



HEALTHCARE WASTE MANAGEMENT

TRAINING MODULE FOR HEALTH STAFF



**Directorate of Environmental and Occupational Health and Food Safety
Ministry of Health**

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PREFACE

Proper management of healthcare waste is an essential prerequisite for the provision of quality healthcare services. Healthcare staff working in healthcare institutions are responsible for proper and safe management of waste generated during service delivery. All healthcare staff need to be aware of and responsive to the waste management process to handle hazardous as well as non-hazardous waste streams safely. It will reduce environmental pollution and create safe working conditions for healthcare workers.

Certain gaps in knowledge on healthcare waste management among health care staff were identified. Knowledge on categorization of waste, national colour code system for waste management, harmful effects of improper waste management and legal aspects of waste management were some of the aspects that need strengthening. It is intended that this training manual will pave the way for a better understanding of healthcare waste management among healthcare staff and update the much required knowledge on healthcare waste management among them.

The content areas of this module were developed in consultation with experts on healthcare waste management considering the identified knowledge gaps of the healthcare staff.

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List of Abbreviations

CEA	- Central Environmental Authority
CO ₂	- Carbon Dioxide
EIA	- Environment Impact Assessment
EPL	- Environmental Protection License
FAO	- Food and Agriculture Organization
HCW MU	- Healthcare Waste Management Unit
HCWM	- Healthcare Waste Management
HDPE	- High Density Polyethylene
HIV	- Human Immunodeficiency Virus
ICNO	- Infection Control Nursing Officer
IPA	- Isopropyl Alcohol
LDPE	- Low Density Polyethylene
MO	- Medical Officer
MoH	- Ministry of Health
MOH	- Medical Officer of Health
PHI	- Public Health Inspector
SWML	- Scheduled Waste Management License
TB	- Tuberculosis
WHO	- World Health Organization

LIST OF ANNEXURES

CHAPTER	ANNEXURE	PAGE NO
CHAPTER 6	1. SITUATIONAL ANALYSIS ON HEALTHCARE WASTE MANAGEMENT	26
	2. IDENTIFICATION OF AVAILABLE FACILITIES FOR WASTE MANAGEMENT	27
	3. AMOUNT OF WASTE GENERATED IN THE HOSPITAL	29
CHAPTER 8	1. THE GAZETTE OF THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA: NO. 1533/16 - 2008.01.25	39
	2. THE GAZETTE OF THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA: NO. 1534/18 - 2008.02.01	45
	3. THE GAZETTE OF THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA: NO. 2126/36 - 2019.06.05	76
	4. LIST OF CEA REGISTERED CONSULTANTS / SPECIALISTS / - 2019/2020	91
	5. LIST OF CEA REGISTERED LABORATORIES - 2019 / 2020	97
	6. CONTACT DETAILS OF PROVINCIAL AND DISTRICT CEA OFFICERS	100
CHAPTER 9	1. ENVIRONMENTAL POLICY OF AKKARAIPATTU BASE HOSPITAL	114
	2. HEALTHCARE WASTE MANAGEMENT POLICY OF AKKARAIPATTU BASE HOSPITAL	115

CONTENTS

	PAGE NO
PREFACE	iii
LIST OF AUTHORS	iv
AUTHORS OF BEST PRACTICES	v
LIST OF CONTRIBUTORS	vi
LIST OF ABBREVIATIONS	vii
LIST OF ANNEXURES	viii
INTRODUCTION	xi
CHAPTER 1 IMPORTANCE OF HEALTHCARE WASTE MANAGEMENT	1
Dr. Inoka Suraweera Consultant Community Physician (Environmental and Occupational Health) Directorate of Environmental and Occupational Health and Food Safety, Ministry of Health	
CHAPTER 2 GENERAL WASTE MANAGEMENT	5
2.1 NON HAZARDOUS GENERAL WASTE MANAGEMENT	5
Mrs. H.P.S. Jayasekara Director (Solid Waste Management) Central Environmental Authority	
2.2 FOOD WASTE	10
Dr. Inoka Suraweera Consultant Community Physician (Environmental and Occupational Health) Directorate of Environmental and Occupational Health and Food Safety , Ministry of Health	
CHAPTER 3 INFECTIOUS WASTE AND SHARPS MANAGEMENT	12
Dr. Geethika Patabendige Consultant Microbiologist National Hospital of Sri Lanka Colombo 10	Dr. Shirani Chandrasiri Consultant Microbiologist Colombo South Teaching Hospital Kalubowila
CHAPTER 4 PATHOLOGICAL WASTE MANAGEMENT AND DISPOSAL	15
4.1 PATHOLOGICAL WASTE MANAGEMENT	15
Dr. S. K. Senanayake Consultant Pathologist Castle Street Hospital for Women	

4.2	COVID -19 WASTE MANAGEMENT	16
	Dr. Inoka Suraweera Consultant Community Physician (Environmental and Occupational Health) Directorate of Environmental and Occupational Health and Food Safety, Ministry of Health	
CHAPTER 5	HEALTHCARE WASTE MANAGEMENT IN PREVENTIVE HEALTH SECTOR	18
	Dr. Inoka Suraweera Consultant Community Physician (Environmental and Occupational Health) Directorate of Environmental and Occupational Health and Food Safety, Ministry of Health	
CHAPTER 6	IMPLEMENTATION OF HEALTHCARE WASTE MANAGEMENT PROGRAMME	19
6.1	WASTE-MANAGEMENT COMMITTEE	19
	Dr. Iresha Pathirage Medical Superintendent BH Balangoda	
6.2	MONITORING AND EVALUATION OF HOSPITAL WASTE MANAGEMENT PROGRAMME	24
CHAPTER 7	OCCUPATIONAL HEALTH AND SAFETY	30
	Dr. Inoka Suraweera Consultant Community Physician (Environmental and Occupational Health) Directorate of Environmental and Occupational Health and Food Safety, Ministry of Health	
CHAPTER 8	POLICIES, ACTS AND REGULATIONS RELATED TO HEALTH CARE WASTE MANAGEMEN	34
	Mr. Tissa D A Gamage Deputy Director Hazardous Waste and Chemical Management Unit Central Environmental Authority	Mrs. Sujeewa T K K Fernando Assistant Director Environment Pollution Control & Chemical Management Division Ministry of Environment
CHAPTER 9	BEST PRACTICES	104
9.1	WASTE MANAGEMENT PROJECT - DISTRICT GENERAL HOSPITAL CHILAW	104
9.2	WASTE MANAGEMENT SYSTEM - BASE HOSPITAL TELDENIYA	105
9.3	WASTE MANAGEMENT - BASE HOSPITAL TELLIPPALAI	106
9.4	HEALTHCARE WASTE MANAGEMENT - BASE HOSPITAL AKKARAIPATTU	110
9.5	BEST PRACTICES IN WASTE MANAGEMENT - ASHRAFF MEMORIAL HOSPITAL KALMUNAI	128

INTRODUCTION

Sri Lanka has a unique healthcare system that delivers free healthcare services to all citizens and it is considered a national priority. Healthcare institutions are dispersed island-wide and provide curative and preventive health services to all citizens. Safe and proper healthcare waste management in healthcare institutions is essential for quality and safe healthcare delivery.

Improper healthcare waste management in healthcare institutions is known to cause adverse health effects to healthcare workers, cleaning staff, local authority waste handlers, patients, visitors and the community. Additionally, it is very well known that improper healthcare waste management can cause air, water and, soil pollution thus adversely affecting the environment. Therefore, it is very important that healthcare waste is managed properly until final disposal. It is the prime responsibility of all healthcare staff to engage in proper healthcare waste management practices.

Healthcare waste consists of hazardous and non-hazardous components. Each waste component has subcategories .

Hazardous waste	Non-hazardous waste
Infectious waste	Food waste
Sharps waste	Garden waste
Chemical waste	Clean plastic/polythene
Pharmaceutical waste	Clean paper/cardboard
Pathological waste	Clean glass
Genotoxic waste	Mixed waste
Radioactive waste	
Pressurized containers	
Waste with high content of heavy metals (cadmium, mercury, lead etc)	
Electrical and electronic waste(E-waste)	

As per the environmental regulations, it is mandatory to manage hazardous and non hazardous healthcare waste properly, to safeguard the health of humans and the environment from its adverse impacts.

As an initial step in the management of waste, segregation at the point of waste generation is important. It is done according to the standard national colour code system, for healthcare waste management, which is illustrated below.

	Black - non-infectious/ non-hazardous waste
	Yellow - infectious waste
	Yellow with red stripes - sharp bin
	Red - clean glass
	Orange - clean plastic waste
	Blue - clean paper
	Green - discarded food/ biodegradable waste
	Brown - metal
	Purple - cytotoxic waste
	Gray - electrical and electronic waste (e-waste)
	White - pharmaceutical waste

Capacity building of health care staff on waste management is an essential prerequisite in improving healthcare waste management within the institution.

This module addresses the waste management principles, waste management procedures for waste streams such as general waste, infectious waste, pathological waste, food waste and COVID -19 waste. Additionally, it describes the occupational health and safety of employees handling healthcare waste, the procedure of conducting waste audits and the legal aspects of healthcare waste management in Sri Lanka.

This module can be used as a training guide as well as a handbook on healthcare waste management for health care workers in Sri Lanka.

IMPORTANCE OF HEALTHCARE WASTE MANAGEMENT

The total waste stream generated from healthcare institutions is classified as healthcare waste.

These are generated from activities in different settings within a healthcare institution such as,

- Diagnosis and treatment in outpatient departments, emergency treatment units, intensive care units, wards or clinics
- Performing surgeries in theatres
- Deliveries in labour rooms
- Performing testing in laboratories
- Conducting immunization activities
- Conducting pathological and forensic autopsies etc

Healthcare waste can be divided into

- Non-hazardous general waste
- Hazardous waste or waste that is associated with health risks

Around 75-90% of the waste produced by a health-care institution is usually called “non-hazardous” or “general healthcare waste”. It comes mostly from the administrative, kitchen and housekeeping functions of healthcare facilities and may include waste from packing material and waste generated during construction and maintenance of healthcare buildings.

The remaining 10- 25% of health-care waste is regarded as “hazardous” and can pose a number of health and environmental risks. It includes waste and by-products, and covers a diverse range of materials, such as

- 1) Infectious waste: waste contaminated with blood and other bodily fluids (e.g. from discarded diagnostic samples), cultures and stocks of infectious agents from laboratory work or waste from patients with infections (e.g. swabs, bandages and disposable medical devices);
- 2) Pathological waste: human tissues, organs, body parts;
- 3) Sharps waste: syringes, needles, disposable scalpels and blades, etc.;
- 4) Chemical waste: solvents and reagents used for laboratory preparations, disinfectants, sterilant and heavy metals contained in medical devices (e.g. mercury in broken thermometers);

- 5) Pharmaceutical waste: expired, unused and contaminated drugs and vaccines;
- 6) Genotoxic waste: waste containing substances with genotoxic properties (i.e. highly hazardous substances that are, mutagenic, teratogenic or carcinogenic), such as cytotoxic drugs used in cancer treatment and their metabolites;
- 7) Radioactive waste: such as products contaminated by radionuclides including radioactive diagnostic material or radiotherapeutic materials; and
- 8) E-waste: electronic and electrical waste

Improper management of healthcare waste poses a significant risk to patients, visitors, healthcare workers, the community and the environment. It contaminates the natural environment (air, water, soil, fauna and flora) and the man-made environment, thereby affecting the health of humans and other living beings. Persons exposed to hazardous healthcare waste are potentially at risk of being injured or developing adverse health outcomes.

Adverse outcomes associated with mismanaged healthcare waste and by-products include:

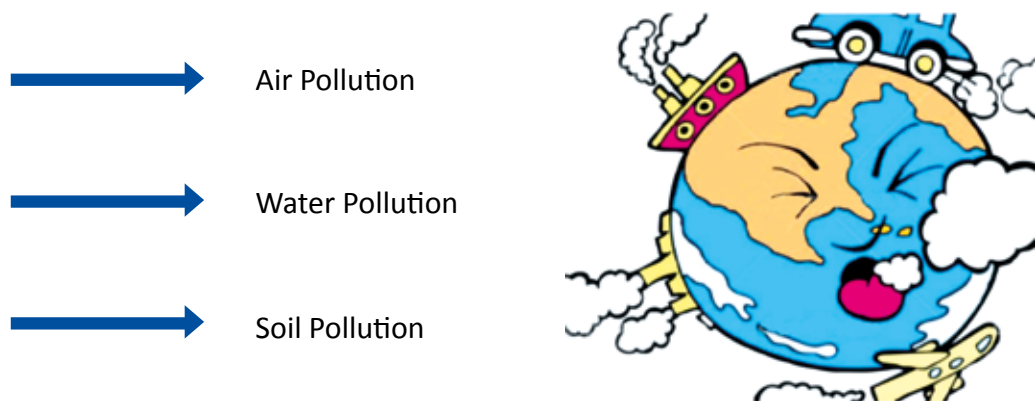
- 1) Injuries inflicted by sharp objects
- 2) Potential for spreading drug-resistant micro-organisms from healthcare facilities into the environment
- 3) Toxic exposures to pharmaceutical products, in particular, antibiotics and cytotoxic drugs releases into the surrounding environment, and to substances such as mercury or dioxins, during the handling or incineration of healthcare wastes
- 4) Chemical burns arising in the context of disinfection, sterilization or waste treatment activities
- 6) Thermal injuries occurring in conjunction with open burning and the operation of medical waste incinerators
- 7) Adverse health outcomes due to environmental pollution





Proper management of healthcare waste is very important in ensuring the health and safety of health care staff and all other categories of staff handling such wastes. Healthy healthcare staff is an essential prerequisite for the provision of quality healthcare services.

The improper management of healthcare waste causes serious environmental problems such as



Open burning of healthcare waste or incineration using substandard incinerators add significant amounts of particulate matter (PM_{10} , $PM_{2.5}$ and ultrafine) to the atmosphere causing air pollution. Air pollution is a silent killer and it is an important risk factor for non-communicable diseases such as ischaemic heart disease, stroke, lung cancer and chronic lung diseases. Children, pregnant mothers, people with pre-existing chronic diseases and outdoor workers are particularly at a higher risk of developing adverse health effects due to air pollution.

Improper segregation and disposal of healthcare waste can cause soil and groundwater pollution affecting the health of humans adversely.



Methane produced by dumping biodegradable and mixed waste (non hazardous waste) in unsanitary landfills and CO₂ produced in the process of incineration of healthcare waste are greenhouse gases. These contribute to global warming and climate change.

Mismanagement of healthcare waste can create immense damage to the environment and affect the health of our planet. Therefore, it is very important to manage healthcare waste in a proper manner so that we may build a better future for all of us, especially for our children.



GENERAL WASTE MANAGEMENT

2.1 NON HAZARDOUS WASTE MANAGEMENT

Introduction:

Around the world, waste generation rates are rising. In 2016, cities in the world generated 2.01 billion tons of solid waste, amounting to a footprint of 0.74 kilograms per person per day. The waste footprint of Sri Lanka is 0.51 kilograms per person per day while it varies from approximately 8- 3 in cities to rural areas.

The category of waste to be discussed under this chapter is also referred to as municipal solid waste (MSW). MSW is generally defined as the waste (other than sewage and air emissions) generated in and usually collected by a municipality. MSW is extremely variable in composition, depending on the income and lifestyle of the generators. The major types of MSW that can be generated from healthcare institutions include food waste, paper, plastic, rags, metal and glass, packaging, debris from construction and demolishing, sweepings and garden waste.

We all are accountable and responsible for adopting proper systems within institutions that are in keeping with the services provided by the particular Local Authority or other disposal options available.

The main objectives of the waste management system include

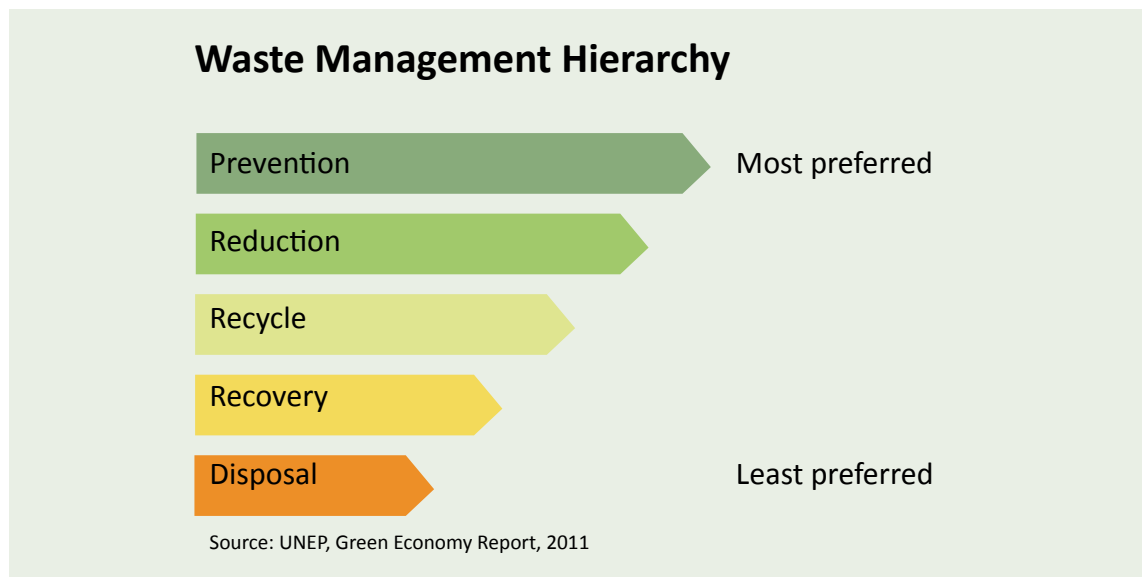
- Reduce the infectious/ hazardous nature of the waste
- Reduce the volume of the waste
- Prevent misuse and abuse of the waste and ensure proper recycling/disposal
- Ensure occupational safety and health
- Aesthetic considerations

02. Identification and quantification of waste

Waste Identification, classification and quantification is the 1st step of waste management. The management of waste as the type and quantity is the deciding factor of its final disposal



solution. Once types of waste are identified we can work on strategies and disposal solutions by planning a waste management system. Other than the choice of disposal solution, the quantification helps to establish a baseline, allowing us to set targets and measure the effectiveness of the programs implemented.



03. Prevention and reduction of waste

The most effective way to reduce your organization's waste is to generate less in the first place. Waste reduction/prevention offers the greatest environmental benefits and cost savings. Here are some proposals that could be implemented at your place of work.

- a) Reduce single-use plastic- unnecessary single-use plastics like straws and plastic cutlery, reusable water bottles, a keep cup, reusable bags and lunch containers. It doesn't take much effort to make a big difference in the reduction of the amount of waste collected.
- b) Invest in a few good-quality reusable items.
- c) Buy items with the least packaging - While some packaging is required for food safety, many items are packaged for convenience and presentation. Choosing to buy items free from unnecessary packaging is a great way to reduce your waste. Buy in bulk will also reduce packaging waste
- d) Keeping a proper inventory will reduce the outdated stuff added to the waste streams.
- e) Donate- If there are supplies or equipment that are not needed or leftover at the end of the year, donate them to a local organization instead of throwing them away
- f) Think paperless. There is much that can be done via email, electronic documents, and online instead of printing paper hard copies.
- g) Reuse of products and packaging prolongs the useful life of these materials, thus delaying final disposal or recycling. Reuse is the repair, refurbishing, washing, or just simple recovery of worn or used products, appliances, furniture and building materials.

07. Landfilling

This is the last option of the solutions available for the waste that does not have any opportunity for reduction or recycling. Sanitary landfills, also known as engineered landfills, must also fit certain requirements to be a truly environmentally friendly option.

The main problem arising from the haphazard disposal is the pollution of groundwater, not just in the place where the waste is placed but also because it may spread out through the whole aquifer, potentially polluting the whole region. Therefore the primary requirement of sanitary landfills is to arrest groundwater pollution through hydrogeological isolation. For this, a suitable linear system with leachate collection and treatment mechanisms should be introduced. The selection of the linear system depending on the ground situation may be a single liner or composite.

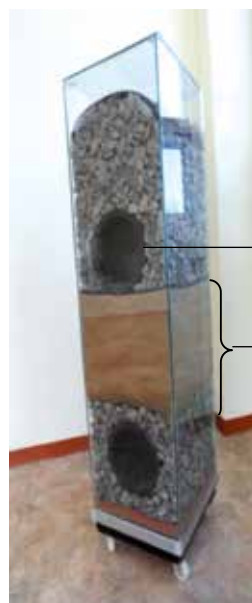
Dumps also tend to burn by themselves because of the gas that has accumulated inside. Since there is no aeration, many reactions occur in the absence of oxygen and combustible fumes are generated. As a result, spontaneous fires can occur frequently and this is dangerous as it emits carcinogenic air pollutants. This issue should also be addressed in the sanitary landfills through providing a proper gas venting system.

Dumps are also breeding grounds for mosquitoes and other vectors and pests. Bad odour is also a concern. This can be prevented by adopting proper operational practices. Waste should be leveled and covered with a soil layer at the end of the day, and a small working area, that can be managed with daily help, should be allocated in order to help make the waste less accessible to pests and vectors and prevent bad odour and scavenging. This is why the operational plan along with the trained and qualified staff is an essential requirement in sanitary landfills.

Among the other supportive requirements, groundwater monitoring, weighbridge, tyre washer, security hut and fence, etc. are also important.



Sanitary landfill - Dompe



Leachate collection pipes

*Composite liner
(HDPE layer +
Bentonite soil mixture)*

08 Monitoring and tracking of waste

- This has to be done through the team appointed for waste management.
- Labeling the waste bags from each source. You can develop an appropriate label which that includes the required information. Eg: Ward No / generating point, date .././....
- This is helpful to identify violators and streamline the segregation through rectification.
- Also, have an idea about waste minimization through keeping a record on weight/ volumes and evaluation of the data.
- Identify strategies and innovative ideas on waste handling, especially reduction.
- It is ideal if you can develop steps to be followed in handling waste from generation up to its destination, focusing on the level of staff attending this task.
- Inventory maintenance and management.

Activity:

List the types of waste and classify as Clinical/contaminated scheduled waste and general waste

Clinical/contaminated scheduled waste	General waste
Swab	Food leftover
Used syringe	Polythene packaging
Amputated parts	etc
etc	

The chart to be completed in planning stage where we can decide the number of bins and its size.

General waste

Source	Degradable		Non degradable				 Can add types
	Food leftovers	Garden waste	Hard Plastic	Polythene	Glass	Meta	Paper	
Ward NO.01								
Kitchen	x		x	x	x		x	
Stores				x			x	

This also can be useful in monitoring progress during implementation of the waste management plan. Here, it is necessary to record quantities instead of yes or No.

2.2 FOOD WASTE

Background

Food waste is a significant issue in many healthcare institutions in Sri Lanka. In a healthcare setting, food waste is mainly generated as follows:

1. Preparation of food for patients/staff
2. Unserved food
3. Leftovers from patients, by-standers or staff



Impact of food wastage

Most uneaten food ends up in landfills where it decomposes and releases greenhouse gases. According to the Food and Agriculture Organization (FAO), food waste is responsible for 8 percent of global human-made greenhouse gas emissions.

In Sri Lanka, like elsewhere in the world, food wastage is associated with significant economic, environmental and social costs. Therefore, there is an urgent need to prevent food wastage, especially in settings where its generation is significant. As this is an issue in most healthcare settings, steps need to be taken to address this at the earliest.

Management of food waste

1. Waste avoidance and minimization

Avoiding the generation of food waste is the best management option. Steps should be taken to reduce food wastage as much as possible in healthcare settings. Possible measures that can be taken to avoid/reduce food waste are as follows;

- Changing the menus
- Improvements in the methods of serving food to patients
- Strict stock taking on the requirement of food for patients and staff
- Awareness-raising for patients and staff regarding the adverse impacts of food wastage



2. Waste segregation

Inappropriate dumping of food waste into other waste categories like infectious, plastic, etc should be avoided. Proper segregation of healthcare waste at the source needs to be practised at all times. Food waste should only be disposed of into waste bags, placed inside green waste bins.

3. Waste treatment

Once the volume of food waste is reduced and separated, it is necessary to dispose of food waste in an environmentally sound and cost-effective way. Food waste can be managed as follows;

- Composting
- Turning into animal feed
- Biogas generation



INFECTIOUS WASTE AND SHARPS MANAGEMENT

Infectious waste:

Infectious waste are a type of hazardous waste which are suspected to contain pathogens in sufficient concentration or quantity to cause disease in susceptible hosts.

Infectious waste include blood and blood products, items contaminated with blood and body fluids (e.g. dressings, cotton swabs and drip sets), microbiological cultures and items contaminated with microorganisms, excreta and clinical specimens.

Sharps:

Sharps generated at healthcare institutions are also infectious and a part of hazardous waste.

Sharps include used or unused needles, syringes, cannulae, scalpel blades, razors, contaminated broken glass, and other similar material.

Management principles:

Management of infectious waste and sharps is costly. Management of these waste should follow the principles commencing from waste minimization, waste segregation /separation, waste handling (collection, transport and storage) up to waste treatment and disposal.

Waste minimization:

Waste minimization is a process, which reduces the amount of generated waste. This reduces waste handling and cost.

Waste segregation/separation:

Inappropriate dumping of other waste categories in to the infectious waste bin or sharps bin should be discouraged because handling and disposal of these waste is costly.

There is a national colour code for healthcare waste for which yellow colour indicates infectious waste while yellow with red stripe is for sharps.

Waste bags should be placed inside waste bins according to the above colour code.

The size of the bags and the volume of the bins should be decided according to the need of the unit. Ideally, the bags and bins should carry the relevant symbol e.g. biohazard symbol for infectious waste and also on the sharps bin.

Waste bins:

Waste bins should be strong, durable and foot-operated with well-fitting lids.

Waste bags:

75 microns/300 gauged, leak-proof strong plastic bag should be used for infectious waste. Waste bags should be labelled to identify the source, and to allow problems with waste segregation to be traced back to the originated area.

Sharps bin

Sharps bin should be made of leak proof and puncture proof material and should be labeled with the biohazard symbol. The sharps bin should have an opening on top, sufficient only to dispose the used sharps and should have a handle to carry.



Waste handling:

This includes collection, transport and storage of waste.

Waste collection and transport:

Waste should be collected from each ward/unit on a regular schedule by an individual with a cart dedicated to waste collection. Waste should not be transported across hallways to another location for storage. The waste cart should be transported through the hospital using a specifically designated route to the storage area. The waste handler should wear a protective gown or apron, heavy duty gloves and boots.

To avoid injuries and infection transmission, trolleys and carts should be easy to load and unload, without sharp edges that could damage waste bags or containers during loading and unloading, easy to clean, dedicated for these type of waste, easy to push and pull, be secured with a lock, be appropriate sized according to the volumes of waste and not too high to avoid restricting the view of staff transporting waste.

Infectious waste and sharps should never be transported by hand due to the risk of accident or injury from infectious material or incorrectly disposed sharps that may protrude from a container. Infectious waste should be transported in closed carts.

Infectious waste and sharps should be transported by trained hospital staff.

Spare trolleys should be available in case of breakdowns and maintenance. The carts should be cleaned and disinfected daily. All waste bags should be tied before removing from the bins and should be intact during transportation.

Waste storage:

Central storage area within a health-care facility should be available away from the patient care area to store different types of waste including infectious waste and sharps safely according to

the colour code until it is treated or collected for transport offsite. The storage place must be identified as an infectious waste area and sharps area by using the biohazard sign. The waste collected should be disposed of as early as possible and should not be kept in the storage area for more than 48 hours. Infectious waste should be stored in a manner that maintains the integrity of the containers, prevents the leakage or release of waste from the containers, and provides protection from water, rain and wind, prevents the spread of infectious agents and maintains the waste in a non-putrescent state.

The storage area should have an impermeable, hard-standing floor with good drainage (away from watercourses), the floor and walls should be easy to clean and disinfect, be cleaned regularly, include the facility to keep general waste separated from infectious and other hazardous waste, have a water supply for cleaning purposes, have easy access for staff in-charge and for waste collection vehicles, be lockable to prevent access by unauthorized persons, have protection from the sun, be inaccessible to animals, insects and birds, have good lighting and at least passive ventilation, not be situated in the proximity of fresh food stores and food preparation areas, have a supply of cleaning equipment, protective clothing and waste bags or containers located conveniently close to the storage area, have a wash basin with running tap water and soap that is readily available for the staff, have spillage containment equipment and be appropriate to the volumes of waste generated from each health care facility. Ideally, the storage room should be connected to a special sewage system for infectious hospital wastewater.

Waste treatment and disposal:

Infectious waste

These should be disposed of by using incinerator, metamizer or hydroclave adhering to the current regulations

Sharps

After the bin is $\frac{3}{4}$ full, it should be disposed of by incineration or metamization

Staff handling waste:

Regular updates, awareness programmes to educate them are needed. Records of Hepatitis B vaccination and protective antibody level should be available

Audits:

Maintaining records of the weight of daily generated waste is needed. Regular audits will improve the quality.

PATHOLOGICAL WASTE MANAGEMENT AND DISPOSAL

4.1 PATHOLOGICAL WASTE MANAGEMENT

Pathological waste includes-

Human blood, blood products and bodily fluids, serum, plasma, or non-glass containers filled with such discarded fluids.

Any substance which contains visible blood, semen, vaginal secretions, cerebrospinal fluid, synovial fluid, peritoneal fluid and pericardial fluid.

Human tissues, organs, body parts, similar waste from surgical biopsies and autopsies.

Segregation and Handling

- Pathological waste should be collected in an appropriate leak-proof container with clear labels in a secured place until disposal.
- This waste does not require inactivation but still needs to be separated from regular trash.
- For items that can cut, but are not intended to do so (E.g. fragile glass, glass slides, coverslips) use a sharps box or a rigid box, and then place in an appropriate bag for disposal.
- Chemicals use for tissue fixation and processing (eg- formaldehyde waste, Xylene waste, etc.) should be stored in a cool, dry, designated container, well-ventilated, fire –proof area away from duty workers and properly labeled as HAZARDOUS and sent for recycling or neutralization.

