

Radon Assessment

Hillsboro School District



Report Date: November 2013



Sterling Technologies, LLC

317 NE 144th Street
Vancouver, WA 98685

Radon Assessment

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1.0 Introduction

Sterling Technologies, LLC (Sterling) conducted onsite radon testing at 36 schools in the Hillsboro School District in the summer of 2013. The purpose of the testing was to identify the presence of radon gas. This survey does not include materials in areas not impacted by the scope of work, or materials behind walls, above ceilings, hidden or buried below ground.

A nationwide survey of radon levels in schools estimates that nearly one in five has at least one schoolroom with a short-term radon level above the action level of 4 pCi/L (picoCuries per liter) - the level at which EPA recommends that schools take action to reduce the level. EPA estimates that more than seventy thousand (70,000) schoolrooms in use today have high short-term radon levels. Hillsboro averaged 2.7 pCi/L throughout the area earning the area a "moderate Radon potential" from a recent DHS survey.

The EPA ranks indoor radon among the most serious environmental health problems facing us today. After smoking, it is the second leading cause of lung cancer in the United States causing an estimated twenty-one thousand (21,000) lung cancer deaths a year.

The sampling was done by accredited inspectors from Sterling Technologies. A RadStar RS 300 continuous monitor was used in the pulse mode ionization chamber setting taking a maximum of 240 readings per hour at a sensitivity of 16 counts per hour/pCi/L of nominal sensitivity. Calibration was recently performed at RadonAway, 3 Saber Way; Ward Hill, MA. Data was downloaded using the latest RADStar Data Capture Utility Program.

In 1993, the United States Environmental Protection Agency (EPA) Office of Radiation and Indoor Air, in conjunction with the USGS, studied radon found in the indoor air of homes. The study determined Washington County to be in Radon Zone 1. Zone 1 areas are predicted to have an average indoor radon screening greater than 4-pCi/L (picoCuries per Liter).

Radon test results were averaged and fell below the federal standards (EPA standard of 4pCi/L) but individual elevated readings were noted.

Sterling recommends the installation of a passive venting system or other ventilation-based solution to reduce background radon levels in the areas sampled exhibiting these elevated readings. Further assessment of cracks and fissures should be addressed at this time.

Radon: Facts and Figures

Radon is a gaseous radioactive element having the symbol Rn, the atomic number 86, an atomic weight of 222, a melting point of -71°C , a boiling point of -62°C , and (depending on the source, there are between 20 and 25 isotopes of radon - 20 cited in the chemical summary, 25 listed in the table of isotopes); it is an extremely toxic, colorless gas; it can be condensed to a transparent liquid and to an opaque, glowing solid; it is derived from the radioactive decay of radium and is used in cancer treatment, as a tracer in leak detection, and in radiography. (From the word *radium*; the substance from which it is derived.)

Radon-222 is the decay product of radium-226. Radon-222 and its parent, Radium-226, are part of the long decay chain for uranium-238. Since Uranium is commonly found in the earth's crust, radium-226 and radon-222 are present in almost all rock and all soil and water. Radon - 222 has a half life of approximately 3.8 days.

The amount of radon in the soil depends on soil chemistry, which varies from one residential area to the next. Radon levels in the soil range from a few hundred to several thousands of pCi/L (picocuries per liter) in air. The amount of radon that escapes from the soil to enter the house depends on the weather, soil porosity, soil moisture, and the suction within the house.

The surgeon general made the following pronouncement after reviewing radon facts and figures in 2005:

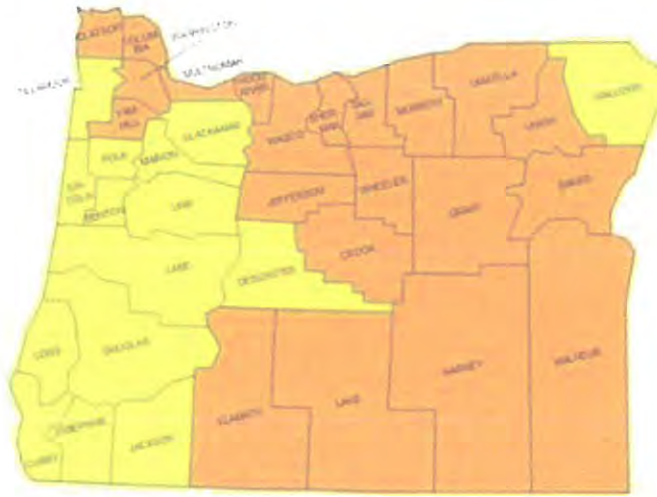
Surgeon General Health Advisory

"Indoor radon is the second-leading cause of lung cancer in the United States and breathing it over prolonged periods can present a significant health risk to families all over the country. It's important to know that this threat is completely preventable. Radon can be detected with a simple test and fixed through well-established venting techniques." January 2005

The United Nation's **World Health Organization** (WHO) says that radon is a worldwide health risk in homes. Dr. Maria Neira of WHO said that "Most radon-induced lung cancers occur from low and medium dose exposures in people's homes. Radon is the second most important cause of lung cancer after smoking in many countries."

Radon is the number one cause of lung cancer among non-smokers, according to EPA estimates. Overall, radon is the second leading cause of lung cancer. Radon is responsible for about 21,000 lung cancer deaths every year. About 2,900 of these deaths occur among people who have never smoked.

Radon Map of Oregon Counties:



Multnomah and Washington counties may have elevated radon levels (noted by brown shading in the above figure).

2.0 Survey Results

The radon gas level averaged 1.01 pCi/L during this survey. However, actual readings as high as 5.4 pCi/L were noted during the week long sampling event. It is recommended that a radon mitigation system is installed as these results are above the 4 pCi/L EPA standard.

Summary table of radon gas levels over the sampling interval taken over the summer sampling period in 2013.

No.	School/Location	Address	Start Date/Time	Finish Date/Time	Avg. Radon Conc.
1	Brookwood	3960 SE Cedar St Hillsboro, OR 97123	10-8-13 11:15	10-14-13 11:30	0.9
2	Butternut Creek Custodian Office	20395 SW Florence St Aloha, OR 97007	8-27-13 14:50	8-28-13 10:05	0.7
3	Eastwood Maintenance Room	2100 NE Lincoln St Hillsboro, OR 97124	9-18-13 11:00	10-18-13 10:00	2.9
4	Farmington View Boiler Area	8300 SW Hillsboro Hwy Hillsboro, OR 97123	9-4-13 14:30	9-9-13 13:30	0.9
5	Free Orchards Custodian Office	2499 S Beech St Cornelius, OR 97113	9-9-13 14:00	9-10-13 14:15	0.3
6	Groner Boiler Area	23405 SW Scholls Ferry Rd Hillsboro, OR 97123	9-4-13 14:30	9-9-13 13:00	0.4

No.	School/Location	Address	Start Date/Time	Finish Date/Time	Avg. Radon Conc.
7	W.L. Henry	1060 SE 24th Ave Hillsboro, OR 97123	10-8-13 11:00	10-14-13 12:00	0.3
8	Imlay Custodian Office	5900 SE Lois St Hillsboro, OR 97123	8-3-13 15:20	8-14-13 8:20	0.4
9	Indian Hills Health Office	21260 SW Rock Rd Aloha, OR 97006	8-23-13 1:30	8-27-13 14:15	0.3
10	Jackson Custodian Closet Drain	675 NE Estate Dr Hillsboro, OR 97124	9-11-13 11:15	9-16-13 10:56	5.4
	Retest		10-16-13 12:25	10-23-13 10:15	2.2
11	Ladd Acres Boiler Area	2425 SW Cornelius Pass Rd Hillsboro, OR 97123	8-23-13 1:45	8-27-13 14:30	0.5
12	Lenox Health Room	21200 NW Rock Creek Blvd Portland, OR 97229	8-12-13 13:00	8-13-13 14:40	0.5
13	Lincoln Street Custodian Office	801 NE Lincoln St Hillsboro, OR 97124	9-16-13 11:45	9-17-16 12:15	0.3
14	W. Verne McKinney Custodian Office	535 NW Darnielle St Hillsboro, OR 97124	9-9-13 14:20	9-10-13 14:40	0.3
15	Minter Bridge Custodian Office	1750 SE Jacquelin Dr Hillsboro, OR 97123	9-3-13 11:30	9-4-13 14:15	0.3
16	Mooberry Boiler Area	1230 NE 10th Ave Hillsboro, OR 97124	9-16-13 11:30	9-17-13 9:40	0.3
17	North Plains Room 14	32030 NW North Ave North Plains, OR 97133	8-9-13 10:45	8-12-13 12:00	2.1
18	Orenco Custodian Office	22550 NW Birch St Hillsboro, OR 97124	8-13-13 15:10	8-14-13 8:10	0.4
19	Paul L. Patterson Boiler Area	261 NE Lenox St Hillsboro, OR 97124	9-10-13 15:05	9-11-13 10:40	0.9
20	Quatama	6905 NE Campus Way Hillsboro, OR 97124	10-16-13 12:25	10-23-13 10:15	1.5
21	Reedville Boiler Area	2695 SW 209th Ave Aloha, OR 97006	8-27-13 14:40	8-28-13 10:50	0.4
22	L.C. Tobias Custodian Office	1065 SW 206th Ave Aloha, OR 97006	8-14-13 9:00	8-23-13 13:30	0.7
23	West Union Basement Custodian Office	23870 NW West Union Rd Hillsboro, OR 97124	8-9-13 11:15	8-12-13 12:30	3.0
	Retest		10-15-13 12:00	10-23-13 11:15	2.7
24	Witch Hazel Custodian Office	4950 SE Davis Rd Hillsboro, OR 97123	8-28-13 11:40	8-29-13 10:40	0.5
25	Rosedale Custodian Office	3901 SW 229th Ave Hillsboro, OR 97007	8-28-13 11:20	8-29-13 10:05	1.0
26	Brown Custodian Office	1505 SW Cornelius Pass Hillsboro, OR 97123	8-14-13 8:45	8-23-13 13:00	0.8



No.	School/Location	Address	Start Date/Time	Finish Date/Time	Avg. Radon Conc.
27	Evergreen Custodian Office	29850 NW Evergreen Rd Hillsboro, OR 97124	9-11-13 11:35	9-16-13 11:10	0.8
28	J.W. Poynter	1535 NE Grant St Hillsboro, OR 97124	9-18-13 11:30	10-18-13 11:00	0.8
29	South Meadows Custodian Office	4690 SE Davis Rd Hillsboro, OR 97123	8-29-13 10:00	9-3-13 10:58	1.3
31	Century Custodian Office	2000 SE Century Blvd Hillsboro, OR 97123	8-29-13 11:00	9-3-13 10:35	0.3
32	Glencoe Basement Closet	2700 NW Glencoe Rd Hillsboro, OR 97124	9-10-13 14:50	9-11-13 10:30	1.2
33	Hilhi Custodian Office	3285 SE Rood Bridge Rd Hillsboro, OR 97123	9-3-13 11:16	9-4-13 13:50	0.3
34	Liberty Custodian Office	21945 NW Wagon Way Hillsboro, OR 97124	8-12-13 12:45	8-13-13 14:20	0.1
35	Miller Ed. Center West Custodian Closet	440 SE Oak St Hillsboro, OR 97123	9-17-13 10:15	9-18-13 10:40	0.7
36	Miller Ed. Center East Storage Room	215 SE 6th Ave Hillsboro, OR 97123	9-17-13 10:00	9-18-13 10:50	1.1

3.0 Recommendations

For the schools tested that did not have levels greater than the Hillsboro average concentration of 2.7 pCi/L no further action or testing is recommended at this time (see green shaded areas). Schools that had single events greater than this benchmark but averaged below the standard are outlined in yellow. Schools that had multiple events greater than this benchmark and are considered more at risk to radon exposure have been outlined in red for discussion and further action. Of greatest concern was Jackson as the short term test was greater than 5 over the interval sampled. However, the long term sampling showed an average below the benchmark standard, with a number of elevated event readings. North Plains and West Union were also elevated in a number of events and should be included in the discussion of possible mitigation venting.

