

# **Medical, Pathological and Low-level Radioactive Waste Management Plan for Incinerator Revised 3-08**

## **Background**

Many WSU laboratories and departments generate medical waste (contaminated solids), pathological waste (carcasses/tissues) and low-level radioactive wastes (contaminated solids, liquids or carcasses/tissues). There are several methods to safely and legally manage each of these waste streams at WSU: 1) medical wastes can be autoclaved, chemically disinfected, or incinerated; 2) pathological wastes are incinerated, and; 3) low-level radioactive wastes can be allowed to decay and disposed as solid / sanitary sewer wastes, transported to permitted treatment facilities, and / or incinerated.

The Washington Department of Ecology Notice of Construction (NOC) air emission permit for the WSU Incinerator requires that a waste management plan be developed and documented. The NOC permit states:

WSU shall prepare and identify the feasibility and the approach to separating certain components of solid waste from actual medical waste, pathological waste and low-level radioactive waste, in order to reduce the amount of toxic emissions from the incinerated waste. The waste management plan may include different goals or approaches from different areas or departments of the facility. It should identify where possible, reasonably available additional waste management measures, taking into account the effectiveness of waste management measures already in place, the costs of additional measures, the emission reductions expected to be achieved, and any other environmental or energy impacts they might have.

## **Purpose**

The purpose of this plan is to develop, implement, monitor, and continuously improve the medical, pathological, and low-level radioactive waste handling systems for the safe and efficient management of these wastes at Washington State University in Pullman, WA. This plan shall document efforts to minimize and manage these wastes in a legal and effective manner that protects human health and the environment.

## **Roles and Responsibilities**

Administrators and principal investigators are responsible for ensuring that medical, pathological and low-level radioactive wastes generated by WSU units are collected, stored and disposed of in a safe and sanitary manner.

## **Identifying Medical / Pathological / Low-level Radioactive Wastes**

### **Medical and Pathological Wastes**

Principal investigators or supervisors are responsible for determining which wastes are medical or pathological wastes per the WSU Safety Policies and Procedures Manual,

Section S80.12 Disposal of Biohazardous Wastes. The following are examples of medical / pathological wastes:

Medical:

- Infectious agents
- Blood and other fluids
- Recombinant DNA of animal origin
- Oncogenic viruses
- Materials contaminated by the above wastes
- Sharps (hypodermic needles, scalpel blades, lancets, etc., per definition of biomedical waste in WAC 480-70-041)
- HEPA filters (that have not been disinfected) from biological safety cabinets and BSL-3 facility exhaust ducts

Pathological:

- Animal Carcasses and Parts contaminated with infectious agents
- Animal Bedding and Manure contaminated with infectious agents
- Chemical Carcinogens in Tissue Mediums
- Fixed Tissues (excluding the fixative (i.e., formalin, a dangerous chemical waste))

#### Non-Medical and Non-Pathological Waste

The following are examples of non-medical / non-pathological wastes that shall not be incinerated:

- Non-infectious Animal Carcasses that can be rendered
- Non-infectious Animal Bedding and Manure
- Non-infectious HEPA Filters
- Recombinant DNA of Plant Origin

Many animal carcasses can be rendered rather than incinerated. Non-infectious animal carcasses shall not be placed into dumpsters because the solid waste transfer station and landfill will not accept them. Animal carcasses that researchers determine are noninfectious may be disposed by the following methods:

- Rendering in Spokane.
- Non-infectious rats, mice and birds will be accepted by the Veterinary Teaching Hospital as food for raptors. Call 335-0711 to make arrangements to drop off the carcasses at the Hospital or to request pickup.

Regular trash and garbage SHALL always be segregated from medical and pathological wastes and SHALL not be incinerated.

#### Low-level Radioactive Wastes

Authorized users are responsible for determining and declaring which materials are radioactive wastes. The authorized user stores radioactive wastes until they are picked up by the Radiation Safety Office (RSO). Radioactive wastes that can be incinerated

include:

- Dry solids (e.g., plastics, metals, glass, paper)
- Animal carcasses and tissues
- Liquid scintillation vials which do not designate as dangerous waste

Any radioactive item (including regulated dangerous chemical wastes which contain radioactive isotopes whose half lives are less than or equal to 90 days) may be stored for a period of time (up to ten half-lives depending upon initial activity) to allow for the decay of radioactive material to levels which may be considered non-radioactive. Verification procedures by the RSO are required prior to the release of the “decayed” waste materials. Hazardous waste satellite accumulation areas must be utilized for long-term storage of regulated dangerous chemical wastes for radioactive decay.

Where feasible, the RSO's decay program encourages segregation and separation of wastes by type and radionuclide to minimize material incinerated. WSU's radioactive materials license prohibits the use of experimental animals that have been administered a licensed isotope material or products containing a licensed material from human consumption or rendering. The small volume of animal carcasses that are generated shall be incinerated.

