

Thompson Rivers University Indoor Air Quality Monitoring Program

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Thompson Rivers University Indoor Air Quality Monitoring Program Rationale.

Current estimates indicate that Canadians spend approximately 90% of their time indoors, where concentrations of some air pollutants may be 2-5 times higher than those found outside.

Documented evidence linking exposure to indoor air pollutants to a variety of physical symptoms, illnesses, decreases in comfort, and diminished productivity, illustrate some of the serious negative health problems suboptimal air quality can cause individuals in indoor environments.

To prevent harm to workers exposed to hazardous indoor air conditions, the province of British Columbia requires indoor air quality be maintained according to research-based ventilation, physical, and purity safety standards.

The province also requires the establishment of workplace inspection and investigation processes as they pertain to indoor air quality.

This document outlines the standards to which Thompson Rivers University (TRU) maintains its indoor air quality, inspection frequency, and the indoor air complaint investigation and resolution processes.

Additionally, this plan will be reviewed annually and updated as necessary, to ensure plan effectiveness and optimal indoor air quality in all buildings at TRU.

Effects of poor indoor air quality.

Poor indoor air quality can lead to a number of physical symptoms and complaints. The most common include:

- Headaches

- Fatigue
- Shortness of breath
- Sinus congestion
- Coughs
- Sneezing
- Eye, nose, and throat irritation
- Skin irritation
- Dizziness
- Nausea

Indoor air contaminants affect some people more seriously, including:

- People with allergies or asthma
- People with respiratory disease
- People whose immune system is suppressed as a result of disease or treatment
- People who wear contact lenses

Some combinations of these symptoms may also manifest themselves as part of a Sick Building Syndrome (SBS) and Building Related Illnesses (BRI).

Although many of these physical symptoms and complaints are sometimes attributed to indoor air quality, it is important to understand that indoor air quality is not always solely responsible. Noise, overcrowding, improper lighting, poor ergonomic conditions, and job stress can also lead to these symptoms and complaints. Frequently, a combination of factors is to blame.

Specific factors that can negatively affect air quality include:

- Physical layout of the building
- Changes to the layout of a building
- HVAC layout
- HVAC performance and maintenance
- Outdoor climate
- Building occupant activities and hygiene
- Indoor contaminants introduced
 - Dust, dirt, or mould in the HVAC system
 - Office equipment such as laser printers and copiers
 - Personal activities such as smoking or cooking
 - Housekeeping activities such as cleaning and dusting
 - Maintenance activities such as painting
 - Spills of water or other liquids
 - Special-use areas such as print shops and laboratories
 - Industrial processes such as dry cleaning
- Outdoor contaminants introduced into the building through the HVAC system including
 - Vehicle exhaust
 - Pollen and dust
 - Smoke

- Unsanitary debris or dumpsters near the outdoor air intake

Environmental tobacco smoke

Second-hand tobacco smoke increases the risks of lung cancer and heart disease, including heart attacks, in otherwise healthy nonsmokers.

In line with local bylaws, the Tobacco and Vapour Products Control Act (TVPCA), and the Tobacco and Vapour Products Control Regulation (TVPCR), TRU's Smoking Policy (ADM 05-2) restricts tobacco use exclusively to 9 designated smoking areas on campus. These areas can be identified by highly visible and easy to understand signage. Within the context of TRU's Smoking Policy, tobacco use includes the use of lit tobacco, medicinal marijuana, cigarettes, cigars, pipes, smokeless tobacco, electronic cigarettes, and any other similar device.

Except for a single location, TRU's designated smoking areas are located 9 meters or further from all building air intakes, doorways, and windows. Plans to move the one outstanding designated smoking area further from their proximal buildings to meet BOMA standards are underway.

TRU's Smoking Policy applies to all campuses of TRU, including classes held outdoors, and all vehicles owned or rented by TRU and applies to all employees and students of the University and all visitors to the University, including those attending private events

As per ADM 05-2, the promotion, advertising, or sale of any tobacco products or related paraphernalia on TRU's property is prohibited. In accordance with the Federal Tobacco Act, corporate tobacco sponsorship of TRU's events or groups is prohibited.

All prospective TRU employees, and students, shall be informed of this policy and regulations by means of the various publications, and signs in place at TRU.

