Program website. The following number of QA/QC samples are associated this facility.

| Round of Testing | QA/QC Samples | | Total |
|-------------------------------|----------------|-----------|-------|
| | Initial | Follow-Up | |
| Spikes ¹ | Not applicable | | 3 |
| Trip Blanks ² | 1 | 0 | 1 |
| Office Blanks ^{3, 4} | 1 | 0 | 1 |
| | | | 5 |

1 - 3% of EIC detectors; and 3% from each LOT of CAD and ATD detectors; a maximum of 6-spiked measurements per month for both EIC detectors and each LOT of CAD and ATD detectors.

2 – One per shipping container from start of detector deployment

3 – One per facility tested as devices are removed/allocated from the storage location for deployment;

4 - One additional blank, analyzed prior to deployment, for storage locations that have not been evaluated or monitored, for detectors that have been stored for more than 30-day durations.

Quality Assurance / Quality Control (continued)

| | |
|---|--|
| Spike Sample Lab Results. Measured values are satisfactory, i.e., within $\pm 25\%$ of the chamber's reference value? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Quality Control measurements comply with QA/QC requirements in the submitted testing organization's/company's QA plan? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| | Round of Testing |
| | Initial |
| | Follow-Up |
| All Field, Trip and Office Blanks are \leq (less than or equal to) to the Method Detection Limit? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes |
| For all Duplicate Samples ¹ , the higher value is $\leq 2x$ the lower value? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes |
| For all Duplicate Samples ¹ , Relative Percent Difference(s) (RPD) ² are less than the Warning Level ³ ? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes |
| For all Duplicate Samples ¹ , Relative Percent Difference(s) (RPD) ² are less than the Control Level ³ ? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes |

1 – Duplicate Control – a “NO” response constitute a control failure and the space/location represented by the duplicate sample becomes an invalid measurement location and should be listed in the “Invalid Measurement Locations” Table attached to this report.

2 - The objective of duplicate tests is to assess the precision error of the measurement method or, how well two side-by-side measurements agree or disagree. Precision involving duplicates is calculated by using Relative Percent Difference (RPD). RPD is equal to the difference between the higher test result minus the lower value test result divided by the average of the two duplicate test results, multiplied by 100. The RPD result is then compared to the warning and control limits.

3 - The Warning Level is set at the deviation from ideal performance that would be expected to occur by chance only 5% of the time, and Control Limits are set at that deviation from ideal performance that would be expected to occur by chance only 1% of the time. The Warning Level indicates a potential problem, which should be investigated. The Control Level indicates that the measurement system should be subject to corrective action.

The control and warning levels for duplicates, based on the averaged duplicate test result, are -

| Average concentration of the two duplicate test results | Warning Level | Control Level |
|---|---------------|----------------|
| < 2.0-pCi/L | 1-pCi/L | Not applicable |
| Between 2.0 and 3.9-pCi/L | 50% RPD | 67% RPD |
| ≥ 4.0 -pCi/L | 28% RPD | 36% RPD |

Summary of Test Results¹ and Determination of Valid Measurements²

| Round of Testing | Ground-Contact | | Upper-Level(s) | | Total |
|--|----------------|-----------|----------------|-----------|-------|
| | Initial | Follow-Up | Initial | Follow-Up | |
| Number of test locations: | 41 | 0 | 4 | 0 | 46 |
| Number of locations ≥ 8.0 -pCi/L: | 0 | 0 | 0 | 0 | 0 |
| Number of locations ≥ 4.0 and ≤ 8 -pCi/L: | 0 | 0 | 0 | 0 | 0 |
| Number of locations ≥ 2.7 and < 4 -pCi/L: | 0 | 0 | 0 | 0 | 0 |
| Number of locations ≥ 2.0 and < 2.7 -pCi/L: | 1 | 0 | 0 | 0 | 1 |
| Number of missing required test locations ³ : | 1 | 0 | 0 | 0 | 1 |
| Number of failed duplicate control locations: | 0 | 0 | 0 | 0 | 0 |
| Percentage of missing test locations for the facility ^{4,5} : | 2.44% | 0% | 0% | 0% | 2.17% |

1 – for locations with multiple test results, report consistent with Section 7.2(When Two Test Results Disagree) and 8.1.2 (Averaging) of ANSI/AARST MA-MFLB 2023 – Conducting Measurements of Radon in Multifamily, School, Commercial and Mix-Use Buildings;

2 - the allowance is to be calculated individually for Ground-Contact and Upper-Level(s) Test Locations;

3 – includes missed or inaccessible locations upon deployment or retrieval, damaged (not able to analyze) and missing detectors upon retrieval;

4 – if all valid measurements are < 4.0 -pCi/L and the total number of test locations are ≥ 18 , there is an allowance of $\leq 33\%$. If less than 18 test locations please review section 6.2 of the ANSI/AARST MA-MFLB 2023;

5 – if any valid measurements are ≥ 4.0 -pCi/L and the total number of test locations are ≥ 20 , there is an allowance of $\leq 25\%$ of the total locations tested. If less than 20 test locations please review section 6.2 of the ANSI/AARST MA-MFLB 2023.

Summary of Test Results¹ and Determination of Valid Measurements² (continued)

| | Round of Testing | Initial | Follow-Up |
|---|------------------|---|---|
| Were test devices deployed in all occupied and intended to be occupied rooms in contact with the ground, and, if applicable, 10% of upper floor rooms? | | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Were valid measurements obtained in all occupied and intended to be occupied rooms in contact with the ground, and, if applicable, 10% of upper floor rooms? | | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| <i>If Yes to both above – then Testing Status – ‘No Further Testing Needed’ mark ‘NA’ below and complete Conclusions section</i> | | | |
| If No to either above, were all results obtained under 4.0-pCi/L and were sufficient valid measurements obtained?^{1,2} <i>If Yes, then - ‘No Further Testing Needed’ complete Conclusion section on first page. If No, then - ‘Follow-up Testing Required’ continue below.</i> | | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA |

1 – if all valid measurements are <4.0-pCi/L and the total number of test locations are ≥18, there is an allowance of ≤33%. If less than 18 test locations please review section 6.2 of the ANSI/AARST MA-MFLB 2023 – Conducting Measurements of Radon in Multifamily, School, Commercial and Mix-Use Buildings to determine the allowance;
 2 – if any valid measurements are ≥4.0-pCi/L and the total number of test locations are ≥20, there is an allowance of ≤25% of the total locations tested. If less than 20 test locations please review section 6.2 of the ANSI/AARST MA-MFLB 2023 – Conducting Measurements of Radon in Multifamily, School, Commercial and Mix-Use Buildings to determine the number the allowance.

Follow-Up Testing

Required –

- If an insufficient number (greater than the allowance provided above) of valid measurements were obtained during the initial round of testing (the “missing required test locations” in the table above);
- Any location test results ≥ 4.0-pCi/L;
- Any location where duplicates fail QC checks; and or
- At the discretion of MCPS IAQ Staff

| Reason for Follow-Up Testing | Testing Procedure | Follow-up Result | Conclusion |
|-------------------------------------|--|------------------|-----------------------------------|
| Insufficient Number of Measurements | Follow same procedures as Initial Testing | Not Applicable | Follow Initial Testing procedures |
| Results ≥ 4.0-pCi/L | Deploy two Short-term follow-up tests and required blanks and duplicates; Average the results of the two tests | ≥4.0 | Mitigation Required |
| Failed QC checks | | ≥2.0 and <4.0 | Consider Mitigation |
| | | <2.0 | Mitigation Not Required |

➤ ***If follow-up testing identifies additional spaces requiring additional testing it will be performed as part of the ongoing follow-testing round.***

Attachment 1:
Summary Data Tables

| Table 1- Radon Testing Results | | |
|---|-------------|---------------------|
| Greencastle Elementary School | | |
| Test Period: 12/09/2024 - 12/12/2024 | | |
| Kit Number | Room / Area | Result |
| 11907013 | 102 | 1.4 |
| 11907026 | 103 | 1.9 |
| 11907045 | 103 | 2.0 |
| 11907038 | 104 | 1.9 |
| 11907019 | 105 | 1.1 |
| 11907055 | 106 | 1.3 |
| 11907042 | 107 | 0.5 |
| 11903593 | 112 | < 0.3 |
| 11903578 | 113 | < 0.3 |
| 11903598 | 113 | < 0.3 |
| 11903600 | 114 | 0.6 |
| 11903592 | 115 | < 0.3 |
| 11903599 | 116 | 0.7 |
| 11907049 | 118 | < 0.3 |
| 11907050 | 118 | Manufacturer Defect |
| 11907041 | 119 | 0.6 |
| 11907044 | 120 | < 0.3 |
| 11907056 | 121 | 0.9 |
| 11907034 | 122 | < 0.3 |
| 11903558 | 125 | < 0.3 |
| 11903564 | 125 | 0.7 |
| 11907017 | 128 | < 0.3 |
| 11907018 | 128 | < 0.3 |
| 11907002 | 130 | < 0.3 |
| 11907031 | 130 | < 0.3 |
| 11907043 | 132 | < 0.3 |
| 11907033 | 133 | < 0.3 |
| 11907032 | 134 | < 0.3 |
| 11907037 | 135 | < 0.3 |
| 11907035 | 136 | < 0.3 |
| 11903563 | 137 | < 0.3 |
| 11903574 | 138 | < 0.3 |
| 11907014 | 140 | 0.7 |
| 11907029 | 141 | < 0.3 |
| 11907030 | 209 | < 0.3 |
| 11907016 | 212 | 0.7 |
| 11907015 | 220 | < 0.3 |

| Table 1- Radon Testing Results | | |
|---|--------------------|---------------|
| Greencastle Elementary School | | |
| Test Period: 12/09/2024 - 12/12/2024 | | |
| Kit Number | Room / Area | Result |
| 11907040 | 220 | < 0.3 |
| 11903585 | 125A | 0.7 |
| 11907020 | APR | 0.7 |
| 11907046 | APR | 0.9 |
| 11903594 | ASST PRINCIPAL | 1.1 |
| 11907001 | CONFERENCE | < 0.3 |
| 11907048 | CONFERENCE | < 0.3 |
| 11903595 | HEALTH | 0.9 |
| 11903586 | HEALTH OFFICE | 1.0 |
| 11903577 | IMC | < 0.3 |
| 11903573 | IMC OFFICE | < 0.3 |
| 11903596 | MAIN | 1.0 |
| 11907047 | PRINCIPAL | < 0.3 |
| 11907036 | TELEPHONE | < 0.3 |
| 11907051 | WORKROOM | < 0.3 |

| Table 3 - QC Radon Testing Results | | | |
|---|----------------|--------------------|---------------|
| Greencastle Elementary School | | | |
| Test Period: 12/09/2024 - 12/12/2024 | | | |
| | | | |
| Kit Number | QC Type | Room / Area | Result |
| 11907026 | D | 103 | 1.9 |
| 11903598 | D | 113 | < 0.3 |
| 11907049 | FB | 118 | < 0.3 |
| 11907018 | FB | 128 | < 0.3 |
| 11907031 | D | 130 | < 0.3 |
| 11907040 | D | 220 | < 0.3 |
| 11907001 | D | Conference | < 0.3 |
| 11477899 | OB | OFFICE BLANK | < 0.3 |
| 11482789 | TB | TRAVEL BLANK | < 0.3 |

Table 3a - Duplicate Worksheet / Data Validation

Greencastle Elementary School

Test Period: 12/09/2024 - 12/13/2024

| Sample ID | | | Duplicate Concentrations (pCi/L) and OC Checks | | | | | | | |
|-------------|----------|-------------|--|-------|-------------------------|-----------------|-------------------------|---------|--------------------------------------|----------|
| Kit Numbers | | Room / Area | Higher | Lower | Check #1 (Pass/Fail) | 2x the Lower | Check #2 (Pass/Fail) | Average | Relative Percent Difference (RPD) | Check #3 |
| 11903578 | 11903598 | 113 | 0.3 | 0.3 | ✓ | 0.6 | PASS | 0.3 | <1-pCi/L | ✓ |
| 11907001 | 11907048 | Conference | 0.3 | 0.3 | ✓ | 0.6 | PASS | 0.3 | <1-pCi/L | ✓ |
| 11907045 | 11907026 | 103 | 2.0 | 1.9 | ✓ | 3.8 | PASS | 2.0 | <1-pCi/L | ✓ |
| 11907031 | 11907002 | 130 | 0.3 | 0.3 | ✓ | 0.6 | PASS | 0.3 | <1-pCi/L | ✓ |
| 11907015 | 11907040 | 220 | 0.3 | 0.3 | ✓ | 0.6 | PASS | 0.3 | <1-pCi/L | ✓ |

NOTES:

QC Check #1 - Data Entry

QC Check #2 - Higher duplicate concentration is < or = to 2x the Lower

QC Check #3 - Meets RPD Limits, by average duplicate concentration

- enter 2 if RPD is BELOW warning and control levels, AND passes QC Check 1 and 2
- enter 1 if RPD is ABOVE warning and BELOW control levels, AND passes QC Check 1 and 2
- enter 0 if RPD is ABOVE control level, or 'FAILS' QC Check 1 or 2

| Average (pCi/L) | Warning Level | Control Level |
|---------------------|---------------|---------------|
| < 2.0 | 1-pCi/L | NA |
| Between 2.0 and 3.9 | 50% RPD | 67% RPD |
| ≥ 4.0 | 28% RPD | 36% RPD |

Attachment 2:
Laboratory Reports

Radon test result report for:

