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1.0 OBJECTIVE

This procedure states how chemical wastes generated in the laboratories at the National University of Singapore (NUS) are to be treated and disposed off in a safe and environmentally sound manner.


This procedure is applicable to all hazardous waste, toxic industrial waste and cytotoxic waste generated at NUS.

2.0 SCOPE

- 2.1 This procedure covers the laboratories in NUS where chemical hazardous waste (HW), toxic industrial waste (TIW) and cytotoxic waste are produced. This SOP covers the management, monitoring, disposal and remediation (if applicable) of all solid and liquid chemical waste released from the University.
- 2.2 Other areas where chemical wastes are produced, such as non laboratory based tenants of NUS, operations, infrastructure and facilities support groups such as Office of Estate and Development (OED) are not covered under this SOP. Contract manufacturing activities undertaken by a third party at NUS site is also not in the scope of this SOP.
- 2.3 All staff, students, visitors, laboratory based tenants and contractors are to comply with the requirements of this procedure.

3.0 RESPONSIBILITIES

- 3.1 **Principal Investigator**
Principal Investigator (or a person appointed by the Head of Department) is responsible for engaging licensed toxic industrial waste (TIW) collectors and communicating the relevant waste disposal requirement to the contractors.
- 3.2 **Staff/Research Personnel**
The staff/research personnel shall be responsible for proper handling and use of hazardous substances in accordance with the applicable safety data sheet (SDS)/local legislations.
- 3.3 **Faculty Safety & Health Officer/Department Safety Coordinator**
He/She shall be responsible for the implementation, training and enforcement of this procedure.
- 3.4 **Head of Department or Directors of RIs/RCs**
The HOD or Director shall appoint a competent person to oversee chemical waste disposal procedures in the Department.

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4.0 DEFINITIONS

- a. **Wastes:** Material which no longer can be used for the purpose they were intended originally.
- b. **Hazardous Waste (HW):** Wastes which by their nature and quality may be potentially detrimental to human health and/or the environment and which require special treatment and disposal but not currently classified as TIW.
- c. **Toxic Industrial Waste (TIW):** Hazardous wastes that are toxic as defined in the schedule of Environmental Public Health (Toxic Industrial Waste) Regulations.
- d. **Cytotoxic Waste:** Cytotoxic waste is highly hazardous and may have mutagenic, teratogenic, or carcinogenic properties.
- e. **SDS:** Safety Data Sheet
- f. **EPMA:** Environmental Protection & Management Act
- g. **OSHE:** Office of Safety, Health & Environment
- h. **PCD:** Pollution Control Department of National Environmental Agency
- i. **Competent Person:** A person who has undergone appropriate training approved by the University.


5.0 PROCEDURES

Wastes from laboratories may include infectious wastes, pathological wastes, contaminated sharps, routine clinical wastes, cytotoxic wastes, radioactive wastes, pharmaceutical wastes, chemical wastes and general wastes.

5.1 Waste Classification and Labeling

- a. PI shall identify and classify wastes generated from the respective lab activities under his/her control.
- b. PI shall ensure that the containers of hazardous waste, TIW, cytotoxic waste and those suspected of being hazardous wastes are clearly labeled. These labels are readily available from OSHE (See appendix A).
- c. If the chemical waste is classified as radioactive waste, the waste is to be treated as radioactive waste and disposed of in accordance with the University Radioactive Waste Disposal Procedures (OSHE/SOP/RS/01).
- d. The wastes shall be classified as follows:

Waste Classification	Examples
Toxic Industrial Waste	Spent catalyst, used oil, grey water, filter cake, used container containing residue of

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	hazardous substance
Hazardous Waste	Acid, alkali, solvents etc.
General Waste	Rubbish, food waste and construction waste
Cytotoxic Waste	Contaminated materials from drug preparation and administration, such as sharps used for cytotoxic drugs*, gauges, vials, packaging; outdated drugs, excess (leftover) solutions


* Sharps used for cytotoxic drug should be discarded into the sharps bin and the sharps bin must be disposed in a cytotoxic labeled waste waste bag.

5.2 Segregation and Storage

- a. PI shall ensure that all wastes are segregated and stored at the designated storage areas. Waste storage locations are to be confirmed with the assistance of Faculty Safety & Health Officer. The PI and staff shall ensure good housekeeping for all wastes stored in the common area under their jurisdiction.
- b. Hazardous waste and toxic industrial waste are to be stored in appropriate containers with secondary containment and appropriate labeling.
- c. Cytotoxic waste should be disposed of in purple colour bags (see Appendix B) with appropriate labeling.

5.3 Waste Disposal

- a. All wastes containing chemical waste should be handled with appropriate personal protective equipment.
- b. Prior to entering into or renewing any contract with a waste collector, a competent person or Faculty Safety & Health Officer shall ensure that the waste collector has a valid license for the type of waste to be collected from NUS. The list of NEA licensed waste contractor may be found on <http://www.nea.gov.sg/cms/pcd/tiwcollectors.pdf>
- c. The competent person with the assistance of Faculty Safety & Health Officer (if required with the assistance of OSHE) shall arrange for licensed TIW collectors to collect hazardous waste and TIW when necessary.
- d. A consignment note shall be completed for all hazardous waste and TIW collected.
- e. A consignment notes for TIW shall be submitted to PCD through e-tracking or mail.
- f. Transport approval from PCD is required for consignment of TIW exceeding the prescribed quantity under Environmental Public Health (TIW) Regulations.
- g. Laboratory technologist or PI or his designate shall maintain copies of all consignment notes.

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5.4 Waste Generated by Contractors


- a. Head of Department or his/her designate shall communicate the waste disposal obligations to the contractor concerned prior to the start of work.
- b. Head of Department or his/her designate responsible for the contractors' activities shall ensure that the waste generated is managed in accordance with this procedure.

6.0 RECORDS

PI or his/her designate shall maintain copies of all consignment notes. Notes shall be kept in record for at least one (1) year.

7.0 REFERENCES

- a. National Environmental Agency (NEA) guidelines on Hazardous substances control (<http://app.nea.gov.sg>)
- b. OSHE SOP on "Biological Waste Disposal" (OSHE/SOP/BS/01)
- c. OSHE SOP on "Lab Sign Posting and Labeling" (OSHE/SOP/GL/01)
- d. OSHE SOP on "Accidents/Incidents Reporting and Investigation" (OSHE/SOP/GL/02)
- e. List of hazardous substances controlled under EPMA (<http://app.nea.gov.sg/cms/htdocs/article.asp?pid=1428>)
- f. Schedule of Environmental Public Health (Toxic Industrial Waste) Regulation (<http://www.nus.edu.sg/osh/legalreg.htm>)

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Appendix B: Cytotoxic Disposal Bag