Transport

- Pathological waste should be kept in a designated area until disposal by the relevant authority. Must not be allowed to accumulate and should be disposed of on a regular basis.
- Human body parts, organs or tissues, similar waste from surgical biopsies and autopsies once removed from the fixatives may be stored in a refrigerator in a designated place (eg. Mortuary) until disposal. Should be labeled clearly with the date of generation.
- If putrescent during storage must be moved within 24 hr for disposal.

Disposal-

- The preferred method for disposal of pathological waste is incineration. Because incinerators usually are located some distance away from the laboratory, precautions for handling, packaging, storage and transport are mandatory.

- Human body parts, organs or tissues, similar waste from surgical biopsies and autopsies must be cremated or buried. Other pathological waste from humans and animals must be incinerated. Each institution must arrange waste disposal locations and regular disposal procedures.
- Liquid pathological waste: The sanitary sewer systems and sanitary pits should be designed by each institution for the disposal of liquid waste. Use of the sanitary sewer reduces the chance for leaks or spills during transport and reduces disposal costs.
- Pathological liquid waste can be poured down the drain (sanitary sewer), under running water, after it has been decontaminated or neutralization by chemical means (Tests must always be carried out to ensure the efficacy of disinfectants).
- Used formaldehyde can be neutralized and rendered non-hazardous by using neutralization substances. (Neutralization will reduce formaldehyde solutions to less than 0.1% and neutralize the pH to 6-9 SU).
- Do not pour neutralized Formaldehyde down the drain without authorization.
- Disposal of neutralized Formaldehyde should be done by an authorized body.
- (Formaldehyde contains methyl alcohol, a biocide which could harm the good bacteria used in wastewater treatment).
- Minimizing solvent waste by recyclers- Laboratory on-site recycling systems enable recycling and reuse of solvents such as xylene, alcohol, acetone, xylene substitutes, formaldehyde and Isopropyl Alcohol (IPA) by fractional distillation. These will reduce solvent waste and disposal costs. The process of recycling should be done by meticulously following standard operating procedures.

4.2 COVID -19 WASTE MANAGEMENT

COVID-19 was declared a pandemic by the World Health Organization (WHO) in 2020. Since then it has been spreading all over the world. Sri Lanka too has experienced the spread of COVID-19 in the country. Safe disposal of COVID-19 waste is very important due to its hazardous nature.

Accordingly, guidelines have been prepared to streamline the management of COVID-19 waste in healthcare institutions. Infectious waste generated from healthcare institutions treating COVID-19 cases should be treated using only the following methods;

- i. Incineration
- ii. Using a metaMizer

Further, the healthcare staff needs to be advised to adhere to the following measures in managing infectious waste from COVID-19 cases/ wards.

- Infectious waste generated from suspected and confirmed COVID-19 cases should be collected in yellow polythene bags of a minimum of 300 gauge and tied well. It should then be put in another yellow bag (double bagged) and tied and sealed with appropriate adhesive tape. Mark the waste bag with a red star for easy identification and prioritized disposal.
- Sharps should be placed in cardboard sharp boxes which are puncture proof and leak proof. Sharps boxes should be designed with a small inlet so that items can be

dropped in but no item can be removed. It should be closed when $\frac{3}{4}$ full. Make sure that the sharps box has a handle.

- These bags and sharps boxes should be marked / labelled with a red star to identify easily as COVID-19 waste and should be transported separately in a trolley or cart which is easy to load, clean and disinfect and should be treated on a priority basis on the same day



- The staff transporting this waste needs to wear proper personal protective (PPE) equipment such as gloves, masks, boots, and an overall at all times.
- The staff at the treatment facility needs to wear proper personal protective equipment such as industrial gloves, masks, boots and overalls.
- Infectious waste handling staff needs to be educated on how to protect themselves. They should be provided with washing facilities having adequate soap and water.



Arrangements need to be made to treat COVID-19 infectious waste within 24 hours of generation. Waste management process needs to be supervised by a team nominated by the Head of the Institution

As in all other situations, attempts should be made to reduce the generation of waste, as much as possible.



HEALTHCARE WASTE MANAGEMENT IN PREVENTIVE HEALTH SECTOR

The healthcare delivery system in Sri Lanka is divided into curative services and preventive health services. The preventive sector is centered around the Medical Officer of Health (MOH) system at the divisional level.

Hazardous and non hazardous healthcare waste is generated in the process of service delivery from the MOH offices. The places of hazardous waste generation are as follows;

1. Antenatal and postnatal clinics
2. Child welfare clinics
3. Well women clinics
4. Family planning clinics
5. Schools when conducting immunizations during school medical inspections

Additionally, there is generation of general waste (non hazardous) from the MOH offices. These include food waste, garden waste, mixed waste, etc.

Waste thus generated needs to be segregated and collected in relevant coloured bins as per the national colour code system for healthcare waste. Final disposal of such wastes needs to be carried out as per the measures described in section 2.1 of chapter 2.

The final disposal of infectious waste should be done either by incineration or using a metaMizer. Healthcare waste management plans at the provincial level need to be developed with details of clustering of all healthcare institutions in the province.

MOH offices need to possess valid environmental protection licenses and scheduled waste management licenses for their functioning.



IMPLEMENTATION OF WASTE MANAGEMENT PROGRAMME

This chapter provides practical guidelines for implementing your waste management programme in your institution and consists of two parts. The first part describes the role of the waste management committee which is responsible for developing suitable waste management strategies for the institution, communicating, and implementing developed strategies and monitoring them. It also details the roles and responsibilities of committee members. The second part consists of a brief introduction to monitoring and evaluation and monitoring and evaluation of waste management programmes by conducting a waste audit. The audit can also be used for situational analysis to identify gaps in current waste management practices for developing an institutional waste management plan. We provide some templates that could be used for auditory purposes, enabling you to practically carry out an audit.

Objectives.

The purpose of this chapter is to help

- Identify the importance of and establish a waste management committee in your institution
- Communicate roles and responsibilities of committee members to all relevant parties
- Appoint a waste audit team and conduct waste audits
- Disseminate and use audit findings to streamline your waste management programme

6.1 Waste-management committee

Healthcare waste management should be viewed as part of infection control. Effective healthcare waste management in a hospital depends on a dedicated waste management team supported by the administration with careful planning, available legislation with adequate financing and full participation of the staff.

The waste management committee plays a key role in waste management by developing waste management strategies, communication as well as monitoring and implementation of

activities. It is advisable to ensure that the duty lists and positions mentioned are in line with the designations and available cadre, to prevent unnecessary trade union action.

The members of the healthcare management committee depend on the level of the healthcare facility. A typical waste-management committee in a large hospital may contain the following members and smaller institutions can appoint members accordingly.

6.1.1 Members of the waste management committee

Members within the institution

- Head of the institution - Director / Deputy Director
- Consultant microbiologist
- MO Public Health/ Quality/ Infection control/ Planning
- Special Grade Nursing Officer
- Infection Control Nursing Officer
- Chief pharmacist
- Chief radiographer
- Administrative Officer
- Accountant
- Hospital Public Health Inspector
- Overseer
- Cleaning supervisor
- Any other person decided by committee/ Head of the institution

Members outside the institution

- Area Medical Officer of Health
- Range PHI
- Provincial Biomedical Engineer
- Provincial/District officer of Central Environmental Authority
- Representatives of Local authority
- Representative of Civil society
- Waste collection representative if outsourced.

It is best to appoint a **waste-management officer** as the focal point of operations with the overall responsibility for developing the health-care waste-management plan, and for the day-to-day operation and monitoring of the waste-disposal system. The head of the hospital should formally appoint the members of the waste-management team in writing, informing each of their duties and responsibilities. The committee should have regular quarterly meetings.

6.1.2 Duties and responsibilities of committee members

Head of the institution

1. Form a waste-management team to develop a written waste-management plan for the hospital. The plan should clearly define the duties and responsibilities of all members of staff, both clinical and non-clinical, in respect to handling health-care waste and establishing lines of accountability.

2. Oversee and approve hospital waste management plans. Ensure that monitoring procedures are incorporated into the plan. The efficiency and effectiveness of the treatment and disposal system should be monitored so that the system can be updated and improved when necessary. Any changes should eventually be incorporated into a revised management plan
3. Designate a waste-management officer to supervise and implement the waste-management plan. The head of hospital retains overall responsibility for ensuring that healthcare and other waste are disposed of according to national guidelines.
4. Keep the waste-management plan updated by setting regular (e.g. annual) review dates. Allocate financial and personnel resources to ensure efficient operation of the plan.
5. Ensure adequate training for staff members and designate the staff responsible for coordinating and implementing training courses.

Consultant Microbiologist

1. Key role in developing hospital waste management plan ensuring infection control and occupational safety
2. Involved in staff training on waste segregation and disposal methods to ensure that all doctors, nurses, and clinical and non-clinical professional staff in their departments are aware of the segregation, sealing and storage procedures, and that all personnel comply with the highest standards.
3. Liaise regularly with the waste-management officer to monitor working practices for failures or mistakes.
4. Encourage medical and nursing staff to be vigilant to ensure that hospital attendants and ancillary staff always follow correct waste management procedures

Focal point for waste management/ officer designated to oversee waste management /waste management officer (MO Public Health)/ Infection Control Nursing Officer (ICNO)

The waste-management officer is responsible for the day-to-day operation and monitoring of the waste-management system in the hospital and should be held by a senior member of the staff. The position should be accountable to the head of the institution and should act as the focal point for waste management (MO public health/ ICNO or suitable medical officer). The waste-management officer should liaise with the infection-control officer, the chief pharmacist and the radiation officer so that they become familiar with the correct procedures for handling and disposal of pathological, pharmaceutical, chemical and radioactive wastes.

1. Liaise with the supplies department to ensure that an appropriate range of bags and containers for health-care waste, protective clothing and collection trolleys is available at all times and ensure that hospital attendants and ancillary staff immediately replace used bags and containers with the correct new bags or containers;
2. Directly supervise hospital attendants, ancillary workers and waste handlers assigned to collect and transport health-care waste and ensure collected segregated waste is transported to the central waste-storage facility of the hospital daily at the planned times.
3. Ensure the correct use of the central storage facility for health-care waste, which should be kept locked but should always be accessible to authorized hospital staff. Prevent all unsupervised dumping of waste on hospital grounds

4. Coordinate and monitor all waste-disposal operations and monitor methods of transportation of waste both onsite and offsite and ensure that waste collected from the hospital is transported by an appropriate vehicle to the designated treatment and disposal site.
5. Ensure that waste is not stored for longer than specified in the guidelines and that the transport organization (which may be the local authority or a private contractor) collects the waste with the required frequency.
6. Organize staff training including for waste handlers on proper waste management practices. Comply with occupational health by liaising with consultants/doctors, matron, and unit in-charge.
7. Investigate and review any reported incidents concerning the handling of health-care waste (in liaison with the infection-control department)
8. Obtain and maintain Environmental Protection License (EPL) and Scheduled Waste Management License (SWML)

Special Grade Nursing officer (Matron)

Responsible for training nursing staff, healthcare assistants, hospital attendants and ancillary staff in the correct procedures for segregation, sealing, storage, transport, and disposal of waste by

1. Liaising with the waste-management officer and others (infection-control officer, chief pharmacist and chief radiographer) to maintain higher standards of infection control.
2. Participating in staff induction and refresher training in the handling and treatment and disposal of health-care waste.
3. Liaising with department heads to ensure coordination of training activities and decide what to do about waste-management issues specific to particular departments.

Infection control nursing officer

The infection-control nursing officer should liaise with the waste-management officer on a continual basis, and provide advice about the control of infection, and the standards of the waste treatment and disposal system.

1. Identify training requirements according to staff grade and occupation
2. Organize and supervise staff training courses on the infection risks from poor waste management
3. Liaise with the department heads, matron, and the hospital director to coordinate training.

The infection-control nursing officer may also have overall responsibility for chemical disinfection, the safe management of chemical stores, and minimizing chemical waste creation.

Chief Pharmacist

The chief pharmacist is responsible for the safe management of pharmaceutical stores and for minimizing pharmaceutical waste. Responsibilities include:

1. Liaising with department heads, the waste-management officer, matron, and the hospital director, and giving advice, in accordance with the national policy and guidelines, on the appropriate procedures for pharmaceutical waste treatment and disposal.
2. Coordinating continued monitoring of procedures for the treatment and disposal of pharmaceutical waste.
3. Ensuring that personnel involved in pharmaceutical waste handling, treatment and disposal receive adequate training.
4. Ensuring being updated with the proper treatment and safe disposal of expired, damaged, and unusable pharmaceuticals, pharmaceutical packaging, and equipment.

The chief pharmacist also has the special responsibility of ensuring that genotoxic products are used safely, and that genotoxic waste is managed safely.

Chief radiographer / (Radiation officer)

The duties and responsibilities of the radiation officer are the same as those of the pharmaceutical officer but relate to radioactive waste. There may also be additional regulations regarding the storage and safeguarding of radioactive waste. These regulations need to be followed strictly for the safety of those handling the waste.

Administrative officer and Accountant

They should liaise with the waste-management officer to ensure a continuous supply of the items required for waste management (plastic bags and containers of the right quality, spare parts for onsite health-care waste-treatment equipment). These items should be ordered at the right time to ensure that they are always available, but the accumulation of excessive stores of supplies should be avoided. They should also investigate the possibility of purchasing environmentally friendly products (e.g. polyvinyl chloride-free plastic items). Also, should take action to ensure allocations for obtaining EPL and SWML.

Overseer and cleaning supervisor

They should liaise with ICNO and focal point for continuous training of relevant staff and assist them by supervising their subordinates to ensure that guidelines are adhered for proper waste management.

Members outside the institution

They should assist in implementation of the hospital waste management plan and obtaining EPL and SWML by providing needed technical guidelines. They are also expected to support this programme by communicating with necessary persons and the public.

6.2 MONITORING AND EVALUATION OF HOSPITAL WASTE MANAGEMENT PROGRAMME

6.2.1 MONITORING AND EVALUATION

Monitoring and evaluation (M&E) are integral and individually distinct parts of project planning and implementation. These critical tools are meant to influence decision-making, including decisions to improve, reorient or discontinue the evaluated intervention or policy, and help organizational learning for sound management.

The purpose of the monitoring is to assess the programmed activities and to determine whether the outputs, delivery and schedule have been reached as planned and, if not, to correct deficiencies as quickly as possible.

Evaluation is a periodic, in-depth time-bound analysis that attempts to assess performance, impact, success, and sustainability of a project against objectives and indicators. Evaluation relies on data generated through monitoring activities as well as information obtained from other sources such as studies, research, in-depth interviews, focus group discussions, etc. An important goal of evaluation is to provide recommendations and lessons to the management.

6.2.2 Monitoring and evaluation of hospital waste management programme

Monitoring and evaluation is an in-built part of a hospital waste management plan. It is important to assess the efficiency and effectiveness of waste management plans and to ensure that the plan is accepted by the staff and that proper waste management practices are followed. Frequent supervision by units in-charge helps for better commitment across respective units. However, monitoring and evaluation of waste management programmes are best done by conducting waste audits.

Waste audit

An effective waste reduction program must be based on current and accurate information on the quantity and composition of the waste stream. A waste audit is a method for analyzing an organization's waste stream. It can be used to determine the amount and types of waste that are generated by the organization in a given timeframe and repeated audits at different times in the year provides a more accurate picture and a better understanding of the quantities of waste generated in individual parts of a health facility.

Waste audits are useful in

- Determining the types of waste and amounts that are being generated at the institution.
- Measuring the amount of recycled and non-recycled waste.
- Identifying areas where the waste management can be improved and what type of waste could be reduced.
- Determining the effectiveness of any waste management strategies.
- Identifying any need for implementing new strategies.

An audit alone will not reduce waste, but it is the starting point that can help to make informed decisions on resource allocation, source reduction and recycling processes. When an audit is completed it can be used as a benchmark against future improvements. Hence a waste audit can be used both as a situational analysis tool for developing a hospital waste management plan and a monitoring and evaluation tool for assessing the effectiveness of an existing plan. After completing a few audits, you will be able to see trends and discover other areas for improvement.

Audit team

A waste audit begins with the selection of an audit team. The number of team members should be decided on the level or size of the hospital. Since monitoring of institutional

waste management is a responsibility of the waste management committee, team members could be selected from among them. They must be motivated, personally interested in and committed to getting the information with the intention of following up on the waste audit with a program to reduce and recycle the maximum amount of material. The involvement of the head of the institution is important in order to authorize the release of necessary records, and to demonstrate the institution's commitment to the effort.

Conducting waste audit

1. **Research** - The first step of the audit is to do research on how waste is currently managing in the institution (Situational Analysis). Data should be collected on all the current waste operations. (Annexure 01)
2. **Walk through the institution** - Following the completion of research, a team should do a 'walk-through' of the institution. Inspection should start at the point of receiving waste to the hospital noting all operations that generate waste including all waste generating points paying attention to the type of waste generated and their management. It is worth paying attention to the available facilities for proper waste management. (Annexure 01 & 02)
3. **Trash sort** – Having understood the basic waste management operations in the institution, the team should move to physically sort out the generated waste with a suitable person using appropriate personal protective equipment. This could be done at the central collecting site or at the units depending on the feasibility of identifying the units where waste was produced. If the amount or type of waste varies substantially from day to day, the team might want to conduct this inspection on random days over the course of two weeks, or daily for a week, and then compute an average profile of one day's waste.

To conduct the inspection, spread out a large plastic sheet and dump the day's waste on it. Do not sort recyclables in an area where they might encounter food and become contaminated and do not dump the clinical waste from the waste bag.

4. **Materials quantification** - After broadly identifying the types of waste generated and how they are segregated, the team has reached the final element of the audit – quantifying the amounts of each of the wastes generated. The quantity of materials generated is important because even though many items in the waste stream might be recyclable, they must be present in sufficient volume to make separate collection feasible. The weighing of waste should be completed at the end of the trash sort. Use a suitable scale for measuring depending on the collected amount. Ensure that you have recorded the total amount of waste produced per day by each unit at the end. (Annexure 03)

Analysis of audited data will help to identify the deviations or deficiencies of the existing plan. Discussions with staff, patients and visitors may be helpful in identifying the deficiencies in the plan that resulted in implementation failures. Correcting these issues and communicating modified plans will help for better waste management in the institution. Conducting regular audits at an agreed time will open new avenues for improving your institution's waste management programme and contribute to obtaining productivity and other awards.

Annexure 01 - SITUATIONAL ANALYSIS ON HEALTHCARE WASTE MANAGEMENT

Name of the hospital

List of current waste collecting points/ waste generating points in the hospital

Waste collecting schedule in the hospital

Amount currently collected by weight (Daily / Weekly/Monthly)

Amount currently collected by volume (Daily/ Weekly/ Monthly)

Availability of temporary storage facilities

Where waste is finally disposed

List of current waste collectors from the hospital and their collecting schedule with contact details

List current recycling efforts if any

Materials collected

How they are collected

Amount of each collected by weight

Amount of waste bags purchased/ issued to units over last 6 months

Cost of disposal of waste if any

Annexure 02 - IDENTIFICATION OF AVAILABLE FACILITIES FOR WASTE MANAGEMENT

Observation chart 01

	Description	Availability Yes/ No									
		Unit									
1	Pictorial display of waste disposal according to colour code										
2	Separate area in the ward for temporary waste collection										
3	Directions for waste disposal area in the ward										
4	Availability of colour coded waste bins in adequate sizes										
5	Collection of used vials as glass waste										
6	Availability of bins in each toilet for used sanitary napkins										
7	Availability of small containers for used vials and syringes in drug trolleys										
8	Availability of waste disposal messages in simple languages Sinhala Tamil										
9	Dogs, cats seen in and around the unit										
10	Labeling of waste bags with unit name										
11	Patients are educated on waste segregation daily										
12	Availability of plastic water bottles on patient cupboards										
13	Supply of safe water to the patients in the ward										
14	Availability of separate dustbin for lunch sheets										
15	Continuation of segregation while transport										

Observation chart 02

Availability of colour coded waste collection containers (BN - bins and BG - bags)

	Patient area		Staff area	
	BN	BG	BN	BG
Glass -red				
Sharps – yellow with red stripes				
Clinical - yellow				
Plastic - orange				
Food - green				
Paper - blue				
General - black				

Observation chart 03

Waste Audit data-collection form on segregation

Name of the unit _____

Number of beds _____

Total no of patients in the unit* _____

Date _____

Type of waste ^a	Availability of color coded dustbins with lids according to the guidelines	Availability waste bags with labeling of the unit	Segregation ^b		Notes ^c
			Staff area	Patient area	

* use No of patient visits for OPD and clinics

a general, glass, sharps, plastic, paper, bio degradable, clinical waste.

b satisfactory(not mixed) / fair (mixed with 2 types) /not satisfactory (mixed with more than 2 types)

c Improper segregation practices(not satisfactory) - describe what has been wrongly put to that bin or waste bags..

Make a note about the collection of e waste

OCCUPATIONAL HEALTH AND SAFETY

1. Occupational hazards

Hazard is the potential to cause harm and can be recognized in every occupational setting.

- Biological hazards (viruses, bacteria, fungi etc)
- Physical hazards (radiation, heat, noise)
- Chemical hazards (disinfectants, sterilants)
- Ergonomical hazards (lifting of patients and goods)
- Psychological hazards (shortages in staff, shift work, multiple supervisors)
- Mechanical hazards



2. Vulnerable groups

All employees coming into close proximity with hazardous healthcare waste are potentially at risk. The main groups at risk are:

- medical doctors, nurses, health-care auxiliaries and hospital maintenance personnel
- staff working in laboratories



- workers in support services, such as cleaning staff, people who work in laundries
- workers transporting waste to a treatment or disposal facility
- workers in waste-management facilities (such as landfills or treatment plants)

Pathogens in mismanaged infectious waste may enter the human body through several routes:

- through a puncture, abrasion or cut in the skin
- through mucous membranes
- by inhalation
- by ingestion.

3. Hazards related to healthcare waste management

Healthcare waste has hazardous and non-hazardous waste components and should be managed properly in order to prevent harmful effects to healthcare staff. From the site of waste generation to disposal, each waste category should be handled according to national guidelines.

The hazardous nature of healthcare waste is due to one or more of the following characteristics:

- presence of infectious agents such as bacteria, viruses, fungi
- a genotoxic or cytotoxic chemical composition
- presence of toxic or hazardous chemicals
- presence of radioactivity
- presence of used sharps





Healthcare waste can consist of biological hazards like various bacteria, viruses, fungi etc. chemical hazards like chemicals that are used for treatment and cleaning procedures, and physical hazards like radiation. Needle prick injuries can happen due to sharps in the waste and it can lead to blood-borne infections such as HIV/AIDS and Hepatitis B and C.

4. Health and safety measures to be adopted for ensuring occupational health and safety

All steps in handling healthcare waste such as the production, segregation, transportation, treatment, and final disposal involve the handling of potentially hazardous material.

Therefore, a proper risk assessment needs to be done to identify the risks in relation to handling healthcare waste before preparing the institutional waste management plan. This will ensure the occupational health and safety of employees handling healthcare waste.

Hospital hygiene and infection control are closely associated with proper healthcare waste management. Healthcare workers need to adhere to universal precautions during treatment procedures and should dispose of the waste generated by those activities responsibly by adhering to proper waste segregation methods.

Risk attributes associated with handling healthcare waste can be reduced by adhering to basic personal hygiene measures. Correct techniques for handwashing are the primary preventive measure for nosocomial infections. It is important to provide the following measures to ensure health of employees handling healthcare waste

- Basic and in service training on management of healthcare waste to employees
- Provision of required personal protective equipment (PPE)

The following PPE should be made available to personnel who collect or handle health-care waste depending on the risk:

- Helmets, with or without visors (depending on the operation).
- Face masks (depending on the operation)

- Eye protectors (safety goggles) (depending on the operation).
- Overalls (coveralls) - obligatory.
- Industrial aprons - obligatory.
- Leg protectors and/or industrial boots - obligatory
- Disposable gloves (medical staff) or heavy-duty gloves (waste workers)



Healthcare waste handlers, especially handlers of hazardous waste, need to wear proper personal protective equipment such as heavy duty gloves, overall, boots, goggles etc.

The following should be practised or made available to ensure health of employees handling healthcare waste

- Facilities for washing with soap and water to be established at strategic locations in order to maintain proper personal hygiene
- Establishment of occupational health services which includes immunization against Hepatitis B, post-exposure prophylactic treatment, incident reporting and medical surveillance
- In house monitoring programme for occupational health and safety



Immunization against Hepatitis B for healthcare staff is recommended to safeguard the health and safety of healthcare workers.

The healthcare waste management process should be implemented carefully, consistently and universally at the healthcare institution. Continuous monitoring and awareness are key aspects for successful adaptation and practice of healthcare waste management practices. Awareness programmes need to be conducted regularly for the healthcare staff highlighting the roles and responsibilities of each category of staff involved in the waste management process. They should be trained and made aware of the safe management of healthcare waste and the importance of it for their health, safety and wellbeing.

POLICIES, ACTS AND REGULATIONS RELATED TO HEALTHCARE WASTE MANAGEMENT

National Policies, Acts and Regulations on Healthcare Waste Management

1. National Policies:

- (i) **The National Policy on Waste Management, 2019** addresses solid, liquid and gaseous healthcare waste with a vision of managing waste sustainability for a healthy life and a cleaner environment.

The policy emphasizes the responsibility and accountability of all stakeholders in healthcare waste management, promoting a circular economy through efficient use of resources and minimizing waste. In addition, it identifies the need for required infrastructure, the importance of ensuring occupational safety and health, development of human resources, securing adequate financial resources, meeting national and international obligations in order to manage healthcare waste successfully.

- (ii) **The National Policy and Strategy on Cleaner Production for Health Sector - 2007** - emphasizes:
 - Establishment of environmentally sound waste management practices emphasizing preventive measures in the healthcare system.

2. Strategies on Healthcare Waste Management

The National Policy on Waste Management (2019) recommends the following strategies in Healthcare Waste Management.

- a) Hazardous and non-hazardous waste shall be collected, treated and disposed of separately to minimize waste management costs and improve resource utilization efficiencies.
- b) Available capacities of existing waste treatment facilities shall be used to their maximum to treat all healthcare waste in the country by clustering hospitals and other healthcare facilities as appropriate and establishing proper collection networks.
- c) Waste treated by steam sterilization technology shall be finally disposed of with municipal wastes to maximize cost effectiveness as it is non-hazardous after proper treatment with confirmed tests in line with the standards.

- d) Waste management plans shall be developed and implemented by all public and private healthcare institutions/facilities in the country irrespective of its scale of operation with special emphasis on clinical waste with proper recording and reporting systems enabling performance monitoring by the authorities.
- e) Special precautions shall be taken to handle, safe treatment and disposal of waste arising from cancer treatment and expired drugs.
- f) Appropriate environmentally friendly and economically viable technologies shall be selected by health institutions depending on the quantity of waste generated.
- g) Clear and user-friendly guidelines shall be developed by the Ministry of Health on all forms of healthcare waste including solid, liquid and gaseous waste management for public and private healthcare institutions/facilities in the country in line with the CEA regulations.
- h) Waste collection networks shall be developed island-wide to prevent haphazard disposal of clinical waste and mixed with other waste streams.
- i) Waste collectors and disposers shall be registered in Local Authorities in addition to the Ministry of Health and the Central Environmental Authority.
- j) Infectious and other health related bulk waste shall be treated and disposed of in an environmentally sound manner.
- k) Healthcare institutions should develop required infrastructure for healthcare waste management to comply with environmental standards stipulated by the Central Environmental Authority.

3. Acts:

The National Environment Act:

The regulations on healthcare waste management are gazetted under the provisions of the National Environment Act and its subsequent amendments

- The National Environment Act No 47 of 1980
- The National Environment Act (Amendment) Act, No 56 of 1988,
- The National Environment Act (Amendment) Act, No 53 of 2000

3.1 Environment Impact Assessment (EIA)

Hospitals proposed to be established in sensitive areas should carry out an Environment Impact Assessment/ Initial Environmental Examination before its construction activities commence in order to mitigate anticipated adverse environmental impacts due to pollution or construction activities.

3.2 Environment Clearance:

All healthcare institutions which need to establish waste treatment facilities such as installation of incinerators/ steam sterilizers etc. or wastewater treatment facilities within the premises need to obtain an “Environment Clearance” from the Central Environment Authority Provincial Office.

Regulations

3.3 Environmental Licenses:

The required licenses are

1. Environmental Protection License (EPL)
2. Scheduled Waste Management License (SWML)

As per the Order published under the Gazette Notification No. 1533/16 dated 25.01.2008 (Environmental Protection License Prescribed Activities), health institutions are included under the prescribed list as follows , making it mandatory to obtain an Environmental Protection license (EPL).

68. Healthcare service centers generating infectious waste, including medical laboratories and research centres

Healthcare waste generated from the healthcare Institutions including Medical Laboratories and Research Centres have been categorized as “Scheduled Waste” (Hazardous Waste) under the Part 11 of the National Environmental (Protection and Quality) Regulations, No. 1 of 2008 published in the Gazette Extra-ordinary No. 1534/18 of 01.02.2008(Hazardous Waste Management Regulation)

25. Discarded drugs except living vaccines and euphoric compounds

N 251 Discarded drugs except living vaccines and euphoric compounds

26. Pathogenic and clinical wastes and quarantined materials

N 261 Pathogenic and clinical wastes and quarantined materials

28. Bio medical and healthcare waste from healthcare institutions including medical laboratories and research centres

S 281 Infectious healthcare waste including laboratory cultures; waste from isolation wards; tissues (swabs),materials or equipment that have been in contact with infected patients ; Human tissues or fluids

S 282 Sharps including needles and scalpels

S 283 Biological and anatomical waste including tissues, organs, body parts, human fetuses and animal carcasses, blood, and body fluids.

S 284 Outdated and discarded drugs including cytotoxic drugs and chemical reagents

S 285 Materials and containers contaminated with the above specified waste

As per the above regulation, in order to manage the “Scheduled Waste”, these institutions should obtain a Scheduled Waste Management License (SWML) as well in addition to the EPL.

