University of Rochester

Indoor Air Quality Program

Revision: July 2017

Revision History:

March 2005: Original document created
June 2011: Reviewed – no changes made
November 2015: Reformatted
July 2017: Reformatted, reviewed

I. PURPOSE

The University recognizes the impact that indoor air quality may have in the workplace. In an effort to provide the University Community with acceptable indoor air quality, Environmental Health and Safety has developed this Indoor Air Quality Program.

Symptoms arising from poor indoor air quality may mimic symptoms commonly associated with a cold, flu or allergies. These symptoms may include upper respiratory irritation, congestion, headaches, nausea, fatigue and itchy or watery eyes. Using occupant interviews, building inspection and air quality testing, Occupational Safety Unit personnel may be able to determine the cause of indoor air quality problems and provide recommendations for remedial actions.

This program establishes procedures for evaluating indoor air quality (IAQ) and provides information to the University Community concerning IAQ.

The objectives of this program include:

- Prevention of illness and adverse health symptoms associated with poor indoor air quality
- Effectively responding to indoor quality complaints and making recommendations for improvement;
- Maintaining indoor air quality within acceptable levels established by consensus guidelines.

II. PERSONNEL AFFECTED

Scope: University wide.

III. DEFINITIONS

Building Material Contamination: Building components treated with a variety of chemicals and preservatives are common sources of indoor air quality problems. Glues and adhesives from new carpet and formaldehyde from new particleboard and upholstery may off-gas and become sources of contamination.

Carbon Dioxide: Carbon dioxide (CO_2) is a major by-product of human respiration and is used as an indicator to evaluate the performance of ventilation systems. Outdoor ambient air in urban areas normally contains about 350 to 500 parts per million (ppm) CO_2. ASHRAE standard 62-1989 (Ventilation for Acceptable Indoor Air Quality) recommends that CO_2 levels be maintained below 1,000 ppm.

Carbon Monoxide: A colorless, odorless, tasteless, poisonous compound that most frequently results from combustion processes.

Contamination From Inside the Building: Contaminants commonly found inside the building include:

- Ozone from copiers
- Cleaning agents
- Formaldehyde from new furniture and carpets
- Sewer gas from dry traps
- Carbon monoxide from improperly maintained or malfunctioning combustion appliances
- Pesticides
- Cosmetics
- Microbial agents from leaks, “water events”, or improperly maintained humidification devices

Contamination From Outside the Building: Contamination commonly found outside of buildings includes:

- Exhaust from motor vehicles
- Fumes from construction or renovation activities

HVAC: Heating, Ventilating, and Air Conditioning (System). This is the equipment that maintains and adjusts temperature and humidity, and supplies fresh air (ventilation) from outside the building to indoor spaces.

Inadequate Ventilation: Inadequate ventilation occurs when an insufficient amount of fresh outside air is supplied to the interior environment and “stale”/contaminated air is not exhausted adequately.

Microbial Contamination: Microbial Contamination may occur in buildings that have been subject to water leaks and other sources of moisture. Contaminants can also be introduced into buildings from stagnant water in HVAC systems and cooling towers. In general, prevention of microbiological contamination is accomplished by eliminating standing water and other sources of moisture (see U of R Mold and Water-Damaged Building Materials Management Policy).

Relative Humidity: Relative humidity levels can affect the release rate of many indoor contaminants, their concentrations in the air, and the potential growth of microbial organisms. Humidity can also have a direct effect on worker comfort. In ASHRAE 55-1981, a “comfort chart” shows an acceptable range of humidity to be from 20 to 60%.

Temperature: Temperature ranges of 73 degrees F to 79 degrees F during the winter months, and 69 to 75 during the summer months are recommended by ASHRAE. These guidelines are intended to achieve thermal conditions in a given environment that at least 80% of persons who occupy that environment will find acceptable or “comfortable”

Volatile Organic Compounds (VOCs): Chemical Compounds emitted as gases from certain solids or liquids. Some VOCs may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times) than outdoors. VOCs are emitted by a wide array of products including paints and lacquers, cleaning supplies, pesticides, building materials and furnishings, office equipment, correction fluids, glues and adhesives, permanent markers, and photographic solutions.