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|----------|-----------|-----------------------|-----------------------|-----------|------------|
| 11907013 | 102 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | 1.4 ± 0.4 | 2024-12-16 |
| 11907026 | 103 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | 1.9 ± 0.4 | 2024-12-16 |
| 11907045 | 103 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | 2.0 ± 0.4 | 2024-12-16 |
| 11907038 | 104 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | 1.9 ± 0.4 | 2024-12-16 |
| 11907019 | 105 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | 1.1 ± 0.3 | 2024-12-16 |
| 11907055 | 106 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | 1.3 ± 0.4 | 2024-12-16 |
| 11907042 | 107 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | 0.5 ± 0.3 | 2024-12-16 |
| 11903593 | 112 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11903578 | 113 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11903598 | 113 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11903600 | 114 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | 0.6 ± 0.3 | 2024-12-16 |
| 11903592 | 115 | 2024-12-09 @ 10:00 am | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11903599 | 116 | 2024-12-09 @ 10:00 am | 2024-12-12 @ 9:00 am | 0.7 ± 0.3 | 2024-12-16 |
| 11907049 | 118 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | < 0.3 | 2024-12-16 |
| 11907050 | 118 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | ???? IA5 | 2024-12-16 |
| 11907041 | 119 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | 0.6 ± 0.3 | 2024-12-16 |
| 11907044 | 120 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11907056 | 121 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | 0.9 ± 0.4 | 2024-12-16 |
| 11907034 | 122 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11903564 | 125 GYM | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | 0.7 ± 0.3 | 2024-12-16 |
| 11903558 | 125 GYM | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11903585 | 125A | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | 0.7 ± 0.3 | 2024-12-16 |
| 11907017 | 128 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11907018 | 128 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11907002 | 130 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11907031 | 130 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11907043 | 132 | 2024-12-09 @ 12:00 pm | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11907033 | 133 | 2024-12-09 @ 12:00 pm | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11907032 | 134 | 2024-12-09 @ 12:00 pm | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11907037 | 135 | 2024-12-09 @ 12:00 pm | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11907035 | 136 | 2024-12-09 @ 12:00 pm | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11903563 | 137 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | < 0.3 | 2024-12-16 |
| 11903574 | 138 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | < 0.3 | 2024-12-16 |
| 11907014 | 140 STAGE | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | 0.7 ± 0.3 | 2024-12-16 |
| 11907029 | 141 | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | < 0.3 | 2024-12-16 |
| 11907030 | 209 | 2024-12-09 @ 12:00 pm | 2024-12-12 @ 10:00 am | < 0.3 | 2024-12-16 |
| 11907016 | 212 | 2024-12-09 @ 12:00 pm | 2024-12-12 @ 10:00 am | 0.7 ± 0.3 | 2024-12-16 |

Radon test result report for:

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|----------|----------------|-----------------------|-----------------------|-----------|------------|
| 11907040 | 220 | 2024-12-09 @ 12:00 pm | 2024-12-12 @ 10:00 am | < 0.3 | 2024-12-16 |
| 11907015 | 220 | 2024-12-09 @ 12:00 pm | 2024-12-12 @ 10:00 am | < 0.3 | 2024-12-16 |
| 11907020 | APR | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | 0.7 ± 0.3 | 2024-12-16 |
| 11907046 | APR | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | 0.9 ± 0.3 | 2024-12-16 |
| 11903594 | ASST PRINCIPAL | 2024-12-09 @ 10:00 am | 2024-12-12 @ 9:00 am | 1.1 ± 0.4 | 2024-12-16 |
| 11907048 | CONFERENCE | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | < 0.3 | 2024-12-16 |
| 11907001 | CONFERENCE | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | < 0.3 | 2024-12-16 |
| 11903595 | HEALTH | 2024-12-09 @ 10:00 am | 2024-12-12 @ 9:00 am | 0.9 ± 0.3 | 2024-12-16 |
| 11903586 | HEALTH OFFICE | 2024-12-09 @ 10:00 am | 2024-12-12 @ 9:00 am | 1.0 ± 0.4 | 2024-12-16 |
| 11903577 | IMC | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11903573 | IMC OFFICE | 2024-12-09 @ 11:00 am | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11903596 | MAIN | 2024-12-09 @ 10:00 am | 2024-12-12 @ 9:00 am | 1.0 ± 0.3 | 2024-12-16 |
| 11907047 | PRINCIPAL | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | < 0.3 | 2024-12-16 |
| 11907036 | TELEPHONE | 2024-12-09 @ 12:00 pm | 2024-12-12 @ 9:00 am | < 0.3 | 2024-12-16 |
| 11907051 | WORKROOM | 2024-12-09 @ 11:00 am | 2024-12-12 @ 10:00 am | < 0.3 | 2024-12-16 |

December 16, 2024

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

**OFFICE
MAIN**

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|-----------------------|-----------------------|--------------|-----------------|
| 11477899 | O | 2024-12-09 @ 10:00 am | 2024-12-12 @ 11:00 am | < 0.3 | 2024-12-16 |
| 11907194 | O | 2024-12-10 @ 10:00 am | 2024-12-13 @ 11:00 am | < 0.3 | 2024-12-16 |

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

December 16, 2024

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

**TRAVEL
MAIN**

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|-----------------------|-----------------------|--------------|-----------------|
| 11482789 | T | 2024-12-09 @ 10:00 am | 2024-12-12 @ 11:00 am | < 0.3 | 2024-12-16 |
| 11907193 | T | 2024-12-10 @ 10:00 am | 2024-12-13 @ 11:00 am | < 0.3 | 2024-12-16 |

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 20001560

NOMINAL Conditions: Radon Conc 50.6 pCi/L Rel. Hum 50.6% Temp. 70.8 F

Date Start: 12/14/24 Date Stop: 12/17/24 Date Start: _____ Date Stop: _____

Time Start: 0815 Time Stop: 0815 Time Start: _____ Time Stop: _____

Device No.'s: (3) CHAR BAGS Device No.'s: _____

11477880, 11477883, 11477896

B4 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**

December 23, 2024

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

**SK
MAIN**

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|----------------------|----------------------|--------------|-----------------|
| 11477880 | SK1 | 2024-12-14 @ 8:00 am | 2024-12-17 @ 8:00 am | 52.0 ± 4.2 | 2024-12-23 |
| 11477883 | SK2 | 2024-12-14 @ 8:00 am | 2024-12-17 @ 8:00 am | 54.6 ± 4.4 | 2024-12-23 |
| 11477896 | SK3 | 2024-12-14 @ 8:00 am | 2024-12-17 @ 8:00 am | 45.5 ± 3.6 | 2024-12-23 |

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 – Testing December 9th – December 12th, 2024

Name of Schools:

1. Georgian Forest ES
2. Glen Haven ES
3. Glenallen ES
4. Greencastle ES
5. Highland ES

| | Date | Initials |
|----------------------------------|------------|----------|
| Radon Test Kits Deployed | 12/09/2024 | BMM |
| Radon Test Kits Collected | 12/12/2024 | BMM |
| Radon Test Kits Shipped to Lab* | 12/12/2024 | BMM |
| Radon Test Kits Received by Lab* | 12/16/2024 | BMM |

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



MCPS RADON TESTING – EXECUTIVE SUMMARY

| | |
|--------------------------|---|
| Site Name | Greencastle Elementary School |
| Date of Test Report | 05/27/2022 |
| Round of Testing | Initial <u>Follow-up</u> 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 | <0.3 pCi/L |

Project Status

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



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: Greencastle Elementary School
13611 Robey Rd.
Silver Spring, MD 20904

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 Greencastle Elementary School, located at 13611 Robey Rd. Silver Spring, MD 20904 (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 29, 2022 and deployed four (4) 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. ≥ 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 April 01, 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 | | |
|--------------------------------------|-------------|--------|
| Greencastle ES RT | | |
| Test Period: 03/29/2022 - 04/01/2022 | | |
| | | |
| Kit Number | Room / Area | Result |
| 11139874 | STAGE | < 0.3 |
| 11139875 | STAGE | < 0.3 |
| 11139877 | STAGE | < 0.3 |
| 11139878 | STAGE | < 0.3 |

| Table 2- Radon Testing Results | | | |
|--------------------------------------|---------|--------------|--------|
| Greencastle ES RT | | | |
| Test Period: 03/29/2022 - 04/01/2022 | | | |
| | | | |
| Kit Number | QC Type | Room / Area | Result |
| 11139874 | D | Stage | < 0.3 |
| 11139878 | FB | Stage | < 0.3 |
| 11139883 | OB | OFFICE BLANK | < 0.3 |
| 11139841 | TB | TRAVEL BLANK | < 0.3 |

ATTACHMENT C

Laboratory Analytical Results

April 4, 2022

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:
GREENCASTLE ES
MAIN

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|-----------------------|-----------------------|--------------|-----------------|
| 11139874 | STAGE | 2022-03-29 @ 11:00 am | 2022-04-01 @ 11:00 am | < 0.3 | 2022-04-04 |
| 11139875 | STAGE | 2022-03-29 @ 11:00 am | 2022-04-01 @ 11:00 am | < 0.3 | 2022-04-04 |
| 11139877 | STAGE | 2022-03-29 @ 11:00 am | 2022-04-01 @ 11:00 am | < 0.3 | 2022-04-04 |
| 11139878 | STAGE | 2022-03-29 @ 11:00 am | 2022-04-01 @ 11:00 am | < 0.3 | 2022-04-04 |

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 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 – Retesting

Name of Schools:

1. Watkins Mill HS
2. Cresthaven ES
3. East Silver Spring ES
4. Fairland Center
5. Francis Scott Key MS
6. Greencastle ES
7. Roscoe Nix ES
8. West Farm Transportation Depot
9. Wheaton HS
10. White Oak MS
11. William Tyler Page ES
12. Bel Pre ES
13. Fairland ES
14. Highland ES
15. Rolling Terrace ES
16. Takoma Park MS
17. Viers Mill ES
18. Poolesville ES

| | Date | Initials |
|----------------------------------|------------|----------|
| Radon Test Kits Deployed | 03/29/2022 | BMM |
| Radon Test Kits Collected | 04/01/2022 | 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 | Greencastle 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 | 50 |
| # Rooms ≥ 4.0 pCi/L | 0 |
| Lowest Value | <0.3 pCi/L |
| Highest Value | 1.9 pCi/L |

Project Status:

Initial testing completed; Missing or compromised samples need re-sampling



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: Greencastle Elementary School
13611 Robey Rd.
Silver Spring, MD 20904

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 Greencastle Elementary School, located at 13611 Robey Rd. Silver Spring, MD 20904 (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 fifty-seven (57) 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 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 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 | | |
|--------------------------------------|-------------|--------|
| Greencastle ES | | |
| Test Period: 03/07/2022 - 03/10/2022 | | |
| Kit Number | Room / Area | Result |
| 11133940 | 102 | < 0.3 |
| 11133962 | 103 | 1.0 |
| 11133948 | 104 | 1.0 |
| 11133947 | 105 | 0.8 |
| 11133970 | 106 | < 0.3 |
| 11133956 | 107 | 0.5 |
| 11130578 | 112 | < 0.3 |
| 11130586 | 113 | < 0.3 |
| 11130593 | 114 | < 0.3 |
| 11130577 | 115 | < 0.3 |
| 11130597 | 116 | 0.6 |
| 11130599 | 116 | 0.7 |
| 11130598 | 117 | 1.9 |
| 11130573 | 118 | < 0.3 |
| 11130574 | 118 | < 0.3 |
| 11130596 | 119 | 0.7 |
| 11130595 | 120 | < 0.3 |
| 11130587 | 121 | < 0.3 |
| 11130585 | 122 | < 0.3 |
| 11130584 | 128 | < 0.3 |
| 11130589 | 128 | < 0.3 |
| 11130594 | 130 | < 0.3 |
| 11130600 | 130 | < 0.3 |
| 11133965 | 132 | < 0.3 |
| 11133954 | 133 | < 0.3 |
| 11133959 | 134 | < 0.3 |
| 11133957 | 135 | < 0.3 |
| 11133960 | 136 | < 0.3 |
| 11130582 | 137 | < 0.3 |
| 11130575 | 138 | < 0.3 |
| 11130581 | 140 | < 0.3 |
| 11133963 | 208 | < 0.3 |
| 11133955 | 220 | < 0.3 |
| 11133964 | 220 | < 0.3 |
| 11133961 | 229 | < 0.3 |
| 11130538 | 100B | 0.7 |
| 11130545 | 100C | < 0.3 |
| 11130537 | 100D | < 0.3 |
| 11130547 | 100E | < 0.3 |
| 11130554 | 100H | < 0.3 |
| 11130561 | 100I | 0.6 |
| 11130562 | 100I | 0.7 |

| Table 1- Radon Testing Results | | |
|--------------------------------------|------------------|--------|
| Greencastle ES | | |
| Test Period: 03/07/2022 - 03/10/2022 | | |
| Kit Number | Room / Area | Result |
| 11130546 | 100J | < 0.3 |
| 11130583 | 109 MULTIPURPOSE | < 0.3 |
| 11130588 | 109 MULTIPURPOSE | < 0.3 |
| 11133953 | 130 TELEPHONE | < 0.3 |
| 11130576 | 141 BS | < 0.3 |
| 11130569 | 144 MEDIA | < 0.3 |
| 11130571 | 144 MEDIA | < 0.3 |
| 11130572 | 144 MEDIA | < 0.3 |
| 11130591 | GYM | < 0.3 |
| 11130592 | GYM | < 0.3 |
| 11130590 | GYM OFFICE | < 0.3 |
| 11130564 | HEALTH OFFICE | < 0.3 |
| 11130579 | KITCHEN OFFICE | < 0.3 |
| 11130552 | MAIN OFFICE | < 0.3 |
| 11130570 | MEDIA OFFICE | < 0.3 |

| Table 2- Radon Testing Results | | | |
|--------------------------------------|---------|--------------|--------|
| Greencastle ES | | | |
| Test Period: 03/07/2022 - 03/10/2022 | | | |
| Kit Number | QC Type | Room / Area | Result |
| 11130561 | D | 100I | 0.6 |
| 11130574 | D | 118 | < 0.3 |
| 11130572 | FB | 144 Media | < 0.3 |
| 11130597 | D | 116 | 0.6 |
| 11130584 | D | 128 | < 0.3 |
| 11130594 | FB | 130 | < 0.3 |
| 11133955 | D | 220 | < 0.3 |
| 11131662 | OB | OFFICE BLANK | < 0.3 |
| 11131691 | TB | TRAVEL BLANK | < 0.3 |

