PBS | Engineering + Environmental

December 14, 2016

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
Four Locations at Wilcox Site, Roseway Heights, and Beaumont
Portland, Oregon
PBS Project No. 06500.618, Phase 0002

Dear Mr. Crelier:

From November 7 to 10, 2016, PBS Engineering and Environmental Inc. (PBS) conducted continuous radon monitor (CRM) measurements at four Portland Public Schools (PPS) sites in four unique locations. These measurements were performed in response to elevated radon levels identified during previous short term radon monitoring. Room 187A at Roseway Heights was not tested during short term testing. At the request of PPS, this room was tested with a CRM as it is a meeting room off room 187, which had elevated radon levels during short term testing. Locations tested are identified in the following table:

Site	Building	Room
Beaumont	Gym	20A
Roseway Heights	Main	187
Roseway Heights	Main	187A
Wilcox	Main	10

This testing was performed with Sun Nuclear Model 1027 continuous radon monitors, EPA and Industry approved testing devices. CRM monitors were placed on desk or table tops in rooms identified for testing. Devices were placed on the morning of November 7, 2016, and collected the afternoon of November 10, 2016. The devices recorded radon levels and tilts (an anti-tampering indication) data for 79 to 80 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)
Beaumont – 20A	11/7/2016 7:07:00 AM	11/10/2016 4:15:00 PM	80 Hours	1.0 pCi/l
Roseway Heights – 187	11/7/2016 7:30:00 AM	11/10/2016 4:29:00 PM	80 Hours	0.3 pCi/l
Roseway Heights – 187A	11/7/2016 7:33:00 AM	11/10/2016 4:30:00 PM	80 Hours	0.3 pCi/l
Wilcox - 10	11/7/2016 9:28:00 AM	11/10/2016 4:45:00 PM	79 Hours	3.9 pCi/l

4412 SW Corbett Avenue, Portland, OR 97239
503.248.1939 Main
866.727.0140 Fax
888.248.1939 Toll-Free
www.pbsenv.com

As the radon average for Wilcox room 10 was so close to the action level of 4.0 pCi/l, further analysis was completed to determine radon concentrations during occupied hours. The radon concentration in room 10 at Wilcox Site during occupied hours (7:00 am to 6:00 pm) averaged 3.2 pCi/l.

For more detail, please see the Report Graph With Detailed Hourly Data for each test location.

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

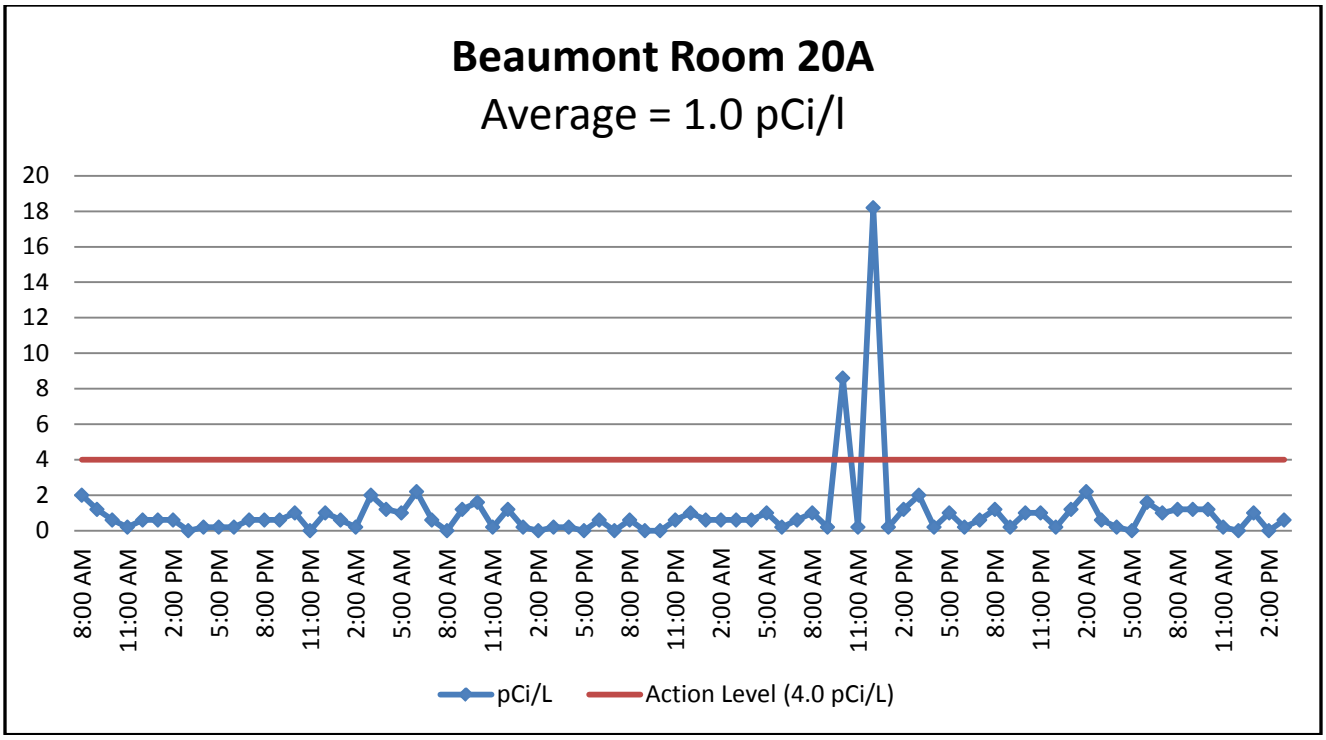
Sincerely,
PBS Engineering and Environmental Inc.

