

# NATIONAL TAIWAN UNIVERSITY

## Regulations for the Storage, Disposal, and Handling of Laboratory Waste

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November 04, 2003	Amended and passed by the 2,315 <sup>th</sup> Administrative Meeting
March 08, 2005	Amended and passed by the 2,378 <sup>th</sup> Administrative Meeting
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### Chapter I General Provisions

Article 1 The National Taiwan University (NTU or “the University”) *Regulations for the Storage, Disposal, and Handling of Laboratory Waste* (“the Regulations”) are formulated to improve the effectiveness of waste management in laboratories and facilitate comprehension of classification standards and waste disposal specifications among faculty, staff, and students. Matters not addressed herein shall be subject to other applicable regulations.

Article 2 The term “laboratory waste” in the Regulations shall include the following seven categories of waste:

1. Radioactive waste: Waste capable of generating ionizing radiation from spontaneous nuclear decay other than nuclear source material and nuclear fuels, as well as equipment that contains the above substances, including sealed and unsealed radioactive materials.
2. Biomedical waste: Animal carcass waste, pathological waste, waste blood, infectious waste sharp implements, waste infectious cultures, bacterial strains, derivative biological products, and other infectious laboratory waste generated or used during the experimental process.
3. Laboratory liquid waste: Liquid waste generated by teaching, research, and other activities that meets the *Standards for Defining Hazardous Industrial Waste* and is considered a potential safety or health hazard by the competent academic program, but not including radioactive or infectious liquid waste.
4. Laboratory glass waste: Glass containers and consumables that contained chemicals at the time of purchase.
5. Expired or waste chemicals: Chemicals that cannot be treated as laboratory liquid waste.
6. Containers and consumables: Containers for various chemicals (excluding radioactive materials) and consumables such as plastics and paper generated by experiments. If specific types of waste are governed by other applicable regulations, those regulations shall prevail.
7. Other waste designated by the central supervising authority in consultation with the central competent authority as harmful to the human body or the environment or announced by the University.

Article 3 Laboratories shall apply online for laboratory waste collection. The University will schedule the collection of accumulated laboratory waste once it reaches an appropriate amount, and applicants shall cooperate in the collection and disposal process upon being notified by the University.

Article 4 All new buildings with laboratories that generate non-general waste, including chemical, biological, and/or radioactive waste, shall set up dedicated waste storage in accordance with the provisions herein.

## **Chapter II Disposal of Radioactive Waste**

Article 5 The disposal of sealed radioactive waste and equipment capable of generating ionizing radiation shall require the prior approval of the Executive Yuan's Atomic Energy Council through application by the Environmental Protection and Occupational Safety and Health Center.

Article 6 Radioactive waste shall be properly sorted, packaged, labeled, and stored in accordance with the following principles:

1. Except for waste containing tritium and gamma ( $\gamma$ ) nuclides, nuclear waste containing different nuclides may be mixed when collected, but different materials must be collected separately.
2. Materials shall be sorted, collected in plastic bags with radiation warning signs, and packaged appropriately according to the type of material.
3. The classification, nuclides, surface radiation exposure intensity, handler, and date of disposal of the waste shall be clearly indicated on the packaging or container before it is sent to waste storage.
4. Storage facilities for gamma ( $\gamma$ ) nuclides and high-level radioactive waste shall be properly shielded.

## **Chapter III Disposal of Biomedical Waste**

Article 7 Types of biomedical waste for disposal are as follows:

1. Genotoxic waste, including the following two categories:
  - 1) Carcinogenic cytotoxins or drugs
  - 2) Potentially carcinogenic cytotoxins or drugs
2. Waste sharp implements: Waste items that may cause puncture wounds or cuts to the human body, including injection needles, syringes and infusion catheters connected to needles, acupuncture needles, surgical suture needles, scalpels, microscope slides, cover slips, broken glassware, etc.
3. Infectious waste, including the following nine categories:
  - 1) Discarded microbial cultures, microbial colonies, and related biological products
  - 2) Pathological waste
  - 3) Waste blood
  - 4) Carcasses and remains of, and bedding for contaminated animals

- 5) Surgical or autopsy waste
  - 6) Laboratory waste
  - 7) Dialysis waste
  - 8) Quarantine waste
  - 9) Waste contaminated with blood and body fluids
4. Other waste designated and announced by the central supervising authority in consultation with the central competent authority as harmful to the human body or the environment.

