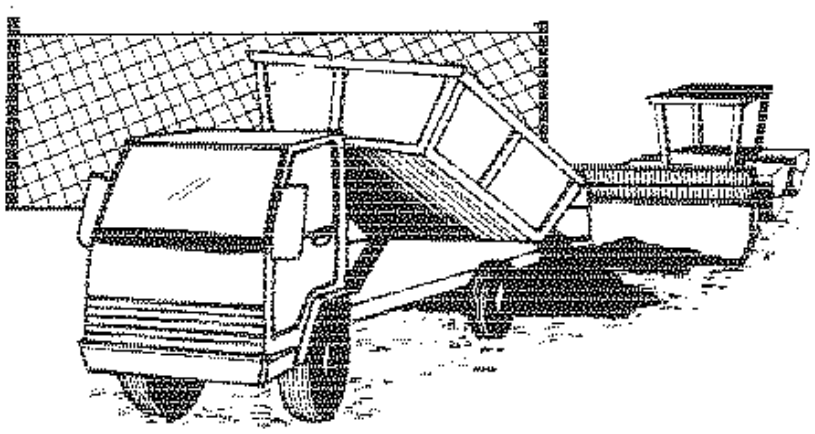
Guidelines
on Sustainable Health Care Waste Management in Gauteng

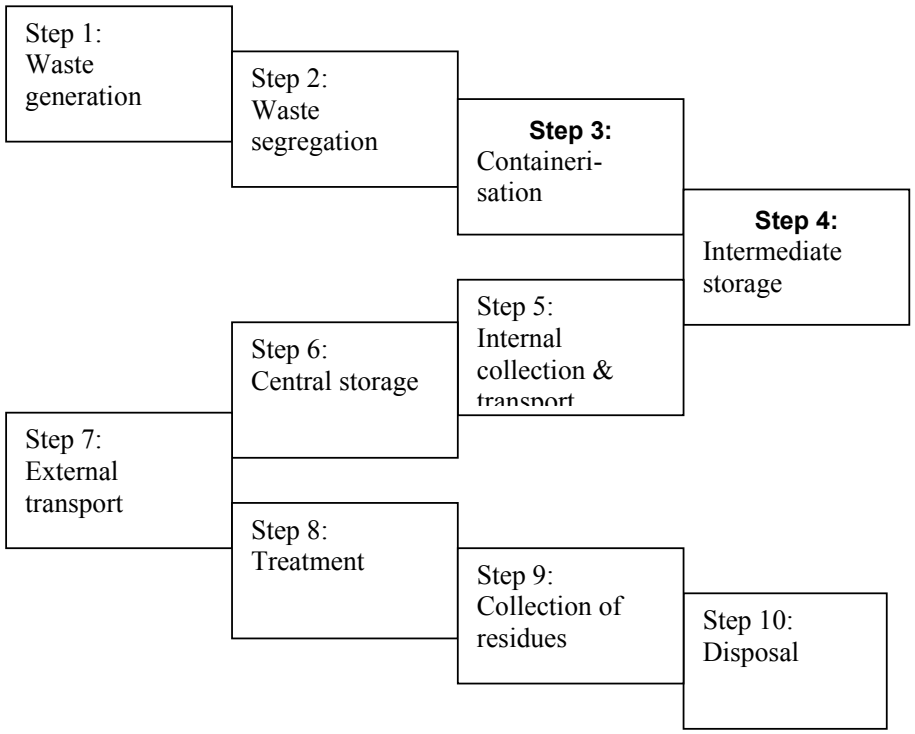
MODULE 7: Disposal of HCRW Residues:

- Environmental risks of landfilling
- What can be disposed of
- Landfilling of treated Health Care Risk Waste residues



7. Module 7: Disposal of HCRW Residues

Box 7.1: Steps of the HCW flow included in this Module



7.1 Objectives of Module 7

The objective of Module 7 of the Guidelines is to provide information on the safe disposal of treated HCRW residues, as supporting information to the "Minimum Requirements for Waste Disposal by Landfill", published by the Department of Water Affairs and Forestry in 1998 (ref. xx). This Module is not intended to present the contents of the aforesaid documents, but merely to provide information specifically related to disposal of treated HCRW that is presently not addressed.

