

Hazardous Waste Management

The word '**SHALL**' in upper caps and bolded indicates a **mandatory requirement**.

Mandatory requirements in this document are:

- Hazardous waste **SHALL** be separated from all other waste and organised by stream
- Every significant stream of hazardous waste **SHALL** be identified and recorded in the Office and/or Project Environmental Management Plan
- Hazardous waste **SHALL NEVER** be released untreated into the environment
- When transported, hazardous waste **SHALL** be properly classified, packaged and labelled, and necessary permits **SHALL** be obtained from authorities, if available
- Deviations from these guidelines **SHALL** be authorised by the most senior officer in the Office/Site and immediately communicated to the HSE Team in HQ.
- Burning of the hazardous waste is **strictly forbidden**

1. What is hazardous waste?

There are different ways of defining and classifying hazardous waste. UNEP defines it as “wastes other than radioactive wastes which, by reason of their chemical activity or toxic, explosive, corrosive or other characteristics cause danger or are likely to cause danger to health or the environment”. A simple way of describing it is as waste that is dangerous and can harm human health and/or the environment.

Non-hazardous waste can become so, if contaminated. If there is a doubt on how to classify a waste stream, this should be treated as hazardous on the basis of the precautionary principle. Additional guidance can be sought from hse@unops.org.

2. Common types of hazardous waste produced in UNOPS projects and or facilities

Hazardous waste **SHALL** be separated from all other waste and organised by stream; high diligence should be given to avoid that hazardous waste contaminates other waste streams.

Every significant stream of hazardous waste **SHALL** be identified and recorded in the Office and/or Project Environmental Management Plan, as well as in the Waste Management Plan (Form EM 02). Table 1 provides some examples of where common hazardous waste streams can be found in projects and office facilities, together with a short description of their environmental and health impacts.

