Mollala River School District Long Term Radon Retest
Rural Dell - 10500 OR-211
Mulino Elementary School - 26660 OR-213
Clarkes Elementary School - 19100 S. Windy City Road

EIS Job No. 2018058

Prepared For:

Attn: Tony Tiano, Facilities Supervisor
The Molalla River School District
412 Swiegle Avenue
Molalla, Oregon 97038

Prepared By:

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September 30, 2018

ENVIRONMENTAL INSPECTION SERVICES

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EIS Job No. 2018058

Attn: Tony Tiano, Facilities Supervisor
The Molalla River School District
412 Swiegle Avenue
Molalla, Oregon 97038

Reference: Longterm Radon Retests at the Molalla River School district facilities known as Rural Dell at 10500 OR-211, Mulino Elementary School at 26660 OR-213, and Clarkes Elementary School at 19100 S. Windy City Road

Dear Mr. Tiano,

A total of five (5) long term radon digital AIRTHING detectors were placed in a total of five (5)functional areas of three (3)schools of the Mollala River School District between the long term testing periods of late June, 2018 and Wednesday, September 26, 2018. The areas of Long term Radon Retests of the Molalla River School district included the three facilities known as Rural Dell at 10500 OR-211, Mulino Elementary School at 26660 OR-213, and Clarkes Elementary School at 19100 S. Windy City Road. No elevated long term radon levels were detected in all the long term radon detector units and no additional radon test considerations were noted for Molalla River school District. The favorable long term monitoring procedures has prompted no additional radon monitoring recommendations for the Molalla River School District.

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The following long term radon detector results are summarized as follows:

SCHOOL	ROOM SPACE	RADON TEST RESULT
Rural Dell Serial No. 2302035416	Javier Class	Long term Average - 2.86 pCi/L Short term average - 8.89 pCi/L
Mulino Elementary School Serial No. 2302035605	Class # 22	Long term Average - 3.02 pCi/l Short term average - 1.56 pCi/L
Mulino Elementary School Serial No. 2302035636	Class # 23	Long term Average - 0.78 pCi/l Short term average - 0.86 pCi/L
Clark Serial No. 2302035601	Office	Long term Average - 2.13 pCi/l Short term average - 0.29 pCi/L
Clark Serial No. 2302035599	Class # 12	Long term Average - 1.13 pCi/l Short term average - 1.75 pCi/L

RADON TEST HISTORY

An initial radon test of all the Molalla River School District school facilities was conducted between March 26 and March 29, 2018. Low radon levels were measured at the Molalla High School, Molalla Elementary School, and Molalla River Middle Schools. Elevated radon levels were measured at very limited functional areas at the Mulino Elementary School, Clarkes Elementary School, and the Rural Dell School. June 19, 2018. The elevated radon measurements prompted a radon retest of the selected aforementioned school measurement areas in June, 2018. Two (2) passive samplers were placed into each of the designated retest areas for quality control purposes resulting in a total of twelve (12) samplers placed during the June retest episode and reported as EIS Job No. 2018046 in June, 2018.

The initial March, 2018 radon assessment elevated radon concentrations are listed as follows;

SCHOOL	ROOM SPACE	RADON TEST RESULT
Mulino Elementary School	Class # 22	Vial # 4453097 - 5.3 pCi/L
Mulino Elementary school	Class # 21	Vial # 4607923 - 8.6 pCi/L
Rural Dell School	Javier class	Vial #4525889 - 5.3 pCi/L
Clarkes Elementary	Room 12 office	Vial # 4525772 - 4.5 pCi/L
Clarkes Elementary	Room 12 main	Vial # 4525972 - 4.0 pCi/L
Clarkes Elementary	Health Room	vial # 4525708 - 4.2 pCi/L

The elevated radon measurements prompted a radon retest of the selected aforementioned school measurement areas in June, 2018. Two (2) passive samplers were placed into each of the designated retest areas for quality control purposes resulting in a total of twelve (12) samplers placed during the June retest episode.

