

Note to Building Owners and Facility Managers

From marketing and negotiating leases and maintenance contracts to planning for future expansion, operating a commercial or public building is a complex process that leaves you little time for unnecessary activities. Working with your facility staff, you make an effort to provide a pleasant setting and are accustomed to dealing with occupant complaints about room temperature, noise, plumbing system problems, and other elements of the building environment.

A healthy indoor environment is one in which the surroundings contribute to productivity, comfort, and a sense of health and well being. The indoor air is free from significant levels of odors, dust and contaminants and circulates to prevent stuffiness without creating drafts. Temperature and humidity are appropriate to the season and to the clothing and activity of the building occupants. There is enough light to illuminate work surfaces without creating glare and noise levels do not interfere with activities. Sanitation, drinking water, fire protection, and other factors affecting health and safety are well-planned and properly managed.

Good air quality is an important component of a healthy indoor environment. For the purposes of this document, the definition of good indoor air quality includes:

- n introduction and distribution of adequate ventilation air
- n control of airborne contaminants
- n maintenance of acceptable temperature and relative humidity

A practical guide to indoor air quality (IAQ) cannot overlook temperature and humidity, because thermal comfort

concerns underlie many complaints about “poor air quality.” Furthermore, temperature and humidity are among the many factors that affect indoor contaminant levels.

It is important to remember that while occupant complaints may be related to time at work, they may not necessarily be due to the quality of the air. Other factors such as noise, lighting, ergonomic stressors (work station and task design), and job-related psychosocial stressors can — individually and in combination — contribute to the complaints. These problems are briefly addressed in this document.

Good indoor air quality enhances occupant health, comfort, and workplace productivity. Rental properties can gain a marketing advantage if they are known to offer a healthy and pleasant indoor environment. Failure to respond promptly and effectively to IAQ problems can have consequences such as:

- n increasing health problems such as cough, eye irritation, headache, and allergic reactions, and, in some rare cases, resulting in life-threatening conditions (e.g., Legionnaire’s disease, carbon monoxide poisoning)
- n reducing productivity due to discomfort or increased absenteeism
- n accelerating deterioration of furnishings and equipment
- n straining relations between landlords and tenants, employers and employees
- n creating negative publicity that could put rental properties at a competitive disadvantage
- n opening potential liability problems (*Note:* Insurance policies tend to exclude pollution-related claims)

Provision of good air quality requires conscientious effort by both building staff and occupants. The commitment to address IAQ problems starts with the building owner or facility manager, the person who has an overview of the organization, sets policy, and assigns staff responsibilities. You have the authority to see that an IAQ policy is articulated and carried out, the ability to identify staff with skills that enable them to react promptly and effectively to complaints, and the incentive to initiate a program that will prevent indoor air problems in the future. As you decide how best to respond to the challenge of preventing and resolving indoor air quality problems in your building, it will be helpful to keep in mind the following thoughts:

It is important to establish a process that encourages an active exchange of information.

Without an open communications policy, an atmosphere of distrust may be created that complicates your efforts to diagnose and correct problems.

Facility staff are in a position to notice malfunctioning equipment or accidental events that could produce indoor air quality problems.

They can play a critical role in identifying problem situations and averting IAQ crises. On the other hand, if staff are not aware of IAQ issues, their activities can also create indoor air quality problems.

Facility staff are often instructed to keep energy costs to a minimum.

Changes in building operation intended to save energy have sometimes contributed to IAQ problems (for example, by reducing the flow of outdoor ventilation air without taking action to maintain the quality of the recirculated air). The correction of IAQ

problems has sometimes led to reduced energy use due to the efficiency associated with a cleaner, and better controlled heating, ventilation, and air conditioning (HVAC) system. The energy needed to condition and distribute ventilation air is only a small part of total building energy consumption and is far overshadowed by other operating costs (such as personnel). Attempting to limit operating costs by reducing ventilation can be a false economy, if it leads to problems such as increased occupant complaints, reduced productivity, and absenteeism.

