PART B : STANDARD PRACTICES FOR CONTROLLED PRODUCTS
University of Manitoba
MARCH 1997

The facilities operate under applicable regulations - Workplace Hazardous Materials Information System, Atomic Energy Control Board, and Medical Research Council guidelines. The Standard is the generic minimum which must be practised. Individual areas or administrative units may require additional and specific practices according to type of application and processes involved. The site-specific procedures have to developed by the Administrative Unit Head or area supervisor who ensures that personnel working in those units follow those safe practices.

1. Responsibility/Authority
Responsibility for implementation of this standard rests at all levels including:

1.1 The University
It is the responsibility of the University acting through deans, directors, heads of departments and other administrative unit to provide:

1.1a A safe and healthy working environment.

1.1b Support for implementation of this Standard and other safety programs including the ones mandated by regulations.

1.1c First aid facilities where appropriate.

1.2 The Department Chairperson or Director or Head of an Administrative Unit is responsible for:

1.2a Establishing and maintaining programs which comply with the regulations in providing a safe and healthy work environment in their areas.

1.2b Appointing a senior staff member as WHMIS Coordinator for the department who will receive WHMIS orientation training from the EHSO and will provide guidance to the department in implementing WHMIS and Safety program in the department.

1.3 Principal Investigators, Laboratory Supervisors and Managers are responsible for ensuring that:

1.3a The safety practices are followed and compliance of regulations relating to operations under their control.

1.3b Employees receive the required safety training on WHMIS, Radiation Safety, Emergency Response Training and on lab/unit specific hazards and their control with specific safety rules and safe work procedures.

1.3c Training is documented and records maintained.

1.3d Regular lab safety inspections are performed by lab/unit personnel. All written records of these inspections shall be kept on file.
1.3e Any unsafe work procedures and unsafe conditions are promptly corrected.

1.3f WHMIS chemical inventory is current and up-to-date and is displayed in the lab/unit.

1.3g All reasonable steps are taken to ensure that necessary PPE are worn by lab/unit personnel.

1.4 The Departmental WHMIS Coordinator is responsible for:

1.4a Providing technical guidance to the department/unit in the implementation of WHMIS for that particular area.

1.4b Ensuring that departmental inventory and MSDS are maintained current and accessible.

1.4c Attending WHMIS/safety training, coordination session offered by the EHSO.

1.4d Providing WHMIS training to students and personnel of the department/unit and maintains records of these training.

1.5 Laboratory/Unit Personnel (including students and employees) are responsible for:

1.5a Following established work procedures and safety practices set for their area as well as the STANDARD PRACTICES FOR CONTROLLED PRODUCTS.

1.5b Wearing personal protective equipment to protect them for identified hazard in the manner prescribed to yield maximum protection.

1.5c Notifying the Principal Investigator, Laboratory Supervisor, Manager, or EHSO of any unsafe or potentially unsafe condition.

1.6 Environmental Health and Safety Office (EHSO) is responsible for:

1.6a Ensuring that adequate programs are provided for compliance with safety and health regulations, and for the protection of the health and safety of students, faculty, staff and the surrounding community.

1.6b Providing information resource base and assist departments/units in providing training sessions to laboratory/unit personnel and departmental WHMIS Coordinators.

1.6c Providing guidance to departments and labs/units in safety matters which includes general/fire safety, personal safety, laboratory safety (Chemical, Biological and Radiation), hazardous waste disposal.

1.6d Conducting annual inspection of fume hoods and eye wash equipment.

1.6e Surveying the work environment to identify hazards and recommendation for abatement.

1.6f Monitoring the work environment for airborne contaminants and makes recommendation for control of exposures.
2. PROCEDURES

2.1 Procurement of Controlled Products
Prior to ordering a controlled product, an evaluation of the potential hazard shall be made. Control measures to minimize risk to all persons shall be considered. Attempts should be made to minimize the amount of controlled products ordered.

