September 21, 2022

Brent Paul, Director of Facility Operations
Lake Oswego School District
2455 Country Club Road
Lake Oswego, Oregon 97034

Via email: paulb@loswego.k12.or.us

Regarding: Radon Testing
Uplands Elementary School
2055 Wembley Park Road
Lake Oswego, Oregon 97034
PBS Project 21600.051

Dear Mr. Paul:

From April 4 to April 7, 2022, PBS Engineering and Environmental Inc. (PBS) performed short-term radon testing at Uplands Elementary School located at 2055 Wembley Park Road in Lake Oswego, 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 brand activated charcoal adsorption detector 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 crawl spaces. The test kits were shipped under chain-of-custody to Alpha Energy Laboratories (National Radon Proficiency Program ID: 101132 AL) for analysis.

Laboratory results indicate that the follow-up sample is above the EPA recommended action level of 4.0 pCi/L. The following table lists the samples with radon levels above the EPA action level.

Test Kit with Radon 4.0 pCi/L or above

Test Kit Number	Sample Location	Radon Level (pCi/L)
RK109889	On bookshelf of center room, CR25	5.1
RK109756	On shelf by door, CR13	4.3
RK109891	On shelf by door, CR16	5.0
RK109892	On shelf by door, CR16, DUP	4.6

Average concentration 4.6

The laboratory results from radon tests completed in frequently occupied areas for most of the school indicate that radon levels are below 4 pCi/L. **However, the testing in classrooms 13, 16, and 25 revealed that there are radon hotspots located under these areas.** Elevated radon levels could occur in frequently occupied areas if constant air handling is not maintained.

A long-term plan for radon mitigation in this area should be considered. Radon mitigation measures may include passive ventilation or an exhaust fan in the tunnel that vents to the exterior of the building.

See the attached laboratory analysis report for sample locations and additional details.

In addition to the EPA recommendation that radon concentrations do 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 503.417.7607 or bob.kleckner@pbsusa.com with any questions or comments.

Sincerely,

Digitally signed by Bob Kleckner
Date: 2022.09.21 13:24:09 -07'00'

Bob Kleckner
Sr. Project Manager

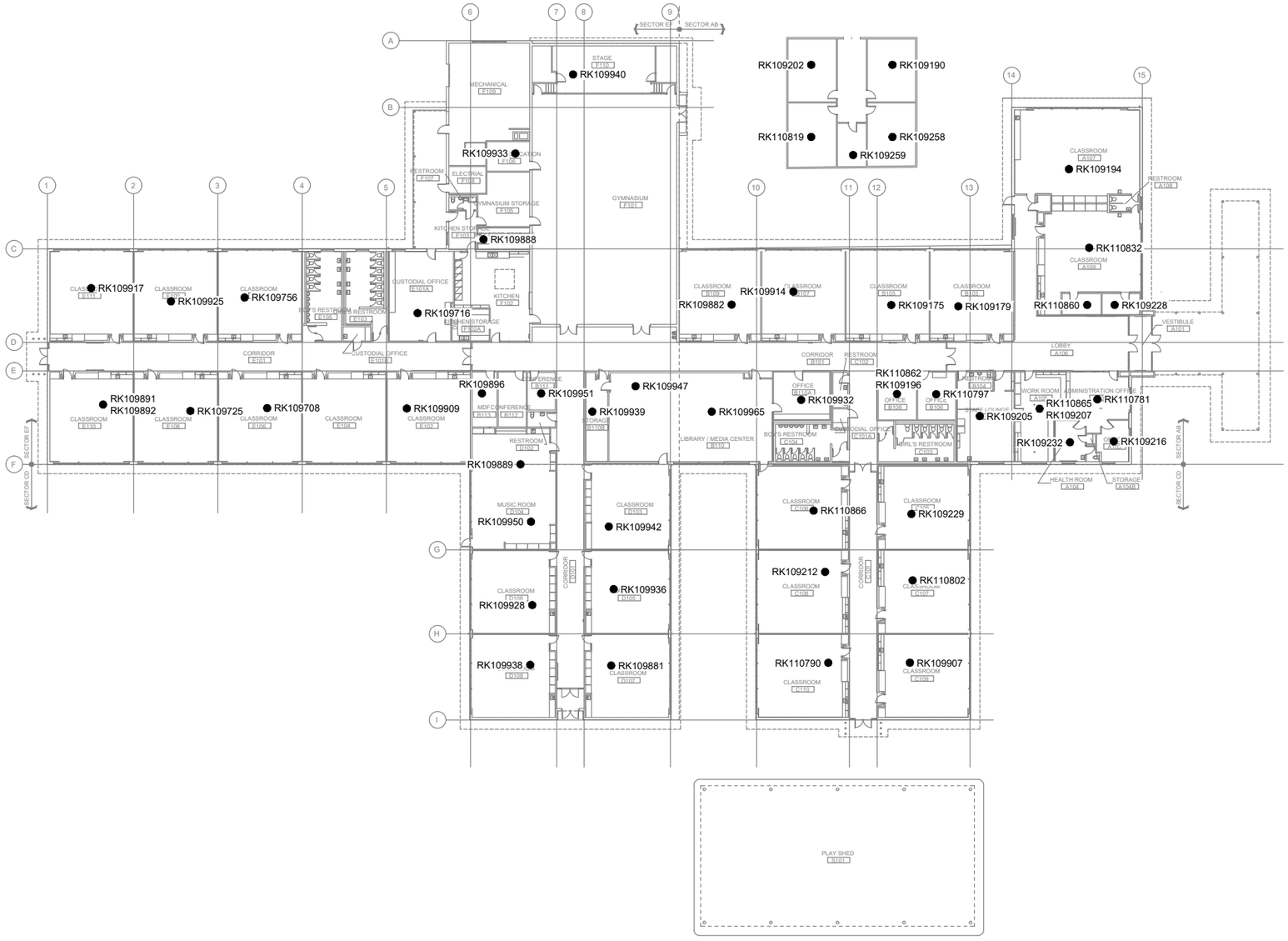
Attachment: Floor Plan RA3
Radonova Laboratory Analysis Radon Monitoring Report

