

E1332

GUIDELINE

FOR WASTE HANDLING AND DISPOSAL IN HEALTH FACILITIES



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CONTENT

	Page
1. Introduction	1
2. Objectives for developing the guideline	2
3. Definitions	2
4. Major types wastes disposed from health facilities	3
5. Units of health facilities that generate infectious and other wastes	4
6. Basic points to be considered before storage of infectious waste.....	5
7. Methods of waste storage	5
7.1 Identifying by kind wastes which discharged from different units of health facilities and storing	5
7.2 Black plastic bag	6
7.3 Yellow plastic bag	6
7.4 Red plastic bag	7
8. Handling	8
9. Need for a method for treatment of solid infectious waste	9
9.1 Need for disinfection infectious waste before disposal	9
9.2 Conditions which limit selection and establishing waste disinfection method	9
9.3 Methods of disinfecting waste	
9.3.1 Chemical disinfection	10
9.3.2 Sterilization by steam	11
9.3.3 Microwave sterilization	11
9.3.4 Sterilization by Radiation	12
9.3.5 Incineration	12
9.3.6 Mechanical treatment method	13
10. Method of liquid waste treatment	
10.1 For small health Facilities	14

10.2 For large health facilities	14
10.2.1 Liquid waste clarification and treatment method ...	14
10.2.2 Disposal of large solid wastes	15
10.2.3 By floating mechanical aerator	15
10.2.4 Sedimentation tank	15
10.2.5 Sludge trickling and drying bed	16
10.2.6 Chemical treatment in chlorination tank	16
10.2.7 Waste effluent drain	16
11. Disposal system for other hazardous wastes that need special handling care	16
11.1 Drugs that can cause serious damage to human tissues.....	16
11.2 Radioactive material	16
11.3 Disposal of high pressure contained material	17
12. Solid waste disposal method	
12.1 For small health facility	18
12.1.1 Incineration	18
12.1.2 Disposal of waste by burring inside the health facility compound	18
13. Maintenance of hygiene and sanitary conditions of medical supplies and equipment, clothes and rooms	19
14. References	20
Annex 1 Categories of health institutions waste	21
Annex 2 Chemical disinfection	25
Annex 3 Incinerator	26
Annex 4 Small incinerator	27
Annex 5 Pit for disposal of small quantities of waste	28

1. INTRODUCTION

As the result of advancement of the knowledge of prevention and control of communicable diseases, better curing of the sick, man's average life expectancy is increasing from time to time. This is the effect mainly of advancement of science, technology and modern treatment systems.

Although the aim of establishing examination and medical service delivery system is to provide medical care, yet if these facilities are not up to the desired standard, maintained clean and safe they could pose high risk to the health care workers, patients, visitors and to the surrounding community.

For example at present it has been identified in Canada, Japan and North America that infectious wastes discharged from hospitals are becoming great concern as source of HIV and Hepatitis B infections for health workers (doctors) nurses, health assistants, custodial and maintenance workers) who are directly involved in handling infectious wastes. During the last ten years medical wastes disposed from health institutions have become world wide political, social and economic issues.

Since the 1960s the quantity of wastes disposed from health institutions have increased tremendously.

Because of the growth and wide distribution of plastic technology, disposables (use and throw) medical supplies such as syringes, needles, plastic gloves etc the wastes disposed from research and health facilities, research laboratories etc. have increased both in quality and quantity.

According to studies done in some countries it is known that a patient on average contributes about 6.5 to 9 pounds (LB) of waste per day. Looking at Ethiopia's situation, according to a study done in 1985 E.C by the Department of Hygiene and Environmental Health (MOH), in 46 hospitals and 76 health centers, up to 178,000 pounds (Lb) of waste generated and disposed per day. Similarly a feasibility study carried out in 16 health centers and 48 clinics revealed that most of the health facilities had no satisfactory liquid and solid wastes disposed systems.

Furthermore, the situation became worse because most of the health facilities are old and did not have adequate budget nor functioning technologic etc.

Therefore, giving due attention to the problems and moving towards action is timely question of the day.

2. OBJECTIVES FOR THE DEVELOPMENT OF THE GUIDELINE

- 2.1 To enable health professionals to protect themselves against health hazards which might be encountered as result of their occupation.
- 2.2 To create awareness among workers in health facilities about the importance of safe disposal of wastes generated from health facilities according to this guideline.
- 2.3 To prevent and control environmental pollution by wastes carelessly disposed from health facilities.
- 2.4 To provide technical support to health professionals and environmental health workers engaged in day to day health inspection and control activities.
- 2.5 Comparing to the present faulty and indiscriminate infectious waste disposal pattern, this guideline may seem to be unrealistic. However, it would indicate the future direction to remedy. The situation and would lead towards establishing infectious and other wastes disposal system that would meet heath safety and hygienic standard.

3. DEFINITIONS

3.1 HEALTH FACILITIES (INSTITUTIONS)

Places in which examination and treatment, medical investigation, microbiological, chemical, toxicological, laboratory examination etc are carried out.

3.2 INFECTIOUS AGENT

An **organism** (usually microscopic). Such as bacteria, protozoa, fungus, rickettsia) virus helminthes that is capable of causing infection or **infectious** diseases in man.

3.3 DISINFECTION

Destroying and eliminating infectious agent through chemical or physical processes.

4. SOME MAJOR TYPES OF WASTES DISPOSED FROM HEALTH FACILITIES

4.1 MEDICAL WASTE

Any waste discharged from health facilities during work process, excluding non hazardous waste.

4.2 NON-HAZARDOUS WASTES

Wastes which are ^{not} dangerous to health such as produced from food preparation (kitchen waste or garbage) offices, bath room etc.

4.3 PATHOLOGICAL WASTE

Wastes from blood and blood products, surgical remains of body parts, tissues, dead animals etc.

4.4 RADIOACTIVE WASTE

Liquid or solid wastes disposed from research laboratories nuclear treatment unit etc.

Containers of radioactive products, needles, syringes, gloves etc used in radioactive treatment processes.

4.5 CHEMICAL WASTE

Wastes resulting after usage such as antiseptic, disinfectants, chemicals of acid and alkaline nature, inflammables, corrosives, reactive etc which are capable of causing danger to the skin, or reproductive organ.

4.6 INFECTIOUS OR BIOLOGICAL WASTE

Type of waste that contain viruses, bacteria, intestinal worms, etc mostly disposed from research laboratory, surgical unit, wound treatment room, delivery room etc.

4.7 SHARPS

includes stitches, sucher, needle, syringe needle, broken bottle and the like.

4.8 PHARMACEUTICAL WASTE

Includes discarded or expired medicines, supplies, pharmaceutical contaminated by microorganisms.

4.9 PRESSURIZED CONTAINERS

Containers of gases under pressure such as oxygen cylinder etc.

5. HEALTH FACILITIES, THEIR UNITS, AND RESEARCH INSTITUTES WHICH GENERATE AND DISPOSED INFECTIOUS AND OTHER WASTE DURING THEIR WORK PROCESSES

5.1 HOSPITALS, HEALTH CENTERS AND CLINICS

5.1.1 Surgical department

5.1.2 Internal medical department

5.1.3 Obstetrics department

5.1.4 Genecology department

5.1.5 Microbiology laboratory

5.1.6 Nuclear medicine unit

5.1.7 Emergency department

5.1.8 Isolation and recovery unit

5.1.9 Orthopedic department

5.1.10 Pediatric department

5.1.11 Morgue

5.2 Research institutes

5.2.1 Microbiological laboratory

5.2.2 Toxicological laboratory

5.2.3 Chemical laboratory

5.3 ANIMAL EXAMINATION AND TREATMENT INSTITUTION

5.4 PHARMACEUTICAL FACTORIES

6. BASIC PRECAUTIONARY MEASURES TO BE CONSIDERED BEFORE STORAGE OF INFECTIOUS WASTE

6.1 Packaging condition of waste

6.2 Temperature level of the storage place and storage time.

During storage it is preferable that the storage time be four days at below 0 to 10 degree centigrade. This is because higher temperature level increases bacterial multiplication rate thus accelerated decomposition followed by emission of foul smell.