#### Low-level Radioactive Wastes That Are Not Incinerated

The following are examples of low-level radioactive wastes that are not incinerated:

- Certain radioactive wastes containing isotopes with half-lives less than or equal to 90 days are acceptable for inclusion in the RSO waste decay program. After decay, solid waste previously considered to be radioactive is surveyed by the RSO to confirm that radioactive materials are not present. In addition, any radioactive signs, labels or insignias are defaced, obliterated or removed by the RSO. RSO then declares these wastes as non-radioactive. These wastes are disposed of as municipal solid waste or recycled. In the case of dangerous chemical wastes, which contained radioactive isotopes with half lives less than or equal to 90 days, the RSO will sample to ensure the radioactive material has decayed, then release the waste to Environmental Health and Safety for disposal.
- Bulk liquids (both dangerous chemical and non-dangerous chemical wastes)
- Liquid scintillation vials (containing dangerous chemical wastes) All bulk liquids and liquid scintillation vials which designate as regulated dangerous waste are specifically excluded from incineration and shall be disposed of through other acceptable means.

#### Prioritized Waste Management Methods

In order to minimize the amount of medical / pathological and low-level radioactive waste incinerated, the WSU faculty, staff, and students shall use the following prioritized methods of management and disposal of these wastes (#1 being the highest priority):

1. Substitution
2. Waste Reduction
3. Reuse
4. Recycling
5. Rendering

6. Radioactive Decay
7. Autoclaving and other acceptable methods
8. Incineration

The following is a brief description (with examples) of the above prioritized methods of waste management.

**Substitution** is the use of alternative methods, such as computer models versus using animals for research and experiments.

**Waste Reduction** is a set of methods and strategies to decrease the amount of waste generated at the source or in actual usage, such as using smaller animals, smaller laboratory ware (petri plates and pipettes for example) or amounts of pathogenic organisms in research and experiments.

**Reuse** is a set of decisions or strategies to prolong the life of a material. Such strategies can result in cost savings, waste volume reduction, and resource preservation. Such actions could include switching to reusable gowns and gloves, purchasing equipment, such as glassware, that can be easily sterilized and reissued for use.

**Recycling** is the actual collection, sorting and processing of discarded materials that will serve as the raw material source for a new product. Such actions could include composting of animal bedding, which then can be reused as bedding or as a soil amendment. Another example is sending non-infectious animal carcasses for rendering rather than incineration.

**Rendering** is the salvaging of protein and fat from waste animal carcasses, either by a dry or wet rendering process.

**Radioactive Decay** is the random, yet predictable, natural physical process through which radioisotopes are converted to non-radioactive isotopes.

**Autoclaving** and other acceptable methods to render waste non-infectious is the actual treatment of waste so that it is no longer infectious and can be disposed as a solid waste after treatment. In addition to autoclaving, other acceptable treatment methods could include use of chemical disinfectants such as bleach prior to disposal. These methods shall be utilized by all WSU waste generators whenever feasible.

**Incineration** is the burning of medical / pathological wastes and low-level radioactive wastes at the WSU incinerator. This method of waste disposal shall be used only when all the other methods described above are not feasible for the waste generated.

### **Incentives to Use Prioritized Waste Management Methods**

The amount of medical, pathological and low-level radioactive wastes generated by each department that is diverted from incineration may actually benefit the university. Even though departments are no longer charged for incineration, it is important to consider all other listed waste management methods in order to reduce overall operational costs to WSU. The more waste that a department diverts from incineration

may equate to cost savings for the university as a whole.

### **Waste Management Plan Implementation**

After evaluating the waste streams and conducting surveys, WSU has determined that some medical (containing plastics and metals), pathological (non-infectious carcasses, bedding and manure), and low-level radioactive wastes (shorter half-lives) can be diverted from incineration. WSU shall do the following to divert some plastics, metals, pathological and low-level radioactive wastes from incineration:

1. Autoclave as much waste as possible to further reduce the amount of plastics and metals that are currently incinerated. After autoclaving / treatment, these wastes shall be disposed as regular solid waste or be recycled as provided in #4 below.
2. Provide equal accessibility for autoclaving of contaminated plastics and metals rather than incineration by modifying policies and procedures for the management of these wastes.
3. Where available and feasible, provide for recycling of autoclaved, treated, decayed plastics and metals.
4. Where available and feasible, provide for the reuse of items after autoclaving / treatment, to further reduce the amount of wastes incinerated.
5. Compost all non-infectious pathological waste (carcasses, animal bedding and manure).
6. WSU is also evaluating state of the art composting methods to determine if it is feasible to compost pathogenic animal bedding, manure and carcasses rather than incinerating them.

WSU shall review these waste management procedures annually and revise them as necessary. If questions arise regarding the WSU Medical, Pathological and Low-level Radioactive Waste Management Plan or about treatment and disposal methods in general, please contact WSU Materials and Resources Management at 335-9075, Environmental Health and Safety at 335-5510 or the Radiation Safety Office at 335-8916, as appropriate.