4.0 References

<http://www.epa.gov/radon> — Visit EPA's Radon home page for facts, discussion points, and frequently asked questions and answers

<http://www.epa.gov/radon/pubs> — Visit this webpage for EPA's radon guidance for schools

<http://www.epa.gov/radon/wherelive.html> — Call your state radon office for state-specific recommendations

<http://www.epa.gov/radon/radonleaders.html> — Connect with radon professionals and solicit advice

<http://www.sosradon.org> — View the National Radon Poster Contest announcement and rules

<http://www.epa.gov/iaq/schooldesign> — View the *IAQ Design Tools for Schools* document

<http://www.epa.gov/iaq/schools/actionkit.html> — Order or print an *IAQ Tools for Schools* kit

<http://www.epa.gov/iaq/schools> Indoor Air

<http://public.health.oregon.gov/healthenvironments/radiationprotection/radongas/pages/index.aspx>

5.0 Limitations

This report is for the exclusive use of the client, applies only to the specific subject property detailed above, and shall not be relied upon by any other party without the prior written consent of the undersigned.

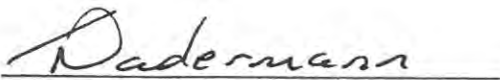
Sterling Technologies acknowledges that despite a thorough inspection during the survey, hidden suspect materials may be present onsite. Care should be taken not to disturb such materials until actual content of such materials has been confirmed. Suspect materials must be treated as ACM until testing proves otherwise.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices in this area at the time this report was prepared. No other hazardous materials/wastes were investigated. No other conditions, expressed or implied, should be understood.

A copy of this report must be made available to any contractor who does work on this site under the scope of work defined by the owner. Additional copies of this report are available from Sterling Technologies upon request.

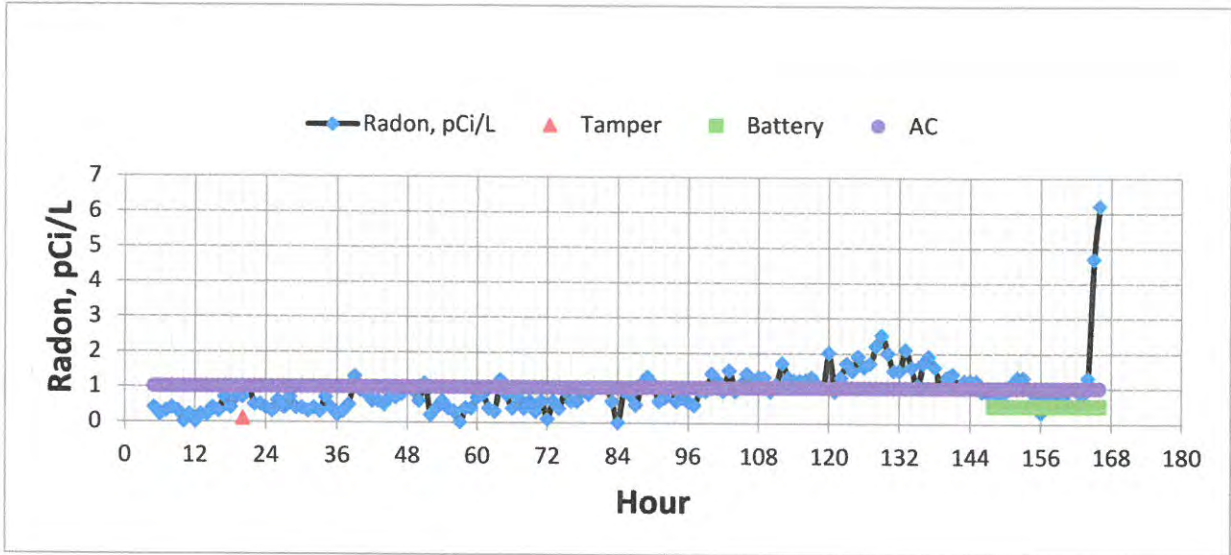
Unless otherwise requested, samples will be retained for a period of 30 days, after which they will be discarded. If you have any questions about these results or would like additional information, please feel free to call our office. Thank you for allowing us to be of service.

