

# KELSAY

## Environmental Consulting

June 22, 2020

Mr. Kevin Strong  
Business Manager  
Sweet Home School District Office  
1920 Long Street  
Sweet Home, Oregon 97386

RE: Long-Term Radon Sampling at the Holley Elementary School (DRAFT)

Kelsay Environmental performed a long-term radon survey at Holley Elementary School located at 40336 Crawfordsville Dr., Sweet Home, Oregon. Sampling began on November 22, 2019 as a screening for potential Radon concerns in compliance with Oregon Revised Statute (ORS) 332.116-167. *Long-term sampling* is defined by a minimum of 90 days which helps account for normal fluctuations in building conditions over time.

Under ORS 332.166-167, radon testing in Oregon Schools must be performed by January 1<sup>st</sup>, 2021. The sampling protocol was derived from a document produced by the Oregon Health Authority called "Testing for Elevated Radon in Oregon Schools, A Protocol and Plan". The screening was performed to determine if radon levels in the building were above the Environmental Protection Agency's (EPA) action level of 4.0 pCi/L (picocuries per liter). If levels exceed the action level, a remediation process must be enacted to mitigate exposure levels. This survey would be the basis of that remediation plan.

Testing locations included every occupied room on the first floor of the structure. According to ORS 332.166-167, it specifies that "at a minimum, any frequently-occupied room in contact with the ground or located above a basement or crawlspace" should be tested.

### Sampling Procedures

Kelsay Environmental conducted sampling for radon gas in all occupied rooms that were bordered by ground or soil. Holley Elementary School consists of a concrete foundation with one floor. Samples were collected using Alpha Track AT-100 diffusion-based track radon monitors from Accustar Labs. A total of 18 rooms were tested (see attached table for locations). In addition, two duplicates one blank and a spike were submitted to the lab to ensure quality control. A total of 21 detectors kits were used.

Radon detectors were placed in each occupied space, particularly within the height of the normal breathing zone (between 2 and 6 feet in height) on November 22, 2019. The conditions of the building were such that the HVAC system was operating under normal occupancy conditions and the building was occupied as usual on a day-to-day basis. Samples were retrieved on March 27, 2020, providing for 126 total days of sampling, and then submitted to the Accustar Laboratory for analysis, a NELAP accredited lab, using electrochemical etching to process its alpha track foils

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Long-Term Radon Sampling at Holley Elementary School

which are subsequently counted with computer-aided image analysis equipment

Samples to be spiked for quality control are sent to the Bowser-Morner Radon Reference Laboratory. Samples are exposed to specific concentrations of radon in a radon reference chamber and are then submitted to the Accustar Labs for analysis. The results are compared to the known spike concentration to ensure quality control.

### Results and Discussion

Radon gas is generally always present in varying quantities, inside and outside of buildings. According to the EPA, radon gas averages 1.3 pCi/L inside buildings across the country, with 0.4 pCi/L generally considered background level. The background level is also the analytical level of detection for AccuStar Labs, levels below which cannot be accurately measured.

**Laboratory results indicate all measured radon gas concentrations were below the action level of 4.0 pCi/L.**

**Spiked samples** were within acceptable parameters for quality assurance based on the Relative Percentage Error (RPE). 6.1 pCi/L is the analytical result for the spikes from Bowser-Morner.

$$((\text{Measured Value} - \text{Reference Value}) / \text{Reference Value}) \times 100\%$$

**Duplicate and blank samples** were as well within acceptable parameters based on the Relative Percent Difference:

$$((\text{Initial Result} - \text{Duplicate Result}) / \text{Average of Both Results}) \times 100\%$$

