HAZARDOUS MATERIAL SPILL MANAGEMENT PROGRAM

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PURPOSE OF THE PROGRAM:

Nipissing University's Hazardous Materials Spill Response plan was developed to provide researchers, laboratory personnel, staff, faculty and administrators with a common reference to clean up a wide variety of spills that may occur on campus. These spills entail both chemical and biological spills, both within the laboratory setting and outside of the laboratory. Because spills and/or accidental releases pose a threat of serious injury to students, staff, animals and the environment, an appropriate and immediate response is warranted. This program will operate wholly within the scope of the Nipissing University Emergency Management Plan (EMP).

PROGRAM OBJECTIVES:

1. To factually assess the situation and determine the type of response that is warranted in the event of a hazardous materials spill.
2. To provide written instructions on the best method to clean up a spill and how to handle the resulting hazardous waste.
3. To assign personnel who will assess and take charge of a spill, if warranted.
4. To implement immediate action to:

    - Mitigate the risk to students, faculty, staff and animals.
    - Identify those parties that should be informed about the situation.
    - Communicate facts about the crisis.
    - Minimize rumours.
    - Restore order and/or confidence.

DEFINITIONS

Biological Spill – Any unplanned or uncontrolled release of any biological agent that can pose a potential safety or health risk to people, research animals, or the environment.

Chemical Spill – Any unplanned or uncontrolled release of any solid, semi-solid, liquid, or gaseous hazardous chemical that can pose a potential safety or health risk to people, research animals, or the environment.

Emergency Management Plan (EMP) – Nipissing University's Emergency Management Plan.

Emergency Manager (EM) – Person who oversees the emergency response for Nipissing University.

Facilities – Facilities covered under this program include all Nipissing University owned and all leased structures and property.

Hazardous Chemical – Any solid, semi-solid, liquid, or gaseous chemical that may pose a physical hazard or health hazard. This would include the following: corrosives (acids, bases); paints, petroleum products, poisons, oxidizers, reactives, and solvents (paint thinners, alcohols).

Health Hazard – Any substance that may cause various acute or chronic adverse health effects such as corrosives, carcinogens, irritants, mutagens, teratogens, sensitizers and infectious substances.

Level I – Incident – An event that is unlikely to result in personal injury or extensive property damage (e.g. incidental spill from weighing or a Minor Spill). It is normally resolved using internal personnel and resources and usually does not require assistance from external agencies. Typically, a Level I Incident would not warrant the activation of the EMP, however, it could escalate in magnitude and consequently be reclassified.

Level II – Crisis – A event that results in major disruptions and is likely to endanger the well-being of the University community and/or cause major damage to property (e.g. Major Spill involving highly toxic, reactive, explosive or life threatening chemicals or large volume of biohazardous material). Emergency responders will likely require the assistance of external agencies. An EMG may be formed and a subsequent ECC chosen.

Level III – Disaster – A catastrophic event that cannot be managed by resources available at the University alone (e.g. gas explosion, airplane crash into University, structural collapse). External assistance will be required to effectively deal with the situation. An EMG will be formed and a ECC chosen.

Material Safety Data Sheet (MSDS) – A document prepared by the manufacturer of a hazardous chemical that contains information about the hazards of the chemical and the appropriate work practices required for safe use and spill response. MSDS's are available online at the main campus at http://msds.nipissingu.ca or offline via CD-ROM or via MSDS binders.

Major Spill – Any hazardous chemical spill that involves greater than 1 liter (spill kit capacity) of liquid material or is highly toxic, highly reactive, explosive or life-threatening chemicals. Any spill situation that presents significant fire, explosion, or other physical or health hazard risks, particularly if a person may be or has been significantly exposed, contaminated, or injured to such an extent that medical or other outside assistance is required. Any spill situation that may adversely impact the external environment whether or not the spill occurred internal or external to the building.

Minor Spill – Any hazardous chemical spill that does not involve highly toxic, highly reactive, or explosive chemicals in a situation that would not constitute an immediate risk to an individual's health, safety or the environment and is less than 1 litre of liquid material (spill kit capacity). This type of spill presents a manageable physical or health hazard to personnel who, while wearing proper Personal Protective Equipment (PPE), will not be exposed to the chemical at a level that exceeds any recognized Ontario Occupational Health and Safety Act (OHSA) limit.

Pathogen Safety Data Sheet (PSDS) – A document prepared by the Public Health Agency of Canada (PHAC) that contains information about the hazards of the pathogen and the appropriate work practices required for safe use and spill response. PSDS's are available online at the main

campus at http://msds.nipissingu.ca or offline via CD-ROM or via MSDS binders. They are also available through the PHAC web-site.

Physical Hazard – A hazardous chemical with physical characteristics that make it combustible, flammable, explosive, reactive, a compressed or cryogenic gas, organic peroxide or an oxidizer.

Risk Group – A standardized classification of the relative hazards of infective organisms used by the Public Health Agency of Canada. There are four risk group categories as follows:

> **Risk Group 1** (*low individual and community risk*) – any biological agent that is unlikely to cause disease in healthy employees or animals.
>
> **Risk Group 2** (*moderate individual risk, low community risk*) – any pathogen that can cause human disease but, under normal circumstances, is unlikely to be a serious hazard to laboratory employees, the community, livestock or the environment. Laboratory exposures rarely cause infection leading to serious disease; effective treatment and preventative measures are available, and the risk of spread is limited.
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> **Risk Group 3** (*high individual risk, low community risk*) – any pathogen that usually causes serious human disease or can result in serious economic consequences but does not ordinarily spread by casual contact from one individual to another, or that causes diseases treatable by anti-microbial or anti-parasitic agents.
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> **Risk Group 4** (*high individual risk, high community risk*) – any pathogen that usually produces very serious human disease, often untreatable, and may be readily transmitted from one individual to another, or from animal to human or vice-versa, directly or indirectly, or by casual contact.

READINESS PREPARATION:

The Nipissing University Emergency Management Plan covers the assignment of roles and responsibilities, emergency control centre, emergency response structure and procedures and communications related to any incident covered by this Program.

SPILL MANAGEMENT PROGRAM

CHEMICAL SPILL PREVENTION

The first step in chemical spill response is to prevent the spill from happening in the first place. The laboratory or working environment should be examined to identify measures that can be taken to minimize the risk of a spill occurring. Chemical spills occur during five types of activities: (1) transport, (2) decanting, (3) storage, (4), handing, and (5) disposal.

TRANSPORTATION

- When transporting large, heavy or a multitude of containers, use a cart suitable for the load with high edges or spill trays that will contain any spills or leaks. Two people should be involved when transporting large amounts of chemicals.
- Carry glass containers in bottle carriers or another leak resistant, unbreakable secondary container.
- Appropriate personal protective equipment shall be worn while transporting chemicals, such as safety glasses and/or a lab coat.

DECANTING

- When transferring chemicals between containers, pay careful attention to the size of the receiving vessel to prevent overfilling it.
- When transferring liquids from large containers, use pumps (including pipette pumps), siphoning (not initiated by mouth), or other mechanical means instead of pouring.
- Use spill containment trays to catch leaks and spills when transferring liquids.
- When transferring flammable liquid from drums, ensure that both the drum and receptacle are grounded and bonded together to avoid an explosion initiated by a static electric spark.
- Ensure proper container labelling as per the WHMIS legislation.
- When transferring hazardous liquid chemicals, perform the transfer in a fume hood if possible.

