

November 2020

Reduction of UPOPs emissions by improving waste management practices at landfills

Operations and Maintenance
Manual for the Hazardous
Waste Interim Storage Facility

Antigua and Barbuda



Resources & Waste
Advisory Group ^{SCE}

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List of Acronyms

BCRC-Caribbean	Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean
BM	Brian McCarthy (Team Leader)
DG	Diana Gheorghiu (Deputy Team Leader)
GEF	Global Environment Facility
HZW	Hazardous waste
HWISF	Hazardous Waste Interim Storage Facility
IBC	Intermediate Bulk Container
IMDG	International Maritime Dangerous Goods
MSDS	Material Safety Data Sheet
PK	Prakash Kowlessar (Key International Expert)
POPS	Persistent Organic Pollutants
PPE	Personal Protective Equipment
RWA	Resources and Waste Advisory
UN	United Nations
UPOPs	Unintentionally produced Persistent Organic Pollutants
WEEE	Waste Electrical and Electronic Equipment
WR	Wolfgang Robrecht (Key International Expert)

Definitions

The following functions must be assigned and acknowledged by all stakeholders operating within the hazardous waste management sector within Antigua and Barbuda prior to service commencement.

Policy Maker	Sets the framework at National level that's implemented to establish the legal standards within which services are delivered
Regulator	Responsible for monitoring and compliance with legal standards for environmental protection with respect to the service (includes Financial, Technical and Environmental regulator)
Planner	Responsibility for strategic and operational planning and general programming and control
Client	Responsible for holding the operator to account for provision of a reliable waste management system meeting the required standards
Operator	Responsible for delivery of the service on the ground through operation of the HWISF
Revenue collector	Responsible for collection of revenue for the service

Background and Introduction

The RWA Group team along with representative of BCRC-Caribbean, conducted an in-country fact finding assignment in Antigua and Barbuda during the week of 8th to 11th October 2019. This report presents the findings related to project Component C “Assess existing hazardous waste facilities in three (3) countries (Antigua & Barbuda, Barbados and Saint Lucia)”. This report presents the findings, building upon and referencing the findings presented in Antigua and Barbuda Baseline Assessment and Training Needs Analysis and the Assessment Report on the existing hazardous waste storage facility.

This report represents the Operation and Maintenance Manuals for the hazardous waste interim storage facility, considering health and safety measures, operation, maintenance and monitoring of the facilities.

Internal operational procedures and working instructions for personnel operating the future hazardous waste interim storage facility should be drafted to include provisions in this report and any other requirements based on local context and applicable national regulations.

1 Enabling Environment and Operator Model

1.1 Enabling Environment

Successful hazardous waste management depends on a number of factors, the most important of which are highlighted in Figure 1. This covers the key enabling factors of Legislation; Enforcement; Supporting services such as appropriate laboratory analytical capabilities, skilled inspectors and operators; and Training.

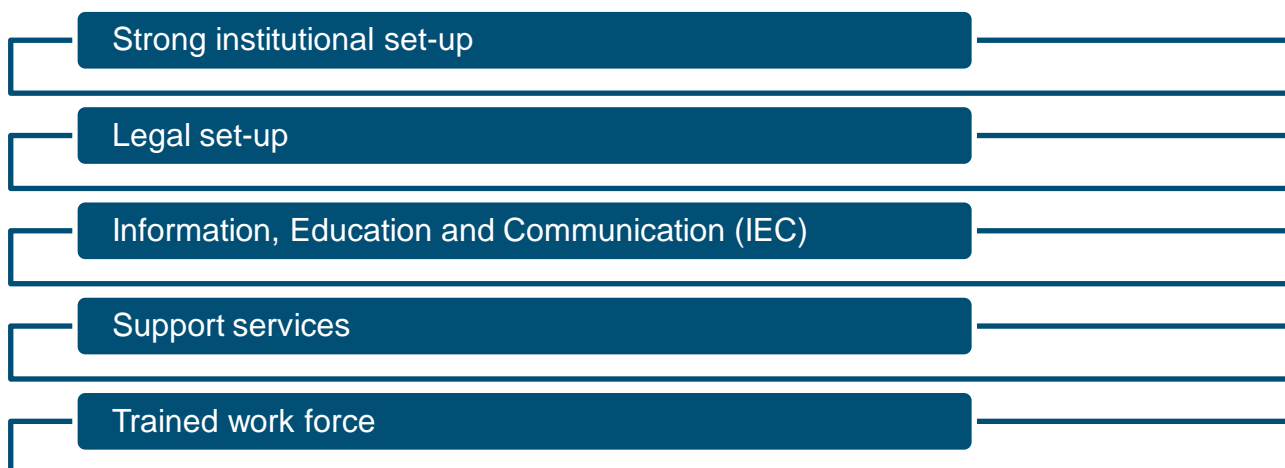


Figure 1: Key factors to establishing a successful hazardous waste management operation.

Prior to establishment and operation of the HWISF, and in order to assist strengthen the factors listed in Figure 1 and define the operator model for the HWISF, it is recommended that a National Coordination Committee be established with a Terms of Reference to develop and implement the Antigua and Barbuda Hazardous Waste Programme and regularly report to Government on progress and bottlenecks. The Membership should comprise the Ministry of Health, Wellness and Environment, NSWMA, Ministry of Education, Paint Industries Oil companies, Dry cleaning industry and other major hazardous waste producers or trade body.

A draft national hazardous waste management implementation plan is presented in Table 1 highlighting the key factors to be considered related to those introduced in Figure 1. This outlines the recommended key aspects required to ensure the successful establishment and operation of a hazardous waste programme and facilitate the operation and maintenance of the HWISF.

Related to these key success factors, the following realities and operational considerations must be acknowledged with regard to hazardous waste management in Antigua and Barbuda:

- Only a limited amount of hazardous waste can be expected captured in the first 5 years of operation of a hazardous waste management system
- This period of uncertainty and small quantities can only be overcome if the waste generators are offered proper advice on the handling of hazardous waste and an option for collection and removal of the waste
- It is not economically viable to set up treatment/disposal systems for several hazardous waste streams - Quantities generated are too low
- Exportation of these wastes for recovery or disposal is the most practical solution.
- Essential to establish a Storage Facility as soon as possible and to further develop the hazardous waste treatment and disposal options in line with the results and experience gained from the Storage Facility
- Costs of collection, testing, bulking, packaging and exportation can be quite costly however the costs of inaction can be more expensive in view of public health and environmental impacts

Table 1: Draft Hazardous Waste Management Implementation Plan

Item	Action	Responsible agency and Partners	Reporting frequency	Time frame
National Coordination Committee	Overseeing the drafting and implementation of HW plan	To be determined nationally	Quarterly	Short term
Legal	<p>Legislation and <u>enforcement mechanisms and their resourcing</u> requires to be strengthened to:</p> <ul style="list-style-type: none"> • Ensure transposition of Basel Convention provisions in order to include definition of hazardous wastes, lists and <u>illegal traffic</u> as an offence amongst others • Register hazardous waste generators, transporters, Exporters Recyclers and their reporting obligations • Include effluent standards for specific sectors i.e., Paint, Dry cleaning • Include a Manifest System • Reporting of quantities in store at generators premises • Hazardous waste audits • Establish fees and fines 	To be determined (TBD) nationally	Monthly	Short term
Information, Education and Awareness	<p>Awareness of stakeholders in relation to hazardous wastes should be raised, mainly related to environmental and public health risks</p> <p>Costs of hazardous wastes to the economy</p> <p>Good practices in terms of sorting, segregation labelling and storage</p> <p>Use of the hazardous waste facility that will be coming into operation, meeting with major generators</p>	nationally	Monthly	Short term
Support services	<ul style="list-style-type: none"> • Identification of crucial testing equipment and documentation of testing methodologies 	TBD nationally	Quarterly	Short to medium term
Support services	<ul style="list-style-type: none"> • Deployment of a team of inspectorate to conduct site inspections at generators premises and training of Inspectorate in the field of hazardous waste 	TBD nationally	Monthly	Medium term
Infrastructure	<ul style="list-style-type: none"> • Supervision of Construction and operation 	TBD nationally	Quarterly	Medium term
Disposal Fee	<ul style="list-style-type: none"> • Working out a reasonable fee 	TBD nationally	Quarterly	Medium to Long term

1.2 Operator Model

From the outset of planning a Hazardous Waste Facility, how the facility will be operated, by whom and how the day-to-day operation and maintenance and the ultimate export and treatment of the hazardous waste will be financed, together representing the “Operator Model” needs to be established. The key functions required and their relationship are illustrated in Figure 2.

These need to be considered within the context that the public waste management sector currently lacks a fully equipped operational arm that could take on the duty to operate hazardous waste management facilities. If private sector participation is envisaged, then it must be determined what length of contract is appropriate, how risks are shared, what the performance criteria which operator must adhere to are and who establishes these, and which agency supervises construction and operation?

When considering the most feasible operator model, a range of issues needs to be addressed, including:

- Duration of contract
- Liability/ risk
- Waste quantities
- Fees
- Financing
- Land
- Environmental impact

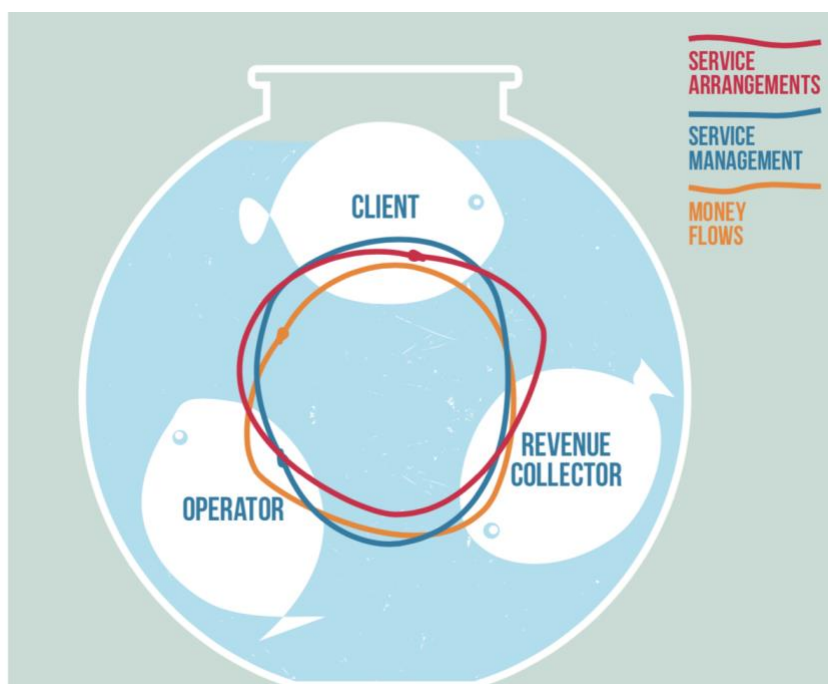


Figure 2: The relationship between three key functions that establish the operator model¹

When considering these, along with the factors introduced earlier, the most important decision is if and when to engage the private sector within the operation and maintenance of the HWISF. A selection of the various public

¹ Operator Models. Respecting Diversity - Guidance Paper for Solid Waste Management Practitioners – Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, 2013.

and private sector models is illustrated in Figure 3 and discussed further in the following sub-sections. These require to be considered and an operator model decided upon prior to initiating operations at the HWISF.