ATTACHMENT C

Laboratory Analytical Results

Radon test result report for:**GREENCASTLE ES**

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|----------|------------------|-----------------------|-----------------------|-----------|------------|
| 11130538 | 100B | 2022-03-07 @ 10:00 am | 2022-03-10 @ 9:00 am | 0.7 ± 0.3 | 2022-03-14 |
| 11130545 | 100C | 2022-03-07 @ 10:00 am | 2022-03-10 @ 9:00 am | < 0.3 | 2022-03-14 |
| 11130537 | 100D | 2022-03-07 @ 10:00 am | 2022-03-10 @ 9:00 am | < 0.3 | 2022-03-14 |
| 11130547 | 100E | 2022-03-07 @ 10:00 am | 2022-03-10 @ 9:00 am | < 0.3 | 2022-03-14 |
| 11130554 | 100H | 2022-03-07 @ 10:00 am | 2022-03-10 @ 9:00 am | < 0.3 | 2022-03-14 |
| 11130561 | 100I | 2022-03-07 @ 10:00 am | 2022-03-10 @ 9:00 am | 0.6 ± 0.3 | 2022-03-14 |
| 11130562 | 100I | 2022-03-07 @ 10:00 am | 2022-03-10 @ 9:00 am | 0.7 ± 0.3 | 2022-03-14 |
| 11130546 | 100J | 2022-03-07 @ 10:00 am | 2022-03-10 @ 9:00 am | < 0.3 | 2022-03-14 |
| 11130588 | 109 MULTIPURPOSE | 2022-03-07 @ 10:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130583 | 109 MULTIPURPOSE | 2022-03-07 @ 10:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130578 | 112 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 9:00 am | < 0.3 | 2022-03-14 |
| 11130586 | 113 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 9:00 am | < 0.3 | 2022-03-14 |
| 11130593 | 114 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 9:00 am | < 0.3 | 2022-03-14 |
| 11130577 | 115 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 9:00 am | < 0.3 | 2022-03-14 |
| 11130599 | 116 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | 0.7 ± 0.3 | 2022-03-14 |
| 11130597 | 116 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | 0.6 ± 0.3 | 2022-03-14 |
| 11130598 | 117 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | 1.9 ± 0.3 | 2022-03-14 |
| 11130574 | 118 | 2022-03-07 @ 10:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130573 | 118 | 2022-03-07 @ 10:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130596 | 119 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | 0.7 ± 0.3 | 2022-03-14 |
| 11130595 | 120 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130587 | 121 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130585 | 122 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130589 | 128 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130584 | 128 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130594 | 130 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130600 | 130 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130582 | 137 | 2022-03-07 @ 10:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130575 | 138 | 2022-03-07 @ 10:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130581 | 140 | 2022-03-07 @ 10:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130576 | 141 BS | 2022-03-07 @ 10:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130572 | 144 MEDIA | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130571 | 144 MEDIA | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130569 | 144 MEDIA | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130592 | GYM | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130591 | GYM | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130590 | GYM OFFICE | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |

March 15, 2022

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

GREENCASTLE ES

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|-----------------------|-----------------------|--------------|-----------------|
| 11130564 | HEALTH OFFICE | 2022-03-07 @ 10:00 am | 2022-03-10 @ 9:00 am | < 0.3 | 2022-03-14 |
| 11130579 | KITCHEN OFFICE | 2022-03-07 @ 10:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11130552 | MAIN OFFICE | 2022-03-07 @ 10:00 am | 2022-03-10 @ 9:00 am | < 0.3 | 2022-03-14 |
| 11130570 | MEDIA OFFICE | 2022-03-07 @ 11:00 am | 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

March 15, 2022

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|-----------------------|-----------------------|--------------|-----------------|
| 11133940 | 102 | 2022-03-07 @ 12:00 pm | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11133962 | 103 | 2022-03-07 @ 12:00 pm | 2022-03-10 @ 10:00 am | 1.0 ± 0.3 | 2022-03-14 |
| 11133948 | 104 | 2022-03-07 @ 12:00 pm | 2022-03-10 @ 10:00 am | 1.0 ± 0.3 | 2022-03-14 |
| 11133947 | 105 | 2022-03-07 @ 12:00 pm | 2022-03-10 @ 10:00 am | 0.8 ± 0.3 | 2022-03-14 |
| 11133970 | 106 | 2022-03-07 @ 12:00 pm | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11133956 | 107 | 2022-03-07 @ 12:00 pm | 2022-03-10 @ 10:00 am | 0.5 ± 0.3 | 2022-03-14 |
| 11133953 | 130 TELEPHONE | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11133965 | 132 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11133954 | 133 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11133959 | 134 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11133957 | 135 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11133960 | 136 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11133963 | 208 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11133955 | 220 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11133964 | 220 | 2022-03-07 @ 11:00 am | 2022-03-10 @ 10:00 am | < 0.3 | 2022-03-14 |
| 11133961 | 229 | 2022-03-07 @ 11:00 am | 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 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 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



MONTGOMERY COUNTY PUBLIC SCHOOLS RADON TESTING

Executive Summary:
Greencastle Elementary School
13611 Robey Road,
Silver Spring, MD 20904

| | |
|------------------------------|---|
| Date of Test Report: | 3/15/2019 |
| Round of Testing: | Initial Follow-up Post Remediation 2 Year Testing 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility |
| # of Rooms Tested: | 2 |
| # of Rooms \geq 4.0 pCi/L: | 0 |
| Low Value: | <0.4 |
| High Value: | <0.4 |

Project Status

Retesting completed: No further action at this time.



March 15, 2019

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

Re: Radon Testing Services

Location: Greencastle Elementary School
13611 Robey Road,
Silver Spring, MD 20904

Dear Mr. Cox:

Intertek-PSI (PSI) is pleased to submit the following report to the Montgomery County Public Schools (MCPS) for completion of a "short-term" 3-day radon test for Greencastle Elementary School, located at 13611 Robey Road, Silver Spring, MD 20904 (subject site).

Scope of Services:

PSI 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. PSI 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 #14SS007) 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.

PSI visited the site on February 26, 2019 and deployed two (2) activated charcoal (AC) radon test kit. PSI deployed radon test kits in frequently-occupied ground contact rooms, and other areas, (if applicable) in accordance with AARST guidance. PSI returned to the site on March 01, 2019 to retrieve the radon sampling test kit. A floor plan map of the building with the test location is included as Attachment A of this report.

PSI shipped all radon tests via overnight delivery to AccuStar Labs for analysis by gamma-ray spectroscopy. Accustar Labs is a NRSB certified analytical laboratory for radon analysis located at 929 Mount Zion Road, Lebanon, Pennsylvania (certification # ARLO007).

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 $\leq 65^{\circ}\text{F}$.

PSI 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.



PSI also conducted observations of field conditions which could affect the results of the test and compiled weather data for the testing period. PSI 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 | NA |
| ≤ 4.0 pCi/L | See Attachment B | |

Notes:
D -Duplicate Sample

The office blank and lab transit blanks had test results of less than the laboratory detection limit of 0.4 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 (703) 698-9300.

ATTACHMENT B

Radon Test Summary Spreadsheet

| Radon Testing Results | | |
|--|--------------------|-----------------------|
| Greencastle Elementary School | | |
| Testing period: 2/26/19 - 3/01/19 | | |
| Kit Number | Room / Area | Result (pCi/L) |
| 3923478 | Computer room | <0.4 |
| 3923480 | Instrumental Music | <0.4 |

Table Notes:

D – Duplicate

FB – Field Blank

OB – Office Blank

TB – Transit Blank

QC – Quality Control

ATTACHMENT C

Laboratory Analytical Results

NRPP 105011 AL
NRSB ARL0007

EPA Method #402-R-92-004
Charcoal Canister
NRPP Device Code 6048
NRSB Device Code 10317

Laboratory Report for:

Property Tested: Project # 04481387-1

Intertek-PSI (VA)
2930 Eskridge Road
Fairfax VA 22031

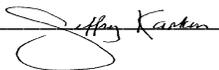
MCPS Radon Survey Greencastle ES
13611 Robey Rd
Silver Spring MD 20904

| Log Number | Device Number | Test Exposure Duration: | Area Tested | Result pCi/L |
|------------|---------------|---------------------------------------|---------------------------------------|--------------|
| 3220627 | 3923478 | 02/26/2019 7:23 am 03/01/2019 6:38 am | First Floor Computer Room/Comm Center | < 0.4 |
| 3220628 | 3923480 | 02/26/2019 7:25 am 03/01/2019 6:39 am | First Floor Instrumental Music Room | < 0.4 |

Comment: A copy of this report was e-mailed to Intertek-PSI (VA)

Distributed by: Intertek-PSI (VA)

Date Received: 03/04/2019 Date Logged: 03/04/2019 Date Analyzed: 03/05/2019 Date Reported: 03/05/2019

Report Reviewed By: 

Report Approved By: 

Disclaimer:

The uncertainty of this radon measurement is +/- 10 %. Factors contributing to uncertainty include statistical variations, daily and seasonal variations in radon concentrations, sample collection techniques and operation of the dwelling. Interference with test conditions may influence the test results.

Shawn Price, Director of Laboratory Operations, AccuStar Labs

This report may only be transferred to a third party in its entirety. Analytical results relate to the samples AS RECEIVED BY THE LABORATORY. Results shown on this report represent levels of radon gas measured between the dates shown in the room or area of the site identified above as "Property Tested". Incorrect information will affect results. The results may not be construed as either predictive or supportive of measurements conducted in any area of this structure at any other time. AccuStar Labs, its employees and agents are not responsible for the consequences of any action taken or not taken based upon the results reported or any verbal or written interpretation of the results.



MONTGOMERY COUNTY PUBLIC SCHOOLS RADON TESTING

Executive Summary:
Greencastle Elementary School
13611 Robey Road,
Silver Spring, MD 20904

| | |
|------------------------------|---|
| Date of Test Report: | 2/13/2019 |
| Round of Testing: | Initial Follow-up Post Remediation 2 Year Testing 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility |
| # of Rooms Tested: | 40 |
| # of Rooms \geq 4.0 pCi/L: | 0 |
| Low Value: | <0.4 |
| High Value: | 0.4 |

Project Status

Initial testing complete: Missing or compromised samples need re-test.



February 13, 2019

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

Re: Radon Testing Services

Location: Greencastle Elementary School
13611 Robey Road,
Silver Spring, MD 20904

Dear Mr. Cox:

Intertek-PSI (PSI) is pleased to submit the following report to the Montgomery County Public Schools (MCPS) for completion of a "short-term" 3-day radon test for Greencastle Elementary School, located at 13611 Robey Road, Silver Spring, MD 20904 (subject site).

Scope of Services:

PSI 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. PSI 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 #14SS007) 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.

PSI visited the site on November 27, 2018 and deployed fifty-two (52) activated charcoal (AC) radon test kits. PSI deployed radon test kits in frequently-occupied ground contact rooms, and other areas, (if applicable) in accordance with AARST guidance. PSI returned to the site on November 30, 2018 to retrieve the radon sampling test kits. A floor plan map of the building with the test locations is included as Attachment A of this report.

As a quality control measure, PSI included duplicate samples, field blanks, lab transit blanks, and office blanks in accordance with AARST recommendations. In addition, PSI submitted ten (10) test kits to Bowser-Morner Inc. as spike samples. The spiked tests were exposed to a known radon concentration by Bowser-Morner Inc. prior to being returned to the laboratory for analysis.

PSI shipped all radon tests via overnight delivery to AccuStar Labs for analysis by gamma-ray spectroscopy. Accustar Labs is a NRSB certified analytical laboratory for radon analysis located at 929 Mount Zion Road, Lebanon, Pennsylvania (certification # ARL0007) and 2 Saber Way, Haverhill, Massachusetts (certification # ARL0017).



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 $\leq 65^{\circ}\text{F}$.

PSI 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.

PSI also conducted observations of field conditions which could affect the results of the test and compiled weather data for the testing period. PSI 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 | NA |
| ≤ 4.0 pCi/L | See Attachment B | |

Notes:
D -Duplicate Sample

The office blank and lab transit blanks had test results of less than the laboratory detection limit of 0.4 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 (703) 698-9300.



Respectfully Submitted,

INTERTEK-PSI

A handwritten signature in black ink that reads "Nand Kaushik". The signature is written in a cursive style.