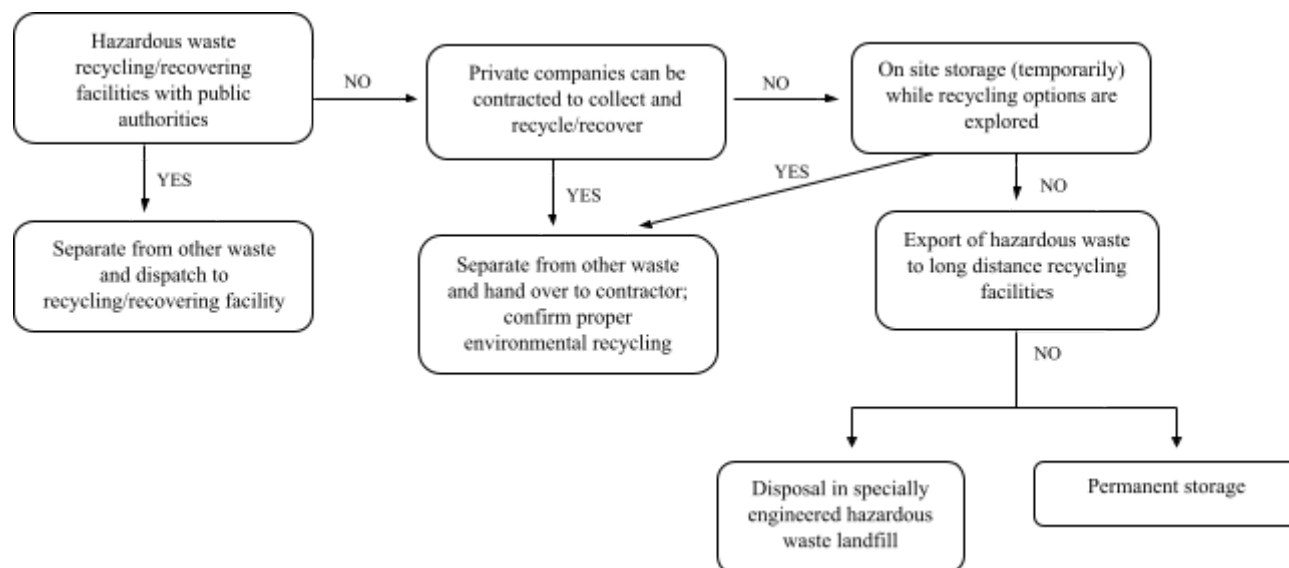
Table 1

TYPE OF WASTE	ENVIRONMENTAL AND HEALTH IMPACTS	WHERE THEY CAN BE FOUND
Used oils	Insoluble, persistent, can contain toxic chemicals and heavy metals, and is a major source of contamination of waterways	From vehicles, generators, other equipment and machinery, kitchens, etc.
Batteries	Contain toxic heavy metals such as lead, mercury, and cadmium	Small and large battery operated devices
Chemicals and pesticides	Toxic; can pollute waterways and may harm fish, plants and other living things	Cleaning products, disinfectants, pest control chemicals

Mercury containing equipment	Mercury is highly toxic to human body; persists and accumulates in the environment	Potential sources are batteries and paints, biocides and pesticides, electrical switches, contacts and relays, light sources, thermometers and other measuring devices, manometers and gauges, etc.
Paints and solvents	Toxic; can pollute waterways and may harm fish, plants and other living things	Material for finishing and decorations of buildings and facilities, wood preservatives, etc.
Electronics	A mixture of materials including some with hazardous potential, and scarce and precious materials as well	Computers, printers, laptops, phones, printers, etc.
Asbestos	Carcinogen when inhaled	Widely used in buildings (insulation, pipes, cement, etc) until the '80s
Pneumatic tyres	Tyres become an hazard to environment and health when uncontrolled open air burning occurs, generating smoke, oil and leaking toxic contaminants	All mobile vehicles and machinery

3. Options for safe recycling and disposal of hazardous waste

Hazardous waste **SHALL NEVER** be released untreated into the environment. Identifying proper disposal can prove challenging in locations where waste management infrastructure is weak or non-existent. It is recommended that a hierarchy of actions is followed, going from the best to least preferred option as illustrated in the graph below.



- Proper recycling and/or recovery of hazardous waste is always the preferred option. In countries and regions with well-developed systems, public authorities provide infrastructure to handle hazardous waste through processes such as physio-chemical treatment (transforming the hazardous substances into less hazardous ones), biological processes (mostly used for wastewater treatment),

stabilisation/solidification (to immobilise and isolate from the environment hazardous elements that cannot be further treated with current technologies), thermal treatment (with control of incineration gases).

- In some cases, private companies may be providing similar services, including partial recovery of high value materials, and/or as part of their take-back or cradle-to-cradle production processes. If no public infrastructure is available, always enquire for available recycling services from private contractors. Due to the very high risk of the substances handled, a proper background check of the processes and facilities used by the contractor(s) is required, to confirm proper environmental management.
- If the hazardous waste cannot be processed in an environmentally sound manner locally or regionally, an alternative may be that of exporting to a location where this is possible. In this case, the hazardous waste **SHALL** be properly classified, packaged and labelled, and necessary permits **SHALL** be obtained from authorities, if local authorities issue these permits. Transportation of hazardous waste over long distances presents additional environmental impacts and risks. This option should be assessed against the alternatives of local disposal in landfill or permanent storage on site.
- If no alternatives are possible, hazardous waste may be disposed in landfill sites that have been properly engineered to contain the waste in isolation from the external environment.
- If no such sites can be used, the last resort is to store hazardous waste (semi-)permanently on a site, until other disposal options become available. This should not be used as a cheaper alternative to other preferable options. When selecting and preparing the site for storage, it is important that:
 - The location of the site must be agreed with local authorities, and in consultation with local stakeholders
 - Carefully select the site (not prone to flooding, landslides, etc.)
 - Select proper containers (inert, do not get attacked from the content, well-sealed)
 - Ensure waste compatibility when storing (i.e. ensure different types of hazardous waste that have potential of reacting with each other are isolated)
 - Ensure waste is properly marked using pictograms from the Globally Harmonized System of Classification and Labelling of Chemicals, using durable labels and with description in English and in local language(s)
 - Records, inventory and inspections should be monitored and kept on record
 - Access should be limited and controlled
 - Consider the hazards for personnel storing the waste, and provide them with adequate protection
 - All relevant stakeholders should be made aware of the existence of the site and of its hazard profile
- In some countries, controlled burning of hazardous material is performed according to local requirements and in properly engineered facilities. In any other situation, **burning of the hazardous waste is strictly forbidden.**