STORAGE

- Ensure shelving units are sturdy. Shelves used for chemical storage should be securely fastened to the wall or floor to provide additional stability. Shelving should be compatible with the stored chemical and not overcrowded with containers.
- Ensure chemicals are stored within easy reach of everyone in the laboratory. Large bottles and containers should be stored as close to the floor as possible.
- Do not store chemical containers directly on the floor where they may be knocked over or broken, unless they are in ULC approved safety cans or still in their original shipping carton and packaging.
- Do not store chemical containers on top of flammable storage or acid storage cabinets, unless they are empty.
- Minimize the number of chemicals and size of containers stored in the lab.
- Ensure that lighting and ventilation is adequate in chemical storage areas.
- Regularly inspect chemicals in storage to ensure there are no leaking or deteriorating containers, including:
    - Keep the outside of the containers clean and free of spills and stains
    - Check that caps and closures are secure and free of deformation. Use only screw caps on chemical containers in storage.
    - Ensure that metal containers are free of rust, bulges or signs of pressure build up.
- Do not store chemicals in unsuitable containers or containers made of incompatible material (e.g. nitric acid stored in metal containers).
- Do not store incompatible chemicals together (e.g. acids with bases). Chemicals must be stored by hazard group and not alphabetically (except within hazard group).

- Purchase solvents and acids in containers with a plastic safety coating, where possible or recommended.
- Ensure organic peroxides are checked for explosive peroxide formation at recommended intervals (see Nipissing University's Laboratory Safety Manual for instructions).

HANDLING

- In laboratories, work in a fume hood whenever possible.
- When setting up and working with laboratory apparatus:
    - Inspect laboratory glassware for cracks and defects before using;
    - Do not stage experiments below heavy objects which might fall on them. Ensure the work area is free of unnecessary clutter;
    - Select equipment that has a reduced potential for breakage;
    - Use non-mercury filled thermometers or alternate types of temperature measuring devices to avoid mercury spills from broken thermometers;
- When planning experiments, anticipate possible accidents and provide controls to deal with problems that may occur.
- If you must work alone after hours, it is recommended that you contact someone else in the building to notify them of your working plans or the evening/weekend. If another person cannot be contacted, contact security at ext. 5555 and inform them that you are working alone and specify the duration of time. Security must be notified when you leave the campus.
- Check gas cylinder valves and gas tubing for leaks before using.
- If possible keep cylinders of highly toxic, corrosive or flammable gasses in a ventilated enclosure.
- Ensure you have access to and know how to use a chemical spill kit before working with chemicals.
- Ensure you know how to contact the Spills Response Team (contact numbers posted in chemical storage areas, usually near the first aid kits).

DISPOSAL

- Do not mix incompatible wastes together to avoid uncontrolled chemical reactions.
- Properly identify the contents of all waste containers to avoid inappropriate disposal.
- Leave at least 25% air space in bottle of liquid waste to allow for vapour expansion and to reduce the potential for spills.
- When not in use, keep waste containers securely closed or capped. Do not leave funnels in waste containers.
- Hazardous waste must not be kept on site for longer than 3 months (Ontario Ministry of Environment regulations).

CHEMICAL SPILL RESPONSE PREPARATION

Minimizing the chance of spills is the responsibility of the user, and therefore prevention is the first step in the response to a chemical spill. The proper procedures for handling the situation are more

likely to be followed with fewer errors and risk to employees and the environment when people are prepared for a hazardous materials spill. To that end, a Spills Response Team has been formed and trained to advise or handle a spill that may be outside of the capabilities of the chemical or biohazardous material user.

TRAINING

All personnel working with hazardous chemicals or biohazardous materials are required to attend Laboratory Safety Training (which includes spills response training) provided by the Laboratory Safety Coordinator. For further information or to set up a training session, please contact the Laboratory Safety Coordinator at ext. 4180.

In addition, a Hazardous Spills Response team (Appendix A) will be designated and trained in spills response and their names and contact information will be posted at all locations where chemicals are stored.

HAZARDOUS CHEMICAL INFORMATION

Material Safety Data Sheets (MSDS's) are required for all WHMIS controlled substances. MSDS's are prepared by the supplier or manufacturer of the material and are intended to indicate the hazards of the product. They also contain information on safe product use, and expectations if the recommendations are not followed how to recognize symptoms of overexposure, and finally what to do in the case of an accidental release. MSDS's are available on-line via the Nipissing University intranet at http://msds.nipissingu.ca.

SPILL PLANNING

The vast majority of spills can be safely cleaned up by laboratory personnel and/or the Spills Response Team. Whoever is most knowledgeable about the spill is responsible for prompt notification and clean-up, if safe to do so. It is the responsibility of the supervisor (in the case of research laboratories) or departmental Chair (in the case of teaching laboratories) to ensure the appropriate clean-up materials and personal protective equipment for the chemicals being handled are readily available for emergency use. They are also responsible for ensuring that spills are cleaned up as soon as possible.

Because of the various types and quantities of chemicals used at Nipissing University, pre-planning is necessary in order to safely handle accidental chemical spills. As such, there are two categories of chemical spills and response procedures outlined in this action plan: (1) Minor chemical spill (Level I response) and (2) Major chemical spill (Level II or Level III response). How spills are categorized will depend on the risk assessment procedure that follows.

RISK ASSESSMENT/SPILL CRITERIA

The following are general guidelines to be followed for a chemical spill.

A. Before determining whether you can safely and effectively address the spill, answer the following questions:
   - What chemicals are typically used in your area?
   - Where is the MSDS for these items? What does it say about spill cleanup?
   - Is the appropriate PPE available?
   - Is an appropriate spill kit available?
   - If the chemical is flammable, do you need to turn off any equipment, heat sources, electrical panels, or other potential ignition sources?
   - Is the ventilation in the potential spill area adequate and/or are there windows that can open?
   - Will the spill have consequences in other areas and to other people?
   - Is the spill contained to a single area or has it entered the environment (entered a drain or into the soil)? If so, then the Spills Action Center (1-800-268-6060) must be contacted.
   - Will you need to notify the Principle Investigator or your supervisor about the spill?

Table 1: Chemical spill criteria used in determining the type of response and treatment materials required to remediate a chemical spill at Nipissing University.

Category	**Size**	**Response**	**Method of Treatment**	**Treatment Materials**
Minor	Not an immediate threat to an individual's wellbeing[1]	Level I	Chemical treatment or absorption	Chemical spill kit
Major	More than 1L or immediate threat to an individual's wellbeing[2]	Level II or Level III	Outside assistance	

B. Chemical spill response kit:
   - Each facility or Department that uses, handles, or stores hazardous chemicals will determine, with the assistance of the Laboratory Safety Coordinator, the need and quantity of stocked chemical spill kits. It is the fiscal responsibility of each facility or Department to procure and maintain chemical spill kits.
   - All potentially affected laboratory personnel, including faculty, staff, research assistants, students and visiting scientists must be trained in the proper use of these chemical spill clean-up kits.
   - Each area that uses or stores hazardous chemicals must have a properly stocked chemical spill kit readily available. The chemical spill kit must be in a single, easily transported container, be centrally located, easily accessible, and labelled as a "Chemical

[1] The spill is in containment or based on information determined in advance from the SDS. The SDS will list potential health effects due to exposure, as well as the type of PPE required in case of an accidental release. If you are not equipped to handle an accidental release, based on information contained within the SDS, then it is considered a major spill, no matter how small the spill. Also, if the spilled material has entered a drain or escaped to the environment, it is considered a major spill, no matter how small the spill.
[2] Ibid.

