The Commonwealth of Massachusetts
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Bureau of Environmental Health
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October 6, 2015

Jeffrey Martin, CFM
Worcester Public Schools
Dr. John E. Durkin Administration Building
20 Irving Street
Worcester, MA 01609

Re: Radon monitoring at City View School – 80 Prospect St. Worcester

Dear Mr. Martin:

Thank you for meeting with Lisa Hébert and me on August 18, 2015 regarding the radon in air monitoring at City View School, Worcester, MA. The purpose of this meeting was to discuss various issues related to the on-going radon monitoring that has been conducted by the Radon Assessment Unit staff of the Massachusetts Department of Public Health (DPH/Bureau of Environmental Health), Indoor Air Quality Program.

As you know, the school has an elaborate radon mitigation system (RMS) that was installed nearly 20 years ago by the DPH in conjunction with Worcester Public Schools following radon testing conducted by a private firm. To ensure that the RMS was operating properly, a continuous radon in air monitoring system was installed in the school. This system was installed, calibrated, and maintained by DPH Radon Assessment Unit staff. To date, the cost incurred by DPH is approaching $130,000. This amount includes costs associated calibration, maintenance, and annual testing, which is approximately $8,500. The current monitoring system is nearing the end of its service life. Continued monitoring efforts would necessitate approximately $30,000 for the eventual replacement of the four continuous radon monitors installed as part of the monitoring system.

As you may be aware, the RMS was built with multiple redundancies and safeguards. The systems were designed to be redundant systems, so that single or even sequential failures of fan motors or the electrical supply would not result in loss of radon venting out from the building. The systems are arranged so that every area is served independently by two pressure

fields. With this arrangement, two independent systems vent the same area; both systems would have to fail in order to lose all radon venting for that area. Six of the stacks have a second fan on them, wired to a separate circuit, and are also on the emergency diesel generator. This was installed as one of the safeguards against loss of electrical power. Two lighted panels that indicate the status of the RMS are located in the building; one in the main office and one in the first floor radon room. There is also a lighted alarm in the first floor hallway. Lastly, approximately 10 new radon fans are generally kept in stock, onsite, should one need to be replaced quickly. It is important to note that the original intent for the RMS was to automate and integrate future monitoring into the building's energy management system.

To date, over 15 years of hourly radon air samples have been downloaded and reviewed by Radon Assessment Unit personnel. Attached is a summary of the radon sampling for the last eight years of monitoring. At no time since the RMS was installed did the average indoor radon concentration exceed the EPA Action Guideline of 4 pCi/L. In fact, the averages were well below 2 pCi/L, which is below the EPA action level.

Based on extensive confirmatory data associated with the RMS, which has been and is currently operating to reduce indoor radon levels, and our discussion on August 18, 2015, the DPH Radon Assessment Unit will be transferring the responsibility of continuous radon monitoring and the maintenance of the RMS to the City of Worcester. As we discussed, the City of Worcester may wish to continue to maintain the radon sampling system that is in place. The current system can remain in place until it can be replaced by the City and continuous monitoring, yearly calibration, repair, upgrades, and maintenance of the radon air sampling equipment would be assumed by Worcester Public Schools.

As we remain committed to school safety in Worcester, we also discussed the feasibility of conducting a radon survey at the school on an annual basis. Our Radon Assessment Unit would be glad to assist in conducting such radon sampling if the appropriate radon sampling kits are purchased by Worcester Public Schools and provided through a certified radon laboratory in Massachusetts. Alternatively, Worcester Public Schools could engage a certified radon measurement specialist to conduct the annual survey. Radon Assessment Unit personnel could provide technical assistance regarding interpretation of radon survey results. Certified radon measurement and mitigation professionals can be found at the following two websites:

1. www.nrsb.org
2. www.aarst.org

For the continuous radon monitors to operate appropriately over the years, air to be sampled was and is dried using a granular desiccant called Drierite (attached is the Safety Data Sheet). Over the course of years of continuous radon air sampling, a significant number of glass jars of spent desiccant have accumulated inside the radon room at the school. This spent

desiccant should be disposed of by a method that is in compliance with applicable state and federal hazardous waste laws.

In the radon room, there is a large fresh air vent that was installed to make the radon room accessible in the event of a failure of the RMS. Currently, and if radon monitoring continues at the school, items blocking the vent should be removed and efforts should be made to keep the radon room free from clutter.

