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DuPage County Judicial Office Facility  
Wheaton, Illinois

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## **SUMMARY**

On September 15-16, 1992, investigators from the National Institute for Occupational Safety and Health (NIOSH) conducted a Health Hazard Evaluation (HHE) at the DuPage County Judicial Office Facility (JOF). This HHE was conducted in response to a management request concerning continuing medical problems among employees following the malfunctioning of a humidifier on March 31, 1992.

NIOSH investigators reviewed the results of a previous consultant's report that showed that extensive environmental monitoring has been conducted since March 31, 1992. Monitoring for basic indoor environmental quality (IEQ) parameters was conducted on both September 15 (PM) and September 16 (AM) throughout the building. This consisted of assessing carbon dioxide ( $\text{CO}_2$ ) levels, relative humidity (RH), and temperature. A portable direct-reading monitor was used to qualitatively monitor for volatile organic compounds (VOC). Janitorial and pesticide application practices were also assessed.

The consultant's report indicated that all IEQ parameters monitored were within applicable guidelines (where guidelines have been established), and appeared to be typical of what is normally found in indoor environments. Results of NIOSH monitoring indicated that  $\text{CO}_2$  levels throughout the building were below the guideline of 1000 ppm on both days monitored. RH was consistently at the high end, or in excess of, the desirable range for both days monitored. VOC monitoring indicated only "trace" amounts of VOCs present when compared with outdoor readings, and were typical of levels found in many non-industrial buildings.

Individual medical interviews were conducted with 53 symptomatic employees, and informal group interviews were conducted with approximately 40 additional employees randomly selected from each of the building's major user groups. Facility incident report logs documenting daily symptom reporting by building occupants between March 27 through August 1992 were reviewed. The interviews and symptom report logs indicated that the predominant type of symptoms were those that have been found in numerous NIOSH investigations conducted in office environments including headache; runny nose; stuffy nose/sinus congestion; dry, itching or tearing eyes, burning eyes, dry throat; fatigue and sleepiness.

No clear environmental causes were found for the symptoms reported by employees. Some environmental deficiencies were identified during the NIOSH evaluation and recommendations were made for their correction. These recommendations were concerned primarily with the building's heating, ventilating and air-conditioning system. Administrative actions to address employee concerns about IEQ were also recommended.

**KEYWORDS:** SIC 9211/9222 (Courts/Legal Counsel and Prosecution), indoor environmental quality, IEQ, carbon dioxide, temperature, relative humidity, HVAC, volatile organic compounds, VOC, headaches, runny nose, stuffy nose, sinus congestion, dry eyes, itching eyes, tearing eyes, burning eyes, dry throat, fatigue, sleepiness

## **INTRODUCTION**

On September 4, 1992, the National Institute for Occupational Safety and Health (NIOSH) received a request for a health hazard evaluation at the DuPage County Judicial Office Facility in Wheaton, Illinois, from a management representative at the Facility. The requestor was concerned about recurring employee illnesses and about symptoms that occurred while employees worked in the Facility.

## **BACKGROUND**

The DuPage County Judicial Office Facility is a four-story, 350,000-square-foot office building designed in the late 1980's and occupied in September, 1991. Approximately 700 full-time county employees work in this building, with 1300 citizens entering the building to conduct business each day. All major elements of the county judicial system are administered from this building, including court hearings and trials, the public defender's office, state attorney's office, and the circuit court judge's office. Floors 1-4 are serviced by four vertical-zone, variable-air-volume heating, ventilating and air-conditioning (HVAC) systems. Outside air is obtained at the roof level. A cafeteria on the first floor is serviced by a separate HVAC system. A basement area, containing a maintenance shop, records vault, and data-processing center, is serviced by two constant-volume HVAC systems that obtain outside air through a ground-level grate.