Exceptions to ADM 05-2 may be granted for traditional and ceremonial events at approved times and places as per TRU's Smudging Protocols or as required by applicable human rights laws, which are isolated from campus buildings well in excess of provincially mandated standards.

As it pertains to enforcement, is the responsibility of supervisors to enforce these regulations among employees. Repeated violations will be reported through supervisory channels to the relevant Dean or Director or designate, who shall inform the Vice-President, Finance and Administration.

It is the responsibility of all employees to enforce these regulations among students and to report repeated violations to the relevant Dean or Director or designate, who shall inform the Vice-President, Finance and Administration.

It is the responsibility of those individuals/departments booking events on the TRU Campus to inform and ensure that tobacco and medical marijuana are used in compliance with this policy and its regulations.

Responsibilities

Everyone working at Thompson Rivers University has a role to play in maintaining safe indoor air quality in the work environment.

Thompson Rivers University Administration

As the employer, Thompson Rivers University is responsible to make certain that the workplace meets the indoor air quality requirements outlined in parts 4.72 to 4.80 of British Columbia's Occupational Health and Safety Regulation (OHSR).

This includes ensuring the following:

- Submission to the Workers Compensation Board drawings and specifications for existing or proposed ventilation systems when requested (Part 4.71)
- That ventilation systems for the supply and distribution of air and removal of indoor air contaminants are designed, constructed and operated in accordance with
 - established engineering principles, and *ASHRAE Standard 62-1989, Ventilation for Acceptable Indoor Air Quality* (Part 4.72).
- That an adequate supply of outdoor air is provided to workplaces in accordance with Table 2 of *ASHRAE Standard 62-1989* (Part 4.72).
- That for building ventilation systems installed prior to 1989, that an adequate supply of outdoor air is be provided in accordance with the ASHRAE standard in place at the time the ventilation system was designed (Part 4.72).
- That ventilation systems are installed when required by the Regulation (Part 4.73).
- That outdoor air is effectively distributed throughout the workplace (Part 4.74).
- That ventilation systems is balanced such that each space within the building receives an adequate allotment of outdoor air, and accommodate actual or normally anticipated occupancy of each space (Part 4.75).
- That ventilation systems are not obstructed by material or equipment placed in front of the ventilation air intakes or discharge points (Part 4.76).
- That outdoor air intakes are located so that outdoor air entering the ventilation system does not contain any contaminant in a concentration greater than normal outdoor ambient air in that locality (Part 4.76).
- Ventilation systems that discharge air from work areas are designed to minimize the likelihood of exposing any worker at a workplace, including an adjacent workplace
 - to an air contaminant in a concentration which exceeds either 10% of its applicable exposure limit in Part 5 (Chemical Agents and Biological Agents), or an acceptable ambient air quality standard established by an authority having jurisdiction over environmental air standards, whichever is greater, and
 - where practicable, to an objectionable odour (Part 4.77).
- Maintenance of acceptable air quality, through establishment of an effective preventive maintenance program for the ventilation system which includes:
 - regular annual inspections
 - of all critical components of the ventilation system, such as dampers, fans, belts, baffles, ductwork, diffusers and control systems, and

- for conditions which would promote the growth of micro-organisms, such as water leaks or stagnant water pools (Part 4.78),
 - correction of any deficiencies found during regular inspections (Part 4.78),
 - repair or replacement of malfunctioning and consumable components, such as filters and belts, and the cleaning of air distribution systems, ducts and dampers when necessary to correct an indoor air quality deficiency (Part 4.78),
 - adequate treatment of open water systems associated with ventilation equipment such as cooling towers and humidifiers, to control biological growth (Part 4.78), and
 - maintenance of combustion sources, such as furnaces, space heaters and water heaters to assure proper burning and exhausting of waste gases so that recirculation of gases to the workplace will not occur (Part 4.78).
- That indoor air quality is investigated when:
 - Complaints are reported (part 4.79).
 - Occupancy in the space changes significantly (part 4.79), or
 - Renovations involving significant changes to the ventilation system occur (part 4.79).
- That investigations include:
 - Ensuring Carbon Dioxide (CO₂) levels are less than 650 ppm
 - An assessment of the ventilation rate, unless the CO₂ levels are less than 650 ppm above ambient outdoor levels (part 4.79),
 - Ensuring Carbon Monoxide (CO) levels do not exceed 9ppm (ASHRAE 62.1),
 - Ensuring total Volatile Organic Compound (VOC) levels do not exceed 1000 µg/m³ (440 ppb) (Health Canada),
 - Ensuring particulate matter (PM₁₀) levels do not exceed 50 µg/m³ (ASHRAE 62.1),
- That temperature and humidity levels within the indoor work environment are maintained within acceptable comfort ranges, as far as is practicable (Parts 4.80 and 7.26 to 7.38), as well as:
 - maintenance of a temperature range of 21-27°C, taking into account seasonal variances and relative humidity (ASHRAE 55);
 - Relative humidity 30-60% (USEPA I-BEAM) or more than 20% (CSA).
- An inspection of the ventilation system as required in section 4.78(2) (part 4.79),
- Sampling for airborne contaminants suspected to be present in concentrations associated with the reported complaints (part 4.79), and
- Accurate complaint, investigation finding, and undertaken corrective actions records (part 4.79).

