





# Hazardous Waste Disposal Standard

2017

Safety Resources

<b>College/Unit:</b>	<b>Safety Resources</b>
<b>Procedure Title:</b>	<b>Hazardous Waste Disposal Standard</b>

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## 1 Purpose

The *Hazardous Waste Disposal Standard* specifies the processes and minimum requirements for the disposal of biological, chemical and radiological waste generated from research, academic, or other activities at the University of Saskatchewan.

## 2 Applicable To

The *Hazardous Waste Disposal Standard* is applicable to all faculty, staff, students and visitors engaged in research, academic or other activities at University of Saskatchewan owned facilities and on its property.

## 3 Definitions

**Biological Material:** Pathogenic and non-pathogenic microorganisms, proteins, and nucleic acids, as well as any biological matter that may contain microorganisms, proteins, nucleic acids, or parts thereof. Examples include, but are not limited to, bacteria, viruses, fungi, prions, toxins, genetically modified organisms, nucleic acids, tissue samples, diagnostic specimens, live vaccines, and isolates of a pathogen (e.g., pure culture, suspension, purified spores).

**Biohazardous Material:** Any pathogenic, or infectious/hazardous biological material, that presents a risk or potential risk to the health of humans, animals, plants, or the environment. The risk can be directly through infection or indirectly through damage to the environment. The material may cause disease in other living organisms or cause significant impact to the environment.

**Container:** The primary containment of a liquid or solid waste. In the case of 4 litre and 10 litre plastic containers, 20 litre pails, and 210 litre drums the container may also be the package.

**Non-infectious Biological Material:** Any waste material that originates from living organisms, which does not present a risk or potential risk to the health of humans, animals, plants, or the environment.

**Package:** An enclosure used to contain one or more containers to form one handling unit for convenience of handling and stowage. A package can be a box or a waste jug.

**Residual Contaminant:** The quantity of chemical left over after maximum elimination possible.

## 4 Scope

The University of Saskatchewan is committed to providing a place of employment and learning that is as free as possible from recognized hazards. A safe and healthy environment is created and maintained through the development and maintenance of supporting programs, the provision of proper facilities, equipment, training, and services, and by promoting safety consciousness.

The *Hazardous Waste Disposal Standard* is a supplemental procedure developed to ensure the proper collection and disposal of hazardous waste at the university in accordance with federal, provincial and municipal legislation and bylaws, and best practices. The standard is intended to be used in concert with other university programs including for chemical safety, biosafety, and radiation safety.

## **5 Responsibilities**

### **5.1 College/Division/Department/Unit Heads**

College/division/department/unit heads are responsible to ensure that faculty, staff, students, and visitors in their charge:

- Comply with the *Hazardous Waste Disposal Standard*;
- Ensure faculty, staff and students in their charge are aware of, and adhere to the *Hazardous Waste Disposal Standard*;
- Comply with all university health, safety and environmental protection requirements;
- As applicable, comply with the requirements of university issued biosafety and/or nuclear substance permits;
- As applicable, comply with federal/provincial licence, permit or certification requirements for the work space(s) and/or activities;
- Comply with college/division/department/unit requirements; and
- Are aware of their responsibilities relating to vacating research spaces, work and storage areas, and for properly decommissioning spaces they are working in.

### **5.2 Faculty, Staff, Students and Visitors**

Faculty, staff, students and visitors shall:

- Adhere to the requirements of the *Hazardous Waste Disposal Standard*;
- As applicable, comply with the requirements of university issued biosafety and nuclear substance permits;
- As applicable, comply with federal/provincial licence, permit or certification requirements for the disposal of hazardous material;
- Comply with college/division/department/unit requirements; and
- Comply with all university and legislative requirements.

### 5.3 Safety Resources

Safety Resources shall:

- Implement and maintain the *Hazardous Waste Disposal Standard*, and other programs and processes in support of health, safety and environmental due diligence;
- Provide training and awareness on occupational health and safety, and the *Hazardous Waste Disposal Standard*;
- Assist faculty, staff, students and visitors at all stages in the disposal of hazardous waste;
- Collect and manage hazardous substances and waste;
- As applicable, comply with the requirements of university issued biosafety and nuclear substance permits;
- As applicable, comply with federal/provincial license, permit or certification requirements for the space(s) and/or activities; and
- Ensure compliance with university and legislative requirements.

Safety Resources services in support of hazardous waste disposal are provided at no charge to the client provided the *Hazardous Waste Disposal Standard* is followed. The college/division/department/unit/faculty will be responsible for all costs associated with the disposal of hazardous waste where required processes have not been adhered to.

For assistance with hazardous waste disposal contact Safety Resources at 306-966-4675.

## 6 Biological Waste

### 6.1 Waste Categories

For disposal purposes, biological waste has been divided into eight categories and a special precaution waste category to ensure proper storage, handling, and disposal practices appropriate for that specific waste. A brief description of biological waste categories is provided in Table 1.

Table 1: Description of biological waste.

<b>Category of Waste</b>	<b>Description</b>
Animal anatomical	Fixed or unfixed large and small animal whole carcasses and/or associated tissues, organs, and body parts.
Animal non-anatomical	Animal liquids which include blood and/or bodily fluids or cell cultures (tissue cultures).
Animal husbandry	Used consumable products from bedding, feeding, and caring of animals.
Human anatomical	Fixed or unfixed human cadavers and/or associated tissues, organs and body parts.
Human non-anatomical	Human liquids which include blood and/or body fluids or cell cultures (tissue cultures).
Microbiological organism liquid	Non-infectious biological and/or biohazardous material in liquid media.
Microbiological laboratory – Excludes pipette tips	Materials (non-animal or husbandry waste) generated from laboratory work. This may include, but is not limited to: laboratory cultures, weigh boats, gloves, paper towels, absorbent pads, bench top covers, plastic products (e.g. tubes, petri dishes),
Microbiological laboratory – Non-glass Pipette tips only	Materials that include plastic pipette tips, serological pipette tips, micropipette tips, swabs, sticks.
Sharps	Sharps are small objects that can penetrate the skin. This includes, but is not limited to needles, syringes, scalpel blades, razor blades, lancets, capillary tubes, slides, cover slips, tubing with needles attached, glass blood vials, glass Pasteur pipettes
<b>Special Precaution Waste</b>	
Biotoxins	A poisonous substance that is a specific product of metabolic activities of a living organism (plant, animal, fungus, bacteria). Toxins do not replicate.
Cytotoxins	A by-product from cytotoxic drug research (e.g. chemotherapy).
Transgenic animals	Genetically modified animals and animal parts.
Transgenic plants	Genetically modified plants and plant parts (e.g. seeds).
Transmissible Spongiform Encephalopathies (TSE)	Animals, animal parts, animal husbandry, liquid waste, and laboratory consumables that contain or have come in contact with material infected by TSE.
Specified Risk Material (SRM)	Specific tissues of bovine where bovine spongiform encephalopathy (BSE) concentrate. These tissues include brain, skull, eyes, trigeminal ganglia, spinal cord, vertebral column (with some exclusions), dorsal root ganglia of cattle 30 months of age and older, and the tonsils and distal ileum of the small intestine of all cattle. SRM waste may also include whole bovine carcasses.

## 6.2 Methods of Waste Disposal

### 6.2.1 Introduction

The method of disposal of biological waste is based on its classification (e.g. non-infectious, biohazardous, special precaution waste). Disposal methods include:

- Disinfection or inactivation through the use of autoclaves located within the facility;
- Chemical disinfection;
- Inactivation through the use of a hydroclave (E.g. Grey bins processed at BioMed Disposals Ltd.);
- Incineration (E.g. Yellow/red pails or barrels sent for incineration through BioMed Disposals Ltd.);
- Rendering;
- Chemical digestion;
- Burial at a licensed facility; or
- Disposal with regular waste (only for non-hazardous waste).

It is the responsibility of the biosafety permit holder and person generating the waste to properly manage the biohazardous and non-infectious biological waste to ensure safe and environmentally responsible disposal and to be in accordance with their biosafety plan, and applicable regulatory requirements.