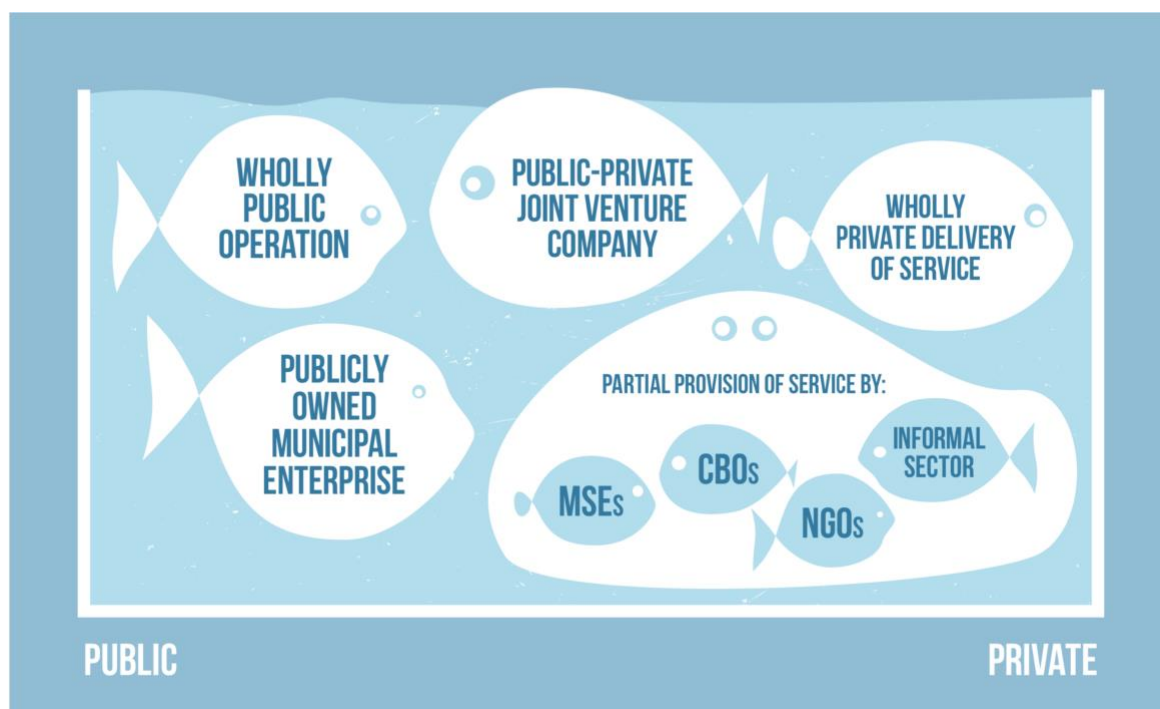
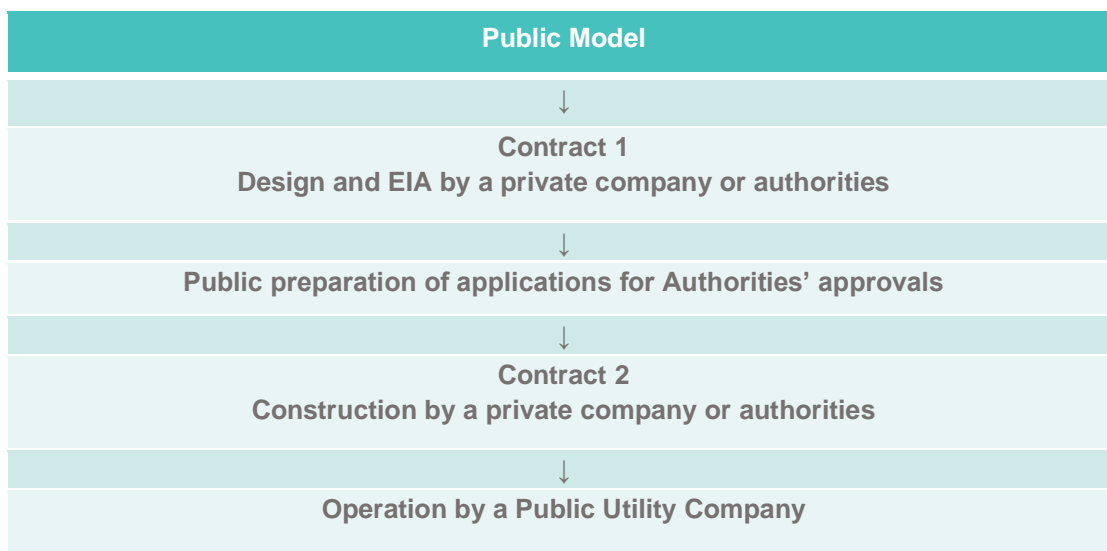


Figure 3: Spectrum of operators, from public to private (GIZ, 2013).

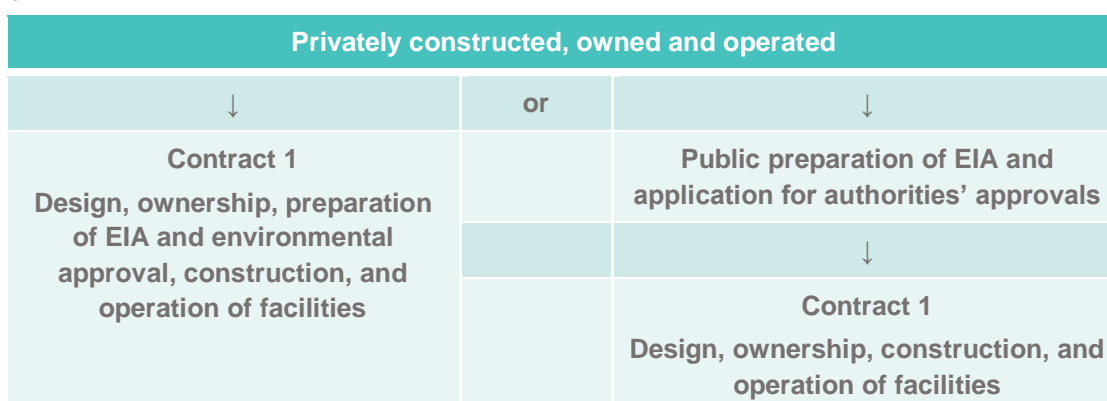
1.2.1 Public sector model

- Public sector financed, designed, owned and operated
- In this model the duration of the contract is not an issue. The depreciation of investments through tariffs would be set at the technical lifetime of the facilities
- Common project risks related to hazardous waste management systems are mostly related to the accuracy of the waste quantities, the knowledge of the waste composition, challenges in achieving Authorities' approvals
- Considerable uncertainty will remain for the HW quantity, as this furthermore will depend on strengthened enforcement of legislation by the Government and the tariff policy
- Financial constraints might limit the implementation especially in a public system where the funds need to be taken from the state budget or borrowed with a state guarantee.
- This model for hazardous waste management is extremely rare. **One example is the Nasereya hazardous waste facility in Egypt.**
- The following diagram depicts the type of contracting arrangements required under a Public Sector Operator Model



1.2.2 Private sector model

- The facility is owned, financed and operated by the private sector. This is also not so common
- In this model the duration of the contract is not an issue as it will be purely private initiative with the operator setting the tariffs
- However, it will need to secure land, seek all clearances (EIA, building permits) and take all the risks pertaining to quantities
- The Integrated hazardous waste management centre, Kualiti Alam, in Malaysia is one such example.
- Long period contracts allow investments also in treatment according to the kinds of collected wastes. In Malaysia – 30 years exclusivity contract with the obligation to invest on treatment of hazardous waste
- The following diagram depicts the type of contracting arrangements required under a Private Sector Operator Model



1.2.3 Joint ventures model – Public, Private Partnerships (PPP)

Two main types with several options:

- Private sector Build, Own Operate and Transfer
- Public Sector Build and Own and Private sector operates

Option 1

- The private sector constructs and operates the facility to a detailed design prepared by the Public sector or its consultants.
- The public sector finances the capital and operational costs. Liability for design rests with the Public Sector.