Application Forms:

Relevant applications for the above two licenses could be downloaded from the following website or obtained from the Head office of the Central Environmental Authority or the Provincial Offices.

Application forms for licenses: Refer www.cea.lk (Downloads)

Please visit CEA website for more details.

The procedure in obtaining the licenses:

1. Submit the duly filled and signed applications to the Central Environmental Authority Head/Provincial office.
2. Pay the inspection fees, once requested by CEA
3. Once the institution is inspected, the requirements to be fulfilled and the existing deficiencies are identified and the institution should develop the system as recommended.
4. Once the developments are completed Central Environment Authority Office should be informed
5. CEA will re-inspect the institution and if requirements are fulfilled up to the satisfactory level, license fees need to be paid
6. Licenses will be issued by CEA.

3.4 Emission Standards of Waste Treatment Facilities:

The waste treatment facilities should comply with the air emission standards stipulated by the Central Environmental Authority.

Dioxin and Furan emissions from incinerators shall be controlled by maintaining temperature between 10000 C to 12500 C and 2-3 seconds retention time in the secondary chamber.

Regulations:

National Environmental (Stationary Source Emission Control) Regulations, No. 01 of 2019

Published in the Gazette Extra-ordinary No. 2126/36 of 05.06.2019

3.5 Wastewater Discharge Standards:

All wastewater discharged from sewerage systems and laboratories should comply with the wastewater discharge standards stipulated by the Central Environmental Authority.

Regulations: Part I of the National Environmental (Protection and Quality) Regulations, No. 1 of 2008 published in the Gazette Extra-ordinary No. 1534/18 of 01.02.2008

The facilities /industries that are engaged in the management of healthcare waste generated from healthcare Institutions including medical laboratories and research centres, should obtain **Scheduled Waste management Licenses from the CEA for the following activities**

- Waste collection
- Waste transportation
- Waste storage
- Waste recovering
- Waste disposal

3.6 Outsourcing of Healthcare Waste Treatment and Disposal

If a health institution is outsourcing the waste treatment and disposal, it should be outsourced only to an organization authorized by the Central Environmental Authority holding a valid Scheduled Waste Management License.

3.7 Healthcare Waste Transportation

If any health institution is using a vehicle to transport healthcare waste it should be specially designed as per the guidelines stipulated by CEA for transportation of hazardous waste with a valid hazardous waste transportation license.

3.8. Complaints

Complaints received from the general public/any other, on improper waste management practices/ pollution issues of healthcare institutions, should be investigated by the Central Environmental Authority.

ANNEXURE I- THE GAZETTE OF THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA: NO. 1533/16 - 2008.01.25

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The Gazette of the Democratic Socialist Republic of Sri Lanka
EXTRAORDINARY

අංක 1533/16 - 2008 ජනවාරි 25 වැනි සිකුරාදා - 2008.01.25
No. 1533/16 - FRIDAY, JANUARY 25, 2008

(Published by Authority)

PART I : SECTION (I) — GENERAL

Government Notifications

THE NATIONAL ENVIRONMENTAL ACT, No. 47 of 1980

Order under Section 23A

BY virtue of the powers vested in me by section 23A of the National Environmental Act, No. 47 of 1980 as amended by Act, Nos. 56 of 1988 and 53 of 2000. I, Patali Champika Ranawaka, Minister of Environment and Natural Resources, do by this Order, determine the activities set out in the Schedule hereto as activities for which a License is required under the aforesaid section being activities which involves or results in discharging, depositing or emitting waste into the environment causing pollution.

PATALI CHAMPIKA RANAWAKA,
Minister of Environment and Natural Resources.

Colombo,
14th January, 2008.

THE SCHEDULE

THE PRESCRIBED ACTIVITIES FOR WHICH A LICENSE IS REQUIRED

PART A

1. Chemicals manufacturing or formulating or repacking industries.
2. Soaps, detergents, softener or any other cleansing preparations manufacturing industries having a production capacity of 1,000 kilograms per day or more.
3. Bulk petroleum liquid or liquefied petroleum gas storage or filling facilities having a total capacity of 150 or more metric tons excluding vehicle fuel filling stations.
4. Industries involved in the use of fibreglass as a raw material where 10 or more workers are employed.
5. Synthetic rubber, natural rubber manufacturing or processing or rubber based industries excluding industries which manufacture less than 100 kilograms of ribbed smoke rubber sheets per day.
6. Activated carbon or carbon black manufacturing industries or charcoal manufacturing industries having a production capacity one or more metric ton per batch.
7. Industries involved in manufacturing extracting or formulating Ayurvedic, Indigenous medicinal products where 25 or more workers are employed.

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8. Chemical fertilizer manufacturing, formulating, processing or repacking Industries.
9. Pesticides, insecticides, fungicides and herbicides manufacturing, formulating or repacking industries.
10. Oil (mineral oil or petroleum) refineries.
11. Dye and dye intermediate manufacturing or formulating industries.
12. Paints (emulsion or enamel), inks, pigments, varnish, polish manufacturing or formulating industries.
13. Petrochemical (basic or intermediates) manufacturing or formulating industries.
14. Industrial gas manufacturing, processing or refilling industries.
15. Asphalt processing plants.
16. Industries involved in the manufacture of polymers or polymer based products (i.e. polyethylene, polyvinyl chloride (PVC), polyurethane, polypropylene, polyester, nylon, polystyrene, resins, fibreglass or other man made fibres etc.) or polymer or polymer based products, recycling industries.
17. All types of tyres, tubes manufacturing or tyre retreading industries.
18. Industries involved in manufacturing or reconditioning of batteries.
19. Any industry involved in the use of asbestos fibres as a raw material.
20. Industries involved in manufacturing, extracting or formulating pharmaceuticals or cosmetic products including intermediates.
21. Adhesives manufacturing industries excluding natural gums.
22. Match sticks manufacturing industries and explosives manufacturing or formulating industries.
23. Batik industries where 10 or more workers are employed.
24. Textile processing (i.e. bleaching, dyeing, printing) industries or garment washing industries or textile sand blasting industries or commercial laundries where 10 or more workers are employed.
25. Tanneries.
26. Lather finishing industries having effluent generating operations.
27. Jute processing industries.
28. Industries involved in bleaching or dyeing of natural fibre or natural fibre based industries where 25 or more workers are employed.
29. Power looms having 25 or more machines or power looms with sizing activities.
30. Sugar manufacturing industries or sugar refineries.
31. Fermentation industries (Distilleries, Breweries) or alcoholic beverages bottling plants or bottling plants having bottle washing operations.
32. Food manufacturing and processing industries including bakery products and confectioneries where 25 or more workers are employed.
33. Abattoirs.
34. Coconut oil or cinnamon oil extraction industries where 25 or more workers are employed.
35. Plants or animal oil/fats extraction industries having production capacity of 10 litres or more per day excluding coconut oil and cinnamon oil extraction industries.
36. Instant tea or coffee processing industries.

37. Non-alcoholic beverages manufacturing industries where 25 or more workers are employed.
38. Desiccated coconut mills or coconut processing industries where 10 or more workers are employed.
39. Rice mills having wet process and having a production capacity of 5,000 kilograms or more per day.
40. All hatcheries or poultry farms having 2,500 or more birds or piggery, cattle, goats farms having animals 50 or more or having rating* for mixed farming 2,500 or more.
*Rating for Mixed Farming = No. of Birds + 50 x (No. of Pigs + No. of Cattle + No. of Goats)
41. Animal feed manufacturing industries having a capacity of 25 or more metric tons per day.
42. Cigarettes or other tobacco products manufacturing industries where 50 or more workers are employed.
43. Industries involved in surface treatment of metal or plastic including electroplating, galvanizing and powder coating industries.
44. Iron and steel mills.
45. Foundries with any type of furnaces.
46. Non-ferrous metal processing industries including secondary process, smelting and recovery of metals.
47. Metal fabricating industries or machinery, machinery parts or hardware items or electrical and electronic goods and equipment manufacturing or assembling industries where 24 or more workers are employed. (Including lathe workshops, welding shops, spray painting industries).
48. Cement industries (clinker grinding, manufacturing or repacking).
49. Concrete batching plants having a production capacity of 50 or more cubic meters per day.
50. Glass or glass based product manufacturing industries.
51. Lime kilns having a production capacity of 20 or more metric tons per day.
52. Ceramic industries where more than 25 or more workers are employed.
53. Mechanized mining activities with multi bore hole blasting or single bore hole blasting activities with production capacity having 600 or more cubic meters per month.
54. Crushing or processing of non-metallic minerals (i.e. limestone, dolomite, apatite, rock phosphate, sand stone, feldspar, quartz, ilmenite, rutile, zircon, mica, graphite, kaolin, etc) excluding lime shell and granite crushing activities.
55. Granite boulders making or processing industries (extracting, blasting, slicing, polishing).
56. Granite crushing (Metal crushing) industries having a total production capacity of 25 or more cubic meters per day.
57. Common wastewater (industrial or sewage) treatment plants.
58. Incinerators having a feeding capacity of 5 or more metric tons per day.
59. Water treatment plants having a treatment capacity of 10,000 or more cubic meters per day.
60. Municipal solid waste and other solid waste composting plants having a capacity or 10 or more metric tons per day.
61. Solid waste recovery/recycling or processing plants having a capacity of 10 or more metric tons per day.
62. Solid waste disposal facility having a disposal capacity of 10 or more metric tons per day.
63. All toxic and hazardous waste treatment facility or disposal facilities or recycling/recovering or storage facilities.
64. Industries involved in chemical treatment and preservation of wood excluding Boron treatment.

65. Saw mills having a milling capacity of 50 or more cubic meters per day or wood based industries where 25 or more workers are employed.
66. Hotels, guest houses, rest houses having 20 or more rooms.
67. Hostels and similar dwelling places where occupancy level is exceeding 200 or more.
68. Health care service centres generating infectious wastes, including medical laboratories and research centres.
69. Automobile or bicycle manufacturing or assembling industries.
70. Vehicles service stations or container yards having vehicle service activities excluding three wheeler and motor cycles services and interior cleaning.
71. Railway workshops or all bus depots having vehicle servicing activities.
72. All vehicle emission testing centres.
73. Electrical power generating utilities excluding standby generators and hydro or solar or wind power generation.
74. Printing presses with lead smelting or newspaper printing or printing process which generates wastewater or colour photographs processing centres.
75. Paper and Pulp Industries or corrugated cartons manufacturing industries.
76. Any industry where 200 or more workers per shift are employed.
77. Industrial Estates approved under the part IVC of the National environmental Act including Katunayake and Biyagama Export processing Zones.
78. Zoological gardens.
79. Transmission towers providing facilities for telecommunication and broadcasting.
80. Any industry not included above which discharges 10 or more cubic meters of wastewater per day or using toxic chemicals in its process.

PART B

1. Soaps, detergents, softener or any other cleansing preparations manufacturing industries having a production capacity less than 1,000 kilograms per day.
2. Bulk petroleum liquid storage facilities excluding filling stations or liquefied petroleum gas (LP Gas) storage or filling facilities having a total capacity less than 150 metric tons.
3. industries involved in the use of fibre glass as a raw material where less than 10 workers are employed.
4. Ribbed smoke rubber sheet manufacturing industries having a production capacity of more than 50 kilograms and less than 100 kilograms per day.
5. Activated carbon or carbon black manufacturing industries or charcoal manufacturing industries having a production capacity less than one metric ton per batch.
6. Industries involved in manufacturing, extracting or formulating Ayurvedic, indigenous medicinal products where more than 10 workers and less than 25 workers are employed.
7. Batik industries where less than 10 workers are employed.
8. Commercial laundries where less than 10 workers are employed.
9. Leather finishing industries having dry process operations.

10. Natural fibre based industries where less than 25 workers are employed excluding industries involved in bleaching or dyeing of natural fibre.
11. Power looms having less than 25 machines.
12. Hand Looms or knitting or embroidery industry having more than 10 looms.
13. Garment industries where 25 or more workers and less than 200 workers per shift are employed.
14. Sugar cane based industries excluding sugar factories of sugar refineries.
15. Food manufacturing and processing industries including bakery products and confectioneries where 5 or more workers and less than 25 workers are employed.
16. Cinnamon oil extracting industry where less than 25 workers are employed.
17. Rice mills having wet process with a production capacity of less than 5,000 kilograms per day.
18. Grinding mills having production capacity of more than 1,000 kilograms per month.
19. Poultry farms have 250 or more and less than 2,500 birds or piggery, cattle, goats farms having animals 5 or more and less than 50 or having rating * for mixed farming 250 and less than 2,500.

* Rating for Mixed Farming = No. of Birds + 50 x (No. of Pigs + No. of Cattle + No. Goats)

20. Animals feed manufacturing industries, having a capacity of less than 25 metric tons per day.
21. All ice manufacturing industries.
22. Metal fabricating industries or machinery, machinery parts or hardware items or electrical and electronic goods and equipment manufacturing or assembling industries where less than 25 workers are employed. (including lathe workshop, welding shops, spray painting industries).
23. Concrete batching plants having a capacity less than 50 cubic meters per day.
24. Single borehole blasting with industrial mining activities using explosives, having a production capacity of less than 600 cubic meters per month.
25. Granite crushing (Metal crushing) industries having a total production capacity of less than 25 cubic meters per day excluding manual crushing operations using hand tools.
26. Municipal solid waste and other solid waste composting plants (excluding household composting) having a capacity of less than 10 metric tons per day.
27. Solid waste recovery/recycling or processing plants having a capacity of less than 10 metric tons per day.
28. Solid waste disposal facilities a disposal capacity of less than 10 metric tons per day.
29. Hostels and similar dwelling places where occupancy level or 25 or more boarders and less than 200 borders.
30. Vehicle repairing and maintaining garages including spray painting or mobile air-conditioning activities.
31. Recycling or recovering centres of refrigerants form air-conditioners or refrigerators.
32. Three wheeler or motor cycle servicing activities or vehicle interior cleaning activities.
33. Any industry not included above which discharges 3 or more and less than 10 cubic meters of industrial processing wastewater per day.

PART C

1. All vehicle filling stations (liquid petroleum and liquefied petroleum gas).
2. Manufacturing of candles where 10 or more workers are employed.
3. Coconut oil extraction industries where 10 or more workers and less than 25 workers are employed.
4. Non-alcoholic beverages manufacturing industries where 10 or more workers and less than 25 workers are employed.
5. Rice mills having dry process operations.
6. Grinding mills having production capacity of less than 1,000 kilograms per month.
7. Tobacco barns.
8. Cinnamon fumigating industries with sulphur fumigation having capacity of 500 or more kilograms per batch.
9. Edible salt packing and processing industries.
10. Tea factories excluding instant tea processing.
11. Concrete pre-cast industries.
12. Mechanized cement blocks manufacturing industries.
13. Lime kilns having a production capacity of less than 20 metric tons per day.
14. Plaster of Paris industries where less than 25 workers are employed.
15. Lime shell crushing industries.
16. Tile and brick kilns.
17. Single borehole blasting with artisanary mining activities using explosives, having capacity of less than 600 cubic meters per month.
18. Saw mills having a milling capacity of less than 50 cubic meters per day or industries involved in Boron treatment of wood or timber seasoning.
19. Carpentry workshops which use multipurpose carpentry machine or wood based industries where more than 5 workers and less than 25 workers are employed.
20. Residential hotels, guest houses, rest houses with 05 or more and less than 20 rooms.
21. Vehicle repairing or maintaining garages excluding spray-painting or mobile air-conditioning activities.
22. Repairing, maintaining or installation centres of refrigerators and air-conditioners.
23. Container yards excluding where vehicle servicing activities are carried out.
24. All electrical and electronic goods repairing centre where more than 10 workers are employed.
25. Printing presses and later press machines excluding lead smelting.

The activities for which Environmental Protection Licence is required and published in *Gazette Extraordinary* No. 1159/22 dated 22.11.2000 is hereby rescinded.

02-288

PRINTED AT THE DEPARTMENT OF GOVERNMENT PRINTING, SRI LANKA.

**Annexures II.- THE GAZETTE OF THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI
LANKA: NO. 1534/18 - 2008.02.01**

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අංක 1534/18 - 2008 පෙබරවාරි 01 වැනි සිකුරාදා - 2008.02.01
No. 1534/18 - FRIDAY, FEBRUARY 01, 2008

(Published by Authority)

PART I : SECTION (I) — GENERAL

Government Notifications

L.D.B. 4/81.

NATIONAL ENVIRONMENTAL ACT, No. 47 OF 1980

REGULATIONS made by the Minister under Section 32 read with Section 23A and 23 B of the National Environmental Act, No. 47 of 1980.

PATALI CHAMPIKA RANAWAKA,
Minister of
Environment and Natural Resources.

Colombo,
14th January, 2008.

Regulations

1. These Regulations may be cited as the National Environmental (Protection and Quality) Regulations, No. 1 of 2008.

PART I

ISSUE OF ENVIRONMENTAL PROTECTION LICENSE FOR EMISSION OR DISPOSAL OF WASTE

2. No person shall, discharge, deposit or emit waste into the environment or carry on any prescribed activity determined by an Order made under Section 23A of the National Environmental Act, No. 47 of 1980 in circumstances which cause or are likely to cause pollution, or noise pollution, otherwise than –

- (a) under the Authority of a license issued by the Central Environmental Authority (hereinafter referred to as “the Authority”) ; and
- (b) in accordance with the such standards and criteria specified in Schedule I hereto, in respect of the specified industries.

3. Notwithstanding anything contained in regulation 2, the Authority may, by a direction issued under regulation 12, impose more stringent standards and criteria than those specified in Schedule I hereto in respect of any prescribed activity, having regard to the need to protect the receiving environment.

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4. Where an activity in respect of which an application for a license is made, is not covered by the standards and criteria specified in Schedule I hereto, the Authority shall examine such application on its merits and grant such application specifying the standards and criteria which shall be applicable. The applicant shall comply with all such directions as may be issued to him by the Authority for the protection of the environment.

5. (1) An application for the license shall be –
- (a) made separately, in respect of prescribed activity regarding which the Acts authorized by the regulations are being carried out ;
 - (b) made substantially in Form A in Schedule II and Schedule IV hereto ;
 - (c) made at least thirty days prior to the commencement of the activity.
- (2) Every applicant shall furnish all such particulars as may be required to be stated in the aforesaid Form A in Schedule II and Schedule IV and any other information that may be called for by the Authority for the purpose of determining whether or not to grant the license.
- (3) Every applicant shall make payment of the license fee specified in Schedule III hereto on intimation by the Authority.

6. Every license issued by the Authority shall be :-

- (a) made substantially in Form B of Schedule II hereto ;
- (b) valid for such period not exceeding three years as specified in the license subject to any suspension or cancellation of the license under Section 23 D of the Act ; and
- (c) renewable.

7. The Authority shall issue the license only if it is satisfied that :-

- (a) the license will not be used to contravene the provisions of the Act or any regulation made there under ;
- (b) no irreversible damage or hazard to any person, environment or any nuisance will result from the acts authorized by the license ;
- (c) the applicant has taken adequate steps for the protection of the environment in accordance with the requirements of the Law.

8. (1) An application for a renewal of a license shall be –

- (a) made at least three months before the date of expiry of the license or one month before effecting any changes, alterations, or extensions to the premises at which the acts authorized by the license are carried out, as the case may be ;
 - (b) made substantially in Form C of Schedule II hereto ;
- (2) Every applicant for a renewal of the license shall furnish all such particulars as may be required to be stated in the aforesaid Form A in Schedule II and Schedule IV and any other information that may be called for by the Authority for the purpose of determining whether or not the license should be renewed.
- (3) Every applicant shall make payment of the license fee specified in the Schedule III hereto for renewal of a license within the period specified by the Authority on receipt of intimation by the Authority.

9. The Authority may, before issuing an order suspending or canceling a license under Section 23 D of the Act, give the holder of the license an opportunity to show cause why such order should not be issued :

Provided that, where, since the issue of the license, the receiving environment has been altered or changed due to natural factors or otherwise or where continued discharge, deposition or emission of waste into the environment under the license affects any beneficial use adversely, the Authority shall forthwith make an order suspending the license for a period to be specified in the order or cancel such license.

10. (1) Any applicant for a license who is aggrieved by the refusal of the Authority to grant a license, or, any holder of a license who is aggrieved by the suspension or cancellation of a license or the refusal to renew a license may, within thirty days after the date of notification of such decision to him, appeal in writing against such refusal, suspension, cancellation or refusal to renew, to the Secretary to the Ministry of the Minister in-charge of the subject of Environment.
 - (2) Such applicant shall be given an opportunity of making representations in person or by authorized representative in connection with his appeal.
 - (3) The Secretary may set aside, vary or confirm the decision appealed from, and the Authority shall give effect to the Secretary's decision.
 - (4) The decision of the Secretary shall be final and conclusive.
11. The holder of a license shall forthwith notify the Authority of –
- (a) any changes made or proposal to be made in the particulars furnished in connection with his application for a license ;
 - (b) any decision to terminate any activity to which the license relates,
- and shall comply with any directions that may be issued by the Authority to prevent or mitigate environmental pollution and hazards.
12. Every applicant and every holder of a license shall comply with any direction given by or on behalf of the Authority for the purpose of protecting the environment.
13. Every person who acts in contravention of any regulations commits an offence punishable under Section 31 of the Act.
14. Any person who operates a prescribed activity shall obtain a license from the Authority prior to the commencement of such activity.

PART II

ISSUE OF LICENSE FOR THE MANAGEMENT OF WASTE

15. No person shall generate collect, transport, store, recover, recycle or dispose waste or establish any site or facility for the disposal of any waste specified in the Schedule VIII (herein after referred to as "scheduled waste") except under the authority of a license issued by the Authority and in accordance with such standards and other criteria as may be specified by the Authority.
16. Every application for a license under regulation 15 shall be substantially in Form A as set out in Schedule IV of these regulations, and be accompanied by –
- (a) a valid certificate of insurance or any other form of financial security acceptable to the Authority, of such sum as is sufficient to cover the risk or damage that may be caused to the public as a result of any activity referred to in regulation 15 being carried on by the applicant ; and
 - (b) such other additional information explanatory of the matters set out in Form A of Schedule IV of this regulation, as the Authority may consider necessary in the interest of the protection of the Environment.
17. Every application for a license under regulation 15 shall be accompanied by a fee calculated on the following basis :-

Generator	Rs. 1000
Collector	Rs. 1000

Storer	Rs.	10,000
Transporter	Rs.	2,000
Recycler	Rs.	5,000
Recoverer	Rs.	5,000
Disposer	Rs.	1,00,000

18. On receipt of an application for a license under regulation 16 and after such risk assessment as the Authority shall deem appropriate, the Authority may issue a license to the applicant.

19. Every license issued by the Authority under regulation 18 shall –

- (a) be substantially in such form as set out in Form B of Schedule IV of this Regulation ;
- (b) be subject to such terms, conditions and standards as may be stipulated in the license in addition to what is specified in the Schedule I hereto ;
- (c) be valid for such period as shall be specified in the license ; and
- (d) on application being made there fore be renewable subject to regulation 25, by the Authority.

20. No person shall continuously engage in the management of scheduled waste with the same physical and chemical characteristics or any aspects thereof, except under a separate license for multiple scheduled waste management operations of the same kind, issued by the Authority in accordance with the provisions of regulation 17 for multiple scheduled waste management operations of the same kind. Such license shall be for a specified period and for a specified quantity of scheduled waste as shall be specified in the license.

21. A license issued under regulation 18, 19 or 20 shall not authorize the mixing of waste, with scheduled waste within the meaning of this Part of these regulations and specified in Part I of these regulations, unless the generator, collector, storer, transporter or person disposing proves to the satisfaction of the Authority that such mixing may reduce the load of pollutants.

22. A license issued under this Part of these regulations shall not be transferable and any transfer made in contravention of these regulations shall render the license issued null and void.

23. A license issued under these regulations to any person shall not be used for the benefit of any other person.

24. Where a person to whom a license has been issued under this Part of these regulations, acts in violation of any of the terms, standards and conditions of the license, the Authority may be order suspend the operation of such license for a period specified in such order, or cancel such license, after granting to the licensee an opportunity to show cause and after recording reasons therefore :

Provided however the Authority shall have power to temporarily suspend the license pending the conclusion of an inquiry under this regulation, where it considers such action urgently required in the public interest.

25. The Authority shall have the power to monitor and inspect activities conducted by a licensee pursuant to any license granted to such person under this part of the regulations.

26. (1) The Authority shall have the power to specify guidelines from time to time, for –

- (a) the establishment of scheduled waste disposal sites ;
- (b) safety measures to be adopted during generation collection, transportation, storage, recovery, recycling or disposal of scheduled wastes ;
- (c) operations regarding recycling or recovery of scheduled waste.

(2) The guideline specified under paragraph (1) shall wherever possible be published in the *Gazette* or shall otherwise be made available to the public.

27. It shall be the duty of every licensee to –

- (a) maintain records substantially in the form set out in the Schedule V of these regulations in respect of collection, transportation, storage, recovery, recycling or disposal of Scheduled waste ;
- (b) send an annual return to the Authority substantially in the form set out in the Schedule VI of these regulations regarding the disposal of Scheduled waste, duly certified by any person authorized for such purposes by the Authority ;
- (c) provide the Authority annually with such information as may be required by the Authority ; and
- (d) record in a register to be maintained by the licensee the quantity, type, quality and origin of Scheduled waste, collected, stored, transported, recovered, recycled and disposed of by him.

28. The register to be maintained under regulation 27 shall be made available by the licensee for inspection at any time by the Authority and it shall be the duty of a licensee to issue a certified copy of any extract of the register so maintained at the request of any member of the public, on the payment of a fee.

29. Any authorized officer of the Authority or a police officer may, for the purpose of ascertaining whether the provisions of these regulations are being complied with-

- (a) enter and inspect any facility or site of generation collection storage, recover, recycling or disposal of scheduled waste ;
- (b) stop and inspect any vehicle in transit, suspected to contain scheduled waste ;
- (c) examine any records maintained under these regulations and take copies of such records ;
- (d) take samples of scheduled waste generated transported, stored, collected, recovered, recycled or disposed of.

30. The Authority shall maintain a record of licences granted under these regulations.

31. Every person involved with the management of scheduled waste shall, in addition to any other signs or symbols required under any other law, display a plainly visible notice in Sinhala, Tamil and English, on the—

- (a) site of generation or storage ;
- (b) vehicle used for transportation ;
- (c) containers or tanks used for collection and storage ; and
- (d) disposal sites whether approved or not,
the following statement and visual sign — “Warning, contains waste, Dangerous to human, health and the environment”

32. The licenece issued under these regulations or a certified copy thereof shall be carried on the vehicle transporting schedule waste, and shall be produced by the driver of the vehicle for inspection by any police officer or other officer authorized by the Authority.

33. Every generator collector, storer, transporter recycler, recovery and disposer of scheduled waste shall —

- (a) ensure that all its employees are adequately trained in handling scheduled waste and shall report to the authority on a bi-annual basis the steps taken to ensure that its employees are so trained ;
- (b) have a regularly updated emergency action plan approved by the authority ;
- (c) ensure that all employees handling scheduled wastes shall be protected by appropriate clothing and other precautions from the adverse effects of the scheduled waste ; and
- (d) ensure that immediate and adequate medical care is available for employees and the public at all times, including emergency situations.

34. Every generator collector, storer, transporter, recycler, recoverer or disposer, of scheduled waste shall forthwith report to the Authority of any accident that may have occurred during or as a result of the generation, collection, storage, transportation, recycling recovery or disposal of waste substantially in the form set out in Schedule VII hereto.

35. Every person who carries on any activity which generates or produces waste or is in possession or control of scheduled waste or is an importer of waste into Sri Lanka, shall inform the Authority-

- (a) on or before the July 31 and January 31, respectively of each year, the quantity and characteristics of scheduled waste generated or produced or in possession or control of or imported as the case may be, in the previous six months and estimate of the quantity and composition of scheduled waste that might be so generated or produced, or be in possession or control of or be imported as the case may be for the ensuing year, including information of process, modifications and changes in chemical usage ; and
- (b) of the measures adopted to apply technologies for the reduction or elimination of the generation or production or the possession or control of scheduled waste, including method adopted for treatment and final disposal of such waste.

PART III

GENERAL

36. The National Environmental (Protection and Quality) Regulation No. 1 of 1990 published in *Gazette Extraordinary* No. 595/16 of February, 1990 as amended from time to time, are hereby rescinded.

37. (1) Notwithstanding the rescinding of the aforesaid regulation, any act or omission done or made under the said regulation shall be effective and has a force of law unless its is contrary to this regulation.
- (2) Every licence issued for the purposes of the aforesaid regulation, after 16th February, 1990 shall be valid and continued as effectual as if issued here under for the purposes of enforcement of the rights and obligations to which such licence applies.

38. For the purpose of this Part of these regulations-

“Act” means the National environmental Act, No. 47 of 1980 ;

“Authority” means the Central Environmental Authority established by the National Environmental Act, No. 47 of 1980 ;

“collection” means the collection including storage for the time being of scheduled waste including those generated in small quantities ;

“disposal” includes any operation which leads to the emission, discharge or deposit of scheduled waste into or upon the environment and further includes other operations such as recycling and recovery ;

“facility” means any location wherein the processes incidental to the generation, collection, storage, recycling, recovery and disposal of scheduled wastes are carried out ;

“generation” means the productions, manufacturing, or creation of scheduled waste from any activity ;

“heavy metals” means the group of elements between and including copper and mercury in the periodic table of the elements having atomic weights between and including 63.546 and 200.590 ;

“management” means the generation collection, storage, transport, recycling, recovery and disposal of scheduled waste, including these generated in small quantities ;

“schedule waste” means any waste specified in Schedule VIII hereto ;

“storage” includes the storing of waste for a minimum reasonable period under conditions which will prevent their release to the environment ;

“transport” means the movement of scheduled waste from the site of generation, importation or storage to any other side including a facility for disposal ;

“waste” means waste as defined in the Act and specified in Scheduled VIII hereto.