Spill Clean-up Kit". The contents of the kit must be appropriate for the types of hazardous chemicals used in the area. Minimum contents should include:

i. Chemical resistant gloves (neoprene, nitrile, etc.).
ii. Absorbent materials (spill pillows, pads, or other spill absorbent).
iii. Safety goggles and/or chemical resistant face shield.
iv. Disposable bags.
v. Neutralization reagents
vi. Hand-held brush and plastic dust pan

C. The following chemicals when spilled in any quantity are considered a major spill due to their hazardous nature:
   - Any acid concentrated enough to emit fumes or gases
   - Any base concentrated enough to emit fumes or gases
   - Any chemical that readily emits vapors or gases at normal temperature and pressure that are extremely toxic by inhalation
   - Any chemical that is sensitive to air, water, shock, friction and/or temperature
   - Any chemical that is readily absorbed through the skin and is extremely toxic at small concentrations.
   - Any mercury compound.

D. Spill Reporting.
   - All spills must be reported to the supervisor in writing.

CHEMICAL SPILL RESPONSE

A. Minor Chemical Spills (Level I response):
   - If you believe that it is safe to clean-up a spilled chemical, follow these steps:
     i. Immediately alert area occupants and supervisor that a spill has occurred and evacuate the area, if necessary.
     ii. Isolate the area so that no one accidently enters the contaminated area by: closing doors; posting other individuals at doors and/or hallways to warn others; installation of barrier tape; or any other reasonable method.
     iii. Increase the ventilation within the spill area. If needed turn on chemical fume hoods and/or open exterior windows.
     iv. Review the spill clean-up procedures recommended on the MSDS.
     v. Locate the nearest Chemical Spill Kit and evaluate the contents.
     vi. Don appropriate PPE such as safety goggles/face shield, gloves, lab coat, or apron. Consider the need for appropriate respiratory protection, if required.

     The use of a respirator or self-contained breathing apparatus requires specialized training and medical surveillance. Never enter a contaminated atmosphere without protection or use a respirator without training. If no trained personnel are available contact Security at ext 5555 or (705) 498-7244 (24 hr. cell#). If respiratory protection is used, ensure there is another person outside the spill area in communication, in case of emergency.

     vii. Protect floor drains or other modes of environmental release. Spill socks and absorbents may be placed around drains as needed.
     viii. Confine the spill to a small area using absorbents.

ix. Spill control materials should be distributed over the entire spill area, working from the outside, circling to the inside. This reduces the chance of splash or spread of the chemical.
x. When spilled materials have been absorbed, collect the residue using a brush and scoop. Be sure to wear appropriate respiratory protection. Place materials in a disposal container, such as polyethylene bags, pails or gallon drums with polyethylene liners for larger quantities.
xi. Place all contaminated PPE (gloves, lab coat, etc.) into a plastic bag for disposal.
xii. Complete the hazardous waste tag and affix to the waste container(s), identifying the material as "*Spill Debris*".

Spilled chemical reagents and contaminated PPE must be disposed of as hazardous waste.

xiii. Decontaminate reusable clean-up supplies and the spill area using mild detergent and water and return them to the spill kit. Determine what spill response materials have been used during the spill clean-up and arrange to have them replaced.
xiv. All laboratory incidents or injuries must be reported immediately to the laboratory supervisor (and your supervisor, if different from the laboratory supervisor), who will submit an incident/injury report within 24 hours to the Manager Environmental Health and Safety and the Laboratory Safety Coordinator.

B. Major Chemical Spill (Level II response):
- Employees should only attempt to clean up large or major spills if they have received Hazardous Materials Handling training, and when appropriate spill clean-up materials and appropriate PPE are readily available and are properly utilized.
- Otherwise, in the event of a major spill for which personnel are not properly prepared, particularly if any person has been significantly exposed, contaminated, injured to such an extent that medical or other outside assistance is needed, follow the following steps:
    i. Evacuate the affected areas and secure these areas (i.e. close the doors).
    ii. Ensure injured or contaminated people get immediate exposure and medical treatment (call 911 in case of injury).
    iii. Contact the Spills Action Centre (1-800-268-6060)
    iv. Alert campus security by calling ext. 5555 or 498-7244 (cell) from a safe distance from the contaminated site.
    v. Remain close to the phone, if requested to do so, until contacted by emergency responders.
    vi. Stand-by to provide more information about the spill, including chemical name, quantity, hazards and any other relevant information. Have a copy of the MSDS on hand if available. Assist emergency personnel upon arrival.
    vii. For any chemical spill that occurs outside the building, with potential for adversely affecting the environment, contact the Spills Action Centre (1-800-268-6060) and/or 911 as appropriate.
    viii. Contact Campus security who may initiate the Emergency Management Plan process described above and in the Nipissing University EMP by contacting the plan activation authority (PAA).

MERCURY SPILL RESPONSE

Mercury is a designated substance under OHSA Regulation 844 and as such the employer must have in place engineering controls, work practices and hygiene practices and facilities to ensure that the time weighted average exposure of a employee to mercury and mercury compounds is within the regulation limits. Mercury has an adverse effect on humans, animals and plants. Hazards exist when mercury is inhaled or ingested. Methyl mercury and alkyl forms are the most toxic and elemental mercury, when exposed to air or heated, emits vapours. Mercury exposure can cause acute poisoning, interstitial pneumonia, bronchitis, muscle tremor, irritability, gingivitis, and localized skin irritation and sensitization. Mercury is both a neurotoxin and a nephrotoxin.

Mercury vapour lamps (white fluorescent tubes) contain mercury and constitute a serious hazard if they are broken and the "white dust" is inhaled. Inhaled mercury vapours or compounds can be absorbed through the respiratory tract and accumulate in the brain, causing damage to the nervous system.

Spills involving mercury should not be allowed to remain, especially on heated surfaces such radiators, ductwork and ovens where toxic concentrations can accumulate.

RISK ASSESSMENT/SPILL CRITERIA

Mercury spills can be categorized into two categories (table 2): (1) Minor spill, which can typically be handled safely by laboratory personnel using a mercury spill kit without the assistance of safety and emergency personnel; and (2) Major spill, which will require outside assistance or when the individual responding does not have the training to mitigate the spill.

Table 2: Chemical spill criteria used in determining the type of response and treatment materials required to remediate a mercury spill at Nipissing University.

Category	Size	Response	Method of Treatment	Treatment Materials
Minor	Less than 28 mL	Level I	Chemical treatment or absorption	Chemical spill kit
Minor	Broken fluorescent light bulb	Level I	Physical pick-up	None
Major	More than 28 mL or immediate threat to an individual's wellbeing[3]	Level II	Outside assistance	

- Minor Mercury Spills (Level I response):

[3] This information can be determined in advance from the SDS. It will list potential health effects due to exposure, as well as the type of PPE required in case of an accidental release. If you are not equipped to handle an accidental release, based on information contained within the SDS, then it is considered a major spill, no matter how small the spill. Also, if the spilled material has entered a drain or escaped to the environment, it is considered a major spill, no matter how small the spill.

- If, based on the outcome of the spill evaluation process, you believe that it is safe to clean-up a spilled mercury, follow these steps:
    i. Immediately alert area occupants and supervisor that a spill has occurred.
    ii. Isolate the area so that no one accidently enters the contaminated area by: closing doors; posting other individuals at the doors and/or hallways to warn others; installation of barrier tape; or any other reasonable method.
    iii. Ventilate the area by turning on fume hoods and/or opening exterior windows.
    iv. Review the spill clean-up procedures as recommended in the MSDS.
    v. Locate the nearest mercury spill kit and evaluate the contents.
    vi. Plan the clean-up procedure to follow.
    vii. Don appropriate PPE such as safety goggles/face shield, gloves, lab coat, or apron. You should consider the need for appropriate respiratory protection, if required.

