



January 26, 2023

Matt F. Lichtenfels, CEM, LEED AP
Energy & Resource Conservation Project Manager
Beaverton School District
2180 SW 170th Avenue
Beaverton, Oregon 97003

Via email: Matthew_Lichtenfels@beaverton.k12.or.us

Regarding: Radon Testing
Ridgewood Elementary School
10100 SW Inglewood Street
Beaverton, Oregon 97225
PBS Project 27121.020.0002

Dear Mr. Lichtenfels:

From January 17 through January 20, 2023, PBS Engineering and Environmental Inc. (PBS) performed short-term radon testing at Ridgewood Elementary School, located at 10100 SW Inglewood Street in Beaverton, Oregon.

The Environmental Protection Agency (EPA) recommends, and the Oregon Health Authority (OHA) requires, that school buildings be tested for radon and that any radon concentrations be maintained below 4.0 picocuries per liter (pCi/L) of air. PBS used Radonova, brand single-use, short-term radon test kits to measure radon levels in frequently occupied rooms that are in contact with the ground or above unoccupied basements or crawlspaces.

The following table lists all samples in which radon levels were found to be above the EPA action level.

Test Kits with Radon 4.0 pCi/L or above

Test Kit Number	Sample Location	Radon Level (pCi/L)
RK109482	Room C116	4.5 ± 0.6
RK109547	Room B108	5.5 ± 0.6
RK109469	Room A114	5.2 ± 0.5

See the attached laboratory analysis report for more details.

In addition to the EPA recommendation that radon concentrations not exceed 4.0 pCi/L, OHA recommends that the following steps be conducted based on the results of a room's initial short-term test:

- **If the result is less than 2.0 pCi/L**, school districts are required to test again every 10 years, per Oregon Revised Statute 332.166-167.

- **If the result is between 2.0 pCi/L and 4.0 pCi/L**, consider fixing (i.e., lowering) the radon in that room.
- **If the result is from 4.0 pCi/L to 8.0 pCi/L**, perform a follow-up measurement of that room using a long-term test. This test should be conducted over as much of a nine-month school year as possible, when the room is likely to be occupied. If that result is equal to or greater than 4.0 pCi/L, the radon in the room should be fixed (i.e., lowered).
- **If the initial short-term test result is equal to or greater than 8.0 pCi/L**, conduct a second short-term test and average its result with the initial short-term test result. If the average of the two is equal to or greater than 4.0 pCi/L, radon in the room should be fixed (i.e., lowered).

Note: A great difference in the results of the short-term tests may indicate a flaw in the testing process. Investigate and consider retesting. For situations in which one of the test results is equal to or greater than 4.0 pCi/L, if the higher result is two or more times the lower result, repeat the test.

LIMITATIONS OF SCOPE

This study was limited to the tests and locations, as previously indicated. The site as a whole may have other environmental concerns that will not be characterized by this study. The findings and conclusions of this work are not scientific certainties, but probabilities based on professional judgment concerning the significance of the data gathered during the course of this investigation. PBS is not able to represent conditions on the site or adjoining sites beyond those detected or observed by PBS.

Please feel free to contact me at 503.417.7603 or Rich.Dufresne@pbsusa.com with any questions or comments.

Sincerely,

Rich Dufresne
Senior Project Manager
PBS Engineering and Environmental Inc.

Attachment: Radonova Laboratory Analysis Report

PBS Engineering & Environmental
Eleanor Dick

RADON MONITORING REPORT

Description of the measurement

The measurement was performed with an Activated Charcoal Adsorption detector (QuickScreen) and was analyzed by Alpha Energy Laboratories (NRPP ID: 101132 AL).

The detector(s) arrived to Alpha Energy Laboratories, Inc. **01/23/2023**. They were measured **01/23/2023**.