2.1a Before a substance is received, information on proper handling, storage and disposal (from MSDS or other appropriate references) should be known to those who will be involved. No container should be accepted without proper label as required by WHMIS regulation.

2.1b For some materials (Radioisotopes, biohazardous and infectious material) approval/permit may be required. For shipping and receiving test samples and diagnostic specimens and infectious agents, compliance with Transportation of Dangerous Goods Regulations is necessary. For all these cases contact Environmental Health & Safety Office for guidance.

2.1c Only the minimum amount of flammable and explosives shall be ordered. Ethers must be used within six months.

2.1d Once received, packages shall be inspected for integrity. Leaking packages shall be refused. If this is not possible, spill containment procedures are to be initiated at once. Immediately inform the supplier. If the label is no longer legible a workplace label is to be attached.

2.1e Contents of packages are to be verified with the packing slip.

2.1f Consult the inventory of maximum quantities and adjust if necessary.

2.1g Containers are to be dated when received and when opened (use permanent ink).

2.2 Inventory of Controlled Products

2.2a An up-to-date and continuous inventory of chemicals will be maintained. Excluding radioactives, one current copy of the chemical inventory shall be posted and a second copy shall be sent to a central collection point maintained for the department by the WHMIS departmental coordinator using the WHMIS chemical inventory database.

2.2b For radioactives, an up-to-date Radioisotope Inventory Form for each stock vial or kit shall be kept in the lab. These forms may be posted or kept within The Radiation Safety Manual. A centralized inventory is maintained by the EHSO.

2.3 Labelling

2.3a All containers of chemicals must have proper labels. Supplier and workplace labels are required on the original containers. Once decanted into other containers a workplace labelling is required to comply with WHMIS, AECB or other applicable regulations.
2.3b Read the label carefully before using the chemical.

2.3c If you are unable to clearly read the label, then confirm the contents prior to using the chemical. Never use a substance from an unlabelled or poorly labelled container.

2.3d Damaged or illegible labels shall be replaced.

2.4 Material Safety Data Sheets (MSDS)
2.4a A Material Safety Data Sheets binder/file shall be maintained for all chemicals in the facility. The MSDS shall be arranged alphabetically and the binder/file shall be easily accessible to all personnel.

2.4b Where a complete set of MSDS in hard copy is not available, personnel shall have access to networked computer to obtain MSDS on NETDOC via local area network.

2.4c Any chemicals which pose a special hazard or risk shall be limited to the minimum quantities required to meet the short-term needs of the program, and materials not in actual use shall be stored under appropriate safe conditions.

2.5 Signs
Prominent signs and labels of the following type shall be posted:

2.5a Emergency telephone numbers of emergency personnel/facilities, supervisors, and laboratory/unit personnel as required by regulatory agencies shall be posted on the outside of the door to the entrance of the facility;

2.5b Location signs for emergency safety showers, eyewash stations, other safety and first aid equipment and exits;

2.5c Warnings at areas where special or unusual hazards exist; including NFPA signs, biohazardous and infectious materials signs, controlled area signs.

2.6 Storage
2.6.1 Stockrooms/storerooms
A dedicated storage area for controlled products should be provided for large amounts of flammable or explosive products. Such a storage facility shall be located away from offices and the main emergency exits. Where possible stockrooms/storerooms should be accessible to the usage areas such that transportation of controlled products though public areas is minimized.

2.6.1a Stockrooms/storerooms shall be adequately and continuously ventilated at the ceiling and at the floor, and be air conditioned. Electrical connections should be explosion-proof.

2.6.1b Incompatible substances must never be stored together or near one another. (Generally an MSDS provides compatibility information for a chemical. Refer to the University "Guidelines for Chemical Storage").

2.6.1c Stockrooms/storerooms should not be used as preparation or repackaging area.
2.6.1d Stockrooms/storerooms should be open during normal working hours but secured and controlled by one person.

2.6.1e Stored chemicals should be examined at least annually for deterioration and container integrity.

2.6.1f Large or heavy containers should be stored on low shelves.

