



**Project Update
Estabrook Elementary School
Lexington, Massachusetts
September 10, 2010**

Indoor Air

- Levels of polychlorinated biphenyls (PCBs) in indoor air have improved substantially
- Many rooms are now below the public health targets suggested by EPA (Table 1)
- Improvement is a direct result of flushing on September 4-5, 2010 and modifying existing ventilation systems to maximize delivery of outdoor air into the building (Table 2)
- Demonstrates that indoor air levels can be managed through ventilation

Interior

- Identified a primary source and what is likely to be an important secondary source indoors
- Primary source
 - Narrow bead of caulk around interior seams of panels that comprise the window wall (Figure 1)
 - Applied sealant to prevent dermal contact with the primary source
 - Plans in development to characterize emissions to air of sealed caulk
- Secondary source
 - Ceiling tiles in original portions of the building
 - No pathway for direct contact by students and teaching staff
 - Maintenance staff advised to avoid contact
 - Plan for removal of ceiling tiles in development
- Complete list of current results is provided in Table 3

Exterior

- Identified a likely additional primary source on the exterior
 - Narrow bead of caulking along panels that comprise the window wall
 - Plan for sealant or removal in development
- Further characterization of soil
 - Finalizing plan and schedule today
- Erecting a 'snow' fence along drip line of school perimeter to prevent inadvertent entry into work area and for precautionary reasons.

Site-Specific Risk Assessment

- Completed and ready for review
- Used to develop indoor air screening levels for both long-term and short-term occupancy (Table 4)
- Based upon region-specific, school-specific, and updated dietary inputs (Tables 5 and 6)

Table 1 Air Sample Results for Polychlorinated Biphenyls as Homologs, Estabrook Elementary School, 117 Grove Street, Lexington, Massachusetts, July 22, 2010 – September 6, 2010*

Sample Location	Total PCBs (ng/m ³)		
	Round 1 ^a	Round 2 ^b	Round 3 ^c
Room 1	299	426	118
Room 2	–	775	455
Room 5	459	736	320
Room 6	1,800	764	483
Room 7A	–	–	5.19
Room 13	319	340	184
Room 21A	–	–	410
Room 24	680	601	226
Room 31A	562	575	444
Room 39B	–	419	–
Room 39C	342	495	245
Library	–	469	196
Art Room	–	–	194
Teacher Work Room	–	–	138
Basement	–	–	227
Ceiling plenum (39C)	–	–	562
Outdoors	<3.79	<5.00	<4.20

PCB polychlorinated biphenyl

ng/m³ nanograms per cubic meter

– air sample not collected at that location

^a Round 1 samples collected July 22, 2010

^b Round 2 samples collected on August 25, 26 or 27, 2010

^c Round 3 samples collected on September 6, 2010

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

Table 2 Outdoor Air Ventilation (cubic feet per minute) Measured in Rooms with Unit Ventilators at Estabrook Elementary School, 117 Grove Street, Lexington, Massachusetts, September 5, 2010

Location	Ventilation Rate ^a (cfm)
Room 1	540 ^b
Room 2	390 ^c
Room 3	580
Room 5	690
Room 6	<100 ^c
Room 11	480
Room 13	890
Room 19	900
Room 21A	440
Room 22	540
Room 23	— ^c
Room 24	520
Room 25	620
Room 26	100 ^c
Room 31A	— ^d
Room 31B	190
Room 39C	460
Teacher's Work Room	520
Library	2,190

cfm cubic feet per minute

- ^a Operating at full outdoor air delivery unless noted otherwise
- ^b Temporary, supplemental outside air delivery in room (1,200 cfm)
- ^c Unit not fully operational
- ^d Unit not operational at all times; 600 cfm when operating



Figure 1 Primary Source Caulking on Interior Panel within Window Frame

Table 3 Bulk Sample Results for Polychlorinated Biphenyls from Estabrook School, Lexington, Massachusetts, September 2, 2010

Building Material	Description	Total PCBs ¹ (ppm _w)
Ceiling Tile	Room 39C, standard new ceiling tile	4.5
	Room 39C, shiny new yellow fiberglass back ceiling tile	8.9
	Room 6, white tile, smooth new face/coating	14.3
	Room 6, white tile, standard new face/coating	18.3
		78
		122
	Room 39C, old ceiling tile	(duplicate)
	Room 6, white tile, shiny new face/coating	141
Cove Base		530
		970
	Room 6, white tile, old face/coating	(duplicate)
Caulking	Room 6, green cove base under windows	160
	Room 6, green cove base with mastic	170
	Room 36B, green cove with black mastic	140
Insulation	Hallway, interior caulk adjacent to exit, outside room 19	450
	Room 39B, interior caulk joint, adjacent panel to ventilator	1,830
	Room 6, interior caulk joint	29,400
	Room 39C, fiberglass insulation	BRL <4.3
	Room 6, insulation paper with clear adhesive	6.1

PCB polychlorinated biphenyl
ppm_w parts per million by weight

¹ PCB concentration analysis performed by Groundwater Analytical, Inc., using U.S. Environmental Protection Agency (EPA) method 8082 (GC/ECD). Aroclor 1016, 1221, 1232, 1242, 1248, 1254 and 1260 tested.