The detectors were deployed by PBS Engineering & Environmental and retrieved by PBS Engineering & Environmental

Property data and address

MEASURE SITE ADDRESS

Ridgewood Elementary School
10100 SW Inglewood St
Beaverton OR 97225

BUILDING ID

Ridgewood Elementary School

Test results

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RK108862 [QuickScreen]	01/17/2023 07:00 AM – 01/20/2023 07:00 AM	C108, Announcement Speaker		0.6 ± 0.4 pCi/L
RK108909 [QuickScreen]	01/17/2023 07:02 AM – 01/20/2023 07:02 AM	C106, Hat by whiteboard		2.9 ± 0.5 pCi/L
RK109549 [QuickScreen]	01/17/2023 07:04 AM – 01/20/2023 07:03 AM	C110, Intercom system		1.3 ± 0.5 pCi/L
RK108924 [QuickScreen]	01/17/2023 07:05 AM – 01/20/2023 07:05 AM	C104, By telephone		3.3 ± 0.5 pCi/L
RK109557 [QuickScreen]	01/17/2023 07:07 AM – 01/20/2023 07:06 AM	C112, AV System		1.6 ± 0.5 pCi/L
RK109478 [QuickScreen]	01/17/2023 07:08 AM – 01/20/2023 07:07 AM	C114, Filing Cabinet		2.0 ± 0.6 pCi/L
RK109482 [QuickScreen]	01/17/2023 07:10 AM – 01/20/2023 07:08 AM	C116, Wood Cabinet (Hidden)		4.5 ± 0.6 pCi/L

Comment to the results

Trygve Rönnqvist (Electronically signed)

Signature Radonova Laboratories Laboratory Measurement Specialist

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331.814.2200, help@radonova.com

PBS Engineering & Environmental
Eleanor Dick

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DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RK109535 [QuickScreen]	01/17/2023 07:13 AM – 01/20/2023 07:09 AM	C118, Lefthand Shelf		1.9 ± 0.6 pCi/L
RK109522 [QuickScreen]	01/17/2023 07:15 AM – 01/20/2023 07:11 AM	B120, Right corner storage		0.9 ± 0.5 pCi/L
RK108916 [QuickScreen]	01/17/2023 07:16 AM – 01/20/2023 07:12 AM	LIBRARY, Top right shelf		1.4 ± 0.4 pCi/L
RK109540 [QuickScreen]	01/17/2023 07:16 AM – 01/20/2023 07:12 AM	LIBRARY, Top Left Shelf		1.1 ± 0.4 pCi/L
RK108936 [QuickScreen]	01/17/2023 07:19 AM – 01/20/2023 07:14 AM	B118, Teachers Desk		< 0.7 pCi/L
RK109542 [QuickScreen]	01/17/2023 07:19 AM – 01/20/2023 07:14 AM	B118 - DUP, Teachers Desk		< 0.6 pCi/L
RK108949 [QuickScreen]	01/17/2023 07:23 AM – 01/20/2023 07:16 AM	CONF 2, "Behind ""T"""		1.5 ± 0.4 pCi/L
RK108941 [QuickScreen]	01/17/2023 07:24 AM – 01/20/2023 07:17 AM	B116, Grey filing cabinet		3.6 ± 0.5 pCi/L
RK108900 [QuickScreen]	01/17/2023 07:25 AM – 01/20/2023 07:18 AM	B114, white shelf		1.7 ± 0.5 pCi/L

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RK108908 [QuickScreen]	01/17/2023 07:27 AM – 01/20/2023 07:19 AM	B112, white shelf		3.9 ± 0.5 pCi/L
RK108938 [QuickScreen]	01/17/2023 07:28 AM – 01/20/2023 07:21 AM	B110, Teachers Desk		1.2 ± 0.5 pCi/L
RK109547 [QuickScreen]	01/17/2023 07:28 AM – 01/20/2023 07:22 AM	B108, Lefthand Shelf		5.5 ± 0.6 pCi/L
RK108923 [QuickScreen]	01/17/2023 07:33 AM – 01/20/2023 07:24 AM	MAIN OFFICE, Shelf with trophy		< 1.0 pCi/L
RK108863 [QuickScreen]	01/17/2023 07:34 AM – 01/20/2023 07:25 AM	HEALTH ROOM/WORK ROOM, paper shredder		DNR
RK108865 [QuickScreen]	01/17/2023 07:36 AM – 01/20/2023 07:26 AM	PRINCIPALS OFFICE, pink pot		< 0.7 pCi/L
RK108861 [QuickScreen]	01/17/2023 07:37 AM – 01/20/2023 07:26 AM	PRINCIPALS OFFICE - DUP, pink pot		< 0.8 pCi/L
RK108947 [QuickScreen]	01/17/2023 07:39 AM – 01/20/2023 07:29 AM	STAFF ROOM, Above toaster		< 0.7 pCi/L
RK109517 [QuickScreen]	01/17/2023 07:40 AM – 01/20/2023 07:30 AM	RESOURCE ROOM, Next to stapler		< 0.9 pCi/L