Nand Kaushik, P.E.
Department Manager, Environmental Services
Nand.Kaushik@intertek.com

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

ATTACHMENT B

Radon Test Summary Spreadsheet

| Radon Testing Results | | |
|--|--------------------------------|-----------------------|
| Greencastle Elementary School | | |
| Testing period: 11/27/18 - 11/30/18 | | |
| Kit Number | Room / Area | Result (pCi/L) |
| 3919738 | 1 (GK #1) | <0.4 |
| 3919731 | 11 (Material Prep) | <0.4 |
| 3917811 | 14 (Health Office) | <0.4 |
| 3917327 | 18 | <0.4 |
| 3917329 | 21 | <0.4 |
| 3917330 | 22 | <0.4 |
| 3917328 | 26 | <0.4 |
| 3919736 | APR | <0.4 |
| 3919735 | Art | <0.4 |
| 3917998 | Assistant Principal | <0.4 |
| 3919728 | Building Services | <0.4 |
| 3919721 | Cafeteria MPR | 0.4 |
| 3919725 | Cafeteria MPR | <0.4 |
| -- | Computer Lab (MISSED) | -- |
| 3917814 | Conference | <0.4 |
| 3919727 | Counselor | <0.4 |
| 3919739 | CR2 | <0.4 |
| 3919732 | CR4 | <0.4 |
| 3919733 | CR5 | <0.4 |
| 3919797 | CR6 | <0.4 |
| 3919793 | CR7 | <0.4 |
| 3919792 | CR8 | <0.4 |
| 3917816 | CR9 | <0.4 |
| 3917996 | CR10 | <0.4 |
| 3919795 | Gym | <0.4 |
| 3919800 | Gym | <0.4 |
| 3919799 | Gym Office | <0.4 |
| 3917993 | Health | 0.4 |
| -- | Instrumental Music (MISSED) | -- |
| 3919724 | K1 | <0.4 |
| 3919726 | K2 | <0.4 |
| 3917994 | K3 | 0.4 |
| 3919722 | K4 | <0.4 |
| 3919729 | Kitchen | <0.4 |
| 3918000 | Main | <0.4 |
| 3917995 | Math | <0.4 |
| 3919740 | Media | <0.4 |
| 3919737 | Media | <0.4 |
| 3919734 | Media Office | <0.4 |
| 3917813 | Music | <0.4 |
| 3917815 | Principal | <0.4 |
| 3919798 | Staff Dining (DR Staff Office) | <0.4 |
| 3917817 | Staff Lounge | <0.4 |

| Radon Testing Results | | |
|--|---------------------------------|-----------------------|
| Greencastle Elementary School | | |
| Testing period: 11/27/18 - 11/30/18 | | |
| Kit Number | Room / Area | Result (pCi/L) |
| 3917997 | Staff Workroom | <0.4 |
| 3917812 | Volunteer Room (Linkage Office) | <0.4 |

| Radon Testing Results | | |
|--|----------------|-----------------------|
| Greencastle Elementary School | | |
| Testing period: 11/27/18 - 11/30/18 | | |
| Kit Number | QC Type | Result (pCi/L) |
| 3917999 | Main (D) | <0.4 |
| 3917820 | Music (D) | <0.4 |
| 3919794 | Gym Office (D) | <0.4 |
| 3919796 | CR6 (D) | <0.4 |
| 3919723 | K4 (D) | <0.4 |
| 3917245 | Field Blank | <0.4 |
| 3917439 | Field Blank | <0.4 |
| 3915541 | Office Blank | <0.4 |
| 3917440 | Transit Blank | <0.4 |

Table Notes:

D – Duplicate

FB – Field Blank

OB – Office Blank

TB – Transit Blank

QC – Quality Control

ATTACHMENT C

Laboratory Analytical Results

NELAC NY 11769
NRPP 103216 AL
NRSB ARL0017

EPA Method #402-R-92-004
Charcoal Canister
NRPP Device Code 6048
NRSB Device Code 10317

Laboratory Report for:

Property Tested: Project # 04481387-1

Intertek-PSI (VA)
2930 Eskridge Road
Fairfax VA 22031

MCPS Radon Survey
Greencastle ES
Silver Spring MD 20904

| Log Number | Device Number | Test Exposure | Duration: | Area Tested | Result pCi/L |
|------------|---------------|--------------------|---------------------|--|--------------|
| 2401286 | 3918000 | 11/27/2018 2:14 pm | 11/30/2018 10:10 am | Bldg Greencastle ES Floor First Room Main | < 0.4 |
| 2401287 | 3917999 | 11/27/2018 2:14 pm | 11/30/2018 10:10 am | Bldg Greencastle ES Flr First Rm Main Duplicate | < 0.4 |
| 2401288 | 3917997 | 11/27/2018 2:18 pm | 11/30/2018 10:11 am | Bldg Greencastle ES Floor First Room Staff WR | < 0.4 |
| 2401289 | 3917993 | 11/27/2018 2:20 pm | 11/30/2018 10:12 am | Bldg Greencastle ES Floor First Room HR | 0.4 |
| 2401290 | 3917811 | 11/27/2018 2:22 pm | 11/30/2018 10:13 am | Bldg Greencastle ES Flr First Rm Nurse's Off | < 0.4 |
| 2401291 | 3917998 | 11/27/2018 2:24 pm | 11/30/2018 10:14 am | Bldg Greencastle ES Flr First Rm Asst Principal | < 0.4 |
| 2401292 | 3917812 | 11/27/2018 2:26 pm | 11/30/2018 10:15 am | Bldg Greencastle ES Flr First Rm Linkage Off | < 0.4 |
| 2401293 | 3917814 | 11/27/2018 2:27 pm | 11/30/2018 10:17 am | Bldg Greencastle ES Floor First Room Conf Roo | < 0.4 |
| 2401294 | 3917815 | 11/27/2018 2:28 pm | 11/30/2018 10:19 am | Bldg Greencastle ES Flr First Rm Principal off | < 0.4 |
| 2401295 | 3917813 | 11/27/2018 2:30 pm | 11/30/2018 10:20 am | Bldg Greencastle ES Floor First Room Music | < 0.4 |
| 2401296 | 3917820 | 11/27/2018 2:30 pm | 11/30/2018 10:20 am | Bldg Greencastle ES Flr First Rm Music Duplicate | < 0.4 |

Comment: Updated 1/29/2018 A copy of this report was emailed to Intertek-PSI (VA).

Distributed by: Intertek-PSI (VA)

Date Received: 12/03/2018 Date Logged: 12/03/2018 Date Analyzed: 12/03/2018 Date Reported: 01/29/2019

Report Reviewed By: 

Report Approved By: 

Disclaimer:

The uncertainty of this radon measurement is ~+/- 10 %. Factors contributing to uncertainty include statistical variations, daily and seasonal variations in radon concentrations, sample collection techniques and operation of the dwelling. Interference with test conditions may influence the test results.

Shawn Price, Director of Laboratory Operations, AccuStar Labs

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NELAC NY 11769
NRPP 103216 AL
NRSB ARL0017

EPA Method #402-R-92-004
Charcoal Canister
NRPP Device Code 6048
NRSB Device Code 10317

Laboratory Report for:

Property Tested: Project # 04481387-1

Intertek-PSI (VA)
2930 Eskridge Road
Fairfax VA 22031

MCPS Radon Survey
Greencastle ES
Silver Spring MD 20904

| Log Number | Device Number | Test Exposure Duration: | Area Tested | Result pCi/L |
|------------|---------------|--|--|--------------|
| 2401297 | 3919736 | 11/27/2018 2:32 pm 11/30/2018 10:21 am | Bldg Greencastle ES Floor First Room APR | < 0.4 |
| 2401298 | 3919731 | 11/27/2018 2:34 pm 11/30/2018 10:21 am | Bldg Greencastle ES Flr First Rm Material Prep | < 0.4 |
| 2401299 | 3919735 | 11/27/2018 2:36 pm 11/30/2018 10:22 am | Bldg Greencastle ES Floor First Room Art | < 0.4 |
| 2401300 | 3919738 | 11/27/2018 2:37 pm 11/30/2018 10:22 am | Bldg Greencastle ES Floor First Room GK1 | < 0.4 |
| 2401301 | 3919740 | 11/27/2018 2:38 pm 11/30/2018 10:23 am | Bldg Greencastle ES Floor First Room Media | < 0.4 |
| 2401302 | 3919737 | 11/27/2018 2:40 pm 11/30/2018 10:24 am | Bldg Greencastle ES Floor First Room Media | < 0.4 |
| 2401303 | 3919734 | 11/27/2018 2:45 pm 11/30/2018 10:25 am | Bldg Greencastle ES Floor First Room Media Off | < 0.4 |
| 2401304 | 3919739 | 11/27/2018 2:46 pm 11/30/2018 10:25 am | Bldg Greencastle ES Floor First Room CR2 | < 0.4 |
| 2401305 | 3919732 | 11/27/2018 2:50 pm 11/30/2018 10:26 am | Bldg Greencastle ES Floor First Room CR4 | < 0.4 |
| 2401306 | 3919733 | 11/27/2018 2:57 pm 11/30/2018 10:27 am | Bldg Greencastle ES Floor First Room CR5 | < 0.4 |
| 2401307 | 3919800 | 11/27/2018 3:00 pm 11/30/2018 10:29 am | Bldg Greencastle ES Floor First Room Gym | < 0.4 |

Comment: Updated 1/29/2018 A copy of this report was emailed to Intertek-PSI (VA).

Distributed by: Intertek-PSI (VA)

Date Received: 12/03/2018 Date Logged: 12/03/2018 Date Analyzed: 12/03/2018 Date Reported: 01/29/2019

Report Reviewed By: 

Report Approved By: 

Shawn Price, Director of Laboratory Operations, AccuStar Labs

Disclaimer:

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NELAC NY 11769
NRPP 103216 AL
NRSB ARL0017

EPA Method #402-R-92-004
Charcoal Canister
NRPP Device Code 6048
NRSB Device Code 10317

Laboratory Report for:

Property Tested: Project # 04481387-1

Intertek-PSI (VA)
2930 Eskridge Road
Fairfax VA 22031

MCPS Radon Survey
Greencastle ES
Silver Spring MD 20904

| Log Number | Device Number | Test Exposure | Duration: | Area Tested | Result pCi/L |
|------------|---------------|--------------------|---------------------|---|--------------|
| 2401308 | 3919799 | 11/27/2018 3:04 pm | 11/30/2018 10:30 am | Bldg Greencastle ES Floor First Room Gym Off | < 0.4 |
| 2401309 | 3919794 | 11/27/2018 3:04 pm | 11/30/2018 10:30 am | Bldg Greencastle ES Flr First Rm Gym Off Duplic | < 0.4 |
| 2401310 | 3919798 | 11/27/2018 3:09 pm | 11/30/2018 10:31 am | Bldg Greencastle ES Flr First Rm DR Staff Off | < 0.4 |
| 2401311 | 3919797 | 11/27/2018 3:10 pm | 11/30/2018 10:32 am | Bldg Greencastle ES Floor First Room CR6 | < 0.4 |
| 2401312 | 3919796 | 11/27/2018 3:10 pm | 11/30/2018 10:32 am | Bldg Greencastle ES Flr First Rm CR6 Duplicate | < 0.4 |
| 2401313 | 3919793 | 11/27/2018 3:12 pm | 11/30/2018 10:33 am | Bldg Greencastle ES Floor First Room CR7 | < 0.4 |
| 2401314 | 3919792 | 11/27/2018 3:15 pm | 11/30/2018 10:34 am | Bldg Greencastle ES Floor First Room CR8 | < 0.4 |
| 2401315 | 3917816 | 11/27/2018 3:16 pm | 11/30/2018 10:34 am | Bldg Greencastle ES Floor First Room CR9 | < 0.4 |
| 2401316 | 3917996 | 11/27/2018 3:20 pm | 11/30/2018 10:35 am | Bldg Greencastle ES Floor First Room CR10 | < 0.4 |
| 2401317 | 3917817 | 11/27/2018 3:24 pm | 11/30/2018 10:35 am | Bldg Greencastle ES Flr First Rm Staff Lounge | < 0.4 |
| 2401318 | 3917995 | 11/27/2018 3:26 pm | 11/30/2018 10:36 am | Bldg Greencastle ES Floor First Room Math | < 0.4 |

Comment: Updated 1/29/2018 A copy of this report was emailed to Intertek-PSI (VA).

Distributed by: Intertek-PSI (VA)

Date Received: 12/03/2018 Date Logged: 12/03/2018 Date Analyzed: 12/03/2018 Date Reported: 01/29/2019

Report Reviewed By: 

Report Approved By: 

Shawn Price, Director of Laboratory Operations, AccuStar Labs

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NELAC NY 11769
NRPP 103216 AL
NRSB ARL0017

EPA Method #402-R-92-004
Charcoal Canister
NRPP Device Code 6048
NRSB Device Code 10317

Laboratory Report for:

Property Tested: Project # 04481387-1

Intertek-PSI (VA)
2930 Eskridge Road
Fairfax VA 22031

MCPS Radon Survey
Greencastle ES
Silver Spring MD 20904

| Log Number | Device Number | Test Exposure | Duration: | Area Tested | Result pCi/L |
|------------|---------------|--------------------|---------------------|--|--------------|
| 2401319 | 3919727 | 11/27/2018 3:28 pm | 11/30/2018 10:36 am | Bldg Greencastle ES Floor First Room Counselor | < 0.4 |
| 2401320 | 3919728 | 11/27/2018 3:30 pm | 11/30/2018 10:37 am | Bldg Greencastle ES Floor First Room Bldg Svcs | < 0.4 |
| 2401321 | 3919729 | 11/27/2018 3:32 pm | 11/30/2018 10:37 am | Bldg Greencastle ES Floor First Room Kitchen | < 0.4 |
| 2401322 | 3919725 | 11/27/2018 3:34 pm | 11/30/2018 10:38 am | Bldg Greencastle ES Floor First Room Café MPR | < 0.4 |
| 2401323 | 3919721 | 11/27/2018 3:38 pm | 11/30/2018 10:38 am | Bldg Greencastle ES Floor First Room Café MPR | 0.4 |
| 2401324 | 3919724 | 11/27/2018 3:40 pm | 11/30/2018 10:38 am | Bldg Greencastle ES Floor First Room K1 | < 0.4 |
| 2401325 | 3919726 | 11/27/2018 3:44 pm | 11/30/2018 10:39 am | Bldg Greencastle ES Floor First Room K2 | < 0.4 |
| 2401326 | 3917994 | 11/27/2018 3:46 pm | 11/30/2018 10:39 am | Bldg Greencastle ES Floor First Room K3 | 0.4 |
| 2401327 | 3919722 | 11/27/2018 3:48 pm | 11/30/2018 10:40 am | Bldg Greencastle ES Floor First Room K4 | < 0.4 |
| 2401328 | 3919723 | 11/27/2018 3:48 pm | 11/30/2018 10:41 am | Bldg Greencastle ES Flr First Rm K4 Duplicate | < 0.4 |
| 2401329 | 3917330 | 11/27/2018 4:00 pm | 11/30/2018 10:42 am | Bldg Greencastle ES Floor Second Room 22 | < 0.4 |

Comment: Updated 1/29/2018 A copy of this report was emailed to Intertek-PSI (VA).

