



Testing, Mitigation, System Design  
CCB 180537  
CASCARI927C1  
Fed ID 26-1809992

12839 NE Airport Way, Building 9  
Portland, Oregon 97230  
Phone: (503) 421-4813  
Fax: (503) 281-6170  
Office@CascadeRadon.com

Radon Survey Analysis  
Job# 19-C119R

for

Central Point School District  
Patrick Elementary School  
c/o Dale Giovannetti

property located at

1500 2<sup>nd</sup> Ave

Gold Hill, OR 97525

January 24, 2020



STATE OF OREGON  
CERTIFIED  
EMERGING SMALL BUSINESS

ESB#10782

## **Introduction**

The following report documents a study of radon levels for the property located at address. The goal of this study is to determine indoor radon levels for all areas in contact with the ground. Testing was performed per Oregon Health Authority School Testing Protocols.

**Analysis assumes that the buildings tested were maintained under “closed-building” conditions** (windows closed and exterior doors shut immediately after entering and exiting), as well as normal indoor temperatures, for the duration of the testing period. The H-VAC system for each building was set to normal occupied settings for the entirety of the testing period.

## **Conclusions and Recommendations**

Test was a “Short-Term” test, with minimum duration of 60 hours. See the chart below of areas in buildings that were tested, and the corresponding levels found. All current test results are provided in Table 1. Maps of the test levels are provided in Appendix A. Note that all thirty-nine (39) locations tested had results below the USEPA Action Level of 4.0 pCi/L.

No mitigation action is recommended at this time. While the USEPA recommends buildings be fixed if the radon level is 4.0 pCi/L or more, because there is no known safe level of exposure to radon, the US EPA also suggests individuals consider fixing buildings for radon levels between 2.0 pCi/L and 4.0 pCi/L.

This report represents the average radon concentration for the period that testing was and at the specific location(s) within the building. The concentration of radon gas in indoor air can vary widely; it fluctuates daily, seasonally, and with weather conditions. Indoor radon levels may be affected by barometric pressure, strong winds, rain-soaked ground, snow cover, heating and A/C systems, building construction, open windows, and the like. For further confirmation of average, long-term radon levels, it is suggested that long-term, Alpha-Track type radon testing be performed.

NOTE: It is recommended that any building indicating low radon values be retested at least every 5 years. In areas where mitigation has been performed, it is recommended to test using long-term testing at least every 2 years.

## **Radon Level Measurements**

The building tested was assumed occupied during testing. The measurement technique used (48) AirChek activated charcoal kits.

Test Start Date: 12/18/2019

Test End Date: 12/21/2019

Measurements of radon levels were made in the following areas:

### ***Table 1: Results***

<b>Room</b>	<b>Floor</b>	<b>Kit ID #</b>	<b>Test Start Time</b>	<b>Test End Time</b>	<b>Result (pCi/L)</b>
13	1	9336106	11:25 AM	10:00 AM	0.9
Kitchen	1	9336105	11:57 AM	10:13 AM	0.7
Boiler room	1	9336108	12:07 PM	10:18 AM	1.3
Ne cafeteria	1	9336111	11:55 AM	10:13 AM	1.8
Sw cafeteria	1	9336112	11:52 AM	10:12 AM	1.4
Timeout office	1	9336113	12:04 PM	10:15 AM	0.3
Work room	1	9336134	11:43 AM	10:09 AM	2.4
Smart room	1	9336135	11:45 AM	10:10 AM	2.2
Stage	1	Duplicate Avg*	11:49 AM	10:11 AM	1.5
Health room	1	9336138	11:59 AM	10:14 AM	0.3
La clinica office	1	9336139	12:00 PM	10:14 AM	0.3
Custodian	1	Duplicate Avg*	12:05 PM	10:16 AM	0.3
17	1	9336161	11:36 AM	10:07 AM	3.2
18	1	9336162	11:38 AM	10:03 AM	2.2
Security	1	9336163	11:18 AM	09:56 AM	0.9
19	1	Duplicate Avg*	11:40 AM	10:02 AM	1.9
5	1	9336165	11:01 AM	09:49 AM	0.6
6	1	9336166	11:03 AM	09:50 AM	1.2
Library	1	Duplicate Avg*	11:22 AM	09:57 AM	0.9
12	1	9336169	11:24 AM	09:59 AM	0.5
16	1	9336170	11:28 AM	10:01 AM	2.2
15	1	9336172	11:30 AM	10:04 AM	2.6
14	1	9336173	11:31 AM	10:06 AM	1.2
Counselor	1	9336174	11:35 AM	10:22 AM	1.7
8	1	9336175	11:09 AM	09:53 AM	1.2
4	1	9336176	10:59 AM	09:48 AM	0.3
7	1	9336177	11:07 AM	09:52 AM	1.2
Principal	1	9336178	10:51 AM	09:44 AM	0.3
Teacher lounge	1	9336179	11:17 AM	09:56 AM	1.0
Back of library	1	9336180	11:20 AM	09:57 AM	0.9

