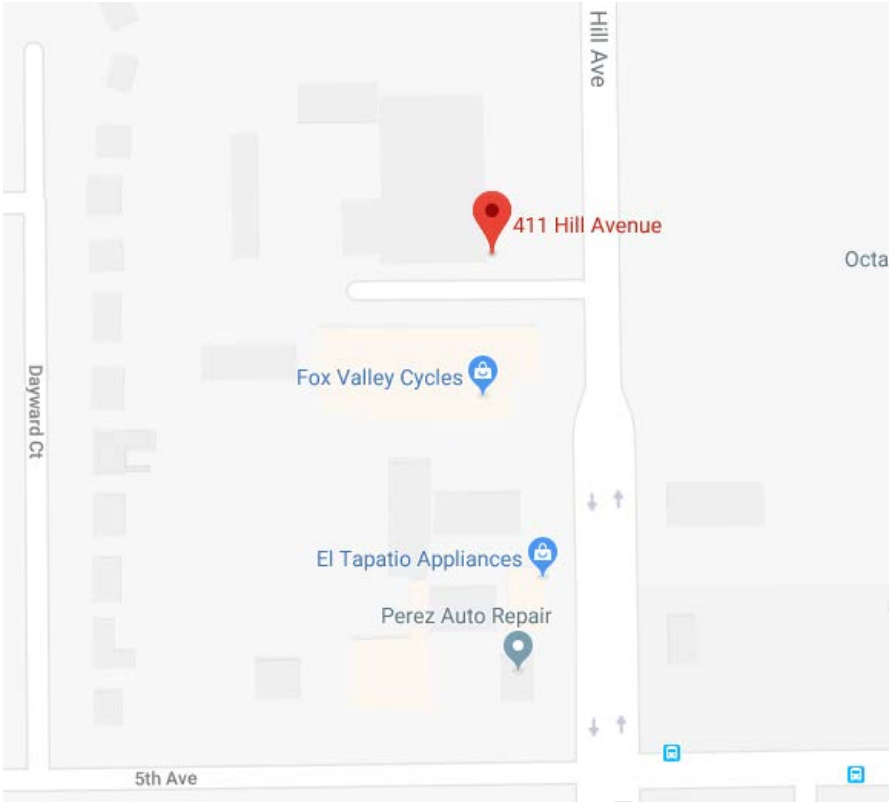
Carnow, Conibear & Assoc., Ltd.
Environmental Consulting Services
600 W. Van Buren St., Suite 500, Chicago, IL 60607
t: 312.782.4486 f: 312.782.5145
www.ccaltd.com

Radon Measurement Survey Report

Site:

Buildings & Grounds Service Center (Career Center)
411 Hill Avenue
Aurora, Illinois 60505

Survey Dates: May 8, 2018 thru May 10, 2018



Prepared For:

East Aurora School District 131
417 Fifth Street
Aurora, Illinois 60505

Carnow Conibear Project No. A146000137

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Radon Measurement Survey Report

Site:

Buildings & Grounds Service Center (Career Center)
411 Hill Avenue
Aurora, Illinois 60505

Surveyed by: Nicole Bennett

Nicole Bennett
Radon Measurement Professional

Report by: Nicole Bennett

Nicole Bennett
Radon Measurement Professional

Reviewed by:

Derek Lantry
Director, Technical Services

Report Issued: July 3, 2018

TABLE OF CONTENTS

APPENDICES

1.0 EXECUTIVE SUMMARY

Carnow, Conibear, & Assoc., Ltd. (Carnow Conibear) was contracted by East Aurora School District 131 to perform a radon measurement survey at the Buildings & Grounds Service Center (Career Center) located at 411 Hill Avenue in Aurora, Illinois. The survey was initiated on May 8, 2018 and completed on May 10, 2018 by Nicole Bennett, an Illinois Emergency Management Agency (IEMA) licensed Radon Measurement Professional (License No. RNI2016213). The scope of work included short term (two to four day) radon measurements in frequently occupied rooms with substantial ground contact. The radon sampling was performed following IEMA and the United States Environmental Protection Agency (USEPA) testing protocols for commercial and school radon measurements, the radon device manufacturer's recommendations, and Carnow Conibear's Quality Assurance Plan.