If you have any questions regarding the report or if we can be of further assistance in this matter, please feel free to call us at (617) 624-5757.

Sincerely,

Michael A. Feeney, R.Ph., J.D., C.H.O.
Director, Indoor Air Quality Program

cc: Jan Sullivan, Acting Director, BEH
Lisa Hébert, Chief, Radon Assessment Unit
Thomas Barrett, Worcester Public Schools

Attachments

City View Room Average (pCi/L)
12/19/06 - 8/18/15

Time Period	Room 107	Basement Hall	Room 105 S	Room 101 S
12/19/06 - 1/26/07	0.6	0.3	0.8	0.6
1/26/07 - 3/7/07	0.5	0.4	0.8	0.5
3/7/07 - 3/28/07	0.4	0.3	0.8	0.5
3/28/07 - 4/5/07	0.5	0.3	0.7	0.6
4/5/07 - 5/16/07	0.4	0.3	0.7	0.5
5/16/07 - 6/15/07	0.4	0.3	0.6	0.5
6/15/07 - 7/25/07	0.5	0.5	0.6	0.5
7/25/07 - 9/5/07	0.6	0.4	0.6	0.5
9/5/07 - 10/16/07	0.7	0.4	1.2	0.6
10/16/07 - 11/26/07	0.7	0.4	1.2	0.7
11/26/07 - 12/27/07	0.6	0.3	1.2	0.6
12/27/07 - 2/5/08	0.4	0.3	1.1	0.5
2/5/2008 - 3/14/08	0.3	0.2	0.7	0.4
3/14/08 - 4/24/08	0.4	0.3	0.8	0.5
4/24/08 - 6/4/08	0.5	0.4	1	0.5
6/4/08 - 7/9/08	0.7	0.5	0.9	0.6
7/9/08 - 8/8/08	0.8	0.7	1.2	0.6
8/8/08 - 9/11/08	0.7	0.5	1.3	0.6
9/11/08 - 10/20/08	0.7	0.4	1.6	0.6
10/20/08 - 11/20/08	0.6	0.3	1.3	0.6
11/20/08 - 12/22/08	0.4	0.3	1.1	0.4
12/22/08 - 1/21/09	0.3	0.2	1	0.5
1/21/09 - 2/11/09	0.3	0.2	1	0.5
2/11/09 - 3/10/09	0.3	0.2	0.9	0.4
3/10/09 - 3/30/09	0.9	0.2	1.1	0.6
3/30/09 - 5/6/09	0.4	0.3	1	0.5
5/6/09 - 6/11/09	0.4	0.4	1	0.6
6/11/09 - 7/19/09	0.5	0.5	0.9	0.6
7/16/09 - 8/18/09	0.7	0.6	1.1	0.7
8/18/09 - 9/24/09	0.6	0.5	1.4	0.7

Time Period	Room 107	Basement Hall	Room 105 S	Room 101 S
9/24/09 - 11/03/09	0.6	0.3	1.4	0.5
11/3/09 - 12/8/09	0.5	0.3	1	0.6
12/8/09 - 1/12/10	0.3	0.2	1	0.5
1/12/10 - 2/2/10	0.3	0.2	1	0.4
2/2/10 - 3/9/10	0.3	0.2	0.2	0.4
3/9/10 - 4/13/10	0.3	0.3	0.4	0.6
4/13/10 - 5/5/10	0.3	0.3	0.4	0.6
5/5/10 - 6/16/10	0.3	0.3	0.4	0.4
6/16/10 - 7/15/10	0.5	0.4	0.4	0.5
7/15/10 - 8/5/10	0.4	0.4	0.3	0.5
8/5/10 - 9/2/10	0.7	0.3	0.3	0.6
9/2/10 - 9/30/10	0.5	0.3	0.4	0.6
9/30/10 - 11/1/10	0.6	0.2	1.1	0.6
11/1/10 - 12/3/10	0.6	0.3	1.1	0.6
12/3/10 - 1/10/11	0.5	0.2	1	0.6
1/10/11 - 2/7/11	0.4	0.2	0.9	0.5
2/7/11 - 3/2/11	0.3	0.2	0.8	0.4
3/2/11 - 4/5/11	0.3	0.2	0.8	0.4
4/5/11 - 5/4/11	0.4	0.3	0.8	0.4
5/4/11 - 6/9/11	0.4	0.3	0.8	0.5
6/9/11 - 6/30/11	0.6	0.4	0.9	0.6
6/30/11 - 8/4/11	0.8	0.6	0.7	0.9
8/4/11 - 8/26/11	0.9	0.6	0.9	0.8
8/26/11 - 9/22/11	0.8	0.4	1.4	0.6
9/22/11 - 10/20/11	0.7	0.9	1.4	0.7
10/20/11 - 11/28/11	0.6	0.3	0.7	0.6
11/28/11 - 12/20/11	0.5	0.4	0.6	0.6
12/20/11 - 1/27/12	0.4	0.5	0.4	0.5
1/27/12 - 2/9/12	0.4	0.2	0.4	0.5
2/9/12 - 3/15/12	0.4	0.2	0.4	0.5
3/15/12 - 4/17/12	0.5	0.3	0.5	0.5
4/17/12 - 5/24/12	0.5	0.3	0.5	0.5
5/24/12 - 6/27/12	0.6	0.4	0.5	0.6
6/27/12 - 7/27/12	0.9	0.5	0.8	0.8

