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Radon Presentation - 4
to City Council, South Lake Tahoe
on November 5, 2024

1. Intro
City Council Members and Mayor: Thank you. I want to advocate for a radon ordinance in our building codes. Appendix AF of the International Residential Codes would require new single and two family residential houses to be built using Radon Resistant techniques and to be tested in order to pass the final inspection. And I want to introduce Cameron Depoke with Environmental Inspections who is licensed radon contractor if you have questions about the actual installations.
2. What is radon?
Radon is a colorless and odorless gas that is part of the radioactive decay process of Uranium. Uranium is found naturally in certain soil types and one of which is granite, the basic geology of the entire Sierra Nevada Mountain Range. Uranium decays to Radium, then to Radon and then to Radon isotopes, or Radon Daughters. Uranium and Radium are heavy metals that stay in the ground. Radon, however is a gas and can migrate up the surface where enter our homes and buildings.
3. How does it get into our homes?
First it migrates up through cracks and pathways in the soil. If you happen to build your house over one of these pathways you will have high radon while your neighbor may have low radon because he did not build his house is not over a vent. Unfortunately these “vents” are undetectable until you build a house over them which sucks the radon in because of the stack effect, heat rising.
4. Is Radon dangerous?
Radon decay particles have negative charges so they attach to dust particles in the air which we breathe in and that puts them in direct contact with the cells in our lungs. When any radioactive isotopes decay they give off bursts of alpha particles that can cause harm to nearby tissue and can cause mutations in those damaged cells. The risk of cancer increases with the length of exposure and the amount of concentration. Lung cancer is the problem.
5. A Class I carcinogen.
The US Surgeon General has designated Radon as a Class I carcinogen, similar to cigarette smoke. In fact Radon is the second leading cause of lung cancer after cigarette smoking.
6. History: It’s important to know how we got here
I’ve been a resident here at the South Shore since the early 1970’s. My wife and I started Grass Roots Natural Foods, and I finished my working career at Lake Tahoe Unified School District. I first became concerned about Radon in 2004 when I tested my house and found that I had been living with high radon for 24 years without knowing it. I did some research, read some books, and was able to mitigate my house myself. I realized that other people needed to be made aware about radon and I saw a business opportunity. I got certified as a radon mitigator in California and ran a business, Radon At Tahoe, for about 16 years, selling these little radon testing devices, mostly on Amazon. In the process I became an advocate for radon awareness here in Tahoe. ere ar
7. California Geological Survey Tahoe Radon MAP
2006 the California Radon Program funded the California Geologic Survey to do a radon study on the Lake Tahoe Area. This resulted in the Tahoe Radon Potential Map, the first in a series radon maps in other high risk counties throughout California.
8. Zephyr Cove Elementary School
In 2007 Zephyr Cove Elementary School was in the news because they could not get their radon numbers down and parents were protesting to close the school. After multiple tries they succeeded.
9. Lake Tahoe Unified School District
In 2007 Lake Tahoe Unified School District decided to test all classrooms for radon. Many classrooms had high radon, but it was not mitigated because the air pressure of the heating and cooling system keeps the radon out.
10. USFS
In 2005 the US Forestry Service Supervisor’s building on Al Tahoe was built using a heating and cooling design which circulated air from the plenum into the office areas. In 2008 one of my customers took a tester to work and discovered high radon. The Forestry Service had to bring in radon experts to retrofit the design at considerable expense and embarrassment. This is the kind of situation that we are trying to avoid.
11. Advocacy and Presentations
South Lake Tahoe City Council
El Dorado County Board of Supervisors
UC Davis Tahoe Environmental Research Center
 the Sierra Club
 Soroptimists
Cancer Society
Real Estate offices, etc.
As a consultant, I helped PineWild Condominiums in Zephyr Cove, NV test their units for radon
I joined the Barton Hospital Patient and Family Advisory Council to develop a brochure to be included in the basket of gifts every new mother takes home with their new baby, including a free radon test kit. We produced quite a nice brochure and the State Radon Program donated the test kits for a trial run, but unfortunately Barton Health decided not to go through with the project.
12. Then last year I noticed two new large construction projects: The City was building a workforce housing project called Sugar Pine Village and the College was building a new student dormitory. I looked into each project and found that whereas the college dorm building plans included radon reducing features, the Sugar Pine Village buildings did not. In fact Cameron’s company has the contract to radon-proof the college dormitory. I believe that all people should be safe from radon so I approached the City Manager and the City Chief Building Official with the idea of upgrading the building code to include radon safety and they encouraged me to bring this to you. So that’s how we got here.
13. South Tahoe’s High Risk Geology.
If you look at the original EPA radon maps from 1980 which covered every county in the U.S. you see that the bulk of the problem is in the East and Mid West. Look at California. Only two counties: Santa Barbara and Ventura make the high radon risk category. El Dorado County is rated as “Moderate” and this designation is still used today. Look at Iowa. Every county has high radon potential. Indeed 71% of all homes in Iowa are above the EPA Action level. However when you consider population, much of Iowa is rural. They have only 3.2 million people. California has over 39 million people. It’s population plus radon risk.
14. Radon Deaths by State
More people die from radon induced lung cancer in California than in any other state. Not because California has the highest radon, but because we have the most people. The Lake Tahoe area has both high radon risk and a high population.
15. Other County Radon Risk Maps.
The California Geological Survey did a series of radon geology maps of other high risk counties. These show some high radon areas but many are in rural areas. Here are some radon risk maps in California.
16. South Lake Tahoe – High Radon and High Population

