

# UNIVERSITY OF TOLEDO

SUBJECT: INDOOR AIR QUALITY (IAQ) INVESTIGATIONS

Procedure No: HM-08-034

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## PROCEDURE STATEMENT

Indoor Air Quality (IAQ) shall be assessed and maintained in accordance with Occupational Safety and Health Administration (OSHA), American Conference of Governmental Hygienists (ACGIH), Environmental Protection Agency, American Industrial Hygiene Association, American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), and the National Institute for Occupational Safety and Health (NIOSH) recommendations.

## PURPOSE OF PROCEDURE

To provide for continued review and assessment of the institutions indoor air quality, to monitor the program's effectiveness and ability to predict and control potential hazardous material exposures at the University of Toledo.

## GENERAL CONSIDERATIONS

### **Indoor Air Quality Policy**

The University of Toledo is committed to providing a work environment that is free of recognized hazards and to investigate complaints that may be related to poor indoor air quality (IAQ). Acceptable indoor air quality is air in which there are no known contaminants at harmful concentrations as determined by the Environmental Health and Radiation Safety Department and with which a substantial majority of people exposed do not express dissatisfaction.

On campus, cases of Sick Building Syndrome or Building-Related Illnesses are very rare, but occasionally IAQ complaints are received by building occupants. Most IAQ complaints are related to mucous membrane and/or respiratory irritation, headache, or fatigue. Office workers may report irritation of mucous membranes of the eye, nose, and throat. In such cases, eye symptoms include itching, redness, and irritation. Respiratory symptoms include nasal congestion, itching, coughing, and runny nose. Throat symptoms include feelings of dryness and irritation. However, these symptoms are not unique to IAQ issues. In most cases there are no definitive signs or laboratory tests available to differentiate building air quality related symptoms from other causes.

Poor indoor air quality may be caused by vapors, dust generated in the work environment, materials infiltrating from outside sources (such as pollen or engine exhaust), contaminants associated with fungal growth, or deficiencies in the ventilation system. Unfortunately, due to scientific limitations and variations in individual sensitivity, Environmental Health and Radiation Safety is not always able to identify an indoor air quality problem when complaints or symptoms are reported.

Although specific regulations have not been developed for IAQ in the work place, Environmental Health and Radiation Safety considers recommendations from the American Conference of Governmental Industrial Hygienists (ACGIH), American Industrial Hygiene Association (AIHA), American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), and the National Institute for Occupational Safety and Health (NIOSH).

## DEFINITIONS

### **Probable Source of Suspected Contaminant**

In some cases, the contaminant can be identified with reasonable certainty, such as when high carbon monoxide levels are found in an area where the occupants have corresponding symptoms. In other cases, a contaminant will be suspected but cannot be confirmed. For example, because respiratory problems can have many causes, mildew or other molds, even if present, may or may not be the cause of an occupant's symptoms. The wide variation in individual sensitivity to mold creates an additional uncertainty.

Mildew and other molds are often identified by visual observation. When not readily observed, probable mold sources include: dirty ventilation ducts, old air conditioner filters, fabrics in humid environments; and, where water intrusion has occurred, affected carpets, walls, ceiling, and office furnishings.

Another consideration is the magnitude of the probable sources of the suspected contaminant. A small area of old carpeting is less likely to be a problematic mold source than a larger area where flooding had occurred.

### **Area of Concern**

During its investigation, Environmental Health and Radiation Safety will delineate an area of concern for indoor air quality problems and possible remediation. The area of concern will be delineated according to the locations of complainants, the probable source of the suspected contaminant, the design of the HVAC system, and physical barriers.

### **Remedial Measures**

Remedial measures may be confined and temporary, or as extensive as renovation of a building's heating, ventilation, and air conditioning (HVAC) system. Less extensive remedial measures include better housekeeping, replacing furniture, cleaning mildew off of pipes, installing portable dehumidifiers or air cleaners, cleaning window air conditioners, and replacing carpet with tile.