Time Period	Room 107	Basement Hall	Room 105 S	Room 101 S
7/27/12 - 8/30/12	1	0.6	0.9	0.8
8/30/12 - 10/03/12	0.8	0.3	0.7	0.8
10/03/12 - 11/6/12	0.7	0.3	0.9	0.6
11/6/12 - 12/6/12	0.7	0.3	0.7	0.7
12/6/12 - 1/9/13	0.5	0.3	0.5	0.6
1/9/13 - 2/13/13	0.4	0.2	0.5	0.5
2/13/13 - 3/21/13	0.4	0.2	0.5	0.4
3/21/13 - 4/26/13	0.4	0.2	0.5	0.5
4/26/13 - 5/31/13	0.3	0.2	0.4	0.5
5/31/13 - 6/26/13	0.3	0.2	0.3	0.4
6/26/13 - 8/1/13	0.4	0.2	0.5	0.5
8/1/13 - 9/5/13	0.5	0.6	0.4	0.5
9/5/13 - 10/11/13	0.5	0.4	0.6	0.6
10/11/13 - 11/12/13	0.6	0.3	0.5	0.8
11/12/13 - 12/16/13	0.7	0.3	0.7	0.7
12/16/13 - 1/17/14	0.5	0.2	0.7	0.5
1/17/14 - 2/19/14	0.4	0.2	0.8	0.4
2/19/14 - 3/28/14	0.3	0.2	0.5	0.3
3/28/14 - 5/6/14	0.4	0.2	0.4	0.5
5/6/14 - 6/10/14	0.3	0.2	0.3	0.4
6/10/14 - 7/2/14	0.3	0.2	0.1	0.4
7/2/14 - 8/8/14	0.4	0.3	0.2	0.5
8/8/14 - 9/10/14	0.4	0.3	0.3	0.4
9/10/14 - 10/6/14	0.5	0.5	0.5	0.6
10/6/14 - 11/12/14	0.5	0.4	0.7	0.5
11/12/14 - 12/16/14	0.6	0.4	0.8	0.6
12/16/14 - 1/22/15	0.6	0.4	0.8	0.5
1/22/15 - 2/13/15	0.5	0.2	0.7	0.4
2/13/15 - 3/24/15	0.3	0.2	0.8	0.4
3/24/15 - 4/10/15	0.3	0.2	0.8	0.4
4/10/15 - 5/13/15	0.3	0.3	0.6	0.5
5/13/15 - 6/19/15	0.3	0.3	0.4	0.4
6/19/15 - 7/20/15	0.3	0.3	0.6	0.4
7/20/15 - 8/18/15	0.3	0.3	0.6	0.4

MATERIAL SAFETY DATA SHEET

IDENTITY: INDICATING DRIERITE **DATE PREPARED: 11-1-2014**
DESCRIPTION: 1/16" TO ¼" BLUE GRANULES

SECTION I

MANUFACTURERS NAME: W.A. HAMMOND DRIERITE CO., LTD.
ADDRESS: P.O. BOX 460, 138 DAYTON AVE., XENIA, OHIO 45385
EMERGENCY PHONE NUMBER: 937-376-2927
INFORMATION PHONE NUMBER: 937-376-2927
www.drierite.com