        The use of a respirator or self-contained breathing apparatus requires specialized training and medical surveillance. Never enter a contaminated atmosphere without protection or use a respirator without training. If no trained personnel are available contact the Spills Action Centre (1-800-268-6060). If respiratory protection is used, ensure there is another person outside the spill area in communication, in case of emergency.

    viii. Protect floor drains or other means of environmental release. Spill socks and absorbents may be placed around drains as needed.
    ix. Using mercury absorbent contained within the kit, encircle and cover the liquid mercury. It should be distributed over the entire spill area, working from the outside, circling to the inside. This reduces the chance of splash or spread of the spilled chemical.
    x. Clean up any broken glass using tongs or a heavy towel. *Do not pick up broken glass by hand.*
    xi. Dampen the absorbent powder with water to facilitate the formation of a metal/mercury amalgam.
    xii. Allow the absorbent to harden. Once the amalgam is completed, carefully sweep the amalgam into the plastic dust pan and place it into a plastic bag.
    xiii. Place all contaminated PPE (gloves, lab coat, etc.) into a second plastic bag for disposal.
    xiv. Complete the hazardous waste tag and affix to the waste container(s), identifying the material as "*Spill Debris*".

        Spilled chemical reagents and contaminated PPE must be disposed of as hazardous waste.

    xv. Decontaminate reusable clean-up supplies and the spill area using mild detergent and water and return them to the spill kit. Determine what spill response materials have been used during the spill clean-up and arrange to have them replaced.
    xvi. All laboratory incidents or injuries must be reported immediately to the laboratory supervisor (and your supervisor, if different from the laboratory supervisor), who will submit an incident/injury report within 24 hours to the Manager Environmental Health and Safety and the Laboratory Safety Coordinator.

Notes:

- Do not use an ordinary vacuum to clean up a mercury spill. Mercury can vaporize.
- Do not use general cleaning products as they may contain chlorine or ammonia. These chemicals react with mercury to emit a toxic gas.
- Do not use a broom or brush to clean up mercury. It can break mercury into smaller particles and spread it.
- Do not pour mercury down the drain.
- Do not allow people whose shoes or clothing may have been contaminated with mercury to walk around or leave the spill area until the contaminated items are removed.

- Broken Fluorescent Lights (Level I response):
  - Nipissing University utilizes a number of compact fluorescent lights (CFLs) as well as a number of regular fluorescent light tubes as a normal aspect of operations. Careful recycling of CFLs and regular fluorescent lights prevents the release of mercury into the environment and allows for the reuse of glass, metals and other materials that make up fluorescent lights. Fluorescent lights contain a very small amount of mercury sealed within the glass tubing.
  - To clean up a broken fluorescent light, the following clean-up procedures must be followed:
    i. Have people leave the room, and don't let anyone walk through the breakage area on their way out.
    ii. Open an exterior window and leave the room for 15 minutes.
    iii. Don appropriate PPE including safety glasses and gloves.
    iv. Carefully scoop up glass fragments and powder using stiff paper or cardboard and place them in a sealable plastic bag. **Avoid using a broom and dust pan as this can aerosolize the mercury laden powder**.
    v. Use sticky tape, such as duct tape, to pick up any remaining glass fragments and powder and place the tape into a sealable plastic bag.
    vi. Wipe the area clean with damp paper towels or disposable wet wipes and place them in the plastic bag.
    vii. Immediately place all clean-up materials outside the building in a trash container or outdoor protected area for the next normal trash pick-up.
    viii. Wash your hands after disposing of the clean-up materials.
- Major Mercury Spills (Level II response):
  - Employees should only attempt to clean up major mercury spills if they have received Hazardous Materials Handling training and when appropriate spill clean-up materials and appropriate PPE are readily available and are properly utilized.
  - In the event of a major spill for which personnel are not properly prepared, particularly if any person has been significantly exposed, contaminated, injured to such an extent that medical or other outside assistance is needed, follow the following steps:
    i. Evacuate the affected areas and secure these areas (i.e. close the doors).
    ii. Contact the Spills Action Centre (1-800-268-6060)
    iii. Alert campus security by calling ext. 5555 or 498-7244 (cell). Do not attempt to call from within the affected area. Be sure to call from a safe distance from the contaminated site.

iv. Remain close to the phone, if requested to do so, until contacted by emergency responders.
v. Stand-by to provide more information about the spill, including chemical name, quantity, hazards and any other relevant information. Have a copy of the MSDS on hand if available. Assist emergency personnel upon arrival.
vi. For any chemical spill that occurs outside the building, with potential for adversely affecting the environment, contact the Spills Action Centre (1-800-268-6060) and/or 911 as appropriate.
vii. Contact Campus security, who may initiate the Emergency Management Plan Process described above and in the Nipissing University EMP by contacting the plan activation authority (PAA).

BIOHAZARDOUS SPILL RESPONSE

A biohazardous spill occurs anytime there is an unplanned release of potentially infectious material into the environment. Proper response to these incidents can ensure personnel and community safety while eliminating environmental contamination. A biohazardous spill can range from something as innocuous as a simple nose-bleed or someone vomiting to more serious issues such as picking up a discarded hypodermic needle or an unintentional release of a laboratory microbiological specimen. As such, a spill response which takes place within a laboratory setting will be different from one that takes place outside of the laboratory.

In order for a biohazardous spill response to be effective and safe for the campus community, affected work groups must:

- Refer the biological spill procedure for their work environment;
- Assure that spill clean-up materials are available for use; and
- Assure that all personnel are trained in the provisions of the spill response procedure.

1. Spills, accidents, exposures to infectious materials, and loss of containment must be reported immediately to the laboratory supervisor (and your supervisor, if different from the laboratory supervisor), who will submit an incident/injury report within 24 hours to the Manager Environmental Health and Safety and the Laboratory Safety Coordinator. Written records of such incidents must be maintained, and the results of incident investigations should be used for continuing education.

RISK ASSESSMENT/SPILL CRITERIA - LABORATORIES

Infectious micro-organisms have traditionally been categorized into four different risk groups based on the relative hazards they pose. The factors used to categorize a particular organism are: pathogenicity, infectious dose, mode of transmission, host range, availability of effective preventative measures, and availability of effective treatment. These classifications assume that an organism will be grown in small volumes in a laboratory for research or diagnostic purposes. The four levels of risk identified by Public Health Agency of Canada (PHAC) and the Canadian Food Inspection Agency (CFIA) are as follows:

- **Risk Group 1** (*low individual and community risk*) – any biological agent that is unlikely to cause disease in healthy employees or animals.

- **Risk Group 2** (*moderate individual risk, low community risk*) – any pathogen that can cause human disease but, under normal circumstances, is unlikely to be a serious hazard to laboratory employees, the community, livestock or the environment. Laboratory exposures rarely cause infection leading to serious disease; effective treatment and preventative measures are available, and the risk of spread is limited.
- **Risk Group 3** (*high individual risk, low community risk*) – any pathogen that usually causes serious human disease or can result in serious economic consequences but does not ordinarily spread by casual contact from one individual to another, or that causes diseases treatable by antimicrobial or antiparasitic agents.
- **Risk Group 4** (*high individual risk, high community risk*) – any pathogen that usually produces very serious human disease, often untreatable, and may be readily transmitted from one individual to another, or from animal to human or vice-versa, directly or indirectly, or by casual contact.

It is of utmost importance to know the agents you are working with. Suppliers and/or PSDS's can provide detailed information on the characteristics of the agent as well as effective containment and clean-up procedures. Section VIII of PHAC Pathogen Safety Data Sheets[4] addresses the specific spill requirements of each agent and should be consulted prior to any spill clean-up. When dealing with any biological spill, the degree of risk and subsequent spill response are dependent on the following:

- What organism was spilled? What are the physical characteristics and potential hazards of that particular organism? What risk group does it belong to?
- How much was spilled? What is the volume and concentration of the organism?
- Where was the spill? In the biological safety cabinet (BSC), in the lab, in a centrifuge, outside the lab?
- What is the potential for release to the environment? Were aerosols or droplets generated?

