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Radon Survey Analysis
Job # 18-C101R

for

Scappoose School District
Scappoose Middle School
c/o Jeff Andresen

property located at

52265 South Columbia River

Hwy Scappoose OR 97056

November 08, 2018



Introduction

The following report documents a study of radon levels for the property located at 52265 South Columbia River Hwy Scappoose OR 97056. The goal of this study is to determine indoor radon levels in all areas in contact with the ground and to sample radon in areas on the floors above. Testing was performed per AARST/ANSI protocols (MALB 2014), and EPA 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 occupied settings for the entirety of the testing period.

Conclusions and Recommendations

Test was a “Short-Term” test, with minimum duration of 70-72 hours. See the chart below of areas in building that were tested, and the corresponding levels found. Note that sixty (60) of 65 locations tested had results below the EPA Action Level of 4.0 pCi/L.

It is recommended that a certified radon mitigation company be contacted to mitigate the elevated radon level bringing them below the EPA Action Level. While the EPA 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, EPA also suggests individuals consider fixing their buildings for radon levels between 2.0 pCi/L and 4.0 pCi/L.

The concentration of radon gas in indoor air can vary widely. It may fluctuate from day to day, week to week, and season to season. Indoor radon levels may be affected by barometric pressure, high winds, rain-soaked ground, snow cover, heating and A/C systems, house construction, open windows, and the like. For further confirmation of average, long-term radon levels, it is suggested a long-term, Alpha-Track type radon test be performed.

NOTE: If radon testing of buildings indicates low radon levels, it is recommended that retesting occur every 5 years. It is recommended that a certified radon mitigation company be contacted to evaluate the areas which are elevated to determine appropriate mitigation action to bring them below the USEPA Action Level. It is recommended that certified mitigated areas be retested every two years to reassure that the areas are maintained below the USEPA Action Level.

Radon Level Measurements

The building tested was assumed occupied during testing.

The measurement technique used (65) AirChek activated charcoal kits.

Test Start Date: 11/5/2018

Test End Date: 11/08/2018

Measurements of radon levels were made in the following areas:

Table 1: Results

Room	Floor	Kit ID#	Test Start Time	Test End Time	Result (pCi/L)
B-3	1	*Duplicate Avg	8:13 AM	8:15 AM	0.9
B-5	1	9112909	8:16 AM	8:17 AM	1.2
Teachers' Lounge	1	9112911	8:22 AM	8:25 AM	1.6