There are primarily two HCW streams to be considered, i.e. that of untreated HCRW (illegal disposal) and that of appropriately treated HCRW (legal disposal). This Module is intended to shed more light on various aspects that should be considered when opting to dispose of treated HCRW, whilst pointing out certain risks associated with the disposal of untreated HCRW.

7.2 Target Group

Module 7 of the Guidelines will be targeting the general workers and landfill operators that are present on the workface where the waste loads are disposed of. It is expected that such persons will be in the best possible position to evaluate the contents of the waste loads being delivered, without actually undertaking investigations that could put their health or safety at risk. In addition to the people responsible for organising the workface, it is also aimed at persons responsible for looking after the occupational health and safety of those that may be exposed to untreated HCRW.

As some of the HCRW landfill workers and operators may not be familiar with the terminology used in these Guidelines, it is in fact intended for this Module to be directed at the senior and middle management who are responsible to supervise and overlook the daily activities of the workers and operators.

7.3 Scope of Module 7

After having collected and transported the treated HCRW residues from the HCRW treatment facility to the disposal site, it is the responsibility of the waste disposal site operators to ensure that the treated HCRW residues are disposed of in an environmentally sound and safe manner. This is however against the background of the principle of duty of care, which does not relief the generator of the HCRW from its responsibility to ensure that the process through which the HCRW is taken from generation to final disposal, will be environmentally sound, whilst being occupationally healthy and safe.

In order not to duplicate the information presented in the Department of Water Affairs and Forestry's Minimum Requirements and merely to provide additional information that may not have been addressed in sufficient detail, Module 7 will address the following topics:

Landfilling of treated HCRW residues;
Special precautions when dealing with treated HCRW residues;
Risks resulting from landfilling of untreated HCRW;
What is allowed and what is not allowed for disposal on general waste landfills?
Importance of cooperation.

7.4 Reference to Other Modules/Documents

The information in this Module is to be read in conjunction with Module 1, which is the Module designed to address all the cross cutting issues identified in the process of integrated HCW management.

To get a better understanding on the interfacing that needs to take place in terms of external transport of treated HCRW residues from the treatment facility to the waste disposal site, readers are referred to Module 6 for more information.

7.5 Landfilling of treated HCRW Residues

Once the HCRW residues are delivered to a waste disposal site, the residues are to be disposed of in accordance with DWAF's *Minimum Requirements for Waste Disposal by Landfill*. Disposal of residues can be defined as the intentional burial or deposit of residues from HCRW treatment processes at an appropriately permitted, developed and operated waste disposal facility.

In addition to DWAF's Minimum Requirements, and as a more operational measure, the Gauteng DACEL will require that the standards, as descried in Box 7.2, be met for residues from burn and non-burn treatment facilities.

Box 7.2: Standards set for landfilling of treated HCRW residues.

General standards for all treatment technologies:
HCRW treatment residues is to be classified in accordance with DWAF's *Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste* to determine whether the residues are to be disposed of on general waste disposal sites, or on hazardous waste disposal sites;
Although ash from incinerators is in general considered to be hazardous due to its concentrated heavy metal content, shredded HCRW from sterilisation processes can in most instances be co-disposed with general municipal waste, subject to it meeting the required classification;

For both burn and non-burn HCRW treatment technology groups, the permit holder must report cases of non-compliance immediately to DACEL with a report containing the reason for non-compliance and the plan for avoiding future non-compliance;
If permitted disposal facilities cannot be used according to the DWAF's Minimum Requirements under those circumstances, operations at the HCRW treatment facility must be stopped and backup treatment measures introduced until such time that compliance can be achieved.

