HAZARD ASSESSMENT & CONTROL PROCEDURE

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1. Purpose

Hazard assessment is a process used to identify and evaluate the health and safety hazards associated with job tasks. Hazard control means the methods used to eliminate or control loss to protect workers from those hazards.

The overall purpose of the Hazard Assessment and Control Procedure is to:

- ensure a safe and healthy work environment by minimizing the risk of injury and occupational illness to workers and
- meet the requirements of the *Alberta Occupational Health and Safety (OHS) Code - Part 2 Hazard Assessment, Elimination and Control.*

2. Scope

Formal hazards assessments are required for all job positions at the University of Calgary and are to be completed using the Hazard Assessment and Control Forms (HACF).

A HACF must be prepared to report the results of the formal hazard assessment and the methods used to control or eliminate the hazards identified.

3. Responsibilities

3.1. Provost, Vice Provosts, Vice Presidents, Associate Vice Presidents and Deans

- Ensure that the Hazard Assessment and Control Procedure is implemented.

3.2. Department Heads and Directors

- Ensure that the Hazard Assessment and Control Procedure is implemented.
- Ensure that formal hazard assessments are completed for all job positions within his/her Faculty/Unit.
- Ensure that field level hazard assessments are conducted, if required.
- Ensure that workers are involved and participate in formal hazard assessments and field level hazard assessments, as required.
- Ensure that all workers affected by formal hazard assessments are informed of the hazards and hazard control measures.
- Ensure Managers, Researchers, Principal Investigators and Supervisors are fulfilling their responsibilities for conducting formal hazard assessments, field level hazard assessments and implementation of hazard controls.
- Ensure that formal hazard assessments are reviewed and updated post incident or when changes to operations are implemented (i.e. new equipment or a process is introduced to the work area).
- Participate in formal hazard assessments, field level hazard assessments and Hazard Assessment and Control training, as required.
- Ensure that records of completed Hazard Assessment and Control Forms and Field Level Hazard Assessments are maintained in your Faculty/Unit for a minimum of 3 years.

3.3. Managers, Researchers, Principal Investigators and Supervisors

- Implement the Hazard Assessment and Control Procedure.
- Conduct formal hazard assessments for all job positions within your area of responsibility.
- Ensure that field level hazard assessments are conducted within your area of responsibility and that you participate as required.
- Ensure that workers are involved and participate in formal hazard assessments and field level hazard assessments, as required.

- Ensure that all workers affected by formal hazard assessments are informed of the hazards and hazard control measures.
- Ensure hazard control recommendations identified on Hazard Assessment and Control Forms and Field Level Hazard Assessments are addressed.
- Review and update Hazard Assessment and Control Forms post incident or when changes to the operation are implemented (i.e. new equipment or a process is introduced to the work area).
- Ensure that formal hazard assessments are reviewed and updated
- Participate in Hazard Assessment and Control training as required.
- Maintain records of completed Hazard Assessment and Control Forms and Field Level Hazard Assessments for a minimum of 3 years.

3.4. Workers

- Participate in formal hazard assessments and training as required.
- Complete field level hazard assessments as required.
- Utilize all identified hazard control measures.
- Recommend improvements to the control of hazards to their supervisor.

3.5. Environment, Health and Safety Department

- Develop the University's Hazard Assessment and Control Procedure and associated standard templates and forms.
- Develop and provide Hazard Assessment and Control training.

4. Training

All individuals conducting formal hazard assessments must complete the Hazard Assessment and Control training offered by EHS at www.ucalgary.ca/safety/courses.

5. Worker Participation

Completion of hazard assessments requires the involvement and participation of the affected workers as required by the *Alberta OHS Code Part 2*. Workers affected by the hazards identified in the formal hazard assessments and field level hazard assessments must be informed of the hazards and of the methods used to control or eliminate the hazards.

6. Hazard Identification

6.1. What is a Hazard?

"A hazard is a situation, condition or thing that may be dangerous to the safety or health of workers." *(Alberta Occupational Health & Safety Code 2009)*

6.2. Types of Hazards

Occupational hazards can be divided into two types:

1. Health Hazards

   Health hazards may produce serious and immediate (acute) health effects. They may also cause long term (chronic) health problems. One area, one organ or all of the body may be affected. A worker who has been exposed to a hazard may develop an occupational illness but may not recognize the symptoms immediately. For example, noise induced hearing loss is often not noticed until the hearing loss is well advanced.

