



May 15, 2023

Joe Crelier
Director of Risk Management
Portland Public Schools

Via email: jcrelier@pps.net

Regarding: Electronic Radon Monitor Results
Ockley Green Middle School
6031 N Montana Avenue
Portland, Oregon
PBS Project 25000.241

Mr. Crelier:

In February and March 2023, PBS performed short-term radon monitoring at Ockley Green Middle School at the request of Portland Public Schools. Results of short-term testing identified elevated radon in select areas. In April 2023, PBS performed follow-up testing in those areas with electronic Continuous Radon Monitors (CRMs) to determine hour-by-hour radon concentrations and provide additional information on mitigation strategies.

METHODOLOGY

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 Sun Nuclear 1028 CRMs to monitor in select areas and identify the dynamics of radon concentration over time.

Testing was conducted at the end of the winter heating season and during the school week when building uses and operations were normal. Given that testing was done as heating was being reduced in the buildings, test results may not fully reflect concentrations during colder periods of time when radon tends to be the most elevated in buildings. Occupied hours were considered to be 6:00 AM to 6:00 PM and unoccupied hours were 6:00 PM to 6:00 AM.

RESULTS

The following table lists the results of radon concentrations at all tested locations.

Table 1: CRM Data Summary

Facility	Location	Test Dates	Overall Average Radon Level*	Average Radon Level During Occupied Hours*	Average Radon Level During Unoccupied Hours*	Average Identified During Feb/Mar 2023 Short-Term Testing*
Ockley Green	Gym	4/18-4/21	4.6	3.8	5.5	6.1
Ockley Green	Industrial Arts	4/18-4/21	2.5	2.7	2.2	4.6

* - units are pCi/L

Overall, concentrations were found to be lower than during initial testing. Concentrations were below the EPA action level of 4.0 pCi/L in the Industrial Arts room, but still above the action level in the Gym. Testing occurred in April after the end of the traditional winter heating season of October-March when radon tends to be at its highest interior concentrations. PBS found that concentrations tended to be lower during occupied hours in the Gym, which is typically observed as building HVAC systems turn on and introduce fresh air during the day. However, concentrations were not lower during occupied hours in the Industrial Arts room. Radon concentrations in the tested locations above are unlikely to increase again until the winter heating season resumes later in the year.

For the Gym, PBS recommends the District examine this location and consider either adjusting the area's HVAC system to introduce additional makeup air, adjusting the HVAC system to change the area's relative air pressure, and examining the current radon mitigation system. Once corrective actions have been taken, additional monitoring during the winter heating season should be conducted using CRMs. For the Industrial Arts room, PBS recommends retesting with CRMs during the winter heating season and determine mitigation requirements with those results.

See the attached CRM printouts for additional information on each 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. 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 503.515.7489 or james.mastanduno@pbsusa.com with any questions or comments.

Sincerely,

 Digitally signed
by James
Mastanduno
Date: 2023.05.15
11:56:20 -07'00'

James Mastanduno
Project Manager

Attachment: Individual Summary Reports

Radon Inspection Report

Test Location:

Ockley Green Middle School
6031 N Montana Ave
Portland, OR

Test For:**Inspected By:**

PBS Engineering and Environmental

Bldg. Type: Educational

Type: Pre-Mitigation

Test Result: Fail

Overall Average:

4.6 pCi/l

EPA Average:

4.6 pCi/l

Test Device Details:

Serial Number: 238738006
Model Number: 1028XP
Last Calibration: 10/12/2022
Next Calibration: 10/12/2023
Cal-Factors: 2.87
Motion Error: Yes

Test Site Condition:**Test Summary:**

<u>CRM Location:</u>	<u>Start:</u>	<u>Stop:</u>	<u>Interval:</u>	<u>Duration:</u>
Gym	04/18/2023 07:32 AM	04/21/2023 06:32 AM	1 hr	71 hr
*First 4 hrs of data excluded	<u>Min:</u>	<u>Max:</u>	<u>Average:</u>	<u>Measurement Units:</u>
Radon Concentration:	0.7	10.8	4.6	pCi/l

