MBA Technologies, Inc.
1901 Huntington Drive
Cherry Hill, NJ 08003

June 18, 2013
Mr. Nathan Spear, PE
Plasma Air International
35 Melrose Place
Stamford, CT 06902

Re: Needlepoint Bipolar Ionization System – Post installation Assessment for:

MEADOWBROOK ELEMENTARY SCHOOL
11525 NW 39TH AVENUE
GAINESVILLE, FL 32606

MBA, Inc has been in the monitoring and testing business for over 40 years. They have on-going monitoring sites up and down the east coast and have provided monitoring data and testing for over 1,000 facilities, including Art Museums, Historical Buildings, Schools, Universities and Artifact Storage Facilities. The testing devices used for this report were less than 6 months old and are considered some of best technology available on the market today.

Overview

The purpose of this air quality assessment is to validate the performance of a needlepoint based air purification system in reducing the outside air intake for this building. The more commonly used Ventilation Rate Procedure (VRP) from ASHRAE's (American Society of Heating, Refrigeration and Air Conditioning Engineers) Standard 62.1 requires 10 CFM per person and 0.12 CFM per square foot for classrooms and similar school related spaces. This results in approximately 13-15 CFM per person. Outside air is used to dilute the pollutants in the building to an acceptable level as defined by ASHRAE. Using ASHRAE's alternative method called the Indoor Air Quality (IAQ) Procedure, the outside air intake was reduced to 5 CFM per person. Air quality readings are then needed to be taken to prove that the pollutants were reduced to a level equal to or lower than that achieved through dilution only. The second purpose of this air quality evaluation was to assess the overall building's air quality by measuring various IAQ parameters and the impact of using a bipolar ionization/plasma air purification technology installed in the building's air handling units.

Testing

On May 8th and 9th, Michael Barford of MBA Technologies, Inc performed testing at the above referenced installation. MBA, Inc. collected direct air samples with the air purification equipment activated for the following selected attributes:

- ***Temperature***
- ***Humidity***
- ***CO2***
- ***Ammonia***
- ***Ozone***
- ***Respirable Particulates***

Temperature and Humidity Readings

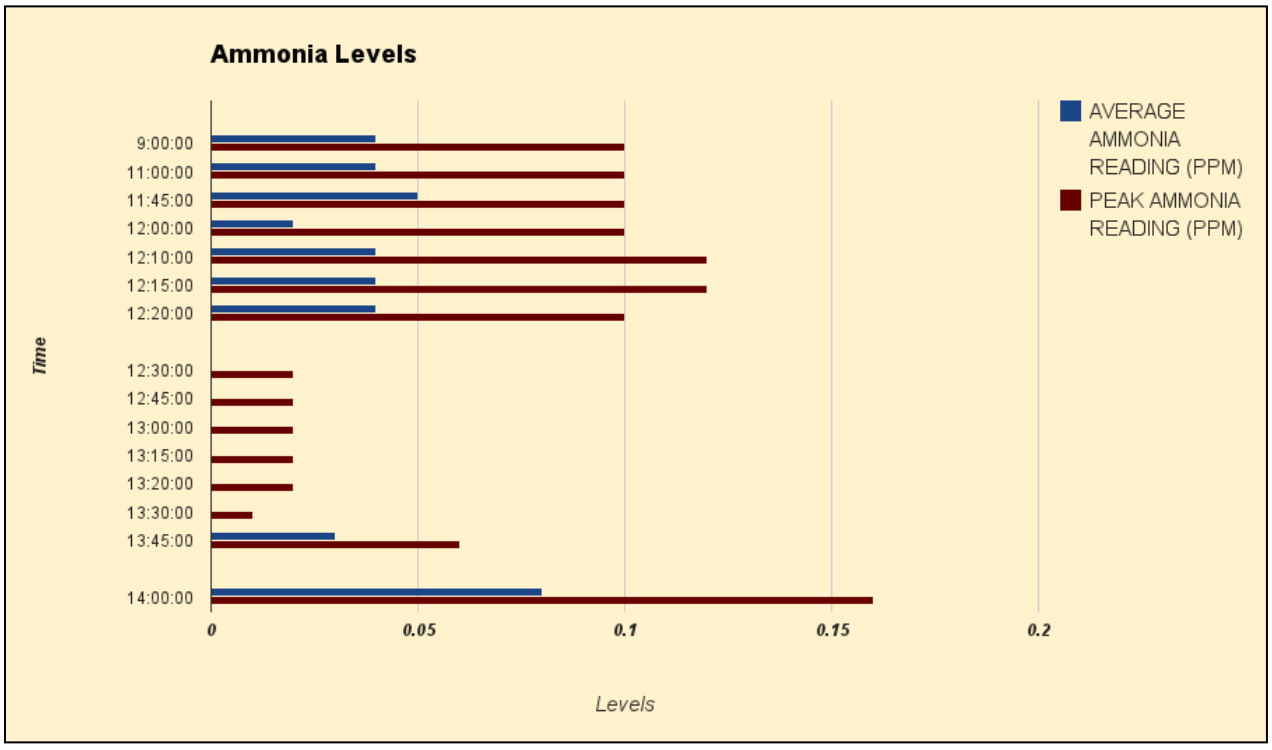
The temperature in the tested rooms ranged between 71.5 degrees F and 74.5 degrees F and the humidity in the tested rooms ranged between 47% and 49%. Acceptable humidity levels range between 40% and 60% RH.