**TABLE 1**  
**SPIKE/DUPLICATE/BLANK SAMPLE RESULTS**  
**HOLLEY ELEMENTARY SCHOOL**

Sample No.	Sample Variety	Location	Results (pCi/L)	Relative Percentage Error/Difference	Acceptance
4327064	Spike	NA	6.1	0%	Yes
4326930/ 4326935	Duplicate/Original	Classroom 4	1.5 – 1.5	0%	Yes
4327051/ 4326905	Duplicate/Original	Classroom 3	1.2 – 1.1	8.69%	Yes
4326998	Blank				TBD

\*Blanks should be close to 0.00 pCi/L or near the laboratory analytical level of detection

\*A trend in RPE values over +/-30 pCi/L should be investigated

\*RPD values of >27% should be questioned for results over 4.0 pCi/L

\*RPD values of >49% should be questioned for results between 2.0-3.9 pCi/L

## Recommendations

Radon levels throughout the structure were all below the EPA Action Level of 4.0 pCi/L and therefore remediation procedures are not required now. Oregon Health Authority (ORS 332.166-167) requires schools to re-test for radon every 10 years regardless of initial testing results or whether mitigation was done.

Sincerely,



Lisa Janik  
Industrial Hygienist

Attachments: Long-Term Radon Sampling Table  
Lab Results/Chain of Custody  
Exposure In Bowser-Morner Radon Chamber

**Radon Sampling Table  
Holley Elementary School  
40336 Crawfordsville Dr.  
Sweet Home, OR**

DEVICE NUMBER	START DATE	STOP DATE	Total Days	LOCATION	RADON pCi/L
4326904	11/22/2019	3/27/2020	126	Main Office	1.3
4326903	11/22/2019	3/27/2020	126	Principal's Office	2.9
4326902	11/22/2019	3/27/2020	126	Health Room	1.3
4326928	11/22/2019	3/27/2020	126	Cafeteria	0.6
4326926	11/22/2019	3/27/2020	126	Class Next to Café	0.9
4326901	11/22/2019	3/27/2020	126	Library	0.7
4326927	11/22/2019	3/27/2020	126	Reset Room	0.6
4326929	11/22/2019	3/27/2020	126	Room 5	1.2
4326935	11/22/2019	3/27/2020	126	Room 4	1.5
4326930	11/22/2019	3/27/2020	126	Room 4 Duplicate	1.5
4327078	11/22/2019	3/27/2020	126	Speech Room	1.8
4327080	11/22/2019	3/27/2020	126	Counseling	1.0
4326931	11/22/2019	3/27/2020	126	Stage	2.3
4326934	11/22/2019	3/27/2020	126	Gym	2.1
4326932	11/22/2019	3/27/2020	126	Custodian Office	0.7
4326905	11/22/2019	3/27/2020	126	Room 3	1.1
4327051	11/22/2019	3/27/2020	126	Room 3 Duplicate	1.2
4327076	11/22/2019	3/27/2020	126	Room 2	1.9
4327079	11/22/2019	3/27/2020	126	Room 1	1.9
4326933	11/22/2019	3/27/2020	126	Modular	<0.4
4327064	11/22/2019	3/27/2020	126	Spike	6.1
4326998				Blank	TBD

**Bold** - Indicates Exceeds Action Level  
EPA Action Level: 4.0 pCi/L  
"<": Below the level of detection

Kelsay Environmental  
833 SE Main St., Suite 410  
Portland, Oregon 97214

NELAC NY 11769  
NRPP 103216 AL  
NRSB ARL0017

EPA Method #402-R-92-004  
Alpha Track  
NRPP Device Code 8205  
NRSB Device Code 12001

Laboratory Report for:

Property Tested:

Kelsay Environmental  
833 Southeast Main Street 410  
Portland OR 97214

Holley Elementary  
40336 Crawfordsville Drive  
Sweet Home OR 97386

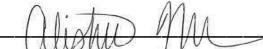
Log Number	Device Number	Test Exposure Duration:		Area Tested	Result pCi/L
2673865	4326904	11/22/2019	03/27/2020	Main Office	1.3
2673866	4326903	11/22/2019	03/27/2020	Principals Office	2.9
2673867	4326902	11/22/2019	03/27/2020	Health Room	1.3
2673868	4326928	11/22/2019	03/27/2020	Cafeteria	0.6
2673869	4326926	11/22/2019	03/27/2020	Class Next to Café	0.9
2673870	4326901	11/22/2019	03/27/2020	Library	0.7
2673871	4326927	11/22/2019	03/27/2020	Reset Room	0.6
2673872	4326929	11/22/2019	03/27/2020	Room 5	1.2
2673873	4326935	11/22/2019	03/27/2020	Room 4	1.5
2673874	4326930	11/22/2019	03/27/2020	Room 4 Duplicate	1.5
2673875	4327078	11/22/2019	03/27/2020	Speech Room	1.8

**Comment:** Confidential: Release results to client only. Kelsay Environmental was emailed a copy of this report.

Test Performed By: Placed: Lisa Janik Retrieved: Lisa Janik

Distributed by: Kelsay Environmental

Date Received: 04/07/2020 Date Logged: 04/22/2020 Date Analyzed: 05/06/2020 Date Reported: 05/19/2020

Report Reviewed By: 

Report Approved By: 

**Disclaimer:**

Shawn Price, Director of Laboratory Operations, AccuStar Labs

The uncertainty of this radon measurement is  $\pm 15\%$ . Factors contributing to uncertainty include statistical variations, daily and seasonal variations in radon concentrations, sample collection techniques, and operation of the dwelling. Interference with test conditions may influence the test results.

This report may only be transferred to a third party in its entirety. Analytical results relate to the samples AS RECEIVED BY THE LABORATORY. Results shown on this report represent levels of radon gas measured between the dates shown in the room or area of the site identified above as "Property Tested". Incorrect information will affect results. The results may not be construed as either predictive or supportive of measurements conducted in any area of this structure at any other time. AccuStar Labs, its employees and agents are not responsible for the consequences of any action taken or not taken based upon the results reported or any verbal or written interpretation of the results.

NELAC NY 11769  
NRPP 103216 AL  
NRSB ARL0017

EPA Method #402-R-92-004  
Alpha Track  
NRPP Device Code 8205  
NRSB Device Code 12001

Laboratory Report for:

Property Tested:

Kelsay Environmental  
833 Southeast Main Street 410  
Portland OR 97214

Holley Elementary  
40336 Crawfordville Drive  
Sweet Home OR 97386


Log Number	Device Number	Test Exposure Duration:		Area Tested	Result pCi/L
2673876	4327080	11/22/2019	03/27/2020	Counseling	1.0
2673877	4326931	11/22/2019	03/27/2020	Stage	2.3
2673878	4326934	11/22/2019	03/27/2020	Gym	2.1
2673879	4326932	11/22/2019	03/27/2020	Custodian Office	0.7
2673880	4326905	11/22/2019	03/27/2020	Room 3	1.1
2673881	4327051	11/22/2019	03/27/2020	Room 3 Duplicate	1.2
2673882	4327076	11/22/2019	03/27/2020	Room 2	1.9
2673883	4327079	11/22/2019	03/27/2020	Room 1	1.9
2673884	4326933	11/22/2019	03/27/2020	Modular	< 0.4
2673885	4327064	11/22/2019	03/27/2020	Spike	6.1

**Comment:** Confidential: Release results to client only. Kelsay Environmental was emailed a copy of this report.

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Send Written Report To: (print clearly)

Kelsey Environmental  
833 SE Main St Ste 410  
Portland, OR 97214

Project Number:

Site Name

Address

City State Zip

Technician Name:

Technician Signature:

(if required)

Tech Certification #: (if required)

Contact: Tel: \_\_\_\_\_

E-Mail Address: Bryson.KES@gmail.com  
Lisa@smk.kes@gmail.com

Start your test before the expiration date shown on your device or your test results will be invalid.

