



Testing, Mitigation, System Design
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Fed ID 26-1809992

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Radon Survey Analysis
Job# 19-C113R

for

Vernonia School District
Mist Elementary School

c/o Mark Brown

property located at

69163 Hwy 47

Clatskanie , OR 97016

March 3, 2020



STATE OF OREGON
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ESB#10782

Introduction

The following report documents a study of radon levels for the property located at 69163 Hwy 47 Clatskanie OR 97016. 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 eight (8) 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 (11) AirChek activated charcoal kits.

Test Start Date: 1/27/2020

Test End Date: 1/30/2020

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)
1	1	9335969	01:12 PM	11:33 AM	0.7
2	1	9335972	01:13 PM	11:33 AM	0.3
3	1	9335971	01:13 PM	11:36 AM	0.8
4	1	9335918	01:15 PM	11:34 AM	0.8
Gym	1	9335978	01:07 PM	11:36 AM	0.3
Kitchen	1	9335915	01:17 PM	11:40 AM	0.3
Office	1	9335968	01:10 PM	11:34 AM	0.8
Stage	1	9341903	01:06 PM	11:37 AM	0.3

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 %
Office	9335968	01:10 PM	11:34 AM	0.8	0.8	No	N/A
	9335970	01:10 PM	11:35 AM	0.7			
Average RPD for Duplicate Averages more than 3.9 pCi/L:							No
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?
4	1	9335912	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:	24.8
Relative percent difference (RPD):	2.8

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