On March 31, 1992, a humidifier malfunction occurred that resulted in the release of a visible haze, possibly containing water-treatment chemicals. This incident caused the facility to be evacuated, and approximately 20 people were seen at a local hospital. Numerous industrial hygiene and engineering evaluations of the building and HVAC system were initiated as a result of this incident. However, because building occupants continued to report health symptoms that they attributed to their work environment, NIOSH was asked to conduct an investigation.

## **EVALUATION PROCEDURES**

### **Environmental**

The NIOSH industrial hygiene evaluation consisted of several elements. Initially, a review of reports generated by an industrial hygiene consultant (retained by DuPage County) to assess the results of environmental monitoring, and heating, ventilating and air-conditioning (HVAC) assessments was conducted. The building was inspected, and actions taken and planned (regarding the HVAC systems) by Capital Plant Engineering to address the concerns of building occupants were reviewed. Air handling units 1-5 and 7 were visually inspected to evaluate cleanliness, damper position, operational parameters, and location of outside air (OA) intakes. A comprehensive HVAC system evaluation was not conducted. Monitoring for standard indoor environmental quality (IEQ) parameters was conducted on both September 15 (PM) and September 16 (AM) throughout the building. This consisted of assessing carbon dioxide ( $\text{CO}_2$ ) levels, relative humidity (RH), and temperature. A portable direct-reading monitor was used to qualitatively monitor for volatile organic compounds (VOC). Janitorial and pesticide application practices were also assessed.

## **Monitoring Methods**

### **A. Carbon Dioxide (CO<sub>2</sub>)**

Instantaneous measurements of CO<sub>2</sub> concentrations were obtained using a Gastech Model RI-411A Portable (direct reading) CO<sub>2</sub> monitor. The principle of detection is non-dispersive infrared absorption. The instrument was zeroed (zero CO<sub>2</sub> gas source) and calibrated prior to use with a known CO<sub>2</sub> source (span gas). The monitor provides CO<sub>2</sub> concentrations in 25 parts per million (ppm) increments with a range of 0 - 4975 ppm. Measurements were obtained at various intervals and locations throughout the building. Outdoor readings were taken to determine baseline CO<sub>2</sub> levels.

### **B. Temperature and Relative Humidity (RH)**

Dry bulb temperature and RH levels throughout the building were determined at various intervals. Outdoor readings were obtained for comparison purposes. Instrumentation consisted of a TSI, Inc. model 8360 VelociCalc® meter with a digital readout. This unit is battery operated and has humidity and temperature sensors on an extendable probe. The temperature range of the meter is 14 to 140°F and the humidity range is 20 - 95%. Temperature and RH as determined via standard dry bulb, wet bulb and psychrometric chart correlated well with levels determined via the VelociCalc® meter.

### **C. Non-Specific VOC Monitoring**

Instantaneous measurements to assess relative levels of VOCs were obtained in various indoor and outdoor locations. This monitoring was done with an Hnu® Systems Model PL 101 analyzer. This portable, non-specific, direct-reading instrument uses the principle of photoionization for detection. The sensor consists of a sealed ultraviolet light source that emits photons which are energetic enough to ionize many compounds. These ions are driven to a collector electrode where the current (proportional to concentration) is measured. A 10.2 electron volt lamp was utilized. This lamp will ionize a wide variety of organic compounds, yet exclude normal constituents of air such as nitrogen, oxygen, carbon dioxide, etc. Measurements were obtained with the instrument set on maximum sensitivity. This sampling was conducted to identify potential sources of solvent emissions or material that may be emitting VOCs.

## **Medical**

On September 15, individual medical interviews were conducted with approximately 40 building occupants. An attempt was made to interview individuals who were thought to be most symptomatic. A number of individuals no longer working in the building were contacted, via telephone, at their new office locations or at their homes. An additional 13 symptomatic individuals were interviewed, via telephone, during the weeks of September 21 and September 28.

Informal group interviews were conducted on September 16 with approximately 40 employees randomly selected from each of the building's major user groups. The purpose of these interviews was to gain further insight into employee complaints regarding the building. Workers were asked to comment on their concerns about indoor environmental quality and on other aspects of work at the DuPage County Judicial Office Facility, including employee-management relations and communications regarding perceived environmental problems at the facility.

