

MEMORANDUM

TO: Robert Healy, City Manager

DATE: 5/20/93

FROM: James M. Conry, Executive Director for Management Services

SUBJECT: Report on Longfellow School Air Quality Complaint:

Attached is a response to the request for a report on an air quality complaint at the Longfellow School.

JMC/tg



N93-045

CAMBRIDGE SCHOOL DEPARTMENT

159 THORNDIKE STREET
CAMBRIDGE, MASSACHUSETTS 02141

May 17, 1993

TO THE HONORABLE MEMBERS OF THE SCHOOL COMMITTEE:

Air Quality Status Report - Longfellow School

Please be notified that attached is a report on the actions taken in response to a recent air quality complaint at the Longfellow School. We will continue to monitor the environment in the school for the rest of this year, and plan to remove rugs in two classrooms (007 and 017) this summer.

Respectfully,

for

Mary Lou McGrath
Superintendent of Schools

MLM/cm

To: Mr. J.C.Conry

Date: May 12, 1993

From: Niraj Malik

Sub: Longfellow School
Air Quality

As a result of complaint about Air Quality in the Kindergarten area (Rms 007 and 017) in the Longfellow School, following tests and measures have been taken.

Air samples in the above areas were taken on Feb 26th, March 16th, March 30th and May 11th for testing the carbon dioxide levels. Carbon dioxide levels were found in the acceptable levels in the range of 600 to 875 ppm with a regular class in session. Carbon monoxide levels were tested by Environmental Health and Engineering on 11th May (11.00 am) and 12th of May (8.00 to 9.30 a.m.) and these levels were found to even below 1 ppm.

Acceptable range for carbon dioxide levels is 1000 ppm as per OSHA/ASHREA guidelines and EPA standard for carbon monoxide is not to exceed 9 ppm over a 8 Hour period.

Other measures taken were:

(a) The carpet in two rooms 007 and 017 were shampooed during the first week of May. We plan to remove carpeting in these two areas including a corridor in between Rms 1 and 2 during the summer vacations and replace with the vinyl tile floor.

(b) The dropping and picking up of the kids in the driveway next to the classrooms has been prohibited by the school so that any potential of carbon monoxide fumes can be reduced. Idling of cars has also been prohibited in this area. Two signs shall be posted in this area by this weekend and the driveway main doors are half closed during the school hours.

(c) Air quality of these two rooms shall be monitored regularly at least once a month until the summer vacations.

(d) I have spoken to Ms. Mary Cheever and Mr. Joseph Nicolora of the Inspectional Services department on these matters and have advised them of our corrective actions. I have also advised the parent body and the school principal on all such issues and our commitment to take all appropriate actions as necessary to correct these environmental and safety issues.

A copy of the air sampling reports is attached for your records.

cc: Mary Cheever
Joseph Nicolora
Margarita Alvarez

May 5, 1993

To: Mary Cheever
City of Cambridge
Inspectional Services Department

From: Jim Rita
Cambridge School Department

Re: Air Quality - Longfellow School

As a result of complaints about Air Quality CO 2 measurements were taken:

These measurements were taken with doors and windows closed and ventilation system working. Students were in classroom.

The results were as follows:

February 26, 1993

room - 7 - 24 students 875 ppm
room - 017-19 students 700 ppm

March 16, 1993

room - 7 - 20 students 650 ppm
room - 017- 19 students 675 ppm

March 30, 1993

room - 7 - 6 students 750 ppm
room - 017- 24 students 600 ppm

Measurement of outside air was 325 ppm. These tests were taken between the hours of 9:00 a.m. and 10:30 a.m.

Meter used to take measurements:

Riken Keiki model R-411A portable CO 2 indicator.

