



NDSU UNIVERSITY POLICE AND SAFETY OFFICE

INDOOR AIR QUALITY PROGRAM

Revised January 29, 2024

Abstract

NDSU recognizes the impact that indoor air quality (IAQ) has in the workplace and is committed to providing each employee a safe place of employment. In an effort to provide the NDSU community with the optimum level of indoor air quality, the Safety Office has developed an Integrated Indoor Air Quality Program designed to provide employees with information and tools needed to address Indoor Air Quality concerns.

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Introduction

Overview

Welcome to the North Dakota State University Indoor Air Quality (IAQ) Program. This Program is designed to provide North Dakota State University employees with information and tools needed to address Indoor Air Quality (IAQ) concerns at our facilities. This section begins by addressing the following questions:

- What is Indoor Air Quality?
- What is Acceptable Indoor Air Quality?
- What Affects Indoor Air Quality?
- How Does North Dakota State University Manage Indoor Air Quality?
- Who Can I Contact for Assistance?

What is Indoor Air Quality?

The Environmental Protection Agency (EPA) define Indoor Air Quality (IAQ) as:

“The temperature, humidity, ventilation and chemical or biological contaminants of the air inside a building.”

Indoor air quality (IAQ) refers to the quality of the air inside buildings as represented by concentrations of pollutants and thermal (temperature and relative humidity) conditions that affect the health, comfort, and performance of occupants.

The growing proliferation of chemical pollutants in consumer and commercial products, the tendency toward tighter building envelopes and reduced ventilation to save energy, and pressures to defer maintenance and other building services to reduce costs may foster indoor air quality problems.

To learn more about IAQ check out the section [Indoor Air Quality Information](#).

What is acceptable IAQ?

The American Society of Heating Refrigeration and Air conditioning Engineers, Inc. (ASHRAE) defines Acceptable Indoor Air Quality as air in which there are not known contaminants at harmful concentrations by cognizant authorities and with which a substantial majority (80% or more) of the people exposed do not express dissatisfaction.

Buildings exist to protect people from the elements and to otherwise support human activity. Buildings should not make people sick, cause them significant discomfort, or otherwise inhibit their ability to perform. However, it must be understood that not all occupants may be "satisfied" with how effectively a building functions.

To learn more about IAQ check out the section [Indoor Air Quality Information](#).

How does North Dakota State University Manage IAQ?

Managing a building is a difficult and complex job. There are many competing demands - health and safety, building maintenance, housekeeping, and communications with occupants. If indoor air quality is not well managed on a regular basis, the resolution of problems can be extremely costly. So, it helps to understand the causes and consequences of indoor air quality and to manage a building to avoid problems.

Maintaining a healthy and comfortable indoor environment in any building requires integrating many components of a complex system. Indoor air quality problems are often preventable and/or solvable.

North Dakota State University has implemented a practical and integrated IAQ management approach for its facilities. The core objective of North Dakota State University's approach is to provide resources to accomplish the following:

- Provide educational resources to employees interested/concerned with IAQ.
- Provide resources to resolve IAQ concerns.
- Provide resources to prevent IAQ concerns.

The basis for this approach is contained in three widely recognized IAQ references:

- [EPA's-Building Air Quality: A Guide for Building Owners and Facility Managers](#),
- [Building Air Quality Action Plan](#), and
- [Indoor Air Quality Building Education and Assessment Model \(IBEAM\)](#)

It is worth noting that the approach emphasizes changing how a building is operated and maintained, not increasing the amount of work or cost associated with those activities. Good IAQ does not have to compete with other building management priorities; in fact, it can enhance some. For example, the efficiencies gained by keeping your HVAC system clean and better controlled both enhance IAQ and reduce energy costs.