SCHEDULE I

TOLERANCE LIMITS FOR THE DISCHARGE OF INDUSTRIAL WASTE IN TO INLAND SURFACE WATERS

No.	Parameter	Unit type of limit	Tolerance Limit values
01.	Total suspended solids	mg/1, max.	50
02.	Particle size of the total suspended solids	µm, less than	850
03.	pH at ambient temperature	-	6.0 - 8.5
04.	Biochemical oxygen demand (BOD ₅ in five days at 20 ^o c or BOD ₃ in three days at 27 ^o c)	mg/1, max.	30
05.	Temperature of discharge	°C, max.	Shall no exceed 40 ^o C in any section of the stream within 15 m down stream from the effluent outlet.
06.	Oils and greases	mg/1, max.	10
07.	Phenolic compounds (as C ₆ H ₅ OH)	mg/1, max.	1
08.	Chemical oxygen demand (COD)	mg/1, max.	250
09.	Colour	Wavelength Range	Maximum spectral absorption coefficient
		436 nm (Yellow range)	7m ⁻¹
		525 nm (Red range)	5m ⁻¹
		620 nm (Blue range)	3m ⁻¹
10.	Dissolved phosphates (as P)	mg/1, max.	5
11.	Total Kjeldahl nitrogen (as N)	mg/1, max.	150
12.	Ammoniacal nitrogen (as N)	mg/1, max.	50
13.	Cyanide (as CN)	mg/1, max.	0.2
14.	Total residual chlorine	mg/1, max.	1.0
15.	Flourides (as F)	mg/1, max.	2.0
16.	Sulphide (as S)	mg/1, max.	2.0
17.	Arsenic (as As)	mg/1, max.	0.2
18.	Cadmium (as Cd)	mg/1, max.	0.1
19.	Chromium, total (as Cr)	mg/1, max.	0.5
20.	Chromium, Hexavalent (as Cr ⁶⁺)	mg/1, max.	0.1
21.	Copper (as Cu)	mg/1, max.	3.0
22.	Iron (as Fe)	mg/1, max.	3.0
23.	Lead (as Pb)	mg/1, max.	0.1
24.	Mercury (as Hg)	mg/1, max.	0.0005
25.	Nickel (as Ni)	mg/1, max.	3.0
26.	Selenium (as Se)	mg/1, max.	0.05

SCHEDULE I (Contd.)

TOLERANCE LIMITS FOR THE DISCHARGE OF INDUSTRIAL WASTE IN TO INLAND SURFACE WATERS

No.	Parameter	Unit type of limit	Tolerance Limit values
27.	Zinc (as Zn)	mg/l, max.	2.0
28.	Pesticides	mg/l, max.	0.005
29.	Detergents/surfactants	mg/l, max.	5
30.	Faecal Coliform	MPN/100 ml, max	40
31.	Radio Active Material :		
	(a) Alpha emitters	micro curie/ml, max	10 ⁻⁸
	(b) Beta emitters	micro curie/ml, max	10 ⁻⁷

Note 1 : All efforts should be made to remove unpleasant odour as far as possible.

Note 2 : These values are based on dilution of effluents by at least 8 volumes of clean receiving water. If the dilution is below 8 times, the permissible limits are multiplied by the 1/8 of the actual dilution.

Note 3 : The above mentioned general standards shall cease to apply with regard to a particular industry when industry specific standards are notified for that industry.

Note 4 : Pesticides as per World Health Organization (WHO) and Food and Agriculture Organization (FAO) requirements.

LIST II

TOLERANCE LIMITS FOR INDUSTRIAL WASTE DISCHARGED ON LAND FOR IRRIGATION PURPOSE

No.	Parameter	Unit type of limit	Tolerance Limit value
1.	Total dissolved solids	mg/l, max.	2100
2.	pH at ambient temperature	-	5.5 - 9.0
3.	Biochemical oxygen demand (BOD ₅ in five days at 20 ^o C or BOD ₃ in three days at 27 ^o c)	mg/l, max.	250
4.	Oils and greases	mg/l, max.	10
5.	Chemical Oxygen Demand (COD)	mg/l, max.	400
6.	Chlorides (as Cl)	mg/l, max.	600
7.	Sulphates (as SO ₄)	mg/l, max.	1000
8.	Boron (as B)	mg/l, max.	2.0
9.	Arsenic (as As)	mg/l, max.	0.2
10.	Cadmium (as Cd)	mg/l, max.	2.0
11.	Chromium, total (as Cr)	mg/l, max.	1.0
12.	Lead (as Pb)	mg/l, max.	1.0
13.	Mercury (as Hg)	mg/l, max.	0.01
14.	Sodium adsorption ratio (SAR)	-	10 - 15
15.	Residual sodium carbonate (RSC)	mol/l, max.	2.5

LIST II (Contd),

TOLERANCE LIMITS FOR INDUSTRIAL WASTE DISCHARGED ON LAND FOR IRRIGATION PURPOSE

No.	Parameter	Unit Type of limit	Tolerance Limit Values
16.	Electrical conductivity	μS/cm. max.	2250
17.	Faecal coliform	MPN/100ml, max.	40
18.	Copper (as Cu)	mg/l, max.	1.0
19.	Cyanide (as CN)	mg/l, max.	0.2
20.	Radio Active Material :		
	(a) Alpha emitters	Micro curie./ml, max.	10 ⁻⁹
	(b) Beta emitters	Micro curie/ml, max.	10 ⁻⁸

Hydraulic Loading Applicable for Different Soils :

Soil Texture Class	Recommended dosage of settled Industrial Effluents (m ³ /hectare, day)
1. Sandy	225 - 280
2. Sandy laom	170 - 225
3. loam	110 - 170
4. Clay loam	55 - 110
5. Clay	35 - 55

LIST III

TOLERANCE LIMITS FOR INDUSTRIAL AND DOMESTIC WASTE DISCHARGED INTO MARINE COASTAL AREAS

No.	Parameter	Unit Type of limit	Tolerance Limit Values
1.	Total suspended solids	mg/l, max.	150
2.	Particle size of -		
	(a) Floatable solids	mm, max.	3
	(b) Settlabe solids	μm, max.	850
3.	pH at ambient temperature	-	5.5 - 9.0
4.	Biochemical oxygen demand (BOD ₅ in five days at 20 ° C or BOD ₃ in three days at 27 ° C)	mg/l, max.	100
5.	Temperature	°C, max	45°C at the point of discharge
6.	Oils and greases	mg/l, max.	20

LIST III (Contd.,)

TOLERANCE LIMITS FOR INDUSTRIAL AND DOMESTIC WASTE DISCHARGED INTO MARINE COASTAL AREAS

No.	Parameter	Unit Type of limit	Tolerance Limit Values
7.	Phenolic compounds (as Phenolic OH)	mg/l, max.	5
8.	Chemical oxygen demand (COD)	mg/l, max.	250
9.	Total residual chlorine	mg/l, max.	1.0
10.	Ammoniacal Nitrogen (as N)	mg/l, max.	50
11.	Cyanide (as CN)	mg/l, max.	0.2
12.	Sulphides (as S)	mg/l, max.	5.0
13.	Fluorides (as F)	mg/l, max.	15
14.	Arsenic (as As)	mg/l, max.	0.2
15.	Cadmium (as Cd)	mg/l, max.	2.0
16.	Chromium, total (as Cr)	mg/l, max.	2.0
17.	Chromium, Hexavalent (as Cr ⁶⁺)	mg/l, max.	1.0
18.	Copper (as Cu)	mg/l, max.	3.0
19.	Lead (as Pb)	mg/l, max.	1.0
20.	Mercury (as Hg)	mg/l, max.	0.01
21.	Nickel (as Ni)	mg/l, max.	5.0
22.	Selenium (as Se)	mg/l, max.	0.1
23.	Zinc (as Zn)	mg/l, max.	5.0
24.	Pesticides	mg/l, max.	0.005
25.	Organo-Phosphorus compounds	mg/l, max.	1.0
26.	Chlorinated hydrocarbons (as C1)	mg/l, max.	0.02
27.	Faecal coliform	MPN/100ml, max.	60
28.	Radio Active Material :		
	(c) Alpha emitters	micro curie/ml, max	10 ⁻⁸
	(d) Beta emitters	micro curie/ml, max	10 ⁻⁷

Note 1 : All efforts should be made to remove unpleasant odour and colour as far as practicable.

Note 2 : These values are based on dilution of effluents by at least 8 volumes of clean receiving water. if the dilution is below 8 times, the permissible limits are multiplied by the 1/8 of the actual dilution.

LIST IV

TOLERANCE LIMITS FOR WASTE FROM RUBBER FACTORIES BEING DISCHARGED INTO INLAND SURFACE WATERS

	Parameters	Units Type of limit	Tolerance Limit Value	
			Type I* Factories	Type II** Factories
1	pH value at ambient temperature	-	6.5 to 8.5	6.5 to 8.5
2	Total suspended solids	mg/1, max.	100	100
3	Total Solids	mg/1, max.	1500	1000
4	Biochemical Oxygen Demand, BOD ₅ in five days at 20°C or BOD ₃ in three days at 27°C	mg/1, max.	60	50
5	Chemical Oxygen Demand (COD)	mg/1, max.	400	400
6	Total Nitrogen (as N)	mg/1, max.	300	60
7	Ammonical Nitrogen (as N)	mg/1, max.	300	40
8	Sulphides (as S)	mg/1, max.	2.0	2.0

- * *Type I Factories* – Latex Concentrate
- ** *Type II Factories* – Standard Lanka Rubber ;
Crepe Rubber and Ribbed Smoked Sheets

Note 1 : All efforts should be made to remove unpleasant odour and colour as far as practicable.

Note 2 : These values are based on dilution of effluents by at least 8 volumes of clean receiving water. If the dilution is below 8 times, the permissible limits are multiplied by the 1/8 of the actual dilution.

LIST V

TOLERANCE LIMITS FOR WASTE FROM TEXTILE INDUSTRY BEING DISCHARGED INTO INLAND SURFACE WATERS

No.	Parameter	Unit type of limit	Tolerance Limit values
01.	pH at ambient temperature		6.5 to 8.5
02.	Temperature	°C, max.	40 measured at site of sampling
03	Total suspended solids	mg/1, max.	50
04	Biochemical Oxygen Demand BOD ₅ in five days at 20°C or BOD ₃ in a three days at 27°C	mg/1, max.	60
05	Colour	Wavelength Range 436 nm (Yellow range) 525 nm (Red range) 620 nm (Blue range)	Maximum spectral Absorption coefficient 7m ⁻¹ 5m ⁻¹ 3m ⁻¹
06.	Oils and grease	mg/1, max.	10
07.	Phenolic compounds (as Phenolic OH)	mg/1, max.	1.0
08.	Chemical Oxygen Demand (COD)	mg/1, max.	250
09.	Sulphides (as S)	mg/1, max.	2.0

LIST V (Contd).,

TOLERANCE LIMITS FOR WASTE FROM TEXTILE INDUSTRY BEING DISCHARGED INTO INLAND SURFACE WATERS

No.	Parameter	Unit type of limit	Tolerance Limit values
10.	Chromium total (as Cr)	mg/l, max.	2.0
11.	Hexavalent Chromium (as Cr ⁺⁶)	mg/l, max.	0.5
12.	Copper, total (as Cu)	mg/l, max.	3.0
13.	Zinc, total (as Zn)	mg/l, max.	5.0
14.	Ammoniacal nitrogen (as N)	mg/l, max.	60
15.	Chloride (as Cl)	mg/l, max.	70

Note 1 : All efforts should be made to remove unpleasant odour and colour as far as practicable.

Note 2 : These values are based on dilution of effluents by at least 8 volumes of clean receiving water. If the dilution is below 8 times, the permissible limits are multiplied by the 1/8 of the actual dilution.

LIST VI

TOLERANCE LIMITS FOR WASTE FROM BEING DISCHARGED FROM TANNING INDUSTRIES

No.	Parameter	Unit Type of Limit	Tolerance Limit Values for Effluents Discharged into Inland Surface Waters	Tolerance Limit Values for Effluents Discharged into Marine Coastal Areas
01	pH value at ambient temperature	°C	5.5 - 9.0	5.5 - 9.0
02	Total suspended solids	mg/l, max.	100	150
03	Biochemical Oxygen Demand (BOD ₅ in five days at 20°C or BOD ₃ in three days at 27°C)	mg/l, max.	60	100
04	Chemical Oxygen Demand (COD)	mg/l, max.	250	300
05	Colour	Wavelength Range 436 nm (Yellow range) 525 nm (Red range) 620 nm (Blue range)	Maximum Absorption coefficient 7m ⁻¹ 5m ⁻¹ 3m ⁻¹	 - - -
06	Alkalinity (as Ca CO ₃)	mg/l, max.	750	-
07	Chloride (as Cl)	mg/l, max.	1000	-
08	Hexavalent Chromium (as Cr ⁺⁶)	mg/l, max.	0.5	0.5
09	Chromium total (as Cr)	mg/l, max.	2.0	2.0
10	Oils and Grease	mg/l, max.	10	2.0
11	Phenolic Compounds (as phenolic OH)	mg/l, max.	1.0	5.0
12	Sulphides (as S)	mg/l, max.	2.0	5.0

Note 1 : All efforts should be made to remove unpleasant odour and colour as far as practicable.

Note 2 : These values are based on dilution of effluents by at least 8 volumes of clean receiving water. If the dilution is below 8 times, the permissible limits are multiplied by the 1/8 of the actual dilution.

LIST VII

TOLERANCE LIMITS FOR DISCHARGE OF EFFLUENTS INTO PUBLIC SEWERS WITH CENTRAL TREATMENT PLANTS

No.	Parameter	Unit type of limit	Tolerance Limit values
1.	Total suspended solids	mg/l, max.	500
2.	pH at ambient temperature	-	5.5 - 10.0
3.	Temperature	°C, max.	45
4.	Biochemical oxygen demand (BOD ₅ in five days at 20 ^o C or BOD ₃ in three days at 27 ^o C)	mg/l, max.	350
5.	Chemical Oxygen Demand (COD)	mg/l, max.	850
6.	Total Kjeldahl nitrogen (as N)	mg/l, max.	500
7.	Free ammonia (as N)	mg/l, max.	50
8.	Ammoniacal nitrogen (as N)	mg/l, max.	50
9.	Cyanide (as CN)	mg/l, max.	2
10.	Total residual chlorine	mg/l, max.	3.0
11.	Chlorides (as Cl)	mg/l, max.	900
12.	Flourides (as F)	mg/l, max.	20
13.	Sulphide (as S)	mg/l, max.	5.0
14.	Sulphates (as SO ₄)	mg/l, max.	1000
15.	Arsenic (as As)	mg/l, max.	0.2
16.	Cadmium (as Cd)	mg/l, max.	1.0
17.	Chromium, total (as Cr)	mg/l, max.	2.0
18.	Copper (as Cu)	mg/l, max.	3.0
19.	Lead (as Pb)	mg/l, max.	1.0
20.	Mercury (as Hg)	mg/l, max.	0.005
21.	Nickel (as Ni)	mg/l, max.	3.0
22.	Selenium (as Se)	mg/l, max.	0.05
23.	Zinc (as Zn)	mg/l, max.	5.0
24.	Pesticides	mg/l, max.	0.2
25.	Detergents/surfactants	mg/l, max.	50
26.	Phenolic compounds (as phenolic OH)	mg/l, max.	5
27.	Oil And Grease	mg/l, max.	30
28.	Radio Active Material :		
	(e) Alpha emitters	micro curie/ml, max	10 ⁻⁸
	(f) Beta emitters	micro curie/ml, max	10 ⁻⁷

Notes : The following conditions should be met :

- * discharge of high viscous material should be prohibited.
- * Calcium Carbide sludge should not be discharged.
- * substances producing inflammable vapours should be absent.

SCHEDULE II

APPLICATION FOR A LICENCE FOR THE EMISSION OF WASTE

Form A

(Regulation 5)

National Environmental Act, No. 47 of 1980 (Section 23 A)

FORM OF APPLICATION FOR AN ENVIRONMENTAL PROTECTION LICENCE FOR EMISSION AND DISPOSAL OF WASTE

Application No. :
Date :

Sector :
Category :

Name of Industry :

Type of Industry : Manufacture/Assembly/Formulation/Repacking/Processing/other (specify)

Name of Applicant :

Postal Address :
Telephone No. :

1. General Description of Industry

1.1 Nature of Industry :

1.2 Location of Industry :

(Location map and a clear route sketch with landmarks to the site to be annexed.)

Address :

1.3 Name of local authority :

1.4 Is the site within an approved Industrial Zone ?

1.5 Amount of Capital Investment :

Local :
Foreign :

1.6 Date of commencement of operation :

1.7 No. of Shifts/Day and Times :

1.8 No. of Workers in Each Shift :

1.9 A List of permits obtained from Local or State Authorities permitting the Establishment and Operation of the Industry.

(Please attach photocopies) :

<i>Name</i>	<i>Date of Issue</i>	<i>Date of Expiry</i>
(a)
(b)
(c)
(d)
(e)

- 1.10 Land use of the area within 5 km radius - Residential / Commercial / Agricultural / Open Space / Public area / Marshy lands / salt Marshy Land / Mangrove / Natural Reserve / Other (specify) :
- 1.11 List of existing industries / institutions / Agricultural land within 2 km radius :
- 1.12 Land available for treatment plant :

2. *Manufacturing Process*

- 2.1 List of main manufactured products and capacities :
- 2.2 List of by-products :
- 2.3 Process Details :
 - 2.3.1. A brief description of the processes used (attach process flow diagram) :
 - 2.3.2. Raw materials used :
(State item wise quantity per day at all stages of manufacture)
 - 2.3.3. Chemical used :

Chemical Name	Trade Name	Quantity / Day / (in kg)
---------------	------------	--------------------------
 - 2.3.4. Precautionary measures adopted in the transport and handling of any hazardous / toxic / flammable / explosive materials :
 - 2.3.5. Storage facilities for hazardous / toxic / flammable / explosive materials :
 - 2.3.6. Do you have adequate fire fighting equipment ?
 - 2.3.7. If so, details of such equipment :

3. *Water*

- 3.1 Water - Requirement
 - Processing : m³ / day
 - Cooling : m³ / day
 - Washing : m³ / day
 - Domestic : m³ / day
- 3.2 Source of Water
 - 1. Public Supply
 - 2. Ground Water (Wells , springs)
 - 3. *Surface water (Stream, river)*
- 3.3 Total daily discharge : m³ / day :
- 3.4 Method of discharge : Open Channel / Pipeline / Covered Drains / Other :
- 3.5 Final point of discharge of waste water : Agricultural land / Marshy land / Sewer / Lake / River / Ela / Estuary / Sea / Other
- 3.6 What other specific toxic substances are discharged? (specify nature and concentration -eg., Inorganics and organics including pesticide, Organic Chlorine Compounds, Heavy Metals etc).,

- 3.7 Methods of treatment of Waste Water (Diagrams of Treatment Process to be included);
- 3.8 Methods adopted for recording characteristics of waste water before and after treatment ;
- 3.9 Give details of reuse of water or water recycling, if any ;

4. Solid Waste

- 4.1 Type and Nature of Solid Wastes :
- 4.2 Total quantity of solid waste - kg/day :
- 4.3 Methods of disposal of solid wastes - Municipal collection system/Land Fill/ Incineration/Composting/Sold/ Recycle :

5. Atmospheric Emissions

Is there emission to the atmosphere : Yes/No - if “Yes” complete the following :

- 5.1 Possible emissions :
 - (a) Oxides of Nitrogen —
 - (b) Oxides of Sulphur—
 - (c) Dust and Soot—
 - (d) Any Other—

- 5.2 No. of Stacks/Chimneys :
Height :

6. Does your industry cause odour problem.

Source :
Method of Abatement :

7. Noise Pollution

- 7.1 does your industry cause noise pollution : Yes/No
- 7.2 if “Yes”, source :
Method of abatement :

8. Energy Requirements

- 8.1 Total Energy Consumption :
 - (a) In-plant generation :
 - (b) public supply :

8.2 Details of Machinery used in the industry and their Horse Power Ratings :

- 8.3 Types of Fuel Used :
 - (a) Purpose :
 - (b) Daily consumption :

9. Recycling/Reuse

- 9.1 Possible salvage of any waste material for reuse :
Specify :

10. Expansion of Industry

Describe your plans for future expansion of the industry, State whether proposed expansion will alter the manufacturing process, raw material, usage and finished products.

I hereby certify that the particulars furnished by me in this application are true and correct. I am aware that if any particulars herein are found to be false or incorrect, my application will be refused and the licence, if issued, will be cancelled.

.....
 Signature of Applicant,

Date.

Additional Information required from Chemical industries

Details information on the following has to be provided :

1. A site map extending half a mile beyond the boundaries of the property depicting the facility, the discharge points for effluents, wells, springs and other surface water bodies and drinking water wells.
2. A description of the procedures, structures and equipment used at the facility in relation to (I) and (II) to :
 - (i) Prevent hazards in transport and unloading operations of chemicals :
 - (ii) Prevent undue exposure of personnel to chemicals (protective clothing etc.,)
3. A description of the following –
 - (i) precautions to prevent accidental fires resulting from storage of chemicals ;
 - (ii) available fire fighting equipment ;
 - (iii) training of personnel in fire fighting.
4. A description of storage system for bulk chemicals prior to use in the industrial process.
5. A description of recovery methods of use chemicals , if any.

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Licence Application No.:.....
 Sector ()
 Category ()

1. Date of receipt of application :.....
2. Reference Plans, Reports and other documents received :
3. If any additional information was requested, details of such requests :.....
4. If the observation of any other Agency was requested, details of such requests :.....
5. Whether a Licence is granted : Yes/No.
6. If a Licence is granted :
 - (a) No. of the Licence :.....
 - (b) Date of Licence :.....
 - (c) Validity period :.....
 - (d) Date of expiry :.....
 - (e) Conditions attached (if any) :.....
7. Reasons for refusal, if licence is refused :

 Designation and Signature of
 the authorized officer.

Date.

NATIONAL ENVIRONMENTAL ACT, No. 47 OF 1980

FORM B

(Regulation 6)

AN ENVIRONMENTAL PROTECTION LICENCE FOR EMISSION AND DISPOSAL OF WASTE ISSUED UNDER SECTION 23 B

M/s.....of.....situated within the area of authority of the Pradeshiya Sabha/Municipal Council/Urban Council of.....is/are hereby authorized to discharge/deposit waste and/or emit noise/vibrations/air emissions which may arise as a result of the operation of the said industry/process, in accordance with the standards and criteria prescribed by the National Environmental (Protection and Quality) Regulations No. 1 of 2008 and the National Environmental (Noise control) Regulation No. 01 of.....

This licence shall be in force from.....to.....unless it is earlier cancelled or suspended.

This licence is subject to the general terms and conditions stated overleaf AND to the additional terms and conditions stated below.

- 1.
- 2.
- 3.
- 4.

Chairman/Director General/Authorized Officer,
Central Environmental Authority.

Date :.....

General Terms and Conditions

1. The licence shall be valid for such period as may be specified in the license, provided it shall **not** be for more than a period of three years from the date of issue. An application for renewal of the license shall be made at least three months prior to the date of expiry of the license.
2. The holders of the Licence shall permit the Director General or any other officer duly authorized in writing by him at any time to enter the premises in respect of which the Licence is issued to examine and inspect any equipment or industrial plant ; and
 - (a) to take samples of any pollutants that are emitted, discharged or deposited from or by such equipment or industrial plant ;
 - (b) to examine books, records or documents relating to the performance or use of such equipment or industrial plant or relating to the emission, discharge or deposition from such industrial plant ;
 - (c) to take photographs of such equipment or industrial plants as he considers necessary or make copies of any books, records or documents seen in the course of such examination; and
 - (d) to take samples of any fuel, substance or material used, in such trade, industry or process carried on in or on such premises.
3. The holder of the Licence shall comply with any requirement communicated from time to time by the Authority as regards :
 - (a) the use of any techniques or installations in the production/process, handling and storage of goods, material, fuel and waste products with a view to minimizing environmental pollution and hazards ; and
 - (b) any additional technical measures for preventing or mitigating environmental pollution and hazards.

4. The holder of the Licence shall ensure that monitoring of environmental pollution or other acts that the authority considers necessary to protect the environment, including the following are done:
 - (a) measurements, calculation, registration of samples to determine actual level of pollution and risk of exposure ;
 - (b) recording and sorting of data and reporting to the Authority ;
 - (c) issuing written instructions to persons employed with regard to handling of hazardous material and installations to protect the environment ;
 - (d) assigning duties and responsibilities to management and staff with regard to protection of the environment ; and
 - (e) ensuring that persons referred to in (c)above, and charged with duties and responsibilities referred to in (d) above are properly qualified persons.
5. This Licence is avlid only for the type and nature of the industry/process/operation as stated in the preliminary application and to the information submitted by the Licencee.
6. Any alteration or extension made to the industry, process or operation should be indicated forthwith to the Authority.

Chairman/Director General/Authorized Officer,
 Central Environmental Authority.

Date :.....

Form C

(Regulation 6)

APPLICAITON FOR RENEWAL OF ENVIRONMENTAL PROTECTION LICENCE FOR EMMISHION AND DISPOSAL OF WASTE

Application No. :
 Date :

Sector :
 Category :

1. Name and location of Industry :
2. Name and address of applicant :
3. Previous Licence No :
 - 3.1 Issued on
 - 3.2 Valid until.....
4. Any changes/alterations/expansions of the industry since last licence was issued –
 (give details) :
5. State if manufacturing process/raw material usage/finished products have been altered in any way.
6. Details of monitoring reports submitted to the Central Environmental Authority during the year :
7. Any other additional information :

I hereby certify that the particulars furnished by me in this application are true and correct. I am aware that if any particulars herein are found to be false or incorrect, my application will be refused and the licence if issued will be cancelled.

.....
 Signature of Applicant.

Date :.....

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1. Was licence renewed – Yes/No
2. If renewed
 - No. of licence
 - Date of licence
 - Validity period
 - Date of expiry
 - Conditions attached (if any)
3. If renewal of licence is refused reasons for refusal :

.....
 Signature and Designation of
 Authorized Officer.

Date :

SCHEDULE III
LICENSING FEE

The Licence fee and the Renewal fee for each of the activities specified in Part “A” of the Order made under Section 23 and published in *Gazette* No. 1533/16 dated 25th January, 2008, shall be levied by the authority on the following basis :-

One year or less — Rs. 7,500/-

The Licence Fee and the renewal fee for each of the activities specified in the Part “B” of the order made under Section 23 and published in *Gazette* No. 1533/16 dated 25th January, 2008, shall be levied by the authority on the following basis :-

For three years or less — Rs. 6,000/-

The Licence Fee and the renewal fee for each of the activities specified in the Part “C” of the order made under Section 23 and published in *Gazette* No. 1533/16 dated 25th January, 2008, shall be levied by the authority on the following basis :-

For three years or less — Rs. 4,000/-

SCHEDULE IV

Form A

(Registration 16(b))

National Environmental Act, No. 47 of 1980 (Section 23A)

FORM OF APPLICATION FOR A LICENCE FOR SCHEDULED WASTE MANAGEMENT

Application No.:

Date:

Sector :

Category :

01. Name of the facility/activity :
02. Location/address :
03. Telephone No. :
04. Local Authority area :
05. District :
06. Province :
07. Name of the Officer to be contacted in an emergency:
08. Contact details:
 - Mobile phone :
 - Tel.:
 - Fax:
 - E-mail:
 - Address :
09. Authorization required for (Please tick appropriate activity/activities)
 - (a) generation ()
 - (b) Collection ()
 - (c) Transportation ()
 - (d) Storage ()
 - (e) Recovery ()
 - (f) Recycling ()
 - (g) Disposal ()

() Permit for one operation () Permit for multiple operations
10. Full Name of the Applicant/Industry :
11. Contact details
 - Address :
 - Tel. No. :
 - Fax No.:
12. In case of renewal of licence, previous licence number and date :
13. Qualifications to engage in the activity covered by the permit:
14. Insurance cover details:
15. Arrangements for security and emergency procedures :
16. Information on accidents as a result of the management of waste :
17. Health and safety measures adopted for the workers and the public:
18. Important Environmental features of the surrounding areas of the site (Please attach a map of the area 2.5km. radius with the site at the centre indicating there in water bodies and important human activities sensitive features):

19. Waste category/categories identified as per the Scheduled VII :
20. Quality and quantity waste handled:
21. Details of the operation system for carrying out the activity/activities:
22. If application is for the establishment of a disposal site, location description and other details:

To be filled by Collector

23. Site/s of Collection (Names and address/es):
24. Proposed dates or frequency of collection :
25. Estimated quantity to be collected:
26. Type of packaging envisaged (Eg. bulk, drummed, tanker etc.) and method of collection):

To be filled by transporter

27. Mode of transportation to be used :
- Class/Type of vehicle :
- Registered number/s:
- Number of vehicles :
28. Details of Routes (include road maps) times and dates :
29. What are the emergency measures adopted (including notice of warning to the public) and what are the precautions taken to prevent accidents: :

To be filled by Storer

30. Location and extent of the storage site :
31. Type of packaging envisaged (bulk, drummed, tanker, concrete blocks etc.) for storing:
32. Period of time waste will be stored :
33. Information relating to recycling/recovery of final disposal of the waste:
34. What are the emergency measures adopted (including posting of warning to public and what are the precautions taken to prevent accidents:

To be filled by recycler/recoverer:

- 35. Location of the recycling/recovery facility :
- 36. Method used in the recycling/recovery process :
- 37. Purpose of recycling/recovery and the market availability for the end product :
- 38. Emergency measures adopted in the event of an accident :

To be filled by Disposer :

- 39. Location of the site for Disposal :
- 40. Method of Disposal :
- 41. Description of the treatment process :
- 42. Emergency measures adopted at the site in the even of an accident :
- 43. Information on the after care of the disposal site :

 Signature of the Applicant.