Distributed by: Intertek-PSI (VA)

Date Received: 12/03/2018 Date Logged: 12/03/2018 Date Analyzed: 12/03/2018 Date Reported: 01/29/2019

Report Reviewed By: 

Report Approved By: 

Shawn Price, Director of Laboratory Operations, AccuStar Labs

Disclaimer:

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NELAC NY 11769
NRPP 103216 AL
NRSB ARL0017

EPA Method #402-R-92-004
Charcoal Canister
NRPP Device Code 6048
NRSB Device Code 10317

Laboratory Report for:

Property Tested: Project # 04481387-1

Intertek-PSI (VA)
2930 Eskridge Road
Fairfax VA 22031

MCPS Radon Survey
Greencastle ES
Silver Spring MD 20904

| Log Number | Device Number | Test | Exposure | Duration: | Area Tested | Result pCi/L |
|------------|---------------|------------|----------|---------------------|--|--------------|
| 2401330 | 3917328 | 11/27/2018 | 4:02 pm | 11/30/2018 10:43 am | Bldg Greencastle ES Floor Second Room 26 | < 0.4 |
| 2401331 | 3917327 | 11/27/2018 | 4:04 pm | 11/30/2018 10:44 am | Bldg Greencastle ES Floor Second Room 18 | < 0.4 |
| 2401332 | 3917329 | 11/27/2018 | 4:06 pm | 11/30/2018 10:45 am | Bldg Greencastle ES Floor Second Room 21 | < 0.4 |
| 2401333 | 3917245 | 11/27/2018 | 2:14 pm | 11/30/2018 10:45 am | Bldg Greencastle ES Field Blank | < 0.4 |
| 2401334 | 3917439 | 11/27/2018 | 2:14 pm | 11/30/2018 10:45 am | Bldg Greencastle ES Field Blank | < 0.4 |
| 2401335 | 3915541 | 11/27/2018 | 2:14 pm | 11/30/2018 10:45 am | Bldg Greencastle ES Transit Blank | < 0.4 |
| 2401336 | 3917440 | 11/27/2018 | 6:00 am | 11/30/2018 6:00 pm | Bldg Greencastle ES Office Blank | < 0.4 |

Comment: Updated 1/29/2018 A copy of this report was emailed to Intertek-PSI (VA).

Distributed by: Intertek-PSI (VA)

Date Received: 12/03/2018 Date Logged: 12/03/2018 Date Analyzed: 12/03/2018 Date Reported: 01/29/2019

Report Reviewed By: 

Report Approved By: 

Disclaimer:

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NRPP 105011 AL
NRSB ARL0007
Ohio RL41

EPA Method #402-R-92-004
Charcoal Canister
NRPP Device Code 6048
NRSB Device Code 10317

Laboratory Report for:

Property Tested:

Intertek-PSI (VA)
2930 Eskridge Road
Fairfax VA 22031

MCPS Radon Survey
4514 Taylorsville Road
Dayton OH 45424

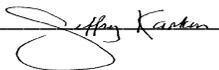
| Log Number | Device Number | Test Exposure Duration: | Area Tested | Result pCi/L |
|------------|---------------|---|-------------|--------------|
| 3204125 | 3926831 | 12/07/2018 9:47 am - 12/10/2018 9:47 am | Spike | 36.1 |
| 3204126 | 3926832 | 12/07/2018 9:47 am - 12/10/2018 9:47 am | Spike | 34.8 |
| 3204127 | 3926833 | 12/07/2018 9:47 am - 12/10/2018 9:47 am | Spike | 33.7 |
| 3204128 | 3926834 | 12/07/2018 9:47 am - 12/10/2018 9:47 am | Spike | 35.8 |
| 3204129 | 3926835 | 12/07/2018 9:47 am - 12/10/2018 9:47 am | Spike | 35.0 |
| 3204130 | 3926836 | 12/07/2018 9:47 am - 12/10/2018 9:47 am | Spike | 34.5 |
| 3204131 | 3926837 | 12/07/2018 9:47 am - 12/10/2018 9:47 am | Spike | 34.6 |
| 3204132 | 3926838 | 12/07/2018 9:47 am - 12/10/2018 9:47 am | Spike | 34.3 |
| 3204133 | 3926839 | 12/07/2018 9:47 am - 12/10/2018 9:47 am | Spike | 33.2 |
| 3204134 | 3926840 | 12/07/2018 9:47 am - 12/10/2018 9:47 am | Spike | 34.0 |

Comment: A copy of this report was e-mailed to Intertek-PSI (VA)

Test Performed By: Unknown

Distributed by: Intertek-PSI (VA)

Date Received: 12/12/2018 Date Logged: 12/12/2018 Date Analyzed: 12/12/2018 Date Reported: 12/13/2018

Report Reviewed By: 

Report Approved By: 

Disclaimer:

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Shawn Price, Director of Laboratory Operations, AccuStar Labs

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EXPOSURE IN BOWSER-MORNER RADON CHAMBER

CLIENT Intertek - PSI

Job Number 187732

NOMINAL Conditions: Radon Conc 32.6 pCi/L Rel. Hum 49.1 % Temp. 70.1 F

Date Start: 12/7/18 Date Stop: 12/10/18

Date Start: _____ Date Stop: _____

Time Start: 0947 Time Stop: 0947

Time Start: _____ Time Stop: _____

Device No.'s: (10) Char. Cans-

Device No.'s: _____

3926831 thru 3926840

G2 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 Survey 2018

Name of Schools:

1. Ashburton ES
2. Carderock Springs ES
3. Diamond ES
4. Fox Chapel ES
5. Baker MS
6. Damascus ES
7. Clemente MS
8. Clopper Mill ES
9. Broad Acres ES
10. Greencastle ES
11. Harmony Hills ES
12. Silver Spring International MS
13. Gaithersburg MS
14. Garrett Park ES
15. New Hampshire Estates ES
16. Georgian Forest ES

| | Date | Initials |
|----------------------------------|--|----------|
| Radon Test Kits Deployed | 11/27/2018 | NL |
| Radon Test Kits Sampled | 11/30/2018 | NL |
| Radon Test Kits Shipped to Lab* | 11/30/2018 | NL |
| Radon Test Kits Received by Lab* | 12/01/2018; 12/02/2018; 12/03/2018 | NL |

*All samples sent to AccuStar Laboratories, 929 Mount Zion Road, Lebanon, PA 17046 and 2 Saber Way, Haverhill, MA 01835

RADON SCREENING SURVEY – FOLLOW-UP GREENCASTLE ELEMENTARY SCHOOL

13611 Robey Rd., Silver Spring, Maryland 20904

EXECUTIVE SUMMARY

| | |
|--|--|
| Date of Test Report: | 3/9/18 |
| Round of Testing: | Initial Follow-up Post Remediation |
| # Rooms Tested | 9 |
| # Rooms \geq 4.0 pCi/L: | 1 |
| Low Value: | <0.3 |
| High Value: | 4.2 |
| Confirmed Rooms \geq 4.0 pCi/L US EPA Action Level | 1 |

Summary of Sampling Events \geq 4.0 pCi/L

| Room | Result (pCi/L) 1/31/18 | Result (pCi/L) 3/9/18 | Average Result (pCi/L) |
|--------------|---------------------------|--------------------------|---------------------------|
| Media Office | 4.5 | 4.2 | 4.4 |
| | | | |
| | | | |
| | | | |
| | | | |



MCPS RADON TESTING - EXECUTIVE SUMMARY

| | |
|--------------------------|---|
| Site Name | Greencastle Elementary School |
| Date of Report | March 9, 2018 |
| Round of Testing | Initial Follow-up Post Remediation 2 year testing 5 year testing HVAC Upgrade Window Replacement New Addition New Facility |
| # of Rooms Tested | 9 |
| # Rooms ≥ 4.0 pCi/L | 1 |
| Lowest Value | <0.3 pCi/L |
| Highest Value | 4.2 pCi/L |

Project Status

Room with results ≥ 4.0 pCi/L:
Media Office (4.2 pCi/L), Media Office Duplicate (4.1 pCi/L)

Current Project Status at this time: Retesting completed; use the average of the initial and re-test results in a room to determine if remediation is necessary.



March 9, 2018

Mr. Richard Cox, MS
Team Leader
Montgomery County Public Schools
Division of Maintenance
Gaithersburg, Maryland 20879

Re: Radon Testing Services

KCI Job #1214634188

Location: Greencastle Elementary School

13611 Robey Rd.
Silver Spring, Maryland 20904

Dear Mr. Cox:

KCI Technologies, Inc. (KCI) is pleased to submit the following report to Montgomery County Public Schools pursuant to completing a “short-term” 3-day radon test for the Greencastle Elementary School, located at 13611 Robey Rd. in Silver Spring, Maryland 20904 (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 February 12, 2018 and deployed ten (10) 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.

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

1. Rooms not successfully tested,
2. Rooms with elevated November 2017 results (i.e. ≥ 3.5 pCi/L).

A floor plan map of the building with the test locations is included as Appendix 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, Inc. prior to being returned to the laboratory for analysis.

KCI returned to the site on February 15, 2018 to retrieve the radon sampling test kits. KCI shipped all radon tests via overnight delivery to Aircheck, Inc. for analysis by gamma-ray spectroscopy. Aircheck, 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 HVAC upgrade testing.

These tests were conducted to:

- Evaluate radon concentrations following the installation of a new HVAC system.

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 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.

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 ranged from the mid-20s to upper 40s and high temperatures ranged from the high-30s to the high-60s. Maximum sustained winds ranged from 10-15 miles per hour. Average humidity was around 69%. 0.05 Inches of precipitation was recorded during the 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). 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 | Media Office | 4.2, 4.1 (D) |
| ≤ 4.0 pCi/L | See Attachment B | 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 410-316-7800.

Sincerely,



Radon Measurement Specialist
KCI Technologies, Inc.

Attachments:

B - Radon Test Summary Spreadsheets

C - Laboratory Analytical Results

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

| Table 1 - Radon Testing Results | | |
|--|--------------------|---------------|
| Greencastle Elementary School | | |
| Test Period: 02/12/18-02/15/18 | | |
| Kit Number | Room / Area | Result |
| 7985899 | ASSIST. PRIN. 2 | < 0.3 |
| 7985894 | CAFE | 3.7 |
| 7985900 | FAC | 0.6 |
| 7985893 | G&T COORDINATOR | 1.4 |
| 7985875 | GYM | 2.4 |
| 7985878 | MEDIA OFFICE | 4.2 |
| 7985877 | MPR | 0.9 |
| 7985892 | TELEPHONE ROOM | < 0.3 |
| 7985898 | VOLUNTEER ROOM | 3.5 |

Table Note:

* Missing or Compromised Sample

| Table 2 - Radon Testing Results | | |
|--|------------------|---------------|
| Greencastle Elementary School | | |
| Test Period: 02/12/18-02/15/18 | | |
| Kit Number | QC Type | Result |
| 7985876 | D (MEDIA OFFICE) | 4.1 |

Table Note:

* Missing or Compromised Sample

ATTACHMENT C

Laboratory Analytical Results

February 27, 2018

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

**GREENCASTLE ELEMENTARY SCHOOL
MAIN**

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|-----------------|----------------------|----------------------|--------------|-----------------|
| 7985899 | ASSIST. PRIN. 2 | 2018-02-12 @ 8:00 am | 2018-02-15 @ 8:00 am | < 0.3 | 2018-02-19 |
| 7985894 | CAFE | 2018-02-12 @ 8:00 am | 2018-02-15 @ 8:00 am | 3.7 ± 0.4 | 2018-02-19 |
| 7985900 | FAC | 2018-02-12 @ 8:00 am | 2018-02-15 @ 8:00 am | 0.6 ± 0.3 | 2018-02-19 |
| 7985893 | G&T COORDINATOR | 2018-02-12 @ 8:00 am | 2018-02-15 @ 8:00 am | 1.4 ± 0.4 | 2018-02-19 |
| 7985875 | GYM | 2018-02-12 @ 8:00 am | 2018-02-15 @ 8:00 am | 2.4 ± 0.4 | 2018-02-19 |
| 7985878 | MEDIA OFFICE | 2018-02-12 @ 8:00 am | 2018-02-15 @ 8:00 am | 4.2 ± 0.5 | 2018-02-19 |
| 7985876 | MEDIA OFFICE | 2018-02-12 @ 8:00 am | 2018-02-15 @ 8:00 am | 4.1 ± 0.5 | 2018-02-19 |
| 7985877 | MPR | 2018-02-12 @ 8:00 am | 2018-02-15 @ 8:00 am | 0.9 ± 0.3 | 2018-02-19 |
| 7985892 | TELEPHONE ROOM | 2018-02-12 @ 8:00 am | 2018-02-15 @ 8:00 am | < 0.3 | 2018-02-19 |
| 7985898 | VOLUNTEER ROOM | 2018-02-12 @ 8:00 am | 2018-02-15 @ 7:00 am | 3.5 ± 0.4 | 2018-02-19 |

Air Chek, Inc. 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

Names of Schools:

1. Highland Elementary School
2. Stephen Knolls Elementary School
3. Silver Creek Middle School
4. Woodlin Elementary School
5. Sligo Creek Elementary School
6. Francis Scott Key Middle School
7. John T. Baker Middle School
8. Cedar Grove Elementary School
9. Clarksburg Elementary School
10. Clarksburg Elementary School Annex
11. Fields Road Elementary School
12. Dufief Elementary School
13. Brown Station Elementary School
14. Diamond Elementary School
15. Fallsmeade Elementary School
16. Thomas Whootton High School
17. Lake Seneca Elementary School
18. Redland Middle School
19. Newport Mill Middle School
20. Bethesda Trans. and Maint. Depot
21. Sequoyah Elementary School
22. Gaithersburg Middle School
23. Wayside Elementary School
24. Travilah Elementary School
25. Damascus High School
26. Jones Lane Elementary School
27. Greencastle Elementary School
28. Spring Brook High School
29. Montgomery Blair High School
30. Watkins Mill High School

| | Date | Initials |
|----------------------------------|---------|----------|
| Radon Test Kits Deployed | 2/12/18 | JM |
| Radon Test Kits Collected | 2/15/18 | JM |
| Radon Test Kits Shipped to Lab* | 2/15/18 | JM |
| Radon Test Kits Received by Lab* | 2/19/15 | JM |

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

Radon test result report for:
OFFICE BLANKS

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|----------------------|----------------------|--------------|-----------------|
| 7979482 | 1 | 2018-02-13 @ 1:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986991 | 10 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7985684 | 11 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986987 | 12 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986993 | 13 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986990 | 14 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7979485 | 2 | 2018-02-13 @ 1:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7985686 | 3 | 2018-02-13 @ 1:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986995 | 4 | 2018-02-13 @ 1:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986989 | 5 | 2018-02-13 @ 1:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986998 | 6 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986986 | 7 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986985 | 8 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986997 | 9 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |

Radon test result report for:
TRANSIT BLANKS

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|----------------------|----------------------|--------------|-----------------|
| 7984188 | 1 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7984044 | 10 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986582 | 11 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986999 | 12 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7987000 | 13 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7984196 | 14 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986996 | 2 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986994 | 3 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7986992 | 4 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7985680 | 5 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7985698 | 6 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7985699 | 7 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7985700 | 8 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |
| 7985872 | 9 | 2018-02-13 @ 2:00 pm | 2018-02-16 @ 2:00 pm | < 0.3 | 2018-02-20 |

February 28, 2018

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

MCPS - Spike Sample Laboratory Results. Measured values are satisfactory, i.e. within $\pm 25\%$ of the chamber's reference value (20.9 pCi/L).