Every complaint merits a response.

Many indoor air quality problems are not difficult to correct and can be solved with in-house expertise. However, gathering relevant information about the problem and identifying appropriate corrective actions is likely to require a coordinated effort by people with a variety of skills.

An indoor air quality problem may be the direct or indirect result of an apparently minor modification.

Actions such as the placement of interior room dividers, the introduction of new office equipment, and personal activities such as cooking can have an impact on indoor air quality. Communication between building management and building occupants regarding their respective responsibilities is a critical element in the management of indoor air quality.

Indoor air quality in a large building is the product of multiple influences, and attempts to bring problems under control do not always produce the expected result.

Some indoor air quality problems are complex and may require the assistance of outside professionals. When contracting for services, you need to be an informed client to avoid unnecessary costs and delays in solving the problem.

If there is reason to believe that an IAQ problem may have serious health implications, appropriate experts such as occupational physicians, industrial hygienists, and mechanical engineers should be called in as soon as possible.

In-house investigations by non-professionals are not recommended in such cases (e.g., if individuals are being hospitalized because of exposure inside the building).

Public and commercial buildings can present a wide range of IAQ problems.

The variety of unique features in their design and usage (e.g., apartment buildings, hospitals, schools, shopping malls) make a wide range of IAQ problems possible. In apartment buildings, for example, each residential unit can produce cooking odors and the operation of kitchen exhaust fans is generally outside the control of building management. The basic informa-

tion and problem-solving processes in this guide can be applied, with necessary adaptations, to a wide range of building types.

This document was written to be a useful resource for you and your staff in preventing and resolving occupants' complaints that may be related in some way to the quality of the indoor air. It provides background information followed by "how-to" guidance for you and your in-house staff. The practical problem-solving techniques it describes have been applied successfully by NIOSH and other investigators. If complaints are not resolved after careful application of this guidance, outside help will probably be needed. Information on possible sources of outside help is included. As you read this document, or turn it over to your staff to implement, EPA and NIOSH urge you to maintain a personal involvement in this issue.

SELECTED INDOOR
AIR QUALITY
PROBLEMS

This box is provided to help building owners and facility managers get acquainted with examples of IAQ problem indicators and associated responses. Some IAQ problem situations require immediate action. Other problems are less urgent, but all merit a response.

**Problems Requiring
Immediate Action**

There have been complaints of headaches, nausea, and combustion odors.

Carbon monoxide poisoning is a possibility. Investigate sources of combustion gases right away.

One or more occupants of your building have been diagnosed as having Legionnaire's disease.

This is a potentially life-threatening illness. Request Health Department assistance in determining whether your building may be the source of the infection.

Staff report that water from a roof leak has flooded a portion of the carpeting.

If damp carpeting cannot be lifted and thoroughly dried within a short time, it might need to be discarded. Proper cleaning and disinfection procedures must be used to prevent the growth of mold and bacteria that could cause serious indoor air quality problems.

**Problems That
Require A
Response, But
Are Not
Emergencies**

Inspection of the humidification system reveals an accumulation of slime and mold. There have been no health complaints suggesting IAQ problems.

Inadequately maintained humidifiers can promote the growth of biological contaminants. Clean equipment thoroughly, and consider modifying maintenance practices.

A group of occupants has discovered that they share common symptoms of headaches, eye irritation, and respiratory complaints and decided that their problems are due to conditions in the building.

The symptoms described suggest an IAQ problem that is not life-threatening, but it would be wise to respond promptly.

Immediately after delivery of new furnishings (furniture or carpeting), occupants complain of odors and discomfort.

Volatile compounds emitted by the new furnishings could be causing the complaints.

Local news articles suggest that some buildings in the area have high indoor radon levels.

The only way to determine the indoor radon concentration in a given structure is to test in appropriate locations.

You wonder whether some old pipe insulation contains asbestos.

Asbestos can be positively identified only by laboratory analysis.