2. Safety Hazards

   A safety hazard is anything that could cause an injury if an incident occurs. An injury caused by a safety hazard is usually obvious. For example: a broken arm, a cut or a fall.

6.3. Hazard Categories

Both health and safety hazards can be classified into the following categories, with listed examples:

Physical Hazards

- Lifting and handling loads
- Highly repetitive motions (musculoskeletal)
- Slipping and tripping hazards (e.g. poorly maintained floors)
- Driving (e.g. ATVs, forklift trucks)

Chemical Hazards

- Chemicals (e.g. battery acids, solvents)
- Dusts (e.g. from grinding, asbestos removal, sandblasting)
- Fumes (e.g. welding)
- Mists and vapours

Biological Hazards

- Viruses, fungi, bacteria
- Moulds
- Blood and body fluids (bloodborne pathogens)
- Sewage

Psychological Hazards

- Workplace violence
- Fatigue

6.4. Sources of Hazards

There are 4 major sources of hazards which include:

1. People: Lack of training, poor communication, inexperience, or other factors may cause at risk behaviour that is a source of hazards.

2. Equipment: The equipment and tools used in the job process may be sources of hazards.

3. Materials: Some items are inherently hazardous and others become hazardous over time due to inadequate maintenance, storage or disposal.

4. Environment: Refers to the overall workplace. Factors such as facility layout, ventilation, and lighting, walking surfaces, temperature and other variables may all be sources of hazards.

6.5. Imminent Danger

Some hazards are significant enough to present a situation of imminent danger. *Section 35* of the *Occupational Health and Safety Act* requires workers not to work in situations where imminent danger exists. Imminent danger means, in relation to any occupation:

- A danger that is not normal for that occupation, or

- A danger under which a person engaged in that occupation would not normally carry out the work.

Environment, Health and Safety has a procedure for all employees if work is refused due to imminent danger. Refer to the following link: www.ucalgary.ca/safety/worker_rights.

7. Hazard Assessment

There are two types of hazard assessments:

- Formal hazard assessments
- Field level hazard assessments

7.1. Formal Hazard Assessments

Formal hazard assessments involve the identification of all jobs and tasks performed by employees, an assessment of the hazards associated with each task and the prioritization of the hazards based on the level of risk they pose.

At the University of Calgary, formal hazard assessments are completed using the Hazard Assessment and Control Form (HACF).

7.1.1. Step–by–Step Instructions to Complete a Hazard Assessment and Control Form (HACF)

1. Create an inventory of all job positions within the Faculty/Unit.

   - An organizational chart for the Faculty/Unit will assist in creating a list of all job positions.
   - Job Profiles/UCPL#'s for MaPS and Support Staff are available from the UC Performance Link.
     - Faculties/Units should contact their Human Resources Partner/Advisor for more information about the UCPL.
   - All job positions must be tied to a HACF; one HACF may be completed for a number of job positions with similar tasks.

2. Form workgroups comprised of employees with similar tasks/hazards associated with their job positions.

   - Managers/Supervisors are required to conduct the formal hazard assessment and ensure that working groups include representation from workers.
   - All individuals conducting hazard assessments must complete the Hazard Assessment and Control training offered by EHS at www.ucalgary.ca/safety/courses.

3. Obtain the appropriate standardized Hazard Assessment and Control Form Template.

   - To assist in the completion of formal hazard assessments, EHS has developed standardized HACF templates based on the general types of work at the U of C.
   - Four standard templates are available. These templates are to be used as a starting point only.
   - Templates are fill-in forms which may be printed and/or completed electronically.

Work Type	Standardized HACF Template
Teaching/Administrative	Hazard Assessment & Control Form – Teaching/Administrative Template
Laboratory	Hazard Assessment & Control Form – Laboratory Template
Technical/Engineering	Hazard Assessment & Control Form – Technical/Engineering Template
Trades	Hazard Assessment & Control Form – Trades Template

Record the following information on the HACF template:

- Job Profile/UCPL #'s or job position titles.
- Date Completed – date the HACF was completed.
- Date Revised – date the HACF was revised.
    - HACFs must be reviewed and updated post incident or when changes to operations are implemented (i.e. new equipment or a process is introduced to the work area).
- Name(s) of the Worker Representatives, Supervisor/Manager and Others who have participated in completion of the HACF.

4. List all tasks associated with the jobs performed.

    - Compare your list with the tasks identified on the HACF Template.
    - Record additional tasks on the HACF Template – spaces are available at the end of each template.