A summary of waste collection and disposal methods for each category of biological waste is presented in Table 2. For assistance with the classification and disposal of biological waste contact the Biosafety Officer or the Safety Resources office at 306-966-4675.



Table 2: Biological waste disposal methods summary.

Category of Waste	Hazard Type	Collection Container Type	Method of Disposal
Animal anatomical	Biohazardous	Plastic biohazard bag placed in Biomed container (Red or Yellow Incinerate Pail; or, barrel)	Biomed Recovery & Disposal Ltd.
	Non-infectious	1. Two plastic bags sealed and placed in cardboard box; or 2. If animal is fixed, collect preservative as chemical waste and place animal into two plastic bags and place into cardboard box.	1. Waste Management Facility (WMF) 2. Fixed animal – decant the preservative and classify as chemical waste. Send to WMF.
	Biohazardous/Non-infectious (large animals only)	1. Saskatoon Processing Co. designated bin. 2. Western College of Veterinary Medicine PDS Necropsy - Alkaline Tissue Digester	1. Saskatoon Processing Co. 2. Western College of Veterinary Medicine PDS Necropsy - Alkaline Tissue Digester
Animal non-anatomical	Biohazardous/Non-infectious	1. Autoclave bag; or 2. Leak proof container large enough to include addition of appropriate disinfectant; or 3. Plastic biohazard bag placed in Biomed container (Grey bin or Rubbermaid tote)	1. Autoclave; or 2. Chemical disinfectant. 3. Biomed Recovery & Disposal Ltd.
Animal husbandry	Biohazardous	1. Autoclave bag; or 2. Plastic biohazard bag placed in Biomed container (Grey bin or Rubbermaid tote)	1. Autoclave; or 2. Biomed Recovery & Disposal Ltd.
	Non-infectious	Two plastic bags sealed.	Regular garbage.
Human anatomical (fixed or unfixed)	Contact the Biosafety Officer or the Safety Resources office at 306-966-4675		
Human non-anatomical	Biohazardous/Non-infectious	1. Autoclave bag; or 2. Leak proof container large enough to include addition of appropriate disinfectant. 3. Plastic biohazard bag placed in Biomed container (Grey bin or Rubbermaid tote)	1. Autoclave; or 2. Chemical disinfectant. 3. Biomed Recovery & Disposal Ltd.
Microbiological liquid	Biohazardous/Non-infectious	1. Autoclave bag; or 2. Leak proof container large enough to include addition of appropriate disinfectant.	1. Autoclave; or 2. Chemical disinfectant.
Microbiological laboratory – Excludes pipette tips	Biohazardous	1. Autoclave bag; or 2. Plastic biohazard bag placed in Biomed container (Grey bin or Rubbermaid tote).	1. Autoclave; or 2. Biomed Recovery & Disposal Ltd.
	Non-infectious	Two plastic bags sealed and placed in a cardboard box.	Regular garbage
Microbiological laboratory – Pipette tips ONLY	Biohazardous	1. Place pipette tips into a lined puncture resistant container (e.g. cardboard box lined with biohazard plastic bag, or place biohazardous plastic bag into a cardboard container) or rigid container with screw on lid (e.g. empty	1. Autoclave; or 2. Biomed Recovery & Disposal Ltd.

Category of Waste	Hazard Type	Collection Container Type	Method of Disposal
		media bottle). 2. Place container into plastic biohazardous autoclave bag if autoclaving; or place into plastic biohazard bag placed in Biomed container (Grey bin or Rubbermaid tote).	
	Non-infectious	Place pipette tips into a lined puncture resistant container (e.g. cardboard box lined with plastic bag) or rigid container with screw on lid (e.g. empty media bottle).	Regular garbage
Sharps	Biohazardous/Non-infectious	1. Sharps container (leak-proof, puncture proof commercially available) 2. Place SHARPS container into an empty (no plastic bag in bin) Grey Biomed bin or on top of the tied-off plastic bag in the Grey Biomed bin.	Biomed Recovery & Disposal Ltd.
Special Precaution Waste	Toxic/Cytotoxic/Disease causing (TSE)	Plastic biohazard bag placed in Biomed container (Red or yellow incinerate pail; or barrel)	Biomed Recovery & Disposal Ltd.
	Transgenic plants	1. Autoclave bag; or 2. Plastic biohazard bag placed in Biomed container (Grey bin or Rubbermaid tote).	1. Autoclave; or 2. Biomed Recovery & Disposal Ltd.
	Transgenic animals	Plastic biohazard bag placed in Biomed container (Red or yellow incinerate pail; or, barrel)	Biomed Recovery & Disposal Ltd.
<i>SRM whole carcasses</i>	Disease causing	Western College of Veterinary Medicine PDS Necropsy - Alkaline Tissue Digester	Western College of Veterinary Medicine PDS Necropsy - Alkaline Tissue Digester

### **6.2.2 Disposal by Autoclave**

Autoclaving is the preferred method for decontaminating animal non-anatomical and husbandry waste, human non-anatomical waste, and microbiological laboratory (including pipette tips) and organism liquid waste.

Individuals using autoclaves shall be trained in their operation, limitations and safeguards for sterilization. The function and efficacy of autoclaves is to be monitored by individuals using the equipment in accordance with the *Monitoring Autoclave Efficacy Standard Operating Procedure*. Contact Safety Resources at 306-966-4675 for assistance in testing the efficacy of autoclaves.

Autoclave bags used to hold biohazardous waste shall be labelled with the biohazardous warning label. Once the waste has been autoclaved and documented in a log book, deface the biohazard symbol from the autoclave bag. This waste can now be disposed to the regular garbage.

Further information about autoclave procedures, refer to Section 15.4.1 of the *Canadian Biosafety Handbook* (2<sup>nd</sup> Ed., 2016), which can be found on the Safety Resources website: [www.safetyresources.usask.ca](http://www.safetyresources.usask.ca).

### **6.2.3 Disposal by Chemical Disinfectant**

Chemical disinfectants render the biological harmless through the use of antimicrobial disinfectants. Due care shall be taken to ensure the waste has truly been inactivated. This is accomplished by using the appropriate disinfectant and concentration, and allowing for proper contact time.

Biosafety permit holders should refer to their biosafety plan for the specific chemical disinfectant(s), required concentration, and appropriate contact time required to render the particular biohazardous materials harmless and for the appropriate method of disposal of associated chemical waste. If this information is not included in the Biosafety Plan, individuals must ensure that the proper chemical disinfectant is used by consulting with the Biosafety Officer prior to use. This is to ensure the appropriate concentration and contact time is being used in order to render the biological material inactive and to ensure the appropriate method of disposal of the associated chemical waste.

Containers used to hold biological waste that is chemically disinfected do not require a hazard warning label on the container.

Contact the Biosafety Officer or the Safety Resources office at 306-966-4675 for further information on acceptable disinfectants and their use.

## 6.2.4 Disposal Through the Waste Management Facility

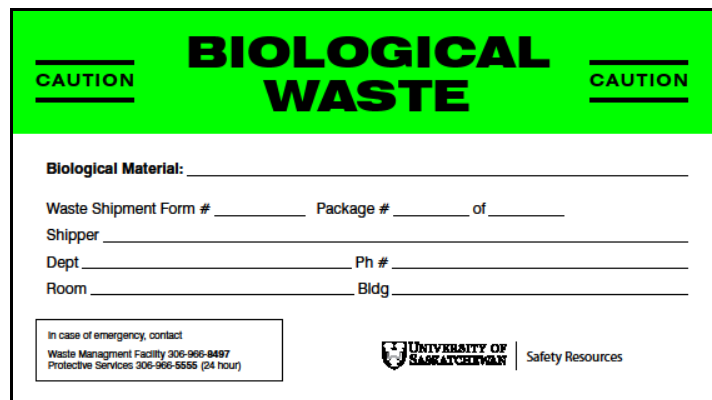
Animal anatomical waste disposed through the WMF is removed from the loading dock area every Thursday between 8:30 and 10:00 a.m. by WMF personnel.