Table 4 Comparison of EPA Risk Guidance Values and Site-Specific Risk Guidance Values for Estabrook Elementary School, 117 Grove Street, Lexington, Massachusetts

Exposure Scenario	Benchmarks	Units	EPA			Estabrook Elementary			
			Pre-school (3 to <6)	Elementary (6 to <12)	Staff (Adult)	Pre-school (3 to <6)	Pre-school with Extended Day Program (3 to <6)	Elementary (6 to <12)	Staff (Adult)
Background	School + Background	ng/kg-day	12.3	5.8	3.3	8.9	8.9	5.7	3.7
Reference Level	EPA RfD for Arochlor 1254	ng/kg-day	20	20	20	20	20	20	20
Long-term ¹	Target PCB in School Indoor Air	ng/m³	114	303	453	151	107	282	422
Short-term ²	Target PCB in School Indoor Air	ng/m³	423	1,126	2,538	764	369	946	2,240

EPA U.S. Environmental Protection Agency
RfD reference dose
PCB polychlorinated biphenyl
ng/kg-day nanograms per kilogram per day
ng/m³ nanograms per cubic meter

¹ Long-term exposure scenario assumes entire school year

² Short-term exposure scenario assumes 20 days of exposure at maximum PCB concentrations and remainder of school year at levels below EPA guidance values

Table 5 Summary of Selected Inputs to Screening Level Calculations

Parameter	Unit	EPA Default Values			Estabrook School Specific Values				EPA Assumptions	Estabrook School Assumptions
		Pre-school (3 to <6)	Elementary (6 to <12)	Staff (Adult)	Pre-school (3 to <6)	Pre-school with Lextended Day Program (3 to <6)	Elementary (6 to <12)	Staff (Adult)		
C _{air-indoor}	ng/m ³	6.9			10				Mean total PCB concentration (sum of PCBs containing 3 to 7 chlorines) in air from 10 homes in Toronto, Canada was 6.9 ng/m ³ (range = 1.1 to 14.4 ng/m ³ ; 95th percentile = 14.2 ng/m ³)(Harrad et al., 2009).	Geometric mean total PCB concentration (sum of 65 congeners) in outdoor air samples (n=16) collected from homes in Dartmouth and New Bedford Downtown, MA was 10 ng/m ³ ; range was 5.2 to 51 ng/m ³ (Vorhees et al., 1997).
C _{air-outdoor}	ng/m ³	0.5			0.6				Harrad et al. (2009) estimated the average total PCBs in outdoor air in Toronto, Canada to be 0.51 ng/m3 (range = 0.1 to 1.4 ng/m3; 95th percentile = 1.2 ng/m3).	Geometric mean total PCB concentration (sum of 65 congeners) in outdoor air samples (n=20) collected from homes in Dartmouth and New Bedford Downtown, MA was 0.6 ng/m ³ ; range was 0.1 to 8.2 ng/m ³ (Vorhees et al., 1997).
C _{dust}	µg/g	0.22			0.69				Mean total PCB concentration (sum of PCBs containing 3 to 7 chlorines) in dust samples collected from 20 homes in Austin, TX was 0.22 ug/g; range was 0.047 to 0.62 ug/g and 95th percentile value was 0.52 ug/g (Harrad et al., 2009). The profile indicated that PCBs 1254, 1260, and 1242 dominated.	Geometric mean total PCB concentration (sum of 65 congeners) in dust samples (n=15) collected from homes in Dartmouth and New Bedford Downtown, MA was 0.69 ug/g; range was 0.26 to 3.6 ug/g and median value was 0.71 ug/g (Vorhees et al., 1999).
C _{soil}	µg/g	0.05			0.06				Urban background concentration of PCBs in soils (0.05 ug/g) based on samples collected from parks in Helsinki, Finland (concentration in Tampere, Finland parks was 0.025 ug/g)(Priha et al., 2005). Data for U.S. background concentrations are limited.	Geometric mean total PCB concentration (sum of 65 congeners) in yard soil samples (n=16) collected from homes in Dartmouth and New Bedford Downtown, MA was 0.06 ug/g; range was 0.015 to 0.29 ug/g and median value was 0.062 ug/g (Vorhees et al., 1999).
Diet	µg/kg-day	8.0E-03	3.0E-03	2.0E-03	1.9E-03	1.9E-03	1.2E-03	1.7E-03	Based on FDA total diet study for foods collected in 1997 in ATSDR (2000).	Calculated based on FDA total diet study for food collected in 2003.
School Days	days/yr	180	180	185	182	182	182	184	The assumed exposure duration for children ages 3 to <19 is 180 days/year; 185 days/year is assumed for teachers/staff and daycare children; upper range may be 208 days/years for staff and daycare. Based on NCES (2009) data for 2006, the minimum number of days in school as required by States having such requirements, ranges from 160 to 187 days/year, with 180 days/year being the most common requirement (30 of 44 States). It is reasonable to assume that some schools run summer camp programs and the days spent at school for some children and staff may be as high as 240 days (180 + 60 days of summer camp). Mean total time in school (ETst) was assumed to be 6.5 hours/day for school age children and pre-school age (3 to <6 years) and 8 hours/day for adults and daycare toddlers (ages 1 to <3 years). Times spent attending school full-time from U.S. EPA (2008; Table 16-16) are 6.4, 6.1, 6.5, 6.7, and 5.8 hours/day for children ages 2 to <3, 3 to <6, 6 to <11, 11 to <16, and 16 to <21 years, respectively. Upper percentile (95th) values for these age groups of children are 10.5, 9.7, 8.3, 8.1, and 8.7 hours/day, respectively. The assumption of 6.5 hours/day appears to be supported by data provided by NCES (2009) for the minimum required length of hours/year in school by state. Among the states with such requirement, the highest is 1,137 hours/year or 6.3 hours/day, assuming 180 days/year in school (average for all states is a minimum time in school of 5.5 hours/day, assuming 180 days/year).	Based on survey conducted at Estabrook School.
School Hours	hr/day	6.5	6.5	8	7	10.1	7	8.5		
Indoor at school	hr/day	6	6	8	6.5	9.4	6.5	8.5		
Outdoor at school	hr/day	0.5	0.5	0	0.5	0.7	0.5	0	Estimated as the sum of indoor (Etsi) and outdoor time (Etso) at school.	

