



Cascade Radon, Inc.  
Testing, Mitigation,  
Systems Design  
CCB 180537 / CASCARI927C1  
Fed ID 26-1809992

12839 NE Airport Way Bldg. 9  
Portland, Oregon 97230  
Phone: (503) 421-4813  
Fax: (503) 281-6170  
Office@CascadeRadon.com

# Peninsula Elementary School

(C-65290)

8125 N Emerald Ave., Portland, OR 97217

April 13, 2018



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## **Purpose**

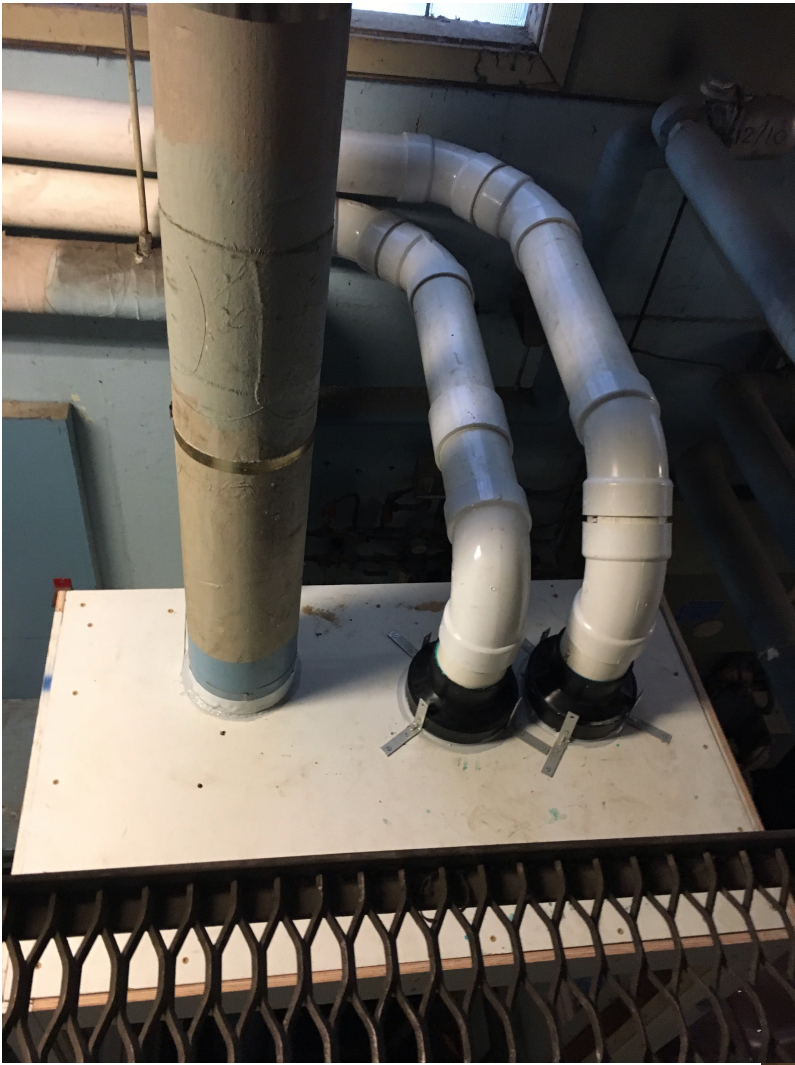
**Initial testing was performed March 7, 2016 to March 10, 2016 by PBS Engineering and Environmental Inc. Testing indicated 8 pCi/L in the boiler room of the facility. PBS performed additional continuous radon monitor testing as a confirmation to determine if mitigation was needed. The radon levels proved to be consistently between 8 to 11 pCi/L. Due to the average being more than twice the EPA action level of 4.0 pCi/L, Cascade Radon was hired to diagnose boiler room and develop a mitigation strategy to reduce the radon levels.**

**The installation of a Capture box style system was used to redirect the radon laden air coming from the pipe tunnels and reduce the radon below the EPA action level of 4 pCi/L. See attached pages for a description of the system components and post-mitigation testing.**