6.3 Storage location and adequacy of the design

6.4 Suitability of the storage place for making it free from microorganisms, and conduciveness of pickup site

6.5 Ensuring that storage place is inaccessible to insects and rodents

6.6 Ascertaining that the containers of waste, cold storage place etc. have clearly visible International Biohazard label or mark.

7. WASTE STORAGE

One of the first job should be proper collection and storage of wastes generated during work processes. The wastes collected from different work places or department must be segregated or sorted out and must be stored properly arranged in temporary container or storage tanks.

The job of proper collection and storage of wastes produced from different work units require the director indirect participation of most of the doctors, nurses, laboratory technicians, health assistants, custodial workers etc. IF these professionals participate in proper management of waste disposal, then:

1. It is possible to maintain cleanliness of the inside and outside of the health facility.
2. It is possible to follow up the health status of the workers engaged in moving waste from place to place.
3. The cost of treating the waste can be minimized.

7.1.7 WASTE SEGREGATION AND STORAGE METHOD

7.1.1 Then wastes discharged from different units must be segregated and placed in leakage proof, non corrosive iron sheet barrel or plastic containers. This alone is not adequate, hence, the inside of the container should have plastic sheet, cover in order to avoid possibility of leakage.

For example wastes collected from administration, doctors or nurses offices should not be stored with wastes disposed from the delivery and operation rooms. In addition infectious waste should not be put in any container but stored in leakage proof strong plastic bag or plastic jar properly sealed or tied up.

7.1.2 Workers directly involved in handling wastes should identify each kind of waste carefully and put in easily identifiable different colour plastic bag or container. This will enable to collect and dispose hazardous wastes. This can be done as follow:

7.2 BLACK PLASTIC

This bag must be used to store wastes discharged from food preparation area and officers.

7.3 YELLOW PLASTIC BAG

The yellow plastic bag should be used to store waste discharged from:

- Surgical unit
- Internal medical unit
- Delivery room

- Isolation unit
- Recovery unit
- Infectious wastes produced from examination and treatment unit etc.
- Instruments like sharps must be stored in bags not likely to be torn or pierced.

For example, used blade, stitching needle, syringe etc. are contaminated, hence if one carelessly or accidentally cut or pricked by these sharps, it will expose one to HIV and other infections.

7.4 RED PLASTIC BAG

Chemicals and the related medicines, should be stored in red plastic bag properly tied or sealed.

- The plastic bag should be stored in leakage proof and non corrosive plastic or iron sheet barrel.
- The storage capacity of the barrel preferably be of 100kg for solid waste and 50 liter for liquid waste.
- Each unit should have (as needed) of similar kind and capacity waste collection barrel.
- All units, except the isolation ward, should have place for placing non-dangerous items.
- For tying or sealing it is not necessary to wait until the bag is full to the brim.
- Even though it is necessary to treat-disinfect infectious as soon as possible, yet if it is not possible for various reasons the follow steps should be taken:
 1. Protect the waste from wind and rain.
 2. First dispose the waste which can decompose quickly

3. If the waste storage place is outside the house, it should be placed in a reliable and secure container.

4. The waste should be protected from access to flies, rodents and similarly from scavengers.

8. HANDLING

- The plastic containers in operation room and recovery ward should be emptied at least to twice daily in to the main collection tank and new clean plastic bag be replaced immediately.
- The waste should be handled only by the person who is assigned for the job.
- In case the waste is accidentally scattered spilled in the rooms or in other places, it should be cleaned immediately and carefully be disinfected by disinfectant meant for the purpose.
- It is possible to dispose non-hazardous waste through the municipal management system or to transport by vehicle to the final disposable site.
- In order to safeguard the health, and to avoid accident such as cuts by sharps etc the porter must be provided with acceptable work clothes, gloves, protective eye glasses, muffles for mouth and nose and work shoes.
- It is necessary to assure that reusable or multiple use examination and treatment supplies and other items should be properly cleaned and sterilized.
- For transporting the waste container or barrel from place to place there must be trolleys or carts. The trolleys should be carefully handled to avoid tipping off the content.
- All wastes produced from health facilities, except those from offices, kitchen, compound cleaning, should be transported by specially designed closed containers.

9. NEED FOR TREATING SOLD INFECTIOUS WASTE

9.1 Wastes generated during work processes from health facilities must be made free from microbial contamination before transporting to the final disposal site for the following reasons:

1. Treating the waste by chemicals, holding under high temperature heat, exposing to radiation energy or burning the waste can destroy microorganism in the waste.
Thus, the risk to human health and environment pollution can be prevented.
2. Breaking into smaller pieces or shredding the waste can reduce the bulk volume of the waste
3. Body parts removed during surgical operation should be shredded before disposal to avoid aesthetically unacceptable contrition.
4. To avoid problem which might arise from disposable supplies such as needles, syringe etc after they have been used

9.2 WASTE TREATMENT FACILITY

Selecting and setting up processes of waste treatment facility depends on the following factors:

1. Type and quantity of infectious waste to be disposed.
2. Availability of waste treatment technology nearby or around the surrounding area.
3. Having financial capability to procure necessary equipment.
4. Availability of professional to operate and maintain the equipment.
5. The equipment and work process should satisfy the requirement of the area.

6. Opinions and goodwill of the community where the waste treatment activities is to be a carried out.

9.3 METHODS OF DISINFECTING WASTE

Before final disposal the waste must be disinfected in order to avoid health risk to man and environment pollution.

The infectious waste collected from different activity units must be treated before hand to prevent spread of microorganisms in the waste by applying chemical treatment, radiation energy or other similar treatment method.

Provided the treatment is reliable, the treated waste can be disposed with municipal disposal system, if no such system the waste can be transported by sucking truck to the selected final disposal site.

However, discarded materials such as syringe, needle etc must be disposed carefully in case they might fall in the hands of scavengers to be sold for reuse.

9.3.1. Chemical disinfection

Chemical treatment is a process of destroying microorganisms in the waste by using liquid chemical disinfectants.

To disinfect using chemicals:

- Select appropriate chemical for the job.
- Determine the concentration level of the chemical selected.
- Determine the contact time of the chemical with the waste
- Reduce the bulk volume of solid waste by grinding, shredding or similar method.

This will help to avoid reuse of such material at syringes, needles etc.

- Some strains of pathogens may be resistant to chemicals, hence medical wastes treated by chemicals should be considered as hazardous to health and be handled carefully.

Therefore, it is necessary to make bacteriological test on the waste treated to ensure its safety.

Method of disposing the chemical used for the treatment should be planned because the chemical mixed with the liquid waste could create health hazard (see Annex 2)

9.3.2. Thermal sterilization

Thermal sterilization is a method of treating waste by applying steam at 160 degree centigrade temperature level in autoclave

- Autoclave is used for sterilizing surgical and bacteriological equipment and supply.

In order to ensure the effective functioning of the autoclave:

- Large and solid material like syringes, needles etc. should be reduced to small size by breaking and compacting.
- Capable person be assigned for operation and maintenance of autoclave.
- The amount of waste produced and the capacity of the autoclave must compatible.

9.3.3. Sterilization by microwave

This is a disinfecting method of waste produced during work processes by burning in microwave oven.

- Small size of microwave oven can be applied for relatively small amount of waste discharged from laboratory, while larger quantity of waste produced from health facility require larger size microwave oven.

- Large and solid waste can be reduced to smaller size by shredding the waste.
- The waste must be held in the microwave oven for at least 30 minutes at 100 degree centigrade.
- The disinfected waste bailed out from the microwave oven must be disposed carefully.

9.3.4. Electro magnetic radiation

This is a method of destroying microorganism in the waste by applying gamma ray or electron beam.

- Inorder to destroy effectively the microorganisms in the wastes large and sold waste have to be reduced to smaller size by grinding and compacting.
- Using electron magnetic beam or gamma ray for treatment method is relatively more effective than other methods, however the cost is too high.
- The waste after disinfection must be carefully transported and buried.

9.3.5. Incineration

This is a method of destroying microorganisms by incinerating or burning the waste in a high temperature heat.