2.6.1g Toxic substances should be segregated in a well-identified area with local exhaust ventilation.

2.6.1h Chemicals which are highly toxic and mercury should be in unbreakable secondary containers.

2.1.6i An up-to-date inventory of chemicals in the stockroom/storeroom shall be maintained and posted.

2.6.2 Work-site Storage
2.6.2a The amount of controlled products at a work-site shall never exceed the amount to be used on any one shift.

2.6.2b Supplier/Workplace labels and the integrity of containers to be inspected daily. Illegible and/or fading/missing labels shall be promptly replaced.

2.6.3 Laboratory Storage
2.6.3a Amounts of chemicals permitted for laboratory should be as small as practical.

2.6.3b Storage on bench tops and in fume hoods is inadvisable.

2.6.3c Regular inspection of stored chemicals will be done by the laboratory supervisor and outdated and unwanted chemicals be disposed. Illegible labels replaced.

2.6.3d A flammable material storage cabinet shall be used for the storage of flammable materials. The maximum amount of flammable and combustible liquids permitted to be stored outside of a Flammable Storage Cabinet shall be 50 L in containers of not more than 4 L in size. Where larger quantities of a flammable or combustible are required in open laboratory, they shall be kept in approved Safety Containers of not more than 25 L in size. Quantities in excess of 50 L shall be kept Flammable Storage Cabinets up to maximum of 500 L of which no more than 250 L shall be Class I Liquids. (See Appendix B: The University of Manitoba Flammable Liquid Storage Policy.)

2.6.3e Flammable liquids requiring refrigeration shall only be stored in spark-proof refrigerators.

2.6.3f Keep flammable away from ignition sources.

2.6.3g Store chemicals according to compatibility.

2.6.3h Segregate flammable and combustibles from oxidizing acids and oxidizers.
2.6.3i Store reducing materials away from oxidizers.

2.6.3j Segregate acids from bases and from active metals.

2.6.3k Segregate acids from chemicals that could generate toxic gases on contact such as sodium cyanide, iron sulphide.

2.6.3l Segregate oxidizing mineral acids from organic acids, flammable and combustible materials.

2.6.3m Perchloric acid and picric acid require special handling. Picric acid is reactive with metals or metal salts and explosive when dry. Picric acid must contain at least 10% water to inhibit explosion. Perchloric acid is also potentially explosive and shall be stored separately.

2.7 Access

2.7a Access to laboratories/facilities where controlled products are used or stored shall be restricted to authorized persons who have been instructed in the nature of the hazards and in appropriate safe handling precautions including procedures in the event of emergencies such as spillage and fire (WHMIS/Radiation Safety) and can demonstrate that the instruction received has been understood.

2.7b All visitors including delivery/service personnel who are required to enter laboratories/facilities where controlled products are used or stored must be escorted by an authorized person. The authorized person will inform the visitor of potential hazards in the area and provide any PPE required and direction on appropriate safe behaviour in the area.

2.7c Generally persons under the age of 16 years should not be permitted in the laboratory or support areas. However, on occasions where such persons are permitted in laboratories as part of educational or class room activity, they must be under direct supervision of authorized personnel who will be responsible to ensure that they are protected at all times from potential hazards.

2.8 Distribution/transporting within facility

2.8a When chemicals are carried by hand, breakable containers should be placed in an outside container or rubber bucket (i.e. secondary containment). The volume of the secondary containment shall hold the maximum volume transported.

2.8b Compressed gas cylinders shall be moved in a hand cart with cylinders firmly restrained with a metal chains.

2.8c Use safety containers for flammable solvents. If these solvents must be kept in glass bottles for reasons of purity, keep the volumes in the bottles to a minimum. Secondary containment should be used for transporting other liquid chemicals.

2.8d Choose routes to minimize transportation through public areas. Consider transporting during low traffic time periods.
2.9 **Dispensing procedures**
(Refer to Appendix C: The University Dispensing guidelines)

2.9a Dispensing should be done in a well ventilated area. A fume hood can be used for this purpose.