Any deviation from these guidelines **SHALL** be authorised by the most senior officer in the Office/Site and immediately communicated to the HSE Team in HQ.

4. Hazardous waste prevention

The best strategy in terms of hazardous waste management is avoidance. All reasonable efforts should be made to avoid the use of hazardous materials, or substitute with alternatives that are less hazardous or not hazardous at all (e.g. eco-labelled electronics contain lower levels of toxic materials, mercury can be substituted in several appliances, use waterborne paints and varnishes with lower VOCs and toxicity, etc.). Possible hazardous waste prevention and avoidance strategies include:

- Avoid releasing the hazard – e.g. asbestos is not hazardous to health if it is not airborne and breathable, thus special care should be given during demolition if there is even a suspicion that asbestos may be present in certain construction materials; tyres release hazardous material only in case of uncontrolled open-air burning
- Buy the right amount of products to avoid having to dispose of leftovers (e.g. paints, varnishes, pesticides, disinfectants)
- Store properly (in sealed container with proper labelling) for later use, or give back to the supplier for use in other sites (e.g. paints, disinfectants)
- Donate left overs to charity or other users (e.g. electronics).
- Ensure that, when donating highly hazardous materials such as used oils or fluorescent bulbs, the recipient knows how to dispose of them without contaminating the environment. UNOPS should not transfer the challenge of handling hazardous waste to people who have no capacity to do it.
- Make use of suppliers take-back schemes whenever these exist (e.g. electronics, toner cartridges)

Measures to minimize volume of hazardous waste generated should be recorded in the Office/Project Environmental Management Plan and relative Waste Management Plan (form EM 02).

Best practice: on-site bio-remediation of contaminated soil

It is common at project sites for minor fuel spillages to occur, leaving soil contaminated with hydro-carbons. When no treatment facilities are available, it is possible to treat this in-situ using biological soil farming processes. However, this should only be undertaken:

- if there is enough time remaining on the project to effectively implement and monitor, or
- if the beneficiary has adequate capacity to complete the process.

Indicatively, the remediation process will take approximately one year. The process for bio-remediation of the contaminated soil is as follows:

- The site is lined with heavy plastic sheeting, and the area contained using bund walls made from densely packed grass or reeds. The area must be adequate in size with the containment method strong enough to withstand local climatic conditions.
- The contaminated soil is spread in a layer to a maximum of 50 cm in depth, with urea fertiliser applied at the rate of 1 kg per m², once a month for 12 months. Lightly turn all the contaminated soil (manually) twice a month – once when applying the fertiliser.
- The soil should be covered with a tarpaulin(s) during periods of heavy rainfall, making provision for drainage off the site.
- Apply water if the soil becomes dry. It needs to be damp rather than saturated.

The soil should be tested prior to the land farming, and on completion to ensure that the process has been effective in removing the hydro-carbons. The soil should be designated for a non-production end use, such as landfill cover, or soil for construction in an area away from water courses.

Note that bioremediation is useful for hydrocarbons and other materials that can be broken down by microorganism. It should not be used for other hazardous wastes such as mercury compounds in fluorescent bulbs.