These requirements will be satisfied through the coordination of efforts by TRU's Facilities Services, the Office of Safety and Emergency management, and the Joint Occupational Health and Safety Committee (JOHSC) as described in the next 3 subsections.

Facilities Services

Thompson Rivers University's Facilities Services have the following responsibilities as they pertain to indoor air quality maintenance:

- Competent HVAC operation;
- Annual recorded inspections of all critical components of the ventilation system such as dampers, fans, belts, baffles, ductwork, diffusers, and control systems;

- Regular recorded inspections for conditions such as water leaks or stagnant water pools that would promote the growth of micro-organisms;
- Record correction of any deficiencies found during inspections;
- Record repair or replacement of malfunctioning and consumable components such as filters and belts, and cleaning of air distribution systems, ducts, and dampers when necessary to correct an indoor air quality deficiency;
- Adequate treatment of open water systems associated with ventilation equipment, such as cooling towers and humidifiers, to control biological growth;
- Maintenance of combustion sources such as furnaces, space heaters, and water heaters to ensure proper burning and exhausting of waste gases so that gases will not be recirculated in the workplace;
- Oversee all renovation, remodeling, and construction projects;
- Cooperate with TRU's OSEM and JOHSC during indoor air complaint investigations

The Office of Safety and Emergency Management

Thompson Rivers University's OSEM has the following responsibilities as they pertain to indoor air quality maintenance:

- Communicate with occupants so they understand their responsibilities and know how to report complaints;
- Lead and perform regular air quality walk through inspections as well as at the following times:
 - When space occupancy changes substantially;
 - After renovations involving significant changes to the ventilation system;
 - When complaints are reported;
- When indoor air quality problems move beyond the scope of OSEM expertise, consult with Facilities Services and TRU Administration for cooperative problem resolution which may include acquisition of equipment or specialized services required to correct the problem;
- Publish most recent IAQ audit data for each workspace on TRU's intranet with access instructions provided in the OSEM online newsletter delivered monthly to all TRU employees.

Joint Occupational Health and Safety and other Safety Committees

In addition to daily employment roles and responsibilities committee members fulfill at Thompson Rivers University, as it pertains to indoor air quality, TRU Joint Occupational Health and Safety Committee members are expected to:

- Serve as safety resources for their work areas;
- Communicate indoor air quality concerns to the JOHSC;
- Participate in indoor air quality investigation as outlined within this document.

Occupants

In addition to the above specialized stakeholders, as it pertains to indoor air quality at TRU, all building occupants are expected to:

- avoid activities that can contaminate indoor air
- to inform the Facilities Services before modifying an office space or adding new equipment that could affect the indoor environment;
- communicate all indoor air quality complaints to the OSEM via the 20.40.1 form.

- understand that some people are unpredictably and adversely affected by fragrances and when indicated, to adhere to scent-free environment directives to accommodate this unpredictable problem.
- inform and work with Facilities Services prior to the introduction of
 - portable heaters and
 - portable humidifiers,
- these last two items, if not properly maintained, can become contaminated with mould and bacteria and negatively contribute to indoor air quality.