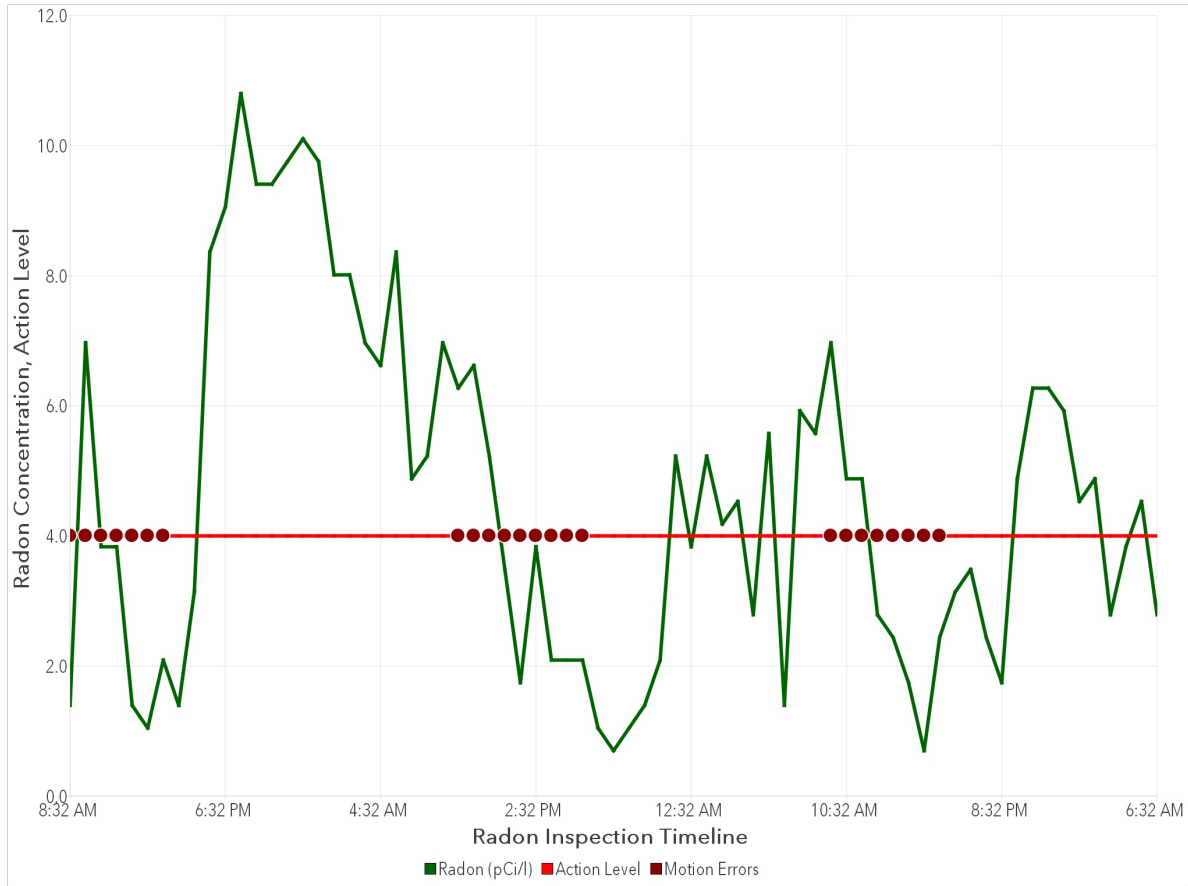
Comments:

Lic/Cert Signature

Test device manufactured by SunRADON, LLC

Inspection Report Date: 04/26/2023

Radon Inspection Chart



Test Result: Fail

Test Location: 6031 N Montana Ave Portland, OR

Inspection Report Date: 04/26/2023

Test device manufactured by SunRADON, LLC

Test Checklist

- ☒ The location of the detector was selected so the detector was not to be disturbed during testing.
- ☒ The monitor was not placed in an area of high humidity such as: Kitchen, laundry room, cellar, spa room, garage, crawl space or sump area.
- ☒ The detector was not located near drafts caused by HVAC vents, windows and doors.
- ☒ The detector was not placed near areas of excessive heat, such as a fireplace or in direct sunlight.
- ☒ Portable window fans were removed or sealed in place prior to testing.
- ☒ The detector was placed within the breathing zone of at least 20 inches to 6 feet above the floor and at least 1 foot below the ceiling if suspended.
- ☒ The detector was not placed within 1 foot of outside walls of the home or within 3 feet of any windows or doors to the exterior of the home.
- ☒ Ceiling fans, portable dehumidifiers, portable humidifiers, portable air filters, and all window air conditioners are not operated within 20 feet of the detector.

Test Result: Fail

Test Location: 6031 N Montana Ave Portland, OR

Inspection Report Date: 04/26/2023

Test device manufactured by SunRADON, LLC

Test Table

* Data from first 4 hours excluded from EPA calculations

<u>Date/Time</u>	<u>Radon(pCi/l)</u>	<u>Flags</u>
04/18/23 08:32 AM	1.4	M
04/18/23 09:32 AM	7.0	M
04/18/23 10:32 AM	3.8	M
04/18/23 11:32 AM	3.8	M
04/18/23 12:32 PM	1.4	M
04/18/23 01:32 PM	1.0	M
04/18/23 02:32 PM	2.1	M
04/18/23 03:32 PM	1.4	-
04/18/23 04:32 PM	3.1	-
04/18/23 05:32 PM	8.4	-
04/18/23 06:32 PM	9.1	-
04/18/23 07:32 PM	10.8	-
04/18/23 08:32 PM	9.4	-
04/18/23 09:32 PM	9.4	-
04/18/23 10:32 PM	9.8	-
04/18/23 11:32 PM	10.1	-
04/19/23 12:32 AM	9.8	-
04/19/23 01:32 AM	8.0	-
04/19/23 02:32 AM	8.0	-
04/19/23 03:32 AM	7.0	-
04/19/23 04:32 AM	6.6	-
04/19/23 05:32 AM	8.4	-
04/19/23 06:32 AM	4.9	-
04/19/23 07:32 AM	5.2	-
04/19/23 08:32 AM	7.0	-
04/19/23 09:32 AM	6.3	M
04/19/23 10:32 AM	6.6	M
04/19/23 11:32 AM	5.2	M
04/19/23 12:32 PM	3.5	M
04/19/23 01:32 PM	1.7	M
04/19/23 02:32 PM	3.8	M
04/19/23 03:32 PM	2.1	M
04/19/23 04:32 PM	2.1	M
04/19/23 05:32 PM	2.1	M
04/19/23 06:32 PM	1.0	-
04/19/23 07:32 PM	0.7	-
04/19/23 08:32 PM	1.0	-
04/19/23 09:32 PM	1.4	-
04/19/23 10:32 PM	2.1	-
04/19/23 11:32 PM	5.2	-
04/20/23 12:32 AM	3.8	-
04/20/23 01:32 AM	5.2	-
04/20/23 02:32 AM	4.2	-
04/20/23 03:32 AM	4.5	-