Article 8 Unless otherwise stipulated by the central supervising authority, waste sharp implements and infectious waste of biomedical waste shall be stored in accordance with the following provisions:

1. Waste sharp implements shall be stored separately from other waste in a sealed, impenetrable, sturdy container for a period of no longer than one year.
2. Infectious waste shall be stored separately from other waste. If it has undergone thermal treatment, it shall be packed in a leak- and break-proof red plastic bag. Such infectious waste may be stored for a maximum of 1 day at a temperature above 5°C, may be refrigerated for a maximum of 7 days at a temperature below 5°C and above 0°C, and may be frozen for a maximum of 30 days at a temperature below 0°C.
3. The following information shall be clearly indicated on the outside of storage containers and plastic bags for infectious waste described in the preceding two paragraphs: Name of the waste, the laboratory where the waste was generated, the name of the representative of the laboratory, date of storage, weight of the waste, name of the disposal and handling organization, and signage that indicates the characteristics of hazardous industrial waste. For infectious waste, the storage temperature shall also be marked.
4. Waste sharp implements of biomedical waste and infectious waste shall be disposed of immediately if they begin to emit a noxious odor during storage.

Article 9 Except for storage for genotoxic waste, which shall be subject to Article 10 herein, biomedical waste storage facilities shall meet the following requirements:

1. The storage facilities shall be marked with signage indicating the characteristics of the hazardous industrial waste at the entrance or on the exterior of the facility where it is clearly visible. The facilities shall also be sturdy with emergency response equipment or measures.
2. Hazardous industrial waste containers of different colors shall be stored separately.
3. Effective drainage and washing facilities shall be installed.
4. Safety equipment and measures to prevent unauthorized access by personnel or animals shall be installed.
5. Equipment and measures to prevent the breeding of mosquitoes, flies, and other disease vectors shall be set up.

6. Equipment and measures to prevent the inflow and infiltration of surface water, rainwater, and groundwater shall be in place.
7. Equipment and measures to collect liquid waste, waste gas, or noxious odors generated by storage facilities and to prevent them from polluting surface water bodies, groundwater bodies, air, or soil shall be installed.

Article 10 Storage facilities for genotoxic waste of biomedical waste shall meet the following requirements:

1. A dedicated storage facility shall be constructed on solid ground with walls lined with or made of impermeable anticorrosive materials.
2. Equipment and measures to prevent the inflow and infiltration of surface water, rainwater, and groundwater shall be in place.
3. Equipment and measures to collect liquid waste, waste gas, or noxious odors generated by storage facilities and to prevent them from polluting surface water bodies, groundwater bodies, air, or soil shall be in place.
4. Disaster prevention equipment and warning signs in red font against a white background framed in black shall be placed in clearly visible locations.

Article 11 The collection and disposal of biomedical waste will be denied if any of the following occurs:

1. The biomedical waste is not sorted in accordance with the University's *Biomedical Waste Classification Standards* or is not marked with the applicable biomedical waste symbol.
2. The storage container does not meet the requirements.
3. The storage container poses a risk of damage or leakage.
4. Failure to comply with other requirements related to the collection and disposal of biomedical waste set forth by the University.

## **Chapter IV Disposal of Laboratory Liquid Waste**

Article 12 The types of laboratory liquid waste for disposal are as follows:

1. Organic liquid waste: lipids, organic solvents with or without halogens, etc.
2. Inorganic liquid waste: liquid waste containing heavy metals, cyanide, mercury, or fluorine; acidic or alkaline liquid waste, or liquid waste containing hexavalent chromium, etc.

Article 13 Laboratory liquid waste may only be contained in uniform HPDE drums made by the University or 20-liter plastic drums.

Article 14 Storage of laboratory liquid waste shall meet the following requirements:

1. Laboratory liquid waste shall be stored in a suitable location; away from high temperatures, sunlight, and rain; and clear of passageways. Containers shall not be stacked or stored near open flames and shall preferably be stored in a cabinet with ventilation.
2. Incompatible liquid wastes shall be stored separately, and containers of incompatible liquid wastes shall not be mixed. A liquid waste

compatibility chart shall be placed in a clearly visible location in the laboratory and be made publicly available.

3. The type and nature of each storage container shall be marked and kept clearly visible. If a container poses a risk of damaging or leaking, it shall be replaced immediately. Containers shall be kept clean at all times.
4. Each liquid waste storage facility shall have a dedicated manager and necessary leak detection equipment to prevent damages resulting from unauthorized access or accidental leakage.

Article 15 A centralized storage facility that stores liquid waste generated by multiple units and/or academic programs shall meet the following requirements:

1. The centralized storage facility shall be built on solid ground with walls lined with or made of impermeable anticorrosive materials and access control to prevent trespassing.
2. Equipment or measures to prevent the inflow and infiltration of surface water, rainwater, and groundwater shall be in place.
3. Equipment and measures to collect liquid waste, waste gas, or noxious odors generated by storage facilities and to prevent them from polluting surface water bodies, groundwater, air, or soil shall be in place.
4. All power sources and lighting within the facility shall be fire- and explosion-proof.
5. Disaster prevention equipment and warning signs in red font against a white background framed in black shall be placed in clearly visible locations.
6. Alarms and fire extinguishing, lighting, and/or emergency safety shower equipment shall be in place as necessary.
7. Monitoring equipment for flammable, reactive, and toxic liquid waste shall be in place as necessary based on the type(s) and characteristics of potential hazards.