Facility incident reports logs, documenting daily symptom reporting by building occupants between March 27, 1992 through August 1992 were reviewed. Contained within these logs were symptom reports from over two hundred different individuals.

## **EVALUATION CRITERIA**

NIOSH investigators have completed over 1100 investigations of the occupational indoor environment in a wide variety of non-industrial settings. The majority of these investigations have been conducted since 1979.

The symptoms and health complaints reported to NIOSH by building occupants have been diverse and usually not suggestive of any particular medical diagnosis or readily associated with a causative agent. A typical spectrum of symptoms has included headaches, unusual fatigue, varying degrees of itching or burning eyes, irritations of the skin, nasal congestion, dry or irritated throats and other respiratory irritations. Typically, the workplace environment has been implicated because workers report that their symptoms lessen or resolve when they leave the building.

A number of published studies have reported high prevalence of symptoms among occupants of office buildings.<sup>1-5</sup> Scientists investigating indoor environmental problems believe that there are multiple factors contributing to building-related occupant complaints.<sup>6,7</sup> Among these factors are imprecisely defined characteristics of heating, ventilating, and air-conditioning (HVAC) systems, cumulative effects of exposure to low concentrations of multiple chemical pollutants, odors, elevated concentrations of particulate matter, microbiological contamination, and physical factors such as thermal comfort, lighting, and noise.<sup>8-13</sup> Indoor environmental pollutants can arise from either outdoor sources or indoor sources.<sup>14</sup>

There are also reports describing results which show that occupant perceptions of the indoor environment are more closely related than any measured indoor contaminant or condition to the occurrence of symptoms.<sup>15-17</sup> Some studies have shown relationships between psychological, social, and organizational factors in the workplace and the occurrence of symptoms and comfort complaints.<sup>17-20</sup>

Less often, an illness may be found to be specifically related to something in the building environment. Some examples of potentially building-related illnesses are allergic rhinitis, allergic asthma, hypersensitivity pneumonitis, Legionnaires' disease, Pontiac fever, carbon monoxide poisoning, and reaction to boiler corrosion inhibitors. The first three conditions can be caused by various microorganisms or other organic material. Legionnaires' disease and Pontiac fever are caused by Legionella bacteria. Sources of carbon monoxide include vehicle exhaust and inadequately ventilated kerosene heaters or other fuel-burning appliances. Exposure to boiler additives can occur if boiler steam is used for humidification or is released by accident.

Problems NIOSH investigators have found in the non-industrial indoor environment have included poor air quality due to ventilation system deficiencies, overcrowding, volatile organic chemicals from office furnishings, machines, structural components of the building and contents, tobacco smoke, microbiological contamination, and outside air pollutants; comfort problems due to improper temperature and relative humidity conditions, poor lighting, and unacceptable noise levels; adverse ergonomic conditions; and job-related psychosocial stressors. In most cases, however, these problems could not be directly linked to the reported health effects.

Standards specifically for the non-industrial indoor environment do not exist. NIOSH, the Occupational Safety and Health Administration (OSHA) and the American Conference of Governmental Industrial Hygienists (ACGIH) have published regulatory standards or recommended limits for occupational exposures.<sup>21-23</sup> With few exceptions, pollutant concentrations observed in the office work environment fall well below these published occupational standards or recommended exposure limits. The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) has published recommended building ventilation design criteria and thermal comfort guidelines.<sup>24,25</sup> The ACGIH has also developed a manual of guidelines for approaching investigations of building-related complaints that might be caused by airborne living organisms or their effluent.<sup>26</sup>

Measurement of indoor environmental contaminants has rarely proved to be helpful in determining the cause of symptoms and complaints except where there are strong or unusual sources, or a proved relationship between a contaminant and a building-related illness. The usual low-level concentrations of particles and variable mixtures of organic materials found are troublesome to understand. However, measuring ventilation and comfort indicators such as carbon dioxide ( $\text{CO}_2$ ), temperature and relative humidity, is useful in the early stages of an investigation in providing information relative to the proper functioning and control of HVAC systems.

