

# INDUSTRIAL HYGIENE REPORT

## Liberty Elementary School

Report to: Vonnie Good, Risk Management

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On-site: December 10–13, 2012

Report: December 19, 2012

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### PURPOSE

Radon monitoring was done to measure the background levels in all classrooms, offices and staff work rooms that are in contact with the ground or below ground level.

### TEST METHOD

Radon Air-Chek short-term test devices were used in each location by placing the device 5-6 feet above the floor, where it is not in direct contact with airflow from the ventilation system, windows or exterior doors. Staff were requested to keep windows closed during the testing.

These short-term devices work by trapping room air inside the grains of charcoal with the devices, meaning that live radon gas is being captured. The analysis is performed by measuring the radiation emitted from the charcoal, which is proportional to the amount of radon that was present in the room air.

The testing occurred from Monday, December 10 to Thursday, December 13, 2012 during normal and routine operation of the school.

### EPA RADON GUIDELINES

The EPA has set an action level of 4.0 pCi/L (picoCuries per liter) for schools. If classrooms or buildings have radon levels at or above 4.0 pCi/L, EPA recommends that schools take action to reduce the level. These actions include:

Step 1. If your result is 4 pCi/L or higher, take a follow-up test (Step 2) to be sure.

Step 2. Follow up with either a long-term test or a second short-term test:

### RESULTS and RECOMMENDATION

Two test locations were above the EPA's action level of 4.0 picoCuries per liter (pCi/l), Rooms 21 and 22.

One test location was slightly below the action level, Classroom 20 @ 3.3 pCi/L .

It is recommended that the operation of the ventilation systems for these three rooms be checked to make sure that the amount of outdoor air supplied has not been shut off. If possible increase the amount of outdoor air to these three classrooms, then retest the rooms for radon levels.

### **BACKGROUND ON RADON**

Radon is a gas that occurs in nature, seeping up from the earth. It is odorless, colorless and tasteless. Radon comes from the natural breakdown, or radioactive decay, from uranium 238, and produces radon. The half-life of an individual element is relatively short. Within two weeks, about 90% of a given amount of radon gas will be gone. However, the actual health concern is for the radon decay products, called radon progeny, which carry a small static charge that allows their attachment to water vapor, dust and smoke particles in the air.

The Radon progeny can become lodged in the lung tissue when they are inhaled, and it is these particles' further radiation decay that is associated with potential lung cancer effects.

Radon can seep into buildings or schools through cracks in slab floors or porous cinderblock. It can enter around loose-fitting drainage pipes or through sump pumps.

The US EPA has set an action level of 4.0 pCi/L. At or above this level of radon, the EPA recommends that corrective measures should be taken to reduce the exposure to radon gas.

### **CONTROL OF RADON LEVELS IN SCHOOLS**

The major control mechanism for lowering radon levels within school buildings is use of dilution ventilation. If the amount of outside air delivered into a building increases, the radon levels should decrease.

**Sample Data Attached**

Radon test result report for:  
**SCHOOL**  
**LIBERTY**

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
4588597	COUNSELOR	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	2.0	2012-12-17
4592111	CUSTODIAL	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	1.4	2012-12-17
4592107	KITCHEN	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	1.1	2012-12-17
4592112	MEDIA CONF RM	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	1.1	2012-12-17
4588595	OFFICE MANAGER	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	0.8	2012-12-17
4588588	PE OFFICE	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	0.9	2012-12-17
4588594	PRINCIPAL	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	0.6	2012-12-17
4588589	RM 1	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	1.5	2012-12-17
4592104	RM 11	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	< 0.3	2012-12-17
4592105	RM 12	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	0.9	2012-12-17
4592106	RM 13	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	< 0.3	2012-12-17
4592113	RM 14	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	< 0.3	2012-12-17
4592114	RM 15	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	< 0.3	2012-12-17
4592115	RM 16	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	2.5	2012-12-17
4592116	RM 17	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	2.0	2012-12-17
4592117	RM 18	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	1.3	2012-12-17
4592118	RM 19	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	1.9	2012-12-17
4588590	RM 2	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	1.0	2012-12-17
4592108	RM 20	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	3.3	2012-12-17
4592109	RM 21	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	4.5	2012-12-17
4592110	RM 22	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	4.6	2012-12-17
4588586	RM 23	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	1.5	2012-12-17
4588587	RM 24	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	1.4	2012-12-17
4588591	RM 3	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	1.3	2012-12-17
4588592	RM 4	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	0.9	2012-12-17
4588593	RM 5	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	0.9	2012-12-17
4592101	RM 6	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	0.8	2012-12-17
4592103	RM 7	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	< 0.3	2012-12-17
4588599	RM 8 LRC	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	0.6	2012-12-17
4588598	RM 8 OFFICE	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	< 0.3	2012-12-17
4588600	RM 9	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	1.2	2012-12-17
4592102	RM10	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	< 0.3	2012-12-17
4588596	STAFF ROOM	2012-12-10 @ 8:00 am	2012-12-13 @ 12:00 pm	< 0.3	2012-12-17