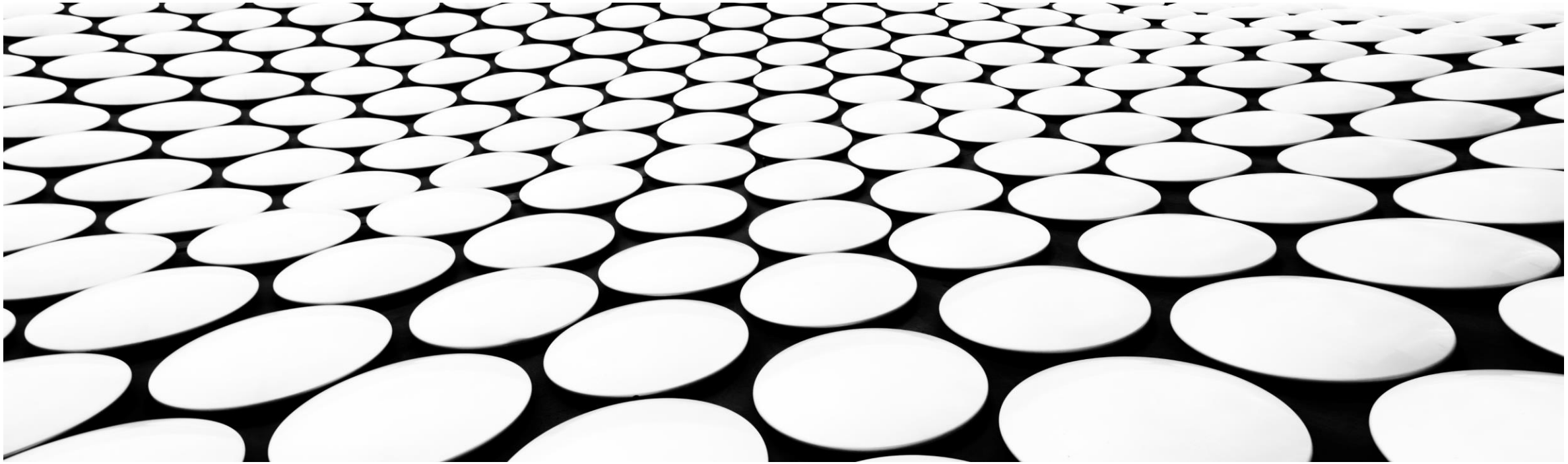
SCHEDULED WASTE MANAGEMENT

OSHMO, UMP

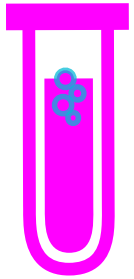


What is scheduled waste??

- Scheduled waste is any wastes that possess hazardous characteristics and have the potential to adversely affect to the public health and environment. There are 77 types of scheduled wastes listed under First Schedule of Environmental Quality (Scheduled Wastes) Regulations 2005 and the management of wastes shall be in accordance with the provisions of the above Regulations.

What is the main effect in the event of illegal dumping of scheduled wastes?

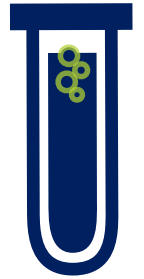
- Pollute watercourse, ground water, the atmosphere and land
- Toxic to human, plant and other organisms
- Health impact such as cancer
- Damage to skin and body tissues
- Fire outbreak at dumping site

