

ACCESS™ Environmental Report

Wetlands Park, November 1, 1999

Session location: Wetlands
 Session site: Woods
 Organizational affiliation: Camden High
 Session environment: Outdoors
 Session type: Ambient
 Location environment: Rural
 Session description: Wetlands
 ACCESSLogger S/N: 99001
 Logging began on: 11/01/1999 at 13:01:34
 Logging stopped on: 11/01/1999 at 14:51:33
 Data uploaded on: 11/05/1999 at 12:24:56
 Pump has not been activated during session.
 Sensors used, in alphabetical order, were:

SENSOR	CHAN	ENG. UNITS	LO LIM	HI LIM
Barometric Pressure	1	in.Hg	*	*
Carbon Dioxide	2	ppm	*	*
Carbon Monoxide	3	ppm	*	*
Nitrogen Dioxide	4	ppb	*	*
Ozone	5	ppb	*	*
Relative Humidity	7	%	*	*
Sulfur Dioxide	8	ppb	*	*
Temperature	9	°F	*	*
Supply Voltage	12	V	*	*

* indicates no limit was set

Environmental sampling rate (seconds): 10
 Samples were averaged and saved every (minutes): 1
 Total samples in this upload: 110
 Data collected by: Lynn Johnson
 City: North Brunswick State: NJ Country: USA
 Longitude: 0° 0' W
 Latitude: 0° 0' N
 Elevation: n/a m

Air Quality Parameters

When evaluating outdoor air, the ACCESS EMS measures the same parameters as those measured by the EPA under the National Ambient Air Quality Standard promulgated by the Clean Air Act. In addition, other parameters, such as ultraviolet radiation, wind speed and wind direction, may be monitored.

The indoor environment has become an issue of concern over the past several years with the advent of new construction techniques and building materials which severely restrict the exchange of indoor and outdoor air. This *could have a deleterious effect on the quality of indoor air,* and, therefore, the quality of life. *Many substances *effect the quality of the indoor environment. The ACCESS EMS, depending upon configuration, can quantify a number of key indicators of both indoor and outdoor air quality including:

- Atomic radiation;
- Barometric pressure;
- Carbon dioxide concentration;
- Carbon monoxide concentration;
- Extremely Low Frequency (ELF) radiation;
- Nitrogen dioxide concentration;
- Ozone concentration;
- Particulate concentration;
- Percent relative humidity;
- Sound level;
- Sulfur dioxide concentration;
- Temperature; and,
- Ultraviolet radiation.

Each of the ACCESS parameters which appear in this report are discussed in detail below. Statistical summaries of the data collected are provided as an integral part of the program, and allows for data to be displayed graphically where applicable. Since it is difficult to display roughly 1500 data points at a time, an averaging technique is used to compress several minutes into one data point. This is why the first data point on a graph may not necessarily have the same value as that displayed after the first averaging period.