Test Result: Fail

Test Location: 6031 N Montana Ave Portland, OR

Inspection Report Date: 04/26/2023

Test device manufactured by SunRADON, LLC

Test Table

* Data from first 4 hours excluded from EPA calculations

<u>Date/Time</u>	<u>Radon(pCi/l)</u>	<u>Flags</u>
04/20/23 04:32 AM	2.8	-
04/20/23 05:32 AM	5.6	-
04/20/23 06:32 AM	1.4	-
04/20/23 07:32 AM	5.9	-
04/20/23 08:32 AM	5.6	-
04/20/23 09:32 AM	7.0	M
04/20/23 10:32 AM	4.9	M
04/20/23 11:32 AM	4.9	M
04/20/23 12:32 PM	2.8	M
04/20/23 01:32 PM	2.4	M
04/20/23 02:32 PM	1.7	M
04/20/23 03:32 PM	0.7	M
04/20/23 04:32 PM	2.4	M
04/20/23 05:32 PM	3.1	-
04/20/23 06:32 PM	3.5	-
04/20/23 07:32 PM	2.4	-
04/20/23 08:32 PM	1.7	-
04/20/23 09:32 PM	4.9	-
04/20/23 10:32 PM	6.3	-
04/20/23 11:32 PM	6.3	-
04/21/23 12:32 AM	5.9	-
04/21/23 01:32 AM	4.5	-
04/21/23 02:32 AM	4.9	-
04/21/23 03:32 AM	2.8	-
04/21/23 04:32 AM	3.8	-
04/21/23 05:32 AM	4.5	-
04/21/23 06:32 AM	2.8	-

Test Result: Fail

Test Location: 6031 N Montana Ave Portland, OR

Inspection Report Date: 04/26/2023

Test device manufactured by SunRADON, LLC

Radon Test Information

Understanding Radon Test Results

Recommended Action Levels vary by country and typically range from 3 pCi/l (100 Bq/m³) to 8 pCi/l (300 Bq/m³). Recommendations below are based on test results by a Continuous Radon Monitor (CRM) Test of at least 48h duration and are based on recommendations by the EPA.

Measured Average Radon Level:

- At or above 4.0 pCi/l (148 Bq/m³): Corrective measures to reduce exposure to radon gas is strongly recommended (ANSI MAH2014)
- Between 2-4 pCi/l (74-148 Bq/m³): Consider mitigation or periodic retest as indoor Radon levels vary by season and weather conditions
- Below 2 pCi/l (74 Bq/m³): Consider bi-annual retest or whenever significant changes to the home structure or mechanical systems occurred

Test Result: Fail

Test Location: 6031 N Montana Ave Portland, OR

Inspection Report Date: 04/26/2023

Test device manufactured by SunRADON, LLC

Radon Inspection Report

Test Location:

Ockley Green Middle School
6031 N Montana Ave
Portland, OR

Test For:**Inspected By:**

PBS Engineering and Environmental

Bldg. Type: Educational

Type: Pre-Mitigation

Test Result: Pass

Overall Average:

2.5 pCi/l

EPA Average:

2.5 pCi/l

Test Device Details:

Serial Number: 238348024
Model Number: 1028XP
Last Calibration: 09/21/2022
Next Calibration: 09/21/2023
Cal-Factors: 2.81
Motion Error: Yes

Test Site Condition:**Test Summary:**

<u>CRM Location:</u>	<u>Start:</u>	<u>Stop:</u>	<u>Interval:</u>	<u>Duration:</u>
Industrial Arts	04/18/2023 07:28 AM	04/21/2023 06:28 AM	1 hr	71 hr
*First 4 hrs of data excluded	<u>Min:</u>	<u>Max:</u>	<u>Average:</u>	<u>Measurement Units:</u>
Radon Concentration:	0.4	6.8	2.5	pCi/l