City of Cambridge
Longfellow School
MDJ
5/18/93

Cambridge Public Schools
Air Quality Program - CO2 Monitoring Worksheet

DATE:

11 May 93

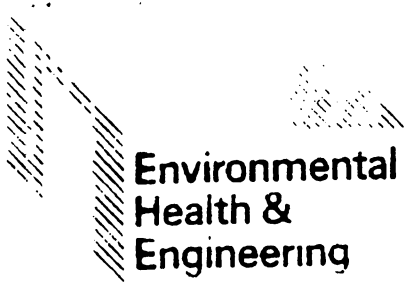
School:

LONG FELLOW

Tested By:

Jim Bick

[illegible]



Environmental Health & Engineering

May 14, 1993

Mr. Niraj Malik
Director of Facilities
Cambridge Public Schools
158 Spring Street
Cambridge, MA 02141

**RE: Indoor Air Quality Investigation Report for the Longfellow School at 359
Broadway in Cambridge, Massachusetts (EH&E #93.129)**

Dear Mr. Malik:

Environmental Health & Engineering, Inc. (EH&E) is pleased to issue our report on the Indoor Air Quality (IAQ) Investigation conducted at the Longfellow School (the "School") located at 359 Broadway in Cambridge, Massachusetts. The report details EH&E's investigation findings at the School and the results of the air tests in the classrooms during the investigation period from Tuesday, May 11, 1993 to Wednesday, May 12, 1993.

SUMMARY

Carbon monoxide was not detected and no combustion gases were sensed in the two basement classrooms facing the rear driveway at the School during EH&E's investigation conducted on May 11 and May 12, 1993. It is likely that the vehicle exhaust fumes reported to have been present in the two classrooms on previous days were the result of exhaust gases being drawn into the outside air intakes for the unit ventilators serving these two classrooms.

Restricting the flow of traffic before and during school hours and ensuring the vehicles' engines are turned off while parked in the driveway should reduce the level of vehicle exhaust gases in the vicinity of the outside air intakes of the classrooms' unit ventilators. Additionally, the classroom windows should remain closed before and during peak traffic hours to reduce the infiltration of outside air into the classroom. Alternatively, charcoal

Environmental Health & Engineering, Inc.
255 Washington Street
Newton, MA 02158-1634
TEL (617) 964-8550 FAX (617) 964-8556

filters to remove the exhaust gases could be installed into the unit ventilators. However, the additional capital and maintenance costs need not be incurred if the flow of traffic in the driveway can be curtailed before and during school hours.

INDOOR AIR QUALITY INVESTIGATION

General Background Information

The investigation was commissioned on the morning of Tuesday, May 11, 1993 by your office in response to the concerns of employees and students' parents regarding the air quality in the two basement classrooms adjacent to the driveway at the rear of the School. An EH&E technician, Bill Matikitis, was immediately dispatched to the school that morning to conduct air tests for carbon monoxide. The tests for carbon monoxide were selected to indicate whether or not vehicle exhaust contaminants were present in the indoor air in the basement kindergarten and first-grade classrooms, #007 and #017, respectively. At your request, Mr. Matikitis, accompanied by David Shore, IAQ Project Coordinator, returned to the school on the morning of Wednesday, May 12, 1993, to conduct additional carbon monoxide measurements in these classrooms.

Longfellow School Site Information

Classrooms #007 and #017 are located in the basement of the School at the rear of the building. The boiler room is also located in the basement between the two classrooms. The classrooms are equipped with ceiling-mounted unit ventilators that provide heated air for the teachers, assistants, and students. These units have their outside air intakes at the rear of the School and facing the driveway. Windows are in place for natural ventilation and supplementary lighting purposes.

The driveway at the rear of the building is used for School employee parking and sections the School's property from the single family residences along Antrim and Fayette Streets behind the building. In the driveway, a fire lane runs the length of the School which restricts parking to the far side of the driveway away from the School.. About 15 vehicles were parallel parked during EH&E's investigation along the far side of the driveway. Unlocked but closed on the days EH&E conducted the investigation, the four foot high swing gates at both ends of the driveway restricted the reported typical flow of traffic from Antrim and Fayette Streets into the driveway.