To ensure waste is removed from the workplace by the WMF personnel, the following procedures shall be adhered:

- Each container must be structurally capable of bearing the total weight of its contents;
- Containers should not weigh more than 20 kg;
- Plastic bags must be sealed or tied shut;
- Boxes are taped shut with packing tape;
- Sharps waste shall only be collected in approved sharps containers. These sharps containers may be shipped on its own as biological waste or added to the chemical waste shipments.
- Complete a *Hazardous Waste Disposal Form* online at [www.safetyresources.usask.ca](http://www.safetyresources.usask.ca) by 1600 hours Wednesday to ensure waste removal for the next day;
- Store waste in a secure cool place (e.g. refrigerator, freezer) to prevent decomposition prior to pick up;
- Containers shall be ready for pick up and at the designated pick up location (loading dock) Thursday morning.

### 6.2.4.1 Labelling of Waste Destined for the WMF

Waste destined for the WMF shall have the following label affixed to it (see Figure 1). Labels are available from the Safety Resources office, or can be printed from the Safety Resources website [http://safetyresources.usask.ca/procedures\\_forms/index.php](http://safetyresources.usask.ca/procedures_forms/index.php).



The image shows a rectangular label for biological waste. The top section has a black background with the word "CAUTION" in white on the left and right, and "BIOLOGICAL WASTE" in large white letters in the center. Below this is a white section with the following text: "Biological Material: \_\_\_\_\_", "Waste Shipment Form # \_\_\_\_\_ Package # \_\_\_\_\_ of \_\_\_\_\_", "Shipper \_\_\_\_\_", "Dept \_\_\_\_\_ Ph # \_\_\_\_\_", and "Room \_\_\_\_\_ Bldg \_\_\_\_\_". At the bottom left, there is a small box with emergency contact information: "In case of emergency, contact", "Waste Management Facility 306-966-8497", and "Protective Services 306-966-6566 (24 hour)". At the bottom right, there is the University of Saskatchewan logo and the text "Safety Resources".

Figure 1: Biological waste label.

All fields on the label shall be completed in full as follows:

- **Biological Material:** Record the category of non-infectious biological material;
- **Waste Shipment Form #:** Corresponds to the number on the *Hazardous Waste Disposal Form*;
- **Package #:** Number of the container within the shipment (i.e. 1 of 4); and
- **Shipper:** Record the name, department, building, room number and telephone number of the person who completed the *Hazardous Waste Disposal Form*. This will be the contact person if WMF personnel require more information about the contents of the package.

#### 6.2.4.2 Hazardous Waste Disposal Form

The *Hazardous Waste Disposal Form* is used to request pick up of anatomical waste by the WMF Personnel. It is accessible online at <http://safetyresources.usask.ca>.

Each form is uniquely numbered for tracking purposes, therefore use only one form per shipment. Complete all fields on the form as follows:

- Record the date the form is sent to the WMF;
- Record the name, department, building, room number, email address and telephone number of the person generating the waste;
- Record the location where the waste can be picked up from (i.e. loading dock);
- Record the total number of containers in the shipment;
- Record the package number (must correspond to the waste label affixed to the package)
- Record the number of containers that correspond to the waste description;
- Record a description of the biological material in each package (i.e. carcasses);
- Total quantity refers to the total weight of all packages; and
- Ensure all containers that are offered for pick up are included on the *Hazardous Waste Disposal Form*.

Once you have completed all fields on your form, click “Submit” to automatically submit your form to WMF personnel. A confirmation email with a copy of your completed form will be sent to the email address you provided. You should keep this copy for your records for one year after the waste was submitted.

A *Hazardous Waste Disposal Form* sample is shown in Figure 2.

University of Saskatchewan  
**Safety Resources Waste Management Facility**

For questions about waste disposal or the Hazardous Waste Disposal form, please contact: 306-966-8497

## Hazardous Waste Disposal Form

<b>Date</b>	<b>Number of packages in this shipment</b>
<input type="text" value="October 31, 2015"/>	<input type="text" value="3"/>
<b>Department</b>	<b>Contact Name</b>
<input type="text" value="Microbiology"/>	<input type="text" value="Michael Smith"/>
<b>Building &amp; Room</b>	<b>Email Address</b>
<input type="text" value="Rm 123, Health Sc. Bldg"/>	<input type="text" value="michael.smith@usask.ca"/>
<b>Pick Up Location</b>	<b>Telephone</b>
<input type="text" value="Loading dock"/>	<input type="text" value="(306) 966-1234"/>

(if different than building & room)

**Notes**

(E.g. Please send more hazardous waste stickers)

**IMPORTANT NOTES**

MIXTURES (more than 2 components): Check off "MIXTURE" and state total quantity in container.  
 Then list all components and their concentrations **by percentage** to equal 100%.  
 WARNING: DO NOT package incompatibles in the same container!  
 Glass bottles must be packed in sturdy containers with sufficient packing material.  
 Chemical Waste in Biohazardous Waste Bags Cannot Be Accepted.

Mixture	Pkg No.	No. Of Containers	Waste Description* <small>*Please write the full chemical name. Do not use abbreviations or chemical formulas.</small>	Percentage <small>Must=100%</small>	Total Quantity <small>L/KG</small>	pH <small>(liquid waste only)</small>	
<input type="checkbox"/> Yes	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="Rat Carcasses"/>	<input type="text" value="100"/>	<input type="text" value="10"/> <input type="text" value="KG"/>	<input type="text" value="N/A"/>	<input type="checkbox"/>
<input type="checkbox"/> Yes	<input type="text" value="2"/>	<input type="text" value="1"/>	<input type="text" value="Sharps container"/>	<input type="text" value="100"/>	<input type="text" value="1"/> <input type="text" value="KG"/>	<input type="text" value="N/A"/>	<input type="checkbox"/>
							<input type="button" value="Add Row"/>

Figure 2: Sample Hazardous Waste Disposal Form for Biological Waste.

## 6.2.5 Disposal Through Biomed Recovery and Disposal Ltd.

Biomed Recovery and Disposal Ltd. (Biomed) uses either a hydroclave sterilization process or incineration to destroy the biological waste. Waste collected in the yellow or red pails, and blue barrels are destined for incineration. Waste collected in sharps containers, grey bins with a yellow lid, and Rubbermaid tote are destined for hydroclaving.

Individuals disposing of biological and/or biohazardous materials through BioMed Disposals must take the online Biowaste Course prior to utilizing their services. To register, please go to the Safety Resources website: [www.safetyresources.usask.ca](http://www.safetyresources.usask.ca).

Waste shall be stored in a secure cool place (e.g. refrigerator, freezer) to prevent decomposition prior to pick up.

To request removal of biohazardous waste by Biomed, contact them at 306-253-4476 to schedule a time for removal if service is not already set up in your area. Ensure waste is at the designated pick up location on the day of their visit.

Some departments have a routine schedule already set for waste removal (e.g. Western College of Veterinary Medicine, Health Sciences Building, Prairie Diagnostic Services (PDS) Necropsy Facility).

### 6.2.5.1 Packing of Waste Destined for Biomed Recovery and Disposal Ltd.

To ensure the safety of Biomed staff the following procedures shall be adhered when packing waste into Biomed containers (red or yellow incinerate pails, grey bin or Rubbermaid tote):

- Collect microbiological waste in a grey Biomed bin lined with a durable biohazard labelled bag. When the bag is  $\frac{3}{4}$  full seal the bag with a zip or twist tie.
  - Place labelled sharps containers on top of the sealed biohazard labelled bag or directly into the grey bin with no bag. **Never** empty the SHARPs container into the Biomed bin.
  - Close the lid and secure the lid to the bin with ties.
- Collect special precaution waste, animal anatomical and husbandry waste in a red or yellow Biomed pail lined with a durable plastic bag. When the bag is  $\frac{3}{4}$  full seal the bag with a zip or twist tie. Seal the lid shut on the pail by using a hammer or blunt object. Waste collected in the yellow or red pails, and blue barrels are destined for incineration. Always ensure these items are labelled with an “Incinerate” sticker.
- Clean and decontaminate the exterior walls of all containers with the appropriate disinfectant prior to shipping.
- Containers with visible signs of external contamination will not be accepted.
- Containers must not weigh more than 50 lb (~22.7 kg)

### 6.2.5.2 Labelling of Waste Destined for Biomed

Waste that is destined for disposal to Biomed is transported off campus and therefore shall be packaged in accordance with the *Transportation of Dangerous Goods (TDG) Regulations* and the person offering the waste container for transport shall be TDG certified in Biowaste. Biowaste Courses are available through Safety Resources upon request. Contact Safety Resources to schedule a course.