GENERAL NOTES

1. THIS DRAWING IS DIAGRAMMATIC. IT IS FOR GENERAL INFORMATION AND SAMPLE LOCATIONS.

LEGEND

● RK109 RADON TEST AND KIT NUMBER



FIRST FLOOR PLAN

SCALE: 1" = 20'

0 10' 20' 40'

PREPARED FOR: LAKE OSWEGO SCHOOL DISTRICT #7J

PBS Engineering and Environmental Inc.
4412 SW Corbett Avenue
Portland, OR 97239
503.248.1939
pbsusa.com

UPLANDS ELEMENTARY SCHOOL

RADON SAMPLING PLAN

2055 SW WEMBLEY PARK ROAD, LAKE OSWEGO, OREGON

NO	REVISION	DATE	BY	APP'D

DRAWN BY: JAB
CHECKED: BK
DATE: SEPTEMBER 2022
PROJECT NUMBER: 21600.051
SHEET DRAWING NO: RA3
SHEET 3 OF 18

FULL SIZE SHEET FORMAT IS 24X36; IF PRINTED SIZE IS NOT 24X36, THEN THIS SHEET FORMAT HAS BEEN MODIFIED & INDICATED DRAWING SCALE IS NOT ACCURATE.

Filename: L:\Projects\21000\21600-21699\21600_LakeOswegoSchoolDistrict\21600.051_DistrictWideRadonSampling\Report DWGs\RA3_UPLANDS\21600.051_RA3.dwg Layout Tab: 11X17 User: Jim Blanco CAD Plot DateTime: 9/21/2022 12:19:06 PM

radonova
The global leader in radon measurement

REPORT NUMBER
6352562:2

REPORT DATE
05/12/2022

REPORT PAGE
1 of 9

PRINT DATE
05/12/2022

OWN ID
N/A

PBS Portland
4321 S Corbett Ave

BY
PBS Engineering & Environmental

REPORT RECEIVER(S)
alex.johnson@pbsusa.com;lindsey.peterson@pbsusa.com
PBS Portland

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. **04/12/2022**.
They were measured **04/12/2022**.

Test data have been given by PBS Portland

Property data and address

MEASURE SITE ADDRESS
Uplands ES
2055 Wembly Park Rd
Lake Oswego OR

BUILDING ID

Test results

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RB104718 [QuickScreen]	*04/04/2022 04:18 PM – 04/07/2022 03:15 PM*	*Field Blank*	*First*	< 1.0 pCi/L
RK110781 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:45 PM*	*on main admin desk, Main office*	*First*	< 1.0 pCi/L
RK109216 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:46 PM*	*on bookshelf, 50C principals office*	*First*	< 0.9 pCi/L
RK109232 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:46 PM*	*top of filing cabinet, 50A health room*	*First*	1.0 pCi/L
RK110865 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:47 PM*	*paper towel holder above sink, 49 workroom*	*First*	< 0.9 pCi/L
RK109207 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:47 PM*	*paper towel holder above sink, 49 workroom*	*First*	< 0.6 pCi/L
RK109205 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:48 PM*	*paper towel holder above sink, 48 faculty room*	*First*	< 0.8 pCi/L