EPA

C

ng/m³

µg/g

µg/kg-day

U.S. Environmental Protection Agency

concentration

nanograms per cubic meter

micrograms per gram

micrograms per kilogram per day



Table 6 FDA Total Diet Study 2003—PCB Concentration in Each Food

Food No.	Food Description	PCB Concentration (ppm)			
		Study Period 1	Study Period 2	Study Period 3	Study Period 4
1	Milk, whole, fluid	<DL	<DL	<DL	<DL
2	Milk, lowfat (2%), fluid	<DL	<DL	<DL	<DL
3	Milk, chocolate, lowfat, fluid	<DL	<DL	<DL	<DL
4	Milk, skim, fluid	<DL	<DL	<DL	<DL
7	Milk shake, chocolate, fast-food	<DL	<DL	<DL	<DL
10	Cheese, American, processed	<DL	<DL	<DL	<DL
12	Cheese, cheddar, natural (sharp/mild)	<DL	<DL	<DL	<DL
13	Beef, ground, regular, pan-cooked	<DL	<DL	<DL	<DL
14	Beef roast, chuck, oven-roasted	<DL	<DL	<DL	<DL
17	Ham, cured (not canned), baked	<DL	<DL	<DL	<DL
18	Pork chop, pan-cooked w/ oil	<DL	<DL	<DL	<DL
19	Pork sausage (link/patty), oven-cooked	<DL	<DL	<DL	<DL
20	Pork bacon, oven-cooked	<DL	<DL	<DL	<DL
21	Pork roast, loin, oven-roasted	<DL	<DL	<DL	<DL
22	Lamb chop, pan-cooked w/ oil	<DL	<DL	<DL	<DL
26	Turkey breast, oven-roasted	<DL	<DL	<DL	<DL
27	Liver (beef/calf), pan-cooked w/ oil	<DL	<DL	<DL	<DL
28	Frankfurter (beef/pork), boiled	<DL	<DL	<DL	<DL
29	Bologna (beef/pork)	<DL	<DL	<DL	<DL
30	Salami, luncheon-meat type (not hard)	<DL	<DL	<DL	<DL
34	Fish sticks or patty, frozen, oven-cooked	<DL	<DL	<DL	<DL
35	Eggs, scrambled w/ oil	<DL	<DL	<DL	<DL
37	Eggs, boiled	<DL	<DL	<DL	<DL
38	Pinto beans, dry, boiled	<DL	<DL	<DL	<DL
39	Pork and beans, canned	<DL	<DL	<DL	<DL
42	Lima beans, immature, frozen, boiled	<DL	<DL	<DL	<DL
46	Peas, green, frozen, boiled	<DL	<DL	<DL	<DL
47	Peanut butter, creamy	<DL	<DL	<DL	<DL
48	Peanuts, dry roasted, salted	<DL	<DL	<DL	<DL
50	Rice, white, enriched, cooked	<DL	<DL	<DL	<DL
51	Oatmeal, plain, cooked	<DL	<DL	<DL	<DL
52	Cream of wheat (farina), enriched, cooked	<DL	<DL	<DL	<DL
53	Corn/hominy grits, enriched, cooked	<DL	<DL	<DL	<DL
54	Corn, fresh/frozen, boiled	<DL	<DL	<DL	<DL
55	Corn, canned	<DL	<DL	<DL	<DL
58	Bread, white, enriched	<DL	<DL	<DL	<DL

Table 6 Continued

Food No.	Food Description	PCB Concentration (ppm)			
		Study Period 1	Study Period 2	Study Period 3	Study Period 4
60	Cornbread, homemade	<DL	<DL	<DL	<DL
61	Biscuits, refrigerated-type, baked	<DL	<DL	<DL	<DL
62	Bread, whole wheat	<DL	<DL	<DL	<DL
63	Tortilla, flour	<DL	<DL	<DL	<DL
64	Bread, rye	<DL	<DL	<DL	<DL
65	Muffin, fruit or plain	<DL	<DL	<DL	<DL
66	Crackers, saltine	<DL	<DL	<DL	<DL
67	Corn/tortilla chips	<DL	<DL	<DL	<DL
69	Noodles, egg, enriched, boiled	<DL	<DL	<DL	<DL
71	Corn flakes cereal	<DL	<DL	<DL	<DL
72	Fruit-flavored cereal, presweetened	<DL	<DL	<DL	<DL
73	Shredded wheat cereal	<DL	<DL	<DL	<DL
74	Raisin bran cereal	<DL	<DL	<DL	<DL
75	Crisped rice cereal	<DL	<DL	<DL	<DL
76	Granola w/ raisins	<DL	<DL	<DL	<DL
77	Oat ring cereal	<DL	<DL	<DL	<DL
78	Apple (red), raw (w/ peel)	<DL	<DL	<DL	<DL
79	Orange (navel/Valencia), raw	<DL	<DL	<DL	<DL
80	Banana, raw	<DL	<DL	<DL	<DL
81	Watermelon, raw/frozen	<DL	<DL	<DL	<DL
83	Peach, raw/frozen	<DL	<DL	<DL	<DL
84	Applesauce, bottled	<DL	<DL	<DL	<DL
85	Pear, raw (w/ peel)	<DL	<DL	<DL	<DL
86	Strawberries, raw/frozen	<DL	<DL	<DL	<DL
87	Fruit cocktail, canned in light syrup	<DL	<DL	<DL	<DL
88	Grapes (red/green), raw	<DL	<DL	<DL	<DL
89	Cantaloupe, raw/frozen	<DL	<DL	<DL	<DL
92	Grapefruit, raw	<DL	<DL	<DL	<DL
93	Pineapple, canned in juice	<DL	<DL	<DL	<DL
95	Raisins	<DL	<DL	<DL	<DL
97	Avocado, raw	<DL	<DL	<DL	<DL
98	Orange juice, frozen conc, reconstituted	<DL	<DL	<DL	<DL
99	Apple juice, bottled	<DL	<DL	<DL	<DL
100	Grapefruit juice, frozen conc, reconstituted	<DL	<DL	<DL	<DL
103	Prune juice, bottled	<DL	<DL	<DL	<DL
105	Lemonade, frozen conc, reconstituted	<DL	<DL	<DL	<DL
107	Spinach, fresh/frozen, boiled	<DL	<DL	<DL	<DL
108	Collards, fresh/frozen, boiled	<DL	<DL	<DL	<DL
109	Lettuce, iceberg, raw	<DL	<DL	<DL	<DL