5. Identify and list the hazards associated with each task.

    - Compare your list with the hazards identified on the HACF Template.
    - Record additional job specific hazards on the HACF Template – spaces are available.

6. Determine the existing hazard controls currently in place.

    - Refer to Section 8 Hazard Control for an explanation of hazard controls.
    - Review the list of existing controls identified on the HACF Template.
    - Record additional job specific controls not already listed on the HACF Template – spaces are available.
    - Existing controls not listed on the HACF Template should be recorded as "Other" and details specified.

7. Rank the hazards.

    - Hazard ranking is based on the existing controls currently in place.
    - Ranking of a hazard has three considerations:
        - severity (S) of the consequences,
        - probability (P) of incident or injury associated with the hazard occurring and,
        - frequency (F) of exposure to the hazard.

    - Rank the severity, probability and frequency of each hazard on the HACF Template by assigning a ranking score for each hazard. Refer to Table 1 – Hazard Ranking.

Table 1 - Hazard Ranking

Hazard Ranking	**1**	**2**	**3**
Severity (S)	First Aid, Medical Aid and/or Minor Property Damage (less than $5,000)	Lost Time Injury and/or Significant Property Damage (between $5,000 and $10,000)	Permanent Disability, Fatality and/or Property Damage (greater than $10,000)
Probability of Incident (P)	Unlikely to occur	Could occur	Likely to occur
Frequency of Exposure (F)	Rarely (<1/month)	Often (3 times/week)	Every day
Severity (S) + Probability (P) + Frequency (F) = Risk Rating			

8. Determine a Risk Rating

- Determine a risk rating for each hazard by adding the hazard ranking scores for Severity (S), Probability (P) and Frequency (F).
- The Risk Rating is used to prioritize hazards. Highest risk hazards should be prioritized and addressed first.
- It is important to attend to the hazard and not get 'wrapped up' in the numbers.

Table 2 – Risk Rating

S + P + F =	Risk	Actions
3 or 4	Low	**Requires monitoring** on the part of your Faculty/Unit to ensure the associated risk level does not increase.
5 or 6	Medium	**Requires attention** on the part of the Faculty/Unit through the implementation of further controls, or change in procedure in order to reduce the level of risk.
7, 8 or 9	High	**Requires immediate attention** on the part of the Faculty/Unit through the implementation of further controls, or change in procedure in order to reduce the level of risk.

9. Identify the recommended hazard controls.

- Review the recommended hazard controls identified on the HACF Template and identify all controls not currently in place but required to be considered for implementation.
- Recommended hazard controls not listed on the HACF Template should be recorded as "Other" and details specified.

10. Assign responsibility for implementation of recommended controls.

- List the recommended controls, person responsible for implementation and completion date on the HACF Template for each task.

11. Review HACFs.

- HACFs must be reviewed and updated:
    - post incident or
    - when changes to operations are implemented (i.e. new equipment or a process is introduced to the work area).

7.2. Field Level Hazard Assessment (FLHA)

In addition to the formal hazard assessment, field level hazard assessments are conducted at locations where the activities and conditions change frequently (e.g. research and teaching field sites, construction sites, outdoor activities affected by weather conditions, etc.). Typically this type of hazard assessment is conducted at the beginning of the first day or each day when a new job/activity is started.

7.2.1. Field Work/Activities

FLHA's must be completed for all research and teaching field excursions, field schools and field work activities.

EHS has developed a FLHA template to assist in the completion of the FLHA and should be considered as a starting point only. Faculties/Units may utilize their own FLHAs.

- Field Level Hazard Assessment (FLHA) – Field Work/Activities

8. Hazard Control

Hazards can be controlled:

- At the source,
- Along the path to the worker (between the source and the worker),
- At the worker (always the last choice).

Types of Hazard Controls

As required by *Part 2* of the *Alberta OHS Code,* hazards are to be controlled using the hierarchy of controls.

1. Engineering Controls (ENG) – provide the highest degree of worker protection because they eliminate or control the hazard at the source. ENG controls are the preferred method of eliminating and controlling hazards.
2. Administrative Controls (ADM) – processes developed by the employer to control hazards not eliminated by engineering controls (e.g. safe work policies, practices and procedures, job scheduling or rotation, and training).
3. Personal Protective Equipment (PPE) – These are the last line of control or defence.
4. Combination of Engineering, Administrative and/or PPE controls.

8.1. Engineering Controls (ENG) – At the Source

Engineering controls at the source include:

Elimination – Getting rid of a hazardous job, tool, process, machine or substance is the best way of protecting workers. An example:

- Using mechanical equipment rather than having workers manually lift, lower, carry, etc.