Date : _____

**FORM B
 Form of Licence**

(Regulation 19(a))

National Environmental Act No. 47 of 1980

LICENCE FOR OPERATING A FACILITY FOR SCHEDULED WASTE MANAGEMENT

Licence Number :
 Date of issue :

M/s of is hereby authorized to operate a facility for generation, collection, storage, recovery, recycle or disposal of the waste more fully described in the Schedule hereto, on the premises situated at and/or to transport the same from to along the route, time and date set out in the Schedule.

This licence shall be in force from to unless it is earlier cancelled or suspended.

This licence is subject to the general terms and conditions stated overleaf and to the terms conditions stated below and to such terms as may be specified in the regulations or guidelines for the time being in force under the National Environmental Act, No. 47 of 1980 as amended by Act No. 56 of 1988.

Other Terms and Conditions:

- 1.
- 2.
- 3.
- 4.

 Chairman/Director General,
 Central Environmental Authority.

Date : _____

(DESCRIPTION OF THE QUANTITY AND TYPES, ETC., OF WASTE)

General Terms and Conditions:

1. Licence shall be in accordance with the provisions of National Environment Act, No. 47 of 1980.
2. The licence or its renewal shall be produced for inspection at the request of an officer authorized by the Central Environmental Authority or any delegate. The Licence shall be displayed in a place accessible to public.
3. The license shall not rent, lend sell, transfer or otherwise transport the waste without obtaining prior permission of the Central Environmental Authority.
4. Any unauthorized change in personnel, equipment, process and working conditions as mentioned in the application by the licensee shall constitute breach of this authorization.
5. It is the duty of the authorized person to take prior permission of the Central Environmental Authority to close down the facility.
6. An application for the renewal of a licence shall be made as laid down in regulation 16 of the National Environmental (Protection and Quantity) regulation No.1 of 1990.
7. This licence shall not be transferred unless under the authorization of the Central Environmental Authority.
8. Any accident which occurs during the management of wastes must be immediately reported to the Central Environmental Authority by the Licensee.

Other terms and Contitions:

- 1.
- 2.
- 3.
- 4.

.....,
 Chairman/Director General,
 Central Environmental Authority.

Date:_____.

SCHEDULE V

[Regulation 27]

(Format for maintaining records of waste at the facility)

1. Name and address of the accupier or operator at the facility :
2. Date of issuance of licence and its reference number :
3. Description of waste :
 Physical form with description Chemical form Total volume and weight (in kg):
4. Description of Storage and treatment of waste:

<i>Date</i>	<i>Waste Code</i>	<i>Amount</i>	<i>Method of Storage of waste</i>	<i>Date</i>	<i>Amount</i>	<i>Method of treatment of waste</i>
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5. Details of transportation of waste:

<i>Waste Code</i>	<i>Amount</i>	<i>Name & Address of the consignee of the package</i>	<i>Mode of packing of the waste for transportation and amount</i>	<i>Mode and route of transportation to site disposal</i>	<i>Date and Time of transportation</i>

6. Details of disposal of Waste :

Waste Code	Date of Disposal	Quantity	Site of disposal (identify the location on the relevant layout drawing for reference)	Method of disposal	Concentration of material in the final waste form	Persons involved in disposal

7. Details on environmental surveillance:

Date of Measurement	Analysis of Ground water			Analysis of soil samples			Analysis of air sampling		Analysis of any other samples (give details)
	Location of sampling	depth of sampling	Data sampling	Location of sampling	Depth of sampling	Data	Location	Data	

Name and Signature of the Head of facility.

SCHEDULE VI

[Regulation 27(b)]

(Format for the sub mission of returns, regarding disposal of scheduled waste)

1. Name and Address of the institution:
2. Details of waste disposal operations:

S no.	Date of issuance of the licence	Description of Waste			Mode of transportation to the site of disposal	Site of disposal (attach a sketch showing the location of disposal)	Brief description of the method of disposal	Date of disposal
		Physical Form & contents	Chemical Form	Total volume of the waste disposal with No. of packages				

3. Detail of environmental surveillance :

Date of Measurement	Analysis of Ground Water			Analysis of soil Samples			Analysis of air sampling		Analysis of any Other samples
	Location of sampling	Depth of Sampling	Data	Location of Sampling	Depth of Sampling	Data	Location of sampling	Data	

Name and address of the Head of facility.

Certificate by authorized person

This is to certify that I have examined the above return, and have satisfied myself of the accuracy of the facts stated there in by physical examination and scientific tests as are necessary for such purpose.

.....,
 Authorized Person.

Date : _____.

SCHEDULE VII

[Regulation 36]

(Form for reporting accidents)

1. The date and time of the accident :
2. Location :
3. Sequence of events leading to accident :
4. The waste involved in the facility :
5. The data for assessing the effects of the accidents on health or the environment:
6. The emergency measures taken :
7. The steps taken to alleviate the effects of accident :
8. The steps taken to prevent the recurrence of such an accident :
9. Names, address and next of kin of persons affected by the accident :
10. Step taken to pay compensation to victims of the accident together with insurance claiming and settlements:

SCHEDULE VIII

List of Scheduled Wastes

Waste Code	Scheduled Waste
PART I - SCHEDULED WASTES FROM NON-SPECIFIC SOURCES	
1. Mineral Oil and Oil-Contaminated Wastes	
N011	Spent oil or grease used for lubricating industrial machines
N012	Spent hydraulic oil from machines, including plastic injection moulding machines, turbines and die-casting machines.
N013	Spent oil-water emulsion used as coolants
N014	Oil tanker sludges
N015	Oil-water mixture such as ballast water
N016	Sludge from oil storage tank
2. Waste containing polychlorinated biphenyls (PCBs) or polychlorinated triphenyls (PCTs)	
N021	Spent oil contaminated with PCB and/or PCTs
N022	Electrical equipment or parts containing or contaminated with PCBs and/or PCTs
N023	Retrofilled transformer contaminated with PCBs and/or PCTs
N024	Containers and all waste materials contaminated with PCBs and/or PCTs
3. Spent organic solvents containing halogen or sulphur, including methylene chloride, 1, 1, 1,-trichloroethane, perchloroethylene and dimethyl sulphide	
N031	Spent halogenated solvents from cleaning and degreasing processes

4. Spent aromatic organic solvents not containing compounds of organic halogen or sulphur, including toluene, xylene, turpentine and kerosene.
 N041 Spent aromatic organic solvents from washing, cleaning, or degreasing processes
5. Spent non-aromatic organic solvents without containing compounds of organic halogen or sulphur, including acetone, ketones, alcohols, cleaning-benzene, and dimethyl formamide
 N051 Spent non-aromatic organic solvents from washing, cleaning or degreasing processes
6. Residues from recovery of halogenated solvents, may contain oil, fat and solvents
 N061 Residues from recovery of halogenated solvents
7. Residues from recovery of non-halogenated solvents, may contain oil, fat and solvents
 N071 Residues from recovery of non-halogenated solvents
8. Spent organometallic compounds may be mixed with benzene excluding mercury compounds
 N081 Residues of organometallic compounds, including tetraethyl lead, tetramethyl lead and organotin compounds from mixing process of anti-knock compound with gasoline
9. Flux wastes, may contain mixture of organic acids, solvents of compounds of ammonium chloride
 N091 Flux wastes from fluxing bath of metal treatment processes
10. Spent aqueous alkaline solutions not containing cyanide, may contain heavy metals
 N101 Spent aqueous alkaline solutions from treatment process of metal or plastic surfaces
 N102 Spent aqueous alkaline solutions from bleaching process of textile materials
11. Spent aqueous alkaline solutions containing cyanide, may contain heavy metals
 N111 Spent aqueous alkaline solution containing cyanide from treatment process of metal or plastic surfaces
12. Spent aqueous chromic acid solutions
 N121 Spent aqueous chromic acid solutions from treatment process of metal or plastic surfaces
 N122 Spent aqueous chromic acid solution from leather tannery processes
13. Spent aqueous inorganic acid solutions other than spent chromic acid solutions, may contain heavy metals
 N131 Spent aqueous acid solutions from treatment process of metal or plastic surfaces
 N132 Spent aqueous inorganic acid solutions from industrial equipment cleaning
14. Spent aqueous or discarded photographic waste from film processing or plates making
 N141 Spent aqueous or discarded photographic waste from film processing or plate making
15. Metal hydroxide sludges containing one or several metals, including chromium, copper, nickel, zinc, lead, cadmium, aluminium and tin
 N151 Metal hydroxide sludges from wastewater treatment system
16. Plating bath sludges containing cyanide
 N161 Plating bath sludges containing cyanide from metal finishing processes
17. Spent salt containing cyanide
 N171 Spent salt containing cyanide from heat treating process
18. Sludges of inks, paints, dyes, pigments, lacquer with or without organic solvent
 N181 Paint sludges from solvent recovery of solvent-based paint waste
 N182 Ink sludges from solvent recovery of solvent-based ink waste
 N183 Lacquer sludges from solvent recovery of solvent-based lacquer waste

- N 184 Paint sludges from paint wastewater treatment system
 - N 185 Ink sludges from ink wastewater treatment system
 - N 186 Pigment sludges from pigment wastewater treatment system
 - N 187 Dye sludges from dye wastewater treatment system
19. Wastes from the production, formulation and use of printing ink, paint, pigment, lacquer or varnish containing organic solvents
- N 191 Discarded or off-specification ink, pigment and paint products
20. sludges, dust, slag, dross and ashes, may contain oxides or sulphate or one of several metals, including lead, cadmium, copper zinc, chromium, nickel, iron, vanadium, and aluminium
- N 201 Dross, slag, ash, dust from metal smelting process or dust emission control system
 - N 202 Dross from soldering process
 - N 203 Residues from recovery of acid pickling liquor
 - N 204 Hydroxide or sulphate sludges from wastewater treatment system
21. spent or discarded strong acids or alkalis
- N 211 Spent or discarded acid of pH less or equal to 2
 - N 212 Spent or discarded alkali of pH greater or equal to 12.5
22. Spent oxidizing agents
- N 221 Spent oxidizing agent
23. Contaminated soil, water, debris or matter resulting from clean-up of a spill or chemical or scheduled waste
- N 231 Contaminated soil, water debris or matter resulting from cleanup of a spill or chemical or scheduled waste
24. Immobilized scheduled wastes, including chemically fixed or encapsulated sludges
- N 241 Immobilized scheduled wastes
25. Discarded drugs except living vaccines and euphoric compounds
- N 251 Discarded drugs except living vaccines and euphoric compounds
26. Pathogenic and clinical wastes and quarantined materials
- N 261 Pathogenic and clinical wastes and quarantined materials
27. Containers and bags containing hazardous residues and material
- N 271 Used containers or bags contaminated with scheduled waste and residues.
28. Mixtures of scheduled wastes
- N 281 A mixture of scheduled wastes
 - N 282 A mixture of scheduled and non-scheduled wastes
29. Mercury wastes containing metallic mercury, organic and inorganic mercury compounds
- N 291 Discarded, Used, fused, broken and off specified fluorescent lamps/bulbs
30. Waste Electrical and Electronic Equipments
- N 301 Discarded Computers and accessories
 - N 302 Discarded Mobile phones.

PART II - SCHEDULED WASTES FROM SPECIFIC SOURCES

1. Mineral Oil and Oil-Contaminated Wastes

- S011 Waste oil or oily sludge from waste water treatment plant of oil refinery or crude oil terminal
- S012 Oily residue from automotive workshop or service station oil grease interceptor
- S013 Oil contaminated earth from re-refining of used lubricating oil
- S014 Oil or sludge from oil refinery maintenance operation.

2. Tar or tarry residues from oil refinery petrochemical plant

- S021 Tar or tarry residues from oil refinery or petrochemical plant

3. Waste of printing inks, paints, dyes, pigments, lacquer, varnish or wood preservative containing organic solvents

- S031 Ink waste from washing of reaction tank or container of ink manufacturing plant.
- S032 Paint waste from washing of reaction tank or container of paint manufacturing plant
- S033 Dyes waste from washing or reaction tank or container of dyes manufacturing plant
- S034 Pigment waste from washing of reaction tank or container of pigment manufacturing plant.
- S035 lacquer or varnish Pigment waste from washing of reaction tank or container of lacquer or varnish manufacturing plant.

4. Clinker, slag and ashes from scheduled wastes incinerator

- S041 Clinker, slag and ashes from scheduled wastes incinerator

5. Waste or printing inks, paints, dyes, pigments, lacquer without containing solvents

- S051 Water based Paint waste from the washing of reaction tank or container of paint manufacturing plant.
- S052 Water based Ink waste from the washing of reaction tank or container of ink manufacturing plant.
- S053 Water based dye and pigment waste from the washing of reaction tank or container of dye and pigment manufacturing plant.
- S054 Ink waste from the washing of cleaning of printing machine of printing works.
- S055 Pigment waste from brick and tile works
- S056 Paint waste from the paint spraying of dipping process of metal works, motor vehicle assembly plant or electrical appliances manufacturing plant.

6. Spent tars or anti-corrosion oils

- S061 Anti-corrosion oils or tar residues from the sealing or spraying or casting processes of motor vehicle assembly plant or automotive workshop.

7. Spent ethylene glycol

- S071 Contaminated ethylene glycol from gas processing plant.
- S072 Unhardened ethylene glycol from polyester manufacturing plant

8. Waste containing phenol or formaldehyde

- S081 Phenol or formaldehyde waste from the washing or reaction or mixing tank of adhesive or glue or resin manufacturing plant
- S082 Sludges containing phenol or formaldehyde waste from the Waste water treatment system of adhesive or glue or resin manufacturing plant

9. Residues of isocyanate compounds, excluding solid polymeric materials.

- S091 Residues of isocyanate compounds from foam manufacturing process.

10. Adhesive or glue waste may contain organic solvents, excluding solid polymeric materials
 - S 101 Off-specification adhesive or glue products from adhesive or glue manufacturing plant
 - S 102 Effluent from the washing of the reaction or processing tank of adhesive or glue manufacturing plant.

11. Uncured resin waste, may contain organic solvents or heavy metals including epoxy resin phenolic resin
 - S 111 Uncured resin residues from electronic or semiconductor, electrical appliances, fibreglass manufacturing plants and metal works.
 - S 112 Effluents from washing of reactor of resin manufacturing plant
 - S 113 Resin sludge from waste water treatment system of resin manufacturing plant

12. Latex effluent, rubber or latex Sludges containing organic solvents or heavy metals
 - S 121 Rubber or latex sludges containing heavy metals from the waste water treatment system of rubber products manufacturing plant.
 - S 122 Rubber or latex sludges containing organic solvent from rubber products manufacturing plant.
 - S 123 Latex effluent from rubber products manufacturing plant.

13. Sludges from the re-refining of used oil products including oily sludges containing acid or lead compounds.
 - S 131 Acid sludge from the re-refining of used lubricating oil.

14. Sludges containing fluoride
 - S 141 Sludges containing fluoride from the waste water treatment system of electronic or semiconductor manufacturing plant.

15. Mineral sludges, including calcium hydroxide sludges, phosphating sludges, calcium sulphite sludges and carbonate sludges.
 - S 151 Sludges from phosphating process of motor vehicle assembly, air conditioning, electrical appliances and electronic or semiconductor plants.
 - S 152 Sludges from the waste water treatment system of plant producing ceramic or tiles, industrial gas and bleaching earth containing heavy metals.

16. Asbestos waste
 - S 1611 Asbestos sludges from the waste water treatment system of Asbestors/cement products manufacturing plant.
 - S 162 Asbestos dust or loose asbestos fibre wastes from asbestos/cement products manufacturing plant.
 - S 163 Empty bags or sack containing loose asbestos fibres from asbestos/cement products manufacturing plant.
 - S 164 Waste arising from repairing/renovation processes and demolition/construction debris containing asbestos.

17. Waste from the production, formulation, repacking, and trade of pesticides ; including herbicides, Insecticide, rodenticides, and fungicides.
 - S 171 Dust from air emission control equipment, or exhaust systems of pesticides production, formulation and repacking plants.
 - S 172 Sludges from wastewater treatment systems of pesticides production, formulation and repacking plants.
 - S 173 Residues from filtering process of intermediate products at pesticides production and formulation plants.
 - S 174 Waste from washing of reaction tank or mixing tank and spillages at pesticide production and formulation plants and spillages at pesticides repacking plants.
 - S 175 Solid residues resulting from stamping process of mosquito coil production plant.
 - S 176 Off-specification and out dated products and contaminated containers from pesticides formulation and repacking plants and trade of pesticides

18. Press cake from pre-treatment of glycerol soap lye
 - S 181 Press cake from pre-treatment of glycerol soap lye from detergent or soap or toiletries plants
19. Wastes containing dye
 - S 191 Waste water containing dye from textile manufacturing plant.
20. Waste from wood preserving operations using inorganic salts containing copper, chromium as well as arsenic of fluoride compounds or using compound containing chlorinated phenol or creosote
 - S201 Waste from wood preserving operations using inorganic salts containing copper, chromium as well as arisenic of fluoride compounds or using compound containing chlorinated phenol or creosote
21. Mercury wastes containing metallic mercury, organic and inorganic mercury compounds
 - S211 Mercury wastes containing metallic mercury from manufacturing of fluoresent lamps
 - S212 Activated carbon waste containing mercury from hydrogen gas purification process.
 - S213 Mercury bearing sludges from brine treatment and Mercury bearing brine purification muds from chlorine production plant.
22. Spent catalysts
 - S221 Spent industrial catalysts from chemical plant manufacturing detergent or soap or toileries plants.
 - S222 Spent industrial catalysts from petroleum and petro-chemical processes
 - S223 Spent industrial catalysts from sulphuric acid and other inorganic acid manufacturing process
23. Leachate from scheduled waste landfills.
 - S231 Leachate from scheduled waste landfills.
24. Rags, papers plastics or filters contaminated with organic solvents
 - S241 Rags, papers plastics or filters contaminated with paint or ink or organic solvent from motor vehicle assembly plants, metal works, electronic or semiconductor plants and printing or packaging plants.
25. Containers and bags containing hazardous residues
 - S251 Used containers or bags contaminated with residues of raw materials and products of pesticide formulation plant
26. Discarded or off specification batteries containing lead, mercury, nickel, cadmium, lithium and Electrolyte from batteries and accumulators.
 - S261 Discarded or off specification batteries from battery manufacturing plant
 - S262 Used or off specified batteries and accumulators
27. Pharmaceutical waste
 - S271 Waste water from washing of reaction vessels and floors of Pharmaceutical products manufacturing plant.
 - S272 Sludges containing pharmaceutical material from waste water treatment plants of pharmaceutical manufacturing/ formulation plants
28. Bio Medical and Health Care Waste from Health Care Institution including Medical Laboratories and Research Centres.
 - S281 Infectious health care waste including laboratory cultures; waste from isolation wards ; tissues (swabs), materials or equipment that have been in contact with infected patients ; Human tissues or fluids
 - S282 Sharps including needles and scalpels
 - S283 Biological and Anatomical waste including tissues, organs, body parts, human fetuses and animal carcasses, blood, and body fluids.
 - S284 Outdated and discarded drugs including cytotoxic drugs and chemical reagents
 - S285 Materials and containers contaminated with the above specified waste

02-289

ANNEXURE III.- THE GAZETTE OF THE DEMOCRATIC SOCIALIST REPUBLIC OF
SRI LANKA: NO. 2126/360 - 2019.6.05



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The Gazette of the Democratic Socialist Republic of Sri Lanka
EXTRAORDINARY

අංක 2126/36 - 2019 ජූනි මස 05 වැනි බදාදා - 2019.06.05
No. 2126/36 - WEDNESDAY JUNE 05, 2019

(Published by Authority)

PART I : SECTION (I) — GENERAL

Government Notifications

L.D.B. 4/81(VIII)

NATIONAL ENVIRONMENTAL ACT No. 47 OF 1980

REGULATIONS made by the President under Section 32 of the National Environmental Act, No. 47 of 1980, read with Sections 23J, 23K and 23L of that Act and Section 51 of the Nineteenth Amendment to the Constitution of the Democratic Socialist Republic of Sri Lanka.

MAITHRIPALA SIRISENA,
President.

Colombo,
05th June, 2019.

REGULATIONS

1. These Regulations may be cited as the National Environmental (Stationary Sources Emission Control) Regulations, No. 01 of 2019.

2. Any person who manages or is in control off any stationary source specified in Schedule I hereto which emanates stack emissions, shall construct such stationary source in conformity with the standards specified in Schedule II hereto.

1A - PG 4551— 1367 (06/2019)
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3. All emissions from stationary sources which are not specified in Schedule I, shall comply with the standards specified in Part I and II of Schedule III hereto.

4. All fugitive emissions emanating from any industrial process shall be measured and controlled according to the methods and standards specified in Schedules IV, V, VI and VII hereto.

5. The methods approved by the Central Environmental Authority (hereinafter referred to as the “Authority”) shall be used in the measurement of emissions.

6. The concentration of any stationary source emission measured shall be converted into dry condition. The following equation shall be used for such conversion :-

$$\text{DRY GAS CONCENTRATION} = \frac{\text{MEASURED CONCENTRATION}}{[100 - (\text{MOISTURE PERCENTAGE})]} \times 100$$

7. The stationary source emission concentration converted into dry condition under Regulation 6, shall be converted into standard condition. The following equation shall be used for such conversion :-

$$C_n (\text{mg} / \text{Nm}^3) = C_s (\text{mg} / \text{m}^3) \times \frac{(P_n \cdot T_s)}{(P_s \cdot T_n)}$$

where C_n = Emission concentration at standard conditions
 C_s = Converted dry emission concentration
 P_n = Standard pressure 760 mmHg
 P_s = Stack pressure in mmHg
 T_n = Standard temperature 273 Kelvin
 T_s = Stack temperature in Kelvin

8. The stationary source emission concentration converted into standard condition under Regulation 7 shall be converted for relevant reference oxygen level specified in Schedule VIII hereto. The following equation shall be used for such conversion :-

$$E_r (\text{mg} / \text{Nm}^3) = E_m (\text{mg} / \text{Nm}^3) \left[\frac{20.9 - O_2 \%_{ref}}{20.9 - O_2 \%_m} \right]$$

where E_r = Emission concentration at fuel specific reference oxygen percentage
 E_m = Standardized emission concentration
 $O_2 \%_{ref}$ = Reference Oxygen percentage of fuel type specified in Schedule VIII
 $O_2 \%_m$ = Measured volume percentage of oxygen level on dry basis.

9. Where the fuel type is not specified in Schedule VIII, the reference oxygen level shall be six percent (6%) : Provided that, where there is a mixed-fuel usage, the major fuel type based on energy input shall be considered. Reference oxygen level shall be ten percent (10%) for incinerators.

10. In the case of multi-fuel usage, for each fuel, the standards specified in Schedule II hereto shall be applied.

11. Minimum stack height of any combustion point source shall be determined by the following equation.

$$C(m) = H(m) + 0.6U(m)$$

where H = The height in meters of the tallest building within 5U radius of the point source.

C = Minimum stack height in meters.

U = Uncorrected stack height in meters.

U shall be determined by following equation.

$$U(m) = 1.36Q^{0.6}$$

where Q = Gross heat input in Mega Watt (MW)

(i) This rule shall be applied for the combustion source with gross heat input greater than 0.620MW.

(ii) In any case, stack height shall not be less than 20 meters except for the combustion sources with gross heat input less than 0.620 MW.

12. In relation to thermal power plants and to any other combustion source, air pollution caused by Sulfur Dioxide (SO₂) emission shall be controlled by fuel quality, stack height or Sulfur Dioxide emission control devices to maintain the existing ambient air quality standards. Minimum stack height shall be determined by accepted air quality modelling software. In the absence of such modelling software, with the approval of the Authority, following equation shall be applied to determine the minimum stack height in meters.

$$\text{Minimum stack height } H(m) = 14Q^{0.25}$$

Where Q is Sulfur Dioxide (SO₂) emission rate kg/hour.

13. Emissions from Crematoriums shall be controlled by emission reduction devices incorporated into the stack of the crematorium.

14. Dioxin and Furan emissions from incinerators shall be controlled by maintaining temperature between 1000° C to 1250° C and 2-3 seconds retention time in secondary chamber.

15. No person shall emit or discharge any pollutant to atmosphere exceeding the pollutant based emission limits specified in Schedule III hereto.

16. Any person who fails to comply with the above regulations, shall be liable to an offence under the National Environmental Act, No. 47 of 1980.

17. In these regulations :-

“Authority” means the Central Environmental Authority established under the National Environmental Act, No. 47 of 1980 ;

“PM” means Particulate Matter ;

“ppm” means parts per million ;

“Nm³” means cubic meter of air at standard conditions of 0⁰ C temperature and 760 mmHg Pressure ;

“Nitrogen Oxides (NO_x)” means total concentration of Nitric Oxide (NO) and Nitrogen Dioxide (NO₂) gas emissions from a stack.

(Regulation 2)

SCHEDULE I

1. Thermal Power Plants
2. Standby Generators
3. Boilers
4. Thermic Fluid Heaters
5. Incinerators
6. Cupolas, Blast Furnaces, Coke Ovens, Basic Oxygen Furnaces, Electric (induction & arc) furnaces
7. Cement Kilns

(Regulation 2)

SCHEDULE II

Instrument/Equipment Based Standards

PART I

THERMAL POWER PLANTS

<i>Fuel</i>	<i>Rated Output Capacity (C)</i>	<i>Type of Pollutant</i>	<i>Emission Limit</i>
Oil	C<1 MW	Particulate Matter (PM), Sulfur Dioxide (SO ₂), Nitrogen Oxides (NO _x)	Shall be controlled by fuel quality and stack height as set out in Regulations 11 and 12
		Smoke	20% Opacity
	1≤C<3 MW	Sulfur Dioxide (SO ₂)	Shall be controlled by fuel quality and stack height as set out in Regulation 12
		Nitrogen Oxides (NO _x)	650mg/Nm ³ for steam turbine
			550mg/Nm ³ for gas turbine/combined cycle turbine
			850mg/Nm ³ for internal combustion engines
		Particulate Matter (PM)	200mg/Nm ³
	Smoke	20% Opacity	
	3≤C<25 MW	Sulfur Dioxide (SO ₂)	Shall be controlled by fuel quality and stack height as set out in Regulation 12
		Nitrogen Oxides (NO _x)	600mg/Nm ³ for steam turbine
			500mg/Nm ³ for gas turbine/combined cycle turbine
			850mg/Nm ³ for internal combustion engines
		Particulate Matter (PM)	150mg/Nm ³
	Smoke	20% Opacity	
	25≤C<100 MW	Sulfur Dioxide (SO ₂)	Shall be controlled by fuel quality and stack height as set out in Regulations 12
		Nitrogen Oxides (NO _x)	550mg/Nm ³ for steam turbine
			450mg/Nm ³ for gas turbine/combined cycle turbine
			700mg/Nm ³ for internal combustion engines
		Particulate Matter (PM)	150mg/Nm ³
	Smoke	20% Opacity	
C≥ 100 MW	Sulfur Dioxide (SO ₂)	1. 850mg/Nm ³ for new power plants with maximum 28kg SO ₂ per day per MW subject to maximum 14 metric tons of SO ₂ /day for first 500MW plus 10kg SO ₂ per day per MW for each additional MW. 2. Shall be controlled by fuel quality for existing power plants	

SCHEDULE II (Contd.)

Instrument/Equipment Based Standards

PART I

THERMAL POWER PLANTS

<i>Fuel</i>	<i>Rated Output Capacity (C)</i>	<i>Type of Pollutant</i>	<i>Emission Limit</i>
Oil		Nitrogen Oxides (NO _x)	500mg/Nm ³ for steam turbine
			450mg/Nm ³ for gas turbine/combined cycle turbine
			650mg/Nm ³ for internal combustion engines
		Particulate Matter (PM)	150mg/Nm ³
		Smoke	20% Opacity
Biomass	C<0.5 MW	Particulate Matter (PM)	Shall be controlled by stack height as set out in Regulation 11
		Nitrogen Oxides (NO _x)	
		Smoke	
	0.5≤C<3MW	Nitrogen Oxides (NO _x)	500mg/Nm ³
		Particulate Matter (PM)	250mg/Nm ³
		Smoke	25% Opacity
	C≥3MW	Nitrogen Oxides (NO _x)	450mg/Nm ³
		Particulate Matter (PM)	200mg/Nm ³
		Smoke	20% Opacity
Coal	C<50MW	Sulfur Dioxide (SO ₂)	1600mg/Nm ³
		Nitrogen Oxides (NO _x)	750mg/Nm ³
		Particulate Matter (PM)	200mg/Nm ³
		Smoke	20% Opacity
	C≥50MW	Sulfur Dioxide (SO ₂)	1. 850mg/Nm ³ for new power plants with maximum 50kg SO ₂ per day per MW subject to maximum 30 metric tons of SO ₂ /day for first 500MW plus 25kg SO ₂ per day per MW for each additional MW. 2. Shall be controlled by fuel quality for existing power plants
		Nitrogen Oxides (NO _x)	650mg/Nm ³
		Particulate Matter (PM)	150mg/Nm ³
		Smoke	15% Opacity
Natural Gas	C<50MW	Sulfur Dioxide (SO ₂)	75mg/Nm ³
		Nitrogen Oxides (NO _x)	350mg/Nm ³ for steam turbine
			250mg/Nm ³ for gas turbine/combined cycle turbine
		400mg/Nm ³ for internal combustion engines	
		Particulate Matter (PM)	100mg/Nm ³
	C≥50MW	Sulfur Dioxide (SO ₂)	75mg/Nm ³
			300mg/Nm ³ for steam turbine
		Nitrogen Oxides (NO _x)	200mg/Nm ³ for gas turbine/combined cycle turbine
			350mg/Nm ³ for internal combustion engines
	Particulate Matter (PM)	75mg/Nm ³	

SCHEDULE II (Contd.)

