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MEMORANDUM

TO: Patrick Goddard, Director of Facilities, Town of Lexington
Paul B. Ash, Ph.D., Superintendent, Lexington Public Schools, Estabrook Advisory Committee

FROM: David L. MacIntosh, Sc.D., Principal Scientist
Matt A. Fragala, M.S., C.I.H., Senior Scientist

DATE: November 30, 2010

RE: Air Samples Collected on November 11, 2010, Estabrook Elementary School (EH&E 17228)

This memorandum provides results of the ninth and most recent round of air sampling at Estabrook Elementary School. The objective of the testing was to measure levels of polychlorinated biphenyls (PCBs) in indoor air of classrooms that have been mitigated according to the interim measures planned at this time for the entire school.

The interim measures were completed in Rooms 1, 2, 3, 5, 11, 13, and 19 as of Sunday, November 7, 2010. Air samples were collected in those rooms from approximately 9:00 a.m. – 4:00 p.m. on Thursday November 11, 2010. Details of the interim measures and other aspects of the current indoor environmental quality (IEQ) management plan are available in the Project Update memorandum dated October 28, 2010, and the materials distributed to the Superintendent's Advisory Committee on November 4, 2010. In brief, a mini-wall was constructed in each room to encapsulate the lower panels of the curtain wall and thereby separate them from indoor air of the classroom. In addition, I-beam chases were enclosed and specific areas related to the curtain wall were sealed with new caulk or foam insulation. Areas sealed included edges of the mini-wall, metal-to-metal joints of aluminum framing, and original caulking at the intersection of horizontal and vertical aluminum frames.

Operating conditions during the testing of the Rooms were standard for winter conditions, except that convective heaters in Rooms 1 and 2 were not in use in accordance with the current IEQ management plan. The thermostat in each room was set to 70 degrees Fahrenheit.

As shown in Table 1, the PCB concentrations in indoor air of the Rooms ranged from 12 nanograms per cubic meter (ng m^{-3}) to 128 ng m^{-3}. These PCB concentrations are within the most conservative annual average levels for all ages suggested by the site-specific assessment (230 ng m^{-3}). In addition, these concentrations are well below the public health levels for annual average concentrations suggested by the U.S. Environmental Protection Agency (EPA) for children older than 6 years (300 ng m^{-3}) and adults (450 ng m^{-3}). Rooms 2, 11, 13, and 19 were less than the EPA's suggested annual average levels for children less than 6 years old (100 ng m^{-3}).

Two additional rounds of testing were conducted at the School on November 20 and 24, 2010. These samples are currently being analyzed with results due to arrive on December 9 and 13, 2010 respectively.

Table 1 Air Sample Results for Total Polychlorinated Biphenyls, Estabrook Elementary School, 117 Grove Street, Lexington, Massachusetts, July 22, 2010 – November 11, 2010*

Sample Location	Total PCBs (ng m^3)								
	Round 1[a]	Round 2[b]	Round 3[c]	Round 4[d]	Round 5[e]	Round 6[f]	Round 7[g]	Round 8[h]	Round 9[i]
Room 1	299	426	118‡	63‡	76‡	153†	145	–	116
Room 2	–	775	455	189	166	253†	53	–	60
Room 3	–	–	–	–	–	364†	111	–	110
Room 4	–	–	–	–	–	344†	126	105	–
Room 5	459	736	320	196	149	209†	67 – 90	–	128
Room 6	1,800	764	483	171	213	383†	182	118 – 144	–
Room 7A	–	–	5.19	–	–	–	–	–	–
Room 11	–	–	–	–	–	–	–	–	65
Room 13	319	340	184	155†	–	–	–	–	89 – 94
Room 19	–	–	–	–	–	–	–	–	12
Room 21A	–	–	410	193	–	–	–	–	–
Room 24	680	601	226	173†	–	–	–	–	–
Room 26	–	–	–	79	–	–	–	–	–
Room 31A	562	575	444	–	–	282	–	–	–
Room 39B	–	419	–	–	–	–	–	–	–
Room 39C	342	495	245	100	–	–	–	–	–
Library	–	469	196	–	–	–	–	–	–
Art Room	–	–	194	–	–	–	–	–	–
Teacher Work Room	–	–	138	–	–	–	–	–	–
Basement	–	–	227	–	–	–	–	–	–
Ceiling plenum (39C)	–	–	562	–	–	–	–	–	–
Psychologist Office	–	–	–	–	–	253	–	–	–
Outdoors	<3.79	<5.00	<4.20	<4.46	<4.32	<4.44	<5.54	<4.58	<4.60

Table 1 Continued

PCB polychlorinated biphenyl
ng m^3 nanograms per cubic meter
– air sample not collected at that location

[a] Round 1 samples collected July 22, 2010, during summer conditions.
[b] Round 2 samples collected on August 25, 26 or 27, 2010, following removal of caulk around exterior window frame.
[c] Round 3 samples collected on September 6, 2010, following initial optimization of outdoor air delivery and central exhaust, unless otherwise noted.
[d] Round 4 samples collected on September 19, 2010 under optimization of outdoor air delivery and central exhaust, and indoor caulk encapsulation, unless otherwise noted.
[e] Round 5 samples collected on September 27, 2010 under optimization of outdoor air delivery and central exhaust, partial indoor caulk encapsulation, and isolation of ceiling tiles.
[f] Round 6 samples collected on September 29, 2010 under reduced outdoor air delivery, central exhaust, full indoor caulk encapsulation, and isolation of ceiling tiles.
[g] Round 7 samples collected on October 18 and 19, 2010 under isolation, encapsulation and air cleaner configurations.
[h] Round 8 samples collected on November 4, 2010 under winter outdoor air delivery, mini-wall, and full indoor caulk encapsulation.
[i] Round 9 samples collected on November 11, 2010 under winter outdoor air delivery, mini-wall, and full indoor caulk encapsulation.