Table 6 Continued

Food No.	Food Description	PCB Concentration (ppm)			
		Study Period 1	Study Period 2	Study Period 3	Study Period 4
110	Cabbage, fresh, boiled	<DL	<DL	<DL	<DL
113	Broccoli, fresh/frozen, boiled	<DL	<DL	<DL	<DL
114	Celery, raw	<DL	<DL	<DL	<DL
115	Asparagus, fresh/frozen, boiled	<DL	<DL	<DL	<DL
116	Cauliflower, fresh/frozen, boiled	<DL	<DL	<DL	<DL
117	Tomato, raw	<DL	<DL	<DL	<DL
119	Tomato sauce, plain, bottled	<DL	<DL	<DL	<DL
121	Green beans, fresh/frozen, boiled	<DL	<DL	<DL	<DL
122	Green beans, canned	<DL	<DL	<DL	<DL
123	Cucumber, peeled, raw	<DL	<DL	<DL	<DL
124	Summer squash, fresh/frozen, boiled	<DL	<DL	<DL	<DL
125	Pepper, sweet, green, raw	<DL	<DL	<DL	<DL
126	Squash, winter (Hubbard/acorn), fresh/frozen, boiled	<DL	<DL	<DL	<DL
128	Onion, mature, raw	<DL	<DL	<DL	<DL
131	Beets, canned	<DL	<DL	<DL	<DL
136	Potato, boiled (w/out peel)	<DL	<DL	<DL	<DL
137	Potato, baked (w/ peel)	<DL	<DL	<DL	<DL
138	Potato chips	<DL	<DL	<DL	<DL
142	Spaghetti w/ meat sauce, homemade	<DL	<DL	<DL	<DL
145	Chili con carne w/ beans, canned	<DL	<DL	<DL	<DL
146	Macaroni and cheese, prepared from box mix	<DL	<DL	<DL	<DL
147	Quarter-pound hamburger on bun, fast-food	<DL	<DL	<DL	<DL
148	Meatloaf, beef, homemade	<DL	<DL	<DL	<DL
152	Chicken potpie, frozen, heated	<DL	<DL	<DL	<DL
155	Soup, chicken noodle, canned, cond, prep w/ water	<DL	<DL	<DL	<DL
156	Soup, tomato, canned, cond, prep w/water	<DL	<DL	<DL	<DL
157	Soup, vegetable beef, canned, cond, prep w/ water	<DL	<DL	<DL	<DL
161	Dill cucumber pickles	<DL	<DL	<DL	<DL
162	Margarine, regular (salted)	<DL	<DL	<DL	<DL
164	Butter, regular (salted)	<DL	<DL	<DL	<DL
166	Mayonnaise, regular, bottled	<DL	<DL	<DL	<DL
167	Half & half cream	<DL	<DL	<DL	<DL
168	Cream substitute, non-diary, liquid/frozen	<DL	<DL	<DL	<DL

Table 6 Continued

Food No.	Food Description	PCB Concentration (ppm)			
		Study Period 1	Study Period 2	Study Period 3	Study Period 4
169	Sugar, white, granulated	<DL	<DL	<DL	<DL
170	Syrup, pancake	<DL	<DL	<DL	<DL
172	Honey	<DL	<DL	<DL	<DL
173	Tomato catsup	<DL	<DL	<DL	<DL
177	Ice cream, light, vanilla	<DL	<DL	<DL	<DL
178	Cake, chocolate w/ icing	<DL	<DL	<DL	<DL
182	Sweet roll/Danish pastry	<DL	<DL	<DL	<DL
183	Chocolate chip cookies	<DL	<DL	<DL	<DL
184	Sandwich cookies w/ crème filling	<DL	<DL	<DL	<DL
185	Apple pie, fresh/frozen	<DL	<DL	<DL	<DL
186	Pumpkin pie, fresh/frozen	<DL	<DL	<DL	<DL
187	Candy bar, milk chocolate, plain	<DL	<DL	<DL	<DL
190	Gelatin dessert, any flavor	<DL	<DL	<DL	<DL
191	Carbonated beverage, cola, regular	<DL	<DL	<DL	<DL
193	Fruit drink, from powder	<DL	<DL	<DL	<DL
194	Carbonated beverage, cola, low-calorie	<DL	<DL	<DL	<DL
197	Tea, from tea bag	<DL	<DL	<DL	<DL
198	Beer	<DL	<DL	<DL	<DL
199	Wine, dry table, red/ white	<DL	<DL	<DL	<DL
202	Infant formula, milk-based, high iron, RTF	<DL	<DL	<DL	<DL
203	Infant formula, milk-based, low iron, RTF	<DL	<DL	<DL	<DL
205	BF, beef and broth/gravy	<DL	<DL	<DL	<DL
207	BF, chicken and broth/gravy	<DL	<DL	<DL	<DL
211	BF, vegetables and beef	<DL	<DL	<DL	<DL
212	BF, vegetables and chicken	<DL	<DL	<DL	<DL
213	BF, vegetables and ham	<DL	<DL	<DL	<DL
214	BF, chicken noodle dinner	<DL	<DL	<DL	<DL
215	BF, macaroni, tomato and beef	<DL	<DL	<DL	<DL
216	BF, turkey and rice	<DL	<DL	<DL	<DL
218	BF, carrots	<DL	<DL	<DL	<DL
219	BF, green beans	<DL	<DL	<DL	<DL
220	BF, mixed vegetables	<DL	<DL	<DL	<DL
221	BF, sweet potatoes	<DL	<DL	<DL	<DL
223	BF, peas	<DL	<DL	<DL	<DL
225	BF, applesauce	<DL	<DL	<DL	<DL
226	BF, peaches	<DL	<DL	<DL	<DL
227	BF, pears	<DL	<DL	<DL	<DL
230	BF, juice, apple	<DL	<DL	<DL	<DL
231	BF, juice, orange	<DL	<DL	<DL	<DL