Instrument/Equipment Based Standards

PART I

THERMAL POWER PLANTS

<i>Fuel</i>	<i>Rated Output Capacity (C)</i>	<i>Type of Pollutant</i>	<i>Emission Limit</i>
Naphtha	Any	Sulfur Dioxide (SO ₂)	75mg/Nm ³
		Nitrogen Oxides (NO _x)	350mg/Nm ³ for steam turbine
			250mg/Nm ³ for gas turbine/combined cycle turbine
		400mg/Nm ³ for internal combustion engines	
Particulate Matter (PM)	75mg/Nm ³		
Municipal Solid Waste	Any	Sulfur Dioxide (SO ₂)	70mg/Nm ³
		Nitrogen Oxides (NO _x)	400mg/Nm ³
		Particulate Matter (PM)	150mg/Nm ³
		Smoke	20% Opacity
		Carbon Monoxide (CO)	50mg/Nm ³
		Hydrogen Chloride (HCl)	20mg/Nm ³
		Mercury (Hg)	0.001mg/Nm ³
		Lead (Pb)	0.01mg/Nm ³

PART II

STANDBY GENERATORS

<i>Fuel</i>	<i>Rated Output Capacity</i>	<i>Type of Pollutant</i>	<i>Emission Limit</i>
Gasoline, kerosene diesel or heavy oil	Any	Particulate Matter (PM), Sulfur Dioxide (SO ₂), Nitrogen Oxides (NO _x)	Shall be controlled by stack height and fuel quality as set out in Regulations 11 and 12
		Smoke	10% Opacity

PART III

BOILERS

<i>Fuel</i>	<i>Rated Output Capacity (C)</i>	<i>Type of Pollutant</i>	<i>Emission Limit</i>
Oil	C<2 metric tons of steam/hour	Particulate Matter (PM), Sulfur Dioxide (SO ₂), Nitrogen Oxides (NO _x)	Shall be controlled by fuel quality and stack height as set out in Regulations 11 and 12
		Smoke	20% Opacity
	C≥2 metric tons of steam/hour	Sulfur Dioxide (SO ₂) Nitrogen Oxides (NO _x)	Shall be controlled by fuel quality and stack height as set out in Regulations 11 and 12
		Smoke	15% Opacity
		Particulate Matter (PM)	100mg/Nm ³
	Bio mass	C<2 metric tons of steam/hour	Particulate Matter (PM) Nitrogen Oxides (NO _x)
Smoke			20% Opacity
C≥2 metric tons of steam/hour		Nitrogen Oxides (NO _x)	Shall be controlled by stack height as set out in Regulations 11
		Smoke	15% Opacity
		Particulate Matter (PM)	200mg/Nm ³
Coal	C<2 metric tons of steam/hour	Particulate Matter (PM), Sulfur Dioxide (SO ₂), Nitrogen Oxides (NO _x)	Shall be controlled by fuel quality stack height as set out in Regulations 11 and 12
		Smoke	20% Opacity
	C≥2 metric tons of steam/hour	Nitrogen Oxides (NO _x)	500mg/Nm ³
		Sulfur Dioxide (SO ₂)	850mg/Nm ³
		Smoke	20% Opacity
		Particulate Matter (PM)	150mg/Nm ³

PART IV

THERMIC FLUID HEATERS

<i>Fuel</i>	<i>Rated Output Capacity (C)</i>	<i>Type of Pollutant</i>	<i>Emission Limit</i>
Oil	C<5000 MJ/hour	Particulate Matter (PM), Sulfur Dioxide (SO ₂), Nitrogen Oxides (NO _x)	Shall be controlled by fuel quality and stack height as set out in Regulations 11 and 12
		Smoke	20% Opacity
	C≥5000 MJ/hour	Sulfur Dioxide (SO ₂) Nitrogen Oxides (NO _x)	Shall be controlled by fuel quality and stack height as set out in Regulations 11 and 12
		Smoke	15% Opacity
		Particulate Matter (PM)	100mg/Nm ³
	Bio mass	C<5000 MJ/hour	Particulate Matter (PM), Nitrogen Oxides (NO _x)
Smoke			20% Opacity
C≥5000 MJ/hour		Nitrogen Oxides (NO _x)	Shall be controlled by stack height as set out in Regulations 11
		Smoke	15% Opacity
		Particulate Matter (PM)	200mg/Nm ³
Coal		C<5000 MJ/hour	Particulate Matter (PM), Sulfur Dioxide (SO ₂), Nitrogen Oxides (NO _x)
	Smoke		20% Opacity
	Nitrogen Oxides (NO _x)		500mg/Nm ³
	C≥5000 MJ/hour	Sulfur Dioxide (SO ₂)	800mg/Nm ³
		Smoke	20% Opacity
		Particulate Matter (PM)	150mg/Nm ³

PART V

INCINERATORS

<i>Rated Output Capacity (C)</i>	<i>Type of Pollutant</i>	<i>Emission Limit</i>
C < 1 Metric Ton/Hour	Sulfur Dioxide (SO ₂)	70mg/Nm ³
	Nitrogen Oxides (NO _x)	400mg/Nm ³
	Particulate Matter (PM)	150mg/Nm ³
	Smoke	20% Opacity
	Carbon Monoxide (CO)	50mg/Nm ³
	Hydrogen Chloride (HCl)	20mg/Nm ³
	Mercury (Hg)	0.01mg/Nm ³
	Lead (Pb)	0.05mg/Nm ³
	Dioxin and Furans	Shall be controlled by temperature and retention time as set out in Regulation 14
C ≥ 1 Metric Ton/Hour	Sulfur Dioxide (SO ₂)	70mg/Nm ³
	Nitrogen Oxides (NO _x)	300mg/Nm ³
	Particulate Matter (PM)	100mg/Nm ³
	Smoke	10% Opacity
	Carbon Monoxide (CO)	50mg/Nm ³
	Hydrogen Chloride (HCl)	15mg/Nm ³
	Mercury (Hg)	0.001mg/Nm ³
	Lead (Pb)	0.01mg/Nm ³
	Dioxin and Furans	Shall be controlled by temperature and retention time as set out in Regulation 14
Any Infected waste Incinerators	Sulfur Dioxide (SO ₂)	70mg/Nm ³
	Nitrogen Oxides (NO _x)	300mg/Nm ³
	Particulate Matter (PM)	100mg/Nm ³
	Smoke	10% Opacity
	Carbon Monoxide (CO)	50mg/Nm ³
	Hydrogen Chloride (HCl)	15mg/Nm ³
	Mercury (Hg)	0.001mg/Nm ³
	Lead (Pb)	0.01mg/Nm ³
	Dioxin / Furans	Shall be controlled by temperature and retention time as set out in Regulation 14

PART VI

CUPOLAS, BLAST FURNACES, COKE OVENS, BASIC OXYGEN FURNACES, ELECTRIC INDUCTION & ELECTRIC ARC FURNACES

<i>Rated Output Capacity (C)</i>	<i>Type of Pollutant</i>	<i>Emission Limit</i>
Any	Particulate Matter (PM)	150mg/Nm ³
	Sulfur Dioxide (SO ₂)	800mg/Nm ³
	Nitrogen Oxides (NO _x)	500mg/Nm ³
	Smoke	20% Opacity

PART VII

CEMENT KILNS

<i>Rated Output Capacity (C)</i>	<i>Type of Pollutant</i>	<i>Emission Limit</i>	
		<i>Existing *</i>	<i>New **</i>
Any	Particulate Matter (PM)	400mg/Nm ³	200mg/Nm ³
	Sulfur Dioxide (SO ₂)	540mg/Nm ³	270mg/Nm ³
	Nitrogen Oxides (NO _x)	1250mg/Nm ³	1000mg/Nm ³
	Smoke	20% Opacity	20% Opacity

* Cement kilns in existence prior to the date of operation of these regulations.

** Cement kilns which will commence operation after the date of operation of these regulations.

(Regulations 3 and Regulation 15)

SCHEDULE III

Pollutant Based Standards

PART I

<i>Pollutant</i>	<i>Process/Source</i>	<i>Emission Limit Combustion</i>	<i>Emission Limit Non - Combustion</i>
Particulate Matters (PM)	Any	150mg/Nm ³	100mg/Nm ³
Smoke	Any	25% Opacity	25% Opacity
Carbon Monoxide (CO)	Any	900mg/Nm ³	1100mg/Nm ³
Sulfur Dioxide (SO ₂)	Sulfuric acid manufacturing plants	2kg/Metric ton of Sulfuric acid production	
	Any Other	1000mg/Nm ³	800mg/Nm ³
Nitrogen Oxides (NO _x)	Nitric acid manufacturing plants	1.5kg/Metric ton of Nitric acid production	
	Any Other	500mg/Nm ³	—
Total Volatile Organic Compounds (TVOC)	Any	20ppm	10ppm

PART II

<i>Pollutant</i>	<i>Process/Source</i>	<i>Emission Limits/Combustion or Non - Combustion</i>
Chlorine (Cl ₂)	Any	Chlorine 35mg/Nm ³
Hydrogen Chloride (HCL)	Hydrochloric acid manufacturing plants	0.8 kg per Metric ton of Hydrochloric acid production
	Any other	Hydrogen Chloride 50mg/Nm ³
Fluorine (F ₂)	Any	Fluorine 20mg/Nm ³
Fluoride (F ⁻) (Hydrogen or Silicon)	Phosphate Industry	0.18 kg/Metric ton of raw material feed
	Any Other	Hydrogen Fluoride 2mg/Nm ³
Hydrogen Sulfide (H ₂ S)	Any	1mg/Nm ³
Cadmium or its compounds	Any	1mg/Nm ³ as Cd
Lead or its compounds	Lead Smelling	0.2mg/Nm ³ as Pb
	Any Other	0.2mg/Nm ³ as Pb
Antimony or its compounds	Any	0.5mg/Nm ³ as Sb
Arsenic or its compounds	Any	0.1mg/Nm ³ as As
Copper or its compounds	Copper smelling	1mg/Nm ³ as Cu
	Any Other	1mg/Nm ³ as Cu
Zinc or its compounds	Any	1mg/Nm ³ as Zn
Mercury or its compounds	Any	0.01mg/Nm ³ as Hg
Dioxin/Furan	Any	2mg/Nm³
Ammonia	Any	10mg/Nm ³

(Regulation 4)

SCHEDULE IV

Fugitive Dust Emission Standards

The difference between two simultaneous 3 hour Total Suspended Particulate Matter (TSPM) measurements (gravimetric) carried out on up-wind and down-wind basis from any process area or emission area shall not be greater than $450\mu\text{g}/\text{m}^3$.

- a. Measurement location shall be within 10 meters from any process equipment or emission area towards up-wind and down - wind directions.
- b. The wind direction shall be the most predominant wind direction during the time period of measurement.
- c. Any method approved by the Authority shall be used for the TSPM measurement.

(Regulation 4)

SCHEDULE V

Fugitive Non-Methane Volatile Organic Compounds (NMVOC) Emission Standards

The difference between two simultaneous Non-Methane Volatile Organic Compound measurements carried out on up-wind and down - wind basis from any process area which emits volatile organic compounds shall not be greater than 5ppm.

- a. The measurement location shall be within 5 meters from any process equipment or emission area towards up - wind and down - wind directions.
- b. The wind direction shall be the most predominant wind direction the time period of measurement.
- c. Any method approved by the Authority shall be used for the determination of Non-Methane Volatile Organic Compounds.

(Regulation 4)

SCHEDULE VI

Fugitive Acid Mist and Ammonia Emission Standards

Fugitive acid mists or fugitive ammonia mist emissions from any process area shall not be greater than $20\text{mg}/\text{m}^3$. The measurement location shall be within 5 meters down-wind from the process area. Sampling time period shall be 3 hours at the sampling flow rate 1 liter/min. Any method approved by the Authority shall be used for the determination of fugitive acid mist and ammonia mist emission level.

(Regulation 4)

SCHEDULE VII

Asbestos Fiber Emission Standards

Ambient asbestos fiber concentrations in process area shall not be greater than 1 fibre/m³. The measurement location shall be within 20 meters down - wind from the process area. Any method approved by the Authority shall be used for the determination of asbestos fiber concentration.

(Regulation 8)

SCHEDULE VIII

Reference Oxygen Levels

<i>Fuel Type</i>	<i>Reference Oxygen Level</i>
Liquid and gaseous fuels	03%
Solid fuels	06%

06- 44

**ANNEXURE IV - LIST OF CEA REGISTERED CONSULTANTS / SPECIALISTS / -
2019/2020**



LIST OF CEA REGISTERED CONSULTANTS /SPECIALISTS – 2019/2020

Nos	Name & Address of the Organization	Area of Speciality	Contact Person	Tel. No/Fax/Email/web
1.	ABC Trade & Investment (Pvt) Ltd No.03, Banadaranayakapura Road Rajagiriya	Wastewater	Mr. Amalraj Jayaseelan CEO Kasun Rathnayake Sales & Operation Manager	Tel : + 94 11 5 877 700 Fax : + 94 11 2 868 555 E mail : info@abcsrilanka.biz Web : www.abcsrilanka.biz
2.	Allied Techno Services (Pvt) Ltd, No. 29, Castle Lane, Colombo 04	Non Chemical Boiler Water Treatment Wastewater	Mr. Hafez Wahid Managing Director Mr. Lalindra Munasinghe Head of Operation	Tel: + 94 11 5977990 E mail : lalindra@alliedtech.lk Web : www.alliedtech.lk
3.	Aquablu Lanka(Pvt) Ltd No.121/ B1/1, Chilaw Road Negombo	Wastewater	Mr. Usahantha Ekanayake Managing Director Mr. Dhamikka Dasa Director	Tel /Fax : +94 31 332 2253 +94 71 481 9398 Email : info@ aquablu.lk Web : www. aquablu.lk
4.	Aqua Technologies (Pvt) Ltd. No. 523, Kotte Road Pitakotte	Wastewater	Mr. Madura Pradeepa Managing Director Mr. Kasun Lakshitha Head of the Department- Wastewater Treatment	Tel /Fax : +94 11 2861295 +94 77 3770445 Email : hodwwt@hydroaqua.lk Web : www.hydroaqua.lk
5.	Avato Water Tech (Pvt) Ltd No. 77,UDA Industrial Estate Katuwana, Homagama.	Wastewater	Mr. K.M. Chandana Kumara Managing Director Mr. Neelaka Karunaratne Business Development Manager	Tel : + 94 11 2895350 + 94 77 7677397 Fax : + 94 11 2895999 E mail : md@wct.lk Web : www. wct.lk
6.	Central Environmental Testing & Consultancy (Pvt) Ltd No. 128/A, Vihara Mawatha Mulagampola, Kandy	Wastewater Air Pollution Control Noise Pollution Control	Eng. IshankaWimalaweera Director	Tel : +94 81 566 6626 +94 71 925 7349 +94 71 648 0032 Email : isanka.cetec@gmail.com Web : www. cetec.lk
7.	Chemco Technologies No.63 Pahala Imbulgoda Imbulgoda Kadawatha	Wastewater	Mr. N.B.N. Dayarathna Manager- Technical Mr. M.M.P.M. Bandara Head of Marketing	Tel : + 94 77 2022611 Fax : + 94 11 7445001 Email: chemtec@sltnet.lk Web: www. chemtech.lk
8.	Chemtec Engineering Solutions 261B, 8th Lane Vidyaraja Mawatha Hokandara South	Wastewater	Mr. Godfrey Perera Director Mr. S. S. R. Pathma Kumara Chemical Engineer	Tel : + 94 11 2724191 + 94 77 5277733 Fax : + 94 11 2724191 Email: chemtec@sltnet.lk Web: www. chemtech.lk
9.	Define Water Management (Pvt) Ltd No.743/41, Muwanbelawatta, Thalagama North, Malabe	Wastewater	Ms. Nilmini Munasinghe Managing Director Mr. Indika Aruna Weerarathna Engineer	Tel : +94 11 5882498 +94 77 8185633 Email : nilmini@definewater.com Web : www. definewater.com
10.	Daw Cooperation (Pvt). Ltd No. 8/665 Ethul Kotte Kotte	Wastewater	Mr. Yasith Wickramasinghe Managing Director Mr. Tharanga Jayawardana Director	Tel: + 94 11 4477474 Fax: + 94 11 4063528 Email : yasith@daw.lk Web: www.daw.lk

Nos	Name & Address of the Organization	Area of Speciality	Contact Person	Tel. No/Fax/Email/web
11.	Daiki Axis Lanka (Pvt) Ltd No.225,High Level Road Galawilawatta Homagama	Wastewater	Dr. M.P.P. Perera Chairman Mr. Prabath Dahanayake CEO	Tel: + 94 11 2 894 423 Fax: + 94 11 2 748 429 Email : info@daikiaxislanka.com Web : www. daikiaxislanka.com
12.	Enviro Water Systems (Pvt.) Ltd. No. 253,Highlevel Road, Maharagama	Wastewater	Mr. Surath Senevirathna Managing Director	Tel: + 94 11 431 9923 Fax: + 94 11 438 4899 Email: envirows@envirows.com Web : www.envirows.com
13.	Ecologic Systems (Pvt.) Ltd No. 683, Negombo Road , Mabole, Wattala.	Wastewater	Mr. Y. M. Bandara General Manager Mr.K.G.N.A. Bandara Head of Env'tl. Engineering	Tel. : +94 11 2932109 Fax : +94 11 2931550 E- mail : ecologic@ute.lk Web : www.ute.lk
14.	Eco Engineer's & Company 176/3, St. Joseph Street Negombo	Wastewater	Mr. Athula Jayamanna Chief Consultant Engineer Mr. Christo Jayamanne Junior Design Engineer	Tel. :+94 71 4778868 Fax : +94 31 2225515 E- mail : eco.engineer@yahoo. com Web : www.ecoengs.com
15.	Ecotech Industrial Solution (Pvt.) Ltd No. 152/19, 6th Lane Sri Mangala Mawatha Makola South Makola	Wastewater	Mr. Rajendra Chandrasekara Managing Director Mr. Nirosha Jayawickrama	Tel. : +94 11 573 8777- 8 +94 77 234 9345 Fax +94 11 292 5825 E- mail : ecotecheng@sltnet.lk Web: www.eco-tech.lk
16.	EML Consultants (Pvt) Ltd. No. 6/10, Rajamaha Vihara Lane Rajamaha Vihara Road Pitakotte	Wastewater Noise Pollution Control Air Pollution Control	Mr. Thilak Hewawasam Chairman Mr. Jeyaraj Chandrasekara Managing Director	Tel/Fax : + 94 11 5535880 + 94 11 5535887 Email : info@emlconsultants. com Web : www.emlconsultants.com
17.	Enviroplus Engineers(Pvt) Ltd No 200/2B Dewala Road, Thalangama South ,Battaramulla	Wastewater	Mr. Priyantha Senevirathne Managing Director Mr. Shantha P Ranathunga Director	Tel/Fax : + 94 11 2873592 +94 11 2861679 Email : info@enviroplus.lk Web : www. enviroplus.lk
18.	ENVIROME International (Pvt) Ltd. No. 131/1, Main Road Attidiya Dehiwala	Wastewater	Mr. Dananjaya P. Kuruppu Managing Director Mr. Tharindu Chamara Rathnasiri Senior Project Application Engineer	Tel: + 94 11 2715515 Fax: + 94 11 5622619 Email : dananjayak1@yahoo.com Web : www.enviromec.lk
19.	Environmental Laboratory & Consulting Services No.889 1/3, Room No 03 1stFloor, Maradana Road, Colombo10	Wastewater Air Pollution Control Noise Pollution Control	Mr. Susil Senevirathna Managing Director Mr. G. Subasinghe ELCS Manager	Tel : + 94 11 2684242 Email: manager@labenvi.com Web : www.labenvi.com
20.	E – Techno Environment Consultants (Pvt) Ltd No 125, Welapara Kirigala, Horana.	Wastewater	Mr. D.K.K. Dadigamuwa Managing Director Mr. Prasad Hettiarachchi Technical Consultant	Tel : +94 77 115 3442 + 94 77 543 7768 Email : premadasa3@gmail.com
21.	Fukada Environmental Solution (Pvt) Ltd No. 92/A, G.H. Perera Mawatha Rathnapitiya Boralasgamuwa	Wastewater	Dr. Nishantha Nanayakkara Managing Director Mr. Dinesh Kumar Chife Executive Officer	Tel: + 94 11 5 235 255 Fax: + 94 112 545 192 Email : fes@davora.lk Web : www.davora.lk

Nos	Name & Address of the Organization	Area of Speciality	Contact Person	Tel. No/Fax/Email/web
22.	GEED Technologies (Pvt) Ltd No. 8/665, EthulKotte Kotte	Wastewater	Mr. Yasith Wickramasinghe Managing Director Mr. Tharanga Jayawardana Director	Tel: +94 11 2865468 Fax: +94 11 2883395 Email : info@geedtec.com Web : www.geedtec.com
23.	Global Scientific Laboratories (Pvt) Ltd. No. 206, Madapatha Piliyandala	Wastewater	Mr. T.W.L.S. Wasalasooriya Managing Director Mr. A.G.J. Gunawardana Director	Tel : + 94 11 2707940 Fax : + 94 11 2706097 Email : info@globalscientific.lk Web : www.globalscientific.lk
24.	Global Industrial Solution (Pvt) Ltd No.156/2/A/1/1 Hokandara Sout Hokandara	Wastewater	Mr. A.V. Weerakoon Director Mrs. Hansani Perera Admin executive	Tel : + 94 11 2053283 + 94 778086823 Email : gis@slt.net.lk Web : www.globalsolutions.lk
25.	Global Designs & Engineering (Pvt.) Ltd No. 24, Maitipe First lane, Karapitiya, Galle.	Wastewater, Noise pollution Control Air Pollution Control	Eng. L. I. Ramanayaka Chairman Eng. K. K. Wijesooriya Partner	Tel. : + 94 91 2242241 + 94 71 4439052 E- Mail : liramanayaka@gmail.com Web : www.gdehome.com
26.	Industrial Solutions Lanka (Pvt.) Ltd No 18, Golden Gate 02 Andagala Mount Estate Wellawa Road Kurunagala	Wastewater Noise Pollution Control Air Pollution Control Stack Emission	Mr. Rushanth Chandrabose Head of the Engineering Mr. Priyan Suriyaarachchi Chemical Engineer	Tel : + 94 37 7395390 + 94 77 7369703 Fax : + 94 37 2052707 Email : info@isl.lk Web : www.isl.lk
27.	Industrial Technology Institute No. 363, Baudhaloka Mawatha Colombo 07	Wastewater Air Pollution Control Noise Pollution Control Cleaner Production Vibration Control	Mr. N.A.T.D.D. Gunasekara Senior Deputy Director (Env. Technology Section) Mr. R.M. Weerasinghe Senior Deputy Director Electro Technology Laboratory	Tel : + 94 11 2379925 + 94 11 2379905 Fax : + 94 11 2379915 Email : thilak@iti.lk Web : www.iti.lk
28.	Industrial Services Bureau (ISB) No. 141, Kandy Road Kurunegala	Wastewater Noise Pollution Control Air Pollution Control	Mr. Neelakanth Wanninayake Executive Director Dr. Mrs. Wasana Gunawardana Senior Consultant	Tel : + 94 37 2223721- 3 +94 71 6991843 Fax : + 94 37 2223562 Email: wasanag@isb.lk Web : www.isb.lk
29.	Kent Engineers (Pvt) Ltd No.27 Malwatta Avenue Kohuwala Nugegoda	Wastewater	Mr. K.G. Chaminda Assistant General Manager Madura De Silva Director Engineering	Tel : + 94 11 2825318 Fax : + 94 11 2825319 Email : info@kentengineers.net Web : www.kentengineers.net
30.	Klaro Lanka (Pvt.) Ltd. No 362, Old Galle Road, Gorakana, Keselwatta, Panadura.	Wastewater	Mr. Sachithra Fernando Managing Director Mr. Gayan Udalgama Operations Manager	Tel: + 94 77 3724246 + 94 76 5842030 Email : sachithradml@slt.net.lk Web : www.klaro.lk
31.	Lalanka Water Management (Pvt) Ltd 13/3, Sri Dharmarama Road Ratmalana	Wastewater	Mr. Sagara Lunuwila Managing Director Ms. Lakmini Wijemanne General Manager	Tel : + 94 11 2722486 Fax : + 94 11 2724997 Email : directort@lalanka.com Web : www.lalanka.com

Nos	Name & Address of the Organization	Area of Speciality	Contact Person	Tel. No/Fax/Email/web
32.	Lily Water Engineering (Pvt)Ltd No.99/75B, Ivory Garden, Old D.R.O. Road Kandana	Wastewater	Mr. D. Wasantha Kumara Director P.C.K. Gamage Director	Tel : + 94 11 2533994 + 94 710702275 Email : dwkumara@sltnet.lk
33.	Lily Aqua (Pvt) Ltd No. 123/3, Thumbovila, Piliyandala	Wastewater	Mr. Ranesh Sugathapala Director Ms. Niranjali Dammika Bandara Director	Tel : + 94 11 2617766 +94 77 3284757 Fax : + 94 11 2606618 Email : ranesh@lilyaqua.lk Web : www.lilyaqua.lk
34.	Lezzaro Technologies (Pvt) Ltd No. 163/2, Athurugiriya Road, Malapalla, Pannipitiya	Wastewater	Mr. Washeera Wijesinghe Director H.P. Kasun Udana Chemical Engineer	Tel : + 94 11 7207374 +94 77 2078527 Email : env_eng@lezzarotech.com Web : www.lezzarotech.com
35.	Leisurelife Water Management (Pvt) Ltd. No. 53L,10th Mile Post, Kossinnawatta Rd Katuwawala, Borelasgamuwa	Wastewater	Mr. Prabath Dahanayake Managing Director Ms. Nithini Punchihewa Manager (Research & Development)	Tel : + 94 11 2509091 +94 11 5515427 Email : leisurelife@sltnet.lk Web : www.leisurelifelk.com
36.	Liyanage Water Solutions No 89/B, Saraboomy Estate, Madapatha, Piliyandala.	Wastewater	Mrs. ManuriYasara Liyanage Proprietor Mr. Suranga Howie Project Manager	Tel /Fax : + 94 11 3130038 + 94 77 4735567 E mail : liyanagewatersolutions@gmail.com
37.	MIRAI Engineering Solution (Pvt) Ltd No.128/A, Prabuddha Mawatha Madampe Piliyandala	Wastewater	Dr. Saman Naliya Gamage Director Mr. C.J. Hettiarachchi Director	Tel : + 94 703233333 + 94 703033382 Email : info@miraieng.com Web : www.miraieng.com
38.	MEET Services (Pvt) Ltd No. 577, Kotte Road Pitakotte	Wastewater Air Pollution Control Noise Pollution Control	Mr. D.M.S.K. Jayasundara Managing Director Mr.P.L.D. Fernando Mining Engineer	Tel : + 94 11 2871244 Email : meetservices@gmail.com Web : www.meetservices.lk
39.	National Engineering Research & Development Centre Energy & Environmental Services Department 2P/17B, Industrial Estate Ekala, Ja-ela	Wastewater Air Pollution Control Noise Pollution Control	Eng. K.T. Jayashinghe Research Fellow Eng. N.P.T. Perera Senior Research Engineer	Tel : + 94 11 2236284 + 94 11 5854374 Fax : + 94 11 2233153 Email : eemc@nerdc.lk Web : www.nerdc.lk
40.	National Building Research Organization Environmental Studies & Services Division 99/1,Jawatta Road Colombo – 05	Wastewater Air Pollution Control Noise Pollution Control Vibration Control Stack Emission	Ms. S.V. Dias Director (Environmental Studies & Services) Mr. H.D.S. Premasiri / Senior Scientist (Air Quality Studies Div.)	Tel : + 94 11 2588946 +94 11 2501834 Fax : + 94 11 2588365 Email : ed_nbro@yahoo.com Web : www.nbro.gov.lk
41.	Okzone Enterprises Galmukalana Estate Kadawala Dunagaha	Wastewater	Mr. Eng. C.U.K Ramanayake Consultant Mr. Kamal Wanniarachchi Project Engineer	Tel : +94 31 2246084 +94 77 3831421 E mail : eokzone@yahoo.com
42.	National Cleaner Production Center No. 66/1, Dewala Road, Nugegoda	Wastewater Cleaner Production Air Pollution Control Noise Pollution Control	Eng. Samantha Kumarasena Chief Executive Officer Ms. Iresha Gurusinghe Senior RECP Expert	Tel : + 94 11 2822272/3 Fax : + 94 11 2822274 Email : samantha@ncpcsrilanka.org Web : www.ncpcsrilanka.org

