



February 9, 2017

Joe Crelier
Director of Risk Management
Portland Public Schools
501 N Dixon Street
Portland, Oregon 97227

Via email: jcrelier@pps.net

Regarding: Continuous Radon Monitor Measurement Report
Ockley Green Gym
Portland, Oregon
PBS Project No. 06500.618, Phase 0002

Dear Mr. Crelier:

From February 2 to February 6, 2017, PBS Engineering and Environmental Inc. (PBS) conducted continuous radon monitor (CRM) measurements at the Ockley Green Gym. This measurement was performed to document any changes in radon levels as a result of changes made to the HVAC system, which were meant to address elevated radon levels identified during previous short-term radon monitoring.

This testing was performed with a Sun Nuclear Model 1027 continuous radon monitor, an EPA- and industry-approved testing device. The CRM monitor was placed on the floor of the gym behind the pull-out bleachers. The device was placed on the afternoon of February 2, 2017, and collected February 6, 2017. The device recorded radon levels and tilts (an anti-tampering indication) data for 90 hours. Closed building conditions were not verified during the course of this testing.

The following table summarizes radon data collected:

Test Location	Start Time	Stop Time	Total Time*	Average Radon Concentration (pCi/L = picocuries per liter)
Ockley Green Gym	02/02/2017 2:30 PM	02/06/2017 1:37 PM	90 Hours	11.0 pCi/L

* Units log data once per hour for a maximum of the first 90 hours. Data for all hours between start and stop times may not be logged.

At the time the CRM was retrieved on Monday February 6, 2017, PBS also checked the average and current readings. "Average" is the average radon concentration in picocuries per liter of air (pCi/L) over the total monitoring period. "Current" is the radon concentration in the current 12-hour period. The average and current readings include data beyond what was recorded by the data logger and is shown on the Report Graphs with Detailed Hourly Data.

The table below indicates the average and current reading at the time noted:

Site	Room	Average (pCi/L)	Current (pCi/L)	Time
Ockley Green	Gym	71.5	88.3	1:37 pm

For more detail, please see the Report Graphs with Detailed Hourly Data for the Ockley Green Gym (attached).

Please feel free to contact me at 503.417.7694 or chris.boyce@pbsusa.com with any questions or comments.