Handling indoor air quality complaints at Thompson Rivers University

The indoor air quality complaint and resolution process at Thompson Rivers University will proceed via the following set of steps:

- 1) Complainant submits an indoor air quality complaint form via SEM form 20.40.1 to the OSEM either in hard copy or electronic form;
- 2) An OSEM representative is assigned the complaint;
- 3) The OSEM representative responsible for complaint response will contact the complainant as soon as reasonably possible after complaint receipt to gather information and to set an interview date and time as soon as reasonably possible;
- 4) The OSEM representative will communicate the desire to have a co-investigator representative to the JOHSC for an indoor air quality investigation and an interview;
- 5) If co-investigator(s) is/are available within the following 3 hours, the OSEM representative will schedule an agreeable time to perform an interview and a walk through inspection of the work area in question;
- 6) The investigative team will then perform and record the interview and inspection using SEM 20.41.1 as described within this document at the agreed upon time;
- 7) If no co-investigators are available within a reasonable period of time, the OSEM representative will proceed with and record a walk through inspection and complainant interview using SEM 20.41.1 as described within this document;
- 8) Following the inspection and the interview, the OSEM will submit their findings to Facilities Service via an Archibus work order for their review;
- 9) Facilities Services will determine if the HVAC and associated components in the area of concern require inspection or more specialized attention;
- 10) If further inspection is not felt to be justified, Facilities Services will inform the OSEM of their reasons for making that decision;
- 11) If an HVAC or more specialized attention inspection is felt to be justified, Facilities Services will inform the OSEM of their reasons for making that decision and inspect the HVAC system as per Form SEM 20.42.1.
- 12) If an HVAC or more specialized attention inspection was performed, Facilities Services will submit the inspection details to the OSEM submitted Archibus request for review and discussion;
- 13) The OSEM will convey the investigation findings to the complainant as soon as reasonably possible;

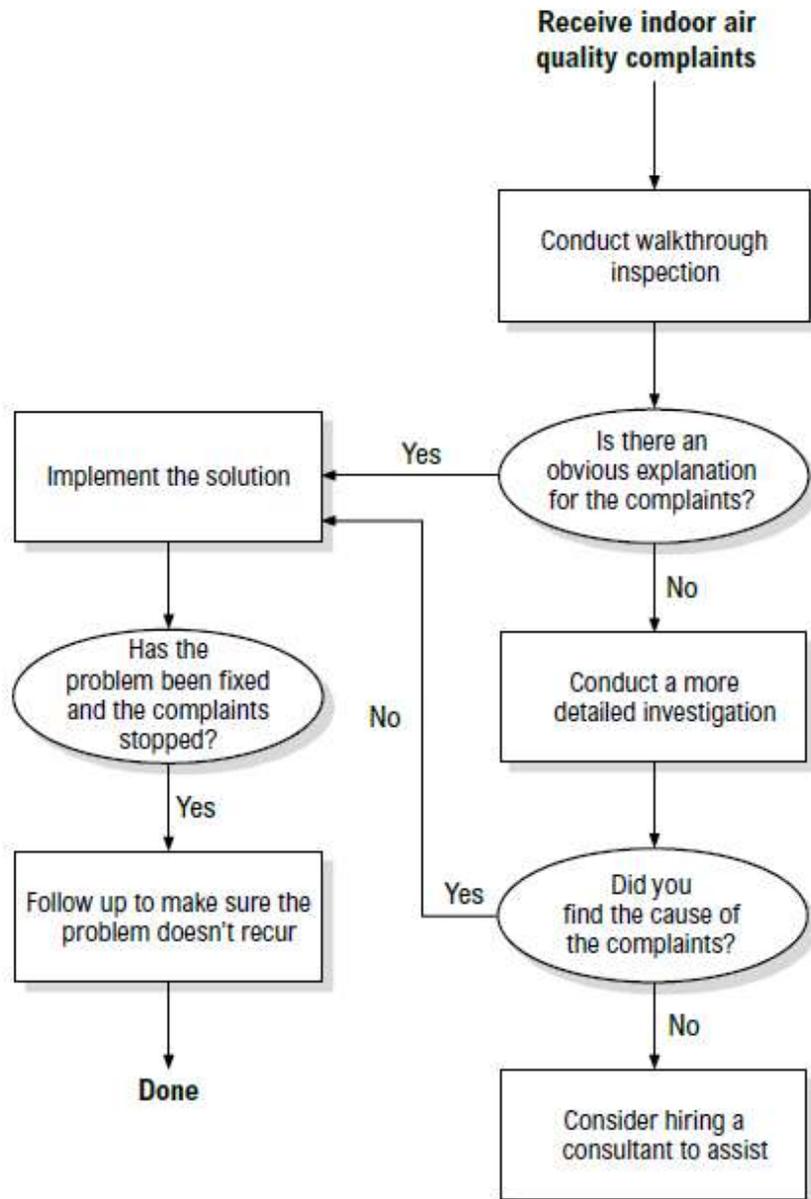
- 14) The OSEM will post the IAQ results on the intranet and distribute them through the monthly safety newsletter;
- 15) The OSEM will then close the complaint.