SECTION II
INGREDIENTS

CHEMICAL IDENTITY	%	OSHA PEL	ACGIH TLV	UNITS	C.A.S. #	TSCA #
CALCIUM SULFATE,	>98	15	10	mg//M3	7778-18-9	A739-8876
COBALT CHLORIDE	<2	0.05*	0.05*	mg/M3	7646-79-9	A451-6434

*(AS COBALT METAL)

HAZARDOUS MATERIAL IDENTIFICATION SYSTEMS (HMIS)

HEALTH	FLAMMABILITY	REACTIVITY	PROTECTIVE EQUIPMENT
1	0	1	E

SECTION III
PHYSICAL/CHEMICAL CHARACTERISTICS

SPECIFIC GRAVITY: (H20-1): 1.87
SOLUBILITY IN WATER: 0.25 GRAMS PER LITER
MELTING POINT: 1450 C DECOMPOSES
APPEARANCE: BLUE GRANULES; NO ODOR

SECTION IV
FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: NONE
EXTINGUISHER MEDIA: NOT COMBUSTABLE
SPECIAL FIRE FIGHTING PROCEDURES: NONE
UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE

SECTION V
REACTIVITY DATA

STABILITY: STABLE
INCOMPATIBLE (MATERIALS TO AVOID): STRONG ACIDS
HAZARDOUS DECOMPOSITION BYPRODUCTS: SO_3 @ 1450 C Cl_2 @318 C
HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

SECTION VI
HEALTH HAZARD DATA

EYES: PARTICLES MAY CAUSE IRRITATION
SKIN: THIS MATERIAL IS NOT TOXIC. MAY DRY OR IRRITATE SKIN
INHALATION: MAY CAUSE AN IRRITATION OR RESPIRATORY ORGANS OF SENSITIVE PERSONS RESULTING IN THE OBSTRUCTION OF AIR WAYS WITH SHORTNESS OF BREATH.
INGESTION: MAY CAUSE VOMITING, DIARRHEA, AND SENSATION OF WARMTH.
SIGNS AND SYMPTOMS OF OVER EXPOSURE: EYES, NOSE, THROAT, OR RESPIRATORY IRRITATION
CARCINOGENICITY OF INGREDIENTS:

MATERIAL	IARC	NTP	OSHA
ALL	NOT LISTED	NOT LISTED	NOT LISTED
COBALT CHLORIDE	YES*	NO	NO

*(COBALT & COBALT COMPOUNDS ARE CLASSIFIED AS GROUP 2B)
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:

PRE-EXISTING UPPER RESPIRATORY AND LUNG DISEASE SUCH AS, BUT NOT LIMITED TO BRONCHITIS, EMPHYSEMA & ASTHMA

EMERGENCY AND FIRST AID PROCEDURES:

EYES: FLUSH WITH WATER. IF IRRITATION CONTINUES OBTAIN MEDICAL ATTENTION

DUST INHALATION: REMOVE TO FRESH AIR

SKIN: WASH WITH WATER

INGESTION: IF PATIENT IS CONSCIOUS, INDUCE VOMITING. OBTAIN MEDICAL ATTENTION

SECTION VII
SPILL OR LEAKAGE PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
SWEEP OR VACUUM MATERIAL INTO APPROPRIATE WASTE CONTAINER FOR DISPOSAL. AVOID DUSTING CONDITIONS

WASTE DISPOSAL METHOD: THIS MATERIAL CAN BE DISPOSED OF IN ACCORDANCE WITH PROCEDURES ACCEPTABLE UNDER FEDERAL, STATE, AND LOCAL REGULATIONS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: KEEP CONTAINER CLOSED. STORE IN COOL DRY PLACE. AVOID GENERATING DUST.

SECTION VIII
CONTROL MEASURES

RESPIRATORY PROTECTION: MASK NIOSH/OSHA APPROVED FOR DUST

VENTILATION: TO MEET TLV REQUIREMENTS

EYES: SAFETY GLASSES OR GOGGLES

OTHER PROTECTIVE EQUIPMENT: GLOVES OR PROTECTIVE CLOTHING NOT USUALLY NECESSARY BUT MAY BE DESIRABLE IN SPECIFIC WORK SITUATIONS.

SECTION IX
REFERENCES

U.S. DEPARTMENT OF LABOR - OSHA FORM APPROVED OMB NO. 1218-0072 OSHA HAZARD COMMUNICATION STANDARD-29 CFR 1910. 1200 U.S. GYPSUM CO. & SHEPARD CHEMICAL

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