Comment to the results

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories Laboratory Measurement Specialist

RADONOVA INC.
1 EAST 22nd STREET, SUITE 200
LOMBARD, IL 60148
331.814.2200, help@radonova.com

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RK110832 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:49 PM*	*paper towel holder above sink, CR02*	*First*	< 0.8 pCi/L
RK110860 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:49 PM*	*by chalkboard, 02A office*	*First*	< 0.6 pCi/L
RK109228 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:49 PM*	*on desk, 02B office*	*First*	< 0.6 pCi/L
RK109194 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:50 PM*	*top of cabinet by door, CR01*	*First*	< 0.7 pCi/L
RK109202 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:52 PM*	*on announcement box, P-01*	*First*	< 0.5 pCi/L
RK110819 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:52 PM*	*by phone on blue bookshelf, P-02*	*First*	< 0.5 pCi/L
RK109259 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:52 PM*	*"on floor, no furniture", P-03*	*First*	0.7 pCi/L
RK109258 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:52 PM*	*on chalkboard, P-04*	*First*	< 0.7 pCi/L

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DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RK109190 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:52 PM*	*on bookshelf by door, P-05*	*First*	< 0.7 pCi/L
RK109179 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:53 PM*	*white bookshelf, CR03*	*First*	< 0.7 pCi/L
RK109175 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:53 PM*	*on coat shelf by door, CR04*	*First*	< 0.6 pCi/L
RK110797 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:54 PM*	*on desk, 46*	*First*	< 0.7 pCi/L
RK110862 [QuickScreen]	*04/04/2022 03:23 PM – 04/07/2022 02:54 PM*	*on shelf, 45*	*First*	< 0.8 pCi/L
RK109196 [QuickScreen]	*04/04/2022 03:43 PM – 04/07/2022 02:54 PM*	*on shelf, 45*	*First*	< 0.7 pCi/L
RK110866 [QuickScreen]	*04/04/2022 03:43 PM – 04/07/2022 02:56 PM*	*on bookshelf, CR38*	*First*	0.9 pCi/L
RK109229 [QuickScreen]	*04/04/2022 03:43 PM – 04/07/2022 02:57 PM*	*on bookshelf, CR43*	*First*	0.8 pCi/L

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DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RK109212 [QuickScreen]	*04/04/2022 03:43 PM – 04/07/2022 02:57 PM*	*on bookshelf behind container of gl, CR39*	*First*	< 0.6 pCi/L
RK110802 [QuickScreen]	*04/04/2022 03:43 PM – 04/07/2022 02:58 PM*	*on bookshelf by door, CR42*	*First*	< 0.7 pCi/L
RK110790 [QuickScreen]	*04/04/2022 03:43 PM – 04/07/2022 02:59 PM*	*top of fridge, CR40*	*First*	< 0.9 pCi/L
RK109907 [QuickScreen]	*04/04/2022 03:52 PM – 04/07/2022 02:59 PM*	*shelf, CR41*	*First*	< 0.7 pCi/L
RK109914 [QuickScreen]	*04/04/2022 03:54 PM – 04/07/2022 03:00 PM*	*on shelf above sink, CR05*	*First*	< 0.9 pCi/L
RK109932 [QuickScreen]	*04/04/2022 03:54 PM – 04/07/2022 03:01 PM*	*on filing cabinet, CR34*	*First*	< 0.7 pCi/L
RK109947 [QuickScreen]	*04/04/2022 03:54 PM – 04/07/2022 03:02 PM*	*bookshelf by door, CR33 library*	*First*	1.0 pCi/L
RK109965 [QuickScreen]	*04/04/2022 03:54 PM – 04/07/2022 03:02 PM*	*bookshelf by door, CR33 library*	*First*	0.9 pCi/L