To promote the use of these straightforward approaches, North Dakota State University has implemented an IAQ Standard Operating Procedure (SOP), developed procedures to address IAQ concerns and has made IAQ information readily available:

- [IAQ Standard Operating Procedure \(SOP\)](#)
- [IAQ Procedures](#)
- [IAQ Information](#)

In order to use this approach effectively, one must have a thorough understanding of the concepts and practice of managing indoor air quality. An understanding can be gained from a thorough reading of our IAQ Standard Operating Procedure (SOP). The Standard Operating Procedure (SOP) outlines procedures to be followed by occupants, supervisors and IAQ Coordinator when IAQ concerns arise. In addition, there is extensive referencing to other IAQ information, making it helpful and easy to implement

the procedures of the North Dakota State University IAQ Standard Operating Procedure (SOP).

IAQ Contact Information:

IAQ Coordinator: Environmental Health and Safety (UPSO)

Telephone: 701-231-7759

Email: nds.police.safety@nds.edu

Address: 1523 12th Ave N, Fargo, ND 58102

IAQ Standard Operating Procedure

Purpose

The purpose of this Standard Operating Procedure (SOP) is to provide the North Dakota State University buildings with the optimum level of indoor air quality (IAQ).

Standards for Indoor Air Quality

North Dakota State University is dedicated to providing a safe workplace and this Standard Operating Procedure (SOP) was developed from and relies on applicable components of:

- Occupational Safety and Health Administration (OSHA) standards,
- American Society of Heating, Refrigeration and Air conditioning Engineers (ASHRAE) standard 62-1989 (Ventilation for Acceptable Indoor Air Quality)
- Environmental Protection Agency, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and National Institute for Occupational Safety and Health guidance (Building Air Quality A Guide for Building Owners and Facility Managers, Building Action Plan and Indoor Air Quality Building Education and Assessment Model {IBEAM}).

Objectives

The objectives of this Standard Operating Procedure (SOP) include the following:

- To prevent illness, injury, and adverse health symptoms associated with poor indoor air quality.
- To respond to indoor air quality complaints effectively and to make recommendations for improvement.
- To maintain indoor air quality within acceptable levels according to consensus guidelines.
- To provide information to employees about indoor air quality.
- To designate a North Dakota State University indoor air quality (IAQ) Coordinator.

General

North Dakota State University is committed to providing each employee a safe place of employment. North Dakota State University will take actions to keep the workplace free of recognized hazards that cause, or are likely to cause, death or serious physical harm and, when available, will employ feasible means that will eliminate or materially reduce the recognized workplace hazard.

North Dakota State University recognizes the impact that indoor air quality has in the workplace. In an effort to provide the North Dakota State University Community with the optimum level of indoor air quality, the Office of Safety and Environmental Health has developed an indoor air quality Standard Operating Procedure (SOP). In addition, North Dakota State University will designate an indoor air quality (IAQ) Coordinator: Environmental Health and Safety (UPSO).

Factors Associated with Poor Indoor Air Quality

Factors associated with poor indoor air quality problems can include:

- Inadequate ventilation
- Contamination from inside buildings
- Contamination from outside the building
- Bioaerosol/Microbial contamination
- Building material contamination

Inadequate Ventilation:

Inadequate ventilation occurs when an insufficient amount of fresh outside air is supplied to the interior environment. Inadequate ventilation can occur when ventilation systems have not been designed to account for building remodeling and or additions.

Contamination from inside buildings:

Contaminates commonly found inside buildings include:

- Ozone from copiers and fax machines
- Pesticides
- Cleaning agents
- Tobacco smoke
- Sewer gas from dry traps
- Cosmetics

Contamination from outside the building:

Contaminates commonly found outside of buildings include:

- Exhaust from motor vehicles
- Fumes from construction or renovation (roofing & street paving projects)

Bioaerosol/Microbial Contamination:

Fungus (mold), a common bioaerosol contamination, occurs in buildings that are susceptible to water leaks and other sources of moisture. Contaminants can also be introduced into buildings from stagnant water in HVAC air distribution systems and cooling towers. In general, prevention of microbiological contamination is accomplished by controlling sources of moisture.