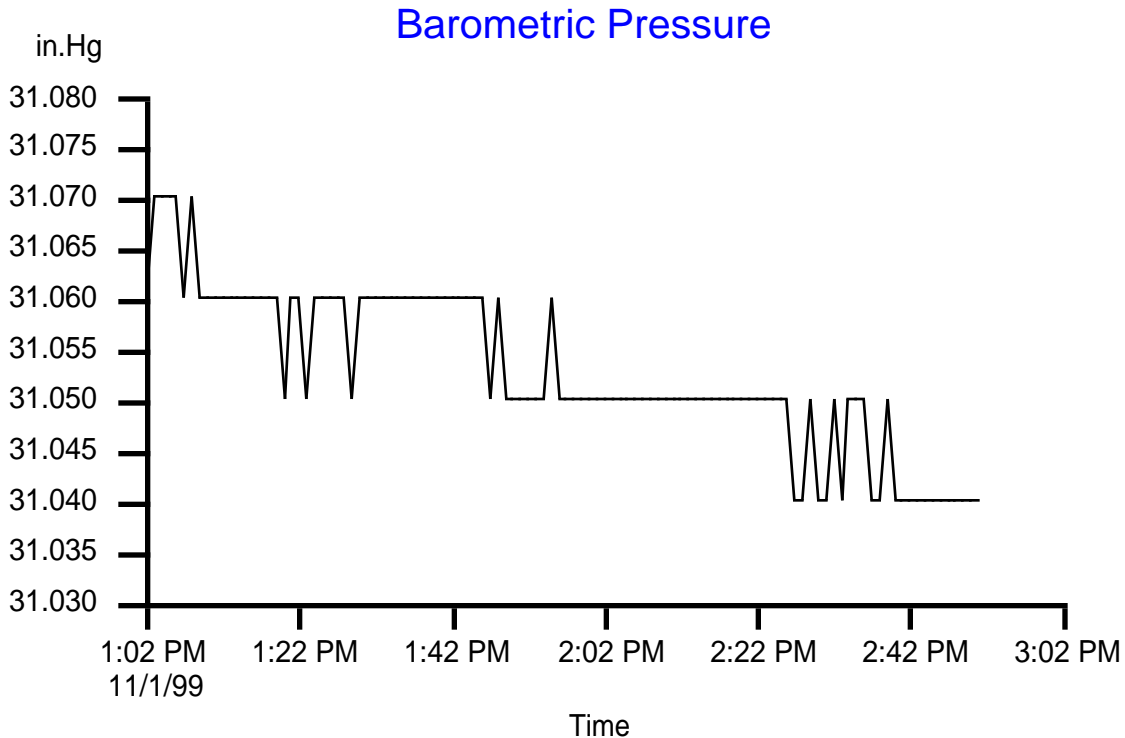
Please note that there are other pollutants which aren't measured by the EMS. Chlordane, VOC's, formaldehyde, lead and bacteria are among this group. If you are experiencing health problems which you suspect may be attributed to these pollutants, further sampling may be warranted.

A number of the indoor air quality standards and recommendations have been formulated by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). The upper and lower limits used in this report are in many cases derived from the most recent ASHRAE standard, ASHRAE 62-1989. Limits associated with outdoor air quality come from the Environmental Protection Agency's National Ambient Air Quality Standard (EPA-NAAQS) and the World Health Organization (WHO).

STATISTICS

Barometric Pressure

There are no standards for barometric pressure. Generally, a trend from high to low pressure signifies that unsettled weather is approaching. A trend in the opposite direction indicates fair weather is approaching.