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|-----------------------|-----------------------|----------------|-----------------|
| 7984181 | 1 | 2018-02-16 @ 11:00 am | 2018-02-19 @ 11:00 am | 19.7 \pm 0.8 | 2018-02-21 |
| 7986621 | 2 | 2018-02-16 @ 11:00 am | 2018-02-19 @ 11:00 am | 19.4 \pm 0.8 | 2018-02-21 |
| 7985683 | 3 | 2018-02-16 @ 11:00 am | 2018-02-19 @ 11:00 am | 19.5 \pm 0.8 | 2018-02-21 |
| 7984168 | 4 | 2018-02-16 @ 11:00 am | 2018-02-19 @ 11:00 am | 20.5 \pm 0.8 | 2018-02-21 |
| 7986618 | 5 | 2018-02-16 @ 11:00 am | 2018-02-19 @ 11:00 am | 19.9 \pm 0.8 | 2018-02-21 |
| 7984169 | 6 | 2018-02-16 @ 11:00 am | 2018-02-19 @ 11:00 am | 20.4 \pm 0.8 | 2018-02-21 |

Air Chek, Inc. 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 183530

NOMINAL Conditions: Radon Conc 20.9 pCi/L Rel. Hum 49.8 % Temp. 79.1 F

Date Start: 2/16/18 Date Stop: 2/19/18 Date Start: _____ Date Stop: _____
Time Start: 1052 Time Stop: 1052 Time Start: _____ Time Stop: _____
Device No.'s: (6) Char. Bags Device No.'s: _____
7984181, 7986621, 7985683 _____
7984168, 7986618, 7984169 _____
G3 Middle

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



MCPS RADON TESTING - EXECUTIVE SUMMARY

| | |
|--------------------------|---|
| Site Name | Greencastle Elementary School |
| Date of Report | January 31, 2018 |
| Round of Testing | Initial Follow-up Post Remediation 2 year testing 5 year testing HVAC Upgrade Window Replacement New Addition New Facility |
| # of Rooms Tested | 44 |
| # Rooms ≥ 4.0 pCi/L | 1 |
| Lowest Value | < 0.3 pCi/L |
| Highest Value | 4.5 pCi/L |

Rooms with results ≥ 4.0 pCi/L: Media Office (4.5 pCi/L)

Current Project Status at this time: Testing Completed; retesting needed for results ≥ 4.0 pCi/L.

Missing or compromised samples need re-test.



January 31, 2018

Mr. Richard Cox, MS
Team Leader
Montgomery County Public Schools
Division of Maintenance
Rockville, Maryland 20855

Re: Radon Testing Services

KCI Job #1214694182

Location: Greencastle Elementary School

13611 Robey Rd.
Silver Spring, Maryland 20904

Dear Mr. Cox:

KCI Technologies, Inc. (KCI) is pleased to submit the following report to Montgomery County Public Schools pursuant to completing a “short-term” 3-day radon test for the Greencastle Elementary School, located at 13611 Robey Rd. in Silver Spring, Maryland 20904 (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 November 28, 2017 and deployed fifty-five (55) 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 Appendix 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, Inc. prior to being returned to the laboratory for analysis.

KCI returned to the site on December 1, 2017 to retrieve the radon sampling test kits. KCI shipped all radon tests via overnight delivery to Aircheck, Inc. for analysis by gamma-ray spectroscopy. Aircheck, 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:

- HVAC upgrade testing.

These tests were conducted to:

- Evaluate radon concentrations following installation of a new HVAC system.

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 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.

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 30s and high temperatures ranged from the low-50s to mid-60s. Maximum sustained winds ranged from 8-15 miles per hour. Average humidity was around 65%. 0.02 Inches of precipitation was recorded during the testing period.

A magnitude 4.1 earthquake was reported on Thursday November 30 near Dover, Delaware approximately 95 miles east of Gaithersburg, Maryland. The earthquake occurred during or just after the radon testing period for this facility. In general, enhanced radon emissions have been observed prior to earthquakes and this has been recorded all over the world, according to the research article entitled *Radon-222: A Potential Short-Term Earthquake Precursor*, published June 30, 2015 in the Journal of Earth Science and Climate

Change. The nearby earthquake, which occurred during or prior to the testing period, may have resulted in higher-than-normal radon test results for this facility.

RESULTS

The sampling locations, field observations, 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). Missing/compromised tests, missed rooms, and locked rooms 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 | Media Office | 4.5 |
| ≤4.0 pCi/L | See Attachment B | See Attachment B |

| Quality Control Samples | |
|--------------------------------|---|
| Results of Blank Canisters: | The field blanks, office blank, 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 410-316-7800.

Sincerely,



James Moulds, CHMM
Radon Measurement Specialist
KCI Technologies, Inc.

Attachments:

B - Tables 1-3, Radon Test Summary Spreadsheets

C- Laboratory Analytical Results

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 | | |
|---------------------------------------|--------------------|---------------|
| Greencastle Elementary School | | |
| Test Period: 11/28/17-12/01/17 | | |
| Kit Number | Room / Area | Result |
| 7976230 | 14 | < 0.3 |
| 7976244 | ADMIN OFFICE | 0.8 |
| 7976243 | APR | < 0.3 |
| 7976263 | ART | 0.6 |
| 7976275 | ASSIST. PRINCIPA | 0.6 |
| 7976268 | BLDG SCVS MGMT | 0.8 |
| 7976248 | COMMUNICATION RO | 0.5 |
| 7976266 | COMP. LAB | 1.9 |
| 7976294 | CONF ROOM | 0.7 |
| 7976252 | CONTROL ROOM | < 0.3 |
| 7976298 | COUNSELOR | 1.1 |
| 7976256 | CR1 | 0.6 |
| 7976293 | CR10 | < 0.3 |
| 7976233 | CR11 | < 0.3 |
| 7976251 | CR2 | 0.7 |
| 7976237 | CR22 | < 0.3 |
| 7976240 | CR3 | < 0.3 |
| 7976247 | CR4 | < 0.3 |
| 7976239 | CR5 | 0.6 |
| 7976295 | CR6 | < 0.3 |
| 7976261 | CR7 | < 0.3 |
| 7976258 | CR8 | < 0.3 |
| 7976291 | CR9 | < 0.3 |
| 7976269 | GYM | 1.8 |
| 7976253 | * GYM (Tampered) | 1.6 |
| 7976292 | GYM OFFICE | 1.2 |
| 7976250 | HEALTH ROOM | 1.1 |
| 7976288 | INSTRUMENTAL MUS | < 0.3 |
| 7976232 | K1 | 0.6 |
| 7976231 | K2 | 0.6 |
| 7976225 | K3 | 0.7 |
| 7976224 | K4 | 0.7 |
| 7976267 | MATERIAL PREP | 2.0 |
| 7976259 | MATH | 1.3 |
| 7976257 | MEDIA CENTER | 2.2 |
| 7976254 | MEDIA OFFICE | 4.5 |
| 7976260 | MPR | 1.3 |
| 7976245 | * MPR (Tampered) | 1.0 |
| 7976255 | MUSIC ROOM | < 0.3 |
| 7976290 | PRINCIPAL OFFICE | 1.7 |
| 7976236 | SPT | 0.8 |
| 7976017 | STAFF DINING | 0.5 |
| 7976281 | STAFF LOUNGE | < 0.3 |
| 7976299 | STAFF WORKROOM | 1.5 |
| 7976274 | TELEPHONE ROOM | 0.8 |
| 7976262 | VOLUNTEER ROOM | 1.6 |

Table Note:

* Missing or Compromised Sample

| Radon Testing Results | | |
|---------------------------------------|--------------------|---------------|
| Greencastle Elementary School | | |
| Test Period: 11/28/17-12/01/17 | | |
| Kit Number | Room / Area | Result |
| | | |

Table Note:

* Missing or Compromised Sample

| Radon Testing Results | | |
|---------------------------------------|-------------------------------|---------------|
| Greencastle Elementary School | | |
| Test Period: 11/28/17-12/01/17 | | |
| Kit Number | QC Type | Result |
| 7976242 | D (ADMIN OFFICE) | 1.0 |
| 7976241 | D (APR) | 0.5 |
| 7976214 | D (ASSISTANT PRINC) | 0.9 |
| 7976228 | D (CR22) | < 0.3 |
| 7976067 | D (STAFF LOUNGE) | < 0.3 |
| 7976287 | * D (VOLUNTEER ROOM:Tampered) | 1.3 |
| 7976238 | FB (COUNSELOR) | < 0.3 |
| 7976226 | FB (HEALTH ROOM) | < 0.3 |
| 7978086 | OB (OB) | < 0.3 |

Table Note:

* Missing or Compromised Sample

ATTACHMENT C

Laboratory Analytical Results

Radon test result report for:

GREENCASTLE ES**1**

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|---------|------------------|-----------------------|----------------------|-----------|------------|
| 7976230 | 14 | 2017-11-28 @ 10:00 am | 2017-12-01 @ 9:00 am | < 0.3 | 2017-12-04 |
| 7976242 | ADMIN OFFICE | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | 1.0 ± 0.3 | 2017-12-04 |
| 7976244 | ADMIN OFFICE | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | 0.8 ± 0.3 | 2017-12-05 |
| 7976241 | APR | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | 0.5 ± 0.3 | 2017-12-04 |
| 7976243 | APR | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-05 |
| 7976263 | ART | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | 0.6 ± 0.3 | 2017-12-05 |
| 7976275 | ASSIST. PRINCIPA | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | 0.6 ± 0.3 | 2017-12-04 |
| 7976214 | ASSISTANT PRINC | 2017-11-28 @ 10:00 am | 2017-12-01 @ 8:00 am | 0.9 ± 0.3 | 2017-12-04 |
| 7976268 | BLDG SCVS MGMT | 2017-11-28 @ 10:00 am | 2017-12-01 @ 8:00 am | 0.8 ± 0.3 | 2017-12-05 |
| 7976248 | COMMUNICATION RO | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | 0.5 ± 0.3 | 2017-12-04 |
| 7976266 | COMP. LAB | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | 1.9 ± 0.3 | 2017-12-05 |
| 7976294 | CONF ROOM | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | 0.7 ± 0.3 | 2017-12-04 |
| 7976252 | CONTROL ROOM | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-05 |
| 7976238 | COUNSELOR | 2017-11-28 @ 10:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-04 |
| 7976298 | COUNSELOR | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | 1.1 ± 0.3 | 2017-12-04 |
| 7976256 | CR1 | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | 0.6 ± 0.3 | 2017-12-04 |
| 7976293 | CR10 | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-05 |
| 7976233 | CR11 | 2017-11-28 @ 10:00 am | 2017-12-01 @ 9:00 am | < 0.3 | 2017-12-04 |
| 7976251 | CR2 | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | 0.7 ± 0.3 | 2017-12-05 |
| 7976228 | CR22 | 2017-11-28 @ 10:00 am | 2017-12-01 @ 9:00 am | < 0.3 | 2017-12-04 |
| 7976237 | CR22 | 2017-11-28 @ 10:00 am | 2017-12-01 @ 9:00 am | < 0.3 | 2017-12-04 |
| 7976240 | CR3 | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-05 |
| 7976247 | CR4 | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-05 |
| 7976239 | CR5 | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | 0.6 ± 0.3 | 2017-12-05 |
| 7976295 | CR6 | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-05 |
| 7976261 | CR7 | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-05 |
| 7976258 | CR8 | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-05 |
| 7976291 | CR9 | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-05 |
| 7976269 | GYM | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | 1.8 ± 0.3 | 2017-12-05 |
| 7976253 | GYM | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | 1.6 ± 0.3 | 2017-12-05 |
| 7976292 | GYM OFFICE | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | 1.2 ± 0.3 | 2017-12-05 |
| 7976250 | HEALTH ROOM | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | 1.1 ± 0.3 | 2017-12-04 |
| 7976226 | HEALTH ROOM | 2017-11-28 @ 10:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-04 |
| 7976288 | INSTRUMENTAL MUS | 2017-11-28 @ 10:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-05 |
| 7976232 | K1 | 2017-11-28 @ 10:00 am | 2017-12-01 @ 8:00 am | 0.6 ± 0.3 | 2017-12-04 |
| 7976231 | K2 | 2017-11-28 @ 10:00 am | 2017-12-01 @ 8:00 am | 0.6 ± 0.3 | 2017-12-05 |
| 7976225 | K3 | 2017-11-28 @ 10:00 am | 2017-12-01 @ 8:00 am | 0.7 ± 0.3 | 2017-12-04 |