Sincerely,

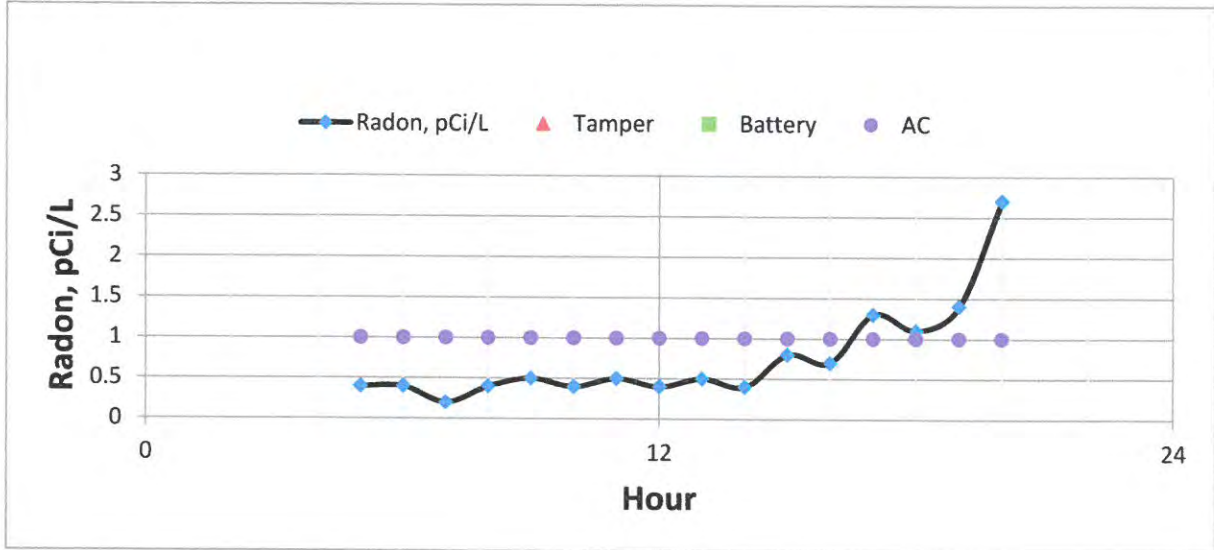


Thomas Nadermann, M.S.
Principal

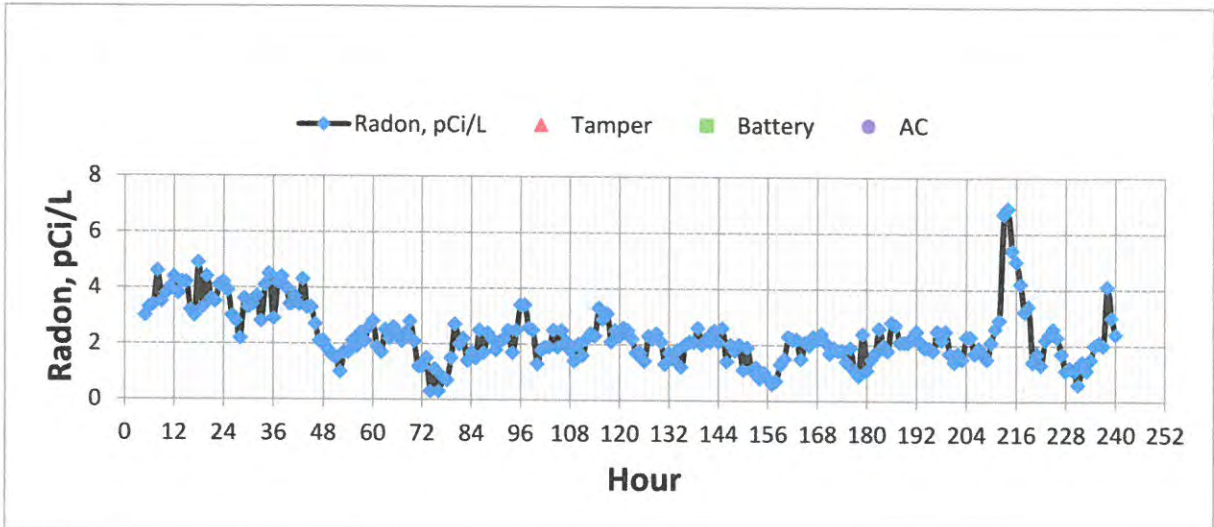
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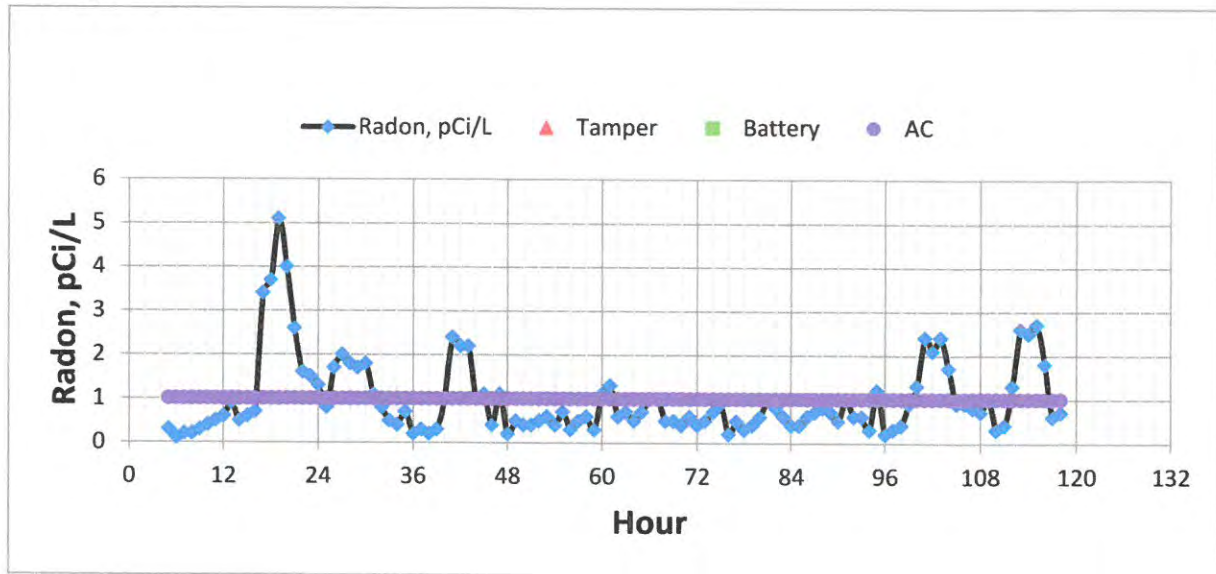
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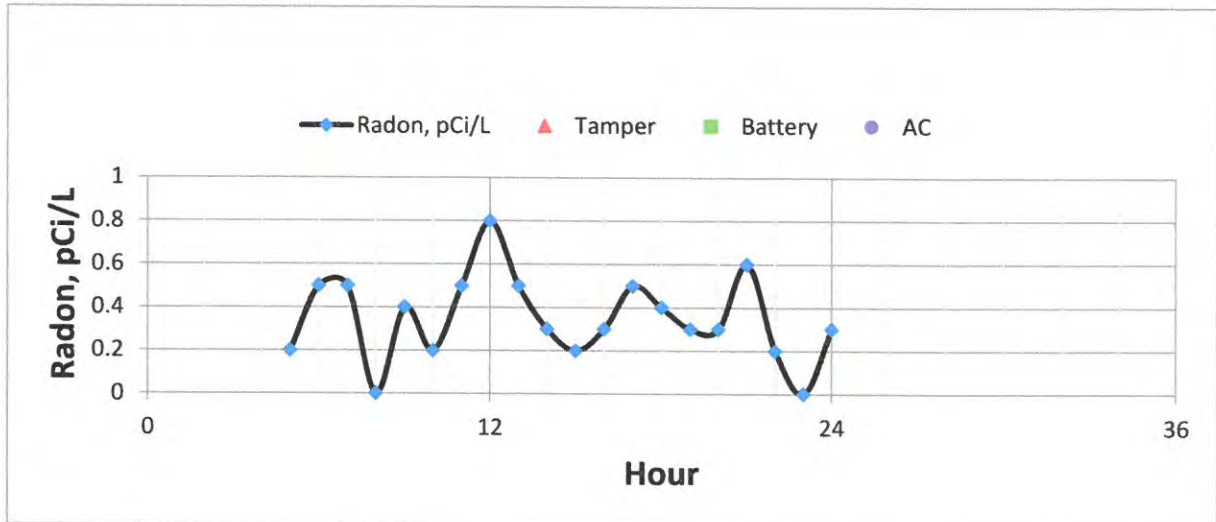
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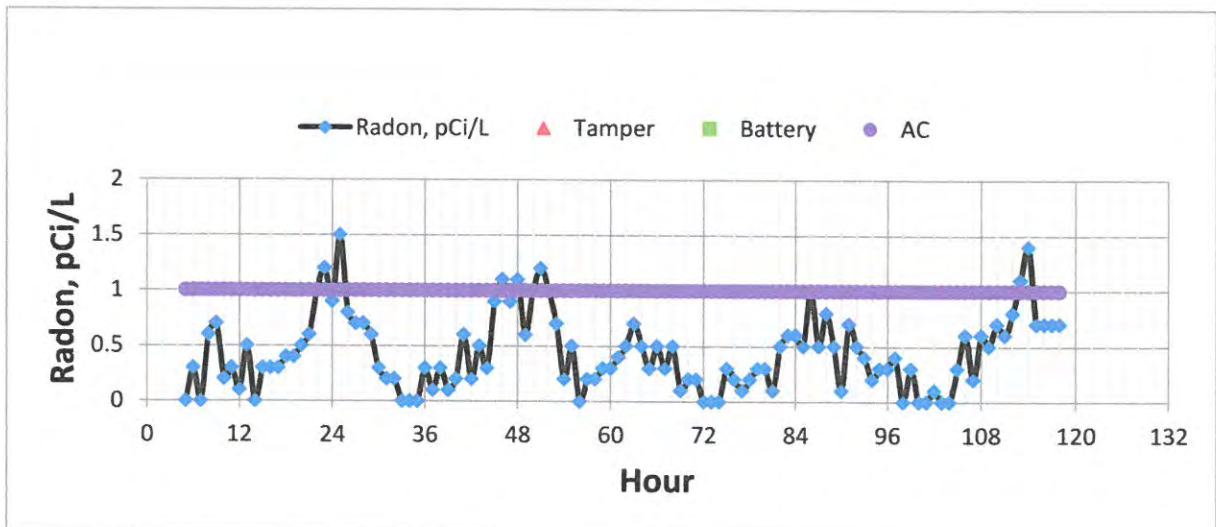
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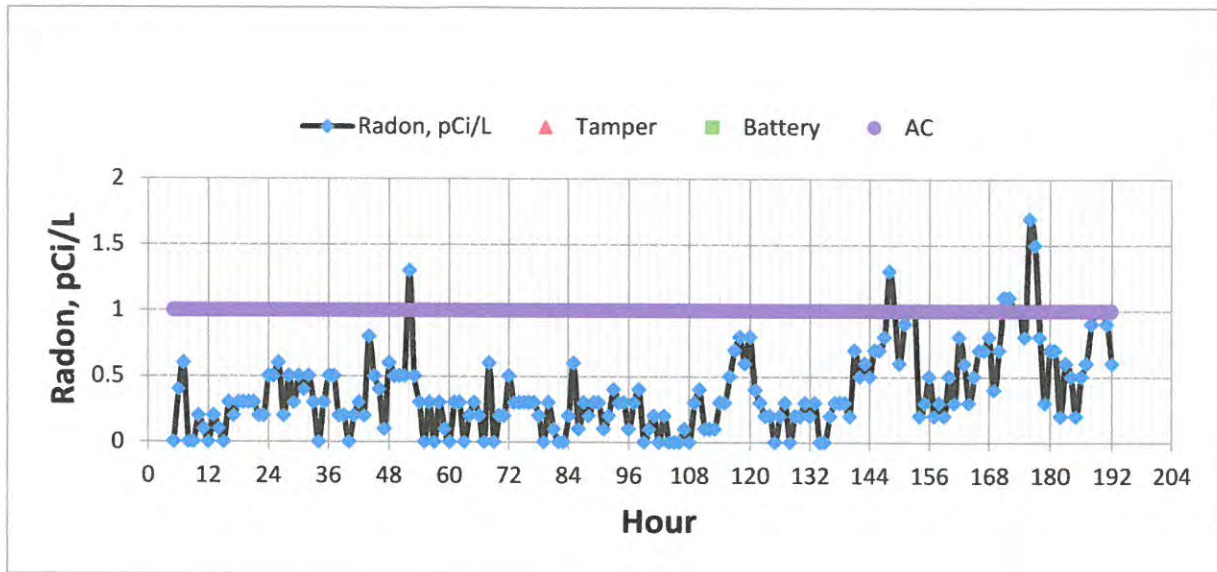