Table 6 Continued

Food No.	Food Description	PCB Concentration (ppm)			
		Study Period 1	Study Period 2	Study Period 3	Study Period 4
232	BF, vanilla custard/pudding	<DL	<DL	<DL	<DL
233	BF, fruit dessert/pudding	<DL	<DL	<DL	<DL
235	Yogurt, lowfat, fruit-flavored	<DL	<DL	<DL	<DL
236	Cheese, Swiss, natural	<DL	<DL	<DL	<DL
237	Cream cheese	<DL	<DL	<DL	<DL
239	Luncheon meat (ham)	<DL	<DL	<DL	<DL
240	Chicken breast, oven-roasted (skin removed)	<DL	<DL	<DL	<DL
241	Chicken nuggets, fast-food	<DL	<DL	<DL	<DL
244	Shrimp, boiled	<DL	<DL	<DL	<DL
248	Bread, cracked wheat	<DL	<DL	<DL	<DL
249	Bagel, plain, toasted	<DL	<DL	<DL	<DL
250	English muffin, plain, toasted	<DL	<DL	<DL	<DL
251	Crackers, graham	<DL	<DL	<DL	<DL
252	Crackers, butter-type	<DL	<DL	<DL	<DL
254	Peach, canned in light/medium syrup	<DL	<DL	<DL	<DL
255	Pear, canned in light syrup	<DL	<DL	<DL	<DL
256	Pineapple juice, frozen conc, reconstituted	<DL	<DL	<DL	<DL
257	Grape juice, frozen conc, reconstituted	<DL	<DL	<DL	<DL
258	Potato, french-fried, fast-food	<DL	<DL	<DL	<DL
259	Carrot, fresh, peeled, boiled	<DL	<DL	<DL	<DL
261	Tomato juice, bottled	<DL	<DL	<DL	<DL
263	Brussels sprouts, fresh/frozen, boiled	<DL	<DL	<DL	<DL
264	Mushrooms, raw	<DL	<DL	<DL	<DL
265	Eggplant, fresh, peeled, boiled	<DL	<DL	<DL	<DL
266	Turnip, fresh/frozen, boiled	<DL	<DL	<DL	<DL
267	Okra, fresh/frozen, boiled	<DL	<DL	<DL	<DL
268	Mixed vegetables, frozen, boiled	<DL	<DL	<DL	<DL
269	Beef stroganoff w/ noodles, homemade	<DL	<DL	<DL	<DL
272	Tuna noodle casserole, homemade	<DL	<DL	<DL	<DL
275	Quarter-pound cheeseburger on bun, fast-food	<DL	<DL	<DL	<DL
276	Fish sandwich on bun, fast-food	<DL	<DL	<DL	<DL
278	Egg, cheese, and ham on English muffin, fast-food	<DL	<DL	<DL	<DL
279	Taco/tostada w/ beef and cheese, from Mexican carry-out	<DL	<DL	<DL	<DL

Table 6 Continued

Food No.	Food Description	PCB Concentration (ppm)			
		Study Period 1	Study Period 2	Study Period 3	Study Period 4
281	Pizza, cheese and pepperoni, regular crust, from pizza carry-out	<DL	<DL	<DL	<DL
283	Soup, bean w/ bacon/pork, canned, cond, prep w/ water	<DL	<DL	<DL	<DL
285	Clam chowder, New England, canned, cond, prep w/ whl milk	<DL	<DL	<DL	<DL
286	Ice cream, regular, vanilla	<DL	<DL	<DL	<DL
287	Sherbet, fruit-flavored	<DL	<DL	<DL	<DL
288	Popsicle, fruit-flavored	<DL	<DL	<DL	<DL
290	Doughnut, cake-type, any flavor	<DL	<DL	<DL	<DL
291	Brownie	<DL	<DL	<DL	<DL
292	Sugar cookies	<DL	<DL	<DL	<DL
293	Candy, hard, any flavor	<DL	<DL	<DL	<DL
294	Pretzels, hard, salted	<DL	<DL	<DL	<DL
295	Syrup, chocolate	<DL	<DL	<DL	<DL
296	Jelly, any flavor	<DL	<DL	<DL	<DL
298	Yellow mustard	<DL	<DL	<DL	<DL
299	Black olives	<DL	<DL	<DL	<DL
300	Sour cream	<DL	<DL	<DL	<DL
305	Coffee, from ground	<DL	<DL	<DL	<DL
306	Carbonated beverage, fruit-flavored, reg	<DL	<DL	<DL	<DL
307	Fruit drink (10% juice), canned or bottled	<DL	<DL	<DL	<DL
309	Infant formula, soy-based, RTF	<DL	<DL	<DL	<DL
313	BF, bananas	<DL	<DL	<DL	<DL
317	BF, teething biscuits	<DL	<DL	<DL	<DL
318	Salmon, steaks/fillets, baked	0.038	0.016	0.022	0.045
320	BF, squash	<DL	<DL	<DL	<DL
323	BF, cereal, oatmeal, dry, prep w/ water	<DL	<DL	<DL	<DL
324	BF, cereal, rice, dry, prep w/ water	<DL	<DL	<DL	<DL
325	BF, cereal, rice w/apples, dry, prep w/ water	<DL	<DL	<DL	<DL
326	BF, veal and broth/gravy	<DL	<DL	<DL	<DL
327	BF, lamb and broth/gravy	<DL	<DL	<DL	<DL
328	BF, turkey and broth/gravy	<DL	<DL	<DL	<DL
331	Meal replacement, liquid RTD, any flavor	<DL	<DL	<DL	<DL
332	Cottage cheese, creamed, lowfat (2% milk fat)	<DL	<DL	<DL	<DL
333	Sour cream dip, any flavor	<DL	<DL	<DL	<DL