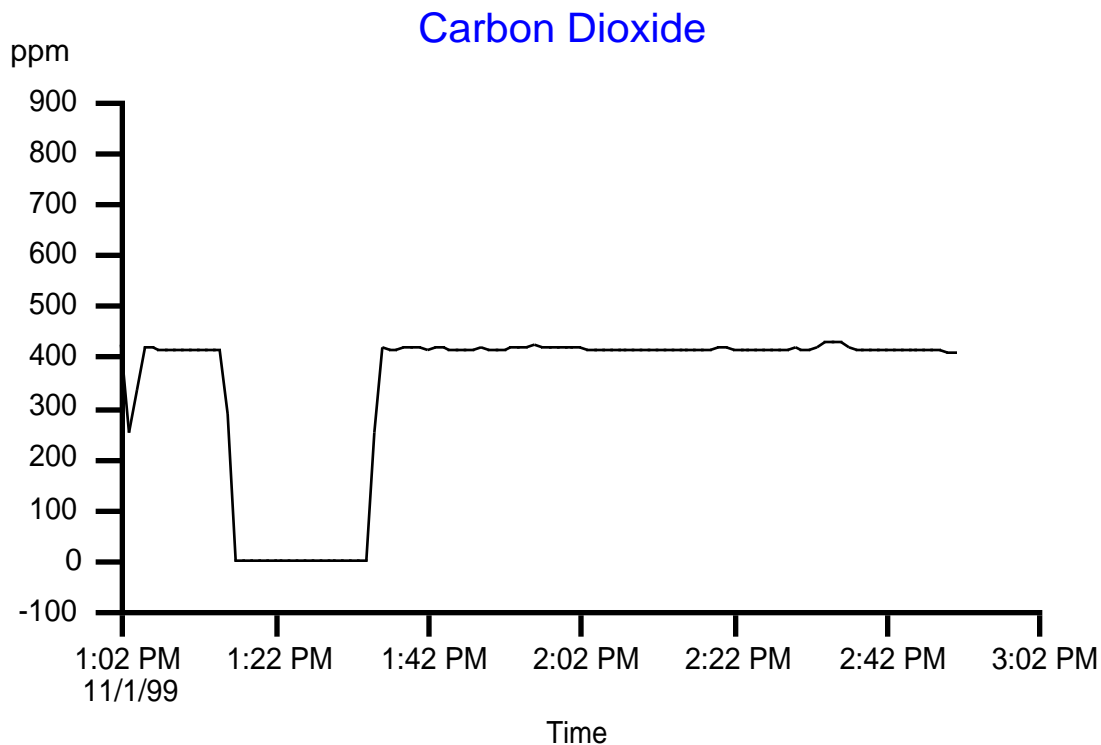


Minimum: 31.04 in.Hg on Mon, Nov 1, 1999 at 2:51 PM
Maximum: 31.07 in.Hg on Mon, Nov 1, 1999 at 1:08 PM
Average: 31.05 in.Hg
Standard Deviation: 0.0
Lower Limit: None
Upper Limit: None

Carbon Dioxide

Carbon dioxide is a good indicator of the rate of air exchange between the indoor and outdoor environments. According to ASHRAE Standard 62-1989, an indoor concentration greater than 1000 ppm suggests that the air exchange is inadequate and incapable of maintaining good air quality. The ambient outdoor concentration of CO₂ is about 350 ppm.

While not a toxic gas, high concentrations of CO₂ can cause drowsiness and a 'stuffy air' feeling. High concentrations are common in older schools due to inadequate ventilation systems and perhaps overcrowding.



Minimum: 0 ppm on Mon, Nov 1, 1999 at 1:34 PM
 Maximum: 429 ppm on Mon, Nov 1, 1999 at 2:34 PM
 Average: 342 ppm
 Standard Deviation: 153.7
 Lower Limit: None
 Upper Limit: None

Carbon Monoxide

Carbon monoxide is a toxic, odorless gas which is a fossil fuel combustion by-product. Primary residential sources of CO include gas stoves, unvented gas and kerosene space heaters, and wood stoves as well as from gas and oil furnaces and hot water heaters.

CO exposure is believed to contribute to, and in some cases worsen, heart disease. Particularly vulnerable are people with arteriosclerosis, and those who smoke cigarettes.

The National Ambient Air Quality Standard (EPA-NAAQS) places an upper limit of 9 ppm of CO for any eight hour period and a limit of 35 ppm for any one hour period.