Room	Floor	Kit ID #	Test Start Time	Test End Time	Result (pCi/L)
2	1	9336182	10:55 AM	09:47 AM	0.5
10	1	9336183	11:14 AM	09:55 AM	0.8
Work rm	1	Duplicate Avg*	11:15 AM	09:55 AM	1.6
Room 1	1	Duplicate Avg*	10:52 AM	09:45 AM	0.3
3	1	9336186	10:56 AM	09:47 AM	0.6
Quiet office 6	1	9336187	11:06 AM	09:51 AM	1.4
11	1	9336188	11:10 AM	09:53 AM	0.7
Main office	1	9336190	10:50 AM	09:45 AM	0.3
9/10	1	9336192	11:12 AM	09:54 AM	0.8

Duplicate measurements were conducted as a means to assess the precision of the test measurements. The criteria of acceptance is that the average relative percent difference (ARPD) of the results of the two measurement results for results whose averages are greater than 4.0pCi/L, should be within 25%. The results of the collated duplicates are provided in Table 2. The applicable ARPD for this survey was not applicable and is thus in compliance.

*Table 2: \*Duplicate Table*

Room	Kit ID#	Test Start Time	Test End Time	Result (pCi/L)	Average (pCi/L)	Avg > 3.9 pCi/L?	RPD %
Room 1	9336185	10:52 AM	09:45 AM	0.3	0.3	No	N/A
	9336181	10:53 AM	09:45 AM	0.3			
19	9336164	11:40 AM	10:02 AM	1.9	1.9	No	N/A
	9336107	11:40 AM	10:02 AM	1.9			
Work Room	9336184	11:15 AM	09:55 AM	1.6	1.6	No	N/A
	9336189	11:15 AM	09:55 AM	1.6			
Library	9336167	11:22 AM	09:57 AM	0.9	0.9	No	N/A
	9336168	11:22 AM	09:57 AM	0.8			
Stage	9336136	11:49 AM	10:11 AM	1.5	1.5	No	N/A
	9336137	11:49 AM	10:11 AM	1.5			
Custodian	9336140	12:05 PM	10:16 AM	0.3	0.3	No	N/A
	9336090	12:09 PM	10:16 AM	0.3			
Average RPD for Duplicate Averages more than 3.9							N/A

Room	Kit ID#	Test Start Time	Test End Time	Result (pCi/L)	Average (pCi/L)	Avg > 3.9 pCi/L?	RPD %
						pCi/L:	
						In Compliance:	Yes

As a means to determine any biases in the results, detectors were deployed but not opened. At the time of test retrieval of the regular test, the devices were removed from their packaging and sent to the laboratory for blind analysis. The results of these unexposed devices are shown in Table 3. As can be seen, the laboratory reported these at the lower level of detection, indicating that no biases were introduced in handling and shipping of the devices.