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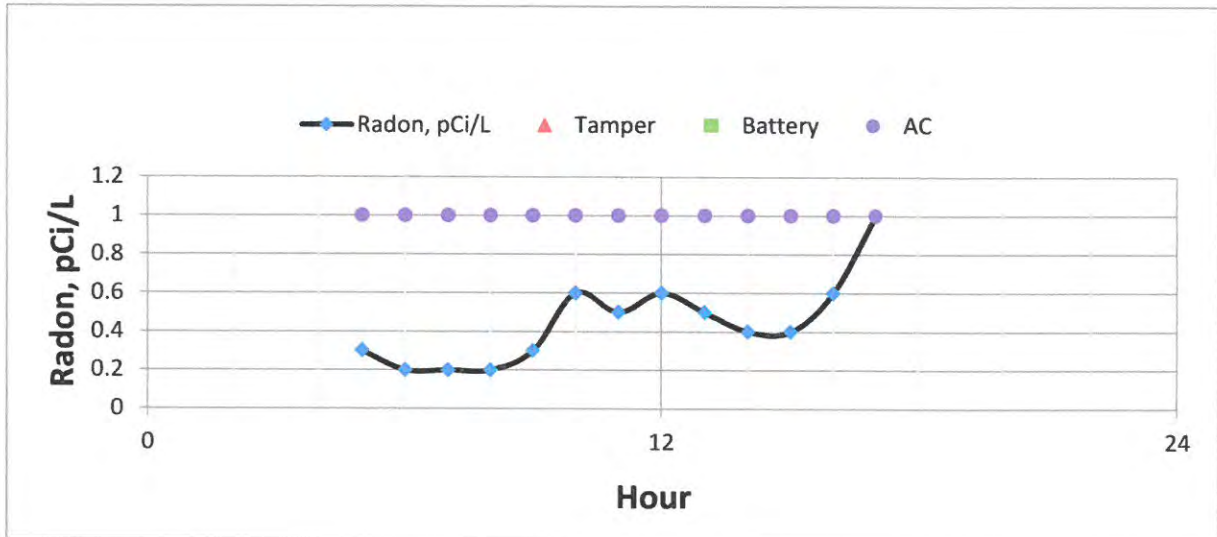
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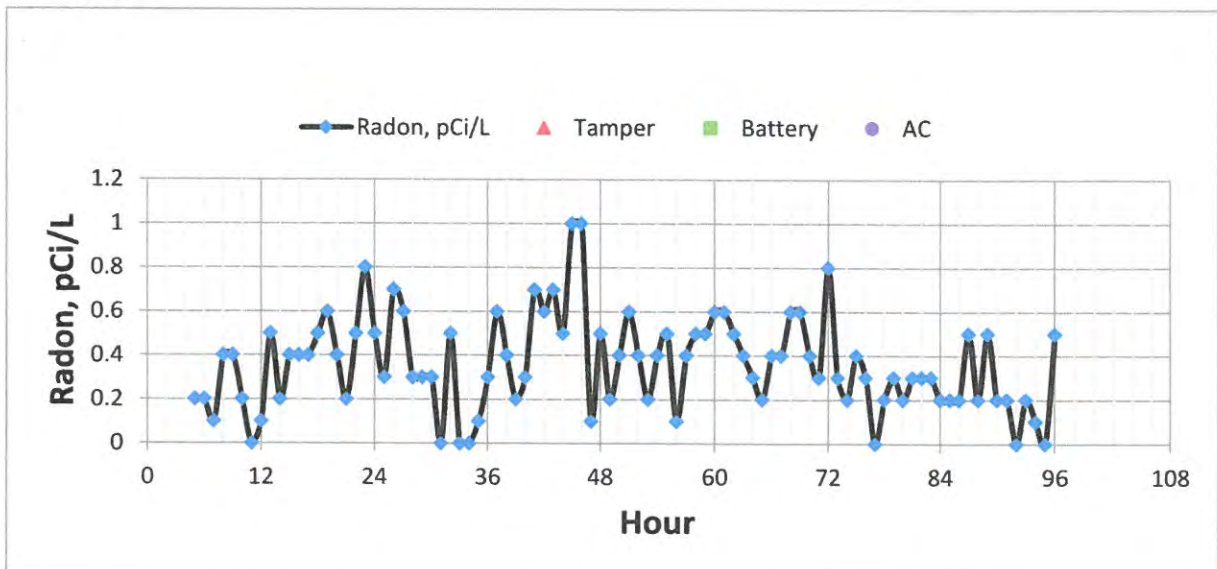
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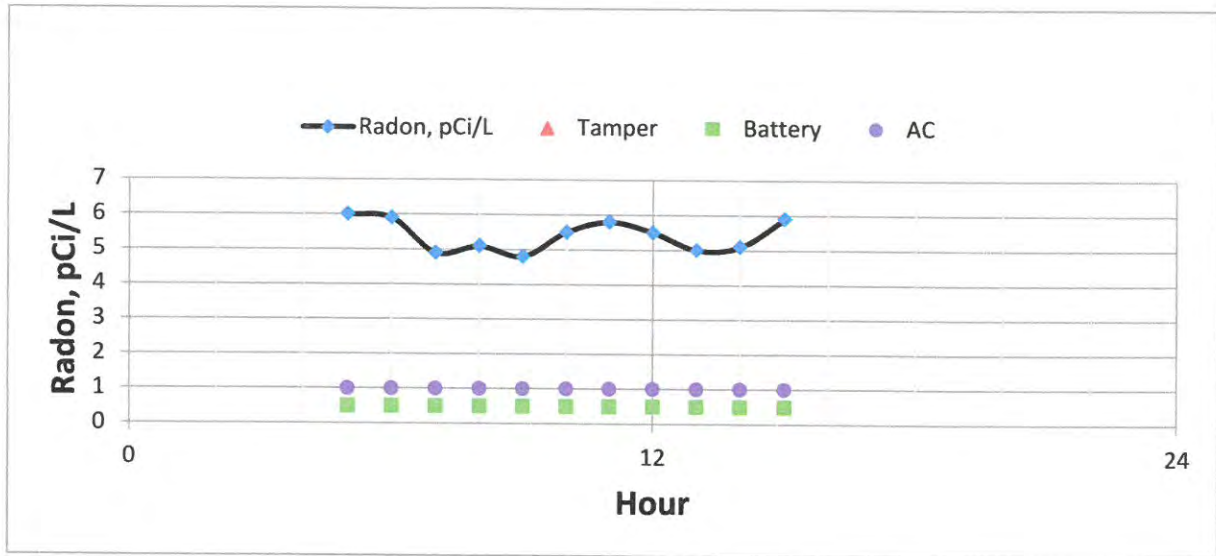
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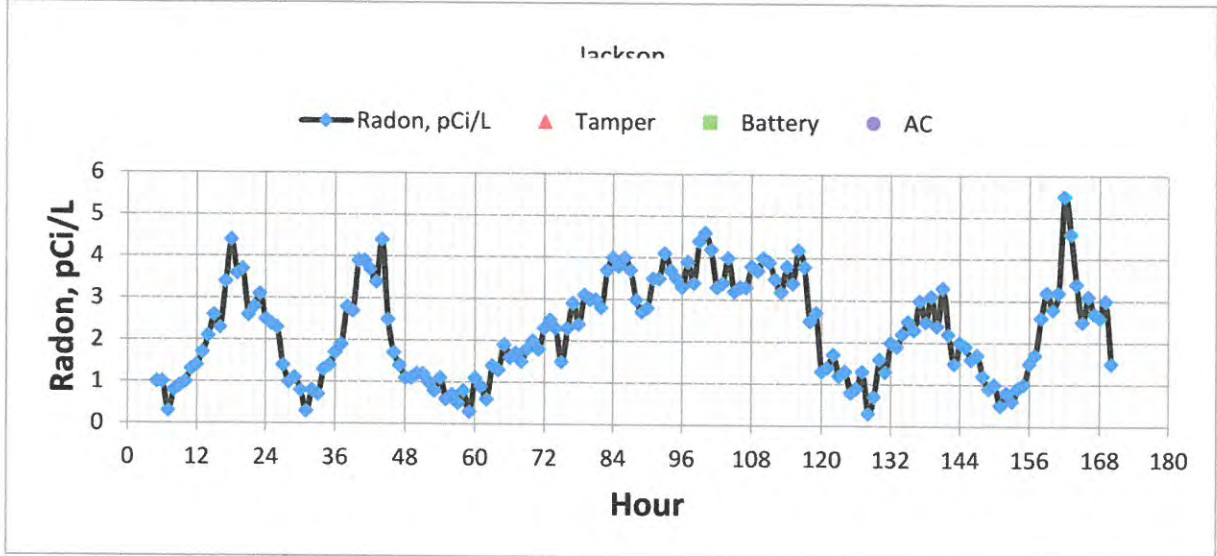
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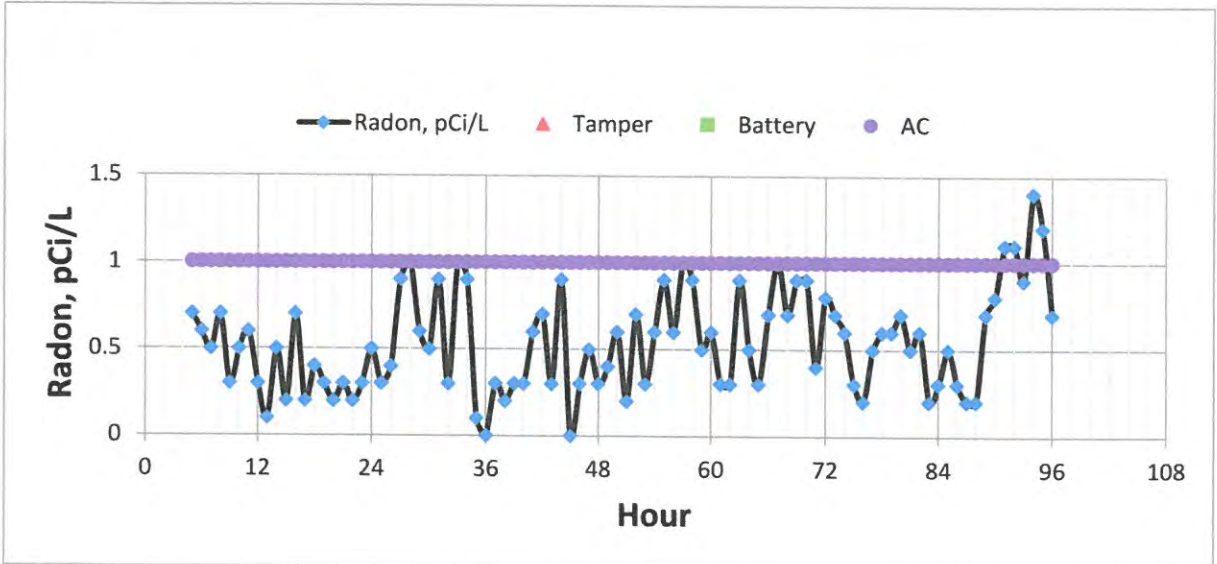