Chris Boyce
Project Manager

Attachments: Report Graph With Detailed Hourly Data (X4)
Bowser Morner CRM Statement of Calibration (x4)
(Serial No.:1407171, 1407176, 1407179, 1407187)

CB::bmp

PBS | Engineering + Environmental



Unit Type: Sun Nuclear Model 1027
Serial Number: 1407176

Date:	Time:	Radon (pCi/l)
November 7, 2016	8:00 AM	2.0
November 7, 2016	9:00 AM	1.2
November 7, 2016	10:00 AM	0.6
November 7, 2016	11:00 AM	0.2
November 7, 2016	12:00 PM	0.6
November 7, 2016	1:00 PM	0.6
November 7, 2016	2:00 PM	0.6
November 7, 2016	3:00 PM	0.0
November 7, 2016	4:00 PM	0.2
November 7, 2016	5:00 PM	0.2
November 7, 2016	6:00 PM	0.2
November 7, 2016	7:00 PM	0.6
November 7, 2016	8:00 PM	0.6
November 7, 2016	9:00 PM	0.6

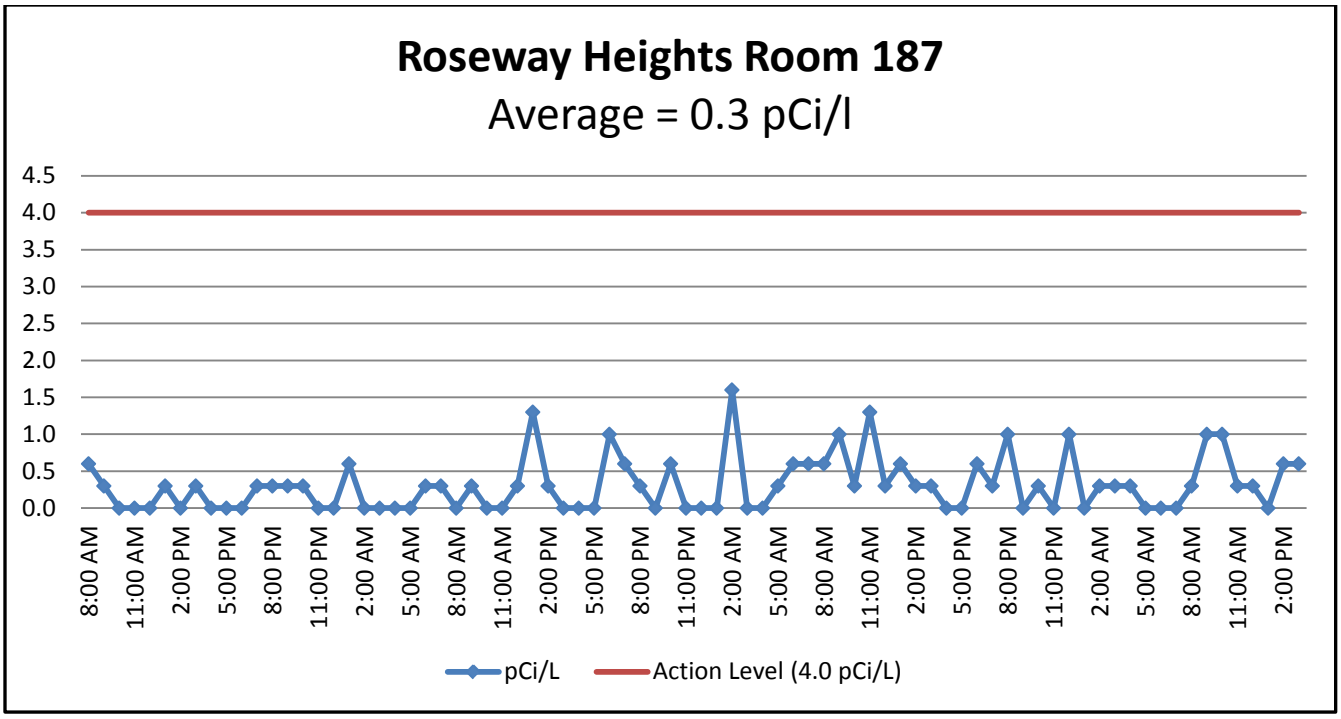
4412 SW Corbett Avenue, Portland, OR 97239
503.248.1939 Main
866.727.0140 Fax
888.248.1939 Toll-Free
www.pbsenv.com