CO_2 Results

The ASHRAE standard for CO_2 levels are 700 PPM added to outdoor (ambient) levels. Outdoor levels were measured at 370 PPM. Indoor levels measured between 710 PPM and 800 PPM so the CO_2 levels measured are acceptable.

Ammonia Results

The graph below shows the measured and peak ammonia levels during the test. Ammonia reduction is one of the main factors determining the amount of outdoor air required during occupied hours. As shown on the following graph, ammonia levels never exceeded 0.16 PPM and averaged no greater than 0.04 PPM. The calculated value of the ammonia using the IAQ Procedure and the air purification system was approximately 0.5 PPM. So, the measured values in several occupied classrooms were well below the calculated values.



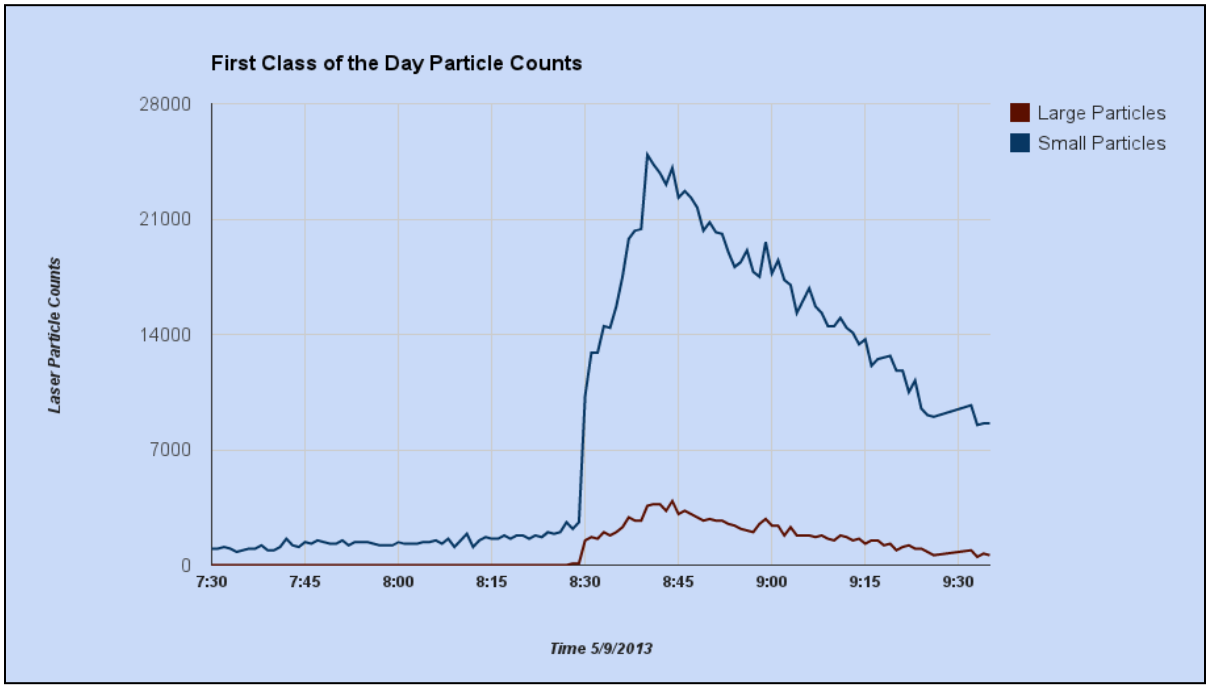
Airborne Particle Discussion