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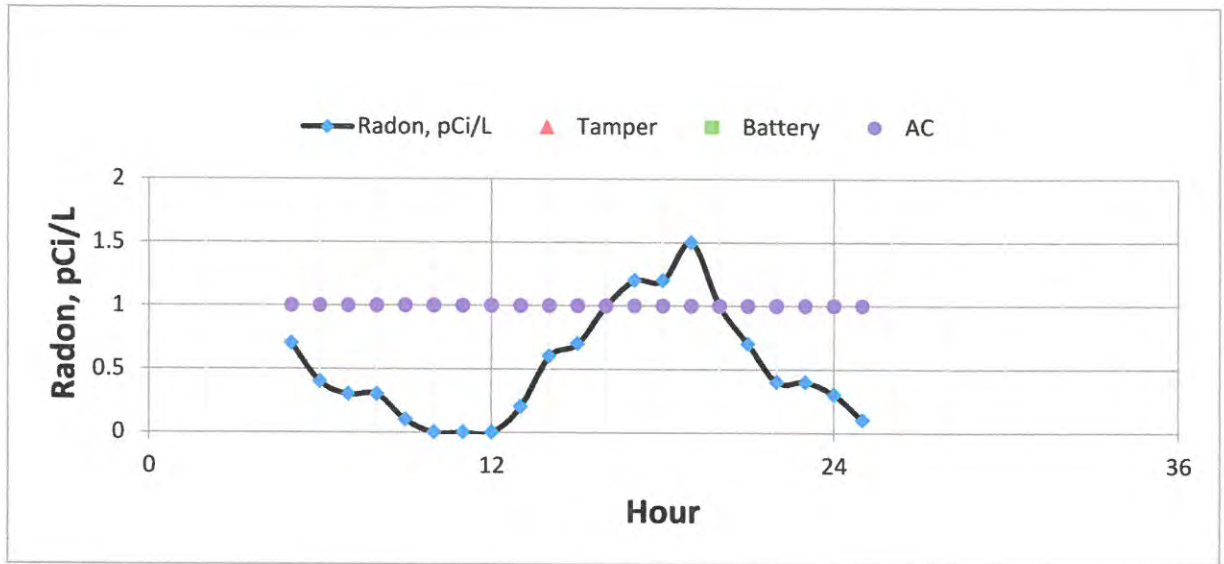
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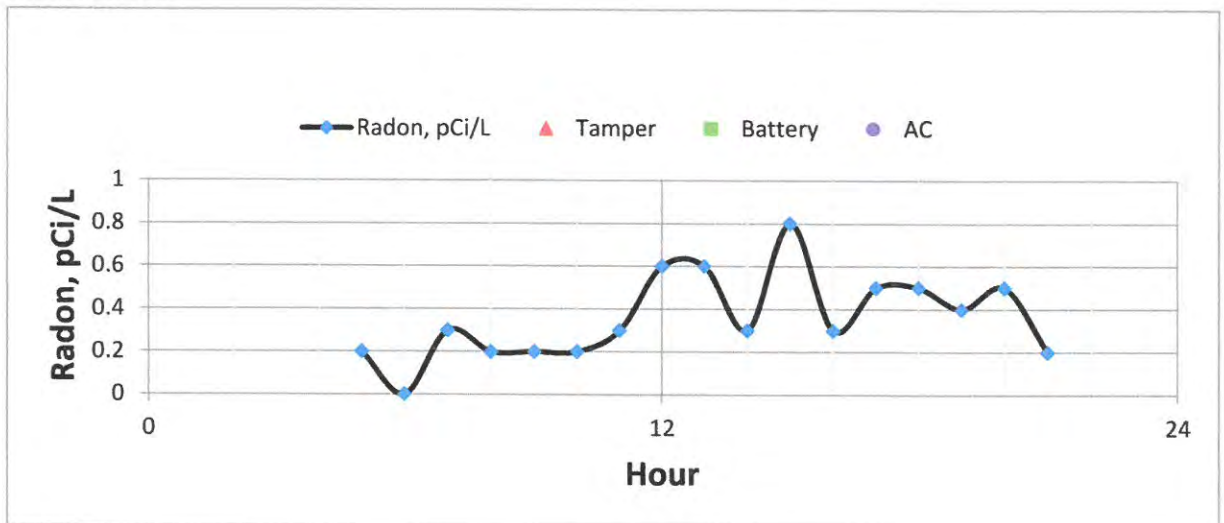
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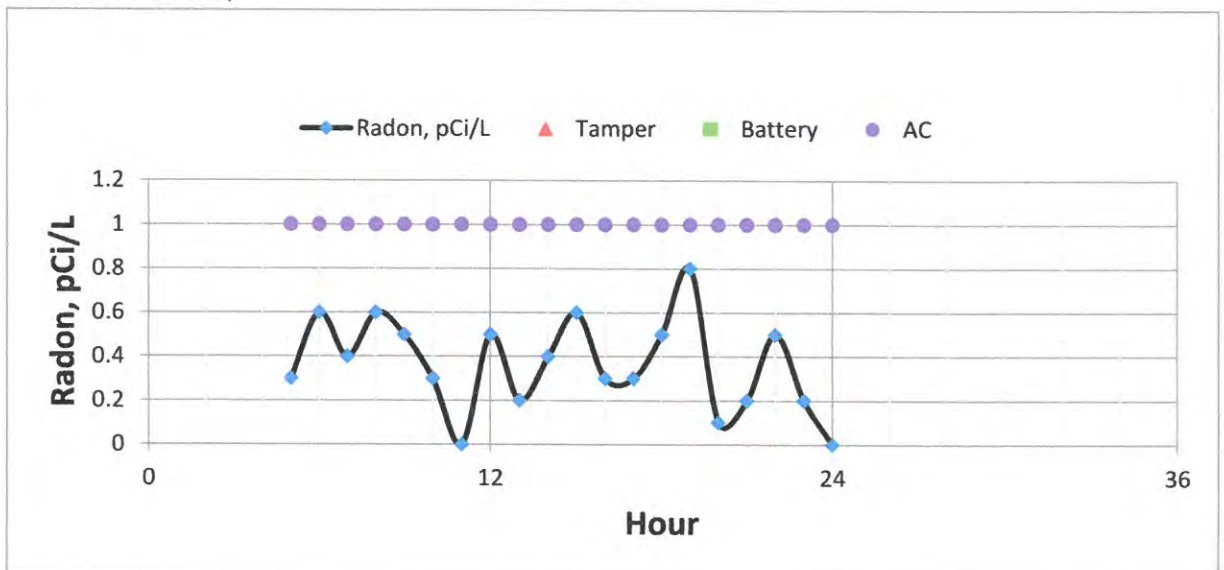
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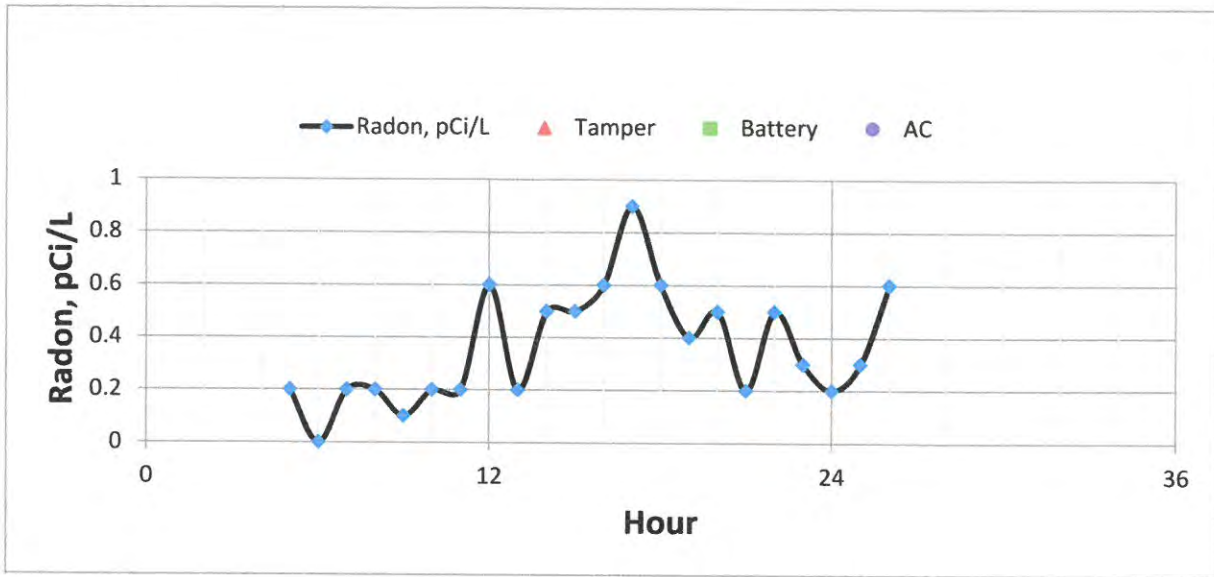
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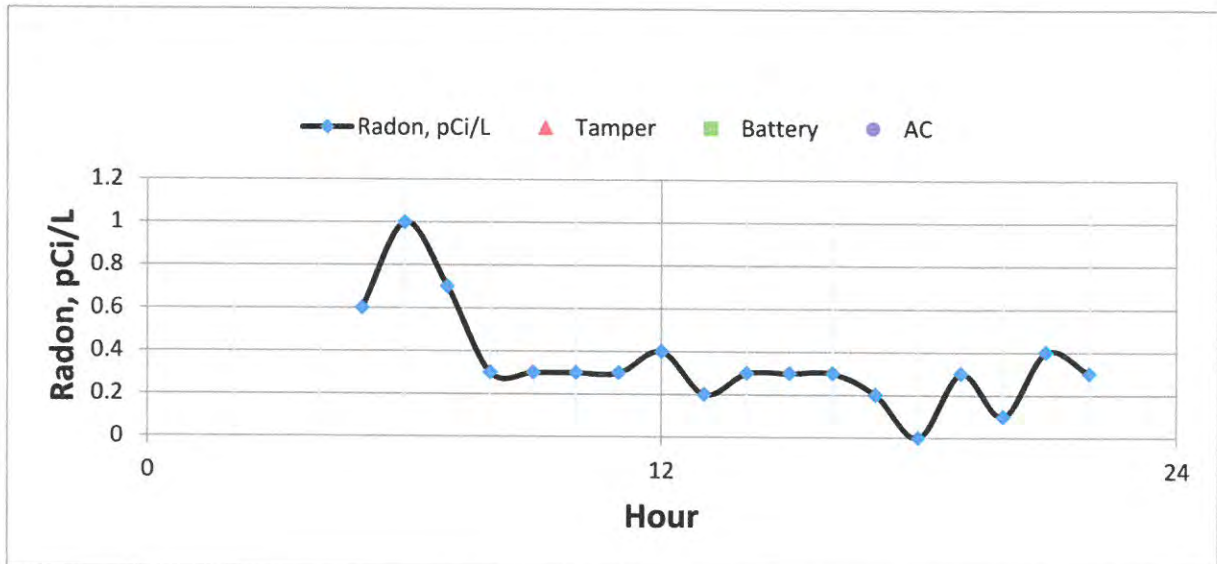