Incinerator bottom ash/fly ash:
Maximum allowable percentage of non-combustible matter will be based on the ignition loss not exceeding 5 % by mass;
Maximum contents of heavy metals for incinerator residues, with a view to forcing optimisation of the combustion efficiency and segregation of heavy metal containing components from the waste stream, will in the absence of national standards, be limited as set out in the EU Directive 2000/76/EC of 4 December 2000;
If detected that there is a problem with the treatment process resulting in it not being fully efficient, the HCRW treatment process is to be discontinued until such time that the problem has been addressed. Any residue loads that may not have been disposed of, is to be disposed of under supervision, and at hazardous waste disposal sites only;
It is important for the permit holder of the treatment facility to document compliance by using a combination of independent emission testing as will be prescribed by DACEL.
A standard frequency of tests shall be carried out. However, in case of three successive previous tests demonstrating compliance, the frequency can be reduced to a prescribed minimum frequency (cf. *State Regulatory Oversight of Medical Waste Treatment Technologies, April 1994)*.

Residues from non-burn technologies:
Microbial inactivation achieved to be documented in accordance with the report "Technical Assistance Manual of the State Regulatory Oversight of Medical Waste Treatment Technologies, April 1994" of the State and Territorial Association/USEPA;
Maximum contents of heavy metals for non-burn technology residues, with a view to forcing optimisation of the combustion efficiency and segregation of heavy metal containing components from the waste stream, will in the absence of national standards, be limited as set out in the EU Directive 2000/76/EC of 4 December 2000;
If detected that there is a problem with the treatment process resulting in it not being fully efficient, the HCRW treatment process is to be discontinued until such time that the problem has been addressed. Any residue loads that may not have been disposed of, is to be disposed of under supervision, and at hazardous waste disposal sites only;
A standard frequency of tests shall be carried out. However, in case of three successive previous tests demonstrating compliance, the frequency can be reduced to a prescribed minimum frequency (cf. *State Regulatory Oversight of Medical Waste Treatment Technologies, April 1994)*.

Certain precautions, as detailed in Box 7.3, needs to be taken when dealing with the residues from treated HCRW, in order to reduce the risk of infection or injuries.

Box 7.3: Special precautions when dealing with treated HCRW residues:

The precautionary principle should in all cases apply, which will require that residues from HCRW treatment processes always be considered to be infectious, even when treated, since:

Even though the HCRW may have been treated to the extent that it is not considered to be infectious any longer, direct human contact without any protective equipment should be avoided, as testing done on the effectiveness of the various HCRW treatment processes are from a practical point of view only done on random samples;
Even though some HCRW treatment processes may make use of high temperatures whilst others will make use of shredders for the destruction of sharp objects, some remaining sharps objects could still create a risk of injuries to humans as well as animals.

Box 7.4 presents a summary on some of the options for the disposal of HCRW residues, which includes possible waste minimisation measures, as well as disposal options for different waste categories.

Box 7.4: Options for disposal of treated HCRW residues.

Disposal of all residues from the HCRW treatment process without minimisation activities, or alternatively by recovering of reusable (e.g. possible use of incinerator ash for road construction) or recyclable (e.g. plastic and glass from sterilisation processes, etc.) materials;
Disposal of non-hazardous residues at general waste disposal sites at reduced cost, by de-listing certain waste categories, or alternatively disposal of hazardous residues at hazardous waste disposal sites at increased cost, without any de-listing of waste categories.

7.6 Risks resulting from Landfilling of Untreated HCRW

Landfilling of waste containing organic waste results in aerobic or anaerobic digestion by microorganisms using the waste's organic material and water. This digestion may take place over decades depending on temperatures and availability of water and air.

Landfilling of especially untreated HCRW poses a threat of pollution of the environment as well as a health and safety risk due to the possible spreading of infections/pathogens to landfill workers, reclaimers and rodents/birds. Infectious waste remains infectious for very long periods, as many bacteria, viruses and other microorganisms do not degrade rapidly in landfills, especially when landfills are not operated to the prescribed procedures and standards.

Landfilling of untreated HCRW is for those reasons not recommended, which is also the approach taken by the Department of Water Affairs and Forestry.

For some remote rural areas, viable long haul systems are to be developed that will meet the technical as well as the environmental requirements for HCW management. Gauteng is however in the unique situation that even the most remote areas are within reach of regional HCRW treatment facilities.