A total of thirty (30) radon test devices were deployed including twenty-five (25) single devices, three (3) duplicates, and two (2) blanks. Activated radon charcoal devices manufactured by Air Chek Inc. were utilized during the radon survey. The activated charcoal devices are passive devices containing activated carbon to measure radon. Testing was initiated on May 8, 2018 and completed on May 10, 2018.

Radon measurement results ranged from less than (<) 0.3 to 0.9 PicoCuries per liter (pCi/L). The radon measurement results indicate areas tested were below the EPA and IEMA recommended action level of 4.0 pCi/L during the time of the test. The average indoor radon concentrations are 1.3 pCi/L nationwide. The average outdoor radon concentration is 0.4 pCi/L.

Based on the radon measurement results Carnow Conibear recommends routine follow-up radon measurement survey every three (3) years, preferably at different seasonal times of the year. Additional radon testing is recommended if significant changes are made to the building's structural or mechanical components.

2.0 BACKGROUND

Radon is a naturally occurring, radioactive, colorless, odorless, tasteless gas produced from the decay of uranium and radium found in most soil and rock. Natural soils and rock such as granites, shales, and corals, contaminated soils from uranium processing mills, contaminated building materials, and groundwater water supplies directly from wells are a few common sources of radon. Radon can be found at some level in all indoor and outdoor air. Unlike most airborne contaminants radon is chemically inert, or chemically inactive. As a result, it is not chemically bound or attached to other materials and can move easily through porous materials or void space.

Typically, most radon gas is generated from the surrounding soil or bedrock, pulled through the soil or rock by air pressure differentials and enters the structure. However, radon gas can come from water, outside air, or contaminated building materials. The strength of the radon source has the biggest impact on indoor radon concentrations. The route of entry (i.e. through holes in the foundation), the building's ventilation rate, foundation type and differences in soils beneath the building can affect the indoor radon concentrations.

The primary health effect attributed to radon exposure is lung cancer. The World Health Organization (WHO), the National Academy of Sciences, the US Department of Health and Human Services, and the EPA classify radon as known human carcinogen. The EPA states radon is the largest source of radiation exposure and risk to the general public. When radon and products of radon decay are inhaled, decay can occur while in contact with the lung prior to being expelled. Because radon is chemically inert, most inhaled radon is rapidly exhaled. However, the inhaled decay products are readily deposited in the lungs, release energy in the form of radiation causing lung tissue damage and consequently increase the risk of lung cancer.

Radon concentrations in air are commonly expressed in picoCuries per liter (pCi/L) in the United States. An EPA national residential radon survey completed in 1991, determined the average indoor radon level is 1.3 pCi/L and the average outdoor level is about 0.4 pCi/L. The National Academy of Sciences' (NAS) latest report on radon, the Biological Effects of Ionizing Radiation (BEIR) VI Report (1999) estimates radon in indoor air causes about 21,000 lung cancer deaths each year in the United States. The EPA states that any level of radon carries some risk, there are no safe levels, and has established an action level of 4.0 pCi/L.

3.0 SCOPE OF WORK

Carnow, Conibear was contracted by East Aurora School District 131 to perform a radon survey at the Buildings & Grounds Service Center (Career Center) located at 411 Hill Avenue in Aurora, Illinois.

The scope of work included short term radon measurements in frequently occupied rooms with substantial ground contact. The duration of short term measurements can range from two (2) to four (4) days. Prior to placement of the radon measurement devices a Quality Assurance Project Plan (QAPP) was developed and general observations were performed to verify test conditions, identify device placement locations, and determine structural and mechanical building components. The QAPP was created to document and describe the necessary quality assurance procedures, quality control activities, and provide a clear, concise, and complete plan for the radon measurement operations. Observations of test conditions verified closed building conditions were maintained at a minimum of twelve (12) hours prior to testing and throughout the measurement period. Closed building conditions are necessary for short term radon measurements in order to stabilize the radon and radon decay product concentrations and increase the reproducibility of the measurement. Closed building conditions require windows and exterior doors on all levels be kept closed (except for normal entry and exit) during the measurement period. Closed building conditions also require the normal operation of heating, ventilating, and air conditions systems.

Radon test devices were deployed in twenty-five (25) locations. In addition, three (3) duplicates, and two (2) blanks, were utilized to measure precision and bias, and ensure quality data. Radon test devices were documented in a permanent log noting the address of the building measured, a diagram of the test area noting the exact locations of all measurement devices deployed, exact start and stop times of the measurement period, a description of the device used and serial number, and the name and IEMA license number of the Radon Measurement Professional. At the end of the measurement period the radon test devices were retrieved, resealed, and mailed to the laboratory for analysis.