The inspection and investigative process

- During regular inspections and inspections prompted by occupancy and renovation changes, using SEM form 20.41.1, the following information will be collected:
 - Individuals included in the investigation;
 - Any occupant comments as they pertain to air quality;
 - Obvious pollutant sources such as humidifiers, new furniture, or new carpets;
 - HVAC system
 - thermostat settings
 - diffuser condition and operation
 - fan condition and operation
 - damper condition and operation
 - presence of mould, stagnant water, blockage or nearby sources of contaminants in outdoor intake
 - IAQ measurements:
 - Air temperature
 - Air relative humidity
 - Oxygen (O₂) levels
 - CO₂ levels
 - Ventilation rate unless CO₂ levels are less than 650ppm above ambient outdoor levels
 - CO levels;
 - Total VOC levels;
 - PM₁₀ levels;
 - Last date of system calibration and any performed adjustment
 - Last date of preventative maintenance
- When inspecting an area in response to an air quality complaint, a member of the OSEM and other investigation team members will:
 - Perform a walk through inspection where investigators collect all regular inspection information outlined in this document as well as the following information:
 - Complainant information regarding the nature and timing of symptoms;
 - Complainant input regarding suspected causes;
 - Sample for airborne contaminants suspected to be present in concentrations associated with the reported complaints;
 - Documentation of possible problem cause(s) observed via walk through inspection
 - Documentation of recommended corrective action(s)
 - Documentation of immediate Corrective action(s) taken
 - Documentation of date(s) for further corrective action completion
 - Documentation of any further recommended investigation in Archibus by the OSEM of Facilities representative(s) involved in the inspection

- As it pertains to indoor air quality complaints, ensure occupants understand what can be reasonably done to resolve complaints.

Illustrated inspection and investigative process



HVAC preventive maintenance performance and documentation guide

Preventative maintenance documentation at Thompson Rivers University must be documented and include the following:

- A statement regarding the health and safety of workers who are conducting maintenance operations;
- The system design parameters, including occupancy, space uses, and conditions anticipated by the designer;
- Operating and maintenance manuals for installed equipment, including part numbers for components that require routine replacement;
- A description of the intended functioning of system controls;
- Inspection reports that state:
 - The date of the inspection
 - Who conducted the inspection
 - The components and conditions inspected
 - The state of the components and conditions when inspected
 - Recommended corrective actions
 - Any corrective actions taken and the dates they were taken
- Specific preventive maintenance procedures and implementation schedules such as instructions for calibration of the HVAC system sensors and a schedule stating when the calibrations are to be conducted;

Typical preventive maintenance tasks

The following are some typical preventive maintenance task that Facilities Services may perform after an inspection:

- Test the volume of air supplied or returned through diffusers to ensure that the system is balanced.
- Calibrate sensors and devices that control airflow, temperature, and humidity.
- Change air filters, clean dirty air intakes, and prevent leaks.
- Inspect drive belts, bearings, motors, and other moving parts. Replace if necessary.
- Clean ductwork and, where ceiling spaces are used as supply or return air plenums, replace damaged or missing tiles.
- Clean and disinfect components where standing water may have been present for extended periods or where dirt, slime, or mould is observed. This includes humidifiers, electrostatic precipitators, cooling towers, fan coil units, air supply and exhaust ducts, air intakes, cooling coils, condensate drains, radiators, and induction units.
- Make sure drain traps in mechanical rooms do not go dry.
- Maintain shower rooms to minimize moulds and odours.
- Follow proper procedures for housekeeping, handling chemicals, and cleaning up spills.
- Inspect heat exchangers when it is suspected that combustion gases are escaping into the air plenum.
- Identify training requirements for property management and building maintenance staff relating to IAQ

Building modifications may prompt the need for an inspection

As specified in section 4.73 of the Regulation, the TRU must permit the installation of a ventilation system if one is required by the Regulation and this requirement takes precedence over any term of a lease agreement that might be contrary to the responsibility stated by the Regulation. Changes in occupancy may also prompt the need for an indoor air quality inspection as described in this document.

