

INDUSTRIAL HYGIENE REPORT

RADON TESTING REPORT

Candalaria Elementary School

Report to: Vonnie B. Good, EHS Salem Keizer School District

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On-site: March 14–17, 2023

Report: March 21, 2023

PURPOSE

After initial testing in 2010 showed radon levels above EPA's Action Level of 4.0 picoCuries/L (pCi/L) in a number of rooms at Candalaria, three radon mitigation systems were installed in August of 2010. To ensure that the systems are functioning properly and levels are well below EPA's Action Level, annual radon testing is performed.

This testing is a requirement in ORS 332 Healthy and Safe Schools Plan rules.

CONCLUSION AND RECOMMENDATION

All lower level (basement) classrooms had low to non-detectable levels of radon.

One test location was above the EPA's action level of 4 picoCuries per liter (pCi/l) this was the "Dungeon" or storage room @ 12.5 pCi/L, which is not meant to be occupied.

One additional room, the fan (Custodian's) room was at @ 3.9 pCi/L. The fan room is no longer used as an office for the custodian.

TESTING

Radon testing was conducted using protocols recommended by the Oregon Health Authority per ORS 332.166-167. Radon Air-Chek short-term test devices were used in the rooms by suspending the device in each room. The testing occurred from March 14-17, 2023, during normal and routine school ventilation system operation, as well as with the radon mitigation system in operation. Weather conditions during the weeks prior of testing had been generally wet with cold to moderate temperatures.

Quality assurance testing was also conducted by utilizing laboratory spiked test devices, (QCS), blank (QCB) test devices, and duplicate samples per the recommendations found in ORS 332.166-167. These quality assurance test results are included in the table below.

EPA RADON GUIDELINES

The EPA has set an Action Level of 4.0 pCi/L (picoCuries per liter) for schools. If classrooms or buildings have radon levels at or above 4.0 pCi/L, EPA recommends that schools take action to reduce the level. These actions include:

Step 1 If your result is 4.0 pCi/L or higher take a follow-up test (Step 2) to be sure.

Step 2. Follow up with either a long-term test or a second short-term test.

CONTROL OF RADON LEVELS IN SCHOOLS

The major control mechanism for lowering radon levels within school buildings is the use of dilution ventilation. If the amount of outside air delivered into a building increases, the radon levels should decrease.

Sample Data Attached

Radon test result report for:
**CANDALARIA
 MAIN**

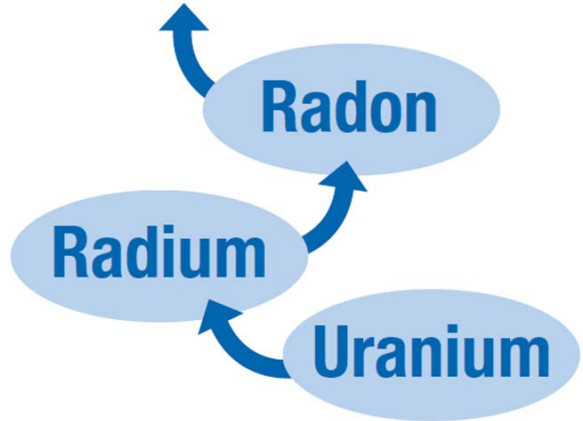
Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11314989	1	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	< 0.3	2023-03-20
11315001	12	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	1.5 ± 0.3	2023-03-20
11315002	13	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	1.5 ± 0.3	2023-03-20
11315003	14	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	2.0 ± 0.3	2023-03-20
11315004	15E	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	3.0 ± 0.3	2023-03-20
11315005	15W	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	2.9 ± 0.3	2023-03-20
11314990	2 SW	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	< 0.3	2023-03-20
11314991	2NE	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	< 0.3	2023-03-20
11314992	3	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	< 0.3	2023-03-20
11314993	4	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	< 0.3	2023-03-20
11314996	5	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	1.0 ± 0.3	2023-03-20
11314994	6	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	1.6 ± 0.3	2023-03-20
11314995	6A	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	1.4 ± 0.3	2023-03-20
11314986	CAFETERIA SW	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	1.2 ± 0.3	2023-03-20
11314987	DUNGEON	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	12.5 ± 1.0	2023-03-20
11314985	FAN RM	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	3.9 ± 0.3	2023-03-20
11314999	GYM W	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	< 0.3	2023-03-20
11315000	GYMNE	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	< 0.3	2023-03-20
11314984	HEALTH RM	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	2.1 ± 0.3	2023-03-20
11314988	KITCHEN	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	0.5 ± 0.3	2023-03-20
11314982	OFFICE MANAGER	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	1.5 ± 0.3	2023-03-20
11314998	PE OFFICE	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	< 0.3	2023-03-20
11314983	PRINCIPAL	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	2.1 ± 0.3	2023-03-20
11315015	QCB1	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	< 0.3	2023-03-20
11315016	QCB2	2023-03-14 @ 10:00 am	2023-03-18 @ 1:00 pm	< 0.3	2023-03-20
11118566	QCS1	2023-03-12 @ 9:00 am	2023-03-15 @ 9:00 am	21.3 ± 1.7	2023-03-20
11314981	SCHOOL OFFICE	2023-03-14 @ 10:00 am	2023-03-17 @ 1:00 pm	2.8 ± 0.3	2023-03-20

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QCS1, highlighted above, is a "laboratory spiked" test kit. They are part of the quality control process of testing referenced in the last paragraph on Page 1 of this report. IT DOES NOT REPRESENT RADON LEVELS IN THE BUILDING!

Radon in schools

Fact Sheet on Radon Exposure for Students and Staff



What is radon?

Radon is a radioactive gas you can't see, smell or taste. It is a decay product of uranium and is found all over the world. Uranium and its decay products are naturally found in the soil and rocks beneath buildings. Our school image (right) shows how uranium naturally decays into radium that further breaks down into radon gas. Radon moves up through the soil and enters buildings in contact.

Why is radon a problem in Oregon schools?

Radon is the 2nd leading cause of lung cancer, after smoking. The Environmental Protection Agency (EPA) estimates around 21,000 radon-related lung cancer deaths occur each year. Breathing high levels of radon in combination with smoking is even more dangerous and increases your risk by ten times.

Home is likely the most significant source for breathing radon. According to the EPA, 1 out of 15 homes has high radon levels. School is likely the second largest source of radon exposure for students and staff. The only way to know your radon levels is to test. The EPA recommends that **all** homes and schools be tested for radon.

EPA
ACTION
LEVEL

4.0

Picocuries
Liter of air

Testing at Home

Radon testing at home can be simple and inexpensive. You can find do-it-yourself test kits at most local hardware stores and online from the [American Lung Association](http://www.AmericanLungAssociation.org). Oregon Health Authority (OHA) Radon Program also offers FREE test kits to those living in areas where little data is available. To find out if you are eligible, contact radon.program@state.or.us.

Testing in Oregon Schools

By law (ORS 332.341-345), all Oregon schools are required to test for radon before January 1, 2021.

School radon testing involves the placement of small testing devices in all frequently occupied rooms on the lowest level of the building. Initial testing is short-term and lasts between 2 and 7 days. Test devices are not dangerous in any way.

Rooms that test at or above 4.0 picocuries per liter of air (pCi/L) (EPA recommended action level) are subject to longer confirmation testing and radon reduction systems.

*Test results for your school can be found at:

For more information about radon, visit www.healthoregon.org/radon.

If you have other questions or concerns about radon testing at your school, contact _____ at _____.



Oregon
Health
Authority