2.9b Because of the danger of static build up and discharge during dispensing of flammable/combustible liquids from metal storage containers having a capacity of 25 litres or more to smaller ones, the storage container shall be electrically grounded by grounding straps or wires connected to known grounds such as metal water pipes, grounded metal building framework or metallic underground gas piping systems. The metal containers shall be electrically bonded with a flexible bonding conductor - a bonding strap or wire. Build-up of static electric charges near the surface of liquids being poured into non-conducting containers should be controlled by limiting the flow rate to less than 1 m/s, using grounded lance or nozzle extension to the bottom of the container. A pump should be used for dispensing flammable liquids. Do not splash-fill containers.

2.9c Labels checked for legibility.

2.9d Chemical resistance of containers should be considered.

2.10 **Personal Behaviour**
Responsible behaviour is mandatory.

2.10a Determine the potential hazards associated with any experiment before beginning it.

2.10b Be aware of other people's movements/activities.

2.10c Be aware of the potential hazards of the work done by co-workers.

2.10d Be alert to unsafe conditions and see that they are corrected. Warn co-workers who are carrying out work in an incorrect or dangerous way.

2.10e Communicate your movements to co-workers to avoid distracting or startling them. Keep your co-workers informed of your activities so that they can respond appropriately in the event of an emergency.

2.10f Do not allow practical jokes and horseplay at any time.

2.10g Do not eat or drink in areas where controlled products are used or stored.

2.10h Confine long hair and loose clothing.

2.10i Avoid wearing jewellery.

2.10j Wear clothing to cover legs, feet and arms.

2.10k Wear shoes that cover the entire foot.

2.10l Keep food or drink out of the operational areas of the laboratory/unit,
2.10j Avoid applying cosmetics.

2.10k Avoid bringing personal items into the working area (lunches, cosmetics)

2.10l Remove gloves and wash hands prior to touching phones, pens and light switches.

2.10m Use equipment only for its designated purpose.

2.10n Ensure guards are in place for movable parts of equipment, e.g. belt-guard from a vacuum pump.

2.10o Pre-authorize all experiments as well as any modification to experimental procedure with your supervisor.

2.10p Wear the appropriate personnel protective equipment.

2.10q Know the location of emergency exits, alarms, available telephones and safety equipment such as extinguishers, showers and eye wash.

2.10r Learn how to use the safety equipment and have good understanding of the safety rules and emergency procedures.

2.10s Keep cabinet and bench drawers and doors closed.

2.10t Keep passages and aisles clear.

2.10u Avoid wearing contact lenses in the laboratory.

2.10v Keep the work area clean and uncluttered with chemicals and equipment properly labelled and stored; and work area cleaned after the operation or at the end of each day.

2.10w Personal protective equipment (gloves, apron, lab coats, overalls etc.) are to be used in the laboratory/facility and should be removed before leaving the room. Remove laboratory coats immediately on significant contamination.

2.10x Avoid working alone in a building; use the "buddy system" for potentially hazardous procedures.

2.10y Seek information and advice about hazards, plan appropriate protective procedures, and plan positioning of equipment before beginning a new operation.

2.10z Be prepared for accidents - before beginning an experiment.

2.10aa Know specific action to take in the event of an accidental release of any controlled products before beginning any experiment or operation.

2.10bb Before handling or storing any chemical, read the label and the MSDS for safety, hazard and precautionary and emergency information.

2.10cc Wear appropriate gloves when there is potential of contact with toxic or
corrosive materials, inspect the glove before each use, wash them before removal, and replace them periodically. Check resistance to chemicals of common glove materials available from manufacturer/distributor of gloves. Change disposable gloves frequently.

2.10.dd Treat all new compounds and substances of unknown toxicity as toxic substances. Do not underestimate risks - assume that any mixture of chemicals will be more toxic than its most toxic component.