#### A. Bioaerosols

Bioaerosols are airborne particles, that are living or were released from a living organism.<sup>26</sup> Exposure limits have not been established for bioaerosols. However, in some cases, this type of contamination can cause or contribute to adverse health outcomes. These outcomes include hypersensitivity pneumonitis (a potentially severe disease) or allergic rhinitis, which can be caused by bacteria, fungi, protozoa and other bioaerosols. Microbial organisms will be found throughout the environment and their presence does not necessarily mean that they are the cause of worker health problems. However, obvious signs of bioaerosol reservoirs, amplifiers and disseminators should be corrected to reduce the potential for these sources to create health problems.

Potential sources include the building HVAC system (stagnant water in condensate pans, filters that become moist, porous acoustical liner in ducts), and water-damaged carpet, ceiling tile and other furnishings. Odor can be another indicator of microbial contamination. If the work area smells moldy, fungi are probably present, and their reservoirs should be identified and removed.<sup>26</sup>

#### B. Carbon Dioxide ( $\text{CO}_2$ )

$\text{CO}_2$  is a normal constituent of exhaled breath and, if monitored, can be used as a screening technique to evaluate whether adequate quantities of fresh air are being introduced into an occupied space. The ASHRAE Standard 62-1989, Ventilation for Acceptable Indoor Air Quality, recommends outdoor air supply rates of 20 cubic feet per minute per person (cfm/person) for office spaces and conference rooms, 15 cfm/person for reception areas, and 60 CFM/person for smoking lounges, and provides estimated maximum occupancy figures for each area.<sup>24</sup>

Indoor  $\text{CO}_2$  concentrations are normally higher than the generally constant ambient  $\text{CO}_2$  concentration (range 300-350 ppm). When indoor  $\text{CO}_2$  concentrations exceed 1000 ppm in areas where the only known source is exhaled breath, inadequate ventilation is

suspected. Elevated CO<sub>2</sub> concentrations suggest that other indoor contaminants may also be increased.

#### C. Temperature and Relative Humidity

The perception of comfort is related to one's metabolic heat production, the transfer of heat to the environment, physiological adjustments, and body temperatures. Heat transfer from the body to the environment is influenced by factors such as temperature, humidity, air movement, personal activities, and clothing. ANSI/ASHRAE Standard 55-1981 specifies conditions in which 80% or more of the occupants will find the environment thermally comfortable.<sup>25</sup> ASHRAE has developed a chart which includes a "comfort zone" considered to be both comfortable and healthful for the majority of the building occupants. This zone lies between 73° and 77°F and 20 to 60% relative humidity. Note, however, that some scientists feel that RH levels below 30% may produce discomfort from dryness.<sup>27</sup> The range is wide because the feeling of comfort is a subjective, individual perception that is related to metabolic heat production, body temperature, and clothing.

### **RESULTS AND DISCUSSION**

#### **Environmental**

A review of the consultant's report showed that considerable environmental monitoring was conducted following the March 31, 1992 humidifier event. In addition to standard IEQ parameters, monitoring included assessing airborne levels of particulate, fibers, bioaerosols, carbon monoxide, ozone, radon, formaldehyde, amine compounds, ethylene glycol and VOCs. These data are summarized below:

- | Particulate: 11µg/m<sup>3</sup> - 90µg/m<sup>3</sup> (minimum - maximum)
- | Fibers (unspecified): None detected - 0.005 fibers/cc
- | Bioaerosols (varies species): 4 - 37 colony forming units/cubic meter (minimum-maximum)
- | Carbon monoxide: None detected - 2 ppm
- | Ozone: <0.02 ppm
- | Radon: 0.2-0.4 picocuries per liter of air
- | Formaldehyde: 0.01 - 0.02 ppm
- | Amine compounds (non-specific): None detected
- | Ethylene glycol: None detected
- | Volatile organic compounds: 50 µg/m<sup>3</sup> to 250 µg/m<sup>3</sup>

These results are all within applicable guidelines (where guidelines have been established), and appear to be typical of non-industrial environments. The results do not suggest the presence of an unusual source of emissions for the above compounds. During the NIOSH survey, the industrial hygiene consultant was continuing to conduct environmental monitoring throughout the building.