Option 2

- The Private Sector designs, construct and operate the facility to a performance specification prepared by the Public sector or its consultants.
- The public sector finances the capital and operational costs without resorting to detailed specifications, through a proper contract with well laid payment schedules

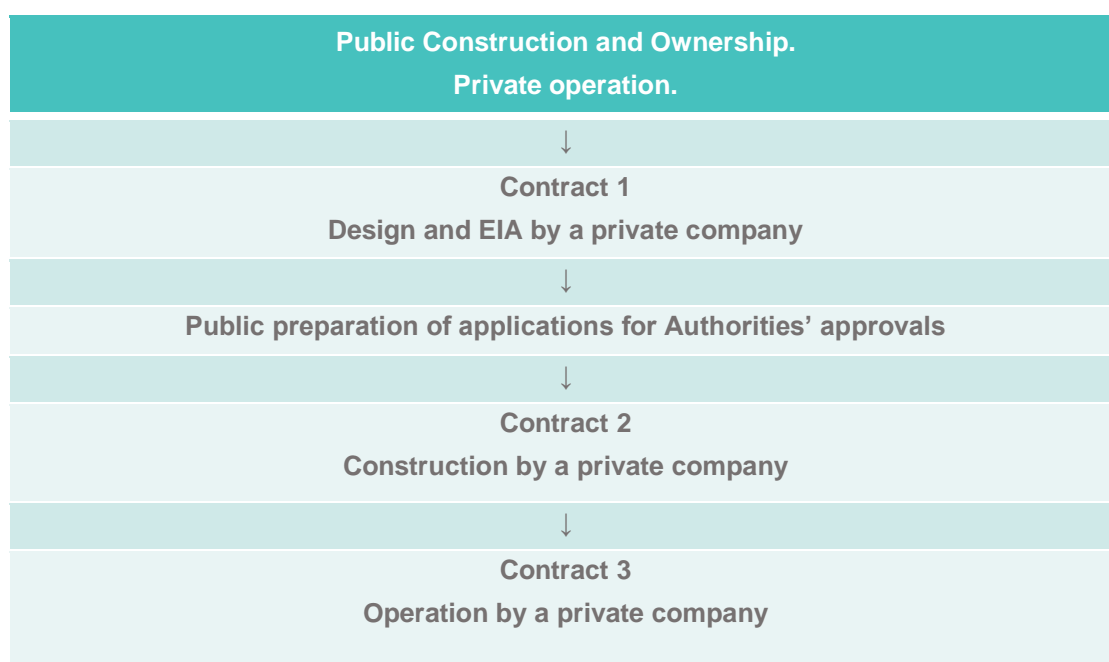
Option 3

- The Private Sector finances the design, construction and operation of the facility to a performance specification prepared by the Public sector or its consultants

Option 4

- The Private sector operates the facility after the construction has been developed by another contractor to a detailed design prepared by the Public sector or its consultants. The contract may require the operator to procure plant and equipment and materials.
- This variation to the Private sector participation offers the advantage in that the expertise required for construction are more related to Civil Engineering and this will allow for a larger pool of bidders as compared to when lumping both construction and operation in a single bidding exercise. This procurement route was chosen by Mauritius who has a Storage facility for hazardous waste.

The following diagram depicts the type of contracting arrangements required under an Operator Model with Construction and Ownership by the Public Sector and Operation by the Private Sector



1.2.4 Evaluation of models

A summary evaluation of the operator models described above is presented in Table 2.

Table 2: Summary evaluation of potential operator models

	Public only	Public BO, private O	Private BOO (T)
Duration of contract	Not applicable.	Could be short-term, e.g 5 years	Should be long term, e.g. 15-20 years.
Risk/ liability	Low risk. All risks and liability with the public sector.	Low risk. The risks can be defined in contract.	Higher risk related to authorities' approvals and land liability. Risk of uncertain waste quantities.
Waste quantities and plant capacities	Important, but no guarantees are required as all liability rests with Authorities	Important. Guarantee from Authorities for minimum quantity or incorporated in the fee structure.	Very important. Guarantee from Authorities for minimum quantity.
Fees	Payment according to cost.	Payment according to cost and private operation.	Payment according to private operation incl. profit element In a concession model for HW no fee need to be paid to the contractor
Financing	Public financing	Public financing	Private financing. Possibly land contribution by Authorities
Land	N/A	N/A	Possible still owned by Authorities Closure fund/insurance
Environmental impact	Under public control	Requires more public control through performance standards.	Requires much public control through performance standards.

BO = Build and Own; O = Operate; BOO = Build Own Operate

1.2.5 Regional approach and Collaboration between operators

It is important to consider the situation within the region beyond domestic considerations. Quantities that will be collected nationally may not be enough for exportation (depending on the characteristics of wastes or compatibility issues) to final disposal facilities. Grouping of waste could be difficult as small quantities of wastes may be non-compatible for shipment, or there may not be a facility available that accepts all the kind of hazardous waste requiring to be processed (e.g. Mercury is not acceptable for incineration and has limited recycling facilities). In addition, not all shipping companies accept as cargo all hazardous waste – as special restrictions apply, and certain cargoes are banned. In such cases, wastes could be shipped from one national facility to another within the region in order to be consolidated into an appropriate quantity that makes shipment along with other similar waste for final disposal economically viable. When considering this option, it must be ensured that the requirements of Basel Convention are complied, in particular that the islands involved are part

of the Basel Convention, have enabling legislation in place and that environmentally sound management conditions for hazardous waste can be ensured throughout the operations envisaged. A Memorandum of Understanding (MoU) or Agreement between the Governments of different countries in the region, that will enforce/allow the operators of each facility to cooperate for the transportation and final disposal of the waste, should be tabled, considered and discussed. In addition, a possible additional bonus of this is that instead of having three laboratories to be established (one per country), only one might be required to be set up in the country with the biggest volume of hazardous waste which can analyse also the samples from the other countries. This has potential overall cost saving implications.

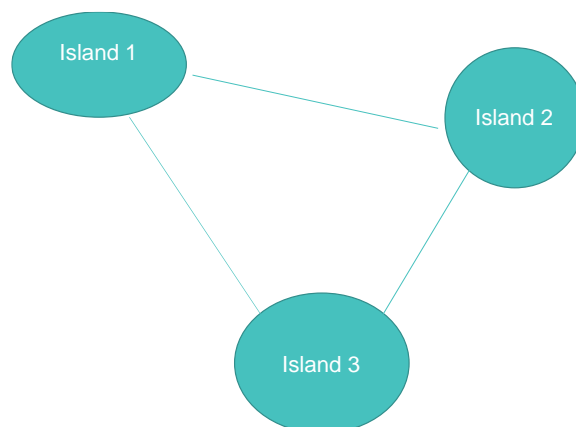


Figure 4: Regional coordination of hazardous waste storage and shipment for treatment.

Under this model, it might be possible to have one private contractor manage the hazardous waste for all three facilities proposed for Antigua and Barbuda, Saint Lucia, and Barbados. This will require agreements between the countries; Joint procurement process and ensuring compliance with each national jurisdiction; and cost sharing mechanisms

Alternatively, an individual operator on each island with free movement of wastes between them allowed and facilitated may assist optimisation of export logistics and costs.

Regardless of operator model, the need for the following prerequisites to ensure active participation from hazardous waste producers cannot be overstated:

- Generators should be informed about the changes in waste management
- Awareness Campaign
- Legislation
- Generators should submit to the authorities at least an annual inventory of hazardous waste
- Incentives to waste producers (tax relief, subsidy)
- Appropriate cost recovery mechanisms to ensure sustainable operation, maintenance and continued investment in the management of hazardous wastes.

1.2.6 Recommendations for Antigua and Barbuda

Given the potentially tremendous demand for capacity building required to ensure the NSWMA in Antigua and Barbuda had the capabilities to operate a hazardous waste management service, from collection to export, it is recommended that Private sector involvement should be considered. However, the enabling environment should be in place first i.e. legislation, enforcement, resourcing and training, etc. The capability of the public sector to monitor private sector contracts dealing with hazardous waste needs to be strengthened with clear roles and responsibilities defined and backed up by clear authority.

Within this context, the following chapters present the main operational management and maintenance requirements for the proposed Hazardous Waste Interim Storage Facility, that can be reviewed by the proposed

National Coordination Committee and incorporated into the roles and responsibilities of one or more public bodies or into a private sector contract depending on which ever operator model is decided upon.

2 General information about the hazardous waste storage facility

The hazardous waste storage facility is intended to operate as a facility for the reception and safe temporary storage of hazardous waste arising from households and other generators within the country, prior to shipment of the waste to licensed facilities for sound treatment, recovery or disposal. The storage facility is primarily designed to hold hazardous wastes until they have amassed enough quantities to make onward treatment or disposal more economical and effective. It is not prepared for final or long-term storage of hazardous waste.

The principles which govern the establishing and operation of the hazardous waste interim storage facility include:

- **Protection of workers:** facility design and operation must meet the appropriate standards for occupational health and safety.
- **Protection of public health:** facility design and operation must meet the appropriate standards for the handling and storage of hazardous waste and measures must be put in place to protect the public.
- **Protection of the environment:** facility design and operation should minimize any potential impact on the surrounding environment.
- **Safe treatment or disposal:** facility design and operation should facilitate the safe future treatment or disposal of temporarily stored waste.
- **Inherent safety through good design and planning:** buildings and associated structures must promote safety through good design in location, construction and layout to minimize the possibility of any adverse incident occurring and reduce the impact of any incident that might occur.
- **Emergency Response:** appropriate systems need to be established and personnel trained for emergency response situations. Should an accident occur, emergency preparedness routines and resources need to be available to limit the consequences and restore safe operations.
- **Full Compliance with applicable Laws and Regulations:** compliance with national laws and regulations needs to be ensured and monitored by responsible authorities, including with respect to relevant international laws, regulations and conventions.
- **Performance improvement - incident investigation, audits and inspections:** all incidents and near misses shall be reported and investigated to identify actions to be taken to prevent their recurrence. Regular audits will be conducted.

While the design of the hazardous waste interim storage facility meets the above principles, the principles will only be met if the future owner, operator, revenue collector and regulating authorities proactively ensure they are adhered to throughout the facility construction and operational phase.

3 Design

As detailed in “Deliverable 9 – Design upgrade report for 3 hazardous waste storage facilities – Antigua and Barbuda” consideration has been given to the estimated types and quantities of hazardous wastes predicted to arise annually in Antigua and Barbuda over the coming 30 years (designed economic life of the building). The interim storage nature of this facility is also considered with the understanding that wastes are stored for no longer than one year. Based on these considerations, the required size of the proposed HWISF is calculated and designed to be 270m² net, plus 10m² of additional roofed storage for gas cylinders and aerosols.

The conceptual design and sizing of the facility and each storage room is based on the concept that the facility is partitioned by fire resistant walls into three waste storage sections for safe keeping of waste, segregated according to compatibility. Additional buffer space has been provided in each storage room to allow for flexibility of use which also requires correct containment and distancing of the materials as described below.

It is therefore proposed that the HWISF be comprised of four distinct sections as illustrated in Figure 1. This includes three separate storage sections for the interim storage of hazardous waste and one separate section for waste reception and sorting, as well as accommodating equipment storage for facility operations.

Sections 1-3 (approximately 73 m² each) are the designated areas for hazardous waste materials with the most relevant quantities. These substances will be stored in special containers as described in sub-chapter 2.10 of the Design Report.