Minor Biohazardous Spill (Level 1 response) **–** is one that can be handled safely by laboratory personnel without the assistance of safety and emergency personnel. Minor spills include:

- The release of a small volume of RG-1 organisms without splashing or agitation.

Major Biohazardous Spill (Level II response) – is one that may require the Spill Response Team and/or outside assistance. These include:

- Any spill involving a biological agent that the individual does not feel confident in their ability to effectively mitigate the spill.
- The release of organisms resulting in excessive splashing and agitation.
- The substantial release of any RG-2 organism.
- The release of a large volume of RG-1 organisms (enough present to seek its own level or run to a low point).

[4] PHAC pathogen safety data sheets can be found here: http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/index-eng.php

BIOHAZARD SPILL RESPONSE KIT:

A. Each facility or Department that uses, handles, or stores biohazardous materials will make a determination, with the assistance of the Laboratory Safety Coordinator, on the need and quantity of stocked biohazardous spill kits. It is the fiscal responsibility of each facility or Department to procure and maintain biohazardous spill kits.
B. All potentially affected laboratory personnel, including faculty, staff, research assistants, students and visiting scientists must be properly trained in the proper use of these biohazardous spill clean-up kits.
C. The kit should be maintained in a green 5-gallon leak-proof bucket and contain the following:
    1. Concentrated household bleach – check expiry date and replace if near expiry;
    2. Spray bottle for making 10% bleach solution;
    3. Forceps or tongs for handling sharps;
    4. Paper towel or other suitable absorbent;
    5. Biohazard bags of various sizes;
    6. Black garbage bag(s);
    7. Disposable gloves;
    8. Face protection (at a minimum safety glasses and N95 mask);
    9. Spill sign to post on door.

BIOHAZARDOUS SPILL RESPONSE - LABORATORIES

In general, for all biohazardous spills, observe the following protocols:

- Notify others in the area immediately to limit potential of further contamination to additional personnel or the environment.
- Assess the situation and determine the classification of the spill – either minor or major based on risk assessment, agent and MSDS information.

MINOR BIOHAZARDOUS SPILLS (LEVEL I RESPONSE):

If, based on the outcome of the spill evaluation process, you believe that it is safe to clean-up a spilled biohazardous spill, follow these steps:

- Remove any contaminated clothing and lab coats. Wash exposed skin with antiseptic soap and water. Get the biohazard spill kit and review spill clean-up procedure before proceeding with clean-up.
- Remove spill supplies from kit and line bucket/container with biohazard bag. Retrieve a sharps container for disposal of sharps, if required.
- Don two pairs of disposable gloves, safety glasses and an N95 face mask. Other forms of respiratory protection may be prescribed based on the information contained within the PSDS.
- If applicable, use mechanical means to pick-up any contaminated sharp items (needles, broken glass, etc.) and place them in an approved sharps container for disposal.
- Cover the spill with paper towels and carefully pour decontamination solution (i.e. 10% bleach solution containing 5000 – 6000 ppm sodium hypochlorite or 70% alcohol, depending on what is specified in the PSDS) around the spill, allowing it to mix with the

material. Spray decontamination solution directly on top of the absorbent material, ensuring that it is well soaked.

- Allow a contact time of 20 minutes.
- Remove the absorbent material using a mechanical means (dustpan and broom, plastic scrapers) and deposit it along with the mechanical tool into a biohazard bag.
- Remove residual disinfectant with paper towels. Dispose of paper towels into the biohazard bag.
- Repeat above steps for sufficient disinfection of contaminated surfaces as required.
- Close the bag securely and place the bag into a black garbage bag and dispose of as regular waste (treated waste is not considered biohazardous).
- Allow the surface to dry. Wipe up the bleach residue with water.
- Remove the outer pair of gloves and respirator and place them in the **second biohazard bag**.
- With the inner gloves still on, remove the safety glasses and clean by spraying liberally with decontamination solution, followed by a 20 minute contact time and then rinse thoroughly.
- Remove the inner pair of gloves and place them in the biohazard bag.
- Close the bag and dispose of as biohazardous waste (autoclave).
- Wash your hands with soap and water. Dry your hands with clean paper towel and then use an alcohol based hand sanitizer.
- Determine what spill response materials have been used during the spill clean-up and arrange to have them replaced.
- All laboratory incidents or injuries must be reported immediately to the laboratory supervisor (and your supervisor, if different from the laboratory supervisor), who will submit an incident/injury report within 24 hours to the Manager Environmental Health and Safety and the Laboratory Safety Coordinator.

SPILL INSIDE A BIOSAFETY CABINET (BSC) (LEVEL I RESPONSE):

If a major spill occurs within the BSC (a spill that is not contained by the work surface) then this spill will be elevated to a Level II response (see below). If the spill is contained within the work surface, follow the directions below:

- Allow BSC to operate unattended for five (5) minutes to facilitate aerosol purification. BSC must run during cleanup to provide personnel and environmental protection
- Call for assistance if needed. It is useful to have a second person with "clean" hands to get materials for clean-up.
- Put on appropriate personal protective equipment (eye protection, lab coat, two pairs of gloves).
- Cover spill inside the BSC with absorbent material (i.e. paper towels).
- Carefully soak the paper towels with an appropriate disinfectant, working from the outside of the spill to the inside.
    i. The agent spilled must not be resistant to the disinfectant selected for cleanup (check the PSDS).
    ii. If bleach is used as a decontaminant, be sure to wipe up any traces of the bleach after the appropriate contact time, followed by a thorough rinse of the area with 70% ethanol and wiping dry.

Note: Bleach can cause discoloration and/or pitting of the stainless steel surface providing a refuge for bacteria to live and grow.

- If the catch basin below the work surface has become contaminated:
  i. Close the drain valve
  ii. Flood the drain pan with disinfectant
  iii. Empty the drain pan into a container with disinfectant.
- Avoid generating aerosols.
- Allow 20 minute disinfectant contact time.
- Remove broken glass or other sharps with tongs, or forceps.
- Place contaminated sharps in a puncture-resistant biohazard sharps container.
- Place all contaminated disposable materials not containing sharps in a biohazard bag.
- Use paper towels to wipe up the disinfected spilled material, and place in a **second biohazard bag**.
- Wipe down all surfaces or items inside the BSC once more with towels and disinfectant and place these into the second biohazard bag.
- Close the bag securely and place the bag into a black garbage bag and dispose of as regular waste (treated waste is not considered biohazardous).
- If bleach is used as a decontaminant, be sure to wipe up any traces of the bleach after the appropriate contact time, followed by a thorough rinse of the area with 70% ethanol and wiping dry followed by a thorough rinse of the area with 70% ethanol and wiping dry.
- Place all contaminated re-usable items into a **third biohazard bag**, then sterilize by autoclaving.
- Remove the outer pair of gloves and respirator and place them in a **first biohazard bag**.
- With the inner gloves still on, remove the safety glasses and clean by spraying liberally with decontamination solution, followed by a 20 minute contact time and then rinse thoroughly.
- Remove the inner pair of gloves and place them in the biohazard bag.
- Close the bag and dispose of as biohazardous waste (autoclave).
- Wash your hands with soap and water. Dry your hands with clean paper towel and then use an alcohol based hand sanitizer.
- BSC must run for at least 10 minutes after cleanup before being used for experiments
- Contact the Laboratory Safety Coordinator if the spill involved a large volume or agent spread by aerosols; BSO will provide guidance to determine if BSC requires formaldehyde decontamination.
- All laboratory incidents or injuries must be reported immediately to the laboratory supervisor (and your supervisor, if different from the laboratory supervisor), who will submit an incident/injury report within 24 hours to the Manager Environmental Health and Safety and the Laboratory Safety Coordinator.