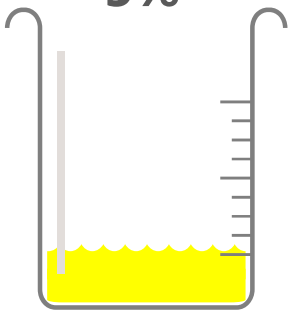


Research &
Development

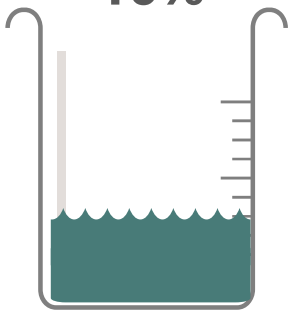
SOURCE
of
SW

Teaching &
Learning

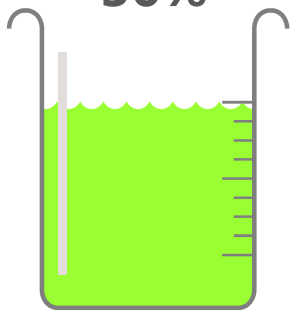




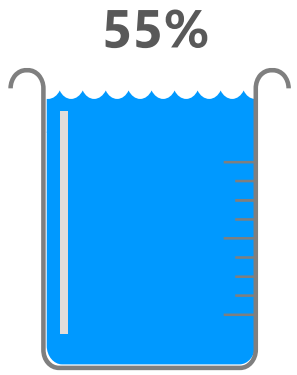
Centre
Of
Excellence



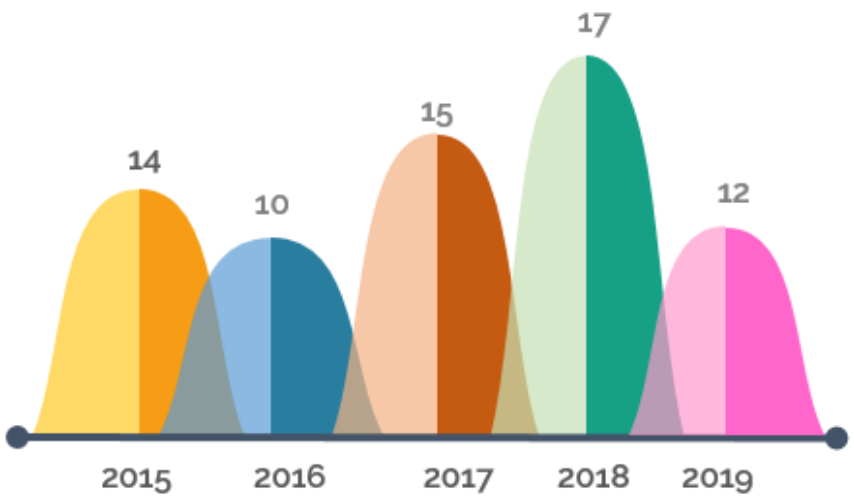
6 Faculties



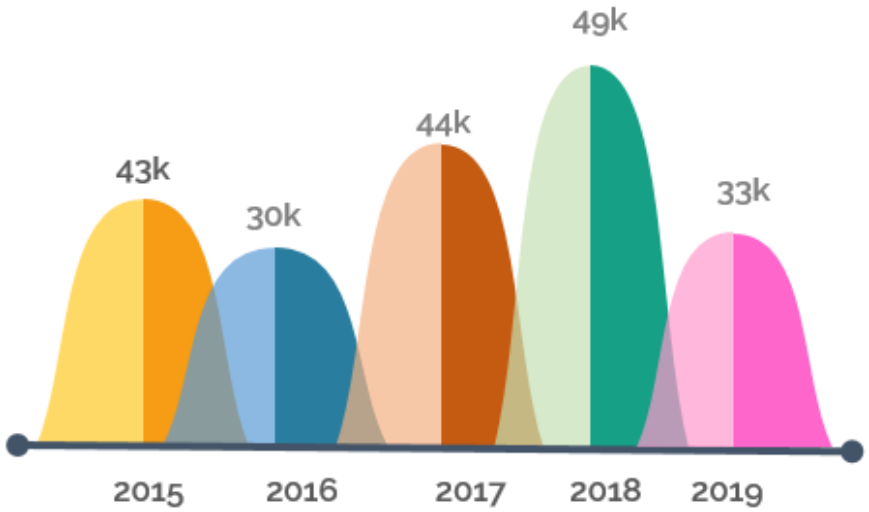
Faculty of
Industrial Science
& Technology