The fourth section is sized as the waste Reception Area where waste is received, separated, labelled and placed in the appropriate container as well as storage area for specific facility equipment (e.g. forklift, etc.).

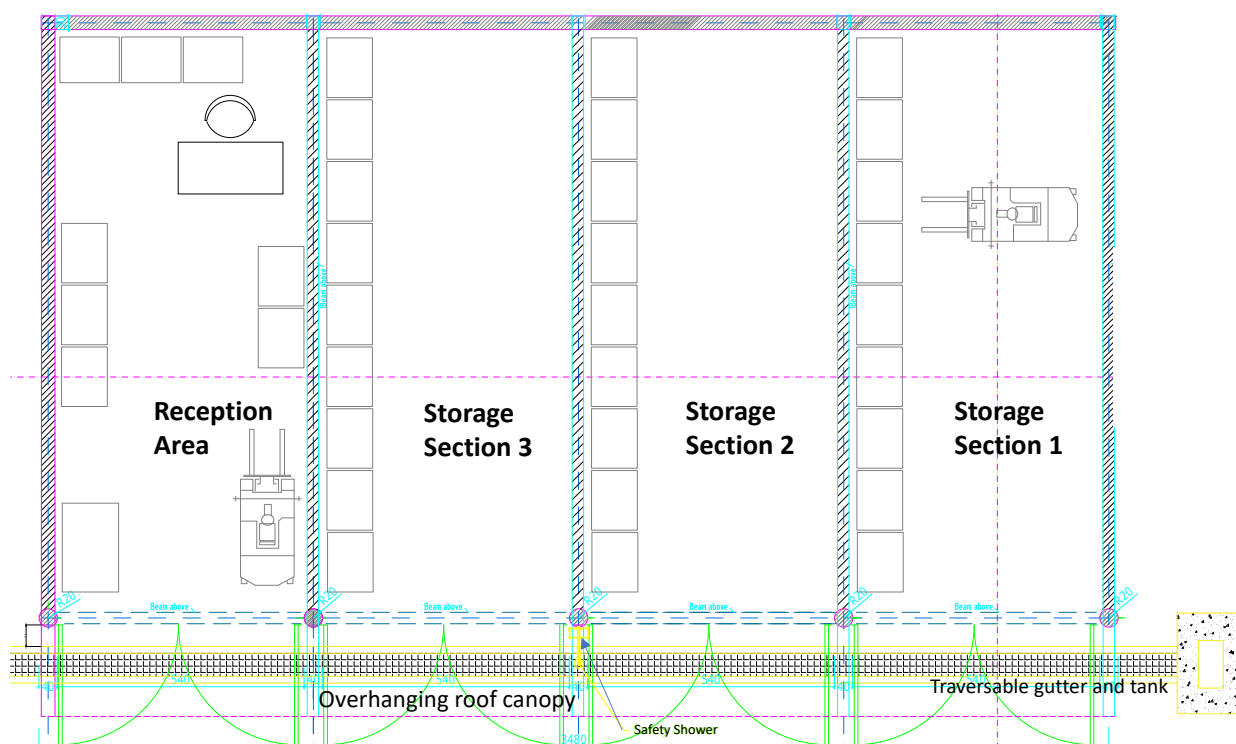


Figure 5: Proposed layout of the HWISF

4 Human Resources (Personnel, Responsibilities and Training)

In order to ensure the successful operation and maintenance of the facility, it must be sufficiently resourced and staffed with competent trained staff. The Operator, whether public or private, shall deploy as a minimum, a facility manager and technician/driver having the required qualifications (at least one must have an advanced degree or equivalent work experience in chemistry and one must have experience in logistics coordination) and experience for the smooth, efficient, and effective operation of the facility.

Facility staff shall have the following minimum roles and responsibilities:

Facility Manager

- (a) Operate and manage the facility and its staff in accordance with the operation and maintenance guidance as prescribed within this document.
- (b) Coordinate all operation and maintenance activities in close coordination with the facility client and regulators ensuring timely response and compliance with all instructions and requests provided by such in accordance with operator contractual arrangements.
- (c) Actively identify, engage with, train and recruit hazardous waste producers to utilise and pay for the services of the facility.
- (d) Examine request for storage of hazardous wastes at the facility and evaluate information on hazardous wastes obtained from generators
- (e) Determine initial analyses and confirmatory tests required for each type of hazardous waste
- (f) Ensure the smooth operation of the laboratory / coordination with third party laboratory ensuring all equipment are always in working conditions and are duly calibrated and all measures are taken to ensure the integrity of the results of the testing (whether this be in-house or through reviewing third party service providers' quality assurance procedures and certification)
- (g) Evaluate analysis results from laboratory and determine whether hazardous wastes may be accepted for storage at the facility
- (h) Ensure the proper packaging and labelling of hazardous wastes at generators' premises
- (i) Ensure the proper collection and transportation of hazardous wastes from generators premises to the facility
- (j) Ensure the proper receipt, unloading, inspection, weighing, sorting, transferring, regrouping, bulking, reconditioning, repackaging, labelling, segregation and storage of hazardous wastes in the facility
- (k) Carry out regular inspection of each storage sub-compartment and containers of hazardous wastes stored within the HWISF to ensure their integrity.
- (l) Make all arrangements (including identifying, tendering and contracting with hazardous waste disposal / treatment facilities operating on the global market, packaging and compliance administration, financial administration, guarantees and insurances, customs clearance, etc) for the exportation and recovery/treatment/disposal of hazardous wastes at licensed facilities
- (m) Implement and maintain/ensure maintaining of waste inventory in the facility (inputs, outputs and stock)
- (n) Establish conditioning, packaging and storage conditions for the different types of waste.
- (o) Ensure the implementation of monitoring as well as its registration, evaluation and record keeping.
- (p) Implement/coordinate internal audits.
- (q) Evaluate HWISF performance, identify opportunities for improvement and implement the necessary changes.
- (r) Report to National Authority.
- (s) Prepare and submit application for exportation of hazardous wastes
- (t) Ensure the proper packing and securing of hazardous waste cargoes in freight containers and placarding of freight containers

- (u) Tracking of hazardous wastes from the time the hazardous wastes leave the facility to delivery at licensed recovery/treatment/disposal facilities
- (v) Submission of certificate of completion of the recovery/treatment/disposal operations to the Client
- (w) Overall responsibility for dealing with spills and other incidents during transportation and on-site.
- (x) Setting-up and maintaining a hazardous waste management tracking system from the point a request for disposal of hazardous wastes to the completion of recovery/treatment/disposal operations

Technician / Foreman / Driver

- (a) Collecting samples of hazardous wastes
- (b) Analysis of hazardous waste samples at on-site laboratory / Transmission of sample to third party laboratory service provider (i.e. Government Analytical Services Laboratory)
- (c) Sampling of hazardous wastes upon receipt at the facility and confirmatory testing
- (d) Analysis of sample test results and preparation / writing of associated report detailing results and implications (whether consignment is accepted or not – if accepted to identify storage conditions and location, if rejected, detailing reason for rejection and appropriate alternate management options to be taken)
- (e) Archiving of samples
- (f) Record keeping
- (g) Operation and management (including service scheduling of forklift truck and

Other supporting staff

The Contractor shall ensure through addition of responsibility to the above staff or through additional staffing the following tasks as required:

- A driver / loader for hazardous waste collection / transport vehicle.
- Facility cleaning and maintenance labourer.
- Weighbridge operator /receptionist; (in co-ordination with the landfill operator)
- Other support staff as deemed necessary for the smooth, efficient and effective operation and maintenance of the facility.

Training and staff competencies

All personnel deployed in the HWISF shall receive the appropriate training, consisting of at least the following:

- (a) General layout of the HWISF, including the acceptance area and storage compartments,
- (b) Location of safety equipment such as MSDSs, PPE, safety shower, eye wash, first aid cabinet, etc. and evacuation points.
- (c) First-aid training.
- (d) Appropriate fitting and use of PPE, including in emergency response situations.
- (e) Fire prevention and use of fire-fighting equipment.
- (f) Identification of classes and divisions of hazardous substances, compatibility and storage containers.
- (g) Understanding MSDS.
- (h) Procedures in the Emergency Plan pertaining to fire, spills or any other incidents.
- (i) Procedures on the operation of the HWISF including desk review, inspection, sampling, analysis, collection, transportation, segregation, transfer, bulking, repackaging, labeling and storage of HZW as well as transfer, marking and placarding of freight containers.
- (j) Record keeping, in particular maintaining the inventory of materials stored in the HWISF.

The above-mentioned skills and competences should be verified and acquired/updated through appropriate and periodic training according to an established competency matrix and training plan. The Operator shall submit to the client a plan listing all the trainings to be carried out and their timeframes.

5 Operation Procedures

5.1 General Principles

The HWISF shall be operated so as to achieve the following objectives:

- safe collection and transportation of HZW
- safe storage pending exportation of HZW, and
- exportation of HZW for treatment, recovery or disposal to licensed facilities.

The operator shall be responsible towards the Environment, the Health, Safety and well-being of its personnel and people affected by its activities.

The daily activities constituting the operation of the HWISF comprise the following:

- **Control Access to the storage facility,**
- **Desk review of disposal request submitted by a waste generator,**
- **Inspection of HZW at the waste generator's premise and sampling for unknown wastes,**
- **Analysis of unknown samples of wastes,**
- **Transmission of weight of HZW to the Employer,**
- **Collection and transportation of HZW to the storage facility,**
- **Reception, segregation, transferring, bulking, repackaging, labeling and storage of HZW at the storage facility,**
- **Drum washing, reuse, cutting and crushing; and**
- **Exportation of HZW to licensed disposal/treatment/recovery facilities.**

Before operating the facility, the following will need to be provided, inter alia, by the Operator:

- **A detailed plan to comply with environmental regulations regarding the limits of any emissions into air, surface water and soil.**
- **A plan for environmental auditing and a programme for a safe and efficient operation of the facility.**
- **Arrangements for data recording.**

5.2 List of Permitted Hazardous Wastes for Storage at the Facility

The list of HZW accepted for storage at the facility is as follows:

- (a) Inorganic liquid wastes
 - Alkaline wastes with cyanide
 - Alkaline wastes without cyanide with pH>9
 - Acidic wastes with pH<4

- Wastes containing Cr⁶⁺ and/or other heavy metals
 - Other inorganic liquid wastes
- (b) Inorganic solid wastes
- Sludge containing heavy metals
 - Oxidizing wastes
 - Unused/expired chemicals, other than reactive and oxidizer wastes
 - Other inorganic solid wastes
- (c) Organic waste with flashpoint < 55°C (Flammable wastes)
- Liquid flammable organic wastes
 - Solid flammable organic wastes
- (d) Organic waste with flashpoint > 55°C (Non-flammable wastes)
- Liquid non-flammable organic waste
 - Solid non-flammable organic waste
- (e) Mixed Inorganic/organic liquids and solids
- Special wastes (pesticides, chemicals, etc.)
- (f) Pharmaceutical wastes

5.3 List of waste accepted, but not stored within the HWISF building

- (a) Waste aerosols and compressed Gases
- (b) Hazardous components from WEEE

Although these types of wastes fall within the operating principles of the HWISF, they are not going to be stored with the building due to alternat provisions being made.