Lab Use Only	Device Number	Building #	Unit #	Floor	Name of Room	Start Date <small>Month/Day/Year</small>	Stop Date <small>Month/Day/Year</small>	Lab Use
	<u>*4326904*</u>		1		Main office	11/22/19	3/27/20	
	<u>*4326903*</u>		2		Principal's office			
	<u>*4326902*</u>		3		Health Room			
	<u>*4326928*</u>		4		Cafeteria			
	<u>*4326926*</u>		5		Class next to cafe			
	<u>*4326901*</u>		6		Library			
	<u>*4326927*</u>		7		Reset Room			
	<u>*4326929*</u>		8		Room 5			
	<u>*4326935*</u>		9		Room 4			
	<u>*4326930*</u>		10		Room 4 duplicate			

Place up to 10 devices together with the matching datasheet in a plastic "zip lock" bag. Please see the back of this datasheet for test instructions.

2/2

Send Written Report To: (print clearly)

Kelsay Environmental  
833 SE Main St. 410  
Portland, OR 97214

Contact: \_\_\_\_\_ Tel: \_\_\_\_\_

E-Mail Address: Bkelsay, KES@gmail.com  
LSM115.KES

Start your test before the expiration date shown on your device or your test results will be invalid.

Project Number:

Site Name

Address

City State Zip

Technician Name:

Technician Signature:

(if required)

Tech Certification #: \_\_\_\_\_  
(if required)

Holley Elementary

Lab Use Only	Device Number	Building #	Unit #	Floor	Name of Room	Start Date <small>Month/Day/Year</small>	Stop Date <small>Month/Day/Year</small>	Lab Use
	*4327078*		11		Speech Room			
	*4327080*		12		Counseling			
	*4326931*		13		Stage			
	*4326934*		14		Gym			
	*4326932*		15		custodial office			
	*4326905*		16		Room 3			
	*4327051*		17		Room 5 duplicate			
	*4327076*		18		Room 2			
	*4327079*		19		Room 1			
	*4326933*		20		Modular			

Place up to 10 devices together w/

datasheet in a plastic "zip lock" bag. Please see the back of this datasheet for test instructions.



**Start test before expiration date on device or result will be invalid.**

Radon in Air Test Data Sheet

Send Written Report To:

Kelsay Environmental

Project Number:

Site Name

Address

City State Zip

Holley Elementary  
4033rd Crawfordville Dr.  
Sweet Home, OR

Contact:

Tel:

E-Mail Address:

Person Conducting Test:

Lisa Janik

Start Date:

Stop Date:

Start and Stop Times and Dates  
must be entered

Lab Use Only

Device Number

Building #

Unit #

Floor

Name of Room

Start Time

Stop Time

Lab Use

4328986

BLANK

BLANK

3/27/20

# EXPOSURE IN BOWSER-MORNER RADON CHAMBER

CLIENT Kelsay Environmental Job Number 194065

NOMINAL Conditions: Radon Conc 25.9 pCi/L Rel. Hum 30.1 % Temp. 70.2 F  
777.0 pCi/L

Date Start: 2/9/20 Date Stop: 3/10/20 Date Start: \_\_\_\_\_ Date Stop: \_\_\_\_\_

Time Start: 0817 Time Stop: 0817 Time Start: \_\_\_\_\_ Time Stop: \_\_\_\_\_

Device No.'s: (24) Alpha Tracks - Device No.'s: \_\_\_\_\_

4326967, 4326968, 4327065, 4326966,

4327143, 4326953, 4327142, 4326955,

4327063, 4327061, 4327064, 4327141,

4327092, 4327093, 4327094, 4327091,

4326970, 4327095, 4326954, 4327050,

MS Right 4327060, 4327062, 4326969, 4327144

126 DAY Conversion: 
$$30 \times 25.9 / 126 = 6.1 \text{ pCi/L}$$