Capital Plant Engineering has made numerous modifications to the HVAC system in order to provide additional outside air to occupied spaces. These modifications, implemented in mid-April 1992, include increasing the minimum outside air provided to the systems (>60%), increasing discharge air temperature to provide more air to occupied spaces, removing aesthetic screens on the roof to reduce reentrainment of exhaust air, operating the system on a continuous (24-hour) basis, and installing minimum stops on VAV boxes. Planned changes include providing additional dehumidification capacity. According to Plant Engineering, there

is a question regarding the ability of the HVAC system to provide sufficient conditioned outside air during all climatic conditions (mid-winter, summer), particularly Air Handler Unit #1.

The results of the NIOSH CO<sub>2</sub>, temperature and relative humidity (RH) monitoring are depicted in Table 1. CO<sub>2</sub> levels throughout the building were below the guideline of 1000 ppm on both days. The highest level of CO<sub>2</sub> detected was 925 ppm, in Courtroom 3005 (43 people in courtroom). Temperatures ranged between 70° and 75° F throughout the building. Humidity control was found to be less than ideal. RH was consistently at the high end, or in excess of, the desirable range for both days monitored. RH levels ranged from 58% to 65% throughout the building.

During the HVAC inspection, large quantities of insects were detected downstream of the filters on AHUs 1-4. This would explain concerns voiced by some building occupants that insects and particles are coming out of the ventilation system. The insects are possibly entering the system through leakage around the filter banks or the access doors. Cooling coil condensate pans on AHUs 1, 3 and 4 were not draining properly as standing water was observed. This is a potential source of microbial growth. AHUs 5 and 7 (basement, Data Processing) appeared to be clean and draining properly.

No obvious sources of chemical contaminants were identified near the outside air intakes. The OA intakes for AHUs 5 and 7 are at ground level, more than 75-100 from traffic. Kitchen exhaust odors may possibly become entrained in the intakes for AHUs 1-4 (roof), depending on wind conditions.

Spot pressure checks showed that the pressure in the courthouse is negative with respect to the outside. This means that unconditioned outside air will infiltrate into the building through doorways and other leakage points. Most buildings are operated under positive pressure to allow for better control of temperature and humidity. The basement and mechanical areas were found to be negative with respect to the rest of the building.

There is no current HVAC test and balance report available to assess the impact of the modifications made to the ventilation system. Some "spot" assessments have been conducted. Many of the calculations and subsequent modifications were based on original design criteria, and not actual measurements.

Janitorial activities are typical of those found in other buildings. When necessary, the carpet is cleaned with steam from distilled water (no carpet cleaning chemicals are used). The carpet is also vacuumed every night. No pesticides have been used in the building since the March 31 humidifier incident.

Informal occupant interviews during the building inspection indicated that employees had not been effectively informed regarding management efforts to address IAQ concerns. Environmental monitoring equipment had been placed in work areas without notifying workers of the purpose or results of the sampling. Employees were also unaware of recent engineering efforts to improve the HVAC system. Some employees expressed concern that consultant reports and other findings were not accessible for review.

During the building inspection and subsequent monitoring surveys we noted that despite the no smoking policy, smoking still occurred on all floors, both by building occupants and building users.

Housekeeping throughout the facility appeared to be in good order. No evidence of moisture damaged material (e.g., ceiling tile) was observed. Janitorial closets were well organized.

