January 8, 2021

Dave Peterson
Hillsboro School District
4901 SE Witch Hazel Road
Hillsboro, Oregon 97123

Via email: petersod@hsd.k12.or.us

Regarding: District Wide Radon Testing
Brookwood Elementary School
3960 SE Cedar St.
Hillsboro, Oregon
PBS Project 23440.024, Phase 0005

Dear Mr. Peterson:

From December 7 to December 10, 2020, PBS Engineering and Environmental Inc. (PBS) performed short term radon testing at Brookwood Elementary School in Hillsboro, Oregon.

The Environmental Protection Agency (EPA) and Oregon Health Authority (OHA) recommend that 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, Inc. 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.

Laboratory results indicate all short-term radon tests at Brookwood Elementary School were below 4.0 pCi/L.

See the attached Laboratory Analysis Report for more details.

In addition to the EPA recommendation that radon concentrations do not exceed 4.0 pCi/L, OHA recommends 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 503.417.7719 or brian.wehner@pbsusa.com with any questions or comments.

Sincerely,

Digitally signed
by Brian Wehner
Date: 2021.01.08
08:13:35 -08'00'

Brian Wehner
Industrial Hygienist

Attachment: Radonova, Inc. c/o Alpha Energy Labs Laboratory Analysis Report

radonova
The global leader in radon measurement

REPORT NUMBER
5721470:1

REPORT DATE
12/22/2020

REPORT PAGE
1 of 5

PRINT DATE
01/07/2021

OWN ID
N/A

BY
PBS Engineering & Environmental

REPORT RECEIVER(S)
PBS Engineering & Environmental

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. **12/11/2020**.
They were measured **12/11/2020**.

No person has signed the record card and verified that the instructions have been followed.

Property data and address

MEASURE SITE ADDRESS
Hillsboro School District
3083 NE 49th Pl.
Hillsboro OR 97124

BUILDING ID
23440.024 / 0005

Test results

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RB103584	*12/07/2020 08:41 AM – 12/10/2020 08:09 AM*	*Main Office*	*First*	0.4 ± 0.3 pCi/L
RB103562	*12/07/2020 08:45 AM – 12/10/2020 08:11 AM*	*Workroom*	*First*	0.6 ± 0.3 pCi/L
RB103953	*12/07/2020 08:47 AM – 12/10/2020 08:16 AM*	*Staff Lounge (106)*	*First*	< 0.7 pCi/L
RB103563	*12/07/2020 08:50 AM – 12/10/2020 08:10 AM*	*Health Room*	*First*	0.8 ± 0.3 pCi/L
RB103969	*12/07/2020 08:52 AM – 12/10/2020 08:12 AM*	*Principal's Office*	*First*	0.8 ± 0.3 pCi/L
RB103593	*12/07/2020 08:55 AM – 12/10/2020 08:13 AM*	*Multi-Purpose Office*	*First*	< 0.9 pCi/L
RB103568	*12/07/2020 08:58 AM – 12/10/2020 08:14 AM*	*Conference Room*	*First*	0.8 ± 0.3 pCi/L
RB103574	*12/07/2020 09:01 AM – 12/10/2020 08:17 AM*	*Couseling Office*	*First*	0.7 ± 0.3 pCi/L
RB103575	*12/07/2020 09:04 AM – 12/10/2020 08:18 AM*	*Room 103*	*First*	< 0.9 pCi/L
RB103569	*12/07/2020 09:07 AM – 12/10/2020 08:19 AM*	*Room 104*	*First*	0.7 ± 0.3 pCi/L

Comment to the results

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories AB Laboratory Measurement Specialist

RADONOVA INC.
900 Oakmont Lane Suite 207
Westmont IL 60559
331.814.2200, help@radonova.com