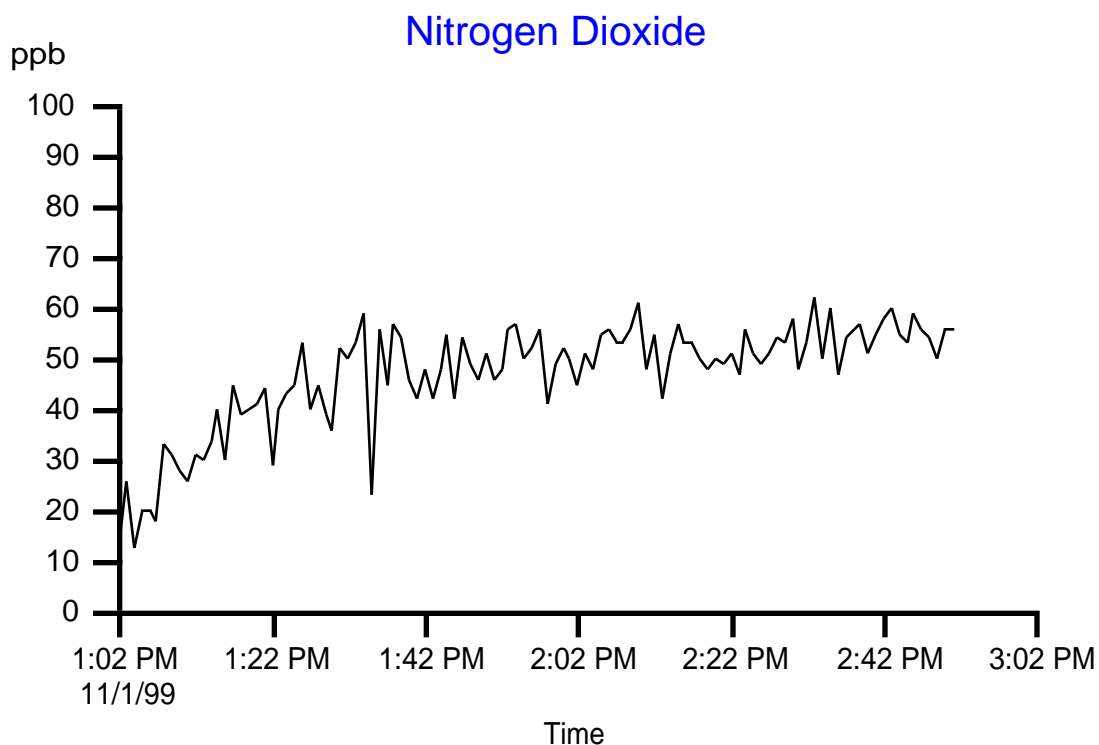
Minimum: 0.0 ppm on Mon, Nov 1, 1999 at 2:51 PM
 Maximum: 0.0 ppm on Mon, Nov 1, 1999 at 2:51 PM
 Average: 0.0 ppm
 Standard Deviation: 0.0
 Lower Limit: None
 Upper Limit: None

Nitrogen Dioxide

Nitrogen dioxide is a gas which is a combustion by-product. Cigarette smoke is a significant source of NO₂ in indoor air. There is no indoor air standard for NO₂ concentration. The NAAQS limits the annual mean value to 50 parts per billion (ppb) for outdoor air. Indoor levels can be considerably higher, exceeding 1,000 ppb during meal preparation which involve cooking. Average indoor concentrations may exceed 100 ppb over a period of days.

Urban outdoor concentration levels are usually between 10 and 50 ppb, according to the World Health Organization (WHO). The WHO recommends that the maximum one hour exposure level be under 210 ppb.

Since NO₂ combines readily with oxygen and other chemicals, isolating its health effects is difficult. The photochemical oxidants that it helps to create have varying degrees of toxicity. NO₂ contributes to respiratory illnesses, especially in people who are already vulnerable due to bronchitis, asthma or other lung disease.