Faculty of
Chemical &
Process
Engineering
Technology

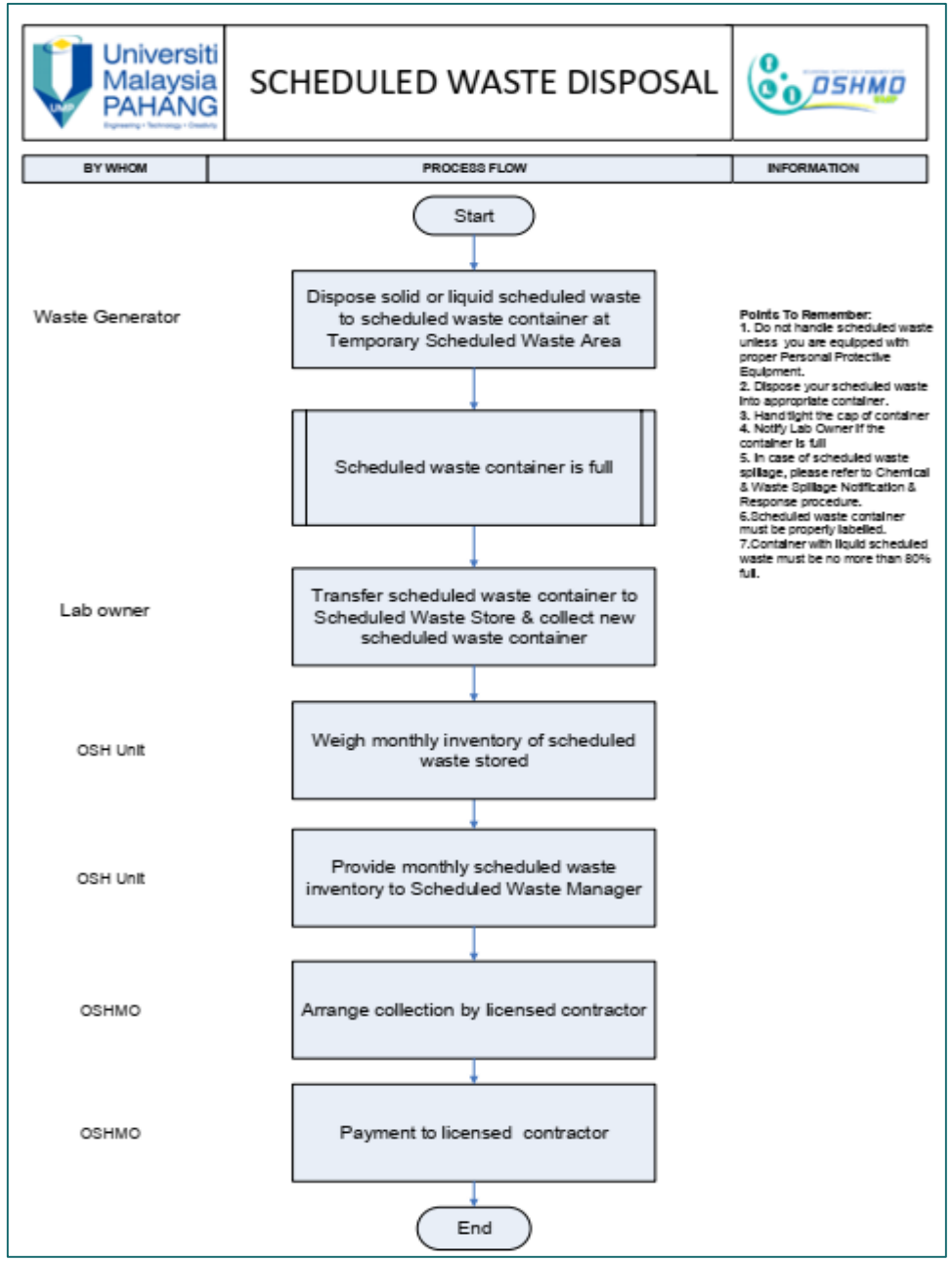


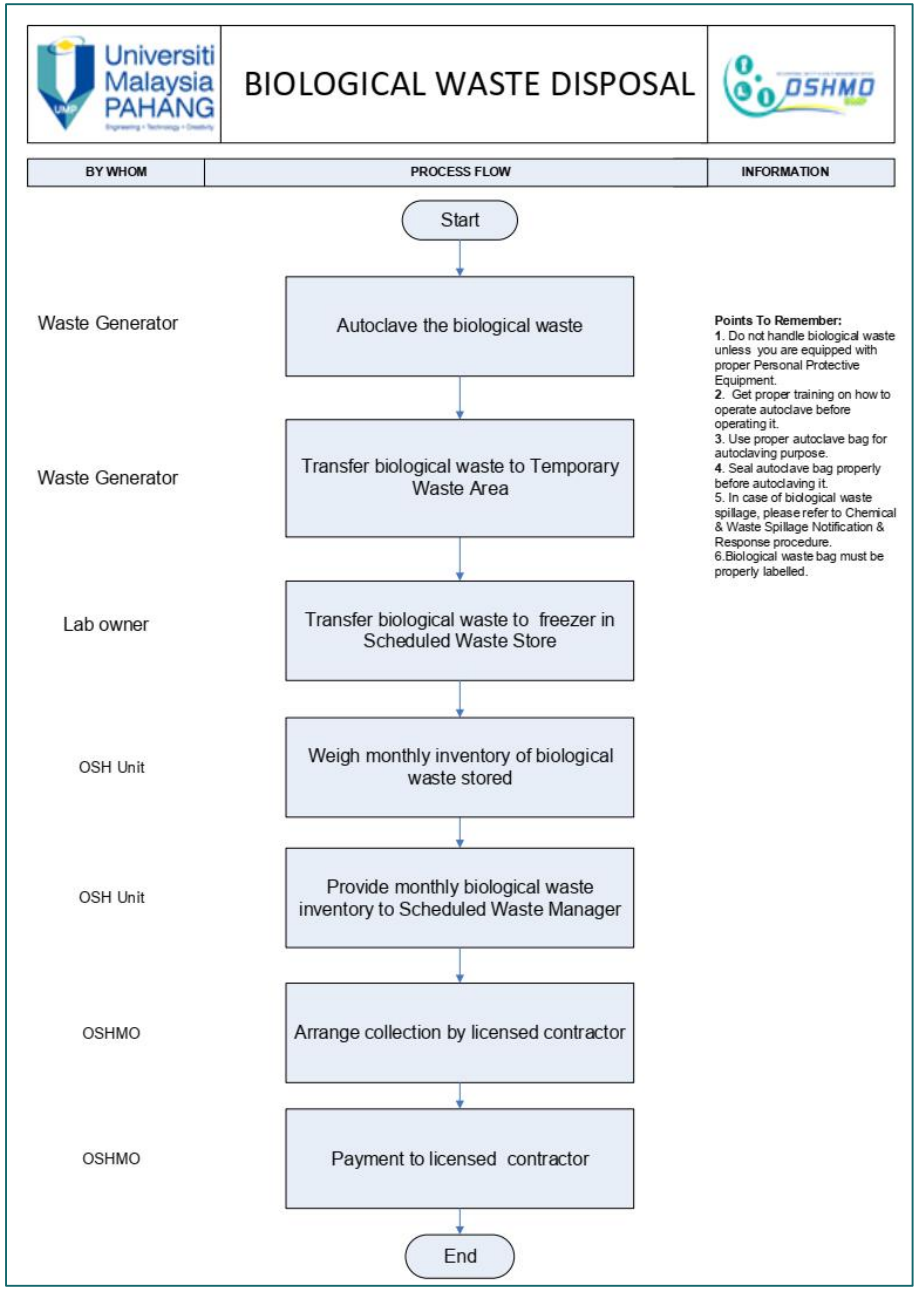
WEIGHT OF SW DISPOSED (Tonne)



COST OF SW DISPOSAL (RM)

HANDLING


Universiti Malaysia PAHANG
SCHEDULED WASTE DISPOSAL
OSHMO
BY WHOM
PROCESS FLOW
INFORMATION
Start
Waste Generator
Dispose solid or liquid scheduled waste to scheduled waste container at Temporary Scheduled Waste Area
Scheduled waste container is full
Lab owner
Transfer scheduled waste container to Scheduled Waste Store & collect new scheduled waste container
OSH Unit
Weigh monthly inventory of scheduled waste stored
OSH Unit
Provide monthly scheduled waste inventory to Scheduled Waste Manager
OSHMO
Arrange collection by licensed contractor
OSHMO
Payment to licensed contractor
End
Points To Remember:
1. Do not handle scheduled waste unless you are equipped with proper Personal Protective Equipment.
2. Dispose your scheduled waste into appropriate container.
3. Hand tight the cap of container
4. Notify Lab Owner if the container is full
5. In case of scheduled waste spillage, please refer to Chemical & Waste Spillage Notification & Response procedure.
6.Scheduled waste container must be properly labelled.
7.Container with liquid scheduled waste must be no more than 80% full.


Universiti Malaysia PAHANG
BIOLOGICAL WASTE DISPOSAL
OSHMO
BY WHOM
PROCESS FLOW
INFORMATION
Start
Waste Generator
Autoclave the biological waste
Waste Generator
Transfer biological waste to Temporary Waste Area
Lab owner
Transfer biological waste to freezer in Scheduled Waste Store
OSH Unit
Weigh monthly inventory of biological waste stored
OSH Unit
Provide monthly biological waste inventory to Scheduled Waste Manager
OSHMO
Arrange collection by licensed contractor
OSHMO
Payment to licensed contractor
End
Points To Remember:
1. Do not handle biological waste unless you are equipped with proper Personal Protective Equipment.
2. Get proper training on how to operate autoclave before operating it.
3. Use proper autoclave bag for autoclaving purpose.
4. Seal autoclave bag properly before autoclaving it.
5. In case of biological waste spillage, please refer to Chemical & Waste Spillage Notification & Response procedure.
6.Biological waste bag must be properly labelled.