- If the health facility does not have its own incinerator, it is necessary to transport the waste to the nearby unit which has incinerator and do the job carefully.
- If the facility has its own incinerator, ensure that the combustion of the waste in the incinerator takes place at 1000 degree centigrade heat inorder to reduce the smoke and foul smell emitted.

- The incinerator must be designed and constructed with scrubber or cyclone device which serves to control floc gas emitted during combustion process.

The purpose of the scrubber or cyclone is to filter out the floc gas emitted into the air.

Nowadays simple type of incinerators are designed and constructed at low cost. However, since these incinerators function at relatively low temperature (heat), they emit smoke and foul smell, thus contribute to environment.

When building small scale incinerator, it is necessary to take into consideration the height of the chimney and wind direction for the purpose of reducing smoke and foul smell emission.

In places where high combustion calorific value, such as paper and the like is scarce, it is possible to use kerosene oil etc. to facilitate combustion process.

- However, using radioactive material, pressurized gas in containers etc. should not be used to start combustion.
- For small health facility a 200 litter capacity iron barrel or similar design can be set up and used (Annex 4)
- Ashes drawn from the incinerator can be disposed in places designated by the municipal or town administration.

9.3.6. Mechanical treatment

This method involves the process of such as cutting or slicing to pieces the removed body parts into smaller size, compressing discarded syringes etc and then disinfecting by applying steam or disinfecting chemicals. Care should be taken not to spill blood or body fluid while cutting or shredding process in order to avoid contaminating the workers or the surrounding. Special care must be taken also while

shredding such things as syringes and needles because the bacteria-load fluid content can spread in aerosol form and contaminate the air.

10. TREATMENT OF FLUID WASTE

10.1 FOR SMALL HEALTH FACILITIES WASTE

Infectious waste disposed from various treatment units are:

- Blood and blood product
- Biological culture
- Urine and stool
- Sputum and nasal discharge
- Waste water from washing floors, walls and latrines.

The infectious waste from the above sources should be disinfected by applying chlorine solution, phenol, creosol, lysol etc disinfectants and then must be discharged into septic tank. The amount of disinfectant applied should not be more than needed to do the job; otherwise it will interfere with the decomposition process in the septic tank. Similarly disposable (single use) medical supplies, after use should be disinfected by chlorine solution etc and then be disarranged into the septic tank prepared for this purpose. The disinfected waste can be collected and discharged into municipal system, if there is such, or can be transported by suck truck to the final disposal site.

10.2 For larger health facilities

10.2.1 Sewage screening and treatment method

The treatment system can be small or large, depending on the volume of liquid waste to be treated. Nevertheless, there must be provision for liquid waste treatment.

The liquid waste clarification process includes the following:

10.2.2 Screening for removal of large size solid waste

This is a process in which liquid waste collected from different units before entering into the sedimentation tank, is lead to pass through screen for retaining relatively large size solid waste.

In this screening process:

The Purpose of Screening is:

- To reduce workload on the next process of treatment steps.
- To avoid blockage of the flow pipe line for removal of sludge.
- To reduce solid material which can be collected in the aeration and sludge digester tanks.

The wet solid material collected during screening process be placed in plastic bag sealed and disposed carefully by burning at selected place.

10.2.3 Floating mechanical aerator

The aeration process is one of the steps of the biological treatment system.

Aeration process helps to decompose organic and floating waste component and to reduce bacterial multiplication in liquid waste.

10.2.4 Sedimentation tank

The liquid waste coming from the floating mechanical lank is lead to the sedimentation lank. Here floating and organic parts in the waste is made to sediment by adding ferrous sulphate to accelerate the process. This process is assumed to reduce about 60% of solid and floating waste and decrease the pollution rate of the waste by about 35%. However, after this process chemical treatment is needed

10.2.5 Sludge trickling and drying bed

The sludge collected in the sedimentation tank is bailed out by pumping and spread over the sludge truckling and drying bed. The sledge trickling and drying basin contains gravel over which the wet sludge is spread and made to trickle. After this the liquid component is returned to the mechanical aeration and floatation chamber. The sludge that is collected over the basin is dried by sunlight or electric drier and disposed by burning.

10.2.6 Chlorination tank

The liquid waste (effluent) discharged after sedimentation process must be disinfected by applying calcium hypochlorite solution through automatic feeder.

10.2.7 The chemically treated Liquid waste (in 10.2.6 above) is made to flow slowly in a zigzagging tank to ensure proper disinfection before discharging to the environment.

11. DISPOSAL METHOD FOR OTHER KINDS OF TOXIC WASTE WHICH REQUIRE SPECIAL ATTENTION

11.1 Drugs for cancer control i.e anticoplastic or thermotupuetic drugs, similarly empty containers of drugs like vials and bottles, needles and syringes used for injections, gloves, bandages and other items related to the drugs must be incinerated by professionals, disposed after detoxified by chemicals. However, diluting the drugs with water and discharging to sewer line must be recognized as a dangerous act.

11.2 Radioactive Materials

- Radioactive wastes discharged from examination and treatment facilities generally have low radioactivity and short shelf life. Therefore, it is possible to store them and hold until the

radioactivity level is drastically reduced to zero or eliminated before disposal.

- Items such as gloves, syringes, gauze and other items which had contact with, after their service is over should be disposed of after holding them for adequate period. However for items in which radioactive was brought, or empty containers, the Radiation Control Authority should be consulted.

11.3 High Pressure Contained Disposal

When there is need to dispose containers which hold air under pressure, they should be buried in a prepared deep pit or they should be returned to the dealer who provided them. However, it should not be forgotten that burning these item is very dangerous act.

12. SOLID WASTE DISPOSAL

Before transporting and disposing the waste collected from the health facility, in designated place, the following factors must be considered:

- Wastes disposed from health facilities under conditions which are injurious to human health, and pollute the environment; such wastes as syringes, needles drug container and bottles, plastic dextrose bags, gauze, bandage and other items, disposed from health facilities under dangerous conditions pose high risk to human health and the environment. Furthermore, special care should be taken because theses items can be piked up by illegal scavengers and could be sold for other use.
- Improperly stored waste provides breeding place for flies and harborage for rodent.

In addition it can create conditions favorable for spread of commutable diseases.

It also spoils the aesthetic condition of the environment.

- The smoke emitted as result of burning the waste can contaminate the surrounding with carbon monoxide, particulate and impart foul smell.

In addition it can contribute to the transmission of respiratory illness

- Solid waste contain pollutants of chemical and biological nature and when discharge into rivers or water body, they are dangerous to aquatic organisms.

Furthermore, discarded items, such as needle, syringe and similar items of medical waste can be carried by water flow to the coastline and could create health hazard to people recreating in the water. Therefore, in order to prevent and control the above listed problems as well as to prevent danger that might arise from hazardous waste, health facilities preferably have compounds with adequate space fro proper disposal of waste.

However, if the area allotted to the health facility is inadequate, then the waste can be incinerated or treated by chemical and can be buried in accordance to the guideline requirement.

12.1 FOR SMALL HEALTH FACILITIES

12.1.1 Incineration

Solid wastes (such as syringes, needles, sharps, bandages, discarded blood bags etc.) can be incinerated in incinerators and the resulting ashes can be buried in the composed in pits designated for the purpose (See Annex 4)

12.1.2 Disposal of waste inside the health unit compound

If the health facility has adequate space, a circular or rectangular pit can be dug and prepared for disposal of waste by burial method.

The depth of pit must be adequate for the waste generated. The walls and floor of the pit be made of stone, the base should be raised from ground cover. The pit should have an openable slab cover made of reinforced (with iron bar) concrete slab. The concrete slab cover serves to prevent access of children, scavengers or animals to the buried waste (See Annex 5)

13. MAINTAINING CLEANLINESS OF MEDICAL SUPPLIES, CLOTHING AND ROOMS

13.1 Various non disposables (multiple use) medical supplies after service, must be cleaned by emersing in chlorine solution or phenol compounds before sterilizing in autoclave in addition:

13.2 Instruments which can stand high temperature heat can be sterilized by holding at 160 degree centigrade for one hour in the autoclave.