Bend | Boise | Coos Bay | Eugene | Portland | Seattle | Tri-Cities | Vancouver | Walla Walla

November 7, 2016	10:00 PM	1.0
November 7, 2016	11:00 PM	0.0
November 8, 2016	12:00 AM	1.0
November 8, 2016	1:00 AM	0.6
November 8, 2016	2:00 AM	0.2
November 8, 2016	3:00 AM	2.0
November 8, 2016	4:00 AM	1.2
November 8, 2016	5:00 AM	1.0
November 8, 2016	6:00 AM	2.2
November 8, 2016	7:00 AM	0.6
November 8, 2016	8:00 AM	0.0
November 8, 2016	9:00 AM	1.2
November 8, 2016	10:00 AM	1.6
November 8, 2016	11:00 AM	0.2
November 8, 2016	12:00 PM	1.2
November 8, 2016	1:00 PM	0.2
November 8, 2016	2:00 PM	0.0
November 8, 2016	3:00 PM	0.2
November 8, 2016	4:00 PM	0.2
November 8, 2016	5:00 PM	0.0
November 8, 2016	6:00 PM	0.6
November 8, 2016	7:00 PM	0.0
November 8, 2016	8:00 PM	0.6
November 8, 2016	9:00 PM	0.0
November 8, 2016	10:00 PM	0.0
November 8, 2016	11:00 PM	0.6
November 9, 2016	12:00 AM	1.0
November 9, 2016	1:00 AM	0.6
November 9, 2016	2:00 AM	0.6
November 9, 2016	3:00 AM	0.6
November 9, 2016	4:00 AM	0.6
November 9, 2016	5:00 AM	1.0
November 9, 2016	6:00 AM	0.2
November 9, 2016	7:00 AM	0.6
November 9, 2016	8:00 AM	1.0
November 9, 2016	9:00 AM	0.2
November 9, 2016	10:00 AM	8.6
November 9, 2016	11:00 AM	0.2
November 9, 2016	12:00 PM	18.2
November 9, 2016	1:00 PM	0.2
November 9, 2016	2:00 PM	1.2

November 9, 2016	3:00 PM	2.0
November 9, 2016	4:00 PM	0.2
November 9, 2016	5:00 PM	1.0
November 9, 2016	6:00 PM	0.2
November 9, 2016	7:00 PM	0.6
November 9, 2016	8:00 PM	1.2
November 9, 2016	9:00 PM	0.2
November 9, 2016	10:00 PM	1.0
November 9, 2016	11:00 PM	1.0
November 10, 2016	12:00 AM	0.2
November 10, 2016	1:00 AM	1.2
November 10, 2016	2:00 AM	2.2
November 10, 2016	3:00 AM	0.6
November 10, 2016	4:00 AM	0.2
November 10, 2016	5:00 AM	0.0
November 10, 2016	6:00 AM	1.6
November 10, 2016	7:00 AM	1.0
November 10, 2016	8:00 AM	1.2
November 10, 2016	9:00 AM	1.2
November 10, 2016	10:00 AM	1.2
November 10, 2016	11:00 AM	0.2
November 10, 2016	12:00 PM	0.0
November 10, 2016	1:00 PM	1.0
November 10, 2016	2:00 PM	0.0
November 10, 2016	3:00 PM	0.6

PBS | Engineering + Environmental



Unit Type: Sun Nuclear Model 1027
Serial Number: 1407171

Date:	Time:	Radon (pCi/l)
November 7, 2016	8:00:00 AM	0.6
November 7, 2016	9:00:00 AM	0.3
November 7, 2016	10:00:00 AM	0.0
November 7, 2016	11:00:00 AM	0.0
November 7, 2016	12:00:00 PM	0.0
November 7, 2016	1:00:00 PM	0.3
November 7, 2016	2:00:00 PM	0.0
November 7, 2016	3:00:00 PM	0.3
November 7, 2016	4:00:00 PM	0.0
November 7, 2016	5:00:00 PM	0.0
November 7, 2016	6:00:00 PM	0.0
November 7, 2016	7:00:00 PM	0.3
November 7, 2016	8:00:00 PM	0.3
November 7, 2016	9:00:00 PM	0.3