INCOMPATIBLE SW

- Specified in the Fourth Schedule of the Regulation
- Example ->

The mixing of a waste in Group A with a waste in Group B may have the following potential consequences:

Group 1-A	*Group 1-B*
Alkaline caustic liquids	Acid sludge
Alkaline cleaner	Chemical cleaners
Alkaline corrosive liquid	Electrolyte, acid
Caustic wastewater	Etching acid, liquid or solvent
Lime sludge and other corrosive alkalies	Pickling liquor and other corrosive acid
	Spent acid
	Spent mixed acid

Potential consequences: Heat generation, violent reaction.

Group 2-A	*Group 2-B*
Asbestos	Solvents
Beryllium	Explosives
Unrinsed pesticide containers	Petroleum
Pesticides	Oil and other flammable wastes

Potential consequences: Release of toxic substances in case of fire or explosion.

- SW should be handled similar to other chemicals. Every relevant safety precaution must be made to ensure safe handling of SW.
- Appropriate PPE should be used when handling SW.
- Waste generator need to ensure that only ¾ of the SW container is filled with SW.
- SW must never be disposed of onto the earth or by evaporation in a fume hood. Fume hoods are there as a safety equipment, not a disposal chamber.

PACKAGING AND LABELLNG

- Container – compatible, durable
- Incompatible SW shall be stored in separate containers, and such containers shall be placed in separate secondary containment areas.
- Storage material made from plastic – corrosion free
- For identification and warning purposes, containers of SW shall be clearly labelled in accordance with the Third Schedule of the Regulation and marked with the SW code
- In the case of waste capable of causing two or more hazards, all the hazards must be clearly identified and the waste shall be labelled accordingly.

SCHEDULED WASTE STORAGE

- SW Containers shall always be closed during storage except when it is necessary to add or remove the SW.
- Area for the storage of the SW containers shall be designed, constructed and maintained adequately in accordance with the guidelines prescribed by the government to prevent spillage or leakage of SW into the environment.
- A storage designated area in the waste generator's PTj shall be located away from the main activity area and area of human activities.
- The storage area should be designed to provide 25% extra storage capacity of the actual maximum amount of waste generated and storage duration for not more than 180 days.
- The entire storage area must be fenced-in and regarded as restricted area.
- Adequate signage should be put up clearly and visible with the word "DANGER" and "SCHEDULED WASTES STORAGE". Other information must also be posted outside the store for communication purpose, for example unauthorized personnel should keep out, PPE signage, Risk Assessment of the activity conducted, hazard of the SW, person in charge's name and phone number and many more.

- Empty SW container should be stored separately from containers containing SW to prevent confusion.
- Storage area should have adequate ventilation to prevent accumulation of hazardous gas.
- The floor of the storage area and loading and unloading area must be covered with concrete or any suitable lining material, free of cracks and gaps to contain any spillage.
- The storage area should be properly managed to prevent rain water or surface water from entering the storage area.
- The entire storage area should be surrounded by a concrete dike or other equivalent structure designed to contain any spillage of the waste under the worst case scenario. 110% x volume of largest container = containment capacity
- Separate compartments should be provided for different groups of incompatible wastes.
- Containers should be stored with an ample aisle space between groups of containers to allow for free movement of personnel
- Inspection of the stored SW shall be carried out on monthly basis

Figure 4: Storage tanks for waste oil. The capacity of the containment should be 110% of the largest container stored.

	SENARAI SEMAK BULANAN STOR BUANGAN TERJADUAL (SW)	PTj : TARIKH:

No	Keterangan	(V/X)	Komen	Penambahbaikan
	STOR			
1	Kawasan stor bersih & kemas			
2	Tiada rekahan di lantai yang boleh menyebabkan cecair meresap.			
3	SW tidak disimpan melebihi 180 hari			
4	Berat SW tidak melebihi 20 metrik tan			
5	SW yang tidak serasi distor secara berasingan			
6	SW tidak terdedah terus kepada cahaya matahari			
7	Bekas SW tidak diletakkan di atas bekas lain			
8	Ruang yang mencukupi diantara bekas SW untuk laluan pekerja			
9	Stor bebas daripada air atau cecair lain.			
	BEKAS SW			
1	Tiada bekas SW yang bocor			
2	Tiada keadaan tidak normal pada bekas SW			
3	Penutup bekas SW ditutup			
4	Bekas SW dilabel dengan baik			
	KESIAPSIAGAAN			
1	Peralatan melawan kebakaran berada dalam keadaan yang baik			
2	PPE mencukupi			
3	Stok label SW mencukupi			

