At any time a building can request IAQ baseline measurements to be collected. Baseline readings include carbon dioxide, temperature, and relative humidity. Depending upon the conditions noted at the time of baseline sampling, additional collections may be performed. For example, if the presence of mold is suspect but cannot be found, mold spore sampling may be performed. Sampling for the presence of carbon monoxide may also be warranted.

**Carbon Dioxide**

The ASHRAE Ventilation Standard 62-1989 for the presence of carbon dioxide was 1000 ppm for several years. At that time, the ASHRAE recommendation of 1000 ppm carbon dioxide was thought to indicate the air exchange rate in the building (replacement of the indoor air with outdoor/return air) was sufficient to prevent the accumulation of odors generated by humans, furnishings and building components. Since the publication of the new ASHRAE Ventilation Standard 62-2001 that guideline has changed. The average ambient air concentration of carbon dioxide has increased since the publication of the AHRAE 62-1989 Standard. At present, ASHRAE recommends the concentration of carbon dioxide indoors not exceed 750 ppm above the outdoor concentration to account for fluctuations in the ambient air. ASHRAE Standards are guidelines, not an enforceable regulation unless incorporated by state or local codes.

Carbon dioxide is a simple asphyxiate, that it is not toxic to humans but creates a hazard when concentrations are sufficient to displace oxygen. Excessively high concentrations of carbon dioxide are needed to cause health problems. Monitoring the concentration of carbon dioxide as a surrogate gas is an easy, reliable method of determining the efficiency of the ventilation system, especially adequate outdoor air intake.

**Temperature and Relative Humidity**

Temperature and relative humidity reflect very general conditions of the air. Most indoor air quality complaints reflect ranges of temperature or relative humidity that are uncomfortable to occupants. Monitoring of these parameters is generally collected for a 7-day period. Indoor temperature generally ranges from 68 to 74 degrees Fahrenheit. Temperatures falling outside this range can be uncomfortably cool for sedentary activities or so warm the air actually feels “stuffy”. Relative humidity is a function of ambient air temperature. During the summer months air conditioning helps to maintain relative humidity to between 30 to 60 % to discourage mold growth. Relative humidity outside of that range can feel either very drying to eyes and other mucous membranes or cause high temperatures to feel “clammy”.

No OPS buildings are currently equipped with humidifiers. Even though the relative humidity frequently falls below 30% during the winter months, the use of individual Indoor Air Quality Baseline Parameters
humidifiers is discouraged. When not properly cleaned and sanitized every day, humidifiers can become breeding grounds for bacteria which are then carried by the water mist, discharged into the air. The EPA has published a fact sheet outlining proper maintenance procedures for humidifiers. Chemical additives to the humidifier water are not encouraged as these chemicals are also discharged into the air and breathed by occupants.

Mold Spores

There are currently no regulations or guidelines established for acceptable concentrations of mold spores in indoor environments. When sampling for mold spores is warranted the sampling strategy will include at a minimum, the complaint area, a non-complaint area (similar to the complaint area) and an outdoor sample collected near the outdoor air intake for the ventilation unit servicing the complaint area. Interpretation of the data depends on the type of collection media used, the ambient conditions and the comparison of all samples collected. Once mold remediation is performed, additional samples are collected to verify effectiveness. (Refer to Appendix B).

OPS uses air-o-cell cassettes to collect mold spore samples. Even though all mold spore collection methods have limitations, this method was felt to be more acceptable. Collection methods that use agar media require several different types of agar to collect and grow all potential spores in the air. Selection of the wrong type of agar can give results that are not at all reflective of the actual conditions. Also the subsequent handling of the sample is not as sensitive to heat and cold during shipment as agar collections. Air-o-cell cassettes draw the air through a small slit past a sticky surface on which pollen, mold spores, and other airborne particulate settle onto the surface. Analysis is performed by microscopic identification of the settled out particles.

Carbon Monoxide

Occasionally the carbon monoxide level within a building may be elevated by improper firing of a gas appliance, a pocket of cold air in the flue trapping combustion gases or from the entrainment of vehicle exhaust. The burning of any organic fuel source (wood, coal, etc.) can also create carbon monoxide. Although the OSHA standard for carbon monoxide concentration is 50 ppm, toxicology data indicate people may develop headaches at levels as low as 3 ppm. Anytime the presence of carbon monoxide is suspect, OPS Environmental or MUD can provide testing.

Other Chemical Contaminates

With the lack of established parameters for chemicals found in typical school situations, OPS uses one tenth the OSHA permissible exposure limit (PEL) as a rough guideline for the determination of
acceptability. In addition, toxicology literature searches are performed. Should toxicology data suggest a lower concentration is potentially harmful, that data will take priority over the OSHA PEL fraction.

The use of unnecessary chemicals is discouraged as the interaction of minute concentrations of different chemicals is suspected of creating new chemical compounds in the air. For this reason use of air fresheners should be discouraged. In addition, the use of air fresheners impedes odor investigations should complaints be issued.

**Ozone**

Ozone is a respiratory irritant that can be created by electrical equipment. Usually the concentration created in this manner is not sufficient to cause problems. However, certain types of air cleaners market themselves as “ozone” or “negative ion” producers. Since ozone is a known respiratory irritant and accumulates at lower levels, there is a potential to create a hazardous situation. The EPA website now carries a fact sheet warning of this problem.

**Mercury**

Most mercury containing thermometers have been removed from OPS property by voluntary efforts made by the Nursing Staff and Science department. Other sources of mercury such as mercury switches on older heating systems and mercury containing fluorescent tubes are replaced with non-mercury containing materials when taken out of service. School science departments may submit a work order to pick up contaminated mercury. All mercury is recycled by a licensed contractor.

OPS Environmental provides mercury spill training for all incoming custodial staff and mercury spill kits are supplied to each school. Mercury will behave as a liquid and seek the lowest level possible. It is critical to contain and properly clean a spill as soon as possible before it leaks into the floor. Environmental does maintain a mercury vacuum and a direct read analyzer for mercury vapors for use in the event of a mercury spill larger than the mercury in one thermometer.