The following is required for all Biomed Disposal bins, pails and barrels (see Figure 3).

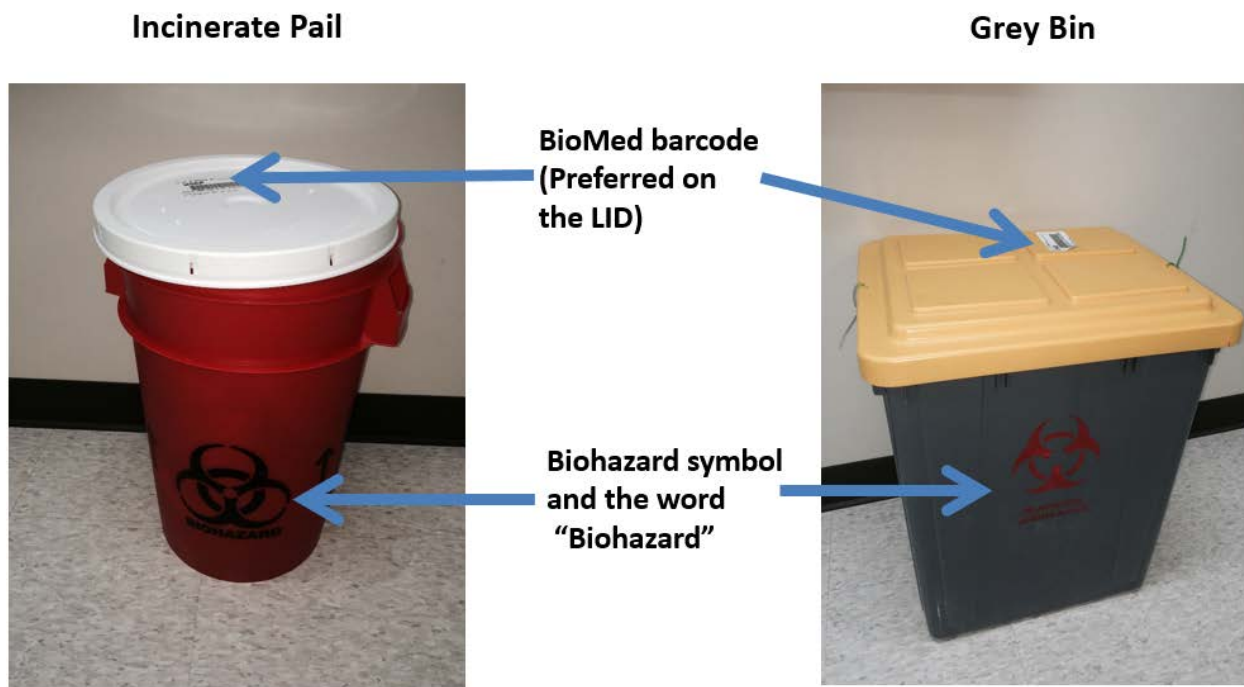


Figure 3: Correctly labelled Biomed Disposal bins.

- Proper shipping name "Biohazard" (should be already marked on package);
- Biohazard symbol (should be already marked on the package);
- Bar code label specific to your department **placed on the lid** of the container (see Figure 4). Contact Biomed at 306-253-4476 to obtain bar code labels.
- If a container is missing the appropriate markings on the package, contact Safety Resources to obtain the correct labels (e.g. Biohazard symbols).





Figure 4: Department bar code.

## 6.2.6 Disposal through the Western College of Veterinary Medicine PDS Necropsy Facility

Large animal anatomical waste, for non-infectious, biohazardous material and SRM material, is disposed of through Western College of Veterinary Medicine PDS Necropsy Facility's Alkaline Tissue Digester via alkaline tissue hydrolysis. For arrangements, please contact the facility supervisor of WCVM PDS Necropsy at (306) 966-2721.

## 7 Chemical Waste

### 7.1 Introduction

Chemical waste is divided into twelve categories (Table 3). Each category of waste requires storage, handling, and disposal practices appropriate for the type of chemicals present in the waste.

It is the responsibility of the supervisor and person generating the chemical waste to properly manage the chemical waste to ensure safe and environmentally responsible disposal in accordance with the *Saskatchewan Hazardous Substances and Waste Dangerous Goods Regulations*, and *City of Saskatoon Sewage Works and Waste and Dumping bylaws*.

Chemical waste shall not be released to the environment, but collected and forwarded to the Waste Management Facility (WMF) for proper disposal.

In determining whether the waste is exempt chemical waste, an element of professional judgment with sufficient evidence supporting the decision is required. That judgment should be based on the ecological, toxicological, stability and reactivity properties of the chemical present. Refer to the *Material Safety Data Sheet (MSDS)* for appropriate safety and environmental considerations.

A brief description of these categories, the method of disposal and the proper container to collect the waste in, is provided in Table 3. This information will help you determine the broad categories of waste that can be disposed of via the Waste Management Facility.

Waste Management Facility staff pick up and transport waste to the WMF. Waste is sorted into separate waste streams according to their class and compatibility, as indicated by an assigned waste code (see Table 4). The waste codes listed in Table 4 are used by WMF staff only; the waste generator does not need to include these codes on chemical waste forms and labels. This information can help waste generators determine which waste streams to keep segregated from one another (e.g. halogenated compounds should be kept separate from other solvent waste). Waste streams may be kept separate due to chemical compatibility, safety reasons, or for cost efficiency (e.g. halogenated waste costs more to ship than non-halogenated solvents).

Table 3: Chemical waste disposal methods summary.

Category of Waste	Description	Collection Container	Method of Disposal
Dry waste with residual contaminants	Any material, but not limited to, plastic bags, empty bottles, plastic containers, paper towel, gloves, pipette tips, broken glassware, etc. contaminated with residual amounts of a chemical.	Cardboard box lined with a plastic bag.	<ol style="list-style-type: none"> <li>1. Ship to Waste Management Facility.</li> <li>2. Dry waste contaminated with low toxicity, corrosivity, flammability or environmental hazardous chemicals may be disposed with regular waste provided: <ul style="list-style-type: none"> <li>• Triple rinse containers, dispose rinsate as liquid chemical waste;</li> <li>• Remove all chemical warning labels;</li> <li>• Slash plastic containers to prevent reuse;</li> <li>• Leave glass bottles intact, do not break; and</li> <li>• Dispose as regular garbage waste.</li> </ul> </li> </ol>
Empty pesticide containers	Any container contaminated with pesticide residue.	Original container.	Ship to Waste Management Facility.
Equipment containing mercury waste	Any equipment containing mercury such as thermometers, barometers, blood pressure gauges, flasks of mercury, etc.	Puncture-proof, sealable container of appropriate size to contain the mercury and equipment, lined with a plastic bag. Do not use an oversize container as it will be disposed of as hazardous waste.	Ship to Waste Management Facility.
Gas cylinders	Any cylinder used to hold a gas or any container used to hold a liquefied gas at or above atmospheric pressure.	Ensure gas cylinder valve is closed and protective cap is secured to cylinder.	<ol style="list-style-type: none"> <li>1. Return to the manufacturer;</li> <li>2. Cylinders that cannot be returned to the manufacturer (cylinders older than ten years or not eligible for re-filling) shall be disposed of through a hazardous waste contractor. A cost is associated with the disposal of the gas cylinder.</li> </ol>
Gel waste	Gels containing trace amounts of chemicals (i.e. ethidium bromide gel waste).	Sealable 20 litre pail lined with plastic.	Ship to Waste Management Facility.