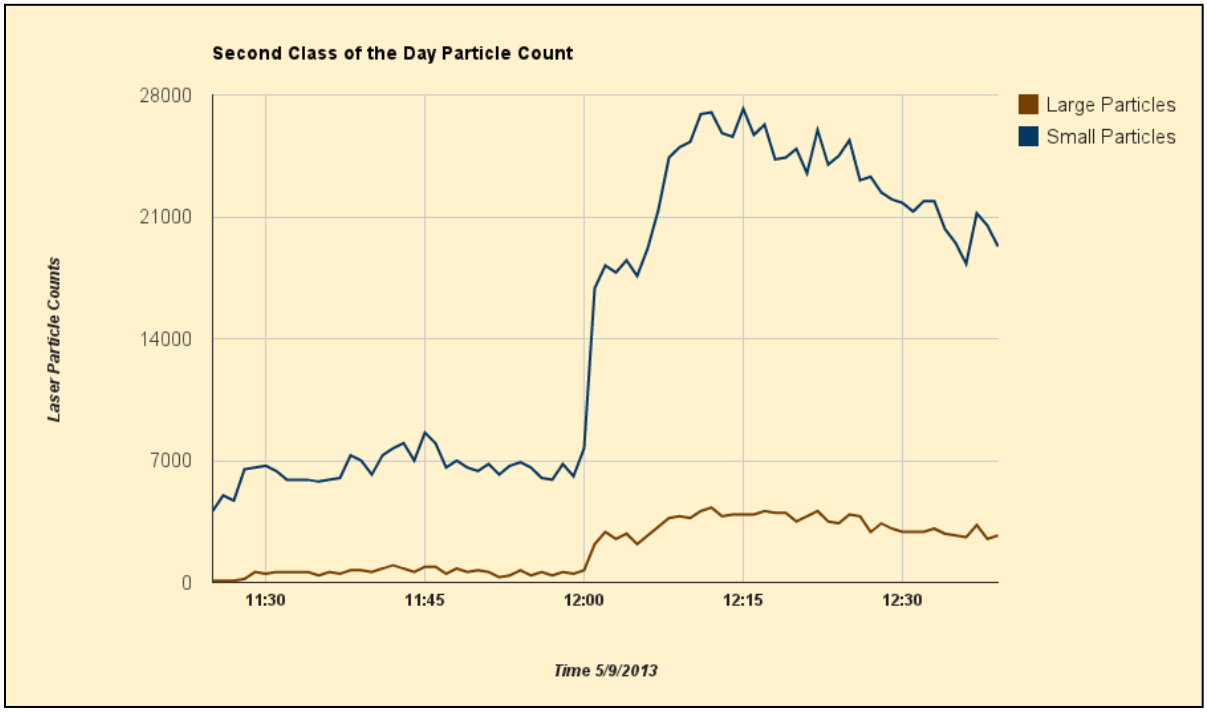
Particle pollution is produced in a great number of ways that can be classified into either mechanical or chemical processes. The mechanical process of particle pollution involves the breaking down of bigger matter into smaller particles without the material changing, only becoming smaller. Agriculture, coal and oil combustion, dust storms and construction are some activities that produce many of the larger or coarse particles. The chemical process of particle formation can be from sources that burn fuel and emit gases. Here, the pollutant vaporizes and then condenses to become a particle of the same chemical compound. The small particles can further react or combine with other compounds in the atmosphere. Major sources for particles formed this way are the burning of fossil fuels in industry, transportation and agriculture.