Instantaneous measurements to assess relative levels of VOCs were obtained in various locations and the results are shown in the following table. All measurements were obtained with the meter at maximum sensitivity, with the unit zeroed prior to sampling. The monitoring indicated only "trace" amounts of VOCs present when compared with outdoor readings; these levels were typical of non-industrial buildings.

Instantaneous Measurements: VOCs  
DuPage Judicial Office Facility  
September 16, 1992

Location	Hnu® Reading (ppm)
Outside Front Entrance	0.5-1
Maintenance Shop	1.5-2
Vault Area, Basement	1.5-2
Data Processing	1.5-2
Chief Circuit Court Judge Office	2
Courtroom 2008	2
State Attorney's Department	1.5-2
Third Floor Corridor	1.5-2
Fourth Floor Corridor	1.5-2

Note: ppm is used here as a relative scale only, and is not indicative of a true concentration of any one contaminant.

### **Medical**

The predominant type of symptoms which occurred among interviewed employees were those that have been found in numerous NIOSH investigations conducted in office environments where there is concern over indoor air quality. These symptoms included headache; runny nose; stuffy nose/sinus congestion; dry throat; dry, itching or irritated eyes; fatigue; and sleepiness. Several employees reported pain or numbness in the shoulder, neck, hands, or wrist. One employee had been evaluated for peripheral neuropathy (a disorder of the nerves); no cause was determined.

A review of all available symptom report logs compiled by the various departments at the judicial center indicated that over 200 of the center's 700 employees reported symptoms between March 27, 1992 and August 31, 1991. These symptoms were primarily those described above. Many of the employees reporting symptoms experienced the symptoms on more than one day, and numerous employees have sought treatment for their symptoms from their physicians.

Reports of building related symptomatology, like those described above, have become increasingly common in recent years; unfortunately the causes of these symptoms have not been clearly identified. As discussed in the evaluation criteria section of this report, many factors are suspected (e.g. volatile organic compounds, formaldehyde, microbial proliferation within buildings, inadequate amounts of outside air, etc.). While it has been difficult to

identify concentrations of specific contaminants that are associated with the occurrence of symptoms, it is felt that by many researchers in the field, that the occurrence of symptoms among building occupants can be lessened by providing a properly maintained interior environment. The NIOSH evaluation identified a few environmental deficiencies at the Judicial Office Facility. The recommendations made in the following section will help to correct these deficiencies and if not already implemented, should be considered before the building is reoccupied.

## **CONCLUSIONS AND RECOMMENDATIONS**

Although no clear environmental causes for the symptoms reported by employees of the DuPage Judicial Office Facility were found, the NIOSH evaluation identified some environmental deficiencies in the Facility. Based on the results and observations of this evaluation, the following recommendations are offered to correct those deficiencies and optimize employee comfort.

1. Identify the mechanism for insects to bypass the HVAC system filters and take corrective actions.
2. Ensure HVAC system drain pans (AHU 1,3,4) are draining properly to prevent the accumulation of standing water.
3. Evaluate the HVAC systems to ensure that sufficient conditioned outside air (using the ASHRAE 62.1989 criteria as a guide) can be provided to occupied spaces during all weather conditions. This assessment should include evaluation of building pressures. A qualified mechanical engineering firm or original HVAC designers should be consulted. Ensure sufficient dehumidification capability is installed (e.g., reheat coils). Conduct a complete test and balance of the system after modifications to ensure that the system operates as intended and designed.
4. Enforce no-smoking policies. The HVAC systems are not isolated and serve many areas.
5. Communication should be improved to ensure employees are kept informed of activities regarding IEQ (e.g., employees should be told why an air sampling device has been placed in their office, and of engineering modifications to improve the HVAC system).
6. Develop and implement an IEQ Management Plan for the building. An IEQ manager or administrator with clearly defined responsibilities, authority, and resources should be selected. This individual should have a good understanding of the building's structure and function, and should be able to effectively communicate with occupants. The elements of a good plan include the following:
  - Proper operation and maintenance of HVAC equipment.
  - Overseeing the activities of occupants and contractors that affect IEQ (e.g., housekeeping, pest control, maintenance, food preparation).
  - Maintaining and ensuring effective and timely communication with occupants regarding IEQ.