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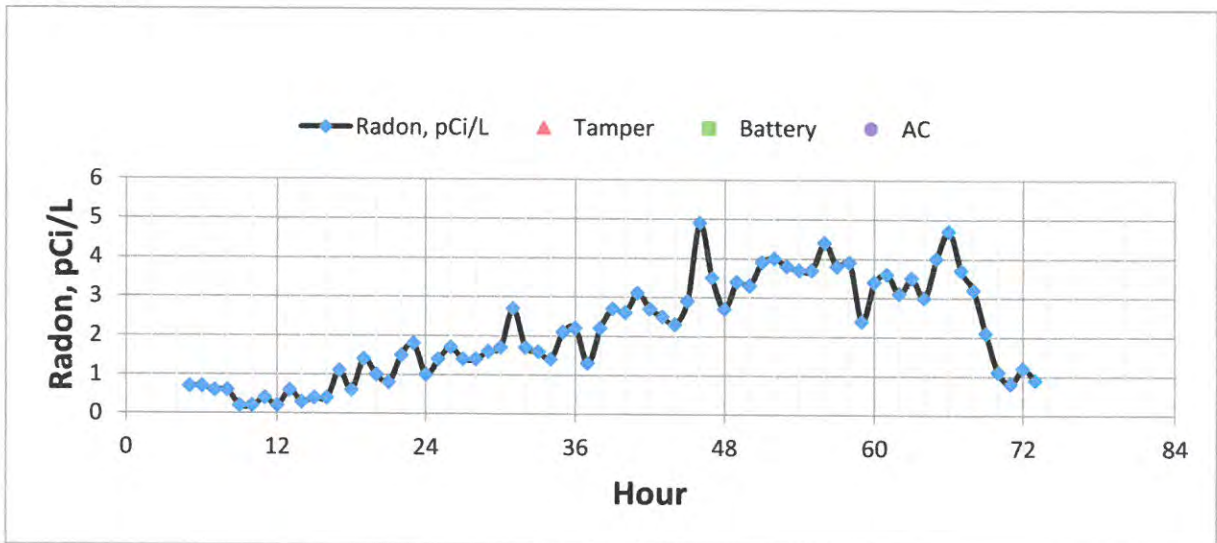
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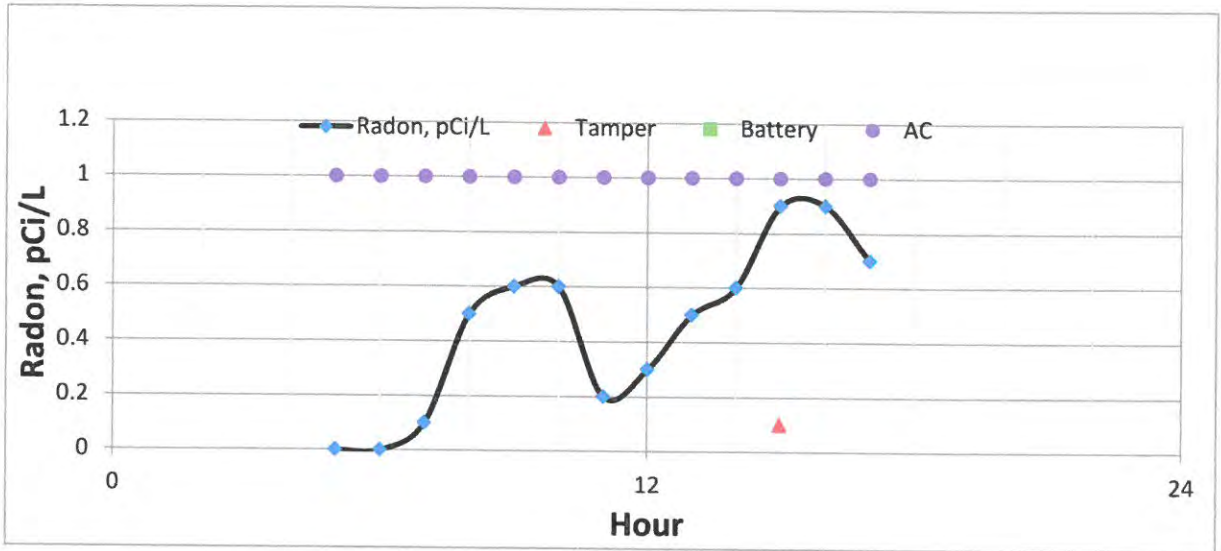
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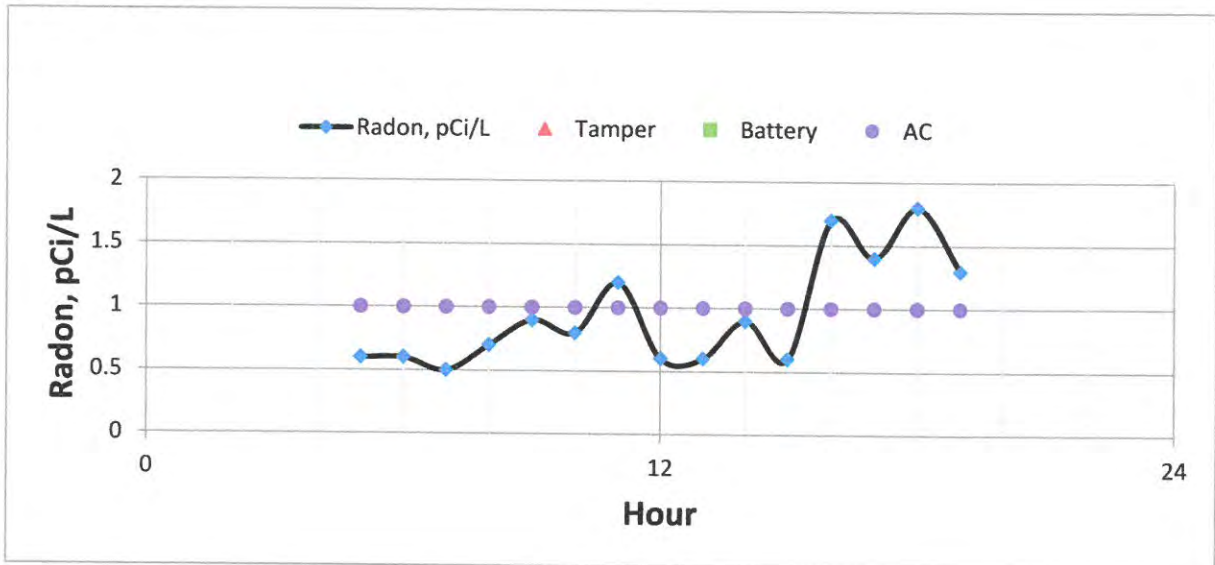
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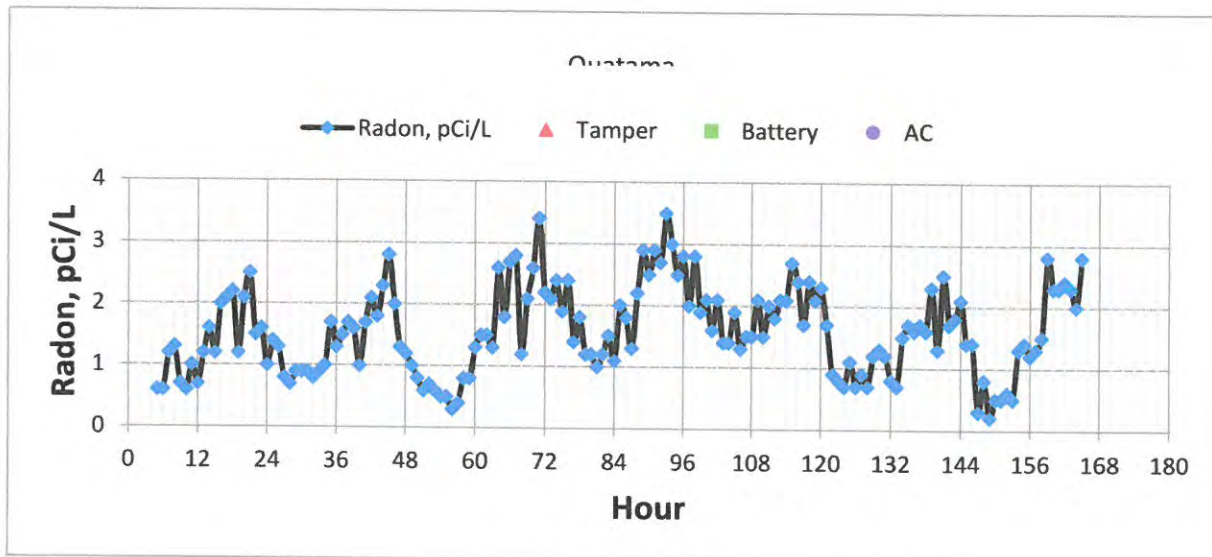
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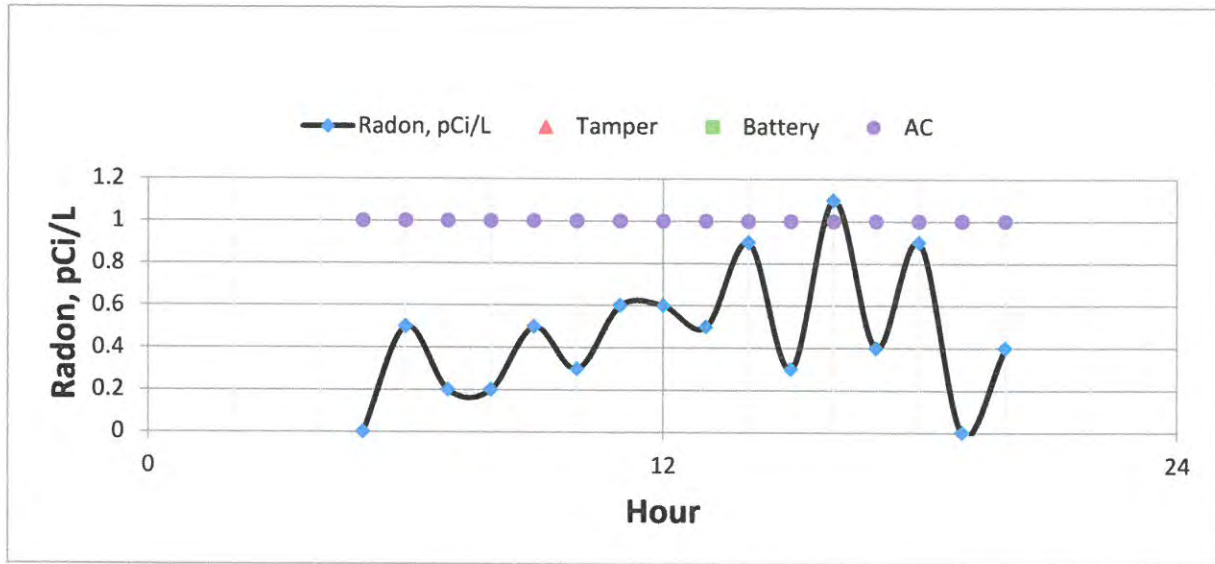