2.10.ee Minimize exposure to chemicals - do not allow laboratory chemicals/controlled products to come in contact with skin and eyes. Use appropriate personal protective equipment e.g., impervious gloves, safety eye glasses with side shields, splash goggles, masks, respirators. Use laboratory hoods or other ventilation devices to prevent exposure to airborne substances. Do not smell, taste or make direct skin contact with chemicals. Wash promptly whenever a chemical has contacted the skin.

2.10.ff Promptly clean up spills, using appropriate protective apparel and equipment and proper disposal.

2.11. Basic Rules and Procedures for Working with Controlled Products
2.11.1 General Rules
2.11.1a Eye protection shall be required for all personnel and visitors in areas where controlled products are stored or used. Safety glasses with side shield provide the minimum protection acceptable for regular use. Visitor safety glasses should be made available at the entrances of all laboratories/units.

2.11.1b It shall be mandatory to wear any personal protective equipment required for conducting operations safely (University Policy 503).
2.11.1c The supervisor will ensure that all procedures for possible health, safety and environmental problems are reviewed before the work is begun. Review the relevant MSDS before starting any procedures. Whenever possible, substitution with non-hazardous or less hazardous alternative chemicals should be practised.

2.11.1d All personnel working with controlled products shall be aware of emergency response protocol.

2.11.1e Chemicals shall only be used when the quality of ventilation is adequate.

2.11.1f Apparatus which may discharge toxic chemicals (vacuum pumps, distillation columns etc.) shall be vented into local exhaust devices.

2.11.1g Do not allow release of toxic substances in cold rooms or similar environmental rooms which contain recirculated atmospheres.

2.11.1h Mechanical pipetting devices shall be available. Mouth pipetting and using mouth suction to start a siphon are prohibited.

2.11.1i The facility will be maintained in an orderly fashion.

2.11.1j Prior approval from the supervisor shall be necessary for any new laboratory procedure.

2.11.1k Unattended experiments should be left operating during night, only with the permission of the supervisor. The telephone number of the supervisor, as well as that of the worker must be clearly posted on the door. Provide for containment of toxic materials in the event of failure of a utility service such as cooling water.

2.11.1l Protective laboratory practices and equipment shall be available and in common use to minimize the potential employee exposure to hazardous chemicals and devices.

2.11.1m Glove boxes shall be tested and inspected before use.

2.11.1n Appropriate respiratory protective equipment shall be used when air contaminant are not sufficiently restricted by engineering controls. Inspecting and properly fit testing the respirator before use.

2.11.1o Any special equipment needed to maintain the required isolation for materials in the laboratory shall be provided e.g. specially labelled waste containers, autoclaves, disposable clothing.

2.11.1p Compressed gas cylinders must be restrained with a rack, strap or chain to prevent
from falling. Rope, bungee cords or plastic tubing are not sufficient to hold heavy cylinder.

2.11.1q If a compressed gas cylinder is not being used, the regulator must be removed and the cap replaced.

2.11.1r Avoid oil or grease coming into contact with the valves on compressed oxygen gas cylinders because of the risk of fire or explosion.

2.11.1s Plugs, cords, outlets and receptacles should be in good condition and not have any splices or exposed conductors. Frayed cords shall be replaced.

2.11.1t All electrical equipment must be properly grounded. Do not alter original wiring by removing grounding wire or using ungrounded adapters.

2.11.1u Avoid using extension cords. They should be used for temporary use only. Place equipment where it can access an electrical outlet directly or have an electrician extend the outlets with approved conduit and wiring to reach the equipment.

2.11.1v All electrical components including switches, electrical panels, outlets etc. must have covers in place and intact.

2.11.1w Do not overload outlets. Install additional outlets if needed.

2.11.2 Accident and spills

A written emergency plan should be established and communicated to all personnel. The plan should include procedures for ventilation failure, fire, spill, evacuation, medical care, reporting and drills.

2.11.2a There should be an alarm system to alert people in all parts of the facility including isolation areas such as cold rooms.