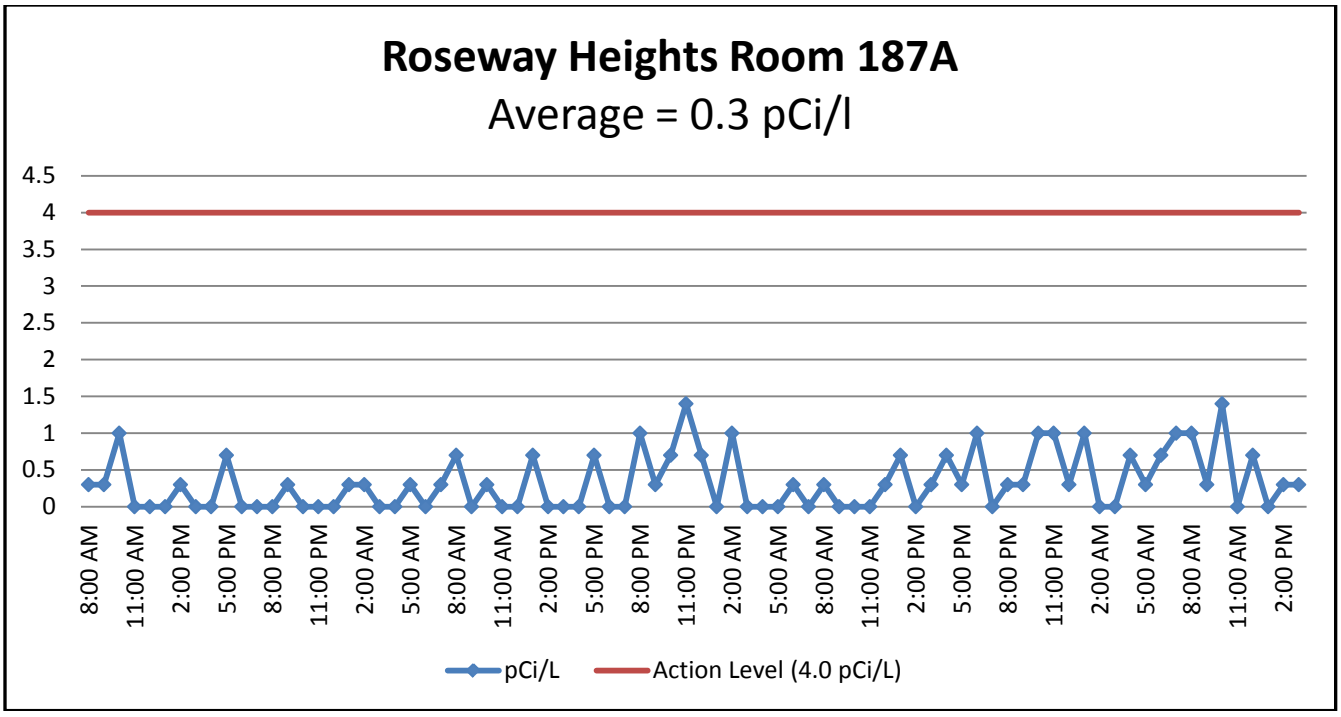
4412 SW Corbett Avenue, Portland, OR 97239
503.248.1939 Main
866.727.0140 Fax
888.248.1939 Toll-Free
www.pbsenv.com

Bend | Boise | Coos Bay | Eugene | Portland | Seattle | Tri-Cities | Vancouver | Walla Walla

November 7, 2016	10:00:00 PM	0.3
November 7, 2016	11:00:00 PM	0.0
November 8, 2016	12:00:00 AM	0.0
November 8, 2016	1:00:00 AM	0.6
November 8, 2016	2:00:00 AM	0.0
November 8, 2016	3:00:00 AM	0.0
November 8, 2016	4:00:00 AM	0.0
November 8, 2016	5:00:00 AM	0.0
November 8, 2016	6:00:00 AM	0.3
November 8, 2016	7:00:00 AM	0.3
November 8, 2016	8:00:00 AM	0.0
November 8, 2016	9:00:00 AM	0.3
November 8, 2016	10:00:00 AM	0.0
November 8, 2016	11:00:00 AM	0.0
November 8, 2016	12:00:00 PM	0.3
November 8, 2016	1:00:00 PM	1.3
November 8, 2016	2:00:00 PM	0.3
November 8, 2016	3:00:00 PM	0.0
November 8, 2016	4:00:00 PM	0.0
November 8, 2016	5:00:00 PM	0.0
November 8, 2016	6:00:00 PM	1.0
November 8, 2016	7:00:00 PM	0.6
November 8, 2016	8:00:00 PM	0.3
November 8, 2016	9:00:00 PM	0.0
November 8, 2016	10:00:00 PM	0.6
November 8, 2016	11:00:00 PM	0.0
November 9, 2016	12:00:00 AM	0.0
November 9, 2016	1:00:00 AM	0.0
November 9, 2016	2:00:00 AM	1.6
November 9, 2016	3:00:00 AM	0.0
November 9, 2016	4:00:00 AM	0.0
November 9, 2016	5:00:00 AM	0.3
November 9, 2016	6:00:00 AM	0.6
November 9, 2016	7:00:00 AM	0.6
November 9, 2016	8:00:00 AM	0.6
November 9, 2016	9:00:00 AM	1.0
November 9, 2016	10:00:00 AM	0.3
November 9, 2016	11:00:00 AM	1.3
November 9, 2016	12:00:00 PM	0.3
November 9, 2016	1:00:00 PM	0.6
November 9, 2016	2:00:00 PM	0.3