† Samples collected under minimum outdoor air delivery.
‡ Sample collected with supplemental air outdoor air (1200 CFM).

* PCB concentration analysis performed by Alpha Analytical Inc., using U.S. Environmental Protection Agency (EPA) Method 10A (GC/MS-SIM).

A graphical summary of the PCB concentration measured in indoor air of the school between July 22 and November 11, 2010, is provided in Figure 1. Indoor air PCB levels measured during Round 9 were approximately 7-fold lower than in Round 1. Similarly, a 2-fold decrease in average concentrations has been achieved since winter ventilation conditions began in late September. These observations demonstrate the effectiveness of the mitigation methods employed in the school.

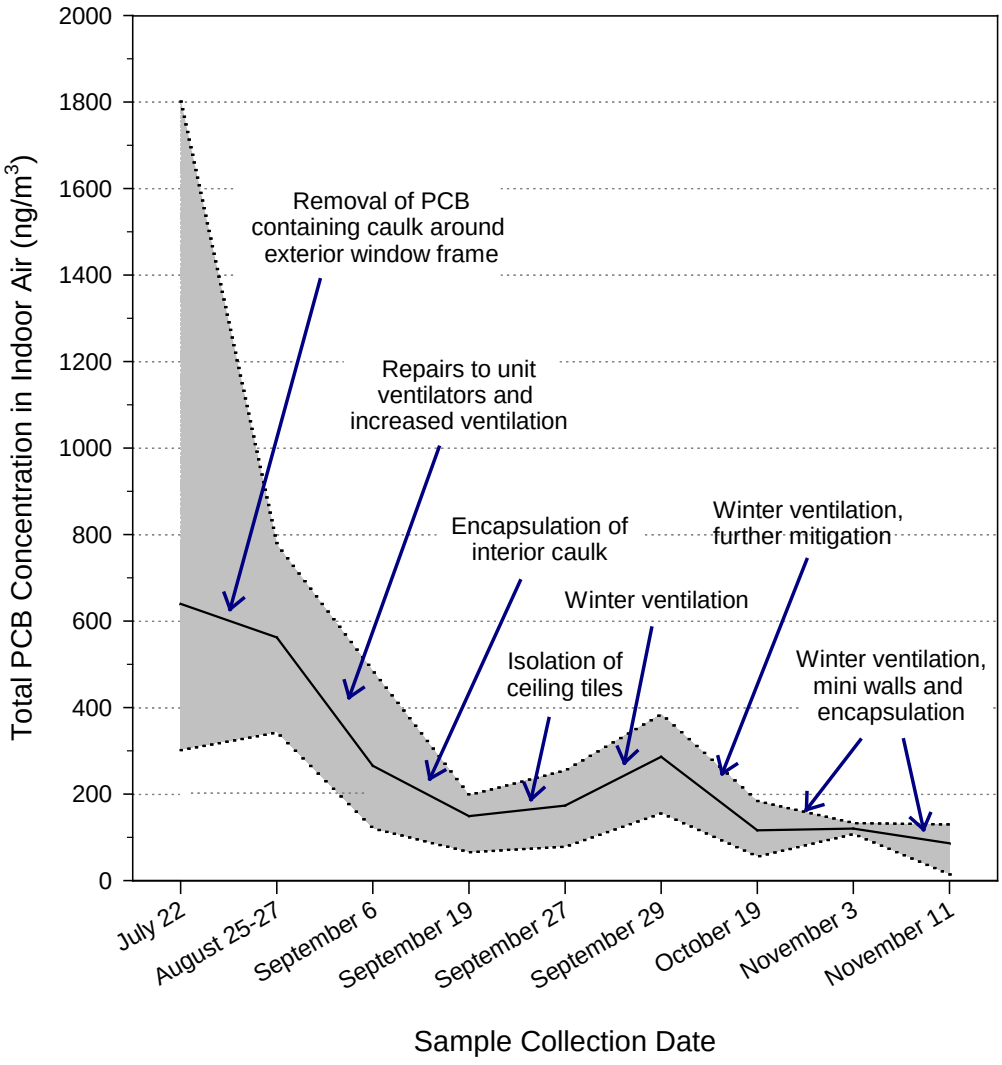

Figure 1 Average (line) and Range (shaded area) of Total PCB Concentration in Indoor Air Over Time

If you have any questions regarding this memorandum please do not hesitate to contact either of us at 1-800-TALK EHE (1-800-825-5343).