

# **Clemson University Indoor Air Quality Plan**

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## Introduction

Concerns with Indoor Air Quality (IAQ) have increased since energy conservation measures were instituted in office buildings during the 1970s, minimizing the infiltration of outside air and contributing to the buildup of contaminants in the indoor air. IAQ or IEQ (Indoor Environmental Quality) refers to the quality of the air in a work environment, at Clemson this would frequently be an office or classroom. Complaints about IAQ range from simple complaints from comfort issues (too hot/cold/drafty, etc.) and odd smells, to more complex problems, where the air quality may be suspected of causing illness and lost work time.

It may not be easy to identify a single reason for IAQ complaints because of the number and variety of possible sources, causes, and varying individual sensitivities. Nevertheless, Clemson is committed to providing its students and employees an indoor environment free of contaminants and airborne disease agents.

## IAQ Managers

The IAQ effort at Clemson is coordinated by the Director of Environmental Health and Safety. For University buildings under the care of University Facilities (UF), UF has designated the Zone Facilities Manager, David Boyles, as the contact for IAQ issues. Additionally, each zone supervisor acts as the IAQ supervisor for the areas under his/her control.

Clemson has established the Campus Building Water and Air Quality Committee, chaired by Dr. Rose Marie McDonald, M.D., to hear employee complaints and to act as the focal point for Clemson's IAQ efforts. Colleges, Schools and Departments are encouraged to select an IAQ contact; EHS will provide periodic training for these IAQ Ambassadors.

All of the IAQ management have been educated on the contents of *Building Air Quality: A Guide for Building Owners and Facility Managers*, and have received training in the fundamentals of IAQ.

## Conducting periodic walkthroughs to assess the current IAQ situation:

Both EHS and UF conduct periodic walkthrough inspections which involves both occupied areas and mechanical rooms. During the walkthrough, IAQ problem indicators are checked and noted on a floor plan or comparable drawing, including:

- Odors
- Dirty or unsanitary conditions
- Visible fungal growth or moldy odors
- Evident moisture in inappropriate locations (e.g., moisture on walls, floors, or
- Staining or discoloration of building material(s)

- Smoke damage
- Presence of hazardous substances
- Potential for soil gas entry (e.g., cracks or holes in building surfaces adjacent to
- Unusual noises from light fixtures or equipment
- Poorly-maintained filters
- Uneven temperatures
- Overcrowding
- Personal air cleaners (e.g., ozone generators, portable filtration units) or fans
- Inadequate ventilation
- Inadequate exhaust air flow
- Blocked vents
- Other conditions that could impact IAQ, especially risk factors that need regular inspection to prevent IAQ problems from occurring (e.g., drain pans that do not fully drain).

The condition and operations of the HVAC system are inspected, including:

Components that need to be repaired, adjusted, cleaned, or replaced have been, and work orders prepared.

- Actual control settings and operating schedules for each air handling unit have been recorded and filed, and checked against the design intent.
- Areas with significant sources of contaminants (e.g., copy rooms, food service areas, printing/photographic areas) are provided with adequate exhaust. Other sources are moved as close to exhaust as possible.

## **Existing and Potential IAQ Problems**

EHS, UF, and the CBWAQC conduct an ongoing assessment of CU buildings for existing problems. Identified IAQ problems have either been corrected or steps are being taken to control them, including both source related IAQ problems and ventilation related IAQ problems.

## **Training**

University and contract personnel whose functions could impact IAQ (e.g., housekeeping staff, maintenance contractors) have been identified and trained.

EHS provides IAQ training and information via the world wide web to University personnel and contractors - especially regarding use of hazardous chemicals.

## **Plan for Facility Operations and Maintenance**

### **HVAC Operations**

Operating schedules for HVAC equipment, ensuring that the HVAC system is operating during significant occupancy periods, have been written and are updated as needed.

The HVAC operating schedule provides for an adequate flush of the building, with as much outside air as is feasible, prior to occupants' arrival.

### **Housekeeping**

All housekeeping equipment and products used in the building are known to the Zone Supervisor, who in turn keeps the UF IAQ Manager informed. Additionally, Housekeeping maintains an inventory of all chemicals used, and keeps the Chemical Hygienist, Naomi Kelly, updated on the inventory.

The products used at Clemson that may produce strong odors, are potential irritants, or may have other IAQ impacts have been determined, and, where possible, have been replaced by products without such impacts.

The UF Housekeeping Director has written procedures that detail proper use, storage, and purchase of cleaning materials; these are updated as needed.

