

## **INDOOR AIR QUALITY MANAGEMENT IN OWNED AND SUPPORTED INFRASTRUCTURE**

### **INTRODUCTION**

Indoor Air Quality (IAQ) has become an increasing area of focus over the past 10 to 20 years, driven by growing expectations for healthy and comfortable indoor environments among building occupants.

Concerns regarding perceived declines in indoor environmental conditions are often associated with increased building envelope airtightness, reduced ventilation rates, and the use of synthetic construction materials, finishes, and furnishings, as well as elevated levels of outdoor and indoor air contaminants. When indoor environmental conditions are not adequately maintained, occupant comfort, job satisfaction, productivity, and overall health may be adversely affected.

### **POOR AIR QUALITY AND HEALTH EFFECTS**

#### **Acute Effects**

Some health effects may occur shortly following a single exposure or repeated exposure to airborne contaminants. These can include irritation of the eyes, nose, and throat, as well as headaches, dizziness, and fatigue. Such acute effects are typically short-term and may resolve once exposure is reduced or eliminated, particularly when the contaminant source can be identified and controlled. In some cases, exposure to indoor contaminants may trigger, exacerbate, or worsen pre-existing respiratory conditions such as asthma.

Individual response to indoor air contaminants varies considerably depending on personal sensitivity. Some individuals may become sensitized to biological or chemical agents following repeated or high-level exposures.

It is also important to note that certain acute symptoms associated with indoor air exposure may be non-specific and can resemble those of common colds or other viral illnesses.

### **Chronic Effects**

Some health effects may occur shortly after a single exposure or repeated exposure to airborne contaminants, including irritation of the eyes, nose, and throat, as well as headaches, dizziness, and fatigue.

While a range of pollutants commonly present in indoor air have been associated with adverse health outcomes, there remains significant uncertainty regarding the specific concentrations and exposure durations required to elicit particular health effects.

### **IAQ ASSESSMENTS**

A range of measures can be implemented to maintain and improve IAQ. In most cases, IAQ issues can be prevented through effective building maintenance practices and addressed through relatively simple, cost-effective corrective actions.

It is also important to recognize that occupant complaints are not always attributable to environmental conditions; factors such as ergonomics or psychosocial stressors may contribute to reported symptoms or concerns. Where an apparent cause cannot be readily identified, a more comprehensive technical investigation may be warranted.

In such cases, IAQ assessment typically focuses on key environmental parameters to identify potential contributing factors. These parameters may include, but are not limited to:

- Carbon dioxide (CO<sub>2</sub>), as an indicator of ventilation effectiveness and air distribution within the occupied space;
- Carbon monoxide (CO), as an indicator of potential infiltration of combustion by-products;
- Temperature and relative humidity, as measures of thermal comfort and environmental conditions;
- Particulate matter, as an indicator of filtration performance and general airborne dust loading;

- Total volatile organic compounds (TVOCs) and formaldehyde, as indicators of off-gassing from building materials, finishes, and furnishings; and
- Noise levels and illuminance, as indicators of acoustic and visual comfort conditions affecting occupants.

### WHO SHOULD INVESTIGATE

Multiple stakeholders may be involved in the identification and resolution of IAQ concerns, including building owners, property managers, and building occupants.

The IAQ response process is initiated following the receipt of an expressed concern regarding indoor environmental conditions. Such concerns may be reported through various communication channels but should be formally directed to building management for appropriate follow-up and coordination.

IAQ issues typically involve both technical and health related components. Addressing only the technical aspects may not fully resolve occupant concerns, as perceived health effects and uncertainty can contribute to the persistence or escalation of complaints, even where environmental measurements are within acceptable limits.

IAQ assessments and related testing activities should be conducted by qualified and competent personnel with demonstrated expertise in indoor environmental quality investigations.

Individuals responsible for conducting measurements, interpreting results, and evaluating findings should possess a thorough understanding of applicable methodologies and building science principles.

Typical qualifications for occupational hygiene professionals engaged in IAQ investigations may include, but are not limited to:

- Certified Industrial Hygienist (CIH)
- Registered Occupational Hygienist (ROH)
- Certified Industrial Hygiene Technologist (CIHT) / Registered Occupational Hygiene Technologist (ROHT)
- Canadian Registered Safety Professional (CRSP)

- Doctorate's (PhD), Master's (MSc), Bachelor's (BSc), or Diploma in a relevant discipline
- Certified Public Health Inspector of Canada (CPHI(C)).

### COMMUNICATION

Throughout the response process, timely and consistent communication is essential to maintaining transparency and building trust with affected occupants. Updates regarding the investigation and any associated corrective actions should be communicated to the individual who initiated the concern.

It is important that complainants are advised that their concerns are being formally acknowledged, appropriately investigated, and that progress toward resolution will be communicated as the process advances.

Where concerns persist despite investigation and mitigation efforts, individuals may be advised to consult a qualified healthcare professional to ensure that all potential contributing factors to their symptoms are appropriately evaluated.

Effective resolution of IAQ related concerns relies on ongoing communication and information sharing among all relevant parties throughout the investigation process.

### APPLIED ECOSCIENCES UNIT

#### Typical Support Services

The Applied Ecosciences Unit provides technical expertise, advisory services, and program support for the assessment, investigation, and management of indoor air quality (IAQ) within built environments. Services are intended to assist facility stakeholders in identifying potential IAQ concerns, evaluating contributing factors, and implementing appropriate corrective and preventive measures. Services include, but are not limited to:

1. Conducting comprehensive indoor air quality investigations and field assessments, including data collection, analysis and interpretation of results;

2. Preparation of detailed scopes of work, technical specifications, and supporting documentation for IAQ-related projects and remediation activities;
3. Development and delivery of specialized IAQ workshops and technical sessions for facility personnel, contractors, and project stakeholders;
4. Provision of IAQ awareness and educational presentations to enhance understanding of indoor environmental quality risks, drivers, and management strategies; and
5. Design and delivery of structured IAQ training programs aimed at building organizational capacity in indoor air quality assessment and management practices.

These services support the proactive management of indoor air quality and helps maintain a safe and healthy environment as well as support building operations and integrity of Government facilities while maintaining compliance with applicable regulatory requirements and industry best practices.

## CONTACT INFORMATION

### Technical Services Branch

The above services may be provided by Alberta Infrastructure and/or a private occupational hygiene consultant.

Where the engagement of an external consultant is identified as the preferred delivery model, the Applied Ecosciences Unit can provide technical support in the development of the project scope, preparation of detailed terms of reference, and oversight support throughout project implementation and construction activities.

Additionally, our Unit offers a comprehensive range of applied indoor air quality and occupational hygiene advisory services to support project planning, regulatory compliance, assessment, and operational execution.

For information or assistance, contact the Manager of Applied Ecosciences Unit at 780-422-7472.