The radon measurement results are reported in picoCurie per liter. A picoCurie per liter is 2.22 atomic radon disintegrations per minute for each liter of air. The results of the radon measurements are interpreted to determine the need for additional testing and assess the quality and confidence of the measurement data. Typically, follow-up measurements will be recommended in every room with results greater than 4.0 pCi/L. The recommendation to mitigate elevated levels of radon shall not be based on the initial measurement results.

4.0 METHODOLOGY

The radon testing was performed following requirements set forth by the IEMA, USEPA, and Carnow Conibear's Quality Assurance Plan. The radon measurement survey consisted of several phases. The initial phase consisted of preliminary testing protocol, including an explanation of services, instructions to comply with closed building conditions, the development of the Quality Assurance Project Plan, and determination of the testing period. Next, general observations of the building were performed to verify test conditions, identify device placement locations, and determine structural and mechanical building components.

The measurement phase included the radon testing device placement and retrieval. Activated radon charcoal devices manufactured by Air Chek Inc. were utilized during this radon survey. The activated charcoal devices are passive devices containing activated carbon to measure radon. Radon test devices were placed in such a way to limit unintentional interference from building occupants. The measurement devices were placed at least three feet from doors, windows to the outside, at least one foot from exterior walls, at least four feet from heat sources, out of the direct flow of ventilation ducts and sunlight, and suspended in the general breathing zone. Duplicate tests were conducted for a minimum of 10% of the total radon test devices deployed to measure precision. Field blanks were submitted for a minimum of 5% of the total number of radon test devices deployed to measure background gamma radiation. Spike tests were not submitted for this survey but are submitted for a minimum of three per 100 radon test devices or a minimum of three per year to measure laboratory accuracy. A total of thirty (30) radon test devices were deployed including twenty-five (25) single devices, three (3) duplicates, and two (2) blanks. At the end of the measurement period the radon measurement devices were retrieved, resealed, and shipped overnight to Air Chek Inc. for analysis. Air Chek Inc. calculates the radon concentration after measuring the gamma activity by the radon decay products produced from the random decay of the collected radon. The final phase consisted of interpreting the results and an assessment of the quality and confidence of the measurement data.

5.0 SUMMARY OF RESULTS

Table 1.0 Radon Measurement Device Results identify all the radon measurement devices deployed and the reported radon results. The radon measurement results are reported in picoCurie per liter (pCi/L).

Radon measurement results were below 4.0pCi/L. The radon measurement results indicate areas tested were below the EPA and IEMA recommended action level of 4.0 pCi/L during the time of the test. No radon mitigation systems were observed in the building. Additionally, the following testing abnormalities were noted during the radon measurement interval:

- The device (serial #9044593) placed in Office 124 was inaccessible at the time of retrieval

Table 1.0 Radon Measurement Device Results

Buildings & Grounds Service Center (Career Center) - 411 Hill Avenue Aurora, Illinois 60505

Device Location	Device Serial #	Start Date	Start Time	Stop Date	Stop Time	Result (pCi/L)	Comments
Room 101	9044584	5/8/2018	2:53 PM	5/10/2018	4:58 PM	< 0.3	
Office 102	9044585	5/8/2018	2:55 PM	5/10/2018	4:59 PM	< 0.3	
Office 103	9044586	5/8/2018	2:56 PM	5/10/2018	5:07 PM	< 0.3	
Office 104	9044587	5/8/2018	2:57 PM	5/10/2018	5:08 PM	< 0.3	
Break Room 121	9044588	5/8/2018	2:57 PM	5/10/2018	5:04 PM	< 0.3	
Mechanical Room 121A	9044589	5/8/2018	2:59 PM	5/10/2018	5:05 PM	< 0.3	
Office 122	9044590	5/8/2018	3:00 PM	5/10/2018	5:03 PM	< 0.3	
Office 122	9044591	5/8/2018	3:00 PM	5/10/2018	5:03 PM	< 0.3	Duplicate RPD = 0.0%
Office 123	9044592	5/8/2018	3:01 PM	5/10/2018	5:01 PM	< 0.3	
Office 124	9044593	5/8/2018	3:02 PM	5/10/2018	---	----	Unable to Retrieve Device
Office 125	9044594	5/8/2018	3:03 PM	5/10/2018	5:00 PM	< 0.3	
Custodial Closet 119	9044595	5/8/2018	3:04 PM	5/10/2018	5:09 PM	0.9	
Room 105	9044596	5/8/2018	3:07 PM	5/10/2018	5:11 PM	< 0.3	
Room 105	9044597	5/8/2018	3:08 PM	5/10/2018	5:11 PM	< 0.3	
Room 106	9044598	5/8/2018	3:10 PM	5/10/2018	5:13 PM	< 0.3	
Room 106	9044599	5/8/2018	3:11 PM	5/10/2018	5:13 PM	< 0.3	
Room 109	9044600	5/8/2018	3:15 PM	5/10/2018	5:16 PM	< 0.3	
Room 108	9045101	5/8/2018	3:16 PM	5/10/2018	5:14 PM	< 0.3	
Room 111	9045102	5/8/2018	3:18 PM	5/10/2018	5:17 PM	0.5	
Room 111	9045103	5/8/2018	3:19 PM	5/10/2018	5:17 PM	< 0.3	
Room 115	9045104	5/8/2018	3:20 PM	5/10/2018	5:19 PM	< 0.3	