Cans of compressed gasses and aerosols (UN Class 2) are recommended to be stored in a separate shed with ventilated sides which is to be constructed outside the main HWISF, with the following characteristics:

- The roof will be a single metal sheet.
- All sides are closed with a fixed mesh wire construction including a lockable door of mesh wire.
- It is to be located at a minimum distance of 7 metres from any open sides of the HWISF and at least 1.5m from walled sides (i.e. a non-combustible barrier at east 1.5m high with a fire-resistance rating of at least one hour).
- It is preferable to locate it in a shaded area to avoid direct sub exposure on the gas canisters to minimise temperature ranges.
- Groundwater protection measures in the storage are not necessary for the gaseous wastes.

Hazardous components of WEEE are to be stored in a container, separated from the HWISF building.

5.4 List of Prohibited Wastes for Storage at the Facility

The list of prohibited wastes is as follows:

- (a) Municipal Solid Wastes
- (b) Non-hazardous industrial wastes
- (c) Radioactive wastes
- (d) Explosive wastes
- (e) Infectious wastes

5.5 Operating hours

The operating hours of the facility shall be defined in coordination with the owner, operator and regulator. However, it is recommended that the facility is manned and open as follows to ensure unhindered delivery and acceptance of hazardous waste from all producers:

- Monday to Friday: 09:00 hours to 17:00 hours
- Saturdays, Sundays and public holidays: closed

5.6 Access to the Storage Facility and Site Security

Access to the site shall be controlled and only authorized persons shall be allowed to the site after approval from the client. The operator shall request any person wishing to visit the facility to seek prior authorization from the client and produce the authorization at the time of their visit. Copy of the authorization issued by the client to this effect shall be transmitted to the operator prior to any visit.

Records of vehicles/persons entering the facility shall be kept at all times. Any authorized visitor within the facility shall be accompanied by the Operator or one of his designated staff.

The site will have a 24-hour security watch all year round (this may be combined with the security for the adjacent landfill site, provided clear coordination agreement is in place).

The control of access to the site will be achieved through the following:

- Site fencing and gates, with warning notices around the operational areas and the site boundary,
- Security barriers and gates including temporary barriers to prevent any unauthorized access to areas to the site, and
- Patrols during operation hours on a random or continuous basis.

The operator shall make provision for the availability of proper communication facilities such as internet, telephone, cellular/mobile phone on site.

5.7 Desk Review of Disposal Request

All disposal requests from generators will have to be made to the Client with a view for the latter to know the potential sources, quantities and measures to put in place to increase capture rate.

Once disposal requests for HZW are made to the Client, same shall be transmitted to the Operator of the HWISF who shall then review the disposal requests. The desk review shall consist of assessing the disposal request made by the generator and identifying the hazardous and non-hazardous components of the disposal request while proposing alternative disposal methods for non-hazardous wastes. No disposal requests shall be reviewed by the Operator without the prior approval from the Client. During the desk review, the Operator may however contact the HZW generator for any additional information required on the wastes generated such as the material safety data sheet (MSDS), the estimated quantity of wastes generated, details on the processes through which the wastes are generated, etc.

5.8 Inspection at the Premises of the Hazardous Waste Generator

Once the preliminary information on the HZW has been obtained and the desk review has been completed, a preliminary assessment report shall be submitted to the Client following which an inspection exercise shall be scheduled at the HZW generator's premise in the presence of a representative of the Client. During the inspection visit, maximum data/ information on the wastes generated such as the weight, the storage containers, the physical state, etc. shall be gathered and recorded. For unknown wastes, samples shall be taken for subsequent analysis using a well-established sampling protocol approved by the Client. Both the weight of known HZW and unknown wastes shall be recorded, albeit separately. For known HZW having all required information, no samples are to be collected for analysis.

For WEEE (if and when accepted), a record of the hazardous components i.e. types, the number of units and the conditions shall be kept.

5.9 Analysis of Unknown Samples of Wastes

Following the inspection exercise, the unknown samples collected shall be analyzed to determine their hazardous nature. The analysis may be carried out by the Operator, Government Analytical Services, or contracted out if the analysis cannot be done in-house. The parameters to be tested shall be restricted to those that allow for the proper handling, repackaging, labeling, separate storage, transportation and treatment/disposal of the wastes. If found hazardous, the weight of the unknown wastes shall be recorded as HZW and included in the total amount of HZW recorded during the inspection exercise. If found non-hazardous, the weight of these wastes shall not be included in the total amount of HZW recorded during the inspection exercise and these wastes shall not be accepted at the facility. Instead, the Client and the waste generator shall be advised of alternative treatment/disposal methods for these non-hazardous wastes.

NOTE: If waste composition is unknown, without analysis it cannot be determined if the waste is hazardous or non-hazardous. Analysis can be as basic as determining the nature of the substance for adequate storage segregation purposes. However, without a clear indication of the nature of the waste and subsequently its properties (UN Class etc.), the waste will not be able to be shipped off island to a licensed facility for treatment/disposal.

Basic analysis could be performed by the operator, by the generator in collaboration and full transparency with the operator, by existing Government Analytical Services labs, or third party contracted by generator and / or operator.

Who pays for the analysis will be subject to national regulations. Often incurring the cost on the generator will discourage generators or owners of obsolete chemicals stocks from coming forward and could also lead to illegal dumping, so careful consideration should be given to these aspects.

5.10 Transmission of Weight of Hazardous Wastes to Client

Once the total amount of HZW has been computed (after analysis of unknown samples), the Operator shall inform the Client of the weight of HZW present within a particular waste generator's premise. This information is important for the Client in case any payment of a disposal fee is required from the waste generator. In case repackaging is required (either at the waste generator's premise or at the storage facility) to meet UN requirements, the weight of HZW transmitted to the Client shall include the weight of the repackaging materials required.

For the HZW components of the WEEE, the details of the types of components, the number of units and their weights shall be transmitted to the Client.

5.11 Collection and Transportation of Hazardous Wastes to Facility

The Operator of the HWISF or a specifically licensed (in accordance with national legislation) hauler shall be responsible for the collection and transportation of HZW from the generator's premises to the facility. Repackaging of the HZW may be carried out at the generator's premise to meet UN requirements, if applicable, and the total weight of the HZW collected at the waste generator's premise shall be recorded in the presence of a representative of the Client and the waste generator. For any HZW that cannot be repackaged or weighed at the generator's premise, same should be done at the HWISF accordingly in the presence of a representative of the Client. The waste generator shall be allowed access to the HWISF to witness the repackaging/weighing, if required.

The HZW shall be transported to the facility in a proper collection vehicle while abiding by all applicable local legislations/regulations. The operator shall affix in a conspicuous position in front and at the rear of the vehicle

transporting HZW a plate bearing the words “HAZARDOUS WASTES” of height 100 mm in black color. The plate shall be a metal plate and of orange color and of at least 60 cm in length and 15 cm in height. The vehicle shall be kept clean and dry and fit to receive HZW for transportation at all times. The vehicle shall be equipped with a wheel chock of a size suited to the maximum mass of the vehicle and to the diameter of the wheel. All the HZW need to be properly repackaged and labeled properly, at the generator’s premise wherever applicable, and incompatible wastes are not to be packed together. The collection vehicle shall not be overloaded, and no leakage must occur during the transportation. Should any leakage occur, the Operator shall have in his possession the proper spills management kits to properly contain the leakage in an environmentally safe and sound manner.

The hazardous components of the WEEE shall be collected in such a manner so as to make the collection and transportation process cost-effective.

5.12 Reception, Segregation, Transferring, Bulking, Repackaging, Labelling and Storage of Hazardous Wastes at the Storage Facility

Once the HZW have been transported to the facility, these shall be weighed using the weighbridge. The wastes collected shall be cross-checked against those inspected during the inspection exercise through visual inspection and comparison with the information previously submitted by the generator. Samples may be taken for confirmatory tests and if the results do not tally with those of the samples taken during the inspection exercise, the generator and the Client will be informed of same. If these wastes are prohibited at the facility, the generator will need to arrange for the collection. The Client will be informed of the incident so as to initiate appropriate follow up actions.

The HZW shall then be weighed individually within the HWISF and records of each HZW including the name of the wastes, weight, date of collection, details of the storage containers, waste generator’s details, UN class number and divisions shall be kept. The HZW shall then be segregated, transferred and bulked, if applicable, based on their compatibility.

HZW shall be repackaged into appropriate UN approved containers that can store the HZW in an environmentally sound manner without any risks to human health and the environment. The repackaging shall be done in accordance with the requirements of the UN Recommendations on the Transport of Dangerous Goods, prior to storage and subsequent exportation to licensed recovery/treatment/disposal facilities.

The repackaged and properly labeled HZW shall then be stored in their respective compartments within the HWISF.

Compatible wastes shall be re-grouped together taking into consideration the specifications of the final treatment/disposal, prior to storage at the facility and subsequent shipment to licensed facilities for recovery/treatment/disposal. The purpose of regrouping is to obtain larger and more homogeneous volumes for waste treatment, to improve safety (e.g. facilitating handling) and to rationalize the costs of logistics.

The Operator shall establish procedures for situations involving the transfer of HZW which may have solidified or stratified or leaking from its original containers into UN-approved containers and shall be fully equipped and prepared to resolve such problems.

Incompatible wastes are not to be stored together. The containers shall be placed on pallets and same placed in the dedicated compartments, as detailed out in Section 2.