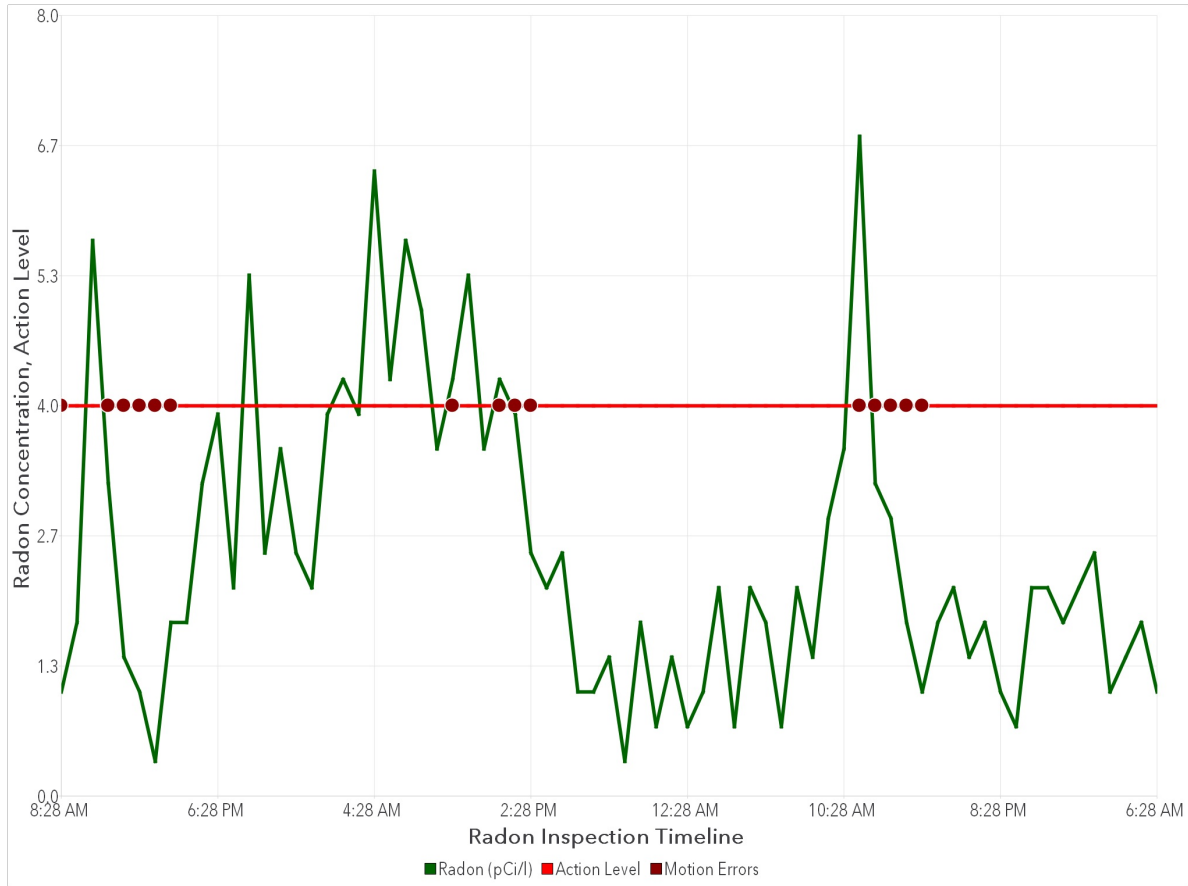
Comments:

Lic/Cert Signature

Test device manufactured by SunRADON, LLC

Inspection Report Date: 04/26/2023

Radon Inspection Chart



Test Result: Pass

Test Location: 6031 N Montana Ave Portland, OR

Inspection Report Date: 04/26/2023

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Test Checklist

- ☒ The location of the detector was selected so the detector was not to be disturbed during testing.
- ☒ The monitor was not placed in an area of high humidity such as: Kitchen, laundry room, cellar, spa room, garage, crawl space or sump area.
- ☒ The detector was not located near drafts caused by HVAC vents, windows and doors.
- ☒ The detector was not placed near areas of excessive heat, such as a fireplace or in direct sunlight.
- ☒ Portable window fans were removed or sealed in place prior to testing.
- ☒ The detector was not placed within 1 foot of outside walls of the home or within 3 feet of any windows or doors to the exterior of the home.
- ☒ Ceiling fans, portable dehumidifiers, portable humidifiers, portable air filters, and all window air conditioners are not operated within 20 feet of the detector.