Table 1.0 Radon Measurement Device Results

Buildings & Grounds Service Center (Career Center) - 411 Hill Avenue Aurora, Illinois 60505

Device Location	Device Serial #	Start Date	Start Time	Stop Date	Stop Time	Result (pCi/L)	Comments
Room 115	9045105	5/8/2018	3:20 PM	5/10/2018	5:19 PM	< 0.3	Duplicate RPD = 0.0%
Room 112A	9045106	5/8/2018	3:27 PM	5/10/2018	5:20 PM	< 0.3	
Room 112	9045107	5/8/2018	3:29 PM	5/10/2018	5:20 PM	< 0.3	
Paint Room 113	9045108	5/8/2018	3:29 PM	5/10/2018	5:21 PM	< 0.3	
Room 116	9045109	5/8/2018	3:37 PM	5/11/2018	1:17 PM	< 0.3	
Room 116	9045110	5/8/2018	3:39 PM	5/11/2018	1:18 PM	< 0.3	
Room 110	9045111	5/8/2018	3:41 PM	5/11/2018	1:20 PM	< 0.3	
Room 110	9045112	5/8/2018	3:41 PM	5/11/2018	1:20 PM	< 0.3	Duplicate RPD = 0.0%
Hallway	9045113	5/8/2018	3:42 PM	5/11/2018	1:22 PM	< 0.3	Blank
Hallway	9045114	5/8/2018	3:42 PM	5/11/2018	1:22 PM	< 0.3	Blank

RPD - Relative Percent Difference = difference divided by the average of simultaneous results times 100. Results less than 4.0 pCi/L shall agree with a RPD of less than 67 percent. Results greater than 4.0 pCi/l shall agree with a RDP of less than 36 percent.
The EPA and IEMA recommended radon action level is 4.0 pCi/L.

6.0 CONCLUSIONS

Carnow, Conibear, & Assoc., Ltd. (Carnow Conibear) was contracted by East Aurora School District 131 to perform a radon survey at the Buildings & Grounds Service Center (Career Center) located at 411 Hill Avenue in Aurora, Illinois. The survey was initiated on May 8, 2018 and completed on May 10, 2018 by Nicole Bennett, an Illinois Emergency Management Agency (IEMA) licensed Radon Measurement Professional (License No. RNI2016213). The scope of work included short term (two to four day) radon measurements in frequently occupied rooms with substantial ground contact. The radon survey was performed in following the IEMA and the USEPA testing protocols for commercial and school radon measurements, the radon device manufacturer's recommendations, and the Carnow Conibear Quality Assurance Plan.

Radon measurement results ranged from less than (<) 0.3 to 0.9 pCi/L. The radon measurement results indicate radon concentrations for areas tested were below the EPA and IEMA recommended action level of 4.0 pCi/L during the time of the test. The average indoor radon concentrations are 1.3 pCi/L nationwide. The average outdoor radon concentration is 0.4 pCi/L.

Based on the radon measurement results Carnow Conibear recommends the following:

- A routine follow-up radon measurement survey every three (3) years, preferably at different seasonal times of the year. Follow-up radon testing is also recommended in locations with invalid test results.

- Additional radon testing if significant changes are made to the building's structural or mechanical components.