**This capture box was designed with both safety and system effectiveness in mind. Entry had to be made easy to allow for maintenance personnel to gain access to the pipe tunnels. A full size door was installed to accommodate these requirements. The box was constructed using high-quality materials for a long lasting and low maintenance system. This style of a mitigation system does not depressurize the soil beneath the concrete slab, it captures and redirects the natural airflow coming from the extensive utility tunnels beneath the building. The vent piping connected to the top of the box then continues to the mitigation fan in the attic and vents it safely to the exterior of the building.**





**Double 4 inch vent piping was installed to draw from the capture box.**



**Vent pipe routing in the boiler of the facility to the fan location in the attic above.**





**A Festa AMG Fury model fan is utilized when a system is required to move a high cubic feet per minute of air. The double 4 inch vent piping join together to 8 inch pipe beneath the mitigation fan and continues through the roof. The diameter of pipe is increased to maximize the venting capability of the mitigation system.**

# Credentials

**Cascade Radon, Inc.**  
12839 NE Airport Way Bldg. 9  
Portland, OR 97230  
(503)421-4813  
office@cascaderadon.com  
CCB180537  
CASCARI977C1  
NEHA/NRPP# 104815RMT  
NRSB# 1G0008

**Snyder Roofing of Oregon LLC**  
12650 SW Hall Blvd.  
Tigard, OR 97223  
(503)620-5252  
Snyder-builds.com  
CCB135987

**Christensen Electric, Inc.**  
17201 NE Sacramento Street  
Portland, OR 97230  
(503)419-3300  
info@christenson.com  
CCB458

**Accurate Concrete Cutting**  
6816 NE 40th Ave.  
Vancouver, WA 98661  
lj@accurate-concrete-cut.com  
CCB191788  
W.A. Contr. License# ACCURCC153M2



**CASCADE RADON, INC.**

Testing, Mitigation,  
Systems Design  
CCB 180537 / CASCARI927C1

12839 NE Airport Way  
Portland, OR 97230  
Phone: (503) 421-4813  
Fax: (503) 281-6170  
[Office@CascadeRadon.com](mailto:Office@CascadeRadon.com)

April 13, 2018  
C-65290

To: Portland Public Schools  
501 N. Dixon Street  
Portland, OR 97227

RE: Peninsula Elementary School  
8125 N Emerald Ave.  
Portland, OR 97217

Effective: February 2, 2018

Cascade Radon, Inc. warrants that all work has been performed in a workmanlike manner and according to the best standard practices. All materials and equipment are new, unless otherwise specified, and of first quality.

Cascade Radon, Inc. guarantees that the installation will maintain average, long-term, indoor radon levels, based upon approved 9 month duration Alpha-Track testing at or below 4 pCi/L for a period of 10 years.

With the exception of the exhaust fan unit(s), Cascade Radon, Inc. warrants that all labor, work, materials and equipment will be free from faults in material or workmanship for period of ten (10) years from the date of substantial completion.

Includes 5-year manufactures replacement warranty on exhaust fan unit(s), beginning at time of initial activation, with any related work and materials provided at no cost to the Client.

All warranties and guarantees are transferable to future owners of the same property.

Warranty or service inquires, please call (503) 421-4813

Sincerely,  
Wade Gervais  
Division Manager  
Cascade Radon, Inc.