The elevated radon levels exceeding the action limit of 4 pCi/l analytically confirmed in the June samplers are listed as follows;

SCHOOL	ROOM SPACE	RADON TEST RESULT
Mulino Elementary school	Class # 21	Vial # 4525851 - 7.9 pCi/L
Mulino Elementary school	Class # 21	Vial # 4607972 - 14.4 pCi/L
Rural Dell School	Javier class	Vial # 4453306 - 6.3 pCi/L
Rural Dell School	Javier class	Vial # 4607961 - 5.5 pCi/L
Clarkes Elementary	Room 12 main	Vial # 4525859 - 4.5 pCi/L
Clarkes Elementary	Room 12 main	Vial # 4525673 - 5.3 pCi/L
Clarkes Elementary	Health Room	vial # 4525985 - 5.0 pCi/L
Clarkes Elementary	Health Room	vial # 4453193 - 4.8 pCi/L

RESULT SUMMARY

The initial and retest samplers are known as passive samplers. The selected radon test devices are activated charcoal adsorption devices (AC) with charcoal treated to increase the ability to adsorb radon gas. The passive nature of the activated charcoal allows continual adsorption and desorption of radon. The adsorbed radon undergoes radioactive decay and is typically measured between two to seven days. AC devices are inexpensive, no power is required, and accurate. The AC detectors do require laboratory analysis and are sensitive to humidity.

RADON DESCRIPTION

Radon is described as a naturally occurring colorless, tasteless and radioactive gas. Radon is also considered a Group A known human carcinogen. Radon travels through the soil and any openings in floor surfaces.

RADON INFLUENCES

The elevated levels of radon in a building is dependent on the following factors

(1.0) - The concentration of radium in the soil or underlying geology;

(2.0) - The ease of radon transport into a building due to such factors as soil permeability; pathways, and openings in the building;

(3.0) - Air differentials such as "stack effect" of warm air displaced by cooler air.

(4.0) - HVAC air transport in a building

(5/0) - Ventilation of the building.

RADON DESCRIPTION

Radon eventually decays into radioactive decay particle products which exert energy known as ionizing energy which may be trapped in the lungs. The trapped ionizing energy may disrupt cellular DNA and damage the cancer suppressant genes. The decay particles further release radiation.

RADON RISK

Prolonged exposure to radon concentrations increases the risk of lung cancer. Not everyone who breathes radon or radon decay products may develop lung cancer. The risk of lung cancer from radon exposure is dependent on several factors to include the actual concentration of radon, the duration of radon exposure, and genetic and health disposition. The risk of radon induced lung cancer does increase dramatically in smokers.

RADON MEASUREMENTS

Radon is measured in curies. A curie is described as the amount of radioactivity released from one gram of radium. A picocurie is the standard measurement of radon. A single picocurie is one trillionth of a curie. Radon is actually measured and reported in picocuries per liter of air (pCi/L). The USEPA initial radon studies were conducted in schools in 1988. Radon levels were noted in schools in every part of the country. The National Radon Survey noted 19.3% of all schools have at least one frequently occupied room with radon levels above the USEPA action level of 4.0 pCi/L. This finding also noted that over 70,000 school rooms are impacted by radon.

RECOMMENDATIONS

The USEPA, OHA Oregon Radon Awareness Program, and numerous non-governmental groups recommend that the school district take action to include radon level in those rooms where the average of the initial and followup short term kit results in test results of 4.0 pCi/l or greater.

The five (5) long term radon digital AIRTHING detectors were placed in a total of five (5)functional areas of three (3)schools of the Mollala River School District between the long term testing periods of late June, 2018 and Wednesday, September 26, 2018. The areas of Long term Radon Retests of the Molalla River School district included the three facilities known as Rural Dell at 10500 OR-211, Mulino Elementary School at 26660 OR-213, and Clarkes Elementary School at 19100 S. Windy City Road. No elevated radon levels were detected in all the long term radon detector units and no additional radon test considerations were noted for Molalla River school District. The favorable long term monitoring procedures has prompted no additional radon monitoring recommendations for the Molalla River School District.

Radon concentrations do fluctuate over time and are influenced by various physical conditions such as temperature, pressure changes; functional space ventilation changes; ground surface changes; and seasonal changes. The long term radon testing is a helpful lont term continuous monitoring and digital measurement of radon concentrations during test episodes of over ten weeks and is helpful in focusing subsequent radon testing in large and diverse school systems. The favorable long term monitoring procedures has prompted no additional radon monitoring recommendations for the Molalla River School District.

Thank you for this opportunity to be of service. If there are any questions feel free to contact me at (503) 680-6398.

Respectfully,

Charles A Spear

Charles A. Spear
Environmental Professional