Segregation of hazardous waste in the respective sections of the HWISF will be conducted in accordance with compatibility, in order to avoid adverse reactions which would endanger the safety of workers and environment in case of accidental mixing or fires. Specific division of materials between the three sections will be dependent upon specific quantities of waste being stored at the facility and containment vessel availability which may change overtime.

Organizing the types of wastes to be stored in the same section will be undertaken based on the UN class of the specific waste as specified in the MSDS when composition is known or based on the composition determined by laboratory analysis. Each different type of waste is to be stored in separate safe packaging with no incompatible wastes sharing the same container or spill catchment tray. Compatibility and segregation rules in Table 3 will be adhered to when deciding where to place a certain waste type within the HWISF. The table was adapted based on UN Model regulations on Dangerous Goods and International Maritime Dangerous Goods Code (IMDG).

Table 3. Dangerous goods (substances and waste) compatibility table and segregation rules.

UN Class/division*		3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	8	9
3	Flammable liquid	X	X	2	1	2	2	X	3	X	X
4.1	Flammable solids (including self-reactive substances)	X	X	1	X	1	2	X	3	1	X
4.2	Substances liable to spontaneous combustion	2	1	X	1	2	2	1	3	1	X
4.3	Substances which, in contact with water, emit flammable gases	1	X	1	X	2	2	X	2	1	X
5.1	Oxidizing agents	2	1	2	2	X	2	1	3	2	X
5.2	Organic peroxides	2	2	2	2	2	X	1	3	2	X
6.1	Toxic substances	X	X	1	X	1	1	X	1	X	X
6.2	Infectious substances	3	3	3	2	3	3	1	X	3	X
8	Corrosive substances	X	1	1	1	2	2	X	3	X	X
9	Miscellaneous hazardous substances/wastes	X	X	X	X	X	X	X	X	X	X

* Substances / wastes pertaining to the following UN classes would not be accepted at the HWISF:

Class 1 – Explosives – not admitted at the HWISF: to be managed by the military/defense force.

Class 2 – Gases and aerosols – cans of pressurized gasses and aerosols are recommended to be stored in a separate shed with ventilated sides, described below.

Class 6.2 – Infectious substances – are intended to be handles and destroyed by the medical waste management units at the hospital.

Class 7 – Radioactive material – not admitted at the HWISF, to be managed by responsible authorities according to specific international protocols.

Segregation code	Meaning
X	<p>No segregation required (unless specific segregation provisions are provided in the Dangerous Goods List).</p> <p>Most dangerous goods of the same class (division) have similar primary hazards and are usually considered to be compatible. Please note, however, that there are a number of different types of solid 'pool chlorine' materials within Division 5.1 which are mutually incompatible – refer to MSDS for further information.</p> <p>With a few exceptions, which should be indicated on MSDS, goods of these classes (divisions) are usually non-reactive with each other. However, in an emergency such as a spill, leak or fire, the presence of the second class (division) may lead to different hazards or increased risk such that additional control measures are required. Refer to MSDS for guidance.</p> <p>In case of Class 8, if one material is a concentrated, strong acid and the other is a concentrated, strong alkali, than these should not be stored in the same section.</p>
1	<p>'Away from' - the distance between the packages to be at least 3 meters.</p> <p>While goods of these two classes (divisions) are usually non-reactive with each other, a fire involving the fire risk goods may lead to the release of large clouds of toxic gases or vapors.</p>
2	<p>'Separated from' - the distance between the packages to be at least 6 meters.</p> <p>In some cases, interaction may result in fire or evolution of toxic vapors. For those that do not interact, a fire involving one may be violently accelerated by the presence of the other. These classes (divisions) should not be kept in the same area unless it can be demonstrated that the risks are fully controlled.</p>
3	<p>'Separated by a complete compartment or hold from' (at least 12 meters.)</p> <p>Store in different section, together with compatible wastes.</p>

A Log diary, as approved by the Client, shall be kept on site for record of the quantities of waste entering the site as noted from the weighbridge.

The operator shall assign a unique identification code to each type of HZW collected from each individual generator to ensure its traceability from collection to the completion of recovery/treatment/disposal operations. The unique identification code shall allow the following information to be retrieved:

- (a) Description and quantity of the HZW received at the facility
- (b) Date of collection
- (c) Contact details of HZW generator
- (d) Complete HZW analysis results and confirmatory test results
- (e) Decision to accept or reject the HZW for storage at the facility
- (f) If accepted for storage at the facility, serial number of storage container, packaging and labeling details
- (g) Storage location of the HZW within the facility (storage room, row, shelf, section, etc.).
- (h) Date of export and exporter, destination (to be filled in upon HZW exiting the facility).

The above information shall be kept at all times at the facility for inspection by the Client.

Note: The facility is not intended to store waste for more than 18 months, waste should be shipped to licensed facilities regularly, in the UN containers it is placed in upon arrival at the facility, following the operations

mentioned in this manual. UN containers are unlikely to deteriorate if used as per UN Recommendations on the transport of dangerous goods provisions but must be checked regularly and specifically prior to shipment.

5.13 Drum Washing, Reuse, Cutting and Crushing

Hazardous waste received should be packaged upon arrival in UN approved containers and shipped to licensed facilities within the container in which they were initially packaged.

In exceptional cases (such as smaller quantities than anticipated, etc.) waste could be repackaged before shipping. Used drums and used IBCs (Intermediate Bulk Containers) shall be cleaned and reconditioned to enable re-use for same purposes where technically and economically possible. Cleaning can be done by pouring, pumping, aspirating, shaking, scraping and chipping, etc., or if necessary, through a combination of these. Container washing operations must take account of the former contents and any residues that may be present. This process, however, should be avoided or minimized, as it generates wastewater which the HWISF is not designed for and would therefore require adequate treatment offsite.

If the reuse of the containers is not possible, then these shall be cut or shredded with a view of reducing the volume, provided all safety measures can be ensured to avoid generation of dust, aerosols, sparks or other hazards for the safety of personnel or the environment. Such operations should be authorized and supervised by the Facility Manager on a case by case basis. Containers used to store cut drums / IBCs should be covered. Contaminated packaging should be regarded as hazardous waste and be shipped for sound management to licensed facilities.

5.14 Exportation of Hazardous Wastes to Licensed Disposal/ Treatment/ Recovery Facilities

HZW are not to be stored within the storage facility for more than 18 months. A program for the exportation of HZW on an annual basis shall be submitted to the Client.

During this interval, all required national and international clearances and permits for the exportation of the HZW shall be sought.

Shipment of HZW shall be carried out in accordance with the provisions of the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal, to which Antigua and Barbuda is a Party and the International Maritime Dangerous Goods (IMDG) Code and its Supplements relating to the safe carriage of dangerous goods at sea.

The operator of the facility must thus submit an application for the exportation of HZW to the Competent Authority for the Basel Convention in Antigua and Barbuda, to the competent authorities of destination, transit and trans-shipment through the use of notification documents.

The application must contain the following documents:

- (a) Cover letter to the attention of the Competent Authority.
- (b) Duly completed notification and pre-filled movement documents.
- (c) Letter from the Director of the shipping company indicating the shipping route from Antigua and Barbuda to the final destination including all ports of call (transit and trans-shipment).

- (d) Duly completed contract between the exporter and the importer and/or disposal/ recovery facility (if different from the importer) (Reference template at **Annex 1**).
- (e) Bank guarantee covering possible re-shipment of the HZW to Antigua and Barbuda (Reference template at **Annex 2**), and
- (f) Permit of the treatment/recovery/disposal facility.

The Client will authorize the exportation of the HZW once the consent of the country of import and all countries of transit are received.

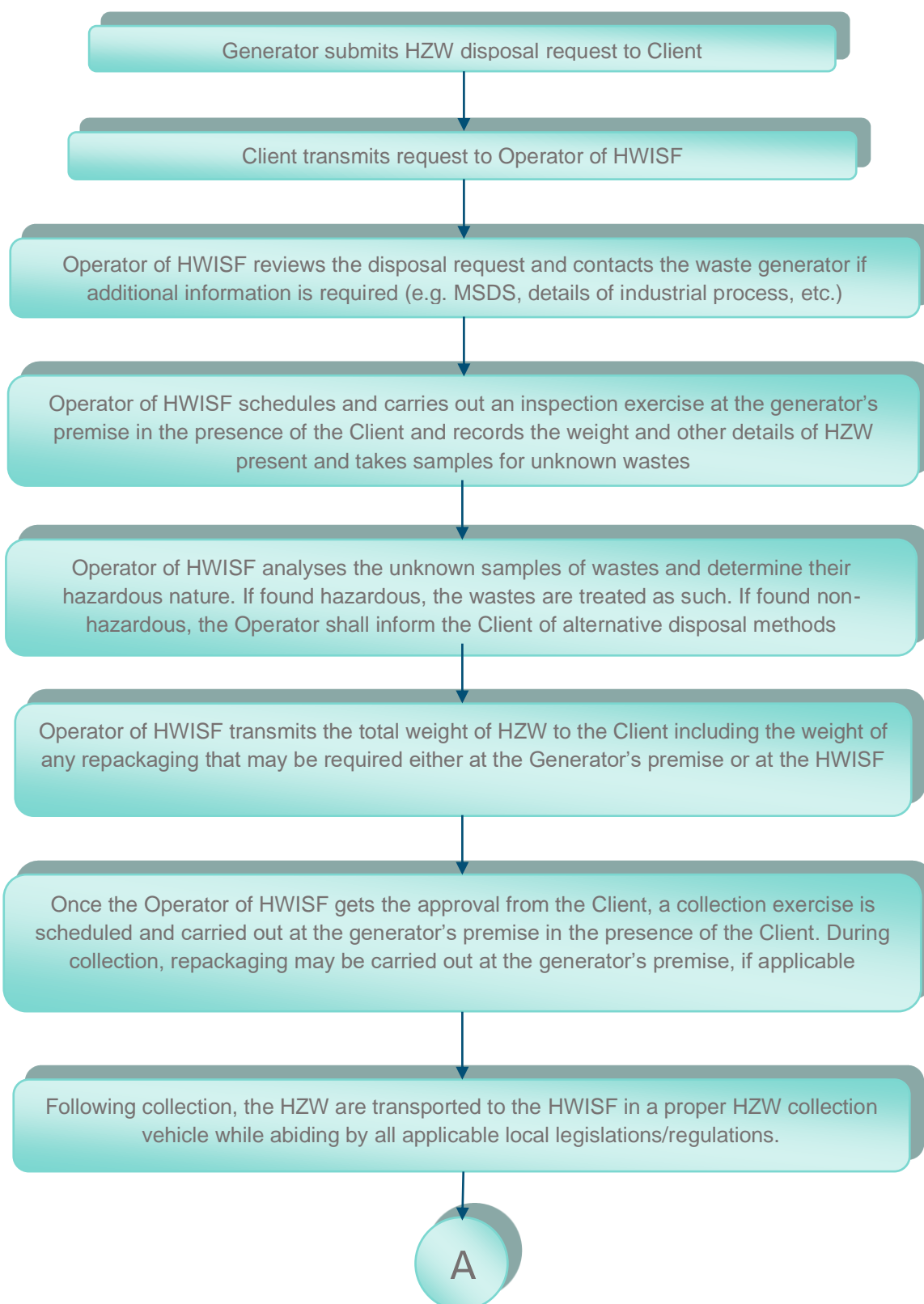
The transfer and loading of the HZW, including WEEE, into freight containers shall be carried out in an environmentally safe and sound manner while protecting the health of all the personnel involved.