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RB103571	*12/07/2020 09:07 AM – 12/10/2020 08:19 AM*	*Room 104 (DUP)*	*First*	0.7 ± 0.3 pCi/L
RB103993	*12/07/2020 09:10 AM – 12/10/2020 08:20 AM*	*Mothers Room*	*First*	< 0.5 pCi/L
RB103578	*12/07/2020 09:12 AM – 12/10/2020 08:21 AM*	*Small Group Room*	*First*	< 0.6 pCi/L
RB103576	*12/07/2020 09:15 AM – 12/10/2020 08:22 AM*	*Room 105*	*First*	< 0.6 pCi/L
RB103586	*12/07/2020 09:18 AM – 12/10/2020 08:23 AM*	*Room 115 / Specialist*	*First*	< 0.5 pCi/L
RB103977	*12/07/2020 09:20 AM – 12/10/2020 08:23 AM*	*Room 116*	*First*	< 0.6 pCi/L
RB103985	*12/07/2020 09:23 AM – 12/10/2020 08:24 AM*	*Media Center*	*First*	< 0.4 pCi/L
RB103585	*12/07/2020 09:24 AM – 12/10/2020 08:24 AM*	*Media Center Office*	*First*	1.0 ± 0.4 pCi/L
RB104002	*12/07/2020 09:27 AM – 12/10/2020 08:25 AM*	*Studio*	*First*	< 0.6 pCi/L
RB103972	*12/07/2020 09:30 AM – 12/10/2020 08:26 AM*	*STEAM Lab*	*First*	< 0.8 pCi/L
RB103988	*12/07/2020 09:30 AM – 12/10/2020 08:26 AM*	*STEAM Lab (DUP)*	*First*	0.9 ± 0.4 pCi/L

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RB103579	*12/07/2020 09:30 AM – 12/10/2020 08:26 AM*	*Blank*		< 0.6 pCi/L
RB103980	*12/07/2020 09:33 AM – 12/10/2020 08:28 AM*	*Room 109*	*First*	< 0.6 pCi/L
RB103565	*12/07/2020 09:35 AM – 12/10/2020 08:29 AM*	*Room 110*	*First*	< 0.6 pCi/L
RB104025	*12/07/2020 09:38 AM – 12/10/2020 08:31 AM*	*Room 111*	*First*	< 0.5 pCi/L
RB103564	*12/07/2020 09:40 AM – 12/10/2020 08:33 AM*	*Room 112*	*First*	0.6 ± 0.4 pCi/L
RB103992	*12/07/2020 09:43 AM – 12/10/2020 08:34 AM*	*Room 113*	*First*	0.6 ± 0.3 pCi/L
RB104017	*12/07/2020 09:45 AM – 12/10/2020 08:35 AM*	*Room 114*	*First*	< 0.5 pCi/L
RB103566	*12/07/2020 09:48 AM – 12/10/2020 08:37 AM*	*Room 115 / Specialist*	*First*	0.7 ± 0.3 pCi/L
RB104009	*12/07/2020 09:51 AM – 12/10/2020 08:39 AM*	*Learning Area 1B*	*First*	< 0.7 pCi/L
RB103556	*12/07/2020 09:51 AM – 12/10/2020 08:39 AM*	*Learning Area 1B (DUP)*	*First*	< 0.8 pCi/L
RB103567	*12/07/2020 09:54 AM – 12/10/2020 08:30 AM*	*Learning Area 1 A*	*First*	< 0.7 pCi/L

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DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RB103557	*12/07/2020 09:57 AM – 12/10/2020 08:40 AM*	*Custodial Office (Room 163)*	*First*	0.5 ± 0.3 pCi/L
RB103558	*12/07/2020 10:00 AM – 12/10/2020 08:43 AM*	*Cafeteria West*	*First*	< 0.7 pCi/L
RB103559	*12/07/2020 10:02 AM – 12/10/2020 08:45 AM*	*Cafeteria East*	*First*	< 0.6 pCi/L
RB103957	*12/07/2020 10:05 AM – 12/10/2020 08:47 AM*	*Gym North*	*First*	0.6 ± 0.3 pCi/L
RB103940	*12/07/2020 10:07 AM – 12/10/2020 08:49 AM*	*Gym South*	*First*	< 0.6 pCi/L
RB104000	*12/07/2020 10:10 AM – 12/10/2020 08:51 AM*	*Music Classroom*	*First*	< 0.5 pCi/L

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Measurement method: Activated Charcoal Adsorption (QuickScreen)

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 AB. Detector deployment is not performed by Radonova Laboratories AB. Measurement information such as monitoring period (dates) and placement location is provided to Radonova Laboratories AB by the end user.

Codes on non-reportable detectors

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

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 AARST and EPA 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.
- EPA Radon Measurements in Schools, EPA 402-R-92-014, July 1993.

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 certifies that the quality control procedures follows the guidance in accordance with EPA 402-R-95-012.

Measurement information displayed in italics on report has been provided by the customer.

Certification no:

101132-AL, 107830-RT

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