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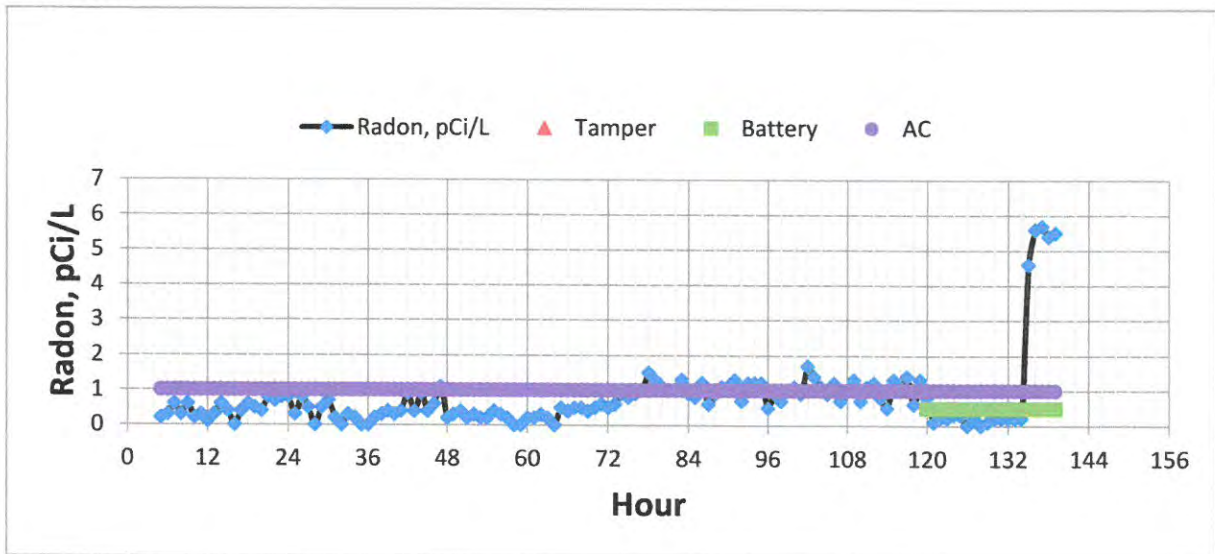
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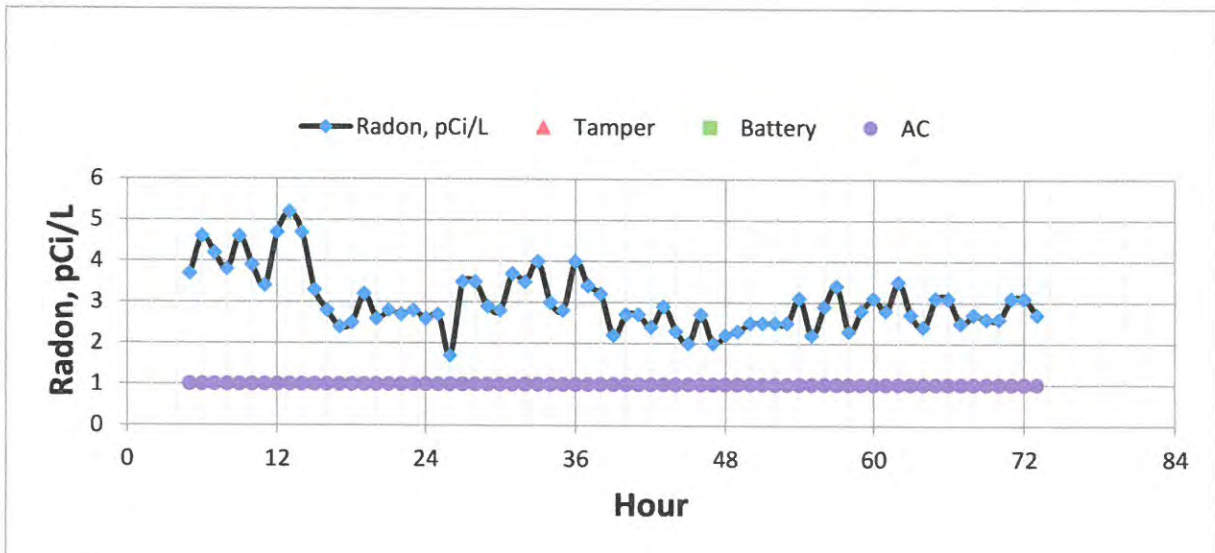
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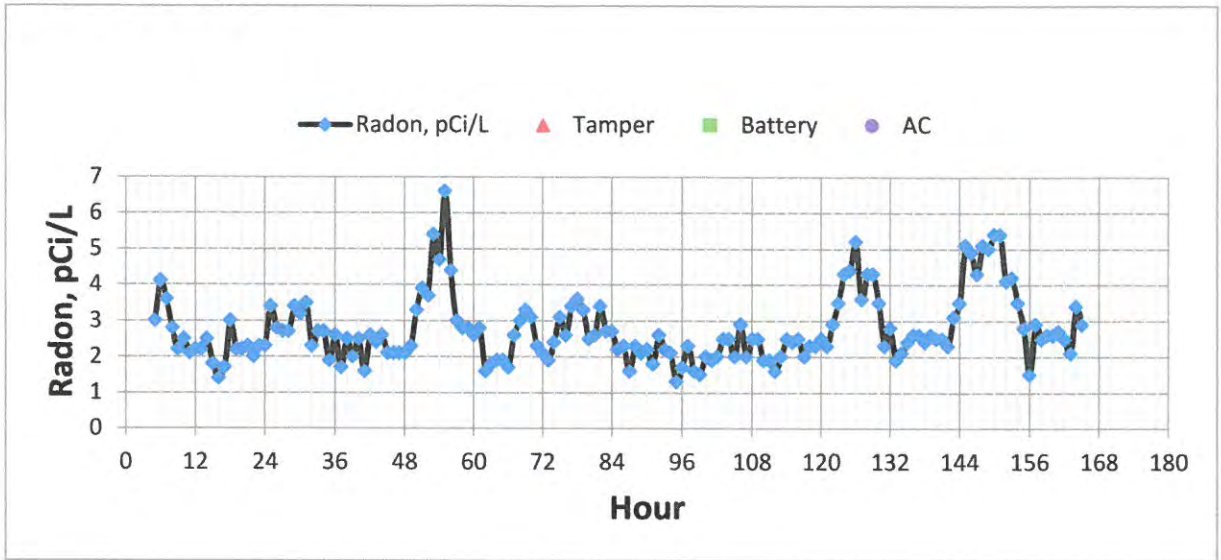
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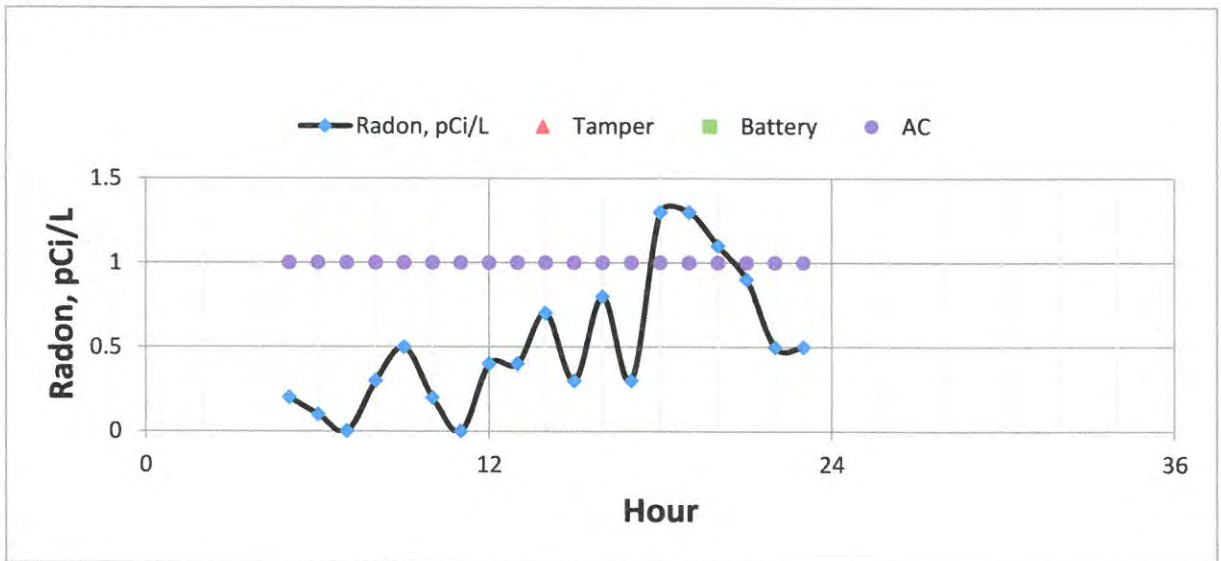
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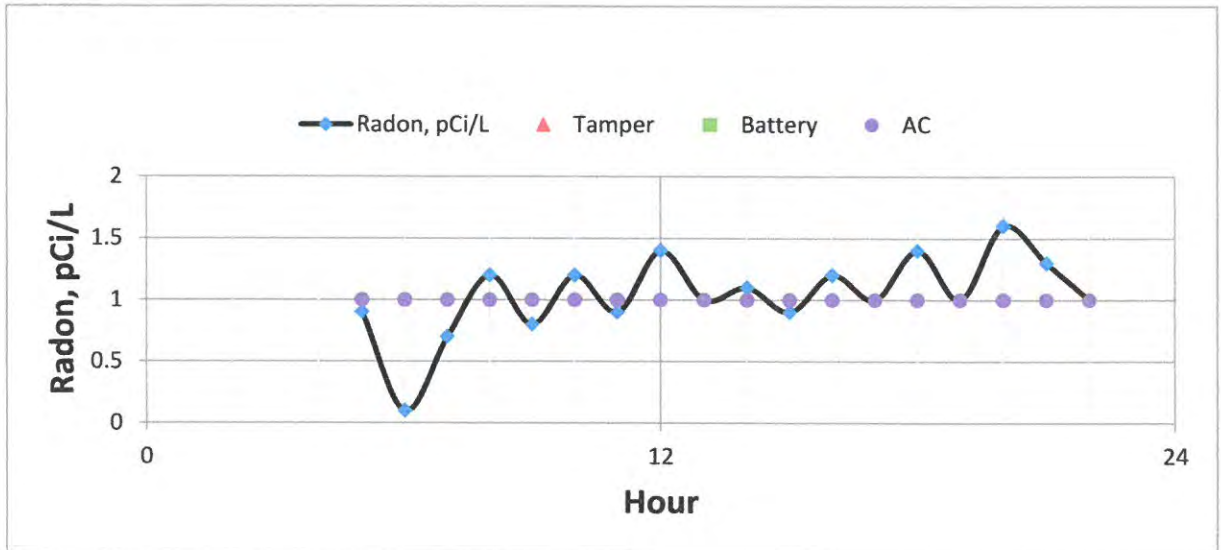
West Union – Long Term