November 9, 2016	3:00:00 PM	0.3
November 9, 2016	4:00:00 PM	0.0
November 9, 2016	5:00:00 PM	0.0
November 9, 2016	6:00:00 PM	0.6
November 9, 2016	7:00:00 PM	0.3
November 9, 2016	8:00:00 PM	1.0
November 9, 2016	9:00:00 PM	0.0
November 9, 2016	10:00:00 PM	0.3
November 9, 2016	11:00:00 PM	0.0
November 10, 2016	12:00:00 AM	1.0
November 10, 2016	1:00:00 AM	0.0
November 10, 2016	2:00:00 AM	0.3
November 10, 2016	3:00:00 AM	0.3
November 10, 2016	4:00:00 AM	0.3
November 10, 2016	5:00:00 AM	0.0
November 10, 2016	6:00:00 AM	0.0
November 10, 2016	7:00:00 AM	0.0
November 10, 2016	8:00:00 AM	0.3
November 10, 2016	9:00:00 AM	1.0
November 10, 2016	10:00:00 AM	1.0
November 10, 2016	11:00:00 AM	0.3
November 10, 2016	12:00:00 PM	0.3
November 10, 2016	1:00:00 PM	0.0
November 10, 2016	2:00:00 PM	0.6
November 10, 2016	3:00:00 PM	0.6

PBS | Engineering + Environmental



Unit Type: Sun Nuclear Model 1027
Serial Number: 1407179

Date:	Time:	Radon (pCi/l)
November 7, 2016	8:00 AM	0.3
November 7, 2016	9:00 AM	0.3
November 7, 2016	10:00 AM	1.0
November 7, 2016	11:00 AM	0.0
November 7, 2016	12:00 PM	0.0
November 7, 2016	1:00 PM	0.0
November 7, 2016	2:00 PM	0.3
November 7, 2016	3:00 PM	0.0
November 7, 2016	4:00 PM	0.0
November 7, 2016	5:00 PM	0.7
November 7, 2016	6:00 PM	0.0
November 7, 2016	7:00 PM	0.0
November 7, 2016	8:00 PM	0.0
November 7, 2016	9:00 PM	0.3

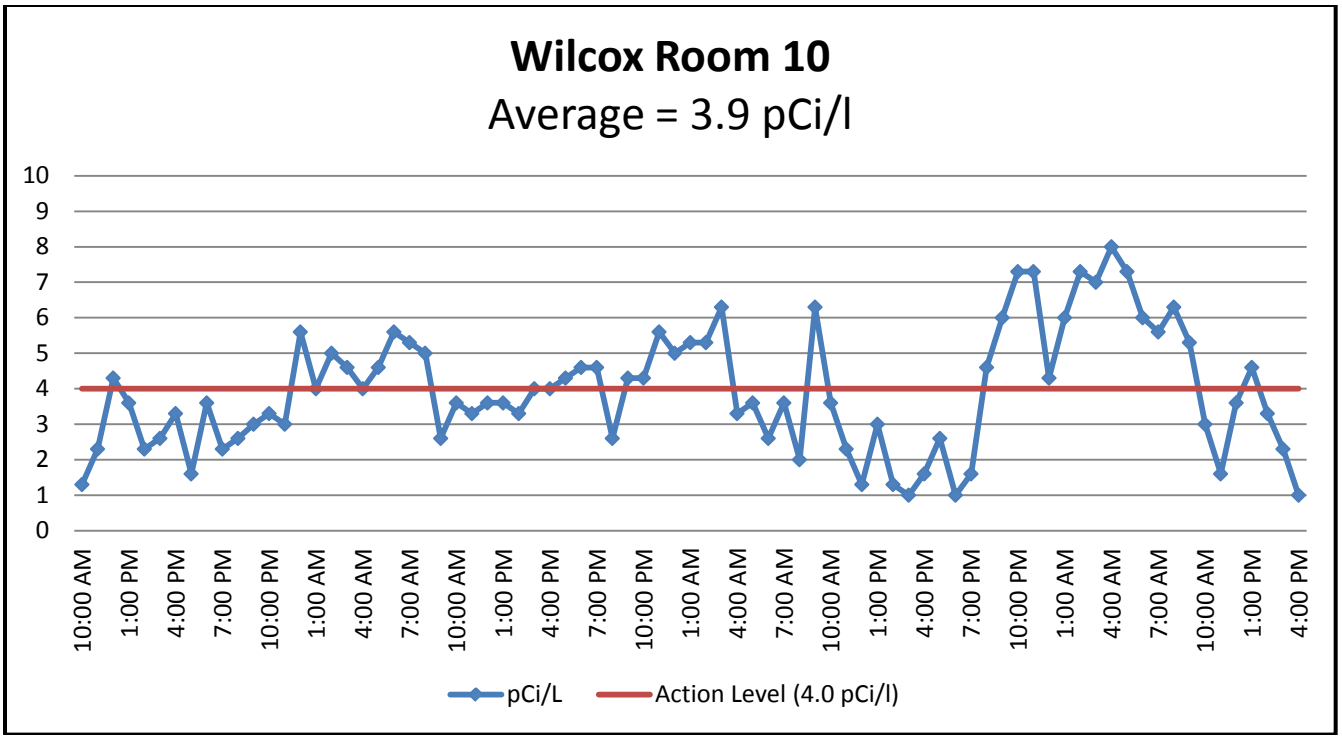
4412 SW Corbett Avenue, Portland, OR 97239
503.248.1939 Main
866.727.0140 Fax
888.248.1939 Toll-Free
www.pbsenv.com