13.3 Instruments sensitive to high temperature heat can be disinfected with chlorine solution or phenol compounds before reuse. In addition they can be effectively disinfected (if possible) with gama ray or ethylene oxide gas before reuse.

13.4 Enamels made of iron or plastic, or beds painted in various colours; carts, drawers and items of plastic covers must be properly washed with savelon or similar chemicals.

Materials meant for single use (disposables) must be disposed immediately after use.

13.5 When patients are discharged after cure or expired, the room and all medical and other items used by the patient should be cleaned with chemicals and then sterilized before use by new admission.

- 13.6 Work clothes, gowns, especially those which had contact with infectious waste must be sterilized in autoclave before sending to the laundry. The inside and outside of shoes should be cleaned with phenolic compounds and be disinfected at least once per day and sterilized in autoclave.
- 13.7 The floor, walls and ceiling must be made of cleanable materials and be cleaned with phenolic compounds at least once per day.
- 13.8 It is necessary to use wet vacuum or filter dry mopping method for cleaning the floor. But dry mopping or sweeping of floor raise dust, hence is strictly forbidden.
- 13.9 The mop should be cleaned with soap and water and then be emersed in Phoenolic compound and kept in it for a resenable time.
- 13.10 All lavatory seats, fittings, wash hand basins, bathtubs etc must be washed with powder detergent and then cleaned by savelon.

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Categories of institutions' Waste

1. General Waste

- 1.1 Paper
- 1.2 Wood
- 1.3 Ashes
- 1.4 Card board
- 1.5 Cartons
- 1.6 Plastics
- 1.7 Rags
- 1.8 Wood scraps
- 1.9 empty Cans

1.10 Food Remains

1.11 Vegetable remains

1.12 Toilet Waste

2. Infectious Waste

2.1 Isolation Room Waste

2.1.1 Waste from patients with diseases considered communicable (blood, excretion, exudes, secretions)

2.2 Cultures

2.2.1 Culture and stocks of infectious agent from clinical and research laboratories

2.2.2 Disposable culture dishes,

2.2.3 Devices used to transfer, inoculate and mix culture

2.2.4 Discarded live and attenuated vaccines

2.3 Animal Waste

2.3.1 Contaminated animals carcasses

2.3.2 Body parts

2.3.3 Beddings of animal that were known to have been exposed to infectious agent

2.3.4 Human Blood and Blood Products

2.3.5 Waste blood

2.3.6 Serum

2.3.7 Plasma

2.3.8 Blood products

2.3.9 Fluids. /residuals

2.3.10 Containers which were used in patient care, testing, laboratory, analysis, intravenous bugs.

2.4 Pathological waste (removed during surgery, autopsy & biopsy)

2.4.1 Tissue

2.4.2 Organs

- 2.4.3 Body Parts Limbs
- 2.4.4 Blood
- 2.4.5 Body fluid and their containers
- 2.4.6 Obstetrical Waste (Placenta, Still birth)
- 2.5 Contaminated equipment (Medical & Surgical)
 - 2.5.1 Blood transfusion sets
 - 2.5.2 Catheters
 - 2.5.3 Colostomy bags
 - 2.5.4 Examination gloves
 - 2.5.5 Surgen gloves
 - 2.5.6 Ryle's tubes
 - 2.5.7 Sputum Container
 - 2.5.8 Needles
 - 2.5.9 Syringes
 - 2.5.10 Spigots
 - 2.5.11 Oxygen mask
 - 2.5.12 Iv. Cannulae & infusion sets
 - 2.5.13 Urine, drainage bags and tubs
 - 2.5.14 Spatulae renal tubes
 - 2.5.15 Tracheostomy sets
 - 2.5.16 Scalpel blades
 - 2.5.17 Pasteour pipettes
 - 2.5.18 Blood vials (Slides and Convers Slips)
 - 2.5.19 Broken and unbroken glass ware
 - 2.5.20 Swabs, absorbants
 - 2.5.21 Tougne depressers
 - 2.5.22 Beddings, Shavings, Feecal Matter
 - 2.5.23 Gauze, pads, bandages and garments
 - 2.5.24 Plastics etc.

2.5.25 Bed Pan covers

2.5.26 Dressing towels

3. Laboratory and Pharmaceutical Chemicals (Care should be taken in handling)

3.1 Alcohols

3.2 Disinfectants

3.3 Antineoplastic agent

3.4 Heavy metals

3.5 Insecticides

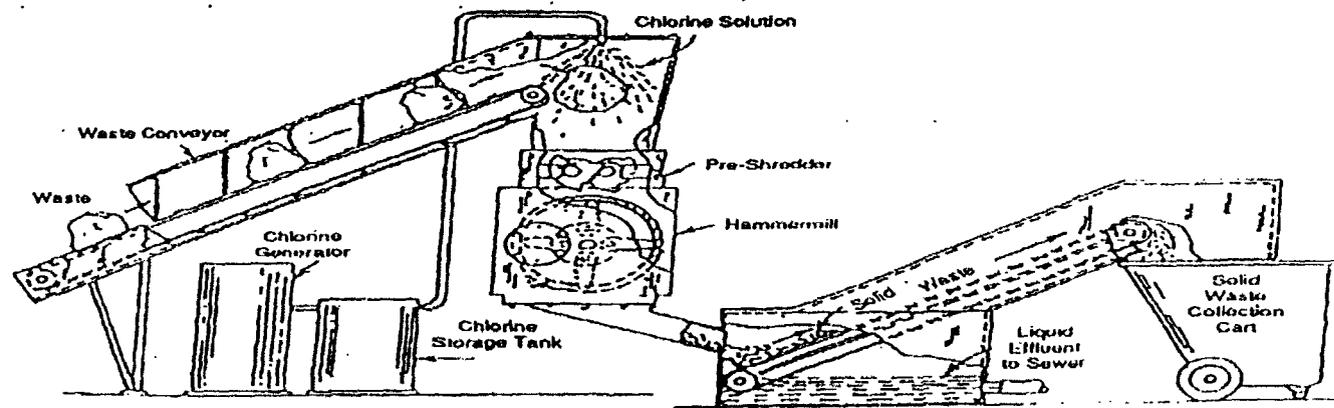
4. Radioactive Waste

4.1 Nuclear medicine diagnostic and therapeutic

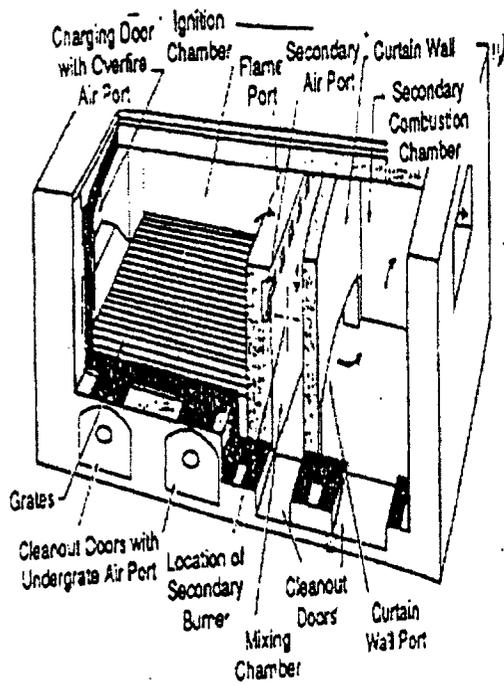
4.2 Contamination of radio active spills