Substitution – Doing the same work in a less hazardous way such as:

- Substituting a hazardous chemical with a less hazardous one.
- Replacing hazardous processes with less hazardous processes.
- Selecting tools, equipment and machinery that require less maintenance.
- Replacing heavy, awkwardly shaped loads with lighter loads with handles and/or good gripping surfaces.

Redesign – Jobs and processes can be redesigned to make them safer. For example:

- Making containers easier to lift and hold.
- Providing fail-safe interlocks on equipment, doors, valves, etc.
- Controlling traffic to avoid collisions.
- Improving workplace lighting, ventilation, temperature control.
- Padding low overheads.
- Providing warning systems.

Isolation – If a hazard cannot be eliminated or replaced, it can sometimes be isolated, contained or otherwise kept away from workers. For example:

- An insulated and air-conditioned control room can protect operators from hazards.
- Sound reducing enclosures for noisy equipment.
- Negative pressure fume hoods in laboratory settings.
- Exhaust ventilation systems (canopy hoods, slot hoods, downdraft hoods, etc.) to control fumes and vapours.

Automation – Dangerous processes can be automated or mechanized. For example:

- Spot welding operations can be handled by computer-controlled robots.
- Mechanical pipetting of substances in a laboratory setting.
- Automatic conveyor.

8.2. Engineering Controls (ENG) – Along the Path

Examples of engineering controls along the path from the hazard to the worker:

Barriers – A hazard can be blocked before it reaches workers. Usually the further a control keeps a hazard away from workers, the more effective it is. For example:

- Special curtains can prevent eye injuries from welding arc radiation.
- Proper equipment guarding will protect workers from contacting moving parts.
- Enclosure and covers.
- Separating vehicle and pedestrian traffic.
- Lock-out systems can isolate energy sources during repair and maintenance.

Absorption – a hazard can be absorbed before it reaches workers. The closer the absorber is to the hazard the better

- Sound baffles can absorb noise generated by machinery.
- Radiation shielding can absorb the radiation from x-ray units.
- Welding glasses absorb the Ultraviolet light generated by welding.
- Activated carbon charcoal can be used to absorb volatile gases generated by experimental procedures.

Dilution – Some hazards can be diluted or dissipated.

- General (dilution) ventilation systems might dilute the concentration of a hazardous gas with clean, tempered air from the outside.
- Dilution ventilation is often quite suitable for less toxic products. However, it is not effective for substances that are harmful in low concentrations like hydrogen sulphide, cyanide gas, methane, etc.

8.3. Administrative Controls (ADM)

When engineering controls are not possible, administrative controls are the next method to controlling hazards. Examples of administrative controls at the level of the worker include:

Work procedures – describe how to safely do a job from start to finish.

- Workers must be trained in work procedures.
- The employer is expected to ensure that workers follow these procedures. Work procedures must be periodically reviewed with workers and updated.

Job rotation– can reduce the time that workers are exposed to a hazard.

- For example, workers can be rotated through jobs requiring repetitive movements to prevent musculoskeletal injuries.

Housekeeping – includes cleaning, waste disposal, and spill cleanup.

- Work areas are less likely to cause injury if they are kept clean and well maintained.

Hygiene - hygiene practices can reduce the risk of toxic materials being absorbed by workers or carried home to their families.

- Street clothing should be kept in separate lockers to avoid being contaminated by work clothing.
- Eating areas are required to be segregated away from toxic hazards.
- Eating is forbidden in work areas with toxic materials.

- Where applicable, workers should be required to shower and change clothes at the end of the shift.

8.4. Personal Protective Equipment (PPE) and Clothing

PPE is used when other controls are not possible and where additional protection is needed.

- Workers must be trained in the proper selection, use, maintenance, and storage of their personal protective equipment.
- Supervisors and workers must understand the limitations of PPE.
- Supervisors must ensure workers wear PPE when it is required.

8.5. Combination of Controls

Sometimes a hazard cannot be adequately controlled by a single type of control (engineering, administrative, or PPE). A combination of these methods may be required to effectively control the hazard. For example, the use of mechanical equipment may eliminate the need for manual lifting (engineering control) but supervisors are required to provide workers with appropriate procedures and training on the use of the mechanical equipment (administrative control).

9. Document Management and Retention

Faculties/Units are responsible to retain all Hazard Assessment and Control Forms and Field Level Hazard Assessments for a minimum of 3 years and ensure records are readily available for audit purposes. Documents may be retained electronically or in hard copy.