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DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RK108942 [QuickScreen]	01/17/2023 07:42 AM – 01/20/2023 07:31 AM	SPEECH 2, grey storage		< 0.8 pCi/L
RK108950 [QuickScreen]	01/17/2023 07:42 AM – 01/20/2023 07:32 AM	CONF 1/COUNSELOR, grey storage		< 0.7 pCi/L
RK108864 [QuickScreen]	01/17/2023 07:44 AM – 01/20/2023 07:33 AM	PSYCH, behind blue bag		< 0.8 pCi/L
RK108943 [QuickScreen]	01/17/2023 07:45 AM – 01/20/2023 07:35 AM	SPEECH, cabinet top		0.9 ± 0.4 pCi/L
RK109491 [QuickScreen]	01/17/2023 07:47 AM – 01/20/2023 07:37 AM	CUSTODIAL OFFICE, grey shelf		2.9 ± 0.7 pCi/L
RK109484 [QuickScreen]	01/17/2023 07:50 AM – 01/20/2023 07:39 AM	MULTI PURPOSE ROOM, clothing shelf		1.7 ± 0.5 pCi/L
RK109552 [QuickScreen]	01/17/2023 07:50 AM – 01/20/2023 07:39 AM	MULTI PURPOSE ROOM, black cart		3.9 ± 0.7 pCi/L
RK109510 [QuickScreen]	01/17/2023 07:52 AM – 01/20/2023 07:40 AM	CAFETERIA, black shelf		1.9 ± 0.6 pCi/L
RK109561 [QuickScreen]	01/17/2023 07:52 AM – 01/20/2023 07:41 AM	CAFETERIA, shelf next to tv		1.7 ± 0.6 pCi/L

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RK109553 [QuickScreen]	01/17/2023 07:55 AM – 01/20/2023 07:42 AM	CAFETERIA, shelf		2.4 ± 0.5 pCi/L
RK109492 [QuickScreen]	01/17/2023 07:55 AM – 01/20/2023 07:42 AM	CAFETERIA - DUP, shelf		2.4 ± 0.5 pCi/L
RK109562 [QuickScreen]	01/17/2023 07:58 AM – 01/20/2023 07:43 AM	A100, left shelf pencil storage		1.5 ± 0.6 pCi/L
RK109506 [QuickScreen]	01/17/2023 07:59 AM – 01/20/2023 07:44 AM	A102, beneath tree		3.9 ± 0.6 pCi/L
RK109519 [QuickScreen]	01/17/2023 08:00 AM – 01/20/2023 07:45 AM	A104, shelf next to pink basket		1.8 ± 0.6 pCi/L
RK109559 [QuickScreen]	01/17/2023 08:01 AM – 01/20/2023 07:46 AM	A106, next to tree		1.4 ± 0.5 pCi/L
RK108911 [QuickScreen]	01/17/2023 08:04 AM – 01/20/2023 07:47 AM	A108, pencil sharpener		< 0.8 pCi/L
RK109469 [QuickScreen]	01/17/2023 08:06 AM – 01/20/2023 07:49 AM	A114, telephone		5.2 ± 0.5 pCi/L
RK108870 [QuickScreen]	01/17/2023 08:06 AM – 01/20/2023 07:50 AM	GYM OFFICE, bookshelf		3.1 ± 0.4 pCi/L