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DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RK109882 [QuickScreen]	*04/04/2022 03:54 PM – 04/07/2022 03:02 PM*	*bookshelf in far corner on top, CR05*	*First*	< 0.6 pCi/L
RK109940 [QuickScreen]	*04/04/2022 03:54 PM – 04/07/2022 03:03 PM*	*stage left, Stage*	*First*	< 0.9 pCi/L
RK109933 [QuickScreen]	*04/04/2022 03:54 PM – 04/07/2022 03:03 PM*	*on shelf, Gym office 07E*	*First*	< 0.8 pCi/L
RK109939 [QuickScreen]	*04/04/2022 03:59 PM – 04/07/2022 03:04 PM*	*on top of cabinet, CR32*	*First*	**DNR**
RK109889 [QuickScreen]	*04/04/2022 03:59 PM – 04/07/2022 03:04 PM*	*on bookshelf of center room, CR25*	*First*	**5.1 pCi/L**
RK109942 [QuickScreen]	*04/04/2022 03:59 PM – 04/07/2022 03:05 PM*	*on shelf, CR31*	*First*	0.8 pCi/L
RK109950 [QuickScreen]	*04/04/2022 03:59 PM – 04/07/2022 03:05 PM*	*on shelf, CR26*	*First*	2.2 pCi/L
RK109936 [QuickScreen]	*04/04/2022 03:59 PM – 04/07/2022 03:06 PM*	*paper towel holder, CR30*	*First*	< 0.7 pCi/L

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DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RK109928 [QuickScreen]	*04/04/2022 03:59 PM – 04/07/2022 03:06 PM*	*paper towel holder, CR27*	*First*	1.3 pCi/L
RK109938 [QuickScreen]	*04/04/2022 03:59 PM – 04/07/2022 03:07 PM*	*paper towel holder, CR28*	*First*	< 0.9 pCi/L
RK109881 [QuickScreen]	*04/04/2022 03:59 PM – 04/07/2022 03:07 PM*	*paper towel holder, CR29*	*First*	< 0.7 pCi/L
RK109951 [QuickScreen]	*04/04/2022 03:59 PM – 04/07/2022 03:08 PM*	*on ground, 23*	*First*	< 1.1 pCi/L
RK109896 [QuickScreen]	*04/04/2022 04:03 PM – 04/07/2022 03:09 PM*	*on desk, 21*	*First*	< 0.7 pCi/L
RK109888 [QuickScreen]	*04/04/2022 04:03 PM – 04/07/2022 03:09 PM*	*paper towel holder, 08 kitchen*	*First*	< 0.9 pCi/L
RK109716 [QuickScreen]	*04/04/2022 04:18 PM – 04/07/2022 03:10 PM*	*on bookshelf, 09 custodial office*	*First*	< 0.6 pCi/L
RK109756 [QuickScreen]	*04/04/2022 04:18 PM – 04/07/2022 03:11 PM*	*on shelf by door, CR13*	*First*	**4.3 pCi/L**

Comment to the results

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DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RK109925 [QuickScreen]	*04/04/2022 04:18 PM – 04/07/2022 03:11 PM*	*on shelf by door, CR14*	*First*	1.4 pCi/L
RK109917 [QuickScreen]	*04/04/2022 04:18 PM – 04/07/2022 03:12 PM*	*on shelf by door, CR15*	*First*	3.6 pCi/L
RK109891 [QuickScreen]	*04/04/2022 04:18 PM – 04/07/2022 03:12 PM*	*on shelf by door, CR16*	*First*	**5.0 pCi/L**
RK109892 [QuickScreen]	*04/04/2022 04:18 PM – 04/07/2022 03:13 PM*	*on shelf by door, CR16*	*First*	**4.6 pCi/L**
RK109725 [QuickScreen]	*04/04/2022 04:18 PM – 04/07/2022 03:13 PM*	*paper towel holder, CR17*	*First*	< 0.7 pCi/L
RK109708 [QuickScreen]	*04/04/2022 04:18 PM – 04/07/2022 03:14 PM*	*paper towel holder, CR18*	*First*	3.9 pCi/L
RK109909 [QuickScreen]	*04/04/2022 04:18 PM – 04/07/2022 03:15 PM*	*paper towel holder, CR20*	*First*	1.0 pCi/L
RB104692 [QuickScreen]	*04/04/2022 04:18 PM – 04/07/2022 03:15 PM*	*Field Blank*	*First*	< 1.4 pCi/L

Comment to the results

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DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RB104699 [QuickScreen]	*04/04/2022 04:18 PM – 04/07/2022 03:15 PM*	*Field Blank*	*First*	< 1.4 pCi/L
RB104892 [QuickScreen]	*04/04/2022 04:18 PM – 04/07/2022 03:15 PM*	*Field Blank*	*First*	< 1.4 pCi/L

Comment to the results

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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

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 Laboratories 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, NY ELAP ID: 11430

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