Category of Waste	Description	Collection Container	Method of Disposal
HPLC/GC sample vials	Small vials containing solutions from analysis on gas chromatography (GC) or high performance liquid chromatography (HPLC) instruments.	Plastic lined cardboard box or 20 litre plastic pail.	Ship to Waste Management Facility.
Liquid chemical waste	Unused or used pure chemicals; mixtures of chemicals; chemicals mixed with aqueous liquids, oils, or hydraulic fluids no longer required for their intended purpose or are waste products.	Containers shall be leak proof, compatible with chemical waste and have a secure and sealable lid. Maximum volume of flammable waste in a container is 5 litres and all other liquid chemical waste is 10 litres. Containers designed to store solid chemicals shall not be used to hold liquid chemicals.	Ship to Waste Management Facility.
Solid chemical waste	Unused chemicals; used or spent chemicals; mixtures of chemicals.	Containers used to hold solids waste shall have secure lids and be packed in a cardboard box with sufficient cushioning to prevent breakage of containers.	Ship to Waste Management Facility.
PCB contaminated waste	Liquid or solid material known to contain or suspected to contain polychlorinated biphenyls (PCB).	Containers shall be compatible with chemical substance and have a secure and sealable lid.	Ship to Waste Management Facility.
Sharps	Sharps (e.g. scalpels, syringes, razors, needles).	Sharps container.	Ship to Waste Management Facility.
Unknowns	A chemical where the chemical composition characteristics are unknown.	Leave in original container and contact the Waste Management Facility.	Contact the Waste Management Facility for assistance. A cost may be associated with the handling and disposal of unknown chemicals.
Unstable	Chemicals that have decomposed or dried into potentially unstable compounds that may react or become explosive under certain conditions (e.g. ether or other peroxide forming compounds, picric acid).	Do not handle or disturb potentially unstable compounds. Contact the Waste Management Facility immediately.	Contact the Waste Management Facility for assistance. A cost may be associated with the handling and disposal of unstable chemicals.

Table 4: Chemical Waste Streams

Waste Stream Category	Physical State	Primary Hazard Class	Description
A	S, L	8	Inorganic acids greater than 60% by volume and other compatible Class 8 materials
AA1	L	3, 6.1	Lean flammable liquid waste with pH greater than 4 and less than 10
AO	S,L	8	Organic acids and other compatible Class 8 materials
BAT	S	8	Batteries; all types
BB1	L	3, 6.1	Lean Flammable liquid waste with pH greater than 4 and less than 10 containing greater than 3% halogen content
BSL	S,L	8	Solid bases and other compatible Class 8 materials; excludes mercury.
CYN	S,L	6.1	Cyanide solids and solutions excluding isocyanates, thiocyanates, and acetonitrile
F1	S,L	6.1	Pesticide contaminated solids and Class 6.1 pesticide waste
F7	L	6.1	Dilute liquid pesticide with less than 1% pesticide content
FLL	L	3	Flammable liquids that are not bulked due to consistency or reactivity
FSL	S	4.1	Flammable solids
G	L	3	Vials containing flammable liquids
I	G	2	Aerosol spray cans
LIA	L	8	Acid solutions, non-oxidizing
LIAN	L	8	Acid solutions with oxidizing content including nitric acid
M1	L	8	Basic solutions and caustics
Mer	S,L	8	Liquid mercury and mercury contaminated items
NLP	S,L	6.1	PG I, Class 6.1 items
OPL	S, L	5.2	Organic peroxides
OX	S,L	5.1	Oxidizers
PCB	S, L	9	PCB ballasts, capacitors, and contaminated items
R2A	S	NR	Trace contaminated items, items contaminated with less hazardous residue; helix treated seed
R2AC	S	NR	Chemicals not regulated by TDG
R2AG	S	NR	Gel waste
SCL	S, L	4.2	Spontaneously combustible chemicals
TIL	S	6.1	Toxic inorganic chemicals regulated by TDG
TOL	S	6.1	Toxic organic chemicals regulated by TDG
WRL	S,L	4.3	Water reactive compounds

## 7.2 Disposal through the WMF

Chemical waste is collected by the WMF personnel, repacked and shipped to a licensed chemical disposal facility for disposal.

Chemical waste designated for the WMF is removed by request.

To request chemical waste removal, a completed *Hazardous Waste Disposal Form* must be submitted online. The *Hazardous Waste Disposal Form* can be found online at [http://facilities.usask.ca/sys-forms-apps/hazardous\\_waste\\_form/index.php](http://facilities.usask.ca/sys-forms-apps/hazardous_waste_form/index.php)

Complete all fields in the *Hazardous Waste Disposal Form* then click “Submit” to automatically submit your form to WMF personnel. You will receive a confirmation email at the email address you provided with a copy of your *Hazardous Waste Disposal Form*. You should keep this copy for your records for one year after the waste was submitted.

Waste generators shall ensure that waste containers are ready for pick up, and at the designated pick up location once the *Hazardous Waste Disposal Form* is submitted.

WMF personnel have the right to refuse pick up of any improperly packaged or labelled waste to ensure their safety. Containers with visible signs of external contamination will not be accepted.

## 7.3 Waste Collection

Plastic hazardous waste containers can be purchased from Facilities Management Stores (306-966-4501) or college/department central stores.

To ensure the safety of the individuals working in the area, custodians, and WMF personnel it is important to adhere to the following instructions:

- Refer to the MSDS for hazards associated with each chemical;
- Do not pack incompatible chemical waste in the same package;
- Use an appropriate size and compatible container for collecting that particular waste;
- During filling, use a funnel to avoid contaminating the outside of the container;
- Do not overfill containers. Leave head space to allow for expansion and to prevent spills when the container is opened by WMF personnel;
- Ensure lids on containers are secured tightly to prevent leakage;
- Packages shall not weigh more than 20 kg (except in the case of drums);
- Ensure sufficient packing material (e.g. packing paper, vermiculite) is used to prevent containers enclosed in a package from damage during transport;
- Ensure that all packages are structurally capable of bearing the aggregate weight of all containers within;
- Once full, tape shut with packaging tape the tops and bottoms of packages; and
- If reusing an empty container for waste collection, ensure the original label is defaced.

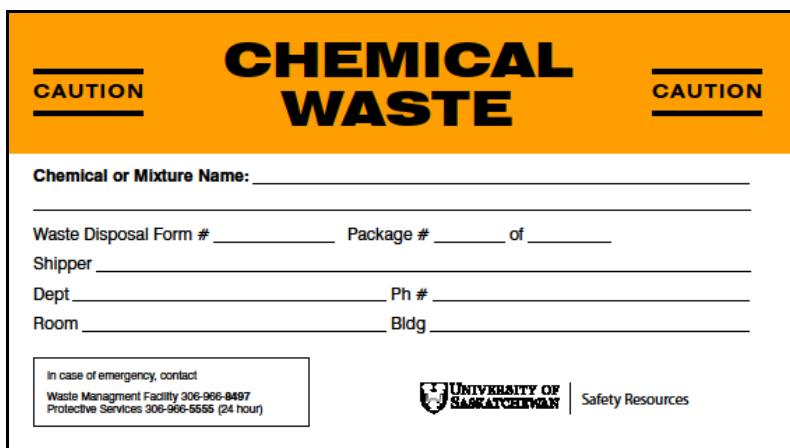
## 7.4 Labelling the Waste Containers

Waste containers must be labeled so Waste Management Facility staff can identify and remove the correct waste from your location; waste will not be removed unless it is labeled. (See Figure 5). These labels also facilitate tracking and processing the waste at the WMF.

Labels can be acquired when you submit a Hazardous Waste Disposal form by requesting more in the notes section. Labels can also be printed from the template on the Safety Resources website [http://safetyresources.usask.ca/procedures\\_forms/index.php](http://safetyresources.usask.ca/procedures_forms/index.php). or they can be picked up directly from the Safety Resources office.

All waste containers and packages shall be properly labelled according to the following requirements:

- Affix a Chemical Waste Label to each package (not containers inside the package). Packages can be boxes or waste jugs;
- Information provided on the label shall be legible;
- Use only proper chemical names on the label. Acronyms, trade names, or chemical formulas are not acceptable;
- Each container shall be numbered prior to being packed. Package numbers and content labels shall correspond to the information on the *Hazardous Waste Disposal Form*; and,
- Any non applicable labels shall be removed from the container and package or otherwise made illegible (painted, scratched out).