## TEST DETAILS:

Peninsula Elementary  
 8125 N Emerald Ave  
 Portland, OR 97217

Portland Public Schools

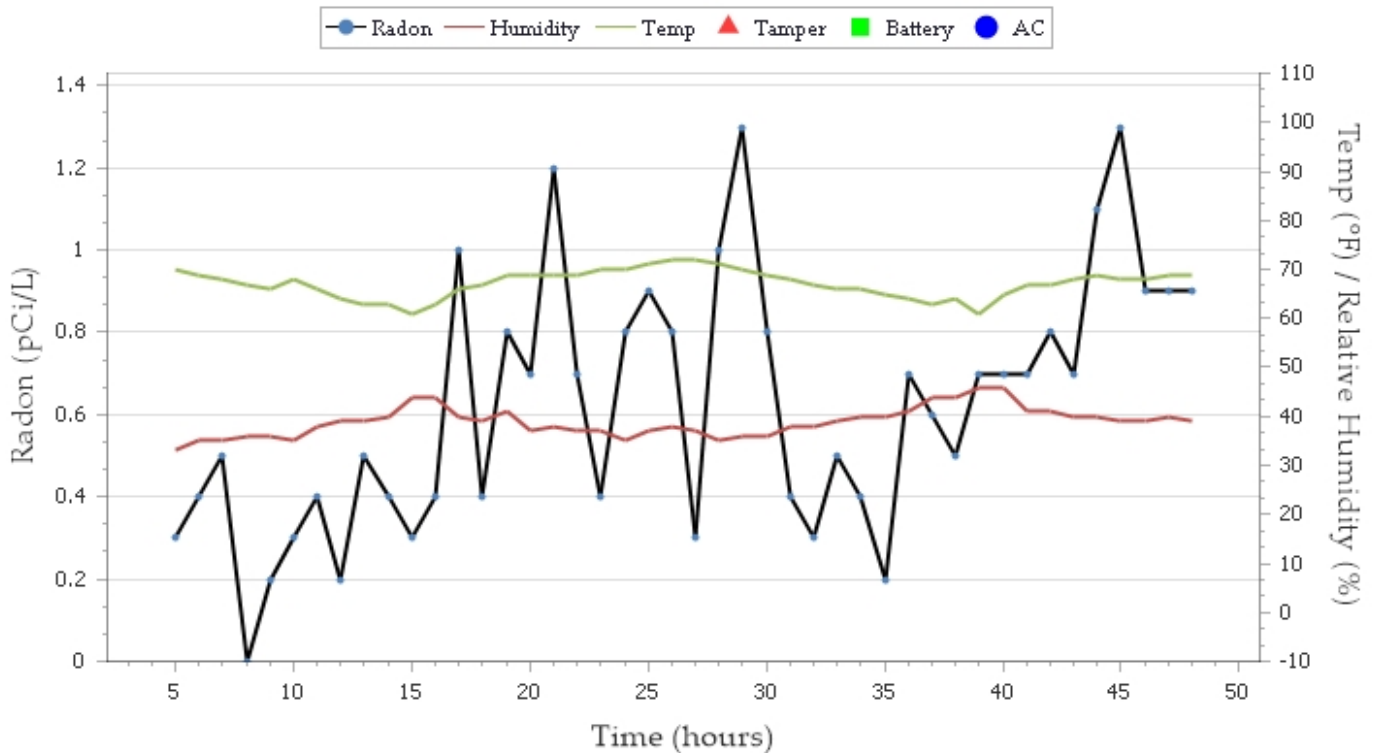
**Test Start Date/Time:** Tuesday, January 30, 2018 // 2:30 PM  
**Test End Date/Time:** Thursday, February 01, 2018 // 2:30 PM  
**Location of Instrument:** Boiler Room

Notes:

## TEST RESULTS:

**Average:** 0.6 pCi/L

**Test ID#** 80267



*Tamara C Linde*

2/2/18

Tamara Linde  
 Certification #:

Date

License 1:

CCB 180537/ CASCARI927C1

License 2:

