Engineering Physics / C.E.D.T. Research Hazards Safety Report

Researcher: _____ **Supervisor**: _____
(please print name)

_____ _____
(signature) (signature)

Where is your office (Building & Room #):_____ Phone ext. #: _____

Location of Lab: _____

Title of Project: _____ Date: _____

1. Have you filed a report for this project within the last year? **G Yes** **G No**
Even if you already filed a report for this project, you need to file a new report every year thereafter.

2. Please identify all potential hazards which may apply to your project:

Potential Hazards		**Does this Hazard Exist?**
Class A:	High pressure (any compressed gas in a cylinder)	**G** Yes **G** No
	If YES, then take EOHSS **Gas Cylinder** course.	
Class B:	Flammable materials (H_2, P, Silane, Acetone, Ether, Toluene)	**G** Yes **G** No
	If YES, then take EOHSS **Fire Safety** course.	
Class C:	Oxidizing materials (O_2, H_2O_2, $KMnO_4$, HNO_3)	**G** Yes **G** No
	If YES, then take EOHSS **Fire Safety** course.	
Class D1:	Immediately toxic materials (Arsine, Phosphine, Sb, As, CO, Cl_2)	**G** Yes **G** No
Class D2:	Long-term toxic effects (Pb, Hg, Asbestos, Be, CCl_4)	**G** Yes **G** No
Class E:	Corrosive materials (acids, alkalis, ammonia,)	**G** Yes **G** No
Class F:	Explosive materials (incompatible chemicals: Acetic + HNO_3)	**G** Yes **G** No
	If YES, then take EOHSS **Fire Safety** course.	
Hydrofluoric Acid	(also Aluminum Fluoride)	**G** Yes **G** No
	If YES, then take EOHSS **Hydrogen Fluoride** course.	

If YES to using any of above chemical hazards, then take EOHSS **Chemical Handling** course.
If YES to using any liquid or solid chemical hazards, take EOHSS **Chemical Spills** course.
If planning to use the Clean Room, take **Clean Room Training**: Doris Stevanovic

Radiation: Ionizing	(g , a , b , neutrons, X-rays: free electrons High V in vacuum)	**G** Yes **G** No
	If YES, then take **Health Physics radiation** safety course.	
Radiation: X-ray Diffractometer	. . . . .	**G** Yes **G** No
	If YES, then take **Health Physics X-ray** safety course.	
Radiation: Microwave	(e.g. microwave ion source)	**G** Yes **G** No
Radiation: Laser	(visible, infra-red, ultraviolet)	**G** Yes **G** No
	If YES, then take EOHSS **Laser** course.	
Electrical: high voltage exposed	(i.e. a temporary experimental setup)	**G** Yes **G** No
	If using Exposed High Voltage, **consult Tech staff** on experiment design.	
Electrical: high voltage enclosed	(evaporator, CVD, MBE, CO_2 laser, Ion pump)	**G** Yes **G** No
	Check that enclosure is grounded with braid to reliable ground.	

Electrical: high current (heaters, arc welder, ion source oven) . . . . . **G** Yes **G** No

High temperature (e.g. soldering iron, heat gun, annealing furnace) . . . . . **G** Yes **G** No
Extreme low temperature (Dry Ice, Liquid Nitrogen/Helium) . . . . . **G** Yes **G** No

Mechanical (e.g. rotary pump, drill press, lathe, milling machine, sander) . . . . . **G** Yes **G** No
If using machine tools, then take **Machine Shop Training**.
Asphyxiants (Sulfur Hexafluoride, Evaporated LN_2, CO, NO_2, H_2S, Methane) . . . . . **G** Yes **G** No

Evacuated glassware (Explosion / Implosion) . . . . . **G** Yes **G** No
Equipment Pressurized temporarily (Baking out Sorption pump,
dissolved CO_2, Aqua Regia (80% HCl + 20% HNO_3)) . . . . . **G** Yes **G** No

Potential Falling objects (bookcases, items piled up) . . . . . **G** Yes **G** No

Very bright light (electric arc welder) . . . . . **G** Yes **G** No
Loud noise (de-pressurization experiment) . . . . . **G** Yes **G** No

Other hazards (list): _____ . . . . . **G** Yes **G** No
_____ . . . . . **G** Yes **G** No
_____ . . . . . **G** Yes **G** No
_____ . . . . . **G** Yes **G** No
_____ . . . . . **G** Yes **G** No

All employees, volunteers, and students doing research are required (in addition to any other courses indicated above) as a prerequisite to doing work, to take the EOHSS safety course **WHMIS core**.

3. If any potential hazards above are checked "**X Yes**", then, further steps are required by you:

1. Take the EOHSS, Health Physics, Machine Shop or other training courses indicated above.
2. Get workplace-specific training from your supervisor or a competent person in the workplace on the hazards of the work.
3. Review the Standard Operating Procedure for the equipment that you will be using.
4. Provide the details of the hazards of the research (as described on page 4) in a full report, attached to this cover page.