The Operator shall ensure that the HZW cargoes for shipment have been repackaged, labeled, packed, secured, marked and placarded and have been provided with the required signs, in accordance with the IMDG Code and other applicable regulations. The person responsible for the packing of the HZW cargoes to a freight container shall provide a signed Container Packing Certificate stating that the cargo has been properly packed and secured and that all applicable transport requirements have been met. Such a declaration shall be attached to the transportation documents.

Only compatible wastes are to be shipped in the same freight containers, but the exportation process shall also be optimized as far as practically possible. A tracking process must be put in place to ensure that the HZW have been well received at the intended treatment/disposal/recovery facilities and that a certificate of delivery/destruction is provided by the Operator of the intended facility.

All transfer of HZW into freight containers for shipment shall be carried out in the presence of a representative of the Client.

5.15 Flowchart for Operation of the Hazardous Waste Storage Facility and Exportation of Hazardous Wastes





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Once at the HWISF, the HZW are cross-checked against those inspected. The HZW are weighed individually and records of each HZW are kept. The HZW shall then be segregated, transferred and bulked, if applicable, based on their compatibility, repackaged and labeled as per UN requirements. The repackaged and properly labeled HZW shall then be stored in their respective compartments within the HWISF.

Once all clearances and permits have been obtained, the HZW are transported and loaded into freight containers for exportation in the presence of the Client's representative. All freight containers must have appropriate placards securely attached as per international requirements and only compatible wastes are to be shipped in the same freight containers. The Operator of the HWISF tracks the exportation process and ensures that the HZW have been well received at the intended treatment/disposal/recovery facilities.

6 Cleaning and Maintenance Procedures

The cleaning and maintenance procedures at the HWISF shall consist of:

- Washing and cleaning of plant and equipment,
- Handling and disposal of contaminated materials or effluents,
- Maintenance of the HWISF and all associated equipment, machinery and accessories,
- Control of nuisance and odors; and
- General care of the site.

6.1 Washing and Cleaning of Vehicles

Contamination through spills in/on vehicles, including transportation vehicle and forklift, should be cleaned using suitable absorbent materials which are present at the HWISF. For regular maintenance not involving spills, vehicles are to be washed and cleaned in a dedicated space, on landfill premises. Any wastewater resulting from this operation which is likely to be contaminated. If the wastewater is found to be hazardous, this shall be treated as HZW. Small quantities of contaminated water could potentially be discharged in leachate/wastewater treatment plants if not posing significant risk, however this needs to be determined on a case by case basis. If the wastewater is found to be non-hazardous, this may be disposed of as normal wastewater.

6.2 Handling and Disposal of Contaminated Materials or Effluents

Any contaminated materials or effluents generated as part of the daily operation at the HWISF or in case of emergency situations such as spills are to be treated as HZW. These shall be placed in their respective UN-approved containers based on their class number and division and stored in the dedicated compartments prior to shipment to licensed disposal/treatment/recovery facilities. Like for other HZW, all records pertaining to contaminated materials or effluents emanating from the operation at the HWISF shall be kept and submitted to the Client on a monthly basis.

6.3 Control of Nuisance and Odour

Nuisance in the form of rodents or insects shall be mitigated through the use of poisonous bait and traps and the site shall be regularly inspected and carcasses removed.

Odor shall be reduced to a minimum by solving the problem if same is found within the HWISF by regular and constant cleaning. The operator shall not use masking sprays to cover-up odor. Good design, a smooth operation and good housekeeping practices (cleaning and ventilation) are considered far more relevant to odor control than chemicals and masking sprays.

7 Monitoring Procedures

Monitoring of the HWISF will be limited to surface water and air monitoring. General visual inspection shall be carried out as mentioned in the Cleaning and maintenance section above. A monthly monitoring report shall be prepared and submitted to the Client.

7.1 Surface Water Monitoring

As a good practice, any direct discharges to surface water should go through a silt trap and oil separators/interceptors that will have to be cleaned on a regular basis. Compacted bales of hay (dried grass stalks) can also be installed in drainage channels to retard surface stormwater flows and filter any oils and sediments prior to existing site perimeter (used bales can be put to landfill if not contaminated with hazardous wastes).

The operator will have to ensure that proper measures are taken to minimize storm water contamination such as ensuring that all areas where there are risks of spillage are properly covered to prevent storm water contamination.

Rainwater runoff should be collected in a basin with runoff discharge. Water from the basin should be regularly monitored (i.e. on a quarterly basis) to establish the performance of the HWISF in terms of preventing contaminant releases. The surface water shall be tested for its compliance to standards for discharge to surface waters or any deviation from upstream water quality. Analyzing parameters should include contaminants present in the waste most frequently received in the facility

7.2 Air quality Monitoring

HZW may comprise volatile components such as volatile organic carbons, ammonia, acid gases, etc. and these may present potential harmful health effects. The HWISF is an open site and ventilation is well ensured. Nevertheless, should there be any smell arising from HZW, the operator shall identify the source and solve the problem accordingly. If the source is a spill, it shall be ensured that the spill is contained and mitigation or corrective actions are taken accordingly. If the source is from a container, same shall be repackaged properly.

8 Health and Safety/Emergency Plan

The Operator of the HWISF shall submit an Emergency Plan to the Client before the start of operations. The emergency plan must include all protocols and procedures to be followed in case of fires, spills and other emergencies. The emergency plan shall also list all the health and safety measures taken at the facility to prevent loss of life, injury to personnel, minimize property damage and protect the surrounding environment.

The Emergency Plan will be elaborated considering national legal requirements but include not less than the aspects stated below. A collaboration relationship should be established with competent authorities to review and test the elaborated plan on a regular basis.

8.1 Fire Prevention and Fire-Fighting System

The facility is equipped with smoke detectors connected with an alarm system in case of fires as well as fire-fighting equipment such as mobile and wall-mounted fire extinguishers. As a measure of preventing fire spreading across the storage facility, the different compartments are constructed with high-quality hollow concrete blocks. It should be ensured that the smoke detectors and alarm system are operating at all times and that all fire extinguishers provided on-site have not reached their expiry dates. Should this be the case, the fire extinguishers need to be replaced accordingly.

The operator shall also submit to the Client procedures and measures that will be adopted to prevent fire or its propagation.

The following fire prevention measures, at a minimum, shall be put in place:

- “No smoking” signs within the precincts of the building.
- All employees expected or anticipated to use fire-fighting equipment shall be instructed on the hazards of firefighting, their operations and procedures to follow in alerting others.
- Fire prevention strategies shall be a major component of all induction training programs.
- Rubbish/waste or HZW stored and kept in demarcated place.
- Means for extinguishing fire to be readily available and maintained. A record thereof shall be kept.
- All flammable substances are to be properly stored.
- Combustible waste materials and residues in any operating area to be kept as per its authorized quantity and dispensed accordingly.
- Hot works such as welding or cutting operations performed upon written permit from Client and under supervision.
- All fire protection facilities shall be adequately maintained and be periodically tested to ensure that they are in satisfactory operating conditions and will serve their purpose in time of emergency.
- The servicing, maintenance and testing of fire detection systems, including cleaning and necessary sensitivity adjustments to be performed at regular periodic intervals and a record thereof shall be kept.
- Approval of an electrical engineer/competent person to be obtained before using any extension cord and multi-plug socket.
- Area around equipment kept free of flammable or combustible materials.
- Dispensing and use of flammable liquids in a safe place where there is good ventilation and no source of ignition; and
- All containers of flammable liquid kept closed when not in use.

Fire notices shall be posted in conspicuous places where employees and visitors can take notice.

The operator shall detail out all the means in terms of human resources, training and equipment that will be required to ensure a rapid and adequate response to any fire situation.

A set of standard instructions to be followed in a fire situation by individual members of the staff shall be prepared and reviewed at regular intervals. The aim will be to ensure that there are no undue delays after an outbreak of fire has been discovered through prompt action by an effective organization.

At least twice in a year, a fire drill and an evacuation exercise shall be carried-out to check the efficiency of the procedure and other arrangements made. All weaknesses shall be recorded and reported to the Client for any corrective actions to be implemented before the next exercise.

All staff members shall be familiar with the evacuation signal; a monthly test of the fire alarm system shall be carried out to enable occupants to familiarize themselves with the particular sound.

8.2 Spills Management

It shall be ensured that the appropriate spill management equipment for each type of HZW stored on site is available in case of any spills of HZW. Any spills or accidental release of HZW shall be contained as soon as identified. Spill kits shall be available at different points in the storage facility and these must have the minimum spill management materials required including absorbents, trowels, brooms, shovels, binding agents, etc. All spill management materials contaminated with HZW shall be disposed of as HZW. Spills may also be collected in special collection trays and these shall then be transferred to the UN-approved containers for disposal as HZW.

Once the spill has been contained and managed, the contaminated area shall be cleaned. The Operator shall make use appropriate cleaning material (water, chemical, etc.) to clean the contaminated area depending on the materials spilt. The MSDS shall be consulted to decide on the chemicals to be used to clean the contaminated area.