SPILL WITHIN A CENTRIFUGE (LEVEL I RESPONSE):

Hazards associated with centrifuging include mechanical failure and the creation of aerosols. To minimize the risk of mechanical failure, centrifuges must be maintained and used according to the manufacturer's instructions. Users should be properly trained and operating instructions that include safety precautions should be prominently posted on the unit.

Aerosols are created by practices such as filling centrifuge tubes, removing plugs or caps from tubes after centrifugation, removing supernatant, and resuspending sedimented pellets. The greatest aerosol hazard is created if a tube breaks during centrifugation. To minimize the generation of aerosols when centrifuging biohazardous material, follow the procedures below:

- Use sealed tubes and safety buckets that seal with O-rings. Before use, inspect tubes, O-rings and buckets for cracks, chips, erosions, bits of broken glass, etc. Do not use aluminum foil to cap centrifuge tubes because it may detach or rupture during centrifugation.
- Fill and open centrifuge tubes, rotors and accessories in a BSC. Avoid overfilling of centrifuge tubes so that closures do not become wet. After tubes are filled and sealed, wipe them down with disinfectant.
- Always balance buckets, tubes and rotors properly before centrifugation.
- Do not decant or pour off supernatant. Use a vacuum system with appropriate in-line reservoirs and filters (See Appendix C for diagram of apparatus set-up).
- Work in a BSC when re-suspending sedimented material. Use a swirling rotary motion rather than shaking. If shaking is necessary, wait a few minutes to permit the aerosol to settle before opening the tube.

At the end of a centrifuge run, wait five (5) minutes before opening the centrifuge. This will allow any aerosols to settle. If a tube breaks within the centrifuge bucket and the containment has not been breached, open the centrifuge bucket in a BSC and proceed to decontaminate the spill as outlined above.

If there is no containment of the spill or the containment has been breached into the centrifuge rotor cavity, carefully close the lid and allow the aerosols to settle for at least 30 minutes and follow the protocols outlined below:

- Remove any contaminated protective clothing and place in a biohazard bag. Wash hands and any exposed skin surfaces with soap and water.
- Don lab coat, two pairs of gloves, N95 respirator and face shield prior to opening the centrifuge and then open carefully to assess the situation.
- Attempt to determine if the spill is contained in a closed cup, bucket or tray carrier, or within a closed rotor.
- If the spill is contained, spray the exterior of the carrier or rotor with a suitable disinfectant (as determined from the PSDS) and allow at least 20 minutes of contact time. Take the carrier or rotor to the nearest BSC approved for use with this agent.
    i. **NOTE:** If a BSC is not available or if the rotor cannot be removed, the centrifuge should remain closed.
    ii. Post a sign indicating "**contaminated-do not use**". Notify lab supervisor and or PI and contact the Laboratory Safety Coordinator, for assistance.
- Obtain and place into the BSC, containers suitable for holding tubes, broken glass or other containers while cleaning centrifuge components.
- Carefully retrieve unbroken tubes, wipe outside with a suitable disinfectant, and place them into the other empty container in the BSC, out of the way. The broken glass tube(s) must be removed with a forceps or other instrument and immersed in a beaker of disinfectant solution for a time appropriate to achieve disinfection. The pieces can then be disposed of in a sharps container.

- After proper decontamination, carriers, rotors etc. can be washed with a mild detergent according to the manufacturer's instructions.
- Thoroughly wipe the inside of the centrifuge chamber with disinfectant saturated towels. Allow for adequate contact time before wiping up excess liquid.
    i. If bleach is used as a decontaminant, be sure to wipe up any traces of the bleach after the appropriate contact time, followed by a thorough rinse of the area with 70% ethanol and wiping dry to ensure that no surface corrosion will occur.
- Remove PPE as described above and wash hands with soap and water. Dry your hands with clean paper towel and then use an alcohol based hand sanitizer.
- All laboratory incidents or injuries must be reported immediately to the laboratory supervisor (and your supervisor, if different from the laboratory supervisor), who will submit an incident/injury report within 24 hours to the Manager Environmental Health and Safety and the Laboratory Safety Coordinator.

BIOHAZARDOUS SPILL ON BODY (LEVEL I RESPONSE)

If a biohazardous substance is spilled on body, the following protocol should be followed:

- Immediately remove contaminated clothing and place in a suitable biohazard bag. All contaminated materials must be treated as biohazardous.
- Vigorously wash exposed areas with soap and water for at least 10 minutes. Alternatively, an alcohol-based hand sanitizer containing at least 65% alcohol content can be used.
- If eye exposure occurs, use eyewash per instructions (at least 15 minutes flush time per eye).
- Obtain medical attention as soon as possible.
- All laboratory incidents or injuries must be reported immediately to the laboratory supervisor (and your supervisor, if different from the laboratory supervisor), who will submit an incident/injury report within 24 hours to the Manager Environmental Health and Safety and the Laboratory Safety Coordinator.

MAJOR BIOHAZARDOUS SPILL (LEVEL II RESPONSE)

- If an area contains large quantities of any RG-1 biological agent (500 mL +) or RG-2 in any quantity, emergency procedures must be included as part of the Standard Operating Procedures for that agent. The SOP must have been reviewed by the University BioSafety Committee prior to implementation.
- Employees should only attempt to clean up large or major spills if they have received Hazardous Materials Handling training, and when appropriate spill clean-up materials and appropriate PPE are readily available and are properly utilized.
- Otherwise, in the event of a major spill for which personnel are not properly prepared, particularly if any person has been significantly exposed, contaminated, injured to such an extent that medical or other outside assistance is needed, follow the following steps:
    - Evacuate the affected areas and secure these areas (i.e. close the doors).
    - Contact the Laboratory Safety Coordinator and/or the Manager Environmental Health and Safety for further instructions.
    - Alert campus security by calling ext. 5555 or 498-7244 (cell). Do not attempt to call from within the affected area. Be sure to call from a safe distance from the contaminated site.

- Remain close to the phone, if requested to do so, until contacted by emergency responders.
- Stand-by to provide more information about the spill, including organism name, quantity, hazards and any other relevant information. Have a copy of the PSDS on hand if available. Assist emergency personnel upon arrival.
- For any biohazardous spill that occurs outside the building, with potential for adversely affecting the environment, Spills Action Centre (1-800-268-6060).
- Contact campus security who may initiate the Emergency Management Plan Process described above and in the Nipissing University EMP by contacting the plan activation authority (PAA).

- All laboratory incidents or injuries must be reported immediately to the laboratory supervisor (and your supervisor, if different from the laboratory supervisor), who will submit an incident/injury report within 24 hours to the Manager Environmental Health and Safety and the Laboratory Safety Coordinator.

RISK ASSESSMENT/SPILL CRITERIA – EXTERNAL TO LABORATORIES

This type of spill can be a result of an unintentional release of a laboratory biohazardous substance outside of the laboratory (i.e. transporting biohazardous waste to the autoclave) or a release of bodily fluids due to a cut or illness. In addition to an actual spill, there may be times when a spent hypodermic needle is found and needs to be dealt with in a safe manner. In many cases it is impossible to determine the level of risk that is present due to infectious diseases that may be present in the fluid. Therefore, it is important that any personnel dealing with this type of spill assume the worst and take all precautions to ensure their personal safety and security.