Article 16 The collection and disposal of laboratory liquid waste will be denied if any of the following occurs:

1. The laboratory liquid waste is not sorted in accordance with the University's *Laboratory Liquid Waste Classification Standards*, or the uniform laboratory liquid waste classification label made by the University is not filled out or posted at the laboratory.
2. The laboratory liquid waste shows signs of stratification or unknown components.
3. The storage container of laboratory liquid waste does not meet the requirements (only the uniform HDPE drum made by the University or 20-liter plastic drum are permissible).
4. The storage container is broken or its cover damaged, posing a risk of leakage.
5. The laboratory liquid waste is delivered outside the designated collection period.

6. The laboratory liquid waste is not registered in accordance with University regulations.

Article 17 To increase waste collection efficiency, laboratory liquid waste must be placed at a fixed location before the designated collection time.

## **Chapter V Disposal of Laboratory Glass Waste**

Article 18 The types of laboratory glass waste for disposal shall include cleaned glass jars/bottles used to contain chemicals at the time of purchase as well as consumables such as beakers, test tubes, graduated cylinders, and droppers that are used to portion or hold chemicals, which have been cleaned and show no trace of remaining chemicals.

Article 19 Waste containers for hazardous industrial waste generated by laboratories may be determined to be general industrial waste according to the *Standards for Defining Hazardous Industrial Waste*, provided that waste containers can be effectively cleaned and any wastewater or liquid waste resulting from the cleaning process can be properly treated.

Article 20 Laboratory glass waste shall be treated in accordance with the following procedures prior to disposal:

1. Wash the laboratory waste glass thoroughly with clean water. After cleaning, collect and classify the liquid waste in accordance with the University's *Laboratory Liquid Waste Classification Standards*.
2. Air-dry the cleaned laboratory glass waste to ensure there is no liquid residue, then store it in a cardboard box.

Article 21 Collection and disposal of laboratory glass waste will be denied if any of the following occurs:

1. The chemical containers are sold by suppliers that recycle the chemical container.
2. The glass waste has not been washed thoroughly with clean water.
3. The glass waste has not been air-dried to ensure there is no liquid residue.

## **Chapter VI Disposal of Expired or Waste Chemicals**

Article 22 The types of expired or waste chemicals for disposal does not include gas cylinders, mercury, and chemicals that can be disposed of as laboratory liquid waste.

Article 23 Expired or waste chemicals shall be sorted based on their characteristics and stored in accordance with Article 14 herein.

Article 24 Collection and disposal requests will be denied if any of the following occurs:

1. The waste may be disposed of as laboratory liquid waste.
2. The waste is not stored in an appropriate container.

3. The waste is not sorted, packaged, or protected in accordance with regulations.

## **Chapter VII Disposal of Containers and Consumables**

- Article 25 Containers and consumables shall be stored separately from the other waste described above and shall be packed in a break-proof red plastic bag before disposal. The following information shall be clearly indicated on the outside of the plastic bag: Name of the waste, the laboratory where the waste was generated, and the name of the laboratory representative; date of storage; weight of the waste; and name of the disposal and handling organization.
- Article 26 Collection and disposal of containers and consumables will be denied if any of the following occurs:
1. The containers still contain chemicals.
  2. The red plastic bags are damaged.

## **Chapter VIII Penalties**

- Article 27 Those who violate the provisions herein for the first time shall be issued a warning, ordered to make improvements, and refused collection of the noncompliant waste. Subsequent violations shall be handled in accordance with the University's *Directives Governing Follow-Up Measures for Laboratories and Non-Laboratory Units in Violation of Environmental Protection and Occupational Safety and Health Regulations*.
- Article 28 Any fines imposed on the University due to a regulatory violation shall be borne solely by the violating academic program or unit.

## **Chapter IX Supplementary Provisions**

- Article 29 For declaration purposes, those who wish to bypass the provisions stipulated herein and hire a public or private waste collection or treatment agency for waste disposal must first provide the necessary waste disposal documents to the Environmental Protection and Occupational Safety and Health Center for review.
- Article 30 The classification, storage, and labeling of all waste shall be subject to the applicable regulations of the University or the competent central supervising authority.
- Article 31 The University may charge waste-generating units or laboratories the applicable waste collection/treatment fees for handling the collection and treatment of waste in accordance with the Regulations.  
Fee standards for the preceding paragraph shall be set separately by the University.
- Article 32 Matters related to laboratory waste not addressed herein may be addressed by additional provisions as necessary.
- Article 33 The Regulations shall be passed by the Administrative Meeting and then

implemented on the date of promulgation.