Diperiksa oleh	
Komen Keseluruhan	

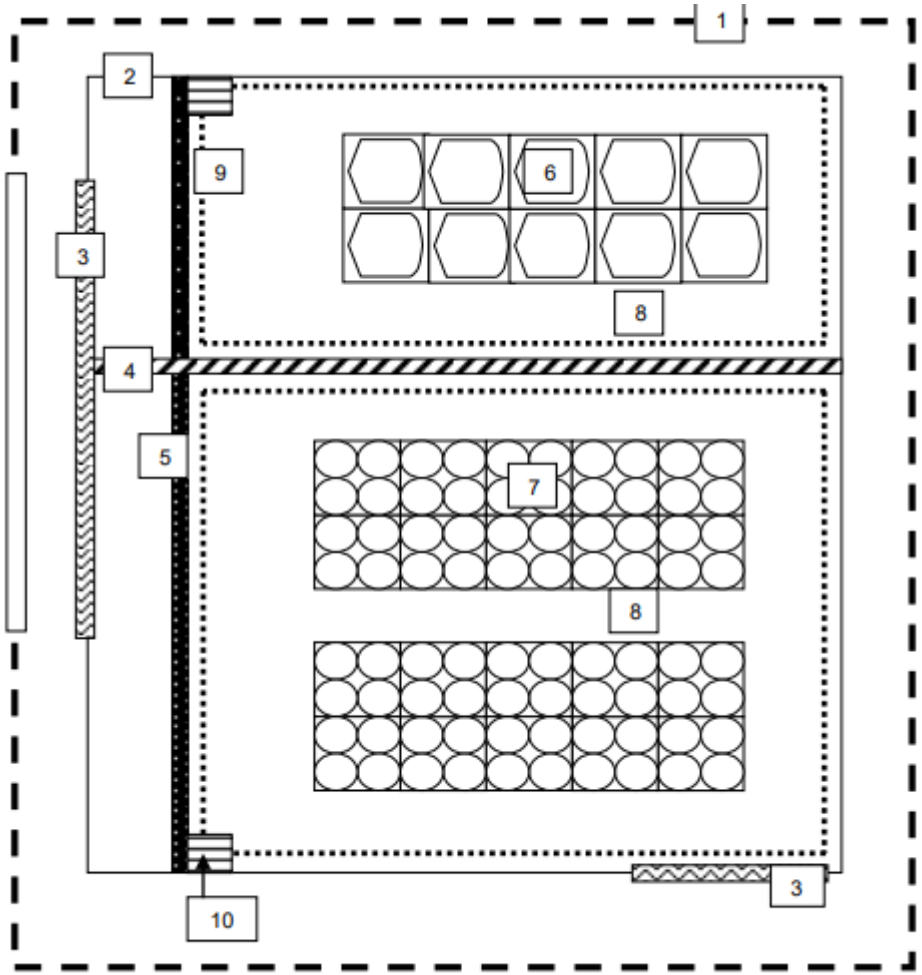


Figure 6: Example of storage area layout

EMERGENCY EQUIPMENT

- Waste generator must provide technical expertise to assist in the clean-up operation in case of any spillage.

INVENTORY

PENGUMUMAN

JABATAN ALAM SEKITAR AKAN MENGUATKUASA PEMATUHAN **PERATURAN-PERATURAN KUALITI ALAM SEKELILING (BUANGAN TERJADUAL) 2005** MELALUI **ELECTRONIC SCHEDULED WASTE INFORMATION SYSTEM (ESWIS)**

PREMIS YANG MELAKUKAN KESALAHAN DI BAWAH PERATURAN INI BOLEH DI KOMPAUN RM2,000.00 SETIAP SATU KESALAHAN.

ANTARA KESALAHAN-KESALAHAN YANG BOLEH DI KOMPAUN ADALAH :

Peraturan 3. Pemberitahuan tentang pengeluaran buangan terjadual

- **Tidak mengemukakan maklumat** seperti kategori, kuantiti baru, dan komposisi kimia buangan terjadual yang dikeluarkan dalam masa **30 hari**

Peraturan 9. Penstoran buangan terjadual

- **Menstorkan buangan terjadual melebihi 180 hari atau 20 tan metrik** (mana-mana yang terdahulu) tanpa kebenaran Ketua Pengarah

Peraturan 11. Pengeluar buangan hendaklah menyimpan inventori buangan terjadual

- Tidak **mengemas kini inventori** sekurang-kurangnya **1 kali / bulan**.