Bend | Boise | Coos Bay | Eugene | Portland | Seattle | Tri-Cities | Vancouver | Walla Walla

November 7, 2016	10:00 PM	0.0
November 7, 2016	11:00 PM	0.0
November 8, 2016	12:00 AM	0.0
November 8, 2016	1:00 AM	0.3
November 8, 2016	2:00 AM	0.3
November 8, 2016	3:00 AM	0.0
November 8, 2016	4:00 AM	0.0
November 8, 2016	5:00 AM	0.3
November 8, 2016	6:00 AM	0.0
November 8, 2016	7:00 AM	0.3
November 8, 2016	8:00 AM	0.7
November 8, 2016	9:00 AM	0.0
November 8, 2016	10:00 AM	0.3
November 8, 2016	11:00 AM	0.0
November 8, 2016	12:00 PM	0.0
November 8, 2016	1:00 PM	0.7
November 8, 2016	2:00 PM	0.0
November 8, 2016	3:00 PM	0.0
November 8, 2016	4:00 PM	0.0
November 8, 2016	5:00 PM	0.7
November 8, 2016	6:00 PM	0.0
November 8, 2016	7:00 PM	0.0
November 8, 2016	8:00 PM	1.0
November 8, 2016	9:00 PM	0.3
November 8, 2016	10:00 PM	0.7
November 8, 2016	11:00 PM	1.4
November 9, 2016	12:00 AM	0.7
November 9, 2016	1:00 AM	0.0
November 9, 2016	2:00 AM	1.0
November 9, 2016	3:00 AM	0.0
November 9, 2016	4:00 AM	0.0
November 9, 2016	5:00 AM	0.0
November 9, 2016	6:00 AM	0.3
November 9, 2016	7:00 AM	0.0
November 9, 2016	8:00 AM	0.3
November 9, 2016	9:00 AM	0.0
November 9, 2016	10:00 AM	0.0
November 9, 2016	11:00 AM	0.0
November 9, 2016	12:00 PM	0.3
November 9, 2016	1:00 PM	0.7
November 9, 2016	2:00 PM	0.0

November 9, 2016	3:00 PM	0.3
November 9, 2016	4:00 PM	0.7
November 9, 2016	5:00 PM	0.3
November 9, 2016	6:00 PM	1.0
November 9, 2016	7:00 PM	0.0
November 9, 2016	8:00 PM	0.3
November 9, 2016	9:00 PM	0.3
November 9, 2016	10:00 PM	1.0
November 9, 2016	11:00 PM	1.0
November 10, 2016	12:00 AM	0.3
November 10, 2016	1:00 AM	1.0
November 10, 2016	2:00 AM	0.0
November 10, 2016	3:00 AM	0.0
November 10, 2016	4:00 AM	0.7
November 10, 2016	5:00 AM	0.3
November 10, 2016	6:00 AM	0.7
November 10, 2016	7:00 AM	1.0
November 10, 2016	8:00 AM	1.0
November 10, 2016	9:00 AM	0.3
November 10, 2016	10:00 AM	1.4
November 10, 2016	11:00 AM	0.0
November 10, 2016	12:00 PM	0.7
November 10, 2016	1:00 PM	0.0
November 10, 2016	2:00 PM	0.3
November 10, 2016	3:00 PM	0.3