Factors to consider

Factors to consider when installing or modifying a ventilation system include:

- The effects that the discharged air will have on other tenants or adjacent properties;
- The effects that the ventilation system will have on the building's structural integrity, water-tightness, and fire safety;
- Whether the ventilation system already complies with all other applicable codes and standards;
- Whether the ventilation system will pose a risk to workers or other persons in the building

Changes in use or occupancy

Changes to the building layout, the number of occupants in a space, or the way spaces are used can affect heating, cooling, and ventilation. It may be necessary for TRU to rebalance, readjust, or modify the HVAC system any time:

- Walls or room dividers are moved;
- The number of occupants in a space increases;
- Equipment that generates heat are installed or removed (e.g. photocopiers and computers);
- Lighting changes;

Training requirements for property management and building maintenance staff relating to IAQ

OSEM employee and JOHSC member IAQ management training requirements:

- IAQ measurement using the Critical Environment Technologies YES AIR 8-Channel IAQ monitor;
- YES AIR-8-Channel IAQ monitor data interpretation and reporting;
- Archibus work order submission and editing;
- IAQ investigation and interview techniques;
- Identification of pollutant sources such as humidifiers, new furniture, pressed wood, carpets, cleaning practices, biological pollutants, and indoor particulate matter;
- Superficial HVAC inspection practices.

Facilities Services employee IAQ management training requirements:

- IAQ investigative and reporting processes.

Common air quality problems and possible causes

Problem	Some possible causes to consider
Occupants complain that the building air is too stuffy or dusty.	<ul style="list-style-type: none"> · Has the HVAC system been properly maintained? · Are any vents blocked? · Is the building being occupied or used differently than originally intended? · Is the air intake located near the air exhaust? · Is the relative humidity too low or high?
Occupants complain that the building air is too warm, cool, dry, or humid.	<ul style="list-style-type: none"> · Is the relative humidity or temperature too low or high? · Are building controls set properly? · Are building controls operating properly? · Have occupants brought in portable space heaters or humidifiers? · Are there any water leaks?
Occupants complain of headaches, decreased alertness, or nausea after being in the building for a long period.	<ul style="list-style-type: none"> · Is the building's air intake near a source of carbon monoxide such as a loading dock or parking garage? · Are there any combustion sources in the building?
Occupants complain of eye irritation, dry or sore throats, nosebleeds, or headaches.	<ul style="list-style-type: none"> · Have there been any recent renovations in the building involving plywood, particleboard, or new furniture? · Are there any other possible sources of formaldehyde? (Formaldehyde, a chemical typically found in the above pressed wood products, can cause the symptoms. Other products exist that can emit formaldehyde.)
Occupants complain of eye, nose, or throat problems; contact lens problems; skin irritation; or respiratory problems.	<ul style="list-style-type: none"> · Is smoke finding its way into the building? · Is there a dirt buildup around diffusers? · Are filters in the ventilation system changed regularly? · Is the humidity too low?
There has been an increase in the number of illnesses among occupants, especially asthmatic and flu-like illnesses.	<ul style="list-style-type: none"> · Is there mould or fungal growth on building surfaces or in the ventilation system? · Is there evidence of a water leak in the building?

General Walkthrough inspection checklist – SEM 20.41.1

Date: _____

Inspector name(s) _____

Department or location inspected _____

Reason for inspection _____

Standard Building Systems Equipment

Buildings include:

- Animal & Health Technology (AHT)
- Arts & Education (A&E)
- BC Center for Open Learning (BCCOL)
- Campus Activity Centre (CAC)
- Clocktower (CT)
- Culinary Arts (CA)
- Daycare
- Faculty Annex N
- House 1 - Faculty Association
- House 4 - Sustainability
- House 5 - Aboriginal Cultural Centre
- House 6/7 - Research Centre
- House 8 - Radio Station
- House 9 - Welcome Centre
- House 10 - Horticulture
- Gymnasium
- The House of Learning (HOL)
- Human Resources (HR)
- International Building (IB)
- Science and Health Sciences
- Library
- Material Distribution Centre
- Old Main (OM)
- Trades and Technology Center (T&T)

Inspection activity	Notes
List individuals included in the investigation (inspector(s), inspection requester(s), area supervisor(s), member(s) of the joint health and safety committee etc.).	