Peraturan 12. Maklumat hendaklah diberikan oleh pengeluar buangan, kontraktor dan penduduk premis yang ditetapkan

- Pengeluar buangan, kontraktor dan penduduk premis yang ditetapkan tidak menyediakan **maklumat nota konsainan**
- Pengeluar buangan itu tidak mengemukakan maklumat kepada Jabatan ini apabila nota konsainan yang dikemukakan kepada pengeluar buangan kepada pihak penerima buangan melalui sistem tidak diterima dalam masa 30 hari.

#jabatanalamsekitar *"Alam Sekitar Tanggungjawab Bersama"*

REGISTERED IN ESWIS

Gambang

Waste Code	Waste Name
SW109	Waste containing mercury or its compound
SW305	Spent lubricating oil
SW311	Waste Oil and Oily Sludge
SW404	Biological Waste
SW409	Empty Chemical Container
SW410	Rags, plastics, papers or filters contaminated with scheduled wastes
SW421	A Mixture of Scheduled Waste
SW429	Chemical that are discarded or off-specification

Pekan

Waste Code	Waste Name
SW305	Spent lubricating oil
SW421	A mixture of scheduled wastes

eSWIS
Electronic Scheduled Waste Information System

PRE-WEIGHT SW CONTAINER

- Kenapa: Regulation 11 clearly highlight that SW generator should keep accurate and up-to-date inventory of the SW generated in accordance with the Fifth Schedule. The record should be kept for three years starting from the date the SW was generated.
- Kenapa : By keeping the inventory, it will prevent the stored SW form exceeding 180 days' time limit imposed on the storage of SW. It will also prevent the amount of SW stored from exceeding 20 metric tonnes.
- Kenapa: Untuk mengisi e-Consignment Note bagi anggaran SW yang akan dilupus setiap 180 hari

PRE-WEIGHT SW CONTAINER

- Siapa : PIC SW bagi setiap makmal
- Bagaimana : Jika ada penimbang -> Timbang setiap SW Container mengikut SW Code
- Bagaimana: Jika tiada penimbang -> timbang 1 container yang penuh & jadikan benchmark untuk container lain. Kira volume SW berdasarkan bilangan container

DISPOSAL

- Disposal will be coordinated for all PTJs once every six (6) months or if the entire storage exceeds 20 metric tons, whichever come first.
- Consignment note will be prepared by JKPBKSBT based on monthly inventory provided by PIC. Consignment note must be prepared before contractor collect the SW for disposal.
- Containers to be transported for disposal shall be fastened securely on a good conditioned pallet. The drums shall be secured with appropriate plastic wrapping or other suitable method.

CURRENT PRACTISE

FTKMA

- Jenis Sisa Buangan : Minyak pelincir terguna, Minyak Hydraulik, Coolant, Sisa pepejal (tercemar dengan minyak), bahan kimia

- Jenis Container Yang Diperlukan (Tong Drum,Carboy,Pallet) beserta Kuantiti.:
  - Tong Drum (Open top) : 10 unit
  - Carboy : 2 unit
  - Pallet : 5 unit

FTKPM

a) Anggaran Kuantiti Sisa Buangan

- 1. Coolant : 1 tong drum setiap 6 bulan (+- 200liter)
- 2. Hydraulic oil : 2 tong drum setahun (+-400 liter)
- 3. EDM oil : 2 tong drum setahun (+-400liter)
- 4. Etchant chemicals : 1 liter per semester

b) Jenis Sisa Buangan

- Coolant
- Hydraulic oil
- EDM oil
- Etchant chemicals (very small quantity)

c) Jenis Container Yang Diperlukan (Tong Drum,Carlboyl,Pallet) beserta Kuantiti.

- Tong drum = 5
- Carboy = 10
- Pallet = 15

FTKEE

b) Jenis Sisa Buangan

- 1. E-waste -
- 2. chemical waste
- 3. metal waste

c) Jenis Container Yang Diperlukan (Tong Drum,Carlboyl,Pallet) beserta Kuantiti.

- Tong drum

IS THERE ANY OF THIS SW IN YOUR LAB?

- SW 312 – Oily residue from automotive workshop, service station oil or grease interceptor ?
  - Example : Oily sludge
  - Source : Automotive workshop etc

DIFFERENT SW CONTAINER FOR EACH RESEARCH GROUP

- Kenapa : mengurangkan risiko tindakbalas kimia yang berbahaya disebabkan oleh campuran pelbagai jenis bahan kimia.
- Kenapa : delegate responsibilities kepada research group
- Bagaimana : SW container disediakan dengan isipadu yang sesuai kepada research group. SW container tersebut disediakan di 1 lokasi sahaja. Research group bertanggungjawab untuk menghantar SW container yang penuh ke SW Store apabila penuh.
- Cabaran : Ruang yang tidak mencukupi. Pelajar tidak dispose ke SW container research group masing2