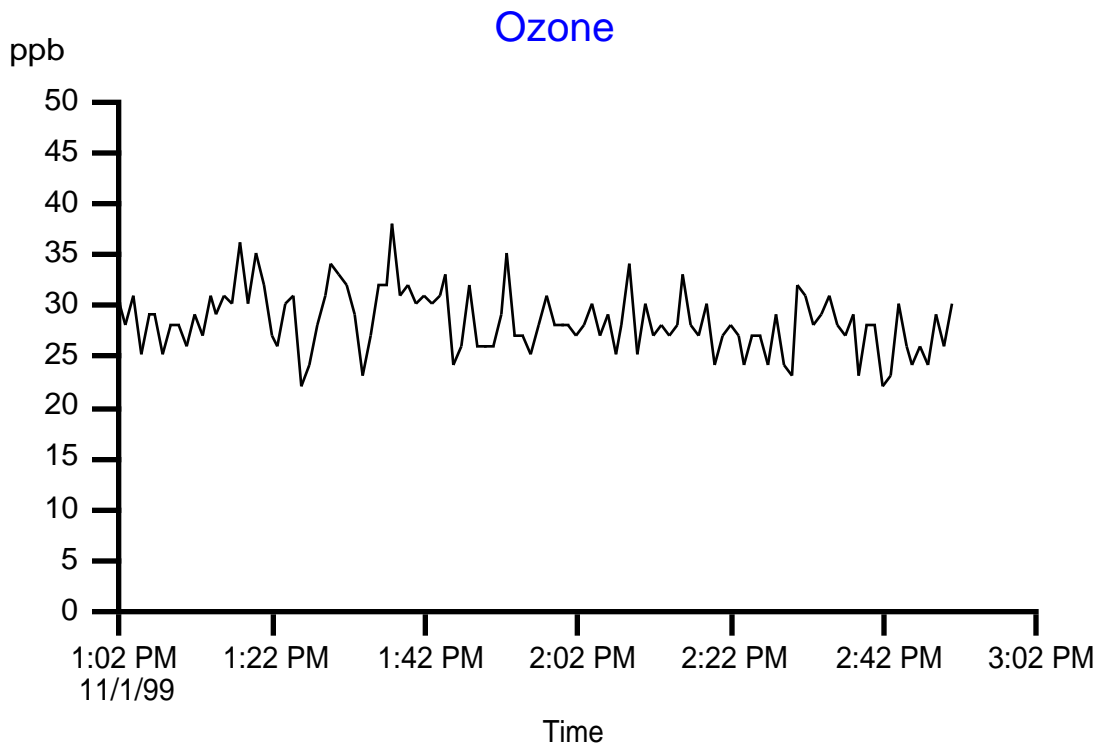


Minimum: 12 ppb on Mon, Nov 1, 1999 at 1:02 PM
Maximum: 62 ppb on Mon, Nov 1, 1999 at 2:33 PM
Average: 47 ppb
Standard Deviation: 10.7
Lower Limit: None
Upper Limit: None

Ozone

Ground-level ozone is a pollutant which can cause respiratory problems. The Food and Drug Administration (FDA) suggests that the indoor ozone concentration should be less than 50 parts per billion (ppb). The NAAQS designates a maximum concentration of 120 ppb for any one hour period.

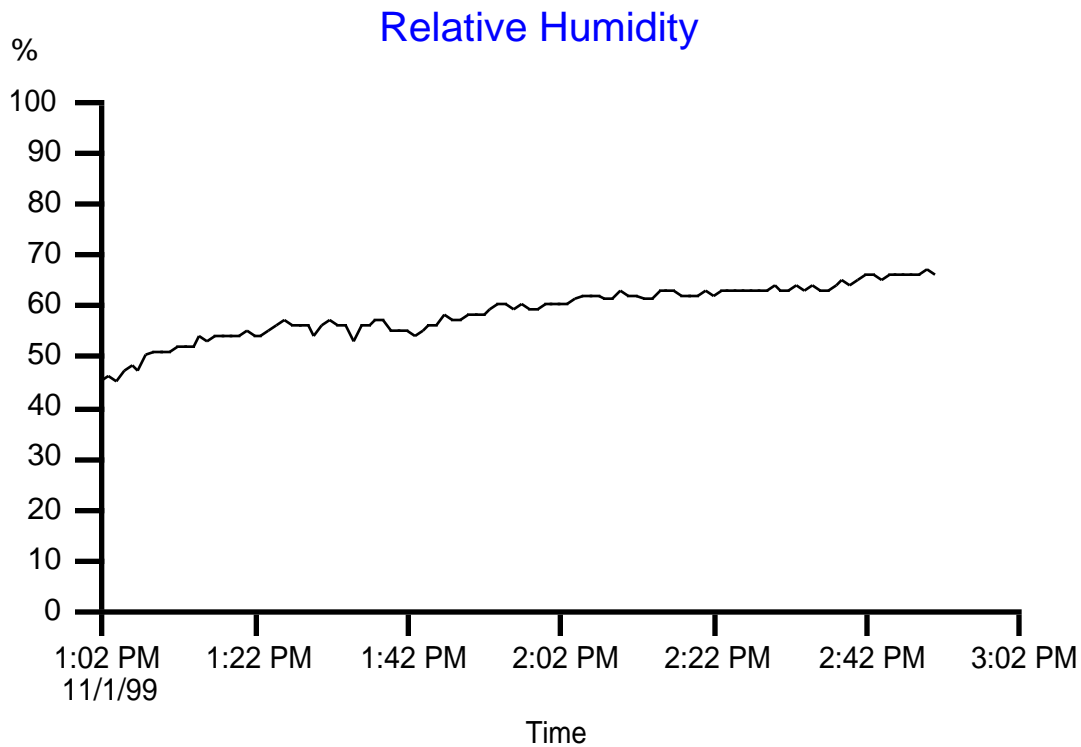
As ozone levels rise, a continuum of less to more severe symptoms are reported, starting with dry throats, wheezing and eye irritation. Breathing may then become more labored, especially while exercising. At levels above 20 ppb, the potential for asthmatic attacks increases, athletic performance decreases significantly, and the impact of infectious illnesses is worsened. All of these effects are magnified for those who smoke cigarettes.