Talk to the building occupants who made the complaints. Discuss the nature and timing of their symptoms. Ask them to identify any suspected causes.	
Check for obvious pollutant sources such as humidifiers, new furniture, or new carpets.	
Check the HVAC system for: <ul style="list-style-type: none"> • Check thermostat settings. • Are thermostats, diffusers, fans, and dampers are clean and operating properly? • Check the outdoor air intake for mould, stagnant water, blockage, or nearby sources of contaminants. 	
IAQ monitor measurements:	
Air temperature	
Air humidity (%)	
Oxygen levels (%)	
Carbon Dioxide levels (ppm)	
Carbon Monoxide levels (ppm)	
VOC levels (ppm)	
Dust levels ($\mu\text{g}/\text{m}^3$)	
Check records: When was the system last calibrated and adjusted? When was preventive maintenance last performed?	
Specialized Building Systems Equipment	
In addition to the above actions, the following buildings also require additional inspection activities:	
Fire suppression system check (BCCOL & OM only) Check records: <ul style="list-style-type: none"> • Has the fire suppression system recently been engaged? • Has the fire suppression system been serviced or inspected in the past 30 days? • Have the fire suppression chemical canisters been replaced in the past 90 days? 	
Chemical Storage (Science only) Check records:	

<ul style="list-style-type: none"> • Have any spills been detected or recorded within the past 30 days? 	
<p>Commercial Kitchen (CAC & CATC only) Check for obvious pollutant sources such as organic build up, improper waste disposal, etc. Check records:</p> <ul style="list-style-type: none"> • Have the refrigerant systems been serviced within the past 90 days? • Has the fire suppression system been serviced in the past 30 days? • Have the fire suppression chemical canisters been replaced in the past 90 days? 	
<p>Welding / Mechanical Bays (Trades only) Check for obvious pollutant sources such as running equipment, etc. Check:</p> <ul style="list-style-type: none"> • Have/are bay doors open? • Are all exhaust fans operating? 	

Possible problem cause(s)

Recommended corrective action(s)

Corrective action(s) taken

Additional investigation required? If yes, describe.

SEM 20.42.1 - TRU General HVAC inspection form

Use this form as a template for every specific and future building on campus

This checklist is from Building Air Quality: A Guide for Building Owners and Facility Managers, December 1991 (EPA Publication No. 400/1-91/003, NIOSH Publication No. 91-114). The full publication, as well as a longer version of the form, is available at: <www.cdc.gov/niosh/baqtoc.html>.

Building name _____ Address _____

Completed by _____ Date _____

Mechanical Room

Clean and dry? _____ Stored refuse or chemicals? If yes, list: _____

Describe items in need of attention _____

Major mechanical equipment

Preventative maintenance (PM) in use? If yes, please summarize: _____

Control System

Type: _____

System operation: _____

Date of last calibration: _____

Boilers

Rated Btu input: _____ Condition: _____

Combustion air: Is there at least one square inch free per 2,000 Btu input? _____

Are there any fuel or combustion odors? _____

Cooling Tower

Clean? _____

Leaks or overflow? _____

Slime or algae growth? _____

Eliminator performance _____

Biocide treatment working? (list biocide type and/or brand) _____

Is a spill containment plan implemented? _____

Is the dirt separator working? _____

Chillers

Are there any refrigerant leaks? _____

Is there evidence of condensation problems? _____

Are waste oil and refrigerant properly stored and disposed of? _____

Air handling

Unit identification _____ Area(s) served _____

Outdoor Air Intake, Mixing Plenum, and Damper

Outdoor air intake location _____

Nearby containment sources? Describe: _____

Bird screen in place and unobstructed? _____

Design total cfm _____ Outdoor air (O.A.) cfm _____ Date last tested and balanced: _____

Minimum % O.A. (damper setting) _____ Minimum cfm O.A. = (total cfm X min. % O.A.) ÷ 100 = _____

Current O.A. damper setting (date, time, and HVAC operating mode) _____

Damper control sequence (describe) _____

Condition of dampers and controls (note date) _____

Fans

Control sequence _____

Condition (note date) _____

Indicated temperatures (°C): _____ supply air _____ mixed air _____ return air _____ outdoor air