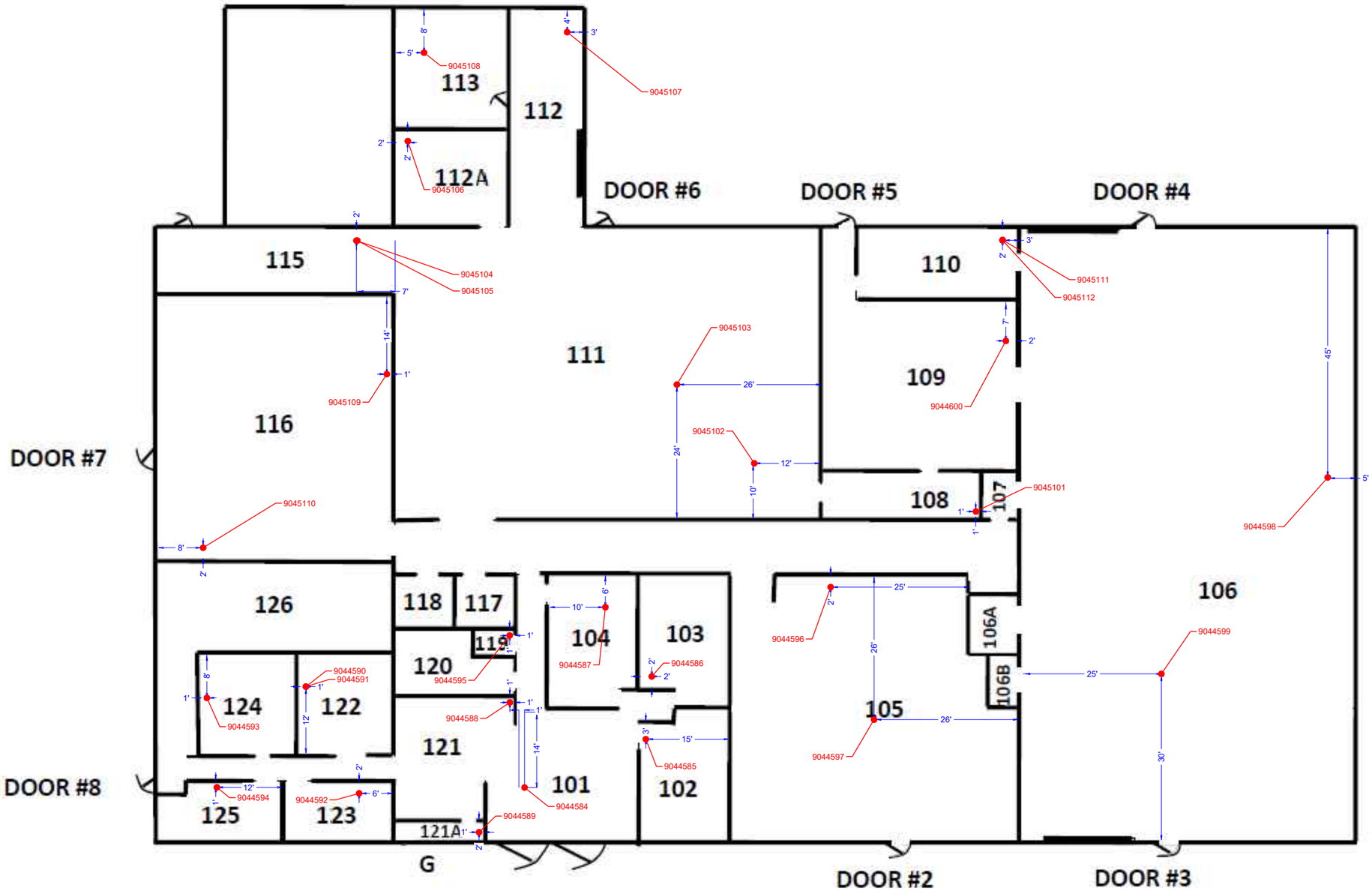
7.0 LIMITATIONS AND CONDITIONS

The information contained in this report was prepared for the exclusive use and reliance of East Aurora School District 131 and Carnow Conibear. This information is based on the specific parameters of the scope of work for this project and the regulations in force at the time of the report.