4. Other safety courses are available provided by EOHSS or Health Physics which may be important, recommended or useful for your work:

Accident Investigation
Asbestos Awareness
Due Diligence
Ergonomics
Fire Warden
First Aid / CPR
Indoor Air Quality
JHSC Certification
Property Protection
Office WHMIS
Slips, Trips, and Falls
Violence in the Workplace
High Level Lab access (in the NRB)
Nuclear Reactor (MNR) Access

Guidelines for
the Engineering Physics / C.E.D.T.
Research Hazards Safety Report

The first two pages of this document are the cover page for your report. It is to be completed by each **supervised researcher** in the department and submitted to the Engineering Physics/C.E.D.T. Joint Occupational Health & Safety Committee.

The term "supervised researcher" includes graduate students, undergraduate students employed on research projects, summer students, postdoctoral fellows, visiting scientists, research engineers, research associates, research assistants, technicians, and volunteers.

Procedure:

If there are **any** potential hazards, the report must be expanded on supplementary pages, as described on the next page. It is preferred that this report be word-processed.

If there are no potential hazards, the completed form on the first two pages will suffice as the report. The supervisor must ensure that each researcher which she/he supervises completes the form and is responsible for its completeness.

A separate report is required for each research project. Reports are required:

1) prior to the start of a new research project (N.B. undergrads working on summer projects);
2) at the time a new person takes up work on an existing project;
3) at the time of any change to a research project which alters the potential hazards inherent in the work.
4) renewed and updated each year by October 1.

The completion of a separate report by each researcher is necessary to ensure that each has consciously made him/herself aware of the potential hazards inherent in the work.

Reports must be renewed and updated every year for any active project. These annual reports are due each year on October 1.

Before submission, the report must be approved, signed and dated by the research supervisor.

Research on Hazards

Information on chemical hazards should be available on the Material Safety Data Sheet supplied by the manufacturer. If a hard copy cannot be located, this should be available on the manufacturer's web site. If this cannot be located, try the following site for the Canadian Centre for Occupational Health and Safety (CCOHS):

http://www.ccohs.ca/

In particular, check out the links for MSDS and CHEMINFO.

Information to be provided on Written Portion of the Report

1. Elaborate on potential hazards

For each potential hazard checked **"[X] Yes"** on the report cover page, provide enough elaboration to describe the hazard. Avoid, however, doing a dry-run of the thesis. In the case of:

! **Radioactivity.** List the strength of the sources used, the fields that one will encounter at normal working distances, and acceptable exposure values as learned in the Health Physics course.

! **Class B (Flammable) & Class F (Explosive) materials.**
List the flash point, explosive range, vapour pressure, and auto-ignition temperature for each material. "Flash point" is defined as the minimum temperature at which a liquid gives off vapour in sufficient concentration to form an ignitable mixture with the air above the surface of the liquid. Flammable liquids are defined as those with a flash point below 37.8º C. Combustible liquids are those with a flash point at or above 37.8º C.

! **Class D (Toxic) materials (may also be Class A).**
List the various exposure values for each material, e.g.
IDLH - Immediately Dangerous to Life or Health (Max air concentration to escape within 30 min. window);
STEL - Short-Term Exposure Limit (15 min. time-weighted ave. exposure not to be exceeded in work day);
PEL - Permissible Exposure Limit (Max. permitted 8-hour time-weighted average airborne concentration);
TLV - Threshold Limit Value (acceptable 8-hour time-weighted average airborne concentration day to day).

Ensure that a Materials Safety Data Sheet (MSDS) for each material is easily accessible in the lab where the research is being carried out. Do not attach any MSDS's to the report.

2. Routine Operating Procedures

Describe the **Standard Operating Procedure(s)** necessary for the safe day-to-day operation of the experiment, equipment, situation or hazardous materials as listed previously. In the Operating Procedure describe:

a) **Laboratory Protective Devices in Use.** For example: fume hood, shielding, grounding, flammable gas detector, toxic gas monitor, real-time radiation monitors.

b) **Personal Protective Devices In Use.** For example: safety glasses, air pack, respirator, gloves (specifying material type), lab coat, safety shoes, safety helmet, ear muffs.

c) **Other Protective Procedures In Use.** For example: radiation dose badges, medical monitoring (specifying type and frequency).

3. Emergency Preparation

What types of accidents are reasonably possible and what are their consequences. What are the types and quantities (if applicable) of the hazard which might cause an emergency. In other words, describe a credible "worst-case" scenario.

a) Describe the **Emergency Procedure(s)** to be used in the event of a mishap. Dial **88**. For example: clean-up methods, neutralization procedures, evacuation plan.

b) **Emergency Devices/Materials Available.** For example: fire extinguisher (stating type and capacity rating), eye wash, shower, toxic/corrosive substance antidote, first aid station. Where are each of these?

Once your report is completed, keep a copy for yourself.

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