Room	Floor	Kit ID#	Test Start Time	Test End Time	Result (pCi/L)
Women's PE office	1	9112910	8:25 AM	8:23 AM	1.9
Women's locker room	1	9112916	8:33 AM	8:23 AM	1.3
B-7	1	9112923	8:42 AM	8:22 AM	1.0
B-9	1	9112918	8:43 AM	8:27 AM	2.3
B-11	1	9112917	8:45 AM	8:28 AM	1.5
B-10	1	*Duplicate Avg	8:48 AM	8:29 AM	0.3
B-2	1	9112920	8:50 AM	8:16 AM	0.7
B-1	1	9112924	8:51 AM	8:16 AM	1.5
Men's Locker room 1	1	9112921	9:00 AM	8:19AM	2.3
Men's Locker room 2	1	9112925	9:00 AM	8:18 AM	2.3
Men's Locker	1	9112913	8:53 AM	8:20 AM	2.4
Men's Locker Office	1	9112912	8:55 AM	8:20 AM	2.1
Teacher Storage/prep	1	9112932	9:13 AM	8:33 AM	1.7
C-3	1	*Duplicate Avg	9:16 AM	8:35 AM	0.3
C-1	1	9112926	9:08 AM	8:31 AM	1.7
Teacher Science Prep	1	9112932	9:13 AM	8:33 AM	5.3
C-2	1	9112927	9:14 AM	8:33 AM	0.2
C-4	1	9112929	9:17 AM	8:36 AM	2.0
C-5	1	9112933	9:20 AM	8:37 AM	3.2
Computer Lab	1	9112934	9:21 AM	8:38 AM	3.3
C-7	1	9112935	9:22 AM	8:38 AM	3.4
C-8	1	9112937	9:26 AM	8:39 AM	0.9
Computer Lab 2	1	9112936	9:27 AM	8:40 AM	1.2
C-9	1	9112940	9:29 AM	8:40 AM	1.0
Modular A	1	9112938	9:33 AM	8:58AM	0.3
Modular B	1	9112939	9:35 AM	8:58 AM	0.3
Woodshop	1	9112942	9:39 AM	9:04 AM	3.3
Woodshop office	1	*Duplicate Avg	10:04 AM	9:05 AM	3.0
Woodshop 2	1	9112949	10:04 AM	9:05 AM	3.8
Cafeteria 1	1	9112945	9:44 AM	9:09 AM	2.3
Cafeteria 2	1	9112943	9:44 AM	9:10 AM	2.6
Cafeteria 3	1	9112930	9:45 AM	9:09 AM	2.3
Kitchen	1	*Duplicate Avg	9:49 AM	9:09 AM	1.8
Team room 1	1	9112952	10:11 AM	8:47 AM	1.2
Gym 1	2	9112954	10:28 AM	8:10 AM	1.3
Gym 2	2	9112953	10:29 AM	8:09 AM	1.3
Gym 3	2	9112955	10:30 AM	8:07 AM	1.4
Stage	2	9112956	10:30 AM	8:08 AM	1.2
Apparatus office	1	*Dulpicate Avg	10:35 AM	9:02 AM	4.2
Apparatus room 1	1	9112957	10:42 AM	9:03 AM	5.5
Apparatus room 2	1	9112958	10:42 AM	9:03 AM	4.4
Team room 2	1	Duplicate Avg	10:45 AM	8:48 AM	1.8

Room	Floor	Kit ID#	Test Start Time	Test End Time	Result (pCi/L)
Annex gym office	1	9112966	10:48 AM	8:44 AM	2.8
Annex gym west	1	9112967	10:52 AM	8:42 AM	0.7
Annex gym NW	1	9112968	10:53 AM	8:42 AM	0.8
Annex gym SW	1	9112963	10:54 AM	8:43 AM	0.5
Annex gym SE	1	9112969	10:57 AM	8:45 AM	0.6
Annex gym NE	1	9112964	10:55 AM	8:45 AM	0.8
Electrical	1	9112970	11:06 AM	8:51 AM	1.4

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 4.0, 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%
B-3	9112907	8:13 AM	8:15 AM	1.0	0.9	No	-
	9112915	8:13 AM	8:15 AM	0.8			
B-10	9112914	8:48 AM	8:29 AM	0.3	0.3	No	-
	9112919	8:48 AM	8:29 AM	0.3			
Kitchen	9112946	9:49 AM	9:09 AM	1.8	1.8	No	-
	9112941	9:50 AM	9:09 AM	1.8			
Woodshop Office	9112948	10:04 AM	9:05 AM	3.1	3.0	No	-
	9112949	10:04 AM	9:05 AM	2.9			
Apparatus office	9112956	10:35 AM	9:02 AM	4.1	4.2	Yes	4.9%
	9039081	10:41 AM	9:02 AM	4.3			
Average RPD for Duplicate Averages more than 3.9 pCi/L:							Yes
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, of test retrieval of the regular test, the devices were removed from their packaging and sent to the laboratory for blind analysis. The results 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?
Teachers lounge	1	9112908	<0.3	Yes
Team room 2	2	9112962	<0.3	Yes
In transit	3	9112975	<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:	26.2 pCi/L
Concentration reported by lab:	25.0
Relative percent difference (RPD):	4.7%

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,

Tamara Linde
NRPP 108246 RT