Minor Biohazardous Spill (Level 1 response) **–** is one that can be handled safely by laboratory or custodial personnel without the assistance of safety and emergency personnel. Minor spills include:

- The release of a few drops of blood or fluid without splashing or agitation. This may be from a minor cut or nose bleed.
- The release of a small puddle of puddle of blood or fluid without splashing or agitation. This may be from a nosebleed or head injury.

Major Biohazardous Spill (Level II response) – is one that may require the Spill Response Team and/or outside assistance. These include:

- The release of a large amount of blood or fluid spread over a large area. This may be due to illness, injury or criminal act.

BIOHAZARD SPILL RESPONSE KIT – EXTERNAL TO LABORATORIES:

A. Each facility that deals with the clean-up of biohazardous materials will make a determination, with the assistance of the Laboratory Safety Coordinator, on the need and quantity of stocked biohazardous spill kits. It is the fiscal responsibility of each facility (or department) to procure and maintain biohazardous spill kits.
B. All potentially affected custodial personnel, including supervisors, must be properly trained in the proper use of these biohazardous spill clean-up kits.

C. The kit should be maintained in a green 5-gallon leak-proof bucket and contain the following:
    1. Concentrated household bleach – check expiry date and replace if near expiry;
    2. Spray bottle for making 10% bleach solution;
    3. Forceps or tongs for handling sharps;
    4. Paper towel or other suitable absorbent;
    5. Biohazard bags of various sizes;
    6. Disposable gloves;
    7. Face protection (at a minimum safety glasses and N95 mask);
    8. Spill sign to post on door.

BIOHAZARDOUS SPILL RESPONSE – EXTERNAL TO LABORATORIES

In general, for all biohazardous spills, observe the following protocols:

- Notify others in the area immediately to limit potential of further contamination to additional personnel or the environment.
- Assess the situation and determine the classification of the spill – either minor or major based on risk assessment, agent and MSDS information.

MINOR BIOHAZARDOUS SPILLS – EXTERNAL TO LABORATORIES (LEVEL I RESPONSE):

If, based on the outcome of the spill evaluation process, you believe that it is safe to clean-up a spilled biohazardous substance, follow these steps:

SPILL ON HARD SURFACE

- Remove any contaminated clothing. Wash exposed skin with antiseptic soap and water. Get the biohazard spill kit and review spill clean-up procedure before proceeding with clean-up.
- Remove spill supplies from kit and line bucket/container with biohazard bag. Retrieve a sharps container for disposal of sharps, if required.
- Don two pairs of disposable gloves, safety glasses and an N95 face mask. Other forms of respiratory protection may be prescribed based on the information contained within the PSDS.
- If applicable, use mechanical means to pick-up any contaminated sharp items (needles, broken glass, etc.) and place them in an approved sharps container for disposal.
- Cover the spill with paper towels and carefully pour decontamination solution (i.e. 10% bleach solution containing 5000 – 6000 ppm sodium hypochlorite) around the spill, allowing it to mix with the material. Spray decontamination solution directly on top of the absorbent material, ensuring that it is well soaked.
- Allow a contact time of 20 minutes.
- Remove the absorbent material using a mechanical means (dustpan and broom, plastic scrapers) and deposit it **along with the mechanical tool** into a biohazard bag.
- Remove residual disinfectant with paper towels. Dispose of paper towels into the biohazard bag.
- Repeat above steps for sufficient disinfection of contaminated surfaces as required.
- Allow the surface to dry. Wipe up the bleach residue with water.
- Remove the outer pair of gloves and place them in the biohazard bag.

- With the inner gloves still on, remove the safety glasses and respirator and place into the biohazard bag.
- Place the biohazard bag into the biohazard spill kit bucket.
- Transport the biohazard spill kit bucket with contents to room H220 (Biology Department) for processing.
- Wash your hands with soap and water. Dry your hands with clean paper towel and then use an alcohol based hand sanitizer.
- Determine what spill response materials have been used during the spill clean-up and arrange to have them replaced.
- Dry your hands with clean paper towel and then use an alcohol based hand sanitizer.
- All incidents or injuries must be reported immediately to your supervisor, who will submit an incident/injury report within 24 hours to the Manager Environmental Health and Safety.

SPILL ON CARPETED SURFACE

- Remove any contaminated clothing. Wash exposed skin with antiseptic soap and water. Get the biohazard spill kit and review spill clean-up procedure before proceeding with clean-up.
- Remove spill supplies from kit and line bucket/container with biohazard bag. Retrieve a sharps container for disposal of sharps, if required.
- Don two pairs of disposable gloves, safety glasses and an N95 face mask. Other forms of respiratory protection may be prescribed based on the information contained within the PSDS.
- If applicable, use mechanical means to pick-up any contaminated sharp items (needles, broken glass, etc.) and place them in an approved sharps container for disposal.
- Sprinkle a liquid binding agent (e.g. Megasorb) over the area of the spill and wait until it has solidified.
- Scoop up as much of the spill/binding agent as possible and place into a red biohazard bag. **Note: <u>this material is biohazardous</u>**.
- Close and secure the biohazardous bag.
- *Method 1:*
    - Spray the entire area with an Accelerated Hydrogen Peroxide (AHP) disinfectant (e.g. Oxivir™). Ensure complete coverage.
    - Agitate the area with a scrub brush to ensure penetration of the disinfectant into the carpet fibres.
    - Allow a 15 minute incubation period to kill the pathogens.
    - Extract the disinfectant sprayed areas with a hot water carpet cleaning machine.
        - **Note: waste water is not biohazardous.**
- *Method 2:*
    - Steam clean the carpet area with a steam cleaner able to produce 70^0C or hotter water.
- Remove the outer pair of gloves and place them into a new biohazard bag.
- With the inner gloves still on, remove the safety glasses and respirator and place into the biohazard bag.
- Place the biohazard bag into the biohazard spill kit bucket.
- Transport the biohazard spill kit bucket with contents to room H220 (Biology Department) for processing.

- Wash your hands with soap and water. Dry your hands with clean paper towel and then use an alcohol based hand sanitizer.
- Determine what spill response materials have been used during the spill clean-up and arrange to have them replaced.

MAJOR BIOHAZARDOUS SPILL – EXTERNAL TO LABORATORIES (LEVEL II RESPONSE)

- In the event of a large spill of blood or bodily fluid, it is important to cordon off the area immediately to limit potential of further contamination to additional personnel or the environment.
- In the event of a major spill for which personnel are not properly prepared, particularly if any person has been significantly exposed, contaminated, injured to such an extent that medical or other outside assistance is needed, follow the following steps:
    - Evacuate the affected area(s) and secure these areas (i.e. close the doors).
    - Alert campus security by calling ext. 5555 or 498-7244 (cell). Do not attempt to call from within the affected area. Be sure to call from a safe distance from the contaminated site.
    - Remain close to the phone, if requested to do so, until contacted by emergency responders.
    - Stand-by to provide more information about the spill, including organism name, quantity, hazards and any other relevant information. Have a copy of the PSDS on hand if available.
    - Wait for Security and/or emergency personnel to arrive.
    - Assist emergency personnel upon arrival.
    - Do not attempt clean-up until authorized by Security and/or emergency personnel.
    - Employees should always work in pairs and only attempt to clean up large or major spills if they have received Hazardous Materials Handling training, and when appropriate spill clean-up materials and appropriate PPE are readily available and are properly utilized.
        - One person to assist and secure the area.
        - The second individual carries out the work.
    - Begin clean-up as previously outlined for hard surfaces or carpeted surfaces.
- For any biohazardous spill that occurs outside the building, with potential for adversely affecting the environment, contact campus security. Campus security may initiate the Emergency Management Plan Process described above and in the Nipissing University EMP by contacting the plan activation authority (PAA).
- All incidents or injuries must be reported immediately to your supervisor, who will submit an incident/injury report within 24 hours to the Manager Environmental Health and Safety.