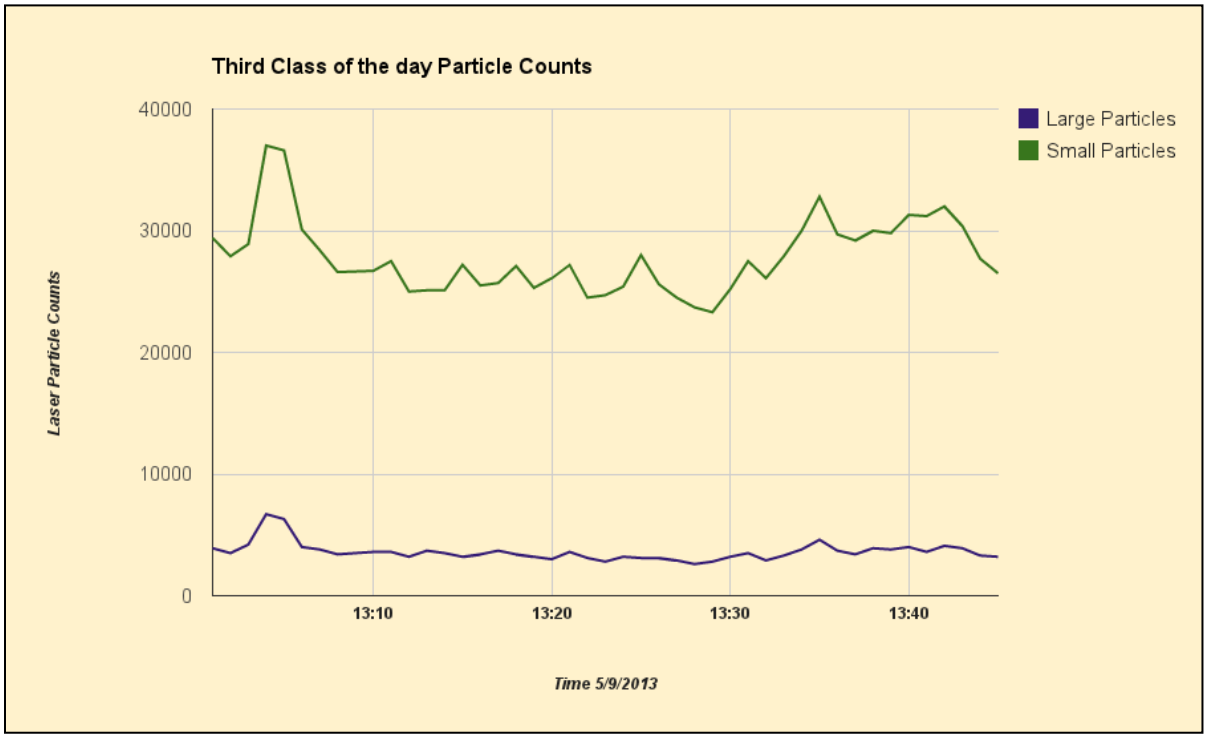
Particles come in many shapes and sizes, and can be solid particles or liquid droplets. Particle size is directly linked to their potential for causing health problems. Traditionally, the environmental sciences have divided particles into two main groups. PM10 are particles between 2.5 and 10 microns (micrometers) in diameter (a human hair is about 60 micron in diameter). PM2.5 are particles smaller than 2.5 microns. The PM10 and PM2.5 measurements you might have seen reported by the EPA, for example, refer to the total weight of the particle found. This is a holdover from when the available technology had difficulty detecting individual particles. More modern monitoring equipment, such as that used in clean room monitoring, count and size individual particles. The device used in the testing of the classroom air is this more modern type of device and counts individual particles in two size ranges which will roughly correlate to PM2.5 and PM10.

Airborne Particle Results

The following three (3) graphs indicate a dramatic increase in particulate count at the beginning of each class as the students enter the classrooms. Then there is a gradual reduction in the particulate count seemingly due to the effect of the ionization process.







Ozone Results

The US Environmental Protection Agency (EPA) has established acceptable levels of ozone in air to be less than 0.075 PPM. Several readings were taken throughout the building and levels were found to be at undetectable 0.0 levels.

Ion Readings

Ion readings were taken using a custom designed AlphaLabs Ion Counter. Ion readings were taken outdoors and in several locations indoors to prove that the plasma ionization equipment was operating. Outdoor ion levels were found to be in the range of 300-400 ions per cubic centimeter (ions/cc). Indoor ion levels ranged between 800 and 1,700 ions/cc. Ion readings were taken for the presence of both positive and negative ions and were found to be roughly equivalent.

Conclusions

The goal of this air quality assessment was to determine whether the bipolar ionization systems installed in the building's air handling units had an effect on the overall air quality in the building and whether the pollutant levels were equal to or less than those calculated using ASHRAE's IAQ procedure.

It can be concluded from the air quality readings that the ammonia levels measured throughout the building are indeed less than those calculated as part of the ASHRAE procedure. Additionally, all measured pollutant levels were found to be below accepted standards. The presence of the bipolar ionization systems appear to have a positive effect on the overall air quality in the building while no ozone was measured and ion levels were considerably higher than outdoor ambient levels.

Testing Equipment

Ammonia Monitor Z-800

The sensing element of the instrument is an electrochemical cell. The cell is a four-electrode type, which contains a working and an active auxiliary electrode. The signal from the auxiliary electrode is used for temperature compensation and to improve the selectivity of the entire sensor. The sensor response is linear with the concentration of the target gas in air.

Dylos DC1100 Particle Counter

A true Laser Particle Counter with 2 size ranges - small (bacteria, mold, etc) and large (pollen, etc.)

DC1100 features technology and engineering that allows monitoring of indoor air quality with an LCD screen that provides small and large particle counts with a dynamic bar graph showing actual count reading. Multiple modes including minute, hour, day and monitor to evaluate your air quality and store up to 30 days of air quality history for review.

Ozone Eco Sensor A-212x

The Eco Sensor Model A-21ZX portable ozone sensor provides a reliable way of checking environments for ozone and for estimating ozone levels. It can be used as a permanent monitor indoors when concentrations average below 0.1 ppm. It may be used outdoors for ozone studies in moderate temperature conditions.

Specifications:

- Range: 0-10 ppm; sensitivity as low as 0.02 ppm
- Display: digital readout in 0.01 ppm increments
- Measurement principle: HMOS (heated metal oxide semiconductor) sensor