PBS | Engineering + Environmental



Unit Type: Sun Nuclear Model 1027
Serial Number: 1407187

Date:	Time:	Radon (pCi/l)
November 7, 2016	10:00:00 AM	1.3
November 7, 2016	11:00:00 AM	2.3
November 7, 2016	12:00:00 PM	4.3
November 7, 2016	1:00:00 PM	3.6
November 7, 2016	2:00:00 PM	2.3
November 7, 2016	3:00:00 PM	2.6
November 7, 2016	4:00:00 PM	3.3
November 7, 2016	5:00:00 PM	1.6
November 7, 2016	6:00:00 PM	3.6
November 7, 2016	7:00:00 PM	2.3
November 7, 2016	8:00:00 PM	2.6
November 7, 2016	9:00:00 PM	3.0
November 7, 2016	10:00:00 PM	3.3
November 7, 2016	11:00:00 PM	3.0

4412 SW Corbett Avenue, Portland, OR 97239
503.248.1939 Main
866.727.0140 Fax
888.248.1939 Toll-Free
www.pbsenv.com

Bend | Boise | Coos Bay | Eugene | Portland | Seattle | Tri-Cities | Vancouver | Walla Walla

November 8, 2016	12:00:00 AM	5.6
November 8, 2016	1:00:00 AM	4.0
November 8, 2016	2:00:00 AM	5.0
November 8, 2016	3:00:00 AM	4.6
November 8, 2016	4:00:00 AM	4.0
November 8, 2016	5:00:00 AM	4.6
November 8, 2016	6:00:00 AM	5.6
November 8, 2016	7:00:00 AM	5.3
November 8, 2016	8:00:00 AM	5.0
November 8, 2016	9:00:00 AM	2.6
November 8, 2016	10:00:00 AM	3.6
November 8, 2016	11:00:00 AM	3.3
November 8, 2016	12:00:00 PM	3.6
November 8, 2016	1:00:00 PM	3.6
November 8, 2016	2:00:00 PM	3.3
November 8, 2016	3:00:00 PM	4.0
November 8, 2016	4:00:00 PM	4.0
November 8, 2016	5:00:00 PM	4.3
November 8, 2016	6:00:00 PM	4.6
November 8, 2016	7:00:00 PM	4.6
November 8, 2016	8:00:00 PM	2.6
November 8, 2016	9:00:00 PM	4.3
November 8, 2016	10:00:00 PM	4.3
November 8, 2016	11:00:00 PM	5.6
November 9, 2016	12:00:00 AM	5.0
November 9, 2016	1:00:00 AM	5.3
November 9, 2016	2:00:00 AM	5.3
November 9, 2016	3:00:00 AM	6.3
November 9, 2016	4:00:00 AM	3.3
November 9, 2016	5:00:00 AM	3.6
November 9, 2016	6:00:00 AM	2.6
November 9, 2016	7:00:00 AM	3.6
November 9, 2016	8:00:00 AM	2.0
November 9, 2016	9:00:00 AM	6.3
November 9, 2016	10:00:00 AM	3.6
November 9, 2016	11:00:00 AM	2.3
November 9, 2016	12:00:00 PM	1.3
November 9, 2016	1:00:00 PM	3.0
November 9, 2016	2:00:00 PM	1.3
November 9, 2016	3:00:00 PM	1.0
November 9, 2016	4:00:00 PM	1.6

November 9, 2016	5:00:00 PM	2.6
November 9, 2016	6:00:00 PM	1.0
November 9, 2016	7:00:00 PM	1.6
November 9, 2016	8:00:00 PM	4.6
November 9, 2016	9:00:00 PM	6.0
November 9, 2016	10:00:00 PM	7.3
November 9, 2016	11:00:00 PM	7.3
November 10, 2016	12:00:00 AM	4.3
November 10, 2016	1:00:00 AM	6.0
November 10, 2016	2:00:00 AM	7.3
November 10, 2016	3:00:00 AM	7.0
November 10, 2016	4:00:00 AM	8.0
November 10, 2016	5:00:00 AM	7.3
November 10, 2016	6:00:00 AM	6.0
November 10, 2016	7:00:00 AM	5.6
November 10, 2016	8:00:00 AM	6.3
November 10, 2016	9:00:00 AM	5.3
November 10, 2016	10:00:00 AM	3.0
November 10, 2016	11:00:00 AM	1.6
November 10, 2016	12:00:00 PM	3.6
November 10, 2016	1:00:00 PM	4.6
November 10, 2016	2:00:00 PM	3.3
November 10, 2016	3:00:00 PM	2.3
November 10, 2016	4:00:00 PM	1.0

* - Highlighted values are typical building occupied hours (7:00 am – 6:00 pm). Occupied hours radon average was 3.2 pCi/l.