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 carpeting and formaldehyde, to new particleboard and upholstery, may off-gas and become sources of contamination.

Symptoms Associated with Poor Indoor Air Quality

Typical symptoms arising from poor indoor air quality often mimic those 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.

According to the EPA, there are two common ailments associated with poor indoor air quality:

- Sick Building Syndrome (SBS)
- Building Related Illness (BRI)

Sick Building Syndrome (SBS):

This term is used to describe situations in which building occupants experience acute health and comfort effects that appear to be linked to time spent in a building, but no specific illness or cause can be identified. The complaints may be localized in a particular room or zone, or may be widespread throughout the building.

Symptoms of SBS include:

- Headaches, eye, nose, or throat irritation, dry cough, dry or itchy skin, dizziness and nausea, difficulty in concentrating, fatigue, and sensitivity to odors.
- Most of those affected, report relief after leaving the building.
- The cause of symptoms is unknown.

Building Related Illness (BRI):

In contrast to SBS, BRI is a diagnosable illness that can be attributed directly to airborne building contaminants.

Indicators of BRI include:

- Building occupants complain of symptoms such as cough, chest tightness, fever, chills, and muscle aches.
- The symptoms can be clinically defined and have clearly identifiable causes.
- Complainants may require prolonged recovery times after leaving the building.

Multiple Chemical Sensitivity:

Multiple Chemical Sensitivity is another term often used when a person believes they are sensitive to very low concentrations of a variety of chemicals, and the exact diagnosis is rarely defined in this condition.

Response to Indoor Air Quality Concerns

A primary goal of this Standard Operating Procedure (SOP) includes actions that focuses on identifying and resolving IAQ issues in a manner that prevents them from reoccurring, and avoids the creation of other problems.

The following resources provide in-depth, step-by-step actions that are effective in combating IAQ problems:

Reporting Procedure for Indoor Air Quality Concerns:

1. Affected employee (occupant) suspects, identifies and/or experiences an indoor air quality concern.
2. Affected associate reports issue to immediate supervisor by using *IAQ Concern Form*.

Response to Indoor Air Quality Concerns:

Initial Response

1. Supervisor investigates reported issue and attempts to determine cause, and
2. IF the cause of IAQ issue is identified and confirmed by visual inspection, (i.e. water leak):
 - a. Supervisor takes corrective action by initiating request for repair or maintenance services.

OR

3. IF the cause of IAQ issue is UNKNOWN or cannot be confirmed by visual inspection, then:
 - a. Supervisor completes *Supervisor IAQ Questionnaire* and submits completed questionnaire to IAQ Coordinator

THEN

4. North Dakota State University IAQ Coordinator will initiate IAQ Investigation procedures within 14 days. Supervisors and affected occupants will be kept informed of progress and/or results throughout the investigation process.

Initial IAQ Investigation

1. IAQ Coordinator completes initial investigation form for the building/area site for the purpose of identifying and confirming the cause of the IAQ and if confirmed, initiates corrective actions for any cause of the IAQ issue. Then reports results and or corrective action to IAQ Coordinator, supervisor and employees

AND MAY

2. Consult with North Dakota State University facility services or HVAC contractor for additional investigation advice/assistance with HVAC system.

THEN

3. IAQ Coordinator records results of Initial IAQ Investigation and begins Phase I IAQ Investigation if determined appropriate.

AND

4. IAQ Coordinator reports all activities/results/conclusions/actions to all affected employees

Phase I IAQ Investigation

The Phase I IAQ Investigation is a three-step process which is completed by, or under the supervision of the North Dakota State University IAQ Coordinator. The steps include:

- Interviewing ALL building/area occupants using the *Employee IAQ Questionnaire*.
- Performing an additional walk-through inspection of the building/area.
- Completing *IAQ Hypothesis Form*.

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 may be evaluated and potential sources of contamination are identified. The *IAQ Hypothesis Form* evaluated this data in an attempt to determine the cause or source of the IAQ concern.