The housekeeping staff or contractors are educated about the IAQ implications, appropriate use, and application of the following to improve IAQ:

- Proper cleaning methods
- Cleaning schedules

### **Purchasing**

- Proper materials storage and use
- Proper trash disposal.

### **Preventive Maintenance**

A preventive maintenance plan has been written by UF and is followed on a regular schedule; this schedule is updated as needed.

The preventive maintenance plan or contract includes the following maintenance items:

- Outside air intakes are inspected for nearby sources of contaminants
- Air distribution dampers are maintained clear of obstructions and operating properly
- Air filters have the pressure drops monitored, and replacement or cleaning is performed regularly
- Drain pans are inspected and cleaned to ensure proper drainage
- Heating and cooling coils are inspected and cleaned
- Interior of air handling units are inspected and cleaned, as warranted

- Fan motor and belts are inspected and replaced as warranted
- Air humidification and controls are inspected and regularly cleaned
- Cooling towers are inspected, cleaned, and water treated according to schedule

Air distribution pathways and VAV boxes are inspected and cleaned as needed).

The preventive maintenance plan and operations manuals are updated when equipment is added, removed, or replaced.

### **Unscheduled Maintenance**

Procedures for unscheduled maintenance events (e.g., equipment failure) have been written and communicated to building staff. They include:

- Zone maintenance personnel immediately tell the IAQ Manager that a maintenance event has occurred.

The IAQ Manager ensures that notification to occupants is provided in a timely manner, addressing how IAQ is being protected.

- Any necessary remedial action is taken.

### **Management of Processes with Potentially Significant Pollutant Sources**

#### **General Good IAQ Practices**

When new products are purchased, information on potential indoor air contaminant emissions is requested from product suppliers. *[Note: Emission information may not be readily available for many products, however information that is available is collected.]*

When the services of architects, engineers, contractors, or other professionals are used, IAQ concerns, such as special exhaust needs, are discussed.

#### **Remodeling and Renovation**

Special procedures to minimize the generation and migration of contaminants or odors to occupied areas of the building are used and required of contractors.

The special procedures used at Clemson are:

- The appropriate EHS staff and the UF Zone Manager review designs and construction activities for all proposed remodeling and renovation activities prior to their initiation
- Work is scheduled during periods of minimum occupancy
- Ventilation is provided in order to isolate work areas
- Lower-emitting work processes are used (e.g., wet-sanding dry wall)
- Specialized cleaning procedures are used (e.g., use of HEPA vacuums)
- Filters are changed more frequently, especially after work is completed
- Emissions from new furnishings are minimized (e.g., buying lower-emitting airing out furnishings before installation, increased amount and duration of after installation)

- Ventilation and distribution equipment are protected from contamination during construction.

### **Painting**

Exposure to paint vapors is minimized by using low-emitting products, scheduling work during periods of minimum occupancy, and increasing ventilation.

### **Pest Control**

Integrated Pest Management procedures are used to the extent possible:

- The pest control products being used in the building are known to EHS and the Zone Supervisor
- Written procedures and contract language ensure that all people who use pest control products read and follow all label directions for proper use, mixing, storage and disposal.
- Non-chemical pest control strategies are used where possible.
- The safest available pest control products that meet the building's needs are used or reviewed with pest control contractor.

### **Shipping or Receiving Activities (all buildings)**

Vehicle exhaust has been prevented from entering the building (including through air intakes and building openings) by installing barriers to airflow from loading dock areas (e.g., doors, curtains, etc.) and using pressurization to prevent mixing of vehicle exhaust with building air.

In buildings where these barriers have yet to be installed, UF has a plan for implementation.

### **Smoking**

Smoking is prohibited in all Clemson University buildings, subject to the Clemson University Smoking Policy.

### **Maintaining cooperative relations with occupants**

EHS and University Facilities keep occupants routinely informed about building conditions and policies that may impact IAQ (e.g., practices that attract insects or smoking policy clarifications). Additionally, occupants are notified about planned major renovation, remodeling, maintenance or pest control activities.

## **Procedures for Responding to IAQ Complaints**

Clear procedures for responding to IAQ complaints have been written and are followed, including:

- Entries such as IAQ problems are logged into the existing work-order system.
- Information is collected from complainants.
- Information and records obtained from complainants are kept confidential.
- The capability of in-house staff to respond to complaints is assessed.
- Appropriate outside sources of assistance are identified.

Feedback is provided in a timely manner to complainant.

- Remedial actions are taken.
- Remedial actions are followed-up to determine if the action has been effective.
- Building staff have been informed of these procedures.
- Building occupants have been informed of these procedures and are periodically reminded of how to locate responsible staff and how to submit a complaint.