RADON REFERENCE LABORATORY

BOWSER MORNER®

STATEMENT OF CALIBRATION

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

BMI Control Information:
Statement No.: 17581709
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.:** 1407171

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:

Visual Inspection	Batteries	Power Adapter	High Voltage	Software Version
Ok	Ok	See above	1199 VDC (Ok)	N5A

Result of Background Exposure (16 hr): 0.2 pCi/liter

Radon Chamber Conditions:

Exposure Duration	Radon Concentration	Relative Humidity	Temperature
48 hr	25.8 ± 0.5 pCi/liter	49.9 ± 0.5 %	70.0 ± 0.1 °F

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:

Average Monitor Reading	Relative Error As Received	Relative Error After Change of Calibration Factor
27.7 pCi/liter	6.6%	-3.1%

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 1.032.

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

Authorized Signature Jill P. Newton, Manager Radon Reference Lab

4514 TAYLORSVILLE RD - DAYTON, OH 45424 - 937.236.8805 EXT 259 - FAX 937.233.2024

RADON REFERENCE LABORATORY

BOWSER MORNER®

STATEMENT OF CALIBRATION

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

BMI Control Information:
Statement No.: 17581705
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.:** 1407176

The monitor was found to be in good physical condition.

Initial Checks:

Visual Inspection	Batteries	Power Adapter	High Voltage	Software Version
Ok	Replaced	11.0 VDC (Ok)	1144 VDC (Ok)	N5A

Result of Background Exposure (16 hr): 0.1 pCi/liter

Radon Chamber Conditions:

Exposure Duration	Radon Concentration	Relative Humidity	Temperature
48 hr	25.8 ± 0.5 pCi/liter	49.9 ± 0.5 %	70.0 ± 0.1 °F

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:

Average Monitor Reading	Relative Error As Received	Relative Error After Change of Calibration Factor
28.0 pCi/liter	8.1%	-1.7%

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 1.017.

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

Authorized Signature Jill P. Newton, Manager Radon Reference Lab

4514 TAYLORSVILLE RD - DAYTON, OH 45424 - 937.236.8805 EXT 259 - FAX 937.233.2024

RADON REFERENCE LABORATORY

BOWSER MORNER®

STATEMENT OF CALIBRATION

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

BMI Control Information:
Statement No.: 17581706
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.:** 1407179

The monitor was found to be in good physical condition.

Initial Checks:

Visual Inspection	Batteries	Power Adapter	High Voltage	Software Version
Ok	Replaced	10.9 VDC (Ok)	1155 VDC (Ok)	N5A

Result of Background Exposure (16 hr): 0.2 pCi/liter

Radon Chamber Conditions:

Exposure Duration	Radon Concentration	Relative Humidity	Temperature
48 hr	26.0 ± 0.3 pCi/liter	48.9 ± 0.6 %	70.0 ± 0.1 °F

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:

Average Monitor Reading	Relative Error As Received	Relative Error After Change of Calibration Factor
27.0 pCi/liter	3.1%	N/A

Based on the results of the calibration, the monitor's internal calibration factor as received was 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 0.970.

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

Authorized Signature Gill P. Newton, Manager Radon Reference Lab

4514 TAYLORSVILLE RD - DAYTON, OH 45424 - 937.236.8805 EXT 259 - FAX 937.233.2024

RADON REFERENCE LABORATORY

BOWSER MORNER®

STATEMENT OF CALIBRATION

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

BMI Control Information:
Statement No.: 17581707
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.:** 1407187

The monitor was found to be in good physical condition.

Initial Checks:

Visual Inspection	Batteries	Power Adapter	High Voltage	Software Version
Ok	Replaced	11.1 VDC (Ok)	1130 VDC (Ok)	N5A

Result of Background Exposure (16 hr): 0.0 pCi/liter

Radon Chamber Conditions:

Exposure Duration	Radon Concentration	Relative Humidity	Temperature
48 hr	25.8 ± 0.5 pCi/liter	49.9 ± 0.5 %	70.0 ± 0.1 °F

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:

Average Monitor Reading	Relative Error As Received	Relative Error After Change of Calibration Factor
28.6 pCi/liter	10.9%	0.8%

Based on the results of the calibration, the monitor's internal calibration factor was changed to the most accurate available setting. The radon measurement should be multiplied by the correction factor of 0.992.

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

Authorized Signature Jill P. Newton, Manager Radon Reference Lab

4514 TAYLORSVILLE RD - DAYTON, OH 45424 - 937.236.8805 EXT 259 - FAX 937.233.2024