Sincerely,

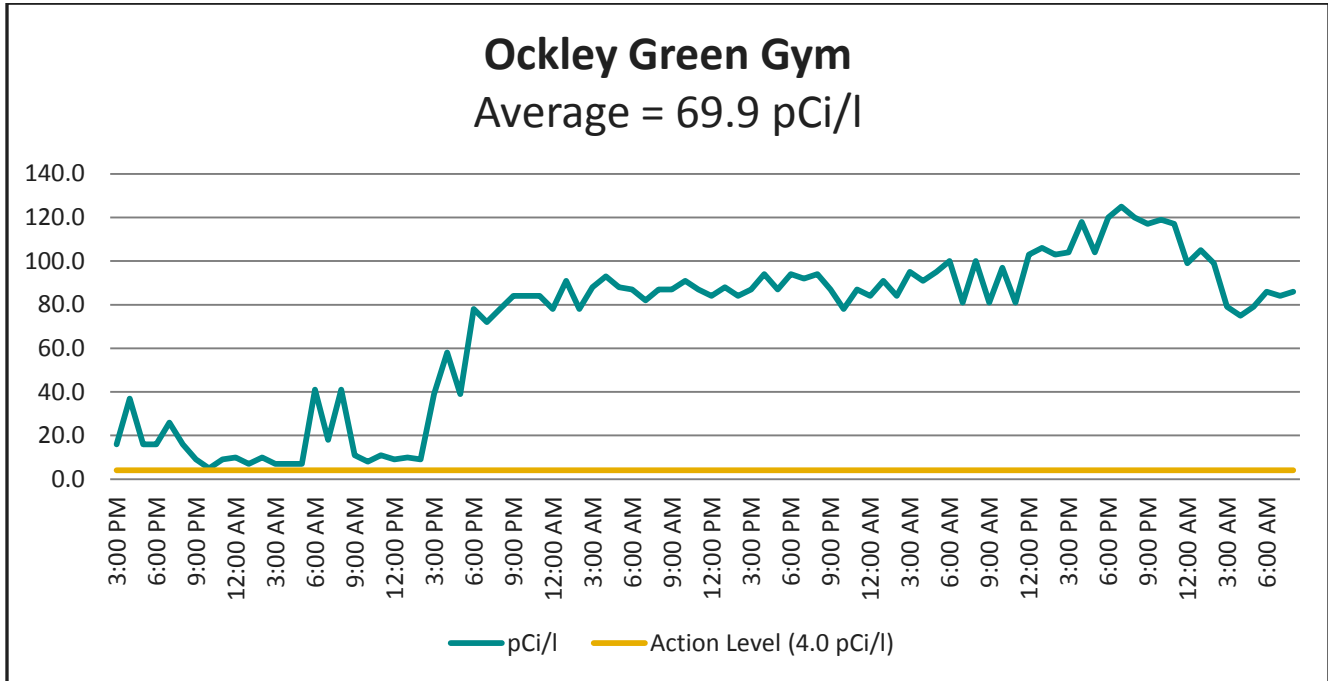


Chris Boyce
Project Manager

Attachments: Report Graphs with Detailed Hourly Data
CRM Statements of Calibration (Serial Numbers: 1407185)

CB::lkn

Unit Type: Sun Nuclear Model 1027
 Serial Number: 1407185



Date:	Time:	Radon (pCi/l)
February 2, 2017	3:00 PM	16.0
February 2, 2017	4:00 PM	37.0
February 2, 2017	5:00 PM	16.0
February 2, 2017	6:00 PM	16.0
February 2, 2017	7:00 PM	26.0
February 2, 2017	8:00 PM	16.0
February 2, 2017	9:00 PM	9.0
February 2, 2017	10:00 PM	5.0
February 2, 2017	11:00 PM	9.0
February 3, 2017	12:00 AM	10.0
February 3, 2017	1:00 AM	7.0
February 3, 2017	2:00 AM	10.0
February 3, 2017	3:00 AM	7.0
February 3, 2017	4:00 AM	7.0
February 3, 2017	5:00 AM	7.0
February 3, 2017	6:00 AM	41.0
February 3, 2017	7:00 AM	18.0
February 3, 2017	8:00 AM	41.0

February 3, 2017	9:00 AM	11.0
February 3, 2017	10:00 AM	8.0
February 3, 2017	11:00 AM	11.0
February 3, 2017	12:00 PM	9.0
February 3, 2017	1:00 PM	10.0
February 3, 2017	2:00 PM	9.0
February 3, 2017	3:00 PM	39.0
February 3, 2017	4:00 PM	58.0
February 3, 2017	5:00 PM	39.0
February 3, 2017	6:00 PM	78.0
February 3, 2017	7:00 PM	72.0
February 3, 2017	8:00 PM	78.0
February 3, 2017	9:00 PM	84.0
February 3, 2017	10:00 PM	84.0
February 3, 2017	11:00 PM	84.0
February 4, 2017	12:00 AM	78.0
February 4, 2017	1:00 AM	91.0
February 4, 2017	2:00 AM	78.0
February 4, 2017	3:00 AM	88.0
February 4, 2017	4:00 AM	93.0
February 4, 2017	5:00 AM	88.0
February 4, 2017	6:00 AM	87.0
February 4, 2017	7:00 AM	82.0
February 4, 2017	8:00 AM	87.0
February 4, 2017	9:00 AM	87.0
February 4, 2017	10:00 AM	91.0
February 4, 2017	11:00 AM	87.0
February 4, 2017	12:00 PM	84.0
February 4, 2017	1:00 PM	88.0
February 4, 2017	2:00 PM	84.0
February 4, 2017	3:00 PM	87.0
February 4, 2017	4:00 PM	94.0
February 4, 2017	5:00 PM	87.0
February 4, 2017	6:00 PM	94.0
February 4, 2017	7:00 PM	92.0
February 4, 2017	8:00 PM	94.0
February 4, 2017	9:00 PM	87.0
February 4, 2017	10:00 PM	78.0
February 4, 2017	11:00 PM	87.0
February 5, 2017	12:00 AM	84.0
February 5, 2017	1:00 AM	91.0