Nos	Name & Address of the Organization	Area of Speciality	Contact Person	Tel. No/Fax/Email/web
43.	Puritas (Pvt) Ltd No. 400 Deans Road Colombo-10	Wastewater	Ms. Sharmila Ragunathan Director Mr. Samantha Athukorala Divisional Manager	Tel : + 94 11 2683963 Fax : + 94 11 2687721 Email : puritas@haycarb.com Web : www.puritas.lk
44.	Prudence Engineering Services (Pvt) Ltd No.7/3, A1/1, First Lane, Bellantara Road, Nadimala, Dehiwala	Wastewater	Mr. Sahan Hettiarachchi Managing Director Mrs. M.A. Abeywardana Director	Tel : + 94 11 2712864 Fax : + 94 11 2723035 Email : prudenceeng@sltnet.lk Web : www.prudenceeng.com
45.	Plastron Enviro System (Pvt) Ltd No.590,Athurugiriya Road Malabe	Wastewater, Noise Pollution Control Air Pollution Control	Mr. R.M. Kulasena Director Mr. Osman Weerasena Manager -Sales	Tel: + 94 11 5 021171 Fax: + 94 11 2 742238 Email : envirosys@sltnet.lk
46.	Samurai Engineering Services & Consultants (Pvt) Ltd No. 94/2/17,Udeshi City Shopping Complex, Makola Road Kiribathgoda, Kelaniya	Wastewater Air Pollution Control Noise Pollution Control Vibration Control	Mr. M. D. M. H. Gunarathne Managing Director Mrs. M. S. D. Fernando Director-Technical	Tel/Fax : +94 11 290 8456 Email: samuraieng@sltnet.lk
47.	Sustainable Water Solution Centre No. 15, 3rd Lane Circular Road South Kurunegala	Wastewater Air Pollution Control Noise Pollution Control	Ms. Manori Dissanayake Director Technical & Operation	Tel : + 94 37 4944087 + 94 71 4394552 + 94 77 9794577 Fax : + 94 37 2257050 Email: watersolutioncentre@gmail.com
48.	Sunray Water Management Service No 508/40,Ganima Dodangoda Kaluthara	Wastewater	Mr. W.P. Ruwan Pathiraja Proprietor K.H. Oshani Warunika Technical Officer	Tel : + 94 34 2286400 Fax : + 94 71 8656898 Email : sunraywms@gmail.com Web : www.sunraywms.com
49.	Texpert Environmental Engineering (Pvt) Ltd No. 142, Kotugoda Road Seeduwa	Wastewater	Mr. W.V. Chandrajeewa Lowe Managing Director	Tel : +94 11 2071156 + 94 77 7447430 Fax : + 94 11 2071156 Email : texpertee@hotmail.com Web : www.texpertee.com
50.	Tritech Engineers (Pvt) Ltd No87 Makola South Makola, Kiribathgoda	Wastewater	Mr. P. Sarathchandara Managing Director Mr. Charith Jayanath Manager	Tel : + 94 11 2906517 Fax : + 94 11 4815201 Email : tritech @ tritech.lk Web : www.tritech.lk
51.	Uniken Lanka Ltd No. 51A, Sri Sangaraja Mawatha, Colombo 10	Wastewater	Mr. M.J.M. Fouz Director-Marketing Mr. A. L.M. Luqmaan Manager – Business Development	Tel : + 94 11 2459747 Fax : + 94 11 2436341 Email : uniken@sltnet.lk Web : www.unikenlanka.com
52.	Vikasitha Enerprise (Pvt) Ltd No 225, Highlevel Road Galawilawatta, Homagama	Wastewater	Dr. M.P.P. Perera Chairman Mr. Prabath Dahanayake CEO	Tel : + 94 11 2 894 423 Fax : + 94 11 2 748 429 Email : veet@vikasitha.com Web : www.vikasithaveet.com
53.	Voda Tech solutions No. 234, Gemunu Mawatha Kotuwegoda Rajagiriya	Wastewater	Mr. Suresh Rathnathilaka Proprietor Ms. K.W. Abeygunawardhana Senior Chemical Engineer	Tel: + 94 11 2 865725 Fax: + 94 11 2 4248256 Email: vodatechsolutions@gmail.com
54.	Watercare Engineering (Pvt) Ltd No. 156/6, Makola Road Kiribathgoda	Wastewater	Mr. Keerthi Wijayatunga Managing Director Mrs. Chintha Wijayatunga Director	Tel: + 94 11 2911499 +94 777358017 E mail : sales@watercare.lk Web: www.watercare.lk

Nos	Name & Address of the Organization	Area of Speciality	Contact Person	Tel. No/Fax/Email/web
55.	Watercare Technologies (Pvt) Ltd No. 77,UJA Industrial Estate Katuwana, Homagama.	Wastewater	Mr. K.M. Chandana Kumara Managing Director Mr. Neelaka Karunaratne Business Development Manager	Tel : + 94 11 2895350 + 94 77 7677397 Fax : + 94 11 2895999 E mail : md@wct.lk Web : www. wct.lk
56.	Aqua Care Engineering (Pvt) Ltd No.42/4C, Circular Road, Ruhunupura Thalawathugoda	Wastewater	Mr. D.V.H. Dayarathna Managing Director Mr. N.D. Samarasinghe	Tel : + 94 11 2080211 Fax : + 94 11 2774852 E mail : info@aquacareengineering.lk Web : www. aquacareengineering.lk
57.	Tech Waters (Pvt) Ltd. No. 303, High Level Road Colombo 05	Wastewater	Mr. Nalin Kamaragoda Managing Director Mr. Shantha Wijethunga General manager	Tel : + 94 11 2826340 + 94 11 2829622 Fax : + 94 11 2853752 E mail: md@techwaterslk.com Web: www.techwaterslk.com
58.	Success Environmental Engineering Solutions No.62, Echo Garden Kamburugamuwa	Wastewater	Mr. Asiri D Senevirathna Managing Director Mr. S.M.S. Bandara	Tel : + 94 77 3764 264 E mail: success@sees.lk Web: www.sees.lk
59.	Professional Met Consultancy Services (Pvt) Ltd No.5, Turnour Road, Colombo 08	Wastewater Air Pollution Control Noise Pollution Control	Mr. M.A. Justin Chairman Mrs. M. A. Pubudini Ishanthi Director	Tel : +94 11 2680155 Email : info@ prometsl.com Web : www. Prometsl.com
60.	SND Green Engineering (Pvt) Ltd No. 22/21B Vidyakara Mawatha Maharagama	Wastewater	Mr. Sasanka Dayawansa Managing Director Mr. A.T.B. Marasinghe Technical Officer	Tel: + 94 11 2896144 + 94 77 7476034 E mail: info@sndgreen.com Web: www.sndgreen.com

ANNEXURE V - LIST OF CEA REGISTERED LABORATORIES - 2019 / 2020



LIST OF CEA REGISTERED LABORATORIES – 2019/2020

Nos.	Laboratory	Area of Specialty	Contact Person	Tel. Nos. Fax/email/web
1.	Laboratory Central Environmental Authority 104, Denzil Kobbekaduwa Mw Battaramulla	Wastewater	Mrs. Wasantha Wijesinghe (Director / Lab Service)	General : +94 11 2873447-8 Ex. 432 + 94 11 2872419 Fax : + 94 11 2872605 Email : twaw@cea.lk Tel : + 94 11 7877282 Ex 472 Email : hjansz@cea.lk
		Noise Air Quality Vibration	Mrs. Hiranthi Jansz Deputy Director	
	Central Provincial Office Central Environmental Authority Polgolla Dam, Plogolla	Wastewater	Mr. Prasanna Kotambewatta Chemist	Tel : + 94 81 7877277 Fax : + 94 81 2494884 Email : prasannanurudda@yahoo.com kandy@cea.lk Web : www.cea.lk
	Eastern Provincial Office Central Environmental Authority Priyantha Mawatha Kanthale	Wastewater	Mrs. D.P.D. Jayasinghe Chemist	Tel : +94 26 223 4488 Fax : +94 55 222 5305 Email : epocekantale@yahoo.com
	Uva Provincial Office Central Environmental Authority Kappetiploa Road Badulla	Wastewater	Mr. J.I. Prasanna Perera Chemist	Tel : +94 55 787 7277 Fax : +94 55 222 5305 Email : indikaran2007@yahoo.com
	Sabaragamuwa Provincial Office Central Environmental Authority No. 582/2, Court Junction New Town Rathnapura	Wastewater	Mrs. Nishadi Tharangani Chemist	Tel : +94 45 222 6984 Fax : +94 45 222 6984 Email : cearatnapura@gmail.com
	Gampaha District Office Central Environmental Authority No.184/1, 1st ad 2nd Level Seylan Bank, Kandy Road, Yakkala	Wastewater	Mr. Mr. M.P. Priyantha Chemist	Tel : +94 33 777 8277 Fax : +94 33 2232201 Email : gampaha@cea.lk maname@cea.lk Web : www.cea.lk
	North Central Provincial Office Central Environmental Authority No.388/40, Harishchandra Mawatha Anuradhapuraya	Wastewater	Mrs. K.S. Ranasinghe Environmental Officer	Tel : +94 25 7877277 Fax : +94 25 2225999 Email : sam21lab@yahoo.com Web : www.cea.lk
	Northern Provincial Office Central Environmental Authority Arwiyalnagar Kilinochchi	Wastewater	Mr. K.S. Sivanesan Environmental Officer	Tel : +94 21 7877277 Fax : +94 21 2285548 Email : kilinochchi@cea.lk Web : www.cea.lk
	North Western Provincial Office Central Environmental Authority No.150, Kandy Road Kurunegala	Wastewater	Mrs. Gayathree Laboratory Assistant	Tel : +94 37 2224730 Fax : +94 37 2267532 Email : nwpcea@gmail.com Web : www.cea.lk
	Southern Provincial Office Central Environmental Authority Matara Road, Koggala, Habaraduwa	Wastewater	Mr. Ruwan Alexander Chemist	Tel : +94 91 787 7294 Fax : +94 91 2233050 Email : galle@cea.lk Web : www.cea.lk
2	Bureau Veritas Consumer Product Services Lanka (Pvt) Ltd No.570 Galle Road Katubedda	Wastewater Heavy Metal Stack Emission Ambient Air Quality Noise Illumination Microbiological Test	Mr. Sidath Wimalananda Business Development Manager Eng. Shashi De Silva Assistant Manager (Environment)	Tel : + 94 11 2350111 Fax : + 94 11 2622198-9 Email: bvpcs.lanka@lk.bureauveritas.com Web : www. bureauveritas.com

Nos.	Laboratory	Area of Specialty	Contact Person	Tel. Nos. Fax/email/web
3	Environmental Laboratory & Consultancy Services (ELCS) No.889 1/3 , Room No 03, 1st floor Maradana Road Colombo 10	Wastewater Noise Stack Emission Ambient Air Quality	Mr. Susil Senevirathne Managing Director Mr. G. Subasinghe Manager	Tel : + 94 11 2684242 + 94 71 6400365 Email: karunasusil@yahoo.com manager@labenvi.com Web. www.labenvi.com
4	Lindel Industrial Laboratories Limited Pattiwila Road Sapugaskanda Makola	Wastewater Microbiological Test	Mr. S. D. Jayasuriya Technical Quality Manager Mr. U.S. Abeysiri Gunawardana Analytical Chemist	Tel: + 94 11 2401675 Fax: + 94 11 2400321 Email: lill@itmin.net Web : www.lill.lk\
5	MAS Fabric park (Pvt) Ltd Kurunagala Road Thulhiriya	Wastewater Microbiological Test	Mr. Harsha Daraniyagala General Manager (Hydro & Environmental) Ms. Amali Hettige Assistant Manger (Hydro & Environmental)	Tel : + 94 77 34 76 735 Fax : + 94 37 2277081 E mail : HarshaD@masholding.com Web : www.Masfabricpark.com
6	National Engineering Research & Development Centre Energy & Environmental Services Department No. 2P/17B Industrial Estate Ekala, Ja-ela	Wastewater Noise Air Quality Stack Emission	Eng. K.T. Jayasinghe Head- Energy & Environment Services Dept. Eng. N.P.T. Perera Senior Research Engineer	Tel: + 94 11 5854374 + 94 11 2236284 Fax: + 94 11 2236434 + 94 11 2233153 Email : eemc@nerdc.lk Web : www.nerdc.lk
7	SGS Lanka (Pvt) Ltd No. 140 Vauxhall Street Colombo 02	Wastewater Noise Air Quality Stack Emission Microbiological Test	Mr. Kolitha Amarasinghe Business Manager - Mrs. Amali Vithanage Assistana Manager (Environmental Service)	Tel: + 94 11 5376280 Fax: + 94 11 5299490 Email: amilavithanage@sgs.com Web: www.sgs.com
8	Sri Lak Laboratory Services(Pvt) Ltd No. 265/6, St. Joseph Street, Negombo.	Wastewater	Mr. W.S.C.A. Sunil Fonseka CEO/Chief Chemist Ms. N.L.C. Weerasinghe Chemist/Microbiologist	Tel. : +94 31 222 0777 +94 71 8064426 E- mail : srilaklab@yahoo.com Web : www. srilaklab.com
9	Anala Laboratory Services (Pvt) Ltd No. 85, Elhena Road Maharagama	Wastewater Microbiological Test	Ms. Enoka Jayawardena Managing Director Ms. M.A.Chathurika Madushani Microbiologist	Tel : + 94 11 4866258 + 94 11 4866443 Fax : + 94 11 2746590 Email : anala.laboratory@yahoo.com
10	Avato Water Tech (Pvt) Ltd No. 77,UDA Industrial Estate Katuwana Homagama	Wastewater	Mr. Chandana Muhandiram Managing Director Mr. Neelaka Karunaratne Business Development Manager	Tel : + 94 11 2895350 + 94 77 7677397 Fax : + 94 11 2895999 E mail : md@wct.lk Web : www. wct.lk
11	Aqua Cleaning (Pvt) Ltd No.506/6 Precious Park Kapuwatta , Ja-ela	Wastewater	Ms. Ramani Wijerathna Managing Director	Tel : + 94 77 236 9856 Email : aquacleaning16@gmail.com
12	Central Environmental Testing & Consultancy (Pvt) Ltd No. 128/A Vihara Mawatha Mulgampola, Kandy	Wastewater Air Quality Noise	Eng. Ishanka Wimalaweera Senior technical Manager, Mr. Kasun Meetiayagoda Deputy Technical Manager	Tel: + 94 71 9257349 +94 815666626 Email: ishanka.cetec@gmail.com Web: www. cetec.lk
13	Global Scientific Laboratories (Pvt) Ltd No. 206, Saraboomi Estate Madapatha Piliyandala	Wastewater Microbiological Test	Mr. T.W.L.S. Wasalasooriya Managing Director Mr. A.G.J. Gunawardana Director	Tel : + 94 11 2707940 Fax : + 94 11 2706097 Email : info@globalscientific.lk Web : www.globalscientific.lk
14	Industrial Services Bureau (ISB) No.141, Kandy Road Kurunegala	Wastewater Noise Air Quality	Mr. Neelakanth Wanninayake Executive Director Mr. Yasantha Karannagoda Chemist	Tel : + 94 37 2223721 -3 + 94 77 7804950 Fax : + 94 37 2223562 Email : wasanag@isb.lk Web : www.isb.lk

Nos.	Laboratory	Area of Specialty	Contact Person	Tel. Nos. Fax/email/web
15	Intertek Lanka (Pvt.) Ltd Intertek House No.282 Kaduwela Road Battaramulla	Wastewater	Mr. Priyantha De Silva Country Managing Director Mr. Ruchira Herath, Laboratory Manager	Tel: + 94 11 4714162 /3 +94 11 2877300 Fax + 94 11 4714161 Email: ruchira.herath@intertek.com Web: www.intertek.com
16	Industrial Solutions Lanka (Pvt.) Ltd No 18 Golden Gate 02 Andagala Mount Estate Wellawa Road Kurunagala	Wastewater Air Quality Stack Emission Noise	Mr. Rushantha Chandrabose Consultant Mr. Kushan Wijesuriya Chemist	Tel: + 94 37 739 5390 + 94 77 7369703 Fax: + 94 37 2052707 Email: info@isl.lk kushanw@isl.lk Web: www.isl.lk
17	Lalanka Laboratory Services (Pvt) Ltd. 13/3, Sri Dharmarama Road Ratmalana	Wastewater	Mr. Sagara Lunuwila Managing Director Ms. Lakmini Wijemanna General Manager	Tel: + 94 11 4005497 + 94 11 2722486 Fax : + 94 11 2724997 Email : directort@lalanka.com gm@lalanka.com Web : www.lalanka.com
18	Microchem Laboratories (Pvt) Ltd No.25 Epitamulla Road Kotte	Wastewater Microbiological Test	Mrs. Manel Perera Managing Director Mr. Chamal De Silva Laboratory Manager	Tel : + 94 77 6595208 + 94 77 2330575 Email : microchem@sltnet.lk Web : www.microchem.lk
19	Marine Environment Protection Authority NO.426/B, Colombo Road, Dadella Galle	Wastewater	Ms. A.J.M. Gunasekara Quality Manger- Laboratory Mr. Sandun Wickramasinghe Technical Manager(Laboratory)	Tel : + 94 91 3130888 E mail : mepalab@gmail.com Web : www.mepa.gov.lk
20	MEET Services Pvt. Ltd. No.577, Kotte Road Pitakotte.	Noise Vibration Air Quality	Mr. D.M.S.K. Jayasundara Managing Director Mr. P.L.D. Fernando Mining Engineer	Tel : +94 112871244 Email : meetservice@gmail.com Web : www.Meetservices.lk
21	National Building Research Organization (NBRO) Environmental Studies and Services Division No. 99/1, Jawatta Road Colombo 05	Wastewater Noise Air Quality Vibration Testing of Hazardous waste & Contaminants Soil Testing	Mrs. S.V. Dias Director (Environmental Studies and Services Division) Mr. H.D.S. Premasiri Senior Scientist	Tel: + 94 11 258 8946 + 94 11 250 1834 Fax: + 94 11 2588365 Email: ed_nbro@yahoo.com Web : www.nbro.gov.lk
22	National Water Supply & Drainage Board Central Laboratory Thelawala Road Rathmalana	Wastewater	Mr. L.P.R.J. Wijesinghe Assistant General Manager	Tel + 94 11 2611133 Fax : +94 11 2611133 Email : chiefoflabs@gmail.com Web : www.waterboard.lk
23	National Water Supply & Drainage Board Laboratory Ambatale Udumulla Road Mulleriyawa	Wastewater	Mrs. V. P. L Jayawardana Chief Chemist Mrs. H.M.A.K. Herath Senior Chemist	Tel + 94 11 2578205 Fax : +94 11 2611133 Email : alaboratory@ymail.com Web : www.waterboard.lk
24	Puritas (Pvt.) Ltd No. 400 Deans Road Colombo 10	Wastewater	Mr. Samantha Athukorala Divisional Manager Mr. Dayan Ganegoda Senior Executive	Tel: + 94 11 268 3963 Fax : + 94 11 2687721 Email : puritas@haycarb.com Web : www.puritas.lk

ANNEXURE VI - CONTACT DETAILS OF PROVINCIAL AND DISTRICT CEA OFFICERS

Western Provincial Office - Mr. H.S Premachandra (Director)

Address Central Environmental Authority, Western Provincial Office, 2nd floor, No.104, Denzil Kobbekaduwa Mawatha, Battaramulla, Sri Lanka.
Telephone : 011-2862831
Fax : 011-2865293
Email : premachandra@cea.lk

Sabaragamuwa Provincial Office - Mr. K.G.T.N Kiriella (Director)



Address Central Environmental Authority, Sabaragamuwa Provincial Office, No. 582/2, New Town, Rathnapura, Sri Lanka.
Telephone : 045-2226984
Fax : 045-2226984
Email : cearatnapura@gmail.com , rathnapura@cea.lk

Central Provincial Office - Mr. K.P Welikannage (Director)



Address Central Environmental Authority, Central Provincial Office, Polgolla Dam Site, Polgolla, Sri Lanka.
Telephone : 081-7877277
Fax : 081-2494884
Email : ceacpo@gmail.com , kandy@cea.lk

Southern Provincial Office - Mr. W Susantha (Director)



Address Central Environmental Authority, Southern Provincial Office, Matara Road, Koggala, Habaraduwa. Sri Lanka
Telephone : 091-7877277
Fax : 091-2282735
Email : ceagalle@gmail.com , galle@cea.lk

Eastern Provincial Office- Mr. M. Sivakumar (Director)



Address Central Environmental Authority, Eastern Provincial Office, No.05, Priyantha Mawatha, Kanthale, Sri Lanka.
Telephone : 026-2234488
Fax : 026-2234488
Email : epocekantale@yahoo.com , kanthale@cea.lk

North Central Provincial Office - Mr. H.L. Kamal Priyantha, (Director)



Address Central Environmental Authority, North Central Provincial Office, No.388/40, Harishchandra Mawatha, Anuradhapuraya, Sri Lanka.
Telephone : 025-2225999, 025-7877277
Fax : 025-2225999
Email : ncpocea@gmail.com , auradhapura@cea.lk

Uva Provincial Office - Mr. M.A.C Najeeb (Director)



Address Central Environmental Authority,Uva Provincial Office,No.179,
Kappatipola Road , Badulla, Sri Lanka.
Telephone : 055-7877277
Fax : 055-2225305
Email : upocea@gmail.com , badulla@cea.lk

Northern Provincial Office - Mr. T. Suboharan, Director (Attending to the Duties)



Address Central Environmental Authority, Northern Provincial Office, Ariviyal
Nagar, Kilinochchi, Sri Lanka.
Telephone : 021-7877277
Fax :
Email : ceanpo@gmail.com , kilinochchi@cea.lk

North Western Provincial Office - Ms.N.G. Senavirathna (Director)



Address Central Environmental Authority,North Western provincial Office,
No.150, Rajapeela Road, Kurunegala, Sri Lanka
Telephone : 037-7877277 / 7877278 / 7877279 / 7877280
Fax : 037 2233885
Email : nwpcea1@gmail.com , kurunegala@cea.lk

Matara District Office - Mrs. D.N. Gajadeera, (Deputy Director)

Address Central Environmental Authority, Matara District Office,No.64/1,Fransis
Samaraveera mawatha, Gabada Street,Hakmana Road, Matara, Sri Lanka.
Telephone : 041 7877277 / 7877278 / 7877279 / 7877280
Fax : 041 2234897
Email : matara@cea.lk

Hambantota District Office - Mr. G.L. Samarathunga (Deputy Director)



Address Central Environmental Authority,Hambanthota District Office, No. 45,
Weeraketiya Road, Tangalle, Sri Lanka
Telephone : 047-2241599
Fax : 047-2241599
Email : hambantotacea@gmail.com . hambantota@cea.lk

Ampara District Office - Mr.S Udayarajan (Asst.Director)



Address Central Environmental Authority,Ampara District Office, 1st Lane,
Ampara, Sri Lanka
Telephone : 063-7877277
Fax : 063-2222192
Email : doamp@yahoo.com , ampara@cea.lk

Kegalle District Office - Mr . R.M.S.B Rathnayaka (Deputy Director)



Address Central Environmental Authority, Kegalle District Office, No. 54/7,
Albet Senavirathna Mawatha, Kegalle, Sri Lanka.
Telephone : 035-7877277
Fax : 035-2230449
Email : ceakg@yahoo.com, kegalle@cea.lk

Kalutara District Office - Mrs.H.D.Chandrika (Deputy Director)



Address Central Environmental Authority, Kaluthara District Office, No.7A,
Asiri Mwatha, Nagoda, Kalutara, Sri Lanka
Telephone : 034-2221420
Fax : 034-2221420
Email : chewage@sltnet.lk , kalutara@cea.lk

Batticaloa District Office - Mr. S. Gohulan (Assistant Director)



Address Central Environmental Authority, Batticaloa District Office,
No.344/5, Chandra Lane , Trinco Road, Batticaloa, Sri Lanka
Telephone : 065-2227522
Fax : 065-2227522
Email : ceadobt@yahoo.com , batticaloa@cea.lk

Nuwara Eliya District Office - Mr. B.D.A Amarasinghe (Assistant Director)



Address Central Environmental Authority, Nuwara Eliya District
Office, No.04, Wajira Mawatha, Hawaeliya, Nuwara Eliya, Sri Lanka
Telephone : 052-2223311
Fax :
Email : nuwaraeliyacea@gmail.com, nuwaraeliya@cea.lk

Gampaha District Office - Mr.M.M.C.S.K. Malwana (Director)



Address Central Environmental Authority, Gampaha District Office, No.184/1,
Kandy Road, Yakkala, Sri Lanka
Telephone : 033-2232201/2232202
Fax : 033-2232202
Email : ceagampaha@yahoo.com , gampaha@cea.lk

Jaffna District Office - Mr T. Suboharan, Director (Attending to the Duties)



Address Central Environmental Authority, Jaffna District Office, Kachcheri, Jaffna, Sri Lanka
Telephone : 021-2224050
Fax : 021-2224050
Email : ceanpo@gmail.com , jaffna@cea.lk

Monaragala District Office- Mr.D.M.P.T. Dissanayake (Officer in-Charge)



Address Central Environmental Authority, Monaragala District Office, 1/49, Viharamulla Road
, Monaragala , Sri Lanka
Telephone : 055-2273963
Fax : 055-2273963
Email : modocea@gmail.com , monaragala@cea.lk

Polonnaruwa District Office-



Address Central Environmental Authority, Polonnaruwa District Office, No.474, 28 Mile Post, Polonnaruwa, Sri Lanka.
Telephone : 027-2227376
Fax : 027-2227376
Email : ceapdo@gmail.com , polonnaruwa@cea.lk

Matale District Office- Mr.M.M.A.I.Janaka (Assistant Director)



Address Central Environmental Authority, Matale District Office, No.14, Meewaththakumbura Road, Matale, Sri Lanka
Telephone : 066-2231205
Fax : 066-2231205
Email : ceamatale@gmail.com , matale@cea.lk

Vavuniya District Office- Mr. S.H.K. Sathischandra (Officer in Charge)



Address Central Environmental Authority, Vavunia District Office, 379, Horawpathana Road, Rambaikulam, Vavuniya, Sri Lanka
Telephone : 024-2220611
Fax : 024-2220611
Email : ceavdo@sltnet.lk, vavniya@cea.lk

Mannar District Office- Mrs. J. Mary Antarida (Officer in-Charge)



Address Central Environmental Authority, Mannar District Office, Old Library Building, Main Street, Mannar, Sri Lanka
Telephone : 023-2251606
Fax : 023-2251606
Email : ceamdo2014@gmail.com, mannar@cea.lk

Mullaitivu District Office - Mr. S.P. Thawakiruba (Officer in-Charge)



Address Central Environmental Authority, Mullaitivu District Office, Mullaithivu Muslim Vidyalaya Road, Vannankulam, Mullaithivu.
Telephone : 021-2290224
Fax :
Email : ceamldo@gmail.com , mullaithivu@cea.lk

Puttalam District Office - Mr. D.M.K. Dissanayaka (Deputy Director)

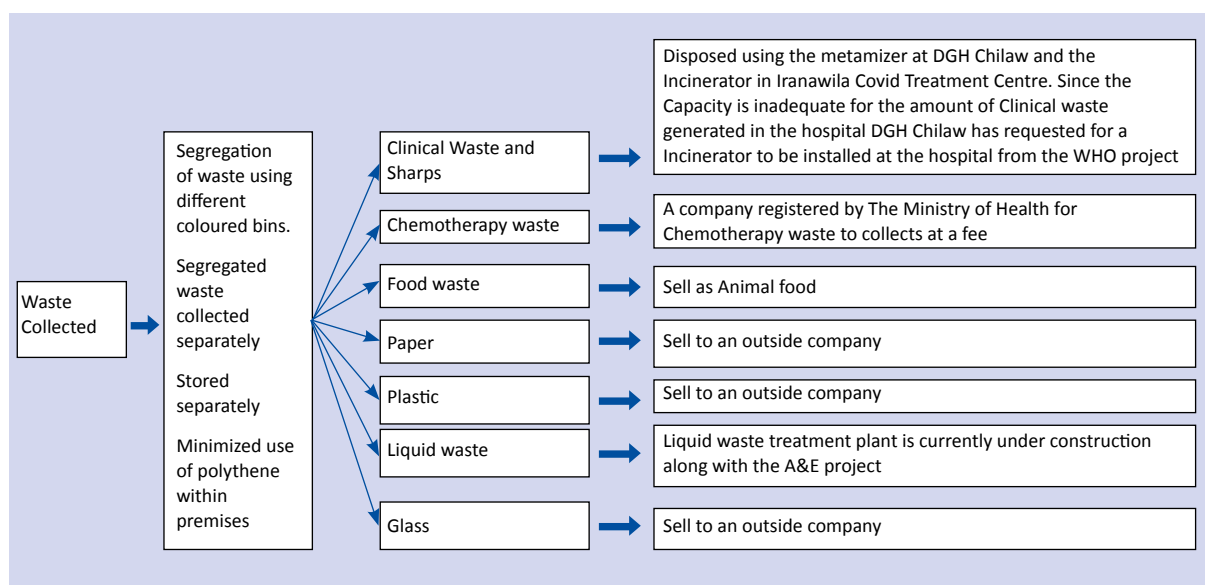


Address Central Environmental Authority, No.155/A, In front of Buddhist Center, Colombo Road, Puttalam
Telephone : 032-2267241
Fax :
Email : nwpcea2@gmail.com, puttalam@cea.lk

BEST PRACTICES

9.1 WASTE MANAGEMENT PROJECT – DISTRICT GENERAL HOSPITAL, CHILAW

Problem: Unsegregated waste, no proper mechanism for waste disposal, Waste collected in hospital premises, unpleasant smell, litigation issues from the Central Environmental Authority, complaints form the neighborhood



Proposed Solution:

Implementation of the Waste management Project :



9.2 Waste management system – Base Hospital Theldeniya

Waste management is a key activity in hospital management. As a hospital governed by the Provincial Council, there are many difficulties associated with limited resources. If institutions fail to manage hospital generated waste in a proper manner, the client-base will begin to erode.

First, a waste audit to identify the amount of waste generated within the hospital premises was conducted. This study identified 465g of food disposed by each patient every day as food waste. We discussed these findings at our quality circles and quality management unit meeting. The team came up with the following proposals

- Build a biogas unit for food waste management
- Limited polythene usage within hospital premises.
- Encourage staff members to use reusable lunch boxes
- Order food for only needy inward patient
- Patients were advised to keep only needy amount of food for their consumption
- Training of staff regarding waste segregation

With the above measures we were able to reduce hospital generated waste by a considerable amount. According to a kaizen proposal we removed all dustbins in patient areas in the ward and arranged a cart with two cleaning service members to collect food waste after each meal. Nursing officers were advised to identify and monitor the patients who were wasting food excessively. As a result, we even had to close down our biogas unit due to the lack of food waste. We arranged a farmer to collect the remaining small amount of food waste as animal feed.

We got another kaizen proposal to stop giving lunch in disposable packets for participants in our training programs. With the help of the hospital welfare society, we were able to buy a buffet set with utilities for our dining room in the main auditorium.

As a result of all of the above we became a base hospital which manages all hospital generated waste within the hospital in 2020. We won the environmental protection license (EPL) & schedule waste management license (SWML) for the year 2020 & won 2nd place in national productivity award



Polythene removed by security officer



Buffet lunch for staff



Food waste collected by cleaning service



Home gardening



Land scaping



Sewerage treatment plant



Incinerator

9.3 Waste management in Base Hospital -Thelippalai

Base Hospital -Thelippalai is a specialized hospital as there is a cancer treatment centre , mental healthcare centre, other specialities including 16 wards with a bed strength of 450 beds , 24 hours functioning OPD & 7 day functioning clinics. This hospital has emerged in the recent past as the third largest hospital in the Northern Province . This is the second largest hospital in Jaffna, second to TH Jaffna.