2.11.2b A spill control policy should be developed and should include consideration of prevention, containment, clean-up and reporting.

2.11.2c All accidents or near accidents should be analyzed with results distributed to all who may benefit.

2.11.2d The following should be used for essentially all laboratory work with chemicals-
a. Eye contact: Promptly flush eyes with water with eye lids open for 15 minutes and seek medical attention.

b. Ingestion: Rinse mouth with water and seek medical attention.

c. Skin contact: Promptly flush the affected area with water and remove any contaminated clothing. If any symptoms persist after washing, seek medical attention.

d. Inhalation: Remove to fresh air and seek medical attention.

For emergency medical attention resulting from such accidents/spill, the nearest emergency medical facilities should be accessed. As for example: Fort Garry Campus - University Health Services at the University Centre (Mon-Fri 8:30 AM - 4:30 PM) / Emergency Department, Victoria General Hospital, 2340 Pembina Hwy.); Bannatyne Campus - Emergency Department, Health Sciences Centre).

When seeking medical attention, provide a copy of the MSDS to the attending medical personnel.

2.11.3 Spill Clean-up
Spill clean-up material/kit (absorbents, neutralizers or decontaminants) shall be readily available together with instructions for their use and appropriate protective equipment for the user. Spills shall be cleaned up promptly and affected area decontaminated and rendered safe by laboratory personnel. All personnel who work with hazardous chemicals, biohazardous materials should be familiar with appropriate procedures for dealing with any substances handled in their laboratory.

2.11.4 Waste Disposal
Follow the University waste disposal protocol and radioactive waste disposal protocols manifested on the Waste Disposal Chart for Laboratories and Waste Disposal Chart for Radioisotope Users. These charts should be prominently displayed in the laboratory/unit.

2.11.4a No controlled products shall be released to the environment. Disposal by recycling or chemical decontamination should be used when possible. Do not dump controlled products down the drain in the sink or fume hood or in the trash.

2.11.4b Bottles used for laboratory waste disposal should be defaced and hazardous waste label with chemical names instead of non specific names such as "organic waste" or "waste solvents".

2.11.4c Before a worker's employment with the laboratory/unit ends, chemicals for which that person was responsible should be properly disposed of through the Environmental Health & Safety Office by filling out Chemical Disposition Form or by returning to the manufacturer.
2.12 Housekeeping, Maintenance, and Inspections:
2.12a Floors should be cleaned regularly.
2.12b Housekeeping and chemical hygiene inspections should be done on a continual basis.
2.12c Eye wash fountains should be flushed weekly and inspected every three months.
2.12d Respirators for routine use should be inspected periodically by the supervisor.
2.12e Emergency eyewash fountains and safety shower and other safety equipment (fume hood, biosafety cabinet etc.) shall be tested regularly and shall have test sticker/certificate attached to them.
2.12f Stairways, hall ways and crawl space shall not be used as storage areas.
2.12g Access to exits, emergency equipment and utility controls should never be blocked.
2.12h There will be regular in-house laboratory inspections.

2.13 Special Practices
2.13.1 Laboratory Fume Hood
2.13.1a All work with hazardous kinds and quantities of materials (e.g. NFPA safety and health hazard ratings of 3 or higher) or any operations which might result in release of toxic vapours, aerosols or dust shall be performed in a laboratory fume hood or in totally enclosed systems.
2.13.1b Before each use, ensure that the hood is working properly (face velocity 100-150 lpm).
2.13.1c Follow the recommended work practices for laboratory hoods.
2.13.1d A fume hood shall not be used as a storage space, only materials being used in an ongoing experiment will be kept in a fume hood.
2.13.1e The hood fan should be kept on when a controlled products (e.g. toxic or flammable chemicals) is inside the hood, whether or not any work is being done in the hood.
2.13.1f Leave the sash lowered (closed) when the hood is unattended.
2.13.1g Keep the sash glass clean. Never obstruct your view with paper, decals, notices or other items.
2.13.1h Hoods should not be used as a means of disposal of volatile chemicals.
2.13.1i Flammable liquids should be handled only in areas free of ignition sources. Heating should be limited to water and oil baths and heating mantles. Oil baths must be used with care and should not be left operating unattended; use another heating process where possible.
2.13.1k When transferring flammable liquids in metal containers/equipment, care shall be taken that metal lines and vessels are bonded together with flexible conducting material of sufficient strength and grounded to a common ground.