4.3 Solid, Liquids and gase from analysis procedure, body organ imaging and tumors localization, and treatment

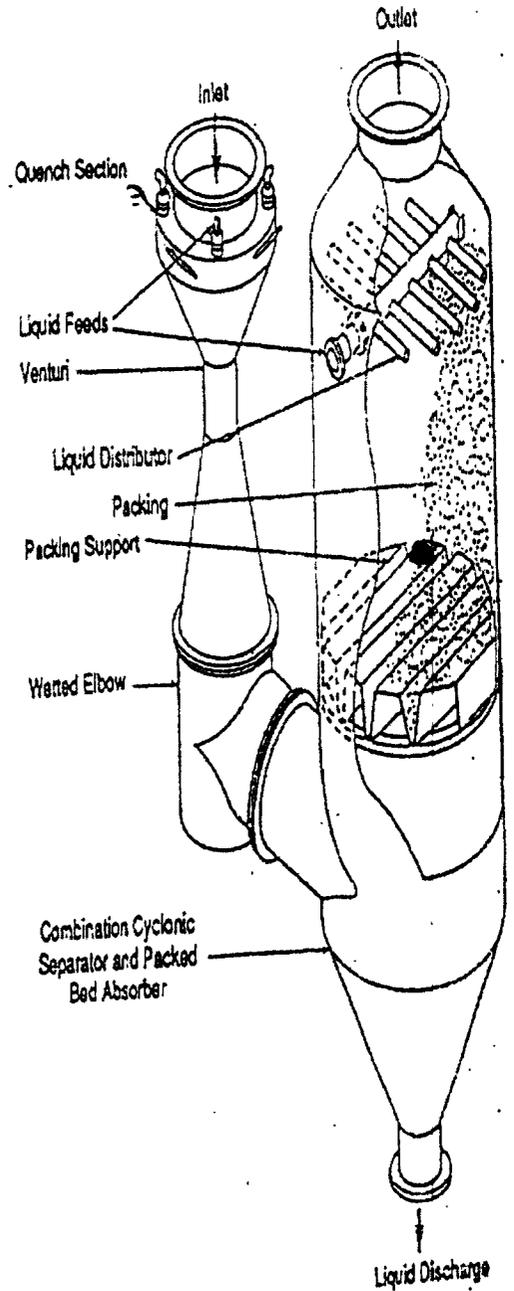
DHA 2 / Annex 2 /



System for shredding with chemical disinfection.

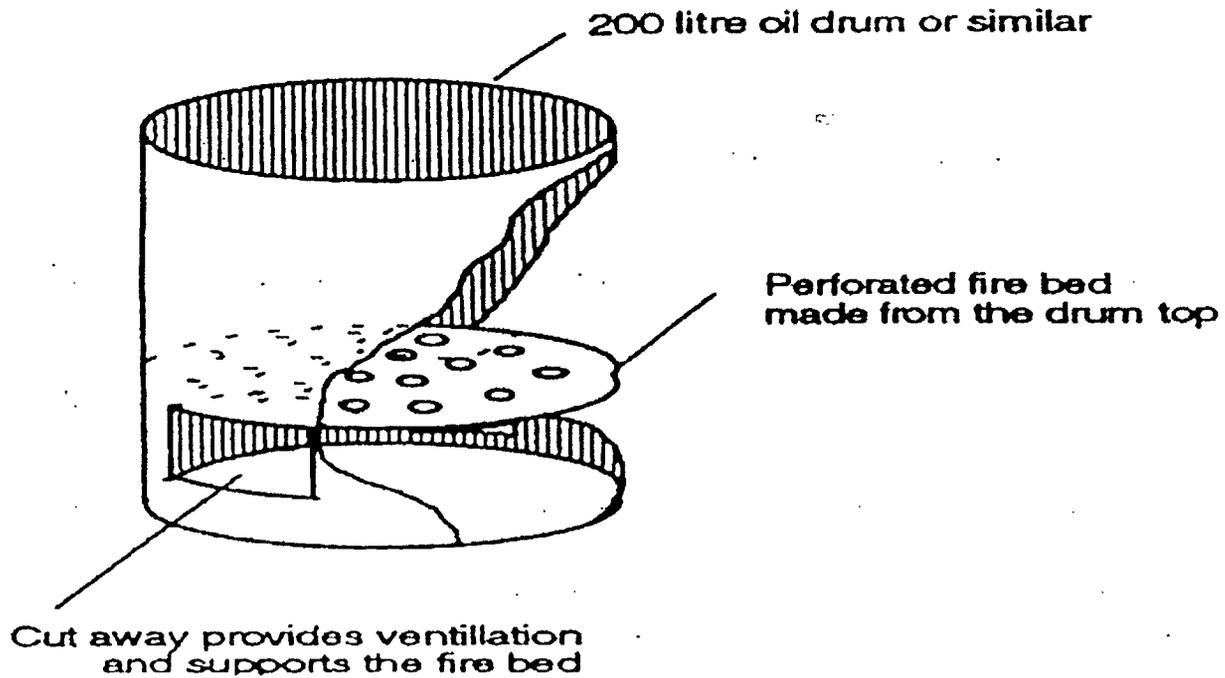


nine multiple-chamber incinerator with grate.



Venturi-scrubber system.

ΑΠΑ 4 / Annex 4 /



Small incinerator made from an oil drum

Use of a pit for disposal of small quantities of waste

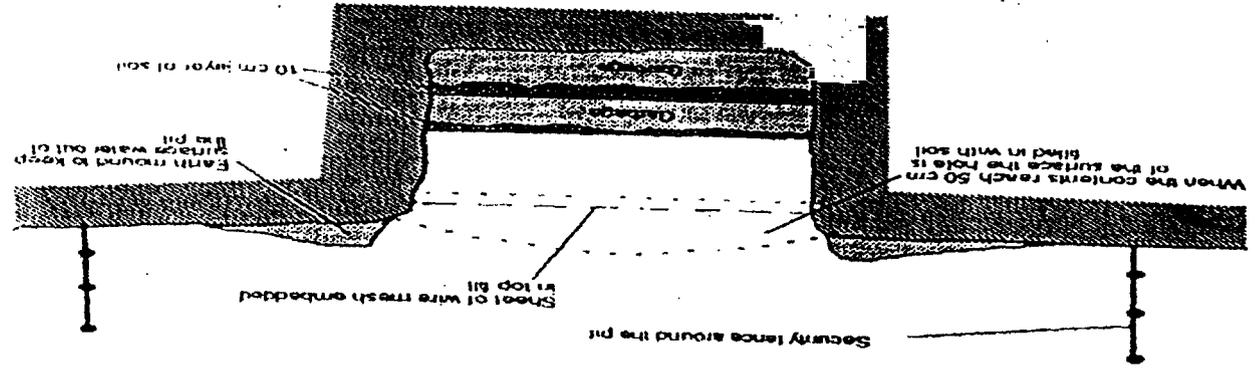
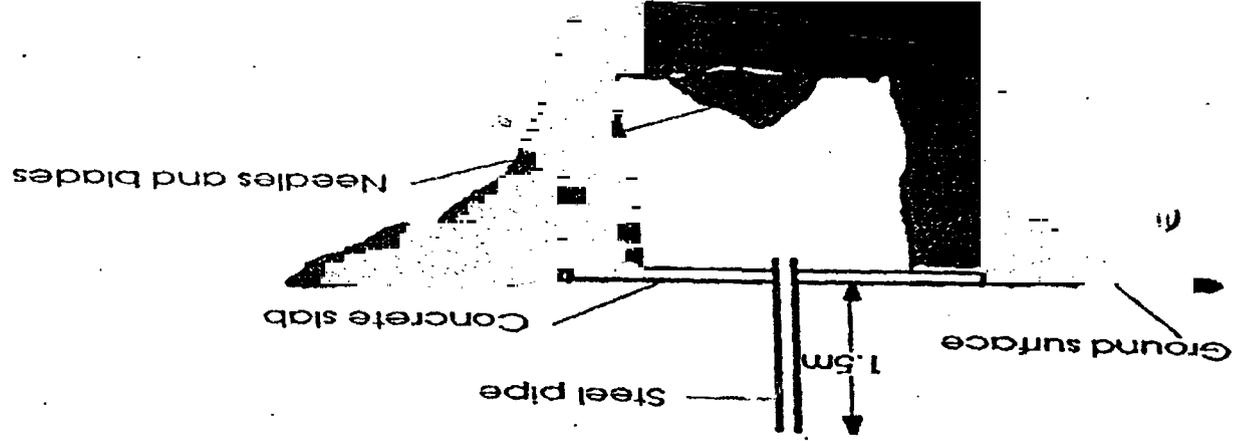