Table 7.5 below summarises some of the perceived advantages versus risks associated with landfilling of untreated HCRW.

Table 7.5: Advantages and disadvantages of landfilling of untreated health care risk waste

Perceived advantages associated with landfilling of untreated HCRW	Risks associated with landfilling of untreated HCRW
Low capital investment costs; Very low operational costs; • Flexibility in terms of capacity.	High risk of pollution of surface water and ground water; No disinfection of HCRW resulting in high risk of spreading of infections; High risk of injuries by sharps; High risk of anatomical waste being stolen for use by traditional healers; High risk of expired pharmaceutical HCRW being stolen for reuse; No volume reduction.

7.7 What is allowed for Disposal on General Waste Landfills

The need for sound and effective segregation of HCW has two sides to it: (1) by disposing of HCRW in the HCGW stream, it is creating the risk of putting the health and safety of waste management workers and even informal waste reclaimers at the landfills at risk, whilst (2) the disposal of HCGW in the HCRW steam leads to increased HCW management costs.

There is often a perception amongst members of the public as well as officials from local authorities responsible for the management of waste disposal facilities, that all waste items generated in health care facilities should be managed, treated and disposed of as HCRW. This would for instance require that items that did not necessarily come in contact with potentially infected areas of patients, also be classified and treated as HCRW, for which the cost is significantly higher than if such uninfected materials were separated at source and disposed of as part of the HCGW stream.

In the most extreme case, common health care packaging material may be considered to be infectious, and should such materials be detected in an untreated form on general waste disposal sites, action is often taken against the transporters of such waste. This results in HCGW being classified as HCRW, which is of course the safer option. Should it not be possible for HCW generators to make the required distinction, the emphasis should remain on the health and safety of all parties that may be affected, rather than on the financial savings that could be achieved.

The other side of the coin is also true, i.e. that some scrupulous waste management companies is prepared to put the health and safety of people at risk, by illegally disposing of untreated HCRW on general waste disposal sites. For the sake of identifying and tracing such people, it is important for landfill operating staff to be able to identify HCRW that is not to be disposed of on general waste landfills. They should further be informed about the actions required to safely containerise such waste for transport to a HCRW treatment facility, or alternatively for safe disposal on the landfill.

The descriptions provided in Table 7.1can be used as broad guidelines to landfill operators for identification of HCW that are not to be disposed of on general waste landfills.

T**able 7.1: Some prominent HCW items that *should* and *should not* be dispose of on general waste disposal sites**.

Items that are *allowed* to be disposed of on general waste landfills:	Description:	Illustration:
Health care packaging materials.	Any cardboard, paper or plastic used for the packaging of medical equipment.	Illustration
Drip bags.	Plastic bags used for supply and dosing of ……	Illustration.
Syringes without needles	Plastic tubes of varying sizes used for injections.	Illustration.
Etc.	Etc.	Etc.
Items that are *not to be disposed* of on general waste landfills:	Description:	Illustration:
Blood bags.	Plastic bags used for the storage and dosing of blood	Illustration
Used or unused needles.	Sharp objects used with syringes to inject patients.	Illustration
Etc.	Etc.	Etc.

The landfill operating staff should at regular intervals be informed about the items that are allowed to be disposed of and those that are not allowed to be disposed of on general waste disposal site. The correct procedures on dealing with possible illegal dumping of HCRW should form part of the ongoing information campaign.

7.8 Importance of Cooperation

The cooperation should in the first instance be with registered HCRW transport companies, in order to identify and eliminate unauthorised collection and disposal of untreated HCRW by scrupulous waste management companies.

The next area of cooperation should be with the HCRW treatment facilities that are making use of any particular waste disposal site. It is first of all to be communicated to the landfill operator that the residues are classified for disposal on that particular class of landfill, and secondly there should be sufficient and effective lines of communication to warn landfill operators in the event of any process failure on the HCRW treatment facility.

7.9 Annexure 7.1: Proposals for info materials for landfill operators

(to be inserted).