If the immediate cause or source for the IAQ concern cannot be identified and confirmed at the completion of Phase I IAQ Investigation, a Phase II IAQ Investigation may be initiated and conducted by or under the supervision of the North Dakota State University IAQ Coordinator.

Phase II IAQ Investigation

During a Phase II IAQ Investigation, common indoor air quality parameters including temperature, humidity, carbon monoxide and carbon dioxide levels may be measured. The most commonly cited quantitative measurements of indoor air quality are provided

by ASHRAE, American Society of Heating and Air Conditioning Engineers, as presented in standard 62-1989.

Carbon Dioxide

Carbon dioxide (CO₂), a major product of human respiration, is used as an indicator to evaluate the performance of ventilation systems. Ordinary outside air in urban areas normally contain about 350 to 400 parts per million (ppm). ASHRAE standard 62-1989 (Ventilation for Acceptable Indoor Air Quality) recommends that CO₂ levels be maintained below 1000 ppm.

Temperature

Temperature ranges of 73 F to 79 F during the winter months, and 69 to 75 during 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 it acceptable or "comfortable."

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%.

Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless, and toxic gas. Incomplete combustion of liquid fuels (gasoline, kerosene or propane) solid fuels (wood, charcoal, and coal), or natural gas produces CO. Indoor levels of CO are generally similar to levels found in the air outside of the occupied building. The current regulatory permissible exposure limit (PEL) as set by the Occupational Safety and Health Administration (OSHA) is 50 ppm.

If the immediate cause or source for the IAQ issue cannot be identified and confirmed at the completion of Phase II IAQ Investigation, a Phase III IAQ Investigation may be initiated and conducted by or under the supervision of the North Dakota State University IAQ Coordinator.

Phase III IAQ Investigation

A Phase III IAQ Investigation is performed when a definitive cause for the symptoms cannot be determined from previous investigations. Phase III IAQ Investigations consist of extensive and more specific monitoring and sampling for chemical and /or microbial contaminants in accordance with Building Air Quality: A guide for Building Owners and

Facility Managers methodologies, standard and customary industrial hygiene practices and NIOSH and OSHA sampling and analytical procedures.

All results, conclusions and recommendations will be documented and reported to all affected employees. If the immediate cause or source for the IAQ issue cannot be identified and confirmed at the completion of Phase III IAQ Investigation and employee/occupant concerns still exist, expertise from outside North Dakota State University MAY become involved.

Occupancy of Workplace with IAQ Concern(s):

North Dakota State University IAQ Coordinator will initiate actions to maintain a safe workplace by evaluating and controlling recognized hazardous conditions and activities that may cause injury to an employee. The response to, and evaluation of workplace safety related to IAQ issues will rely on the North Dakota State University Standard Operating Procedure (SOP) & applicable elements of Occupational Safety and Health Administration, American Society of Heating, Refrigeration and Air conditioning Engineers, Environmental Protection Agency, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and National Institute for Occupational Safety and Health standards and recommendations.

At any time during response to an indoor air quality concern, and/or upon completion of a workplace evaluation, and/or when information from any source becomes available to indicate the presence of work place hazard(s) that may cause injury: North Dakota State University IAQ Coordinator may determine that a workplace is "unsafe" due to an IAQ issue. This determination may be based on:

- Associate exposure levels in excess of OSHA permissible exposure levels and/or NIOSH or ACGIH recommended exposure levels.
- IAQ conditions not satisfying ASHRAE Standard 62-1989 definition for acceptable IAQ "Air in which there are no known contaminants at harmful concentrations as determined by cognizant authorities and with which a substantial majority (80% or more) of the people exposed do not express dissatisfaction."
- Concentrated outbreak of IAQ related documented symptoms/illness in workplace

If a workplace is deemed "unsafe," an alternative workplace will be provided for potentially affected employees until such time that the recognized workplace hazard is eliminated or materially reduced.