Figure 7.1 Pit for on-site disposal of sharps



28 / 5 / 2005

NHA 5 / Annex 5/

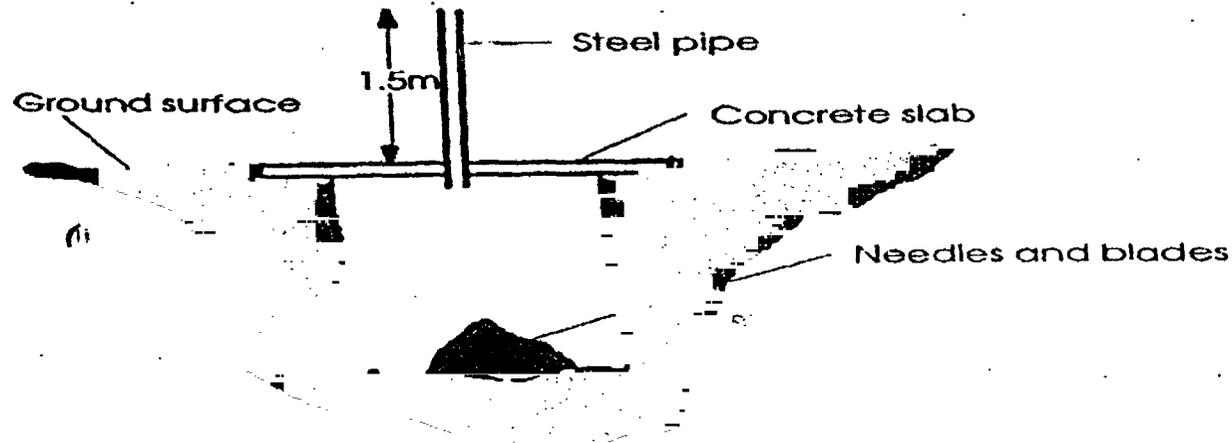
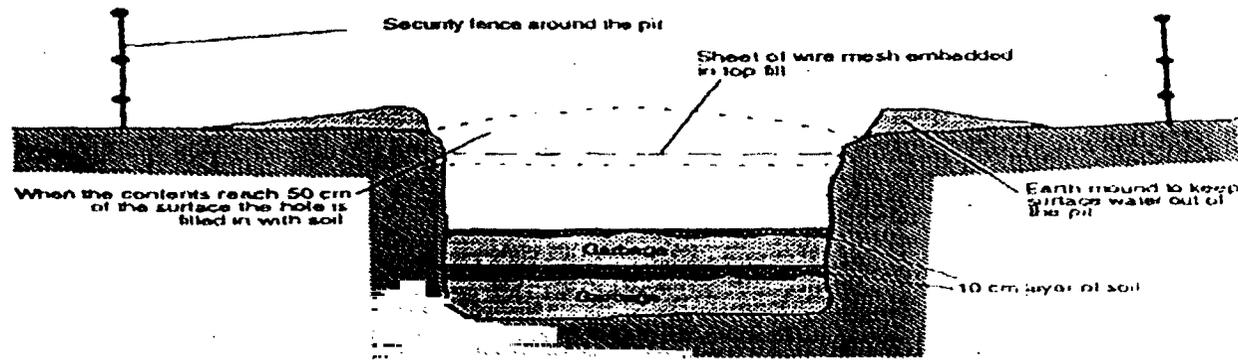
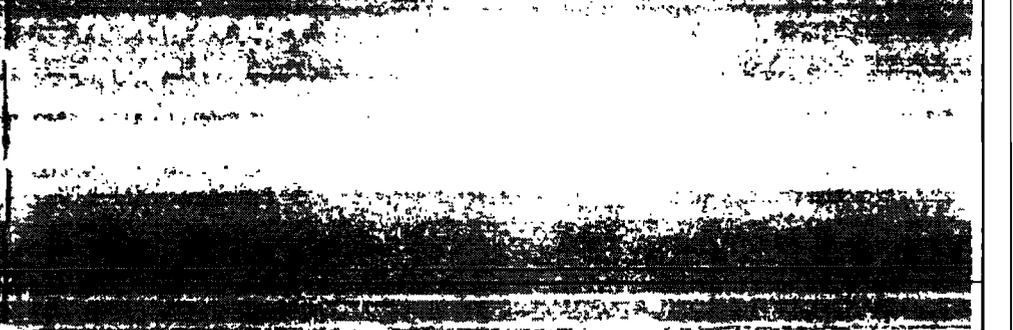
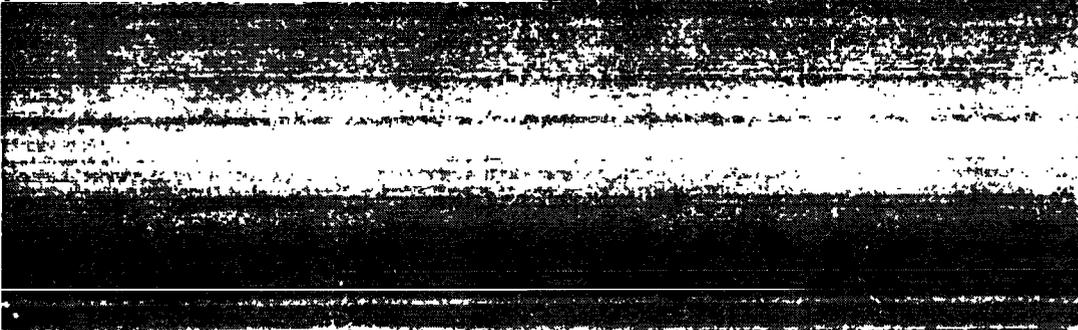
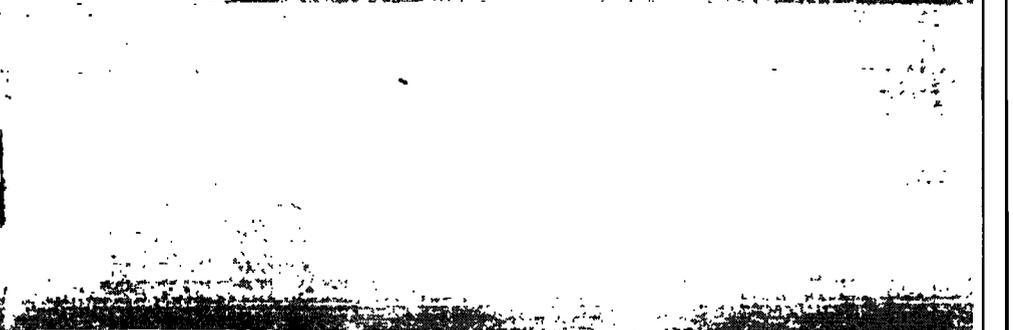
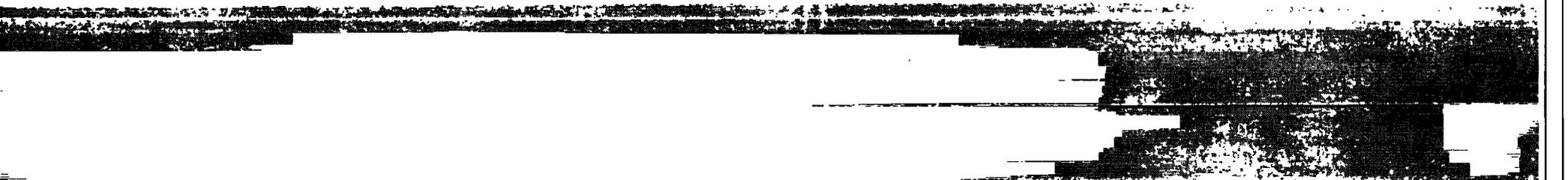


Figure 7.1 Pit for on-site disposal of sharps



Use of a pit for disposal of small quantities of waste



የጤና ድርጅቶች
ቆሻሻ አያያዝና አወጋገድ
መመሪያ

ዘጠና ጥበቃ ማ/ር
የቴክኔጅና አካባቢ ጤና አገልግሎት መምሪያ
የአገልግሎት ለውጥ ተቋማት ልማትና ተግባር ዘርፍ ዘርፍ
መስከረም 1990
አዲስ አበባ