South Lake Tahoe just happens to be sitting in a high radon risk area. South Lake Tahoe has 21,000 residents, the highest population in the Sierra Nevada. We have 3 times the population of Mammoth Lakes, which also has high radon, but has only 7,000 residents. It is geology and population.

1. What do the Radon Tests Show?
The California Radon Program kept a data base through 2016 of every radon test sent to a lab and or conducted by a certified testing professional. There are over 60,000 tests state wide and 1,793 tests in the Lake Tahoe Basin by Zip Code. California is not particularly high in radon with about 11% of homes throughout the state testing high . But in South Lake Tahoe our 1793 tests show 41% of houses have high radon. Cameron Depoke with Environmental Inspections tells me that it is currently closer to 55%. That’s 4 out of 10 or 5 out of 10.
2. Radon Testing when buying a Home.
Radon testing is not required when buying a home because the California Hazard Report doesn’t use the new Radon Maps but instead uses the old 1980 EPA Radon Maps which show only two counties in California with high risk and all of El Dorado County, including South Lake Tahoe, as “Moderate” Radon Risk.
3. How do get radon out of an existing house?
To show you the differences in building radon out versus fixing it after the fact.
It requires:
Barrier cloth secured to the concrete foundation and posts with special adhesive.
 Perforated French drain pipe under the cloth
Connected to ABS pipe and run to an outside a vent
On the outside of the building you mount a low wattage radon fan
and you run a pipe or rain gutter down spout up to just above the roof line to vent it.
4. How do you prevent radon in New Construction?
The EPA booklet: RRNC – Radon Resistant New Construction shows in detail the standards for RRNC.
It is much cheaper and much easier if you build radon resistance into a new building while you are building it. No need for an outside fan, the fan goes in the attic out of sight. And no need for outside pipes since the pipes get run inside a utility closet like all the other plumbing. The barrier cloth can be put down before the first floor goes on, much easier to do standing up than crawling around in a crawl space. It’s a big savings for the contractor and hence the homeowner.
5. List of 154 Cities and Counties who have done what I am asking you to do.
Included in your packet.
6. What does Appendix AF do?
It requires that all new one and two family houses to use RRNC: Radon Resistant New Construction techniques and be tested for radon as part of the final inspection.
7. Summary

Adopt Appendix AF into our building codes because

 1.) Radon causes lung cancer;

2.) We have a lot of radon here;

3.) We have a lot of people here;

4.) It is easy to build it out.

Thank You.