Record Keeping

The IAQ Coordinator will maintain all indoor air quality forms and reports on file for future reference. The IAQ Coordinator investigates indoor air quality complaints and distributes written final reports to affected parties.

IAQ Procedures

Overview

North Dakota State University's Indoor Air Quality (IAQ) Procedures have been designed to integrate resources, facilitate effective communication, and achieve IAQ Standard Operating Procedure (SOP) goals. Specific objectives include:

- To clarify the responsibilities of supervisors, staff, and occupants in maintaining a safe and comfortable indoor environment.
- To respond effectively to occupant complaints.
- To facilitate trust and understandings, and prevent situations in which result in disruptive, contentious, and costly remedies including legal remedies that may have been avoided.
- To help supervisors, occupants and staff improve their work environment through positive contributions.

Procedures have been established for the following:

- Occupants
- Supervisors
- IAQ Coordinator
- Information Request Form

Occupant Procedures:

Determine if IAQ Concern is an Emergency:

Emergencies are situations in which a limited time is available to avert or deal with serious health problems or property damage. Examples include:

- Hazardous material spills
- Flooding on porous materials (Additional Resource: [EPA's Mold, Moisture & Your Home](#))
- Gray water (e.g., sewer) spills
- Gas leak
- Sudden onset of headaches, dizziness, drowsiness, nausea, and/or combustion odors (could be carbon monoxide poisoning)
- Widespread breathing difficulties, chest tightness, or respiratory irritation (potential serious infectious or allergenic agent)
- Diagnosed Legionnaires disease or tuberculosis

If deemed an emergency - take actions according to North Dakota State University policies.

Note: In emergency situations the focus is to deal with the situation creating the hazardous conditions first, including getting people out of harm's way. Suggested actions include:

- Immediately notify and seek assistance from an appropriate authority (e.g. health department, hazardous waste office, fire department, gas utility etc.).
- Evacuate the area if needed.
- Obtain medical assistance.
- Ventilate affected areas with large quantities of outdoor air using temporary fans if necessary.
- Inform building occupants of problem, what is being done, and maintain clear communications.

Reporting an IAQ Concern:

When you suspect, have identified and/or have experienced a concern you believe is related to IAQ in work workplace:

- Read North Dakota State University IAQ Standard Operating Procedure (SOP).
- Complete North Dakota State University *IAQ Concern Form*.
- Deliver completed form to your supervisor.
- Start record of IAQ concern by using the *IAQ Diary Form*.
- Contact the IAQ Coordinator at North Dakota State University at 701-231-7759 if you have questions.

Requesting IAQ Information:

North Dakota State University has assembled a wealth of information about IAQ that may contribute to your understanding of this dynamic topic. The information includes the references that serve as the basis for the North Dakota State University Standard Operating Procedure (SOP) and links to IAQ related website. Additional IAQ information may be obtained by:

- Contacting the IAQ Coordinator at North Dakota State University at 701-231-7759 if you have questions.

Supervisor Procedures:

Determine if IAQ Concern is an Emergency:

Emergencies are situations in which a limited time is available to avert or deal with serious health problems or property damage. Examples include:

- Hazardous material spills
- Flooding on porous materials (Additional Resource: [EPA's Mold, Moisture & Your Home](#))
- Gray water (e.g., sewer) spills

- Gas leak
- Sudden onset of headaches, dizziness, drowsiness, nausea, and/or combustion odors (could be carbon monoxide poisoning)
- Widespread breathing difficulties, chest tightness, or respiratory irritation (potential serious infectious or allergenic agent)
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- Inform building occupants of problem, what is being done, and maintain clear communications.

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When you suspect, have identified and/or have experienced a concern you believe is related to IAQ in work workplace:

- Read North Dakota State University IAQ Standard Operating Procedure (SOP).
- Complete North Dakota State University *IAQ Concern Form*.
- Deliver completed form to your supervisor.
- Start record of IAQ concern by using the *IAQ Diary Form*.
- Contact the IAQ Coordinator at North Dakota State University at 701-231-7759 if you have questions.