The image shows a template for a chemical waste label. It features a prominent orange header with the words "CHEMICAL WASTE" in large, bold, black letters. On either side of the header, the word "CAUTION" is written in black, flanked by horizontal lines. Below the header, there are several fields for text entry: "Chemical or Mixture Name:" followed by a line; "Waste Disposal Form # \_\_\_\_\_ Package # \_\_\_\_\_ of \_\_\_\_\_"; "Shipper \_\_\_\_\_"; "Dept \_\_\_\_\_ Ph # \_\_\_\_\_"; and "Room \_\_\_\_\_ Bldg \_\_\_\_\_". At the bottom left, there is a small box containing emergency contact information: "In case of emergency, contact Waste Management Facility 306-966-8497 Protective Services 306-966-5555 (24 hour)". At the bottom right, there is the University of Saskatchewan logo and the text "UNIVERSITY OF SASKATCHEWAN | Safety Resources".

Figure 5: Chemical waste label.

All fields on the label shall be completed in full as follows:

- **Chemical or Mixture Name:** Record the most abundant chemical name shipped in the package;

- **Waste Disposal Form #:** Corresponds to the number on the *Hazardous Waste Disposal Form*;
- **Package #:** Number of the package within the shipment (e.g. 1 of 4); and
- **Shipper:** Record the name, department, telephone number, room number and building of the person who completed the *Hazardous Waste Disposal Form*. This will be the contact person if WMF personnel require more information about the contents of the package.

## 7.5 Storage of Hazardous Waste Containers

Each laboratory shall establish a location for the consolidation of chemical waste in consideration of the following requirement.

- Store chemical waste in a location that does not obstruct any pathways;
- Never store incompatible chemical waste in a manner that will allow reactions to occur in the event of a spill or release;
- Do not stockpile chemical waste;
- Store liquid chemical waste in containment trays or on sufficient absorbent material to absorb a spill;
- Ensure WMF personnel are familiar with the waste storage location; and
- Maximum volume for flammable liquid waste that may be stored outside a flammable storage cabinet is 50 litres.

## 7.6 Requesting Hazardous Waste Disposal

### 7.6.1 Hazardous Waste Disposal Form

The *Hazardous Waste Disposal Form* is used to request a chemical waste pick-up by WMF personnel. The *Hazardous Waste Disposal Form* is accessible online at <http://safetyresources.usask.ca/>. Click on the green “*Hazardous Waste Disposal Form*” button on the bottom right of the page to start a new form. Each form is uniquely numbered for tracking purposes; therefore, use only one form per shipment.

Complete all fields on the form as follows, fill out the:

- date;
- total number of packages in the shipment;
- name, department, email address and telephone number of the person generating the waste (not the shipper if shipper and generator are different);
- building, room number, and location in the room where the waste can be picked up from;
- notes can be added to request stickers, a specific time for waste pick up if desired, or to convey important information about the waste shipment.



For each type of waste, fill out the:

- package number – this corresponds to the waste label affixed to the package. When a box contains numerous bottles of waste inside it, they will all have the same package number;
- number of containers – there may be multiple containers of the same waste;
- Give an accurate description of the chemicals in each package. This shall include the chemical names of all constituents in the container/package. Acronyms, trade names, or chemical formulas are not acceptable;
  - If the waste is a mixture, check off the box under the Mixture column, then list each chemical that is included in the mixture in its own row under “Mixture Component Details”.
- Percentage applies if there is a mixture of chemicals; indicate the proportion of each chemical as a percentage (%). Do not use concentrations. If you are sending unused or pure chemicals, indicate 100%.
- Total quantity refers to the total quantity of chemicals of a given waste description in that package; and
- Select the correct pH if applicable (for liquid chemical mixtures).
- Ensure all containers and packages that are offered for pick up are included on the *Hazardous Waste Disposal Form*.

Once you have completed all the fields, click “Submit form” to automatically submit your form to WMF personnel. A confirmation email with a copy of your completed form will be sent to the email address you provided. You should keep this copy for your records for one year after the waste was submitted.

### 7.6.2 Waste Disposal through Agriculture Stores or Chemistry Stores

- If you currently bring your hazardous waste to Agriculture Stores (Ag 1E26) or Chemistry Stores (Thorv G46), make sure to enter this into the field “Pickup Location” on the Hazardous Waste Disposal Form
- You will need to **print** your confirmation email and bring it with you to give to the staff at Agriculture Stores/Chemistry Stores when you bring your waste for disposal

A sample *Hazardous Waste Disposal Form* is presented in Figure 6 (see next page).

**University of Saskatchewan  
Safety Resources Waste Management Facility**

For questions about waste disposal or the Hazardous Waste Disposal form, please contact: 306-966-8497

## Hazardous Waste Disposal Form

<b>Date</b>	<input type="text" value="31 Oct 2015"/>	<b>Number of packages in this shipment</b>	<input type="text" value="3"/>
<b>Department</b>	<input type="text" value="Microbiology"/>	<b>Contact Name</b>	<input type="text" value="Michael Smith"/>
<b>Building &amp; Room</b>	<input type="text" value="Rm 123, Health Sc. Bldg"/>	<b>Email Address</b>	<input type="text" value="michael.smith@usask.ca"/>
<b>Pick Up Location</b>	<input type="text" value="Location"/>	<b>Telephone</b>	<input type="text" value="(306) 966-1234"/>

(if different than building & room)

**Notes**

(E.g. Please send more hazardous waste stickers)

**IMPORTANT NOTES**

MIXTURES (more than 2 components): Check off "MIXTURE" and state total quantity in container.  
Then list all components and their concentrations by percentage to equal 100%.  
WARNING: DO NOT package Incompatibles in the same container!  
Glass bottles must be packed in sturdy containers with sufficient packing material.  
Chemical Waste in Biohazardous Waste Bags Cannot Be Accepted.

Mixture	Pkg No.	No. Of Containers	Waste Description* <small>*Please write the full chemical name. Do not use abbreviations or chemical formulas.</small>	Percentage <small>Must=100%</small>	Total Quantity <small>L/KG</small>	pH <small>(liquid waste only)</small>	
<input checked="" type="checkbox"/> Yes	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="text" value="MIXTURE"/>	<input type="text" value="100"/>	<input type="text" value="10"/> L	<input type="text" value="4 - 9.9"/>	<input type="button" value="−"/>
MIXTURE COMPONENT DETAILS							
			<input type="text" value="Acetone"/>	<input type="text" value="50"/>	<input type="button" value="−"/>		
			<input type="text" value="Methanol"/>	<input type="text" value="50"/>	<input type="button" value="−"/>		
<input type="button" value="Add Component"/>							
<input type="checkbox"/> Yes	<input type="text" value="2"/>	<input type="text" value="1"/>	<input type="text" value="Potassium hydroxide solid"/>	<input type="text" value="100"/>	<input type="text" value="0.05"/> KG	<input type="text" value="N/A"/>	<input type="button" value="−"/>
<input checked="" type="checkbox"/> Yes	<input type="text" value="3"/>	<input type="text" value="1"/>	<input type="text" value="MIXTURE"/>	<input type="text" value="100"/>	<input type="text" value="♯"/> −	<input type="text" value="N/A"/>	<input type="button" value="−"/>
MIXTURE COMPONENT DETAILS							
			<input type="text" value="Paper towel"/>	<input type="text" value="99.9"/>	<input type="button" value="−"/>		
			<input type="text" value="Ethidium bromide"/>	<input type="text" value="0.01"/>	<input type="button" value="−"/>		
<input type="button" value="Add Component"/>							
<input type="button" value="Add Row"/>							

**Figure 6: Sample Hazardous Waste Disposal Form for Chemical Waste.**

## 7.7 Disposal of Gas Cylinders

Prior to purchasing a gas cylinder, individuals shall determine if the cylinder is returnable to the manufacturer. If not, disposing of the gas cylinder through a contractor may be required.

Any costs associated with the disposal of gas cylinders through a contractor shall be the responsibility of the waste generator.

WMF personnel will act in a consulting role with individuals on proper disposal procedures for gas cylinders on a case by case basis.

