NYC 9/11 Public Portal Document

ATC ASSOCIATES INC.

104 East 25th Street 10th FL
New York, New York 10010
www.atc-enviro.com
212.353.8280
Fax 212.353.8306

January 15, 2002

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
P.S. 89M
201 Warren Street
New York, New York 10282
ATC Project No. 15-19125-0297

Dear Mr. Orlan:

ATC Associates Inc. (ATC) is pleased to provide this report of indoor air quality (IAQ) measurements collected on January 11, 2002, at the referenced school. The New York City Board of Education (BOE) requested these measurements as part of a program to determine if acceptable indoor air quality is being maintained.

SCOPE OF WORK

ATC conducted this evaluation to assess the basic parameters of temperature, relative humidity, carbon dioxide (CO_2) and carbon monoxide (CO).

Total volatile organic compounds (TVOCs), nitrogen dioxide (NO_2) and respirable particulates ($PM_{2.5}$) were also measured.

Tenzin Namgyan and Wagdi Abdelhahid, 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, CO_2 and CO with a Q-Trak® Model 8551, manufactured by TSI, Inc.

ATC measured concentrations of respirable particulates ($PM_{2.5}$) 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).

ATC measured concentrations of NO_2 using an Interscan NO_2 analyzer Model No. 1152.

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SUBJECT TO PROTECTIVE ORDER NO. 2, SEPT. 2008

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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 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 ($\mu g/m^3$) 24-hour average	USEPA NPAAQS
Temperature	Summer: 73-79°F at 50% RH Winter: 68-75°F at 50% RH	ASHRAE 55
Relative Humidity	30 – 60 %	ASHRAE 55
Total Volatile Organic Compounds (TVOC)	1 ppm	AIHA
Nitrogen Dioxide (NO_2)	0.053 ppm (annual average)	USEPA NPAAQS

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

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REAL-TIME ENVIRONMENTAL MEASUREMENTS

ATC collected sixty-one (61) sets of real-time environmental measurements consisting of sixty (60) in the school building and one (1) outdoors. All five floors of the school were surveyed. These results are described below. Field data sheets are found in Attachment 1.

Temperature

Indoor dry bulb temperature measurements ranged from 68.3 °F to 92.0 °F. Seven (7) measurements were above the range of 68 to 75°F (at 50 percent relative humidity) recommended by ASHRAE Standard 55-1992 during the heating season (wintertime conditions). These measurements were collected from 5th floor. The outdoor temperature was 56.5 °F.

Relative Humidity

The relative humidity indoors ranged from 19.5 percent to 29.7 percent. All measurements were below the ASHRAE-recommended range of 30 to 60 percent for occupant comfort. The outdoor relative humidity was 18.8 percent.

Carbon Dioxide Concentration

Carbon dioxide concentrations indoors ranged from 416 ppm to 540 ppm. All CO_2 measurements were below the ASHRAE Standard 62-1999 recommended maximum concentration of <700 ppm above the background level. The outdoor (background) CO_2 concentration was 448 ppm. Therefore, the maximum acceptable level of CO_2 at this location was 1148 ppm (background level + 700 ppm). Levels above the recommended maximum do not indicate a health risk. Carbon dioxide measurements are used as an indicator of available outdoor air. The primary source of CO_2 indoors is occupant respiration. The school building during ATC's assessment was not occupied.

Carbon Monoxide Concentration

Carbon monoxide concentrations indoors were 1-2 ppm for all readings. These concentrations were below the NPAAQS/ASHRAE guideline of 9 ppm The outdoor CO concentration was 3 ppm.

Respirable Particulates ($PM_{2.5}$)

Respirable particulate concentrations* indoors ranged between 6 $\mu g/m^3$ to 18 $\mu g/m^3$. All measurements were below the NPAAQS of 65 $\mu g/m^3$ 24-hour average concentration of particulate matter 2.5 micrometers or less in aerodynamic diameter. The outdoor respirable particulate concentration was 36 $\mu g/m^3$.

* The measurements made during this assessment were instantaneous readings, the NPAAQS is a 24-hour average.

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TVOC Concentration

TVOCs were not detected anywhere inside the building (0.0 ppm). The outdoor TVOC concentration was also 0.0 ppm.

Nitrogen Dioxide

Nitrogen dioxide was not detected anywhere inside the building (0.0 ppm). The outdoor TVOC concentration was also 0.0 ppm.

OBSERVATIONS

During this assessment, ATC noted the following:

- The interior of the building appeared clean and free of dust and debris;
- The building was not occupied at the time of the assessment;
- No smoke odor was detected in the building.

FINDINGS

Based on the real-time measurements, the following findings are presented:

1. Concentrations of respirable particulates, CO_2, CO and TVOCs were within applicable standards and guidelines.

2. All indoor measurements of relative humidity were below the ASHRAE-recommended range of 30 to 60 percent for occupant comfort.

3. Seven (7) temperature measurements were above the range of 68 to 75°F (at 50 percent relative humidity) recommended by ASHRAE Standard 55-1992 during the heating season (wintertime conditions). These readings were collected from the 5th floor.

It is our pleasure to provide these indoor air quality 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.

Andreas C. Andreou
Senior Project Manager

Reviewed by:

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

Attachment