Information forwarded by the classroom teachers and assistants indicated that the driveway is frequently used by parents transporting their children to and from School as well as by service and delivery persons calling on the School. Upwards of 40 to 50 vehicles were estimated to travel the driveway during the morning hours. Additionally, it was reported that while parents are escorting the children into their classrooms and delivery personnel are in the School, it is common for their vehicle engines to be left operating. This volume of traffic would likely result in a build-up of vehicle exhaust in the immediate vicinity of the driveway. Since the outside air intakes for the two basement classrooms face the driveway, it is probable that the vehicle exhaust is drawn into the outside air intakes of the unit ventilators and transferred into these classrooms.

AIR TESTS FOR CARBON MONOXIDE (CO)

Background

Carbon monoxide is a gaseous by-product of incomplete combustion found in the exhaust of automobiles, boilers, and other combustion processes, including tobacco smoking. This gas is not typically elevated in indoor air, but excessive levels can occur under certain conditions such as entrainment of exhaust from trucks idling at a loading dock, migration of air from parking garages, or leakage of boiler flue gas into a building. High concentrations of CO have been linked to health effects ranging from headache to death.

The potential health effects of measured concentrations of CO depend upon the percentage of carboxyhemoglobin (% COHb) in the blood. The World Health Organization (WHO) recommends a carboxyhemoglobin level of 2.5% - 3% for the protection of the general population, including sensitive groups (WHO 1987). The WHO's air concentration guidelines to protect these levels include: a maximum permitted exposure of 87 ppm for periods less than 15 minutes; and time-weighted average exposures of 50 ppm for 30 minutes, 25 ppm for 1 hour, and 10 ppm for 8 hours.

The Environmental Protection Agency (EPA) National Primary Ambient Air Quality Standard sets outdoor exposure limits for CO at 35 ppm for a one-hour exposure, and at 9 ppm for an eight-hour exposure (EPA 40CFR50 1992). Based on the same EPA standard, American Society of Heating, Refrigerating, and Air Conditioning Engineers

(ASHRAE) provides an IAQ standard for CO of 9 ppm for an eight-hour exposure (ASHRAE 62-1989).

The Final Rule Limit Occupational Permissible Exposure Limit (PEL) for CO set by the Occupational Safety and Health Administration (OSHA), as well as by the American Conference of Governmental Industrial Hygienists (ACGIH 1992) is 35 ppm for an eight-hour time-weighted average (TWA) exposure, never to exceed 200 ppm based on a five minute TWA exposure or 1,500 ppm, based on an instantaneous reading (OSHA 1910.1000, Table Z-1-A). The "immediately dangerous to life or health" (IDLH) concentration, set for respirator selection, is defined by NIOSH to be 1,500 ppm CO and is the concentration at which one could escape within 30 minutes without a respirator and not cause "irreversible health effects" (NIOSH June 1990).

Air Test Methods

Carbon monoxide levels were determined with *Drager* direct reading colorimetric detector devices. The detector tube measurement system consists of a detector tube and a gas detector pump. Each detector tube contains a very sensitive reagent system that relies on a chemical reaction between the air contaminant and the reagent to produce a visual color stain along a calibrated scale marked on the tube. The manually operated gas pump employs a bellows type pump which draws 100 cm³ of air per stroke through the detector tube. An automatic stroke indicator and a pressure controlled end-of-stroke indicator is located on the pump head.

Prior to initiation of and after the sampling period, the pump was checked for leaks and suction capacity. Between measurements, the pump was purged with air by performing several strokes without a tube in place. Prior to departure to the School on May 11, 1993, the tube lot was checked for sensitivity by exposure of a tube to a known standard CO gas concentration of 8.63 ppm.

The detector tubes used for the sampling were *Drager Carbon Monoxide 2/a* (Tube Lot #AREJO141, Expiration Date: December 1995) *Short-Term Tubes*. The standard measuring range for these tubes was from less than 2 ppm to 60 ppm for the sampling volume attained with 10 pump strokes. For this sampling period, the pump stroke count was increased to 20 which reduced the measuring range to 1 ppm to 30 ppm. In the

presence of carbon monoxide, the indicating layer in the detector tube would be expected change in color from white to brown green.