Table 6 Continued

Food No.	Food Description	PCB Concentration (ppm)			
		Study Period 1	Study Period 2	Study Period 3	Study Period 4
334	Beef steak, loin/sirloin, broiled	<DL	<DL	<DL	<DL
335	Luncheon meat (chicken/turkey)	<DL	<DL	<DL	<DL
336	Chicken breast, fried, fast-food (w/ skin)	<DL	<DL	<DL	<DL
337	Chicken thigh, oven-roasted (skin removed)	<DL	<DL	<DL	<DL
338	Chicken leg, fried, fast-food (w/ skin)	<DL	<DL	<DL	<DL
339	Catfish, pan-cooked w/ oil	<DL	0.017	<DL	<DL
340	Tuna, canned in water, drained	<DL	<DL	<DL	<DL
341	Refried beans, canned	<DL	<DL	<DL	<DL
342	White beans, dry, boiled	<DL	<DL	<DL	<DL
343	Sunflower seeds (shelled), roasted, salted	<DL	<DL	<DL	<DL
344	Pancakes, frozen, heated	<DL	<DL	<DL	<DL
345	Breakfast tart/toaster pastry	<DL	<DL	<DL	<DL
346	Macaroni salad, from grocery/deli	<DL	<DL	<DL	<DL
347	Spaghetti, enriched, boiled	<DL	<DL	<DL	<DL
348	Apricots, canned in heavy/light syrup	<DL	<DL	<DL	<DL
350	Fruit juice blend (100% juice), canned/bottled	<DL	<DL	<DL	<DL
351	Cranberry juice cocktail, canned/bottled	<DL	<DL	<DL	<DL
352	Orange juice, bottled/carton	<DL	<DL	<DL	<DL
353	Potato salad, mayonnaise-type, from grocery/deli	<DL	<DL	<DL	<DL
354	Potato, mashed, prepared from fresh	<DL	<DL	<DL	<DL
355	Coleslaw, mayonnaise-type, from grocery/deli	<DL	<DL	<DL	<DL
356	Carrot, baby, raw	<DL	<DL	<DL	<DL
357	Lettuce, leaf, raw	<DL	<DL	<DL	<DL
358	Sweet potatoes, canned	<DL	<DL	<DL	<DL
359	Tomato salsa, bottled	<DL	<DL	<DL	<DL
360	Beef and vegetable stew, canned	<DL	<DL	<DL	<DL
361	Lasagna w/ meat, frozen, heated	<DL	<DL	<DL	<DL
362	Beef w/ vegetables in sauce, from Chinese carry-out	<DL	<DL	<DL	<DL
363	Chicken w/ vegetables in sauce, from Chinese carry-out	<DL	<DL	<DL	<DL

Table 6 Continued

Food No.	Food Description	PCB Concentration (ppm)			
		Study Period 1	Study Period 2	Study Period 3	Study Period 4
364	Fried rice, meatless, from Chinese carry-out	<DL	<DL	<DL	<DL
365	Burrito w/ beef, beans and cheese, from Mexican carry-out	<DL	<DL	<DL	<DL
366	Chicken filet (broiled) sandwich on bun, fast-food	<DL	<DL	<DL	<DL
367	Soup, Oriental noodles (ramen noodles), prep w/ water	<DL	<DL	<DL	<DL
368	Pudding, ready-to-eat, flavor other than chocolate	<DL	<DL	<DL	<DL
369	Cake, yellow w/ icing	<DL	<DL	<DL	<DL
370	Granola bar, w/ raisins	<DL	<DL	<DL	<DL
371	Candy bar, chocolate, nougat, and nuts	<DL	<DL	<DL	<DL
372	Popcorn, microwave, butter-flavored	<DL	<DL	<DL	<DL
373	Sweet & sour sauce	<DL	<DL	<DL	<DL
374	Brown gravy, canned or bottled	<DL	<DL	<DL	<DL
375	Salad dressing, creamy/buttermilk type, regular	<DL	<DL	<DL	<DL
376	Salad dressing, creamy/buttermilk type, low-calorie	<DL	<DL	<DL	<DL
377	Salad dressing, Italian, regular	<DL	<DL	<DL	<DL
378	Olive oil	<DL	<DL	<DL	<DL
379	Vegetable oil	<DL	<DL	<DL	<DL
380	Bottled drinking water (mineral/spring), not carbonated or flavored	<DL	<DL	<DL	<DL
381	Decaffeinated coffee, from ground	<DL	<DL	<DL	<DL
382	Decaffeinated tea, from tea bag	<DL	<DL	<DL	<DL
700	BF, cereal, barley, dry, prep w/ water	<DL	<DL	<DL	<DL
701	BF, cereal, mixed, dry, prep w/ water	<DL	<DL	<DL	<DL
703	BF, juice, apple-banana	<DL	<DL	<DL	<DL
704	BF, juice, apple-cherry	<DL	<DL	<DL	<DL
705	BF, juice, apple-grape	<DL	<DL	<DL	<DL
710	BF, juice, mixed fruit	<DL	<DL	<DL	<DL
711	BF, juice, pear	<DL	<DL	<DL	<DL
712	BF, juice, grape	<DL	<DL	<DL	<DL
713	BF, pears and pineapple	<DL	<DL	<DL	<DL
714	BF, plums w/ apples and/or pears	<DL	<DL	<DL	<DL
715	BF, bananas and pineapple	<DL	<DL	<DL	<DL