Minimum: 22 ppb on Mon, Nov 1, 1999 at 2:42 PM
Maximum: 38 ppb on Mon, Nov 1, 1999 at 1:38 PM
Average: 28 ppb
Standard Deviation: 3.1
Lower Limit: None
Upper Limit: None

Relative Humidity

ASHRAE 62-1989 suggests maintaining an indoor relative humidity between 30 and 60%. A relative humidity higher than 60% encourages the growth of mold and other biogenic pollutants while a humidity below 30% may cause irritation to mucous membranes due to a lack of moisture in the air.



Minimum: 45 % on Mon, Nov 1, 1999 at 1:04 PM

Maximum: 67 % on Mon, Nov 1, 1999 at 2:50 PM

Average: 59 %

Standard Deviation: 5.2

Lower Limit: None

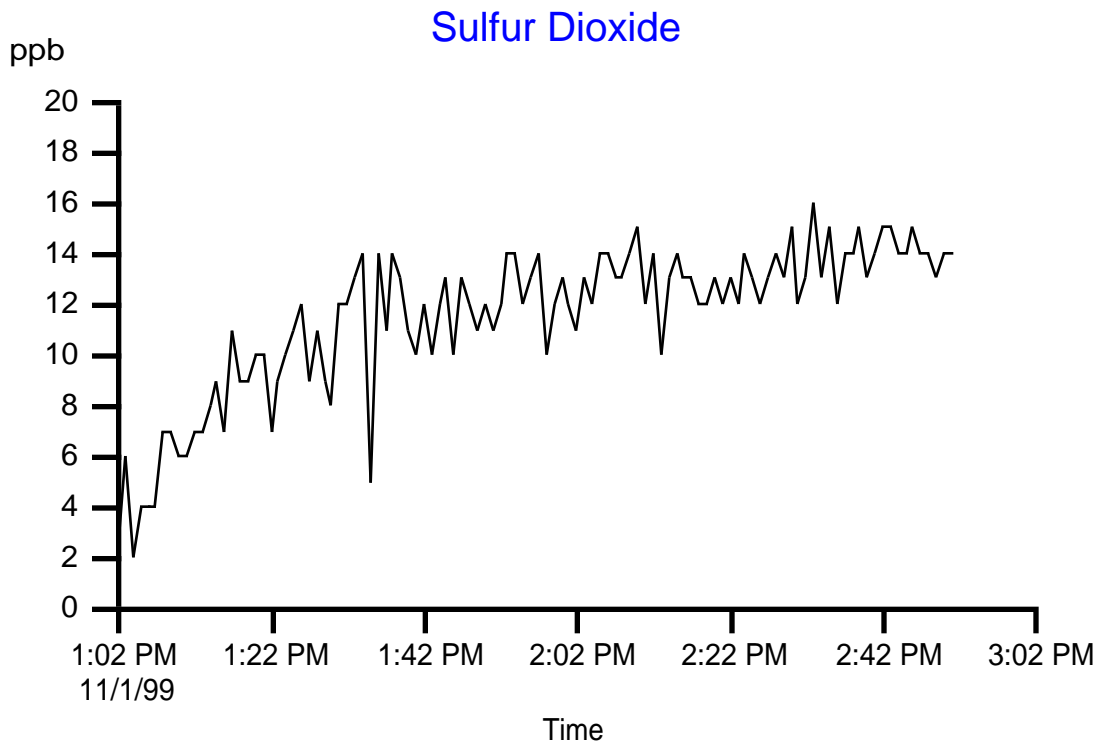
Upper Limit: None

Sulfur Dioxide

A combustion by-product of wood-burning stoves and hydrocarbon fuels, SO₂ is a toxic gas. The NAAQS requires SO₂ concentration to be below 140 parts per billion (ppb) in any given 24 hour period. In some parts of Europe, twenty four hour background levels are between 85 and 170 ppb, according to the WHO.