## 8 Radioactive Waste

### 8.1 Introduction

Any substance, material, or item that may have come in contact with a nuclear substance or unused nuclear substance no longer required shall be considered radioactive waste. It is the responsibility of the nuclear substance permit holder and person generating the radioactive waste to properly manage radioactive waste to ensure safe and environmentally responsible disposal of the radioactive or potentially radioactive waste and to be in accordance with the University of Saskatchewan's Nuclear Substances and Radiation Devices Licence with the Canadian Nuclear Safety Commission.

Radioactive waste must never be placed in regular garbage bins.

Radioactive waste is divided into ten categories with each type of waste requiring storage, handling, and disposal practices appropriate for the amount of radioactivity present in the waste.

A summary of the categories of radioactive waste together with the type of collection containers is summarized in Table 4.

Table 4: Summary of radioactive waste categories.

Category of Waste	Acronym for type of Waste	Description	Collection Container
Animal waste	ANW	Animal tissue, carcasses, body parts, and/or organs.	Sturdy plastic bag. A rigid outer container may be required for transport purposes. The Safety Consultant – Radiation Safety will determine how many animals can be collected together.
Aqueous	AQU	Liquid in which the solvent is water.	Any plastic container of appropriate size with a secure and sealable lid. Recycled containers are acceptable provided they were previously used to hold liquids (the use of milk containers is not permitted).

Category of Waste	Acronym for type of Waste	Description	Collection Container
Dry	DRY	Laboratory wares (e.g. pipette tips, petri plates, test tubes, gloves, absorbent materials, bench coats) that have possibly come in contact with a nuclear substance and are not chemically contaminated. Only containers with residual liquid content are acceptable.	Cardboard box lined with a plastic bag.
Gel waste	GEL	Gels containing trace amounts of chemicals (i.e. ethidium bromide gel waste) and radioactivity.	Sealable plastic container lined with plastic.
Liquid scintillation vials	LSV	Plastic or glass vials containing the radioactive sample and the liquid scintillant.	Plastic lined cardboard boxes or plastic containers.
Non aqueous	NAQ	Liquids that contain flammable, toxic, and/or corrosive ingredients and a nuclear substance.	Containers shall be compatible with chemical substance and have a secure and sealable lid.
Protein iodination waste	PRO	Waste generated during separation of the desired product from the waste using exclusion chromatography.	All waste is mixed in a plastic container small enough to fit into a 4 litre can. Dimensions of the can are 15 cm in height and 16.5 cm in diameter.
Sharps	---	Sharps (e.g. scalpels, empty syringes, razors).	Sharps container. Do not designate as radioactive.
Shipping vial holder	---	The secondary container holding the shipping vial. This could be plastic or lead lined.	Collect lead lined shipping vial holders in a box. Deface plastic vial holders and dispose in dry waste container.
Transuranic waste	TRU	Waste generated from handling radioactive elements with an atomic number greater than 89 (e.g. uranium ore).	Collect laboratory waste in cardboard box lined with a plastic bag. Collect nuclear substance waste in original container and contact the Safety Consultant – Radiation Safety for further assistance.
Unused or partially used radioisotope	URM	Any radioisotope partly used or unused that is futile (e.g. chemically broken down, bacteriological contamination, old or no longer required for research).	Radionuclides with an activity greater than 100 $\mu\text{Ci}$ (370 kBq) shall remain in their original shipping vials. Radionuclides with an activity equal to or less than 100 $\mu\text{Ci}$ (370 kBq) shall be pipetted from the shipping vials and added to the aqueous waste container.

## 8.2 Methods of Disposal of Radioactive Waste

All radioactive waste is collected by the Waste Management Facility (WMF). Radioactive waste is picked up every Monday. If Monday is a holiday the waste will be picked up the next day.

To request radioactive waste removal a completed *Radioactive Waste Authorization Form* must be received by the Safety Consultant – Radiation Safety by 1600 hours Thursday to ensure waste removal for the following week. Forms can either be mailed or delivered to Safety Resources, Room 150 Research Annex. Faxed forms are not accepted.

Waste generators shall ensure that the containers are ready for pick up prior to the *Radioactive Waste Disposal Form* being sent to the Safety Resources office. Containers with visible signs of external contamination or incorrect labelling will not be accepted. If the item was left behind A *Rejection Note* will be left on the container explaining why.

## 8.3 Waste Collection

It is important that radioactive waste be collected in accordance with the procedures identified in this standard.

- Remove all radiation warning symbols from waste contents (e.g. shipping vials, containers, bench coats, etc.);
- Do not mix beta emitter with gamma emitter waste;
- Do not mix long lived ( $T_{1/2} > 1$  year) radioactive waste with short lived ( $T_{1/2} < 1$  year) radioactive waste;
- Use an appropriate size and compatible container for collecting that particular waste;
- Do not overfill containers. Leave sufficient space to allow for expansion and contraction of the contents in the container;
- Ensure lids on containers are secured tightly to prevent leakage;
- Remove all radiation warning labels from the container;
- If reusing an empty container for waste collection ensure the original label is defaced;
- During filling, use a funnel to avoid contaminating the outside of the container;
- Containers shall not weigh more than 20 kg;
- Ensure all packages are structurally capable of withstanding the aggregate weight of its contents;
- Once full, tape shut with packaging tape the tops of packages; and
- Glass containers shall not be used to collect radioactive waste.

## 8.4 Labelling the Waste Containers

Labels can be acquired from the Safety Resources office. All waste containers shall be properly labelled according to the following requirements:

- Affix a *Radioactive Waste Label* (see Figure 7) to each container prior to its use to ensure laboratory and custodial staff can readily identify the container;
- Information provided on the label shall be legible;
- Numbers and labels shall correspond to the information on the *Radioactive Waste Disposal Authorization Form* which corresponds to the container in which the waste is held; and
- Any non-applicable labels shall be removed from the container or otherwise made illegible (painted, scratched out).

The image shows a rectangular radioactive waste label. At the top, there is a yellow banner with two purple radiation symbols on either side of the word "CAUTION" in large, bold, purple letters. Below this, in smaller purple letters, is "RAYONNEMENT • DANGER • RADIATION". The main body of the label is white with black text and lines. It contains several fields for information: "TYPE OF WASTE:" followed by a blank line; "Waste Disposal Form # \_\_\_\_\_ Container # \_\_\_\_\_"; "Radioisotope \_\_\_\_\_ Activity \_\_\_\_\_"; and "Permit Holder \_\_\_\_\_". To the right of these fields is a box titled "Safety Resources use only" containing "Received Date" and "Disposal Date" fields. At the bottom left, there is a box with emergency contact information: "In case of emergency, contact Waste Management Facility 306-966-8487 Protective Services 306-966-5555 (24 hour)". At the bottom center is the University of Saskatchewan logo, and at the bottom right is the text "UNIVERSITY OF SASKATCHEWAN | Safety Resources".

Figure 7: Radioactive waste label.

All fields on the label shall be completed in full as follows:

- **Type of Waste:** Record one of the 9 categories of waste listed in table 4;
- **Waste disposal form #:** Corresponds to the number on the *Radioactive Waste Disposal Authorization Form*;
- **Container #:** Number of the container within the shipment;
- **Radioisotope:** Record the radioisotope(s) collected in the container;
- **Activity:** Record the amount of activity present in the container after it has been closed. Refer to section 8.5.1 on how to determine the activity; and
- **Permit Holder:** Record the name of the person responsible for the permit that waste was generated under.

## 8.5 Storage of Waste

Each laboratory shall establish a location for the consolidation of radioactive waste. This location should be in the same laboratory where the waste is generated. Radioactive waste shall be stored in a location that does not obstruct any pathways. Radioactive waste should be stored in a secure location in the laboratory.

All liquid waste shall be placed in containment trays or on top of enough absorbent material to absorb the liquid in the event of a spill.

Radioactive waste may have to be shielded and stored in such a manner that the dose to personnel is as low as reasonably possible. Any form of shielding material used around radioactive waste shall be designed, constructed, and handled in such a way that it can be easily moved by the WMF personnel at the time of waste pick up. Consult with the your area's Safety Consultant or contact the Safety Resources office at 306-966-4675 if shielding is required for radioactive waste.

Avoid storing radioactive waste in the laboratory for decay purposes. Avoid stockpiling radioactive waste.