Table 6 Continued

Food No.	Food Description	PCB Concentration (ppm)			
		Study Period 1	Study Period 2	Study Period 3	Study Period 4
717	BF, apricots w/ mixed fruit	<DL	<DL	<DL	<DL
719	BF, banana dessert	<DL	<DL	<DL	<DL
720	BF, peach cobbler/dessert	<DL	<DL	<DL	<DL
721	BF, fruit yogurt dessert	<DL	<DL	<DL	<DL
722	BF, dutch apple/apple cobbler	<DL	<DL	<DL	<DL
723	BF, arrowroot cookies	<DL	<DL	<DL	<DL
724	BF, zweiback toast	<DL	<DL	<DL	<DL
725	BF, cereal, oatmeal w/ fruit, prep w/ water	<DL	<DL	<DL	<DL
726	BF, chicken w/ rice	<DL	<DL	<DL	<DL
727	BF, beef and noodles/beef stroganoff	<DL	<DL	<DL	<DL
728	BF, vegetables and turkey	<DL	<DL	<DL	<DL
729	BF, macaroni and cheese	<DL	<DL	<DL	<DL
730	BF, apples with berries	<DL	<DL	<DL	<DL
731	BF, apples w/ fruit other than berries	<DL	<DL	<DL	<DL
FDA	U.S. Food and Drug Administration				
PCB	polychlorinated biphenyl				
ppm	parts per million				
<DL	less than detection limit				

APPENDIX



ENVIRONMENTAL SAMPLING RESULTS

ESTABROOK ELEMENTARY SCHOOL

Last Updated: September 9, 2010

Table 1 Bulk Caulking Sample Results for Polychlorinated Biphenyls from Estabrook Elementary School, 117 Grove Street, Lexington, Massachusetts, June 16 and 17, 2010

Sample ID	Location (Description) ^a	Aroclor 1248 ^{1,2} (ppm _w)	Notes
112207	Map location 1 (grey)	7.2	1C (6.6)
112208	Map location 2 (grey)	9.5	1C (9.3)
112209	Map location 3 (white)	15,000	1C (12,000)
112210	Map location 4 (white)	21,000	1C (17,000)
112211	Map location 5 (white)	16,000	1C (14,000)
112212	Duplicate 112211 (white)	17,000	1C (14,000)
112213	Map location 6 (white)	9,900	1C (8,100)
112214	Map location 7 (black)	4.4	1C (2.9)
112215	Map location 8 (clear)	7.4	2C (6.1)
112216	Map location 9 (grey)	0.36 0.62*	1C (0.29) 1C (0.55)*
112217	Map location 10 (brown)	0.88	1C (0.61)
112218	Map location 11 (white)	190*	2C (170)*
112219	Map location 12 (white)	4,000* 2,000**	2C (3,600) 2C (1,200)**
112220	Map location 13 (grey)	6.8*	2C (5.6)*
112221	Map location 14 (grey)	2.9*	1C (2.6)*
112222	Map location 15 (grey)	1.6	1C (1.5)

^a See Appendix A for sample locations

Table 2 Bulk (Brick) Sample Results for Polychlorinated Biphenyls from Estabrook Elementary School, 117 Grove Street, Lexington, Massachusetts, August 10, 2010			
Sample ID	Description	Aroclor 1248^{1,2} (ppm_w)	Notes
113729	Brick (Map location 3) 1/4 inch	0.53	2C (0.46)
113730	Brick (Map location 3) 1/2 inch	0.08	2C (0.08)
113731	Brick (Map location 6) 1/4 inch	4 p	2C (2)
113732	Brick (Map location 6) 1/2 inch	0.13	2C (0.11)
113733	Duplicate of 113732	0.2	2C (0.17)
<p>ppm_w parts per million by weight</p> <p>¹ PCB concentration analysis performed by Groundwater Analytical, Inc., using U.S. Environmental Protection Agency (EPA) method 8082 (GC/ECD).</p> <p>² Aroclor 1016, 1221, 1232, 1242, 1254, and 1260 also tested. All results below reporting levels, unless noted.</p> <p>1C: Confirmation concentration reported from first column quantification.</p> <p>2C: Confirmation concentration reported from second column quantification.</p> <p>p: Indicates greater than 40% difference between detected concentrations on the two GC columns.</p>			

Table 3 Bulk (Glazing) Sample Results for Polychlorinated Biphenyls from Estabrook Elementary School, 117 Grove Street, Lexington, Massachusetts, August 10, 2010			
Sample ID	Description	Aroclor 1248^{1,2} (ppm_w)	Notes
113725	Gray exterior glazing sealant	0.89*	2C (0.78)
113726	White glazing sealant	1.5	1C (1.3)
113727	White glazing sealant	2.6*	2C (2.4)
113728	Black interior glazing sealant	150*	2C (120)
<p>ppm_w parts per million by weight</p> <p>¹ PCB concentration analysis performed by Groundwater Analytical, Inc., using U.S. Environmental Protection Agency (EPA) method 8082 (GC/ECD).</p> <p>² Aroclor 1016, 1221, 1232, 1242, 1254, and 1260 also tested. All results below reporting levels, unless noted.</p> <p>* Aroclor 1254 result</p> <p>1C: Confirmation concentration reported from first column quantification.</p> <p>2C: Confirmation concentration reported from second column quantification.</p>			