Test Result: Pass

Test Location: 6031 N Montana Ave Portland, OR

Inspection Report Date: 04/26/2023

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Test Table

* Data from first 4 hours excluded from EPA calculations

<u>Date/Time</u>	<u>Radon(pCi/l)</u>	<u>Flags</u>
04/18/23 08:28 AM	1.1	M
04/18/23 09:28 AM	1.8	-
04/18/23 10:28 AM	5.7	-
04/18/23 11:28 AM	3.2	M
04/18/23 12:28 PM	1.4	M
04/18/23 01:28 PM	1.1	M
04/18/23 02:28 PM	0.4	M
04/18/23 03:28 PM	1.8	M
04/18/23 04:28 PM	1.8	-
04/18/23 05:28 PM	3.2	-
04/18/23 06:28 PM	3.9	-
04/18/23 07:28 PM	2.1	-
04/18/23 08:28 PM	5.3	-
04/18/23 09:28 PM	2.5	-
04/18/23 10:28 PM	3.6	-
04/18/23 11:28 PM	2.5	-
04/19/23 12:28 AM	2.1	-
04/19/23 01:28 AM	3.9	-
04/19/23 02:28 AM	4.3	-
04/19/23 03:28 AM	3.9	-
04/19/23 04:28 AM	6.4	-
04/19/23 05:28 AM	4.3	-
04/19/23 06:28 AM	5.7	-
04/19/23 07:28 AM	5.0	-
04/19/23 08:28 AM	3.6	-
04/19/23 09:28 AM	4.3	M
04/19/23 10:28 AM	5.3	-
04/19/23 11:28 AM	3.6	-
04/19/23 12:28 PM	4.3	M
04/19/23 01:28 PM	3.9	M
04/19/23 02:28 PM	2.5	M
04/19/23 03:28 PM	2.1	-
04/19/23 04:28 PM	2.5	-
04/19/23 05:28 PM	1.1	-
04/19/23 06:28 PM	1.1	-
04/19/23 07:28 PM	1.4	-
04/19/23 08:28 PM	0.4	-
04/19/23 09:28 PM	1.8	-
04/19/23 10:28 PM	0.7	-
04/19/23 11:28 PM	1.4	-
04/20/23 12:28 AM	0.7	-
04/20/23 01:28 AM	1.1	-
04/20/23 02:28 AM	2.1	-
04/20/23 03:28 AM	0.7	-

Test Result: Pass

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04/20/23 06:28 AM	0.7	-
04/20/23 07:28 AM	2.1	-
04/20/23 08:28 AM	1.4	-
04/20/23 09:28 AM	2.8	-
04/20/23 10:28 AM	3.6	-
04/20/23 11:28 AM	6.8	M
04/20/23 12:28 PM	3.2	M
04/20/23 01:28 PM	2.8	M
04/20/23 02:28 PM	1.8	M
04/20/23 03:28 PM	1.1	M
04/20/23 04:28 PM	1.8	-
04/20/23 05:28 PM	2.1	-
04/20/23 06:28 PM	1.4	-
04/20/23 07:28 PM	1.8	-
04/20/23 08:28 PM	1.1	-
04/20/23 09:28 PM	0.7	-
04/20/23 10:28 PM	2.1	-
04/20/23 11:28 PM	2.1	-
04/21/23 12:28 AM	1.8	-
04/21/23 01:28 AM	2.1	-
04/21/23 02:28 AM	2.5	-
04/21/23 03:28 AM	1.1	-
04/21/23 04:28 AM	1.4	-
04/21/23 05:28 AM	1.8	-
04/21/23 06:28 AM	1.1	-

Test Result: Pass

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Inspection Report Date: 04/26/2023

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- Below 2 pCi/l (74 Bq/m³): Consider bi-annual retest or whenever significant changes to the home structure or mechanical systems occurred

Test Result: Pass

Test Location: 6031 N Montana Ave Portland, OR

Inspection Report Date: 04/26/2023

Test device manufactured by SunRADON, LLC