Supervisor Response to IAQ Concern(s):

The supervisor is an integral component of IAQ management. In accordance with North Dakota State University Standard Operating Procedure (SOP), your involvement will include conducting an initial response when you receive of one or more completed "IAQ Concern Form(s)". If someone informs you of an IAQ concern by some other means (unless it is an emergency), please ask that they complete an *IAQ Concern Form*.

When you receive one or more completed *IAQ Concern Form(s)*:

1. Determine if IAQ Concern is an Emergency
2. Read North Dakota State University IAQ Standard Operating Procedure (SOP)
3. Complete *Supervisor Initial Response Form*
4. If Supervisor Initial Response identifies cause of IAQ concern, initiate corrective action(s) by initiating request for repair or maintenance services and communicate action(s) with employees/occupants.
5. If Supervisor Initial Response DOES NOT identify cause of IAQ concern complete *IAQ Supervisor Questionnaire* and deliver to ALL completed forms associated with concern to IAQ Coordinator.
6. Maintain file for all records and actions.
7. Communicate actions with employees/occupants.

Requesting IAQ Information:

North Dakota State University has assembled a wealth of information about IAQ that may contribute to your understanding of this dynamic topic. The information includes the references that serve as the basis for the North Dakota State University Standard Operating Procedure (SOP) and links to IAQ related website. Additional IAQ information may be obtained by:

- Contacting the IAQ Coordinator at North Dakota State University at 701-231-7759 if you have questions.

IAQ Coordinator Procedures:

Indoor air quality management is best facilitated when one individual is given overall responsibility for IAQ. North Dakota State University has designated Environmental Health and Safety (UPSO) as the location for the IAQ Coordinator for all North Dakota State University buildings. His/her responsibilities will include:

- Coordinating staff IAQ training.
- Maintain North Dakota State University's IAQ occupant concern reporting and response system.
- Investigate employee IAQ concerns.
- Facilitate effective communication with employees, staff and other affected persons about building activities, and responsibilities for IAQ.

The following procedures assist the IAQ Coordinator to accomplish her/his responsibilities.

Determine if IAQ Concern is an Emergency:

Emergencies are situations in which a limited time is available to avert or deal with serious health problems or property damage. Examples include:

- Hazardous material spills

- Flooding on porous materials (Additional Resource: [EPA's Mold, Moisture & Your Home](#))
- Gray water (e.g., sewer) spills
- Gas leak
- Sudden onset of headaches, dizziness, drowsiness, nausea, and/or combustion odors (could be carbon monoxide poisoning)
- Widespread breathing difficulties, chest tightness, or respiratory irritation (potential serious infectious or allergenic agent)
- Diagnosed Legionnaires disease or tuberculosis

If deemed an emergency - take actions according to North Dakota State University policies.

Note: In emergency situations the focus is to deal with the situation creating the hazardous conditions first, including getting people out of harm's way. Suggested actions include:

- Immediately notify and seek assistance from an appropriate authority (e.g. health department, hazardous waste office, fire department, gas utility etc.).
- Evacuate the area if needed.
- Obtain medical assistance.
- Ventilate affected areas with large quantities of outdoor air using temporary fans if necessary.
- Inform building occupants of problem, what is being done, and maintain clear communications.

IAQ Coordinator Response to IAQ Concern(s):

In accordance with North Dakota State University Standard Operating Procedure (SOP), IAQ Coordinators involvement will include conducting an initial response when your office receives of one or more completed *IAQ Concern Form(s)*, *Supervisor Initial Response Form* and *Supervisor Questionnaire*. If informed of an IAQ concern by some other means (unless it is an emergency), please ask that they follow North Dakota State University IAQ Standard Operating Procedure (SOP).