### **Sick Building Syndrome (SBS)**

When the symptoms of respiratory tract and eye irritation, headaches and fatigue are experienced by a sizeable percentage of building occupants (usually more than 20 percent), the situation has become known as Sick Building Syndrome (SBS). Specific causes of SBS remain unknown. Insufficient fresh air (outdoor air) being brought inside is sometimes associated with buildings with SBS. A single cause for SBS is unlikely. Many hypotheses must be considered in determining the cause of complaints in any particular building, including ventilation rates, ventilation system maintenance and type, and a multitude of irritants from occupant activities, microbial contamination, and off-gassing from building furnishings.

### **Building-Related Illness (BRI)**

Building-related illness is very rare, but often more serious than symptoms reported in SBS, and may affect only a small number of building occupants. BRI is characterized by a distinguishable set of common occupant symptoms, often accompanied by physical signs and clinical abnormalities. BRI is confirmed by a physician's diagnosis and may include infections such as legionellosis, toxic syndromes associated with exposure to chemical or physical agents, and hypersensitivity diseases, including hypersensitivity pneumonitis, "humidifier fever," asthma, and allergic rhinitis.

### **Prevention of Indoor Air Quality Problems**

Many IAQ issues can be avoided with timely maintenance and repair of building HVAC systems and rapid response to water intrusion into a building. The drying process of water damaged areas must be started within 48 hours to prevent the initiation of fungal growth. Building occupants should notify Facilities Maintenance as soon as possible of plumbing, roof and foundation leaks or HVAC malfunctions. Facilities Maintenance and Environmental Health and Radiation Safety respond quickly to these problems. Facilities Maintenance will follow the established guidelines for water remediation.

### **Environmental Health and Radiation Safety Indoor Air Quality Investigation**

Evaluation of building related complaints requires the cooperative effort of the complainant, Facilities Maintenance, and Environmental Health and Radiation Safety. Following the initial complaint, Environmental Health and Radiation Safety will interview the complainant to determine if his or her symptoms are potentially related to IAQ problems. When such a potential exists, Environmental Health and Radiation Safety will conduct an IAQ investigation with appropriate Facilities Maintenance staff according to the following procedures. The investigation may lead to plans for remediation.

## **PROCEDURE**

### **Identification of IAQ Problems**

Building occupants who experience irritations that may be related to indoor air quality should complete the "Indoor Environmental Quality" survey form found at [http://www.utoledo.edu/depts/safety/Indoor\\_Environmental\\_Quality.html](http://www.utoledo.edu/depts/safety/Indoor_Environmental_Quality.html). Environmental Health and Radiation Safety will review the form and interview the complainant to determine what further action is needed.

Complaints received by Facilities Maintenance, involving specific symptoms, may be forwarded directly to Environmental Health and Radiation Safety for review. Facility engineers and campus maintenance workers who

identify IAQ problems or risks (e.g., odors, significant mold growth, faulty building humidification systems) can contact Environmental Health and Radiation Safety directly.

### **Initial On-Site IAQ Investigation**

When notified and if warranted, the Environmental Health and Radiation Safety Department will conduct an initial on-site investigation. The following conditions may be evaluated:

- Percentage of outside air being supplied to building
- Location of outside air intake(s)
- Immediate outside environment
- Ventilation rate
- Operation and maintenance of HVAC system
- Relative humidity
- Temperature
- Carbon dioxide level
- Signs of water intrusion including plumbing, roof, and foundation leaks

Environmental Health and Radiation Safety will also evaluate the work area and building for probable sources of contaminants, such as: chemical use and storage, general housekeeping, recent renovations and/or new furnishings, floods, activities in work area, and the building HVAC system. Some investigations will require the assistance of Facilities Maintenance and requests will be made for HVAC measurements by Air Quality staff.

### **Phase II IAQ Investigation**

In some cases, the initial investigation indicates the need for a Phase II IAQ investigation to provide more detailed information regarding the nature of the problem. This phase of the investigation may include the following:

- Monitoring for chemical contaminants
- Detailed HVAC evaluations
- Medical examinations and/or testing at Occupational Medicine Services

### **Limitations of IAQ Investigations**

Sampling methodologies and acceptable limits have been established for many contaminants. However, occupants may continue to experience discomfort at contaminant levels below standards for occupational exposure. Individual sensitivities vary and the ability to measure possible irritants at low concentrations is limited by technology. Thus, irritants may be present at concentrations that are undetected but may cause health effects in sensitive individuals.