Elevated levels of SO₂ contribute to a variety of respiratory ailments. Chronic, long-term low-level exposure to SO₂ is a contributing factor leading to bronchitis, lung cancer and labored breathing. Frequency and severity of respiratory disease also

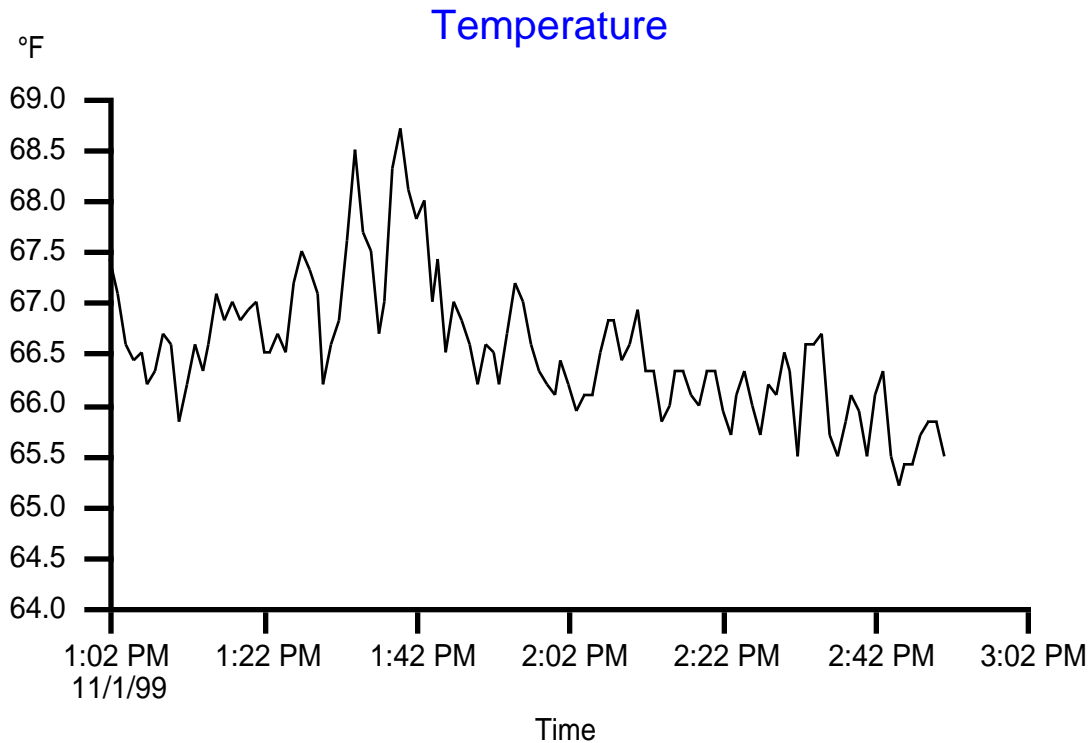
increases. The ability of the lungs to filter out particles, bacteria and harmful microorganisms is reduced. Lung damage can be irreversible.



Minimum: 2 ppb on Mon, Nov 1, 1999 at 1:04 PM
Maximum: 16 ppb on Mon, Nov 1, 1999 at 2:33 PM
Average: 11 ppb
Standard Deviation: 3.0
Lower Limit: None
Upper Limit: None

Temperature

Comfortable indoor temperature is a subjective factor and there are no standards for indoor air temperature. It should be noted however, that lower temperatures will tend to inhibit the release of both volatile organic compounds, (found in construction materials, paints, and furnishings), and formaldehyde. Values between 65°F and 75°F are considered 'comfortable' by a majority of people.



Minimum: 65.2 °F on Mon, Nov 1, 1999 at 2:45 PM

Maximum: 68.7 °F on Mon, Nov 1, 1999 at 1:40 PM

Average: 66.5 °F

Standard Deviation: 0.7

Lower Limit: None

Upper Limit: None