Initial Investigation:

- Determine if IAQ Concern is an Emergency
- Read North Dakota State University IAQ Standard Operating Procedure (SOP)
- Conduct initial walk-through of area/building and complete *IAQ Coordinator Initial Investigation Form*.
- If *IAQ Coordinator Initial Investigation Form* identifies cause of IAQ concern, initiate corrective action(s) by initiating request for repair or maintenance services and communicate action(s) with employees/occupants

- IAQ Coordinator records results of Initial IAQ Investigation and begins Phase I IAQ Investigation if determined appropriate
- Maintain file for all records and actions
- Communicate actions with employees/occupants.

Phase I IAQ Investigation:

The Phase I IAQ Investigation is a three-step process which is completed by, or under the supervision of the North Dakota State University IAQ Coordinator. The steps include:

1. Interview ALL building/area occupants using the *Employee IAQ Questionnaire*
2. When completed *Employee IAQ Questionnaire(s)* are returned, complete *Questionnaire Evaluation Form*.
3. Complete *IAQ Hypothesis Form* using Diagnosis Information and completed *Questionnaire Evaluation Form*.
4. Conduct additional walk-through inspection of the building/area as if warranted by completed *IAQ Hypothesis Form*.
5. If completed *IAQ Hypothesis Form* identifies cause of IAQ concern, initiate corrective action(s) by initiating request for repair or maintenance services and communicate action(s) with employees/occupants
6. IAQ Coordinator records results of Phase I IAQ Investigation and begins Phase II and or Phase III IAQ Investigation if determined appropriate
7. Maintain file for all records and actions
8. Communicate actions with employees/occupants.

Phase II IAQ Investigation

During a Phase II IAQ Investigation, common indoor air quality parameters including temperature, humidity, carbon monoxide and carbon dioxide levels may be measured. North Dakota State University may seek outside assistance to conduct these activities.

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

Phase III IAQ Investigation

A Phase III IAQ Investigation is performed when a definitive cause for the symptoms cannot be determined from previous investigations. Phase III IAQ Investigations consist of extensive and more specific monitoring and sampling for chemical and /or microbial contaminants in accordance with Building Air Quality: A guide for Building Owners and Facility Managers methodologies, standard and customary industrial hygiene practices and NIOSH and OSHA sampling and analytical procedures. North Dakota State University may seek outside assistance to conduct these activities.

Information Request Form

Information regarding indoor air quality can be requested by calling the Safety Office at 701-231-7759 or via email: ndsu.police.safety@ndsu.edu

Indoor Air Quality Information

References

North Dakota State University's Indoor Air Quality (IAQ) Standard Operating Procedure (SOP) is based in three highly regarded IAQ references. They are:

- USEPA/NIOSH, 1998. [*Building Air Quality Action Plan*](#). U.S. Environmental Protection Agency and the U.S. National Institute of Occupational Safety and Health. Washington, D.C. EPA Publication No. 402-K-98-001.
- USEPA/NIOSH, 1991. [*Building Air Quality: A Guide for Building Owners and Facility Managers*](#). U.S. Environmental Protection Agency and the U.S. National Institute of Occupational Safety and Health. Washington, D.C. EPA/400/1-91/033
- USEPA/NIOSH, 1991. [*Indoor Air Quality Building Education and Assessment Model*](#). U.S. Environmental Protection Agency and the U.S. National Institute of Occupational Safety and Health. Washington, D.C. EPA/402/C1-01/001

Additional Internet IAQ References and Links

- [Environmental Protection Agency IAQ Links](#)
- [Occupational Safety and Health IAQ Links](#)
- [Glossary of IAQ Terms](#)

Forms

The following IAQ Forms have been developed as components of the North Dakota State University IAQ Standard Operating Procedure (SOP). They are used when documenting information regarding IAQ concerns.