- Educating building occupants and contractors about their responsibilities in relation to IEQ.
- Proactive identification and management of projects that may affect IEQ (e.g., redecoration, renovation, relocation of personnel, etc.).

The NIOSH/EPA Building Air Quality Guidance Document should be consulted for details on developing and implementing IEQ management plans.<sup>27</sup>

7. Due to the uncertainty of many employees regarding healthy work conditions at the JOF, some employees may have an understandable reluctance to return to the building. In similar situations, where employees have been temporarily relocated to other worksites because of building-associated health concerns and then asked to re-occupy their original worksite, some employees experienced symptoms upon returning to the building. It is quite possible that this will also occur at the JOF. Thus, it may be advisable to continue providing alternative work sites for individuals who experience health difficulties upon returning to the building. Such work decisions are best made by employees and their physicians in consultation with management officials at the JOF.

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1. Chairman, DuPage County Board
2. Chairman of the Special Committee on the JOF

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**TABLE 1**  
**ENVIRONMENTAL MONITORING RESULTS**  
**CARBON DIOXIDE (CO<sub>2</sub>), TEMPERATURE, RELATIVE HUMIDITY (RH%)**  
**DUPAGE COUNTY JUDICIAL OFFICE FACILITY**  
**WHEATON, ILLINOIS**  
**SEPTEMBER 15-16, 1992**

<b>Location</b>	<b>Date:Time</b>	<b>CO<sub>2</sub> (PPM)</b>	<b>°F</b>	<b>RH%</b>
Maintenance Shop Basement AHU #5	9/16:0830	375	69.9	66
	9/15:1430	425	71.0	58
North End of Basement, Main Hallway AHU #5	9/16:0835	375	70.5	66
	9/15:1431	450	71.0	62
Data Processing Center AHU #7	9/16:0836	425	69.8	65
	9/15:1435	500	71.0	62
Vault Area, North Basement AHU #5	9/16:0837	375	70.6	66
	9/15:1440	425	71.4	64
Microfilm Area, Basement AHU #5	9/16:0838	425	71.2	66
	9/15:1442	425	71.4	63
Courts Clerk, Basement AHU #5	9/16:0839	425	71.3	67
	9/15:1445	475	72.4	63
Main Entrance, first floor AHUs 1-4	9/16:0900	575	73.0	62
	9/15:1450	525	73.5	62
Circuit Court Clerk Imaging Area, first floor AHU #1	9/16:0901	475	72.6	60
	9/15:1451	475	72.8	57
Circuit Court Clerk Imaging Area, first floor AHU #1	9/16:0902	425	72.2	59
	9/15:1453	375	72.8	58
Criminal Traffic, first floor AHU #1	9/16:0903	475	71.7	59
	9/15:1456	500	72.6	56
Probation, first floor, center AHU #2	9/16:0904	475	72.5	60
	9/15:1457	425	73.0	57