Table 4 Bulk (Soil) Sample Results for Polychlorinated Biphenyls from Estabrook Elementary School, 117 Grove Street, Lexington, Massachusetts, August 10, 2010

Sample ID	Description	Aroclor 1254 ^{1,2} (ppm _w)	Notes
113734	Soil (Map Location 3)	7.4	2C (6.3)
113735	Soil (Map Location 4)	0.12	1C (0.1)
113736	Soil (Map Location 5)	0.14	1C (0.13)
113737	Soil (Map Location 6)	0.13	2C (0.11)
113738	Duplicate 113737	0.13	2C (0.12)

ppm_w parts per million by weight

¹ PCB concentration analysis performed by Groundwater Analytical, Inc., using U.S. Environmental Protection Agency (EPA) method 8082 (GC/ECD).

² Aroclor 1016, 1221, 1232, 1242, 1248, and 1260 also tested. All results below reporting levels, unless noted.

1C: Confirmation concentration reported from first column quantification.

2C: Confirmation concentration reported from second column quantification.

Table 5 Bulk Sample Results for Polychlorinated Biphenyls from Estabrook Elementary School, 117 Grove Street, Lexington, Massachusetts, September 2, 2010

Sample ID	Description	Aroclor 1254 ^{1,2} (ppm _w)	Notes
114976	39C, old ceiling tile	32 46 [†]	1C(30) 1C(32)
114977	39C, shiny new yellow fiberglass back ceiling tile	5.1 3.8 [†]	1C(4.7) 1C(3.7)
114978	39C, standard new ceiling tile	4.5	1C(4.3)
114979	Duplicate 114976	30 92 [†]	2C(29) 1C(64)
114980	39C, fiberglass insulation	<4.3 (BRL)	—
114982	36B, green cove with black mastic	140	1C(140)
114985	39B, interior caulk joint, adjacent panel to ventilator	630 1,200 [†]	2C(600) 1C(1,000)
114987	6, white tile, old face/coating	530	2C(520)
114988	6, white tile, shiny new face/coating	76 65 [†]	1C(67) 1C(61)
114989	6, white tile, standard new face/coating	7.3 11 [†]	1C(6.6) 1C(8.6)
114990	6, white tile, smooth new face/coating	5.8 8.5 [†]	1C(4.7) 1C(6.7)
114991	Duplicate 114987	970	1C(940)
114993	6, insulation paper with clear adhesive	6.1	1C(5.5)
114994	6, interior caulk joint	9,400 20,000 [†]	6,900 16,000
114995	6, green cove base with mastic	170	1C(160)
114996	6, green cove base under windows	160	2C(160)
115000	Hallway, interior caulk adjacent to exit, outside room 19	450	1C(390)

ppm_w parts per million by weight

¹ PCB concentration analysis performed by Groundwater Analytical, Inc., using U.S. Environmental Protection Agency (EPA) method 8082 (GC/ECD).

² Aroclor 1016, 1221, 1232, 1242, 1248, and 1260 also tested. All results below reporting levels, unless noted.

[†] Aroclor 1260 result

1C: Confirmation concentration reported from first column quantification.

2C: Confirmation concentration reported from second column quantification.

e: Indicates concentration exceeded calibration range for the analyte.

Table 6 Wipe Sample Results for Polychlorinated Biphenyls from Estabrook Elementary School, 117 Grove Street, Lexington, Massachusetts, September 2, 2010

Sample ID	Description	Aroclor 1248 ^{1,2} (µg/100cm ²)	Notes
114983	Room 39B, oil debris under motor, unit ventilator	21 27 [†]	1C(15) 1C(21)
114984	Room 39B, oil debris under fan	34 120 [†]	1C(27) 2C(81)
114986	Room 6, return duct	38* 55 [†]	1C(33) 1C(46)
114992	Room 6, supply duct	BRL <1	—

µg/100cm² micrograms per 100 square centimeters

¹ PCB concentration analysis performed by Groundwater Analytical, Inc., using U.S. Environmental Protection Agency (EPA) method 8082 (GC/ECD).

² Aroclor 1016, 1221, 1232, 1242, 1254, and 1260 also tested. All results below reporting levels, unless noted.

* Aroclor 1254 tested

† Aroclor 1260 tested

1C: Confirmation concentration reported from first column quantification.

2C: Confirmation concentration reported from second column quantification.

Table 7 Air Sample Results for Polychlorinated Biphenyls as Homologs, Estabrook Elementary School, 117 Grove Street, Lexington, Massachusetts, July 22, 2010 – September 6, 2010*

Sample Location	Total PCBs (ng/m ³)		
	Round 1 ^a	Round 2 ^b	Round 3 ^c
Room 1	299	426	118
Room 2	--	775	455
Room 5	459	736	320
Room 6	1800	764	483
Room 7A	--	--	**
Room 13	319	340	184
Room 21A	--	--	**
Room 24	680	601	226
Room 31A	562	575	444
Room 39B	--	419	**
Room 39C	342	495	245
Library	--	469	196
Art Room	--	--	**
Teacher Work Room	--	--	**
Basement	--	--	**
Ceiling plenum (39C)	--	--	**
Outdoors	<3.79	<5.00	**

^a Round 1 samples collected July 22, 2010

^b Round 2 samples collected on August 25, 26 or 27, 2010

^c Round 3 samples collected on September 6, 2010

ng/m³ nanograms per cubic meter

-- air sample not collected at that location

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

** Results expected September 10, 2010