**Table 3: Blanks**

Room	Blank #	Kit ID #	Result (pCi/L)	In Compliance?
6	1	9336191	0.3	Yes
16	2	9336171	0.3	Yes

A device was also selected from the lot of detectors that were utilized for exposure to a known radon environment at a spiking chamber (Bowser-Morner, NEHANRPP ID# 101 TC). After exposure, the device was submitted as a blind measurement to the laboratory. A comparison of the reported reading from the lab and the known concentration in the chamber is as follows:

Chamber concentration to which device was exposed:	25.5 pCi/L
Concentration reported by lab:	25.2
Relative percent difference (RPD):	1.2

Chamber concentration to which device was exposed:	25.5 pCi/L
Concentration reported by lab:	27.2
Relative percent difference (RPD):	6.5

The RPD between the reported and spiking concentration is well within normal limits.

**Key:**

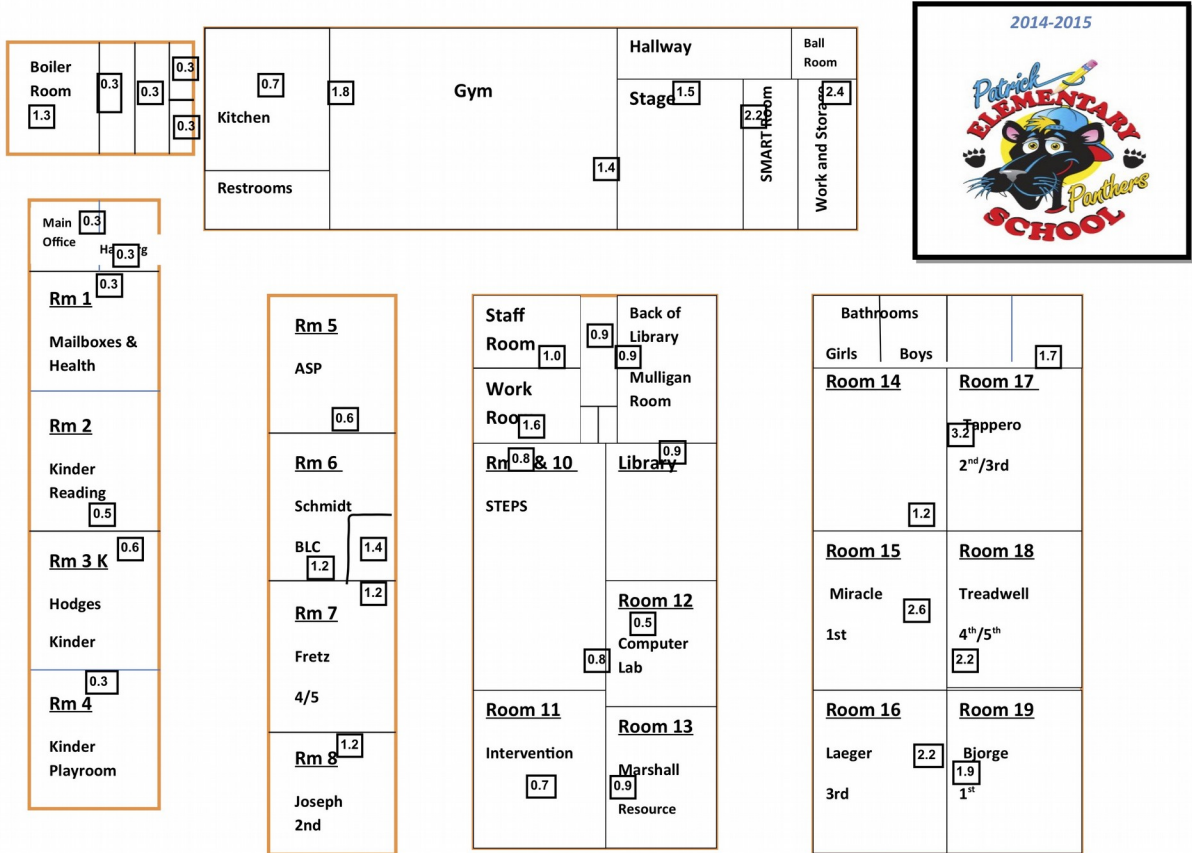
pCi/L: Picocuries per liter – units of radon concentration.

Average (Avg): Cumulative average of the entire period since the test started.

Please contact me if you have any questions.

Thank you,  
 Rachell Meyers  
 NRPP 110320 RT

Appendix A: Test Results Map



# Appendix B: Test Placement Map