Occupant Forms

[INDOOR AIR QUALITY \(IAQ\) Concern Form](#)

This form is a component of the North Dakota State University Indoor Air Quality (IAQ) Standard Operating Procedure (SOP). Use this form to report to your supervisor any concerns you have related to the indoor air quality/environment in your workplace. Indoor air quality concerns may include issues with temperature, humidity, ventilation, odors, or air pollutants that may be causing health or discomfort symptoms. If you have questions when completing this form, contact North Dakota State University IAQ Coordinator at 231-7759. When completed, deliver to your immediate supervisor.

[INDOOR AIR QUALITY \(IAQ\) Diary of Concerns](#)

This form is a component of an Indoor Air Quality (IAQ) investigation. If you have questions when completing this form, contact North Dakota State University IAQ Coordinator at 231-7759. Please record each occasion when you experience a symptom of ill-health or discomfort that you think may be linked to an IAQ condition in your workplace. It is important that you record the time and date and your location within the building as accurately as possible, because that will help to identify conditions (e.g., equipment operation) that may be associated with the problem. Also, please try to describe the severity of your symptoms (e.g., mild, severe) and their duration (the length of time that they persist). 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

[INDOOR AIR QUALITY \(IAQ\) Employee Questionnaire](#)

This form is a component of an Indoor Air Quality (IAQ) investigation, and should be completed by all occupants in an area/building affected by an IAQ concern. It is a lengthy and detailed questionnaire that should be completed by all occupants whether or not they are concerned with IAQ. If you have questions when completing this form, contact North Dakota State University IAQ Coordinator at 231-7759.

Supervisor Forms

[INDOOR AIR QUALITY \(IAQ\) Supervisor Initial Response Form](#)

This form is used to assist a supervisor with an Initial Response to an IAQ concern. It is completed following the receipt of a completed IAQ Concern Form. Please thoroughly read all completed IAQ Concern Forms before beginning Supervisor Initial Response. This is not intended to be an intensive or detailed inspection, but rather a quick overview of conditions that can affect IAQ. The Supervisor's Initial Response consists of a walk-through inspection of the workplace. During the walk-through use your senses of sight, smell, feeling and hearing to assess conditions. The form is an instructional guide designed to address easily discernible conditions which can adversely affect IAQ. If you have questions when completing this form, contact North Dakota State University IAQ Coordinator at 231-7759.

[INDOOR AIR QUALITY \(IAQ\) Supervisor Questionnaire Form](#)

This form is required to initiate an Indoor Air Quality (IAQ) investigation, and should be completed AFTER you (the supervisor) have had an opportunity to visually inspect the area and you have attempted but are unable to identify the cause for any IAQ concern by completing the Supervisor Initial Response Form. If you have questions when completing this form, contact North Dakota State University IAQ Coordinator 231-7759.

IAQ Coordinator Forms

[INDOOR AIR QUALITY \(IAQ\) Initial Investigation Form](#)

This form is a component of an Indoor Air Quality (IAQ) investigation, and is completed by the North Dakota State University IAQ Coordinator. This form is completed AFTER receipt of Supervisor Questionnaire and during a walkthrough of the area/building.

[INDOOR AIR QUALITY \(IAQ\) Employee Questionnaire](#)

This form is a component of an Indoor Air Quality (IAQ) investigation, and should be completed by all occupants in an area/building affected by an IAQ concern. It is a lengthy and detailed questionnaire that

should be completed by all occupants whether or not they are concerned with IAQ. When IAQ Coordinator has received all completed form she/he can use the [IAQ Questionnaire Evaluation Form](#) to evaluate the data.

[INDOOR AIR QUALITY \(IAQ\) Questionnaire Evaluation Form](#)

This form is designed to assist the IAQ Coordinator when evaluating completed IAQ Questionnaires.

[INDOOR AIR QUALITY \(IAQ\) Hypothesis Form](#)

This form is designed to assist the IAQ Coordinator when evaluating IAQ Information. The form is designed to compile information from various sources (All completed forms, interviews, building records etc.) in order to identify causes of IAQ concerns