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DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
<i>RK108940 [QuickScreen]</i>	<i>01/17/2023 08:08 AM – 01/20/2023 07:51 AM</i>	<i>GYMNASIUM, on fence</i>		<i>3.0 ± 0.5 pCi/L</i>
<i>RK109555 [QuickScreen]</i>	<i>01/17/2023 08:08 AM – 01/20/2023 07:52 AM</i>	<i>GYMNASIUM, on bulletin board</i>		<i>2.6 ± 0.5 pCi/L</i>
<i>RK108932 [QuickScreen]</i>	<i>01/17/2023 08:17 AM – 01/20/2023 07:53 AM</i>	<i>GYMNASIUM - DUP, gym hall</i>		<i>2.7 ± 0.5 pCi/L</i>
<i>RK109470 [QuickScreen]</i>	<i>01/17/2023 08:19 AM – 01/20/2023 10:08 AM</i>	<i>BLANK, BLANK</i>		<i>< 0.9 pCi/L</i>
<i>RK109474 [QuickScreen]</i>	<i>01/17/2023 08:19 AM – 01/20/2023 10:09 AM</i>	<i>BLANK, BLANK</i>		<i>< 0.9 pCi/L</i>
<i>RK109518 [QuickScreen]</i>	<i>01/17/2023 08:19 AM – 01/20/2023 10:10 AM</i>	<i>BLANK, BLANK</i>		<i>< 0.9 pCi/L</i>

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Measurement method: Activated Charcoal Adsorption

For this method using the QuickScreen detector, the airtight container with activated charcoal is opened in the area to be sampled and radon in the air adsorbs onto the charcoal granules. At the end of the sampling period, the container is sealed and may be sent to a laboratory for analysis. The gamma decay from the radon adsorbed to the charcoal is counted on a scintillation detector and a calculation based on calibration information is used to calculate the radon concentration at the sample site.

Measured radon concentrations

For each detector, the measured value of the radon concentration is provided. For each value an uncertainty associated with the measurement to a 95% confidence level is also provided. For example a measurement result of 4.0 ± 0.5 pCi/L means that the radon concentration is most likely contained in the range 3.5 - 4.5 pCi/L. If the start or end date of the measurement has not been provided, the radon concentration cannot be calculated. In such cases, the total exposure in pCi*days/L will be reported. The reported measured values are related to the detectors as received by Radonova Laboratories. Detector deployment is not performed by Radonova Laboratories. Measurement information such as monitoring period (dates) and placement location is provided to Radonova Laboratories by the end user.

Codes on non-reportable detectors

DNR Not Reported – Detector Not Returned
ERR Not Reported – See comment

Measurement method versions used when the report was created

ANSI/AARST MAH-2019, Protocol for Conducting Measurements of Radon and Radon Decay Products in Homes
ANSI/AARST MAMF-2017, rev. 1/2021, Protocol for Conducting Measurements of Radon and Radon Decay Products in Multifamily Buildings
ANSI/AARST MALB-2014, rev. 1/2021, Prot. for Conducting Measurements of Radon and Radon Decay Products In Schools and Large Buildings

Radon measurements in Multifamily Buildings, Schools and Large Buildings

The United States Environmental Protection Agency (EPA) recommends remediation if the results of one long-term test or the average of two short-term tests conducted in an occupied room are 4.0 pCi/L or higher. The average yearly residential indoor radon level in the US is estimated to be around 1.3 pCi/L. Long-term tests are conducted for more than 90 days. Short-term tests are conducted between 2 and 90 days and should be performed under closed building conditions.

If an initial short-term test result is less than 4 pCi/L, a follow-up measurement is probably not needed.

If an initial short-term test result is between 4 pCi/L and 8 pCi/L, a long-term or a short-term follow-up measurement is recommended.

If an initial short-term test result is greater than 8 pCi/L, a short term follow-up measurement is recommended in order to get a fast result.

More information about radon measurements and mitigation can be found in the ANSI/AARST publications:

- ANSI/AARST Protocol for Conducting Measurements of Radon and Radon-Decay Products in Schools and Large Buildings.
- ANSI/AARST Protocol for Conducting Radon and Radon Decay Product Measurements in Multifamily Buildings.
- ANSI/AARST Radon Mitigation Standards for Schools and Large Buildings.
- ANSI/AARST Radon Mitigation Standards for Multifamily Buildings.

For more information about the interpretation of your test results or about other radon related issues we suggest contacting your state radon office.

Signature on the report

With the signature on the report, the Measurement specialist at Radonova Laboratories certifies that the quality control procedures follows the guidance in accordance with the AARST/ANSI Measurement Protocols. Measurement information displayed in italics on report has been provided by the customer.

Certification no:

101132-AL, 107830-RT, NY ELAP ID: 11430

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