NRPP 108946RT, 108953RT



## INTERVAL REPORT:

Hour	T	B	AC	pCi/L	Temp	Humd	Alpha
1				0.1	69	36	4
2				0.5	70	33	18
3				0.8	70	34	29
4				0.4	71	33	14
5				0.3	70	33	12
6				0.4	69	35	15
7				0.5	68	35	18
8				0.0	67	36	1
9				0.2	66	36	7
10				0.3	68	35	12
11				0.4	66	38	14
12				0.2	64	39	8
13				0.5	63	39	17
14				0.4	63	40	15
15				0.3	61	44	10
16				0.4	63	44	16
17				1.0	66	40	35
18				0.4	67	39	14
19				0.8	69	41	29
20				0.7	69	37	26
21				1.2	69	38	40
22				0.7	69	37	25
23				0.4	70	37	15
24				0.8	70	35	29
25				0.9	71	37	30
26				0.8	72	38	27
27				0.3	72	37	11
28				1.0	71	35	35
29				1.3	70	36	43
30				0.8	69	36	28
31				0.4	68	38	16
32				0.3	67	38	10
33				0.5	66	39	18
34				0.4	66	40	14
35				0.2	65	40	8
36				0.7	64	41	23
37				0.6	63	44	21
38				0.5	64	44	19
39				0.7	61	46	25
40				0.7	65	46	24
41				0.7	67	41	23
42				0.8	67	41	28
43				0.7	68	40	24
44				1.1	69	40	38
45				1.3	68	39	43
46				0.9	68	39	32
47				0.9	69	40	32
48				0.9	69	39	30

**Minimum:** 0.0 pCi/L      **Maximum:** 1.3 pCi/L      **Average:** 0.6 pCi/L

Tamara C Linde      2/2/18  
 Tamara Linde      Date  
 Certification #:  
 License 1:      CCB 180537/ CASCARI927C1

Tamara Linde  
Cascade Radon  
12839 NE Airport Way  
Portland, OR 97230  
Phone: 503-421-4813  
office@cascaderadon.com

Fax: 503-281-6170



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License 2:

NRPP 108946RT, 108953RT

RadStar RS800  
Serial#: 01981

Radon Detector/Monitor  
Calib.#: 00315 Bkgnd15 Test ID#: 80267

Version 1.6  
Page 3 of 3





**CERTIFICATE OF CALIBRATION  
RadStar RS800 Continuous Monitor**

This instrument has been calibrated in accordance with the procedures set forth by the manufacturer.  
Please retain this certificate for your records

Cal Date: 2-2-17 Last Cal Date: 10/12/15 Next Cal Date: 2-2-18  
Device Serial Number: 1981 Device Type: RS800  
Device Status: Passed  X Failed  Radon Chamber: TC 103 A

NRPP Chamber#TC103	Radon Gas Concentration: <u>22.1 pCi/l</u>
CRM Serial Numbers: <u>0356 0352</u>	
Chamber Temperature: <u>72.5 °F</u>	Chamber Humidity: <u>47.9 %RH</u>
Start Chamber Exposure: <u>10/19/16 11:30</u>	Stop Chamber Exposure: <u>10/21/16 08:30</u>

Calibration Number (as found, if applicable) 315 *Calib#=(10240/(Hourly Counts/pCi/l))*

Calibration Number (Final) 315 Calibrated By: *Ken Smith*

**RadonAway 3 Saber Way Ward Hill, Massachusetts 01835 978-521-3703**

This RadStar Continuous Radon Monitor has been calibrated by the Manufacturer using a standard operating procedure for the calibration of the RS800, TP010 Rev E. This procedure provides for the following performance checks:

- System Functional Checks
- Battery Check
- Back Ground Check in Nitrogen 0.1 pCi/l 15 cph
- Chamber Exposure in known Radon Gas Concentration
- Adjustment to Calibration Number, if necessary
- Adjustment to Background, if necessary
- Verification Chamber Exposure, if necessary

*(As Tested Background is Integrated into Instrument Calculation Program. Do Not Adjust Readings by Background)*

The manufacturer, RadonAway performs quarterly inter-comparisons with a Secondary Chamber

NRPP Device Code 476 Device group 18 USEPA Verified

Radon Measurement Specialist:

NRSB #6SS0002, NRPP #100842RT

*The RadStar RS800 is distributed by Accustar Labs 888-580-9596*



## TEST DETAILS:

Peninsula Elementary  
 8125 N Emerald Ave  
 Portland, OR 97217

Portland Public Schools

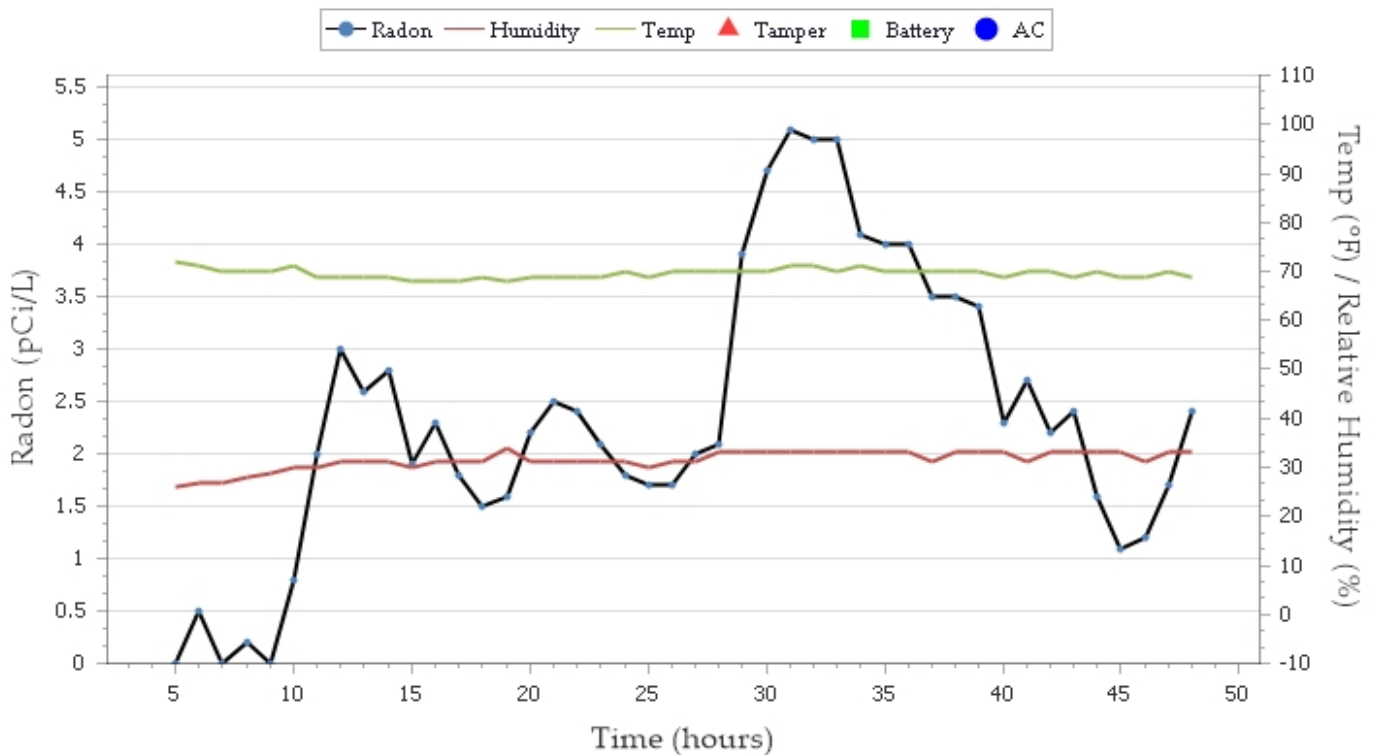
**Test Start Date/Time:** Tuesday, January 30, 2018 // 2:30 PM  
**Test End Date/Time:** Thursday, February 01, 2018 // 2:30 PM  
**Location of Instrument:** Boiler Room Office

Notes:

## TEST RESULTS:

**Average:** 2.3 pCi/L

**Test ID#** 80514



*Tamara C Linde*

2/2/18

Tamara Linde

Date

Certification #:

License 1:

CCB 180537/ CASCARI927C1

License 2:

NRPP 108946RT, 108953RT



## INTERVAL REPORT:

Hour	T	B	AC	pCi/L	Temp	Humd	Alpha
1				0.2	68	33	8
2				0.4	71	28	14
3				0.0	72	27	2
4				0.2	72	27	9
5				0.0	72	26	3
6				0.5	71	27	17
7				0.0	70	27	0
8				0.2	70	28	9
9				0.0	70	29	1
10				0.8	71	30	27
11				2.0	69	30	61
12				3.0	69	31	93
13				2.6	69	31	79
14				2.8	69	31	86
15				1.9	68	30	58
16				2.3	68	31	72
17				1.8	68	31	56
18				1.5	69	31	47
19				1.6	68	34	49
20				2.2	69	31	69
21				2.5	69	31	77
22				2.4	69	31	75
23				2.1	69	31	66
24				1.8	70	31	56
25				1.7	69	30	53
26				1.7	70	31	53
27				2.0	70	31	62
28				2.1	70	33	65
29				3.9	70	33	119
30				4.7	70	33	142
31				5.1	71	33	154
32				5.0	71	33	151
33				5.0	70	33	151
34				4.1	71	33	125
35				4.0	70	33	121
36				4.0	70	33	123
37				3.5	70	31	107
38				3.5	70	33	106
39				3.4	70	33	104
40				2.3	69	33	70
41				2.7	70	31	83
42				2.2	70	33	68
43				2.4	69	33	74
44				1.6	70	33	49
45				1.1	69	33	35
46				1.2	69	31	37
47				1.7	70	33	52
48				2.4	69	33	75

**Minimum:** 0.0 pCi/L      **Maximum:** 5.1 pCi/L      **Average:** 2.3 pCi/L

*Tamara C Linde*

2/2/18

Tamara Linde

Date

Certification #:

License 1:

CCB 180537/ CASCARI927C1



Tamara Linde  
Cascade Radon  
12839 NE Airport Way  
Portland, OR 97230  
Phone: 503-421-4813  
office@cascaderadon.com

Fax: 503-281-6170



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License 2:

NRPP 108946RT, 108953RT

RadStar RS800  
Serial#: 01645

Radon Detector/Monitor  
Calib.#: 00341 Bkgnd10 Test ID#: 80514

Version 1.6  
Page 3 of 3



**CERTIFICATE OF CALIBRATION  
RadStar RS800 Continuous Monitor**

This instrument has been calibrated in accordance with the procedures set forth by the manufacturer.  
Please retain this certificate for your records

Cal Date: 4-10-17 Last Cal Date: 06/09/16 Next Cal Date: 4-10-18  
Device Serial Number: 1645 Device Type: RS800  
Device Status: Passed  Failed  Radon Chamber: TC 103 B

NRPP Chamber#TC103	Radon Gas Concentration: <u>19.7 pCi/l</u>
CRM Serial Numbers: <u>4183 2173 2178</u>	
Chamber Temperature: <u>69.9 °F</u>	Chamber Humidity: <u>39.3 %RH</u>
Start Chamber Exposure: <u>04/04/17 10:00</u>	Stop Chamber Exposure: <u>04/06/17 08:00</u>

Calibration Number (as found, if applicable) 305 *Calib#=(10240/(Hourly Counts/pCi/l))*  
Calibration Number (Final) 341 Calibrated By: *Ken Furrer*

**RadonAway 3 Saber Way Ward Hill, Massachusetts 01835 978-521-3703**

This RadStar Continuous Radon Monitor has been calibrated by the Manufacturer using a standard operating procedure for the calibration of the RS800, TP010 Rev E. This procedure provides for the following performance checks:

- System Functional Checks
- Battery Check
- Back Ground Check in Nitrogen 0.1 pCi/l 10 cph
- Chamber Exposure in known Radon Gas Concentration
- Adjustment to Calibration Number, if necessary
- Adjustment to Background, if necessary
- Verification Chamber Exposure, if necessary

*(As Tested Background is Integrated into Instrument Calculation Program, Do Not Adjust Readings by Background)*

The manufacturer, RadonAway performs quarterly inter-comparisons with a Secondary Chamber

NRPP Device Code 476 Device group 18 USEPA Verified

Radon Measurement Specialist:

NRSB #6SS0002, NRPP #100842RT

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