Sampling and measuring indoor mold contamination on surfaces is of limited value because mold is found in virtually all environments, and because no consensus or regulatory standards have been established. One of the problems with establishing standards is that individual sensitivity to mold varies greatly.

Because of the small number of occupants and uncontrolled conditions, epidemiological studies are of no or very limited value.

### **Environmental Health and Radiation Safety IAQ Investigation Report and Remedial Measures**

Environmental Health and Radiation Safety will prepare a written report of investigation results where warranted, including conclusions regarding possible causes of the IAQ problems. Copies of the IAQ investigation report will be forwarded to the complainant and his or her supervisor, and other associated units. If Facilities Maintenance has been involved in providing input, or if the report identifies problems related to facilities, then Facilities Maintenance will be provided a Draft Report with the opportunity to review and comment within seven days.

### **Remedial Measure Decision-making**

When indicated, Environmental Health and Radiation Safety will recommend remedial measures. These will be reviewed by Director of Environmental Health and Radiation Safety, the complainant's supervisor, and/or Facilities Maintenance as needed. When visual observations find significant mold in water-damaged environments, controlling and eliminating mold growth will be recommended in accordance with the University of Toledo Mold Prevention and Remediation Guidelines. Environmental Health and Radiation Safety will determine if other IAQ risks are actionable by evaluating four variables:

- Probable source of a suspected contaminant, and its extent or magnitude

- Number of occupants involved with the suspected contaminant, and the severity of their symptoms
- The availability of reasonable and effective measures to mitigate the suspected contaminant
- Time of exposure of the symptomatic employees to the suspected contaminant

When the source of an indoor air quality problem and appropriate remedial measures are difficult to discern, recommendations will rely on the judgment of Facilities Maintenance and Environmental Health and Radiation Safety staff.

#### **Implementation of Occupant-Responsible Remedial Measures**

Remedial action that needs to be implemented by the supervisor should be completed within a reasonable time. This type of action could include, but is not limited to the following; general housekeeping, the purchase of a non-fabric chair, or the relocation of printers or paper storage etc.

#### **Implementation of Other Remedial Measures**

If the remedial measures require building maintenance or repair, Facilities Maintenance will work with Environmental Health and Radiation Safety and the building occupant to implement them.

#### **After Action Environmental Health and Radiation Safety Review**

The complainant's department and/or Facilities Maintenance will notify Environmental Health and Radiation Safety when remedial actions have been completed. The building occupant and his or her department will be responsible for reporting any further problems to Environmental Health and Radiation Safety after this follow-up.

#### **Building Occupants with Continuing IAQ Complaints**

##### **Students with Continuing IAQ Complaints**

Students who experience symptoms after the remedial measures have been implemented should report to the Student Health for a medical evaluation. Student Health/Main Campus Medical Center will work with Environmental Health and Radiation Safety and, when appropriate, the Director of Environmental Health and Radiation Safety to make recommendations for additional follow-up.

##### **Employees with Continuing IAQ Complaints**

Employees who experience symptoms after the remedial measures have been implemented should report the symptoms to their supervisor and may be referred to Occupational Health for a medical evaluation. If an employee presents medical documentation to his or her supervisor from the employee's personal physician, the supervisor should forward the note to Occupational Health.

After review of all reports, Occupational Health will make recommendations to the employee, his or her supervisor, and Environmental Health and Radiation Safety for any additional follow-up. The affected department should not implement any permanent accommodations that the employee's physician has requested until Occupational Health completes an occupational medical assessment and reviews Environmental Health and Radiation Safety IAQ investigation reports. The Human Resources Department and Union Office may also be involved in the decision-making process.

If Occupational Health deem that the medical accommodation for the employee's position is necessary, the employee's supervisor should contact the University's ADA Officer. The ADA Officer will work with the employee's department in determining what accommodations are reasonable under the current essential job functions for that employee.

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