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December 7, 2001

Mr. Bernard P. Orlan
Director, Environmental Health & Safety
New York City Board of Education
28-11 Queens Plaza North
Long Island City, NY 11101-4008

**Re: Indoor Air Quality Assessment
Public School 234M
292 Greenwich Street
New York, New York
ATC Project No. 15-19125-0279**

Dear Mr. Orlan:

ATC Associates Inc. (ATC) is pleased to provide this report of indoor air quality (IAQ) assessments conducted on November 29 – December 1, 2001, at the referenced school. The New York City Board of Education (BOE) requested this assessment to determine indoor air quality prior to reopening the school.

SCOPE OF WORK

ATC conducted this evaluation to assess the basic parameters of temperature, relative humidity, carbon dioxide (CO₂) and carbon monoxide (CO).

Total volatile organic compounds (TVOCs) and respirable particulates (PM_{2.5}) were also measured.

Tenzin Namgyal and Wagdi Abdelshahid, Industrial Hygienists, of ATC's New York City office, conducted the assessment. ATC's findings and conclusions are based on a visual inspection, real-time environmental measurements and conditions present in the school at the time of the assessment.

ATC measured temperature, relative humidity, CO₂ and CO with a Q-Trak® Model 8551, manufactured by TSI, Inc.

ATC measured concentrations of respirable particulates with a Dust-Trak® Aerosol Monitor Model 8520, manufactured by TSI, Inc.

ATC measured concentrations of TVOCs using a RAE Systems, Inc. MiniRAE® photoionization detector (PID).

The assessment was performed consistent with generally accepted indoor air quality assessment practices. As with all such assessments, there were inherent limitations created by constraints of

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time, operational and work practice variability, variations in indoor air quality parameters and sampling and analytical accuracy. The results of the sampling represent conditions found on the dates of the survey and may not represent conditions found at other times. The information presented in this report should be used by the BOE as a guide to assess the need for further improvements in current indoor air quality control activities.

EVALUATION CRITERIA

Currently, there are no regulatory standards for indoor air quality in non-industrial buildings, such as offices and schools. For the real-time data collected, ATC uses the commonly accepted guidelines cited in the following publications:

- *Ventilation for Acceptable Indoor Air Quality (ASHRAE 62-1999)*, American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE);
- *Thermal Environmental Conditions for Human Occupancy (ASHRAE 55-1992)*;
- *Industrial Hygienists Guide to Indoor Air Quality Investigations* (1993), American Industrial Hygiene Association (AIHA).

Table 1 lists target guidelines for the parameters that ATC evaluated during this investigation. Meeting one, some, or all of the listed values does not assure that acceptable indoor air quality will be achieved at all times.

TABLE 1
TARGET GUIDELINES FOR INDOOR AIR QUALITY PARAMETERS EVALUATED

PARAMETER	TARGET LEVEL	AGENCY OR ORGANIZATION
Carbon Dioxide (CO ₂)	<700 parts per million (ppm) above background level	ASHRAE 62
Carbon Monoxide (CO)	9 ppm	ASHRAE 62 (adopted from USEPA NPAAQS)
Respirable Particulates (PM _{2.5})	65 micrograms per cubic meter of air (µg/m ³) 24-hour average	USEPA NPAAQS
Temperature	Summer: 73-79°F at 50% RH Winter: 69-76°F at 50% RH	ASHRAE 55
Relative Humidity	30 – 60 %	ASHRAE 55
Total Volatile Organic Compounds (TVOC)	1 ppm	AIHA

USEPA = United States Environmental Protection Agency
NPAAQS = National Primary Ambient-Air Quality Standard
AIHA = American Industrial Hygiene Association

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SUBJECT TO PROTECTIVE ORDER NO. 2, SEPT. 2008

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Table 2 shows the ranges for the IAQ parameters measured on all four days.

TABLE 2
REAL-TIME ENVIRONMENTAL MEASUREMENTS
(INDOOR RANGE/OUTDOOR MAXIMUM)

Parameter	Nov. 29	Nov. 30	Dec. 1	Dec. 2
Temperature (°F)	65.2 – 72.1/55.6	65.0 – 73.2/ 67.1	69.2 – 77.4/ 69.4	67.0 – 72.8/ 59.4
Relative Humidity (%)	47.9 – 55.6/ 88.1	51.1 – 64.7/ 76.4	42.8 – 58.3/ 38.7	37.5 – 54.2/ 47.0
Carbon dioxide (ppm)	380 – 500/ 395	394 – 480/ 430	385 – 480/ 390	370 – 460/ 368
Carbon Monoxide (ppm)	1 – 2/ 3	1 – 2/ 2	0 – 2/ 1	0 – 2/ 2
Respirable particulates (PM _{2.5}) (ug/m ³)	32 – 59/ 65	48 – 110/ 104	24 – 38/18	33 – 65/ 57
TVOCs (ppm)	0.0 – 0.9*/ 0.0	0.0 – 8.6*/ 0.0	0.0 – 21.0*/ 0.0	0.0 – 2.4*/ 0.0

* Strong paint odor

DISCUSSION

Measurements of temperature, relative humidity, CO₂, CO and respirable particulates were generally within the guideline ranges (Table 1). The particulate (PM_{2.5}) readings indoors reflected the conditions outdoors. Some respirable particulate readings were above the EPA standard of 65 ug/m³. This standard is a 24-hour average and ATC collected only instantaneous real-time readings. Elevated TVOC readings resulted directly from painting activity in the building on the days the readings were made. The odor had dissipated considerably by the last day of measurements.

It must be noted that all of these measurements were made in an unoccupied building. Only ATC personnel and custodial staff were present. Levels would be expected to be different in a fully occupied building. Temperature, relative humidity, CO₂ and respirable particulates may all be expected to increase to varying degrees when the school is occupied.

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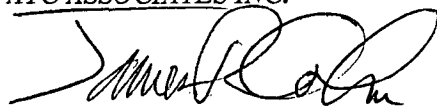
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It is our pleasure to provide these indoor air consultative services to the New York City Board of Education. If you have any questions about this report, please call (212) 353-8280, extension 261 or 212.

Sincerely,
ATC ASSOCIATES INC.



James R. Cohn, CIH, CSP
Regional Manager
Industrial Hygiene Division

Attachments