At this hospital , general waste used to be about 300kg per day. We reduced the general waste from that amount down to 100kg through proper segregation. Separating waste without proper buckets proved problematic. However, we are grateful to the Consultant Community Physician in charge of Environmental and Occupational Health of the Environmental and Occupational Health (E&OH) Directorate of the Ministry of Health for the assistance in providing waste buckets to segregate waste according to our requirement.

We are also grateful to her for the support and assistance given to educate our staff on proper waste management and waste segregation.

Accordingly, waste disposal takes place as follows

- General waste is sent to valley North Pradeshiya Sabha
- Infected waste is sent to our incinerator and metamizer
- Chemo waste generated at the cancer unit is sent to Sisili Samudra Company with the recommendations from E and OH Directorate of the Ministry of Health and approved from Provincial Director of Health Services – Northern Province.

IMAGES OF INNOVATIONS OF B.H. THELIPPALI







9.4 Healthcare waste management - Base Hospital Akkaraipattu



THE WAY FORWARD TO SUSTAINABLE CONTINUOUS IMPROVEMENT IN HEALTHCARE WASTE MANAGEMENT

BASE HOSPITAL AKKARAIPATTU

Introduction

Akkaraipattu Base Hospital (ABH) is a type A, 382 bedded hospital situated in Ampara District. ABH has fully functioning General Surgical Unit, Gynecology & obstetric Unit, Pediatric Unit, Medical Unit, Operation Theater, and CSSD along with other routine units. ABH is generating 300 kg of total waste per day including 100 kg of food waste, 100 kg of hazardous waste and 100 kg of other waste, averagely. In the middle of 2016, the Establishment of a 'Healthcare Waste Management System' was an important turning point in achieving all the success of ABH in Healthcare Waste Management. This system was created and led by the Healthcare Waste Management Unit, which was the key element of sustainable continuous improvement. In 2018, ABH won the Presidential Environmental BRONZE AWARD of Sri Lanka. In the area of sustainable continuous improvement ABH won the most precious AWARD in Sri Lanka – The Presidential Environmental 'GOLD AWARD' in 2019. We are proud to share our experiences on the way forward and are committed to sustainable continuous improvement in Healthcare Waste Management.



The steps we moved through

1. DISCUSSION AND DECISION MAKING TO IMPROVE THE HEALTHCARE WASTE MANAGEMENT SYSTEM OF ABH

Problems in the Healthcare Waste Management system of Akkaraipattu Base Hospital and possible long-term solutions for a sustainable system were discussed in a management committee meeting held in the middle of 2016.

2. INTERNAL APPOINTMENT OF A MEDICAL OFFICER FOR COVER UP DUTY AT THE NEWLY ESTABLISHED HEALTHCARE WASTE MANAGEMENT UNIT

A medical officer who worked in the surgical unit, with adequate experience in healthcare waste management was identified by the top management and appointed as a MO of a Healthcare waste management unit. with the willingness of his volunteer and dedicated service to this unit as a responsible MO towards the visionary development.

3. **SITUATION ANALYSIS** (within the hospital)

This was conducted with a volunteer group of staff called the “Green Guard Group” led by MO HWMU

4. **SITUATION ANALYSIS** (within the hospital)

A study visit to the selected hospitals and recycling centers was conducted by a volunteer group (Green Guard Group) of staff led by MO HWMU

5. **ESTABLISHMENT OF INDEPENDENTLY FUNCTIONING HWM UNIT UNDER THE MEDICAL SUPERINTENDENT**

An independently functioning healthcare waste management unit was established by DR.IM JAVAHIR, Medical Superintendent with the following workforce

- I. MO - 01 (cover-up duty)
- II. NO – 01 (cover-up duty)
- III. HA – 04 (full-time duty)

Duties and responsibilities were designed

6. **ESTABLISHMENT OF ENVIRONMENTAL POLICY** (Annexure - I)

7. **ESTABLISHMENT OF WASTE MANAGEMENT POLICY** (Annexure - II)

To systematize the rules and regulations of healthcare waste management, we created waste management legislation with the following scope.

- I. Handling the waste in a green manner to nature
- II. Nature-friendly disposal system
- III. Proactive reusing and recycling system.

8. **ESTABLISHMENT OF MODIFIED UNIQUE COLOUR CODE SYSTEM** (Picture -01)

The colour code system was in the process modified with the 16 categories of wastes by following up the standards of the world health organization as well as national policy.

9. **PLACEMENT OF LIMITED NUMBER OF WASTE BINES WERE REARRANGED ACCORDING TO NEW COLOUR CODE SYSTEM** (Picture 02)

To achieve proper segregation at the primary-waste generation point we rearranged bins according to the new colour code system.

10. **SUBDIVISION OF SEGREGATION UNDER TWO CATEGORIES**

I. **PRIMARY SEGREGATION (Non-hazardous + hazardous wastes)**

At the point of waste generation – from all units

II. **SECONDARY SEGREGATION (Non-hazardous waste only)** – (Picture – 02)

It is mandatory that, following internal transportation of waste from generation point to segregation point, located in the waste management unit in the backyard, janitorial staff will conduct the segregation. This is referred to as secondary segregation. The benefit of mandatory-secondary segregation is that we are able to get output of 100% pure waste materials which is in high demand at recycling centers.

11. ACCURATE SUSTAINABLE MONITORING AND AUDITING ONLINE SOFTWARE SYSTEM



To collect the data and analyzing it to make adjustments towards sustainable development, we initiated efforts to measure all waste. Data was entered into the Microsoft Excel sheet to collect the following information.

- I. Total amount of all categories of waste
- II. Total for each category
- III. Total wastes stored for selling to CEA registered recyclers and re-users
- IV. Total food waste for feeding to Biogas digester established within the hospital
- V. Total Food waste for the composting process
- VI. Total food waste for intuitional compo farm
- VII. Total food waste for selling to private farms to feeding to livestock
- VIII. Total infectious waste for the final disposal by incineration
- IX. Total infectious waste for the final disposal by MetaMizer
- X. Total waste for final disposal through municipal council for landfilling purpose

12. CONDUCTING MONTHLY REVIEW MEETING WITHIN THE HOSPITAL

To trigger the hospital staff to pay more attention in the waste management process and motivate the unit heads to advise and supervise patients and visitors during the inward period, we initiated a process to prepare statistical analysis and conduct monthly review meetings that looked at all data related to the waste management process in this hospital.

13. CONVERTING WASTE INTO MONEY

In keeping with the waste management processes of reuse and recycling and to prevent harm to the environment, Akkaraipattu base hospital looked for the CEA-registered government and private re-users and recyclers around the island and organized study visits to build a bilateral relationship.

Due to these efforts, the hospital was able to find places to sell properly segregated waste and learn methods to recycling this waste for composting.

However, the management of this hospital unanimously decided to deposit the entire income from selling the segregated waste to the government treasury.

The coconut shell waste generated from the hospital kitchen was used to prepare the boil water from the hot water catering system to fulfill the needs of the entire staff, patient and visitors.

14. INNOVATIONS IN HEALTHCARE WASTE MANAGEMENT UNIT

I. MANUAL BAILING MACHINE

As a remedial action, the staff of this unit discovered and erected a manual

baling machine by using steel-cut pieces to bail the waste such as paper, plastic, polythene and cardboard waste manually.

This innovative production has been effective in helping utilize the maximum space in storage in transporting the above categories of waste to the medical supply division of the health Ministry.



II. INSTITUTIONAL COMPO-FARM

As another innovative effort of this unit, we established a well-structured compo farm to grow cock, hens and ducks, including the river fish.

This compo farm was designed by the staff of the Healthcare Waste Management Unit. A fish tank with a middle bed of 1-meter height was built in the center of this farm. Composting tumbler bins were placed with the aim of feeding the maggots falling from the compost bin to the fish in the tank built around the bed.

TWO TYPES OF COMPOSTING METHOD

The degradable categories of waste such as food, vegetable and garden waste are diverted as an energetic compost by feeding to the

- a) Tumbler bin method
- b) Open windrow bed method

III. BIOGAS DIGESTER

Gas generated from this system by feeding kitchen waste and adequate cow dung, is supplied to the hospital kitchen. In addition, this process helps mitigate expenditure for gas purchased for cooking purposes.

15. MAINTAINING PROPER REGISTERS AND CHECKLISTS

Towards the sustainable development through the regular supervision and avoid the unnecessary interruption of the services of machinery and system, we used to maintain the following register and checklist.

The following register and checklist is used to ensure sustainable development without unnecessary interruption of services:

- I. Checklist for water treatment plant
 - a) Checklist for chlorination room
 - b) Checklist for Main collector unit
 - c) Checklist for Rotator
- II. Checklist for Incinerator
- III. Register for Incinerator fuel consumption
- IV. Checklist for MetaMizer
- V. Checklist for biogas digester

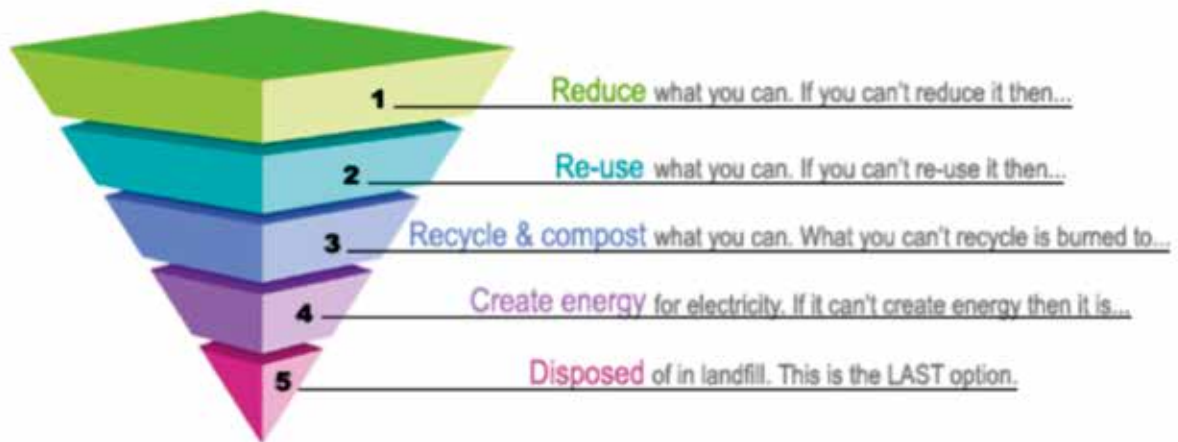
ANNEXURE – I ENVIRONMENTAL POLICY OF AKKARAIPATTU BASE HOSPITAL

Members of the Steering Committee of Healthcare Quality and Safety met on the 18th of January 2018 at the Auditorium of Akkaraipattu Base Hospital. In this meeting, The Environmental Policy of Akkaraipattu Base Hospital was reviewed and updated.

Medical Superintendent, Staff and the Hospital Development Committee are committed to maintaining a patient-friendly sustainable green environment by signing this document by the Medical Superintendent of this hospital

1. Akkaraipattu Base Hospital, as a healthcare institution in the coastal area of Ampara District, has the responsibility to comply with relevant environmental legislation locally, nationally and internationally
2. Akkaraipattu Base Hospital is strongly committed to reducing waste production. We are also committed to efficient disposal of waste through standard segregation procedures aimed at minimizing the impact to the environment in keeping with national and international standards
3. All guidelines and instructions are formulated and executed to keep the hospital environment clean. This contributes to the well-being of the staff, patients and visitors (Customer)
4. All Hospital buildings, present and future, will adhere to the green hospital concept, reducing the deleterious impacts on the environment
5. To reduce the effects on the environment, all hospital procurements are environmentally friendly
6. The administration and staff of Akkaraipattu Base Hospital make every effort to ensure efficient use of water and energy and to increase the percentage of the use of renewable energy annually
7. Akkaraipattu Base Hospital organizes continuous training programs to educate patients, visitors, the public and employees on environmental issues and the environmental effects of human behaviours
8. The administration and staff of Akkaraipattu Base Hospital continuously educate the community on the importance of complying with relevant environmental legislation locally and nationally.

ANNEXURE – II Healthcare Waste Management Policy of Akkaraipattu Base Hospital.



1. WASTE - REDUCTION:

Akkaraipattu Base Hospital developed the following policies in order to reduce generation of waste.

- I. Green purchasing policy
- II. Green hospital concept
- III. Plastic/polythene ban policy

2. WASTE - REUSE:

Akkaraipattu Base Hospital is committed to promoting the reuse of waste in an eco-friendly way only.

Infectious waste can be reused after proper disinfection only.

3. WASTE – RECYCLE:

Maximize the recycle

Minimize the dumping

4. FOOD WASTE UTILIZATION:

- No food waste can be given for dumping purposes
- Food waste which is generated by ABH shall be utilized in the following way/s
 - a) To be used for Composting
 - b) To be feed live stokes
 - c) To be used for production of biogas

5. DISPOSAL OF INFECTIOUS WASTE:

All infectious waste shall be disposed of using one of the following methods

- I. By incinerator with the following facilities
 - Dual chamber as recommended by WHO
 - 800°C to 1200 °C of temperature as recommended by WHO
 - Height of chimney as recommended by CEA (30 Feet)
 - Ass disposal into the concrete pit
- II. By MetaMizer provided by MoH
- III. By placenta pit

PICTURES OF HEALTHCARE WASTE MANAGEMENT UNIT - ABH



2016 - Before starting the separate Healthcare Waste Management Unit



2018 - One year after Establishment of HWMU



2018 - Two years after Establishment of HWMU

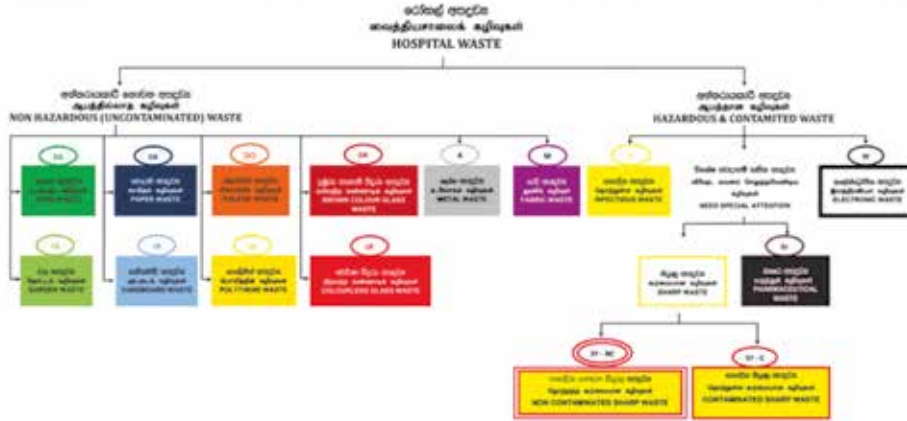


2019 - Three years after Establishment of HWMU

ESTABLISHMENT OF MODIFIED UNIQUE COLOUR CODE SYSTEM



AKKARAIPATTU BASE HOSPITAL கொடும்பட்டி அருகிலான சுகாதாரப் பகுதியில் உள்ள மருத்துவ கழிவுகளை மேலாண்மை செய்வதற்கான நிறக் குறியீடு COLOUR CODE SYSTEM OF HEALTHCARE WASTE MANAGEMENT



"Zero Waste! Zero Harm to the Nature!"

PLACEMENT OF LIMITED NUMBER OF WASTE BINES WERE REARRANGED ACCORDING TO NEW COLOR CODE SYSTEM



PRIMARY SEGREGATION AT UNIT LEVEL



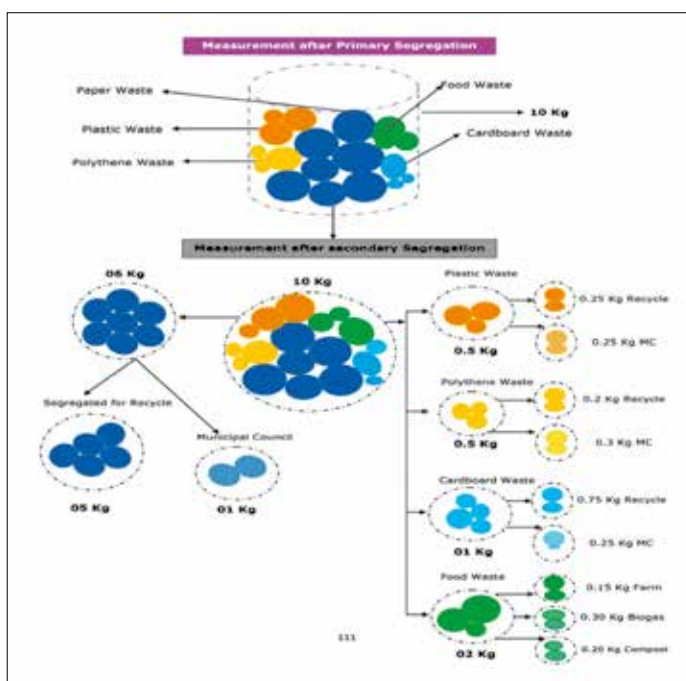
PICTURES OF TEMPORARY STORAGE AREA (AFTER SECONDARY SEGREGATION)



PICTURES - NON-HAZARDOUS WASTE STORAGE



CONCEPT OF MONITORING SYSTEM



MANUAL BAILING MACHINE



COMPO-FARM



TWO TYPES OF COMPOSTING METHOD



Open-Cage Method



Tumbler Method

BIOGAS DIGESTER



METAMIZER



“STOP POLYTHENE” - SOME CSR PROJECTS



பொலித்தீன் உணவுத் தாள் (Lunchsheet) பாவனை ஆரோக்கியமற்றது
 சாத்தியமான சுகாதார சூழலில் அலிவாஸ் சுகாதார சேவைகளை
**USAGE OF POLYTHENE FOOD WRAPPERS
 IS NOT HEALTHY**





பிளாஸ்டிக் பை பாவனை கொடிய நோய்களை ஏற்படுத்தும்
 துணிப் பைகளை பயன் படுத்துவோம். நோயின்றி வாழுவோம்
 உயக்க உயக்க சித்திரம் சித்திரம், சாத்தியமான சுகாதார
 சூழலில் அலிவாஸ் சுகாதார சேவைகளை
**USAGE OF PLASTIC BAGS CAUSES DANGEROUS DISEASES
 USE FABRIC BAGS! LIVE DISEASE FREE!!**






‘துணிப்பையை எடுத்துச் செல்வோம் பொலித்தீன் பைக்கு மறுப்புச் சொல்வோம்’
மாபெரும் விழிப்புணர்வு நடை பவனி
 வேண்டாம் ! வேண்டாம் ! பிளாஸ்டிக் பை வேண்டாம் !
 நோய்களை ஏற்படும் பிளாஸ்டிக் பை வேண்டாம் !

“உருவம் உருவம் சித்திரம் சித்திரம், சாத்தியமான சுகாதார சூழலில் அலிவாஸ் சுகாதார சேவைகளை”
உருவம் உருவம் சித்திரம் சித்திரம்
 உருவம் உருவம் சித்திரம் சித்திரம், சாத்தியமான சுகாதார சூழலில் அலிவாஸ் சுகாதார சேவைகளை !
Let's carry fabric bags. Say 'NO' to polythene bags.
“GRAND AWARENESS WALK”
 We do not want! We do not want!
 We do not want polythene bags which offer diseases.








CONTINUOUS IMPROVEMENT OF OPEN-CAGE COMPOSTING



2016



2017



2018

CONTINUOUS IMPROVEMENT OF COMPOST-FILTERING



2016



2017



2018-2019



2020

CONTINUOUS IMPROVEMENT OF SEGREGATION PROCESS



2016



2016



2017



2017



2018



2018

CONTINUOUS IMPROVEMENT OF SECONDARY SEGREGATION-INFRASTRUCTURE



2015



2015



2016-2017



2016-2017



2018



2018



2018



2018

CONTINUOUS IMPROVEMENT IN STORAGE SYSTEM



Before 2016



Before 2016



Before 2016



Before 2016



Before 2016



On Midway of construction 2017



Before 2017



After 2017



2019



2019



2019



2019

CONTINUOUS IMPROVEMENT IN PACKING OF WASTE



Before 2017



Before 2017



Before 2017



Middle of 2017



2018



2018

IMPROVEMENT OF CARDBOARD WASTE PACKING



2016



2017



2017

IMPROVEMENT OF TUMBLER METHOD COMPOSTING (THE WAY MAKE FAST COMPOST)



2016



2018



2018

PICTURES - REUSE OF WASTES BY UNITS



Reuse of PVC Pipe





2017 - MONITORING AREA IN HEALTHCARE WASTE MANAGEMENT UNIT



ABH – LAND SCAPING (2018 – 2019)



**IT WAS ENDED WITH WINNING
FIRST PLACE OF GOLD PRESIDENTIAL ENVIRONMENTAL AWARD
IN 2019**



NOW WE ARE ON THE TRACK FOR SUSTAINABILITY

9.5 BEST PRACTICES IN WASTE MANAGEMENT - ASHRAFF MEMORIAL HOSPITAL KALMUNAI.

Ashraff Memorial Hospital is one of the major hospitals in the coastal region of Ampara District. The Hospital is administered by the Department of Health Services under the Ministry of Health.

We demonstrate our best practices & commitment to corporate social responsibility (CSR) through top-level involvement (medical superintendent and medical officers), policy investments (RO systems, water treatment plant, biomass project, rainwater harvesting etc.), programs (Cleaner Production Assessment, water audit, energy audit), signatories to voluntary standards (ISO 14064-1 certification), principles and reporting.

Waste management is optimally managed by the team involving the Planning Unit, Public Health Unit & Quality management unit under the guidance and supervision of Dr. ALF. Rahman, Medical Superintendent

WASTE MANAGEMENT APPROACH

1. Method of separation at source

- a. Colour coded bins for waste segregation
 1. General waste
 2. Infectious waste
 3. Sharp bin
 4. Food waste
 5. Paper & hard Board
 6. Glass & Metals
 7. Plastic
 8. Liquid waste (Spillage kit)
- b. Colour bags for separate waste inside the bins
- c. The practice of identification code (unit / ward)
- d. Instruction to clients on admission regarding waste segregation by link nurses
- e. Supervision by PHI, Link nurses, IC-NO and others
- f. Training on waste segregation to all staff
- g. Displaying of posters in all visible places

2. Method of Collection Transport & storage

- a. Separate trained janitors for hazardous & Non-hazardous waste
- b. Pre-allocated time table for collection
- c. Collecting in coloure-coded carts
- d. Root map for transport
- e. Closed transport system (fully covered)
- f. Personal protective equipment in practice for collecting waste
- g. Special training for collecting to employees
- h. Special vaccination for waste handling workers (Eg: Hep – B vaccine, Covi Shield vaccine etc.)
- i. Appointment of Trained Waste store management employee

- j. Separate Building unit for storage facilities
- k. Computerizing the data entry system
- l. Rechecking desk at storage site
- m. Re-segregation of recyclable waste – Paper, Glass, Hardboard, Metal, Rubber

3. Treatment

- a. Biogas plant – food waste
- b. Compost Production - organic waste
- c. Incineration – infectious waste
- d. Metamizer - infectious waste
- e. Sewerage treatment plant – wastewater
- f. Sale - segregated waste to the registered recyclers
- g. Biomass water heater - renewable energy sources (coconut shell)

4. Reuse of End products

- a. Biogas for cooking
- b. Biogas plant residues as fertilizer
- c. Compost from compost plant for fertilizing the plants
- d. Water from Sewage plant for watering to garden
- e. End products from metamizer used as brick, floor tile, flower pots & landfilling

5. Auditing & Monitoring mechanism of waste management process

- a. Daily checking of waste by PHI, NO, Link nurses in the units
- b. Electronic system for information of all waste details to MO-Public health
- c. Computerized waste surveillance system and analysis of all types of waste
- d. Appointment of immediate & intermediate supervisor to supervise the waste collection
- e. Appointment of Environmental Audit team
- f. Conducting Monthly environmental review meeting

BENCHMARK PRACTICES

1. Water Conservation

- a. Rainwater harvesting system
- b. Water recirculation system at CSSD
- c. Water reuse system at dialysis unit (RO plant rejected water)
- d. AC Condensate water catchment system
- e. Water purification filter in the water pond
- f. Wastewater Treatment plant
- g. Conduct water audit

2. Solid Waste Management

- a. 5RWaste Management processing
- b. Maintain waste management unit and computerization of waste management unit at collecting center
- c. Follow Zero waste management policy

- d. Proper waste segregation strategies
- e. Installation of metamizer for infectious & hazardous waste
- f. Waste transport process conducted at low-cost method + Waste materials used for innovations
- g. Conduct walkthrough RECP assessment, safety Audit, material audit / chemical audit, and environmental risk assessment

3. Hazardous Waste Management

- a. Minimizing and adequately managing waste and hazardous chemicals
- b. Regular drug review to minimize chemical waste
- c. Regular lab review to minimize liquid & chemical waste
- d. Convert all x-ray film into a software CR system (In CDs) and on-line service (no more processing for X-ray film except for orthopedic and OPD and no waste from the darkroom)
- e. Dental RVG x-ray replacing routine x-ray film
- f. Replacing AMALGAM with COMPOSITE for filling teeth at dental unit
- g. Replacement of Blood Pressure monitors (BP Apparatus) which are with mercury and all BP apparatus are replaced with analog type BP apparatus which is mercury free.
- h. Replacing all mercuric thermometer with digital thermometers
- i. Replace the use of Roneo machine with modern duplicator to reduce lead poisoning
- j. Introduction of biodegradable polythene/ plastic which decays naturally to carbon dioxide (CO₂) and water/ promotes the usage of alternative biodegradable bags.

4. Energy Efficiency Mechanism

- a. Use renewable energy sources (Solar system, biomass)
- b. Energy Saving – generator operation flex alert system uses to save energy consumption during generator usage
- c. Use biomass-fired hot water system
- d. Conduct energy audit (2019)

5. Renewable Resource Usage

- a. Biomass fired water heater (coconut shell use as raw material)
- b. The biomass water heating system has produced 69,526 & 82,435 litres of hot water in 2018 and 2019 years respectively. It has produced an average of 190 litres per day from an average of 9 kg of coconut shells.
- c. Solar system - 45.42% has been produced using renewable energy sources
- d. Biogas plant for the production of gas from biodegradable waste.
- e. Biogas plants annually produced an average of 49.7 GJ of energy from 987.5 kg of average biogas.
- f. Following green procurement guidelines during purchasing goods
- g. 5RWaste Management processing

6. Water - reused or recycled

- a. Water from laundry and sewerage treatment plant for gardening, washing drains, ponds

- b. Water running through dialysis machines, for washing
- c. Treated wastewater from CSSD (central sterilization supply division) for gardening- 2000L untreated water for 24 hrs.
- d. Water from RO (Reverse Osmosis) plant
- e. Use water collected from Air conditioners for gardening
 - i. + 18,000 BTU- 2l per hour
 - ii. + 24,000 BTU- 3.5 l per hour
- f. Rain Water Harvesting System-
Two tanks with a capacity of 3000 L and 50000 L for rainwater harvesting are installed at the hospital premises for the purposes of washing vehicles, & Agriculture purposes

7. Training and awareness for employees

- a. Training programme on solid waste manage
- b. Training programme on clean & friendly environment
- c. Training programme on reduction of infection
- d. Training programme on Income generation from the waste (recycle, biogas generation used for kitchen compost fertilizer used for gardening)
- e. Training programme on green productivity for the Improvement of Green productivity culture
- f. Training programme on Pleasurable environment
- g. Training programme on Energy saving
- h. Training programme on Water saving

8. Training and awareness for public

- a. Training programme on Energy saving
- b. Training programme on Water saving

STRATEGIES FOR MINIMIZATION

1. Solid Waste Generation

- a. Introducing an online x- ray image system instead of routine x-ray film.
- b. Declared as polythene free zone since 2016
- c. Polythene bags & plastic containers prevented by promoting hospital kitchen meals among staff & clients
- d. Replacing utensils with biodegradable materials
- e. Reusable utensils instead of plastic items for kitchen use & staff
- f. Replacement of plastic containers of the food supply by stainless steel utensils
- g. Computerized solid waste assessment system for data collection, analysis & monitoring
- h. Repair and reuse of damaged articles
- i. Prohibition of plastic water bottles within hospital premises
- j. Recycling of papers, Hard Boards, Biodegradable waste, Non-Biodegradable waste, plastics, Metals and Rubber
- k. Usage of biogas by-products (Fertilizer)to maintain the greeneries in the hospital environment

- l. Use of metamizer for selected hazardous wastes
- m. Reuse of treated wastewater from sewage treatment plant
- n. Produce compost from garden waste and use it fertilizing the plants
- o. End products from metamizer are used for producing brick, floor tile and flower pots
- p. Invented a Waste management equipment - Paper baler
- q. Reuse of,
 - + used envelopes for cash distribution - 50%
 - + used envelopes for posting letters - 50%
 - + receiving fax papers for drafting letters - 75%
 - + single side printed papers for printing letters -100%
 - + glove covers in making gauze /cotton wool packets in CSSD 100%
 - + used sample tubes in laboratory -100%
 - + used sample glass bottles after autoclaving - 100%

2. Wastewater Generation

- a. Reuse of treated black water from the treatment plant for gardening
- b. Reuse of treated greywater from laundry for gardening
- c. Use of water from air conditioners, sterilizer, reverse osmosis plant, treated water from sewerage plant
- d. Monthly analysis of water consumption of each unit by energy manager
- e. Instruction near all water taps to save water
- f. Awareness to all inward patients through the health education on the use of water
- g. Awareness through the announcement during visiting hours on the water-saving
- h. Recycling technology at water pond
- i. Displaying instruction near all water taps & points
- j. Giving handbills at the time of admission to patients regarding water saving
- k. Displaying posters & billboards
- l. Food operable water taps
- m. System for reporting & correction of all water leakages with immediate effect (24x7)
- n. Floating switch at all wells & tanks
- o. The double flash system at commode cistern
- p. Floating valve at water reservoir tank
- q. Mechanical Sprinklers to garden
- r. Using water collected from Air conditioners for gardening
- s. Using wastewater from the treatment plant for gardening
- t. 21 treating wastewater from CSSD (central sterilization supply division) and use for gardening- 2000L untreated water for 24 hours