Actual temperatures (°C): _____ supply air _____ mixed air _____ return air _____ outdoor air

Coils

Heating fluid discharge temperature _____ ΔT _____ cooling fluid discharge temperature _____ ΔT _____

Controls (describe) _____

Controls (note date) _____

Humidifier

Type _____ If a biocide is used, note type or brand _____

Condition (no overflow, drains trapped, all nozzles working?) _____

No slime, visible growth, or mineral deposits? _____

Distribution system

Zone/room	System Type	Supply Air		Return Air		Power Exhaust	
		ducted/ unducted	cfm	ducted/ unducted	cfm	control	serves (e.g., toilet)

Condition of distribution system and terminal equipment (note locations of problems)

Adequate access for maintenance? _____

Ducts and coils clean and unobstructed? _____

Air paths unobstructed? Supply _____ Return _____ Transfer _____ Exhaust _____ Make-up _____

Note locations of blocked air paths, diffusers, or grilles _____

Any unintentional openings into plenums? _____

Controls operating properly? _____

Air volume correct? _____

Drain pans clean? Any visible growth or odors? _____

Filters

Location	Type/Rating	Size	Date Last Changed	Condition (give date)

Building specific equipment

Fire suppression system (complete for OM, BCCOL, CAC, CATC only)

Adequate access for maintenance? _____

Suppressant cylinder in excellent repair? _____

Does the chemical cylinder appear to be untouched and free of leaks? _____

When was the Fire suppression system last serviced/inspected? (MM/DD/YYYY) ____ / ____ / ____

When was the Fire suppression chemical cylinder last replaced? (MM/DD/YYYY) ____ / ____ / _____

Server room temperature (OM, BCCOL only) _____

Last system inspection date (MM/DD/YYYY) ____ / ____ / _____

Chemical storage (complete for Science only)

Condition (Any Spilt, broken, or open bottles? Do chemicals appear to be closed and in proper locations)? _____

Do drains appear to be unobstructed? _____

Are exhaust systems functioning properly? _____

Commercial Kitchen (complete for CAC, CATC only)

Do **all** areas harbor adequate access for maintenance? _____

Is there a preventative maintenance service plan in place for all major kitchen equipment? ____ please describe _____

Condition (no overflow, drains trapped, all nozzles working?) _____

No slime, visible growth, or mineral deposits (Check behind, in, and under equipment)? _____

List any potential organic odorants: _____

Do floor or appliance drains show signs of organic buildup or mould growth? _____

Check industrial cleaning storage (Clean, no spills, leaks, open bottles): _____

Is WHIMIS manual & training up to date for all employees? _____

Is the ammonia refrigerant system in good repair? _____

When was the Fire suppression system last serviced/inspected? (MM/DD/YYYY) ____ / ____ / _____

When was the Fire suppression chemical cylinder last replaced? (MM/DD/YYYY) ____ / ____ / _____

When was the refrigerant system last serviced / inspected? (MM/DD/YYYY) ____ / ____ / ____

Indicated freezer temperature (°C) (List for all units): _____

Actual freezer temperature (°C) (List for all units): _____

Indicated refrigerator temperature (°C) (List for all units): _____

Actual refrigerator temperature (°C) (List for all units): _____

Welding / Mechanical bay (complete for Trades only)

Do **all** areas harbor adequate access for maintenance? _____

Have any incidents been reported in the past 30 days? _____

Are all exhaust fans on and operational? _____

Have the bay doors been open? _____

Have the students had any equipment undergoing maintenance running? _____

Occupied space

Thermostat types

Zone/Room	Thermostat Location	What Does Thermostat Control? (e.g., radiator, AHU-3)	Setpoints		Measured Temperature	Day/Time
			Summer	Winter		

Humidistats/dehumidistats type

Zone/Room	Humidistat / Dehumidistat Location	What Does It Control?	Setpoints (%RH)	Measured Temperature	Day/ Time

Potential problems (note location(s)) _____

Thermostat comfort or air circulation (drafts, obstructed airflow, stagnant air, overcrowding, poor thermostat location)

Malfunctioning equipment _____

Major sources of odors or contaminants (e.g., poor sanitation, incompatible uses of space) _____