February 5, 2017	2:00 AM	84.0
February 5, 2017	3:00 AM	95.0
February 5, 2017	4:00 AM	91.0
February 5, 2017	5:00 AM	95.0
February 5, 2017	6:00 AM	100.0
February 5, 2017	7:00 AM	81.0
February 5, 2017	8:00 AM	100.0
February 5, 2017	9:00 AM	81.0
February 5, 2017	10:00 AM	97.0
February 5, 2017	11:00 AM	81.0
February 5, 2017	12:00 PM	103.0
February 5, 2017	1:00 PM	106.0
February 5, 2017	2:00 PM	103.0
February 5, 2017	3:00 PM	104.0
February 5, 2017	4:00 PM	118.0
February 5, 2017	5:00 PM	104.0
February 5, 2017	6:00 PM	120.0
February 5, 2017	7:00 PM	125.0
February 5, 2017	8:00 PM	120.0
February 5, 2017	9:00 PM	117.0
February 5, 2017	10:00 PM	119.0
February 5, 2017	11:00 PM	117.0
February 6, 2017	12:00 AM	99.0
February 6, 2017	1:00 AM	105.0
February 6, 2017	2:00 AM	99.0
February 6, 2017	3:00 AM	79.0
February 6, 2017	4:00 AM	75.0
February 6, 2017	5:00 AM	79.0
February 6, 2017	6:00 AM	86.0
February 6, 2017	7:00 AM	84.0
February 6, 2017	8:00 AM	86.0



RADON REFERENCE LABORATORY

STATEMENT OF CALIBRATION

**BOWSER
MORNER**®

Client Information:

PBS Engineering & Environmental Inc.
4412 Southwest Corbett Avenue
Portland, Oregon 97239
Attn: Chris Boyce

BMI Control Information:

Statement No.: 17581701
Issue Date: July 25, 2016
Calibrated on: July 25, 2016
Calibrated by: JPN
Calibration site: BMI Dayton

Description of Continuous Radon Monitor:

Manufacturer: Sun Nuclear **Model:** 1027 **Serial No.:** 1407185

The monitor was found to be in good physical condition. No power adapter was received with the monitor. The calibration was conducted using an adapter belonging to Bowser-Morner.

Initial Checks:

<u>Visual Inspection</u> Ok	<u>Batteries</u> Ok	<u>Power Adapter</u> See above	<u>High Voltage</u> 1118 VDC (Ok)	<u>Software Version</u> N5A
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Result of Background Exposure (18 hr): 0.1 pCi/liter

Radon Chamber Conditions:

<u>Exposure Duration</u> 48 hr	<u>Radon Concentration</u> 26.0 ± 0.3 pCi/liter	<u>Relative Humidity</u> 48.9 ± 0.6 %	<u>Temperature</u> 70.0 ± 0.1 °F
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The values listed above for the radon concentration, relative humidity and temperature are the means and standard deviations of the hourly average measurements of these parameters. The calibration of Bowser-Morner's Radon Monitoring System is maintained through comparisons with the USEPA radon laboratory in Las Vegas using a NIST traceable radium standard. The estimated total uncertainty of Bowser-Morner's average chamber concentration is ± 6.4% at the 95% confidence level.

Results of Calibration:

<u>Average Monitor Reading</u> 29.7 pCi/liter	<u>Relative Error As Received</u> 13.8%	<u>Relative Error After Change of Calibration Factor</u> 3.5%
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Based on the results of the calibration, the monitor's internal calibration factor was changed to the most accurate available setting. The background value listed above should be subtracted from the radon measurement and the result multiplied by the correction factor of 0.966.

The calibration was performed using BMI procedure number 42-001.

Authorized Signature *Gill P. Newton*, Manager Radon Reference Lab

All Reports Remain The Confidential Property of Bowser-Morner and No Publication Or Distribution Of Reports May be Made Without Our Express Written Consent, Except As Authorized by Contract. Results contained in this Report are Reflective Only of the Items Calibrated or Tested.