- 1. መግቢያ 1
- 2. የግብርና ስርዓት ዝርዝር 2
- 3. ስርዓት 3
- 4. ክፍያ የሰጠ የሚያስፈልግ ምን ምን ዓይነት ክፍያዎች 4
- 5. አገልግሎት ለሰጠ የሚያስፈልግ የሚያስፈልግ ልዩ ልዩ የሥራ ክፍሎችና የሰጠ የሚያስፈልግ 4
- 6. አገልግሎት ለሰጠ ለማስፈጸም የሚያስፈልግ የሥራ ስርዓት መግቢያ የሰጠው መግቢያዎች 5
- 7. ቆይታ ማስፈጸም 5
 - 7.1 ክፍያ ልዩ ክፍሎች የሚያስፈልግ ቆይታ በዓይነት ለሰጠ ስርዓት ዝርዝር ዘዴ 6
 - 7.2 የቆይታ ስርዓት ዝርዝር 6
 - 7.3 የቆይታ ስርዓት ዝርዝር 6
 - 7.4 ቆይታ ስርዓት ዝርዝር 7
- 8. አገልግሎት 8
- 9. ስርዓት አገልግሎት ቆይታ ማስፈጸም ዘዴ አስፈላጊነት 9
 - 9.1 አገልግሎት ቆይታ ማስፈጸም በሥራ ስርዓት ላይ ማስፈጸም አስፈላጊነት 9
 - 9.2 ቆይታ ስርዓት ለማስፈጸም ዘዴ ላይ የሚያስፈልግ የሚያስፈልግ ክፍያዎች የሚያስፈልግ ስርዓት 11
 - 9.3 ቆይታ ስርዓት ማስፈጸም ዘዴ 11
 - 9.3.1 የሥራ ስርዓት አገልግሎት 11
 - 9.3.2 የሥራ ስርዓት አገልግሎት 11
 - 9.3.3 የሥራ ስርዓት አገልግሎት 11

1. መግቢያ

10	ግብርና ስርዓት ስርዓት ስርዓት ስርዓት	15
10.1	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	15
10.2	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	15
10.2.1	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	15
10.2.2	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	16
10.2.3	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	16
10.2.4	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	16
10.2.5	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	17
10.2.6	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	17
10.2.7	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	17
11	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	17
11.1	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	17
11.2	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	18
11.3	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	18
12	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	18
12.1	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	20
12.1.1	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	20
12.1.2	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	20
13	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	20
14	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	23
14.1	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	23
14.2	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	23
14.3	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	23
14.4	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	23
14.5	ሰነድ ስርዓት ስርዓት ስርዓት ስርዓት	23

10.2.5 Բեքս պղնձադրոշմի (սլաժի քանդակում և ճեղքում) համար 10.2.5.1-ի համապատասխանությունը ստուգելու համար պահանջվում է իրականացնել հետևյալ փորձերը:

Երկրորդ փորձ

Ստուգվող սարքի վրա կատարվում է հետևյալ փորձը: Բեքսը կազմակերպվում է հետևյալ կերպով: Բեքսը կազմակերպվում է հետևյալ կերպով:

Ստուգվող սարքի վրա կատարվում է հետևյալ փորձը: Բեքսը կազմակերպվում է հետևյալ կերպով: Բեքսը կազմակերպվում է հետևյալ կերպով:

10.2.5.1 Բեքսի փորձի (effluent drain) համար 10.2.5.1.1-ի համապատասխանությունը ստուգելու համար պահանջվում է իրականացնել հետևյալ փորձերը:

Ստուգվող սարքի վրա կատարվում է հետևյալ փորձը: Բեքսը կազմակերպվում է հետևյալ կերպով: Բեքսը կազմակերպվում է հետևյալ կերպով:

10.2.5.2 Բեքսի փորձի (chlorination tank) համար 10.2.5.2.1-ի համապատասխանությունը ստուգելու համար պահանջվում է իրականացնել հետևյալ փորձերը:

Ստուգվող սարքի վրա կատարվում է հետևյալ փորձը: Բեքսը կազմակերպվում է հետևյալ կերպով: Բեքսը կազմակերպվում է հետևյալ կերպով:

(բեք)

10.2.5 Բեքս պղնձադրոշմի (սլաժի քանդակում և ճեղքում) համար 10.2.5.1-ի համապատասխանությունը ստուգելու համար պահանջվում է իրականացնել հետևյալ փորձերը:

10.2.5.1

Ստուգվող սարքի վրա կատարվում է հետևյալ փորձը: Բեքսը կազմակերպվում է հետևյալ կերպով: Բեքսը կազմակերպվում է հետևյալ կերպով:

Ստուգվող սարքի վրա կատարվում է հետևյալ փորձը: Բեքսը կազմակերպվում է հետևյալ կերպով: Բեքսը կազմակերպվում է հետևյալ կերպով:

10.2.5.1.1 Բեքսի փորձի (effluent drain) համար 10.2.5.1.1.1-ի համապատասխանությունը ստուգելու համար պահանջվում է իրականացնել հետևյալ փորձերը:

Ստուգվող սարքի վրա կատարվում է հետևյալ փորձը: Բեքսը կազմակերպվում է հետևյալ կերպով: Բեքսը կազմակերպվում է հետևյալ կերպով:

(բեք)

10.2.5.2 Բեքսի փորձի (chlorination tank) համար 10.2.5.2.1-ի համապատասխանությունը ստուգելու համար պահանջվում է իրականացնել հետևյալ փորձերը:

Ստուգվող սարքի վրա կատարվում է հետևյալ փորձը: Բեքսը կազմակերպվում է հետևյալ կերպով: Բեքսը կազմակերպվում է հետևյալ կերպով:

Ստուգվող սարքի վրա կատարվում է հետևյալ փորձը: Բեքսը կազմակերպվում է հետևյալ կերպով: Բեքսը կազմակերպվում է հետևյալ կերպով:

(բեք)

10.2.5.2.1 Բեքսի փորձի (chlorination tank) համար 10.2.5.2.1.1-ի համապատասխանությունը ստուգելու համար պահանջվում է իրականացնել հետևյալ փորձերը:

Ստուգվող սարքի վրա կատարվում է հետևյալ փորձը: Բեքսը կազմակերպվում է հետևյալ կերպով: Բեքսը կազմակերպվում է հետևյալ կերպով:

10.2.5 Բեքս պղնձադրոշմի (սլաժի քանդակում և ճեղքում) համար 10.2.5.1-ի համապատասխանությունը ստուգելու համար պահանջվում է իրականացնել հետևյալ փորձերը:

1. **STATE OF TEXAS**

2. **COUNTY OF DALLAS**

3. I, **JOHN A. SMITH**, County Clerk of said County, do hereby certify that the within and foregoing is a true and correct copy of the original as the same appears in the records of said County.

4. **WITNESSETH** my hand and seal of office this **15th** day of **April**, 19**05**.

5. **JOHN A. SMITH**, County Clerk.

6. **My Commission Expires** **1st** day of **April**, 19**06**.

7. I, **JOHN A. SMITH**, County Clerk of said County, do hereby certify that the within and foregoing is a true and correct copy of the original as the same appears in the records of said County.

8. **WITNESSETH** my hand and seal of office this **15th** day of **April**, 19**05**.

9. **JOHN A. SMITH**, County Clerk.

10. **My Commission Expires** **1st** day of **April**, 19**06**.

11. I, **JOHN A. SMITH**, County Clerk of said County, do hereby certify that the within and foregoing is a true and correct copy of the original as the same appears in the records of said County.

12. **WITNESSETH** my hand and seal of office this **15th** day of **April**, 19**05**.

13. **JOHN A. SMITH**, County Clerk.

14. **My Commission Expires** **1st** day of **April**, 19**06**.

15. **STATE OF TEXAS**

16. **COUNTY OF DALLAS**

17. I, **JOHN A. SMITH**, County Clerk of said County, do hereby certify that the within and foregoing is a true and correct copy of the original as the same appears in the records of said County.