2.13.1l Work with explosives shall be limited to the minimum quantities needed. For small quantities used in a hood, an explosion barrier in the hood, with personnel should wear protective eye wear, face masks and hand protection. For larger quantities, the facility must be specifically designed for the research program.

2.13.1m Highly exothermic or potentially explosive reactions must never be left unattended.

2.13.1n Other workers must be notified when an explosive hazard is present through direct announcement and conspicuous warning signs.

2.13.1o Ethers and other materials which degrade to unstable compounds shall be shelf dated for disposal six months after being opened and not more than twelve months after purchase even if unopened unless processed to remove any unstable peroxides that may have formed.

2.13.1p Systems containing toxic gases that would be immediately dangerous to life and health (IDLH) or gases that could pose an explosion hazard if allowed to escape and especially if they have no sensory warning properties, shall be leak tested prior to use and after any maintenance or modification.

2.13.2 Vacuum Systems
Vacuum systems (e.g. Dewar flasks, large vacuum bottles, vacuum desiccators) capable of imploding, resulting in large quantities of glass shrapnel or flying debris, shall be protected with cages or barriers or, for smaller systems, shall be wrapped in adhesive tape.

2.13.2a When using a vacuum pump, place a condensation trap with coolant between the pump and the apparatus in order to prevent any volatile substances from getting into the pump. Vacuum traps should be wrapped with adhesive tape.

2.13.2b Leather or insulated gloves should be worn to handle dry ice; never put your head inside a dry ice chest since absence of oxygen and the presence of carbon dioxide could cause suffocation.

2.13.3 Biohazardous Material
Biological hazards which include microorganisms - bacteria, viruses, fungi or other infectious agents, insects, animals and some plants, present distinct problems.

2.13.3a Special biohazard warning signs must be posted prominently in areas where work with
biohazardous materials are carried out.

2.13.3b Extra precautions are required for personnel working with hazardous microorganisms.

2.13.3c Immunization, if feasible, should be considered for those at risk. (Persons of child bearing age, pregnant women and immuno-compromised personnel handling or exposed to biohazardous and infectious agents and other controlled products must be informed of the dangers of such work.)

2.13.3d The standard practices and precautions as outlined in "Laboratory Biosafety Guidelines" developed by Medical Research Council of Canada and Laboratory Centre for Disease Control, Health Protection Branch, Health Canada shall be followed.

2.13.3e Biological Safety Cabinets used for containment of biohazards shall be regularly tested and shall be certified and a current certificate displayed.

2.13.3f The laboratories shall have adequate decontamination, sterilization, spill control and clean-up, waste-disposal protocol in place.

2.13.4 Cryogenic substances

2.13.4a Use of cooling agents such as liquid nitrogen or liquid air requires wearing of special gloves and a face shield.

2.13.4b Never use liquid nitrogen or liquid air to cool substances combustible in air because of the risk of explosion from condensation of the oxygen in air.

2.13.4c Keep cryogenic substances in containers which are not tightly closed to prevent explosive build up of pressure. Do not use domestic thermos bottle; use special industrial bottles.

2.14 Servicing

Prior to service, equipment or fixture shall be decommissioned. Decommissioning requires the removal of all controlled products and their residue and then removing in applicable warning signage or labels. Necessary Personal Protective Equipment shall be worn during the process.
Bibliography

The following books, manual, regulations, guidelines etc. were consulted in developing this Standard. The invaluable help from these is greatly acknowledged.


U.S. Department of Labour, Occupational Safety and Health Administration, *OSHA Laboratory Standard*, 1990.