Radon test result report for:**GREENCASTLE ES****1**

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|------------------|-----------------------|----------------------|--------------|-----------------|
| 7976224 | K4 | 2017-11-28 @ 10:00 am | 2017-12-01 @ 8:00 am | 0.7 ± 0.3 | 2017-12-04 |
| 7976267 | MATERIAL PREP | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | 2.0 ± 0.3 | 2017-12-05 |
| 7976259 | MATH | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | 1.3 ± 0.3 | 2017-12-05 |
| 7976257 | MEDIA CENTER | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | 2.2 ± 0.3 | 2017-12-05 |
| 7976254 | MEDIA OFFICE | 2017-11-28 @ 9:00 am | 2017-12-01 @ 9:00 am | 4.5 ± 0.4 | 2017-12-04 |
| 7976260 | MPR | 2017-11-28 @ 10:00 am | 2017-12-01 @ 8:00 am | 1.3 ± 0.3 | 2017-12-05 |
| 7976245 | MPR | 2017-11-28 @ 10:00 am | 2017-12-01 @ 8:00 am | 1.0 ± 0.3 | 2017-12-05 |
| 7976255 | MUSIC ROOM | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-05 |
| 7978086 | OB | 2017-11-28 @ 2:00 pm | 2017-12-01 @ 2:00 pm | < 0.3 | 2017-12-04 |
| 7976290 | PRINCIPAL OFFICE | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | 1.7 ± 0.3 | 2017-12-05 |
| 7976236 | SPT | 2017-11-28 @ 10:00 am | 2017-12-01 @ 9:00 am | 0.8 ± 0.3 | 2017-12-04 |
| 7976017 | STAFF DINING | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | 0.5 ± 0.3 | 2017-12-05 |
| 7976067 | STAFF LOUNGE | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-05 |
| 7976281 | STAFF LOUNGE | 2017-11-28 @ 9:00 am | 2017-12-01 @ 8:00 am | < 0.3 | 2017-12-05 |
| 7976299 | STAFF WORKROOM | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | 1.5 ± 0.3 | 2017-12-05 |
| 7976274 | TELEPHONE ROOM | 2017-11-28 @ 8:00 am | 2017-12-01 @ 8:00 am | 0.8 ± 0.3 | 2017-12-04 |
| 7976287 | VOLUNTEER ROOM | 2017-11-28 @ 10:00 am | 2017-12-01 @ 8:00 am | 1.3 ± 0.3 | 2017-12-04 |
| 7976262 | VOLUNTEER ROOM | 2017-11-28 @ 10:00 am | 2017-12-01 @ 8:00 am | 1.6 ± 0.4 | 2017-12-05 |



Radon Test Kit Chain of Custody

Project Name: MCPS Radon Phase

Names of Schools:

1. Chevy Chase Elementary School
2. Greencastle Elementary School
3. English Manor
4. Rock View Elementary School
5. Wheaton Woods Elementary School
6. Sequoyah Elementary School
7. Fallsmead Elementary School
8. Beall Elementary School
9. Stephen Knolls School
10. Maryvale Elementary School
11. Redland Middle School
12. Walt Whitman High School
13. Springbrook High School
14. Blair G. Ewing Center
15. Viers Mill Elementary School
16. Albert Einstein High School
17. Wayside Elementary School
18. Thomas S. Wootton High School
19. Highland Elementary School
20. Bethesda Transportation Depot
21. Bethesda Maintenance Depot
22. Travilah Elementary School
23. Lathrop E. Smith Center

| | Date | Initials |
|----------------------------------|----------|----------|
| Radon Test Kits Deployed | 11/28/17 | JM |
| Radon Test Kits Collected | 12/01/17 | JM |
| Radon Test Kits Shipped to Lab* | 12/01/17 | JM |
| Radon Test Kits Received by Lab* | 12/05/17 | JM |

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

Radon test result report for:**TRANSIT 1****NONE**

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|---------|------------|----------------------|----------------------|-------|------------|
| 7978062 | TRANSIT 1 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7975804 | TRANSIT 10 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7977990 | TRANSIT 11 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7978201 | TRANSIT 12 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7978203 | TRANSIT 13 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7978206 | TRANSIT 14 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-05 |
| 7978246 | TRANSIT 15 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-05 |
| 7978239 | TRANSIT 16 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-05 |
| 7978226 | TRANSIT 17 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-05 |
| 7975078 | TRANSIT 18 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-05 |
| 7975077 | TRANSIT 19 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-05 |
| 7978074 | TRANSIT 2 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7975076 | TRANSIT 20 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7975684 | TRANSIT 21 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7975683 | TRANSIT 22 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7975601 | TRANSIT 23 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7978011 | TRANSIT 24 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7978012 | TRANSIT 25 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7978094 | TRANSIT 26 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-05 |
| 7975624 | TRANSIT 27 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-05 |
| 7834562 | TRANSIT 28 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-05 |
| 7977995 | TRANSIT 29 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-05 |
| 7978098 | TRANSIT 3 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7977992 | TRANSIT 30 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7978719 | TRANSIT 4 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-05 |
| 7978732 | TRANSIT 5 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7978731 | TRANSIT 6 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7975806 | TRANSIT 7 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7975815 | TRANSIT 8 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |
| 7975805 | TRANSIT 9 | 2017-11-27 @ 4:00 pm | 2017-11-30 @ 4:00 pm | < 0.3 | 2017-12-04 |

December 19, 2017

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

MCPS - Spike Sample Laboratory Results. Measured values are satisfactory, i.e. within $\pm 25\%$ of the chamber's reference value (27.7 pCi/L).

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|-----------------------|-----------------------|----------------|-----------------|
| 7975075 | S1 | 2017-12-01 @ 11:00 am | 2017-12-04 @ 11:00 am | 25.6 \pm 0.7 | 2017-12-07 |
| 7975064 | S2 | 2017-12-01 @ 11:00 am | 2017-12-04 @ 11:00 am | 27.4 \pm 0.8 | 2017-12-07 |
| 7975063 | S3 | 2017-12-01 @ 11:00 am | 2017-12-04 @ 11:00 am | 26.3 \pm 0.7 | 2017-12-07 |
| 7975065 | S4 | 2017-12-01 @ 11:00 am | 2017-12-04 @ 11:00 am | 23.0 \pm 0.7 | 2017-12-07 |
| 7975069 | S5 | 2017-12-01 @ 11:00 am | 2017-12-04 @ 11:00 am | 25.6 \pm 0.7 | 2017-12-07 |
| 7975070 | S6 | 2017-12-01 @ 11:00 am | 2017-12-04 @ 11:00 am | 23.0 \pm 0.7 | 2017-12-07 |

Air Chek, Inc. 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 182393

NOMINAL Conditions: Radon Conc 27.7 pCi/L Rel. Hum 49.1 % Temp. 70.1 F

Date Start: 12/1/17 Date Stop: 12/4/17 Date Start: _____ Date Stop: _____

Time Start: 1049 Time Stop: 1049 Time Start: _____ Time Stop: _____

Device No.'s: (6) Char. Bags. Device No.'s: _____

7975075, 7975064, 7975063, _____

7975065, 7975069, 7975070 _____

F4 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

RADON SCREENING SURVEY – FOLLOW-UP GREENCASTLE ELEMENTARY SCHOOL

13611 Robey Road, Silver Spring, Maryland 20904

EXECUTIVE SUMMARY

| | |
|--|--|
| Date of Test Report: | 3/21/16 Follow-Up |
| Round of Testing: | Initial Follow-up Post Remediation |
| # Rooms Tested | 1 |
| # Rooms \geq 4.0 pCi/L: | 0 |
| Low Value: | <0.3 |
| High Value: | 1.9 |
| Confirmed Rooms \geq 4.0 pCi/L US EPA Action Level | 0 |

Summary of Sampling Events \geq 4.0 pCi/L

| Room | Result (pCi/L) 3/11/16 (Rev. 1 Initial) | Result (pCi/L) 3/21/16 Follow-Up | Average Result (pCi/L) |
|------------------|--|-------------------------------------|---------------------------|
| Material Prep Rm | --- Missing | 1.9 | 1.9 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |



MCPS RADON TESTING

Executive Summary: Greencastle Elementary School

| | |
|---------------------------|--|
| Date of Test Report: | 3/21/2016 |
| Round of Testing: | Initial Follow-up Post Remediation |
| # Rooms Tested: | 1 |
| # Rooms \geq 4.0 pCi/L: | 0 |
| Low Value: | < 0.3 |
| High Value: | 1.9 |

Project Status:

Retesting completed; no further action at this time.



March 21, 2016

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

Re: **Radon Testing Services**
KCI Job # 12146341.29

Location: Greencastle Elementary School
13611 Robey Road
Silver Spring, Maryland 20904

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 Greencastle Elementary School, located at 13611 Robey Road in Silver Spring, Maryland 20904 (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 February 23, 2016 and deployed three (3) 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 February 26, 2016 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. Note that strong storms and heavy rainfall were recorded during the test period. The unusual weather conditions may have resulted in atypical radon test results for this facility.

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 blank, office blanks, 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

*Office blanks were submitted at a rate of 1% for all samples deployed in Phase 9 testing. Office blanks were not submitted under each school individually.

| Radon Testing Results | | |
|---------------------------------------|--------------------|---------------|
| Greencastle Elementary School | | |
| Test Period: 02/23/16-02/26/16 | | |
| Kit Number | Room / Area | Result |
| 7732195 | MATERIAL PREP | 1.9 |

Table Note:

* Missing or Compromised Sample

| Radon Testing Results | | |
|---------------------------------------|--------------------|---------------|
| Greencastle Elementary School | | |
| Test Period: 02/23/16-02/26/16 | | |
| Kit Number | QC Type | Result |
| 7732196 | D (MATERIAL PREP) | 1.7 |
| 7732198 | FB (MATERIAL PREP) | < 0.3 |

Table Note:

* Missing or Compromised Sample

ATTACHMENT C

Laboratory Analytical Results

March 8, 2016 **** LABORATORY ANALYSIS REPORT ****

Radon test result report for:
**GREENCASTLE ELEMENTARY SCHOOL
MAIN**

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|----------------------|-----------------------|--------------|-----------------|
| 7732195 | MATERIAL PREP | 2016-02-23 @ 1:00 pm | 2016-02-26 @ 11:00 am | 1.9 ± 0.3 | 2016-03-01 |
| 7732196 | MATERIAL PREP | 2016-02-23 @ 1:00 pm | 2016-02-26 @ 11:00 am | 1.7 ± 0.3 | 2016-03-01 |
| 7732198 | MATERIAL PREP | 2016-02-23 @ 1:00 pm | 2016-02-26 @ 11:00 am | < 0.3 | 2016-03-01 |

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

March 9, 2016 **** LABORATORY ANALYSIS REPORT ****

Radon test result report for:
MCPS
Phase 9 Office Blanks

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|----------------------|----------------------|--------------|-----------------|
| 7712568 | 0 | 2016-02-22 @ 6:00 pm | 2016-02-25 @ 3:00 pm | < 0.3 | 2016-02-29 |
| 7712584 | 0 | 2016-02-22 @ 6:00 pm | 2016-02-25 @ 3:00 pm | < 0.3 | 2016-02-29 |
| 7719460 | 0 | 2016-02-22 @ 6:00 pm | 2016-02-25 @ 3:00 pm | < 0.3 | 2016-02-29 |
| 7719481 | 0 | 2016-02-22 @ 6:00 pm | 2016-02-25 @ 3:00 pm | < 0.3 | 2016-02-29 |
| 7719497 | 0 | 2016-02-22 @ 6:00 pm | 2016-02-25 @ 3:00 pm | < 0.3 | 2016-02-29 |
| 7719498 | 0 | 2016-02-22 @ 6:00 pm | 2016-02-25 @ 3:00 pm | < 0.3 | 2016-02-29 |

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

March 9, 2016 **** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

MCPS

Phase 9 Office Blanks

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|----------------------|----------------------|--------------|-----------------|
| 7731626 | 0 | 2016-02-23 @ 2:00 pm | 2016-02-26 @ 3:00 pm | < 0.3 | 2016-03-01 |
| 7731633 | 0 | 2016-02-23 @ 2:00 pm | 2016-02-26 @ 3:00 pm | < 0.3 | 2016-03-01 |
| 7735204 | 0 | 2016-02-23 @ 2:00 pm | 2016-02-26 @ 3:00 pm | < 0.3 | 2016-03-01 |

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

February 23, 2016 **LABORATORY ANALYSIS REPORT** **

Radon test result report for:
TRANSIT- PHASE 7, 8, 9
NONE

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|---------|---------|----------------------|-----------------------|-------|------------|
| 7734937 | 1 | 2016-02-19 @ 3:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734946 | 10 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734955 | 11 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734956 | 12 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734959 | 13 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734930 | 14 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734953 | 15 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734954 | 16 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734940 | 17 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734949 | 18 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734948 | 19 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734939 | 2 | 2016-02-19 @ 3:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734942 | 20 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734929 | 21 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734933 | 22 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734934 | 23 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734936 | 24 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734943 | 25 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734944 | 26 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734935 | 27 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734928 | 28 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734952 | 29 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734947 | 3 | 2016-02-19 @ 3:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734931 | 30 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734932 | 31 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7718520 | 32 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7718523 | 33 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7718522 | 34 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7718521 | 35 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734945 | 4 | 2016-02-19 @ 3:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734960 | 5 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734958 | 6 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734951 | 7 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734957 | 8 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |
| 7734938 | 9 | 2016-02-19 @ 4:00 pm | 2016-02-22 @ 11:00 am | < 0.3 | 2016-02-23 |