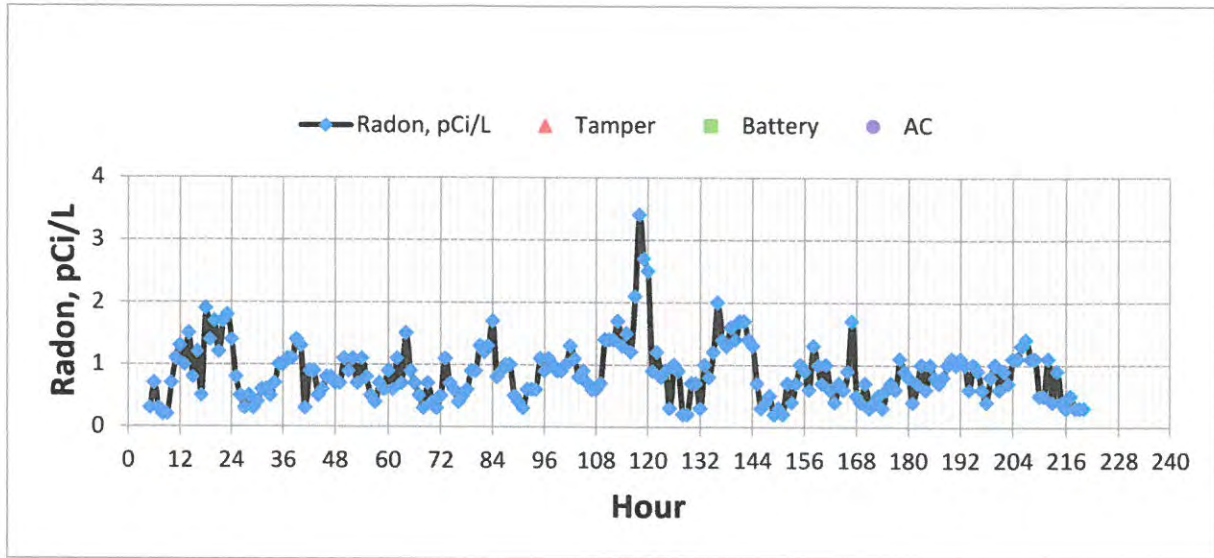
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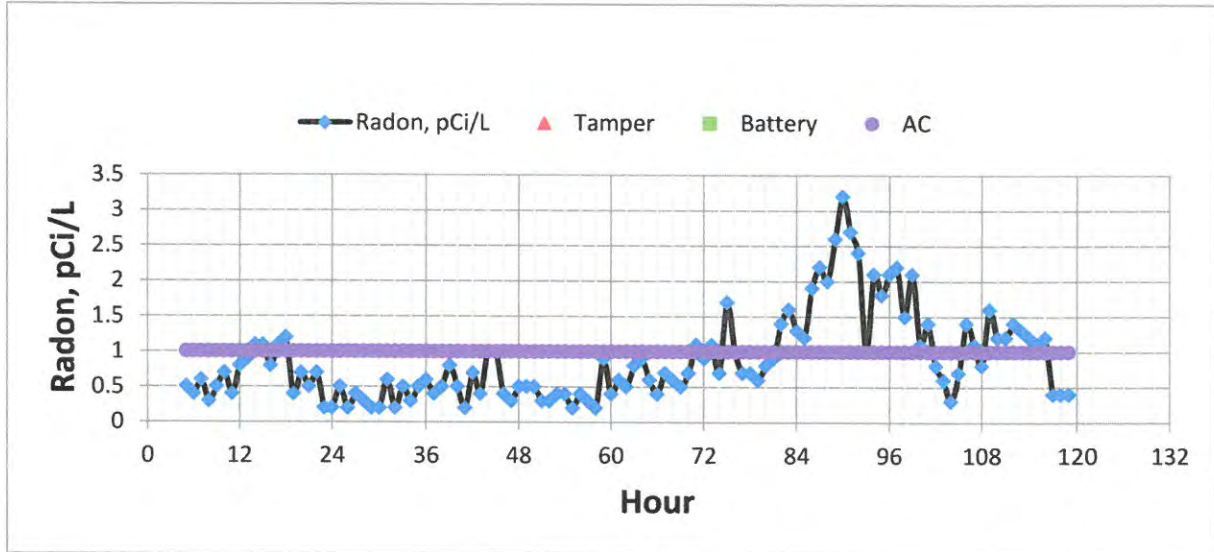
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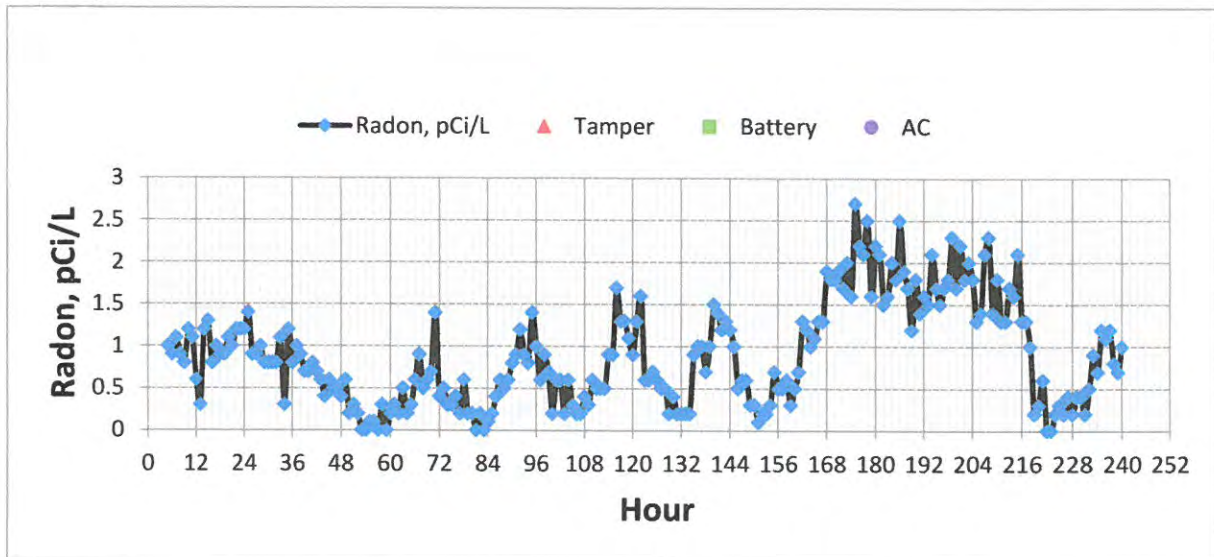
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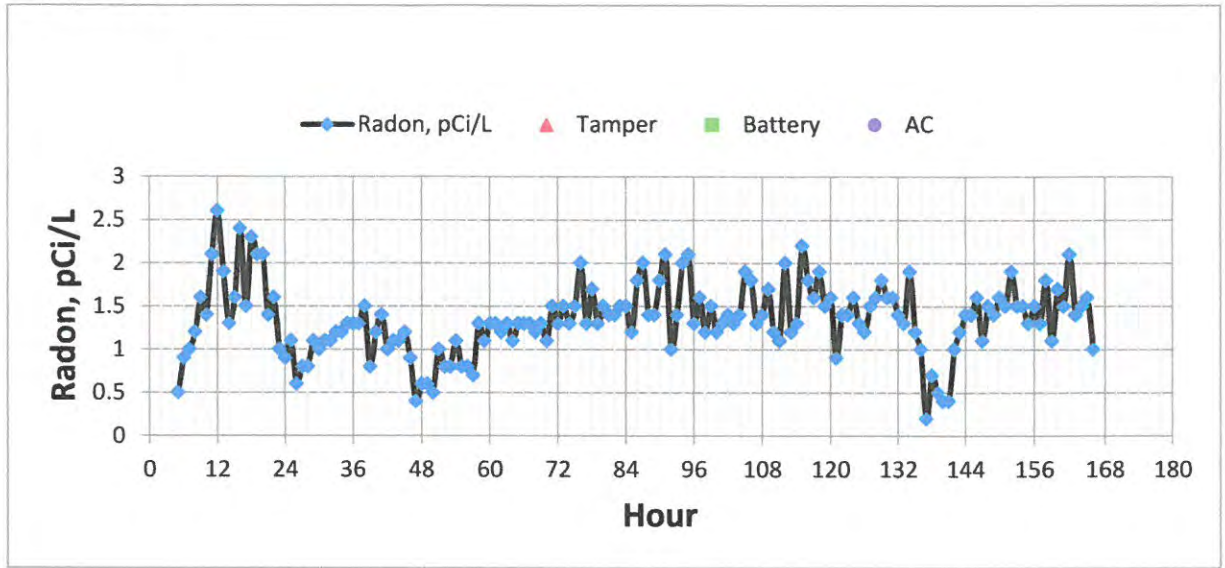
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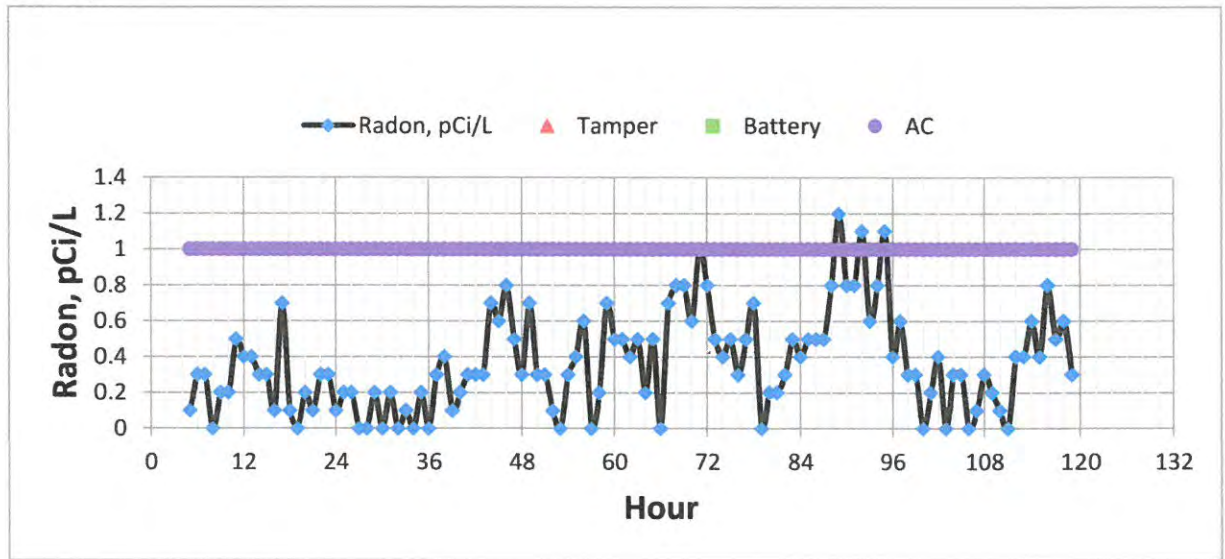
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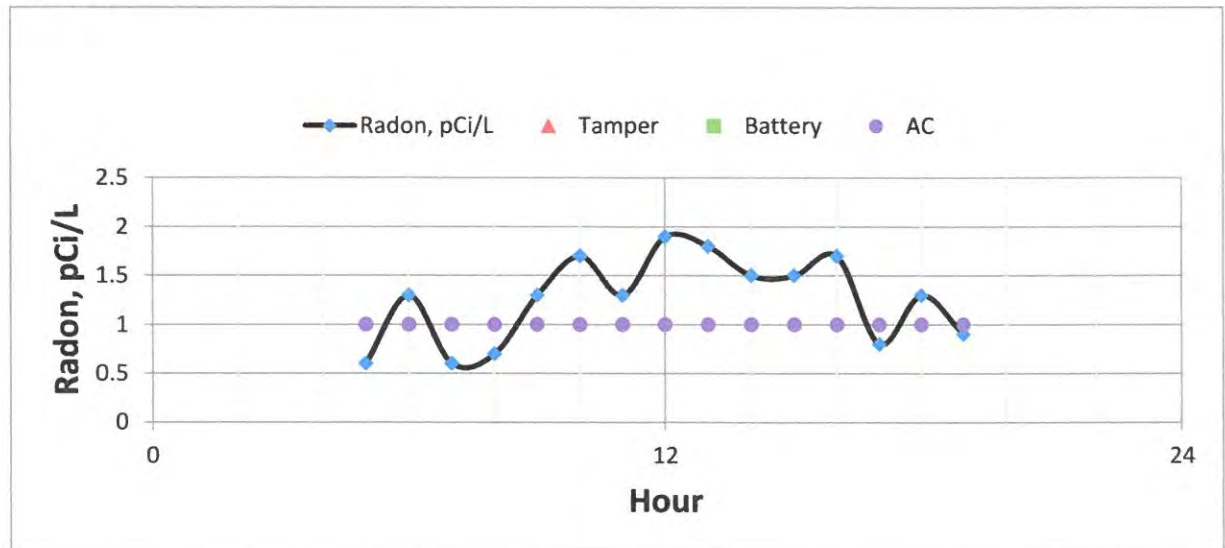
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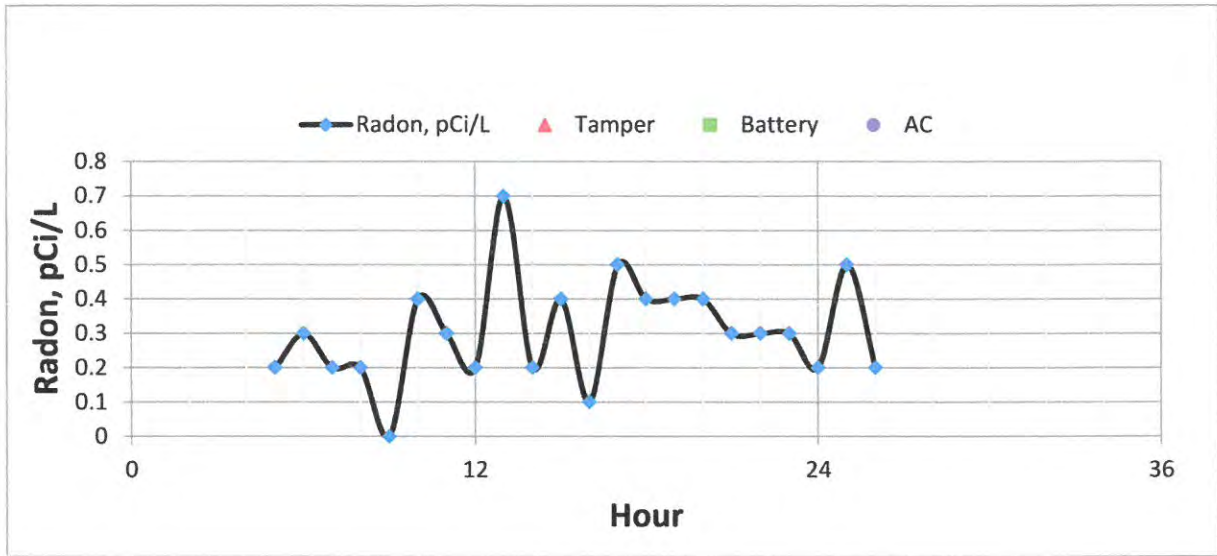
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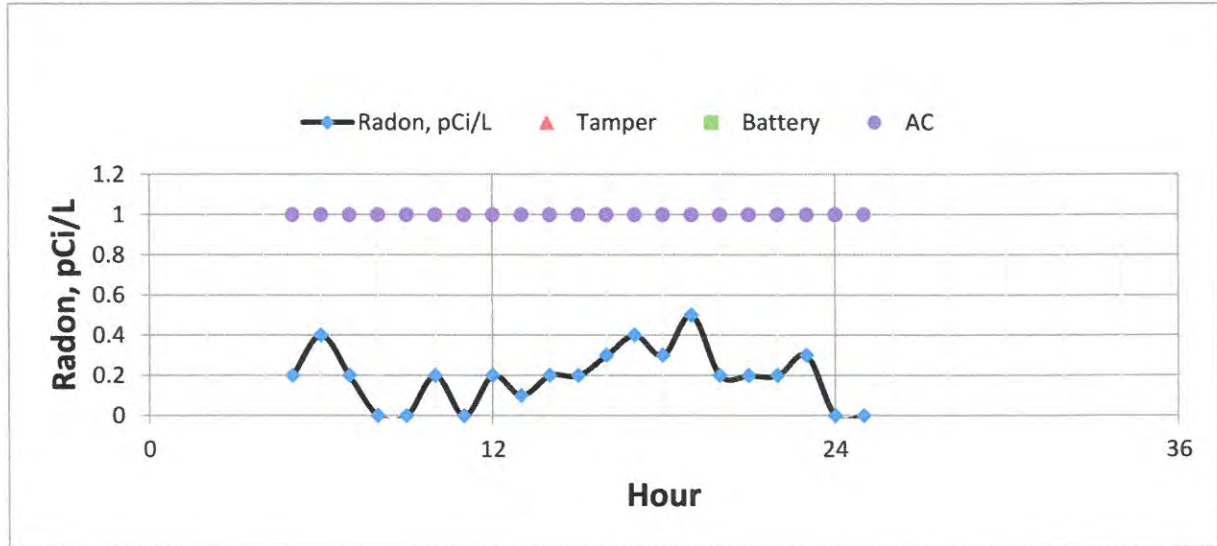
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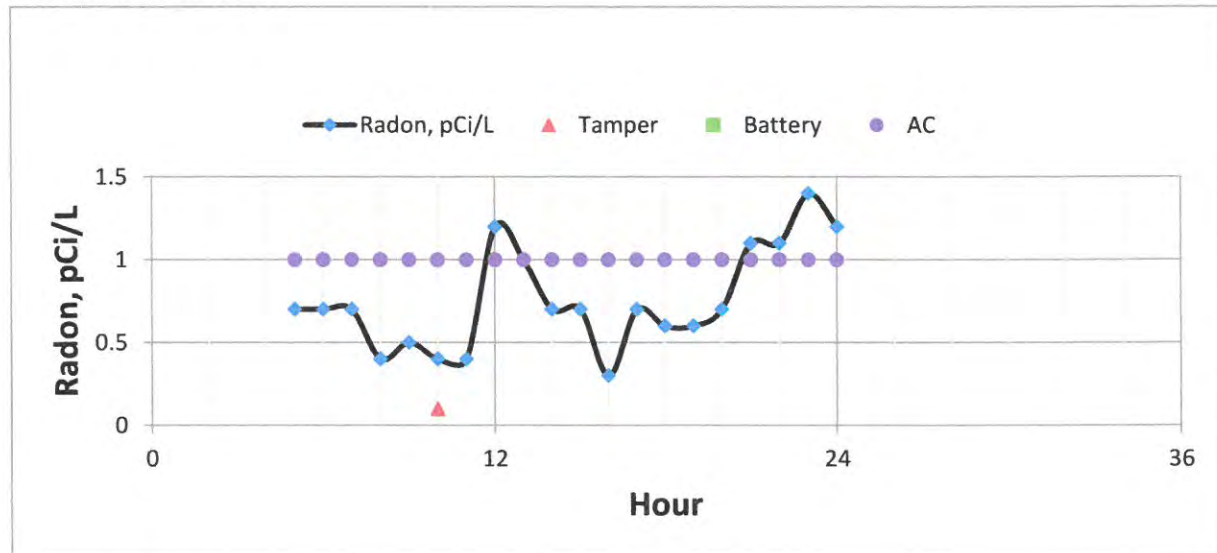
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Liberty



Miller Ed. Center West



Miller Ed. Center East