10. Reporting of Unsafe or Unhealthy Conditions and Practices

Unsafe or unhealthy conditions and practices should be reported to your direct supervisor. Alternately, they may be reported electronically using the Report a Hazard or Concern link on the EHS Website at www.ucalgary.ca/safety/reportahazard.

11. Definitions

AASP	Means Alberta Association for Safety Partnerships.
Administrative Controls	means processes developed by the employer to control hazards not eliminated by engineering controls (e.g. safe work policies, practices and procedures, job scheduling or rotation, and training).
EHS	means Environment, Health and Safety.
Employee	means an individual who is engaged to work for the University under a contract of service, that is, there is an employer-employee relationship between the individual and the University. For clarity, this term includes support staff, management and professional staff, the senior administration group, researchers, graduate students who are remunerated by the University, and faculty members.
Engineering Controls	is the preferred method of hazard control if elimination is not possible; physical controls implemented at the design, installation, or engineering stages (e.g. guards, auto shutoff, etc.).
Field-Level Hazard Assessment (FLHA)	hazard assessments that are conducted on the spot at work locations where the activities and conditions change frequently (e.g. construction sites, road building activities, brush control activities, outdoor work activities affected by weather conditions).

FLHA	means Field-Level Hazard Assessment.
Formal Hazard Assessment	is the identification of all jobs and tasks performed by employees, assessment of the hazards associated with each task and the prioritization of the hazards based on the level of risk they pose. At the University of Calgary, formal hazard assessments are completed using the Hazard Assessment and Control Form (HACF).
HACF	means Hazard Assessment and Control Form.
Hazard	means a situation, condition or thing that may be dangerous to the safety or health of workers. *Alberta OHS Code (2009).*
Hazard Assessment	is a process used to identify and evaluate the health and safety hazards associated with job tasks and provides a method for prioritizing health and safety hazards. There are two types: 1) formal hazard assessment 2) field level hazard assessment (FLHA).
Hazard Control	means methods used to eliminate or control loss and include Engineering Controls, Administrative Controls and Personal Protective Equipment.
Lost Time Injury	means injuries reportable to the Workers Compensation Board (WCB) that cause (or are likely to cause) a worker to be off work beyond the day of injury.
Manager	means *Department Heads and Directors* in this procedure for the purposes of the AASP Certificate of Recognition (COR) audit protocol.
OHS	means Occupational Health and Safety.
Personal Protective Equipment (PPE)	means equipment used or clothing worn by a person for protection from health or safety hazards associated with conditions at a work site (e.g. gloves, safety glasses, fall protection, etc.). PPE is used when engineering or administrative methods cannot fully control the hazards.
PI	means Principal Investigator.
Risk	means the likelihood that a hazard will result in injury or disease to people, damage to the environment, property, plant or equipment and the potential consequences of that injury, illness, loss or damage.
Senior Management	means the *Provost, Vice Provosts, Vice Presidents, Associate Vice Presidents and Deans* in this procedure for the purposes of the AASP Certificate of Recognition (COR) audit protocol.
Supervisor	means *Managers, Researchers, Principal Investigators and Supervisors* in this procedure for the purposes of the AASP Certificate of Recognition (COR) audit protocol.
UCPL	means the UC Performance Link which supports competency based performance management processes, including job profiles, performance feedback, and performance development opportunities and plans.
UCPL #	means the UC Performance Link number identified on job profiles.

Worker	means a person engaged in an occupation. *Alberta OHS Act (2009)*

12. Related Documents

- Hazard Assessment & Control Form (HACF) Templates – Summary of Tasks
- Hazard Assessment & Control Form – Teaching/Administrative Template
- Hazard Assessment & Control Form – Laboratory Template
- Hazard Assessment & Control Form – Technical/Engineering Template
- Hazard Assessment & Control Form – Trades Template
- Field Level Hazard Assessment Form – Field Work/Activities

13. References and Additional Resources

- Alberta Occupational Health and Safety Act, Regulation and Code
  http://employment.alberta.ca/SFW/307.html

- University of Calgary Occupational Health and Safety Policy
  http://www.ucalgary.ca/policies/files/policies/OHandSPolicy.pdf

- EHS Website
  www.ucalgary.ca/safety
  www.ucalgary.ca/safety/courses
  www.ucalgary.ca/safety/worker_rights
  www.ucalgary.ca/safety/reportahazard