February
15,
2016

****LABORATORY ANALYSIS
REPORT ****

Spike Sample Laboratory Results

Radon test result report for:
MCPS

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|--------------|----------------|----------------------|----------------------|--------------|-----------------|
| 7718273 | 101A | 2016-01-30 @ 9:00 am | 2016-02-01 @ 9:00 am | 6.5 ± 0.6 | 2016-02-04 |
| 7718281 | 102B | 2016-01-30 @ 9:00 am | 2016-02-01 @ 9:00 am | 6.4 ± 0.6 | 2016-02-04 |
| 7718282 | 103C | 2016-01-30 @ 9:00 am | 2016-02-01 @ 9:00 am | 6.3 ± 0.6 | 2016-02-04 |
| 7718288 | 104D | 2016-01-30 @ 9:00 am | 2016-02-01 @ 9:00 am | 6.7 ± 0.6 | 2016-02-04 |
| 7718289 | 105E | 2016-01-30 @ 9:00 am | 2016-02-01 @ 9:00 am | 6.6 ± 0.6 | 2016-02-04 |
| 7718291 | 106F | 2016-01-30 @ 9:00 am | 2016-02-01 @ 9:00 am | 6.5 ± 0.6 | 2016-02-04 |

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 KCF Technologies Inc. Job Number 173704

NOMINAL Conditions: Radon Conc 5.9 pCi/L Rel. Hum 45.9 % Temp. 79.0 F

Date Start: 1/30/16 Date Stop: 2/1/16 Date Start: _____ Date Stop: _____

Time Start: 0926 Time Stop: 0926 Time Start: _____ Time Stop: _____

Device No.'s: (6) Char. Bags - Device No.'s: _____

7718281, 7718282, 7718291, _____

7718288, 7718289, 7718273 _____

ε3 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 μR/h Elevation = 820 ft**



Radon Test Kit Chain of Custody

Project Name: MCPS Radon Phase 9

Name of Schools:

- | | | |
|--------------------------|---------------------------|------------------------|
| 1. Rocking Horse Road ES | 16. Broad Acres ES | 31. Rosa Parks MS |
| 2. Rockwell ES | 17. Belmont ES | 32. Rosemary Hills ES |
| 3. Oakland Terrace ES | 18. Emory Grove Center | 33. Sequoyah ES |
| 4. Rosemont ES | 19. Forest Knolls ES | 34. Damascus HS |
| 5. Beall ES | 20. Baker MS | 35. Einstein ES |
| 6. Cresthaven ES | 21. MLK MS | 36. Forest Oak MS |
| 7. Quince Orchard HS | 22. Richard Montgomery HS | 37. Hoover MS |
| 8. Smith Center | 23. Sherwood HS | 38. Julius West MS |
| 9. Ashburton ES | 24. Walter Johnson HS | 39. John F. Kennedy HS |
| 10. Bannockburn ES | 25. Diamond ES | 40. Travilah ES |
| 11. Bradley Hills ES | 26. Newport Mill MS | 41. Watkins Mill HS |
| 12. Cannon Road ES | 27. Drew ES | 42. Northwood HS |
| 13. Flora M. Singer ES | 28. Monocacy ES | 43. Lincoln Center |
| 14. Clarksburg HS | 29. Potomac ES | |
| 15. Briggs Chaney MS | 30. Rock Terrace School | |

| | Date | Initials |
|----------------------------------|---------|----------|
| Radon Test Kits Deployed | 2/22/16 | JM |
| Radon Test Kits Collected | 2/25/16 | JM |
| Radon Test Kits Shipped to Lab* | 2/25/16 | JM |
| Radon Test Kits Received by Lab* | 2/29/16 | JM |

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



Radon Test Kit Chain of Custody

Project Name: MCPS Radon Phase 9

Name of Schools:

- | | |
|----------------------------|-------------------------|
| 1. Banneker MS | 10. Maryvale ES |
| 2. Bethesda-Chevy Chase HS | 11. Montgomery Blair HS |
| 3. Burtonsville ES | 12. Poolesville HS |
| 4. Chevy Chase ES | 13. Rachel Carson ES |
| 5. Clopper Mill ES | 14. Stedwick ES |
| 6. Edison HS | 15. Watkins Mill ES |
| 7. Flower Hill ES | 16. Laytonsville ES |
| 8. Flower Valley ES | 17. Lincoln Center |
| 9. Greencastle ES | |

| | Date | Initials |
|----------------------------------|---------|----------|
| Radon Test Kits Deployed | 2/23/16 | JM |
| Radon Test Kits Collected | 2/26/16 | JM |
| Radon Test Kits Shipped to Lab* | 2/26/16 | JM |
| Radon Test Kits Received by Lab* | 3/01/16 | JM |

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



MCPS RADON TESTING

Executive Summary: Greencastle Elementary School

| | |
|---------------------------|--|
| Date of Test Report: | 3/11/2016 (Rev 1) |
| Round of Testing: | Initial Follow-up Post Remediation |
| # Rooms Tested: | 43 |
| # Rooms \geq 4.0 pCi/L: | 0 |
| Low Value: | < 0.3 |
| High Value: | 2.4 |

Project Status:

Initial testing completed; missing or compromised samples need re-test.



March 11, 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: Greencastle Elementary School
13611 Robey Road
Silver Spring, MD 20904

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 Greencastle Elementary School, located at 13611 Robey Road in Silver Spring, Maryland 20904 (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 fifty-four (54) 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 | | |
|---------------------------------------|------------------------------|---------------|
| Greencastle ES | | |
| Test Period: 12/28/15-12/31/15 | | |
| Kit Number | Room / Area | Result |
| 7707449 | ADMIN OFF | < 0.3 |
| 7707415 | APR | < 0.3 |
| 7707454 | ASSIST PRINCIP 1 | < 0.3 |
| 7707450 | ASSIST PRINCIP2 | < 0.3 |
| 7707439 | BLDG SVC MANAGER | 0.6 |
| 7707452 | COMMUNICATION RM | 1.2 |
| 7707448 | CONFERENCE RM | < 0.3 |
| 7707455 | CONTROL RM | < 0.3 |
| 7707456 | COUNSELOR OFFICE | 1.3 |
| 7707416 | CR1 | 0.6 |
| 7707421 | CR10 | < 0.3 |
| 7707410 | CR11 | < 0.3 |
| 7707402 | CR14 | 0.6 |
| 7707441 | CR2 | < 0.3 |
| 7707408 | CR2 ART | 0.7 |
| 7707411 | CR22 | < 0.3 |
| 7707428 | CR3 | < 0.3 |
| 7707424 | CR4 | < 0.3 |
| 7707426 | CR5 | < 0.3 |
| 7707422 | CR6 | < 0.3 |
| 7707432 | CR7 | < 0.3 |
| 7707457 | CR8 | < 0.3 |
| 7707423 | CR9 | < 0.3 |
| 7707407 | FAC | 0.8 |
| 7707433 | G&T COORDINATOR | 1.2 |
| 7707406 | GYM | 1.2 |
| 7707412 | GYM | 1.8 |
| 7707417 | GYM OFFICE | 0.7 |
| 7707444 | HEALTH RM | < 0.3 |
| 7707443 | INSTRUMENT MUSIC | 0.9 |
| 7707435 | K1 | < 0.3 |
| 7707431 | K2 | 0.6 |
| 7707446 | K3 | 0.6 |
| 7707429 | K4 | < 0.3 |
| 7707453 | * MATERIAL PREP RM (missing) | - |
| 7707440 | MEDIA CENTER | 1.2 |
| 7707425 | MEDIA CENTER OFF | 2.4 |
| 7707437 | MPR | 1.9 |
| 7707447 | MPR | 1.4 |
| 7707414 | MU | < 0.3 |
| 7707442 | PRINCIPLE OFFICE | 1.6 |
| 7707403 | SPT | 0.6 |
| 7707436 | STAFF DINING RM | 1.1 |
| 7707418 | STAFF LOUNGE | < 0.3 |
| 7707434 | VOLUNTEER RM | 1.9 |

Table Note:

* Missing or Compromised Sample

| Radon Testing Results | | |
|---------------------------------------|------------------|---------------|
| Greencastle ES | | |
| Test Period: 12/28/15-12/31/15 | | |
| Kit Number | QC Type | Result |
| 7707438 | D (ADMIN OFFICE) | 1.0 |
| 7707419 | D (CR1) | < 0.3 |
| 7707430 | D (CR10) | < 0.3 |
| 7707420 | D (CR5) | < 0.3 |
| 7707451 | D (K4) | < 0.3 |
| 7707445 | D (MPR) | 1.6 |
| 7707427 | FB (CR10) | < 0.3 |
| 7707413 | FB (MU) | < 0.3 |
| 7707505 | 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:
**GREENCASTLE ES
MAIN**

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|---------|------------------|-----------------------|-----------------------|-----------|------------|
| 7707505 | 0 | 2015-12-28 @ 5:00 pm | 2015-12-31 @ 1:00 pm | < 0.3 | 2016-01-05 |
| 7707449 | ADMIN OFF | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | < 0.3 | 2016-01-05 |
| 7707438 | ADMIN OFFICE | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | 1.0 ± 0.3 | 2016-01-04 |
| 7707415 | APR | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707454 | ASSIST PRINCIP 1 | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | < 0.3 | 2016-01-05 |
| 7707450 | ASSIST PRINCIP2 | 2015-12-28 @ 9:00 am | 2015-12-31 @ 10:00 am | < 0.3 | 2016-01-05 |
| 7707439 | BLDG SVC MANAGER | 2015-12-28 @ 10:00 am | 2015-12-31 @ 8:00 am | 0.6 ± 0.3 | 2016-01-05 |
| 7707452 | COMMUNICATION RM | 2015-12-28 @ 10:00 am | 2015-12-31 @ 8:00 am | 1.2 ± 0.3 | 2016-01-04 |
| 7707448 | CONFERENCE RM | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | < 0.3 | 2016-01-05 |
| 7707455 | CONTROL RM | 2015-12-28 @ 10:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707456 | COUNSELOR OFFICE | 2015-12-28 @ 10:00 am | 2015-12-31 @ 8:00 am | 1.3 ± 0.3 | 2016-01-04 |
| 7707416 | CR1 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | 0.6 ± 0.3 | 2016-01-05 |
| 7707419 | CR1 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707421 | CR10 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-04 |
| 7707430 | CR10 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-04 |
| 7707427 | CR10 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707410 | CR11 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707402 | CR14 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | 0.6 ± 0.3 | 2016-01-05 |
| 7707441 | CR2 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707408 | CR2 ART | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | 0.7 ± 0.4 | 2016-01-05 |
| 7707411 | CR22 | 2015-12-28 @ 12:00 pm | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707428 | CR3 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707424 | CR4 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707420 | CR5 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707426 | CR5 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707422 | CR6 | 2015-12-28 @ 10:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707432 | CR7 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707457 | CR8 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707423 | CR9 | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707407 | FAC | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | 0.8 ± 0.3 | 2016-01-05 |
| 7707433 | G&T COORDINATOR | 2015-12-28 @ 10:00 am | 2015-12-31 @ 8:00 am | 1.2 ± 0.3 | 2016-01-04 |
| 7707406 | GYM | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | 1.2 ± 0.4 | 2016-01-05 |
| 7707412 | GYM | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | 1.8 ± 0.4 | 2016-01-05 |
| 7707417 | GYM OFFICE | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | 0.7 ± 0.3 | 2016-01-05 |
| 7707444 | HEALTH RM | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | < 0.3 | 2016-01-04 |
| 7707443 | INSTRUMENT MUSIC | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | 0.9 ± 0.4 | 2016-01-05 |
| 7707435 | K1 | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | < 0.3 | 2016-01-05 |

January
16,
2016

**LABORATORY ANALYSIS
REPORT ****

Radon test result report for:
**GREENCASTLE ES
MAIN**

| Kit # | Room Id | Started | Ended | pCi/L | Analyzed |
|---------|------------------|-----------------------|----------------------|-----------|------------|
| 7707431 | K2 | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | 0.6 ± 0.3 | 2016-01-04 |
| 7707446 | K3 | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | 0.6 ± 0.3 | 2016-01-05 |
| 7707451 | K4 | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | < 0.3 | 2016-01-05 |
| 7707429 | K4 | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | < 0.3 | 2016-01-05 |
| 7707453 | MATERIAL PREP RM | @ | @ | | |
| 7707440 | MEDIA CENTER | 2015-12-28 @ 10:00 am | 2015-12-31 @ 8:00 am | 1.2 ± 0.4 | 2016-01-05 |
| 7707425 | MEDIA CENTER OFF | 2015-12-28 @ 10:00 am | 2015-12-31 @ 8:00 am | 2.4 ± 0.5 | 2016-01-05 |
| 7707437 | MPR | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | 1.9 ± 0.4 | 2016-01-04 |
| 7707447 | MPR | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | 1.4 ± 0.3 | 2016-01-04 |
| 7707445 | MPR | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | 1.6 ± 0.4 | 2016-01-05 |
| 7707413 | MU | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707414 | MU | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707442 | PRINCIPLE OFFICE | 2015-12-28 @ 9:00 am | 2015-12-31 @ 9:00 am | 1.6 ± 0.4 | 2016-01-05 |
| 7707403 | SPT | 2015-12-28 @ 11:00 am | 2015-12-31 @ 8:00 am | 0.6 ± 0.3 | 2016-01-04 |
| 7707436 | STAFF DINING RM | 2015-12-28 @ 10:00 am | 2015-12-31 @ 8:00 am | 1.1 ± 0.4 | 2016-01-05 |
| 7707418 | STAFF LOUNGE | 2015-12-28 @ 10:00 am | 2015-12-31 @ 8:00 am | < 0.3 | 2016-01-05 |
| 7707434 | VOLUNTEER RM | 2015-12-28 @ 10:00 am | 2015-12-31 @ 9:00 am | 1.9 ± 0.4 | 2016-01-05 |

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