IV. RESPONSIBILITIES

- Environmental Health and Safety investigates indoor air quality complaints and distributes written final reports with recommendations to affected parties.
- University Facilities repairs building structures, HVAC and other building systems and performs regular preventive maintenance to ensure systems are functioning correctly. UR Facilities also makes adjustments, repairs, and modifications to systems to correct improper function.

V. PROCEDURES

IAQ Investigation

- **Phase I Assessment**
  The first step in a typical IAQ investigation is a Phase I or preliminary assessment. Phase I assessments include interviewing occupants and performing a walk-through inspection of the building or area of complaint. The interview(s) can include using an ***employee questionnaire and occupant diary (see appendix II)*** The questionnaire is used to obtain information about the nature of the employee complaints and symptoms and also to determine the magnitude of the problem.

  During the walk-through, building ventilation systems are evaluated and potential sources of contamination are identified. If the immediate cause or source cannot be found, a Phase II assessment is required.

- **Phase II Assessment**
  During a Phase II assessment, common indoor air quality parameters including temperature, relative humidity, TVOC, carbon dioxide and carbon monoxide levels are measured. Frequently, a data-logging study of basic indoor air quality parameters is performed.

  The most commonly cited quantitative measurements of indoor air quality are provided by ***ASHRAE, American Society of Heating and Air Conditioning Engineers*** in standard 62-1989.

- **Phase III Assessment**
  A Phase III Assessment may be performed when a definitive cause for the symptoms cannot be determined during the Phase II Assessment of the investigation.

Phase III Assessments consists of extensive and more specific monitoring and sampling for chemical and/or microbial contaminants. Environmental Health and Safety may contract Phase III Assessments to Professional Indoor Air Consultants. In our final report for a Phase III investigation, our office will typically recommend that the occupant seek the services of an occupational health physician.

VI. REFERENCES

- ASHRAE (American Society of Heating and Air Conditioning Engineers), Standard 62-1989.
- General Duty Clause of the OSH Act of 1970, section 5
- University of Rochester Mold and Water-Damaged Building Materials Management Policy

VII. APPENDICES/FORMS

- Appendix I – Occupant Interview
- Appendix II – Occupant Diary

Appendix I – Indoor Air Quality Program

OCCUPANT INTERVIEW

Location:

Occupant name:

Date:

SYMPTOM PATTERNS

What kind of symptoms or discomfort are you experiencing?

Are you aware of other people with similar symptoms or concerns? Yes___ No___

If so, what are their names and locations?_____

_____

Do you have any health conditions that make you particularly susceptible to environmental problems?

___Wear contact lenses ___Chronic respiratory problems

___ Allergies ___ Immune system suppressed

TIMING PATTERNS

When did your symptoms start?

Do they go away? If so, when?

Have you noticed any other events (such as weather events, temperature or humidity changes, or activities in the building) that tend to occur around the same time as your symptoms?

SPATIAL PATTERNS

Where are you when you experience symptoms or discomfort?

Where do you spend most of your time in the building/office/lab?

ADDITIONAL INFORMATION

Do you have any observation about building conditions that might need attention or might help explain your symptoms (e.g., temperature, humidity, drafts, stagnant air, odors)?

Have you sought medical attention for your symptoms?

Do you have any other comments?

Appendix II – Indoor Air Quality Program

OCCUPANT DIARY

Occupant Name:

Location:

Date:

On the form below, please record each occasion when you experience a symptom of ill health or discomfort that you think may be linked to an environmental condition in this location.

It is important that you record the time and date and your location within the building as accurately as possible, this will help to identify conditions (e.g., equipment operation) that may be associated with your problem. Also, please try to describe the severity of your symptoms (e.g., mild, severe) and the duration. Any other observations that you think may help in identifying the cause of the problem should be noted in the “comments” column. Feel free to attach additional pages or use more than one line for each event if you need more room to record your observations.

Time/Date	Location	Symptom	Severity/Duration	Comments