18. **WITNESSETH** my hand and seal of office this **15th** day of **April**, 19**05**.

19. **JOHN A. SMITH**, County Clerk.

20. **My Commission Expires** **1st** day of **April**, 19**06**.

21. I, **JOHN A. SMITH**, County Clerk of said County, do hereby certify that the within and foregoing is a true and correct copy of the original as the same appears in the records of said County.

22. **WITNESSETH** my hand and seal of office this **15th** day of **April**, 19**05**.

23. **JOHN A. SMITH**, County Clerk.

24. **My Commission Expires** **1st** day of **April**, 19**06**.

25. I, **JOHN A. SMITH**, County Clerk of said County, do hereby certify that the within and foregoing is a true and correct copy of the original as the same appears in the records of said County.

26. **WITNESSETH** my hand and seal of office this **15th** day of **April**, 19**05**.

27. **JOHN A. SMITH**, County Clerk.

28. **My Commission Expires** **1st** day of **April**, 19**06**.

- 13.9 መወልወያዎች (mop) በግራምና በወይን ካሶና በሌላ ልዩ-ሰላሳ ስነ-ምግባር በሌላው ወይን ክሊኒክ ወይን ዘራቶ ማቆላቆል ያስፈልጋል።
- 13.10 ሃሳብና ስራ መቆላቆል (Lavatory seats) መግባባት (Bottling) ሃሳብ መቆላቆል ባንዲያ (Wash hand basin) ሃሳብ መቆላቆል ስራዎች በመጠን በሌላው (powder Detergent) ክፍለ-ሰራ በሌላው መጠን ያገኛሉ።

14. References

- 1. WHO Managing medical waste (2002) Geneva: WHO 2004
- 2. CDC Guidelines for infection control in health care facilities (2003)
- 3. CDC Management of Waste from Health Care Facilities (2003)
- 4. WHO Medical and Institutional Waste Management Guidance (2004) Geneva
- 5. WHO Operational Guidelines for the Control of Medical Waste (2004) Geneva 2004
- 6. WHO Guidelines for infection control in health care facilities (2003)
- 7. WHO Guidelines for the Control of Infection in Health Care Facilities (2003)
- 8. WHO Guidelines for the Control of Infection in Health Care Facilities (2003)
- 9. WHO Guidelines for the Control of Infection in Health Care Facilities (2003)
- 10. WHO Guidelines for the Control of Infection in Health Care Facilities (2003)

አዘል 1 Annex 1

Categories of Institutions' Waste

- E. **General Waste**
 - E1 Paper
 - E2 Wood
 - E3 Asres
 - E4 Cardboard
 - E5 Glass

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes the need for transparency and accountability in financial reporting.

Introduction

The purpose of this document is to provide a comprehensive overview of the financial performance of the organization over the past year. It details the revenue generated, expenses incurred, and the overall profit margin. The data is presented in a clear and concise manner, allowing stakeholders to easily understand the financial health of the company.

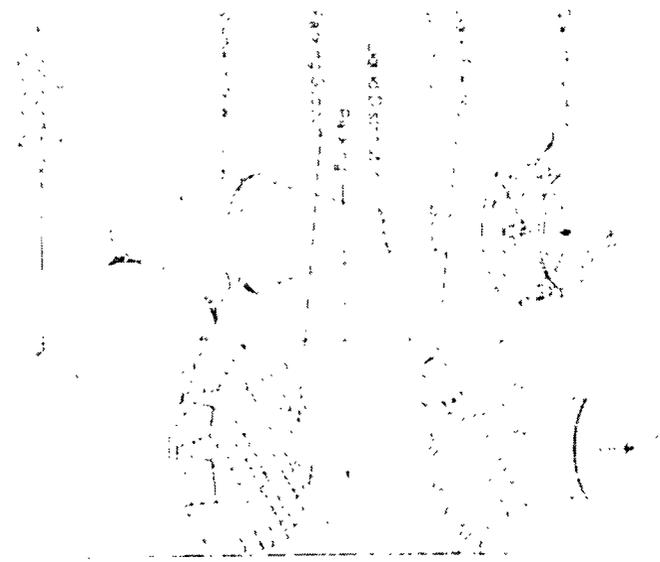
The following table provides a summary of the key financial metrics for the year. The revenue increased by 15% compared to the previous year, while expenses remained relatively stable, resulting in a 10% increase in net profit.

The primary driver of the revenue growth was the launch of our new product line, which has received excellent market reception. Additionally, our marketing efforts have been highly effective, leading to a significant increase in customer acquisition and retention.

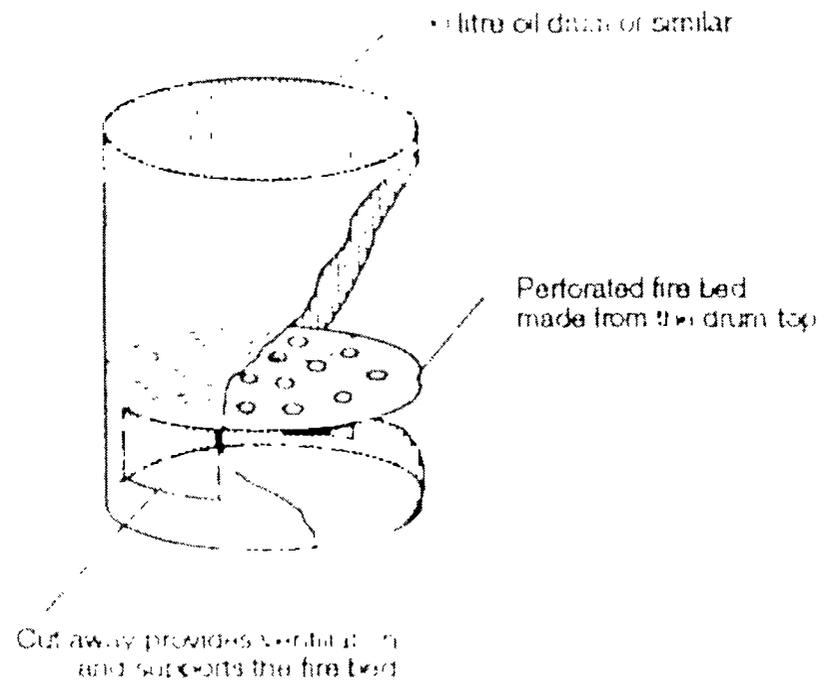
Despite the overall positive performance, there are several areas where we need to focus our attention. In particular, we need to improve our operational efficiency and reduce our overhead costs. This will be a key priority for the coming year, as we continue to grow and expand our market presence.



ANNEX 3 /



ANNEX 4 /



Small incinerator made from an oil drum

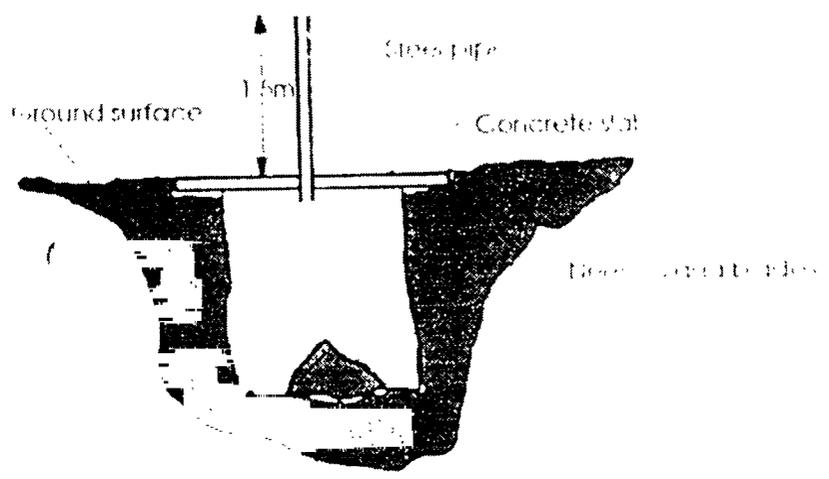


Figure 2.1 - Pit for on-site disposal of bottles