If research has suspended for a duration of time dispose of all radioactive waste immediately, regardless if the container is full or not.

## 8.6 Radioactive Waste Disposal Authorization Form

The *Radioactive Waste Disposal Form* is used to record the radioactive waste to be removed from the laboratory by WMF personnel. The *Radioactive Waste Disposal Form* can be acquired from the Safety Resources office. Each form is uniquely numbered for tracking purposes. Complete all fields on the form as follows:

- To request radioactive waste removal from the laboratory, complete a *Radioactive Waste Disposal Form* and mail the first two copies of the form to Safety Resources, Room 150 Research Annex. The third copy should be retained for your records. No pick up is authorized unless the Radiation Safety Office receives this form;
- If the number of containers to be picked up is greater than ten do not continue the numbering onto another form. Start a new form;
- Record the name, department, building, room number, and telephone number of the person shipping the waste;
- The description for the "Type of Waste" shall be one of the ten categories identified in Table 4;
- Provide a general description of the waste collected in the container (e.g. gloves, cleaning material, petri plates, gels, columns). For liquid waste list the chemicals present in the waste;
- If a chemical is included in the waste include the percentage and name of those chemicals in the column titled "chemical nature";
- The volume or weight is the volume or weight of the radioactive waste, not the weight of the container. (e.g. URM waste should never include the weight of the lead shipping vial holder.);
- The total activity for each container shall be determined; and
- A container of waste can have more than one requisition number associated with it.

A sample of a correctly completed *Radioactive Waste Disposal Authorization Form* is shown in Figure 8.

**RADIOACTIVE WASTE DISPOSAL AUTHORIZATION FORM**

SEND TOP TWO COPIES TO RADIATION SAFETY OFFICE **Nº 001571**

PERMIT HOLDER Dr. G. Smith DEPT. Microbiology DESIGNATED WORKER RESPONSIBLE FOR PACKING RADIOACTIVE WASTE Jane Carter

LAB ROOM NO. 123 BUILDING Health Sciences PHONE NO. 966-9876 DATE \_\_\_\_\_

LIST EACH CONTAINER SEPARATELY								FOR O. H. & S. OFFICE USE ONLY. DO NOT WRITE IN THIS AREA			
CONTAINER NUMBER	TYPE OF CONTAINER	TYPE OF WASTE	PHYSICAL NATURE	CHEMICAL NATURE	VOL/WEIGHT	ISOTOPE	ACTIVITY	REQUISITION NUMBER(S)	METHOD OF DISPOSAL	EXTERNAL RADIATION	WASTE MGR. ACTION/DATE
1	Box	DRY	paper towel, gloves, pipette tips		5 kg	P-32	1 uCi	5903			
2	Jug	AQU	0.05 mM NiCl <sub>2</sub> Buffer (PBS salt)		10 L	P-32	35 uCi	5910			
3	Jug	LSV	plastic / Ready Safe cocktail	toluene	10 kg	C-14	5 uCi	5903/5910/5911			
4	Box	URM	Thymidine		20 ml	H-3	175 uCi	5911			
5											
6											
7											
8											
9											

Figure 8: Sample Radioactive Waste Disposal Authorization Form.

### 8.6.1 Calculating Radioactive Waste Activity

Methods that may be used to determine the amount of activity in each category of waste at the time of disposal are summarized in Table 5. This activity shall be recorded on the *Radioactive Waste Disposal Authorization Form*.

Table 5: Methods for determining the activity in the waste.

Category of Waste	Method to Determine Activity
AQU	<ol style="list-style-type: none"> <li>1. Shake the container to ensure contents are properly mixed.</li> <li>2. Take a 1 ml aliquot sample of the waste and count the sample on a liquid scintillation counter or gamma counter. Record the counts per minute (cpm).</li> <li>3. Survey the outside of the container and record the maximum reading in the units of counts per minute (cpm).</li> </ol>
DRY	Dry waste usually contains very low amounts of activity since the material <i>may have</i> come in contact with a nuclear substance. For low beta emitter waste, the reported activity should be estimated very low. For high energy beta emitters waste, using a GM survey meter survey the surface of the container and record the maximum cpm.
DRY (animal)	Activity is determined based on the activity injected into the animal.
GEL	Activity based on experimental protocol.
LSV	Either keep a running total of the activity disposed to the waste container or determine the average activity and multiply by the number of vials disposed to the waste container. Regardless of which method is used, one must correct for decay, if applicable.



Category of Waste	Method to Determine Activity
NAQ	4. Shake the container to ensure contents are properly mixed. 5. Take a 1 ml aliquot sample of the waste and count the sample on a liquid scintillation counter or gamma counter. Record the counts per minute (cpm). 6. Survey the outside of the container, including the bottom and record the maximum reading in the units of counts per minute (cpm).
PRO	Since all protein iodination waste goes into one waste container, the amount of activity removed from the stock vial minus the activity collected in the samples equals the activity collected in the waste.
TRU	Contact the Safety Consultant – Radiation Safety.
URM	The amount of activity remaining in the shipping vial can be determined from the inventory sheet. Correct for decay.

## 9 Rejection Note

A *Rejection Note* will be attached to any package that was rejected for pickup (see Figure 9). Some of the reasons why a package may be left behind include:

- No cushioning around glass bottles;
- Items in the container do not match the disposal form;
- The disposal label(s) are not filled out correctly or completely;
- The package(s) are not suitable for transport;
- The package(s) are over-sized, over-filled or over-weight;
- Visible signs of external contamination on the package; and
- The container lid does not close or seal adequately.

Once the deficiency has been rectified, complete another *waste disposal form* and submit it to WMF for pick up.

UNIVERSITY OF SASKATCHEWAN  
SAFETY RESOURCES  
HAZARDOUS WASTE MANAGEMENT  
PHONE: 306-966-8497

**Sorry, we were not able to pick-up this waste because:**

- Glass bottle(s) are not packaged properly.
- Items in the container(s) do not match the disposal form.
- The disposal label(s) are not filled out correctly and/ or completely.
- The package(s) are not suitable for transport.
- The package(s) are over-sized, over-filled or over-weight.
- The lid does not close or seal adequately.
- Other (specify): \_\_\_\_\_

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We were unable to locate the person responsible for this waste, so this item will be removed from the disposal form. Please rectify issue(s) noted above and add this package/ item to your next disposal form.

If you have questions or need a Hazardous Waste Disposal Manual, please call the Waste Management Facility at 306-966-8497.

Safety Resources Staff: \_\_\_\_\_

Date: \_\_\_\_\_

Figure 9: Rejection note.

## 10 Records

Shippers of hazardous waste shall maintain copies of all information related to the disposal of hazardous waste for at least one year.

Safety Resources shall maintain records of all documents and related correspondence received. All information provided by the applicant shall be treated as confidential.

## 11 Standard Review

This standard shall be reviewed by Safety Resources at least once every three years. The standard may, however, be reviewed by Safety Resources at any time, to correct errors or to make procedural changes.

## 12 References

- *Safety Resources Policy*, University of Saskatchewan.
- *Biosafety Code of Practice*, Safety Resources.
- *Radiation Safety Code of Practice*, Safety Resources.
- *Monitoring Autoclave Efficacy Standard Operating Procedure*, Safety Resources.
- *Canadian Biosafety Standards and Guidelines (CBSG), First Edition. 2013*
- *Containment Standards for Plant Pests*, Canadian Food Inspection Agency.
- *Containment Standards for Aquatic Animal Pathogens*, Canadian Food Inspection Agency.
- *Nuclear Substance and Radiation Devices Licence*, Canadian Nuclear Safety Commission.
- *Transportation of Dangerous Goods Regulations*, Transport Canada.
- *Hazardous Substances and Waste Dangerous Goods Regulations*, Saskatchewan Ministry of the Environment.
- *Saskatchewan Occupational Health and Safety Regulations*, Ministry of Labour Relations and Workplace Safety.
- *Saskatchewan Biomedical Waste Management Guidelines*, Ministry of Labour Relations and Workplace Safety.
- *Sewer Works Bylaw*, City of Saskatoon.
- *Waste and Dumping Bylaw*, City of Saskatoon.