TABLE 1, CONTINUED

<b>Location</b>	<b>Date:Time</b>	<b>CO<sub>2</sub> (PPM)</b>	<b>°F</b>	<b>RH%</b>
Probation, first floor, NW AHU #2	9/16:0905	425	72.2	60
	9/15:1458	375	72.9	58
Jury Commission, first floor AHU #3	9/16:0906	575	73.3	61
	9/15:1500	575	73.4	57
New Child Support, first floor AHU #4	9/16:0907	375	72.3	61
	9/15:1501	450	72.2	58
Outside front entrance	9/16:0908	325	74.0	69
	9/15:1502	300	78.7	79
Center escalator area, fourth floor AHU #1-4	9/16:0909	500	74.8	63
	9/15:1503	350	75.2	61
Courtroom 4005 AHU#1	9/16:0910 <sup>1</sup>	525	72.9	60
Courtroom 4002 AHU #2	9/16:0916 <sup>2</sup>	525	72.4	60
Courtroom 4001 AHU #1	9/16:0915 <sup>3</sup>	500	72.4	59
	9/15:1505 <sup>4</sup>	375	72.4	57
Courtroom 4012 AHU #4	9/16:0918 <sup>5</sup>	425	72.3	60
Courtroom 4004 AHU #2	9/16:0917 <sup>6</sup>	625	72.8	60
	9/15:1510	425	71.7	58
Jury room 460 AHU #2	9/15:1515	325	73.6	60
Chamber 463 AHU #2	9/15:1516	425	74.3	59
Chamber 443 AHU #4	9/15:1517	350	74.6	57
PD Copy Room AHU #3	9/15:1522	425	74.8	55
PD Office, Center AHU #3	9/16:0921	425	73.6	59
	9/15:1520	350	73.8	55
Center Escalator area, third floor, AHU #1-4	9/16:0925	500	73.9	57
	9/15:1540	350	72.9	57
State Attorneys office, children division AHU #3	9/16:0928	425	73.5	56
	9/15:1545	325	73.1	56
PD Office, South AHU #3	9/16:0922	425	72.7	58
	9/15:1521	350	73.8	55

TABLE 1, CONTINUED

Location	Date:Time	CO <sub>2</sub> (PPM)	°F	RH%
State Attorneys office, civil division AHU #3-4	9/16:0930	375	72.9	57
	9/15:1544	300	72.6	56
State Attorneys office, felony division AHU #4	9/16:0931	400	73.6	58
	9/15:1546	450	73.5	58
State Attorneys office, misdemeanor division AHU #4	9/16:0932	375	72.9	57
	9/15:1545	400	73.6	57
Courtroom 3007 AHU #1	9/16:0940 <sup>7</sup>	525	72.4	58
	9/15:1532 <sup>8</sup>	400	71.9	55
Chamber 389 AHU #1	9/15:1525	300	72.4	54
Chamber 390 AHU #1	9/15:1530	325	71.6	54
Courtroom 3005 AHU #1	9/16:0910 <sup>9</sup>	900	73.6	59
Courtroom 3002 AHU #2	9/16:0950 <sup>10</sup>	625	73.6	59
	9/15:1535 <sup>11</sup>	400	72.4	57
Chamber 373 AHU #2	9/15:1546	300	73.0	58
Center escalator area, second floor AHU #1-4	9/16:0951	425	73.7	57
	9/15:1549	350	73.9	57
Courtroom 2001 AHU #1	9/16:0952 <sup>12</sup>	500	73.3	57
Courtroom 2005 AHU #1	9/16:0953 <sup>13</sup>	535	73.7	57
Courtroom 2008 AHU #2	9/16:0954 <sup>14</sup>	575	74.3	58
Courtroom 2010 AHU #2	9/16:0955 <sup>15</sup>	775	74.3	59
Courtroom 2020 AHU #4	9/16:1005 <sup>16</sup>	375	72.8	57
Courtroom 2006 AHU #2	9/15:1550 <sup>17</sup>	350	73.9	56
Chief Circuit Court Judges office, AHU #3	9/16:1000	500	73.0	56
	9/15:1600	325	72.7	54
Law Library AHU #3-4	9/16:1007	350	73.0	58
	9/15:1602	325	73.4	55

## NOTES:

PPM = parts per million of gas or vapor per million parts air  
 AHU = air handling unit serving the area monitored

1. 25 people in courtroom
2. 30 people in courtroom
3. 26 people in courtroom
4. 24 people in courtroom
5. 19 people in courtroom
6. 38 people in courtroom

7. 15 people in courtroom
8. 8 people in courtroom
9. 48 people in courtroom
10. 28 people in courtroom
11. 8 people in courtroom
12. 14 people in courtroom
13. 24 people in courtroom
14. 20 people in courtroom
15. 34 people in courtroom
16. 12 people in courtroom
17. 6 people in courtroom