Carnow Conibear has applied prevailing industry standards and reasonable judgment and effort within the scope of work, while conducting the radon measurement survey. The standards, judgment, and effort used by Carnow Conibear personnel to investigate, assess, and determine the presence of potential environmental hazards and liabilities associated with the radon survey at the Buildings & Grounds Service Center (Career Center), Aurora, Illinois are consistent with requirements outlined in federal and state guidelines. Carnow Conibear makes no warranty, express or implied, that the findings and interpretations in this report are a complete representation of the environmental hazards and liabilities, associated with the Buildings & Grounds Service Center (Career Center), Aurora, Illinois.

APPENDIX A

Floor Plans – Radon Sampling Locations



1 RADON SAMPLE LOCATIONS
GROUND FLOOR PLAN

NOT TO SCALE

N TRUE NORTH

TESTED BY:
Derek Lantry
IEMA License #: RNI2004213

DRAWN BY:
J. Kalingasan

CHECKED BY:
D. Lantry

CLIENT:
East Aurora Public School District 131
417 Fifth Street
Aurora, Illinois, 60505

LEGEND:
- Approximate location of activated charcoal radon measurement device
- 4482418 Radon measurement device serial number

SHEET TITLE:
Radon Testing Locations at
Buildings and Grounds Service Center
411 Hill Avenue
Aurora IL, 60505

Carnow, Conibear & Assoc., Ltd.
Environmental Consulting Services
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CARNOW CONIBEAR

CCA PROJECT NO.
A146000137

SURVEY DATE:
5/8/2018 to 5/11/2018

SHEET NO.
Rn-1

K:_comepd\Projects\Radon Program\2018 Projects\2018 East Aurora District Radon Testing\Buildings & Grounds (Career Center)\Buildings and Grounds (Career Center) Radon.dwg

APPENDIX B

Laboratory Analysis Report

May 16, 2018 **** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

BUILDINGS AND GROUNDS SERVICE CENTE
411 HILL AVENUE, AURORA, IL

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
9044588	BREAK ROOM 121	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044595	CUSTODIAL CLOSET 119	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	0.9 ± 0.3	2018-05-14
9045113	HALLWAY	2018-05-08 @ 4:00 pm	2018-05-11 @ 1:00 pm	< 0.3	2018-05-14
9045114	HALLWAY	2018-05-08 @ 4:00 pm	2018-05-11 @ 1:00 pm	< 0.3	2018-05-14
9044589	MECHANICAL ROOM 121A	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044585	OFFICE 102	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044586	OFFICE 103	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044587	OFFICE 104	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044590	OFFICE 122	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044591	OFFICE 122	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044592	OFFICE 123	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044594	OFFICE 125	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9045108	PAINT ROOM 113	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044584	ROOM 101	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044596	ROOM 105	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044597	ROOM 105	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044598	ROOM 106	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044599	ROOM 106	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9045101	ROOM 108	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9044600	ROOM 109	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9045112	ROOM 110	2018-05-08 @ 4:00 pm	2018-05-11 @ 1:00 pm	< 0.3	2018-05-14
9045111	ROOM 110	2018-05-08 @ 4:00 pm	2018-05-11 @ 1:00 pm	< 0.3	2018-05-14
9045103	ROOM 111	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9045102	ROOM 111	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	0.5 ± 0.3	2018-05-14
9045107	ROOM 112	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9045106	ROOM 112A	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9045104	ROOM 115	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9045105	ROOM 115	2018-05-08 @ 3:00 pm	2018-05-10 @ 5:00 pm	< 0.3	2018-05-14
9045109	ROOM 116	2018-05-08 @ 4:00 pm	2018-05-11 @ 1:00 pm	< 0.3	2018-05-14
9045110	ROOM 116	2018-05-08 @ 4:00 pm	2018-05-11 @ 1:00 pm	< 0.3	2018-05-14

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

APPENDIX C

Radon Measurement Professional License

Bruce Rauner
Governor

State of Illinois

James K. Joseph
Director

IEMA Division of Nuclear Safety

Pursuant to the Radon Industry Licensing Act, 420 ILCS 44 et seq. and 32 Illinois Adminstrative Code 422, Licensing of Radon Detection and Mitigation Services, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued.

This is to certify that **Nicole Bennett**

License Number **RNI2016213**

has met the requirements for **Radon Measurement Professional**

Issued - Expires **05/18/2016 - 05/31/2021**

Limited to Radon measurements of residential real estate, home environment, school and commercial buildings only.

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AUG. 26TH 1818

161391001

Patrick I. Daniels, Radon Program