APPENDIX A: HAZARDOUS SPILL RESPONSE TEAM

Team Member	Department and Responsibility	Contact Information	
Shelly Demers	Print Plus/Shipping and Receiving		
Tracy Hone	Print Plus/Shipping and Receiving		
Kevin Vibe	Print Plus/Shipping and Receiving		
Shawn Bester	Print Plus/Shipping and Receiving		
Paul Smylie	Biology/Chemistry, H-Wing		
Ashley Ryan	Biology/Chemistry, R-Wing		
Amy Stillar	Neuroscience, R-Wing		
Vacant	Geography, A-Wing		
Leah Symington	FAVA, Monastery		

APPENDIX B EXERCISE LOG

For the Hazardous Material Spill Management Program to succeed, it is crucial that all those who have roles and responsibilities for handling a hazardous material spill are familiar with the Program and know how to apply the procedures contained within. Furthermore, the Spills Management Program will need to be tested on a regular basis beginning with small, relatively simple exercises slowly progressing to full scale, multi-faceted emergencies. This will help to ensure that the Program is current and can be activated at a moment's notice.

The Manager Environmental Health and Safety will be responsible for scheduling and testing the Program at least annually. Generally, it is advantageous to have the maximum number of people participate in the test exercise. Maximum participation increases awareness, buy-in and ownership in achieving successful Program implementation. It is also important to rotate personnel involved in the testing in order to prepare for the loss of key individuals, as a result of a disaster or due to employee turnover.

Date	Type of Exercise	Comments

APPENDIX C HAZARDOUS SPILL RESPONSE TEAM STANDARD OPERATING PROCEDURE

INTRODUCTION

The Hazardous Spill Response Team has been assembled in order to provide a rapid response to any emergency situation that involves a hazardous chemical or biological spill that cannot be handled by students, faculty or employees who are involved in the actual spill incident. The response team has representation from Environmental Health and Safety, the Science Departments (Biology, Psychology and Geography), Fine Arts, Shipping and Receiving and Print Plus.

The names and contact information of the members of the Spill Response Team will be posted at all locations where chemicals are stored (usually next to the first aid kit). Normally each member of the Spill Response Team will be responsible for the area they work near and would thus be designated as the Primary Contact for that area. A member of the Spills Response Team may be called to attend a spill at other than their primary location if the Primary Contact for that location is unavailable.

SPILL RESPONSE PROCEDURES

The procedures outlined below are a synopsis of the procedures found in the Hazardous Material Spill Management Program. Spills fall into two main categories: 1) those that are considered minor (less than 1 litre) and do not pose a threat to an individual's wellbeing and 2) those that are considered major involving a spill greater than 1L or pose an immediate threat to an individual's wellbeing (see procedures flow chart below). When called to respond to a hazardous material spill, the following must be followed:

1. Prior to arriving at the scene:
    a. Determine if there are any injuries related to the spill.
    b. Determine what and how much was spilled. Is it a Minor or Major spill?
    c. Is there a hard-copy MSDS or Pathogen Safety Data Sheet (PSDS) available? If not, obtain a hard copy from the MSDS database.
    d. Is the proper spill kit available?
    e. Is the proper PPE available?
    f. If a Major spill that is beyond internal capabilities, then call the Spills Action Centre (1-800-268-6060) and/or 911 as appropriate and provide all relevant information.
2. Once you arrive at the spill site, assess the scene.
    a. Determine whether or not the spill can be handled internally. If not, then call the Spills Action Centre (1-800-268-6060) and/or 911 as appropriate and provide all relevant information.
    b. Has the spill area been isolated? If not, ensure that no one enters the contaminated zone.
    c. Has the material entered any drains? If not, protect the drains. If yes, it is considered a Major Spill and the Spills Action Centre (1-800-268-6060) must be contacted.
    d. If a volatile or noxious liquid has been spilled, increase ventilation by opening a window or turning on the chemical fume hood(s), if present.

3. If determined to be a Minor spill, then proceed to clean up the spill as outlined in the MSDS or PSDS.
    a. Be sure to fill out an incident report after the spill is cleaned up and forward to your supervisor.
4. If determined to be a Major Chemical spill contact the Spills Action Centre (1-800-268-6060) and/or 911 as appropriate and give the particulars of the situation to the control operator. As soon as possible, contact Security Services, the Manager Environmental Health and Safety and the Laboratory Safety Coordinator.
5. If determined to be a Major Biohazardous spill, contact the Laboratory Safety Coordinator and the Manager Environmental Health and Safety for further instructions and guidance. Depending on the spill size, the spill may be handled internally.

Laboratory Spill Response Procedures

FOR EMERGENCY	- Spills Action Centre at 1-800-268-6060 - 911 - Contact Security at ext. 5555 DURING WORKING HOURS - Security Cell (705) 498-7244 Available 24 HOURS

CHEMICAL SPILL

ASSESS THE SPILL

Is the spill manageable? Is it a minor spill that can be cleaned up?

NO

- Evacuate lab, restrict area and notify others in the area of the spill.
- If there is immediate risk to the safety of other people in the building, **and if safe to do so**, activate the fire alarm and evacuate.
- Contact the **Spills Action Centre** (1-800-268-6060) and provide with all relevant information.
- Contact campus security at ext. 5555 and provide all relevant information.
- If safe to do so:
  - Attend to injured/contaminated personnel.
  - Turn off ignition sources if flammable material involved.
  - Restrict/contain spill.

YES

- Attend to injured/contaminated personnel.
- Turn off ignition sources if flammable material involved.
- Restrict area and notify others of the spill.
- Don appropriate PPE (refer to MSDS).
- Contain the spill.
- Neutralize if appropriate/required.
- Soak up spilled material using appropriate absorbents as applicable.
- Transfer to appropriate container and treat has hazardous waste.

Note that certain materials such as pyrophorics, mercury and hydrofluoric acid require specific neutralizers and/or modified spill response procedures. Specific response procedures should be developed based on the identity and quantity of material being handled.

BIOHAZARDOUS MATERIAL SPILL

LEVEL 1 AND LEVEL 2 BIOHAZARDS

- Don appropriate PPE (refer to Pathogen Safety Data Sheet).
- Attend to injured/contaminated personnel.
- Restrict area and notify others of the spill.
- Contain the spill if safe to do so.
- Cover the spill with appropriate absorbents (usually paper towel)
- Decontaminate the area with appropriate disinfectant allowing for sufficient contact time (refer to Pathogen Safety Data Sheet).
- Transfer to garbage bag and treat as regular waste. Note: treated waste is not biohazardous.

DOCUMENT REVISION HISTORY

Date	Author	Revision
Jan 10, 2011	Dave Vadnais	Revised definition of minor spill from 5L to 1L based on chemical spill kit limitations. Added section on chemicals that require a major spill response in any quantity
Apr 16, 2013	Dave Vadnais	Revised spill response procedures to include the Spills Action Centre as a first contact for spills that cannot be dealt with internally. Added PSDS to the table of definitions. Added Risk Group definitions to the table of definitions. Minor wording changes for clarity. Changed Appendix A to reflect the members of the Hazardous Spill Response Team. Added Appendix 3 Hazardous Spill Response Team Standard Operating Procedure
Dec 1, 2014	Dave Vadnais	Revised spill response procedures for bodily fluid spills on carpets based on new information.
Apr 6, 2016	Dave Vadnais	Updated spill response poster.
Apr 25, 2016	Dave Vadnais	Updated spill response criteria to reflect change from size of spill to effects on human health