8.3 Health & Safety Aspects

It shall be ensured that all the personnel deployed in the HWISF are provided with the appropriate PPE. All PPE to be used shall be in line with the recommendations of the MSDS of the HZW / chemicals being handled.

The minimum PPE necessary to be provided to and used by workers is specific for the operations carried out. This includes:

- a) For waste acceptance and storage operations, the following PPE must be worn by site staff involved in unloading and storing of hazardous waste:
 - a. Eye protection – safety glasses, goggles, a face shield
 - b. Gloves – gauntlet gloves
 - c. Chemical apron for clothing protection
 - d. Respiratory protection (depending on the situation and the hazards posed by the handled waste)
 - e. Heavy-duty footwear with slip reducing soles and steel caps.

- b) During spill response. In the event of a leak or spill, the following items may be required and should be stored near the hazardous waste acceptance and storage areas:
 - a. Coverall suit
 - b. Chemical resistant face shield
 - c. Chemical resistant boots
 - d. Emergency respirator

- e. A spill kit (or kits) appropriate to the quantities and types of wastes stored.

The amount and type of PPE kept on site should be sufficient all staff for everyday sorting and storing of HZW, as well as for response to any spills or other incidents. PPE should be kept separate from normal clothing. After use, all PPE should be maintained and cleaned in accordance with the manufacturer's instructions and the relevant national regulations. It is recommended that staff wear clothing made from natural fibers, to minimize risk of burns in case of fire.

In addition, showers are provided at entrance gate of the compartments and these shall be used in case of eye/skin contact with certain chemicals/HZW.

At a minimum, the following safety rules shall be applicable at the facility:

- **Prevent the accumulation of flammable or combustible materials such as rags, solvents, or paper except in approved storage containers or receptacles.**
- **When not in use, store hand tools in their proper location with sharp edges facing inwards.**
- **Maintain all tools and work equipment in good condition.**
- **Store or place heavy equipment on low levels.**
- **Ensure explosion-proof electrical equipment is properly equipped and maintained.**
- **Clean up all accidental spills immediately.**
- **Keep access clear to walkways, exits, safety and firefighting equipment.**
- **Food or drink shall not be kept or consumed in areas where possible contamination may be present.**
- **Do not carry matches or lighters into any work site or any classified area where an explosive atmosphere could be present.**
- **Use only approved cleaning agents.**
- **Never use open flames to test for gas leak.**
- **Use only approved safety receptacles to store or transport flammable liquids.**
- **Use only approved storage containers (flammable liquid cabinets) for storage of flammable liquids.**
- **All containers should be correctly labeled to identify the contents.**
- **Avoid routing cables, cords and hoses through aisle ways, walkways, driveways or doorways, if possible.**

All employees shall be made to adhere to basic rules of conduct while at work or while engaged in any response activities. The attention of employees should be drawn to the fact that failure to follow basic rules of conduct or any other health, safety or environmental rule is considered a serious performance issue and may result in disciplinary action, up to and, including termination of employment.

9 CLEANING AND MAINTENANCE PROCEDURES OF HWISF BUILDING AND EQUIPMENT

9.1 General

The Operator shall plan and execute cleaning and maintenance procedures ensuring, that

- The buildings, structures, seeded and planted areas, paved and un-paved traffic areas etc. are maintained clean and proper without damages, that may impede their functionality or appearance.
- All moving or fixed equipment and machinery are maintained clean and in good working condition.
- All service facilities, e.g., outdoor sewage system is inspected regularly, cleaned and maintained.
- Painting of all structures, plant and equipment, as and when required.
- Maintain of all the fencing located on the site and its perimeter, including the fence posts, fixtures, entrance gate, etc.
- Maintain all plumbing works and electrical systems, including equipment, bulbs, etc. and provision to replace them, when found to be defective.

All mechanical equipment and machinery used at the facility must be strictly maintained according to the supplier's/producer's specifications, which are attached as Appendix 3 and are an integral part of this manual.

Every day at closing time the facility should be inspected to ensure no equipment or container is misplaced and all emergency/security detection/alarm systems are functional. .

9.2 Fence and Surrounding Areas

The fence and the surrounding areas in the vicinity of the HWISF shall be inspected and windblown litter removed on a regular basis, e.g. once every week. Collected litter shall subsequently be disposed of at the landfill.

Registered damages of the fence and gate must be repaired immediately.

9.3 Reception Area

The reception area shall be kept free from dropped and windblown waste and soil/mud.

9.4 Weighbridge

The following requirements regarding the weighbridge have to be co-ordinated with the landfill operator:

The weighbridge and the weighbridge foundations shall be kept clean and free of spilled waste.

The weighbridge shall be serviced and maintained strictly in accordance with the supplier's specifications.

The weighbridge shall be controlled and certified on a yearly basis by the competent authority:

[Name, tel. and contact person of the local standardisation office]

Any calibration needed shall follow the directions and regulations given by the above authority.

In the case of any problems with the weighbridge operation, the responsible operator shall immediately inform the HWISF/ landfill management, who in turn will order the immediate repair works. The above stated competent authority shall be informed of any irregularities of the function of the weighbridge, which may have an influence on the accuracy of the weighbridge results.

The HWISF management shall search for cooperation with other facilities that possess an approved weighbridge to enable weighing even at times when the weighbridge is out of operation.

In case of malfunction of the data registration system the weighbridge operator shall immediately inform the HWISF management, who in turn will order the immediate repair works and will inform the Owner of the HWISF. In such a period the data on delivered waste will be recorded manually. When the data system has been repaired and in operation all the manually registered data shall be converted to the data system.

9.5 Buildings, Structures and Installations

Observed damages to buildings, structures and installations must be repaired immediately.

For all significant incidents a damage report shall be prepared and send to the Owner of the HWISF.

The HWISF must always be kept clean and tidy for optimal working conditions.

9.6 Equipment and Machinery

Equipment and machinery used at the HWISF must be strictly maintained according to the supplier's/producer's specifications, which are attached as Appendix 3 and are an integral part of this manual. Instructions on the frequency of lubrication, oil change and inspections must by strictly adhered to.

The equipment and machinery must be kept clean and protected from corrosion.

A logbook must be kept for each main element of equipment. Logbooks shall as a minimum be available for

- Fork-lift
- Oil filter press
- Aerosol can disposal system
- Fire detection system
- Firefighting equipment

All data regarding service, maintenance and repair of the equipment shall be recorded in the logbooks.

A minimum supply of consumables (storage containers, personal protective equipment (PPE), etc.) must be kept and maintained within the facility.

9.7 Access and Maneuvering area

The roads must be inspected regularly. Any potholes or other damages must be repaired within the shortest period of time ensuring, that minor damages do not develop in to an extent, which may impede the function of the facility.

By the end of each working day all paved areas at the HWISF and the external access road shall be inspected for dust, litter and spillage of waste.

9.8 Surface Water Ditches

Surface water ditches shall on a regular basis be inspected and kept clear from waste, vegetation, soil and sand to prevent clogging of the system. The ditches must be inspected at least once per week and supplemental after any heavy rainfall. Any damages to the lining of the ditches shall be repaired immediately.

Annex 1

Contract Template

between "The Notifier"
[company name]
[contact information]

and "The Consignee"
[company name]
[contact information]

concerning the shipment of *[waste description and quantity]* from *[country of dispatch]* to *[country of destination]* for *[recovery / disposal]* at the Consignee's facility in relation to notification number(s):

.....

The Notifier and the Consignee agree on the following terms:

1. The Notifier agrees to deliver the waste to the Consignee for the *[recovery / disposal]* thereof and the Consignee agrees to receive the waste and *[recover / dispose]* it in an environmentally sound manner according to national and international legal and statutory prescriptions in force.
2. The *[recovery / disposal]* facility confirms that it is authorised by its national law to receive hazardous wastes for *[recovery / disposal]*.
3. The Notifier shall take the waste back if the shipment or the recovery or disposal has not been completed as planned or if it has been effected as an illegal shipment.
4. The Consignee agrees to recover or dispose the waste in an environmentally sound manner, if the shipment has been effected as an illegal shipment.
5. The Consignee shall, within 3 working days following the receipt of the waste, complete box 18 of the movement document and send a copy of the form to the Notifier and to all competent authorities concerned.

6. The Consignee shall, as soon as possible and not later than 12 months following the receipt of the waste, complete box 19 of the movement document certifying that the waste has been *[recovered / disposed]* in an environmentally sound manner and send a copy of the form to the Notifier and to all competent authorities concerned (certificate of recovery / disposal).

7. If the Consignee issues an incorrect certificate of *[recovery / disposal]* with the consequence that the financial guarantee is released, he shall bear the costs arising from the duty to return the waste to the area of jurisdiction of the competent authority of dispatch and its disposal or recovery in an alternative and environmentally sound manner.

This contract covers the shipments of waste commencing *[during the period from –first departure date- to –last departure date- / under the above-mentioned notification(s)]*.

Shipment route: *[To specify]*

Date: *[date of signature]*

Date: *[date of signature]*

For the Notifier

For the Consignee

Name and title

Name and title

Annex 2

Bank Guarantee Template

Bank's Name and Address of issuing Branch or Office.....

Beneficiary: Client's Name

Date:

Bank Guarantee No.:

We have been informed that*name of the company*has submitted an application for the export of *specify quantity and types of hazardous wastes to be exported.....*per annum to*country of import*under notification number

Furthermore, we understand that, according to your conditions the application must be supported by a Bank Guarantee in relation to the possible re-shipment of the hazardous wastes to Antigua and Barbuda and liability and compensation for any damage resulting from the transboundary movement.

At the request of*name of company*....., we.....*name of Bank*, hereby irrevocably undertake to pay any sum or sums not exceeding in total an amount of *amount in figures.....(.....amount in words.....)* upon receipt by us of your first demand in writing accompanied by a written statement stating that an event requiring compensation has occurred during the said transboundary movement.

This guarantee shall expire 45 days after the last date of departure mentioned in the Notification Form.

.....*Bank's seal and authorized signature (s)*.....

Annex 3

Service and Maintenance Instructions

As a minimum requirement, service manuals shall be provided for the following equipment by the suppliers:

- Fork-lifter
- Oil filter press
- Aerosol can disposal system
- Fire detection system
- Firefighting equipment

TO BE DELIVERED BY THE SUPPLIERS OF FACILITIES AND EQUIPMENT!!