BIOLOGICAL WASTE

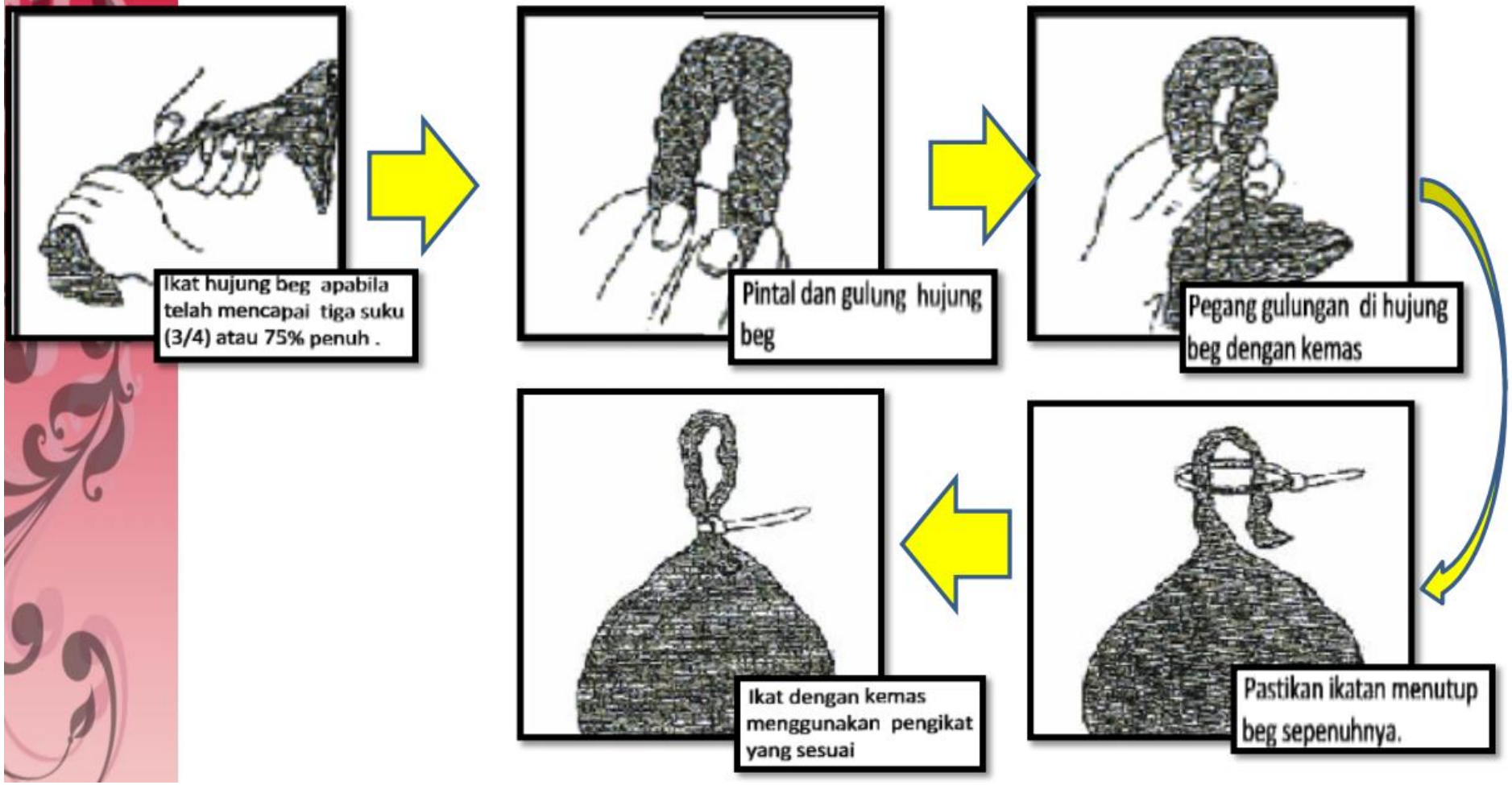
BIOLOGICAL WASTE

- Sharp waste, liquid bio waste, solid bio waste
- use only yellow plastic bag for bio waste
- Do not fully tighten plastic bag using cable tight before autoclave. Do so after the waste has been autoclaved.
- Biological wastes must not be stored with other SW unless those waste is properly separated by barriers.

SHARP WASTE BIN

- Do nc

CARA MENGIKAT BEG PLASTIK



SEGREGATION OF SOLID SW

LET'S REDUCE GENERATION OF SW