Air Test Results

The results of the carbon monoxide measurements and quality control check are summarized in Table 1.0, which indicates the dates, sample times, locations, concentrations measured in ppm, and general sample location observations.

Table 1.0 Concentrations of CO Measured in Two Basement Classrooms at the Longfellow School in Cambridge, Massachusetts.				
Sampling Location	Sampling Date & Time	Pump Stroke	CO (ppm) ¹	Sampling Location Observations
Classroom #017	5/11/93 11:10 a.m.	20	ND ²	No combustion odors; no haze
Driveway (Ambient)	5/11/93 11:35 a.m.	20	ND	No combustion odors; no haze
Classroom #017	5/12/93 8:25 a.m.	20	ND	No combustion odors; no haze
Classroom #007	5/12/93 8:40 a.m.	20	ND	No combustion odors; no haze
Driveway (Ambient)	5/12/93 9:00 a.m.	20	ND	No combustion odors; no haze
QC Check	5/11/93 10:00 a.m.	20	10-20	8.63 ppm x 2 (17.3 ppm) CO concentration; brown green stain
(1) ppm = parts of vapor or gas per million parts of air by volume at 25°C and 760 mm Hg.				
(2) ND = None detected; no stain visible.				

None of the detector tubes used at the School displayed any visible stain reaction along the calibrated scale marked along the length of the tubes. No observations were made in any of the sample locations that would indicate the presence of any of the compounds known to interfere with the detector tube measurement system. The quality control checks performed at EH&E's offices satisfactorily demonstrated the sensitivity of the detector tube lot as characterized by the length and color of stain. These results indicated that CO was not detected above 1 ppm at any of the locations sampled at the School, and therefore, that CO was well below all currently accepted applicable health and safety guidelines and regulations.

REFERENCES

ACGIH 1992. *Guide to Occupational Exposure Values--1992*. Compiled by the American Conference of Governmental Industrial Hygienists, Cincinnati, OH.

ASHRAE Standard 62-1989. *Ventilation for acceptable indoor air quality*. American Society of Heating, Refrigerating, and Air Conditioning Engineers, Atlanta, GA.

EPA 40CFR50. 1992. *National primary and secondary ambient air quality standards*. Code of Federal Regulations, Title 40 Part 50. U.S. Environmental Protection Agency. Washington, D.C.

NIOSH June 1990. *NIOSH Pocket Guide to Chemical Hazards*. U.S. Department of Health and Human Services, Washington, D.C.

OSHA 29 CFR Part 1904 Occupational Safety and Health Act of 1970.
OSHA 1910.1000 Subpart Z, 31:8101 (Occupational Safety & Health Administration).

WHO 1987. *Air Quality Guidelines for Europe*. WHO Regional Publications European Series No. 23, WHO Regional Office for Europe, Copenhagen.

Should you have any questions concerning the information contained within this report, please contact me or John F. McCarthy, Sc.D., C.I.H., President, at our Newton offices listed below.

Sincerely,



David M. Shore

IAQ Project Coordinator

Environmental
Health &
Engineering



EXECUTIVE DEPARTMENT
ROBERT W. HEALY
City Manager

RICHARD C. ROSSI
Deputy City Manager

CITY OF CAMBRIDGE
CAMBRIDGE, MASSACHUSETTS 02139

TEL 349-4300
FAX 349-4307

12.

May 24, 1993

To The Honorable, The City Council:

Please find attached a response to Awaiting Report Item No. 41, regarding the results of testing for Air Quality at the Longfellow School, received from James M. Conry, Executive Director for Management Services for the Cambridge School Department.

Very truly yours,

A handwritten signature in black ink, appearing to read "Robert W. Healy", is written over a diagonal line.

Robert W. Healy
City Manager

RWH/mev
attachment

Consent Agenda #12 5-248
Response to Awaiting Report #41
RE: results of testing for Air
Quality at Longfellow School.

In City Council,
May 24, 1993

- Referred back to
the City Manager
on motion of Councilor
Russell.